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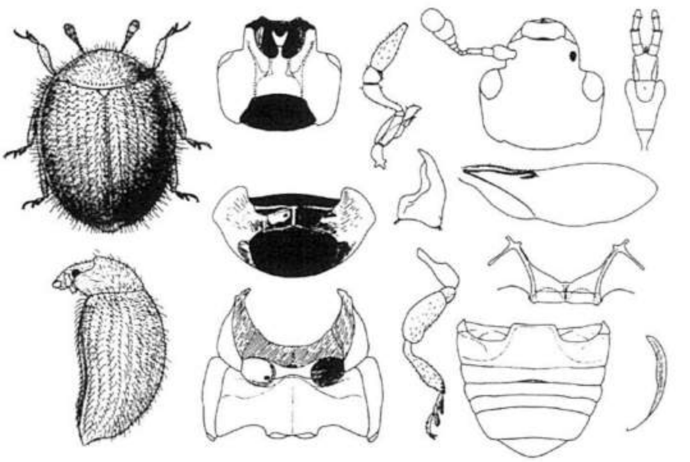

Scotoscymnus japonicus (Reitter)
(Tribe Sukunahikonini H. Kamiya)

Special Publication of the Japan Coleopterological Society
No. 1
11 June 2001
Osaka

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Hiroyuki SASAJI (KAMIYA before marriage) was born in Takashima-chou, Nishisonogi-gun, Nagasaki Prefecture on 11th June 1935. In junior high school and high school, his marked scholastic talent manifested itself, and he received appropriate awards from government in recognition of academic excellence. He was strongly attracted to natural history, especially to insects. During World War II, economical and political benefits were not to be had from activities such as collecting and studying insects, but without hesitation and with enthusiasm the young Hiroyuki proceeded to develop his knowledge of entomology.

In pursuit of his entomological interests, he enrolled in a program in the Agricultural Department of Kyushu University and studied in the Entomological Laboratory, there. Upon completion of his undergraduate program, he undertook graduate work. The focus of his master's and doctoral programs was the taxonomic study of the beetle family Coccinellidae. At that time the Japanese taxa of this family were hardly understood, and it was difficult to make species-level identifications. Facing this difficulty, he grappled vigorously with these beetles and clarified knowledge of the Japanese taxa, including their larvae.

While pursuing his doctoral studies, young SASAJI accepted employment, as an assistant, in the Biological Laboratory in the Education Department of Fukui University. This laboratory became the principal base for his entomological career. He extended his study of Coccinellidae, begun during his Master's program, and completed a taxonomic revision of Japanese coccinellids. Based on his outstanding thesis, he obtained the degree of Doctor of Agriculture from Kyushu University in 1967. The doctoral dissertation was published in 1971, as "Fauna Japonica: Coleoptera: Coccinellidae". Because of its excellence, this monograph serves as a model for young students who aspire to be systematic entomologists.This publication was followed by additional studies of notable breadth and depth. Subse-quently, in 1977, in recognition of his outstanding work, he was promoted to the rank of Professor in Fukui University.

In addition to the Coccinellidae, Professor SASAJI has contributed many valuable publications about other families of Cucujoidea, eg. Colydiidae, Languriidae, Propalticidae, Zopheridae and so on.

His morphologically based taxonomic work was informed and enlightened by field studies that demonstrated reproductive isolation between the species pairs *Harmonia axyridis* (PALLAS) / *Harmonia yedoensis* (TAKIZAWA) and between *Propylea quatuordecimpunctata* (LINNAEUS)/ *Propylea japonica* (THUNBERG).

Professor SASAJI was the first coleopterist in Japan to undertake comparative studies of Coleoptera using electrophoretic techniques. Working in the Laboratory of Dr. OHNISHI in Nagoya University, he presented in several papers the reconstructed phylogeny of some coccinellids by analysis of esterase isozymes. Now, analyses of this type are used for the study of many taxa. This fact evidently indicates his scientific foresight. Thus, he steadily advanced his study from several perspectives, and has produced numerous substantial results.

In addition to his outstanding taxonomic contributions, Professor SASAJI has worked with amateur entomologists of all ages at Kyushu University and at Fukui University to promote insect study. The present activity of entomophiles in Fukui prefecture is owing mainly to SASAJI. In the interest of developing knowledge of beetles, one year ago he accepted the presidency of the Japan Coleopterological Society.

Also he published some books for beginners. "Dôbutsu-Bunruigaku-Nyûmon (translated as Guide of the Zoological Taxonomy)" is notable for beginning entomologists and entomophiles, because its rich and expert content is easily understood. A general work, entitled "Natural History of the Ladybirds", summarizes and amplifies his previous studies. The contents comprise a broadly based treatment of Japanese lady beetles, emphasizing systematic and ecological aspects, as needed to enlighten beginning entomologists about these fine insects.

As required by his age, Professor SASAJI retired from Fukui University at the end of March of this year. Thence he has been recommended for the Emeritus Professor of Fukui University due to his scholaly achievements. From now on, he will devote himself to entomology without the disturbance of routine duties. We celebrate his retirement and wish him well in extending his contribution to development of entomology in Japan. As an expression of our admiration of his contributions, our respect for him as a person, and with high expectations for his future entomological endeavors, we offer this special publication of the Society.

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少年学成りて意気益々壮 — 佐々治さんの退官に寄せて

大澤　省三
(JT生命誌研究館)

もう30年以上も前，私の広島時代のこと，敬愛するM先生が何かの学会で広島に来られ，拙宅を訪問された．虫談に花を咲かせていたが，その内に話が日本の昆虫学の現状に及んだ．M先生曰く，佐々治君という非常に優秀な若手がいてねえ，彼は右手でも左手でも字だけでなく，図まで書くのですよ，と．その佐々治さんが，もう定年退官とは正に光陰矢の如しである．佐々治さんは，M先生の期待に違わず多くの立派な仕事をされたし，まだこれからもされるであろう．定年退官がめでたいかどうかは，それを何年も前に経験した私にとって多少複雑な思いがないでもない．しかし，多くの雑用から解放され，好きなことだけが出来るという意味では，一つの節目として心からお祝いの言葉を贈りたい．

さて，佐々治さんには，幾つかの顔がある．優れた甲虫分類学者であることは，誰でも知っている．それに匹敵する顔として，優れた進化生物学者であるし，立派な教育者でもあることを忘れてはならない．特筆すべきは，分子的手法を世界ではじめて甲虫の種の問題に導入したのが他ならぬ佐々治さんであるという事実である．また，アマチュアの虫屋からみれば，佐々治さんは根っからの虫好きで，そうなればこそ，福井県の昆虫相解明という一大事業の中心となって活躍出来たのであろう．このような幾つかの顔すべてが融和しているのが，佐々治さんであり，その絶妙なバランス感覚は余人の追随を許さないものがある．

甲虫分類学者としての佐々治さん — これについては，いまさら多言を要しないであろう．1971年に出版された＜Fauna Japonica－Coccinelidae＞はあまりにも有名で，その分類体系は日本のみならず世界のテントウムシ研究者に多大の影響を与えた．その中には日本のテントウムシ全種が16枚の見事な原色図版で示されているが，これらはすべて佐々治さん自身の手になるというから，驚きのほかない．佐々治さんは，テントウムシを中心に，広くヒラタムシ上科の分類にも手を染められているが，幼虫の形態や生態をも含めた系統的観点を常に意識されている点で，極めてユニークである．

進化生物学者としての佐々治さん — これは，分類学者としての佐々治さんと表裏一体で，本来区別すべきではないかもしれない．しかし，交雑実験を含め遺伝学的手法を縦横に駆使したテントウムシの種の問題の解析は，並の昆虫学者の及ぶところではないということだけは確かである．これらの研究の成果は，＜テントウムシの自然史＞（1998，東京大学出版会）で知ることが出来る．さらに，佐々治さんのUP Biologyの中の一冊＜動物分類学入門＞（1989，東京大学出版会）も進化生物学者としての佐々治さんを彷彿とさせる名著である（月刊むしに私が書評を書いた）．上にもふれたように私個人として特に強調しておきたいのは，甲虫研究への分子的手法の導入である，この研究は佐々治さんが名古屋大学理学部生物学科の大西英爾教授の研究室へ留学された時になされたもので，昆虫学史の上から見ても大変重要である．CROWSONがかの有名な著書＜The Biology of the Coleoptera＞（1981）の中で種の多型の問題を論じているが，そこでは分子的手法を用いた研究が2編紹介されており，その一つがテントウムシのSASAJI and OHNISHI（1973），もう一つは*Triborium*を使ったSVEFRDORF（1976）のものである．発表年代からいっても佐々治さんらのものは3年も前であり，しかもその論文中の2つの図が丸ごと掲載されているのである．CROWSONがいかにこの研究を重視してしていたかを窺い知ることができよう．私がオサムシの分子系統の研究をはじめたきっかけの一つは，このSASAJI and OHNISHIの先駆的研究にある．

教育者としての佐々治さん — 30余年教育学部で教鞭をとられたのだから，数多くの教師志望

の学生を育ててこられたことは，想像にかたくない．学生の卒業論文を見ると，そのテーマも内容も驚くほどレベルが高く，殆どがどこへ出しても恥ずかしくないものである．学生の努力もさることながら，佐々治さんの優れた指導力には脱帽である．さらに，上に述べた UP Biology の本は，講義録を中心に纏められたそうである．この様な高度な講義を受けることの出来た学生は，幸いである．実利に走るか，無気力に流されやすい昨今の風潮とは無縁の，生物学の面白さを実体験した教師が教育の現場で活躍しているのを想像するだけでも愉快ではないか．

虫屋としての佐々治さん — このことについては，多言を要しない．これまで書いてきたことの全ての源である，と私は思っている．少年老いやすく学成り難し，といわれる．表題に書いたように佐々治さんに限っていえば，少年学成りて意気益々壮，である．折りも折り，このたび，名会長，故 林匡夫博士の後を受け，日本甲虫学会の会長に就任された．余人をもって代え難い当をえた人選で，学会にとってまことに幸いであったと思っている．研究に，そして学会の発展のため，お元気で益々のご活躍を期待したい．

佐々治寛之教授の退官を祝す

森本　桂
（九州大学名誉教授）

来る３月をもって，佐々治教授が福井大学を退官されることになりました．御苦労さまと申し上げるとともに，勤め上げられたことを心からお祝い申し上げます．

私が江崎悌三・安松京三両先生のもとで昆虫学の勉強をすべく，九州大学へ入学したのは昭和２７年でした．その頃すでに長崎東高校に神谷寛之ありと聞こえており，モンキタマムシの再発見を含む長崎県のタマムシ科の研究を高校生活の置き土産として，昭和29年に九大へ入学してきました．長崎東高校では生物部誌「染色体」をほとんど神谷君一人で仕上げ，発行していましたが，誌名が示す通り，神谷君は「ショウジョウバエの研究」とか「ムラサキウニの受精と卵割に関する実験」というような生物学の根幹に関わる分野にも興味を示していたようです．九大に入学すると，神谷君は筑紫昆虫同好会を組織して「筑紫の昆虫」の発行をはじめました．彼の会員に対する影響力は極めて大きく，例えば次のようなことがありました．木元新作君は洋傘（当時は高価であった），私は手製の叩き網，神谷君は捕虫網だけの出で立ちで若杉山へ採集に行った際，採れた虫の量は圧倒的に叩き網が多く，また途中から雨となって神谷君だけがずぶ濡れになったことがありました，この直後から，同好会会員に叩き網が急速に普及し，また神谷君自身も若杉山の登り口で微小なムクゲチビテントウを叩き落としました．

神谷君は安松先生の天敵研究に関連してテントウムシの研究をすることになりましたが，面白い甲虫には関心が強く，昆虫学教室員の採集した甲虫を上記３人の甲虫屋で山分けする際，ヒラタムシ上科に加えてカミキリムシなども彼の領分であり，またタマムシ研究の夢も忘れがたくて「多摩夢子」の雅号で雑文を書く程でした．学生用には実体顕微鏡２台，タイプライター１台という貧弱な昆虫学教室でしたが，よく学び，よく採集にでました．あるとき，江崎先生から呼ばれ，「こんな小さな虫の名がお前の教室でわかるか」と某教授から虫が届けられたので調べよと申し付けられました．神谷君ら何名かで順々にこの虫を調べ，一度に種名を書いた紙を見せて，全員同一名であれば手を締めて１件落着，江崎先生は受話器を取り上げて「あんな虫はすぐ分かる」，神谷君は１年半の教養課程を経て専門課程に入るとまもなく，昆虫学教室同窓誌「ひこさんがらがら」を創刊し，表紙にこのがらがらをデザインしました．あるとき，江崎先生のお宅に神谷君や私達が呼ばれ，古今東西の学会にまつわる怪文書を見せていただきましたが，当時昆虫学会を震駭させたアングラ出版物「つわもの」が廃刊になった頃で，「復刊１号を是非だせ，金もネタも私が出す」と要請されながら，先生の逝去でこれを果たせず，大変残念に思っています．このように，神谷君の雑誌編集，ガリ切り，製本等の能力は当時から頭抜けたものがありました．また，毎晩のように私の下宿に集まり，三枝豊平君らも加わって楽しく語り合ったものです．

神谷君の研究は急速に発展し，成虫と幼虫の形態や食性を含めた幅広い研究でテントウムシ科をまとめると同時に，誰にでも確実に同定できるように多数の図を付けた解説なども次々に公表し，またヒラタムシ上科の研究も始めました．昭和38年福井大学への就職，42年結婚で佐々治への改姓などがありましたが，昭和46年の Fauna Japonica Coccinellidae はそれまでのテントウムシの一連の研究を大きくとりまとめたもので，昭和43・45年の系統論とともに世界のテントウムシ研究に大きな影響を与えました．そのきれいな原色全形図は彼自身の手によるものです．研究はヒラタムシ上科でも幅広く発展しましたが，いずれの研究でも詳細な形態写生図と見事な全形図を伴っており，特に頭部幕状骨の比較形態は注目すべき着眼点です．種の問題に関しても交配実験やアイソザイムなどの面から着実に対応し，成果は「テントウムシの自

然史」（平成１０年）の中でも詳説されています．

佐々治君はまた，昭和60年の「福井県昆虫目録」，平成10年の同第2版，平成11年の「福井県のすぐれた自然」などの編集者として，福井県の昆虫を含む環境の実態解明や自然保護に重要な基礎情報を与えました．昆虫相の調査過程で佐々治君は昭和57年に福井昆虫研究会を設立しましたが，彼の編集する機関誌「福井虫報」は甲虫やハチの記事が多く，楽しい内容です．

今回の定年退官は，大学からの退官であって，研究者としては現役のままです．責任から解放されて，のびのびと研究を継続し，ヒラタムシ上科をつぎつぎに纏められることを私達は楽しみにしています．

祝　　辞

日高　敏隆

(滋賀県立大学学長・元日本昆虫学会会長)

佐々治寛之先生がいよいよ定年ご退官と聞いて，まず何よりも“おめでとうございます”と言いたい.

じつはぼく自身が定年で退官するとき“おめでとう”といわれて，定年退官がなぜめでたいのか，よくわからなかった．ぼくはもっと仕事をしたいのに…と思っていたからである.

けれど，今，佐々治先生についてはよくわかる．というのは，何年か前，先生が手術をされたときは本当に心配だったからである．すっかり痩せられてしまった先生が，近く手術ですとおっしゃったときは，正直なところほんとに大丈夫なんだろうかと思ってしまったのである.

でも先生は立派にぼくらの余計な心配を乗りこえられ，すっかり元気になられた．そして1998年度昆虫学会大会の副会長もやっていただいた．その準備委員会のたびごとに，先生は福井からはるばる汽車に乗ってやってこられ，夜，また汽車で帰っていかれた．もちろん出席委員の中で最遠距離である．はじめはちゃんとお迎えしお送りしなくてはと思ったが，そんな必要はさらさらなかった．そして大学のたくさんの公務も，元気に捌いていかれた.

だから，今，ぼくは心から“定年退官おめでとうございます”と言いたい．定年退官は一つの節目にすぎず，これからの先生のますますのご活躍が，今やまったく確かなものになったのがありありとわかるからである.

かつてぼくが東大出版会のUPバイオロジーの編集委員であったころ，佐々治先生にお願いして，「動物分類学入門」(1989)を書いていただいた．分類学は大切な学問なのに，その本質に触れるわかりやすい本がなかったからである．先生はぼくらの期待に違わぬ良い本を書いて下さった．この本で分類学を身近に感じてくれた人が何人もいたことと思う．本当にありがとうございました.

先生は教育学部改組にも大変な尽力をされた．文部省の指令のもと，各地の大学が教育学部の組み換えに取り組んでいるなか，佐々治先生は福井大学での委員長として，多大な力と時間をこの問題のために捧げられた.

その結果，新しく組み換えられた教育地域科学部という，ユニークな組織ができあがり，先生はずっとその中心にあって活躍されている．地域と環境ということがクローズアップされている現在，この組織にはますますの発展が望まれている.

ご自身の研究はもとよりとして，佐々治先生はこのような場面でも大きなお仕事をされてきた．今，いよいよご定年というのは残念であるが，それはあまり関係がない．先生にはこれからも，大学という束縛を離れて，ますますの仕事をしていただかなくてはならないからである.

先生，お元気で活躍して下さい.

虫屋の受験

青木　淳一
（横浜国立大学環境科学研究センター教授，神奈川県立生命の星・地球博物館館長）

それはいつの頃からか，どうしてか，わからない．当時，高校生で神谷寛之さんといっていた佐々治さんと私の文通が始まった．一度も会ったことのない二人が，何通も手紙のやり取りをしていたのである．どんな内容であったか，ほとんど覚えていないが，とにかく「僕たちは将来は昆虫学者になるんだ．だから，どこかいい大学の農学部に入ろう」と互いに励ましあいながら，受験勉強をしていた．外国ではそんなことはないが，日本では昆虫学は農学部，その他の動物学は理学部という住み分けがきちんとできているのが不思議である．

結果はどうであったか．神谷君はみごと目的の九州大学農学部に合格した．私は東京大学を受けてみごとに落ちた．しかし，その後ずるいことをやって，東大農学部に編入試験で入り込んだ．こうして二人とも農学部の昆虫の研究室で勉強することになった．そして初めて東京で互いの顔を見たのである．互いに初対面とは思えず，大いに打ち解けて話が弾んだ．たしか，その頃から佐々治さんは酒が強かったと思う．その後も，なんどか一緒に飲む機会があったが，とてもかなわない．普段からよく喋る人がますます話に油が乗り，酒も話も止まるところを知らない．そして，どんなに飲んでも，最後まで目がキラキラと輝いているのは大したものである．

私がかつては虫屋であったことを知る人は多くないだろうが，幼稚園の頃から集めだした蝶，カメムシ，甲虫の標本は相当な量に達した．そのうち標本箱を買う小遣いが不足し，甲虫だけになった．さらに，私の嫌いな柔らかい甲虫やピカピカ光る甲虫はやめて，色彩が地味で，表面がざらついていて，堅くて，できれば体の両側が平行な甲虫だけを集めるようになった．その好みが究極の状態に達し，一つの科，すなわちホソカタムシ科（広義）だけに集中した．しかし，大学に入ってからの私の研究対象はダニに移ってしまった．折角集めたホソカタムシの標本は一つも記載することなく，他人の手に渡った．その「他人」とは，他人とは思えない佐々治さんだったのである．

私も佐々治さん同様，2001年3月で停年退官を迎える．かれは停年後どんな生き方をしていくのかわからないが，二人とも，今度は少しのんびりと虫やダニを眺め，その合間にゆっくりと酒をのみながら暮らしていくことだろう．そしてまた，たまには文通をすることになるだろう．達者でな！

祝　辞

養老　孟司

（元東京大学医学部教授）

佐々治寛之さんとはあまり親しくない．そんな気がする．私がごく親しく知っていたのは，高校生から大学院生のときの神谷寛之さんだからである．

ところがその神谷さんに，ほとんど会ったことがない．なにしろいまと違って，私が高校から大学に在学していた頃は，九州は遠かった．会おうと思っても，そう簡単には会えない．ただよくお手紙をいただいた．神谷さんは左手書きで，ハガキにむやみに細かい字を並べる癖があった．ラベルを書くことでついた癖だろうと思う．要するに虫のペン・フレンドなのである．

高校生の頃は，もちろん神谷さんも進学に悩んでいた．いまでは想像がつかないと思うが，当時は基礎の学問では「食えない」というのが，世間の常識だった．それでも神谷さんは昆虫を専門にすると決意されて，九大の昆虫学教室に入られた．その辺までのいきさつは，私もよく記憶している．

テントウムシの解剖をはじめて，指先の訓練のために，小さい折鶴をおっている．そんな手紙もいただいたことがある．これは私が在学した東大の解剖学教室でも同じだったから，よく覚えている．いまの人はそんな訓練はしないと思う．

もう一度，今度は佐々治氏と直接にご縁ができたのは，十年ほど前にテントウムシの本を東京大学の出版会から刊行されたときである．そのときの出版会の理事長が私だったからである．だからこの本は佐々治寛之著で，発行人が私になっている．

それからときどき福井でお会いするようになった．福井県大野市はじつは私の父親の故郷である．故郷にもご無沙汰なら，佐々治さんにもご無沙汰が続いたのは，私が忙しかったからである．日本の世間では，二足のわらじがはけるほど，勤務が甘くはない．これでは残りの人生を，虫も捕らずにムダにすることになる．そう思って，私は大学を辞めた．おかげでその後，佐々治さんにも何度か会う機会を持てるようになった．

先日「ローレンツとは誰だったのか」という心理学者の書いた本を読んでいたら，コンラート・ローレンツはトリック・スター型の性格だと書いてあった．この性格は，思春期直前の状況のままで，発育が止まってしまった性格型を意味するらしい．私が自分で考えても，白髪の爺さんが捕虫網を持って野外を歩いている図は，子ども爺というしかない．虫のプロとアマチュアはどこが違うかというなら，そこであろう．プロになったら，その道では子どものままでいるわけにはいかない．それが幸だったか，不幸だったか，神様にしかわかるまい．高校生の神谷さんを想い出しながら，そんなことを思う．

神奈川県産甲虫4,000種達成の夢も佐々治先生のお陰

平野　幸彦
（神奈川昆虫談話会代表）

佐々治寛之先生が，永年勤務されていた福井大学を定年退官されるという．

佐々治寛之（旧姓神谷）の名前を知ったのは「染色体」という長崎東高校生物部発行の機関誌であった．当時，高校の生物部が全国的に活躍した時代で，私が在学していた小田原高校も生物部が活発に活動していた．「しろだも」という機関誌を発行して全国の生物部と雑誌の交換などをした。その中の一つが長崎東高校の生物部で，内容の充実した雑誌に驚き，中でも甲虫類の報告は当時としては眼を見張るものだった．大いに刺激を受けたのは言うまでもなく，それから郷土の甲虫相を何がなんでも解明しようと心に誓ったものである．実際に手紙を書いたりしたのはかなり後で，更にお目にかかったのは20年も前なのかも知れない．佐々治先生の業績をいまさら私が述べてもしようがないので，他の人にお任せしたい．

アマチュアで一番困るのは同定で，図鑑や記載文献などで調べても確定出来ないものも多い．そこで専門家に標本を送って同定してもらうことが多くなった．それ故，多くの専門家の方々にお世話になったが，佐々治先生が一番多かった．グループ毎に郷土の甲虫がある程度わかるようになってくると必然的に微小甲虫に眼が向く．その中の一つがヒラタムシ上科である．ヒラタコメツキモドキという珍奇な甲虫は三浦半島で採集したものが，タイプとなった．科がよくわからない微小な丸い甲虫を送ったら，何とヒゲナガゾウムシで，森本桂博士の所に転送されて記載された．などなど．

最近は各地の同好会で県別の甲虫リストが発表されるようになった．3,000種に達した県は神奈川県が最初で，福岡県（1989），福井県（1990）と続く．神奈川県の甲虫数は将来，他県に追い越されることは必然で，その筆頭に佐々治先生率いる福井県がある．抜かれないようにと頑張った結果，神奈川県産の甲虫種類数は現在，3,960種になっている．この中で，佐々治先生によって記載されたものもいくつかあり，4,000種達成も佐々治先生のお陰と，改めてお礼を申し上げたい．

佐々治先生はすでに日本甲虫学会の会長に就任され，今後もヒラタムシ上科の研究に研鑽されることと思われるが，日本未記録の種はかなりあるので，どしどし記載して地域甲虫相の解明に貢献していただければと願っている．

佐々治寛之先生と福井昆虫研究会

羽田　義任
(福井昆虫研究会代表幹事)

佐々治先生は，福井昆虫研究会の生みの親であり，育ての親である．

先生は，永年福井大学教育学部の教授として，学生の指導に，またご専門の研究に多大の成果を挙げてこられたが，その一方で福井県の昆虫相の調査研究にも中心的役割を担って来られた方である．1973年に始まった「福井県自然環境保全調査研究会」では，昆虫部会の部会長として活躍された．この調査研究の一部は，福井県昆虫目録（収録種数 6,539種は、その当時の一県の昆虫目録としては全国一であった）として1985年に刊行されたが，これが福井昆虫研究会が発足する動機となったのである．

先生は“地方の昆虫相の究明は，その土地の昆虫同好者に与えられた重要な使命の一つである”ということを持論にされておられ，目録作成は一つの通過点であって，さらに詳しい解明には，県企画の機関ではなく同好者の自主的な研究組織が必要であると考えられた．先生の発案により，目録作成に当たった12名の昆虫部会員が発起人となり，1987年に福井昆虫研究会が誕生したのであるから，佐々治先生は正しく生みの親なのである．福井昆虫研究会は年に二回，機関誌「福井虫報」を発行している．同好会の成否は機関誌の充実如何にあると考えられた先生は，自ら編集幹事を引き受けられた．発会当初は30名そこそこであった会員も年を追うごとに増加して，現在は120名にまで達しているが，これはひとえに先生が編集される福井虫報の魅力によるものである．

120名の会員のうち約70名は福井県以外に在住する人たちである．その多くは福井虫報を購読するために入会された方々である．忙しい公務の中，毎号発表される佐々治先生の報文をはじめ，充実した内容と読みやすく，かつあか抜けした編集が，多くの同好者を引き寄せた最大の理由ではないかと思う．正に先生は福井昆虫研究会の育ての親なのである．

福井虫報の表紙のカットも，またなかなかの圧巻である．福井県ゆかりの昆虫をテーマにして毎号違った挿し絵が描かれるのであるが，ここでも先生の豊かな才能の一部が披露されている．創刊以来第27号まで27冊が刊行された中で17冊までが，佐々治先生の健筆による甲虫のカットが表紙を飾り，虫報の誌価を一段と高めている．

退官後も佐々治先生は編集幹事として福井昆虫研究会を育てる親には変わりがない．しかし，13年間，例会や総会の会場に使用させていただいた福井大学に，もう佐々治先生の姿がないのだと思うと，いちまつの寂しさを感じるのは私だけではないであろう．福井昆虫研究会を代表して，佐々治先生の永年のご功績に敬意と感謝を捧げ，今後のご健勝とご発展を心からお祈り申し上げます．

佐々治先輩の思い出

池崎　善博
（長崎女子短期大学）

佐々治寛之先生の御退官をまずもってお慶び申し上げます．佐々治先生は私には長崎県立長崎東高校生物部の先輩で，昭和29年の3月佐々治先生が卒業されたのと入れ替わりに私が入学しました，そして佐々治先生の妹さんと同学年でした．佐々治先生（当時，神谷姓）は高校時代から秀才で，当時の先生であった古川憲介氏は「彼は東大に現役合格できたのに昆虫学の江崎悌三先生を慕って九州大学に進学した」と後に書いておられます．進学校では東大合格者数で他校と競うのは今も昔も変わりませんから，半ば残念そうに書いておられます．九州大学に入学されてからも後輩の活動をずっと指導してくださり，私たちにとっては顧問の先生より「恐るべき先輩」でもありました．佐々治先輩はご自身が創刊されたといってよい生物部誌「染色体」を毎年春休みに発行するため，福岡市から長崎市まで帰省され１週間母校の生物教室に通って編集から印刷迄で懇切に指導してくださいました．当時の印刷技術は今想像もつかない孔版印刷と呼ばれる方法で，ロウをしませて作られた原紙をヤスリ板に載せ，鉄筆で一文字ずつ書くもので，全ページの手書きを佐々治先輩が担当されました．それを待って私たち後輩は一枚ずつ紙をめくりながらローラーで印刷し，ホッチキスで止め製本しました．表紙には佐々治先輩が昆虫を選び表紙実物大・手書き印刷され，できあがった甲虫の図は見事で神業でした．高校時代からどのようにしてこの高度な技術を身につけられたのか不思議に思っています．部誌作製に私も1週間無欠席で通いましたので，編集後記に私を誉めて書いてくださいました．先輩は晴れた日も雨傘を持たれ「イギリスの紳士はこうするんじゃ」とおっしゃっておられました．

東高生物部研究誌
染色体
CHROMOSOME
No. 8

長崎東高等学校生物部　発行
August. 1954

佐々治先生手書きの生物部誌（１９５４年）

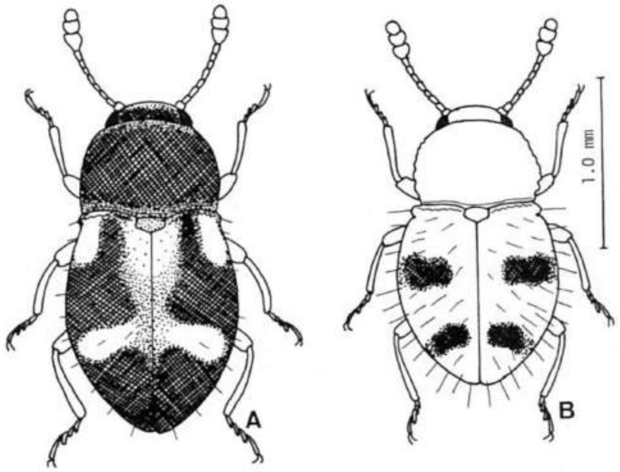
佐々治先生が文字を書かれるのを直接見られた親しい方はそのユニークさをよくご存知でしょう．ここでは書かないことにします．私が大学生の時（昭和35年ごろ），九州大学に初めて佐々治先輩をお訪ねした時の事ですが，古い木造昆虫学教室の大部屋に，佐々治先生を真ん中にして右にはゾウムシの森本桂先生，左にはハムシの木元新作先生（いずれも院生）が研究しておられ，今思えばすごい顔ぶれでした．佐々治先輩は私を連れて昆虫学教室内を案内してくださり，その時，有名なザイツのチ

ョウのモノグラフを見せていただきました．夜は飲みにも連れていってくださり，佐々治先輩間借りの1軒屋にお邪魔しましたが，部屋には昆虫学書がピラミッド型にうず高く積んであり(本棚なし)，その中からこれが有名なイムズの昆虫学テキストだよ」と言って分厚い書物を見せてくださいました．ふとんが1つしかなくて佐々治先生と背をピッタリ合わせて寝ましたが，そういう経験をなさった方は他にはいらっしゃらないでしょう．隣部屋の住人は何とヤギで，晩中ゴトゴト音を立てており，なんとも不思議な家でした．先生は九大生時代には福岡市に「筑紫昆虫同好会」を創始され手作りの見事な会誌も発行され，甲虫の絵解き検索が出ています．これらは40年ほど前の話ですが佐々治先生にはほんとうにお世話になりました．

佐々治先生は高校時代にモンキタマムシを研究を雑誌「新昆虫」に発表し，タマムシ科に興味を持っておられその影響で私たちも高校時代タマムシ科の採集に熱中しましたが，私たちの採集品）の一部は先輩のコレクションに今も納まっているでしょう．ご承知のように先生は後にテントウムシ科に目を向けられ，長崎布付近で採集されたものも多く学名などに長碕の地名が採用きれています．佐々治先輩はその後もずっしり重い別刷を私のため度々送ってくださいましたが，美しい図を拝見するのも楽しみの一つでした．私は永年，佐々治先生からの年賀状をためていますのでぼちぼち甲虫図鑑ができそうです．佐々治先生とは久しぶりに1999年の日本昆虫学会（愛媛大学）でお目にかかりましたが，昔と変わらぬ昆虫学への情熱を燃やしておられました．ご退官後は日々健康に気をつけられ後進者の指導にあたられますようお祈り申し上げます．

生物部員と先輩との交流会（1956年12月3日，右矢印は佐々治先輩，左の矢印が筆者

*佐々治寛之（1999）昆虫とクラブ活動と雑誌．「昆虫と自然」**34** (9): 19 も合わせてご覧ください．



A: *Atomarops lewisi* RETTER; B. *A. dharma* SASAJI

Spec. Publ. Japan Coleopt. Soc., Osaka, (1): xiii–xx, June 11, 2001

昆虫少年—いま熟年虫屋

佐々治　寛之

1.生いたち

1935年6月11日，長崎県西彼杵郡高島町で男児が呱々の声をあげ，神谷寛之と命名された．(1966年10月，佐々治と改姓)．父親の神谷新太郎は三菱鉱業高島炭坑の副所長だったが，三菱・三井・現地の合弁会社の最高責任者として中支に渡り，1938年6月28日安徽省でゲリラに襲撃されて殉職した．その時留守家族，母と3男3女は長崎市内に住んでいたが，殉職の知らせがあった時，私は池のある庭でオタマジャクシやアメンボと遊んでいたことをかなりはっきり憶えている．4歳の時である．父の没後，母の実家のある東京へ出て茗荷谷に住んだ．1942年4月小石川区小日向台町国民学校に入学した．友達とトンボ捕りやセミ捕りに行ったこともあったし，コオロギを飼育したりした．しかし，みんながチャンバラをしたり，ビー玉で遊んだりする中で，私は体力が劣っているせいもあってか，ひっそり自分の殻にこもることが多かったようである．いわば，いじめられっ子で，小動物を相手にした，泣き虫・弱虫だった．

1944年8月，親許を離れて私たちは宮城県鳴子町へ学童集団疎開に旅立った．緑豊かな自然に囲まれた鳴子は美しかった．虫もたくさんいた．ところが，その集団疎開の教育は私にとって恐ろしい以外の何物でもなかった．小日向台町国民学校の集団疎開教育が秀れていると都知事から表彰されたほど厳しいもので，点呼・朝礼に始まり，就寝まですべてが規制され，机上の学業は良かったものの，体育は私にとって苦痛なものであった．特に冬期のスキーは苦しかった．１０分もかかって急な傾斜を登ると下りは数秒，するとすぐに登れ! 転ぶとしかられた上にもう一度．もちろん洗濯は自身でやらねばならない．東京が戦災で壊滅しても次の世を背負うのは君たちだと期待される．まさに軍国主義の期待されたエリート，帝都少国民だった．そのようなとき，泣べそを慰めてくれたのは虫たちだった．しかし虫などに関心を持つこと自体が非国民だった．

幸か不幸か，我が家族は東京から福井市に疎開することになったので1945年4月，鳴子から引き取られた．しかし，戦禍は激しくなり7月19日福井市は壊滅を受け，我が家も燃え，戦後は福井市花堂にしばらく住む．花堂（はなんどう）は八幡山の麓にあり，観察に，採集に短い期間だったが良く歩いた．指導者には全く恵まれなかったが，「ぼくは昆虫学者になるのだ」と自負していた．しかし，のち再び八幡山を歩き，福井の昆虫について語り，福井の自然環境を論ずるようになることは当時，想像すらしなかった．

2.長崎県高島へ

父が残した幾許かの財産も戦後のインフレで生活を脅かすようになり，当時「黒ダイヤ」の名のように炭坑は好景気であったから，高島（父の最後の任地）に行けば母の勤め口もあろうかと，福井から高島へと向った．生活は決して豊かにならなかったが，やがて九大工学部を卒業した長兄は父の最後だった三菱鉱業に就職した．高島は全島炭坑の島であるから小学・中学を通じて教員も物理・化学関係の人が多く，会社の技術関係の職員も同様の傾向であった．しかし，私が生物にこだわり続けたのは当然ではあったが不思議である．

島は一辺 1 km ほどの正方形にしっぽをつけたエイのような形で，最高地海抜約100m，そこに2万人ほどの住民がいるのであるから昆虫の生活圏は狭まれる．それでも中央にある権現山はけわしい斜面に囲まれ自然のままである．また道路わきの斜面にはダンチクが茂っていた．ま

た水が無いのが特徴的で当時はすべての生活用水をタンカーで運んでいた．川も全くない．ただ1ヶ所だけ春にはヒキガエルが産卵に来る池があった．中央に近い斜面に中学校があり，その運動場の周囲には櫻が茂っていたし，すぐその横に数百のクマゼミが合唱するセンダンが数本あった．

さて，私の高島中学時代はクラブ活動に明け暮れた日々であった．著作目録をご覧いただければ判るように，関心の中心は昆虫であったが，材料が入手されるかぎりいろんな動物を解剖し，スケッチした．広島高師編の「日本動物解剖図説」がテキストで，その解剖は高校にも続く．中学でのまとまった研究として「高島近海に於ける浮游生物の季節的変化」がある．そのレポートは長崎県科学教育展に出品され「教育長賞（最高位の賞）」を受けた．その一部分は部誌に孔版ながら抄報されている．クラブ活動の研究成果は指導に当る教師の影響が大きいが，審査に当った先生方は高島中学にはそのような教師がいないことに気付いていたらしい．

中学校から始ったクラブ活動の成果は部誌作りである．「アミーバ」第1号から第5号までを刊行した．すべて自家製の孔版刷りである．この雑誌作りは高校での「染色体」，大学での「筑紫の昆虫」，現今の「福井虫報」への原点でもある．

3.長崎東高校と長崎昆虫同好会，そして進路

高島には従業員対象の定時制高校はあったが普通の高校はなかった．長崎市内には普通公立高校として長崎東高と西高があった．私は東高を受験したが，その理由は当時の東高梅田倫平校長のすすめによるものである．梅田校長は本来生物専攻の方で昆虫にも造詣の深い方で科学展を機会に面識があった．私の高校入学は1951年4月である．

高校に入学して早速生物部の扉を叩いた．それ以来，昼休みと放課後は部室だった．また，土曜の午後と日曜に近郊の里山に採集に出かけ，雨天は標本作りをした．前項に述べたように部室で動物の解剖を良くやった．昆虫採集はしだいに甲虫が中心になる．実験らしい実験は個人の立場で行ったものが多かったように思う．ただ，部室は独立管理下にあるものではなく，生物準備室と教室を利用させてもらっていたので，時間が制限されていた．高校の生物部でも随分いろんなことをやったが，1年のときは「ショウジョウバエの研究」である．東京都立大からミュータントを頒けて貰い相当熱心にやり，単なるメンデル遺伝の検証実験だけでなく，痕跡翅の発現が温度によって異なることなど，自分では自信作のつもりであった．しかし長崎県科学教育展では優秀賞に終った．その時の審査の先生の講評では，「高校生の自由研究は時間をかけた努力が必要」ということだった．その反発から（あとで考えるとそうだった），2年の時は綿密な予備計画と準備を整えて，「ムラサキウニの受精と卵割に関する実験」を正味1日だけ行った．これは見事「教育長賞」を射とめた．

生物部は部員はそれほど多くはなかったが，盛んに研究・採集活動を行ない，例えば秋の文化祭で演劇部に次ぐ第2位の人気を博した．生島（現姓二枝）貞利，田村憲夫，池崎善博の昆虫研究の熱心な部員がいて，その伝統は後に続く．また，部誌「染色体」は他校とも交換し広く知られた．

1951年に創立した「長崎昆虫同好会」は山根孝夫，萬木二郎氏（ともに長崎大医学部学生，のち開業）を中心に活発な例会・採集を行い，「こがねむし」誌を発行した．東高生物部も何人かは会員として活動に参画した．また私自身は山根氏の下宿をしばしば訪れて指導を受けた．

その頃市販誌として「新昆蟲」(北隆館)が発行されていたが私ども昆虫少年にとって良い指針となり，「むしぺん」欄を初めとして気楽に投稿が認められていたので，これは虫屋としての登竜門として効果があった．私にとっても全国レベルでの虫界を知るのに便利であった．また，「新昆蟲」の標本交換欄や同好会誌紹介を通じて見知らぬ各地の虫友と文通することになる．西川協一，青木淳一，養老孟司氏などとは永続きしたが対面するのはずっとあとのことである．

あとのお二人からは今回本論文集に祝辞をいただいたが西川氏は故人となられた．

進路: 高校生にとって大学受験は重要問題である．私は常識的に東大理IIを目標にしていたが，1952年11月，私の将来を決定する事柄があった．長崎でツュンベリー生誕200年式典なる催しがあり，その講師として九州大学の江崎悌三教授がおいでになるという．前述の梅田倫平校長が江崎先生に会わせてやろうということになった．生意気な神谷少年は長時間にわたって面談することを許された．その後，ツマキヘリカメムシのタイプ産地の問題を始め何度か質問の手紙を差上げたがその度ごとに丁寧なご返事を戴いた．また九大の安松京三先生とも会う機会があった．偉大な昆虫学者に接することにより，３年生になり進路希望の調査があった時，「九大・農」と書くことに躊躇しなかった．これはいうまでもなく昆虫分類学への志向を意味する．

1952年頃から甲虫の目録作りが始っている．また東高の裏山ともいえる金毘羅山で多産が発見されたモンキタマムシが契機で，もともと好きだったタマムシ科の研究で長崎県科学展では「長崎県のタマムシ科」で教育長賞を受けた．1954年２月大学入試を目前にしてまとめたものである．そして卒業式ではクラブ活動の功績により同窓会長賞をもらった．

4.九州大学に入る

教養部時代 1954年4月九州大学に入学，初めの１年半は六本松学舎である．入学式の翌日，新入生オリエンテーションのあと白水隆先生にお目にかかり，その後，先生の研究室に机を貰う．まだ教養課程であるが事実上昆虫学の勉強が始った．そして白水先生が九大における最初の師匠ということになる．折を見て農学部昆虫学教室に出向き，先生方や日浦・森本・村上・木元といった先輩方にも顔を合わせる．六本松は第１分校といったが久留米市には第２分校があり宮本正一先生がおいでだった．次の年には第２分校に三枝豊平氏が入学して来る．

将来の専門分野を決めねばならない．白水先生に伴われて農学部に行き，江崎先生・安松先生に相談する．甲虫では2級先輩の森本さんがゾウムシ類を，木元さんがハムシ類をやっている．すでに専門家の風格が見られた．タマムシ科はかって九大にもおいでだった黒澤良彦氏がやっているので駄目だという．何か大きな分類群に挑戦したかった．天敵学者でもある安松先生は，「テントウムシ科は天敵として極めて重要であるが，今日本には誰もいない」という．江崎先生は，「かってテントウムシ科をやった人が日本に２人いたが，大変むずかしい群で挫折してしまった．しっかりやってほしい」と．ゾウムシやハムシに比べると種数から見て貧弱で物足りなかったが，そういわれると，あまのじゃくの私は「よーし，それならぼくがやろう」と，テントウムシ科にした．そしてその周辺の分類群を含めて，ヒラタムシ上科をレパートリーとした．早速文献収集である．手書きのものも若干あるが，大部分は写真によるコピーである．まだゼロックスはなかった．

筑紫昆虫同好会 長崎東高生物部の経験をふまえて，白水先生の指導の下に「筑紫昆虫同好会」を結成した．月例会を行ない，これは研究発表会または採集会である．昆虫学教室の先輩方にも参加いただき，特に木船さんと森本さんにはお世話になった．会の運営のためには資金と会員拡大が必要である．特にグループとして協力してくれたのは福岡女子大学と修猷館高校で，修猷館高校から東大へ行った富永義昭氏は甲虫をやっていたが，魚の分類に転じた．

筑昆はまたたく間に会員数100名を越し，私は農学部に進学してからも専門的研究とは別に，地域の同好会活動の一環として，その発展に努力した．1958年には「九州の昆虫採集案内」(169頁, 6図版)を刊行し，私は３ヶ所を分担したが，すべての案内地図は地名のレタリングを含めて私が手書きしたので，想い出のひとつである．

1959年初めての新種記載 1955年秋に農学部に進学し，58年大学院進学，分類学研究者としては遅まきであるが1959年6月，私の書いた新種が「昆蟲」に登載された．「日本産 Chilocorini 族の再検討」である．学生に授業の駄洒落としていうのだが，1758年リンネの「自然の体系」，

1859年ダーウィンの「種の起源」，100年たって1959年神谷の新種記載と．1959年10月，日本昆虫学会大会で「特異な瓢虫科—新種とその分類学的位置」なる講演を行い，その翌年Sukunahikonini なる新族が公刊された．テントウムシ科の分類学的標徴の変更にかかわる発見として注目された．1961年，「日本産ヒメテントウ族の再検討」（修士論文）の公刊．ぼちぼちのペースながら，日本（琉球を含む）産テントウムシ科が行く．その間に柑橘園のテントウや地方分布記録などを報告した．また，天敵としてのテントウムシ利用の指針・検索表も書いた．

テントウムシ科以外の甲虫の分類　テントウムシ以外の甲虫についてもしばしば報告して来たがそれらは主に分布記録や一般の同好者に目の付かないものの紹介程度だった．しかし，私の関心は新種の記載そのものよりも，その昆虫の系統進化学的位置に関する考証にあったといって良い．そのはしりが，1961年の「日本におけるホソキカワムシ科（Hemipeplidae）の発見」である．ヨコミゾゴミムシダマシの分類学的位置はそれに次ぐものであるが，公刊されたのは私が福井に行ってからのことである．

5.九州大学から福井大学へ

1962年6月大学院博士課程満了を待たずに，福井大学学芸学部（生物学）に助手として赴任することになった．奨学資金とバイトで生活していたわけであるから就職できることはこの上もない．常木勝次教授はすべてに厳しいことは学界に聞えていたので，出発に際して九大の先輩・同僚たちは，「だらしない君にあの先生の助手が務まるかな ?」と心配してくれた．採用の決定は6月10日，実は6月11日は私の誕生日で皆が祝ってくれた翌12日朝，安松先生から呼び出しがあり，その旨が知らされ，1週間以内に着任せよとのことだった．希望は出していたものの音沙汰がないので中ば諦めていたので大喜び，大急ぎで引越しの準備をする．

福井に来たその冬は38（サンパチ）の豪雪が襲い，交通機関はストップ、福井大学も休学，全学総出で鉄筋屋上の除雪の後，研究室に戻りストーブの薬缶をひっくり反し，足を大やけどする．下宿に帰れないので研究室に泊る．おかげでいくつかの論文の原稿が仕上がった．周囲の人は，暖かい九州から来て驚いたでしょうと慰めてくれたが，「なーに，これしきの雪九州男子はビクともしませんよ」と啖呵をきる．

私事で恐縮であるが，冒頭に触れた父は実は福井中学—四高—東大出身の一人息子であったが，福井が好きでなく福井に戻ることはなかった．また母方の祖父武内徹も福井市出身，軍人で陸軍中将となったが東京に在住し福井に帰ることはなかった．ただ1921-26年福井市長を務めている．私が福井大学に赴任して来た時，“見知らぬ土地で……”と同情をいただいたが，戦災でひどい目に会ったし，上記のように福井は縁故浅からぬ土地だったのである．そのような次第で初めの頃は単なる勤務地でしかなかったが，しだいに愛着が深まり，地域の自然史（ここでは昆虫相）に深い関心を持つようにもなった．そして定年を迎え福井大学を去るまで38年余り福井大学にいたことになる．

テントウムシ科の系統分類と日本産種の再検討　今までにまとめて来た族単位の再検討に空白を埋めることによって，日本産種の記載分類は仕上がる．しかし，テントウムシ科全体の系統分類体系の見直しが必要であった．この部分は「テントウムシ科の系統分類」(1968年)として公刊した．成虫だけでなく幼虫の比較形態が必要だったがその部分は1965年に刊行した．この両者と総論および各論を集大成して1967年に九州大学から農学博士の学位を得ていた．

もし出来れば一冊のまとまった出版物として出せないものだろうかと思っていた．幸い中根猛彦先生のアドバイスで文部省研究成果刊行助成金を申請したらということになり，パスして学術図書出版社（啓学出版社）からファウナ・ヤポニカの1巻として出せることとなった．本シリーズは原色図版が付く．専門画家に描いて貰うというので，私が自分で書きたいといったら，社長はうちの出版物は素人の絵は使えないという．２，３枚の見本を見せたら，これならば使

えると合格した．幸い教育学部には美術の先生もおいでなので，田中隆盛先生から絵の具や描画技法のアドバイスを受けた．日本産全種をカラーで描いた．そして，1971年「日本動物誌: テントウムシ科（昆虫綱: 甲虫目）（英文）」（349頁，16原色図版）が世に出たのである．

同胞種の研究　「日本動物誌: テントウムシ科」出版の直後である．松にいるナミテントウがおかしいということが浮かび上って来た．そもそもナミテントウは駒井・千野・星野（1956など）に代表されるように集団遺伝学の研究材料として良く知られていた．ところが成虫ではほとんど区別が出来ないが幼虫が明瞭に異なる個体群があり，生殖的に隔離されていることが発見された（1971）．クリサキテントウである．

一方，ヒメカメノコテントウとコカメノコテントウは同所的に生息しているが明瞭に区別できる．しかし，交配すると雑種が出来ることが確められた．種の問題を探る研究材料になり得る．私たちは実験室内では雑種が形成されるが野外では独立種として存在し，もし出来ても雑種崩壊という現象で生殖的に隔離していると説明した（佐々治・矢原・斎藤，1975）．このようなことが出発点となって，種の問題を研究室の主要テーマにしたのである．

また，種や系統を考える上で可能なかぎり多くの生物学分野の情報を活用するのが望ましいと，名古屋大学の大西英爾先生に師事してアイソザイムの研究を始めた．雄・雌の生殖器官，蛹，幼虫，消化器官，核型などを手がけ卒業研究の指導としても活用した．

福井県自然環境保全調査など　国が公布した自然環境保全法に基づき，福井県自然環境保全条例が出来，同基礎調査が1973年に開始された．その第1回目の調査報告書が1976年に刊行，第2回目は1980-1985年，第3回目は1993-1998年，年度によって多少異なるが，数個の部会があり昆虫部会はその1つである．調査員はこれも年度によって異なるが，第3回目の場合昆虫部会20名であった．20名のうち14名が教員または教職経験者で，佐々治がずっと部会長を務め，第3回目からは全体の会長をしている．昆虫相調査（目録作り）が主な作業で，福井県の○○目というテーマを行った者がかなりおり，その成果がこの目録に生かされている．また，ライフ・ワークともなっている．「福井県昆虫目録」(1985)，「同 (第2版)」(1998)，「福井県のすぐれた自然」（1999）などに集約されている．

「福井の科学者」と敦賀市中池見湿地の自然環境　日本科学者会議は環境保全と深くかかわる民主団体で，その福井支部もいろんな分野で活動している．中でも中池見湿地の自然環境保全に関する問題は，大阪ガスKKから中池見にLNG（液化天然ガス）備蓄基地計画が出されたことに始まり，10年間計画を凍結するなど現在国際問題として発展している．

「日本および近隣地域のヒラタムシ上科甲虫の分類学的寄与，I-VIII」(1983-1995)　ヒラタムシ上科は極めて多様な分類群で，見かけ上の形質では誤ることが少なくない．系統分類学の重要形質を解剖分解スケッチして示したシリーズである．単なる新種の記載というのではなく，系統的に問題がありそうな材料を取扱った．

6.「原色日本甲虫図鑑 I, III」(保育社，1986, 1985).

I は原色図鑑というよりも甲虫全体の概説である．私は成虫による科の検索表を担当した．形質を理解するために頁数が許すかぎり部分図を付けた．図鑑であるから標本を同定するための便宜的なものが良いかもしれないが，未知のものの存在を配慮して，また系統関係を理解するために作成した．森本によるI 巻末の亜科までの分類表と邦産種数+当図鑑所載種数，並びに主要文献目録は多少とも専門的に日本の甲虫の分類に携わる学究に対して極めて有用である．

III はタマムシ上科からヒラタムシ上科までで，私はヒラタムシ上科のうち28科を担当した．私が担当した部分は亜科・属・種の邦産すべてを，可能なかぎり検索表に納めることを目標とした．また，全体の編集・構成にも関与した．保育社の基本方針は1図版25個体，その解説4頁であった．科ごとの図版数は最初の大前提であった．この種の出版物はまず図版を作成して，

その解説を書くことが多い．執筆者の多数の方が予定よりも多い標本を並べた．本には少しでも豊富な内容を入れたいが，出版社も商売であるから制限がある．多少の許容は認められたが，執筆者としては不本意であったであろう．編集者として非常に苦しかった．例えばハナノミ科・ハナノミダマシ科の第67図版には44個体(種)が出ているが，解説と注記を含めると118種，とても4頁で解説を書ける量ではなかった．図鑑の性格上，誰かが全分類群をカバーしなくてはならない．しかし現段階では既知種すら全種が把握できない上に大量の未記載種（予想を含む）があるから，当然限界がある．不本意な点があり，せめて解説記載をもう少しふやしたかったがまずまずの成果であったと自負している．

なお，日本産土壌動物検索図説（青木淳一編，1991）（改訂版，1999）に甲虫の科の図解検索を書いた．

7.「テントウムシの自然史」(1998)と「動物分類学入門」(1989)

「入門」の方は大学一般教育の理系学生を想定して書いた小著で，動物分類学の専門書ではない．教科書（副読本）のつもりで，なるべく個人的主張を出さないようにしたので，おまえの本は思想がないと非難されることがある．取材はなるべく身近かなデータから得るようにした．その後分類学，多様性生物学に関する好著がいくつか出版されたので影がうすくなったかもしれない．

「テントウムシの自然史」は，文字通り世界および日本におけるテントウムシ科に関する研究史に始まり，形態・系統分類，族レベルの分類解説のあと特論としてナミテントウ種群，ヒメカメノコテントウ種群，オオニジュウヤホシ種群（紹介），多型と種多様性，湿地のテントウ，食性と生活史の構成で，分類関係の付図はほとんど私自身が描いたものである．表紙に6頭の原色図を出していただいたがその出典がどこにも示されていないのは残念であった．成書として属レベルの検索表，出来れば種の検索表が欲しい所であるが，それが必要な方は上記保育社図鑑を持っているだろうことと，環動昆の絵解き検索表（単行本の一部として刊行予定）と競合するので省いた．また，テントウムシの教材としての利用についても書きたかったし，天敵としての価値について一章を設けるべきだったかも知れないが，外国でいくつもの優れた大冊が出ているのでそれにゆだねることにした．

8.半生をふりかえる

天下自由な風来坊だった私は縁あって佐々治家の養子となる．実家は福井県丸岡町川上，庭の柿が熊に食われるような山村集落であるが，私は車の運転が出来ないので福井市内の公務員宿舎に住み，時おり実家に帰る日々であった．川上に虫はたくさんいるのに！ ただし，まだ新種は採れていない．

運動神経が鈍く，体力もないが健康で良く歩いた．病気らしい病気もしなかったが1980年胃ガンで入院したのを皮切りに，脳硬膜外血腫で長期入院（一時は再起不能といわれた），坐骨神経痛でヘルニアを併発，腰が痛くて歩行不便で山歩きは困難，さらに3年前直腸ガンでまた切腹．福井市のシンボル“不死鳥フェニクス”の如く転倒虫は起き上り，まだ生きている．そして論文を細々ながら書いている．

学術研究や大学の管理運営は本務として当然であるが，地域の自然環境と自然史に相当のエネルギーを注いで来た．もっと純粋な学術研究に専念すれば良いのにと批判する人もいる．福井に来てから38年余り，飽きもせず虫を追った．初めの所でくどくど述べたようにガキの頃からの延長である．サンパチの豪雪の直前に来て，38年後の21世紀を迎える途端に福井大学を去る．著作目録は学問に責任を持てるようになった1950年から退職の2000年までである．

その間に私は何をしたのだろうか．虫屋は“テントウムシを主としたヒラタムシ上科の系統分類学”と評して下さるであろう．私自身にはテントウムシは研究材料であって本来の目的は“生物学的多様性の研究”であったと自ら気づいた．生物多様性とはただいろんなものがたくさんあるというのではない．その多様な中に規則性に支えられ，進化の結果として存在する．それと同時に自然史の理念を看板にし，具体的な対象として常に地域とその自然環境を念頭に置いていた．そして学生を主とした教育が手段でもあった．

略歴

1935年6月１１日　長崎県西彼杵郡高島町（当時高島村）で神谷新太郎・宇多子の三男として誕生．新太郎は三菱鉱業技師であったが1938年6月中支で殉職．その後東京に住む．
1942年4月　小石川区立小日向台国民学校に入学．
1944年7月—45年4月　学童集団疎開によって宮城県玉造郡鳴子町．
1945年4月—45年１０月　家族の個別疎開によって福井市に移住．花月国民学校．7月19日福井市大空襲の戦災を受ける．豊（みのり）国民学校に転校．
1945年１１月　長崎県西彼杵郡高島町．高島町立高島国民学校に転校．
1948年4月　同，高島町立高島中学校入学．在学中「アミーバ」誌を編集・発行．
1951年2月　長崎県科学教育展において教育長賞受賞「高島近海における浮游生物の季節的変化」．
1951年4月　長崎県立長崎東高等学校入学．在学中「染色体」誌を編集．
1952年2月　長崎県科学教育展において優秀賞受賞「猩々蝿の研究」．
1953年2月　同上において教育長賞受賞「ムラサキウニの受精と卵割に関する実験」．
1954年2月　同上において教育長賞受賞「長崎県のタマムシ科」．
1954年4月　九州大学教養部（理科II類農学士志望）に入学．
1955年9月　九州大学農学部農学科（昆虫学教室）に進学．
1958年3月　九州大学農学部卒業．
1958年4月　九州大学大学院農学研究科農学専攻（昆虫学）修士課程入学．
1960年3月　同上，修士課程修了．同4月博士課程進学．
1962年6月　同上，中途退学．
1962年6月１０日　福井大学学芸学部助手（理科，生物学教室）．のち学芸学部は教育学部と名称変更．
1967年１２月　九州大学より農学博士授与．
1971年3月　「Fauna Japonica: Coccinellidae (Insecta: Coleoptera)」(Academic Press of Japan 単著)．
1974年1月　助教授昇任．
1977年1月　教授昇任．
1980年—81年　日本昆虫学会編集委員長．
1985年１１月　「原色日本甲虫図鑑（III）」(保育社，編著)．
1989年1月　「動物分類学入門」(東大出版会，単著)．
1991年3月　「福井県大百科事典」(福井新聞社，生物部門監修)．
1998年1月　「テントウムシの自然史」(東大出版会，単著)．
2000年1月—　日本甲虫学会会長．

学会における活動

2001年1月現在：日本昆虫分類学会評議員・編集委員，日本生物地理学会評議員，日本鞘翅学会編集委員，日本科学者会議福井支部代表幹事，福井県自然環境保全調査研究会会長，福井県環境審議会委員，福井県自然環境審議会委員（自然環境部会長），福井昆虫研究会編集幹事．

過去の役職を含めて主な活動学会：日本動物学会，日本動物分類学会，日本生態学会，国際生物分類学会，日本応用動物昆虫学会，国際甲虫学会．

CONTENTS

Contributed Papers

Spec. Publ. Japan Coleopt. Soc. Osaka, (1): 1–24, June 11, 2001

佐々治(旧姓・神谷)寛之* 著作目録 (1950–2000)
A List of Papers and Writings by Dr. Hiroyuki SASAJI (formerly Hiroyuki KAMIYA)

この目録は学術的に学界で認められている論文だけでなく，平易な採集報告や，その当時の自然観・虫屋の雰囲気・書評なども含めた． (佐々治寛之)

–1950–

01. 高島と昆虫．アミーバ，(1): 2–3.
02. 蝉と高島方言．アミーバ，(1): 3.
03. Marmot. アミーバ，(1): 4.
04. 脈搏調査統計．アミーバ，(1): 8–9.
05. 彷徨変異（菊の）．アミーバ，(1): 7.
06. 細胞分裂．アミーバ，(2): 7.
07. 寄生虫．アミーバ，(2): 8–11.
08. ハツカネズミの寄生虫．アミーバ，(2): 12.
09. 昆虫採集と標本製作．アミーバ，(2): 19–22.
10. ウニの人工授精．アミーバ，(3): 4–7.
11. 齧歯類の解剖の総合．アミーバ，(3): 10–25.
12. 高島近海に於ける浮游生物の季節的変化．アミーバ，(3): 31–49.

–1951–

00. 研究発表: 高島近海に於ける浮游生物の季節的変化．長崎県科学教育展（教育長賞受賞）．

–1952–

01. 猩々蝿の研究．こがねむし，**2** (1): 9–17.
02. 高島の昆虫（1）．こがねむし，**2** (3/4): 5–9.
03. （共同実験報告）ミツバチの色覚実験．染色体，(4): 12–15.
04. 心臓灌流実験．染色体，(4): 17. [共著: 福井克明]
05. 畸形植物について．染色体，(4): 33–37.
06. プラナリアの研究（2），プラナリアの再生に於ける環境の影響について．染色体，(4): 48–49.
07. 猩々蝿の研究．染色体，(4): 57–78.
08. 岩屋山昆虫採集記．染色体，(5): 15–18.
09. ムラサキウニ初期発生実験．染色体，(5): 23–41.
10. ヒラタハナムグリの一生態について．染色体，(5): 14.
00. 研究発表: 猩々蝿の研究．.長崎県科学教育展（優秀賞受賞）．
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* 旧姓: 神谷寛之(—1966)

[アミーバ: 長崎県高島町立高島中学校生物班研究誌(孔版)]

[染色体: 長崎県立長崎東高等学校生物部誌(孔版)]

[こがねむし: 長崎昆虫同好会会誌(孔版)]

–1953–

01. 高島の昆虫（2）．こがねむし，**3** (1): 7–10.
02. モンキタマムシ長崎市附近に多産．こがねむし，**3** (2/3): 10. [共著: 生島貞利]
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04. モンキタマムシ長崎市附近に多産．新昆蟲，**6** (13): 42–43.
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06. 烽火山採集記．染色体，(6): 22–24.
07. 標本箱より．染色体，(6): 25–41. [共著: 田村憲夫]
08. クチキコオロギ長崎にて採集．こがねむし，**3** (1): 7–10.
09. ツマキヘリカメムシの原産地について．こがねむし，**3** (2/3): 3.
10. モンキタマムシの斑紋異常．こがねむし，**3** (2/3): 7.
11. 採集品短報．こがねむし，**3** (2/3): 14–16. [共著]
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07. 偶感．染色体，(8): 28–30.
08. 科学展にみられた小学生標本より．こがねむし，**3** (4): 13–14.
09. キマダラカメムシ高島に産す．こがねむし，**4** (1/2): 8.
10. メスアカムラサキ採卵に成功．こがねむし，**4** (1/2): 8.
11. クズノチビタマムシの交尾．こがねむし，**4** (3): 13.
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14. 九州で羽化したメスアカムラサキ．虫界速報，(32): 6. [共著: 白水　隆]
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19. 創刊者の弁．生研部報，(1): 1.
20. 四つ葉のクローバ—複葉と単葉とどっちが先—．生研部報，(1): 4.
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01. 長崎市附近産鞘翅目目録（第三報）コガネムシ科. 染色体，(9): 7–16.
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06. 私のクラブ活動論．染色体，(9): 59–61.
07. 蝉と高島雑感．こがねむし，**4** (4): 6–7.
08. キチョウ初見日．筑紫の昆虫，**1**(1): 33.
09. 球場照明昆虫相を変える？ 筑紫の昆虫，**1**(1): 34.
10. *Aphanisticus yasumatsui* の和名．筑紫の昆虫，**1**(2): 44.
11. 筑紫昆虫同好会という会．筑昆月報，(1): 1.
12. ニイニイゼミ初聞．筑昆月報，(1): 2.
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15. 1955年を迎える．生研部報，(8): 1–4.
16. 再び種について．生研部報，(9): 1.
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18. Gen と形質 — vestigial と温度など —．生研部報，(11): 1.
19. 森下先生らを囲んで．生研部報，(11): 5.
20. 学名談義．生研部報，?.
21. （多摩夢子）"Papilio" パピリオ．新昆蟲，8(10): 27.
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02. NEOCAZIRA CONFRAGOSA．筑紫の昆虫，**2** (1): 2–4.
03. ヨツボシゲンセイ九州に産す．新昆蟲，**9** (5): 51. [共著: 木船悌嗣]
04. オオカマキリモドキ佐多岬に産す．新昆蟲，**9** (5): 51.
05. 九州祖母山産甲虫数種の記録．新昆蟲，**9** (6): 12–13.
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[筑昆月報: 筑紫昆虫同好会連絡誌]

[Lupe: 大阪府立北野高等学校生物研究室(孔版)]

[ひこさんがらがら: ひこさんがらがらの会(九州大学農学部昆虫学教室)会誌]

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[例会通信: 九州大学農学部昆虫学教室]

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[あられがこ: 福井生物研究会]

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チーム・日本生物多様性防衛ネットワーク(BIDEN): 111–147. [共著: 長田　勝・岸本　修]

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10. 福井県のヒメテントウ類覚え書（2）.ニセヒメテントウ属（*Pseudoscymnus* 属）. 福井虫報, (22): 5–12.
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13. 自然を守るとは — 中池見湿地の保全とトラスト運動 — シンポジウム「自然を守るとは」福井の科学者, (74): 13–36. [共著: 長田・河野・今大地]
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18. 福井の虫たち, アミダテントウ. 福井新聞, 1998年4月17日.
19. 福井の虫たち, ナカイケミヒメテントウ. 福井新聞, 1998年5月1日.
20. 福井の虫たち, オガサワラチャイロカミキリ. 福井新聞, 1998年5月15日.
21. 福井の虫たち, スネケブカヒロコバネカミキリ. 福井新聞, 1998年5月29日.
22. 福井の虫たち, ヤノトラカミキリ. 福井新聞, 1998年6月12日.
23. 福井の虫たち, サシゲチビタマムシ. 福井新聞, 1998年6月26日.
24. 福井の虫たち, ヒゲブトナガクチキ. 福井新聞, 1998年7月10日.
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26. 福井の虫たち, サカイマルヒメキノコ. 福井新聞, 1998年8月7日.
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30. 福井の虫たち, チャバネホソミツギリゾウムシ. 福井新聞, 1998年10月2日.
31. 福井の虫たち, マツムシモドキ. 福井新聞, 1998年10月30日.
32. 福井の虫たち, ヒメハルゼミ. 福井新聞, 1998年11月13日.
33. 福井の虫たち, ナカジマシロアリ. 福井新聞, 1998年11月27日.
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12. 福井の虫たち, ベダリアテントウ. 福井新聞, 1999年2月27日.
13. 福井の虫たち, オシマヒメテントウ. 福井新聞, 1999年3月13日.
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21. フジジガバチ福井大学構内からの記録. 福井虫報, (25): 29. [共著: 小室良子]
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24.「福井県のすぐれた自然，動物編」（福井県）. 452 pp. [佐々治; 福井県自然環境保全研究会会長として全編の監修，動物編のうち昆虫部門を共同または分担執筆]

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03. 日本甲虫学会会長就任のごあいさつ．ねじればね，(86): 14.
04. 福井県大野市平家平で羽田義任氏が採集した分布上注目する甲虫類．福井虫報，(26): 51–52.
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06. [文献紹介]: ヒックマン編（大田次郎監訳）. 1999.「現代生物科学辞典」．講談社サイエンティフィク．福井虫報，(26): 54.
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10. 甲虫学者中根猛彦と私．ねじればね，(87): 6–8.
11. テントウムシ類の消化器官の比較形態．福井虫報，(27): 29.
12. 表紙の図: ヒラタコメツキモドキに寄せて．福井虫報，(27): 1–10. [共著: 出口秀樹].
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Spec. Publ. Japan Coleopt. Soc. Osaka, (1): 25–40, June 11, 2001

A List of Coleopterous Taxa Submitted by Dr. Hiroyuki SASAJI / KAMIYA

I. Family-group Names

Tribe **Sukunahikonini** H. KAMIYA, 1960 (Coccinellidae)
Type-genus: *Sukunahikona* H. KAMIYA, 1960
Kontyu, **28**: 24.

Tribe **Shirozuellini** SASAJI, 1967 (Coccinellidae)
Type-genus: *Shirozuella* SASAJI, 1967
Etizenia, (**25**): 23.

Subfamily **Eidoreinae** SASAJI, 1986 (Endomychidae)
Type-genus: *Eidoreus* SHARP, 1885
Pap. Ent. to NAKANE: 235.
= Eupsilobinae CASEY 1895 (Type-genus: *Eupsilobius* CASEY, 1895)

Tribe **Prostominiini** SASAJI, 1988 (Salpingidae)
Type-genus: *Prostominia* REITTER, 1889
Mem. Fukui Univ., (**38**): 33.

II. Genus-group Names

Genus ***Sukunahikona*** H. KAMIYA, 1960 (Coccinellidae)
Type-species: *Sukunahikona japonica* H. KAMIYA, 1960
Kontyu, **28**: 22.
= *Scotoscymnus* WEISE, 1901

Genus ***Axinoscymnus*** H. KAMIYA, 1963 (Coccinellidae)
Type-species: *Axinoscymnus beneficus* H. KAMIYA, 1963
Mushi, **37**: 127.

Genus ***Shirozuella*** SASAJI, 1967 (Coccinellidae)
Type-species: *Shirozuella mirabilis* SASAJI, 1967
Etizenia, (**25**): 24.

Genus ***Hikonasukuna*** SASAJI, 1967 (Coccinellidae)
Type-species: *Hikonasukuna monticola* SASAJI, 1967
Etizenia, (**25**): 4.

Genus ***Dexialia*** SASAJI, 1970 (Anamorphidae)
Type-species: *Dexialia ovalis* SASAJI, 1970
Etizenia, (**43**): 4.

Genus ***Keiscymnus*** SASAJI, 1971 (Coccinellidae)
Type-species: *Keiscymnus tosaensis* SASAJI, 1971
Fauna Japonica: 95.

Subgenus ***Neopullus*** SASAJI, 1971 (in *Scymnus*, Coccinellidae)
Type-species: *Scymnus hoffmanni* WEISE, 1879
Fauna Japonica: 177.

Subgenus ***Nipponopullus*** H. KAMIYA, 1961 (in *Scymnus*, Coccinellidae)
Type-species: *Scymnus* (*Nipponoscymnus*) *pirikamenoko* H. KAMIYA, 1961
J. Kyushu Univ., **11**: 284.

Genus ***Nipponophloeus*** SASAJI, 1983 (Cucujidae)
Type-species: *Laemophloeus dorcoides* REITTER, 1874
Mem. Fukui Univ., (**33**): 21.

Genus ***Dernostea*** SASAJI, 1984 (Cryptophagidae)
Type-species: *Dernostea tanakai* SASAJI, 1984
Mem. Fukui Univ., (**34**): 27.

Genus ***Polacus*** SASAJI, 1985 (Oedemeridae)
Type-species: *Polacus longicornis* SASAJI, 1985
Gekkan-Mushi, (**177**): 10.

Genus ***Medamatento*** SASAJI, 1989 (Coccinellidae)
Type-species: *Shirozuella ocularis* SASAJI, 1988
Mem. Fukui Univ., (**39**): 22.

III. Species-group Names

A) CLAVICORNIA (+ Cerophytidae)

Cerophytidae ヒゲコメツキダマシ科
Cerophytum japonicum SASAJI, 1999 ヒゲコメツキダマシ (I–1)
Ent. Rev. Jpn., **54**: 97. Type locality: Tochigi Pref. (Tashiro-rindo).

Cerophytum japonicum SASAJI, 1999 ヒゲコメツキダマシ(I–1); *Aspidiphorus sakaii* SASAJI, 1993 サカイマルヒメキノコ(I–2); *Ancistria kurosawai* SASAJI, 1993 クロサワツツヒラタムシ (I–3); *Leptophloeus abei* SASAJI, 1986 ヒゲナガホソチビヒラタムシ (I–4); *Leptophloeus femoralis* SASAJI, 1983 ホソチビヒラタムシ (I–5); *Propalticus morimotoi* H. KAMIYA, 1964 マダラミジンキスイ (I–6); *Propalticus ryukyuensis* H. KAMIYA, 1964 ムネスジミジンキスイ (I–7); *Telmatophilus orientalis* SASAJI, 1987 ガマキスイ (I–8); *Caenoscelis kurosai* SASAJI, 1987 ヘリムネキスイ (I–9); *Atomarops dharma* SASAJI, 1989 ダルマコメツキモドキ (I–10); *Toramus quadriguttatus* SASAJI, 1989 ヨツボシケナガキスイ (I–11); *Xenoscelinus hiranoi* SASAJI, 1989 ヒラタコメツキモドキ (I–12); *Cryptophilus hiranoi* SASAJI, 1984 アカスジナガムクゲキスイ (I–13); *Biphyllus loochooanus* SASAJI, 1991 リュウキュウクロムクゲキスイ (I–14); *Philothermus shibatai* SASAJI, 1983 ツシマカクホソカタムシ (I–15); *Philothermus takasago* SASAJI, 1983 (I–16)

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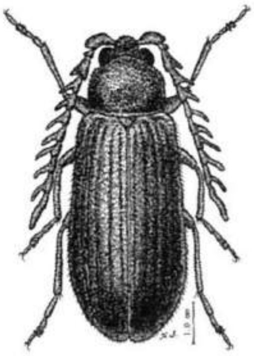

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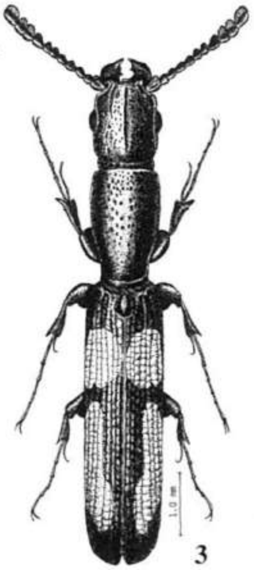

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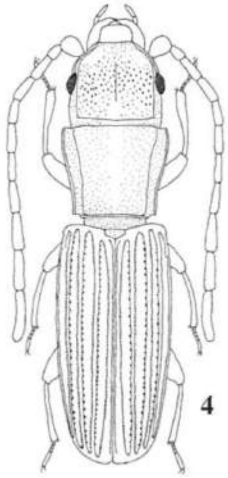

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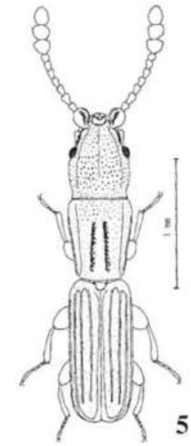

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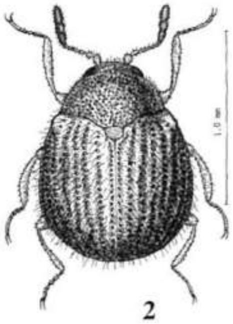

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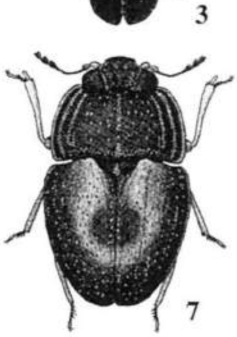

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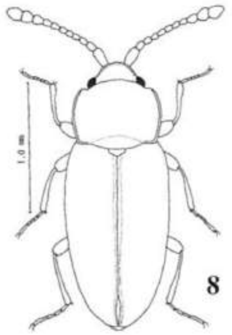

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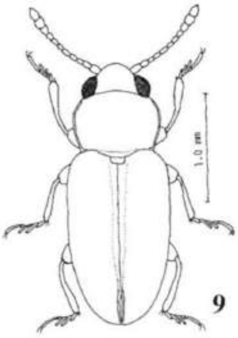

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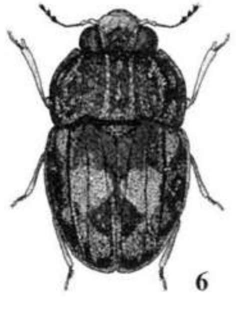

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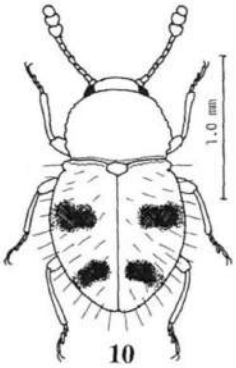

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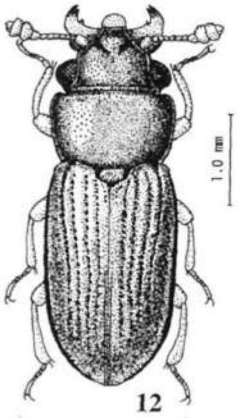

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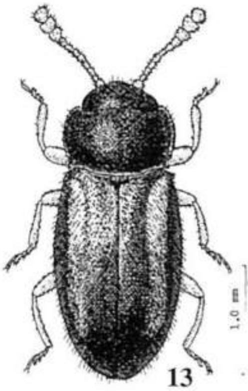

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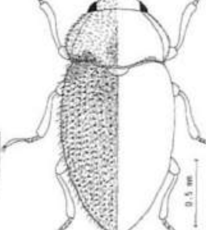

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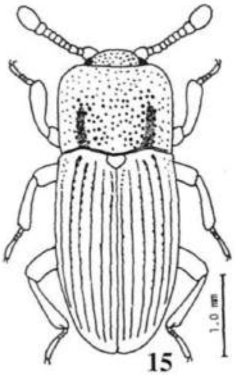

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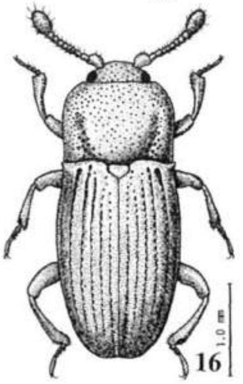


16

Sphindidae ヒメキノコムシ科
Aspidiphorus sakaii SASAJI, 1993 サカイマルヒメキノ (I–2)
Mem. Fukui Univ., (**44**): 18. Type locality: Fukui Pref. (Mt. Benzaiten).

Passandridae ツツヒラタムシ科
Ancistria kurosawai SASAJI, 1993 クロサワツツヒラタムシ (I–3)
Mem. Fukui Univ., (**44**): 22. Type locality: Tanegashima I. (Ohkeri).

Cucujidae ヒラタムシ科
Pediacus kurosawai SASAJI, 1983 チャイロキカワヒラタムシ
Mem. Fukui Univ., (**33**): 18. Type locality: Fukushima Pref. (Yunohana).
Leptophloeus abei SASAJI, 1986 ヒゲナガホソチビヒラタムシ (I–4)
Kontyu, **54**: 684. Type locality: Aomori Pref. (Oirase).
Leptophloeus femoralis SASAJI, 1983 ホソチビヒラタムシ (I–5)
Mem. Fukui Univ., (**33**): 25. Type locality: Fukuoka Pref. (Mt. Innaki).
Leptophloeus foveicollis SASAJI, 1986 ムナクボチビヒラタムシ
Kontyu, **54**: 681. Type locality: Hiroshima Pref. (Hiroshima-shi).

Propalticidae ミジンキスイ科
Propalticus kiuchii SASAJI, 1971 キウチミジンキスイ
Kontyu, **39**: 37. Type locality: Ehime Pref. (Omogo Valley).
Propalticus morimotoi H. KAMIYA, 1964 マダラミジンキスイ (I–6)
Kontyu, **32**: 281. Type locality: Iriomote I. (Ushiku-mori).
Propalticus ryukyuensis H. KAMIYA, 1964 ムネスジミジンキスイ (I–7)
Kontyu, **32**: 283. Type locality: Iriomote I. (Ushiku-mori).

Cryptophagidae キスイムシ科
Serratomaria vulgaris SASAJI, 1984 ササマルキスイ
Mem. Fukui Univ., (**34**): 22. Type locality: Fukui Pref. (Mt. Norikurayama).
Telmatophilus orientalis SASAJI, 1987 ガマキスイ (I–8)
Mem. Fukui Univ., (**37**): 24. Type locality: Tokyo (Arakawa Riv.).
Caenoscelis kurosai SASAJI, 1987 ヘリムネキスイ (I–9)
Mem. Fukui Univ., (**37**): 26. Type locality: Tokyo (Itabashi-ku).
Stenodea japonica SASAJI, 1984 フタフシセマルキスイ
Mem. Fukui Univ., (**34**): 25. Type locality: Fukuoka Pref. (Mt. Hikosan).
Dernostea tanakai SASAJI, 1984 ダエンキスイ
Mem. Fukui Univ., (**34**): 28. Type locality: Hiroshima Pref. (Takano).

Languriidae コメツキモドキ科
Atomarops curvitibialis SASAJI, 1991
Trans. Essa, (**71**): 41. Type locality: Formosa (Sun Moon Lake).
Atomarops dharma SASAJI, 1989 ダルマコメツキモドキ (I–10)
Mem. Fukui Univ., (**39**): 19. Type locality: Okinawa I. (Yona).
Toramus quadriguttatus SASAJI, 1989 ヨツボシケナガキスイ (I–11)
Mem. Fukui Univ., (**39**): 11. Type locality: Okinawa I. (Kudeken).

Toramus uenoi SASAJI, 1989 ウスモンケナガキスイ
Mem. Fukui Univ., (**39**): 14. Type locality: Ishigaki I. (Takeda).
Xenoscelinus hiranoi SASAJI, 1989 ヒラタコメツキモドキ (I–12)
Kanagawa-Chuho, (**90**): 226. Type locality: Kanagawa Pref. (Mt. Miura-Fuji).
Cryptophilus hiranoi SASAJI, 1984 アカスジナガムクゲキスイ (I–13)
Mem. Fukui Univ., (**34**): 31. Type locality: Kanagawa Pref. (Mt. Daiyu-yama).

Biphyllidae ムクゲキスイムシ科
Biphyllus complexus SASAJI, 1983 フトナミゲムクゲキスイ
Mem. Fukui Univ., (**33**): 31. Type locality: Fukuoka Pref. (Mt. Hikosan).
Biphyllus japonicus SASAJI, 1983 クロアシムクゲキスイ
Mem. Fukui Univ., (**33**): 34. Type locality: Fukui Pref. (Mt. Hoonji).
Biphyllus kuzurius SASAJI, 1985 クズリュウムクゲキスイ
Mem. Fukui Univ., (**35**): 11. Type locality: Fukui Pref. (Mt. Washikura-dake).
Biphyllus loochooanus SASAJI, 1991 リュウキュウクロムクゲキスイ (I–14)
Mem. Fukui Univ., (**41**): 12. Type locality: Yonaguni I. (Mt. Urabu).

Cerylonidae カクホソカタムシ科
Lapecautomus orientalis SASAJI, 1983 ナガマルホソカタムシ
Mem. Fukui Univ., (**33**): 42. Type locality: Nara Pref. (Mt. Toh-no-mine).
Philothermus shibatai SASAJI, 1983 ツシマカクホソカタムシ (I–15)
Mem. Fukui Univ., (**33**): 41. Type locality: Tsushima I. (Mt. Tatera).
Philothermus takasago SASAJI, 1983 (I–16)
Mem. Fukui Univ., (**33**): 38. Type locality: Formosa (Penpuchi).

Bothrideridae ムキヒゲホソカタムシ科
Antibothrus morimotoi SASAJI, 1997 イノウエホソカタムシ (II–1)
Esakia, (**37**): 111. Type locality: Fukui Pref. (Fukui-shi).
Dastarcus kurosawai SASAJI, 1968 クロサワオオホソカタムシ
Ent. Pap. to Kurosawa: 244. Type locality: Ishigaki I. (Mt. Banna-dake).

Endomychidae テントウムシダマシ科
Holoparamecus (***Calyptobium***) ***amabilis*** SASAJI, 1991クロオビツヤヒメマキムシ (II–2)
Mem. Fukui Univ., (**41**): 22. Type locality: Ishigaki I. (Mt. Banna-dake).
Leiestes fines SASAJI, 1995 オビホソテントウダマシ (II–3)
Mem. Fukui Univ., (**47**): 24. Type locality: Aomori Pref. (Kosei-rindo).
Eidoreus japonicus SASAJI, 1991 ツヤチビテントウダマシ
Mem. Fukui Univ., (**41**): 18. Type locality: Shizuoka Pref. (Sugeyama).
Chondria formosana SASAJI, 1970 (II–4)
Etizenia, (**43**): 9. Type locality: Formosa (Penpuchi).
Danae castanea SASAJI, 1978 カバイロダナエテントウダマシ
Mem. Fukui Univ., (**28**): 23. Type locality: Nagasaki Pref. (Mt. Kompira).
Saula chujoi SASAJI, 1970 (II–5)
Etizenia, (**43**): 7. Type locality: Formosa (Sungkang).

Endomychus gorhami kyushuensis SASAJI, 1978 クロルリテントウダマシ

Mem. Fukui Univ., (**28**): 25. Type locality: Fukuoka Pref. (Mt. Hikosan).

Endomychus hiranoi SASAJI, 1978 ヒラノクロテントウダマシ

Mem. Fukui Univ., (**28**): 27. Type locality: Kanagawa Pref. (Miyanoshita).

Meilichius multimaculatus SASAJI, 1970 (II–6)

Etizenia, (**43**): 15. Type locality: Formosa (Penpuchi).

Mycetina karin SASAJI, 1995 カリンテントウダマシ (II–7)

Mem. Fukui Univ., (**47**): 26. Type locality: Amami-Oshima I. (nr. Akafusa).

Ectomychus nigrofasciatus SASAJI, 1988 クロオビテントウダマシ (II–8)

Mem. Fukui Univ., (**38**): 19. Type locality: Okinawa I. (Yona).

Ectomychus yukihikoi SASAJI, 1995 ヒメケブカテントウダマシ (II–9)

Mem. Fukui Univ., (**47**): 28. Type locality: Amami-Oshima (Chuorindo).

Anamorphidae = Mychothenidae マルテントウダマシ科

Bystodes flavoapicalis SASAJI, 1990 キモンマルテントウダマシ

Esakia Spec. Iss., (**1**): 70. Type locality: Okinawa I. (Naha).

Bystodes kidoi SASAJI, 1990 キドマルテントウダマシ

Esakia Spec. Iss., (**1**): 71. Type locality: Fukuoka Pref. (Mt. Jo-yama).

Bystodes taiwanensis SASAJI, 1970 (II–10)

Etizenia, (**43**): 1. Type locality: Formosa (Penpuchi).

Bystodes yaeyamensis SASAJI, 1990 ケナガマルテントウダマシ

Esakia Spec. Iss., (**1**): 72. Type locality: Ishigaki I. (Mt. Omoto-dake).

Dialexia hisanoi SASAJI, 1978 ベニモンマルテントウダマシ (II–11)

Mem. Fukui Univ., (**28**): 12. Type locality: Fukui Pref. (Iwaya).

Dexialia mirabilis SASAJI, 1995 ムナグロマルテントウダマシ (II–12)

Mem. Fukui Univ., (**47**): 22. Type locality: Fukushima Pref. (Motei-rindo).

Dexialia ovalis SASAJI, 1970 (II–13)

Etizenia, (**43**): 5. Type locality: Formosa (Sungkang).

Dexialis spectabilis SASAJI, 1984 アトモンマルガタテントウダマシ (II–14)

Mem. Fukui Univ., (**34**): 32. Type locality: Kagoshima Pref. (Nagashima).

Mychothenus asiaticus SASAJI, 1978 ダエンテントウダマシ (II–15)

Mem. Fukui Univ., (**28**): 6. Type locality: Fukuoka Pref. (Mt. Hikosan).

Mychothenus hirashimai SASAJI, 1990 オキナワダエンテントウダマシ

Esakia Spec. Iss., (**1**): 68. Type locality: Okinawa I. (Naha).

Idiophyes boninensis SASAJI, 1978 オガサワラマルテントウダマシ (II–16)

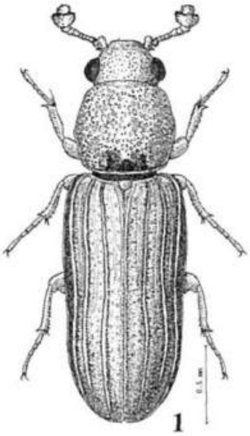
Mem. Fukui Univ., (**28**): 19. Type locality: Chichi-jima I. (Oogiura).

Idiophyes uenoi SASAJI, 1990 ウエノコマルガタテントウダマシ

Esakia Spec. Iss., (**1**): 73. Type locality: Okinawa I. (Naha).

Antibothrus morimotoi SASAJI, 1997 イノウエホソカタムシ (II-1]; *Holoparamecus* (*Calyptobium*) *amabilis* SASAJI, 1991 クロオビツヤヒメマキムシ (II–2); *Leiestes fines* SASAJI, 1995 オビホソテントウダマシ (II–3); *Chondria formosana* SASAJI, 1970 (II–4); *Saula chujoi* SASAJI, 1970 (II–5), *Meilichius multimaculatus* SASAJI, 1970 (II–6); *Mycetina karin* SASAJI, 1995 カリンテントウダマシ (II–7); *Ectomychus nigrofasciatus* SASAJI, 1988 クロオビテントウダマシ (II–8); *Ectomychus yukihikoi* SASAJI, 1995 ヒメケブカテントウダマシ (II–9); *Bystodes taiwanensis* SASAJI, 1970 (II–10); *Dialexia hisanoi* SASAJI, 1978 ベニモンマルテントウダマシ (II–11); *Dexialia mirabilis* SASAJI, 1995 ムナグロマルテントウダマシ (II–12); *Dexialia ovalis* SASAJI, 1970 (II–13); *Dexialis spectabilis* SASAJI, 1984 アトモンマルガタテントウダマシ (II–14); *Mychothenus asiaticus* SASAJI, 1978 ダエンテントウダマシ (II–15); *Idiophyes boninensis* SASAJI, 1978 オガサワラマルテントウダマシ (II–16)

II



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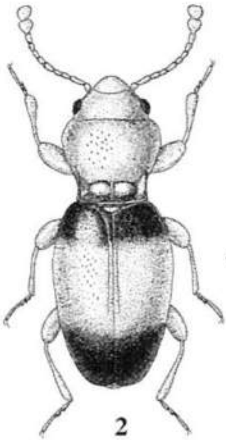

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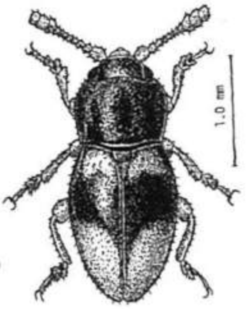

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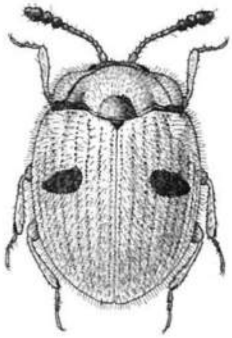

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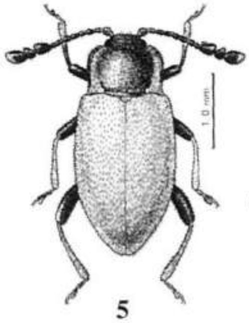

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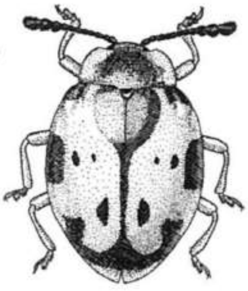

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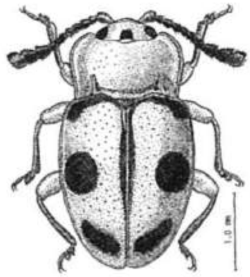

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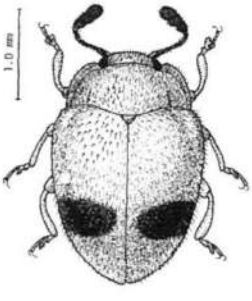

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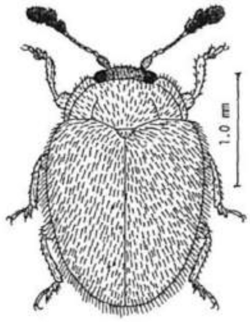

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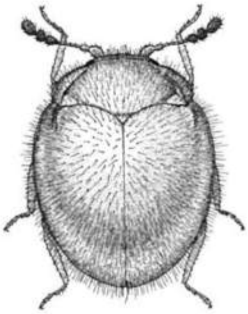

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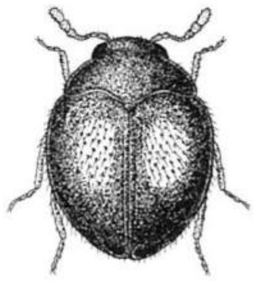

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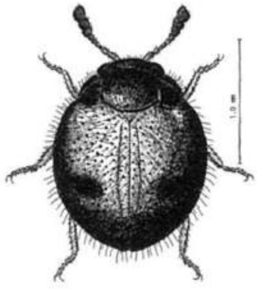

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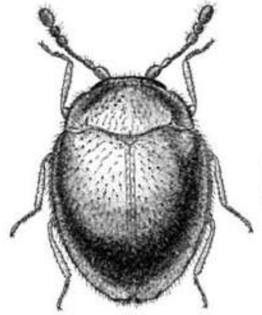

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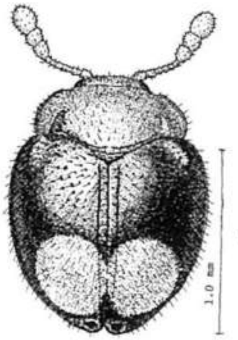

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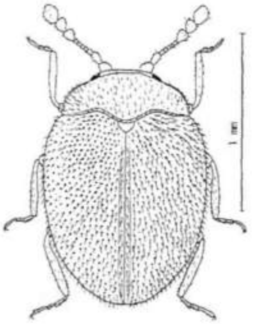

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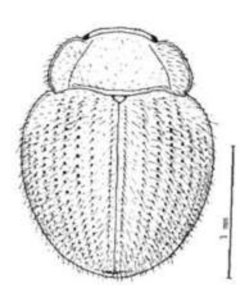


16

B) COOCINELIDAE

Coccinellidae テントウムシ科

Subfamily Sticholotidinae

Tribe Sukunahikonini

Hikonasukuna monticola SASAJI, 1967

Etizenia, (**25**): 5. Type locality: Formosa (Mt. Alishan).

Sukunahikona bicolor H. KAMIYA, 1965 フタイロチビテントウ

Kontyu, **33**: 113. Type locality: Ishigaki I. (Mt. Omoto-dake).

= *Scotoscymnus bicolor* (H. KAMIYA)

Sukunahikona japonica H. KAMIYA, 1960 ムクゲチビテントウ (III-1)

Kontyu, **28**: 24. Type locality: Fukuoka Pref. (Mt. Wakasugi).

= *Scotoscymnus japonicus* (REITTER, 1889)

Tribe Sticholotidini

Nesolotis azumai SASAJI, 1967 キイロメツブテントウ

Mushi, **40**: 177. Type locality: Okinawa I. (Naha).

Nesolotis shirozui SASAJI, 1967

Etizenia, (**25**): 18. Type locality: Formosa (Fenchihu).

Nesolotis tsunekii SASAJI, 1967

Etizenia, (**25**): 17. Type locality: Formosa (Wulai).

Pharoscymnus taoi SASAJI, 1967

Etizenia, (**25**): 21. Type locality: Formosa (Puli).

Sticholotis hirashimai SASAJI, 1967

Etizenia, (**25**): 14. Type locality: Formosa (Penpuchi).

Sticholotis morimotoi H. KAMIYA, 1965 モリモトメツブテントウ

Kontyu, **33**: 110. Type locality: Ishigaki I. (Mt. Omoto-san).

Stictobura amabilis H. KAMIYA, 1965 ナナホシメツブテントウ

Kontyu, **33**: 111. Type locality: Iriomote I. (Shirahama).

= *Nesolotis amabilis* (H. KAMIYA): SASAJI, 1967

Tribe Serangiini

Catana yasumatsui SASAJI, 1967

Etizenia, (**25**): 9. Type locality: Formosa (Sungkang).

Serangiella sabahensis SASAJI, 1968

Mushi, **42**: 120. Type locality: Borneo (Papar).

Serangium ruficolle H. KAMIYA, 1965 クビアカツヤテントウ

Kontyu, **33**: 114. Type locality: Okinoerabu I. (Wadomari).

Serangium ryukyuense H. KAMIYA, 1965 リュウキュウツヤテントウ

Kontyu, **33**: 115. Type locality: Iriomote I. (Ushiku-mori).

Tribe Shirozuellini

Medamatento secunda SASAJI, 1989 クロメダマテントウ (IV–1)

Mem. Fukui Univ., (**39**): 22. Type locality: Ishigaki I. (Takeda).

Shirozuella mirabilis SASAJI, 1967 (IV–2)

Etizenia, (**25**): 25. Type locality: Formosa (Sungkang).

Shirozuella ocularis SASAJI, 1988 メダマテントウ (IV–3)

Mem. Fukui Univ., (**38**): 14. Type locality: Okinawa I. (Yona).

= *Medamatento ocularis* (SASAJI)

Subfamily Coccidulinae

Tribe Coccidulini

Sumnius babai SASAJI, 1994
Spec. Bull. Essa ent. Soc., (**2**): 236. Type locality: Formosa (Liu Kuei).

Tribe Monocorynini

Monocoryna yamashinai SASAJI, 1989 (IV–4)
Bull. Biogeogr. Soc. Jpn., **44**: 117. Type locality: Thailand (Phuping Palace).

Subfamily Scymninae

Tribe Stethorini

Stethorus chengi SASAJI, 1968
Etizenia, (**32**): 5. Type locality: Formosa (Chiai).

Stethorus japonicus H. KAMIYA, 1959 キアシクロヒメテントウ (III–2)
Kontyu, **27**: 139. Type locality: Fukuoka Pref. (Mt. Wakasugi).

Stethorus hirashimai SASAJI, 1968
Etizenia, (**32**): 5. Type locality: Formosa (Neichiao).

Stethorus loi SASAJI, 1968
Etizenia, (**32**): 2. Type locality: Formosa (Taipei).

Tribe Scymnini

Axinoscymnus beneficus H. KAMIYA, 1963 ネアカヒメテントウ (III–3)
Mushi, **37**: 128. Type locality: Amami-Oshima I. (Nase).

Axinoscymnus nigripennis H. KAMIYA, 1965 クロバネヒメテントウ
Kontyu, **33**: 100. Type locality: Okinawa I. (Izumi).

Axinoscymnus rai H. KAMIYA, 1965 ライヒメテントウ
Kontyu, **33**: 101. Type locality: Okinawa I. (Kudeken).

Clitostethus nagasakiensis H. KAMIYA, 1961 ナガサキヒメテントウ
J. Kyushu Univ., **11**: 279. Type locality: Nagasaki Pref. (Mt. Iwayasan).
= *Pseudoscymnus nagasakiensis* (H. KAMIYA): H. KAMIYA, 1966

Clitostethus lewisi H. KAMIYA, 1961 ルイスヒメテントウ
J. Kyushu Univ., **11**: 279. Type locality: Nagasaki Pref. (Mt. Kompira).
= *Pseudoscymnus lewisi* (H. KAMIYA): H. KAMIYA, 1966

Keiscymnus tosaensis SASAJI, 1971 トサヒメテントウ (III–4)
Fauna Japonica: 95. Type locality: Kochi Pref. (Mt. Kajigamori).

Nephus boninensis SASAJI, 1982 オガサワラヒメテントウ
Spec. Iss. Chujo: 65. Type locality: Hahajima I. (Inokumawan).

Nephus ryukyuensis SASAJI, 1971 リュウキュウナガヒメテントウ (III–5)
Fauna Japonica: 131. Type locality: Iriomote I. (Shirahama).

Nephes oshimaensis SASAJI, 1976 (III–6)
Mem. Fukui Univ.: 53. Type Locality: Fukui Pref. (Oshima)

Pseudoscymnus quinquepunctatus okinawanus H. KAMIYA, 1965
イツボシヒメテントウ沖縄亜種
Kontyu, **33**: 103. Type locality: Okinawa I. (Izumi).

Psedoscymnus ohtsukai SASAJI, 1982 オオツカヒメテントウ
Spec. Iss. Chujo: 68. Type locality: .Kumamoto Pref. (Mt. Ohira)

Pseudoscymnus tsugae SASAJI et MCCLURE, 1997 ツガクロヒメテントウ
Ann. Ent. Soc. Am., **90**: 563. Type locality: Osaka Pref. (Takatsuki).

Scymnus* (*Nipponopullus*) *pirikamenoko H. KAMIYA, 1961　アイヌノヒメテントウ

J. Kyushu Univ., **11**: 284. Type locality: Hokkaido (Kitami).

Scymnus* (*Neopullus*) *babai SASAJI, 1971　ババヒメテントウ

Fauna Japonica: 188. Type locality: Niigata Pref. (Katamachi).

Scymnus* (*Neopullus*) *nakaikemensis SASAJI et KISHIMOTO, 1996
ナカイケミヒメテントウ (III–7)

Mem. Snowdraft Lab., Fukui Univ., (**3**): 15. Type locality: Fukui Pref. (Nakaikemi).

Scymnus* (*Neopullus*) *ohtai SASAJI, 1971　オオタヒメテントウ

Fauna Japonica: 184. Type locality: Hokkaido (Ashoro).

Scymnus* (*Neopullus*) *taishuensis SASAJI, 1971　ツシマアカスジヒメテントウ (III–8)

Fauna Japonica: 186. Type locality: Tsushima I. (Mt. Tatera).

Scymnus* (*Nephus*) *ryuguus H. KAMIYA, 1961　リュウグウヒメテントウ

J. Kyushu Univ., **11**: 289. Type locality: Okinawa I. (Chinen).

= *Nephus ryuguus* (H. KAMIYA): SASAJI, 1971

Scymnus* (*Nephus*) *kaiensis H. KAMIYA, 1961　カイヒメテントウ

J. Kyushu Univ., **11**: 286. Type locality: Yamanashi Pref. (Kofu).

= *Nephus kaiensis* (H. KAMIYA): SASAJI, 1971

Scymnus* (*Nephus*) *kompirasanus H. KAMIYA　ムモンヒメテントウ

J. Kyushu Univ., **11**: 295. Type locality: Kagawa Pref. (Mt. Zoozu).

= *Nephus kompirasanus* (H. KAMIYA): SASAJI, 1971

Scymnus* (*Nephus*) *yotsumon H. KAMIYA　ヨツモンヒメテントウ

J. Kyushu Univ., **11**: 287. Type locality: Yamanashi Pref. (Kofu).

= *Nephus yotsumon* (H. KAMIYA): SASAJI, 1971.

Scymnus* (*Nephus*) *tagiapatus H. KAMIYA, 1965　ニセセスジヒメテントウ (III–9)

Kontyu, **33**: 104. Type locality: Ishigaki I. (Arakawa).

= *Nephus tagiapatus* (H. KAMIYA): SASAJI, 1968.

Scymnus* (*Pullus*) *centralis H. KAMIYA, 1965

Spec. Bull. Lep.: 81. Type locality: Formosa (Rimogan~Magan).

Scymnus* (*Pullus*) *chujoi SASAJI, 1982　チュウジョウヒメテントウ

Spec. Iss. Chujo: 69. Type locality: Fukui Pref. (Mt. Hyakuri).

Scymnus* (*Pullus*) *giganteus H. KAMIYA, 1961　オニヒメテントウ

J. Kyushu Univ., **11**: 321. Type locality: Kagawa Pref. (Zentsuji).

Scymnus* (*Pullus*) *hatomensis H. KAMIYA, 1965　ハトマヒメテントウ

Kontyu, **33**: 108. Type locality: Hatoma I.

Scymnus* (*Pullus*) *kaguyahime H. KAMIYA, 1961　カグヤヒメテントウ

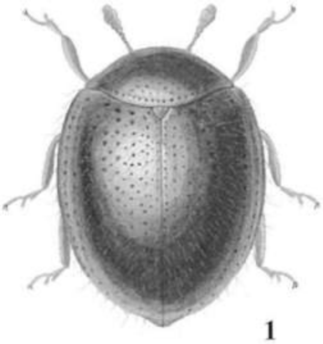
J. Kyushu Univ., **11**: 313. Type locality: Fukuoka Pref. (Kashii).

Scymnus* (*Pullus*) *kimotoi H. KAMIYA, 1965　キモトヒメテントウ

Kontyu, **33**: 106. Type locality: Ishigaki I. (Ushiku-mori).

Sukunahikona japonica H. KAMIYA, 1960 ムクゲチビテントウ (III–1); *Stethorus japonicus* H. KAMIYA, 1959 キアシクロヒメテントウ (III–2); *Axinoscymnus beneficus* H. KAMIYA, 1963 ネアカヒメテントウ (III–3); *Keiscymnus tosaensis* SASAJI, 1971 トサヒメテントウ (III–4); *Nephus ryukyuensis* SASAJI, 1971 リュウキュウナガヒメテントウ (III–5); *Nephus oshimaensis* SASAJI, 1976 (III–6); *Scymnus* (*Neopullus*) *nakaikemensis* SASAJI et KISHIMOTO, 1996 ナカイケミヒメテントウ (III–7); *Scymnus* (*Neopullus*) *taishuensis* SASAJI, 1971 ツシマアカスジヒメテントウ (III–8); *Scymnus* (*Nephus*) *tagiapatus* H. KAMIYA, 1965 ニセセスジヒメテントウ (III–9); *Scymnus* (*Pullus*) *syoitii* SASAJI, 1971 キイロヒメテントウ (III–10); *Scymnus* (*Pullus*) *yamato* H. KAMIYA, 1961 ヤマトヒメテントウ; *Hyperaspis* (*Oxynychus*) *gyotokui* H. KAMIYA, 1963 ギョウトクテントウ (III–11); *Exochomus isensis* H. KAMIYA, 1966 イセテントウ (III–12)

III



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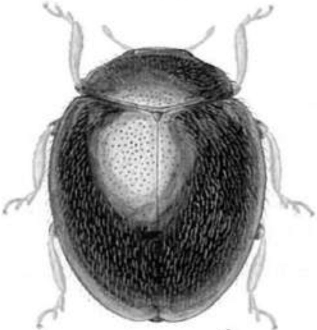

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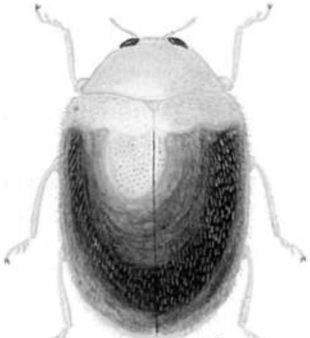

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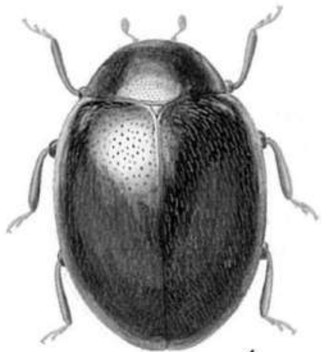

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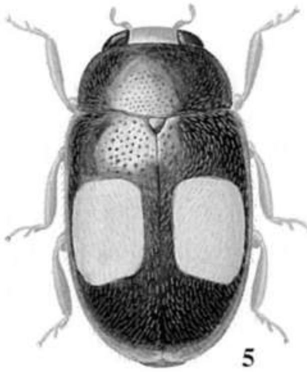

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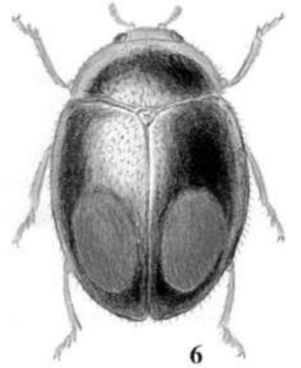

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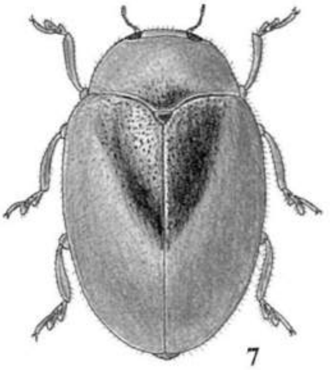

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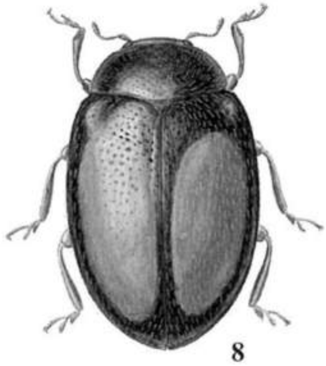

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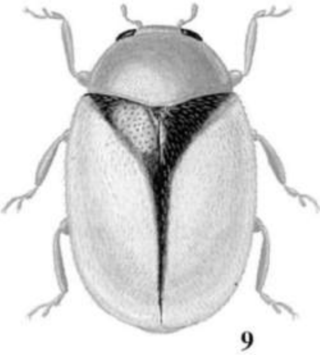

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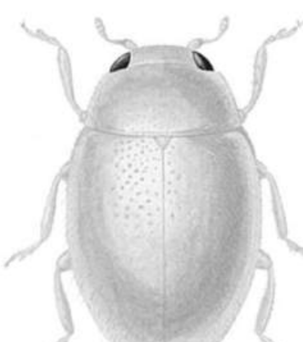

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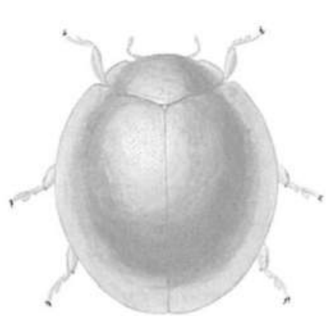


12

Scymnus* (*Pullus*) *otohime H. KAMIYA, 1961 オトヒメテントウ

J. Kyushu Univ., **11**: 314. Type locality: Fukuoka Pref. (Mt. Hikosan).

= *Scymnus* (*Neopullus*) *otohime* H. KAMIYA: SASAJI, 1971

Scymnus* (*Pullus*) *ovimaculatus SASAJI, 1968

Mushi, **42**: 124. Type locality: Malaya (Parit Buntar).

Scymnus* (*Pullus*) *rectoides SASAJI, 1971 ニセツマアカヒメテントウ

Fauna Japonica: 156. Type locality: Yamanashi Pref. (Shiojiri).

Scymnus* (*Pullus*) *shirozui H. KAMIYA, 1965

Spec. Bull. Lep.: 77. Type locality: Formosa (Urai~Agyoku).

Scymnus* (*Pullus*) *syoitii SASAJI, 1971 キイロヒメテントウ (III–10)

Fauna Japonica: 146. Type locality: Fukuoka Pref. (Kashii).

Scymnus* (*Pullus*) *takasago H. KAMIYA, 1965

Spec. Bull. Lep.: 80. Type locality: Formosa (Oiwake).

Scymnus* (*Pullus*) *vencoxus H. KAMIYA, 1965 セダカヒメテントウ

Kontyu, **33**: 316. Type locality: Kochi Pref. (Monobe-mura).

= *Scymnus* (*Pullus*) *convexus* H. KAMIYA, 1961. J. Kyushu Univ., **11**: 315. (nec *convexus* NUMENMACHER, 1937)

Scymnus* (*Pullus*) *yamato H. KAMIYA, 1961 ヤマトヒメテントウ

J. Kyushu Univ., **11**: 310. Type locality: Fukuoka Pref. (Fukuoka).

= *Scymnus* (*Neopullus*) *yamato* H. KAMIYA: SASAJI, 1971

Scymnus* (*Scymnus*) *marinus H. KAMIYA, 1961 ハマベテントウ

J. Kyushu Univ., **11**: 299. Type locality: Fukuoka Pref. (Okinoshima I.).

Scymnus* (*Scymnus*) *nigrosuturalis H. KAMIYA, 1961 クロスジヒメテントウ

J. Kyushu Univ., **11**: 298. Type locality: Okinoerabu I.

Scymnus* (*Scymnus*) *tsushimensis SASAJI, 1970 ツシマヒメテントウ

Bull. Natn. Sci. Mus., **13**: 209. Type locality: Tsushima I. (Tsutsu-Uchiyama).

Tribe Hyperaspini

Hyperaspis* (*Hyperaspis*) *babai H. KAMIYA, 1963 ババホシナシテントウ

Mem. Fukui Univ., (**13**): 82. Type locality: Nagano Pref. (Karuizawa).

Hyperaspis* (*Oxynychus*) *gyotokui H. KAMIYA, 1963 ギョウトクテントウ (III–11)

Mem. Fukui Univ., (**13**): 83. Type locality: Fukuoka Pref. (Mino).

Exochomus isensis H. KAMIYA, 1966 イセテントウ (III–12)

Mushi, **29**: 80. Type locality: Mie Pref. (Mt. Takakura).

= *Arawana isensis* (H. KAMIYA): SASAJI, 1971

Subfamily Chiloconinae

Tribe Aspidimerini

Aspidimerus esakii SASAJI, 1968

Etizenia, (**32**): 16. Type locality: Formosa (Chihsinliao).

Aspidimerus matsumurai SASAJI, 1968

Etizenia, (**32**): 17. Type locality: Formosa (Granbi).

Cryptogonus angusticarinatus SASAJI, 1968

Etizenia, (**32**): 13. Type locality: Formosa (Wulai).

Cryptogonus kurosawai SASAJI, 1968

Etizenia, (**32**): 11. Type locality: Formosa (Puli).

Cryptogonus ohtai SASAJI, 1968
Etizenia, (**32**): 8. Type locality: Formosa (Kuantsuling).

Tribe Platynaspini

Phymatosternus lanyuanus SASAJI, 1991
Trans. Essa, (**71**): 49. Type locality: Formosa (Lan Yu I.).

Platynaspidius babai SASAJI, 1988
Trans. Essa, (**65**): 41. Type locality: Formosa (Keng Ting).

Tribe Chilocorini

Chilocorus alishanus SASAJI, 1968
Etizenia, (**32**): 20. Type locality: Formosa (Mt. Alishan).

Chilocorus amamensis H. KAMIYA, 1959 アマミアカホシテントウ
Kontyu, **27**: 103. Type locality: Amami Is. (Okinoerabu I.).

Chilocorus esakii H. KAMIYA, 1959 エサキアカホシテントウ
Kontyu, **27**: 102. Type locality: Kagoshima Pref. (Cape Sata).

Chilocorus ishigakensis H. KAMIYA, 1959 イシガキアカホシテントウ
Kontyu, **27**: 104. Type locality: Ishigaki I.

Chilocorus shirozui SASAJI, 1968
Etizenia, (**32**): 22. Type locality: Formosa (Sungkang).

Subfamily Coccinellinae

Alloneda osawai SASAJI, 1986
Mem. Fukui Univ., (**36**): 4. Type locality: Formosa (Puli).

Chelonitis (?) ***takasago*** SASAJI, 1982
Mem. Fukui Univ., (**31**): 8. Type locality: Formosa (Sungkang).
= *Oenopia* (*Gyrocaria*) *takasago* (SASAJI): SASAJI, 1988

Coelophora flavomarginata SASAJI, 1982
Mem. Fukui Univ., (**31**): 20. Type locality: Formosa (Wushe-Chunyan).

Coelophora itoi SASAJI, 1982
Mem. Fukui Univ., (**31**): 23. Type locality: Formosa (Nanshanchi).

Coelophora tanoi SASAJI, 1982
Mem. Fukui Univ., (**31**): 25. Type locality: Formosa (Kueishanhu).

Lemnia (***Lemnia***) ***loi*** SASAJI, 1982
Mem. Fukui Univ., (**31**): 29. Type locality: Formosa (Taipei).

Propylea shirozui SASAJI, 1982
Mem. Fukui Univ., (**31**): 13. Type locality: Formosa (Sungkang).

Micraspis hirashimai SASAJI, 1968
Mushi, **42**: 129. Type locality: Borneo-Sarawak (Tarat).

Micraspis yasumatsui SASAJI, 1968
Mushi, **42**: 131. Type locality: E. Pakistan (Dacca).

Halyzia shirozui SASAJI, 1982
Mem. Fukui Univ., (**31**): 36. Type locality: Formosa (Sungkang).

Harmonia shoichii SASAJI, 1998 イマサカテントウ
Mem. Fukui Univ., (**38**): 17. Type locality: Formosa (Meifeng).

C) HETEROMERA

Colydiidae ホソカタムシ科

Bolcocius formosanus SASAJI, 1984
Mem. Fukui Univ., (**34**): 42. Type locality: Formosa (Tienhsiang).
Bolcocius shibatai SASAJI, 1984 コヒラタホソカタムシ
Mem. Fukui Univ., (**34**): 38. Type locality: Amami-Oshima I. (Hatsuno).
Bolcocius yaeyamensis SASAJI, 1984 ヤエヤマコヒラタホソカタムシ
Mem. Fukui Univ., (**34**): 41. Type locality: Ishigaki I.
Cicones hayashii SASAJI, 1971 ハヤシヒメヒラタホソカタムシ
Life Study, **15**: 42. Type locality: Kanagawa Pref. (Yokohama).
= *Synchita hayashii* (SASAJI): SASAJI, 1985
Cicones rufosignatus SASAJI, 1984 ベニモンヒメヒラタホソカタムシ (IV–5)
Mem. Fukui Univ., (**34**): 34. Type locality: Fukui Pref. (Otomi).
Neotrichus lanyuensis SASAJI, 1968 コウトウノコムネホソカタムシ (IV–6)
Ent. Pap. to Kurosawa: 247. Type locality: Formosa (Lanyu I.).
Neotrichus serraticollis SASAJI, 1968 ノコムネホソカタムシ (IV–7)
Ent. Pap. to Kurosawa: 246. Type locality: Ishigaki I. (Mt. Banna-dake).

Melandryidae ナガクチキムシ科

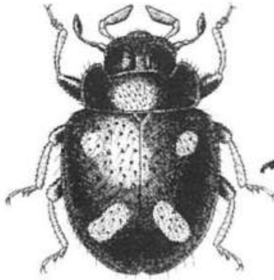
Lederia (***Lederina***) ***angusticanalis*** SASAJI, 1987 ミゾボソノミナガクチキ
Mem. Fukui Univ., (**37**): 43. Type locality: Fukuoka Pref. (Mt. Sefuri).
Lederia (***Lederina***) ***kidoi*** SASAJI, 1995 キドノミナガクチキ (IV–8)
Spec. Bull. Jpn. Coleop., (**4**): 426. Type locality: Fukuoka Pref. (Ooshima I.).
Lederia (***Lederina***) ***pion*** SASAJI, 1987 オオノミナガクチキ
Mem. Fukui Univ., (**37**): 45. Type locality: Fukuoka Pref. (Mt. Jo-yama).
Microscapha isensis SASAJI, 1987 ホソノミナガクチキ
Mem. Fukui Univ., (**37**): 35. Type locality: Mie Pref. (Mt. Nonoboriyama).
Holostrophus morimotoi SASAJI, 1974 モリモトヒメナガクチキ
Mem. Fukui Univ., (**24**): 1. Type locality: Kagoshima Pref. (Cape Sata).
Dircaeomorpha elegans SASAJI, 1974 ヒゲブトナガクチキ
Mem. Fukui Univ., (**24**): 4. Type locality: Fukui Pref. (Okochi).
Prothalpia utakoae SASAJI, 1988 アカバネナガクチキ (IV–9)
Mem. Fukui Univ., (**38**): 43. Type locality: Ooita Pref. (Mt. Kurodake).

Zopheridae コブゴミムシダマシ科

Usechus ohdaiensis SASAJI, 1987 オオダイヨコミゾコブゴミムシダマシ (IV–10)
Mem. Fukui Univ., (**37**): 52. Type locality: Nara Pref. (Mt. Ohdaigahara).
Usechus tsushimensis H. KAMIYA, 1963 ツシマヨコミゾコブゴミムシダマシ
Mushi, **37**: 21. Type locality: Tsushima I. (Izuhara-Mt. Ariakeyama).

Medamatento secunda SASAJI, 1989 クロメダマテントウ (IV–1); *Shirozuella mirabilis* SASAJI, 1967 (IV–2); *Shirozuella ocularis* SASAJI, 1988 メダマテントウ (IV–3); *Monocoryna yamashinai* SASAJI, 1989 (IV–4); *Cicones rufosignatus* SASAJI, 1984 ベニモンヒメヒラタホソカタムシ (IV–5); *Neotrichus lanyuensis* SASAJI, 1968 コウトウノコムネホソカタムシ (IV–6); *Neotrichus serraticollis* SASAJI, 1968 ノコムネホソカタムシ (IV–7); *Lederia* (*Lederina*) *kidoi* SASAJI, 1995 キドノミナガクチキ (IV–8); *Prothalpia utakoae* SASAJI, 1988 アカバネナガクチキ (IV–9); *Usechus ohdaiensis* SASAJI, 1987 オオダイヨコミゾコブゴミムシダマシ (IV–10); *Archaeoglenes orientalis* SASAJI, 1983 キイロチビコクヌストモドキ (IV–11); *Polacus longicornis* SASAJI, 1985 マサニカミキリモドキ (IV–12); *Hemipeplus miyamotoi* H. KAMIYA, 1961 ホソキカワムシ (IV–13); *Inopeplus uenoi* SASAJI, 1984 カギモンハネカクシダマシ (IV–14); *Trogocryptoides shintaroi* SASAJI, 1988 カクチビキカワムシ (IV–15); *Salpingus* (*Salpingus*) *morishimai* SASAJI, 1987 クチナガチビキカワムシ (IV–16).

IV



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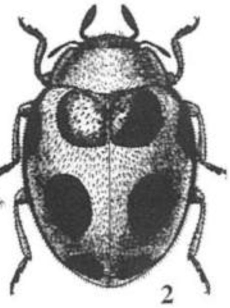

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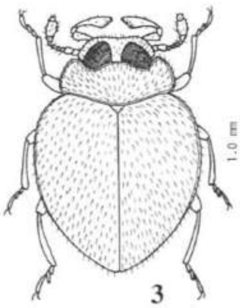

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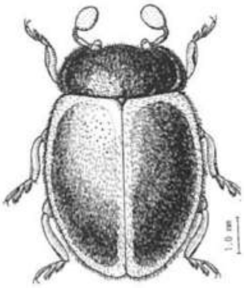

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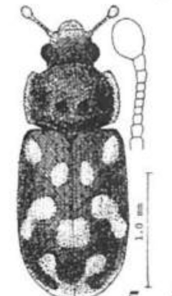

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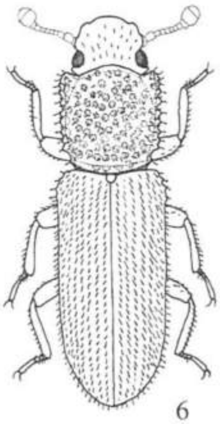

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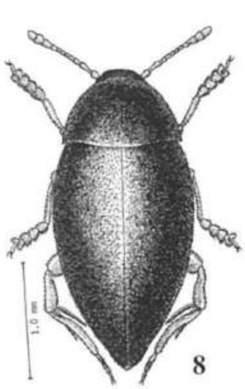

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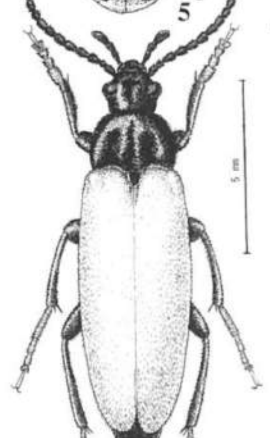

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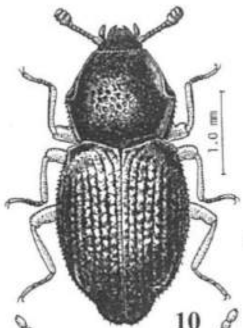

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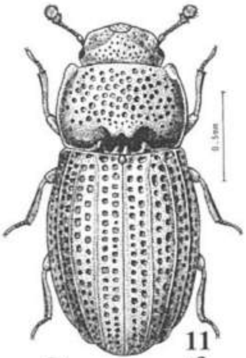

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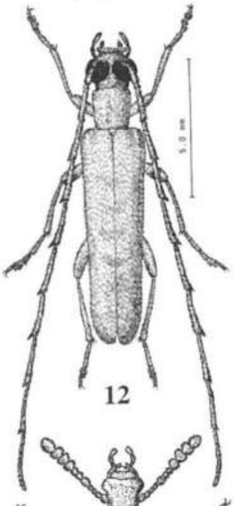

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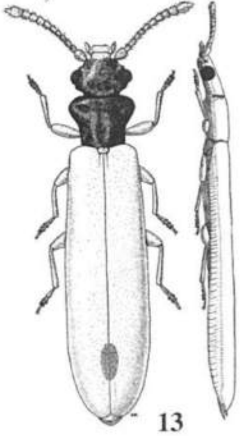

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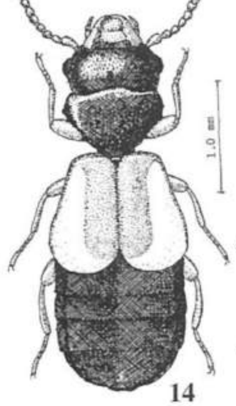

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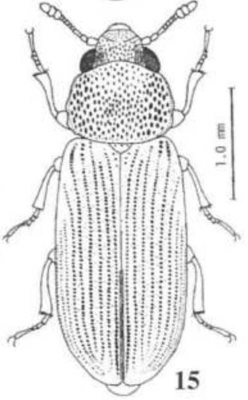

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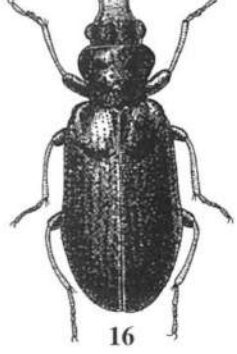

16

Tenebrionidae ゴミムシダマシ科
Arthromacra formosana SASAJI, 1986
Mem. Fukui Univ., (**36**): 11. Type locality: Formosa (Tsifeng).
Chlorophila admirabilis SASAJI, 1986
Mem. Fukui Univ., (**36**): 9. Type locality: Formosa (Liukuei).
Archaeoglenes orientalis SASAJI, 1983 キイロチビコクヌストモドキ (IV–11)
Mem. Fukui Univ., (**33**): 47. Type locality: Kumamoto Pref. (Tsuetate).

Oedemeridae カミキリモドキ科
Polacus longicornis SASAJI, 1985 マサニカミキリモドキ (IV–12)
Gekkan-Mushi, (**177**): 11. Type locality: Formosa (Mt. Fengang).

Hemipeplidae ホソキカワムシ科
Hemipeplus miyamotoi H. KAMIYA, 1961 ホソキカワムシ (IV–13)
Mushi, **35**: 75. Type locality: Amami-Oshima I. (Shinmura-Yuwan).

Inopeplidae ハネカクシダマシ科
Inopeplus monstrosus SASAJI, 1988 オバケハネカクシダマシ
Mem. Fukui Univ., (**38**): 41. Type locality: Amami-Oshima I.
= *Uruminopeplus sakaii* SATÔ et HATTA, 1988
Inopeplus syozoi SASAJI, 1986 オオサワハネカクシダマシ
Mem. Fukui Univ., (**36**): 7. Type locality: Formosa (nr. Henchung).
Inopeplus uenoi SASAJI, 1984 カギモンハネカクシダマシ (IV–14)
Mem. Fukui Univ., (**34**): 46. Type locality: Iriomote I. (Shirahama).

Salpingidae チビキカワムシ科
Trogocryptoides shintaroi SASAJI, 1988 カクチビキカワムシ (IV–15)
Mem. Fukui Univ., (**38**): 35. Type locality: Fukuoka Pref. (Mt. Jo-yama).
Salpingus (Salpingus) morishimai SASAJI, 1987 クチナガチビキカワムシ (IV–16)
Mem. Fukui Univ., (**37**): 29. Type locality: Tochigi Pref. (Nikko-shi).
Lissodema (Lissodema) morimotoi SASAJI, 1988 モリモトチビキカワムシ
Mem. Fukui Univ., (**38**): 30. Type locality: Fukuoka Pref. (Mt. Hikosan).
Lissodema (Lissodema) munaguro SASAJI, 1988 ムナグロチビキカワムシ
Mem. Fukui Univ., (**38**): 28. Type locality: Okinawa I. (Mt. Yaedake).
Lissodema (Lissodema) teruhisai SASAJI, 1988 クロオビチビキカワムシ
Mem. Fukui Univ., (**38**): 27. Type locality: Okinawa Pref. (Ikeya-jima I.).
Lissodema (Lissodema) uenoi SASAJI, 1988 クロナガチビキカワムシ
Mem. Fukui Univ., (**38**): 32. Type locality: Okinawa I. (Sueyoshi).

Spec. Publ. Japan Coleopt. Soc., Osaka, (1): 41–44, June 11, 2001

On *Leptocarabus kyushuensis* from Shimabara Peninsula, Nagasaki Prefecture, Japan (Coleoptera: Carabidae)

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JT Biohistory Research Hall, Takatsuki, Osaka, Japan
(Kim's present address: National Institute of Genetics, Mishima, Shizuoka Japan)
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We have presented a series of evidence suggesting that all the Japanese *Leptocarabus* species (except *L. kurilensis*) have no direct ancestry in the Eurasian Continent including Korean Peninsula and China.

The ancestor of the Japanese species would have inhabited the eastern periphery of the ancient Eurasian Continent, followed by its differentiation into several species after split of the Japanese Islands from the continent. The above view has been derived from the phylogenetic analysis of mitochondrial NADH dehydrogenase subunit 5 (ND5) gene sequences as well as nuclear 28S rDNA sequences of the Japanese and the continental *Leptocarabus* species (KIM *et al.*, 2000).

The phylogenetic relationships among the Japanese species and subspecies remain still somewhat obscure and the detailed account on this subject will be published elsewhere (KIM *et al.*, 2001). In the present article, we have dealt with mainly so-called *Leptocarabus kyushuensis* from Shimabara Peninsula, Nagasaki Prefecture, because the Shimabara population is sharply distinguishable molecular-phylogenetically from the nominotypical *L. kyushuensis* in the mainland Kyushu and the Chugoku district in Honshu, and occupies the key position in considering the speciation of the Japanese *Leptocarabus*.

The last author (S.O.) wishes to dedicate this paper to Professor Hiroyuki SASAJI in commemoration of his retirement from Fukui University.

Materials and Methods

For the analytical methods and construction of the phylogenetic trees, see KIM *et al.* (2000). Using the neighbor-joining (NJ) method (SAITOU and NEI, 1987) and unweighted pair-group method with arithmetic mean (UPGMA) (KUMAR *et al.*, 1993), the phylogenetic trees were constructed using the sequences containing a 1069 bp 3'-region of the ND5 gene. Bootstrap analysis was done for the trees based on 500 resamplings (FELSENSTEIN, 1985). The evolutionary distances (D) were computed by KIMURA's two-parameter method (KIMURA, 1980). For setting the time scale, a 0.01 D unit corresponding to 3.6 million years (MYR) was used (SU *et al.*, 1999).

Results and Discussion

The male genitalia and other morphological characters of *L. kyushuensis* from Shimabara Peninsula agree well with those of the typical *L. kyushuensis* from Kyushu, and there is no reason for the Shimabara population to discriminate morphologically from the other *L. kyushuensis*.

Both NJ and UPGMA analysis yielded trees with the same topology. Figure 1 shows a simplified UPGMA phylogenetic tree for the Japanese *Leptocarabus* species with special emphasis on the Shimabara population of *L. kyushuensis*. In both UPGMA- and NJ- (not shown) trees, the Shimabara population belongs to a distinctly different lineage from *L. kyushuensis* from the mainland Kyushu and the Chugoku district. It should be noted that the *L. kyushuensis* specimens from Kumamoto Prefecture, including one from Mt. Kinbo that is only about 2 km apart from Shimabara Peninsula and is separated by Shimabara Bay, all belong to the typical *L. kyushuensis* lineage (A in Fig. 1). The Shimabara population (B in Fig. 1) shares the common ancestry with all the other *Leptocarabus* (sub) species (*L. procerulus*, *L. procerulus miyakei*, *L. kumagaii*, *L. hiurai* and *L. arboreus*) except *L. kurilensis*, while the typical *L. kyushuensis* specimens form a separate cluster (A in Fig. 1) from the others. The two lineages, A and B, would have separated about 11 MYA from their common ancestry. Since the direct ancestry of these two lineages has not been found in the present Eurasian Continent including Korean Peninsula, the separation of the two lineages would have occurred somewhere in the ancient Japanese

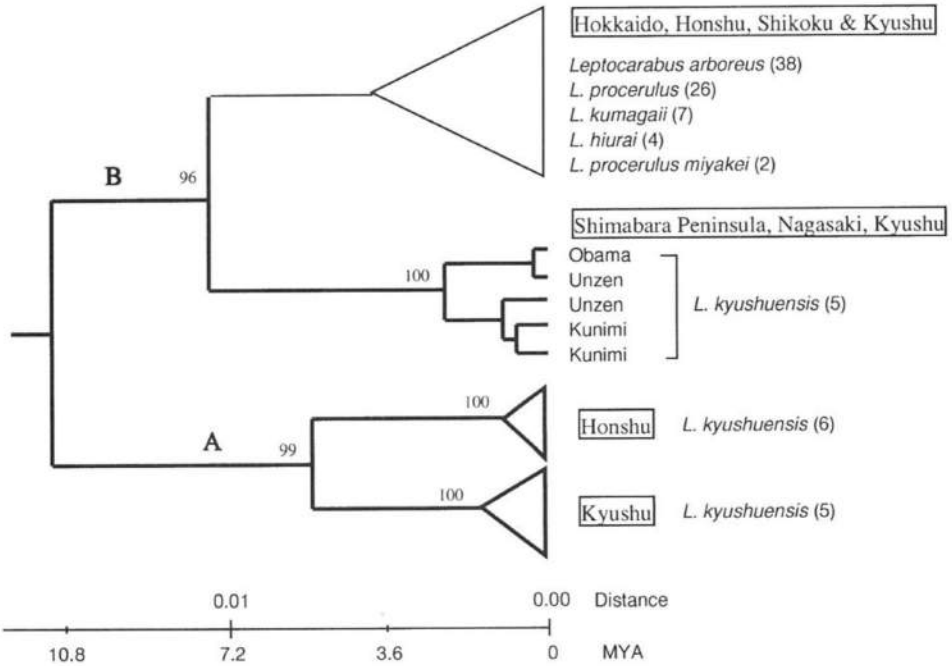

Fig. 1. Simplified phylogenetic tree (UPGMA) of the mitochondrial ND5 gene from *Leptocarabus kyushuensis* and other *Leptocarabus* (sub) species with special reference to the Shimabara population. In parentheses after scientific name are shown the numbers of individuals that have been examined for each (sub) species.

Islands, presumably in northern Kyushu.

From the above observations, it may be assumed that the common ancestry of the lineages A and B, i.e, the ancestry that led to all the Japanese *Leptocarabus* (sub) species had the *L. kyushuensis*-like morphological characters. In the lineage A, the morphological characters would have remained almost unchanged since separation of the two lineages. In the lineage B, the Shimabara population and the other *Leptocarabus* (sub) species separated from each other about 7 MYA, and the former has kept the *L. kyushuensis*-like characters, while the latter underwent morphological transformation characteristic to the respective *Leptocarabus* species. In this connection, it is of interest to note that the nuclear ITS (internal transcribed spacers I + II) of all the *L. kyushuensis* specimens examined including those from Shimabara Peninsula is 3.0 kbp long, while that of all other *Leptocarabus* species is 2.0–2.3 kbp long. This suggests that some changes leading to elimination of the ITS sequence would have taken place in the nuclear genome during emergence of the latter.

We thank Messrs. Shoichi IMSAKA and Yoshio AOKI for invaluable specimens used in this study.

要　約

金　衡坤・蘇　智慧・冨永　修・大澤省三：長崎県島原半島のキユウシユウクロナガオサムシ——長崎県島原半島のキユウシユウクロナガオサムシは，雄交尾器を含め，形態的特徴は九州本土のキユウシユウクロナガと区別できない．しかし，ミトコンドリアND5遺伝子による系統解析によれば，島原のものは，九州本土や本州のもの（A系統）とは別系統に属し，クロナガオサムシ，コクロナガオサムシなどを含むB系統に入る．古日本列島（多分，九州北部）にいた日本のクロナガオサムシ属の祖先型は，形態的にはキユウシユウクロナガ型で，A, B の2系統に分岐後，B系統がさらに2分岐し，一方はキユウシユウクロナガ型の形態を残したまま，島原の集団となり，他方は形態変化を伴ってクロナガオサムシやコクロナガオサムシに分化したと推定される．

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Morphological and Physiological Traits of Seasonal Forms of a Migrant Skipper, *Parnara guttata guttata* (Lepidoptera : Hesperiidae)

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Abstract The morphological and physiological traits of a migrant skipper *Parnara guttata guttata* (Lepidoptera: Hesperiidae) were compared between the two seasonal forms, summer and autumn. The adults of the summer form and the autumn form that were used in the present study were grown during the larval period under 16L8D and 14L10D at 25°C, respectively.

The body size and forewing size were significantly larger in the adults grown under 14L10D than those under 16L8D. The correlation coefficient between the head capsule width and forewing area was larger in the adults grown under 14L10D than that under 16L8D, and the difference between the two photoperiods was larger in males than in females. The flight activity of males grown under 14L10D was significantly greater than that under 16L8D. The amount of lipid storage in males under 14L10D was also more than that under 16L8D. However, flight activity and lipid storage between the two photoperiods showed no differences in females. The regression between the forewing area and flight distance under the two photoperiods was positive except for females under 16L8D. The correlation coefficient in males grown under 14L10D was significantly larger than that under 16L8D.

These facts show that the adults grown under 14L10D have migrant traits, and these traits are indicated more clearly in males than females.

Introduction

The rice skipper *Parnara guttata guttata* migrates in a southwestly direction from late August to mid-September in Japan (HIURA,1982; NAKASUJI,1988). This skipper species has three generations a year and the adults emerge in the periods from May to June (overwintering generation), mid-July (1st generation) and from late August to September (2nd generation). The 2nd or 3rd stadium larvae of the 3rd generation enter diapause (ISHII and HIDAKA, 1979) and overwinter.

The adult skipper has three seasonal forms that are determined by the daylength during the mature larval periods (ISHII and HIDAKA,1979). Daylengths shorter than 15h produce a dark, large autumn form that corresponds to the adult of the 2nd generation. Daylengths longer than 15h produce a pale, small summer form that corresponds to the adults of the 1st generation. The spring form that is produced under overwintering conditions varies in color depending on the daylength during the period when the larvae develop to the sensitive stages. The autumn form emerged under 14L10D had a longer preoviposition period and lesser fecundity than the summer form emerged under 16L8D (ONO and NAKASUJI,1980). These traits of the spring form

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emerged under 12L12D were intermediate between the autumn and summer forms (NAKASUJI and NAKANO,1990). The flight activity of adults on the day of emergence was higher in both the spring and autumn forms than the summer form (NAKASUJI and NAKANO,1990). As mentioned above, the autumn form of *P. g. guttata* seems to have traits of a migrant as compared with the summer form.

In the present study, we compared the morphology and physiology of the summer and autumn forms of this skipper and examined whether or not the autumn form has the characters of a migrant.

Materials and methods

About fifty adults of *P. g. guttata* were collected from the field in July, 1997 in Okayama, western Japan and the stock culture was maintained for 3 or 4 generations by the method of NAKASUJI and HONDA (1979). The 1st stadium larvae were individually introduced into a transparent plastic cup (4.5 cm in diameter, 3.5 cm in height) and were supplied with rice seedlings. A piece of wet filter paper was placed at the bottom of the cup and the food was renewed at one- or two-day intervals. One hundred and fifty larvae were reared under each condition of 16L-8D or 14L-10D at 25° C. The final stadium larvae were sorted according to sex on the basis of the testes that are visible on dorsal plate of male abdomen.

The pupae were weighed on the day after pupation using a balance (A and D, FX-300N). The widths of the head capsule, and the length (L) and maximum width (W) of the right forewing of adults were measured using a binocular microscope attached to a video-micrometer (Olympus VM-60) on the day of emergence. The area of wing was calculated by L·W/2. Adult specimens were used for the measurement of flight energy. The thorax and abdomen of the adults were lyophilized and weighed. Lipid extraction was performed according to FOLCH *et al.* (1957) and ITOYAMA *et al.* (1999). In order to extract lipid, an individual sample was incubated in 5 ml chloroform-methanol (2 : 1, v/v) at 70°C for 3h. The sample was incubated again in new chloroform-methanol solution at 70°C for 3h. The sample after lipid extraction was lyophilized and weighed again. The amount of lipid was estimated by the weight difference before and after extraction.

Another group of adults that were reared by the method described above was tested for flight activity using the flight mill system (I. Techno Engineering, Japan), which can accommodate 16 individuals at a time. The flight duration and flight distance were automatically logged in the computer unit of the flight mill system. The skipper was tethered on the tip of the flight mill rotor (40 cm in length, 0.92 g in weight). Adults were immobilized inside a freezer (–10°C) for 5 minutes, then the scale on the dorsal plate of the mesothorax was removed. A small amount of bond (Nichosi, G17) was applied on one end of a small, wooden strip (2 cm in length, 2 mm in diameter) and the wood was attached to the thorax. The other end of the wood was set on one side of a rotor. A piece of wood of a similar weight to the skipper was set on the other side of the rotor. The adults were allowed to fly for 12h under light regime and wind conditions (1m/second) created by an electric fan (30 cm in diameter) from a distance of 2.5 m at 25° C. The length and maximum width of the right forewing were measured after the flight test.

Results

Morphological traits.

The pupal weight of individuals emerged under 14L10D was 0.270g (± 0.005, SE) and that under 16L8D was 0.238g (± 0.005, SE). The former was significantly heavier than the latter ($p < 0.01$, Mann-Whitney U-test).

The width of the head capsule and area of the right forewing were compared between the adults emerged under 14L10D and 16L8D in Fig. 1. Both characters of individuals under 14L10D were significantly wider than those under 16L8D.

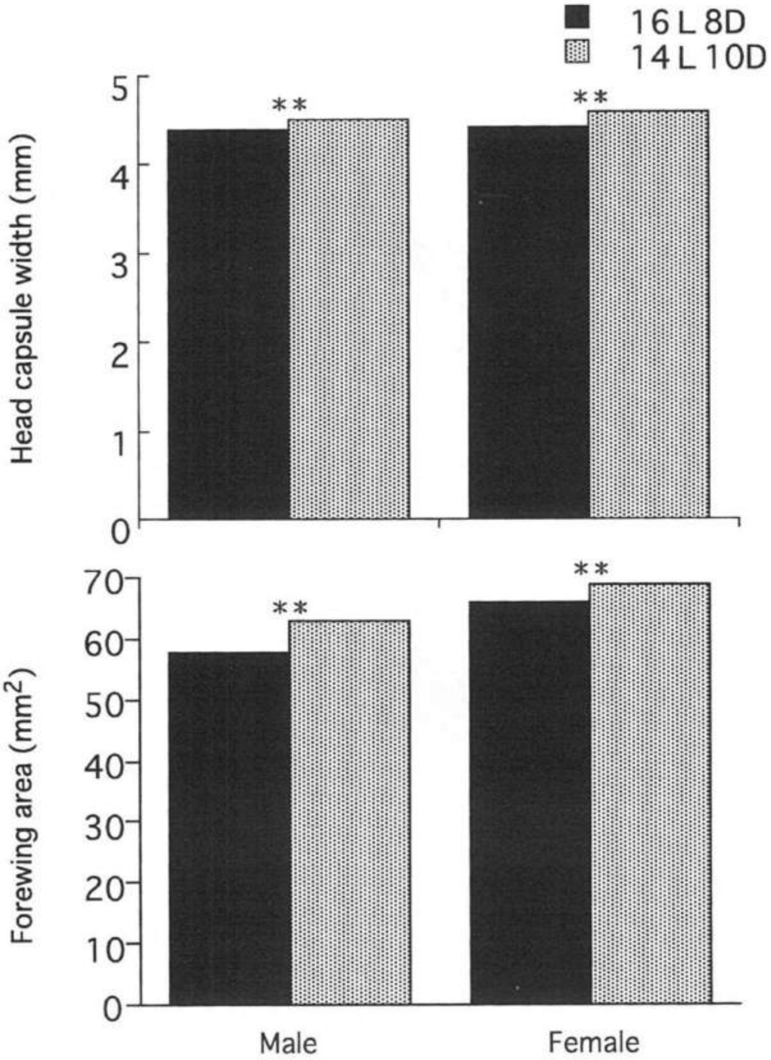

Fig. 1. Comparison of head capsule width and forewing area of adults between the two rearing conditions of larvae, under 14LIOD and 16L8D at 25°C, . (** $p<0.01$, Mann-Whitney U-test).

The relationship between the head capsule width and forewing area was compared between adults emerged under 14L10D and 16L8D (Fig. 2). A significant positive regression (*r*) was obtained between the two items in all cases ($p < 0.01$). Furthermore, the correlation coefficient (*b*) in the individuals under 14L10D was significantly larger than that under 16L8D in both male and female adults ($p < 0.01$, analysis of covariance). In particular, the value of the coefficient in males was considerably larger in the former than the latter. There is a possibility that the correlation under 16L8D is not linear but it fits to a saturation curve, especially in males.

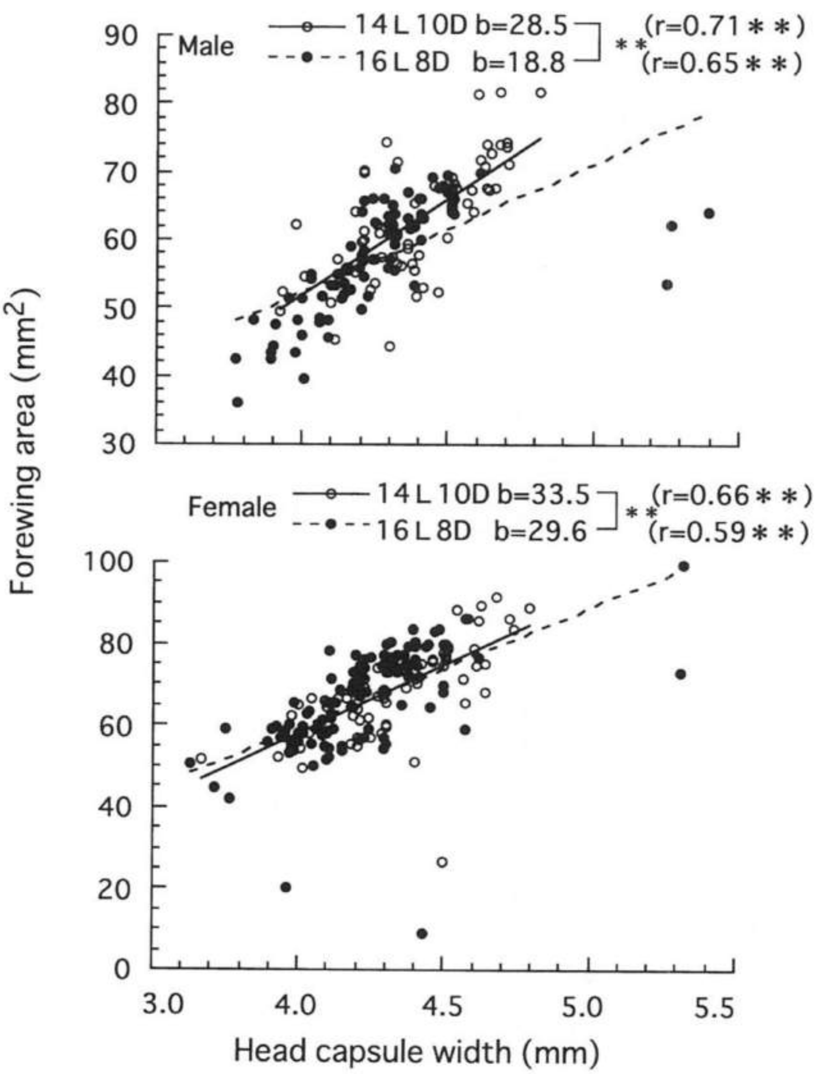

Fig. 2 Relationship between head capsule width and forewing area of adults emerged under 14LIOD or 16L8D. (** $p<0.01$, test for correlation coefficient (*b*) by analysis of covariance).

Flight activity and fuel.

The total flight distance for 12h was compared between adults emerged under 14L10D and 16L8D (Fig. 3). The flight distance of males under 14L10D was significantly longer than that under 16L8D ($p < 0.01$, Mann-Whitney U-test). However, the distance of females showed no difference between the two conditions.

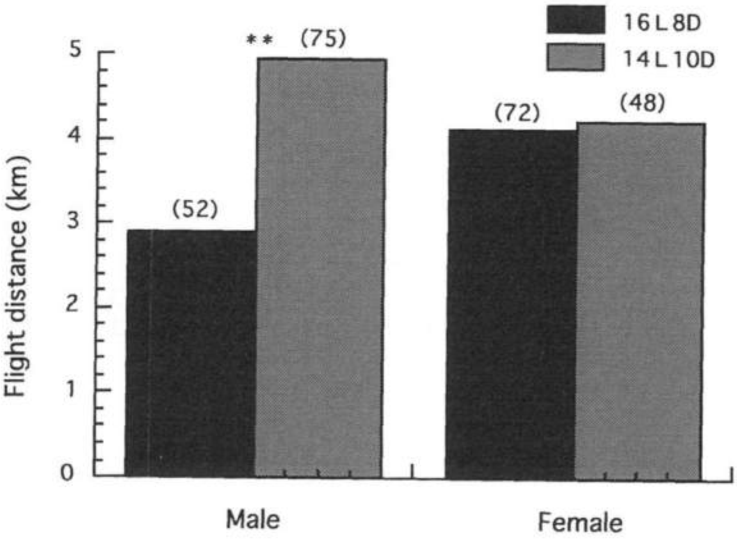

Fig. 3 Comparison of flight distance of adults for 12h between the two rearing conditions of larvae, under 14LIOD and 16L8D at 25°C. * * $p<0.01$, Mann-Whitney U-test. Numerical figures in parenthesis show the number of individuals tested.

The relationship between the forewing area and flight distance was compared between the adults emerged under 14L10D and 16L8D (Fig. 4). A positive regression was obtained between the two items, and the regression coefficient (*r*) was significant ($p < 0.05$) except for females under 16L8D.

The correlation coefficient (*b*) of males under 14L10D was significantly larger than that under 16L8D ($p < 0.05$, analysis of covariance). On the other hand, the coefficient in females showed no difference between the two conditions of 14L10D and 16L8D.

The amount of the major flight fuel of insects, lipids, was compared between the adults emerged under 14L10D and 16L8D (Fig. 5). The amount of lipid in males under 14L10D was significantly more than that under 16L8D. The amount in females showed no difference between the two photoperiod conditions.

Discussion

Many butterfly species migrate seasonally (WILLIAMS, 1958; HIURA, 1973; BAKER,1978). The best known migration, that by the monarch butterfly *Danaus plexippus*, occurs in autumn for more than 3000km from Canada to overwintering sites in California, Florida and New Mexico

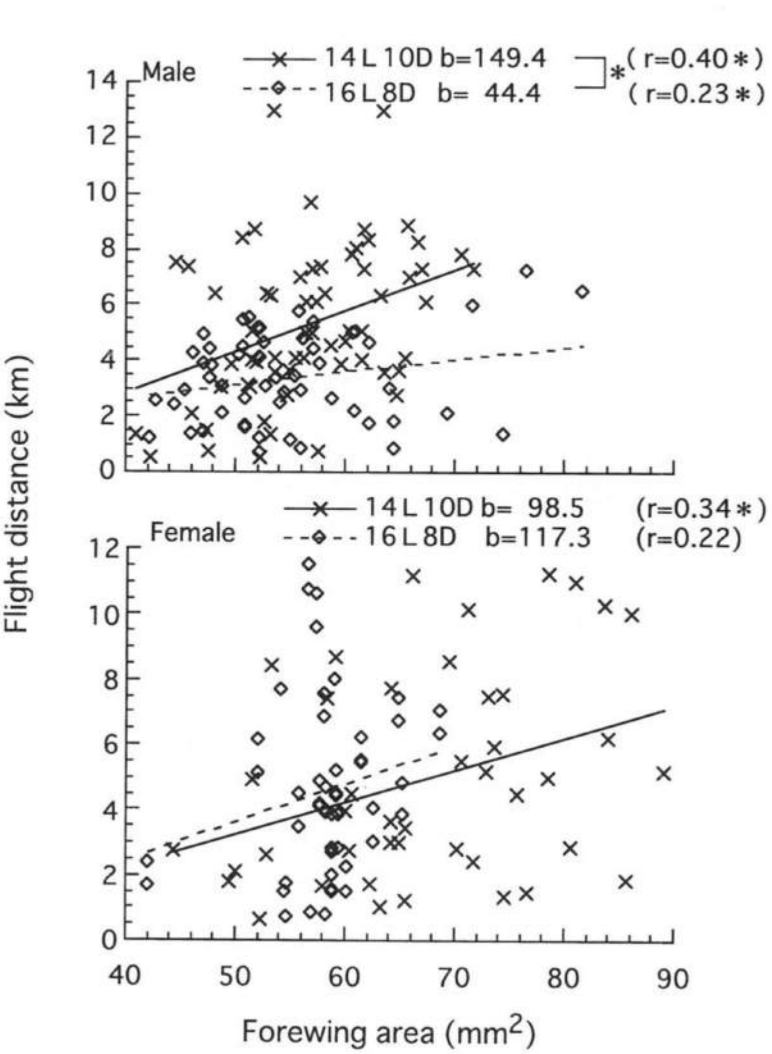

Fig. 4. Relationship between forewing area and flight distance of adults for 12h under a rearing condition of 14LIOD or 16L8D. *p<0.05, test for correlation coefficient (*b*) by analysis of covariance.

(URQUHART and URQUHART, 1976). A danaid, the chestnut tiger *Parantica sita* also migrates a maximum of 1200km north in spring and to south for 1700km in autumn in southwestern Japan (FUKUDA, 1998).

Migration or adaptive dispersal is essentially a transference of adults of a new generation from one breeding habitat to others (JOHNSON, 1969). Migrations are distinguished from non-migrations by differences in their flight behavior. Migratory flight is more or less persistent, continuous in a direction and occurs over distances. On the other hand, non-migratory flight or trivial movement near or within a breeding habitat soon ends in feeding, mating or oviposition. Generally speaking, migrants have specific traits in their morphology and physiology that are distinguished from those of non-migrants. These are differences in flight apparatus, e.g. length of wings and degree in flight muscle development as well as physiological differences such as

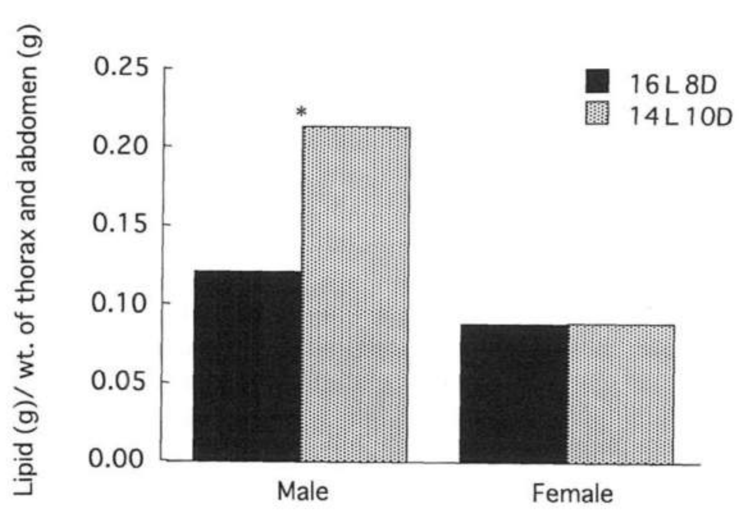

Fig. 5. Comparison of flight fuel (lipids) weight, per dry weight of thorax and abdomen of adults between the two rearing conditions of larvae, under 14LIOD and 1 6L8D at 25°C. * $p<0.05$, Mann-Whitney U-test.

preovipositional period, fecundity, diapause induction and storage of fuel for flight (HARRISON, 1980; ROFF and FAIRBAIN, 1991).

As mentioned previously, the 2nd generation of the rice skipper, *P. g. guttata* migrates in a southwestely direction (HIURA, 1980). The migratory flight continues for 2 to 3h mostly in the morning at a speed of 30km/h only on the day of emergence (MIYASHITA, 1973; HIURA, 1980; NAKASUJI and ISHII, 1983). The distance of migration was estimated to be less than 100km by the degree of consumption of fuel storage (NAKASUJI and ISHII, 1983; ISHII, 2000).

The two seasonal morphs of *P. g. guttata*, small, pale summer morph, and large, dark autumn morph, are produced under different day lengths during the mature larval stages (ISHII and HIDAKA, 1979). The critical photoperiod that divides the two morphs is 15L9D. Therefore, 16L8D photoperiod produces the summer morph and 14L10D produces the autumn morph, the latter corresponds to the migrant form. In the present study, the body size and wing size were larger in the adults emerged under 14L10D than those under 16L8D. These facts support the results by ISHII and HIDAKA (1979). Adults emerged under 14L10D have a longer preoviposition period and lesser fecundity than those under 16L8D, and the flight activity of the former on the day of emergence was higher than the latter in both males and females (NAKASUJI and NAKANO, 1990). In the present study, the flight activity on the day of emergence was significantly higher in the males emerged under 14L10D than those under 16L8D. However, there was no difference in females between the two photoperiod conditions. According to NAKASUJI and NAKANO (1990), the flight activity pattern in relation to adult age differed between males and females. The flight activity of males under 14L10D was highest on the day of emergence, but decreased to the level of males under 16L8D on the 4th and 7th days after emergence. On the other hand, the flight activity of females under 14L10D was maintained at a high level irrespective of days after emergence. The flight activity of females under 16L8D was low on the day of emergence but it increased to the level of females under 14L10D on the 4th day after emergence. This difference is probably due to a difference in the flight behavior of trivial movement in their habitat between the sexes. The female adults fly daily for 2 or 3km in wide grasslands for egg laying. On the other hand, the trivial flight of males is limited along the surrounding grasslands for feeding and mating. This may partially explain why migratory traits in terms of flight activity are observed more clearly in males than females.

The migratory morph stores a greater amount of lipids than the non-migratory morph in many insect species that have the dispersal polymorphism. Lipids, especially triglyceride, are considered to be the major fuel for migration (GUNN and GATEHOUSE, 1987; ZERA *et al.*, 1994; AYALI *et al.*, 1996; TANAKA and SUZUKI, 1998; BEGUM *et al.*, 1999; ITOYAMA *et al.*, 1999). In the present study, the storage of lipids in males emerged under 14L10D was significantly greater than that under 16L8D. However, the lipid storage in females showed no difference between the two morphs. The amounts of lipids stored corresponded well with the flight activities in males and females. The most of lipid in *P. g. guttata* was triglyceride (MIZUMOTO, unpublished data).

One interesting result obtained in the present study is shown in Fig. 2. The relative rate of increase in wing area to increase in adult body size under 14L10D is higher than that under 16L8D. This phenomenon means that the individuals grown under 14L10D develop wings at a higher rate when the body size increases than the individuals under 16L8D do. This provided new evidence that the autumn morph is more suitable to flight than the summer form is. Such differences in allometric growth between seasonal morphs has not been reported for any butterfly species.

On the basis of the traits mentioned above, the migration of the autumn morph of *P. g. guttata* seems to be obligatory. However, the distance of the migration is relatively short, less than 100 km as stated previously. The function of this perplexing migration can be considered as follows (NAKASUJI, 1988). The female adults of the overwintering and 1st generation lay smaller eggs on wet lowland grasses with soft leaves. On the other hand, the females of the 2nd generation, *i. e.* migrants, lay larger eggs on dry upland grasses with tough leaves (NAKASUJI and KIMURA, 1984; NAKASUJI *et al.*, 1986; NAKASUJI, 1987). The larvae hatched from smaller eggs are not able to survive on the dry upland grasses with tough leaves (NAKASUJI and KIMURA, 1984; MASUZAWA *et al.*, 1983). The wet lowland grasses with soft leaves wither in winter in temperate districts. Therefore, this skipper inevitably changes its habitat from wet land to dry land in autumn (NAKASUJI, 1982). The migration of *P. g. guttata* in autumn is thought to function in shifting its habitat between breeding and overwintering seasons. The overwintering larvae are able to survive winter in most of their distributed areas except for the northern borders (OMORI, 1933; NAKASUJI *et al.*, 1981). Therefore, they need not fly for longer distances. Why they fly in a southwesterly direction in autumn has not been determined as yet. The larvae of the 3rd generation (overwintering generation) are not able to survive winter in the northern border areas where snow covers host grasses for a certain period (NAKASUJI *et al.*, 1981). The migration in a southwesterly direction might be of benefit to *P. g. guttata* at least in these areas. A return migration to the northern border area in spring was suggested by NAKASUJI and ISHII (1988), and ISHII (2000).

要　　約

中筋房夫・水元誠：移動性のチョウ，イチモンジセセリの季節多型の形態的，生理的特性——イチモンジセセリには日長依存的季節多型があり，5月に羽化する越冬世代成虫，7月に羽化す

る第1世代成虫，8月末から9月に羽化する第2世代成虫はそれぞれ色彩や体サイズが異なっている．この内，顕著な移動が知られているのは第2世代成虫である．移動が知られていない第1世代成虫は16時間日長下で，移動する第2世代成虫は14時間日長で幼虫期を飼育すると得られる．

ここでは，16時間，14時間日長で幼虫を飼育して得られた個体の蛹重や成虫の体サイズ，翅面積を測定するとともに，フライトミルを用いて飛翔活動性を調べた．さらに昆虫の主要な飛翔エネルギーとなる脂質含量も測り，両日長間で比較した．蛹重，成虫体サイズは14時間日長の方が16時間日長よりも有意に大きく，翅面積も前者の方が広かった．体サイズ（頭幅）と翅面積の間の回帰分析から，体サイズの増加に対する翅面積の増加率（回帰係数）は14時間日長下でより大きく，両日長間で翅面積の相対成長率が異なることが示された．羽化当日の飛翔活動性は雄で14時間日長下で有意に高かったが，雌では日長間に差は無かった．翅面積と飛翔活動性の間には正の相関がみられ，その回帰係数は14時間日長下の雄で有意に大きかった．雌での回帰係数には日長間で差が認められなかった．飛翔エネルギーとなる脂質量は雄では14時間日長で有意に多かったが，雌では日長間に差は無かった．この傾向は飛翔活動性のそれと同じであった．

以上の結果より，14時間日長下で幼虫期を育った成虫は，形態的，生理的に移動型の形質を示し，その傾向は雄成虫でより顕著であることが分かった．以上の結果を既知の事実と併せて考察し，イチモンジセセリの移動の特性について議論した．

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Revision of the Subtribe Quediina and the Tribe Tanygnathinini. Part III. Taiwan. (Coleoptera: Staphylinidae). Supplement II

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Abstract Additional distributional and bionomic data are presented for several Taiwanese members of the subtribe Quediina of the tribe Staphylinini, and of the tribe Tanygnathinini. Two new species are described: *Quedius* (*Microsaurus*) *inexspectatus*, and *Indoquedius chuen*.

Key words Coleoptera, Staphylinidae, Staphylinini, Quediina, Tanygnathinina, Taiwan, taxonomy, faunistics.

This paper contains additional taxonomic, bionomic and faunistic data for Taiwanese members of Quediina and Tanygnathinina. Included are data on specimens that were for various reasons not included in my two previous publications (SMETANA, 1995, 1996), as well as on specimens collected after the publication of these two papers. Also included are the descriptions of two new species *Quedius* (*Microsaurus*) *inexspectatus* and *Indoquedius chuen*.

Except for the specimens of *Indoquedius shibatai* SMETANA, all other specimens were collected by the author, and the data are accompanied by a code in square brackets, referring to notes in my field book. The specimens are kept in the SMETANA collection, Ottawa, Canada, and in the collection of the National Museum of Natural Science, Taichung, Taiwan.

Quedius (*Microsaurus*) *beesoni* CAMERON, 1932

New records: Nantou Hsien: 16 specimens, Meifeng, 2130 m, 2. V. 1998, [T196]; 1 specimen, Shanlinchi, 1650 m, 19. V. 1991, [T87]; Kaohsiung Hsien: 6 specimens, Peinantashan trail, 1950 m, 8. VII. 1993, [T 145].

Comments. The large series of specimens from Meifeng was collected from under fermenting green leaves beneath fallen large tree branches. The specimen from Shanlinchi comes from leaf litter along a forest creek. The specimens from Peinantashan were taken by sifting soft, decaying mushrooms on a large fallen tree.

Quedius (*Microsaurus*) *miwai* BERNHAUER, 1943

New records: Nantou Hsien: 4 specimens, Meifeng, 2130 m, 10. VII. 1993, [T146]; same, 1 specimen, 2. V. 1998, [T196]; Kaohsiung Hsien: 1 specimen, Kuanshan trail above Kaunshanchi Riv., 2550 m, 22. VII. 1993, [T160]; 1 specimen, Peinantashan trail, 2450 m, 2. V. 1995, [T170].

Comments. The specimens from Meifeng were sifted from leaf litter and other debris along large fallen trees, as well as from moist moss on them. The specimen from Kuanshan trail was taken from moist rotting wood of a large fallen tree. The specimen from Peinantashan trail was sifted from moist debris in a forest gully.

Quedius (*Microsaurus*) *inexspectatus* sp. nov.

(Figs. 1–6)

Description. Male. Piceous-black, head and pronotum with hardly noticeable, elytra with slightly more pronounced, indefinite metallic hue, elytra with suture and hind margin, and posterior margins of abdominal tergites and apex of abdomen inconspicuously, mostly narrowly, paler; abdomen iridescent; maxillary and labial palpi pale testaceous; antennae piceous with first three segments testaceous; legs testaceous. Head of rounded quadrangular shape, wider than long (ratio 1.22), distinctly narrowed posteriad behind eyes, posterior angles entirely obsolete, indistinct; eyes convex and very large; tempora considerably shorter than length of eyes seen from above (ratio 0.26), impunctate; no additional setiferous punctures between anterior frontal punctures; posterior frontal puncture situated quite close to posteromedial margin of eye, almost touching it; two setiferous punctures between it and posterior margin of head, situated close to posterior margin of head; temporal puncture situated quite close to posterior margin of eye, almost touching it; surface of head with fine and dense microsculpture of transverse and oblique waves, with sparsely distributed micropunctulae. Antennae moderately long, moderately incrassate toward apex, segment 3 slightly longer than segment 2 (ratio 1.18), segment 4 longer than wide (ratio 1.33), segment 5 vaguely longer than wide, segment 6 as long as wide, following segments gradually becoming wider and shorter, segments 9 and 10 slightly wider than long, last segment about as long as two preceding segments combined.

Pronotum vaguely wider than long (ratio 1.1), widest at about posterior third, narrowed anteriad, with lateral margins continuously arcuate with broadly rounded base, transversely convex, lateral portions not explanate; dorsal rows each with three punctures; sublateral rows each with two punctures, each situated close to anterior margin, posterior puncture therefore situated considerably before level of large lateral puncture; microsculpture similar to that on head but markedly denser and finer, with micropunctulation hardly noticeable. Scutellum appearing impunctate, however with two very fine punctures in transverse row on middle portion.

Elytra moderately long, at base distinctly narrower than pronotum at widest point, at suture about as long as, at sides somewhat longer than pronotum at midline (ratio 1.11); punctation in general coarse, particularly on basal half, slightly uneven, gradually becoming finer toward posterior margin, transverse interspaces between punctures on basal half mostly about as large as diameters of punctures; posterolateral corners appearing almost impunctate, each with small, round impression; surface between punctures without microsculpture. Abdomen with tergite 7 (fifth visible) bearing fine whitish apical seam of palisade fringe; punctation sparse and much finer than that on elytra, in general becoming even sparser toward apex of abdomen, tergite 3 (first visible) almost impunctate in middle and along posterior margin, middle portion of tergite 4 (second visible) impunctate; pubescence piceous; surface between punctures with exceedingly dense and fine microsculpture of transverse striae.

First four segments of front tarsus markedly dilated, sub-bilobed, each densely covered with modified pale setae ventrally; segment two as wide as apex of tibia; segment four narrower than preceding segments. Sternite 8 with two long setae on each side; with moderately wide and deep, obtusely triangular medio-apical emargination, small area before emargination flattened and smooth (Fig. 1). Genital segment with tergite 10 triangular, markedly narrowed toward subarcuate apex, with numerous, unequally long setae at apex, and with a pair of subapical setae (Fig. 2); sternite 9 elongate, with very narrow basal portion, vaguely emarginate apically, with one stronger seta at each side of emargination (Fig. 3). Aedoeagus (Figs. 4-6) small; median lobe with almost parallel-sided middle portion, anteriorly rather abruptly narrowed into moderately long, narrow apical portion with subacute apex. Paramere rather short, moderately constricted in middle portion, dilated into spoon-like apical portion by far not reaching apex of median lobe; four setae at apex and two similar setae at each lateral margin below apex; underside of paramere with ten fine sensory peg setae forming an arc along apical margin. Internal sac without larger sclerotized structures.

Female unknown.

Length 5.6 mm.

Type material. Holotype: ♂, "Taiwan, Taitung Hsien Hsinkangshan above Chengkang 750 m 18.IV.1998, A. SMETANA [T182]". In the SMETANA collection, Ottawa, Canada. To be eventually deposited in the Museum d'histoire Naturelle, Geneve, Switzerland.

Geographical distribution: *Quedius inexspectatus* is at present known only from the Hsinkangshan mountain range in southern Taiwan.

Bionomics. The holotype was taken by sifting moist leaf litter and other debris, accumulated at bases of vertical walls along an old forest logging road.

Comparisons and comments. Based on general appearance, the shape of the head and pronotum, the type of punctation of the abdomen, as well as the male sexual characters, including the shape of the aedoeagus, *Quedius inexspectatus* is probably best assigned to the *placidus* Group (see SMETANA, 1995: 49), despite the fact that the elytral punctation does not display the longitudinal rows described for the other species of the species group. The group at present contains three species: *Q. miwai*, *Q. yean* SMETANA, 1995, and *Q. shibatai* SMETANA, 1995. *Quedius miwai* differs drastically by the small eyes and the temporal puncture on the head distant from posterior margin of the eye (see the key below); the remaining two species differ from *Q. inexspectatus*, in addition to the male sexual characters, by a combination of several characters, including the chaetotaxy (position of both the posterior frontal and temporal punctures) and shape of the head (the head is markedly more narrowed behind eyes than in either of the other two species), the length of the elytra and the development of the pale apical seam of palisade fringe on abdominal tergite 7. A modified key to the Taiwanese species of the *placidus* Group is presented below.

Etymology. The specific epithet is the Latin adjective *inexspectatus*, *-a*, *-um* (unexpected). It refers to the fact that it was not expected to find another new species belonging to this species group in Taiwan.

The following key will allow the determination of Taiwanese species of the *placidus* Group:

1 Eyes small to moderately large, tempora longer (ratio 1.20) to slightly shorter (ratio 0.80) than eyes seen from above. Aedoeagus as in Figs. 59–61 in SMETANA, 1995. Length 5.8–7.0 mm ········· *Q. miwai* BERNHAUER, 1943

— Eyes large, tempora distinctly to considerably shorter than length of eyes seen from above (ratios 0.26–0.48) ········· 2

2 Abdominal tergite 7 (fifth visible) with whitish apical seam of palisade fringe ········· 3

— Abdominal tergite 7 (fifth visible) without whitish apical seam of palisade fringe. Posterior frontal puncture separated from posteromedial margin of eye by distance about equal to diameter of puncture. Male unknown. Length 6.8 mm ········· *Q. yean* SMETANA, 1995

3 Posterior frontal puncture separated from posteromedial margin of eye by distance about twice as large as diameter of puncture; temporal puncture situated about midway between posterior margin of eye and posterior margin of head. Elytra shorter, at suture vaguely shorter (ratio 0.91), at sides about as long as pronotum at midline. Aedoeagus as in Figs. 67–70 in SMETANA, 1995. Length 5.7–6.8 mm ········· *Q. shibatai* SMETANA, 1995

— Both posterior frontal and temporal punctures situated quite close to posteromedial margin of eye, almost touching it. Elytra longer, at suture about as long as, at sides somewhat longer than pronotum at midline (ratio 1.11). Aedoeagus as in Figs. 4–6. Length 5.6 mm ········· *Q. inexspectatus* spec. nov.

Quedius* (*Microsaurus*) *noboruitoi HAYASHI, 1992

New records: Nantou Hsien: 1 specimen, Meifeng, 4. V. 1998, [T199]; Kaohsiung Hsien; 1 specimen, Peinantashan Trail, 1950 m, 8. VII. 1993, [T145].

Comments. The specimen from Meifeng was taken by sifting relatively thin layer of fallen leaves and other debris on a sun-exposed forest slope. The specimen from Peinantashan was sifted from old mushrooms and debris around them on a large fallen tree on a forest clearing.

Quedius* (*Microsaurus*) *syh SMETANA, 1995

New record: Kaohsiung Hsien: 3 specimens, Peinantashan Trail, 2450 and 2500 m, 2. and 3. V. 1995, [T170,T171].

Comments. The specimens were taken in two small forest seepages by sifting moist to wet leaf litter and other forest floor litter.

Quedius* (*Microsaurus*) *chiaw SMETANA, 1995

New records: Nantou Hsien: 3 specimens, Meifeng, 2130 m, 2. V. 1998, [T196]; Taichung Hsien: 1 specimen, Anmashan, 2120 m, 13. V. 1992, [T128].

Comments. The specimens from Meifeng were taken by sifting pieces of bark, rotting wood and other debris around bases of large standing trees. The specimen from Anmashan was taken by sifting numerous tiny mushrooms and debris under them on a large fallen tree.

Quedius* (*Distichalius*) *meng SMETANA, 1995

New records: Kaohsiung Hsien: 2 specimens, road above Tona Forest Station, km 16-17, 1700-1800 m, 28. IV. 1998, [T190]; 1 specimen, same, 1850 m, 29.IV.1998, [T191]; Nantou Hsien: 1 specimen, Houhuanshan, Kuenyang, 3050 m, 13. V. 1995, [T179].

Comments. The specimens from near Tona Forest Station were taken by sifting wet leaf litter, moss and other debris at bases of wet rock walls along a forest road, and by sifting moist moss on a large fallen tree.

Quedius* (*Raphirus*) *maculiventris BERNHAUER, 1934

New records: Illan Hsien: 2 specimens, Taipingshan, 1880 m, 14. VII. 1993, [T152]; 1 specimen, same, 15. VII. 1993, [T154]; Nantou Hsien: 1 specimen, Meifeng, 2130 m, [T146].

Comments. All specimen were taken by sifting moss on fallen trees.

Quedius* (*Raphirus*) *tarng SMETANA, 1995

New records: Kaohsiung Hsien: 4 specimens, Kuanshan trail at Kaunshanchi River, 2400 m, 20. VII. 1993, [T158]; Nantou Hsien: 2 specimens, Meifeng, 2130 m, 4. V. 1998, [T199].

Comments. The specimens from Kuanshan trail were taken by sifting fallen leaves and other debris under bushes along the river. The specimens from Meifeng were sifted from fallen leaves and other debris on a sun-exposed slope in a mature broadleaved forest.

Quedius* (*Raphirus*) *goang SMETANA, 1995

New record. Nantou Hsien: 1 specimen, Houhuanshan, Kuenyang, 3050 m, 13.V.1995, [T179].

Comments. The specimen was taken by sifting wet moss and other debris along a small creek.

Quedius* (*Raphirus*) *kurosawai SHIBATA, 1986

New records: Nantou Hsien: 5 specimens, Meifeng, 2. V. 1998, [T196]; Kaohsiung Hsien: 1 specimen, road above Tona Forest Station, 1850 m, 29. IV. 1998, [T191].

Comments. The specimens from Meifeng were collected by sifting moss and debris under it on large fallen trees. The specimen from near Tona Forest Station was taken by sifting mushrooms growing on a mossy fallen tree; it is at the same time the southernmost record of this species in Taiwan.

Quedius* (*Raphirus*) *dih SMETANA, 1995

New record: Ilan Hsien: 2 specimens, Taipingshan, 1950 m, 13. VII. 1993, [T150].

Comments. The specimens were taken in a mature, predominantly coniferous, forest by sifting moist moss on fallen trees. The species is at present known only from Taipingshan.

Quedius (*Raphirus*) *meei* SMETANA, 1995

New record: Nantou Hsien: 1 specimen, Meifeng, 2130 m, 4. V. 1998, [T 199].

Comments. The specimen was sifted from fallen leaves and other debris on a sun-exposed slope in a mature broad-leaved forest.

Quedius (*Raphirus*) *shan* SMETANA, 1995

New records: Kaohsiung Hsien: 3 specimens, Peinantashan trail, 2450 m, 2. V. 1995, [T170]; 5 specimens, same, 2500 m, 3. V. 1995, [T171]; 1 specimen, same, 2390–2490 m, 6. VII. 1993, [T138].

Comments. The specimens were taken by sifting moist leaf litter and other debris on two small seepages in a mixed mature forest. The species is known only from the three mountain ranges Kuanshan, Peitawushan and Peinantashan in southern Taiwan.

Quedius (*Raphirus*) *wuh* SMETANA, 1995

New record: Nantou Hsien: 1 specimen, Houhuanshan, Kuenyang, 3050 m, 13. V. 1995, [T179].

Comments. The specimen was taken by sifting wet moss and other debris along a small creek in a coniferous forest. This is the type locality of the species and only two males were previously known. The female of the species is still not known.

Indoquedius shibatai SMETANA, 1995

New records: Chiai Hsien: 1 specimen, Fungchiifo, 19. VII. 1969, T. KOBAYASHI; Pingtung Hsien: 1 specimen, Kenting Park, 13. VIII. 1969, Y. MAEDA. Both specimens in Y. HAYASHI collection.

Indoquedius chuen sp. nov.

(Figs. 7–10)

Description. In all characters quite similar to *I. shibatai*, and different only by male sexual characters.

Male. First four segments of front tarsus and sternite 8 similar to those of *I. shibatai*, and not appreciably different. Genital segment with tergite 10 of similar shape but more narrowed, with less numerous setae and with deeper and wider medioapical emargination (Fig. 7 and Fig. 252 in SMETANA, 1995); sternite 9 narrower with similar, but shorter basal portion, apical portion with depigmented, elongate area at each lateral margin, medioapical emargination deeper (Fig. 8 and Fig. 253 in SMETANA, 1995). Aedoeagus (Figs. 9,10) similar to that of *I. shibatai*, but median lobe slightly constricted in about apical fourth and then moderately dilated toward obtusely angulate apex; paramere distinctly reaching apex of median lobe, sensory peg setae on underside less numerous (Figs. 9,10 and Figs. 254, 256 in SMETANA,1995); internal sac with large, central, bilobed sclerite densely covered by scale-like setae, similar to that of *I. shibatai*.

Female. Unknown.

Type material. Holotype (male): "Taiwan, Kaohsiung Hs. Rd. abv. Tona For. Sta. [Fork] 1850 m, 28. IV. 98 A. SMETANA [T191]". Temporarily in the SMETANA collection, Ottawa, Canada. To be eventually deposited in the National Museum of Natural Science, Taichung, Taiwan.

Geographical distribution. *Indoquedius chuen* is at present known only from the type locality in southern Taiwan.

Bionomics. The holotype was taken by sifting mouldy leaf litter and other debris along a large fallen tree at the edge of a mature broadleaved forest.

Comment. Despite the striking external similarity of *I. chuen* with *I. shibatai*, the differences in male sexual characters support the specific distinctness of *I. chuen*.

Etymology. The specific epithet is the Chinese noun chuen, which is spring in one of its meanings. It refers to the fact that the holotype was collected in the spring.

Bolitogyrus rufomaculatus (SHIBATA, 1979)

New records: Taitung Hsien: 3 specimens, Hsinkangshan above Chengkang, 750 m, 18. IV. 1998, [T182]; Kaohsiung Hsien: 3 specimens, forest above Tona Forest Station, 30. IV. 1998, [T192].

Comments. The specimens from Hsinkangshan were taken from small, soft whitish mushrooms growing on a large fallen tree branch. Specimens from near Tona Forest Station were sifted from old mushrooms growing on old fallen trees, and from moss and various debris around them.

Bolitogyrus rufomaculatus is closely related, and very similar, to *B. fukienensis* SCHEERPELTZ, 1974, known at present only from the province of Fujian of mainland China (see SMETANA, 2000: 56 for details).

Acylophorus furcatus MOTSCHULSKY, 1858

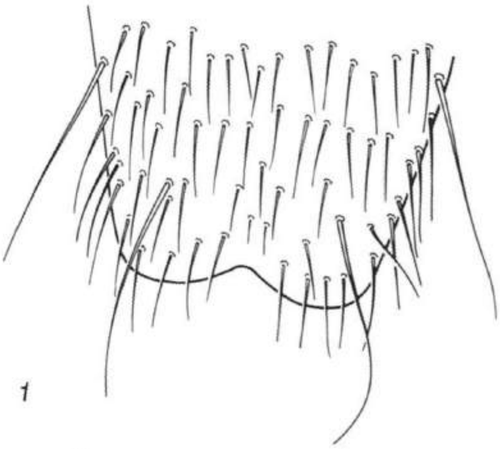
New record: Nantou Hsien: 4 specimens, Lienhuachih, 650 m, 5. V. 1998, [T187].

Comments. The specimens were taken, together with *Atanygnathus juang*, from wet leaves and other debris at a small puddle of water along a forest road.

Atanygnathus juang SMETANA, 1995

New records: Nantou Hsien: 7 specimens, Lienhuachih, 650 m, 5. V. 1998, [T200]. Taitung Hsien: 25 specimens, Hsinkangshan above Chengkang, 550–600 m, 22. IV. 1998, [T187].

Comments. The specimens from Lienhuachih were taken from wet leaves and other debris at a small puddle of water along a forest road. The long series of specimens from Hsinkangshan was taken from wet leaf litter and other debris, accumulated along bases of dripping wet vertical rock walls along an old forest road. Only a few records of this species, known so far only from Taiwan, were previously known.



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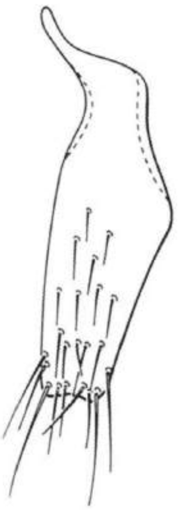

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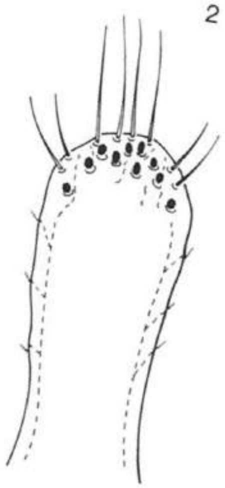

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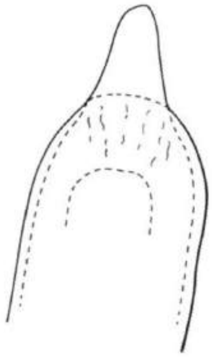

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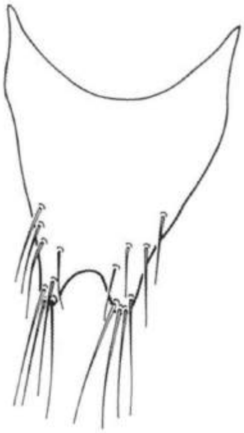

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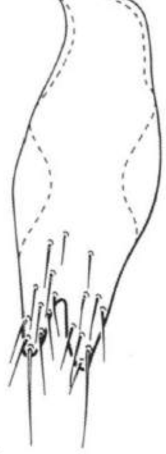

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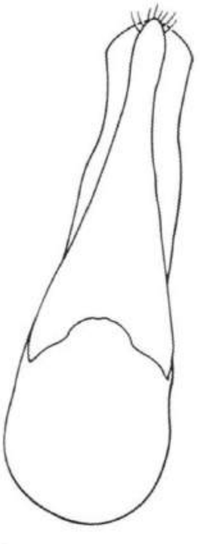

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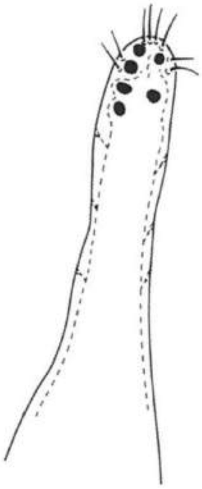

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Figs. 1–10. Figs. 1–6. *Quedius inexspectatus*: 1, apical portion of male sternite 8; 2, tergite 10 of male genital segment; 3, sternite 9 of male genital segment; 4, aedoeagus, ventral view; 5, apical portion of underside of paramere; 6, apical portion of median lobe of aedoeagus, ventral view. Figs. 7–10. *Indoquedius chuen*: 7, tergite 10 of male genital segment; 8, sternite 9 of male genital segment; 9, aedoeagus, ventral view; 10, apical portion of underside of paramere.

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B-chromosomes in the Indonesian populations of a phytophagous ladybird beetle "*Epilachna vigintioctopunctata*"

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Abstract Sumatran and Javanese populations of *Epilachna vigintioctopunctata* contained B-chromosomes in their karyotype other than a standard set of chromosomes ($2n=18$). The B-chromosomes behaved as univalents at meiosis. Males seem to have more Bs than females. In addition to these B-chromosomes, karyotypes of some B-carrying males contained a large non-homologous chromosome, which may also be a kind of B-chromosomes. All other populations of *E. vigintioctopunctata* so far studied for the karyotypes, including the one from Lombok Island newly studied here, did not possess B-chromosomes. This is the first report of B-chromosomes in Epilachnine beetles, except for those appearing as supernumerary Y chromosomes.

Key words B-chromosomes, *Epilachna vigintioctopunctata*, Indonesia, karyotypes, male-biased prevalence.

Introduction

B-chromosomes are supernumerary or accessory chromosomes differing from normal A-chromosomes in various characteristics, such as morphology, pairing behavior, and genetic effectiveness. For a long time they have attracted enormous attention of cytogeneticists, population geneticists, and other evolutionary biologists (JONES and REES, 1982) .

B-chromosomes were first discovered of all the living organisms in the chrysomelid genus *Diabrotica* by STEVENS (1908). Since then, they have been reported in more than 50 species of beetles, which represent Polyphaga alone (SMITH and VIRKKI, 1978; JONES and REES, 1982).

However, no such chromosomes have been found in the phytophagous ladybird beetles of the genus *Epilachna* (Coccinellidae), except for supernumerary Y chromosomes reported in *E. pustulosa* KÔNO (TSURUSAKI *et al*., 1993). During a survey of genetical and karyological differentiation in a widespread species, *E. vigintioctopunctata* (FABRICIUS), we have found B-chromosomes in a few populations in Indonesia (KOBAYASHI *et al*., 2000). This paper deals with the full account of our observation concerning the B chromosomes in the Indonesian populations.

Material and methods

Epilachna vigintioctopunctata is a notorious pest of solanaceous crops, being widely distributed in Asia and Australia. Recently, KOBAYASHI *et al*. (2000) have shown that the species

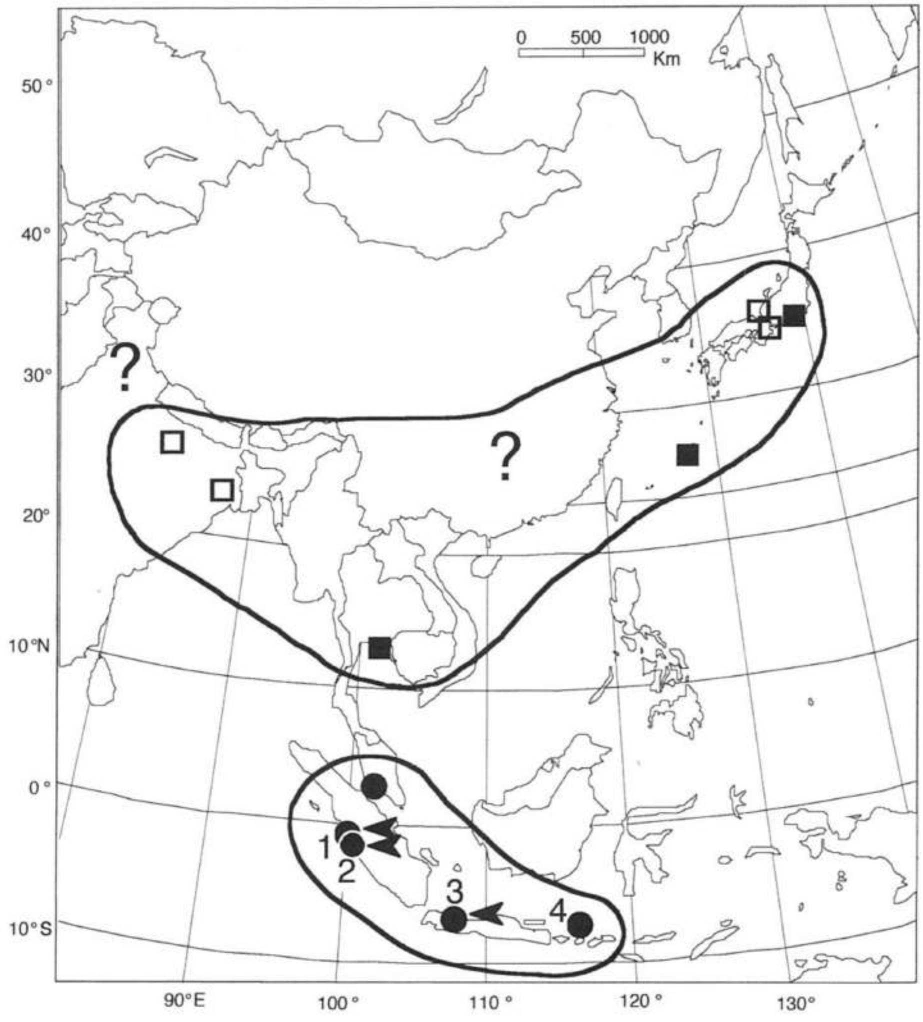

Fig. 1. Map showing localities where chromosomes were analysed in *Epilachna vigintioctopunctata* in the present study and in KOBAYASHI *et al*. (2000). Squares: populations with an XYp karyotype. Circles: populations with an Xyp karyotype. Open squares represent other literature records (TANAKA and SASAJI, 1992; YOSIDA, 1948; BOSE, 1948; AGARWAL, 1961). Only Indonesian populations are directly relevant in the present paper: 1, Padang, Sumatra; 2, Kayu Jao, near Padang; 3, Bogor, Java; 4, Senaru, Lombok. Arrow heads mark populations where B-chromosomes were found.

actually consists of two cryptic species that differ in their distributional ranges from one another, through analyses of mitochondrial DNA and karyotypes and crossing experiments. Of these two cryptic species, B-chromosomes were found only in Indonesian populations of a "species" occupying more southerly ranges (Kuala Lumpur in the Malay Peninsula, and Sumatra and Java in Indonesia)(Fig. 1). The general feature of karyotypes of the two "species" of "*E. vigintioctopunctata*" was described in our previous paper (table 3, and figures 3 and 4 in KOBAYASHI *et al.*, 2000). In the present paper, we examine karyotypes of three Indonesian populations treated by KOBAYASHI *et al.* (2000), and an additional population newly obtained from Lombok Island (Table 1).

The cytological data were obtained from air-dried preparations of testes or ovaries of adults. For females, individuals just after eclosion were used. For males, field-collected individuals of uncertain ages were also used. The procedure of the air-drying methods was the same as described in KOBAYASHI *et al.* (2000).

Table 1. The four Indonesian populations of *"Epilachna vigintioctopunctata"* studied and their chromosome numbers.

Locality	Date[1]	Specimens examined	Chromosome number		
			Male		Female
			2n	MI	2n
Kayujao, near Padang, Sumatra	4/7-VIII-1988	3♂	18/21	8+Xyp(+Bs)	-
Padang, Sumatra	(III-1995)	9♂6♀	18-21	8+Xyp(+Bs)	18
Bogor, Java	(II-1994)	10♂3♀	18-22	8+Xyp(+Bs)	18/20
Senaru, Lombok	2-XI-2000	5♂	18	8+Xyp	-

[1] For Padang and Bogor populations, laboratory strains were used for the analysis (KOBAYASHI *et al.*, 2000). For these populations, dates of collection of the founders of the laboratory strains are given in parentheses.

Results

(1) Morphology and Frequencies of B-chromosome

Table 1 summarizes results of the karyotypic analyses. Diploid number of chromosomes of the Indonesian populations of *E. vigintioctopunctata* from Sumatra and Java varied from 18 to 22 even within a population, except for females of a Padang population, Sumatra Island. Confronting mitotic metaphases (Fig. 2) with first meiotic metaphases (Fig. 3) obtained from each individual from polymorphic populations (Kayujao, Padang, and Bogor), and comparing those karyotypes with the normal karyotype (fig. 3 in KOBAYASHI *et al.*, 2000) from the populations without variation in chromosome number (Kuala Lumpur), it was revealed that the numerical variation was caused by the involvement of B-chromosomes.

Newly studied population from Lombok Island (Senaru) showed a male karyotype (2n=18) with a small Y chromosome in mitotic metaphase and the Xyp sex chromosome association in the first meiotic metaphase, which is typical for the Indonesian populations of the "*E. vigintioctopunctata*" (Fig. 3; also see figs. 3 and 4 in KOBAYASHI *et al.*, 2000). However, they did not possess any B-chromosomes.

The B-chromosomes were small, but still larger than the Y chromosome, and metacentric

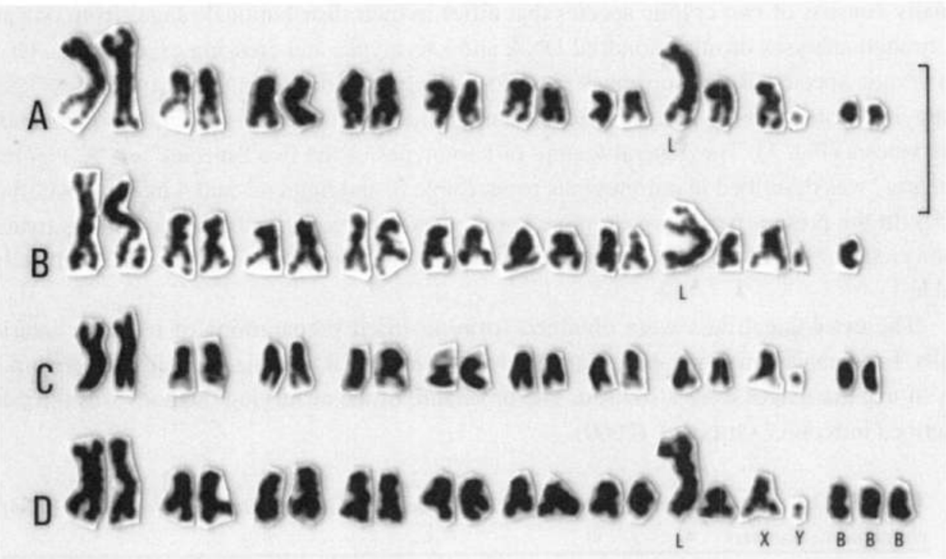

Fig. 2. Representative karyotypes of male *Epilachna vigintioctopunctata* with supernumerary chromosomes. L = large non-homologous chromosome which is probably translocated to one of the autosomes. B = small B chromosomes. A-D: karyotypes with 1L+2Bs, 1L+1B, 0L+2Bs, and 1L+3Bs, respectively. A: Padang. B-D: Bogor. Scale = 0.01mm.

Table 2. Number and frequncy of free B-chromosomes retained in the four Indonesian populations of "*Epilachna vigintioctopunctata*" studied.

Locality	No. Spec. examined	Number of free B-chromosomes[1] range	mean	mode	median	SD[2]	Frequency of B-carrying indiv.
Kayujao, Padang, Sumatra	3♂	0-3	1	0	0	-	0.33
Padang[3], Sumatra	9♂	0-2	0.67	0/1	1	0.71	0.56
	6♀	0	0	0	0	0	0
Bogor[3], Java	10♂	0-4	1.6	1	1	1.17	0.9
	3♀	0-2	0.67	0	0	-	0.33
Senaru, Lombok	5♂	0	0	0	0	-	0

[1] Range, mean, mode, and median are not for all the cells counted, but for individuals for which these values are represented by modes.

[2] Calculated for samples with >5 individuals alone.

[3] Frequency and the number of B-chromosomes were significantly different between males and females in Padang (FISHER's exact probability = 0.04 for the frequency of B-carrying individuals; <0.05, MAN-WHITNEY U-test for the difference in the number of Bs) but not in Bogor, though males seem to have more B chromosomes in both populations.

or submetacentric in morphology (marked with B in Fig. 2). They behaved as univalents in the first meiotic metaphases (Fig. 3C, D), as expected from the behavior of usual B-chromosomes in other organisms .

Frequencies of individuals with the B-chromosome(s) in each population were shown in Table 2. The frequency of individuals with at least one B was significantly higher in males than in females in Padang population. Moreover, males bear significantly more B-chromosomes than females in the population. The Bogor population also showed the same tendencies (Table 2), though statistically the sexual differences were not significant.

(2) Large non-homologous chromosome

Except for those typical B-chromosomes described above, karyotypes of some individuals carrying Bs contained a large chromosome whose homologue cannot be found (Fig. 2). The large chromosome, marked with L in Fig. 2, is similar to the first pair of autosomes in both size and morphology and virtually cannot be distinguished from them. This non-homologous chromosome was found only in a few males (2 and 1 males in Padang and Bogor populations, respectively). Those males contained 1 or 2 free B-chromosomes. Those males also had a possible non-homologous bivalent in the first meiotic metaphases (Fig. 3D).

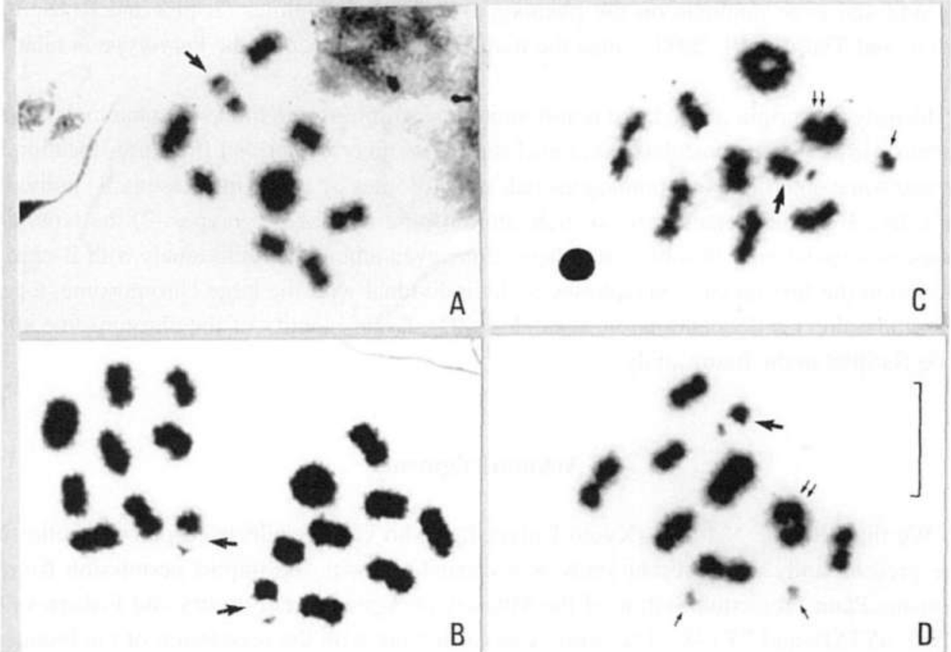

Fig. 3. First meiotic metaphases of *Epilachna vigintioctopunctata*. Large arrow marks XYp or Xyp associations. Small single arrow represents small B-chromosome seen as a univalent. Small double arrows mark a large chromosome forming a nonhomologous bivalant with one of the autosomes. A: Male with 2n=18 (the diploid karyotype is shown in fig. 3D from Bangkok in KOBAYASHI *et al.* , 2000). B: Two mataphases of a male with 2n=18 from Kuala Lumpur. C: male with 2n=19 (Fig. 2B) from Bogor. D: male with 2n=20 (Fig. 2A) from Padang. Scale = 0.01mm.

Discussion

The following three routes have usually been postulated as the origin of B-chromosomes: 1) progressive heterochromatinization of standard autosomes; 2) duplication of standard heterochromatic chromosomes like X and Y chromosomes; and 3) deletion or translocations of standard heterochromites (SMITH and VIRKKI, 1978). Possible male-biased spreading of B-chromosomes in the Padang and Bogor populations of *Epilachna vigintioctopunctata* may suggest that the Bs in the present case originate from the duplication of Y chromosomes. The fact that supernumerary Y chromosomes were present in some males of a Japanese species, *Epilachna pustulosa* (TSURUSAKI *et al.*, 1993) also support the above view. It is likely that the Bs in *E. vigintioctopunctata* also arise from duplication of Y chromosomes and gradual losing of association with

X at meiosis.

It must be noted, however, that the Bs in *E. vigintioctopunctata* are much larger than Y-chromosomes, at least in the karyotype at mitotic metaphase (Fig. 1). Further study is therefore, needed for inferring their origin.

Phenotypic effects of the B-chromosomes in this species are also unknown. The species is highly variable in elytral spot patterns in Sumatra (ABBAS *et al.*, 1988; KATAKURA *et al.*, 1994) and in Java (KATAKURA *et al.*, unpublished data). Hence this issue highly deserves to be studied. This species may also be a hopeful material to study odd-even effects (differential effects of Bs in odd and even numbers on the phenotype) of B-chromosomes (JONES and REES, 1982; GORLOV and TSURUSAKI, 2000), since the number of Bs retained in the karyotype is relatively high.

Identity and origin of the large non-homologous chromosome found in some males remain uncertain. However, we postulate that the chromosome may be derived from translocation of a B-chromosome onto one of a homologous pair of autosomes by following reasons: 1) individuals lacking free B-chromosomes bear no such chromosome in their karyotypes; 2) the large chromosome was found only in some individuals alone even among the individuals with B-chromosomes; 3) in the first meiotic metaphases of the individual with the large chromosome, a possible non-homologous bivalent can be seen (Fig. 2D). Exact identity of the chromosome should also be clarified in the future study.

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Insect Fauna Associated with *Cycas revoluta* (Cycadaceae), with a Discovery of a Cerambycid Megasporophyll Miner

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Abstract Larvae of *Mimectatina meridiana ohirai* BREUNING et VILLIERS, 1973 (Cerambycidae) were found mining megasporophylls and dead frond rachises of a cycad, *Cycas revoluta*, on Okinawa Islands, Japan. The larvae started mining at apical pinnate lamina of a megasporophyll, then descended the central axis, and sometimes entered side stalks to bore into immature seeds. The emerged adult beetles nibbled trichomes on megasporophylls. Since the beetles have not been observed to visit male cones, they appeared not to contribute to pollination of the cycads. From the dead frond rachises, four beetle species, including two cerambycid, one curculionid and one scolytid species, emerged, while living fronds were not observed to be damaged by insect herbivores.

Key words Cycad; megasporophyll miner; Cerambycidae; *Cycas revoluta*; *Mimectatina*.

Introduction

The Cycadales, one of four extant classes of gymnosperms, diversified in the Early Permian (JOHNSON & WILSON, 1990). They are dioecious woody perennials, bearing a crown of pinnate fronds and large male and female cones, which are composed of microsporophylls and megasporophylls, respectively. The Cycadales is divided into four families, Zamiaceae, Cycadaceae, Boweniaceae and Stangeriaceae, and their pollination systems are anemophilous or entomophilous.

Most species of Zamiaceae are pollinated by curculionid beetles, whose larvae feed on parenchyma of microsporophylls and pupate within stalks of the microsporophylls (TANG, 1987; NORSTOG & FAWCETT, 1989; ORNDUFF, 1991; VOVIDES, 1991; FORSTER *et al.*, 1994; DONALDSON, 1997). In contrast, most species of Cycadaceae are pollinated by wind (NIKLAS & NORSTOG, 1984; WANG *et al.*, 1997), while the male cones emit strong odor. The volatile composition resembles that of Zamiaceae, but acts potent herbivore deterrents (PELLMYR *et al.*, 1991).

In Japan, a cycad of Cycadaceae, *Cycas revoluta*, is distributed in the southeastern part of Japan. This cycad blooms in early summer, and the male cones emit strong odor, but attracts few insects on Amami Islands in Japan (KATO, 2000). It has not yet been known whether there are any herbivorous insects associated with the reproductive structures of *Cycas* except an individual of a cerambycid beetle species, *Mimectatina meridiana*, which has emerged from a seed

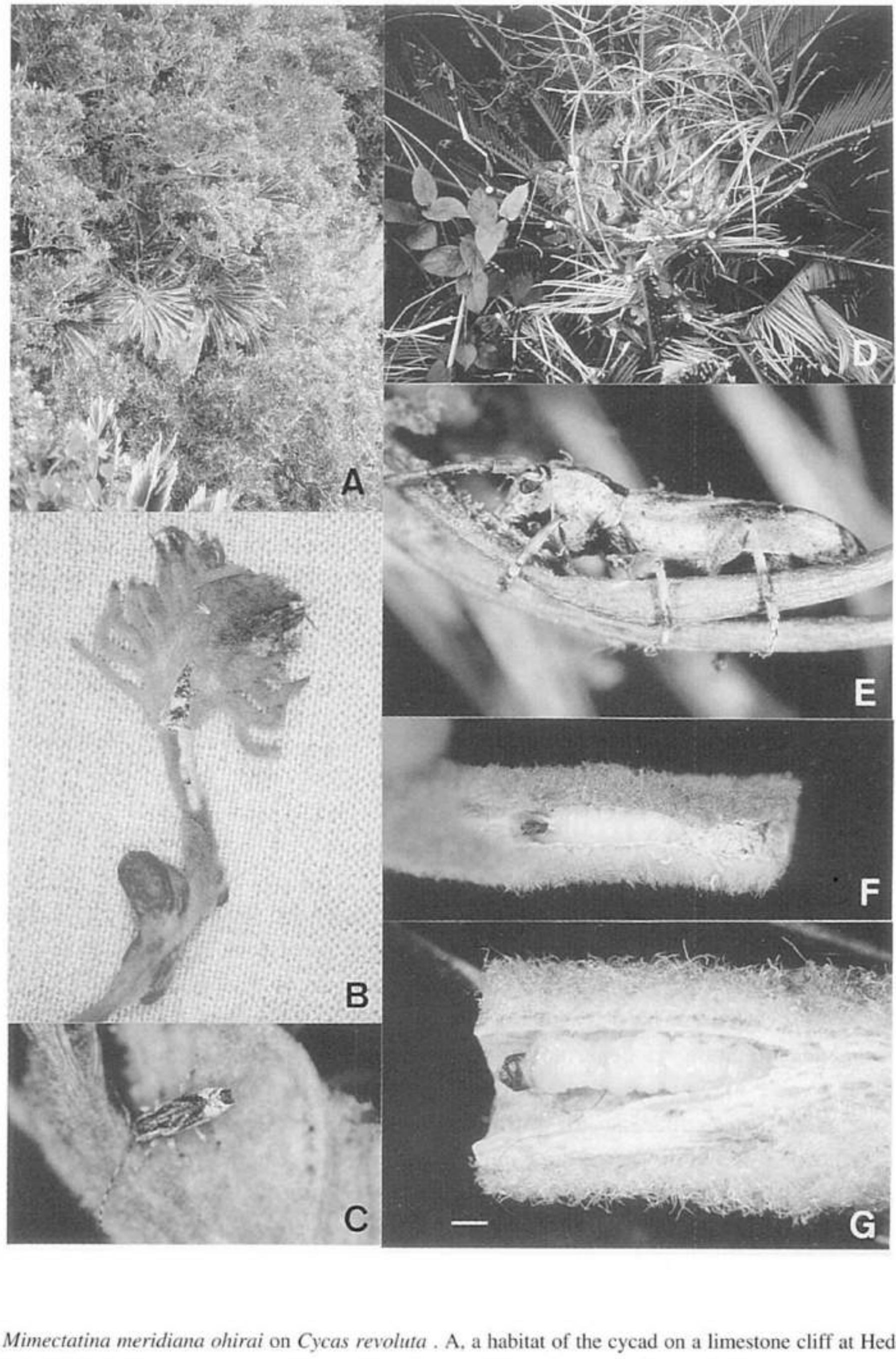

Fig. 1. *Mimectatina meridiana ohirai* on *Cycas revoluta* . A, a habitat of the cycad on a limestone cliff at Hedo, Okinawa Island; B, a megasporophyll mined by a larva with its mine partly dissected; C, an emerged adult; D, a female cycad with many megasporophylls bearing seeds; E, an adult nibling trichomes on a megasporophyll; F, side view of a mining larva with its minefilled with feces; G, ventral view of a mining larva (scale = 1 mm).

of the cycad in Miyazaki (KOIKE, 1971). My preliminary survey suggested that megasporophylls of the cycad on Okinawa Island were occasionally mined by various insect larvae including the cerambycid. Then, I conducted extensive rearing of endophytic insects mining the reproductive and vegetative structures in the Ryukyu Archipelago.

In this paper, I report insect fauna associated with the cycad, describe ecology of these insects, and discuss the origin of the herbivore fauna on cycads and ecological interactions between cycads and their herbivores.

Materials and Methods

I surveyed insect herbivores on cycads at Hedo, Kunigami-mura, Okinawa Island (26°51'N, 128°15°E, altitude 70 m) and at Yohena, Yagaji Island (26°39'N, 128°0'E, altitude 1 m), Okinawa Prefecture, Japan. Microsporophylls, megasporophylls and fronds of *Cycas revoluta*, which had signs of herbivory, were collected at Hedo on 10 March 1997, 1 February 1998 and 19 April 2000, and at Yohena on 1 February 1998. A part of the sample were dissected for endophytic insects, and others were kept in plastic container for rearing.

Results

Cycas revoluta was distributed on limestone cliffs or rocky slopes at Hedo, Okinawa Islands (Fig. 1A). Some of these cycads had been planted, and female plants have been selected out to collect seeds (Fig. 1D). Megasporophylls of these female cycads were found to be mined by cerambycid larvae on 10 March 1997 at Hedo on Okinawa Island. Adult beetles emerge from the mined megasporophylls from mid April to late June (Fig. 1C). They proved to be *Mimectatina meridiana ohirai*, whereas their coloration somewhat differed from the forms found in Kyu-shu, Amami Islands and the Izu Archipelago in having a wider whitish band at posterior part of elytra. The emerged adult beetles nibbled trichomes on megasporophylls (Fig. 1E). The beetles

Table 1. A list of insects associated with *Cycas revoluta* on Okinawa Islands, and plant parts which they utilize.

Family		plant parts utilized				
	Species	micro-sporophyll	mega-sporophyll	immature seed	frond pinna	frond rachis
Cerambycidae						
	Mimectatina meridiana ohirai	-	+	+	-	+
	Sybra ordinata loochooana	-	-	-	-	+
Curculionidae						
	Oxyderma sp.	-	+	-	-	+
Scolytidae						
	Margadillius sp.	-	+	-	+	+

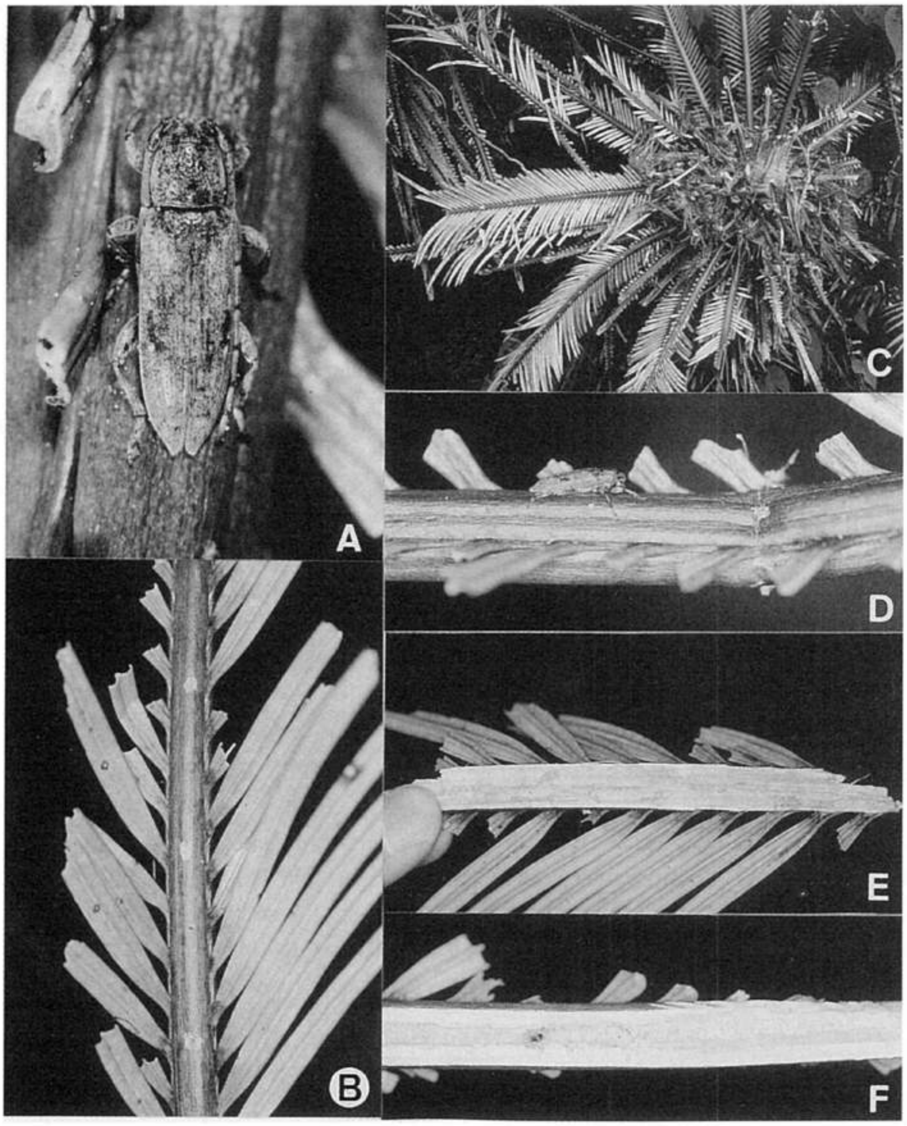

Fig. 2. *Sybra ordinata* on *Cycas revoluta*. A, dorsal view of an emerged adult; B, oviposition scars insiced on a dead frond rachis at an interval; C, dead fron rachises having oviposition scars; D, side view of an adult; E, eggs layed into pith of a frond rachis; F, a larva mining a frond rachis.

have not been observed to visit male cones of the cycad.

The larvae started mining at apical pinnate lamina of a megasporophyll, then bore down the central axis, and sometimes entered side stalks of seeds to bore into immature seeds (Fig. 1B). Pupation took place in the mine, which was filled with feces (Fig. 1F) . Most larvae could not bore into hard coats of mature seeds protected by hard seed coats. The morphology of a larva (Fig. 1G) was identical to the description by the Japanese Society of Coleopterology (1984).

From dead frond rachis of the cycad, four beetle species (two cerambycids, one curculionid and one scolytid) emerged from mid May to late June (Table 1) . All these insects utilized only dead or rotten parts, and did not attacked living parts.

The most dominant rachis miner was a cerambycid, *Sybra ordinata* (Fig. 2A, D), and *M. meridiana* was rare in frond rachises. Eggs of *Sybra ordinata loochooana* were laid into pith of frond rachis from upper or lower side at an interval of about 2–8 cm (Fig. 2B–E). The oviposition scar was a conical hole (diameter 1.6–2.2 mm, depth 1.1–1.3 mm). In addition to oviposition scar, there were biting scars which did not penetrate to pith. The laid egg was large and the length was 2.1 mm (Fig. 2E). Up to 11 eggs were laid on a frond rachis. The larvae mined pith of the frond rachises, and the mine was filled with white feces (Fig. 2F). The empty mines were sometimes utilized by ants and pseudoscorpions.

Discussion

The beetle which emerged from megasporophyll of the cycad was a cerambycid, and I assigned it as *Mimectatina meridiana ohirai*. The species sensu lato has wide variation in color pattern of elytra, and has been known to feed on wood of *Ficus* spp., *Morus* spp., *Toddalia asiatica* and *Aucuba japonica* (The Japanese Society of Coleopterology, 1994) and seeds of *Cycas revoluta* (KOIKE, 1971). Some of these varieties may be definite taxa which differ in their host plants. Therefore, morphological and molecular analyses of these varieties are awaited.

The attack by this beetle to reproductive structure of the cycad may decrease fitness of female cycads, because the larvae damage immature seeds. While it is interesting question whether the beetle pollinates the cycads, the beetle has not yet been observed to visit male cones of the cycad until now. This suggests that the cycad is pollinated not by the beetles but by wind. In general, cycads have a long interval as long as 6 months between pollination and fertilization, and a long interval up to 3 years between ovule initiation and seed maturation (JOHNSON & WILSON, 1990). These long time lags might have impeded evolution of pollination mutualism between cycads and pollinators which parasitize reproductive structures of cycads.

Four beetle species were found to utilize dead frond rachises. Among these beetles, *Sybra ordinata* has been known to feed on rotten wood of various angiosperm genera, e.g., *Castanopsis*, *Boemeria*, *Morus*, *Ficus*, *Pittosporum*, *Mallotus*, *Rhus* and *Zanthoxylum* (KOJIMA & NAKAMURA, 1986). The large size of an egg laid by this beetle might be related with the wide range of host plants. Although cycads are archaic plants, the insects associated with the cycads are not always archaic ones, and most of their relatives are angiosperm feeders. Moreover, the cerambycid beetles are not cycad specialists and utilized various angiosperms. These facts may suggest that these insects became cycad feeders secondarily from angiosperm feeders. Cycads are famous for poisonous chemicals which are toxic to human and probably to many insect herbivores. While some beetle species are specialist herbivores of living ftond of cycads (WINDSOR *et al.*, 1999), the insects observed in this study attacked only old or dead tissue in which the poisonous chemicals might have been partly decomposed.

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Description on Larva of *Nicrophorus maculifrons* (Coleoptera, Silphidae)

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Abstract Mature larva of *Nicrophorus maculifrons* KRAATZ is described and illustrated for the first time.

On Japanese Nicrophorinae larvae only two species, *Ptomascopus morio* KRAATZ (KUROSA, 1959; ANDERSON, 1982) and *Nicrophorus concolor* KRAATZ (HAYASHI, 1986), have been described or illustrated until now. In this paper, I am going to describe the larva of *N. maculifrons* KRAATZ. Larva was fixed in boiling water and then preserved in 70–80 % alcohol. Structural terms are followed those of DORSEY (1940). Larval diagnostic characters for the Silphidae as shown by CROWSON (1955) and NEWTON (1991) and descriptions of the subfamily and/or genus by KLAUSNITZER and ZERCHE (1978), ANDERSON (1982), ANDERSON and PECK (1985) and RUZICKA (1992) are very useful for the present study.

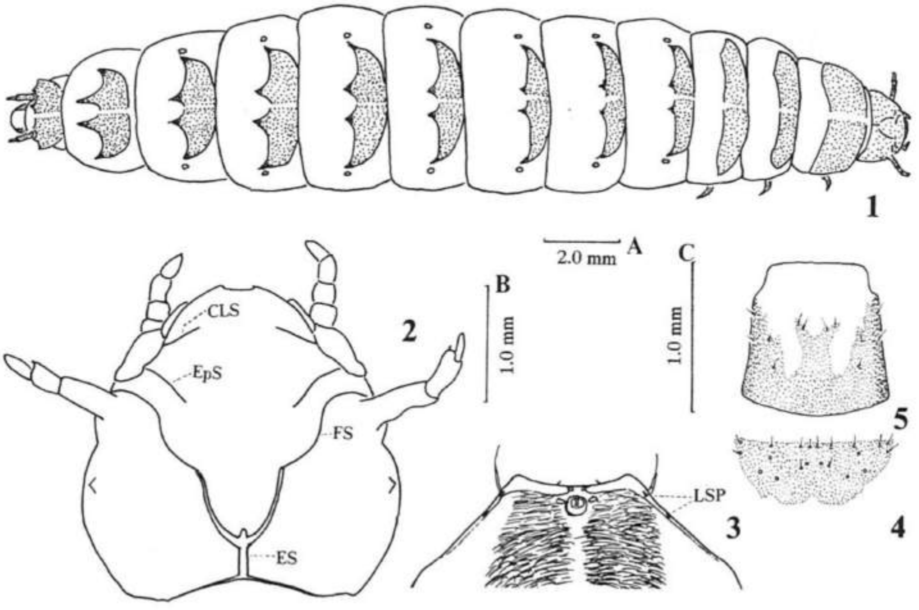
Before going further, I wish to express my deep gratitude to Drs. Nodoka HAYASHI of Yokohama City and Masatoshi TAKAKUWA of the Kanagawa Prefectural Museum of Natural History, Odawara, not only for their kindness in critically reading an early version of the manuscript of this paper but also for their kind advice. This paper is dedicated to Dr. Hiroyuki SASAJI for commemorating his retirement from the Fukui University.

Nicrophorus maculifrons KRAATZ, 1877

(Figs. 1– 5)

Mature larva. Body eruciform, tapering posteriorly (Fig. 1); all thoracic and abdominal segments generally elliptical in cross-section. Color milky white, except for sclerites yellowish brown; mandibles, medial portions of labrum and head, spines of abdominal tergites and urogomphi reddish brown.

Head (Fig. 2) with clypeo-labral suture, epistomal suture, epicranial suture and frontal suture. Mandible with eight teeth, 1st and 4th equal in length; 4th and 6–7th slightly recurved anteriorly, 1st–3rd, 4–5th and 7–8th broadly joined at bases. Antennae three-segmented, with a sensory seta at each latero-ventral corner in the apex of segment II. Maxillary palpi as shown in Fig. 2. Labrum slightly swollen in the middle, unsclerotized laterally, though antero-lateral margins slightly sclerotized. Labial palpi with basal segment unsclerotized ventrally; distance between bases of labial palpi about 1.25× as wide as basal segment of labial palpus. Ligula without small lateral lobes. Epipharynx (Fig. 3) with antero-lateral margins each bearing two lateral sensory pegs; apical emargination shallow, with a pair of stout seta which is inwardly directed.



Figs. 1–5. Mature larva of *Nicrophorus maculifrons* KRAATZ, 1877. 1, Dorsal habitus; 2, head (setae omitted), dorsal view, showing sutures (CLS: clypeo-labral suture; EpS: epistomal suture; ES: epicranial suture; FS: frontal suture); 3, apical portion of epipharynx (LSP: lateral sensory pegs); 4, 9th abdominal sternite; 5, 10th abdominal segment, ventral view. Scale A is applied to Fig. 1, scale B is to Fig. 2, and scale C is to Figs. 4-5. Fig. 3 is a freehand drawing.

Prothorax, meso- and metathoraces sclerotized, their lateral sides rounded and slightly swelled, without spines. Relative lengths and widths of tergites from pro- to metathorax as follows: 1.4 : 3.5; 0.7 : 3.8; 0.8 : 3.9.

Abdominal segments I–VIII with four spines on each tergite; lateral and mid-dorsal spines of segment I equal in size, almost 1/2 as long as diameter of spiracle on the same segment; lateral and mid-dorsal spines of segment II equal in size, very slightly larger than those of segment I; lateral and mid-dorsal spines of segment III equal in length, almost as long as diameter of spiracle on the same segment; lateral spines of segments IV–VIII almost 1/2 length of mid-dorsal spines; lateral spines of segments IV–V and VII about 1.2× as long as diameter of spiracle on segment IV, slightly larger than diameter of spiracles on segments V–VIII, though those of segments VI and VIII about 1.6× as long as diameter of spiracle on segment IV, about 2× as long as diameter of spiracle on segments V–VIII; segments VI–VIII with venter sclerotized in the middle, each sclerite being very small and indistinct. Abdominal tergite of segment IX with lateral spines and urogomphi: the lateral spine equal in size to that of segment III, distance between bases of urogomphus and lateral spine about 2.5× length of lateral spine, urogomphus two-segmented, with suture at base complete, the 1st segment 2.13× as long as 2nd; sternite IX (Fig. 4) entire, with posterior margin almost straight, anterior margin broadly arcuate, notched medially. Abdominal segment X (Fig. 5) with venter partially sclerotized, the middle sclerite Y-shaped, extending to base of an innermost pair of apical setae; basal and lateral portions also sclerotized.

Length of larva 26.50 mm; width of head capsule 2.05 mm.

Specimen examined. One larva, Mt. Yahiko-yama, Nishi-kanbara, Niigata Pref., central Honshu, 27-V-1990, M. NISHIKAWA leg. Specimen in my collection.

Notes. The examined larva was found with other three larvae (damaged during conveyance) and a female adult in a can trap set on a forest floor. Determination was based on this association.

Larval characters of the North American species have been described by ANDERSON (1982) and ANDERSON and PECK (1985). European ones were also described by RUZICKA (1992). Judging from these papers, the present species is closely related to *Nicrophorus fossor* ERICHSON, *N. investigator* ZETTERSTEDT and *N. nigrita* MANNERHEIM in having the Y-shaped sclerotization of the venter of the abdominal segment X (as in Fig. 5), and to *N. defodiens* MANNERHEIM and *N. sayi* LAPORTE in having the unsclerotized ventral surface of the basal segment of labial palpi, respectively. And it share these two characters with *N. vespilloides* HERBST.

要　約

西川正明：マエモンシデムシ幼虫の記載 ―― 新潟県弥彦山産の標本にもとづいて，マエモンシデムシ *Nicrophorus maculifrons* KRAATZ の老熟幼虫の形態を記載した．最近，北アメリカ産およびヨーロッパ産の本科幼虫を記載した ANDERSON (1982)，ANDERSON and PECK (1985)，さらに RUZICKA (1992)によって判断すれば，本種の幼虫は，腹部第10節の腹面基部および中央部がY字状に節片化することで *N. fossor* ERICHSON，*N. investigator* ZETTERSTEDT と *N. nigrita* MANNERHEIM に，第1節腹面が節片化した下唇肢を持つことで，*N. sayi* LAPORTE と *N. defodiens* MANNERHEIM に類似している．また，*N. vespilloides* HERBST とはそれら両方の特徴を共有している．

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New Species and New Records of Zuphiinae from Australia (Coleoptera: Carabidae)

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Abstract *Acrogenys lucai* sp. nov. and *A. jabiruensis* sp. nov. from northern parts of the Northern Territory of Australia, *Acrogenys sumlini* sp. nov. from northwestern Australia, and *Zuphium flavum* sp. nov. from northern South Australia are described. The latter species is easily distinguished from all other Australian species of *Zuphium* s. str. by its small size and yellow colour. For the genera *Acrogenys* MACLEAY and *Zuphium* LATREILLE revised keys are presented. A number of additional records of Australian zuphiine species are given. A checklist of all zuphiine species recorded from Australia is added.

Introduction

The Zuphiine fauna of Australia recently has been subject to a number of revisionary papers and some additional descriptions of single species (BAEHR, 1984, 1985a, 1985b, 1986a, 1986b, 1988, 1991, 1992, 1995). It became evident during these studies that Australia is surprisingly rich in species which, however, concentrate in the northern tropical belt, whereas the dry interior apparently has a highly impoverished fauna. The more interesting is the record of a peculiar new species of the genus *Zuphium* s. str. in interior South Australia. The single specimen was collected rather recently and was discovered when I sorted through the large amount of unidentified ground beetles in the collections of the South Australian Museum, Adelaide. Three additional new species of the genus *Acrogenys* were sent for identification by different collectors. They are distinguished by minor characters from the described species of the subgenus *Acrogenys* s. str.

Since the recent catalogue of MOORE *et al.* (1987) is outdated with respect to the Australian Zuphiinae, a checklist of all known species is added to this paper.

Abbreviations of collections mentioned in text

ANIC:	Australian National Insect Collection, Cambella
CBM:	Working collection M. BAEHR, München
MCST:	Museum Civico die Storia naturale, Torino
MNTD:	Museum and Art Gallery of the Northern Territory, Darwin
SAMA:	South Australian Museum, Adelaide
WAM:	Western Australian Museum, Perth
ZSM:	Zoologische Staatssammlung, München

Abbreviations The states of Australia are cited with their usual abbreviations. Northern

South Australia for example is abbreviated as n.SA.

Measurements

Measurements have been made under a stereo microscope by use of an ocular micrometer. Length has been measured from apex of labrum to apex of elytra. Length of pronotum was taken from the most produced tip of anterior angles to most advanced part of base.

Additional records of Australian Zuphiinae

For synonymies and original descriptions see the respective literature records given at each species.

Acrogenys demarzi BAEHR

BAEHR 1984, p. 124.

New record: 12°40'S 132°54'E, Jabiru NT, 5–9 Jul 1977, R. PENGILLY, pitfall trap (MNTD).

Note. This characteristically shaped species is apparently constricted to the northernmost part of Northern Territory, from where the single above specimen has been recorded.

Pseudaptinus fulvus (CASTELNAU)

BAEHR 1985a, p. 39.

New record: S. A. Arkaroola, III. 1994, leg. HOGENHOUT (CBM).

Note. The single specimen is apparently the first record of this southern species from South Australia. So far the recorded the range extends from southern Queensland to northwestern Victoria.

Pseudaptinus iridescens BAEHR

BAEHR 1985a, p. 43.

New records: N. T. Bullock Ck, Camfield Hmsd, 17°10'S 131°25'E, M.V. Light, 19–20. VIII. 1982, I. ARCHIBALD (MNTD); NT 95/7, Mary River, 115 km e. Darwin, 2–3. VIII. 1995, M. BAEHR (CBM); NT 95/52, Mary River, 115 km e. Darwin, 29–30. VIII. 1995, M. BAEHR (CBM); West Baines River at Cr. with Victoria Hwy, 23–24. VIII. 1995, M. BAEHR (CBM); WA 95/39, Denham River, 120 km n. Turkey Creek, 21–22. VIII. 1995, M. BAEHR (CBM); QLD 3, L. Broadwater, 35 km ssw. Dalby, 16–17. XII. 1998, M. BAEHR (CBM); NSW 6, Maynes Lag., 20 km s. Goondiwindi, 17–17. XII. 1998, M. BAEHR (CBM).

Note. 10 specimens. The most widespread and apparently most common Australian species of the genus *Pseudaptinus*. The new records from southeastern Queensland and northeastern New South Wales enlarge the recorded range to the east, nevertheless both localities are from west of Great Dividing Range.

Pseudaptinus cyclophthalmus BAEHR

BAEHR 1985a, p. 48.

New record: NT 95/52, Mary River, 115 km e. Darwin, 29–30. VIII. 1995, M. BAEHR (CBM).

Note. Three specimens. Apparently a very rare species that was so far known only from the holotype. The new record (3 specimens) enlarges the range somewhat to the west.

Pseudaptinus hirsutulus BAEHR

BAEHR 1985a, p. 51.

New records: N. T., Junction of Arnhem Hwy & Oenpelli Road, M.V. Light, 26–27. VI. 1980, M. B. MALIPATIL (MNTD); NT 95/52, Mary River, 115 km e. Darwin, 29–30. VIII. 1995, M. BAEHR (CBM).

Note. Two specimens. A characteristic species that has been recorded only from northeastern Northern Territory at and near Arnhem Land.

Parazuphium tropicum BAEHR

BAEHR 1985b, p. 301.

New records: NT 95/7, Mary River, 115 km e. Darwin, 2–3. VIII. 1995, M. BAEHR (CBM); NT 95/52, Mary River, 115 km e. Darwin, 29–30. VIII. 1995, M. BAEHR (CBM); NT 95/44, Victoria River, 5 km w. Victoria River Cr., 24–25. VIII. 1995, M. BAEHR (CBM, ZSM); N.T. m 50, Victoria River Roadhouse, 20–21/24–25. III. 1996, P. M. GIACHINO leg. (MCST).

Note. Fourteen specimens. A quite common species widely distributed from northern Queensland to northwestern Australia.

Parazuphium darlingtoni BAEHR

BAEHR 1985b, p. 305.

New records: NT 95/47, 5 km e. Edith River Cr., 27–28. VIII. 1995, M. BAEHR (CBM); NT 95/7, Mary River, 115 km e. Darwin, 2–3. VIII. 1995, M. BAEHR (CBM); N. T. Timber Creek, m 50, 22. III. 1996, P. M. GIACHINO leg. (MCST); N. T. Katherine m 50, 18–27. III.–1. IV. 1996, P. M. GIACHINO leg. (MCST); N. T. m 50, Victoria River Roadhouse, 20–21/24–25. III. 1996, P. M. GIACHINO leg. (MCST).

Note. Six specimens. All records from within the known range of this rather widely distributed species.

Parazuphium mastersii (CASTELNAU)

BAEHR 1985b, p. 307.

New record: NT 95/42, West Baines River at Cr. with Victoria Hwy, 23–24. VIII. 1995, M. BAEHR (CBM).

Note. A single specimen. The most widely ranging Australian *Parazuphium*. The new record area is situated just west of the recorded range.

Parazuphium barbarae BAEHR

BAEHR 1985b, p. 309.

New record: Murganella N.T., 28. VII. 1982, C. WILSON & S. COLLINS, ex light trap (MNTD).

Note. A single specimen. The new record enlarges the known range to the north into Coburg Peninsula.

Parazuphium flavescens BAEHR

BAEHR 1985b, p. 312.

New records: NT 95/44, Victoria River, 5 km w. Victoria R. Cr., 24–25. VIII. 1995, M. BAEHR (CBM); WA 95/39, Denham River, 120 km n. Turkey Creek, 21–22. VIII. 1995, M. BAEHR (CBM).

Note. Two specimens. A rare species, so far known from the Kimberleys only. The new records enlarge the distribution to the east into northwestern Northern Territory.

Parazuphium rockhamptonense (CASTELNAU)

BAEHR 1986, p. 314.

New records: NT 95/42, West Baines River at Cr. with Victoria Hwy, 23–24. VIII. 1995, M. BAEHR (CBM, ZSM); NT 95/52, Mary River, 115 km e. Darwin, 29–30. VIII. 1995, M. BAEHR (CBM); WA 95/39, Denham River, 120 km n. Turkey Creek, 21–22. VIII. 1995, M. BAEHR (CBM).

Note. Twenty specimens. A fairly common species, so far known only from central eastern Queensland and northwestern Australia from western Northern Territory to the Kimberleys in Western Australia.

Zuphium australe australe CHAUDOIR

BAEHR 1986a, p. 6.

New records: VIC 48, Wyperfeld NP. L. Brambuck, 1–2. I. 1999, M. BAEHR (CBM, ZSM); NSW 26, Darling River, Kinchega NP, 20 km ssw. Menindee, 23–24. XII. 1998, M. BAEHR (CBM); NSW 29, Darling River at Paramaroo L., 15 km nne. Menindee, 25–26. XII. 1998, M. BAEHR (CBM); QLD 3, L. Broadwater, 35 km ssw. Dalby, 16–17. XII. 1998, M. BAEHR (CBM).

Note. Thirteen specimens. The new records are from within the range of this rather common southern subspecies.

Zuphium australe incertum BAEHR

BAEHR 1986a, p. 9.

New records: N.T., "Alroy Downs" Station 19°18'S 136°04'E, 5. III. 1980, G. GOW & P. HORNER, *Zuphium australe* CHAUD. Zuphiinae (MNTD); Australia, NT 95/52, Mary River, 115 km e. Darwin, 29–30. VIII. 1995, M. BAEHR (CBM).

Note. Two specimens. The northern subspecies of a widespread southern species. The new records are from within the recorded range.

Zuphium macleayanum BAEHR

BAEHR 1986a, p. 14.

New record: NT, Mataranka, 20. I. 1996, P. M. GIACHINO leg. (CBM).

Note. A single specimen. This species was so far known from the holotype only. The new locality is not far from the type locality in northern central Northern Territory.

Zuphium moorei BAEHR

BAEHR 1986a, p. 15.

New record: N. T. m 50, Victoria River Roadhouse, 20–21/24–25. III. 1996, P. M. GIACHINO leg. (MCST).

Note. Two specimens. The new locality of this fairly common species is slightly east of the recorded range.

Zuphium thouzeti minor BAEHR

BAEHR 1986a, p. 11.

New records: 12.12°S 132.56°E, 7 km NW by N of Cahills Crossing (East Alligator R.) N.T., 27. V. 1973, T. WEIR & N. FORRESTER (MNTD); N. T. Katherine m 50, 18–27. III.–1. IV. 1996, P. M. GIACHINO leg. (MCST).

Note. 2 specimens. The northern subspecies of a widespread eastern species. The new record is from within the recorded range.

Planetes magelae BAEHR

BAEHR 1986b, p. 157.

New records: N. T. 1 km W of Baralili Ck crossing on Arnhem Hwy nr Jabiru, M. V. Light, 25. VI. 1980, M. B. MALIPATIL (MNTD); Baralili Ck crossing on Arnhem Hwy nr Jabiru, M. V. Light, 24. VI. 1980, M. B. MALIPATIL (MNTD); N. T. Carndarl Billabong nr Jabiru, M.V. Light, 2. X. 1980, M. B. MALIPATIL (MNTD); N. T. Junction of Arnhem Hwy/Oenpelli Road, M.V. Light, 26–27. VI. 1980, M. B. MALIPATIL (MNTD); N. T. Kakadu NP c. 1 km S of Arnhem Hwy on Pine Creek Rd, M. V. Light, 25–30. III. 1980, M. B. MALIPATIL (MNTD); Tortilla Flat 11. III. 1982, J. WALDOCK, ex light trap (MNTD); Murganella, NT. 4. VIII. 1982, C. WILSON & S. COLLINS, ex light trap (MNTD).

Note. Thirteen specimens. A common species in the northernmost parts of Northern Territory, in particular in and around Arnhem Land.

New species

Acrogenys (s. str.) ***lucai*** sp. nov.

(Figs 1, 4)

Holotype: ♀, Australia N. T. Gregory N. P. Victoria Crossing 1–2. I. 1997 at light/al lume

L. TOLEDANO and R. OLIVIERI (ANIC) leg.

Diagnosis. Species of subgenus *Acrogenys* s. str. Distinguished from the related species *A. jabiruensis* sp. nov. and *A. sumlini* sp. nov. by basally wider pronotum, far less tectiform 7th interval and only apically raised suture. Further distinguished from *A. jabiruensis* by less dense though more irregular elytral puncturation; and from *A. sumlini* by denser puncturation and less smooth elytral intervals.

Description: Measurements. Length: 10.3 mm; width: 3.4 mm. Ratio width/length of pronotum: 1.11; ratio widest diameter/narrowest diameter of pronotum: 1.67; ratio width of pronotum/width of head: 1.32; ratio length/width of elytra: 1.79; ratio width of elytra/width of pronotum: 1.42.

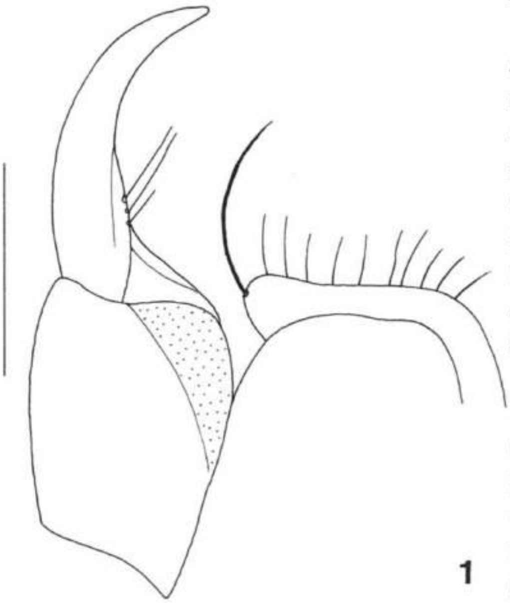

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Fig. 1. *Acrogenys lucai* sp. nov. Female stylomeres 1+2, lateral plate. Scale: 0.25 mm.

Colour. Black. Mouth parts, tibiae and tarsi dark piceous, outer antennomeres laterally dark reddish.

Head. Considerably narrower than pronotum. Eyes large, laterally projecting, orbit c. 2/3 of length of eye. Base of head wide. Labrum anteriorly almost straight, smooth. Mandibles rather short. Mentum with triangular, unidentate tooth. Glossa polysetose, paraglossae elongate, membraneous, curved inwards. Lacinia strongly setose, with a few short hairs at lateral border of apex. Labial palpus narrow, elongate, slightly widened to apex, terminal palpomere slightly shorter than penultimate, almost impilose. Maxillary palpus short and stout, densely setose, terminal palpomere widened at apex. Antenna fairly elongate, surpassing base of pronotum by about 3 antennomeres. Median antennomeres about 1.5× as long as wide. Whole antenna densely setose. Dorsal surface very coarsely and rather densely punctate, though middle of frons more sparsely punctate, punctures anteriorly larger than towards neck. Surface hirsute. Hairs elongate, erect, slightly inclined anteriorly.

Prothorax. Large and wide, distinctly wider than long, markedly cordiform. Apex slightly concave, anterior angles rounded off. Sides markedly convex in anterior half, posteriorly deeply concave. Basal angles angulate, laterally projecting. Base comparatively wide, laterally deeply excised. Lateral margin barely raised, marginal channel not explanate. Disk uneven, median sulcus deep, evenly deepened in middle and near apex, median line not attaining apex. Basal grooves deep, linear, almost straight, almost attaining middle of pronotum. Margin in anterior half with 3–4 long erect setae, of which only the punctures are visible in the holotype, and with an elongate seta at basal angle. Puncturation coarse, dense, somewhat coriaceous. Pilosity dense, elongate, hirsute, on disk inclined posteriorly, at lateral margins inclined anteriorly.

Elytra. Rather elongate, laterally slightly though evenly convex. Humeri projecting, rounded. Lateral margin behind humeri feebly concave. Apex slightly sinuate. Seventh interval raised, tectiform, though comparatively shallow and, at least in posterior half, irregularly intersected. Sutural interval depressed in middle, remarkably raised in posterior fourth, there considerably more raised than 7th interval. Surface between 7th interval and suture somewhat irregular, not perceptibly depressed. Striae coarsely punctate, crenulate. Intervals rather densely punctate and in lateral parts somewhat intersected. Pilosity dense, elongate, hirsute, inclined posteriorly, intermixed with erect hairs on odd intervals, though these hairs almost all lost or depressed. Marginal setae numerous, very elongate. Apex of elytra without densely pilose yellow spot. No traces of microreticulation visible on intervals. Intervals moderately glossy. Elytra fused together, posterior wings absent.

Ventral surface. Densely punctate and pilose. Metepisternum little longer than wide. Sternum VII in female with 3 elongate setae on either side of posterior margin, though setae lost.

Legs. Rather elongate, densely punctate and pilose. Squamosity of male protarsus unknown.

Male genitalia. Unknown.

Female genitalia. Stylomere 2 very elongate, narrow, with acute apex, with 2-3 attached setae near base, at position of the ventro-lateral ensiform seta(e). No dorso-median ensiform seta present, nor apical nematiform seta(e). Apex of stylomere 1 asetose, though apical margin of lateral plate medially with very elongate, curved seta.

Variation. Unknown.

Distribution. Northwestern Northern Territory of Australia. Known only from type locality.

Bionomics. Collected at light near large river.

Etymology. The name is an acronym in honour of my friend Dr. Luca TOLEDANO, collector of this and of many other interesting species in northern Australia.

Acrogenys (s. str.) ***jabiruensis*** sp. nov.
(Figs 2, 5)

Holotype: ♂, 12°40'S 132°54'E, Jabiru NT, 5–9. VII. 1977, R. PENGILLY, pitfall trap (MNTD).

Diagnosis. Species of subgenus *Acrogenys* s. str. Distinguished from the related species *A. lucai* sp. nov. and *A. sumlini* sp. nov. by much denser elytral puncturation. Further distinguished from *A. lucai* by more regularly tectiform 7th interval, completely raised suture, and denser though less irregular elytral puncturation; and from *A. sumlini* by less cordate pronotum with less explanate lateral margins, and less tectiform 7th interval.

Description: Measurements. Length: 11.3 mm; width: 3.6 mm. Ratio width/length of pronotum: 1.08; ratio widest diameter/narrowest diameter of pronotum: 1.72; ratio width of pronotum/width of head: 1.37; ratio length/width of elytra: 1.81; ratio width of elytra/width of pronotum: 1.31.

Colour. Black. Mouth parts, tibiae and tarsi dark piceous, outer antennomeres laterally dark reddish.

Head. Considerably narrower than pronotum. Eyes large, laterally projecting, orbit c. 2/3 of length of eye. Base of head wide. Labrum anteriorly almost straight, smooth. Mandibles rather short. Mentum with triangular, unidentate tooth. Glossa polysetose, paraglossae elongate, membraneous, curved inwards. Lacinia strongly setose, with a few short hairs at lateral border of apex. Labial palpus narrow, elongate, slightly widened to apex, terminal palpomere slightly

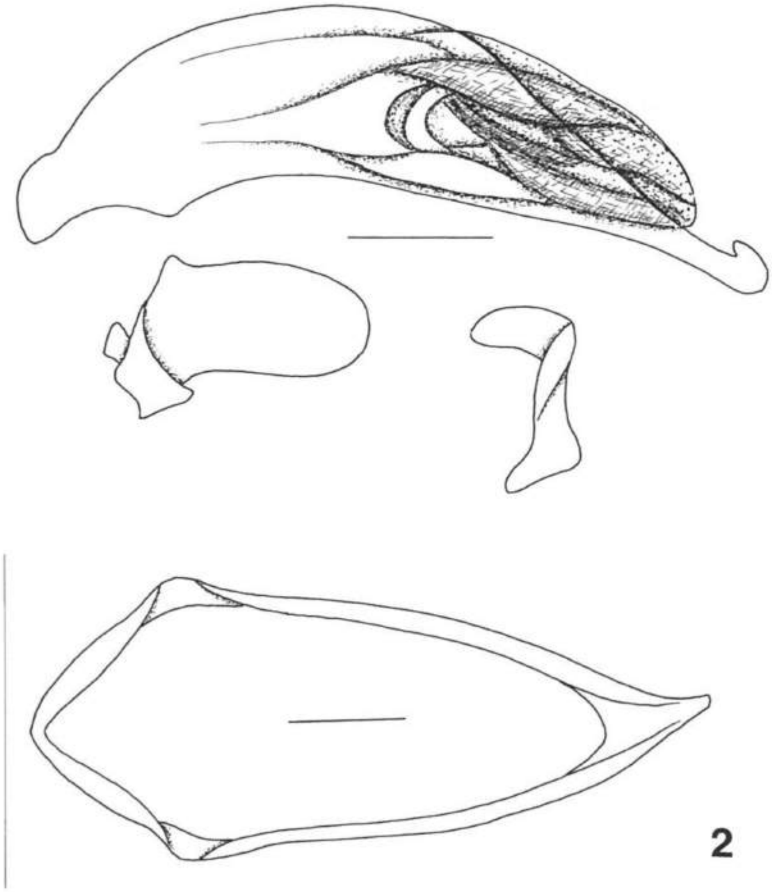

Fig. 2. *Acrogenys jabiruensis* sp. nov., aedeagus, parameres, and genital ring. Scale: 0.5 mm.

shorter than penultimate, almost impilose. Maxillary palpus short and stout, densely setose, terminal palpomere widened at apex. Antenna fairly elongate, surpassing base of pronotum by about 3 1/2 antennomeres. Median antennomeres >1.5× as long as wide. Whole antenna densely setose. Dorsal surface very coarsely and densely punctate, also on middle of frons, punctures anteriorly barely larger than posteriorly. Surface hirsute. Hairs elongate, erect, slightly inclined anteriorly.

Prothorax. Large and wide, distinctly wider than long, markedly cordiform. Apex slightly concave, anterior angles rounded off. Sides markedly convex in anterior half, posteriorly deeply concave. Basal angles angulate, laterally projecting. Base comparatively narrow, laterally deeply excised. Lateral margin slightly raised, marginal channel not explanate. Disk moderately uneven, median sulcus deep throughout, median line not attaining apex. Basal grooves deep, linear, almost straight, surpassing middle of pronotum. Margin in anterior half with 3–4 long erect setae, and with an elongate seta at basal angle. Puncturation very coarse and dense, somewhat coriaceous. Pilosity dense, elongate, hirsute, on disk inclined posteriorly, at lateral margins inclined anteriorly.

Elytra. Elongate, laterally very slightly convex. Humeri projecting, rounded. Lateral margin behind humeri barely concave. Apex slightly sinuate. Seventh interval raised, regularly tectiform, though comparatively shallow, not intersected. Sutural interval raised throughout, about as high as 7th interval. Surface between 7th interval and suture regularly depressed, though not concave. Striae coarsely punctate, crenulate. Intervals very densely and regularly punctate, laterally barely intersected. Pilosity very dense, elongate, hirsute, inclined posteriorly, intermixed with erect hairs on odd intervals. Marginal setae numerous, very elongate. Apex of elytra without densely pilose yellow spot. Traces of about isodiametric microreticulation rather well visible on intervals, therefore intervals comparatively dull.

Elytra fused together, posterior wings absent.

Lower surface. Densely punctate and pilose. Metepisternum little longer than wide. Sternum VII in male with 2 elongate setae on either side of posterior margin.

Legs. Rather elongate, densely punctate and pilose. First–3rd tarsomeres of male protarsus slightly widened and densely squamose on lower surface. Squamosity slightly asymmetric.

Male genitalia. Genital ring narrow, elongate, slightly triangular, fairly symmetric, with moderately elongate, narrow apex. Aedeagus fairly compact, with moderately elongate, knobbed, on upper surface hooked apex. Internal sac complexly folded, but without heavily sclerotized parts. Parameres highly dissimilar, left large, at apex widely rounded, right much smaller (see fig. 2).

Female genitalia. Unknown.

Variation, Unknown.

Distribution. Arnhem Land, northernmost Northern Territory of Australia. Known only from type locality.

Bionomics. Collected in pitfall trap.

Etymology. The name refers to the type locality.

Acrogenys (s. str.) ***sumlini*** sp. nov.
(Figs 3, 6)

Holotype: ♂, Australia: W. A. Quarry Beach nr Broome 17°58'05" S 122°17'23"E, 2. XII. 1997, SUMLIN & SHETTERLEY sea beach at light (WAM). Paratype: 1 ♀, same data (CBM).

Diagnosis. Species of subgenus *Acrogenys* s. str. Distinguished from the related species *A. lucai* sp. nov. and *A. jabiruensis* sp. nov. by markedly tectiform 7th interval and raised sutural interval, and by explanate and upturned lateral margins of pronotum, from *A. jabiruensis* sp. nov. also by slightly longer, less compact aedeagus with slightly shorter apex, and more asymmetric genital ring.

Description. Measurements. Length: 12.3–12.5 mm; width: 3.90–3.95 mm. Ratio width/length of pronotum: 1.12–1.15; ratio widest diameter/narrowest diameter of pronotum: 1.76–1.84; ratio width of pronotum/width of head: 1.32–1.35; ratio length/width of elytra: 1.85–1.88; ratio width of elytra/width of pronotum: 1.38–1.40.

Colour. Black. Mouth parts, tibiae and tarsi very dark piceous, outer antennomeres laterally dark reddish.

Head. Considerably narrower than pronotum. Eyes large, laterally projecting, orbit c. 2/3 of length of eye. Base of head wide. Labrum anteriorly almost straight, smooth. Mandibles rather short. Mentum with triangular, unidentate tooth. Glossa polysetose, paraglossae elongate, membraneous, curved inwards. Lacinia strongly setose, with a few short hairs at lateral border

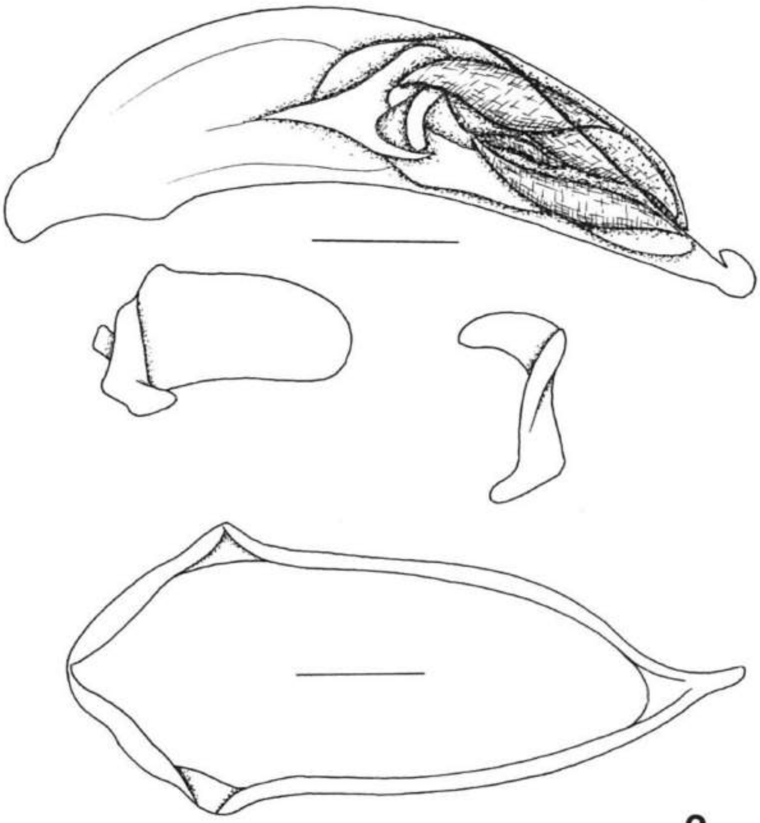

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Fig. 3. *Acrogenys sumlini* sp. nov., aedeagus, parameres and genital ring. Scale: 0.5 mm.

of apex. Labial palpus narrow, elongate, slightly widened to apex, terminal palpomere slightly shorter than penultimate, almost impilose. Maxillary palpus short and stout, densely setose, terminal palpomere widened at apex. Antenna fairly elongate, surpassing base of pronotum by about 3 1/2 antennomeres. Median antennomeres >1.5× as long as wide. Whole antenna densely setose. Dorsal surface very coarsely though moderately densely punctate, slightly less densely on middle of frons, punctures anteriorly slightly larger than posteriorly. Surface hirsute. Hairs elongate, erect, slightly inclined anteriorly.

Prothorax. Large and wide, distinctly wider than long, markedly cordiform. Apex slightly concave, anterior angles rounded off. Sides markedly convex in anterior half, posteriorly deeply concave. Basal angles angulate, laterally projecting. Base comparatively narrow, laterally deeply excised. Lateral margin considerably raised, marginal channel distinctly explanate. Disk moderately uneven, median sulcus very deep throughout, median line not attaining apex. Basal grooves deep, linear, almost straight, surpassing middle of pronotum. Margin in anterior half with 3–4 long erect setae, and with an elongate seta at basal angle. Puncturation very coarse and moderately dense, not coriaceous. Pilosity dense, elongate, hirsute, on disk inclined posteriorly, at lateral margins inclined anteriorly.

Elytra. Elongate, laterally very slightly convex. Humeri projecting, rounded. Lateral margin behind humeri barely concave. Apex slightly sinuate. Seventh interval raised, regularly tectiform, comparatively high, not intersected. Sutural interval basally slightly raised, in posterior half considerably raised, there about as high as 7th interval. Surface between 7th interval and suture regularly depressed, though not concave. Striae very coarsely punctate, markedly crenulate. Intervals comparatively sparsely and finely punctate, laterally not intersected. Pilosity dense, elongate, hirsute, inclined posteriorly, intermixed with erect hairs on odd intervals. Marginal setae numerous, very elongate. Apex of elytra without densely pilose yellow spot. No traces of microreticulation visible on intervals, therefore intervals glossy. Elytra fused together, posterior wings absent.

Ventral surface. Densely punctate and pilose. Metepisternum little longer than wide. Sternum VII in male with 3 elongate setae on either side of posterior margin.

Legs. Rather elongate, densely punctate and pilose. First–3rd tarsomeres of male protarsus slightly widened and remarkably sparsely squamose on lower surface. Squamosity asymmetric.

Male genitalia. Genital ring narrow, elongate, slightly triangular, fairly asymmetric, with elongate, very narrow apex. Aedeagus fairly compact, with moderately elongate, knobbed, on upper surface hooked apex. Internal sac complexly folded, but without heavily sclerotized parts. Parameres highly dissimilar, left large, at apex widely rounded, right much smaller (see fig. 3).

Female genitalia. Very similar to those of *A. lucai* sp. nov. Both stylomeres 2 with 3 attached setae near base.

Variation. Some variation noted in relative shape of pronotum

Distribution. Northwestern Australia. Known only from type locality.

Bionomics. At light near sea shore.

Etymology. The name is an acronym in honour of the collector, Mr. W. SUMLIN, III.

Zuphium flavum sp. nov.

(Fig. 7)

Holotype: ♀, S. Australia. 3.5 km NW Bitchera WH Eringa Stn., 26°33'34"S 135°30'18"E pitfalls 14–17. XI. 1995, Stony desert survey BI02 (SAMA).

Diagnosis. A small, remarkably light coloured *Zuphium* s. str., distinguished from all other Australian species by lesser size.

Description. Measurements. Length: 5.85 mm; width: c. 2.2 mm. Ratio width/length of pronotum: 0.97; ratio width of pronotum/width of head: 1.12; ratio length/width of elytra: c. 1.45; ratio width of elytra/width of pronotum: c. 1.60; ratio length of 1st antennomere/width of head: 1.84.

Colour. Light yellowish-reddish.

Head. Large and wide, depressed, but slightly narrower than pronotum. Eyes small, laterally little projecting, orbit to neck longer than eye. Base of head narrow. Labrum short and wide, anteriorly almost straight, 6–setose. Clypeus also short and wide, bisetose. Mandibles rather short, near apex suddenly incurved. Lateral margin near base and upper rim of scrobe with several stiff, elongate hairs, intermixed with some shorter and more delicate hairs. Mentum with triangular, unidentate tooth. Glossa bisetose, paraglossae elongate, membraneous, far surpassing glossa, curved inwards towards apex. Lacinia strongly setose. Both palpi rather narrow, terminal papomere widened to apex, transversely cut, densely pilose. Antenna elongate, surpassing base of pronotum by about 3 1/2 antennomeres. Basal antennomere very elongate, widened towards apex, densely pilose and with a single elongate seta near apex on upper surface. Median antennomeres about 3.5×as long as wide. Whole antenna densely setose. Anterior supraorbital seta situated near anterior border of eye, posterior seta situated far behind eye near basal margin of head. Puncturation of dorsal surface sparse, rather fine, Pilosity hirsute. Hairs rather short, erect, slightly inclined anteriorly. Lower surface of head also hirsute, hairs inclined anteriorly. Microreticulation absent, surface glossy.

Prothorax. Fairly large, slightly longer than wide, gently cordiform. Apex slightly concave in middle, laterally slightly oblique. Anterior angles rounded off. Sides convex in anterior three fourths, posteriorly gently concave. Basal angles right, though obtuse, laterally not projecting. Base wide, in middle slightly concave. Lateral margin bordered, apex and base unbordered. Disk depressed, median line shallow, not attaining apex. Basal grooves shallow, elongate. Anterior marginal seta situated about at anterior sixth, posterior marginal seta at basal angle. Puncturation of disk dense, rather fine, pilosity hirsute, hairs inclined anteriorly. Microreticulation absent, surface rather glossy.

Elytra. Rather short and wide, widest at posterior third, depressed. Humeri oblique. Lateral margin almost straight, incurved in posterior third. Apex rounded, slightly incurved towards suture, with membraneous margin. Striae lightly impressed, intervals very gently convex, densely punctate and pilose. Pilosity markedly inclined posteriorly. Marginal series consisting of 9–10 punctures in two rows behind humeri, 6 punctures in posterior third, and a single puncture at middle of apical margin. Setae extremely elongate. Microreticulation absent, surface moderately glossy. Elytra free, posterior wings fully developed.

Lower surface. Densely punctate and pilose. Metepisternum about twice as long as wide. Sternum VII in female with 2 elongate setae on either side of posterior margin.

Legs. Elongate, femora swollen, densely punctate and pilose. Squamosity of male protarsus unknown.

Male genitalia. Unknown.

Female genitalia. Stylomere 2 crescent-shaped, with obtuse apex, asetose. Stylomere 1 at apex setose.

Variation. Unknown.

Distribution. Northern South Australia. Known only from type locality.

Bionomics. Unknown. The collecting site is situated in semidesert.

Etymology. The name refers to the light colour.

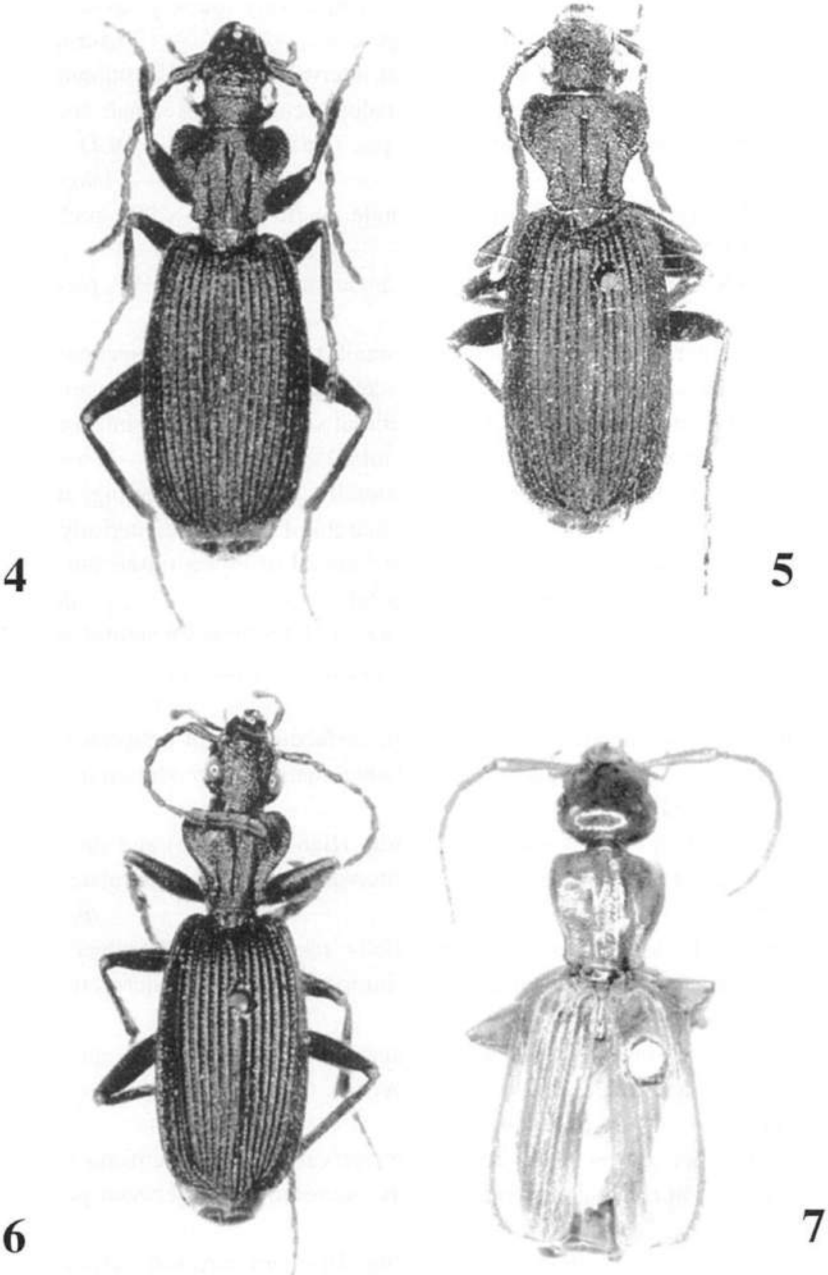
Relationships. Unknown. Unique within the Australian *Zuphium* s. str.

Recognition

Revised key to the species of the genus *Acrogenys* MACLEAY

For better distinction, citation of figures from the revision of the genus *Acrogenys* (BAEHR, 1984) and from a further paper (BAEHR, 1992a) are included in this key under the ciphers Ba84 and Ba92.

1. Seventh interval of elytra distinctly tectiform, sutural interval raised; pronotum as long as wide or even wider; terminal palpomere of labial palpus very sparsely setose; male aedeagus with distinct terminal knob (Ba84: figs. 7–9; figs. 2, 3) .... (*Acrogenys* s. str.) 2
1'. Seventh interval of elytra not tectiform, sutural interval not raised; pronotum considerably longer than wide; terminal palpomere of labial palpus densely setose; male aedeagus without distinct terminal knob, only with upturned apex (Ba84: fig. 10). e.QLD (*Paracrogenys* BAEHR) .... *longicollis* GESTRO
2. Pronotum with very acute, dentiform basal angle, angle clearly <90°, prebasal sinuosity very deep (Ba84: fig. 12; Ba92: fig. 1) 3
2'. Pronotum with less acute, not dentiform basal angle, angle clearly >90°, prebasal sinuosity less deep (Ba84: figs 5a-c, 11; figs 7–9) 4
3. Larger species, length >12.5 mm; eyes rather small, laterally little projecting; antenna elongate, median antennomeres >2×as long as wide; margin of pronotum anteriorly distinctly crenulate, passing somewhat angularly into prebasal sinuosity; sutural interval of elytra distinctly tectiform; apex of elytra without yellow tufted spot. c.NT .... *centralis* BAEHR
3'. Smaller species, length <12 mm; eyes large, laterally markedly projecting; antenna shorter, median antennomeres c. 1.5×as long as wide; margin of pronotum anteriorly not crenulate, evenly passing into prebasal sinuosity; sutural interval of elytra raised but not tectiform; apex of elytra with distinct yellow tufted spot. n.NT .... *demarzi* BAEHR
4. Seventh interval conspicuously tectiform, surface of elytra between sutural and 7th interval distinctly depressed (Fig. 6); lateral margins of pronotum wide, distinctly upturned (Fig. 9). n.WA .... *sumlini* sp. nov.
4'. Seventh interval less conspicuously tectiform, surface of elytra between sutural and 7th interval not concave, usually slightly convex; lateral margins of pronotum usually less wide, not or barely upturned 5
5. Pronotum narrow with shallow prebasal sinuosity (Ba84: figs 5a,b) and sutural interval not conspicuously raised near apex of elytra and intervals barely microreticulate between punctures. e.QLD .... *hirsuta* MACLEAY
5'. Pronotum wide with deep prebasal sinuosity (Ba84: fig. 11; figs 4, 5); either sutural interval conspicuously raised near apex of elytra or intervals distinctly microreticulate between punctures. n.NT, n.WA 6
6. Suture near apex conspicuously raised, 7th interval barely tectiform in apical fourth, more convexly rounded and intersected (fig. 4); intervals barely microreticulate between punctures. nw.NT .... *lucai* sp. nov.
6'. Suture near apex not conspicuously raised, 7th interval distinctly tectiform in apical fourth, acute and barely intersected; intervals densely microreticulate between punctures. n.NT, n.WA 7
7. Pronotum narrower with shallower sinuosity (fig. 5); elytra narrower, ratio length/width > 1.8; sutural interval perceptibly raised. n.NT .... *jabiruensis* sp. nov.
7'. Pronotum wider with deeper prebasal sinuosity (Ba84: fig.11); elytra wider, ratio length/width c. 1.65; sutural interval barely raised. n.WA .... *laticollis* BAEHR



Figs. 4–7. Habitus. 4, *Acrogenys lucai* sp. nov., lengths: 10.3 mm; 5, *A. jabiruensis* sp. nov., length: 11.3 mm; 6, *A. sumlini* sp. nov., length: 12.3 mm; 7, *Zuphium flavum* sp. nov., length: 5.85 mm.

Revised key to the Australian species of the genus *Zuphium* LATREILLE

For better distinction, citations of figures from the revision of the genus *Zuphium* (BAEHR 1986a) are included in this key under the ciphers Ba86.

1. Eyes small, much shorter than orbits, orbits evenly curved (Ba86: fig. 1a); 1st antennomere usually longer than width of head; colour always reddish; size rather large (7.65–8.75 mm). e.VIC, se.NSW .... *castelnaui* GESTRO
1'. Eyes larger, barely shorter, or longer than orbits, orbits more angulate (Ba86: fig. 1b; fig. 10); 1st antennomere usually shorter than width of head; colour commonly dark piceous to black, when reddish or yellowish, then size small (<6 mm) 2
2. Size small (length <6 mm) and colour light reddish to yellow. n.SA .... *flavum* sp. nov.
2'. Size larger (length >6.75 mm) and colour dark piceous to black 3
3. Basal angles of pronotum acute, angle <90° (Ba86: fig. 3d); puncturation on pronotum widely spaced, rather coarse, at widest diameter c. 15 punctures between median line and border; puncturation on elytra rather sparse, c. 6 punctures each interval; surface glossy, pilosity elongate, hirsute; size large (c. 8.5 mm). nw.NT .... *macleayanum* BAEHR
3'. Basal angles of pronotum less acute, angle >90° (Ba86: figs. 3a,b,e); puncturation on pronotum dense, fine, at widest diameter >20 punctures between median line and border; puncturation on elytra dense and fine, 10–12 punctures each interval; surface less glossy, pilosity shorter, less hirsute; size variable 4
4. Basal angle of pronotum fairly acute, angle c. 90°–95°, angle not obtuse (Ba86: fig. 3e); upper surface rather glossy; aedeagus fairly depressed, with elongate, thin apex (Ba86: fig. 12); size small (7.15–7.95 mm). nw. NT, n.WA .... *moorei* BAEHR
4'. Basal angle of pronotum obtuse, angle >95° (Ba86: figs. 3a,b); upper surface less glossy; aedeagus rather convex, with shorter apex (Ba86: figs. 7–11); size variable 5
5. Size generally larger, length 7.85–8.8 mm; pronotum more robust, wider, base relatively wider (Ba86: fig. 3b); aedeagus moderately convex, apes fairly elongate, apex of left paramere rather straight (Ba86: figs. 10–11) .... *thouzeti* CASTELNAU 6
5'. Size generally smaller, length 6.75–8.1 mm; pronotum less robust, narrower, base relatively narrower (Ba86: fig. 3a); aedeagus markedly convex, apes short, apex of left paramere convex (Ba86: figs. 7–9 .... *australe* CHAUDOIR 7
6. Pronotum very robust, wide, basal angles rather obtuse, angle frequently c. 100°; apex of aedeagus longer (Ba86: fig. 10). e.QLD, NSW .... *thouzeti thouzeti* CASTELNAU
6'. Pronotum less robust, narrower, basal angles less obtuse, angle 95°–100°; apex of aedeagus shorter (Ba86: fig. 11). n.NT, n.WA .... *thouzeti minor* BAEHR
7. Aedeagus very convex, apex very short and thick, knob-like (Ba86: fig. 7). s.QLD, NSW, VIC, SA, s.WA .... *australe australe* CHAUDOIR
7'. Aedeagus less convex, apex less short and thick (Ba86: figs. 8–9) Distribution different 8
8. Aedeagus rather convex, apex rather short and stout (Ba86: fig. 8). Hamersley Range, n.WA .... *australe millstreameanum* BAEHR
8'. Aedeagus less convex, apex much more elongate and less stout (Ba86: fig. 9). n.NT .... *australe incertum* BAEHR

Remarks

Genus ***Acrogenys*** MACLEAY

With the three new species described herein, the Australian genus *Acrogenys* now includes eight species, of which seven belong to the apotypic subgenus *Acrogenys* s. str., while one species, *A. longicollis* GESTRO, constitutes the plesiotypic subgenus *Paracrogenys* BAEHR. This unique species is characterized by the lack of distinct carinae on the elytra and by the purely upturned though not knobbed apex of aedeagus, which both character states obviously are plesiomorphic. All species of the apotypic subgenus *Acrogenys* s. str. possess a more or less distinctly carinate 7th interval, sometimes also a raised sutural interval, and a distinctly knobbed apex of aedeagus. Generally the species are fairly uniform, though they exhibit differences in shape of elytra and pronotum, distinctness of elytral carinae, microreticulation, and structure of the male aedeagus.

Most probably the evolution of character development was towards sharply raised or even carinate 7th elytral intervals and also raised sutural interval, at the same time towards increasingly cordiform pronotum with deeply excised lateral margins and sharply projecting posterior angles.

According to the weak development of the elytral carinae and to its narrow and fairly depressed pronotum with comparatively shallow prebasal sinuosity, *Acrogenys hirsuta* MACLEAY is probably the most plesiotypic species of the nominate subgenus. In view of their wide cordiform pronota with deep prebasal sinuosity and sharply angulate basal angles, and to the marked development of the lateral carinae and the distinctly raised suture of the elytra, *A. demarzi* BAEHR, *A. sumlini* sp. nov., and *A. centralis* BAEHR are the most apotypic in those respects, although they show different development of the mentioned character states. *A. jabiruensis* sp. nov., *A. lucai* sp. nov., and *A. laticollis* BAEHR in most respects are intermediate between the mentioned species and *A. hirsuta*.

When this short summary of phylogenetic relations is combined with distribution, a striking pattern is to be noted: The most plesiotypic species of the whole genus (*A. longicollis*) lives in eastern Queensland. Eastern Queensland including northeastern New South Wales is also the home of the most plesiotypic species of the apotypic subgenus *Acrogenys* s. str (*A. hirsuta*). No other species has been so far recorded from Queensland, though all other species are distributed through Northern Territory and northwestern Australia. The most apotypic species either occur in far Northern Territory (Arnhemland: *A. demarzi*), northwestern Australia (southern margin of the Kimberleys: *A. sumlini*), and central Northern Territory (Musgrave Ranges: *A. centralis*).

It seems, hence, that in the genus *Acrogenys* the same evolutionary mechanism was responsible for the present distribution pattern as in many other carabid groups occurring in the tropical belt of northern Australia (BAEHR, 1992b, 1992c, 1997). Probably it was the repeated opening and closure of corridors between the refugia of far Northern Territory, Northwestern Australia, and also Central Australia during the stadials and interstadials of Glacial Period that was responsible for the repeated immigration of populations into those refugia which in turn were separated from their eastern counterparts and eventually evolved into separate species. Repetition of such events probably caused the considerably higher species diversity in the mentioned refugia compared with eastern Queensland, in spite of the generally wetter and altogether more suitable environments in wet eastern Australia. Again the evolution of the northern

Acrogenys is a fine example of the effects that the Glacial Period had on evolution, diversity, and distribution of North Australian carabids.

Genus ***Zuphium*** LATREILLE

To date, the genus *Zuphium* LATREILLE in the sense of BAEHR (1986a) (excluding *Parazuphium* JEANNEL) in Australia includes only relatively large, usually well pigmented species that (except for the widely spread *Zuphium australe* CHAUDOIR) are distributed rather marginally in southern, eastern, and northern Australia. Apart of the southeastern *Zuphium castelnaui* GESTRO all Australian taxa of *Zuphium* s. str. are very closely related and do not bear striking differences in external and genitalic morphology.

Similarly to the situation in the genus *Acrogenys* the differentiation of closely related species and subspecies may have been the result of rather recent geographic and climatic events as mentioned under the above genus.

The new species *Zuphium flavum* from central Australia, however, is outstanding in its small size, uniformly flavous colour, and occurrence in a very dry part of interior Australia. Without knowing the male genitalia little can be said about its relationships to any of the described Australian species, which relationships probably are not very close. Nevertheless, in certain external characters the new species is more alike the likewise rather light coloured, small-eyed *Z. castelnaui* GESTRO of eastern Victoria and southeastern New South Wales than to any other species.

Unfortunately, the collecting circumstances of the single specimen of *Zuphium flavum* are unknown, and little is known about the environment in which the specimen was caught, except that most probably it is semidesert.

Alphabetical checklist of Australian Zuphiine species with notes on distribution

At present, the Australian zuphiine fauna includes 36 species and additional 3 subspecies that distribute into the six genera *Acrogenys* W. MACLEAY, *Colasidia* BASILEWSKY, *Parazuphium* JEANNEL, *Planetes* W. S. MACLEAY, *Pseudaptinus* CASTELNAU and *Zuphium* LATREILLE.

Acrogenys centralis BAEHR, 1992 n.SA
Acrogenys demarzi BAEHR, 1984 n.NT
Acrogenys hirsuta MACLEAY, 1864 ne.NSW, e.QLD
Acrogenys jabiruensis **sp. nov.** n.NT
Acrogenys laticollis BAEHR, 1984 n.NT, n.WA
Acrogenys longicollis GESTRO, 1875 e.QLD
Acrogenys lucai **sp. nov.** n.NT
Acrogenys sumlini **sp. nov.** n.WA
Colasidia monteithi BAEHR, 1987 ne.QLD
Parazuphium barbarae BAEHR, 1985 n.NT, n.WA
Parazuphium darlingtoni BAEHR, 1985 n.QLD, n.NT, n.WA
Parazuphium flavescens BAEHR, 1985 n.NT n.WA

Parazuphium mastersii (CASTELNAU, 1867) s.SA, VIC, ACT, NSW, e.QLD, n.NT, n.WA
Parazuphium rockhamptonense (CASTELNAU, 1867) e.QLD, n.NT, n.WA
Parazuphium sinuum (DARLINGTON, 1968) n.NT
Parazuphium tropicum BAEHR, 1985 n.QLD, n.NT, n.WA
Parazuphium weiri BAEHR, 1985 n.NT
Planetes angusticollis BAEHR, 1986 n.NT
Planetes australis (MACLEAY, 1871) e.QLD
Planetes magelae BAEHR, 1986 n.NT
Planetes millstreamensis BAEHR, 1986 n.WA
Pseudaptinus australis (BLACKBURN, 1890) s.SA
Pseudaptinus brittoni BAEHR, 1985 n.WA
Pseudaptinus cyclophthalmus BAEHR, 1985 n.NT
Pseudaptinus depressipennis BAEHR, 1995 n.QLD
Pseudaptinus fulvus (CASTELNAU, 1867) nw.VIC, NSW, s.QLD
Pseudaptinus hirsutulus BAEHR, 1985 n.NT
Pseudaptinus iridescens BAEHR, 1985 nw.VIC, c.NSW, c.QLD, n.NT, n.WA
Pseudaptinus monteithi BAEHR, 1985 SA, c.NSW, w.QLD, n.NT, WA
Pseudaptinus punctatostriatus BAEHR, 1985 n.NT, n.WA
Zuphium australe australe CHAUDOIR, 1862 SA, VIC, NSW, QLD, c.WA
Zuphium australe incertum BAEHR, 1986 n.NT
Zuphium australe millstreameanum BAEHR, 1986 n.WA
Zuphium castelnaui GESTRO, 1875 VIC, s.NSW
Zuphium flavum, **sp. nov**. n.SA
Zuphium macleayanum BAEHR, 1986 n.NT
Zuphium moorei BAEHR, 1986 n.NT, n.WA
Zuphium thouzeti thouzeti CASTELNAU, 1867 n.SA, NSW, e.QLD
Zuphium thouzeti minor BAEHR, 1986 n.NT, n.WA

Acknowledgements

My sincere thanks are due to Dr. G. R. BROWN (Darwin), Dr. P. M. GIACHINO (Torino), Dr. E. MATTHEWS (Adelaide), Mr. W. SUMLIN, III (San Antonio), and Dr. L. TOLEDANO (Verona) for their kind loan of material.

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A New Species of the Genus *Stenus* LATREILLE from Japan (Coleoptera, Staphylinidae)

167th Contribution to the knowledge of Steninae

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Abstract Description of *Stenus* (*Nestus*) *hiroyukii* sp. nov. from the Nagano Pref., Honshu, Japan.

Two widespread species of the holarctic group of *Stenus melanarius* STEPHENS are known from Japan: *S. melanarius verecundus* SHARP (Hokkaido, Honshu, Kyushu) and *S. boops* LJUNGH (Hokkaido), a third, new species, endemic to Honshu, is described here and named in honour of Prof. Hiroyuki SASAJI. With the new species the total number of *Stenus*-species known from Japan is now 206.

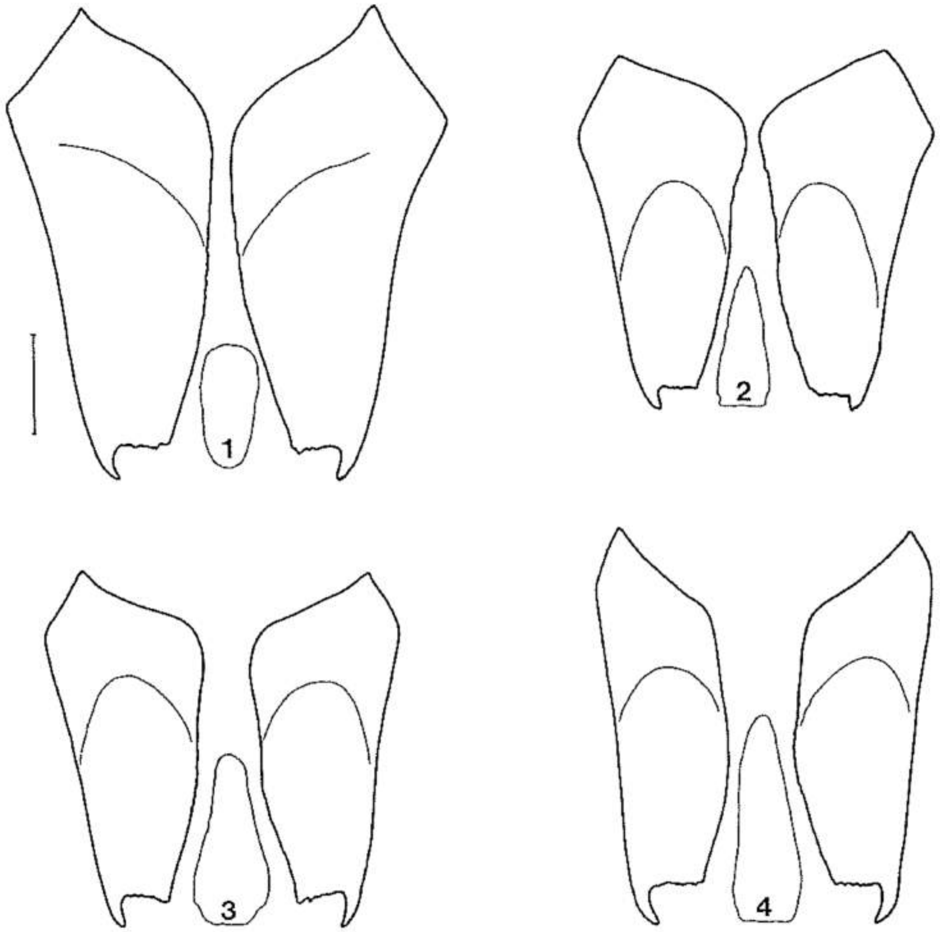
Stenus (Nestus) hiroyukii sp. nov.

(Fig. 2)

Description. Black, shining, fore body moderately coarsely and moderately densely punctate, abdomen finely and moderately sparsely punctate; pubescence distinct, short, recumbent. Antennae black, first segment of maxillary palpi reddish yellow, the following segments black, legs black. Clypeus and labrum black, moderately sparsely pubescent. Length: 2.7–3.6 mm (length of fore body: 1.7 mm).

Head distinctly narrower than elytra (proportional measurements: 27.5 : 31.5), frons broad (average distance between eyes: 15) with two shallow but distinct longitudinal furrows, middle portion as broad as each of the side portions, broadly vaulted, distinctly extending beyond the level of inner eye margins. Punctation on the side portions of frons moderately coarse and dense, diameter of punctures as large as medial cross section of third antennal segment, interstices smaller than half diameter of punctures: punctation on the middle portion finer and sparser, most punctures about as large as basal cross section of third antennal segment, interstices larger than diameter of punctures. Antennae short, slightly extending beyond the middle of the pronotum when reflexed, penultimate segments as long as broad.

Pronotum barrel-shaped, longer than broad (25 : 23), broadest in about middle, sides moderately convex (not distinctly concave in posterior half); no impressions dorsally. Punctation moderately coarse and moderately dense, diameter of punctures about as large as apical cross section of third antennal segment, interstices mostly as large as half diameter of punctures, at



Figs. 1-4. Posterior portion of valvifera and separated oblong sclerotized accessoric element at sternite 9; 1, *Stenus boops* LJUNGH (Hokkaido: Kushiro Moor); 2, *S. hiroyukii* sp. n. (holotype); 3, *S. melanarius verecundus* SHARP (Hokkaido: Kushiro Moor, 3; Honshu: Marunuma). Scale = 0.1 mm.

places (*f.e.* in actual middle) sometimes larger than diameter of punctures, smaller near anterior and near posterior margin, where the punctures become larger than the apical cross section of the third antennal segment.

Elytra short and trapeziform, distinctly broader than head (31.5 : 27.5), broader than long (31 : 30), shoulders moderately prominent, sides straightly divergent, broadest near posterior margin, posterior margin broadly and shallowly emarginate (sutural length: 22). Humeral impression shallow, a further shallow impression medio-laterally, sutural impression long and distinct. Punctation about as coarse as on pronotum, moderately dense, interstices mostly larger than half diameter of punctures, rarely as large as diameter of punctures; punctation on sutural impression coarser and denser.

Abdomen broad, paratergites moderately broad, those of segment 4 about as broad as the first antennal segment, punctation moderately coarse and dense. Tergite 7 with a narrow membranous fringe apically (the species has reduced wings). Basal furrows of basal tergites deep with four longitudinal keels; punctation throughout fine and moderately sparse, punctures on tergite 3 at least as large as basal cross section of third antennal segment, interstices somewhat larger than diameter of punctures; punctation on tergite 7 only slightly finer, tergite 10 with a few shallow punctures.

Legs moderately robust, tarsi simple, metatarsi three fifths the length of the metatibiae, first segment as long as the two following segments combined, much shorter than the last segment.

Fore parts with faint but distinct groundsculpture (fatty lustre), interstices on abdominal tergites 3–5 almost smooth, distinctly reticulated on tergites 7–10.

Male: unknown.

Female: Sternite 8 very slightly obtusely projecting posteriomedially. Valvifera (Fig. 2), apicolateral projection short. Tergite 10 triangularly rounded. The oblong sclerotized accessory element of tergite 10 less long than half the posterior portion of the valvifer (17 : 42) (in *S. boops* 15 : 55 (Fig. 1); in *S. melanarius verecundus* 21 : 42 (Figs. 3, 4).

Discussion. This new species is close to *S. boops* LJUNGH and might have been differentiated from a marginal population of that species. The females of the *melanarius*-group are distinguished from those of other habitually similar species by the presence of two sclerotized accessory elements at sternite 9 (a broad membranous one apically and an oblong, moderately sharply delimited element preapically) and by lacking a sclerotized spermatheca (as e.g. is found in *S. shogun* PUTHZ). The ratio of that oblong element to the length of the valvifer is of specific value as is shown in this paper for the first time. *Stenus hiroyukii* sp. n. is distinguished from *S. boops* and *S. melanarius* by the different lateral outline of the posterior portion of the pronotum (in both species this portion is distinctly concave), from *S. boops* further by the much sparser and less coarse punctation of the fore parts, the finer and sparser abdominal punctation, the shorter apicolateral projection of the valvifer (compare fig. 1) and the relative length of the oblong sclerotized accessory element at sternite 9, from *S. melanarius verecundus* (which has specimens with similar fine and sparse abdominal punctation) by the trapeziform elytra, the sparser and less coarse punctation of head and pronotum, by shorter apicolateral projections of the valvifera and by the much shorter oblong sclerotized accessory element at sternite 9 (compare figs. 3, 4).

Acknowledgement

I would like to thank my friend Dr. Shun-ichiro NAOMI (Chiba) for sending me the new species from his collection for identification.

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Redescription of *Ophrygonius minor* (GRAVELY) (Coleoptera: Passalidae) with a New Synonym*

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Abstract *Ophrygonius minor* (GRAVELY) is redescribed based on the lectotype specimen. In addition, *Aceraius parvulus* HINCKS is regarded as a junior synonym of *O. minor*.

Ophrygonius minor was originally described as *Aceraius minor* from Taiping, the Malay Peninsula by GRAVELY (1914). Later, GRAVELY (1918) transferred this species from *Aceraius* to *Ophrygonius* based on his new definition for the two genera. On the other hand, *A. parvulus* was described from Mt. Inas, the Malay Peninsula by HINCKS (1938).

I had an opportunity to examine the holotype of *Aceraius parvulus* HINCKS preserved in the collection of the Manchester Museum and found that this species appears to be very similar to *Ophrygonius minor* (GRAVELY). Thereafter, I examined the lectotype of *O. minor* preserved in the collection of the Museum für Naturkunde der Hunboldt Universtät zu Berlin. Close examination and comparison between the type specimens have made it evident that *O. minor* and *A. parvulus* are specifically identical with each other. Thus, I herewith redescribe *Ophrygonius minor* based on the lectotype specimen and regard *Aceraius parvulus* as a junior synonym of *O. minor*. I adopt the terminology of GRAVELY (1914) in the redescription.

Ophrygonius minor (GRAVELY)

(Fig. 1)

Aceraius minor GRAVELY, 1914, Mem. Ind. Mus., 3: 240.

Ophrygonius minor: GRAVELY, 1918, Mem. Ind. Mus., 7:. 76; HINCKS & DIBB, 1935, Coleopt. Cat., 142: 81; KON & JOHKI, 1991, Jpn. J. Entomol., 59: 505; BOUCHER, 1993, Nouv. Rev. Entomol. (N. S.), 10(2): 157;—— 1995, Ann. Soc. Entomol. Fr. (N. S.), 31(1): 55;—— 1997, Rev. fr. Entomol. (N. S.), 19 (1-2): 44;—— 1999, Rev. fr. Entomol. (N. S.), 21 (3): 125.

Aceraius parvulus HINCKS, 1938, Proc. R. entomol. Soc. Lond., B, 7: 15; HINCKS & DIBB, 1958, Coleopt. Cat. Suppl., 142: 23.

Description of lectotype. Sex unknown. Body length from anterior margin of head to the apices of elytra, 23 mm. Body reddish brown (the lectotype is teneral).

Antenna with six lamellae, the first one scarcely pubescent, the first three short, the last

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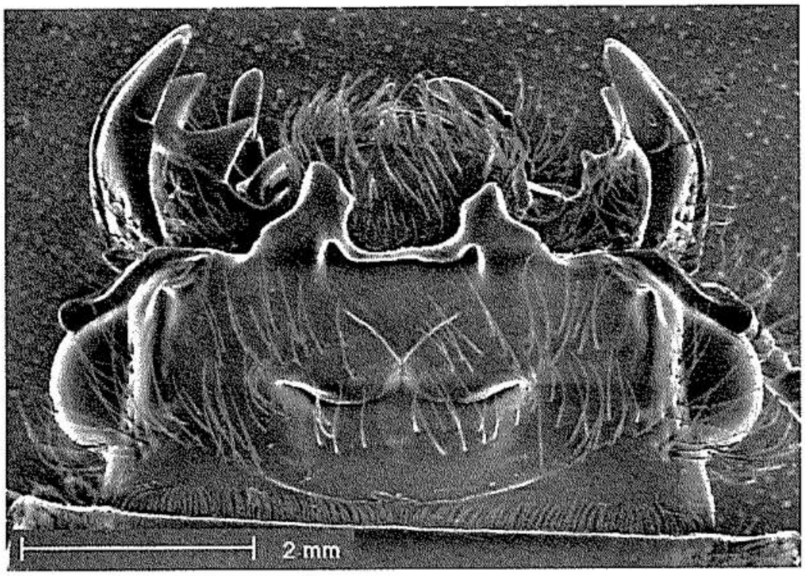

Fig. 1. Head of *Ophrygonius minor* (GRAVELY). Scale, 2mm.

three moderately long. Labrum punctured and hairy, anterior margin obliquely straight, left angle more prominent forward than the right one. Mentum punctured and hairy in lateral portion, with a few setiferous punctures in central portion, anterior margin of central portion almost straight. Hypostomal process impunctate and hairless, outer margin slightly concave in anterior portion, straight in posterior portion. Upper tooth of mandible distinct though very low, the left one located a little more anteriorly than the right one; anterior lower tooth of left mandible acutely triangular in dorsal view, weakly bifid at apex, a little longer and more slender than left lowest terminal tooth; right anterior lower tooth much smaller than the left one and right lowest terminal tooth, simply pointed at apex; outer margin of left mandible with strong outer basal denticle, weakly swollen in postero-upper portion. Outer tubercle obliquely truncated at distal end, outer angle more prominent forward than the inner one; left outer tubercle larger than the right one; outer margin of outer tubercle concave in distal portion, swollen in proximal portion close to base; ridge between inner tubercles distinct, almost straight; anterior angle of head obtusely angular but not prominent forward; canthus rounded at distal end, with distinct ridge along anterior margin, anterior margin concave; frontal ridge distinct, with shallow groove anteriorly, vanishing on a way to inner tubercle; upper surface of head smooth, with setiferous punctures in depressed area and areas behind parietal and supraorbital ridges; parietal ridge sinuated a little in dorsal view; supraoccipital ridge obsolete in distal portion; supraorbital ridge rounded, apical angle distinct.

Pronotum sparsely punctured and hairy in lateral portion, without median sulcus, lateroposterior margin without strong groove. Posterior plate of prosternum wholly punctured and hairy; mesothoracic episterna punctured in anterior and upper portions, impunctate and smooth in central portion, frosted in posterior portion; mesosternum impunctate and hairless, frosted excepting in scar, slightly wrinkled in central portion, glossy in scar; central portion of metasternum impunctate, hairless, smooth; anterior intermediate area wholly punctured and hairy; posterior intermediate area without dents, impunctate and hairless excepting along posterior margin and along border to lateral area; lateral area wholly punctured and hairy; ridge separating between lateral and anterior intermediate areas distinct. Tenth rib of elytron impunctate and hairless; ninth punctured and hairy along whole length; eighth impunctate and hairless excepting in posterior end; seventh sparsely punctured and hairy along whole length. Visible second abdominal sternite sparsely hairy.

Specimens examined. The lectotype of *Ophrygonius minor* (GRAVELY): Malacca, Taiping 1300–1500 m; the holotype of *Aceraius parvulus* HINCKS: Gunung Inas 3000–4000 ft., Malay Peninsula, 30. XI. 1899.

Notes. HINCKS (1938) noted that *Aceraius parvulus* ran down to *A. pilifer* (PERCHERON) by GRAVELY's (1918) key for the genus *Aceraius* but could be distinguished from the latter by having the following characters: body more slender; upper tooth of left mandible not strongly marked. If HINCKS tried to identify the specimen by GRAVELY's (1918) key for the genus *Ophrygonius*, *A. parvulus* should run down to *O. minor* (GRAVELY).

Acknowledgments

I express my hearty thanks to M. UHLIG and J. SCHULZE of the Museum für Naturkunde der Hunboldt Universtät zu Berlin and C. JOHNSON of the Department of Entomology, Manchester Museum for giving me opportunities to examine the type specimens. This study is dedicated to Prof. H. SASAJI, one of the dominant figures in Coleopterology in Japan.

要　　約

近　雅博：*Ophrygonius minor* (GRAVELY) の再記載と新シノニム.——— *Ophrygonius minor* (GRAVELY) をレクトタイプに基づき再記載した．また，*Aceraius parvulus* HINCKS を本種の下位同物異名とみなした．

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Observations On *Coccinula crotchi* (LEWIS) (Coleoptera: Coccinellidae)

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Coccinula crotchi (LEWIS) (Coleoptera, Coccinellidae) is a rather rare species distributed in Hokkaido and Honshu, Japan. About a quarter century ago, I had an opportunity to observe interesting bionomics of this species.

On 15. IX. 1975, when Tama New Town was in its very early stage of construction, I visited Tama Center, Tama, Tokyo Pref., where I happened to capture a female individual of *C. crotchi* on a composite grass. In the glass bottle, she deposited 4 eggs as a clutch on the same day while being conveyed to my home in Suita, Osaka Pref. From these eggs, larvae hatched on 20. IX, and only one larva remained in the rearing glass bottle, while the other three larvae disappeared soon. In the bottle the mother beetle and the only larva were fed aphids and apple slices, and larva ate scale insects also. The female further deposited five eggs on 25. IX, three of which were probably eaten by the mother beetle on the same day, and the remaining two also disappeared by 27. IX. The only larva pupated on 2. X, and emerged as a male adult on 8. X. Meanwhile, the mother beetle again deposited an egg clutch on 1. X, all eggs of which yielded newly hatched larvae on 5. X, but by 12. X all the larvae disappeared. Although the remaining two beetles (mother and her son) surprisingly exhibited mating, she deposited eggs no more, and both died on 3. XII. 1975.

Entomophagous coccinellid species are known to often exhibit cannibalism against kin eggs and larvae (HODEK, 1967; OKADA *et al.*, 1972). The present observation is consistent with this fact, suggesting mother beetle's eating her own eggs, as well as her and/or her offspring's eating young kin. HOSHIKAWA (1995) also observed *C. crotchi* mother beetle eating her own eggs.

MAJERUS & MAJERUS (2000) verified the presenee of a male-killing bacterium in a congeneric coccinellid species, *Coccinula quatuordecimpustulata* (LINNAEUS) (what they call *C. sinensis*), in which species male embryos are killed by the bacterium, and some of the eggs are thus sterile, resulting in female-biased sex ratio of the infected population. Also, in *C. quatuordecimpustulata*, the killed male eggs are eaten by neonate female larvae. Whether *C. crotchi* harbors such a bacterium, as its congeneric does, is not certain, but it is quite possible because *C. crotchi* is allied and almost equal-sized to *C. quatuordecimpustulata*, both species exhibit egg-cannibalistic behavior, and the sizes of egg clutch are comparable to each other [MAJERUS & MAJERUS (2000) emphasized that the egg clutch size of *C. quatuordecimpustulata* is exceptionally small among bacterium-barboring coccinellids].

In Hokkaido, *C. crotchi* is univoltine (HOSHIKAWA, 1995). HOSHIKAWA's (1995) observation of male-biased sex ratio in newly emerged adult population in Hokkaido was not significant.

In contrast to Hokkaido, *C. crotchi* is divoltine or multivoltine in, at least, Central through Western Honshu (HOSHIKAWA *et al.*, 1994; HOSHIKAWA & TSUGE, 1998), and the present observation, as well as adult collection data in Osaka (SHIYAKE, 1999), is consistent with this fact. However, the present data showing autumnal oviposition is incompatible with the data from Shimane Pref. (HOSHIKAWA & TSUGE, 1998), where the females are incapable of oviposition in autumn. Further study is needed to compare the difference of *C. crotchi* life cycle between the Japan Sea side and the Pacific Sea side of Honshu.

As for the habitat, it has been stated that *C. crotchi* tends to be found at riverside's (HOSHIKAWA *et al.* 1994; SHIYAKE, 1999), as the other rare coccinellids, *Coccinella ainu* LEWIS and *Coccinella explanata* MIYATAKE do (IWATA, 1995). I add to it that *C. crotchi* was once captured on a willow tree on the edge of a pond in Osaka Pref. (1ex., Ushigakubi-ike, Tsukumodai, Suita, VI.1964, R. IWATA leg.).

This article is dedicated to Dr. Hiroyuki SASAJI, an outstanding coccinellidologist, on his retirement from Fukui University.

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New Phyline Plant Bugs from Japan (Heteroptera: Miridae: Phylinae)

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Abstract New taxa of the phyline plant bugs are described from Japan. Two new genera, *Sasajiophylus* and *Eremophylus*, are proposed to accommodate a respective undescribed species, *S. crapulatus* and *E. hirtus*. Two new species and two new subspecies of the genus *Campylomma* REUTER are also described. The genus *Rubrocuneocoris* SCHUH is reported from Japan for the first time, with description of a new species, *R. albescens*.

The Phylinae are the largest plant bug subfamily in the Miridae. Because of their tiny size, members of this subfamily are usually difficult to identify, and numerous undescribed taxa still remain worldwide. During continuing investigation by the author and colleagues, many unidentified phyline specimens have been collected in Japan.

This is the second part of serial papers subsequent to YASUNAGA (1999), organized to document the Japanese phyline fauna step by step. In the present paper, two new genera, five new species and two subspecies of the Phylinae are described.

All measurements in the text are given in millimeters. Selected references are only cited in the synonymic lists for known taxa as KERZHNER & JOSIFOV (1999) and SCHUH (1995) presented comprehensive catalogs. Type specimens are deposited in Biological Laboratory, Hokkaido University of Education, Sapporo (HUES) and National Institute of Agro-Environmental Sciences, Tsukuba, Ibaraki (NIAS).

Campylomma REUTER, 1878

This is one of the largest genera among the Phylinae, with more than 120 described species mainly in the Old World tropics and subtropics. In Japan, only 5 species have hitherto been known, but the present study recognizes 2 new species and 2 new subspecies.

Campylomma boninense CARVALHO, 1956

(Figs. 1-4)

Campylomma boninensis CARVALHO, 1956: 34 (n. sp.); SCHUH, 1984: 265 (diag., redesc.); YASUNAGA *et al.*, 1993: 148 (diag.); SCHUH, 1995: 277 (cat.).
Campylomma boninense: KERZHNER & JOSIFOV, 1999: 320 (cat.).

This species was first described by CARVALHO (1956), based on specimens collected on Chichijima Island of the Ogasawara (Bonin). YASUNAGA *et al.* (1993) reported its occurrence on the Hahajima Island of the same island group, to which it was considered endemic. The individuals from the Ogasawara are, without exception, easily recognized by the following characters: Body oval, slightly elongate; antennal segment I pale, with fuscous spots apically; antennal segment II entirely dark, or pale with dark base and apex; head and pronotum dark brown; hemelytra pale green or pale brownish green; femora yellow, with many small, dark spots (Fig. 1) (see SCHUH (1984) for further diagnostic characters).

In my recent examination, however, specimens from Amami and Okinawa Islands of the Ryukyus, and Tsushima Island were found to belong to *C. boninense*, based on the same male genital structure. Although I have not found any significant structural difference, the individuals from Amami and Tsushima, and those from Okinawa each exhibit distinct color pattern as described below. I herein conclude that the Amami and Tsushima populations and the Okinawa population should belong to separable subspecies of *C. boninense*.

Campylomma boninense flavipes n. ssp.

(Figs. 2 & 4)

Similar to the nominotypical subspecies in external structures and male vesica. Body generally fuscous. Dorsum including head, thoracic pleura, and abdomen totally black or dark brown. Antennae totally creamy yellow, segment I usually narrowly dark at extreme base: lengths of segments I–IV (♂/♀): 0.13/ 0.14, 0.61/ 0.56, 0.36/ 0.36, 0.26/ 0.29. Coxae and legs generally creamy yellow; basal 1/4-1/3 of each coxa usually darkened; metafemora lacking any dark marks or spots; tibiae without dark spots at bases of spines; lengths of metafemur, tibia and tarsus (♂/ ♀): 0.74/ 0.77, 1.08/ 1.08, 0.36/ 0.36.

Dimensions (♂/♀). Body length 2.1/ 2.2; length from apex of tylus to cuneal fracture 1.50/ 1.55; head width including eyes 0.60/ 0.61; vertex width 0.31/ 0.32; basal pronotal width 0.75/ 0.83; width across hemelytra 0.94/ 1.00.

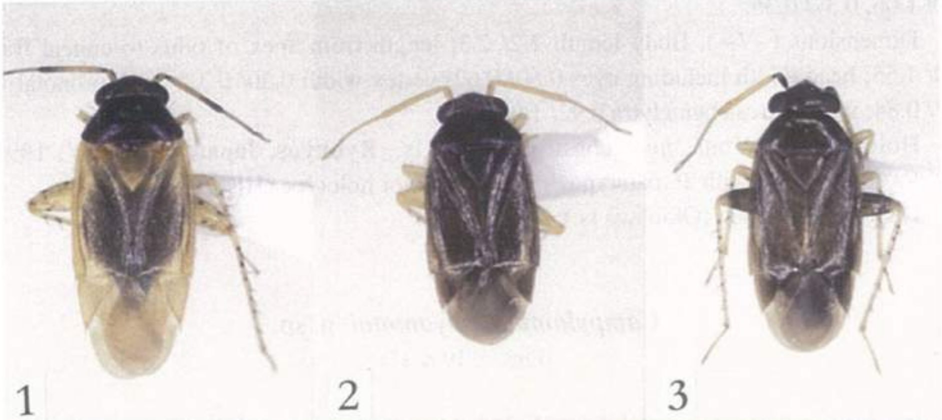
Holotype: ♂, Coast of Ankiyaba, Tatsugo T., Amami-Oshima Is., Ryukyus, Japan, ex flowers of *Glehnia littoralis* (Umbelliferae), 1. VI. 1993, T. YASUNAGA (HUES), with 380 paratypes same data as for holotype (HUES). Additional material: 3♂♂, Kamitsuki, Tsushima Is., Nagasaki Pref., Kyushu, 19. X. 1999, K. TAKAHASHI (HUES).

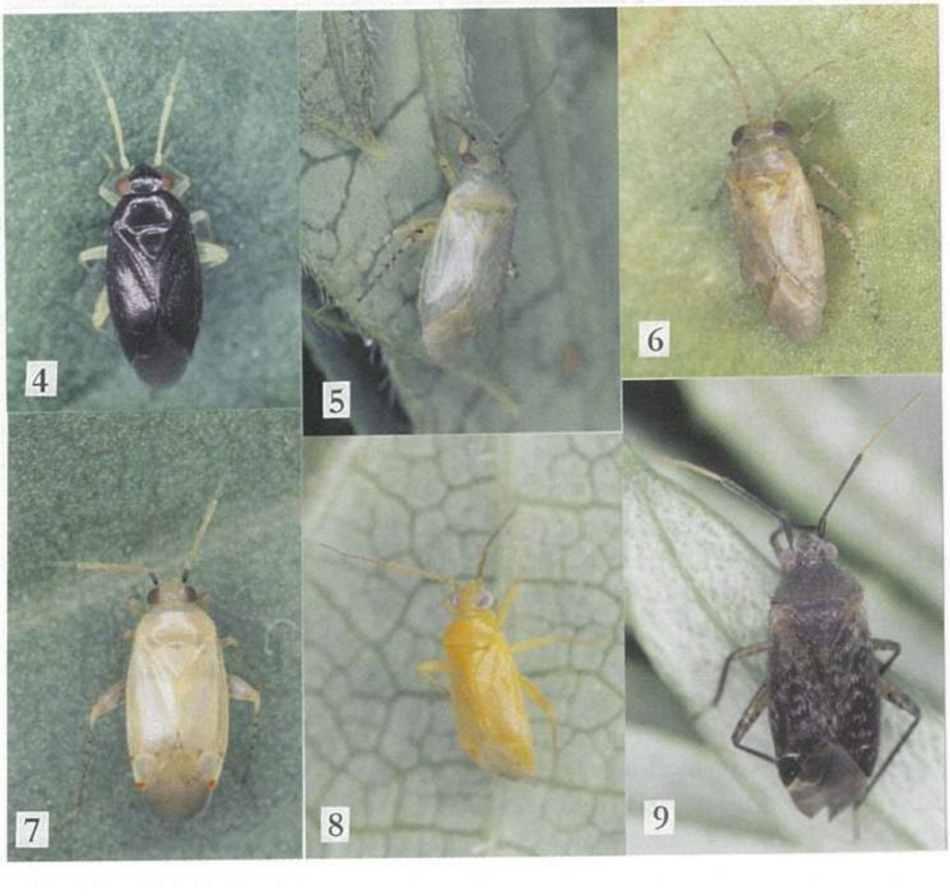
Distribution. Japan (Amami-Oshima and Tsushima Isls.).

Campylomma boninense aterrimum n. ssp.

(Fig. 3)

Similar to the preceding subspecies in having fuscous general coloration. Dorsum including head, thoracic pleura, all coxae and abdomen, dark chocolate brown. Antennae pale brown; segment I entirely blackish brown; segment II with a narrow, fuscous ring at base; lengths of segments I-IV (♂/♀): 0.14/ 0.15, 0.60/ 0.55, 0.36/ 0.36, 0.26/ 0.25. Legs pale brown; metafemur dark brown, sometimes with irregular, darker marks and/or pale extreme apex; metatibia with dark spots at bases of spines; lengths of metafemur, tibia and tarsus (♂/♀): 0.72/ 0.76,





Figs. 1–3. *Campylomma boninensis*, males. 1, Nominotypical subspecies from Hahajima, Ogasawara; 2, ssp. *flavipes* from Amami Is.; 3, ssp. *aterrimum* from Okinawa Is.

Figs. 4–9. Adults of Phyline plant bugs; 4, *Campylomma boninensis flavipes* from Tsushima Is.; 5, *C. miyamotoi*; 6, *C. eurycephalum*, holotype; 7, *Rubrocuneocoris albescens*, holotype; 8, *Sasajiophylus crapulatus*; 9, *Eremophylus hirtus*, holotype.

1.10/ 1.06, 0.37/ 0.36.

Dimensions (♂/♀). Body length 2.2/ 2.3; length from apex of tylus to cuneal fracture 1.50/ 1.55; head width including eyes 0.60/ 0.62; vertex width 0.30/ 0.32; basal pronotal width 0.77/ 0.84; width across hemelytra 0.92/ 1.08.

Holotype: ♂, Yona, near coast, Okinawa Is., Ryukyus, Japan, 20–24. V. 1993, T. YASUNAGA (HUES), with 36 paratypes same data as for holotype (HUES).

Distribution. Japan (Okinawa Is.).

Campylomma miyamotoi n. sp.

(Figs. 5, 10 & 11)

Body generally pale green but easily faded to pale brown or yellow after death, oval and very small; dorsal surface shining, uniformly clothed with simple, brown setae and silvery, sericeous, flattened pubescence. Antennae pale brown; segment I with a dark spot occupying bases of two apical spines; segment II with a dark ring at base, shorter than width of head including eyes; lengths of segments I-IV (♂/♀): 0.12/ 0.12, 0.44/ 0.44, 0.32/ 0.32, 0.25/ 0.24. Rostrum short, not exceeding apex of mesocoxa; segment IV almost entirely darkened. Hemelytral membrane pale grayish brown, semitransparent. Legs totally light; femora with dark, small, circular spots at bases of spines and trichobothria; basal part of metatibia sometimes with dark spots at bases of spines; lengths of metafemur, tibia and tarsus (♂/♀): 0.65/ 0.66, 0.96/ 1.02, 0.30/ 0.31. Abdomen light, in ♂ with reddish brown phallotheca. Male genitalia (Figs. 11 & 12). Genital segment lacking thumb-like process; phallotheca somewhat curved, tapered toward apex; vesical apical appendages short and rather broad; longer appendage minutely spinulate.

Dimensions (♂/♀). Body length 2.0/ 2.2; length from apex of tylus to cuneal fracture 1.35/ 1.47; head width including eyes 0.56/ 0.56; vertex width 0.25/ 0.27; basal pronotal width 0.73/ 0.79; width across hemelytra 0.89/ 0.96.

Holotype: ♂, Kônoura, Sotome T., Nagasaki Pref., Kyushu, Japan, 4. VIII. 1996, T. YASUNAGA (HUES), with 72 paratypes (HUES) collected between 17. VII and 4. VIII from the following localities: Honshu: Mt. Takakura, San'yo T., Okayama Pref.; Yasukawa Valley, Ohtoh Vil., Wakayama Pref. Kyushu: Yamada Park, Kitakyushu C., Fukuoka Pref.; same as holotype. All specimens were collected by sweeping *Albizzia julibrissin* (Legminosae).

Distribution. Japan (Honshu, Shikoku, Kyushu).

This new species is similar in general appearance and possibly confused with *C. chinense* SCHUH, from which it can be distinguished by the significantly smaller size and the smooth genital capsule that lacks the thumb-like process.

A breeding host of *C. miyamotoi* was confirmed to be *Albizzia julibrissin*, on which both mature and immature forms were found. This mirid often co-occurs with numerous psyllids that appear to be prey.

Campylomma eurycephalum n. sp.

(Figs. 6, 12 & 13)

Male. Body generally yellowish brown, oblong-oval; dorsal surface shining, slightly tinged with green, with uniformly distributed, dark, suberect setae. Head noticeably broad, with simple, dark brown setae and silky, reclining pubescence. Antennae pale brown, without distinct spot or annulation; lengths of segments I–IV: 0.18, 0.59, 0.34, 0.23. Rostrum short, reaching base of mesocoxa. Pronotum, mesoscutum and scutellum clothed with dark, suberect setae and silky, suberect pubescence. Hemelytra with noticeable, dark, suberect setae and short, reclining, scalelike pubescence. Femoral dark spots dense; tibial spines fuscous, arising from dark spots. Male genitalia (Figs. 12 & 13). Genital segment lacking lateral thumb-like process; phallotheca not strongly curved, blunt-tipped; vesica broad, with 3 distinct spiculi apically.

Female unknown.

Dimensions (♂). Body length 2.6; length from apex of tylus to cuneal fracture 1.80; head width including eyes 0.80; vertex width 0.36; basal pronotal width 0.97; width across hemelytra 1.18.

Holotype: ♂, Hoshino, Ishigaki Is., Ryukyus, Japan, 25. II. 1999, K. TAKAHASHI (HUES).

Distribution. Japan (Ishigaki Is.).

This new species is easily distinguished from other congeners occurring in Japan and the adjacent regions by the broad head, the dark setae on the dorsum, the unicolorously pale brown antenna, the dense femoral dark spots, the smooth male genital segment that lacks the thumb-like process, and the form of the vesica. No biological information is currently available.

Rubrocuneocoris SCHUH, 1984

This genus currently comprises only 4 species, 3 of which are known from the Pacific islands. There is a single temperate species, *R. quercicola* JOSIFOV, 1987 in the Korean Peninsula and Russian Primorskij territory. During this study, an additional species was recently found in Japan.

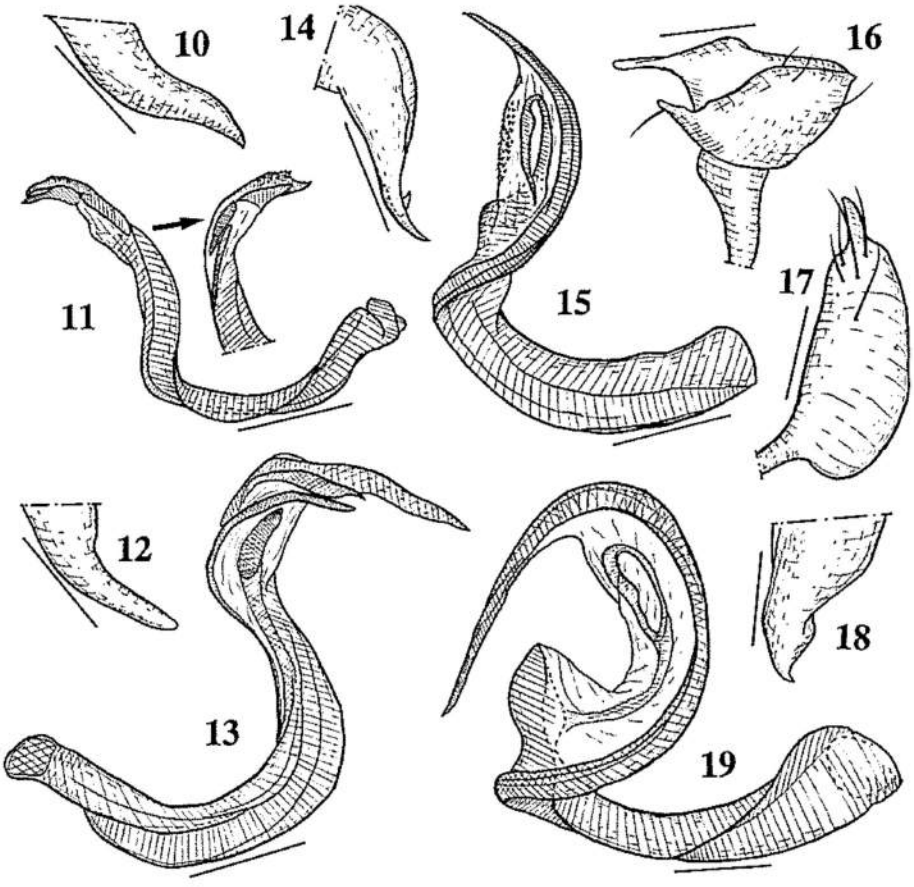
Rubrocuneocoris albescens n. sp.

(Fig. 7)

Female. Body generally light creamy yellow, oval; dorsal surface shining, slightly brownish, with densely distributed, suberect, silky pubescence. Head narrowly brown at antennal bases. Antennae pale brown; segment I dark brown, with darker basal half; segments III and IV brown; lengths of segments I-IV: 0.24, 0.96, 0.48, 0.38. Rostrum pale brown, reaching apex of metacoxa; apical part of segment IV broadly reddish brown. Thoracic pleura widely grayish brown; ostiolar peritreme yellow, with grayish mesial knob. Apices of embolium and cuneus scarlet; hemelytral membrane pale grayish brown, with a scarlet spot on posterior part of vein. Coxae and legs creamy yellow; apical part of each femur more or less tinged with sanguineous; tibiae with brown spots at bases of pale brown spines; tarsi pale brown, with darker apices of tarsomeres III; lengths of metafemur, tibia and tarsus: 1.08, 1.80, 0.38. Ventro-lateral region of abdomen grayish brown.

Male unknown.

Dimensions (♀). Body length 3.5; length of apex from tylus to cuneal fracture 2.25; head width including eyes 0.67; vertex width 0.35; basal pronotal width 1.08; width across hemelytra



Figs. 10–19. Male genitalia of *Campylomma miyamotoi* (10 & 11), *C. eurycephalum* (12 & 13), *Sasajiophylus crapulatus* (14 & 15), and *Eremophylus hirtus* (16–19). 10, 12, 14 & 18, Phallotheca; 11, 13, 15 & 19, vesica; 16, left paramere; 17, right paramere. Scale bars: 0.1 mm.

1.38.

Holotype: ♀, Nishikuma Valley, Monobe Vil., Kochi Pref., Shikoku, Japan, light trap, 8. VII. 2000, M. TAKAI (HUES).

Distribution. Japan (Shikoku).

This new species is assumed to be allied to *R. quercicola* JOSIFOV, from which it is easily distinguished by the creamy general coloration, the almost wholly pale head, the longer antenna, the distinctly infuscated antennal segment I that lacks any reddish mark, and the larger brown spots at bases of the tibial spines. The latter species is distinct in having the generally orange body and the pale antennal segment I with the reddish apex (JOSIFOV, 1987).

Sasajiophylus n. gen.

Body elongate oval, slender in ♂; dorsal surface uniformly clothed with simple, brown setae and silvery, sericeous pubescence. Head rather oblique, weakly shagreened; vertex not margined or sulcate. Antennae long, generally cylindrical; segment II much longer than width of head including eyes; segment III more than half length of II. Rostrum reaching apex of mesocoxa. Pronotum impunctate, about twice as long as wide; scutellum flat, weakly and transversely rugose. Hemelytra composed of rather thin integument. Legs long; femora slender; meta-femur not thickened.

Male genitalia (Figs. 14 & 15). Genital segment tapered, with a distinct, mesal keel; phallotheca sharply pointed, with a subapical tooth; vesica rather broad, twisted mesially, with a field of minute spines along secondary gonopore.

Type species: *Sasajiophylus crapulatus*, new species.

Etymology. Named in honor of Prof. H. SASAJI, combined with the generic name *Phylus* HAHN; gender masculine.

This new genus is at first sight similar to *Phylus* HAHN, but is distinct in having the silvery pubescence on the dorsum, the weak hemelytra, the subapical tooth of the phallotheca, and the form of the vesica. Any definitively related genera of *Sasajiophylus* are yet to be confirmed.

Sasajiophylus crapulatus n. sp.

(Figs. 8, 14 & 15)

Body generally pale orange, immaculate; dorsal surface rather shining. Antennae pale orange; segments III and IV pale brown; lengths of segments I-IV (♂/♀): 0.20/ 0.20, 0.88/ 0.77, 0.50/ 0.48, 0.34/ 0.36. Rostrum pale orange brown; apical part of segment IV darkened. Thoracic pleura somewhat yellowish. Hemelytral membrane pale grayish brown, semitransparent, with pale orange veins. Legs pale orange; tibiae and tarsi pale brown; tibial spines brown, prominent; apices of tarsomeres III dark brown; lengths of metafemur, tibia and tarsus (♂/♀): 0.96/ 0.96, 1.40/ 1.27, 0.44/ 0.44. Abdomen unicolorously pale orange. Male genitalia as described above.

Dimensions (♂/♀). Body length 2.8/ 2.8; length from apex of tylus to cuneal fracture 1.92/ 1.86; head width including eyes 0.60/ 0.55; vertex width 0.26/ 0.30; basal pronotal width 0.83/ 0.84; width across hemelytra 0.99/ 1.08.

Holotype: ♂, Mt. Wasamata, Kamikitayama Vil., Nara Pref., Honshu, Japan, 24–25. VII. 1992, Y. NAKATANI (HUES). Paratypes: Honshu: 5♂♂, 3♀♀, same data as for holotype (HUES & NIAS). Shikoku: 2♂♂, 1♀, Teragawa, Hongawa Vil., Kochi Pref., 20. VII. 1997, I. YAMASHITA (HUES); 2♂♂, Tengu-ike, Higashitsuno Vil., Kochi Pref., 21. VII. 2000, M. TAKAI (HUES). Kyushu: 1♂, Kami-hori, Miyazaki Pref., 22. VI. 1968, S. TAWARA (NIAS).

This new species is easily recognized by the immaculate orange body, the simple, brown setae and silvery sericeous pubescence on the dorsum, and the slender long legs. The specimens were collected mainly by light traps, and no biological information is currently available.

Eremophylus n. gen.

Body generally fuscous, oval, slightly elongate; dorsal surface significantly shagreened, with simple, dark, strong setae and woolly pubescence. Head oblique, shagreened, with dense wooly pubescence and several dark setae; tylus rather projected. Antennae totally cylindrical; segment II shorter than basal width of pronotum. Rostrum nearly reaching apex of mesocoxa.

Pronotum, mesoscutum and scutellum shagreened, impunctate, with dark, suberect setae and silver, woolly pubescence; pleura widely shagreened or pruinosed, with woolly, reclining pubescence. Hemelytra weekly shining, with dark, suberect setae especially on embolium and uniformly distributed, woolly, reclining pubescence. Legs rather long; hind femur slender; tibia with fuscous, strong spines; tarsi slender and long. Male genitalia (Figs. 16-19): Phallotheca somewhat constricted subapically, with an apical, pointed hook; right paramere flattened, with an apical, small process; vesica strongly bent mesially and rounded apically, with mesial region developed at bending portion.

Type species: *Eremophylus hirtus* YASUNAGA, new species.

Etymology. From the Greek, eremos (solitary, lonely), combined with the generic name *Phylus* HAHN, referring to the uncertain systematic position of this new genus without close relatives; gender masculine.

This new genus is somewhat similar in general appearance to *Psallus* FIEBER, but the dorsal vestiture and male genitalia are unique to *Eremophylus*. Currently, its systematic position is not clear, since no reliable sister genus is determined.

Eremophylus hirtus n. sp.

(Figs. 9, 16–19)

Male. Body generally somber dark brown; dorsal surface and thoracic pleura widely shagreened. Head grayish brown, irregularly speckled with dark marks or spots; frons narrowly striate. Antennae dark chocolate brown; segments III and IV pale brown; lengths of segments I–IV: 0.24, 0.94, 0.48, 0.39. Pronotum with somewhat lighter calli; sides of mesoscutum pale brown. Hemelytral membrane pale grayish brown, with a pale, semitransparent spot along apical part of cuneus. Coxae and legs pale brown; femora, especially on ventral surface, with distinct dark brown spots; pro- and mesotibiae somber brown, with several obscure annulations basally; metatibia dark chocolate brown; tarsomeres III dark brown; lengths of metafemur, tibia and tarsus: 1.27, 1.68, 0.55. Abdomen totally dark brown. Male genitalia as described above.

Female. Unknown.

Dimensions (♂). Body length 3.5; length from apex of tylus to cuneal fracture 2.50; head width including eyes 0.72; vertex width 0.34; basal pronotal width 1.12; width across hemelytra 1.38.

Holotype: ♂, Nishikuma Valley, Monobe Vil., Kochi Pref., Shikoku, Japan, 15. VII. 2000, M. TAKAI (HUES). Paratype: 1 ♂, Mt. Takao, Tokyo, 25. V. 1959, T. MAENAMI (NIAS).

This new species is readily recognized by the somber dark brown general coloration and the widely shagreened dorsum provided with the dark, strong setae and woolly pubescence. This mirid seems to be rare, currently represented only by two males that were attracted to light, and no biological information is available.

Acknowledgments

I especially thank Dr. S. MIYAMOTO (Fukuoka City) for continuous advice and encouragement. I am grateful to the following individuals for offering valuable material and/or kind assistance in the field: Mr. S. GOTOH (Tanabe City); Dr. K. TAKAHASHI (National Food Research Institute, Tsukuba); Messrs. M. TAKAI and I. YAMASHITA (Kochi Agricultural Research Center, Nankoku); Dr. K. NAGAI (Okayama Agricultural Experimental Station); Dr. Y. NAKATANI (NIAS); and my wife Miho-Arare. Mr. TAKAI was generous enough to provide some excellent photographs. Thanks are extended to the Japan Coleopterological Society for inviting me to participate in this memorial volume honoring Prof. H. SASAJI, on occasion of his retirement of Fukui University.

要　　約

安永智秀：日本から新たに記載されるチビカスミカメ類（異翅目：カスミカメムシ科：チビカスミカメ亜科）——— チビカスミカメ類は，カスミカメムシ科における最大の亜科(Phylinae)を構成する．このグループに含まれる種は，体が微小で互いに酷似したものが多く，一般に分類同定が困難であり，世界に莫大な数の未記載種が存在する．わが国の生息種相もあまり解明されておらず，多くの未知種が残存している．本文では，日本各地からもたらされた標本を検して確認された，次の2新属，5新種，2新亜種を記載，図示した．*Sasajiophylus crapulatus*, *Eremophylus hirtus* (新属新種)；*Campylomma eurycephalum*, *C. miyamotoi*, *Rubrocuneocoris albescens*(新種)；*Campylomma boninense aterrimum*, *C. b. flavipes*（新亜種）．

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Spec. Publ. Japan Coleopt. Soc. Osaka, (1): 123–127, June 11, 2001

A New Species of the Genus *Aphalara* from the Cool Temperate Zone of Honshu and Shikoku, Japan (Homoptera: Psylloidea: Aphalaridae)

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Abstract A new species of the genus *Aphalara* is described under the name of *A. sasajii*. It can be found from the cool temperate zone of Honshu and Shikoku, Japan.

Key words Aphalaridae; *Aphalara sasajii*; new species; cool temperate zone; Japan.

Introduction

There are considerable number of species of the genus *Aphalara* with maculation or markings on their forewings known from the Palaearctic Region, even in Japan such as *A. fasciata* KUWAYAMA, 1908 and *A. itadori* (SHINJI, 1938).

After careful examination of the specimens of the genus obtained from the cool temperate zone of Honshu and Shikoku, I came to the conclusion that it was new to science. Then, it is described in the present paper. It resembles *A. fasciata* KUWAYAMA from Japan and *A. jungsukae* KWON, 1983 from South Korea in wing maculation, but can be distinguished from these species by several characteristics as shown below.

It is my great pleasure that I can dedicate this short paper to Prof. Hiroyuki SASAJI of the Fukui University on commemorative occasion of his retirement, who has been long a teacher and senior friend to me since my school days. The specific name of the present new species is dedicated to him.

The holotype and a large part of the type series treated in this paper will be kept at the Osaka Museum of Natural History, and some of paratypes will be deposited at Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka; Entomological Institute, Faculty of Agriculture, Hokkaido University, Sapporo; Dept. of Entomology, The Natural Hisotory Museum, London and U. S. National Museum, U. S. A.

I express my gratitude to Prof. Emerit. Toyohei SAIGUSA of Kyushu University, Mr. Ko SETO, Nara City, Prof. Hiroshi SHIMA of Kyushu University and Dr. Akinori NAKANISHI of Museum of Nature and Human Activities, Hyogo for their kind offer of materials. I am much indebted to Mr. Hisashi MASUDA, Kofu City for his aid in collecting gall materials and information.

Key to species of the genus *Aphalara* of Japan

1(4) Forewing without any maculation or markings.
2(3) Forewing slender, 2.6 times as long as wide; male forceps with a small apical and anterior projection; female genitalia short. ·········· *A. polygoni* FOERSTER, 1848
3(2) Forewing wide, 2.2 – 2.4 times as long as wide; male forceps with a conspicuous apical and anterior projection; female genitalia long. ·········· *A. morimotoi* MIYATAKE, 1997
4(1) Forewing with band(s) or markings.
5(8) Cubital cell of forewing rather flat, nearly 2 times as long as high.
6(7) Forewing with single (only outer) bands of dark brown. ·········· *A. fasciata* KUWAYAMA, 1908
7(6) Forewing with double (both inner and outer) band of dark brown. ·········· *A. sasajii* MIYATAKE, sp. nov.
8(5) Cubital cell of forewing somewhat parallelogrammic, 1.2 times as long as high. ·········· *A. itadori* (SHINJI, 1938)

Aphalara sasajii Y. MIYATAKE, sp. nov.

[Japanese name: Tanisoba-madara-kijirami]

(Figs. 1, 2)

Coloration: General color light to reddish brown, usually with some stripes and markings of lighter or darker brown dorsad. Antenna yellowish to pale brown, with two apical segments

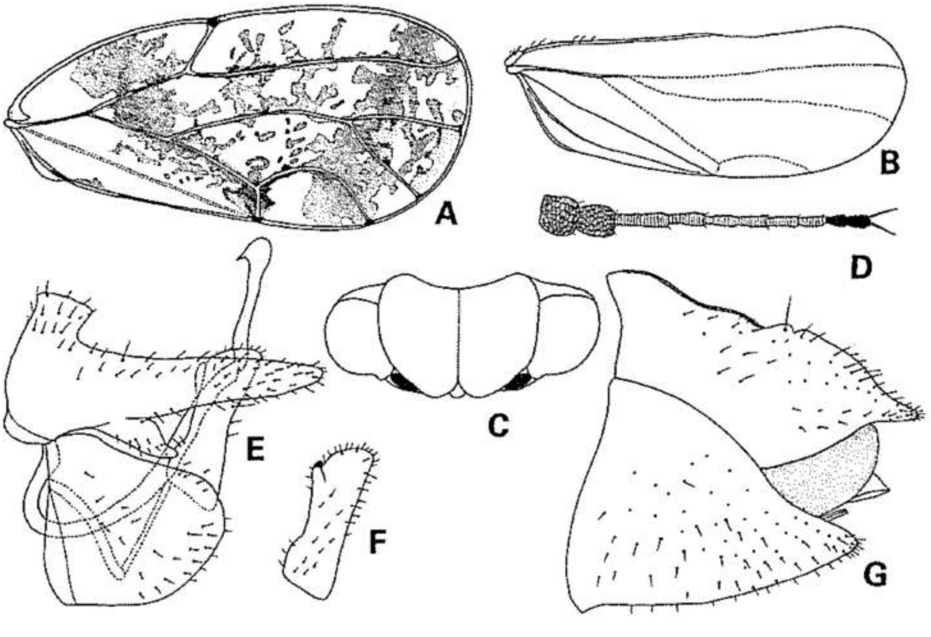

Fig. 1, *Aphalara sasajii* sp. nov.; A, Forewing, female; B, hind wing, female; C, head, dorsal view, female; D, antenna, female; E, male genitalia; F, inner face of male forceps; G, female genitalia; Hirokochi, nr Narada, Yamanashi Pref., 31. VII. 1959.

Fig. 2. Leaf margin roll galls on *Polygonum nepalense* caused by nymphs of *Aphalara sasajii* collected at Somaguchi-yama, Makioka-cho, Higashiyamanashi-gun, Yamanashi Pref., 4. X. 1981, Hisashi MASUDA leg.

(sometimes apex of 8th segment additionally) of black, with two basal segments which are more or less brownish. Vertex pale brown, sometimes darker anteriorly. Genal area reddish brown. Eyes dark brown; ocelli brownish. Thorax with two pairs of brown wide stripes dorsad on scutum.

Forewings transparent, with irregular markings of dark brown nearly throughout as figured, with two rather conspicuous bands from subapex of wing to apex of Cu_1 and from middle of C+Sc to apex of Cu_2; with dark spots at apices of R_1, M_{1+2}, M_{3+4}, Cu_1 and Cu_2. Legs yellowish to pale brown; claws and apical spines of posterior tibiae and tarsi black. Abdomen dark brownish dorsally, pale ventrally. Male genitalia pale brown, subapical and inner projection of forceps dark brown. Female genitalia light brown to brownish.

Structure. Head (Fig. 1–C) nearly as wide as or slightly narrower than thorax, deflexed; vertex wider than long, produced forward anteriorly, with deep impression medio-posteriorly on each side of median line, rugose and not pubescent on surface. Genal area rounded, forming small rounded tubercle. Antennae (Fig. 1–D) short and stout, nearly as long as width of head including eyes, with two long setae at apex, apex of each segment with a short seta as figured, relative length of each segment as 3: 3: 4: 3: 2.5: 2.5: 2.5: 2.5: 2: 2.

Thorax large, strongly arched, not pubescent; pronotum deflexed, medial part produced forward in dorsal view, not hairy; praescutum rather rhomboidal, twice as wide as long; mesoscutum deflexed, projected laterally, mesoscutellum somewhat rectangular, twice as wide as long. Forewings (Fig. 1–A) long and wide, nearly 2 times as long as wide, narrow basally, broad apically, widely rounded at apex; C+Sc thickened; Rs long, slightly sinuate, ended near wing apex; M slightly arched; medial cell long triangular, M_{1+2} as long as M_{3+4}; Cu_1 strongly arched; cubital cell rather high. Hind wings (Fig. 1–B) long and slender, 2.6–2.7 times as long as wide, nearly 4/5 as long as forewing, anterior margin sinuate, rounded at apex; venation not triozine, M branched from M-stem; cubital cell flat; C+Sc with several setae and frenulum basally. Legs short, stout, moderately hairy; femora not much swollen; posterior tibiae without basal spur, usually with 10 apical spines; proximal segment of posterior tarsus with a pair of apical spines; meracanthus rather long, acute apically, projected obliquely ventro-caudad. Abdomen (excl. genital segment) slightly shorter than or nearly as long as thorax, with short pubescence ventrally.

Male genitalia (Fig. 1–E) almost 2/3 as long as the rest of abdomen, typically aphalarid type; proctiger extended laterally into a long horizontal process which is attenuate apically, narrowly rounded at apex, slightly pubescent as figured, with a conspicuous ventral projection near midway; forceps rather long, slightly higher than proctiger, rather parallel-margined in lateral view, with an anterior and inner projection near apex (Fig. 1–F) and an anterior knob-like projection basally; subgenital plate large and high, nearly as high as forceps, dorsal margin sinuate, ventral margin strongly convex, with sparse pubescence. Female genitalia (Fig. 1–G) large, rather short, nearly 4/5 as long as the rest of abdomen, nearly as long as high in lateral view; dorsal valve slightly longer than ventral, with apical portion shortly attenuate, subacute at apex, dorsal margin strongly sinuate and distinctly impressed near midpoint, with sparse pubescence and microsetae as figured; ventral valve shorter than inner valve, dorsal margin sinuate, ventral margin rather straight, narrowly rounded at apex, with sparse pubescence and microsetae.

Measurements. Length of body in male 1.5–1.7 mm, female 1.9–2.0 mm (to tip of folded wings in male 2.3–2.5 mm, female 2.6 - 2.8 mm); length of forewing in male 1.8–2.0 mm, female 2.1–2.3 mm; width of forewing in male 0.8 to 0.9 mm, female 1.0–1.1 mm; length of hind wing in male 1.6–1.8 mm, female 1.8–2.0 mm; width of hind wing in male 0.6 mm, female 0.6–0.7 mm; length of antenna in male 0.5–0.6 mm, female 0.5–0.6 mm; width of head in male 0.5–0.6 mm, female 0.5–0.6 mm.

Holotype: ♂, Hirokochi, alt. ca. 1150 m, MC 53383202, nr Narada, Hayakawa-cho, Minamikoma-gun, Yamanashi Pref., Honshu, 31. VII. 1959, on *Polygonum nepalense*, Y. MIYATAKE leg. (OMNH TI 133). Paratopotypes: 51♂♂, 28♀♀(2♂♂, 2♀♀on slides), the same data as the holotype. Paratypes: 1♂, Amarisawa, Yamanashi Pref., 7. VI. 1960, T. SAIGUSA leg.; 14♂♂, 37♀♀, Onnazawa, nr Ina City, Nagano Pref., 21. VIII. 1962, on *Polygonum nepalense*, Y. MIYATAKE leg.; 6♂♂, 5♀♀, Kakuma Valley, Sanada-cho, N of Ueda City, Nagano Pref., 9. VIII. 1969, on *Polygonum nepalense*, K. SETO leg.; 1♂, Kanmon-Kumabuchi, Omogo Valley, Ehime Pref., 26. V. 1967, H. SHIMA leg.; 1♀, Mt. Ishizuchi, alt. 1850 m, Ehime Pref., 30. V. 1967, A. NAKANISHI leg.; 1♂, Mt. Ishizuchi, alt. 1850 m, Ehime Pref., 30. V. 1967, H. SHIMA leg.

Distribution: Japan (Honshu, Shikoku).

Host plant: "Tanisoba"– *Polygonum nepalense* MEISN. [Polygonaceae].

Remarks: Differs from *A. fasciata* KUWAYAMA, 1908 in having wider forewing with somewhat double (outer and inner) bands (singly outer band only in *fasciata*), male forceps with smaller anterior projections apically, and longer ventral valve in female genitalia. Differs from *A. jungsukae* KWON, 1983 in having forewing with longer Cu than M+Cu (same length in *jungsukae*), male forceps with larger inner teeth apically, and dorsal valve of female genitalia which is not downcurved apically.

Biology. This species seems to be bivoltine in Japan. Adults appear from July to August and September to October. Hibernation takes a place in the adult stage. Hibernated adults come to the host plant in May and oviposit on young shoots. Infested leaves become leaf margin roll galls, and they are wrinkled and more or less twisted (Fig. 2). Sometimes they are tinged with yellowish green or reddish, and turn really red especially in autumn. Many nymphs can be seen in galls. The last instar nymphs come out from galls before emerging (MIYATAKE, 1996).

要　　約

宮武頼夫：タデキジラミ科の1新種. ――― 本州と四国の冷温帯に分布するタデキジラミ科の1新種を，タニソバマダラキジラミ*Aphalara sasajii*として記載した．本種は，年2化と思われ、幼虫はタデ科のタニソバの葉縁を巻いて虫えいを形成し，中で群生する．

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The Subgenera of *Clivina* LATREILLE in the Western Hemisphere, and a Revision of Subgenus *Antroforceps* BARR (new status), with Notes about Evolutionary Aspects (Coleoptera: Carabidae: Clivinini)

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Abstract A detailed description of *Clivina*, based on Western Hemisphere species, includes reference to previously unnoted mandibular and labial features. Based on external structural features, *Antroforceps* BARR (type species *Antroforceps bolivari* BARR, 1967) is included in *Clivina* as a subgenus (new status). The five Western Hemisphere subgenera of *Clivina* (*Paraclivina* KULT, *Clivina* (s. str.), *Semiclivina* KULT, *Reichardtula* WHITEHEAD, and *Antroforceps* BARR) are characterized, using exclusively external structural features of adults. The subgenus *Antroforceps* is treated in more detail, including a key to and descriptions of the three species, *C.* (*A.*) *rubicunda* LECONTE, 1857, *C.* (*A.*) *sasajii*, new species (type area, Latimer County, Oklahoma, U.S.A.) and *C.* (*A.*) *bolivari* BARR. A preliminary phylogenetic analysis postulates the following relationships: *Paraclivina* + (*Clivina* ((*Antroforceps*) +(*Semiclivina* + *Reichardtula*))). Based on morphoclines in sculpture of the pronotum, eye development, and development of the metathoracic wings, relationships of the species of *Antroforceps* are postulated to be: *C. rubicunda* + (*C. sasajii* + *C. bolivari*). The geographical history of *Antroforceps* is postulated to have been associated with climatic drying in the eastern part of southwestern United States and northeastern México.

Introduction

The purpose of this contribution is to make known a new North American species of the genus *Clivina* LATREILLE, 1802 that is interesting because its annectant features permit juxtaposing two other species, namely *C. rubicunda* LECONTE, 1857, and *Antroforceps bolivari* BARR, 1967, which are structurally quite disparate. To provide a suitable context for this small assemblage, the Western Hemisphere subgenera of *Clivina* are reviewed and characterized in terms of external morphological characters. Also, attention is drawn to features that might have general implications in clivinine classification, such as structure of the mandibles and of the pit organs of the mentum (BELL, 1998: 264). Included are keys, taxonomic treatments, and illustrations.

Although *Clivina* is wide-ranging geographically, the genus has been a subject for at most, broad regional treatments only, such as ANDREWES (1929; Oriental Region), KULT (1959; Afrotropical Region); BASILEWSKY (1973; Madagascar); and DARLINGTON (1962; New

Guinea). Without the context of a general treatment such as is available for the related subtribe Dyschiriina (thanks to FEDORENKO, 1996), current authors must content themselves with reviews limited by the material that is readily available. Thus, the observations that follow are restricted to the genus as it is known in the Western Hemisphere.

BOUSQUET (1997: 343) noted that recent treatments of Nearctic species of *Clivina* were confined to isolated descriptions and regional publications. As recorded by WHITEHEAD (1977: 391) the taxonomic structure for the Western Hemisphere taxa of *Clivina* was established by KULT (1947), who arranged the species in four subgenera, currently known as *Paraclivina* KULT, *Semiclivina* KULT, *Clivina* (s. str.), and *Reichardtula* WHITEHEAD (a replacement name for *Eupalamus* SCHMIDT-GOEBEL). This arrangement is reflected in the catalogue of BOUSQUET and LAROCHELLE (1993: 122-124). KULT (1959: 212) described *Isoclivina* for four Afrotropical species, and stated that it was represented also in the Western Hemisphere, but without naming the species that he had in mind. Subsequently, NICHOLS (1988a: 121) included the Neotropical Greater Antillean *C. limbipennis* JACQUELIN du VAL in *Isoclivina*, but the diagnostic features of this subgenus that NICHOLS presented hardly differ from those of *Clivina* (s. str.). Accordingly, I am disinclined to believe that *Isoclivina*, if it is subgenerically distinct, is in the Western Hemisphere, an opinion expressed previously by the late D. R. WHITEHEAD (unpublished MS key, in my library).

Material and Methods

Material

This study is based on detailed examination of the 31 specimens included in *Antroforceps* BARR, and on more or less casual examination of many specimens representing all of the Western Hemisphere subgenera of *Clivina*, as well as various Old World species of this genus and related genera. Additionally, I checked particular characters, especially of the mouthparts, in many other clivinine and scaritine genera. Most of the specimens examined were housed in the Strickland Museum, University of Alberta (UASM).

Museums or private collections, with identifying codens, from which some specimens were borrowed, and names of individuals (in parentheses) who made the loans, are:

CNCI	Canadan National Collection of Insects, ECORC, Agriculture and Agri-Food Canada, K.W. Neatby Building, CEF, Ottawa, Ontario, K1A0C6, Canada (Y. BOUSQUET)
FSCA	Florida State Collection of Arthropods, Division of Plant Industry, 1911 34th Street SW, P. O. Box 14711, Gainesville, Florida, 32614, U.S.A. (R. E. WOODRUFF, M. C. THOMAS)
KHSC	Karl H. STEPHAN Collection, Route 1, Box 913, Red Oak, Oklahoma, 74563, U.S.A.
MCZC	Museum of Comparative Zoology, Harvard University, 26 Oxford Street, Cambridge, Massachusetts, 02138, U. S. A. (P. D. PERKINS)
USNM	United States National Museum of Natural History, Smithsonian Institution, Washington, D. C., 20560, U.S.A. (D. R. WHITEHEAD, T. L. ERWIN).

Methods

Label data for type material are presented to provide a transcription as exact as possible, with information on each label included in quotation marks, background color (other than white) indicated in square brackets, and with line endings indicated by back slashes.

Measurements, made with an ocular micrometer in a Wild M5 stereobinocular microscope, at a magnification of 50×, are the following:

Head length (HL) – linear distance from apical margin of clypeus to posterior margin of left eye;

Length of pronotum (PL) – linear distance from anterior to posterior margin, measured along the midline;

Pronotal maximum width (PW) – greatest linear transverse distance;

Elytral length (EL) – linear distance from basal ridge to apex, measured along suture;

Elytral width (EW) – greatest linear transverse distance across both elytra.

These measurements were taken on the largest and smallest specimens of *C. rubicunda*, all specimens of *C. sasajii*, and on the holotype of *C. bolivari*. They are reported in Table 1 as Standardized Body Length (SBL = sum of the lengths of head, pronotum and elytra, as specified above) and elytral width, to indicate size, and as ratios representing various body proportions that are liable to be of diagnostic value. They are illustrative rather than definitive.

Dissections were made using standard techniques. Genitalia and other small structures were preserved in glycerine in microvials, pinned beneath the specimens from which they were removed. Larger structures, gold-coated for study with a scanning electron microscope, were glued to cards beneath the specimens from which they were removed.

Illustrations are in the form of line drawings and photographs made with a Scanning Electron Microscope (SEM).

Species ranking is based on morphological characters, with an inference of conspecificty (genetic continuity) from marked similarity among the members of a study series, and an inference of genetic discontinuity based on marked difference of such a series from the adults of all other known species of *Clivina*.

Supraspecific grouping is based on hypotheses of monophyly and of recency of common ancestry. Thus, a taxon, no matter how different from its closest relatives, is grouped with them, and ranked accordingly. Ranking applied here is conservative, with the acceptance of the broad definition of *Clivina* currently in use by most extant or comparatively recently deceased authors (for example, JEANNEL, 1941; KULT, 1947; ANTOINE, 1955; LINDROTH, 1961; WHITEHEAD, 1977; NICHOLS, 1988a, b; ERWIN and SIMS, 1984; MOORE *et al.*, 1987; BOUSQUET, 1997; and LORENZ, 1998b). To demonstrate the phylogenetic structure within this protean genus, several supraspecific ranks are required, such as subgenus, species group, and species subgroup.

LINDROTH (1961) and BOUSQUET (1997) equated the rank of species group with that of subgenus, as used by KULT (1947). But I think it preferable to separate these ranks, and to use them at different categorical levels. In this contribution, only one infrageneric rank is required, but I expect that groups and subgroups will be useful in treating the more diverse subgenera, as demonstrated by KULT (1959) in his treatment of the Afrotropical taxa of *Clivina*.

The *Antroforceps* problem

BARR (1967) proposed the genus *Antroforceps* for a single subtropical Mexican, cavernicolous (almost certainly troglolobitic), anopthalmous, brachypterous species, *A. bolivari* BARR, 1967, and assigned this genus to the Gondwanian tribe (or subtribe) Forcipatorini, a group otherwise confined in the Western Hemisphere to the tropical part of the Neotropical Region. WHITEHEAD (1977: 389, 392) placed *Antroforceps* in the Clivinina, a decision endorsed by PERRAULT (1994: 685). BALL and SHPELEY (2000: 377) included *A. bolivari* in the genus *Clivina*, but did not give reasons for this assignment.

BARR (1967: 69) based his classificatory decision on features that he believed were diagnostic, but that are actually shared by at least some forcipatorines and clivinines ("genae widely expanded behind the orbit, ..., clypeus fused to the frons, and the mandibles are elongate and falciform"), and thus are not diagnostic of either group, though very long mandibles with markedly reduced basal areas and associated teeth are characteristic of the Forcipatorina. The mandibles of *Antroforceps*, though somewhat elongate, are in proportions and tooth development much more like those of typical clivinines. Also the external orifices of the mental pit organs are located at the posterior margin of the mentum (as in clivinines) and not more medially (as in forcipatorines). Thus, it seems clear that *Antroforceps* is a clivinine rather than a forcipatorine.

Further, in many respects, *A. bolivari* is similar to *C. rubicunda*, an undeniable member of *Clivina* (sensu lato). Many of the differences between these taxa are bridged by the characteristics of the new species, *C. sasajii*. One could remove the latter two species from *Clivina*, joining them with *A. bolivari*, in a separate genus, but that group would be no more different from the other four subgenera of Western Hemisphere *Clivina* than those groups are from one another. No doubt, this *Antroforceps* assemblage is distinctive, and worthy of recognition, but I think it most appropriate to rank the group as a subgenus within *Clivina*.

Genus *Clivina* LATREILLE, 1802

Clivina LATREILLE, 1802: 96.

Type species: *Scarites arenarius* FABRICIUS (1792: 96) = *Tenebrio fossor* LINNAEUS, 1758: 417 (designated by original monotypy [LORENZ, 1998a: 66]).

Recognition. Adults of this genus are distinguished from those of other Western Hemisphere clivinines by the following combination of character states: marginal groove of elytron prolonged more or less to sutural angle, with intervals 1–3 separated from apical margin, mandibles with occlusal margins prominently dentate; labial pit organs with orifices posteriorly, approximately in submental-mental suture; frons between eyes without series of longitudinal carinae; width of gula less than half width of mentum; glossal sclerite narrow, spathiform; fore femur distinctly less than 3×as long as deep; hind femur about 2.5×as long as hind trochanter; hind coxae contiguous medially; and abdominal sternum VII laterally each side without dorsal projection in contact with elytral plica.

Description. Details recorded below for female genitalia, defensive secretions, and larvae as features of *Clivina* are more appropriately regarded as characteristics of the tribe Clivinini.

They are recorded here as a reminder to taxonomists who study primarily sclerotized parts of dead adults that other information is available from which to obtain characters for more detailed investigation.

Form average for Clivinini, distinctly subcylindrical to somewhat depressed. Overall length about 4 to 15 mm.

Color. Body uniformly rufous to black, or black with elytra bicolored; with all appendages paler, or legs dark and palpi pale.

Microsculpture. Various, according to sclerite and taxon. In most taxa, isodiametric mesh pattern predominant; transverse pattern on few sclerites, in few taxa; grated pattern (at least in Western Hemisphere taxa) not evident.

Chaetotaxy. Head capsule: clypeus with one pair of setae; vertex with two pairs of supraorbital setae. Mouthparts: labrum with row of five to nine setae near anterior margin; maxillary stipes with four setae; palpifer with one seta; labial submentum and mentum with four setae, each; glossal sclerite (Fig. 3E, **gs**) apically and labial palpomere 2 bisetose. Pronotum with two pairs of lateral setae. Elytron with parascutellar seta, two to eight discal setae in interval 3, and approximately 30 umbilical setae. Legs (fore, middle and hind): coxae (0-2-2); trochanters (2-1-1); femora (2–1–1); tarsi, ventrally asetose.

Head (see Figs. 1A–C for examples). Clypeus with anterior margin beaded, concave medially, laterally each side with or without subdentiform projection; with or without distinct angulate projection (**cdp**); supraantennal lobes (**sl**) extended nearly to anterior margin of clypeus, or shorter (Figs. 1A–C); frontoclypeal suture (**fcs**) evident or not medially; frontal impressions (**fi**) deep, bordered posteriorly by distinct, short lateral carina (**lr**) and extended anteriorly about half length of clypeus; thus, clypeus without areas ("wings") each side isolated from median area (Figs. 1A–C); or, frontal impressions deep and wide to anterior margin of clypeus, thus lateral wings distinct; frontal fovea (**ff**) moderately deep to shallow and small, to absent; frons each side with prominent supraantennal lobe, or frontal plate (**sl**); dorsoposteriorly with or without sharp transverse carina (**tc**) and impression (**ti**) between posterior extensions of frontal grooves. Laterally, with or without suborbital ridge (**sor**) each side, with two projections one smaller and one larger (**sorp**); ventrolaterally with or without sharp longitudinal carina extended from margin of gnathal sinus (or buccal fissure) to plane of posterior margin of temple.

Eyes. Normal size, almost as long as temple (Fig. 1A); or microphthalmous, with eye about 0.1 length of temple (Fig. 1B, **e**); or anophthalmous, eyes absent (Fig. 1C), temporal area irregular in form.

Antennae. Antennomeres 4-11 moniliform, each antennomere with width and length about equal, to filiform, with each antennomere distinctly longer than wide. Antennomere 1 (scape) with single apical seta; antennomere 2 (pedicel) with about six setae; antennomere 3 moderately densely setose; antennomeres 4-11 densely setose.

Mouthparts. For details, see description of subgenus *Antroforceps*, below, and Figs. 2-3. That description is thought to be generally applicable to genus, a generalization yet to be established.

Prothorax. Pronotum (Figs. 1A–C) slightly to distinctly longer than wide; anterior margin shallowly concave, laterally projected narrowly and distinctly; lateral margins smooth or crenulate, parallel for most of their length, incurved posteriorly; lateral bead each side extended to posterior margin or incurved anteriad in form of a prebasal (or pseudobasal) margin (LINDROTH, 1961: 158, Fig. 78); simply angulate (dentiform) or biangulate posteriorly, dentiform projections directed dorsad; posterior margin narrow, slightly concave, beaded or not; anterior transverse impression indistinct to distinct, posterior transverse impression not indicated, or deep, near posterior margin; median longitudinal impression distinct, narrow, extended from posterior margin nearly to anterior margin; posteriolateral impressions rather indistinct, continuous with broad, indistinctly delimited lateral grooves; disc very slightly to markedly convex, depressed medially in vicinity of longitudinal impression; surface posteriorly with or without pair of paramedian denticulations, posteriorly directed. Proepipleuron very narrow; proepisternum with or without narrow longitudinal ridge (characteristic of subg. *Semiclivina* KULT). Prosternum bicarinate short distance anteriad fore coxae; medially longitudinally carinate or not for most of length.

Pterothorax. Markedly constricted anteriorly. Metasternum average, distinctly longer than length of middle coxae, or very short, about subequal in length to length of middle coxae; metepisternum with lateral margin distinctly longer than width at base, or anterior and lateral margins subequal in length.

Elytra (Figs. 4A–C). Elongate, markedly narrowed anteriorly or not; sides parallel for most of their length. Humerus rounded, or variously dentate (Fig. 4A, **hdp**). Parascutellar stria (**pss**) present or absent; striae 1–3 extended individually to elytral base; striae 4 and 5 also extended to base individually, or joined short distance prebasally, and common stria extended to base. Discal intervals flat to slightly convex; interval 6 at base convex to carinate; intervals 7-8 variously convex to carinate. Basal ridge represented toward suture by basal, dorsally projected denticulations, or not evident. Lateral channel average (Fig. 4A, **lc**) to very broad (Fig. 4C). Discal setae two to eight (Fig. 4C); umbilical setae (Fig. 4A, **us**) numerous, short.

Hind wings. Normally developed (long), or short stubs, non-functional for flight.

Legs. Middle tibia (Fig. 3F) with preapical apophysis (**apo**) prominent or not. Tarsomere 1 of all legs elongate, about length of tarsomeres 2-4 together. Paronychia and arolium leaf-like, rather large, or paronychia absent, arolia slender, spine-like.

Abdominal sterna. Sternum III without or with pair of paramedian longitudinal sulci (Fig. 5, **ics**). Setae of Sternum VII two or four, variously located: equidistant from one another, or variously grouped.

Male genitalia (Figs. 6A–B). Median lobe flat, more or less markedly curved in lateral aspect, apex various. Internal sac with basal sclerite (**bs**); with or without spines.

Female genitalia. Ovipositor (Figs. 7A–C; see also DEUVE 1993: 141–142, Fig. 211). Gonocoxa IX (**go**) monomerous, not divided, slender, curved; margin with two long, slender ensiform setae (**es**), and various other slender setae; ventral surface with subapical setose organ (two short nematiform setae [**ns**] and rather long pit pegs [**pp**]). Internal genital organs (LIEBHERR and WILL, 1998: 127, Fig. 17; 148): spermatheca long, coiled at base; spermathecal gland with long duct, appended to spermatheca.

Pygidial glands. Secretion of quinones (MOORE, 1979: 194, Table 1).

Chromosomes. Diploid numbers 24-46 (*Clivina* [s. str.], SERRANO and GALIAN, 1998: 212).

Larvae. Antennomere III with terminal sense organ. Tarsus with single claw. Urogomphus flattened and setose (ARNDT, 1993: 26-27. See also THOMPSON, 1979: 252, Fig. 47).

Habitat and way of life. Most species are hygrophilous geophiles. They are halophobic (NICHOLS, 1988a: 120), avoiding saline situations. Many species are restricted to special places (damp soil in forest, or mud by standing water, or sandy river banks, etc. [DARLINGTON, 1962:

359; ERWIN, 1990: 37]). A few species live in decaying logs. Most species are fossorial, but dig only shallow burrows (LINDROTH, 1961: 158-159). Some species inhabit rodent burrows, and some are cavernicolous. Some species (such as *Clivina collaris* HERBST and *C. fossor* FABRICIUS) are synanthropic, living in gardens, etc., and other human-disturbed habitats remote from standing water. Adults are nocturnal, and those of some species occur in substantial numbers on warm summer evenings at light sources, which they reach by flight. Adults of more northern species hibernate (ERWIN, 1981: 141-142).

Geographical distribution. Virtually worldwide in distribution, the range of this genus extends in the Western Hemisphere from about 50°N (western Canada) south to *ca.* 35°S, in northern Argentina, with most of the species confined to the tropics.

Chorological affinities. The range of *Clivina* in the Western Hemisphere overlaps broadly the ranges of the other indigenous clivinine genera.

Phylogenetic relationships. Not specified.

Included species

This genus includes 378 species, in eleven subgenera. (LORENZ, [1998b: 131–135] recognized only nine subgenera, having placed *Reichardtula* WHITEHEAD in *Clivina* [s. str.], and listed *Antroforceps* BARR as a separate genus).

The subgenera in the Western Hemisphere are characterized in the following key, but only *Antroforceps* is treated in detail.

Diagnostic features in key form of Western Hemisphere subgenera of *Clivina* LATREILLE

1. Mandible with scrobe distinctly laterad, mostly not evident from dorsal aspect. Supraantennal lobes prominent, extended almost to anterior margin of clypeus. Clypeus continuous at least in part, lateral wings not sharply set off from median portion. Labial mentum without prominent U-shaped ridge. Pronotum with prebasal transverse groove and ridge continuous each side with lateral groove and bead (see LINDROTH, 1961: 158, Fig. 78); posteriolateral angles rounded, not angulate. Elytron with two discal setae; humerus rounded; interval 8 carinate only toward apex; striae 1–5 separate from one another at base. Fore femur ventrally without a small dentiform projection toward apex. Middle tibia with preapical apophysis small, not prominent. Abdominal sternum III without pair of complete longitudinally oriented paramedian carinae; sternum VII with setigerous punctures unevenly spaced, middle two closer to one another than to adjacent lateral punctures .... *Paraclivina* KULT

   Type species: *Clivina burmeisteri* PUTZEYS, 1866 (by original designation) (LORENZ, 1998a: 135)

1' Mandible explanate, depressed, all of scrobe evident in dorsal aspect. Supraantennal lobes terminated distinctly posteriad anterior margin of clypeus (Figs. 1A–C). Clypeus continuous at least in part, lateral wings not sharply set off from median portion, or lateral wings distinctly isolated from median portion. Mentum with or without prominent U-shaped ridge. Pronotum without prebasal ridge, lateral bead each side extended to basal margin (Figs. 1A–C); posteriolateral angle each side distinctly dentiform, angulate, with or without accessory lateral dentiform projection posteriad posteriolateral angle. Fore femur ventrally with or without a small dentiform projection toward apex. Middle tibia with preapical seta-bearing apophysis; if prominent, its seta preapical; if small, its seta apical. Elytron with more than two discal setae; humerus rounded or bidentiform; interval 8 carinate for most of its length or not; striae 1-5 at base separate from one another, or 4 and 5 joined together. Abdominal sternum III with or without paramedian sulci, surface plane 2

2(1') Abdominal sternum III without paramedian sulci, surface plane. Clypeus continuous at least in part, lateral wings not sharply set off from median portion. Mentum without prominent U-shaped ridge. Pronotum without accessory lateral tooth posteriad posteriolateral angle. Elytron with four discal setae; humerus rounded; interval 8 carinate toward apex, only; striae 1–5 at base separate from one another, or 4 and 5 joined together. Fore femur ventrally without a small dentiform projection toward apex. Middle tibia with prominent preapical apophysis (Fig. 3F, **apo**) , its seta preapical. Abdominal sternum VII with setigerous punctures spaced about evenly .... *Clivina* (sensu stricto)

Type species: same as for genus; see above.

2' Abdominal sternum III with pair of paramedian sulci (Fig. 5, **ics**), longitudinally oriented. Clypeus continuous at least in part, lateral wings not sharply set off from median portion, or lateral wings distinctly isolated from median portion. Mentum with or without prominent U-shaped ridge. Pronotum with or without accessory lateral dentiform projection posteriad posteriolateral angle. Elytron with four to eight setigerous punctures in interval 3; humerus rounded or bidentiform (Fig. 4, **hdp**); interval 8 carinate for most of its length or not; striae 1–5 at base separate from one another, or 4 and 5 joined together. Fore femur ventrally with or without a small dentiform projection toward apex. Middle tibia with preapical apophysis prominent (Fig. 3F, **apo**) or tuberculate. Abdominal sternum VII with setigerous punctures spaced evenly or not 3

3(2') Proepisternum with longitudinal carina. Clypeus continuous at least in part, lateral wings not sharply set off from median portion. Mentum with prominent U-shaped carina, transverse near posterior margin, laterally each side extended to lateroapical margin of lateral lobe. Pronotum without accessory dentiform projection posteriad posteriolateral angle. Elytron with discal setae four; humerus rounded; interval 8 carinate toward apex, only; striae 1–5 at base separate from one another. Fore femur ventrally with a small dentiform projection toward apex. Abdominal sternum VII (Fig. 5) with setigerous punctures two on each side, each lateral pair widely separated from one another. Middle tibia with preapical apophysis prominent (Fig. 3F, **apo**) .... *Semiclivina* KULT

Type species: *Clivina dentipes* DEJEAN, 1825 (by original designation) (LORENZ, 1998a: 160).

3.' Proepisternum without longitudinal carina. Clypeus continuous at least in part, lateral wings not sharply set off from median portion, or lateral wings distinctly isolated from median portion. Mentum with or without prominent U-shaped carina. Pronotum with or without accessory dentiform projection posteriad posteriolateral angle. Fore femur ventrally toward apex dentate or not. Elytron with discal setae four to eight; humerus rounded or bidentiform (Fig. 4A–B, **hdp**); interval 8 carinate for most of its length or not; striae 1–5 at base separate from one another, or 4 and 5 joined together. Fore femur ventrally without a small dentiform projection toward apex. Middle tibial preapical apophysis prominent (Fig. 3F, **apo**) or not. Abdominal sternum VII with setigerous punctures spaced evenly or not 4

4(3') Pronotum with accessory lateral dentiform projection posteriad posteriolateral angle (Figs. 1A–C, **pdp**). Elytron with humerus bidentiform (Figs. 4A–C, **hdp**), discal setae five or eight; interval 8 carinate for most of its length. Middle tibia with preapical apophysis (Fig. 3F, **apo**) prominent, its seta preapical. Clypeus continuous at least in part, lateral wings not sharply set off from median portion. Mentum without prominent ridge. Elytron basally with striae 1–5 separate from one another. Abdominal sternum VII with setigerous punctures spaced about evenly .... *Antroforceps* BARR, **new status**

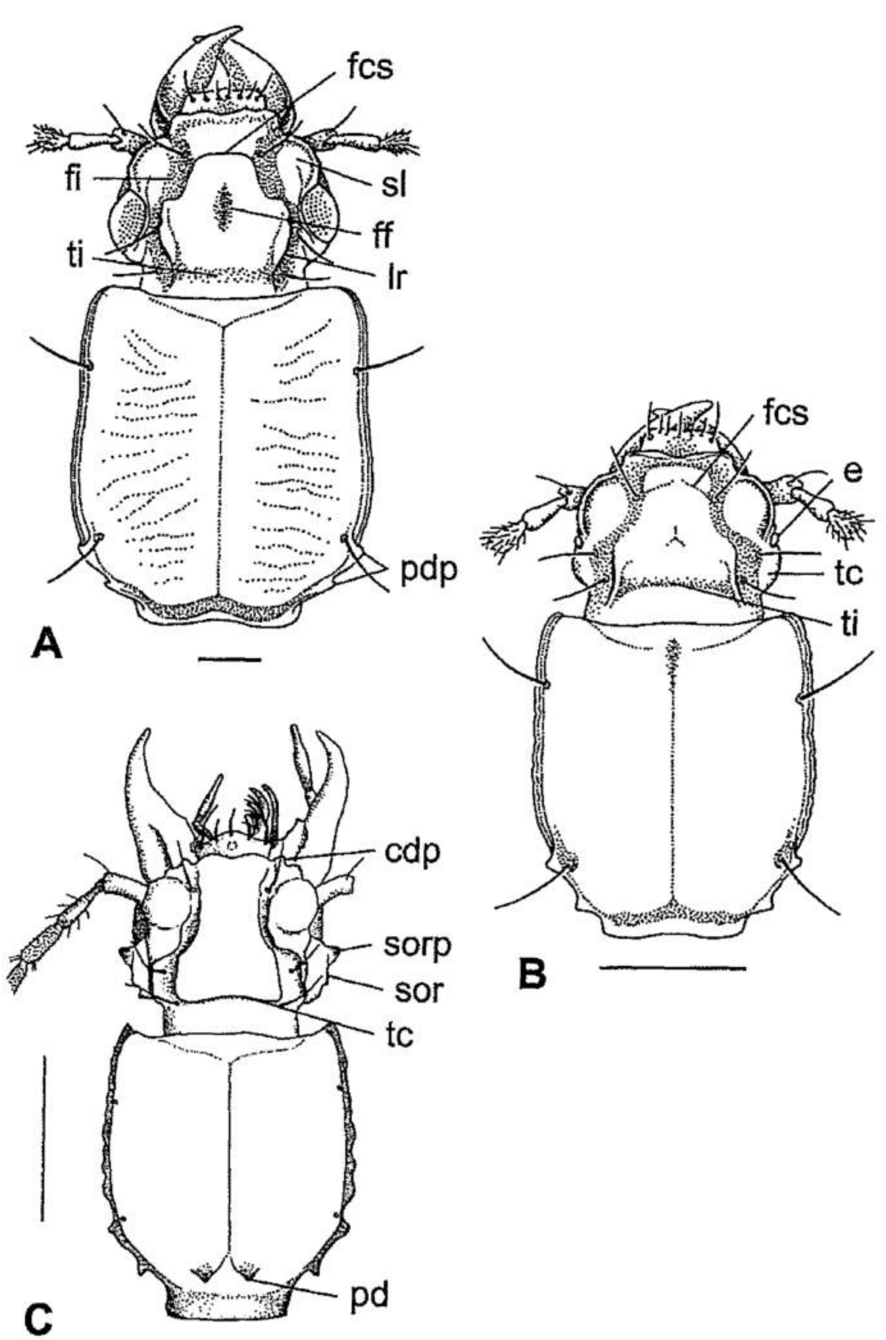


Fig. 1. Line drawings of head and pronotum of species of *Clivina* (*Antroforceps*): A, *C. rubicunda* LECONTE; B, *C. sasajii*, new species; C, *C. bolivari* BARR. (from BARR, 1967: 68, Fig. 1). Legend: cdp, clypeal dentiform projection; e, eye; fcs, frontoclypeal suture; ff, frontal fovea; fi, frontal impression; pd, paramedian dentiform projection; lc, lateral carina; pdp, posteriolateral dentiform projections; plr, posteriolateral ridge; sl, supraantennal lobe; sor, suborbital ridge; sorp, anteriolateral projection of suborbital ridge; t, temple; tc, transverse carina; ti, transverse impression. Scale bar = 0.5 mm.

Type species: see below.

4' Pronotum without accessory lateral dentiform projection. Elytron with discal setae four; humerus rounded, not bidentiform; interval 8 carinate toward apex, only. Middle tibia with preapical apophysis tuberculate, its seta terminal in position. Clypeus with lateral wings distinctly isolated from median portion by extension of frontal impressions to anterior clypeal margin. Mentum with prominent U-shaped ridge. Elytron basally with striae 1–3 separate from one another, 4 and 5 joined together. Abdominal sternum VII (Fig. 5) with setigerous punctures two on each side, each lateral pair widely separated from one another .... *Reichardtula* WHITEHEAD

Type species: *Eupalamus clivinoides* SCHMIDT-GOEBEL, 1846 (by original monotypy) (LORENZ, 1998a: 85).

Subgenus *Antroforceps* BARR, **new status**

Clivina "Dix-septieme groupe" PUTZEYS, 1866: 143

Antroforceps BARR, 1967: 66.— WHITEHEAD, 1977: 389, 392. — PERRAULT, 1994: 684. — LORENZ, 1998a: 45; — 1998b: 139.

Type species: *Antroforceps bolivari* BARR, 1967 (original designation and monotypy).

Taxonomic note. PUTZEYS (1866: 143) recognized this assemblage by including one of its members, *C. rubicunda* LECONTE, in his monospecific group 17. However, PUTZEYS did not provide names for his numbered groups, so his intrageneric arrangements are without nomenclatural significance.

Recognition. Adults of this subgenus are distinguished from those of other subgenera by the character states noted in the diagnoses, above. Most readily seen are the bidentiform posteriolateral margins of the pronotum, the bidentiform elytral humeri (or crenulate humeral margins), and the carinate or partially carinate intervals 6–8.

Description. Form average for *Clivina* to somewhat depressed. Standardized body length: 3.70–5.70 mm., width 1.06–1.76 mm.

Color. Body uniformly rufous, with palpi testaceous.

Microsculpture. Head, dorsal surface: frontoclypeus anteriorly and laterally with mesh pattern isodiametric, sculpticells large and flat, most of surface smooth, without microlines, or almost without microlines; vertex and supraantennal lobes smooth also; laterally, temples, ocular areas and vertex with microlines distinct, mesh pattern isodiametric. Head, ventral surface: mesh pattern isodiametric, or microlines evident, with few isodiametric sculpticells; gula smooth or with isodiametric mesh pattern; posteriad eyes, surface more or less rugulose. Mouthparts: labrum with mesh pattern isodiametric, microlines very fine and difficult to see at 100×; mandibles dorsobasally smooth, toward apex with very fine microlines, oriented transversely, mesh pattern not evident; scrobes with mesh pattern isodiametric, or surface smooth, without microlines; ventrally basolaterally, with mesh pattern longitudinal, surface smooth toward apex; labial submentum with isodiametric mesh pattern, microlines very fine; mentum smooth medially, laterally with isodiametric mesh pattern, microlines very fine. Thorax: pronotum with mesh pattern isodiametric, microlines fine, sculpticells rather large, flat, or surface of disc smooth, mesh pattern evident. Proepipleuron with mesh pattern slightly longitudinal; proepisternum with mesh pattern isodiametric; prosternum with very shallow microlines evi-

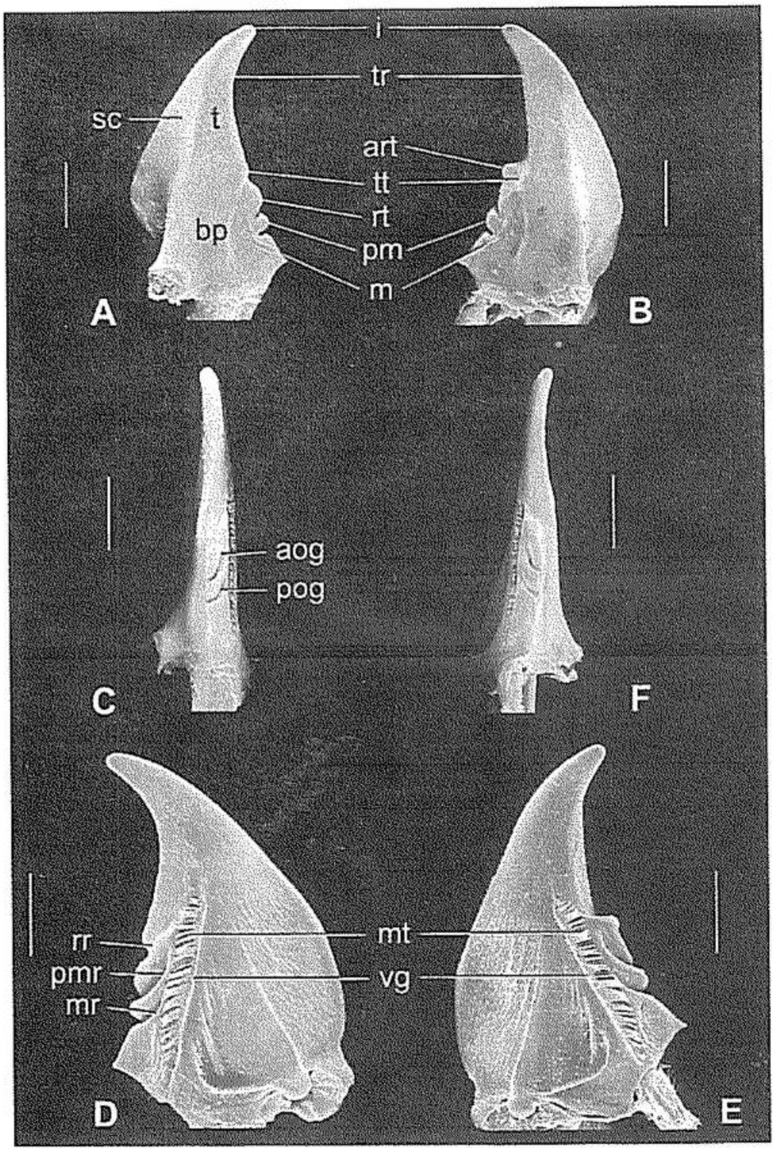


Fig. 2. SEM photographs of mandibles of *Clivina* (*Antroforceps*) *sasajii*, new species. A, C, D, left mandible, dorsal, occlusal, and ventral aspects, respectively; B, E, F, right mandible, dorsal, ventral, and occlusal aspects, respectively. Legend: aog, anterior occlusal groove; art, anterior retinacular tooth; bp, basal portion; i, incisor tooth; m, molar tooth; mr, molar ridge; mt, microtrichia; pm, premolar tooth; pmr, premolar ridge; pog, posterior occlusal groove; rr, retinacular ridge; rt, retinacular tooth; sc, scrobe; t, terebra; tr, terebral ridge; tt, terebral tooth; vg, ventral groove. Scale bars = 100μm.

dent, mesh pattern not so. Pterothoracic sclerites about same as their prothoracic counterparts. Elytra: dorsally, nearly smooth, with or without vestiges of mesh pattern; epipleuron with surface rugulose, microlines distinct, irregular, mesh pattern vestigial, or mesh pattern distinct, sculpticells slightly elongate. Abdominal sterna: mesh pattern isodiametric laterally, slightly transverse medially, microlines distinct, sculpticells slightly convex, surface beaded.

Head (Figs. 1A–C). Clypeus with anterior margin beaded, concave medially, laterally each side with or without subdentiform projection; with or without distinct angulate projection; fron-

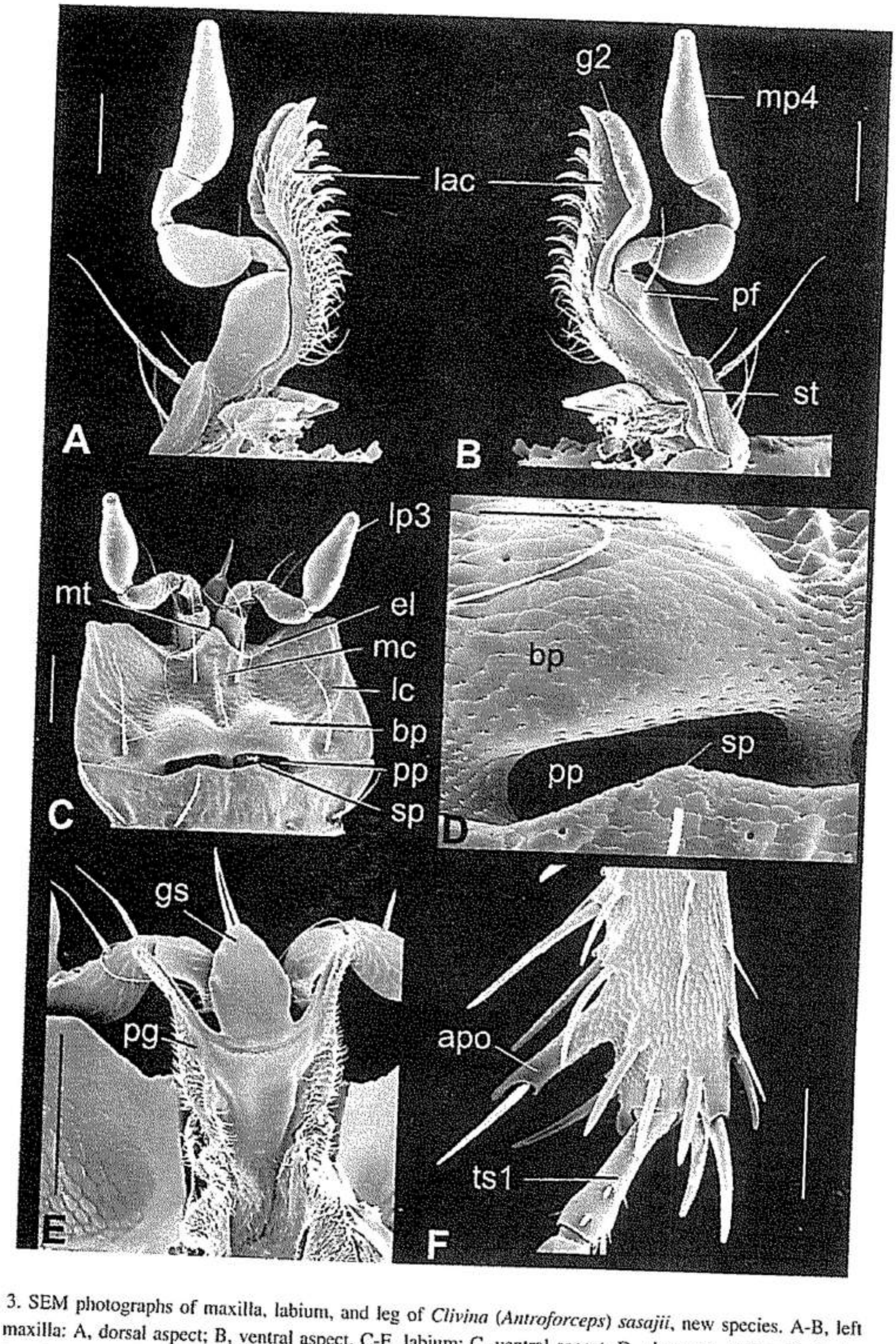


Fig. 3. SEM photographs of maxilla, labium, and leg of *Clivina* (*Antroforceps*) *sasajii*, new species. A-B, left maxilla: A, dorsal aspect; B, ventral aspect. C-E, labium: C, ventral aspect; D, pit organ, orifice; E, ligula, dorsal aspect. F, middle tibia and tarsomere 1. Legend: apo, apophysis; bp, bulbous projection; el, epilobe; g2, galeomere 2; gs, glossal sclerite; lac, lacinia; lc, lateral carina; lp3, labial palpomere 3; mc, median carina; mp4, maxillary palpomere 4; mt, mental tooth; pf, palpifer; pp, paramedian pit organ, orifice; pg, paraglossa; sp, submental projection; st, stipes; ts1, tarsomere 1. Scale bars A-C and E-F = 100μm; D = 50μm.

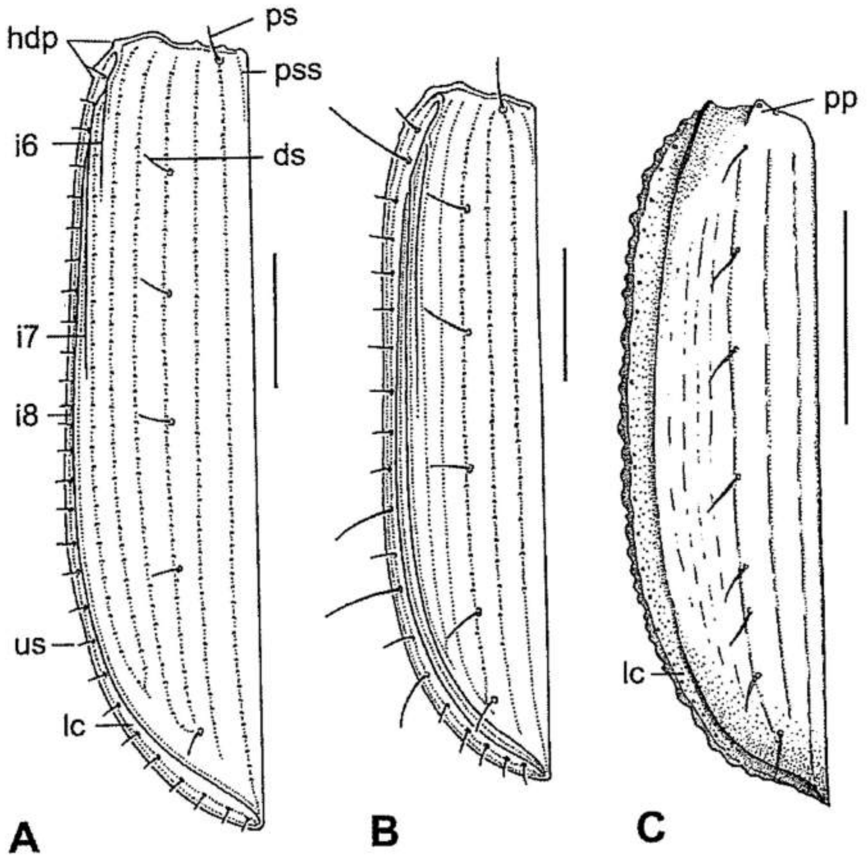
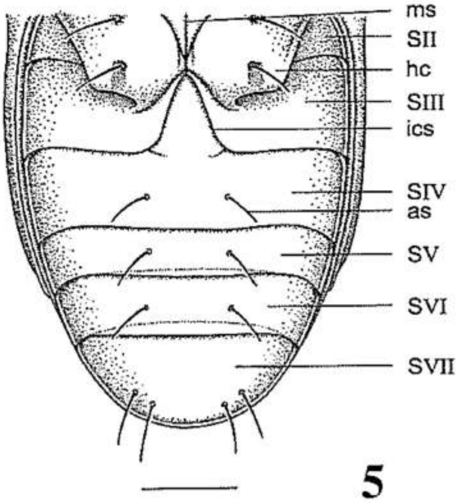


Fig. 4. Line drawings of left elytron of: A, *C. rubicunda* LeConte; B. *C. sasajii*, new species; C, *C. bolivari* Barr (from Barr, 1967: 68, Fig. 1). Legend: ds, discal seta; hdp, humeral dentiform projections; i6- i8, intervals 6-8 respectively; lc, lateral channel; pp, parascutellar dentiform projection; ps, parascutellar seta; pss, parascutellar stria; us, umbilical seta. Scale bar = 0.5 mm.

toclypeal suture (Figs. 1 A, B, **fcs**) evident or not medially; frontal impressions (Fig. 1A, **fi**) deep, bordered posteriorly by distinct, short longitudinal carina; extended anteriorly about half length of clypeus; thus, clypeus without areas ("wings") each side isolated from median area; frontal fovea moderately deep to shallow and small, to absent; frons each side with prominent supraantennal lobe (Fig. 1A, **sl**), dorsoposteriorly with or without sharp transverse carina (Fig. 1C, **tc**) between posterior extensions of frontal grooves; transverse impression (Figs. 1 A, B, **ti**) evident. Laterally, with or without suborbital ridge (Fig. 1C, **sor**) each side, with two projections one smaller and one larger (Fig. 1C, **sorp**); ventrolaterally with or without sharp longitudinal carina extended from margin of gnathal sinus to plane of posterior margin of temple.

Eyes. Normal size, almost as long as temple (Fig. 1A); or microphthalmous (Fig. 1B, **e**), with eye about 0.1 length of temple (**t**); or anophthalmous (Fig. 1C), temporal area irregular in outline.

Antennae. Antennomeres 4–11 moniliform, each antennomere with width and length about equal, to filiform, with each antennomere distinctly longer than wide (Fig. 1C).



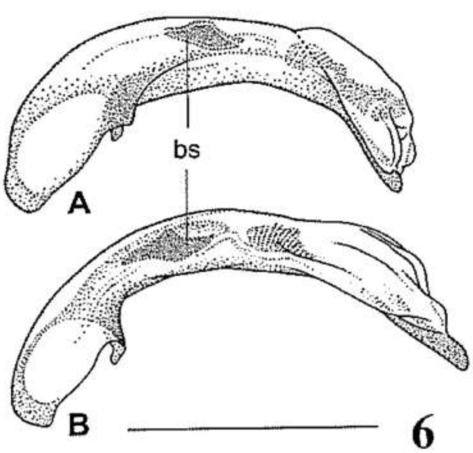


Fig. 5. Line drawing of abdominal sterna, and apical portion of hind coxae and metasternum, ventral aspect, of *Clivina* (*Reichardtula*) *americana* DEJEAN. Legend: as, ambulatory seta; hc, hind coxa; ics, intercoxal sulcus; ms, metasternum, apex of antecoxal piece; SII-SVII, abdominal sternum II- VII, respectively. Scale bar = 0.5 mm.

Fig. 6. Line drawings of male genitalia, median lobe, left lateral aspect of *Clivina* (*Antroforceps*) : A, *C. rubicunda* LECONTE; B. *C. sasajii*, new species. Legend: bs, basal sclerite of internal sac. Scale bar = 0.5 mm.

Antennomere 1 (scape) with single apical seta; antennomere 2 (pedicel) with about six setae; antennomere 3 moderately densely setose; antennomeres 4-11 densely setose.

Mouthparts. Labrum with anterior margin markedly to slightly subangulate, convex. Mandibles (Figs. 2 A–F): elongate or not, explanate basally, with ventrolateral margin projected more or less markedly laterad, occlusal margins (Figs. 2 C, F) with distinct anterior and posterior occlusal grooves (**aog** and **pog**, respectively), ventrally with long ventral groove and moderately long microtrichia; left mandible (Fig. 1A) with terebral ridge (**tr**) markedly concave, occlusal margin with blunt terebral tooth (**tt**), broad and blunt retinacular tooth (**rt**), narrow premolar tooth (**pm**), and broad molar tooth (**m**), terminated in acute angle; right mandible (Fig. 1B) with terebral ridge straight, terebral tooth small, retinaculum with anterior tooth (art) prominent, retinacular ridge straight, posterior retinacular tooth not evident, premolar tooth narrow, molar tooth broad, terminated in acute angle, and basal brush rather small. Maxilla (Figs. 3A, B): lacinia (**lac**) with short apical tooth, galeomeres about equal in length, galeomere 1 sinuate, galeomere 2 (**g2**) broader than galeomere 1; palpus, with palpomere 2 markedly thick, palpomere 3 shorter than palpomeres 2 and 4, palpomere 4 (**mp4**) broad medially, tapered markedly to narrowly rounded apex. Labium (Figs. 3 C–E): submental-mental suture complete, submentum with small paramedian anterior projection (Figs. 3 C, D, **sp**) each side midline; mentum basolaterally with pair of large pit organs (**pp**) with orifices elongate, parallel to submental-mental suture, each covered by a convex, cap-like projection (**bp**) of mentum; medially with sharp keel (Fig. 3C, **mc**) extended about 2/3 length of sclerite, and laterally with smaller carina (**lc**); tooth prominent, more so than lateral lobes, apex broadly rounded; tooth flanked by sharp, dorsally curved dentiform projections of epilobes; or tooth (Fig. 3C, **mt**) shorter than lateral lobes. and epilobes (**el**) not projected; lateral lobes relatively short, apically subtruncate,

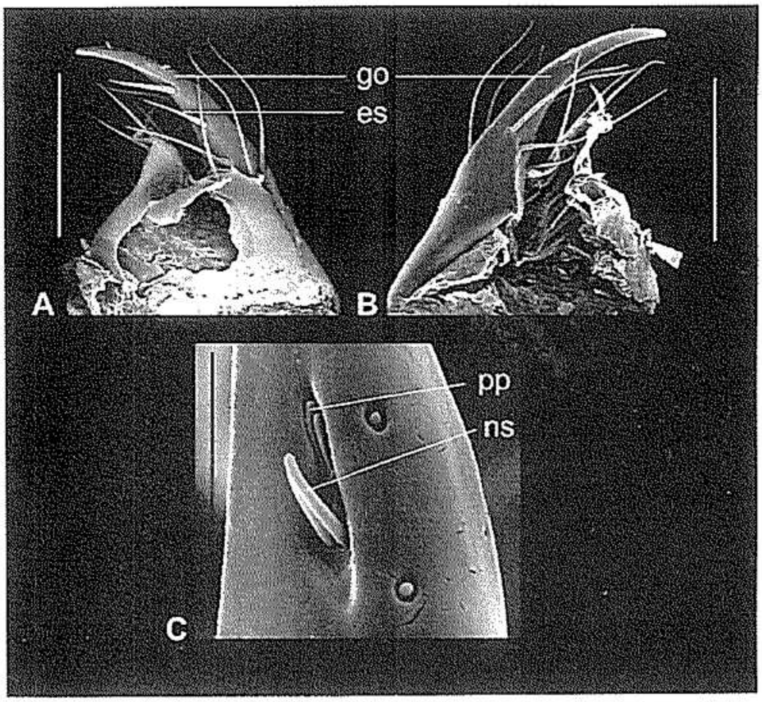


Fig. 7. SEM photographs of the ovipositor, left laterotergite, segment IX, and gonocoxa of *Clivina* (*Antroforceps*) *sasajii*, new species. A, lateral aspect; B, medial aspect; C, ventral aspect. Legend: es, ensiform seta; go, gonocoxa; ns, nematiform seta; pp, pit peg. Scale bars A-B = 100μm; C = 10μm.

with dentiform projection laterally; glossal sclerite (Fig. 3E, **gs**) distinctly narrowed apically, spathiform; paraglossae (**pg**) slender, divergent from glossal sclerite, with covering of microtrichia dorsally; palpomeres markedly slender, elongate, or shorter (Fig. 3C, **lp3**), similar in form and proportions to maxillary palpomeres.

Prothorax. Pronotum slightly (Figs. 1 A, B) to distinctly (Fig. 1C) longer than wide; anterior margin shallowly concave, laterally projected narrowly and distinctly; lateral margins smooth (Fig. 1A) or crenulate (Figs. 1 B, C), parallel for most of their length, incurved posteriorly; biangulate (Fig. 1A, **pdp**) posteriorly, dentiform projections directed dorsad; posterior margin narrow, slightly concave, beaded or not; anterior transverse impression indistinct to distinct; posterior transverse impression not indicated (Fig. 1C), or deep (Fig. 1A), near posterior margin; median longitudinal impression distinct, narrow, extended from posterior margin nearly to anterior margin; posteriolateral impressions rather indistinct, continuous with broad, indistinctly delimited lateral grooves; disc very slightly convex, depressed medially in vicinity of longitudinal impression; surface posteriorly with or without pair of paramedian dentiform projections, posteriorly directed. Prosternum bicarinate short distance anteriad fore coxae; medially longitudinally carinate or not for most of length.

Pterothorax. Markedly constricted anteriorly. Metasternum average, distinctly longer than length of middle coxae, or very short, about subequal in length to length of middle coxae; metepisternum with lateral margin distinctly longer than width at base, or anterior and lateral margins subequal in length.

Elytra (Figs. 4 A–C). Elongate, markedly narrowed anteriorly or not; sides parallel for most of their length. Humerus clearly bidentiform (Fig. 4A, **hdp**) with smooth lateral margin, or unidentiform (Fig. 4C) with crenulate lateral margin (second humeral denticulation not distinguishable from serrulations). Parascutellar stria present (Fig. 4A, **pss**) or absent (Fig. 4C). Interval 5 slightly convex, not carinate; intervals 6-8 carinate; 6 extended to humerus (Fig. 4A, **i6**). Basal ridge represented toward suture by basal, dorsally projected parascutellar dentiform projection (Fig. 4C, **pp**), or projection not evident. Discal setae (Fig. 4A, **ds**) in interval 3 five to eight.

Hind wings. Normally developed (long), or short stubs, non-functional for flight.

Legs. Elongate, slender; middle tibia with preapical apophysis (Fig. 3F, **apo**). Tarsomere 1 (**ts1**) of all legs markedly elongate. Paronychia and arolium leaf-like, rather large, or paronychia absent, arolium slender, spine-like.

Abdominal sterna. Sternum III with pair of paramedian longitudinal sulci (Fig. 5, **ics**). Setae of Sternum VII about equidistant from one another (in contrast to condition illustrated in Fig. 5).

Male genitalia. Median lobe (Figs. 6 A–B) flat, more or les markedly curved in lateral aspect, apex narrowly rounded. Internal sac with basal sclerite (**bs**), but without spines.

Ovipositor (Figs. 7 A–C). Typical for *Clivina* females. Internal female organs of reproduction not studied.

Way of life. The species of *Antroforceps* are variously forest-inhabiting hygrophiles to troglobites.

Geographical distribution (Fig. 8). Confined to eastern North America, the range of this subgenus extends from Connecticut south to central Florida, and westward to the Mississippi Basin and southward in Mexico to southern Tamaulipas.

Chorological affinities. The range of *Antroforceps* is overlapped by the geographical ranges of the other four Western Hemisphere subgenera of *Clivina* (s. lat.).

Phylogenetic relationships (Fig. 9). Adults of this subgenus share with *Semiclivina* and *Reichardtula* the paramedian sulci on abdominal sternum III. (Figs. 5, **ics**). This is a putatively synapotypic feature of these three subgenera. Within this complex, *Antroforceps* adults exhibit a putatively plesiotypic distribution of the setae of abdominal sternum VII, whereas *Semiclivina* and *Reichardtula* exhibit the apotypic condition (Fig. 5, **SVII**), accepted as synapotypic for these taxa. Thus, *Antroforceps* may be the adelphotaxon of the common ancestor of *Semiclivina* and *Reichardtula*.

Included species.— This subgenus includes three species, treated below.

Key to species of subgenus *Antroforceps* BARR

1. Pronotum and elytron with lateral margins smooth (Figs. 1A, 4A), not crenulate, without paramedian dorsal projections. Eye average (Fig. 1A), extended over most of temporal lobe. Metepisternum elongate, lateral margin longer than width at base. Metathoracic wings of normal size or short, about length of abdominal sterna II + III .... *C.* (*A.*). *rubicunda* LECONTE

1' Pronotum with lateral margins more or less distinctly crenulate (Figs. 1B, C), with or without dorsal paramedian projections (posteriad on pronotum, anteriad on elytra). Elytron with lateral margin smooth (Fig. 4B) or crenulate (Fig. 4C). Head microphthalmous (eye about 0.1 length of temple, Fig. 1B, **t**) or anopthalmous (Fig. 1C). Metepisternum short, lateral and basal margins subequal. Metathoracic wings small or absent 2

2(1') Elytron (Fig. 4B) with discal setae five, lateral margin smooth, not crenulate; pronotum (Fig. 1B) with lateral margins shallowly crenulate. Pronotum and elytra without paramedian dorsal projections. Microphthalmous (Fig. 1B) ························ *C.* (*A.*). *sasajii*, new species

2' Elytron (Fig. 4C) with discal setae eight, lateral margin crenulate. Lateral margins of pronotum (Fig. 1C) pronouncedly crenulate. Pronotum and elytra with paramedian dorsal projections (Figs. 1C and 4C). Anophthalmous (Fig. 1C) ······················ *C.* (*A.*). *bolivari* Barr

Table 1. Variation in range of measurements (mm) and ratios for species of the subgenus *Antroforceps* Barr.

Species	N	SBL	EW	HW/PW	PW/EW	PW/PL	PL/EL
C. rubicunda LeC.	2	4.26–4.54	1.29–1.38	0.7–0.72	0.80–0.85	0.92–0.93	0.4–0.47
C. sasajii, n. sp.	9	3.70–4.27	1.06–1.20	0.73–0.77	0.83–0.89	0.87–0.89	0.46–0.48
C. bolivari Barr	1	5.70	1.76	0.89	0.67	0.82	0.43

Clivina (*Antroforceps*) *rubicunda* LeConte

Clivina rubicunda LeConte, 1857: 81, 82. — Bousquet and Larochelle, 1993: 103. — Downie and Arnett, 1998: 110. — Peck and Thomas, 1998: 17. — Lorenz, 1998a: 770; — 1998b: 133. — Ciegler, 2000: 42.

Type material. Not examined. Identity of this species was established by study of the original description and of determined specimens in the USNM collection.

Type area. The only locality noted in connection with the original description is "Louisiana". A more precise type locality does not seem to be required at this time.

Recognition. See key to species of subgenus *Antroforceps*. The most readily observed features are the large eyes, and the smooth (non-crenulate) lateral margins of the pronotum.

Description. With character states of subgenus, restricted as in the key to species of *Antroforceps*, in the recognition section above, and as follows. For measurements and proportions, see Table 1.

Microsculpture. Head, dorsal surface of frontoclypeus with few microlines posteriorly; most of surface smooth; ventrally, head capsule and gula with mesh pattern isodiametric. Mouthparts: mandibles dorsobasally smooth, toward apex and scrobes with very fine microlines, oriented transversely, mesh pattern not evident; labial submentum and mentum with isodiametric mesh pattern, microlines very fine. Thorax: pronotum with disc smooth, laterally microlines fine, mesh pattern obscure; proepipleuron with mesh pattern slightly longitudinal, proepisternum and prosternum with mesh pattern isodiametric, sculpticells slightly convex, surface beaded; pterothoracic metasternum with mesh pattern transverse, sculpticells flat, laterally mesh pattern isodiametric, surface beaded; metepisternum with mesh pattern isodiametric, sculpticells slightly convex, surface beaded. Elytra: dorsally smooth, with vestiges of mesh pattern; epipleuron with surface subrugose, microlines distinct, mesh pattern slightly longitudinal.

Chaetotaxy. Elytron with five setae in interval 3.

Head (Fig. 1A). Clypeus: anterior margin without subdentiform projections, delimited posteriorly by deep narrow frontoclypeal suture (**fcs**); laterally each side without angulate projection. Vertex posteriodorsally with shallow transverse impression (**ti**), without transverse ridge; frontal fovea (**ff**) distinct; ventrolaterally without sharp longitudinal carina extended from margin of buccal fissure to plane of posterior margin of temple.

Antennae. Short, in back-folded position extended to posteriolateral angles of pronotum; antennomeres 5–10 submoniliform, as long as wide or very slightly longer, average for *Clivina*.

Mouthparts. Labrum: anterior margin distinctly rounded, not subangulate. Mandibles broader and shorter than in *C. bolivari*. Maxillae: thicker than those of *C. bolivari*, lacinia more setose; galea shorter and broader compared to *C. bolivari*.; palpomeres shorter compared to *C. bolivari*. Labium: tooth of mentum less prominent than lateral lobes; apex of tooth narrow; epilobes without dentiform projections; glossal sclerite broader than in *C. sasajii*; palpomeres shorter compared to *C. bolivari*, average for *Clivina*.

Prothorax. Pronotum (Fig. 1A): proportions as in Table 1, nearly quadrate; anterior margin shallowly concave, laterally projected narrowly and distinctly; lateral margins smooth; posterior margin narrow, slightly concave, beaded; anterior transverse impression distinct; posterior transverse impression deep very close to posterior margin; median longitudinal impression distinct, narrow, extended from posterior margin nearly to anterior margin; posteriolateral impressions indistinct; disc very slightly convex, depressed medially in vicinity of longitudinal impression; surface posteriorly without pair of paramedian dentiform projections. Prosternum: bicarinate short distance anteriad fore coxae; medially narrow, but not carinate for most of length.

Pterothorax. Metasternum longer than middle coxae; metepisternum with lateral margin distinctly longer than basal width.

Elytra (Fig. 4A). Elongate, sides parallel for most of their length, humerus not markedly narrowed, distinctly bidentiform (**hdp**); parascutellar stria (**pss**) distinct; interval 5 slightly convex, not carinate; interval 6 (**i6**) slightly convex through most of length, but carinate at base; interval 7 (**i7**) carinate for about 1/4 length; interval 8 (**i8**) carinate, especially marked preapically and at humeri; basal ridge represented toward suture by basal denticulate projections.

Hind wings. Dimorphic, either macropterous or brachypterous.

Legs. Average in length for *Clivina*; tarsomere 5 with paronychia not evident, arolium slender, not leaflike.

Male genitalia. Median lobe (Fig. 6A), in left lateral aspect with ventral surface more curved and the apical portion distinctly shorter than that of *C. sasajii* (*cf.* Fig. 6B).

Morphological note. Of the 15 specimens examined for wing development, 11 were brachypterous and four were macropterous, the ratio being about 3:1, indicating the expected dominance of the brachypterous condition. No geographical pattern was discernible.

Habitat and *way of life*. Label data suggest that this species is hygrophilous, living in leaf litter close to flowing or standing water. Records of light collecting indicate that adults fly at night, as do many other macropterous scaritines.

Geographical distribution (Fig. 8). The known range of this species is confined to eastern United States, from Connecticut to central Florida in the east, and westward to the Mississippi Basin (BOUSQUET & LAROCHELLE, 1993: 103; PECK & THOMAS, 1998: 17; and CIEGLER, 2000: 42.).

Chorological affinities. The northernmost member of *Antroforceps*, the range of this species and of *C. sasajii* approach one another but are not known to overlap.

Phylogenetic relationships (Fig. 9). This species is the putative adelphotaxon of *C. sasajii* + *C. bolivari*. See below for details.

Material examined. I have seen 21 specimens from the following localities in United States of America.

ALABAMA. Monroe Co.: 0.3 mi. E. Peterman, Brushy Ck., beaver pond, 20. V. 1978, FOLKERTS & ROUGHLEY (UASM, female). FLORIDA. Leon Co.: Tall Timbers Res. Sta., hammock forest, UV light, 16–20. IV. 1970, D. L. HARRIS (USNM, female); same locality, UV light, 10. VIII. 1981 (CNCI, sex not determined). IOWA. Johnson Co.: Iowa City, 12. V. 1917, L. BUCHANAN (USNM, male). MARYLAND. Montgomery Co.: Plummer's Island, Carderock, litter, woodland pool, 1974, D. R. WHITEHEAD (USNM, male); Carderock, 1974 (USNM, 3 males, 3 females). Prince Georges Co.: Anacostia R., 16. VI. 1970, M. DRUCKENBROD (USNM, male); Largo, R. GORDON (USNM, female). MICHIGAN. Saint Clair Co.: Port Huron, VI, C. V. RILEY (USNM, male). NEW YORK. Kings Co.: Rockaway Beach, Long Island, 11. VI. 1922, E. SHOEMAKER (USNM, female). PENNSYLVANIA. Philadelphia Co.: Frankford, Lime Creek, 8. VII, G. M. GREENE (USNM, female). SOUTH CAROLINA. Florence Co: Florence, I-II. 1939 (USNM, male, female); same locality, 1. VIII. 1958, V. M. KIRK (USNM, male). VIRGINIA. Fairfax Co.: Mt. Vernon, 14. V. 1924, E. NOYES USNM (female). Montgomery Co.: Great Falls, 19. VI, F. KNAB (USNM, male).

***Clivina* (*Antroforceps*) *sasajii*, new species**

Type material. Nine specimens. HOLOTYPE male, labelled: "OKLAHOMA LATIMER CO.,/ IV. 83/ Karl Stephan"; "Upland Forest/ under rock" [handwritten] (KHSC). ALLOTYPE female, labelled same as holotype (KHSC). PARATYPES: two males, female, labelled same as holotype (KHSC); three males, one female labelled "OKLAHOMA: Latimer Co./ W. of Wilburton/ 19–21. XII. 1991/ K. STEPHAN, P. SKELLEY/ pocket gopher burrow " (FSCA).

Type area. Latimer County, eastern Oklahoma, U.S.A.

Specific epithet. The specific epithet is a Latinized adjective, masculine gender, genitive case, based on the surname of the distinguished Japanese coleopterist and clavicorn specialist, Professor Dr. Hiroyuki SASAJI, to whom this species is dedicated on the occasion of his retirement.

Recognition. See key to species of subgenus *Antroforceps*. The most readily observed features are the very small eyes, and the slightly crenulate lateral margins of the pronotum.

Description. With character states of subgenus, restricted as in the key to species of *Antroforceps*, in the recognition section above, and as follows. For measurements and proportions, see Table 1.

Microsculpture. Head, dorsal surface of frontoclypeus anteriorly and laterally with mesh pattern isodiametric, sculpticells large and flat; most of surface smooth, without microlines; ventrally, microlines evident, with few isodiametric sculpticells; gula smooth. Mouthparts: mandibles dorsobasally smooth, toward apex with very fine microlines, oriented transversely, mesh pattern not evident; scrobes with mesh pattern isodiametric; labial submentum with isodiametric mesh pattern, microlines very fine; mentum smooth medially, laterally with isodiametric mesh pattern, microlines very fine. Thorax: pronotum with mesh pattern isodiametric, microlines fine, sculpticells rather large, flat; proepipleuron and proepisternum with mesh pattern isodiametric; prosternum with very shallow microlines evident, mesh pattern not evident; pterothoracic sclerites about same as their prothoracic counterparts. Elytra: dorsally nearly smooth, with vestiges of mesh pattern; epipleuron with surfaces seemingly subrugose, microlines distinct, irregular, mesh pattern vestigial.

Chaetotaxy. Elytron (Fig. 4B) with five setae in interval 3.

Head (Fig. 1B). Clypeus: anterior margin slightly angularly concave, without dentiform projections laterally; frontoclypeal suture (**fcs**) complete but shallow. Frons anteriodorsally each side with prominent supraantennal lobe; posteriodorsally with transverse groove bordered dorsally by slightly developed ridge between posterior extensions of frontal impressions; medial fovea small, very shallow, obsolescent; laterally, suborbital ridge slightly developed; without ventrolateral longitudinal ridge.

Antennae. Short, in backfolded position extended only to about posteriolateral angles of pronotum; antennomeres 5–10 submoniliform, as long as wide or very slightly longer, average for *Clivina*.

Mouthparts. Labrum: anterior margin slightly convex medially. Mandibles (Figs. 2 A–F) about average for *Clivina* adults, distinctly shorter and wider than those of *C. bolivari*. Maxillae (Figs. 3 A–B): thicker than those of *C. bolivari*, lacinia more setose and wider than that of *C. bolivari*; galea shorter and wider; palpomeres, especially mp3 and 4, shorter than those of *C. bolivari*. Labium (Figs. 3 C–E): mentum with tooth (Fig. 3C, **mt**) shorter than lateral lobes; apex narrowly rounded; epilobes (**el**) without dentiform projections; glossal sclerite (Fig. 3E, **gs**) wider than in *C. bolivari*; palpomeres shorter than those of *C. bolivari*, average for *Clivina*.

Prothorax. Pronotum (Fig. 1B): proportions as in Table 1, more elongate than pronotum of *C. rubicunda*, less so than that of *C. bolivari*; anterior margin shallowly concave, laterally projected narrowly and distinctly; lateral margins slightly crenulate, parallel for most of their length, incurved posteriorly; posterior margin narrow, slightly concave, beaded; anterior transverse impression distinct: posterior transverse impression deep, very close to posterior margin; median longitudinal impression distinct, narrow, extended from posterior margin nearly to anterior margin; posteriolateral impressions rather indistinct, continuous with broad, indistinctly delimited lateral grooves; disc very slightly convex, depressed medially in vicinity of median longitudinal impression; surface posteriorly without pair of paramedian dentiform projections. Prosternum: bicarinate short distance anteriad fore coxae; medially narrow, but not longitudinally carinate for most of length.

Pterothorax. Metasternum very short, about subequal in length to length of mid coxae; metepisternum with lateral margin in length subequal to basal width.

Elytra (Fig. 4B). Elongate, sides parallel for most of their length; parascutellar stria evident, but short and shallow; interval 5 slightly convex, not carinate; interval 6 slightly convex through most of length, but carinate in about basal 1/4; interval 7 carinate for most of length; interval 8 carinate; basal ridge represented toward suture by basal dentiform projections.

Hind wings. Brachypterous.

Legs. Average in length for *Clivina*; tarsomere 5 with paronychia not evident, arolium slender, not leaflike Male genitalia. Median lobe (Fig. 6B), in left lateral aspect with the ventral surface rather less curved and the apical portion distinctly longer than that of *C. rubicunda*.

Ovipositor. As in Figs. 7 A–C.

Habitat. Label data suggest that this species is mesophilous, living away from standing water, in forest soil, or in pocket gopher (probably *Geomys bursarius dutcheri* DAVIS) burrows, in more open situations.

Geographical distribution (Fig. 8). This species is known only from eastern Oklahoma.

Chorological affinities. The range of this species is isolated from those of its closest relatives: close to, but west of *C. rubicunda*, and removed considerably to the north of *C. bolivari*.

Phylogenetic relationships (Fig. 9). This species is the putative adelphotaxon of C. *bolivari*. See below for details.

Material examined. Type material, only. See above for details.

Clivina (*Antroforceps*) *bolivari* BARR

Antroforceps bolivari, BARR, 1967: 66. – LORENZ, 1998b: 139.

Clivina bolivari; BALL and SHPELEY, 2000: 377.

Type material. HOLOTYPE male, labeled: "TYPE " [red paper]; "M. C. Z. / Type / 31547" [red paper]; "MEXICO Tamps./ Sotano de la Joya/ O. Knox – E. ALEXANDER" [handwritten];"*Antroforceps/ bolivari* BARR/ HOLOTYPE [female symbol]" [handwritten] (MCZC).

Type locality. Mexico, State of Tamaulipas, Sotano de la Joya.

Recognition. Many features distinguish adults of this species from other members of the genus *Clivina*. The most readily observed are: absence of eyes, and the markedly crenulate lateral margins of the pronotum and elytra. Also, for a specimen of *Clivina*, the holotype has relatively long appendages, particularly readily seen in the proportions of antennomeres 5–10.

Description. With character states of subgenus, restricted as in the key to species of *Antroforceps*, in the recognition section above, and as follows. For measurements and proportions, see Table 1.

Microsculpture. Head, dorsal surface of frontoclypeus anteriorly and laterally with mesh pattern isodiametric, sculpticells large and flat; most of surface smooth, without microlines; ventrally, microlines evident, with few isodiametric sculpticells; gula smooth. Mouthparts: mandibles dorsobasally smooth, toward apex with very fine microlines, oriented transversely, mesh pattern not evident; scrobes with mesh pattern isodiametric; labial submentum with isodiametric mesh pattern microlines very fine; mentum smooth medially, laterally with isodiametric mesh pattern, microlines very fine. Thorax: pronotum with mesh pattern isodiametric, microlines fine, sculpticells rather large, flat; proepipleuron and proepisternum with mesh pattern isodiametric; prosternum with very shallow microlines evident, mesh pattern not evident; pterothoracic sclerites about same as their prothoracic counterparts. Elytra: dorsally, nearly smooth, with vestiges of mesh pattern; epipleura with surfaces seemingly subrugose, microlines distinct, irregular, mesh pattern vestigial.

Chaetotaxy. Elytron (Fig. 4C) with eight setae in interval 3.

Head (Fig. 1C). Clypeus: anterior margin concave medially, concavity each side with subdentiform projection; laterally each side with distinct angulate projection (**cdp**). Frontoclypeal suture not evident medially. Frons anteriodorsally each side with prominent supraantennal lobe; posteriodorsally with sharp transverse carina (**tc**) between posterior extensions of frontolateral impressions; medial fovea absent. Laterally, with suborbital ridge (**sor**) each side, with two projections one smaller and one larger (**sorp**); ventrolaterally with sharp longitudinal carina extended from margin of buccal fissure to plane of posterior margin of temple.

Antennae. Elongate, in backfolded position extended to about basal 1/3 of elytra; antennomeres 5-10 filiform; all antennomeres distinctly longer than wide.

Mouthparts. Labrum: anterior margin subangulate (Fig. 1C), convex, much more so than in *C. sasajii* (Fig. 1B). Mandibles (Fig. 1C) slender, more elongate than in *C. sasajii*. Maxillae: slender; lacinia more slender than that of *C. sasajii*, and less setose; galea more elongate and slender; palpomeres more slender and elongate, especially mp3 and 4. Labium: mentum with tooth prominent, more so than lateral lobes, apex broad; tooth flanked each side by sharp, dorsally curved dentiform projections (part of epilobes); glossae more slender than in *C. sasajii*; palpomeres markedly slender, elongate.

Prothorax. Pronotum (Fig. 1C): proportions as in Table 1, elongate; anterior margin shallowly concave, laterally projected narrowly and distinctly; lateral margins distinctly crenulate, parallel for most of their length, incurved posteriorly; posterior margin narrow, slightly concave, not beaded; anterior transverse impression indistinct, posterior transverse impression not indicated; median longitudinal impression distinct, narrow, extended from posterior margin nearly to anterior margin; posteriolateral impressions rather indistinct, continuous with broad, indistinctly delimited lateral grooves; disc very slightly convex, depressed medially in vicinity of longitudinal impression; surface posteriorly with pair of paramedian dentiform projections (**pd**), posteriorly directed; prosternum bicarinate short distance anteriad fore coxae; medially longitudinally carinate for most of length.

Pterothorax. Markedly constricted anteriorly; metasternum very short, about subequal in length to length of mid coxae; metepisternum with length of lateral margin subequal to width at base.

Elytra (Fig. 4C). Elongate, markedly narrowed anteriorly; sides parallel for most of their length; parascutellar stria absent; intervals 5 and 7 slightly convex, not carinate; interval 6 slightly convex through most of length, but carinulate near humerus; interval 8 carinate, especially marked preapically and at humeri. Basal ridge represented toward suture by parascutellar dentiform projection (**pp**). Lateral channel (**lc**) very broad.

Hind wings. Brachypterous, short stubs, non-functional for flight.

Legs. Elongate, slender for *Clivina*; tarsomere 5 with paronychia and arolium leaf-like, rather large.

Male genitalia: unknown.

Habitat. The holotype was collected in a deep cave, and its features suggest that the species must be a troglobite.

Geographical distribution (Fig. 8). This species is known only from the Sierra de Guatemala mountains, in northeastern Mexico.

Chorological affinities. The southernmost member of *Antroforceps*, this species is isolated by the eastern part of the Chihuahuan desert from the other members of its subgenus.

Phylogenetic relationships (Fig. 9). This species is the putative adelphotaxon of *C. sasajii*, new species.

Evolutionary aspects

By placing taxonomic information in an evolutionary context, greater generality may be achieved (see, for example, the zoogeographical treatment of West Indian species of *Clivina* by NICHOLS [1988b: 91]). However, because of paucity of information about *Antroforceps*, and because this present contribution is focused on only a portion of the genus *Clivina*, an elaborate

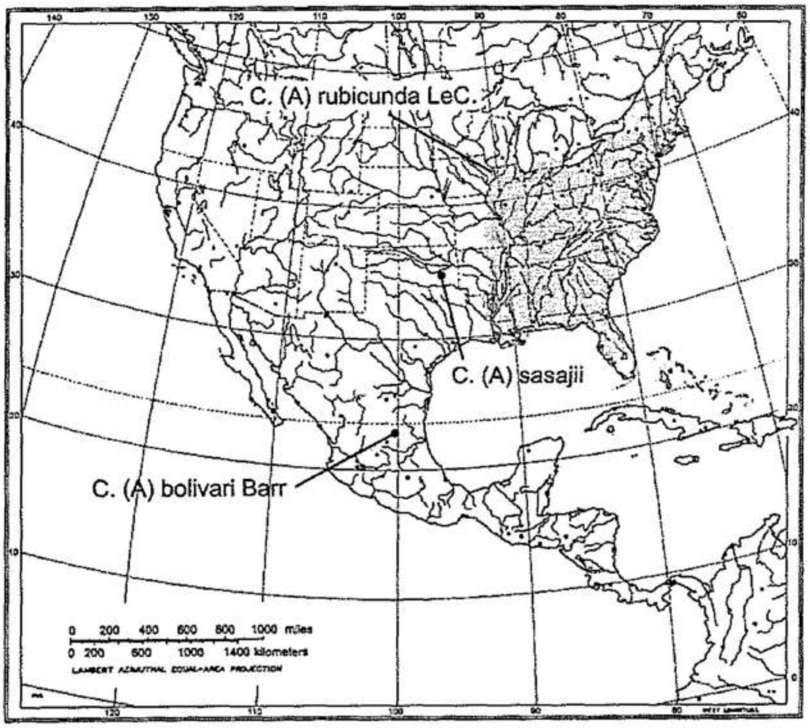


Fig. 8. Map of eastern North America, showing the known geographical ranges of the species of subgenus *Antroforceps*.

analysis of the data hardly seems justified. Figure 9 summarizes my views about relationships. Distribution of only a few of the character states of the included taxa is indicated.

At the subgeneric level, *Clivina*, *Semiclivina*, *Reichardtula* and *Antroforceps* are postulated to form a monophyletic group, the *Clivina* assemblage, based on development of the flattened mandibles (*i.e.*, with scrobes dorsal rather than lateral). Within the *Clivina* subgeneric assemblage, *Semiclivina*, *Reichardtula* and *Antroforceps* are postulated to form a monophyletic group, based on development of the intercoxal sulci of abdominal sternum VII. From that tri-subgeneric grouping, *Antroforceps* arose, retaining a plesiotypic arrangement of setae on abdominal sternum VII, but developing a second set of pronotal posteriolateral dentiform projections, and an additional pair of discal setae of the elytra.

Within *Antroforceps*, the evolutionary trajectory is postulated to be departure from a hygrophilic environment to a mesophilic one and from a way of life that involved flight by adults to a more sedentary and fossorial one, in which the metathoracic wings were markedly reduced (along with the metathorax itself), with a loss of flight capacity. Also, the eyes were reduced markedly. Relatively uninterrupted life below the surface led eventually to cavernicoly, probably with an intermediate step, of life in rodent burrows. Obligate cave life led eventually, through mutation and natural selection, to loss of eyes, and lengthening of appendages, in the absence of the need to dig one's way through soil.

Geographical correlates (Fig. 8) of the evolutionary hypothesis for the species of *Antroforceps* are relatively simple. The three species are allopatric, with *C. rubicunda* in and east of the Mississippi Basin; *C. sasajii*, west of the Mississippi Basin; and *C. bolivari*, in a cave in Mexico, south of the ranges of the other two species, and south of the intervening Chihuahuan desert. To explain the pattern, I postulate an ancestral hygrophilous species, living in sites along water courses, shaded by members of a plant assemblage essentially similar to the extant Eastern Deciduous Forest, with a geographical range more or less encompassed by the ranges of the presently extant species of *Antroforceps*.

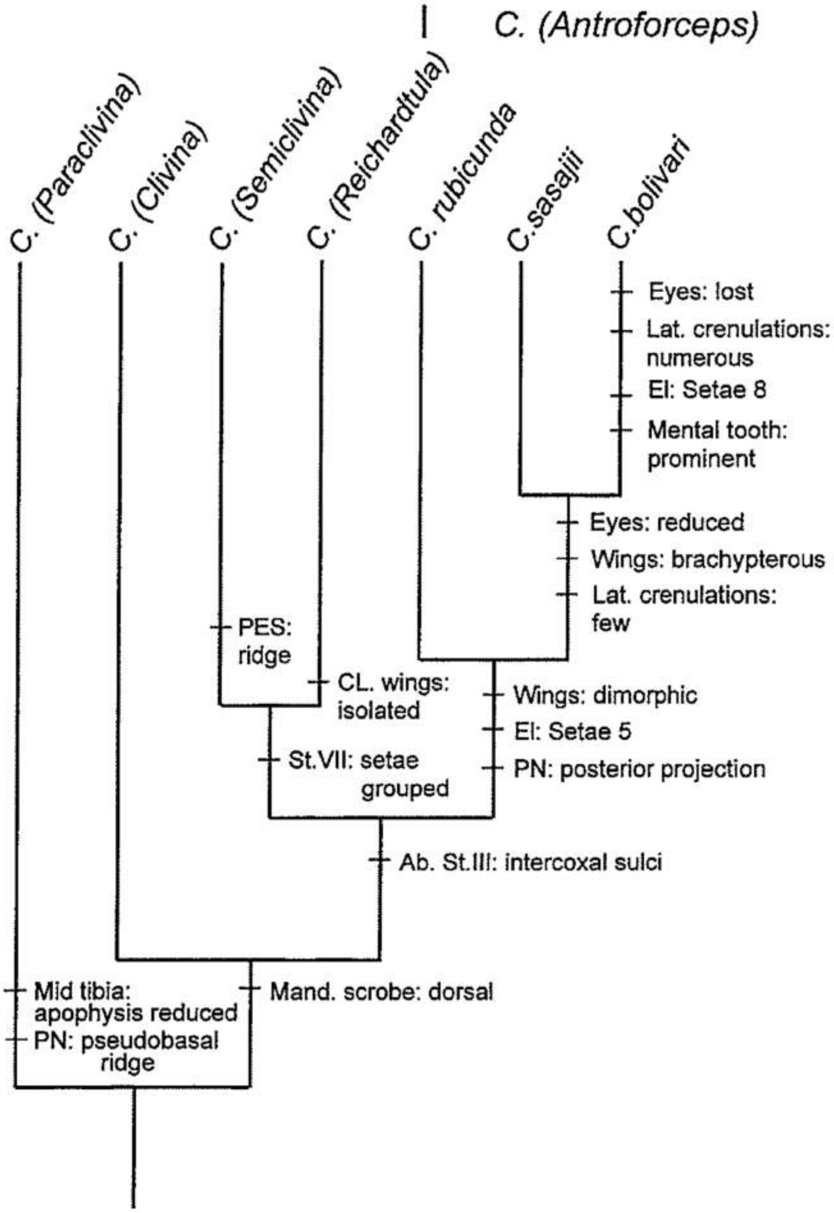


Fig. 9. Phylogenetic diagram, illustrating the postulated relationships of the known Western Hemisphere subgenera of *Clivina* and of the species of subgenus *Antroforceps*.

An initial climatic change (probably drying in late Pliocene-Pleistocene time) divided the range of the ancestral *Antroforceps* species into an eastern and western segment, the eastern segment differentiating to produce *C. rubicunda*, and the western segment being the ancestral stock of *C. sasajii* + *C. bolivari*. This western stock adapted to the drier climate in which it found itself by seeking the humidity it required underground (including rodent burrows). Perhaps more intense drying led to spread eastward of the Chihuahuan desert, and the division of the western *Antroforceps* stock, with the northern segment giving rise to the structurally and behaviorally more primitive *C. sasajii*, and the southern segment producing the highly derived troglobitic *C. bolivari*.

As support for the evolutionary sequence postulated above, I note that it correlates in a general way with sequences postulated for other carabid groups (see, for example, BALL and NIMMO [1983: 350–353]). But more than such a correlation is needed for support of the hypothesis, in particular much more data about the western and southern species of *Antroforceps*, each of which is known only from a single locality or two localities in close proximity to one another. Are additional related species, whose combinations of structural features fill the marked gap between the features of *C. bolivari* and *C. sasajii*, to be found in caves or in association with Mexican species of the pocket gopher genus *Geomys*? Such would help to confirm the postulated phylogenetic connections. We will know only if someone does the necessary exploratory work. We may hope that such a person will receive whatever cooperation is required from governmental authorities of both United States and Mexico charged with the responsibility of environmental protection.

Concluding remarks

This has been an interesting and rewarding study. It has been personally enlightening, and I hope may have shed some light on a group of beetles which has attracted much less attention in North America than it deserves. Drab and uniform the adults of the genus *Clivina* may be, but they exhibit a wealth of structural features that should help to reveal their evolutionary patterns. The subgenus *Antroforceps* itself, must be of substantial evolutionary interest, exhibiting as it does, a wide range of variation in morphological features, including transformation series connecting burrowing geophily and cavernicoly. Many years of deeply satisfying work await anyone who elects to take up the challenge of revising *Clivina* for the Western Hemisphere, or for that matter, investigating the clivinines more generally.

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Notes on Three Species of *Pidonia* (Coleoptera: Cerambycidae) from Vietnam, with Descriptions of Two New Species

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Abstract Three species of the lepturine genus *Pidonia* are recorded from northern Vietnam, of which two are new to science. These new species belong to the subgenus *Pidonia* (s. str.) and named *P.* (*P.*) *sciaphila* and *P.* (*P.*) *morikawai.* The diagnostic features of *P. insperata* A. SAITO are described. The subgeneric assignment of these three species is noted.

Key words *Pidonia*; Coleoptera; Cerambycidae; New Species; Vietnam.

The lepturine genus *Pidonia* MULSANT consists of 150 species distributed over the temperate zone of Holarctic Region. Up to the present, one species of this genus has been recorded from northern Vietnam.

The present paper contains the result of my study on the species of the genus *Pidonia* obtained in the mountainous areas of northern Vietnam. The *Pidonia* specimens were almost collected in a hill on the northern ridge of mountain near the pass "Deo Tram-Ton", which is a little more than 2,000 m in altitude. The tree-covered hills have been partially deforested and are in use for pasture. Most *Pidonia* specimens were collected on the blossoms of *Castanopsis* sp. blooming on the border of primeval forest.

Among three species of the genus collected, two species are new to science and will be named *P.* (*P.*) *sciaphila* and *P.* (*P.*) *morikawai.* Only known species, *P. insperata* A. SAITO is redescribed and noted with reference to the subgeneric assignment. The holotypes designated in this study are preserved in the collection of the National Science Museum (Nat. Hist.), Tokyo.

Before going further, I wish to express my hearty thanks to Messrs. T. KITAMURA, K. MORIKAWA and K. TSUTSUI, for their kind offer of valuable specimens.

Pidonia (*Pidonia*) *insperata* A. SAITO, 1995

Pidonia (*Cryptopidonia*) *insperata* A. SAITO, 1995, Elytra, Tokyo, 23 (2): 160, figs. 1–14 (♂, Hoang Lien Son Mts., northern rigde of Mt. Phang Si Pang, 1,950 m in altitude, in Lai Chau Province, May 17, 1995; NSMT).

Pidonia (*Pidonia*) *insperata*: KUBOKI, 1997, Coleopterists' News, (119): 7.

Elytra yellowish fulvous with black markings; latero-basal marking small; latero-median marking small in male, or large, triangular in female; latero-apical marking weakly falcate in female; apical marking narrowly present.

Apical segment of maxillary palpi relatively large, triangular, broadened apicad, obliquely truncate at apex, with straight outer margin in male, or club-shaped in female, gradually broadened in basal two-thirds and narrowed towards apex, obliquely truncate at apex, with curved outer margin.

Prothorax obtusely angulate and prominent laterally just before the middle, shallowly constricted before and behind the prominence. Elytra separately subtruncate at apices.

Diverticulum of male genitalia relatively short.

Spermatheca lightly sclerotized, strongly swollen, widest before the middle, gradually narrowed towards apex; cornu curved at apical part; ramus flat with relatively short spermathecal gland; collum truncate without transverse crease.

Specimens examined. 3♂♂, 4♀♀, Hoang Lien Son Mts., northern ridge of Mt. Phang Si Pang, 2,050 m in altitude, Lai Chau Province, 30. IV.–1. V. 1997, M. KUBOKI leg.; ditto, 2♂♂, K. TSUTSUI leg.; ditto, 2♂♂, T. KITAMURA leg.; ditto, 4♂♂, 4♀♀, K. MORIKAWA leg.; 1♂, southern part of the pass Deo Tram-Ton, 1,720 m in altitude, Lai Chau Province, 29. IV. 1997, K. MORIKAWA leg.

The proportion of paraproct to the ovipositor excluding styli varies from species to species in the genus *Pidonia*. The paraproct is generally well developed in the subgenus *Pidonia* (s. str.) than in the subgenera *Mumon*, *Omphalodera* and *Cryptopidonia*. *P. insperata* and *P. submetallica* are the only exceptions so far examined in the subgenus *Pidonia* (s. str.), of which the paraproct is short and almost of the same proportion as in the species of the subgenus *Mumon*.

The subgenus *Cryptopidonia* is characterized by the following combination of morphological features: prothorax roundly expanded laterally just before the middle; latero-median markings of elytra well developed, orbicular to oblong; elytra separately rounded at apices; diverticulum long; spermatheca minutely striated; collum of spermatheca funnel-shaped. As *P. insperata* does not possess these features, it should be transferred from the subgenus *Cryptopidonia* to *Pidonia* s. str.

Pidonia (Pidonia) sciaphila KUBOKI, sp. nov.

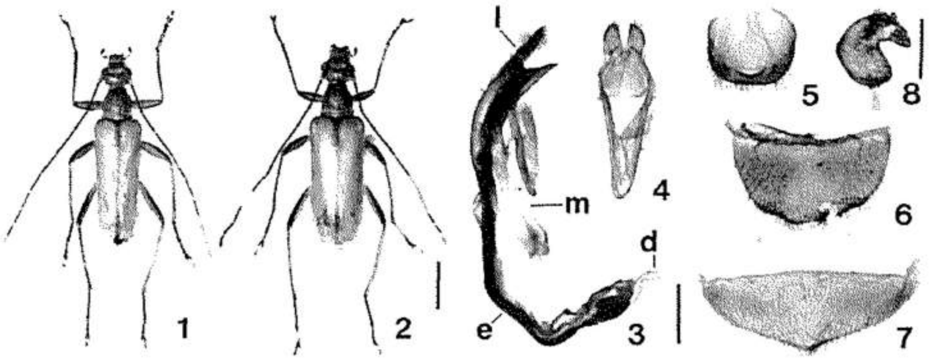
(Figs. 1–8)

Body medium in size, elongate, slightly tapering apicad in male, tumid in female, furnished with pale fulvous pubescence.

Length: 8.2 mm (male), 7.8 mm (female); breadth: 2.1 mm (male), 2.2 mm (female).

Colour: Body almost fulvous. Head brownish fulvous; mouth parts fulvous except for reddish brown apex of mandibles; apical segment of maxillary palpi dark brown; antennae brownish fulvous, 3rd to 11th segments dark brown, with brownish fulvous apex on 7th to 10th segments, 11th segment almost brownish fulvous. Eyes black. Prothorax brownish fulvous. Scutellum brownish fulvous. Legs brownish fulvous; dorsal side of femora dark brown in apical half; front tibiae dark brown with brownish dorsal side; middle and hind tibiae dark brown; tarsi and claws almost dark brown. Elytra entirely yellowish fulvous. Abdomen bicoloured; 1st and 2nd sternites dark brown; 3rd to 5th sternites brownish fulvous.

Head broader across eyes than basal breadth of prothorax (male, 1,08: 1.0; female, 1.02: 1.0); temples strongly produced behind eyes, then convergent and abruptly constricted at neck; frons subvertical and transverse, covered with coarse punctures, bearing a fine but distinct median longitudinal furrow extending backwards; vertex fairly flat, weakly convex above, finely



Figs. 1–8. *Pidonia (Pidonia) sciaphila* KUBOKI, sp. nov., from northern Vietnam. 1, 3, 4, 5, 6, ♂; 2, 7, 8, ♀. 3, genital organ (m=median lobe; l=lateral lobes; e=endophallus; d=diverticulum) in lateral view; 4, lateral lobes in ventral view; 5, last abdominal tergite; 6, 7, last abdominal sternite; 8, spermatheca. Scales: 1, 2 2.0mm, 8 0.2 mm, the rest 0.4 mm.

punctate, shining and sparsely clothed with fine pubescence. Eyes relatively prominent, moderately faceted, and strongly emarginate at middle of inner margin. Antennae relatively long and slender; apical two segments surpassing elytral apices in male; apical segments barely reaching elytral apices in female; the order of each antennal segment in comparative length as follows: male, 5>3>6>1+2>4 and female, 5>3>6>4>1+2. Apical segment of maxillary palpi triangular, sharply broadened apically with straight outer margin in male; apical segment gently broadened apically with curved outer margin in female.

Prothorax longer than basal breadth (male, 1.12: 1.0; female, 1.02: 1.0), strongly angulate and prominent laterally just before the middle, deeply constricted before and behind the prominent; breadth across prominent portions distinctly broader (male, 1.06: 1.0) or narrower (female, 0.96: 1.0) than base; basal margin weakly bisinuate; disc of pronotum convex above, finely and closely punctate, sparsely clothed with fine pubescence. Scutellum small and triangular, slightly longer than broad, bearing thin pubescence on the surface. Elytra 2.50 times (male) or 2.28 times (female) as long as basal breadth, gradually narrowed posteriad (male) or almost parallel-sided (female), and separately truncate at apices; surface sparsely and shallowly punctate, sparsely clothed with subappressed pubescence; interspace between punctures narrower than diameter of each puncture.

Legs relatively slender, clothed with short pubescence; femora clavate; tibiae linear, straight; tarsi densely clothed with short pubescence on under surface.

Abdomen elongate and gradually narrowed towards apex; last abdominal tergite as shown in Fig. 5 (male); apex of last abdominal tergite subtruncate in female; last abdominal sternites as shown in Fig. 6 (male) or in Fig. 7 (female).

Male genitalia: Median lobe as shown in Fig. 3; lateral lobes shorter than median lobe, each apex roundly produced, bearing relatively long terminal hairs (Fig. 4); endophallus long and furnished with a pair of falcate sclerites; diverticulum short (Fig. 3).

Female genitalia: Spermatheca lightly sclerotized as shown in Fig. 8; vagina gradually enlarged basad; valvifer narrowed apicad; apical segment of coxite elliptic and strongly sclerotized; stylus abaxially united to the apical part of coxite, linearly oblong, sclerotized except for apex, with long and sparse hairs in the terminal area.

Distribution: Northern Vietnam.

Type series. Holotype: ♂, Hoang Lien Son Mts., northern ridge of Mt. Phang Si Pang, 2,050 m in altitude, Lai Chau Province, 1. V. 1997, K. TSUTSUI leg. Paratype: 1♀, same locality as for the holotype, 1. V. 1997, K. MORIKAWA leg.

Remarks. This new species resembles *P. straminea* HOLZSCHUH from Sichuan, China, but may be readily distinguished from it by the brownish fulvous antennae, sharply pointed apex of the median lobe of the male genitalia and longer lateral lobes of the male genitalia.

Etymology. The specific name is derived from Greece "skia- = scia-" means shadow, and "-phila" means loving.

Pidonia (*Pidonia*) *morikawai* KUBOKI, sp. nov.

(Figs. 9–16)

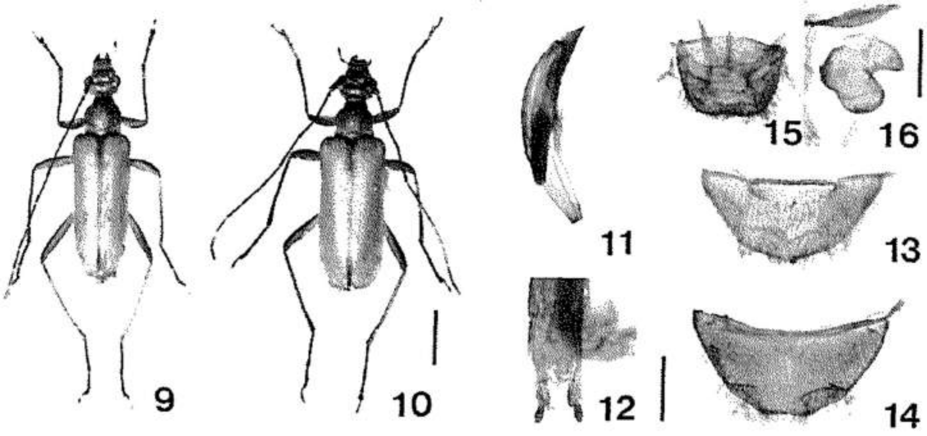
Body relatively medium, elongate, slightly tapering apicad in male but tumid in female and furnished with pale fulvous pubescence.

Length: 8.1 mm (male), 7.3 mm (female); breadth: 2.1 mm (male), 2.1 mm (female).

Colour: Body almost fulvous. Head reddish fulvous; mouth parts fulvous except for reddish brown apex of each mandible; apical segment of maxillary palpi dark brown; antennae reddish fulvous; 3rd to 7th segments dark brown; 8th to 11th segments brownish yellow. Eyes black. Prothorax reddish fulvous. Scutellum reddish fulvous. Legs brownish fulvous; dorsal side of femora dark brown in apical half; tibiae dark brown; tarsi and claws almost dark brown. Elytra almost yellowish fulvous; apical marking very faintly present. Abdomen brownish fulvous.

Head broader across eyes than basal breadth of prothorax (male, 1.02:1.0; female, 1.02:1.0); temples weakly produced behind eyes, then convergent and gently constricted at neck; frons subvertical and transverse, covered with coarse punctures, bearing a fine but distinct median longitudinal furrow extending backwards; vertex fairly convex above, coarsely punctate, sparsely clothed with fine pubescence. Eyes relatively prominent, moderately faceted, and strongly emarginate at middle of inner margin. Antennae relatively long and slender; apical two segments surpassing elytral apices in male or apical segments barely reaching elytral apices in female; last segment 5.5 times (male) or 5.7 times (female) as long as wide; the order of each antennal segment in comparative length as follows: male, 5>3=6>1+2>4 and female, 5>3=6>1+2>4. Apical segment of maxillary palpi club-shaped, gradually broadened to two-thirds from base, then narrowed towards apex, obliquely truncate at apex, with curved outer margin in male, or gently broadened apically with curved outer margin in female.

Prothorax longer than basal breadth (male, 1.08:1.0; female, 1.04:1.0), strongly expanded laterally just before the middle, shallowly constricted before and behind the prominence; breadth across prominent portions slightly broader (male, 1.02: 1.0) or slightly narrower (female, 1.0: 0.98) than base; basal margin weakly bisinuate; disc of pronotum strongly convex above, finely and closely punctate, sparsely clothed with fine pubescence. Scutellum small and triangular, slightly longer than broad, bearing thin pubescence on the surface. Elytra 2.42 times (male) or 2.28 times (female) as long as basal breadth, gradually narrowed posteriad (male) or almost parallel-sided (female), and weakly subtruncate at apices; surface sparsely and shallowly punctate, sparsely clothed with subappressed pubescence; interspace between punctures narrow-



Figs. 9–16. *Pidonia* (*Pidonia*) *morikawai* Kuboki, sp. nov., from northern Vietnam. 9, 11, 14, 15, ♂; 10, 12, 13, 16, ♀. 11, median lobe in lateral view; 12, apical part of ovipositor; 13, 14, last abdominal sternite; 15, last abdominal tergite; 16, spermatheca. Scales: 9, 10 2.0 mm, 16 0.2 mm, the rest 0.4 mm.

er than diameter of each puncture.

Legs relatively slender, clothed with short pubescence; femora clavate; tibiae linear, straight; tarsi densely clothed with short pubescence on under surface.

Abdomen elongate and gradually narrowed towards apex; last abdominal tergite as shown in Fig. 15 (male) or apex of last abdominal tergite subtruncate and shallowly emarginate at middle in female; last abdominal sternites as shown in Fig 14 (male) or in Fig. 13 (female).

Male genitalia: Median lobe falcate in lateral view, relatively small, weakly curved ventrad and sharply pointed at apex (Fig. 11); lateral lobes shorter than median lobe, each apex roundly produced and obliquely subtruncate, bearing relatively long terminal hairs.

Female genitalia: Spermatheca lightly sclerotized as shown in Fig. 16; vagina gradually enlarged basad; valvifer narrowed apicad; apical segment of coxite and stylus as shown in Fig. 12.

Distribution: Northern Vietnam.

Type series. Holotype: ♂, Hoang Lien Son Mts., northern ridge of Mt. Phang Si Pang, 2,050 m in altitude, Lai Chau Province, 30. IV. 1997, K. Tsutsui leg. Paratype: 1♀, same locality as for the holotype, 1. V. 1997, K. Morikawa leg.

Remarks. This new species resembles *P. sciaphila* Kuboki, but may be readily distinguished from it by the angulate and prominent prothorax at sides; the subtruncate elytral apex; the small and gently curved median lobe of male genitalia and the triangular maxillary palpi of male.

Etymology. The specific name of the new species is dedicated to Mr. Kiyoshi Morikawa who collected a part of the specimens on this study.

要約

窪木幹夫：ベトナムから発見されたヒメハナカミキリ属の３種について．——— ベトナム北部のインドシナ最高峰のファン・シ・パン山の標高 2,050mの原生林の林縁で，３種の *Pidonia*

を採集した．これらのうち，未記載種の2種 *P. sciaphila* 及び *P. morikawai* を命名記載した．また，既知種の *P. insperata* A. SAITOの形態を詳細に検討した．*P. sciaphila* と *P. morikawai* は，頭，胸，腹部や鞘翅の黒色部の縮小が著しく，殆ど黄褐色で，共によく似ている．しかし，両種は，前胸側部，雄交尾器，小腮鬚の形態で区別できる．また，鞘翅端が切型で，前胸側部が三角形に突出し，雌の受精嚢のカプセルが微細な縞模様を欠くタイプで，受精嚢の基部が切型であることから，3種とも *Pidonia* 亜属の一員とした．

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A New Sawfly of the Genus *Priophorus* (Hymenoptera: Tenthredinidae) from Mt. Hakusan, Honshu, Japan

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Abstract *Priophorus hakusanensis* sp. nov. from Japan is described and illustrated.

Key words Tenthredinidae, Nematinae, *Priophorus*, new srpecies, Japan.

In Japan, six species of the *Priophorus* are known to occur at present such as *P. cydoniae* (TAKEUCHI), *P. hyonosanus* OKUTANI, *P. morio* (LEPELETIER), *P. nigricans* CAMERON, *P. omogoensis* OKUTANI and *P. pallipes* (LEPELETIER) (ABE & TOGASHI, 1989). Recently, the seventh species was captured in Mt. Hakusan, Ishikawa Pre., Japan, which is close to *P. morio*, but the structures of the lancet and penis valve are different, and thus, it is described in this paper as a new species in the followings.

Priophorus hakusanensis sp. nov.

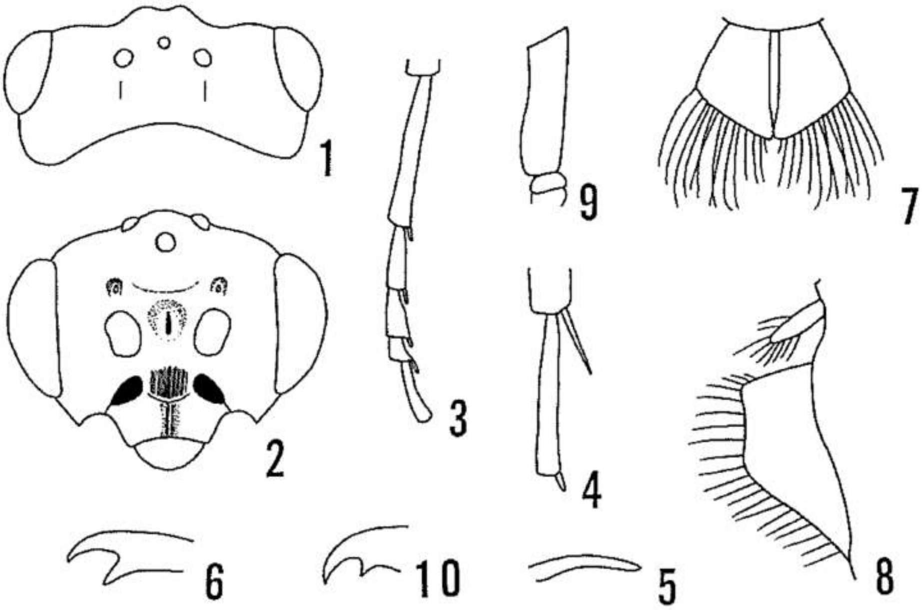
(Figs. 1–13)

Female. Length 7 mm. Body entirely black, but cenchrus milky white. Antenna black. Wings slightly infuscate, stigma and veins dark brown to black. Legs black with following parts pale ocherous: apical portion of fore and mid femora, basal portion of all tibiae, inner side of fore and mid tibiae, inner side of two basal segments of fore and mid tarsi except for apical portions.

Head transverse; circumocellar, interocellar, and postocellar furrows indistinct; lateral furrows distinct and linear (Fig. l); postocellar area slightly convex, transverse (ratio between length and width about 1.0 : 1.4); COL : POL : OCL = 1.0 : 1.0 : 1.0; frontal area nearly flattened; median fovea slightly concave, with a median longitudinal furrow (Fig. 2); lateral fovea distinct, nearly circular in outline, open below, with a conical projection in middle; supraclypeal area convex; supraclypeal fovea distinct; clypeus slightly convex, with a median longitudinal carina (Fig. 2), slightly emarginate at anterior margin; labrum nearly flattened; malar space long, nearly as long as basal breadth of mandible; postorbital groove distinct; postgenal carina distinct but short.

Antennae long, longer than costa of forewing (ratio about 1.0 : 0.8) ; relative lengths of segments about 2.0 : 1.0 : 8.0 : 9.2: 9.2 : 7.5 : 6.7 : 6.7 : 6.7; pedicel rectangular (ratio between length and width about 1.0 : 1.7) .

Thorax: mesoscutellum nearly flattened; epicnemium indistinct. Wings: petiole of anal cell of hindwing about 2.2 times as long as nervulus. Legs: hind basitarsus slightly longer than following 3 segments combined (ratio about 1.0 : 0.8–0.9) (Fig. 3); fore inner tibial spur simple



Figs. 1–8. *Priophorus hakusanensis* sp. nov. (holotype, female). 1, Head, dorsal view; 2, do, front view; 3, hind tarsus, lateral view; 4, hind basitarsus and hind inner tibial spur, lateral view; 5, fore inner tibial spur, lateral view; 6, claw, lateral view; 7, sawsheath, dorsal view; 8, do, lateral view. Figs. 9–10. basal 3 segments of antenna and claw of male of *P. hakusanensis* sp. nov. (paratype, male). 9, basal 3 segments of antenna, lateral view; 10, claw, lateral view.

(Fig. 5); tarsal claw as in Fig. 6; hind inner tibial spur long, about 1.7 times as long as apical breadth of hind tibia (Fig. 4).

Abdomen: sawsheath in dorsal and lateral views as in Figs. 7 and 8; lancet as in Fig. 11; 1st and 2nd annuli divergent; 1st annulus with 9 distinct teeth.

Punctation. Head and thorax except for pronotum covered with fine setigerous punctures, punctures on anterior half of inner orbits and clypeus larger than those on vertex; supraclypeal area covered with many longitudinal striae (Fig. 2); metanotum practically impunctate, shining; upper portion of mesosternum nearly impunctate, shining. Pronotum distinctly and evenly punctured, interspaces between punctures practically impunctate, shining. Central portion of 1st tergite distinctly and evenly punctured, lateral sides of 1st tergite practically impunctate; 2nd to last tergites covered with fine setigerous punctures.

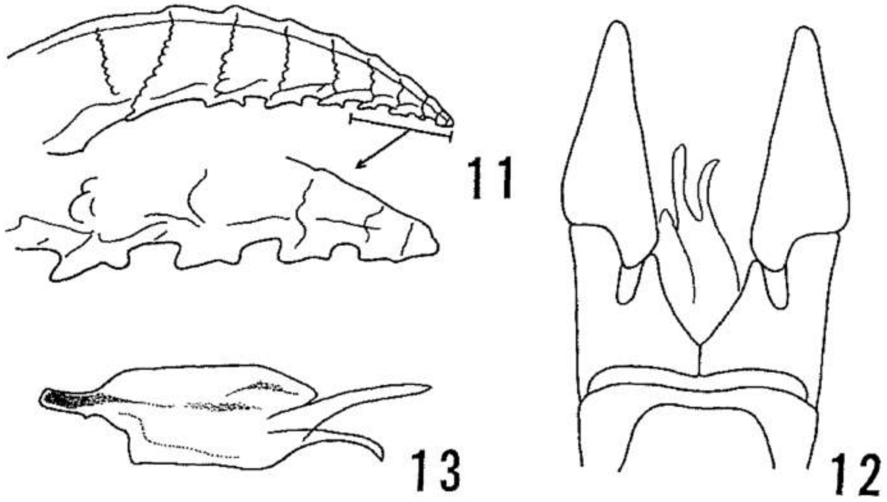
Male. Length 6 mm. Structure and coloration similar to those of female but OOL slightly longer than POL (ratio about 1.2–1.3 : 1.0); 3rd antennal segment without projection (Fig. 9); tarsal claw describe claw-unusual to differ so much from female (Fig. 10). Male genitalia as in Fig. 12; penis valve as in Fig. 15, with short valvura.

Food plant. Unknown.

Distribution. Japan (Honshu).

Holotype: ♀, 11. V. 1998, Mt. Hakusan (alt. 1300–1500 m), Ishikawa Pref., I. TOGASHI leg. Paratype: ♂, data same as for holotype. All types are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo.

Remarks. This new species runs to *P. morio* (LEPELETIER) in BENSON's (1958 as *brullei*)



Figs. 11–13. *P. hakusanensis* sp. nov. 11, lancet (holotype); 12, male genitalia (paratype); 13, penis valve (ditto).

and SMITH's (1974) key, but it is easily separable from the latter by having 9 distinct teeth of the 1st annulus of the lancet (in *morio*, the 1st annulus has 4 or 5 distinct teeth), by the black tegula (in *morio*, the tegula is brownish to whitish), and by the lancet having 9 serrulae (in *morio*, the lancet has 8 serrulae) and by the shape of the penis valve (in *morio*, the penis valve has a long valvura, nearly as long as the paravalva, see Fig. 358 in BENSON, 1958 and Fig. 13). From *P. hyonosanus* OKUTANI, it is easily separable by the shape of the sawsheath (in *hyonosanus*, the posterior margin of the sawsheath, in dorsal view, is nearly truncate), by the black tegula (in *hyonosanus*, the tegula is yellow), and by the black trochanters (in *hyonosanus*, the trochanters are whitish).

Etymology: Named after its locality, Mt. Hakusan.

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I thank Dr. David R. SMITH, USDA; Washington, D.C., for reviewing this manuscript.

要　　　約

富樫一次：白山産ヒメハナバチの一新種 —— 本論文では 新種，*Priophorus hakusanensis* ハクサンヒメハナバチ（新称）を記載した．本種はキイチゴヒメハナバチやブナヒメハナバチに極似するが，産卵管鞘や産卵管の形態により区別される．

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Distribution of the Lady Beetles (Coleoptera, Coccinellidae) in Plant Formations in the Russian Far East

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Abstract Ninety-two species of the family Coccinellidae are known from the Russian Far East. The characteristic features of the distribution of the Coccinellidae in biotopes in the Far East are determined by topography, geographic position of the region, richness of the flora, and economical activity of man. In forest formations, the greatest species diversity is found in the broad-leaved forests where 35 species of Coccinellidae are known.

Key words Lady beetles; fauna; ecology; geographic and biotopic distribution; Russian Far East.

Lady beetles (Coccinellidae) constitute one of the largest families of coleopteroid insects, including over 5,000 species. The Palearctic region accounts for about 700 species, with 221 species in 45 genera recorded from the former Soviet Union. The overwhelming majority of lady beetles are predators, feeding on aphids, psyllids, whiteflies, mealybugs, scales, thrips, spider mites, leaf beetle larvae and other small arthropods and are natural regulators of these pests.

The present work is founded upon material collected in field the by the authors in various natural climatic zones of the Far East (1969–2000). Specimens were obtained from diverse plant communities in Kamchatka, Magadan, Amur, Sakhalin regions, Primorski krai and Khabarovsk territory. Both expeditions and stationary studies were conducted.

Our investigations have established that the coccinellid fauna of the Russian Far East includes 92 species in 35 genera, 11 tribes and 6 subfamilies. In contiguous Far Eastern territories composition of coccinellid fauna is well studied. Recorded are 153 species from Japan (SASAJI, 1971), 320 species in China (PANG, MAO, 1979), 246 species in Vietnam (HOANG, 1982), 196 species in Taiwan (YU, WANG, 1999), 91 species in Korea (PARK, 1993), 86 species in Mongolia (BIELAWSKI, 1984), 88 species in Canada (BELICEK, 1976), and 475 species in America North of Mexico (GORDON, 1985).

Species composition and occurrence of the Coccinellidae are presented in Table 1. *Harmonia axyridis*, *Coccinella septempunctata septempunctata*, *Propylea quatuordecimpunctata* and *Calvia quatuordecimguttata* are the most abundant species in the Far East. Coccinellid fauna of Primorye is the richest in species composition. Number of species observed are: 67 over the territory of Primorye, 55 in the Amur Region, 50 in Khabarovsk Territory, 40 in Sakhalin, 29 in Magadan Region, 23 in Kuril Islands, and 20 in Kamchatka (KUZNETSOV, 1993, 1997; KUZNETSOV, ZAKHAROV, 2000).

The formation of the regional fauna of Coccinellidae as well as of other insects passed is influenced with three basic types of vegetation: boreal (taiga), nemoral (broad-leaved) and steppe. Evolution of coccinellid fauna was mainly determined by features of geographic position, relief and geological history.

Coccinellidae are subdivided into the following groups according to the taxonomic group of their hosts: 1. aphidophages (58 species), 2. coccidophages (23 species), 3. phylloophages (4 species), 4. micetophages (3 species), 5. mixoentomophages, feeding on various groups of insects (1 species), and acariphages (3 species). It should be noted that these subdivisions are to a great extent conventional, as some species feed on both aphids and coccids, but generally show a preference for one or the other. Besides, most coccinellid species, along with their main nutritional sources, will also feed on other small insects, including psyllids, whiteflies, and thrips. The majority of coccinellid species (85) in the Far East of Russia are the predators of insects and other small arthropod pests, but the following 4 species are phyllophagous: *Henosepilachna vigintioctomaculata*, *Subcoccinella vigintiquatuorpunctata*, *Cynegetis impunctata*, and *Epilachna chinensis*.

The first is a serious pest of potatoes and vegetables (cucumbers, tomatoes etc.) cultivated in Khabarovsk Territory and Primorsky Territory. Under local conditions the remaining 3 species live on the grassy vegetation of meadows; they have not yet been recorded on cultivated plants.

Most coccinellid species are strictly confined with definite biotopes and type of vegetation. Depending on preferred type of vegetation we distinguish 3 basic ecological complexes: 1) dendrobionts, 2) eurybionts, and 3) chortobionts. In the Far East, some species may shift to other biotopes. Thus in Siberia, Europe and southern Far East, *Anatis ocellata* is usually observed in crowns of conifers but feeds in mass on aphids damaging broad-leaved trees in flood-plain forests in Kamchatka and Magadan Region. While moving northward, lady beetles select more arid and well warmed habitats with rare vegetation in river valleys. Moving southward same species inhabit more dewy and shady habitats with dense plant cover. Zonal change of habitats is common among transzonal species.

On the vast territory of the Far East with its various climatic conditions, relief and geological history, the following habitats are recognized: tundra, coniferous forests, mixed forests, and forest-steppe.

The tundra and forest-tundra cover extensive area on the north of Magadan Region, Kamchatka and Chukotka. Species composition of Coccinellidae is very scarce in the tundra. Holarctic species prevail here: *Anisosticta bitriangularis*, *A. strigata*, *Adonia arctica*, *Ceratomegila ulkeni*, *Hippodamia tredecimpunctata*, *Adalia bipunctata frigida*, *Coccinella hieroglyphica mannerheimi*, *Calvia quatuordecimguttata*. Boreal species *Anatis ocellata*, *Myzia gebleri* and *Hyperaspis kamtchaticus* occur in shrubby bushes of cedar elfin wood.

In the light coniferous taiga located southward to the tundra and covering wide area in Magadan Region, Kamchatka and Sakhalin, fauna of Coccinellidae is presented by boreal species. Holarctic (*Coccinella trifasciata*, *C. nivicola*, *C. hieroglyphica mannerhaimi*, *C. transversoguttata*, *Adalia bipunctata frigida*, *Anisosticta bitriangularis*, *Hippodamia tredecimpunctata*), transpalearctic (*Hippodamia septemmaculata*, *Anisosticta novemdecimpunctata*, *Stethorus punctillum*, *Coccinella s. septempunctata*, *Propylea quatuordecimpunctata*), Eurasian taiga (*Scymnus abietis*, *Myzia oblongoguttata*, *Adalia conglomerata*, *Anatis ocellata*), Trans-Siberian (*Myzia gebleri*, *Harmonia axyridis*), and East Siberian (*Anisosticta sibirica*, *Adonia amoena*) species occur here.

For the dark coniferous taiga that prevails in Lower Priamurye, at the coast of the Sea of Okhotsk, in Sakhalin, northern and central Kuril Islands and in Primorye in Sikhote-Alin mountains above 700-800 meters, typical taiga species of Coccinellidae are abundant: *Scymnus nigrinus*, *S. abietis*, *Adonia conglomerata*, *Anatis ocellata*, *Myzia oblongoguttata*, *Harmonia quatuordecimguttata*, *Exochomus quadripustulatus*. Species complex of spruce-fir forests of northern Sikhote-Alin and Sakhalin is the richest one and includes *Myzia gebleri*, *Anatis ocellata*, *Harmonia axyridis* and some other species.

Fauna of Coccinellidae in the mixed and broad-leaved forests covering wide territory on the south and southeast of Primorye, middle Priamurye, Southern Sakhalin and Southern Kuril Islands is very specific and diverse. Transpalearctic species are distributed here: *Serangium lygaenum*, *Stethorus amurensis*, *St. yezoensis*, *Pseudoscymnus hareja*, *Scymnus lambatus*, *S. dorcatomoides*, *Chilocorus rubidus*, *Ch. inornatus*, *Ch. kuwanae*, *Rodolia limbata*, *R. concolor*, *Eoadalia koltzei*, *Coccinella ainu*, *C. sachalinensis*, *Propylea japonica*, *Aiolocaria hexaspilota*, *Sumnius higrofuscus*, *Anatis halonis*, *Hyperaspis amurensis*. Holarctic (*Calvia quatuordecimguttata*, *C. duodecimmaculata*), transpalearctic (*Stethorus punctillum*, *Coccinella s. septempunctata*, *Propylea quatuordecimpunctata*, *Oenopia conglobata*, *Chilocorus bipustulatus*, *Ch. renipustulatus*, *Halyzia sedecimguttata*, *Calvia decimguttata*, *Vibidia duodecimguttata*), Eurasiatic taiga and forest (*Scymnus nigrinus*, *S. ferrugatus*, *S. suturalis*, *Adalia conglomerata*, *Anatis ocellata*, *Myzia oblongoguttata*, *Cavia quindecimguttata*), and Trans-Siberian (*Myzia gebleri*, *Harmonia axyridis*) species are also common in the tops of conifers and broad-leaved trees in deciduous and mixed forests. *Coccinella septempunctata brucki* occurs in grass meadows in Sakhalin and Kuril Islands.

In the Far East, the forest-steppe covers small areas in middle Priamurye (Zeisko-Bureinskaya plain) and Primorye (Prikhankaiskaya plain). Fauna of lady beetles of the forest-steppe includes species from different biocenosis but meadow species are the most abundant. Typical steppe species occurring here are *Adonia amoena*, *Coccinella transversoguttata*, *C. undecimpunctata*, *Semiadalia apicalis*, *Coccinella nigrovittata*, *Adalia bipunctata fasciopunctata*, *Hyperaspis erythrocephala gyotokui*, *Subcoccinella vigintiquatuorpunctata*. Manchurian (*Hyperaspis leechi*, *H. amurensis*, *Chilocorus inornatus*, *Ch. kuwanae*, *Scymnus crinitus*, *Oenopia bissexnotata*, *Rodolia concolor*, *Exochomus mongol*, *Coccinella ainu*), pan-palearchaearctic (*Rodolia limbata*, *Hyperaspis asiatica*, *Epilachna chinensis*), and Indo-Malayan palearctic (*Sumnius nigrofuscus*, *Chilocorus rubidus*, *Aiolocaria hexaspilota*) species also present in forest-steppe. These species represent the major part of the species complex of this zone. The forest-steppe is also inhabited by many species, which are characteristic for forests, meadows, peatbogs and pigweeds. In southwestern Primorye in the pine-oak forests, common for coniferous species of Coccinellidae occur.

Study of zonal faunistic complexes of Coccinellidae in Far East allows to reveal peculiarities of landscape distribution of separate species and to display their relation to definite biotopes. The distribution of coccinellids in various biotopes is determined by their food specificity, and ecologically determined by need for certain environmental conditions developed in the course of each species' evolution. Food specificity is characteristic of lady beetles, and greatly influences their biotopic distribution. The reproduction of predaceous coccinellids depends on the availability of prey insects. Lack or scarcity of such insects may motivate carnivorous lady beetles to relocate to a different habitat. It has been noted that during the vegetational season, aphids migrate from one host plant to another. They are followed by the migration of aphid-feeding lady beetles. However, this type of migration does not influence the general rules for their distribution within biocenoses. The coexistence of eurytopic, nearly ubiquitous species with more stenotopic species creates difficulties in the recognition of discrete lady beetle biotopes. Additionally, some species have a preference to forest vegetation, some prefer herbaceous vegetation, and others readily accept both.

Lady beetles possess a vast ecological flexibility and occur in various plant communities. The characteristic features of the distribution of the Coccinellidae in biotopes in the Far East are determined by the topography, geographical position of the region, richness of the flora, and the economical activities of man. In forest formations in the Far East, the greatest species diversity is found in the broad-leaved forests. On trees and brushes of such forests 35 species occur, whereas the coccinellid fauna of other forest types is less diverse: the Coccinellidae of the mixed coniferous-broad-leaved forests count 32 species, of fir-spruce forests 23 species, of larch forests 21 species, of pine forests 19 species. In the belt of high mountain plants, represented by the alpine tundra, forest tundra and elfin woods (of *Pinus pupila*) we found 16 species of lady beetles.

For leafy trees in the broad-leaved and coniferous-broad-leaved forests the following species are characteristic: *Harmonia axyridis*, *Calvia* (*An.*) *quatuordecimguttata*, *C.* (*C.*) *decimguttata*, *C.* (*An.*) *duodecimmaculata*, *Propylea quatuordecimpunctata*, *Stethorus* (*S.*) *punctillum*, *Vibidia duodecimguttata*, *Halyzia sedecimguttata*, *Aiolocaria hexaspilota*, *Scymnus* (*P.*) *ferrugatus*. More rarely occur *Serangium lyganeum*, *Chilocorus rubidus*, *Ch. kuwanae*, *Ch. inornatus*, *Rodolia limbata*, *Oenopia bissexnotata*, and *Calvia* (*An.*) *quinquedecimguttata*.

In the crowns of conifers growing in the coniferous-broad-leaved and fir-spruce forests, the following typically coniferous species of lady beetles live, playing an important role in the regulation of adelges and other aphid species: *Adalia conglomerata*, *Scymnus* (*S.*) *abietis*, *S.* (*P.*) *suturalis*, *S.* (*S.*) *nigrinus*, *Anatis ocellata*, *A. halonis*, *M. oblongoguttata*, and *M. gebleri*, *Myzia oblongoguttata*, *Adalia conglomerata*, *Coccinella trifasciata*, *C. nivicola*, *C. hieroglyphica mannerheimi*, and *Anatis ocellata* occur in various types of leafy forests growing on vast territories in the northern areas of the Far East.

Scymnus (*S.*) *nigrinus*, *Myrrha octodecimguttata*, *Adalia conglomerata*, *Anatis ocellata*, *M. gebleri*, and *Coccinella nivicola* are characteristic of pine forests in the Amur region and Yakutia. *Adalia bipunctata frigida*, *Coccinella septempunctata*, *C. trifasciata*, *Calvia* (*An.*) *duodecimmaculata*, and *Anatis ocellata* dominate in the flood-plain leafy forests of the Magadan and Kamchatka regions.

The greatest density of coccinellids in forest cenoses is recorded from the forest edges, in felled areas, and in well-lit stands, where very often plant-sucking pests appear in masses. Under the denser canopy lady beetles are encountered only rarely. In various formations of herbaceous vegetation, the number and variety of species decrease with increasing humidity. The richest diversity of lady beetles is found in the steppes-meadows of Prikhankaiskaja and Zeisko-Bureiskaja valleys. The most depauperate fauna is found on peat-bogs and in the tundra of the northern Far East. Twenty-nine species of lady beetle live on the herbaceous vegetation of dry meadows; the usual cast includes: *Coccinella septempunctata*, *C. magnifica*, *C. trifasciata*, *Coccinula quatuordecimpustulata sinensis*, *Propylea quatuordecimpunctata*, *P. japonica*, *Adonia amoena*, *A. variegata*, *Scymnus* (*S.*) *frontalis*, *S.* (*S.*) *crinitus*, *S.* (*N.*) *redtenbacheri*, and *S.* (*N.*) *kolzei*.

Hyperaspis erythrocephala gyotokui, *H. asiatica*, *H. leechi*, *Stethorus punctillum*, *Scymnus* (*P.*) *haemorrhoidalis*, *S.* (*P.*) *limbatus*, *S.* (*S.*) *jakowlewi*, *S.* (*S.*) *rubromaculatus*, *Semiadalia apicalis* are characteristic of the steppes. Hygrophilious lady beetles dominate in peat-bogs:

Table 1: Distribution and occurrence of Coccinellidae in various landscapes of the Russian Far East. AG, Agrocenosis; MD, meadow; M, mire; BL, broad-leaved forests; CBL, coniferous-broad-leaved forests; SF, spruce-fir forests; L, larch forests; P, pine forests; MTF, mountain tundra and forest tundra. Abundance is indicated by the following symbols: +++, abundant; ++, common; +, rare.

Species	Plant formations								
	AG	MD	M	BL	CBL	SF	L	P	MTF
Subfamily Stycholotine									
1. *Serangium lygaeum* KHNZORIAN, 1972	-	-	-	+	+	-	-	-	-
Subfamily Scymninae									
2. *Stethorus* (*Stethorus*) *punctillum* WEISE, 1891	++	+	-	++	+	+	-	+	-
3. *S.* (*Allostethorus*) *amurensis* KHNZORIAN, 1972	-	-	-	+	-	-	-	-	-
4. *S.* (*A.*) *yezoensis* MIYATAKE, 1966	-	-	-	+	-	-	-	-	-
5. *Pseudoscymnus hareja* (WEISE, 1979)	-	-	-	+	+	-	-	-	-
6. *Scymnus* (*Scymnus*) *nigrinus* KUGELANN, 1794	-	-	-	-	+	+	+	++	-
7. *S.* (*S.*) *abietis* PAYKULL, 1798	-	-	-	-	+	++	+	-	+
8. *S.* (*S.*) *crinitus* FÜRSCH, 1966	+	++	+	-	-	-	-	-	-
9. *S.* (*S.*) *rubromaculatus* (GOEZE, 1777)	+	+	-	-	-	-	-	-	-
10. *S.* (*S.*) *jakowlewi* WEISE, 1892	-	+	-	-	-	-	-	-	-
11. *S.* (*S.*) *frontalis* (FABRICIUS, 1798)	+	++	-	-	-	-	-	-	-
12. *S.* (*Neopullus*) *fuscatus* BOHEMAN, 1858	-	+	++	-	-	-	-	-	-
13. *S.* (*Pullus*) *haemorrhoidalis* HERBST, 1797	+	+	-	-	-	-	-	-	-
14. *S.* (*P.*) *ferrugatus* (MOLL, 1785)	-	-	-	++	++	-	-	-	-
15. *S.* (*P.*) *formicarius* MULSANT, 1850	-	-	-	-	-	+	-	-	-
16. *S.* (*P.*) *auritus* THUNBERG, 1785	-	-	-	+	-	-	-	-	-
17. *S.* (*P.*) *limbatus* STEPHENS, 1831	-	+	-	-	-	-	-	-	-
18. *S.* (*P.*) *suturalis* THUNBERG, 1795	-	-	-	-	++	+	-	++	-
19. *S.* (*P.*) *dorcatomoides* WEISE, 1879	-	-	-	+	+	-	-	-	-
20. *Nephus redtenbacheri* (MULSANT, 1846)	-	+	-	-	-	-	-	-	-
21. *N. patagiatus* (LEWIS, 1896)	-	+	-	-	-	-	-	-	-
22. *N. koltzei* (WEISE, 1887)	+	++	-	-	-	-	-	-	-
23. *N. bipunctatus* (KUGELANN, 1794)	-	+	-	-	-	-	-	-	-
24. *N. koreanus* FÜRSCH, 1965	-	+	-	-	-	-	-	-	-
25. *N. wrasei* PÜTZ et KUZNETSOV, 1995	-	+	-	-	-	-	-		-
26. *Hyperaspis amurensis* WEISE,	+	++	-	-	-	-	-	-	-
27. *H. asiatica* LEWIS, 1846	+	+	-	-	-	-	-	-	-
28. *H. leechi* MIYATAKE, 1961	-	+	-	-	-	-	-	-	-
29. *H. kamtchaticus* KUZNETSOV et REN, 1996	-	-	-	-	-	-	-	-	+
30. *H. erythrosephala gyotokui* KAMIYA, 1963	+	++	-	-	-	-	-	-	-
Subfamily Chilocorinae									
31. *Chilocorus rubidus* HOPE, 1931	+	-	-	+	-	-	-	-	-
32. *Ch. inornatus* WEISE, 1887	+	-	-	++	+	-	-	-	-
33. *Ch. kuwanae* SILVESTRI, 1909	-	-	-	++	+	-	-	-	-
34. *Ch. renipustulatus* (SCRIBA, 1790)	-	-	-	+	-	-	-	-	-
35. *Ch. bipustulatus* (LINNAEUS, 1758)	-	-	-	+	-	-	-	-	-
36. *Exochomus* (*Exochomus*) *quadripustulatus* (LINNAEUS, 1758)	-	-	-	-	-	-	-	++	-
37. *E.* (*Parexochomus*) *nigromaculatus* (GOEZE, 1777)	-	+	-	-	-	-	-	-	-
38. *E.* (*Anexochomus*) *mongol* BAROVSKY, 1922	-	-	-	+	-	-	-	-	-
39. *Sumnius nigrofuscus* JING, 1983	-	-	-	+	-	-	-	-	-
40. *Coccidula rufa* (HERBST, 1783)	+	++	+++	-	-	-	-	-	-
41. *Rodolia limbata* (MOTSCHULSKY, 1866)	-	-	-	+	+	-	-	-	-
42. *R. concolor* (LEWIS, 1879)	-	-	-	+	-	-	-	-	-
Subfamily Coccinellinae									
43. *Anisosticta bitriangularis* (SAY, 1924)	-	+	+	-	-	-	-	-	-

44.	*A. novemdecimpunctata* LINNAEUS, 1758	-	-	+	-	-	-	-	-	-
45.	*A. strigata* (THUNBERG, 1795)	-	-	+	-	-	-	-	-	-
46.	*A. kobensis* LEWIS, 1896	+	++	++	-	-	-	-	-	-
47.	*A. sibirica* BIELAWSKI, 1958	+	++	+++	-	-	-	-	-	-
48.	*Ceratomegilla ulkei* CROTCH, 1873	-	+	-	-	-	-	-	-	-
49.	*Hippodamia tredecimpunctata* (LINNAEUS, 1758)	+++	+++	++	-	-	-	-	-	-
50.	*H. septemmaculata* (De GEER, 1775)	-	++	+	-	-	-	-	-	-
51.	*Adonia variegata* (GOEZE, 1777)	+	++	+	-	-	-	-	-	-
52.	*A. amoena* (FALDERMAN, 1835)	-	+++	-	-	-	-	-	-	-
53.	*A. arctica* (SCHNEIDER, 1787)	-	+	-	-	-	-	-	-	-
54.	*Semiadalia apicalis* (WEISE, 1879)	-	+	-	-	-	-	-	-	-
55.	*Adalia conglomerata* (LINNAEUS, 1758)	-	-	-	-	+++	++	++	++	++
56a.	*Adalia b. bipunctata* (LINNAEUS, 1758)	-	-	-	+	-	-	-	-	-
56·.	*A. b. frigida* (SCHNEIDER, 1792)	-	-	-	++	-	+	-	-	+
56,.	*A. b. fasciatopunctata* FALDERMANN, 1825	-	-	-	+	-	-	-	-	-
57.	*Eoadalia koltzei* (WEISE, 1887)	-	-	-	-	+	-	-	-	-
58.	*Coccinella undecimpunctata* LINNAUES, 1758	+	+	-	-	-	-	-	-	-
59.	*C. transversoguttata* LINNAEUS, 1758	-	-	-	+	-	+	+	-	+
60.	*C. trifasciata* LINNAEUS, 1758	-	+	-	-	-	++	++	+	+
61‡.	*C. s. septempunctata* LINNAEUS, 1758	+++	+++	+	++	+	+	+	-	+
61·.	*C. s. brucki* MULSANT, 1866	++	++	-	+	+	-	-	-	-
62.	*C. magnifica* REDTENBACHER, 1843	-	+	-	-	-	-	-	-	-
63.	*C. nivicola* MULSANT, 1850	-	-	-	-	-	+	++	+	+
64.	*C. nigrovittata* KAPUR, 1963	-	+	-	-	-	-	-	-	-
65.	*C. ainu* LEWIS, 1896	-	-	-	+	-	-	-	-	-
66.	*C. hieroglyphica mannerheimi* MULSANT,	-	-	-	-	-	+	++	-	+
67.	*C. sachalinensis* OHTA, 1928	-	+	-	-	-	-	-	-	-
68.	*C. quinquepunctata* LINNAUES, 1758	-	+	-	-	-	-	-	-	-
69.	*Coccinula quatuordecimpustulata sinensis* WEISE, 1889	+++	+++	+	++	+	+	+	-	-
70.	*Oenopia conglobata* (LINNAEUS, 1758)	-	-	-	+	-	-	-	-	-
71.	*O. bissexnotata* (MULSANT, 1850)	-	-	-	+	-	-	-	-	-
72.	*Propylea quatuordecimpunctata* (LINNAUES, 1758)	+++	+++	+	++	++	+	+	-	+
73.	*P. japonica* (THUNBERG, 1781)	+	++	-	-	-	-	-	-	-
74.	*Harmonia axyridis* (PALLAS, 1773)	+++	++	+	+++	+++	++	+	+	-
75.	*H. quadripunctata* (PONTOPPIDAN, 1763)	-	-	-	-	+	-	-	++	-
76.	*Myrrha octodecimguttata* (LINNAEUS, 1758)	-	-	-	-	-	-	+	+	-
77.	*Calvia (Calvia) decemguttata* (LINNAEUS, 1758)	+	-	-	++	+++	+	+	+	-
78.	*C. (Anisocalvia) duodecimmaculata* (GEBLER, 1832)	+	-	-	++	++	++	+	+	+
79.	*C. (A.) quatuordecimguttata* (LINNAEUS, 1758)	+	-	-	+++	+++	++	++	+	+
80.	*C. (A.) quindecimguttata* (FABRICIUS, 1777)	-	-	-	+	+	-	-	-	-
81.	*Myzia oblongoguttata* (LINNAEUS, 1758)	-	-	-	-	++	+	+	+	-
82.	*M. gebleri* (CROTCH, 1874)	-	-	-	-	++	++	++	+	+
83.	*Anatis ocellata* (LINNAEUS, 1758)	-	-	-	+	++	+	++	++	+
84.	*A. halonis* LEWIS, 1896	-	-	-	-	+	+	+	+	-
85.	*Aiolocaria hexaspilota* (HOPE, 1831)	-	-	-	++	-	-	-	-	
86.	*Halyzia sedecimguttata* (LINNAEUS, 1758)	-	-	-	+	+	+	+	+	

87.	*Vibidia duodecimguttata* (LINNAEUS, 1758)	+	-	-	+++	++	+	-	-	-
88.	*Psyllobora vigintiopunctata* (LINNAEUS, 1758)	+	++	-	-	-	-	-	-	-
	Subfamily Epilachninae									
89.	*Henosepilachna vigintiomaculata* (MOTSCHULSKY, 1857)	+++	+	-	+	+	-	-	-	-
90.	*Epilachna chinensis* Weise, 1912	-	+	-	-	-	-	-	-	-
91.	*Subcoccinella vigintiquatuorpunctata* (LINNAEUS, 1758)	-	+	-	-	-	-	-	-	-
92.	*Cynegetis impunctata* (LINNAEUS, 1767)	-	++	-	-	-	-	-	-	-
	Total	28	45	15	35	32	23	21	19	16

Anisosticta sibirica, *A. bitriangularis*, *A. kobansis*, *Coccidula rufa*, *Hippodamia tredecimpunctata*. *Hippodamia septemmaculata*, *Propylea quatuordecimpunctata*, *Coccinella septempunctata*, and *Adonia variegata* are found here. *Adalia bipunctata frigida*, *Adonia arctica*, *A. variegata*, *Coccinella hieroglyphica mannerheimi*, *C. trifasciata*, and *Anisosticta strigata* live on tundra vegetation.

Depauperate fauna is characteristic of a cultivated landscape, but at the same time some species may increase sharply. Adult beetles and larvae of *Coccinella septempunctata*, *Propylea quaturdecimpunctata*, *Harmonia axyridis*, *Coccinula quatuordecimpustulata sinensis*, and *Hippodamia tredecimpunctata* occurred in high numbers on agricultural plantings in the southern Far East. Some years these predaceous Coccinellidae, along with other aphidophages, can effectively regulate the populations of aphids – important crop pests – in agrocenoses.

The species composition of coccinellids in orchards is made up of a subset of the same representatives found in the broad-leaved forest fauna. Sixteen species of lady beetles were recorded from orchards on apple trees, pear trees, plum trees, cherry trees, raspberry and currants. *Harmonia axyridis*, *Calvia* (*An.*) *quatuordecimguttata*, *Propylea quatuordecimpunctata*, *Coccinella septempunctata*, and *Stethorus* (*St.*) *punctillum* are dominant species there. (During the last years the number of the latter species has decreased due to intensive application of highly toxic pesticides in the orchards.) The larvae and adults of these beneficial coccinellids feed on the apple aphid *Aphis pomi* DEG., mealy plum aphid *Hyalopterus pruni* GEOFFROY, current aphid *Cryptomyzus ribis* L., apple sucker *Psylla mali* SCHM., pear psylla *Psylla pyricola* FRST., *P. pyrisudga* FRST., and *Dysaphis reaumuri* MORDV., as well as many species of coccids and spider mites.

Thus, in forest formations in the Far East, the greatest species diversity is found in the broad-leaved forests where 35 species occur. The Coccinellidae of the mixed coniferous-broad-leaved forests count 32 species, of the fir-spruce forests 23 species, of larch forests 21 species, and of pine forests 19 species. In the belt of high mountain plants, represented by the alpine tundra and forest tundra 16 species of lady beetles were found. Depauperate fauna is characteristic of a cultivated landscape, but at the same time some species increase sharply.

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A Review of Sulawesian *Ischnodactylus* (Coleoptera: Tenebrionidae), with Revised List of the World species

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Abstract Four new species, *Ischnodactylus sasajii* sp. nov., *I. insulicola* sp. nov. *I. celebensis* sp. nov. and *I. inermiceps* sp. nov. are described from Sulawesi. A key to the Sulawesian species is provided; a list of all *Ischnodactylus*-species is given. Nine species of the genus *Ischnodactylus* are newly synonymized as follows: *Basides andamansis* PIC, 1916 = *Ischnodactylus batesi* CHEVROLAT, 1878; *Ischnodactylus colon* GEBIEN, 1925 = *Ischnodactylus bicornutus sumatrensis* (PIC, 1916); *Basides sumatrensis* PIC, 1925 = *Ischnodactylus bicornutus sumatrensis* (PIC, 1916); *Basides ruficornis* PIC, 1925 = *Ischnodactylus bisbifasciatus* GEBIEN, 1925; *Ischnodactylus immaculatus* GEBIEN, 1925 = *Ischnodactylus diversicornis* (PIC, 1916); *Basides bisbimaculatus* PIC, 1925 = *Ischnodactylus malaccanus* (PIC, 1916); *Ischnodactylus gradatus* GEBIEN, 1925 = *Ischnodactylus malaccanus rufithorax* (PIC, 1916); *Basides unimaculatus* PIC, 1916 = *Ischnodactylus rubromarginatus* (CHEVROLAT, 1878); following new combinations are proposed: *Basides andamansis subobliteratus* PIC, 1916 = *Ischnodactylus batesi subobliteratus* (PIC, 1916); *Basides bicornutus reducticornis* PIC, 1925 = *Ischnodactylus bicornutus reducticornis* (PIC, 1925); *Basides sumatrensis duplicatus* PIC, 1925 = *Ischnodactylus bicornutus duplicatus* (PIC, 1925); *Basides unimaculatus verticalis* PIC, 1916 = *Ischnodactylus rubromarginatus verticalis* (PIC, 1916); *Basides marginatus* PIC, 1928 = *Steneucyrtus marginatus* (PIC, 1928); *Basides bimaculatus* PIC, 1925 = *Ischnodactylus pici* ANDO, nom. nov. preoccupied by GEBIEN, 1925.

Introduction

In the Sulawesian fauna, no species of the genus *Ischnodactylus* CHEVROLAT, 1877 has been recorded. Recently I could recognize four species of the genus in Sulawesi through the collecting trip to the Island by myself and the favorable offers of my friends. All the four species were proved to be new to science by my detailed subsequent examination. I will, therefore, describe these new species inclusive of notes on the distinction between their related species and gave a key to the Sulawesian species.

Meanwhile, many species described by PIC under the genera *Ischnodactylus* and *Basides* are still remained without reviewing their generic assignment, because GEBIEN (1940) kept the PIC's species under the uncertain taxonomic position. In the present paper, I also gave a revised check-list including the nomenclatural changes such as synonymies, new combinations and a proposal of new name as the result of my careful re-examination of all species including some types.

It is a distinct honor to dedicate this paper to Prof. Dr. Hiroyuki SASAJI of Fukui University on the occasion of his retirement.

Before going further into detail, I wish to express my sincere gratitude to Prof. Dr. Nobuo OHBAYASHI, and Assistant Prof. Dr. Masahiro SAKAI, College of Agriculture, Ehime University, for their continuous guidance. This study would not have been possible without the cooperation of the following individuals, who graciously provided invaluable materials and type specimens: Dr. Claude GIRARD, Muséum National d'Histoire Naturelle, Paris, Dr. Ottó MERKL, Magyar Természettudományi Muséum, Budapest, Dr. Martin BAEHR, Zoologische Staatssammlung München, Dr. Wolfgang SCHAWALLER, Staatliches Museum für Naturkunde, Stuttgart.

Abbreviations used herein are the same as those in ANDO's previous papers.

Steneucyrtus marginatus (PIC, 1928) **comb. nov.**

Basides marginatus PIC, 1928, Mél. exot.-ent., (**52**): 10. Type locality: Annam.

Type examined: 1 ex., Annam, Dalat, 30. III. 1924, R. VITALIS de Salvaga leg. (MNHN).

Distribution. Vietnam (Annam).

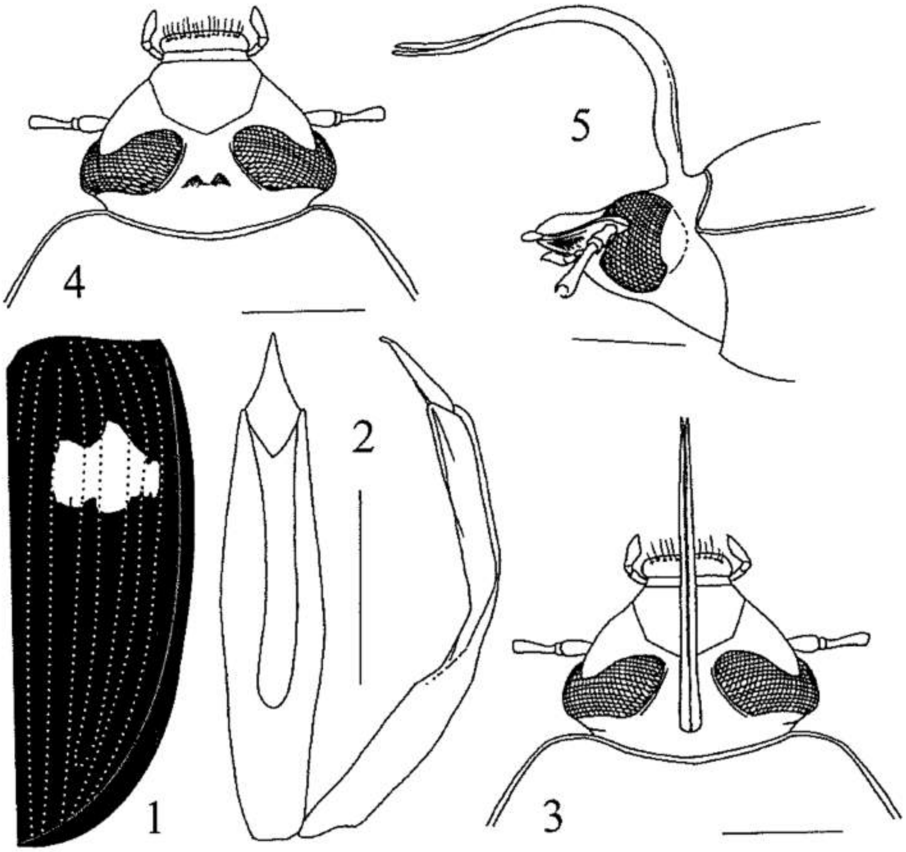
Ischnodactylus sasajii sp. nov.

(Figs. 1–5, 18)

General. Oblong-oval, flattened; colour black, lustrous, horns of head, legs and mouthparts somewhat paler and faded into dark reddish brown; elytra with a pair of reddish yellow anterior bands which are occupying from 2nd stria to 8th interval, narrowed laterad, produced either direction of base and apex at 5th interval, and much shorter than the length between base and anterior margin of the band itself.

Male. Head transversely triangular, finely and moderately, or sparsely (on genae) punctate; clypeus pentagonal, distinctly convex, produced forwards and truncate at the apex; fronto-clypeal suture visible only at posterior portion; genae longer than wide, and depressed towards proximal areas, with outer margins reflexed and divergent just before eyes, thence feebly rounded and strongly narrowed to apex; vertex armed with a pair of thick and cylindrical vertical horns, which are very long, about 2.4 time as long as head (holotype), suddenly and strongly bent at the midway, and horizontally running forwards, and devoid of apical hairs, in some paratypes the horns much reduced to cones (fig. 4) or thick and simply extending vertically; frons beneath the horns depressed, narrow and smooth; TD/IE = *ca.* 2.20–2.50. Eyes transverse and very large, strongly produced laterad, deeply notched in the front by reflexed genae. Antennae rather slender, reaching before elytral band; 3rd to 7th segments each longer than wide; 5th to 7th triangular; 11th oblong-oval. Terminal segment of maxillary palpus narrow securiform. Mentum semicircular, flat, sparsely pubescent and punctate, with a large and a bold hair-bearing transverse pore before base. Submentum transversely pentagonal, microsculptured. Gula campanulate, and microsculptured; gular sutures distinct.

Pronotum transverse, flattened though weakly convex at center, covered with shagreened fine microsculpture, widest at basal 1/4, PW/PL = *ca.* 1.86–1.97; punctures fine and dense, sometimes obscure, somewhat coarse between small basal foveae along base; apical margin narrow, moderately emarginate, thickly bordered; apical angles not angulate, but broadly rounded;



Figs. 1–5. *Ischnodactylus sasajii* sp. nov.; 1, right elytron, showing the elytral fascia; 2, male genitalia (left: dorsal view, right: lateral view); 3, head: dorsal view, male; 4, head of reduced horns in paratype: dorsal view, male; 5, head: lateral view, male. (scales: 0.5 mm for 2, 1.0 mm for 3–5).

lateral margins rounded, feebly divergent from base to basal 1/4, thence roundly narrowing to apex, finely bordered, devoid of lateral sulci; basal angles subrectangular; basal margin truncate, finely bordered, roundly produced posteriad in median 1/4. Scutellum flat, microscopically punctate.

Elytra oblong, feebly convex, widest at about basal 1/3, EL/EW = *ca.* 1.37–1.41, with shallow and broad sulci along lateral margins; lateral marginal flattened areas entire throughout, coarsely and sparsely punctate, much more broadened in apical 3rd; disc not striate but serially punctate; serial punctures separated by a distance about 1.9 to 2.5 times their diameter, and further denser in apical portion, rather dense on 1st seria; intervals entirely flat except for slightly convex apical portion of 9th interval, minutely and densely punctate, 4th interval narrower on anterior band than the rest; humeral callus rudimentary; scutellary striole clearly punctate; elytral epipleuron flat, broad at humeri.

Prosternum long in front of coxae, densely rugose and minutely punctate, gently bordered at apex; prosternal process rhombic, strongly narrowed in posterior half, acute at apex, slightly convex and sparsely pubescent on disc, moderately bordered at sides; propleuron coarsely and densely punctate. Mesosternum pubescent, strongly carinate longitudinally at the middle of the bottom; mesosternal ridge narrow V-shaped, raised forwards, sparsely pubescent, with anterior angles obtusely rounded. Metasternum short, obscurely and moderately punctate in density at sides, flattened in median narrow area, where the punctures are minute, dense and pubescent. Abdominal sternites densely punctate, longitudinally rugose in basal 3 sternites; punctures on 3 basal sternites pubescent; 5th sternite rather acute triangular. Male genitalia shown in fig. 2.

Legs slender; trochanters sparsely pubescent; meso- and metatibiae flat and broad; tarsi long, LM = 24.5, 9.7, 5.2, 21.7.

Female. Frons not depressed between eyes, minutely and densely punctate towards vertex, which is devoid of horns; LM = 24.5, 10.5, 6.0, 18.8; metasternal punctures hair-bearing as in male.

Measurements: Length: 9.0–10.0 mm; width: 4.5–5.1 mm

Type series. Holotype: ♂, Puncak Palopo, S. Sulawesi, Indonesia, 2. I. 2000, K. ANDO leg. (CAEU). Allotype: 1 ♀, same data as for the holotype (CAEU). Paratypes: 2 ♂♂, 1 ♀, same data as for the holotype (PCA); 1 ♀, C-Sulawesi, Lake Poso, Pendolo, Boe, 21. VIII. 1990, A. RIEDEL leg. (SMNS); 2 ♂♂, 1 ♀, Mamasa, S. Sulawesi, Indonesia, 1999, Native collector leg. (PCA).

Diagnosis. The new species has such unique characteristics as constantly large body, thick and long horns of head, broad lateral marginal areas of elytra, and transverse anterior fascia of elytra. This new species is allied to *I. formosanus* GEBIEN from Taiwan, but is readily separated from the latter by the following characters: body much larger and entirely black; horns of male head cylindrical, different in shape; elytral intervals entirely flat; elytral lateral margins much broadly flattened; elytral fasciae different in shape, never reaching 2nd intervals; mentum semicircular.

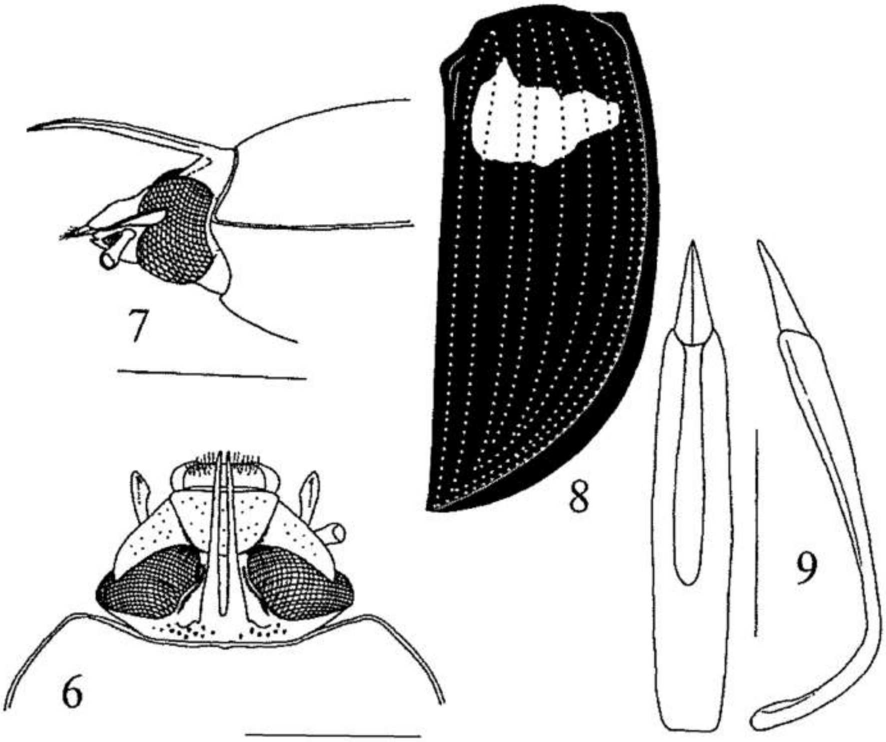
Etymology. The specific name is dedicated to Prof. Dr. Hiroyuki SASAJI, Fukui University.

Ischnodactylus insulicola sp. nov.

(Figs. 6–9, 19)

General. Oblong-oval, weakly convex, lustrous; colour black, 2 basal segments of antennae, clypeus, genae, mouthparts, legs and ventral side dark reddish brown, antennae and pronotum often dark reddish brown; elytra with a pair of dark reddish yellow anterior bands which are occupying from middle of 2nd interval to 8th stria and narrowed laterad, shorter than the space before it, ordinarily produced forwards at 3rd interval and so backwards at 5th interval.

Male. Head transversely trapezoidal, finely microsculptured on clypeus and genae; clypeus gently convex, truncate and never reflexed at apex, coarsely and moderately punctate; fronto-clypeal suture distinct, but not engraved laterally; genae narrow, slightly roundly narrowed to apex, depressed on inner portion before eyes, similarly punctate as on clypeus; frons strongly depressed, smooth except for coarsely and sparsely punctate behind clypeal suture, TD/IE = *ca*. 2.75–3.67; vertex armed with a pair of parallel and thin horns, which are directed upper forwards and minutely punctate, devoid of apical hairs. Eyes transverse and much large, roundly produced laterad, devoid of inner ocular sulci. Antennae slender, 5th to 9th segments rather rounded. Terminal segment of maxillary palpus narrow-triangular. Mentum obtrapezoidal, weakly convex behind apex, irregularly punctate; mentum pore large and triangular, bearing a short and bold hair, and a large hair-bearing puncture at each middle of lateral margins. Submentum coarsely and densely punctate. Gula smooth, gular sutures not impressed. Space



Figs. 6–9. *Ischnodactylus insulicola* sp. nov.; 6, head: dorsal view, male; 7, head: lateral view, male; 8, right elytron, showing the elytral fascia; 9, male genitalia (left: dorsal view, right: lateral view). (scales: 1.0 mm for 6–7, 0.5 mm for 9).

between gula and buccal plate coarsely covered with dense punctures.

Pronotum trapezoidal, flattened, not sulcate along lateral margins, widest at base, PB/PL = *ca.* 2.21–2.30; punctures minute and dense, slightly sparser in lateral areas; basal foveae faintly depressed; apical margin shallowly emarginate, straight in median 3/7, distinctly bordered; apical angles obtuse, broadly rounded and hardly produced; lateral margins finely bordered, roundly and weakly convergent from base to apical 1/4, thence linearly narrowed to apex; basal angles a little more obtusely angulate than rectangle; basal margin feebly bisinuate on each side. Scutellum depressed, with some microscopical punctures.

Elytra oblong, weakly convex, rounded at sides, widest at basal 1/3, EL/EW = *ca.* 1.14–1.35, hardly sulcate along lateral margins, more or less raised along serial punctures, which are rather sparse, becoming minuter or vestigial in apical portions; intervals flattened, slightly convex on apical portions of 8th and 9th intervals, finely and densely punctate, the punctures mingled with two sizes, 3rd and 5th intervals a little broadened on the anterior band; humeral callus weak; elytral epipleuron depressed, not broadened in apical half.

Prosternum gently raised in middle, thickly bordered at apex; prosternal process rhombic, sparsely pilose, distinctly constricted before coxae, and weakly descendant posteriad, acutely pointed at apex. Mesosternal ridge narrow V-shaped, pubescent, with anterior edges obtusely rounded in lateral view. Metasternum irregularly punctate along anterior margin, pubescent in median obtriangular area at about median 3rd. Abdominal sternites hardly rugulose, evenly covered with hair-bearing punctures; the hairs in punctures longer at middle of 1st sternite and along apical margin of 5th sternite; 5th sternite with a clear transverse depression along base.

Legs not robust; LM = *ca*. 26.5, 13.0, 9.6, 23.0.

Female. Head devoid of horns, with frons raised, faintly depressed along middle, gently ascendant towards vertex, coarsely and rather densely punctate, mentum pore semicircular, TD/IE = *ca*. 3.00–4.00; PB/PL = *ca*. 2.10-2.38; EL/EW = *ca*. 1.15–1.29; LM = *ca*. 25.0, 11.2, 8.4, 23.0.

Measurements: Length: 6.1 – 7.1 mm; width: 3.4 – 3.7 mm.

Type series. Holotype: ♂, Mamasa, S. Sulawesi, Indonesia, 1999, Native collector leg. (CAEU). Allotype: 1♀, same data as for the holotype (CAEU). Paratypes: 7♂♂, 21♀♀, same data as for the holotype (PCA).

Diagnosis. The new species is allied to *I. formosanus* GEBIEN from Taiwan and to the preceding new species, but is easily distinguishable from these by the following points: from *I. formosanus*, elytra black, more or less raised along serial punctures, lateral margins more broadened, elytral fasciae different in shape, intervals almost flat, serial punctures more dense; horns on male head hardly curved; frons in male more strongly depressed; tibiae strongly divergent apicad, etc.; from *I. sasajii* sp. nov., body constantly smaller; elytra with lateral sulci narrower and obscure anteriorly, serial punctures more sparse, intervals more sparsely and ambiguously punctate; elytral fasciae forming much clear "band"at a glance, more or less arcuate, and produced forwards at about on 2nd stria to 3rd interval.

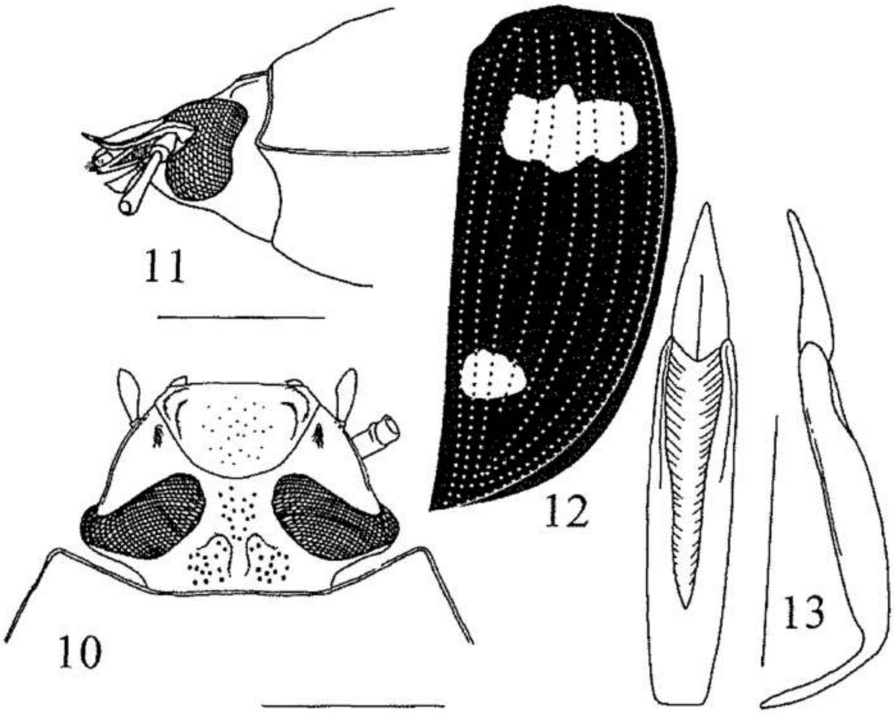
Ischnodactylus inermiceps sp. nov.

(Figs. 10–13, 20)

Male. Oblong-oval, moderately lustrous; colour dark reddish brown, head, tarsi, lateral margins, basal 2 segments of antennae and ventral side lighter in colour; elytra with reddish yellow a pair of anterior bands and of ante-apical spots; the anterior band lying between 2nd and 8th striae, nearly as long as the space before it, undulate either direction of anteriad and posteriad at 5th interval; the ante-apical spot transversely oval, further from elytral apex, situated at about apical 2/5, and occupying from 1st to 5th striae.

Head trapezoidal, depressed; clypeus moderately convex, sparsely punctate, strongly reflexed at apex, with apical margin produced upwards in median 4/5; fronto-clypeal suture fine, vestigial posteriorly; genae strongly reflexed at sides, roundly depressed along clypeal suture, finely punctate; frons depressed, gradually ascendant posteriad, densely and rater coarsely punctate though the punctures more dense on vertical area, TD/IE = *ca*. 2.05; vertex devoid of horns, and the area of them roundly and not obviously raised. Eyes large, strongly produced laterad, weakly depressed in inner-anterior half. Fourth segment of antennae a little shorter than 3rd. Terminal segment of maxillary palpus weakly securiform. Mentum flabellate, weakly convex, with a large hair-bearing pore before base. Space between submentum and gula coarsely punctate. Gula microsculptured, broadly campanulate.

Pronotum slightly convex, depressed on each side of middle behind apical margin, minutely and closely punctate, widest at base, PB/PL = *ca*. 2.07; basal foveae distinct; apical margin roundly emarginate, briefly straight in middle, clearly bordered; apical angles subrectangular, produced but the corners not pointed; lateral margins narrowly bordered, not sulcate along the



Figs. 10–13. *Ischnodactylus inermiceps* sp. nov.; 10, head: dorsal view, male; 11, head: lateral view, male; 12, right elytron, showing the elytral fasciae; 13, male genitalia (left: dorsal view, right: lateral view). (scales: 1.0 mm for 10–11, 0.5 mm for 13).

border, hardly narrowed from base to middle, and linearly convergent in apical half; basal angles angulate, rectangular; basal margin depressed. Scutellum flat, nearly smooth, rounded at sides.

Elytra oblong, widest at basal 2/9, EL/EW = *ca.* 1.39, convex behind base, thence gently sloping posteriad; with serial punctures rather sparse, and minuter in apical portion; intervals feebly convex, very finely punctate, 3rd and 5th intervals broadened on the anterior band; lateral margins broad, slightly depressed but not sulcate; humeral callus distinct; elytral epipleuron flat and smooth.

Prosternum long, weakly convex, distinctly bordered at apex; prosternal process rhombic, strongly constricted between coxae and very acutely tapering behind coxae, with fine and pilose punctures in apical portion. Mesosternal ridge narrow V-shaped, well raised and sparsely with pilose punctures. Metasternum short, finely and evenly punctate except for latero-posterior areas, the punctures hair-bearing, and the hairs of them much long in the median area. Abdominal sternites shagreened in basal 3 sternites, with punctures very finely pubescent, dense on 1st and 2nd sternites, sparse on 3rd and 5th, very sparse on 4th.

Femora thick, LM = 27.0, 10.8, 7.5, 18.7.

Female. Unknown.

Measurements: Length: 7.7 mm; width: 3.8 mm.

Holotype: ♂, C. Sulawesi, 17 km E Pendolo, 800 m, 120.45.49E.2.06.33S, 4–9. VII. 1999, Balm leg. (SMNS).

This new species is very similar to *I. sumbawicus* GEBIEN from Sumbawa. In comparison with the original description of GEBIEN (1925), this new species is probably different from the latter in having the angulate and strongly reflexed anterior part of subtrapezoidal head, and much more acute anterior angles of the pronotum; the elytra more or less gibbous at humeri, with the anterior bands which are not bold than the space in front of them. Although this new species is decorated with the anterior band and the ante-apical spot on each elytron, construction of head suggests that the new species is probably allied to *I. trigonalis* GEBIEN from Borneo systematically. And conclusive different characteristics between them are due to the shape of anterior fasciae of the elytra.

Ischnodactylus celebensis sp. nov.

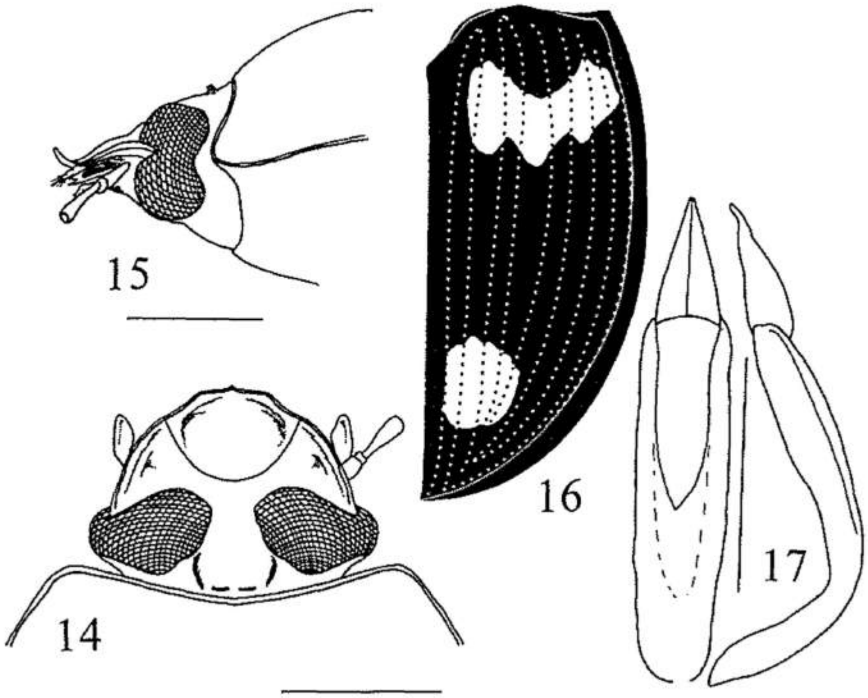
(Figs. 14-17, 21)

Male. Oblong-oval, flat, lustrous; colour black, two basal segments of antennae, mouthparts, apical portions of femora, ventral side and tarsi dark reddish brown, elytra decorated with reddish yellow a pair of anterior bands and of ante-apical spots; the anterior band lying from 2nd interval to 9th stria about at basal 1/5, arcuately emarginate at anterior margin and undulate posterior margin at 3rd, 5th and between 6th stria and inner half of 9th interval, shorter than the longest point of the space in front of it; the ante-apical spot oblong, occupying between 1st and 6th stria at about elytral apical 1/5.

Head semicircular, extremely reflexed at outer margin of frontal half; clypeus moderately convex, roundly depressed on each side behind apex, irregularly and sparsely punctate, with apical margin vertically produced briefly in median 2/3, bearing a minute point at middle; frontoclypeal suture distinctly engraved; genae excavate in frontal half and unevenly raised posteriorly, more or less depressed before eyes, irregularly punctate in same manner of those on clypeus; frons narrow, strongly depressed towards vertical area, with fine microscopical punctures, TD/IE = *ca*. 2.50; vertex raised laterally, probably with a pair of flattened horns, because the horns of the type material were broken and already disappear their main part, considered by the cross section features of the horns on their stump, the horns might be flattened; areas either sides of the horns coarsely and densely punctate. Eyes large and transverse, flattened in the front and roundly produced laterad, devoid of inner ocular sulci. Antennae just reaching base of elytra; 4th segment large, 5th to ultimate segments wider than long. Terminal segment of maxillary palpus oblong. Mentum quadrate, 1.08 times as wide as long, weakly convex forwards and depressed at sides; mentum pore rounded before base, bearing a long hair at middle. Submentum coarsely punctate. Gula triangular, densely covered with transverse microscopical lines; gular sutures clearly engraved. Space between buccal plate and gula coarsely punctate.

Pronotum transverse, flat, gently sloping in apical area near apical angles, widest at base, PB/PL = *ca*. 2.12; disc feebly convex in median portion towards apical 1/3, hardly sulcate along lateral margins, minutely and densely punctate; basal foveae weakly impressed; apical margin entirely bordered, roundly and shallowly emarginate; apical angles obtusely rounded, slightly produced; lateral margins narrowly bordered, roundly convergent from base to apex; basal angles obtusely angulate; basal margin clearly bisinuous on each side. Scutellum microscopically punctate.

Elytra oblong, weakly convex anteriorly, widest at basal 2/9, narrow and hardly sulcate



Figs. 14–17. *Ischnodactylus celebensis* sp. nov.; 14, head: dorsal view, male; 15, head: lateral view, male; 16, right elytron, showing the elytral fasciae; 17, male genitalia (left: dorsal view, right: lateral view). (scales: 1.0 mm for 14–15, 0.5 mm for 17).

along lateral margins, serially punctate, EL/EW = *ca*. 1.35; serial punctures distinct and rather close, denser and more or less minuter apically; intervals flat though feebly convex in apical area of 8th and 9th intervals, minutely and densely punctate, 3rd and 5th intervals broadened on anterior band, interspace between 9th stria and lateral margin coarsely punctate; humeral callus weak; elytral epipleuron depressed, broadened in basal half, sparsely punctate.

Prosternum weakly raised, straight and clearly bordered at apex; prosternal process narrow rhombic, pointed at apex, moderately pubescent. Mesosternal V-shaped ridge narrow, weakly sloping forwards, sparsely scattered with hair-bearing punctures, with anterior edges obtusely rounded in lateral view. Metasternum short, distinctly raised along middle, sparsely pubescent in the median area and obscurely punctate in lateral portions. Abdominal sternites covered with minute and hair-bearing punctures, longitudinally and densely rugulose in 3 basal sternites; punctures dense on basal 4 sternites.

Legs rather short; trochanters sparsely pubescent; femora thick, metafemora tumid towards apical 2/7; LM = *ca*. 29.5, 13.6, 9.5, 24.8.

Female. Unknown.

Measurements: Length: 7.9 mm; width: 4.1 mm.

Holotype: 1 ♂, Mamasa, S. Sulawesi, Indonesia, 1999, Native Collector leg. (CAEU).

Diagnosis. This species is very similar to *I. sumbawicus* GEBIEN from Sumbawa, but is readily separable from the latter by the following characteristics: apical margin of clypeus decorated with a minute point at middle; anterior bands of elytra arcuate and never undulate anteriorly, shorter in length than the space in front of them. The new species is also similar to the preceding species, distinction between them is shown in the specific key.

Key to the Sulawesian species of the genus *Ischnodactylus*

1 (4) Each elytron only with anterior transverse band, devoid of ante-apical spot; anterior portion of head truncate, with clypeus not reflexed; labrum visible from above.

2 (3) Male head with horns which are bold and cylindrical, projecting vertically; elytra with anterior band not arcuate, posterior half along elytral lateral margins broadly flattened; body constantly larger. Length: 9.0–10.0 mm.……… *I. sasajii* sp. nov.

3 (2) Male head with horns which are slender and not cylindrical, projecting obliquely forwards; elytra with anterior band arcuate, posterior half along elytral lateral margins not broadly flattened; body constantly smaller. Length: 6.1–7.1 mm. ……… *I. insulicola* sp. nov.

4 (1) Each elytron with anterior transverse band and ante-apical spot; anterior portion of head subtruncate or entirely rounded, with clypeus and genae extremely reflexed; labrum invisible from above.

5 (6) Body black; elytra roundly tapering posteriad from the widest point, with anterior band longer than the space before it, arcuately emarginate at anterior margin, and undulate in posterior margin at 3rd, 5th and 7th intervals, ante-apical spot rounded; elytral intervals entirely flat, feebly convex in apical area of 8th and 9th; head with a pair of horns in male, clypeus entirely rounded, with a minute median tip at apex, apical margin of epistom between clypeus and genae not angulate; pronotum clearly bisinuate on each side of base, with anterior angles obtusely rounded. Length: 7.9 mm.……… *I. celebensis* sp. nov.

6 (5) Body dark reddish brown; elytra linearly tapering posteriad from the widest point, with anterior band nearly as long as the space before it, weakly produced either direction of forwards and backwards at 5th interval, ante-apical spot transversely oval; elytral intervals feebly convex; head devoid of horns in male, clypeus trapezoidal, without median tip at apex, apical margin of epistom between clypeus and genae angulate; pronotum not bisinuate on each side of base, with anterior angles subrectangular. Length: 7.7 mm.………………… *I. inermiceps* sp. nov.

List of the genus *Ischnodactylus* CHEVROLAT, 1877

1. *Ischnodactylus apicalis* (PIC, 1916)

Basides apicalis PIC, 1916, Mél. exot.-ent., **(20)**: 13; 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 435, 437. Type area: Sumatra.

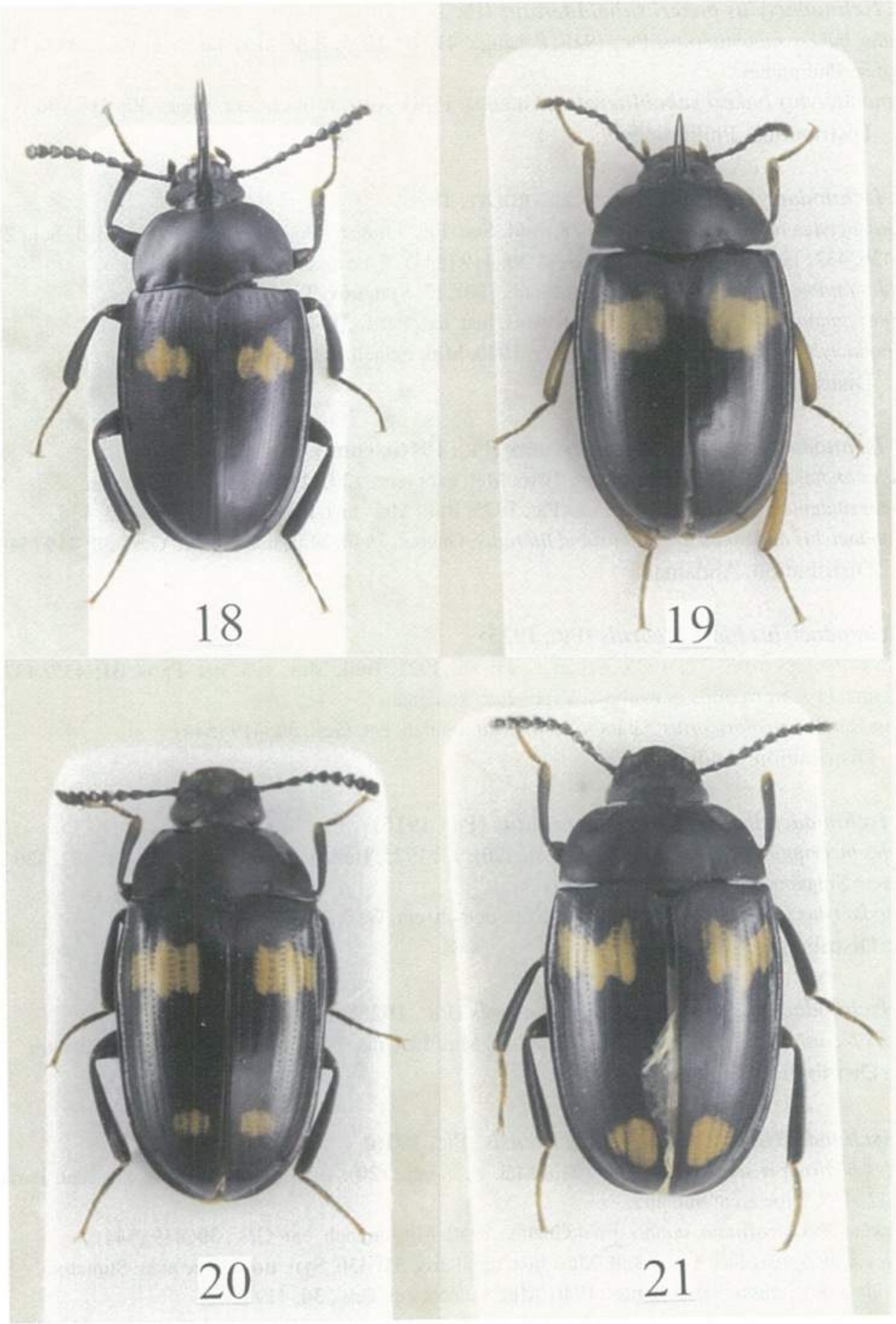
Ischnodactylus apicalis; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Sumatra.

2-1. *Ischnodactylus bakeri bakeri* GEBIEN, 1925

Ischnodactylus bakeri GEBIEN, 1925, Phil. J. Sci., **27 (3)**: 425, 437; 1940, Mitt. münch. ent. Ges., **30**: 418 (543) — PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436, 437. Type area: Philippines (Mindanao: Kolambugan, Bukidnon, Tangkulan).

Distribution. Philippines.



Figs. 18–21. *Ischnodactylus* spp., dorsal aspect; 18, *I. sasajii* sp. nov.; 19, *I. insulicola* sp. nov.; 20, *I. inermiceps* sp. nov.; 21, *I. celebensis* sp. nov.

2-2. *Ischnodactylus bakeri subobliteratus* (PIC, 1925)

Basides bakeri subobliteratus PIC, 1925, Échange, **41**: 16; 1925, Bull. Mus. hist. nat. Paris, **31**: 435. Type area: Philippines.

Ischnodactylus bakeri subobliteratus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 418 (543).

Distribution. Philippines.

3-1. *Ischnodactylus batesi batesi* CHEVROLAT, 1878

Ischnodactylus batesi CHEVROLAT, 1878, Bull. Soc. Ent. France: 88.— GEBIEN, 1925, Phil. J. Sci., **27 (3)**: 426, 432; 1940, Mitt. münch. ent. Ges., **30**: 419 (544). Type area: Sumatra.

Basides andamansis PIC, 1916, Mél. exot.-ent., **(20)**: 13. **Syn. nov**. Type area: Andaman.

Basides andamensis [sic] PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 435, 436.

Ischnodactylus andamanensis [sic]: GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Sumatra, Andaman.

3-2. *Ischnodactylus batesi subobliteratus* (PIC, 1916), **comb. nov**.

Basides andamansis subobliteratus PIC, 1916, Mél. exot.-ent., **(20)**: 13. Type area: Andaman.

Basides andamensis [sic] *subobliteratus* PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 435, 436.

Ischnodactylus andamanensis [sic] *subobliteratus*; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Andaman.

4. *Ischnodactylus bicoloricornis* (PIC, 1925)

Basides bicoloricornis PIC, 1925, Échange, **41**: 16; 1925, Bull. Mus. hist. nat. Paris, **31**: 435, 437, 438 (named *tricoloricornis* in his key). Type area: Andaman.

Ischnodactylus bicoloricornis; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Andaman.

5-1. *Ischnodactylus bicornutus bicornutus* (PIC, 1916)

Basides bicornutus PIC, 1916, Mél. exot.-ent., **(20)**: 13; 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 436. Type area: Singapore.

Ischnodactylus bicornutus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Singapore

5-2. *Ischnodactylus bicornutus reducticornis* (PIC, 1925), **comb. nov**.

Basides bicornutus reducticornis PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 435. Type area: Sumatra.

Distribution. Sumatra.

5-3. *Ischnodactylus bicornutus sumatrensis* (PIC, 1916)

Basides bicornutus sumatrensis PIC, 1916, Mél. exot.-ent., **(20)**: 13; 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 435. Type area: Sumatra.

Ischnodactylus bicornutus sumatrensis; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Basides sumatrensis PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436. **Syn. nov**. Type area: Sumatra.

Ischnodactylus sumatrensis; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Ischnodactylus colon GEBIEN, 1925, Phil. J. Sci., **27 (3)**: 428; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). — PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 436. **Syn. nov**. Type area: Borneo (Sarawak), Sumatra (Soekaranda, Bekantiang).

Distribution. Sumatra, Borneo.

5-4. *Ischnodactylus bicornutus duplicatus* (PIC, 1925), **comb. nov**.

Basides sumatrensis duplicatus Pic, 1925, Bull. Mus. hist. nat. Paris, **31**: 436. Type area: ?Borneo.

Ischnodactylus sumatrensis duplicatus; Gebien, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Borneo, Sumatra.

6. ***Ischnodactylus bimaculatus*** Gebien, 1925

Ischnodactylus bimaculatus Gebien, 1925, Phil. J. Sci., **27** (**3**): 425, 437; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). — Pic, 1925, Bull. Mus. hist. nat. Paris, **31**: 435, 436. Type area: Philippines (Mindanao: Kolambugan. Luzon: Mt. Maquiling).

Distribution. Philippines.

7. ***Ischnodactylus bisbifasciatus*** Gebien, 1925

Ischnodactylus bisbifasciatus Gebien, 1925, Phil. J. Sci., **27** (**3**): 425, 446; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). Type area: Formosa (Fuhosho, Juli).

Basides ruficornis Pic, 1925, Échange, **41**: 16; 1925, Bull. Mus. hist. nat. Paris, **31**: 434, 437. **Syn. nov.** Type area: China.

Ischnodactylus ruficornis; Gebien, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Taiwan, China.

8. ***Ischnodactylus bisetiger*** Gebien, 1925

Ischnodactylus bisetiger Gebien, 1925, Phil. J. Sci., **27** (**3**): 426, 440; 1940, Mitt. münch. ent. Ges., **30**: 419 (544). — Pic, 1925, Bull. Mus. hist. nat. Paris, **31**: 436. Type area: Sumatra (Soekaranda, Tebing-tinggi).

Distribution. Sumatra.

9. ***Ischnodactylus brevecornutus*** (Pic, 1925)

Basides brevecornutus Pic, 1925, Échange, **41**: 16; 1925, Bull. Mus. hist. nat. Paris, **31**: 434, 437. Type area: Sumatra.

Ischnodactylus brevecornutus; Gebien, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Sumatra.

10. ***Ischnodactylus celebensis*** Ando, **sp. nov.**

Type area: Sulawesi (Mamasa).

Distribution. Sulawesi.

11-1. ***Ischnodactylus diabolicus diabolicus*** (Pic, 1925)

Basides diabolicus Pic, 1925, Échange, (**41**): 16; 1925, Bull. Mus. hist. nat. Paris, **31**: 434, 436, 437. Type area: New Guinea.

Ischnodactylus diabolicus; Gebien, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. New Guinea.

11-2. ***Ischnodactylus diabolicus scutellaris*** (Pic, 1925)

Basides diabolicus scutellaris Pic, 1925, Bull. Mus. hist. nat. Paris, **31**: 434, 437. Type area: New Guinea.

Ischnodactylus diabolicus scutellaris; Gebien, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. New Guinea.

12-1. ***Ischnodactylus diversicornis diversicornis*** (Pic, 1916) **comb.** et **stat. nov.**

Basides rufopiceus diversicornis Pic, 1916, Mél. exot.-ent., (**20**): 14. Type area: Sumatra.

Ischnodactylus rufopiceus diversicornis; Gebien, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Basides diversicornis Pic, 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 434.

Ischnodactylus diversicornis; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Ischnodactylus immaculatus GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 424, 426; 1940, Mitt. münch. ent. Ges., **30**: 418 (543).— PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 434. **Syn. nov.** Type area: Sumatra (Soekaranda, Liangagas), Borneo (Sarawak: Ophir).

Distribution. Sumatra, Borneo.

12-2. *Ischnodactylus diversicornis brevenotatus* (PIC, 1925)

Basides diversicornis brevenotatus PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 434. Type area: Sumatra, Borneo.

Ischnodactylus diversicornis brevenotatus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Sumatra, Borneo.

13. *Ischnodactylus fenestratus* GEBIEN, 1925

Ischnodactylus fenestratus GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 426, 436; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). — PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436, 438. Type area: Borneo, N. Sumatra (Tandjong Morawu, Serdang).

Distribution. Philippines ?, Borneo, Sumatra.

14. *Ischnodactylus formosanus* GEBIEN, 1925

Ischnodactylus formosanus GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 424, 445; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). — PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436. Type area: Formosa (Hoozan, Fuhosho).

Distribution. Taiwan.

15. *Ischnodactylus inermiceps* ANDO, **sp. nov.**

Type area: Sulawesi (Pendolo).

Distribution. Sulawesi.

16. *Ischnodactylus insulicola* ANDO, **sp. nov.**

Type area: Sulawesi (Mamasa).

Distribution. Sulawesi.

17. *Ischnodactylus iriomotensis* ANDO, 1978

Ischnodactylus iriomotensis ANDO, 1978, Ent. Rev. Japan, **32**: 81. Type area: Japan (Iriomote Is.: Mt. Tedou, Nakara River, Shirahama).

Distribution. Japan (Iriomote Is.).

18. *Ischnodactylus loripes* LEWIS, 1894

Ischnodactylus loripes LEWIS, 1894, Ann. Mag. Nat. Hist., **6** (**13**): 392, pl. 13, fig. 6.— GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 424, 428; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). — PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436. Type area: Japan (Oyayama).

Distribution. Japan.

19. *Ischnodactylus luzonicus* KULZER, 1964

Ischnodactylus luzonicus KULZER, 1964, Ent. Arb. Mus. G. Frey, **15**: 226. Type area: Philippines (Luzon: Baltalason).

Distribution. Philippines (Luzon Is.).

20-1. ***Ischnodactylus malaccanus malaccanus*** (PIC, 1916)

Basides malaccanus PIC, 1916, Mél. exot.-ent., **(20)**: 12; 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 436. Type area: Malacca.

Ischnodactylus malaccanus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Basides bisbimaculatus PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436, 437. **Syn. nov.** Type area: Sumatra.

Ischnodactylus bisbimaculatus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Malacca, Sumatra.

20-2. ***Ischnodactylus malaccanus rufithorax*** (PIC, 1916)

Basides malaccanus rufithorax PIC, 1916, Mél. exot.-ent., **(20)**: 12; 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 436. Type area: Sumatra.

Ischnodactylus malaccanus rufithorax; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Ischnodactylus gradatus GEBIEN, 1925, Phil. J. Sci., **27 (3)**: 425, 431; 1940, Mitt. münch. ent. Ges., **30**: 418 (543).— PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 432. **Syn. nov.** Type area: Sumatra (Soekaranda, Liangagas).

Distribution. Sumatra.

21. ***Ischnodactylus mirabilis*** GEBIEN, 1914

Ischnodactylus mirabilis GEBIEN, 1914, Notes Leyd. Mus., **36**: 64; 1925, Phil. J. Sci., **27 (3)**: 426, 432; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). Type area: Simalur (Sinabang).

Distribution. Simalur.

22. ***Ischnodactylus nasutus*** GEBIEN, 1925

Ischnodactylus nasutus GEBIEN, 1925, Phil. J. Sci., **27 (3)**: 425, 434; 1940, Mitt. münch. ent. Ges., **30**: 418 (543).— PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436. Type area: Philippines (Mindanao: Basilan, Iligan, Kolambugan).

Distribution. Philippines (Mindanao).

23. ***Ischnodactylus parallelicorne*** (NAKANE, 1956)

Platydema parallelicorne NAKANE, 1956, Sci. Rep. Saikyo Univ., **2 (3A)**: 164. Type area: Japan (Towada, Daisen, Kurami).

Ischnodactylus parallelicorne: NAKANE, 1975, Mem. Nat. Sci. Mus. Tokyo, **8**: 162.

Distribution. Japan.

24. ***Ischnodactylus pici*** ANDO, **nom. nov.** preoccupied by GEBIEN, 1925.

Basides bimaculatus PIC, 1925, Échange, **41**: 16; 1925, Bull. Mus. hist. nat. Paris, **31**: 435. Type area: Sumatra.

Ischnodactylus bimaculatus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544), nec GEBIEN, 1925.

Distribution. Sumatra.

25. ***Ischnodactylus quadrioculatus*** CHEVROLAT, 1877

Ischnodactylus quadrioculatus CHEVROLAT, 1877, Pet. Nouv. Ent., 2: 178. — GEBIEN, 1925, Phil. J. Sci., **27 (3)**: 426, 441; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). Type area: Java.

Ischnodactylus quadri-dentatus CHEVROLAT, 1877, Pet. Nov. Ent., 2: 173. Type area: Java.

Distribution. Java.

26-1. ***Ischnodactylus rubromarginatus rubromarginatus*** (CHEVROLAT, 1878)

Histeropsis rubro-marginatus CHEVROLAT, 1878, Pet. Nouv. ent., **2**: 242. Type area: Sarrow.

Ischnodactylus rubromarginatus; GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 429; 1940, Mitt. münch. ent. Ges., **30**: 418 (543).

Basides unimaculatus PIC, 1916, Mél. exot.-ent., (**20**): 12; 1925, Bull. Mus. hist. nat. Paris, **31**: 432, 435, 437, 438. **Syn. nov.** Type area: Sumatra.

Ischnodactylus unimaculatus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Malacca, Sumatra, Perak, Penang.

26-2. ***Ischnodactylus rubromarginatus verticalis*** (PIC, 1925), **comb. nov.**

Basides unimaculatus verticalis PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 435. Type area: Sumatra.

Distribution. Sumatra.

26-3. ***Ischnodactylus rubromarginatus yunnanus*** KASZAB, 1965

Ischnodactylus rubromarginatus yunnanus KASZAB, 1965, Annls. hist. nat. mus. natn. hung., **57**: 284. Type area: Yunnan (Siaomengyang).

Distribution. China (Yunnan).

27. ***Ischnodactylus sasajii*** ANDO, **sp. nov.**

Type area: Sulawesi (Puncak Palopo, Lake Poso, Mamasa).

Distribution. Sulawesi.

28. ***Ischnodactylus sexguttatus*** GEBIEN, 1925

Ischnodactylus sexguttatus GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 426, 438; 1940, Mitt. münch. ent. Ges., **30**: 419 (544). — PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 433. Type area: Sumatra (Soekaranda, Ober Langkat, Deli, Tebing-tinggi), Borneo (Sandakan).

Distribution. Sumatra, Borneo.

29. ***Ischnodactylus sumbawicus*** GEBIEN, 1925

Ischnodactylus sumbawicus GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 424, 443; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). Type area: Sumbawa.

Distribution. Sumbawa.

30. ***Ischnodactylus tonkineus*** (PIC, 1925)

Basides tonkineus PIC, 1925, Échange, **41**: 16; 1925, Bull. Mus. hist. nat. Paris, **31**: 435, 437, 438. Type area: Tonkin.

Ischnodactylus tonkineus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Vietnam.

31. ***Ischnodactylus trigonalis*** GEBIEN, 1925

Ischnodactylus trigonalis GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 426, 433; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). — PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436. Type area: Borneo (Sarawak).

Distribution. Borneo.

32. ***Ischnodactylus trimaculatus*** (PIC, 1916)

Basides trimaculatus PIC, 1916, Mél. exot.-ent., (**20**): 13; 1925, Bull. Mus. hist. nat. Paris, **31**: 433, 435. Type area: Banguey Is.

Ischnodactylus trimaculatus; GEBIEN, 1940, Mitt. münch. ent. Ges., **30**: 419 (544).

Distribution. Banguey Is.

33. ***Ischnodactylus unifasciatus*** GEBIEN, 1925

Ischnodactylus unifasciatus GEBIEN, 1925, Phil. J. Sci., **27** (**3**): 424, 444; 1940, Mitt. münch. ent. Ges., **30**: 418 (543). — PIC, 1925, Bull. Mus. hist. nat. Paris, **31**: 436. Type area: Ober Assam.

Distribution. Assam.

? ***Basides flavofasciatus*** PIC, 1916, Mél. exot.-ent., (**20**): 12. Type area: Zanguebar.

要　　約

安藤清志．スラウェシ島の *Ischnodactylus* 属．——— スラウェシからはこれまで *Ischnodactylus* CHEVROLAT, 1877の種は記録されていなかったが，最近私自身の採集旅行と友人からの標本提供で，この島から本属の4種の分布が確認された．慎重に調査した結果，これらはすべて新種であったので近似種との詳しい識別点を伴って記載した．なおこれらの検索表も作成した．一方 GEBIEN (1940) はそのリストの中で，PICの書いた種をあやふやな状態のまま残したので，いまだにこれらの種は正確な所属が再検討されないまま残されている．また従来混乱していた *Ischnodactylus* 属，*Basides* 属に含まれる他の種についてもタイプ標本の調査を含む再検討を行い，シノニム，転属，新名といった命名規約上の処理をして *Ischnodactylus* 属の種名リストを作成した．

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Immature Stages of *Nemophora trimetrella* STRINGER (Lepidoptera: Adelidae)

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Abstract. Immature stages of *Nemophora trimetrella* STRINGER, 1930, including mature larva and pupa, are described for the first time. The larval case is characteristic in being constructed from minute leaf fragments and soil particles.

Key words Lepidoptera, Adelidae; *Nemophora trimetrella*; immature stages; Japan.

Introduction

Morphological study on the immature stages of Japanese adelids has been poorly performed, except KUROKO (1961) reported the detailed descriptions on the immature stages of *Nemophora raddei* (REBEL).

In April 2000, unique larval cases of lepidopterous species were collected at Nose and Mt. Izumikatsuragi, Osaka Prefecture, and they were revealed to be those of *N. trimetrelle* STRINGER, 1930 by rearing. This species occurs in Honshu, Shikoku and Kyushu of Japan (MORIUTI, 1982) and seemed to be not common.

In the present paper, immature stages of *N. trimetrella* are described for the first time with stress on some characters important for the taxonomy.

Materials and Methods

Larvae for morphological study were collected at Yoshino, Nose, and Mt. Izumikatsuragi, Osaka Prefecture in April 2000. The larvae were reared in the laboratory near natural condition. Larvae for scanning electron microscopy (SEM) observation were chemically dried following STEHR (1987).

Terminology adopted in this paper referred to DAVIS (1987).

Nemophora trimetrella STRINGER, 1930

(Figs. 1–5)

Mature larva (Figs. 1B–D, 2, 4): Length: 8.2–8.7 mm. Body yellowish-white, flattened dorsoventrally.

Head: Head capsule pale-brown, flattened, posterior margin acutely V-shaped. Frontoclypeus large. Adfrontal sclerites elongate and narrow. Epicranial suture absent. Six stemmata present per side, arranged in uneven. Area within stemmatous semicircle black, posteriolateral part of the stemmatous semicircle with a black stria. Labrum with six pairs of setae.

Thorax: Dorsal plates pale to dark brown, well pigmented lateral and posterior portions; prothorax well pigmented, mosothorax rather weakly and metathorax indistinctly pigmented. Prespiracular sclerite of prothorax fused to dorsal plate.

Abdomen: Almost creamy-white, except A10 with brown dorsal and ventral plates. Prolegs reduced; multiserial crochets present on A3–A6 and absent on A10. Crochets arranged in several transverse rows (Figs. 1C, 4).

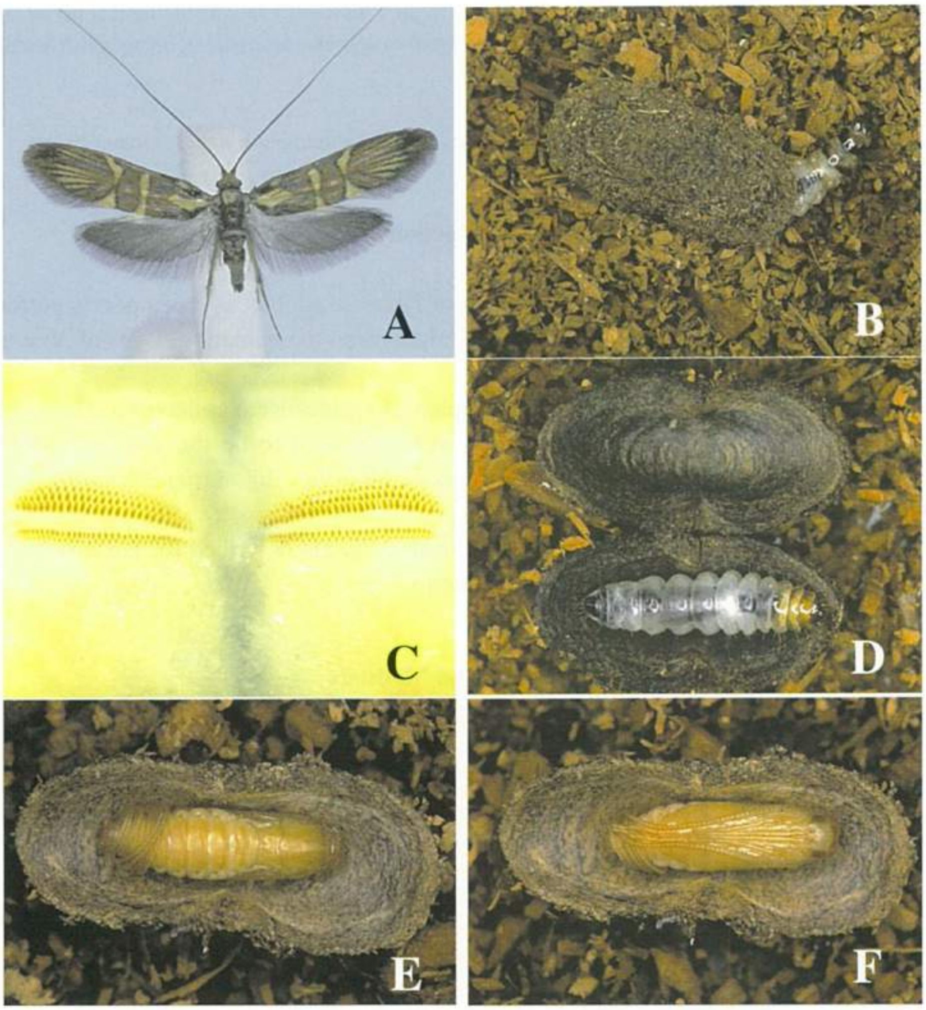

Fig. 1. Adult, larval cases, mature larvae and pupae of *Nemophora trimetrella* STRINGER collected in Nose, Osaka Pref. A, Adult (♂); B, larva within portable case ; C, crochets (A5) of mature larva; D, larva (dorsal view); E, pupa (♂, dorsal view); F, ditto. (ventral view).

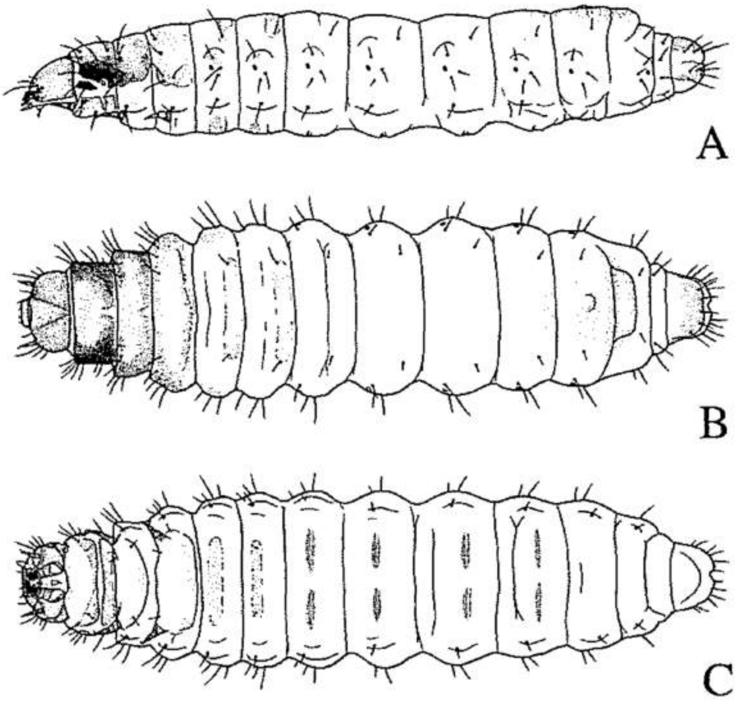

Fig. 2. Mature larva of *Nemophora trimetrella* STRINGER. A, Lateral view; B, dorsal view; C, ventral view.

Chaetotaxy (Fig. 3):

Head: A3 longest, S2 next longest. AF1 arising rather higher over the half of adfrontal sclerite. AF2 absent. C1 longer than C2. P1 long adjacent to ecdysial line, P2 very short. Pa present on about the same distance from La and P2. Pb present near MD1.

Thorax: Prothorax: XD1, XD2, D1, D2, SD1, SD2, L1, L2, and L3 present on thoracic shield, D1 very short, XD2, D2, and SD1 very long. SV1 and SV2 long, on elongate pinaculum, which is situated between thoracic and abdominal plates. Meso- and metathorax: Almost same arrangement as prothorax except absence of XD1, XD2 and SV2, and presence of MSD1 and MSD2 on common pinaculum which is weakly sclerotized.

Abdomen: First to seventh abdominal segments: All setae, except D2, L1 and L3, rather short. SV setae very short. V1 present, ventral to SV2. Eighth abdominal segment: All setae, except L1, rather short. L1 and L2 situated anterior to spiracle. Ninth abdominal segment: D1, D2, SD1, L1, L2, L3 and SV1 arranged in a vertical line.

Portable case of mature larva (Fig. 1B, D)

Length 10.5–11.6mm. Elongate-ovate, flat, more or less constricted medially, constructed from minute leaf fragments and soil particles.

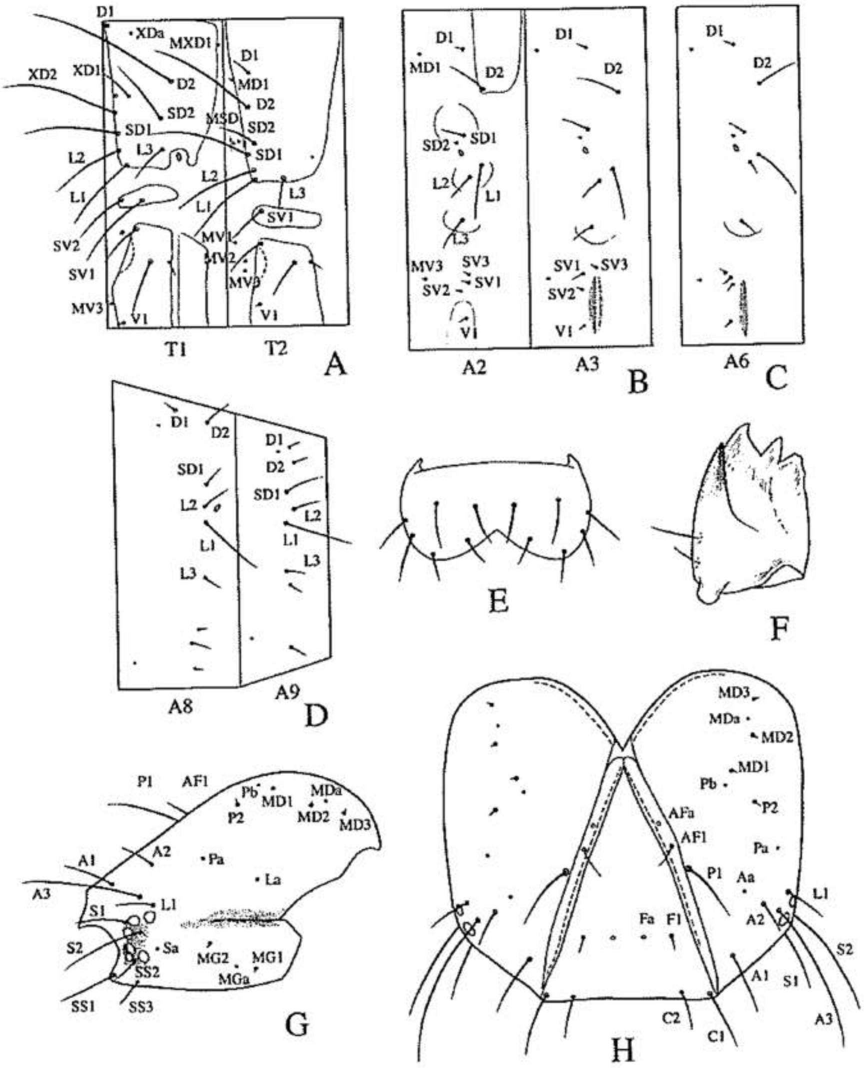

Fig. 3. Chaetotaxy and mouth parts of mature larva of *Nemophora trimetrella* STRINGER. A, Prothorax and mosothorax; B, second and third abdominal segments; C, sixth abdominal segment; D, eighth andnineth abdominal segments; E, labrum (frontal view); F, right mandible (ventral view); G, head capsule (lateral view); H, ditto, (dorsal view).

Pupa (Figs.1E, F, 5)

Length 6.5–7.4 mm. Body pale-yellow, elongate. Vertex flattened, with a pair of long setae. Clypeus with a pair of short setae. Antenna very long, nearly extending to tip of abdomen and then curved dorsally to coil about 5 times around posterior portion of abdomen in male, coil about 2 times in female. Maxillary palpus small, triangular. Galea relatively long, extending to about half-length of fore and mid legs. Wing extending to sixth abdominal segment. Third to seventh abdominal segments with a row of tergal spines. A pair of hooked spines on caudal

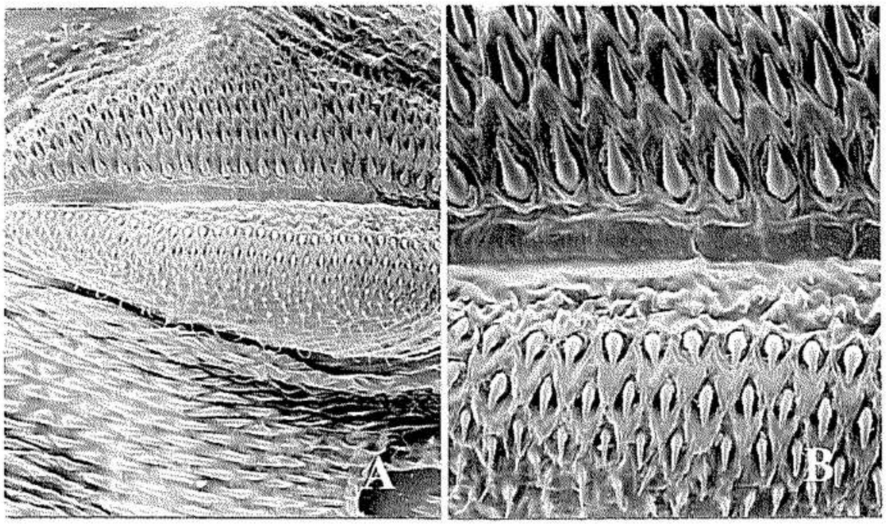

Fig. 4. Chrochets of third abdominal segment in mature larva of *Nemophora trimetrella* STRINGER. A, ×220; B, ×600.

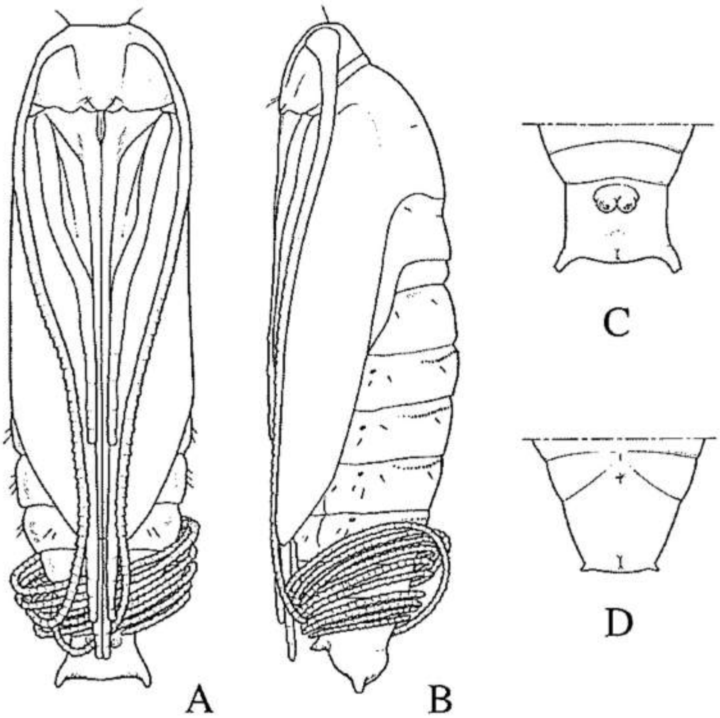

Fig. 5. Pupa of*Nemophora trimetrella* STRINGER. A, Ventral view; B, lateral view; C, terminalia (ventral view); D, ditto. A-C: Male, D: Female.

margin of eighth segment dorsally in female, absent in male. Ninth segment with a pair of short ventral tubercles at the middle of anterior portion and caudal tubercles posterolaterally in male; caudal tubercles short, truncate and weakly curved, located apart each other.

Specimens examined: JAPAN, Honshu.

[Larvae]: 5 exs., Yoshino, Nose, Osaka Pref., 12. IV. 2000, H. OKAMOTO leg.;. 1 ex., same locality, 24. IV. 2000, Y. MIYAMOTO leg.; 2 exs., Mt. Izumikatsuragi, Kaizuka City, Osaka Pref., 12. IV. 2000, T. HIROWATARI leg.

[Pupae]: 5♂♂, 3♀♀, Yoshino, Nose, Osaka Pref., 12. IV. 2000, larvae, H. OKAMOTO leg.; 1♂, same locality, 24. IV. 2000, larva, Y. MIYAMOTO leg.

Remarks: The mature larvae of *N. trimetrella* with the portable cases were found on the ground of Japanese chestnut (*Castanea crenata* SIEB. et ZUCC.) plantation (*ca.* 300 m a.s.l.) which was surrounded by coppice comprising *Quercus serrata* THUNB. ex MURRAY and *Q. acutissima* CARRUTHER in Nose, Osaka Prefecture. They were also collected in the deciduous forest near the summit of Mt. Izumikatsuragi (*ca.* 850 m a.s.l.) where *Fagus crenata* BLUME is dominated. In both localities, the larvae were found near the humus soil under the leaf litter. Before pupation, in the laboratory, the larvae camouflaged the portable case with additional minute leaf fragments.

The larval portable case of *Nemophora trimetrella*, being constructed from minute leaf fragments and covered with soil particles, may be unique in Adelidae and resembles that of *N. minimella* ([DENIS & SCHIFFERMÜLLER]) shown by HEATH & PELHAM-CLINTON (1976). However, the similarity of their larval cases seem to be derived independently, judging from the morphological differences of the adults.

The moth of *N. trimetrella* flies in May and June, and the male flies singly, not in swarms. The moths are occasionally attracted to the light. The mature larvae, and probably throughout the larval stages except for the first instar, feed on the dead leaves of some deciduous trees, however, the host plant to which the female oviposit is still unknown.

According to KUROKO (1961), the setae L1 and L2 of eighth abdominal segment are situated posteroventrad to the spiracle in the mature larva of *N. raddei*, while the L1 and L2 are situated anterior to the spiracle in that of *N. trimetrella*. This appears to be the most different point of the chaetotaxy of the two species. On the other hand, the developed caudal tubercles of male pupa were demonstrated by KUROKO (1961) in *N. raddei*. To the author's knowledge, the shapes of the caudal and ventral tubercles of the pupae are different among the species and genera, which seem to provide important taxonomic characters. These morphological characters deserve more attention in further studies on immature stages of Adelidae.

Acknowledgments

I wish to express my cordial thanks to Dr. H. KUROKO (Hannan City, Osaka Pref.) for his valuable suggestions. I am also indebted to Mr. Y. MIYAMOTO and Mr. H. OKAMOTO (Osaka Prefecture University) for providing valuable materials.

要　約

広渡俊哉：ホソフタオビヒゲナガ（鱗翅目，ヒゲナガガ科）の幼生期．——— 幼生期の生態や形態がこれまでまったく知られていなかったホソフタオビヒゲナガ *Nemophora trimetrella* Stringer, 1930の終齢幼虫と蛹の形態を記載した．ヒゲナガガ科の幼虫は，ふつう切り取った枯れ葉を片面に数枚つづりあわせた扁平で楕円形のポータブルケースを作るが，ホソフタオビヒゲナガのケースは細かい枯葉の破片や土などをつづり合わせたものであることが明らかになった。また，雄の蛹腹端にみられる尾突起は，分類学的に注目すべきな形質であることが示唆された．

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Male Morphological Dimorphism in the Stag Beetle, *Dorcus rectus* (Coleoptera: Lucanidae)

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Abstract The body length and mandible length of males of *Dorcus rectus* (MOTSCHULSKY) were measured. The frequency distribution of mandible length was bimodal. The body-mandible relationship consisted of two different allometric relationships. These results suggested that males of this species showed morphological dimorphism and could be divided into the minors and majors.

Introduction

Male morphological dimorphism is known for several beetle species (e.g., the family Lucanidae: INUKAI, 1924; ARROW, 1937; CLARK, 1977; SAKAINO, 1987; KAWANO, 1988, 1989; IGUCHI, 1992; the family Scarabaeidae: COOK, 1987; EBERHARD, 1987; EBERHARD & GUTIERREZ, 1991; SIVA-JOTHY, 1987; KAWANO, 1995a, 1995b; EMLEN, 1994; RASMUSSEN, 1994; IGUCHI, 1998; the family Ceralnbycidae: GOLDSMITH, 1985). In these beetles, males are divided into the minors and majors with respect to horn or mandible size. The majors have larger horns or mandibles than the minors.

Many species of stag beetles (the family Lucanidae) inhabit Japan, but only a few statistical studies on male dimorphism have been done (e.g., INUKAI, 1924; IGUCHI, 1992). Therefore I here report male dimorphism in *Dorcus rectus*. As I previously suggested the possibility of the existence of male dimorphism in this species (IGUCHI, 1992) on the insufficient evidence.

The present study is carried out to confirm the existence of male dimorphism in this species.

Materials and Methods

For this study, 119 male adults were employed, which were collected in and around Okaya City, Nagano Prefecture, during 1990-1994. For each male, body length and mandible length were measured. Body length was measured from the front of the head to the tip of the elytra along the center line of the body. Mandible length was measured in a straight line parallel to the center line of the body.

To analyze the relationship between body length and mandible length, I used the methods of EBERARD & GUTIERREZ (1991). First of all, the above morphological data were logarithmically transfonned. Next, the data were fit to the following quadratic equation:

$$Y = AX^2 + BX + C$$

where X was the natural logarithm of body length, Y was the natural logarithm of mandible length, and A , B and C were regression coefficients. Lastly, if A differed significantly from zero, I concluded that the regression was nonlinear and that the body-mandible relationship consisted of two allometric relationships.

My previous study (IGUCHI, 1992) on this species revealed that the body–mandible relationship varied continuously. Therefore, I fit the original (untransformed) data to Model 3 shown by EBERHARD & GUTIERREZ (1991). In other words, I fit the original data to the following two regression lines:

$$y = ax + b \ (x \geqq p)$$

$$y = cx + d \ (x < p)$$

where x was body length, y was mandible length, and a, b , c and d were regression coefficients. I determined a switch point p so that the sum of the squared deviations from the regression lines were the smallest.

Results and discussion

The test for the nonlinearity of the allometric relationship showed that A differed significantly from zero (t = 6.23, df = 116, $P < 0.001$). Therefore, following the above methods, I determined the switch point p as $p = 27$ and obtained the two regression lines shown in Fig. 1. Both regression lines were highly significant (small males, 12.78, df = 53, $P < 0.00$; large males, t = 11.34, df = 62, $P < 0.001$). The slopes of the regression lines differed significantly (t = 5.37,

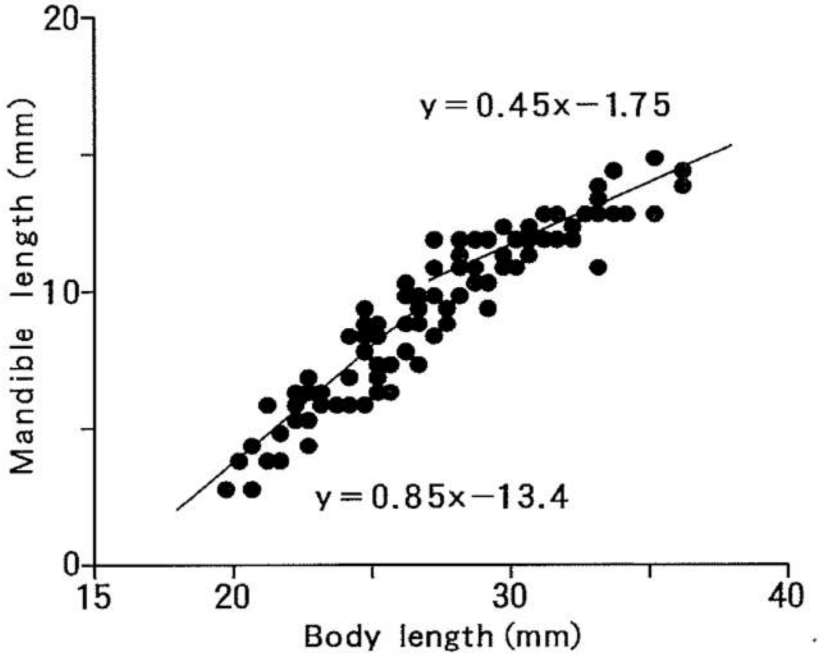

Fig. 1. Relationship between body length and mandible length for 119 males collected in and around Okaya City, Nagano Prefecture. The two regression lines were separately fit to minors (body length < 27 mm) and majors (body length ≧ 27 mm).

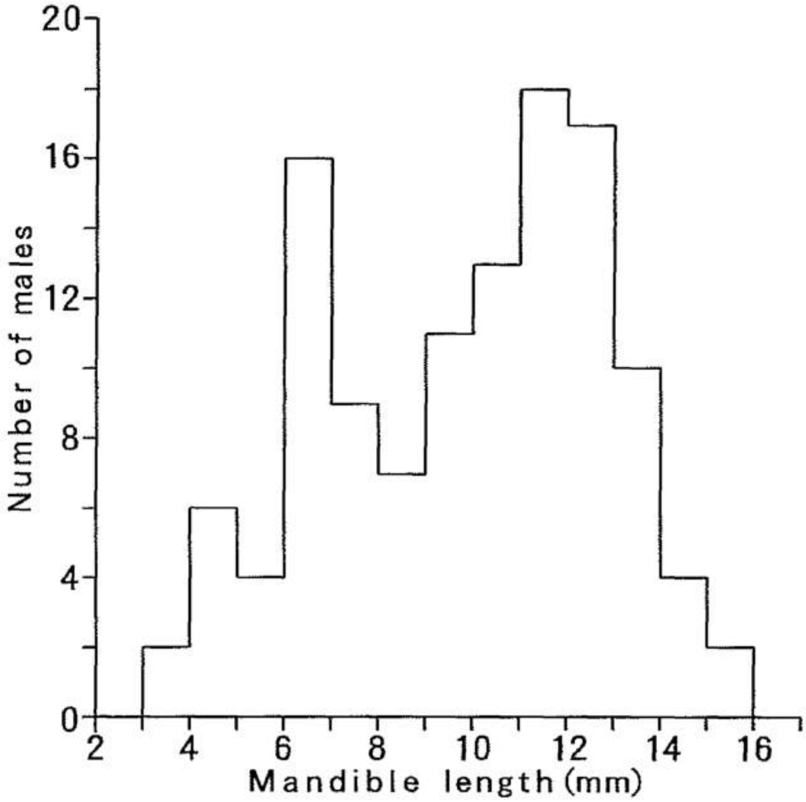

Fig. 2 . Frequency distribution of mandible length for 119 males collected in and around Okaya City, Nagano Prefecture .

df = 115, $P < 0.001$).

The frequency distribution of mandible length was clearly bimodal (Fig. 2). The mandible length of the lowest class between the two peaks was 8–9 mm. On the other hand, the x value of the switch point in the body-mandible relationship was approximately 10 mm (Fig. 1). These values of mandible length were obtained by different methods. Nevertheless, they were almost the same.

The body-mandible relationship did not show clear sigmoidal curve. However, the present results strongly suggested that the males of this species showed morphological dimorphism and could be divided into minors (small males) and majors (large males).

要約

井口　豊：コクワガタ雄の二型性について. ——— 長野県岡谷市周辺で採集されたコクワガタ雄の体長と大顎長が測定された. 体長一大顎長の関係は二つの直線として表現され, 大顎長の頻度分布は二山となった. このことから, コクワガタ雄は形態的な二型性を示すと判断された.

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Revision of the Genus *Scutellathous* from Japan, with Descriptions of Two New Species and Taxonomic Notes on its Relatives (Elateridae, Coleoptera)

"Some New Forms of Elateridae in Japan (XXIX)"

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Abstract *Scutellathous chairo* sp. nov. from Honshu, Shikoku and Kyushu, and *Scutellathous seinoi* sp. nov. from Kumamoto Prefecture of Kyushu are described.

Key words *Scutellathous chairo*, *Scutellathous seinoi*, new species, Japan

The genus *Scutellathous* was established by KISHII, 1955 for a Japanese species, *Athous comes* LEWIS, 1894 from Sapporo in Hokkaido, and at the same time, *Athous porrecticollis* LEWIS, 1894 from Junsai in Hokkaido was transferred to it, and a new species, *Scutellathous horioi* was described from Mt. Hikosan in Fukuoka Prefecture (this species is now treated in the genus *Stenagostus* C. G. THOMSON, 1859), and belongs to the tribe Hemicrepidiini of the subfamily Dendrometrinae. After that, four species were added from Japan as new species to this genus by subsequent entomologists in Japan. However, some taxonomical problems still remain about this genus and Japanese species.

In recent years, I have reexamined the Japanese species of *Scutellathous* previously unsorted or unidentified species, and found that at least two of them are new to science. They will be described in the present paper.

The Japanese species of the genus *Scutellathous* including *S. comes* (LEWIS, 1894), *S. porrecticollis* (LEWIS, 1894), *S. comes yakuensis* NAKANE et KISHII, 1958, *S. fujianus* ÔHIRA, 1963, *S. shikokuanus* KISHII, 1985, *S. ozakii* ÔHIRA, 1992, have close resemblance in having the following characters: body, antennae and legs more or less yellowish or reddish brown, in general remarkably smooth all over, antennae elongate and serrated from 3rd joint, frons clearly and triangularly concave behind frontal edge, which is well-developed ahead like as a pentroof, pronotum quadrate and usually longer than wide, with rather sparse punctures in general, and no medio-longitudinal depression in general, each hind angle of prothorax unicarinated, broad, short, and triangular with pointed and upheaved apex, scutellum small, subquadrate, densely punctured, plainly emarginated at anterior edge, with anterior half strongly bent interiorly, of which surface is entirely glabrous and concave, elytral intervals among punctate striae smooth and sparsely punctured, more or less finely and transversely rugate at anterior part, posterior end of each elytron rounded, prosternal process narrow, elongate and straightly extending postero-interiorly, median lobe of male genitalia gradually narrowing apically, with apical end rather acutely pointed, each lateral lobe of male genitalia simple, with apical end more or less rounded at apex, without any apico-lateral triangular expansion, bursa copulatrix of female genital organ having 4 or 5 thorny plates. These species are reexamined mostly on the structure of lateral lobe of male genitalia and of thorny plates of female bursa copulatrix in the course of my study on the Hemicrepidiini, and *Scutellathous comes yakuensis* was already raised the rank to full species (KISHII, 1999: 33) and two new species are described in the present paper.

All the holotype of the new species are deposited in the collection of the Osaka Museum of Natural History and some paratypes in my collection.

Before going further, I gratefully acknowledge to the late Dr. Kintaro BABA and the late Mr. Hiroshi ISHIDA for supply of useful materials, and also I wish to express my deep gratitude to Messrs. Koichi HOSODA, Futoshi ICHIKAWA, Kenji KANNO, Toshiyuki KATO, Isao MATOBA, Kozo MIZUNO, Nobuyuki NARUKAWA, Hideyo NOMURA, Akio SEINO, Ryuichi SHIMAMOTO, Fumiki TAKAHASHI, Isamu TANAKA, Hideyuki YOKOZEKI for their kind offering elaterid-materials and useful information in this study.

On the Genus *Scutellathous* KISHII, 1955

In 1996 (pp. 67, 68), ÔHIRA referred to his opinion about a synonymy of *Scutellathous* with *Parathous* FLEUTIAUX, 1918 from the South-west Asia, and revised the combination of some species with *Parathous*. However, I consider both genera *Parathous* and *Scutellathous* are different from each other by reason of the noticeable characteristics as in the following key.

1(2) Frontal edge of head moderately developed ahead, with frontal groove shallow and perpendicular. Pronotum deeply and widely furrowed medio-longitudinally, with remarkably dense and entirely reticulate punctures. Hind corners of pronotum broad and rounded at apices, with each apical end not pointed. Elytral dorsum very scabrous and rugose with rows of coarse and strong punctures, these bottoms small and rounded and upper faces subquadrate .... *Parathous* FLEUTIAUX, 1918

2(1) Frontal edge of head well-developed ahead like pentroof, with frontal groove deep and declined. Pronotum simply rounded above, generally without any medio-longitudinal furrow, with sparse punctures, with interpunctate space wide and smooth. Hind corners of pronotum triangular, with each apical end distinctly pointed and upheaved. Elytral dorsum entirely smooth and sparsely punctured, with rows of dense, longitudinal and strong punctures........ *Scutellathous* KISHII, 1955

Scutellathous porrecticollis (LEWIS, 1894)

(Japanese name: Munaguro-tsuya-kometsuki)

(Fig. 17)

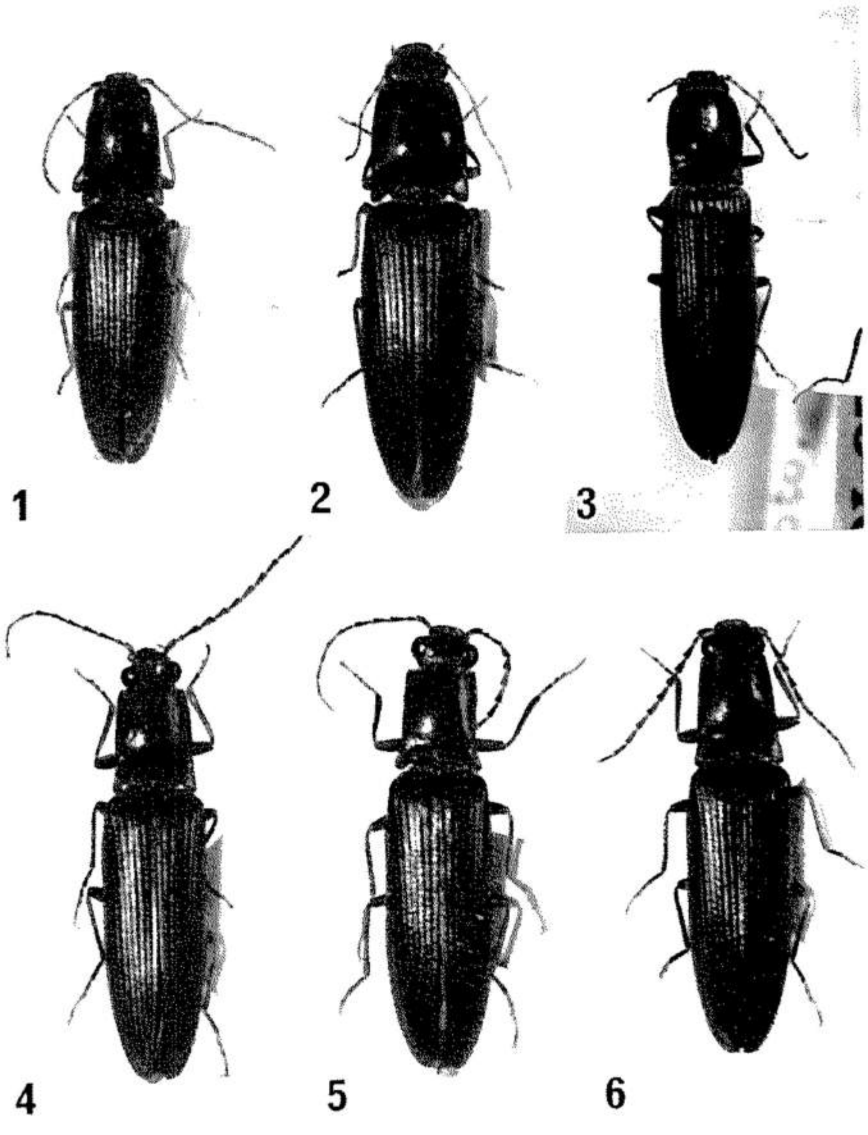
Athous porrecticollis LEWIS, 1894, Ann. Mag. nat. Hist., (6) 13: 201 (Junsai).

Athous (*Athous*) *porrecticollis*: SCHENKLING,1927, in JUNK's Col. Cat. 88, Elat. II: 316.

Athous daisetsusanus MIWA, 1928, Ins. Mats., II (3): 136 (Mt. Daisetsu, Sapporo and Towada), synonymized by MIWA, 1934, Fauna Elat.: 111.

Scutellathous porrecticollis: KISHII, 1955, Akitu, 4 (3): 80.

Athous daisetsuzanus [!]: NAKANE, 1971, Annl. Rep. JIBP/CT-S, 1970: 181.



Figs.1-6. Habitus of *Scutellathous* spp. 1, *Scutellathous chairo* KISHII, sp. nov., holotype (♂, 11.4 mm); 2, ditto, paratype (♀, 14.2 mm); 3, *Scutellathous seinoi* KISHII, sp. nov., holotype (♀, 14.2 mm); 4, *Scutellathous comes* (LEWIS, 1894)(♂, 12.3 mm); 5, *Scutellathous shikokuanus* KISHII, 1985 (♂, 13.1 mm); 6, *Scutellathous yakuensis* NAKANE et KISHII, 1958 (♂, 13.1 mm).

Scutellathous horioi: SASAKI, 1983, *jezoensis*, 10: 17 (Hokkaido), misidentification.
Soutellathous [!] *porrecticollis*: YASUDA, 1976, Kamikawa-cho no Shizen, 1: 61.

Diagnosis: Small species, 8.5 to 10.5 mm in length, head, antennae, pronotum and ventral surface more or less blackish, pronotal punctures rather dense and ocellated, median lobe of male genitalia clearly narrowing at apical 1/4, apices of lateral lobes roundly broadened laterally (Fig.17). Female not examined.

Specimens examined: 1♂, Sounkyo, Hokkaido, 31. VII. 1950, S. SHIBANAI leg.; 2♂♂, Kamiotoineppu, Teshio, Hokkaido, 28. VII. 1958, T. KISHII leg.; 1♂, Urakawa, Hokkaido, 25. VII. 1964, S. KONDO leg.; 1♂, Abashiri Lake, Memanbetsu-cho, Hokkaido, 17. VII. 1992, T. KATO leg.; 1♂, Miwa, Koshimizu-cho, Hokkaido, 27. VII. 1998, T. KATO leg.

Distribution: Hokkaido, Honshu (Aomori?, after MIWA, 1928).

Notes. MIWA (1928) reported this species from Towada Lake of Aomori in Honshu, Japan as *Athous daisetsusanus*, but when this species was synonymized by him with *porrecticollis* he (1934) did not quote this record. Until now, I don't know the reliable record of this species from Honshu.

Scutellathous comes (LEWIS, 1894)

(Japanese name: Chairo-tsuyahada-kometsuki)

(Figs.4, 8, 13, 14 & 19)

Athous comes LEWIS, 1894, Ann. Mag. nat. Hist., (6) 12: 200 (Sapporo).
Athous (Athous) comes: SCHENKLING, 1927, in JUNK's Col. Cat. 88, Elat. II: 313.
Scutellathous comes: KISHII, 1955, Akitu, 4 (3): 80.
Scutellathous comes comes: MIZUNO, 1965, Suzumushi, 15 (98): 50 (Nagano).

Diagnosis: Medium and rather slender species, 9.5 to 12.5 mm in length, entirely yellowish or brownish, pronotal punctures rather dense and simple or partly subocellated, median lobe of male genitalia gradually narrowing apically, with apical 1/3 not so acute (Fig. 8), each lateral lobe weakly sinuate outwards at the middle, then straightly extending apically, with apex simply rounded at end and not broadened laterally (Figs. 13, 14), bursa copulatrix (Fig.19) with 5 thorny plates having long and robust thorns, of which plate-a a little longer than wide, plate-b subcircular, subequal in length and width, plate-c subtriangular, and plates-d subcircular.

Specimens examined: 1♂, Nenokuchi, Towada, Aomori, 30. VII. 1952, T. KISHII leg.; 1♂, Aomori City, Aomori, 26. VII. 1967, B. YAMAYA leg.; 1♂, Hinoemata, Fukushima, 27–29. VII. 1975, K. MIZUNO leg.; 1♂, Yunohana Spa, Fukushima, 29. VII. 1977, K. MIZUNO leg.; 1♂, Mt. Asakusa, Niigata, 5. VIII. 1984, K. BABA leg.; 1♂, Tsubame Spa, Niigata, 15. VIII. 1981, K. BABA leg.; 1♂, Gozaishi-kosen Spa, Nirasaki, Yamanashi, 3. IX. 1990, K. HOSODA leg.; 1♂, ditto, 7. VII. 1990, K. HOSODA leg.; 1♂, Nikengoya, Yamanashi, 1. VIII. 1965, H. NOMURA leg.; 1♀, Mt. Hakusan, Ishikawa, 27. VII. 1963, MATSUEDA leg.; 1♂, Mt. Tanigawa, Gunnma, 4. VIII. 1949, T. NAKANE leg.; 1♂, Karuisawa, Nagano, 2. VIII. 1982, K. MIZUNO leg.; 1♂, Kamikouchi, Nagano, 5. VII. 1916. K. TAKEUCHI leg.; 1♂, Mt. Togakushi, Nagano, 31. VII. 1998, H. NOMURA leg.; 2♂♂, Igawa-mura, Shizuoka, 29. VII. 1965, K. MIZUNO leg.; 2♂♂, Nukumi Pass, Gifu, 6–12. VIII. 1956, T. TOMATSU leg.; 1♂, Hidarimata-dani, Gifu, 29. VII. 1974, I. KIRIYAMA leg.; 1♂, Ashiu, Kyoto, 15. VII. 1973, K. MIZUNO leg.; 1♂, Rokko to Arima, Hyogo, 10. VII. 1955, H. ISHIDA leg.; 2♂♂, Mt. Hyonosen, Hyogo, 25. VII. 1955, H. ISHIDA leg.; 1♂, Mt. Ouginosen, Hyogo, 27. VII. 1959, T. TAKAHASHI leg.; 1♂, Jindoji valley, Tenkawa, Nara, 24. VIII. 1974, O. TOMINAGA leg.; 1♂, Mt. Ohdaigahara, Nara, 21. VII. 1971, O. TOMINAGA leg.; 1♂, Mt. Misen, Ohmine, Nara, 28. VII. 1980, K. MIZUNO leg.; 1♂, Mt. Ohdaigahara, Wakayama, 14. V. 1961, Y. KIMURA leg.; 1♀, Mt. Kojin-dake, Wakayama, 1. VIII. 1956, K. TSUKAMOTO leg.; 1♀, Mino Pass, Wakayama, 3. VIII. 1960, T. TOMIWA leg.; 2♂♂, Mt. Daisen, Tottori, 16. VII. 1960, N. OHTANI leg.

Distribution: Hokkaido, Honshu, Shikoku and Kyushu.

Notes. Any specimens from Shikoku and Kyushu Islands have not been examined.

Scutellathous ozakii ÔHIRA, 1992

(Japanese name: Iwaki-tsuyahada-kometsuki)

Scutellathous ozakii ÔHIRA, 1992, Elytra, 20 (2): 225–226 (Mt. Iwakisan).

Diagnosis (according to the original description): Large and robust species, 15 mm in length, blackish brown, pronotum with a shallow medio-longitudinal furrow, pronotal punctures dense, coarse and umbilical, genital organs of both sexes unexamined. Male unknown.

Specimen not examined.

Distribution: Honshu (Mt. Iwakisan, Aomori Prefecture).

Notes. According to the original description, this species can be distinguished from *S. comes* by the robuster body, and shorter and more acutely serrate antennae. Body length is 13 mm [!] in his Japanese summary.

Scutellathous fujianus ÔHIRA, 1963

(Japanese name: Fuji-chairo-tsuyahada-kometsuki)

Scutellathous fujianus ÔHIRA, 1963, Trans. Shikoku ent. Soc., 8 (1): 16 (Asagiri-Plateau of Mt. Fuji).

Diagnosis: (according to the original description): Large species, 14 mm in length, entirely reddish brown, pronotum with a shallow smooth median line, pronotal punctures dense, even and umbilical at sides, genital organs of both sexes unexamined. Male unknown.

Specimen not examined.

Distribution: Honshu (Asagiri-Plateau of Mt. Fuji in Shizuoka Prefecture).

Notes. According to the original description, this species can be distinguished from *S. comes* by the larger and reddish brown body and by the denser and umbilicate pronotal punctures.

Scutellathous sasajii KISHII, sp. nov.

(Japanese name: Hoso-aka-tsuya-kometsuki)

(Figs. 1, 2, 7, 11, 12 & 18)

Scutellathous suturalis: KISHII, 1955, Akitu, 4 (3): 80, nec CANDEZE, 1873, et auct.

Scutellathous sp.: KISHII, 1987, A Taxonomic Study of the Japanese Elateridae (Coleoptera), with the keys to the subfamilies, tribes and genera. Kyoto: 92; — 1997, Nejirebane, 77: 4 (Mt. Minamimata-yama in Mie); — 1998, ibid., 81: 3 (Kuritani of Mt. Ohdaigahara in Mie); — 1999, ibid., 83: 3–4 (Mt. Gomanodan in Wakayama).

Diagnosis: Medium or large and rather robust species, 10.5 to 14.2 mm in length, reddish brown, pronotal punctures dense, generally simple, gently and gradually subocellate anteriorly as well as laterally, median lobe of male genitalia distinctly slender and acutely extending apically (Fig. 7), each lateral lobe plainly sinuate laterally at the middle, then diverging apically, with apico-lateral part weakly expanded outwards (Figs. 11, 12), bursa copulatrix (Fig. 18) with

5 thorny plates having slender thorns, of which plate-a is subelliptic and plainly wider than long, plate-b semicircular and subequal in length and width, plate-c smallest and semicircular, and plates-d subtriangular.

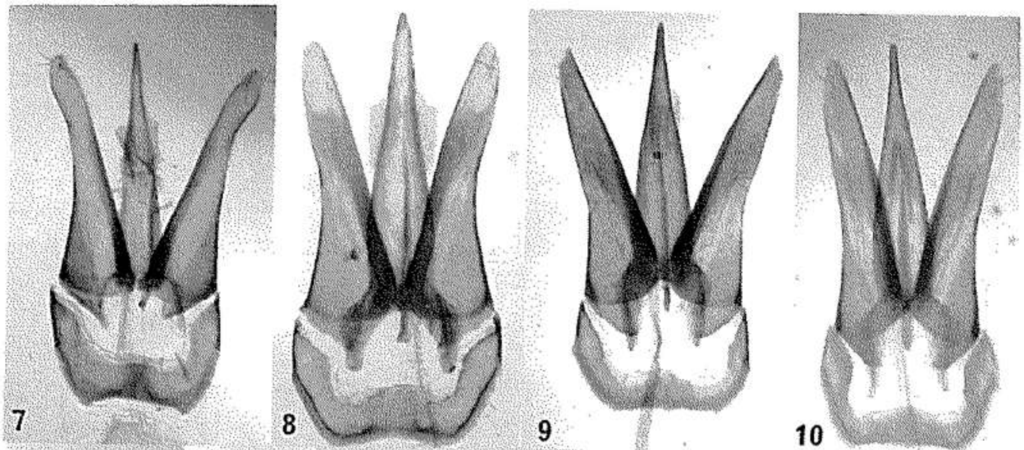
Description. Male. Length 10.5 to 12.9 mm. Entirely reddish brown, with the exception of antennae, pronotal hind corners, sutural line of elytra, ventral surface and legs more or less paler. Pubescence long, a little sparse, suberected and fulvous. Head quadrate, longer than wide, narrowest between eyes, entirely smooth, with punctures uneven in density and size, rather sparse, generally subocellated; frons with a shallow wide and triangular depression behind anterior edge; frontal groove distinctly larger, shallowly and transversely excavated, with a small glabrous hollow at the middle. Antennae elongate, apical three segments exceeding apices of hind angles of prothorax and serrated from 3rd segment; 2nd segment smallest, obconic, 1.5 times as long as width, 3rd two times as long as 2nd or a little more, 3rd to 5th entirely elongate triangular, 6th to 10th rather elongate hanging-bell-formed and gradually narrower apically, 11th narrow rhombic and longest except basal segment. Pronotum elongate, quadrate, ca. 1.3 as long as wide; lateral sides a little narrowing anteriorly in most specimens, rarely entirely parallel-sided; disc simply and roundly convex, without any medio-longitudinal line nor furrow at the middle, but in some specimens feebly canaliculated at posterior slope; punctures not so dense, rather even in density and size, generally simple, but gradually becoming subumbilical antero-laterally; each hind angle broad, short and triangular, unicarinated near lateral margin, with posterior apex pointed and plainly upheaved; posterior margin having a small notch near each hind corner. Scutellum small, subshield-formed, declivous, a little convex above at the middle, with punctures denser, finer and more uneven than those on pronotum, except median part more or less glabrous. Elytral intervals among punctate-striae subflattened, with small and simple punctures, a little uneven in density, transversely and feebly rugate on basal 1/4; posterior end of each sutural margin feebly mucronate, and outer apical end rounded. Prosternal process elongate, straightly extending postero-interiorly, with posterior end simply narrowing and rounded, without any notches nor projections. Legs moderate.

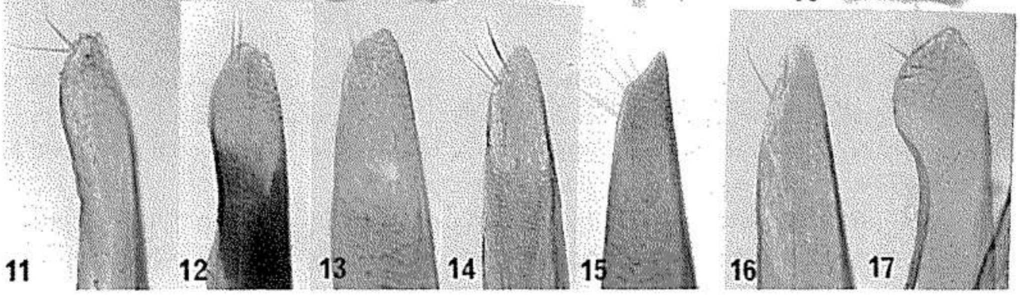
Female. Length 12.2 to 14.2 mm. Antennae slender, a little shorter than male, apical one segment exceeding apices of hind angles of prothorax. Pronotum more or less roundly expanded laterally at the middle.

Holotype. ♂, Mt. Ohdaigahara, Nara, 26. VII. 1980, N. NARUKAWA leg. Paratypes: 1♀, Mt. Ohdaigahara, Nara, 26. VII. 1980, N. NARUKAWA leg.; 1♂, ditto, 22. VII. 1953, T. KISHII leg.; 1♀, ditto, 21. VII. 1971, O. TOMINAGA leg.; 1♂, 1♀, ditto, 28. VII. 1988, I. TANAKA leg.; 1♂, Mt. Misen, Tenkawa, Nara, 10. VII. 1998, K. KANNO leg.; 1♂, Ashiu, Kyoto, 11. VII. 1971, K. TANI leg.; 1♀, Kuri-tani, Ohdaigahara, Mie, 10. VIII. 1996, F. ICHIKAWA leg.; 1♂, ditto, 9. VII. 1994, H. YOKOZEKI leg.; 1♂, Mt. Mayoi-take, Mie, 16. VII. 2000, H. YOKOZEKI leg.; 1♀, Mt. Minamimata-yama, Oh-uchiyama-mura, Mie, 5. VIII. 1995, N. NARUKAWA leg.; 1♀, Mt. Myojin-take, Iitaka-cho, Mie, 18. VII. 1998, N. NARUKAWA leg.; 1♂, Mt. Gomanodan, Wakayama, 30. VII. 1956, S. GOTOH leg.; 1♂, ditto, 16. VIII. 1982, I. MATOBA leg.; 1♀, Hattomaki, Wakayama, 22. VII. 1969, M. UMEMOTO leg.; 1♀, Tosayama-mura, Kochi, 26. VII. 1981, R. SHIMAMOTO leg.; 1♀, Mt. Sobosan, Miyazaki, 30. VII. 1951, F. TAKAHASHI leg.

Distribution: Honshu, Shikoku and Kyushu.

Etymology: The specific name is in honor of Dr. Hiroyuki Sasaji, Fukui University.





Figs.7-10. Male genitaliae of *Scutellathous* spp. 7, *Scutellathous chairo* KISHII, sp. nov. (7454: micro-slide number, and so forth); 8, *Scutellathous comes* (LEWIS, 1894) (7849); 9, *Scutellathous shikokuanus* KISHII, 1985 (2206); 10, *Scutellathous yakuensis* NAKANE et KISHII, 1958 (5629).

Figs.11-17. Apex of paramere (lateral lobe) of male genitaliae of *Scutellathous* spp. 11, *Scutellathous chairo* KISHII, sp. nov. (paratype, Mt. Gomanodan, 7454); 12, ditto (paratype, Mt. Ohdaigahara, 1112); 13, *Scutellathous comes* (LEWIS, 1894) (Nikengoya in Yamanashi, 7849); 14, ditto (Yunohana in Fukushima, 7848); 15, *Scutellathous shikokuanus* KISHII, 1985 (paratype, Mt. Tsurugi, 2206); 16, *Scutellathous yakuensis* NAKANE et KISHII, 1958 (Is. Yakushima, 5629); 17, *Scutellathous porrecticollis* (LEWIS, 1894) (Hokkaido, 7495).

Scutellathous shikokuanus KISHII, 1985

(Japanese name: Shikoku-tsuya-kometsuki)

(Figs.5, 9, 15 & 20)

Scutellathous shikokuanus KISHII, 1985, Bull. Heian High School, Kyoto, 29: 9–10 (Mt. Tsurugi in Tokushima Pref. and Mt. Ishizuchi in Ehime Pref.).

Diagnosis: Medium and subslender species, 11.5 to 13.1 mm in length, entirely reddish brown, pronotal punctures rather sparse, small and simple, median lobe of male genitalia clearly narrowing apically (Fig. 9), each lateral lobe a little sinuate at the middle, then straightly extending apically, with apical end rather obliquely truncated at apex and inner angle pointed (Fig. 15), bursa copulatrix (Fig. 20) with 5 thorny plates having long and robust thorns, of which plate-a is subovate, a little longer than width, plate-b subcircular, plate-c smallest and triangular, and plates-d subcircular.

Specimens examined: 1♂(holotype), 1♀, Mt. Tsurugi, Tokushima, 25. VII. 1966, K. MIZUNO leg.; 1

♀ (paratype), ditto, 27. VII. 1966, K. MIZUNO leg.; 1♂ (paratype), ditto, 26. VII. 1966, Y. IMAI leg.; 1♂ (paratype), ditto, 25. VII. 1969, H. OKAMOTO leg.; 1♂ (paratype), ditto, 28–30. VII. 1973, K. MIZUNO leg.; 1♂, ditto, 6. VIII. 1998, Y. DOI leg.; 1♂ (paratype), Mt. Ishizuchi, Ehime, 26. VII. 1979, R. SHIMAMOTO leg.; 1♂, ditto, 25. VI. 1988, M. SHIROISHI leg.; 1♂, Mt. Kajigamori, Kochi, 29. VII. 1966, K. MIZUNO leg.

Distribution: Shikoku (Tokushima, Ehime and Kochi Prefectures).

Notes. *S. comes*, *S. chairo* and *S. shikokuanus* entirely resemble in the external appearance with one another, but the shape of the male genitalia and of the thorny plates on female bursa copulatrix are different mutually.

Scutellathous seinoi KISHII, sp. nov.

(Japanese name: Higo-tsuyahada-kometsuki)

(Figs.3 & 21)

Diagnosis: Large, elongate and rather slender species, 14.2 mm in length, reddish brown, pronotal punctures rather sparse, generally simple, bursa copulatrix (Fig. 21) with 4 thorny plates having long slender thorns, of which plate-a is subsemicircular, plate-b subelliptic and longer than width, plate-c absent, and plates-d subtriangular.

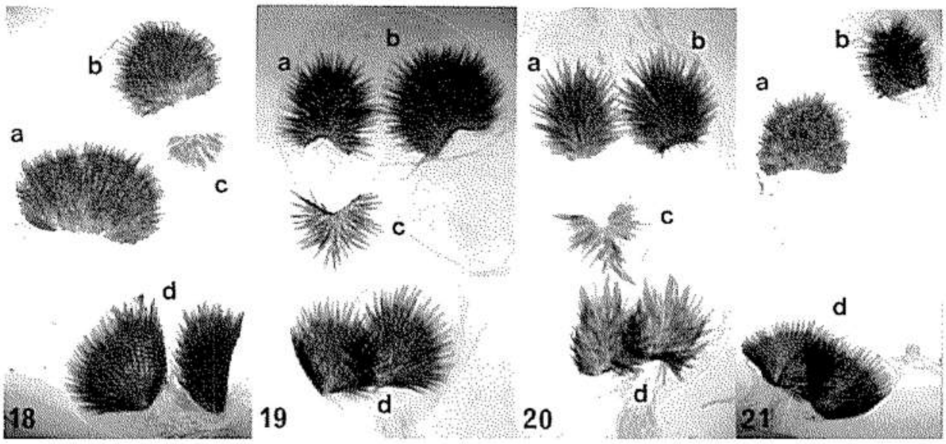
Description: Female. Length 14.2 mm. Entirely reddish brown, with the exception of antennae, pronotal hind corners and legs more or less paler. Pubescence short, rather sparse, erected and fulvous. Head quadrate, slightly longer than wide, narrowest between eyes, entirely smooth, with punctures uneven in density and size, dense, and subocellated; frons with a shallow wide and triangular depression behind anterior edge; frontal groove large, shallowly and transversely excavated, with a small hollow at the middle. Antennae elongate,and serrated from 3rd segment, apical one segment exceeding apices of hind angles of prothorax; 2nd segment smallest, obconic, twice as long as width, 3rd longest, about two times longer than 2nd or a little more, 3rd to 10th ill-serrated, elongate triangular, and gradually narrower apically, 11th narrow rhombic. Pronotum elongate, quadrate, ca. 1.2 times longer than wide; lateral sides clearly and roundly expanded laterally, widest at the middle; disc simply and roundly convex, without any medio-longitudinal line nor furrow; punctures rather fine, even in density and size, generally simple, but a little umbilical along lateral border; hind angles parallel-sided, not divergent outwards, short and triangular, with a fine carination extending shortly along each lateral margin, with posterior apex pointed and plainly upheaved; posterior margin having a small notch near hind corner. Scutellum small, subquadrate, declivous, feebly elevated above at the middle, with punctures distinctly sparse, finer and more uneven than pronotal ones. Elytral intervals among punctate-striae subflattened, with sparse small and simple punctures, a little uneven in density, transversely and feebly rugate on humeral part only; posterior end of each sutural margin feebly mucronate, and outer apical end rounded. Prosternal process elongate, straightly extending postero-interiorly, with posterior end simply narrowing and rounded, without any notches nor projections. Legs moderate.

Male unknown.

Holotype. ♀, Yamaingiri, Izumi-mura, Kumamoto, 11–12. VIII. 1986, A. SEINO leg.

Distribution: Kyushu (Kumamoto Pref.)

Etymology: The specific name is dedicated to Mr. Akio SEINO, Niigata, who has been offering elaterid beetles continuously.



Figs.18-21. Thorny plates on bursa copulatrix of *Scutellathous* spp., a: plate-a, b: plate-b, c: plate-c, d: plates-d. 18, *Scutellathous chairo* KISHII, sp. nov. (paratype, Mie Pref., 7869); 19, *Scutellathous comes* (LEWIS, 1894)(Wakayama Pref., 7865); 20, *Scutellathous shikokuanus* KISHII, 1985 (Tokushima Pref., 4508); 21, *Scutellathous seinoi* KISHII, sp. nov. (holotype, Kumamoto Pref., 7877).

Scutellathous yakuensis NAKANE et KISHII, 1958

(Japanese name: Yaku-chairo-tsuyahada-kometsuki)
(Figs. 6, 10 & 16)

Scutellathous comes yakuensis NAKANE et KISHII, 1958, Sci. Rep. Saikyo Univ. (Nat. Sci. & Liv. Sci.), 2 (5): 36 (Hananoego in Yakushima Is.).

Scutellathous yakuensis: KISHII, 1999, Bull. Heian High School, Kyoto, 42: 33.

Diagnosis: Medium and slender species, 10.6 to 14.4 mm in length, entirely reddish brown, pronotal punctures rather large, dense and more or less ocellated, median lobe of male genitalia plainly narrowing apically (Fig. 10), each lateral lobe weakly sinuate at the middle, then straightly extending apically, with apical end rounded (Fig.16). Female unknown.

Specimens examined: 1♂, Kosugi-dani, Is. Yaku, Kagoshima, 6 .VIII. 1957, N. TAMU leg.; 3♂♂, Takatsuka, ditto, 14. VII. 1984, T. OGATA leg.

Distribution: Is. Yaku-shima.

Notes. The pronotum is distinctly oblong and almost straight at wide, lateral sides almost straightened.

要約

岸井　尚：*Scutellathous* 属の再検討.——— 本邦固有の *Scutellathous* 属と東南アジアに分布する *Parathous* 属との違いと，これまでに知られていた6種の特徴及び2新種について記載した．外形では色彩形状その他で互いに極めてよく似ていて区別の困難なコメツキであるが，雄交尾器側片と雌貯精嚢内の角質板形状には顕著な違いが認められる．

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Potential Flight Ability of *Oberea hebescens* BATES (Coleoptera: Cerambycidae)*

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Abstract The potential flight ability, including flight duration, flight distance, and flight speed, of *Oberea hebescens* adults was assessed using a flight mill actgraph. Although there was no significant difference in the flight speed between both sexes, the flight duration and flight distance were significantly greater in the males than in the females. The flight ability of *O. hebescens* was compared with that of the Japanese pine sawyer, *Monochamus alternatus*, in relation to the growing habitat, density, and architecture of host trees.

Key words flight ability; *Oberea hebescens*; Coleoptera; Cerambycidae; host density; *Neolitsea sericea*; body weight.

Introduction

As to cerambycid beetles, population studies have focused on such pest species as *Monochamus alternatus* HOPE (TOGASHI, 1989; SHIBATA, 1989), *Semanotus japonicus* (LACORDAILE) (SHIBATA, 1989), and *Psacothea hilaris* (PASCOE) (TSUTSUMI, 1999). However, non-pest species have seldom been paid attention, except two North American species, *Saperda inornata* SAY and *Oberea schaumii* LECONTE (HUSSAIN, 1972). Since 1970s, we have been studying the population dynamics of *Oberea hebescens* BATES (YUKAWA, 1977), in order to promote a better understanding of regulation mechanisms in the non-pest cerambycid that is associated with tree species of the family Lauraceae.

In our recent studies (MASAOKA and YUKAWA, unpublished data), we came to aware that

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* Contribution from the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka (Ser. 5, No. 52)

adults of *O. hebescens* seemed to spend a considerable amount of energy in search for preferable tree species and suitable host leaves for feeding on and current shoots for egg-laying. In addition, a relatively low population density of *O. hebescens* adults is likely to make it difficult for them to encounter mating partners in forests. Therefore, we realized a necessity of accessing the potential flight ability of *O. hebescens*.

The flight ability has been measured as the flight duration of insects attached to a wire arm (OHKUBO, 1973 for the brown plant hopper, *Nilaparvata lugens*; DAVIS, 1980 for a cerambycid beetle, *Tetraopes tetraopthalmus*; SOLBRECK, 1980 for a curculionid beetle, *Hylobius abietis*). ITO (1982) reported that the mean flight duration of *M. alternatus* (the Japanese pine sawyer) varied with the age of adults, ranging from 8'30" to 16'28" in females and from 7'24" to 20'27" in males. Only available data using a flight mill for the flight ability of cerambycid beetles in Japan was provided by ENDA (1985) for *M. alternatus*. He measured the flight duration, flight distance, and flight speed and discussed the flight ability in relation to the body weight and the age of adults.

The present paper intends to report the flight ability, including the flight duration, flight distance, and flight speed, of *O. hebescens* using a new type of flight mill and to discuss the ability in relation to the habitat, density, and architecture of host trees. We also measured the loss of body weight by flight. These data are compared with those of *M. alternatus*.

Materials and Methods

Insect and host plants

In Kyushu, adults of *O. hebescens* begin to emerge usually in late April to early May, and feed on mid-veins (sometimes side-veins or petioles) of fresh leaves of Lauraceae species such as *Neolitsea sericea* (BL.) KOIDZUMI, *Machilus thunbergii* SIEB. et ZUCC., *Machilus japonica* SIEB. et ZUCC., and *Cinnamomum japonicum* SIEB. ex NAKAI. Females lay their eggs in the current shoots and larvae bore toward the older shoots (YUKAWA, 1977; KOJIMA and NAKAMURA, 1986; MASAOKA and YUKAWA, unpublished data) .

Flight ability

The flight ability of *O. hebescens* was assessed on June 3, 1999 in Biological Laboratory, Kurume university for 3 males and 3 females collected from the suburbs of Fukuoka City. The

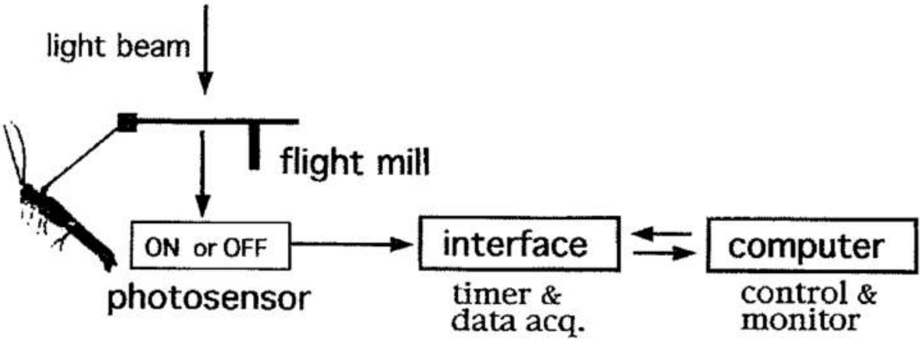

Fig. 1. A block and schematic diagram of flight-activity recording system.

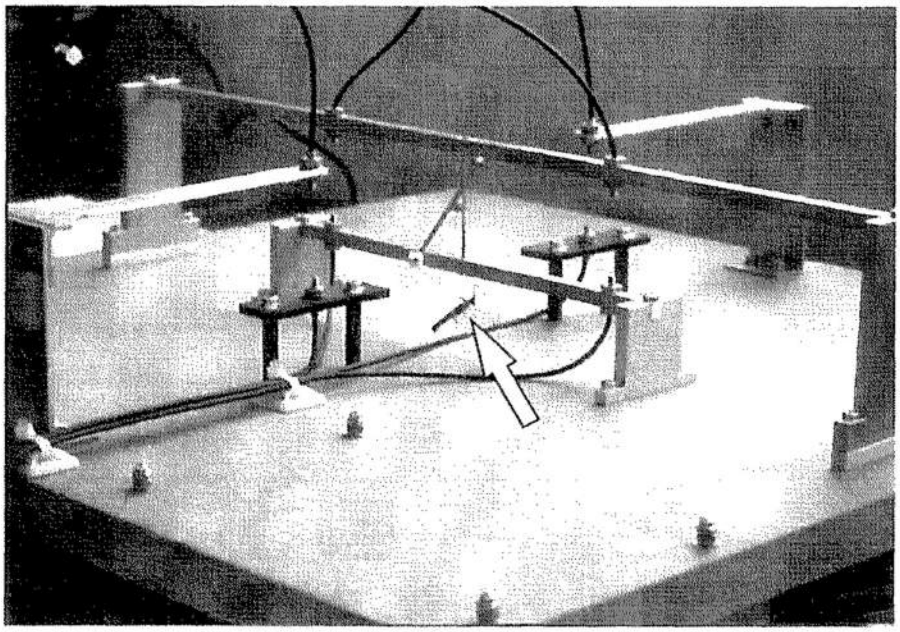

Fig. 2. *Oberea hebescens* attached at the pronotum to the blunt head of a needle which is hold to the end of the arm of the flight mill.

components of flight ability, such as flight duration, flight distance, and flight speed, were recorded during one flight trial of each individual using a flight mill actgraph (Marutanishiko Co., Ltd., Fukuoka). A block of recording system is schematically indicated in Fig. 1. Each individual was attached at the pronotum to the blunt head of a 3 cm-long needle with a small amount of dental inlay wax. The needle was hold to the end of the arm of the flight mill. The pterothorax posture in flight is always held at an angle of about 45° to the line of flight to bring out the greatest flight ability (Fig. 2). The flight distance was calculated by counting rotations of the flight mill since one rotation is equivalent to 1 m in distance. Flight speed per one rotation was automatically figured and listed in turn. The upward flight speed of a female under free flight conditions in the laboratory was assessed with a video camera and computer software to compare with the horizontal flight speed recorded by flight mill. Using this video figure (30 frames/sec) , the velocity of flight was calculated from displacements on successive frames.

Body weight loss by flight

In order to estimate flying energy costs, the body weight of 2 males and 2 females was measured before and after respective flights. By this measurement, the body weight loss and its percentage to the initial body weight were calculated.

Host density

The density of host trees was surveyed in November 2000 at two census fields, Ino (Hisayama Town, Fukuoka Pref.) and Mt. Tachibana (Fukuoka City). At each census field, a 15×15 m plot was established and all trees of *N. sericea* with the height more than 50 cm were plotted on a map. Then, the mean nearest neighbor distances of the host trees were measured. There were a few trees of *M. thunbergii* and *C. japonicum* in the plots, but they were excluded

Table 1. Flight distance, duration, and speed of *Oberea hebescens* adults.

	Symbol of adults tested	Flight distance (m)	Flight duration (min)	Flight speed (cm/sec)
Female	A	96.3	2.2	71.8
	B	282.5	3.4	135.1
	C	329.8	6.0	90.9
	Mean	236.2	3.9	99.3
Male	D	743.0	8.2	151.5
	E	471.3	8.6	71.2
	F	432.5	13.1	55.2
	Mean	548.9	10.0	92.6

from the mapping because *O. hebescens* does not prefer these trees to *N. sericea* for oviposition (MASAOKA and YUKAWA, unpublished data) .

Results

The cerambycid beetles that were attached to the arm of flight mill at the angle of about 45 degree flew continuously for more than two minutes. However, those at the angles other than 45 degree stopped flying immediately after the flight mill started rotating.

After the first flight, all cerambycid individuals tested would not fly again for a period of time. Therefore, Table 1 shows results of the first flight by respective individuals. In the males, mean flight duration per individual was 10.0 minutes, mean flight distance was 548.9 m, and mean flight speed was 92.6 cm/sec. In the females, mean flight duration was 3.9 minutes, mean flight distance was 236.2 m, and mean flight speed was 99.3 cm/sec. Although there was no significant difference in the flight speed between both sexes, the flight duration and flight distance were significantly greater in the males than in the females (MAN-WHITNEY U-test, $P<0.05$).

Upward flight speed of the female under free conditions in the laboratory was 51.3

Table 2. Body weight loss of *Oberea hescens* adults by one flight in relation to flight distance.

	Symbol of adults tested	Flight distance (m)	Initial body weight (mg)	Weight loss (mg)	% to initial weight
Female	A	96.3	75.76	1.29	1.70
	B	282.5	90.27	0.98	1.09
Male	D	743.0	56.19	0.97	1.73
	E	471.3	75.94	0.86	1.13
Mean		398.1	74.54	1.03	1.38

Table 3. Flight distance, duration, and speed of *Monochamus alternatus* adults based on the data of Yamane (1974) and Enda (1985).

		Flight distance (m)	Flight duration (min)	Flight speed (cm/sec)
Enda (1985)	Female	36 ~ 2570	1 ~ 48	21 ~ 151
	Mean	861	17	85
	Male	78 ~ 3269	2 ~ 58	48 ~ 175
	Mean	1015	18	101
Yamane (1974)	Female & Male	---	---	60 ~ 160
	Mean	---	---	106

cm/sec., which was obviously slower than the horizontal flight speed recorded by the flight mill.

Each of the 2 males and 2 females lost 0.86 to 1.29 mg (1.09 to 1.73 %) of their body weight after the flight (Table 2). There was no significant relation between the flight distances and the percentages of weight loss.

The mean distances between the nearest two host trees were 1.26 m in Ino and 5.97 m in Mt. Tachibana. In the former there were many saplings with the tree height below 100 cm, while in the latter relatively taller trees were growing sparsely.

Discussion

In order to compare the flight ability of *O. hebescens* with that of *M. alternatus*, we provided Table 3 based on the data by ENDA (1985) and YAMANE (1974). The flight duration and flight distance of *M. alternatus* were greater than those of *O. hebescens* in both sexes, respectively. These results may be related to differences of their host plants including host habitat, host density, host architecture, etc .

For feeding on and ovipositing, *O. hebescens* preferably utilizes *N. sericea* saplings (MASAOKA and YUKAWA, unpublished) that are relatively short and grow inside evergreen forests. In the forests, the flight behavior of *O. hebescens* is not disturbed by strong wind (mean speed: 0.60 m/sec inside the calm evergreen forest, while 1.19 m/sec in the windy canopy layer; unpublished data from the Research Institute of Kyushu University Forests). In addition, the density of *N. sericea* saplings is not so sparse. The mean distances between the nearest two host trees were 1.26 m in Ino and 5.97 m in Mt. Tachibana. Under these conditions, the flight ability exhibited by *O. hebescens* is considered to be adequate.

In contrast, *Pinus thunbergii* PARL and *Pinus densiflora* SIEB. et ZUCC. are the host plants of *M. alternatus*. The former grows along the seashore and the latter on ridge, on banks, and in wastelands. Thus they grow in relatively windy places and the flight activity of *M. alternatus* is likely to be strongly disturbed. Furthermore, *P. densiflora* and *P. thunbergii* trees that are attacked by *M. alternatus* are much larger (TOGASHI, 1989) than *N. sericea* saplings. Therefore, *M. alternatus* has to possess a strong flight ability for mating, ovipositing, and dispersal.

In the flight speed, however, there was no significant difference between the data for *O. hebescens* and that for *M. alternatus* on the flight mill (ENDA, 1985) and in the field (YAMANE, 1974). The differences of habitats may not be reflected to the flight speed of both species.

As to the differences between both sexes, our data for *O. hebescens*, as well as those for *M. alternatus* (ENDA, 1985), revealed that the flight ability of males was higher than that of females. HANKS (1999) also referred to this tendency in various cerambycid beetles. There is no difference between both male and female adults in the cost of finding host leaves to feed on. However, males has to fly for longer distance to encounter mating partners than females that fly in search for oviposition targets, since the female density is much lower than the host tree density.

ENDA (1985) reported that there was no correlation between flight distance and body weight loss of *M. alternatus*. We obtained similar results for *O. hebescens*. More detailed experiments are necessary to evaluate the body weight loss in relation to the flight distance.

ITO (1982) reported that the mean flight duration of *M. alternatus* varied with the age of adults. Such variations were not taken into our experiments, since the adult longevity of *O. hebescens* was apparently shorter (at most for two weeks; MASAOKA and YUKAWA, unpublished data) than that of *M. alternatus* (at least for 40 days on average; ITO, 1982) .

Acknowledgements

We would like to express our gratitude to Dr. H. OHKUBO (Department of Physics, School of Medicine, Kurume University) who provided a software for measuring the flight ability. We wish to thank Prof. M. TAKAGI, Institute of Biological Control, Faculty of Agriculture, Kyushu University, for his advice in analyzing data. Our thanks are also due to Dr. O. TADAUCHI, Dr. S. KAMITANI, Mr. D. YAMAGUCHI, and other students in the Entomological laboratory, Faculty of Agriculture, Kyushu University, for their help in various ways .

要　　約

政岡　適・上宮健吉・湯川淳一：ヒメリンゴカミキリの飛翔能力. —— ヒメリンゴカミキリの潜在的な飛翔能力（飛翔距離，時間，速度）を，フライトミルを使って調査した. 飛翔速度については，両性間に有意差は認められなかったが，距離と時間に関しては，雄の方が有意に高い値となった. また，棲息環境や密度，寄主の樹形に注目して，ヒメリンゴカミキリの飛翔能力と，マツノマダラカミキリのそれとを比較した.

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A New Paederine Beetle of the Group of *Lathrobium brachypterum* (Coleoptera: Staphylinidae) from Fukui Prefecture, Central Japan

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Abstract A new species of the staphylinid group of *Lathrobium brachypterum* is described under the name of *L.* (s. str.) *sasajii*. It is obtained by sifting dead leaves in mountainous areas at the northeastern part of Fukui Prefecture, Central Japan.

Through the courtesy of Dr. Shun-Ichi UÉNO, I had an opportunity to examine two staphylinid specimens belonging to the group of *Lathrobium brachypterum*. They were obtained by sifting dead leaves at two different localities in the northeastern part of Fukui Prefecture, Central Japan. However, they can be regarded as belonging to a single species for reason of having the same secondary sexual characters of the abdominal sternites and identical configuration of the genital organ in the male. After a careful examination, it has become clear that this species is new to science because of the peculiarities in the secondary sexual characters and genital organ in the male, which are clearly different from those of the members of the same species group.

It will be described in the present paper in commemoration of the retirement of Hiroyuki SASAJI, Professor of Biology, from the Faculty of Education, Fukui University.

Before going further, I wish to express my hearty thanks to Dr. Shun-Ichi UÉNO, Visiting Professor at Tokyo University of Agriculture, for his kindness in giving me the opportunity of studying the interesting specimens and valuable advice on the present study. Deep gratitude is also due to Dr. Yoshiaki NISHIKAWA, Ohtemon-Gakuin University, Osaka, for his kindness in supplying the specimens used in this study and to Dr. Takayuki NAGASHIMA, Tokyo University of Agriculture, for taking the photograph inserted in this paper.

Lathrobium (s. str.) *sasajii* Y. WATANABE, sp. nov.

(Figs. 1–5)

[Japanese name: Sasaji-himekobane-nagahanekakushi]

Body length: 6.3–6.5 mm (from front margin of head to anal end); 3.3 mm (from front margin of head to elytral apices).

Body elongate, subparallel-sided and somewhat depressed above. Colour reddish brown and moderately shining, with head somewhat darker; palpi, sutural areas and apical margin of elytra, two apical segments of abdomen and legs yellowish brown.

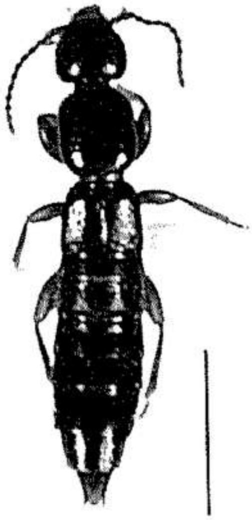


Fig. 1. Habitus of *Lathrobium* (s. str.) *sasajii* sp. nov, ♂ from Iwaya-kan'non. Scale: 2.0 mm.

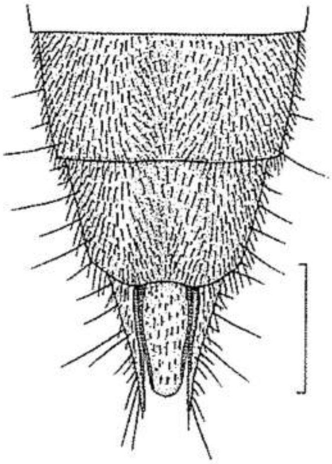
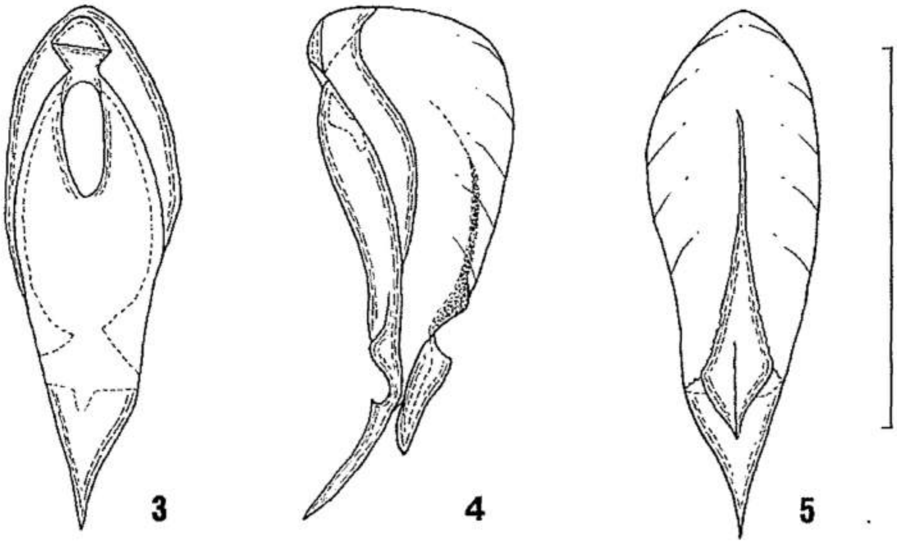


Fig. 2. Last three abdominal sternites in the male of *Lathrobium* (s. str.) *sasajii* sp. nov. Scale: 1.0 mm.

Male. Head subquadrate and subdepressed above, somewhat narrowed anteriad, a little transverse (width/length = 1.11); lateral sides gently arcuate, frontal area between antennal tubercles transversely flattened and glabrous, provided with a large setiferous puncture inside each antennal tubercle; surface sparsely scattered with distinct setiferous punctures which become closer in latero-posterial parts than in medio-frontal part and covered with extremely fine coriaceous ground sculpture only visible under high magnification; eyes small and flat, their longitudinal diameter about two-fifths as long as postocular part. Antennae elongate, extending to near the middle of pronotum and not thickened towards apical segment, 6th to 10th more or less moniliform, two proximal segments polished, the remainings opaque, 1st robust and apparently dilated apicad, twice as long as broad, 2nd constricted at the base, a little longer than broad (length/width = 1.20), though remarkably shorter (2nd/1st = 0.50) and somewhat narrower (2nd/1st = 0.83) than 1st, 3rd about 1.5 times as long as broad, almost as long as but slightly narrower (3rd/2nd = 0.80) than 2nd, 4th evidently longer than broad (length/width = 1.40) but slightly shorter (4th/3rd = 0.93) than though as broad as 3rd, 5th to 10th equal in both length and width to one another, each a little longer than broad (length/width = 1.25), but slightly shorter (each of 5th to10th/4th = 0.89) than though as broad as 4th, 11th fusiform, about twice as long as broad and apparently longer (11th/10th = 1.60) than though as broad as 10th, subacuminate at the tip.

Pronotum nearly oblong and convex medially, almost parallel-sided from apex to posterior fourth, then somewhat narrowed posteriad, apparently longer than broad (length/width = 1.19) and distinctly longer (pronotum/head = 1.39) and very slightly broader (pronotum/head = 1.05) than head; lateral sides almost straight except near anterior and posterior angles as seen from dorsal side, anterior margin gently rounded, posterior margin subtruncate, anterior angles obtuse and not visible from above, posterior ones narrowly rounded; surface more closely and more coarsely punctured than on head except for a narrow smooth median space through the length of



Figs. 3–5. Male genital organ of *Lathrobium* (s. str.) *sasajii* sp. nov.; 3, dorsal view; 4, lateral view; 5, ventral view. Scale: 1.0 mm.

pronotum. Scutellum subtriangular, provided with a few minute setiferous punctures on the surface.

Elytra subtrapezoidal and dilated posteriad, distinctly shorter (elytra/pronotum = 0.80) but a little broader (elytra/pronotum = 1.10) than pronotum; lateral sides nearly straight, posterior margin broadly emarginate at the middle, posterior angles rounded; surface somewhat densely and very roughly punctured and covered with fine brownish pubescence similar to those on pronotum.

Legs moderately long; profemora remarkably thickened though abruptly constricted near the apex and excavated in apical half on the inner face; protibiae dilated apicad, hollowed in basal half on the inner face and provided with a number of transverse rows of comb-like yellowish setae within the hollow; meso- and metatibiae simple; 1st to 4th protarsal segments strongly widened; meso- and metatarsi thin.

Abdomen elongate, somewhat dilated from 3rd towards 6th segment, and then abruptly narrowed towards the anal end; 3rd to 7th tergites each shallowly and transversely depressed along the base, and closely covered with fine and superficial punctures and fine brownish pubescence, 8th and 9th tergites each much more sparingly and finely punctured than in the preceding tergites; 8th sternite slightly emarginate at the middle of posterior margin and shallowly, longitudinally depressed in front of the emargination; 7th sternite nearly truncate at the middle of posterior margin and depressed in a U-shape at the middle just before posterior margin, surface of the depression somewhat sparsely beset with fine brownish setae than in other parts.

Genital organ long elliptical and slightly asymmetrical, well sclerotized except for membraneous ventral side of median lobe. Median lobe distinctly shorter than fused paramere, widest at the middle and more strongly narrowed apicad than basad; ventral sclerotized piece slightly asymmetrically and strongly narrowed towards the acutely pointed tip in apical part, with a strong carina along the median line on surface. Fused paramere relatively broad, widest near middle and then narrowed both basad and apicad though strongly so towards apical part, which is slightly asymmetrical, acutely pointed at the apex, and deeply hollowed on the upper face in apical third.

Female. Unknown.

Type series. Holotype: ♂, Iwaya-kan'non, Iwaya, Katsuyama-shi, Fukui Pref., Honshu, Japan, 15. V. 1989, Y. NISHIKAWA leg. Paratype: 1♂, Une, Kanazu-machi, Fukui Pref., C. Japan, 26. IX. 1993, Y. NISHIKAWA leg. The type specimens are deposited in the collection of the Laboratory of Insect Resources, Tokyo University of Agriculture.

Distribution. Japan (central Honshu).

Remarks. The present new species is similar in size and general appearance to *L.* (s. str.) *brachypterum* SHARP (1889, p. 255), but can be distinguished from it by the following points: head more strongly narrowed anteriad and less strongly punctured, pronotum not so distinctly narrowed posteriad, elytra sparsely and much more shallowly punctured, 7th sternite provided with a distinct U-shaped depression at the middle just before posterior margin, and different configuration of the male genital organ. This new species is also similar to *L.* (s. str.) *nabetaniense* Y. WATANABE (1997, p. 144) from Ishikawa Prefecture in secondary sexual characters of the abdominal sternites, but different from it in smaller body and configuration of the male genital organ.

Bionomics. The holotype was obtained by sifting dead leaves accumulated on the ground near Iwaya-kan'non at an altitude of about 1,220 m. The paratype was obtained also by sifting dead leaves in the ground of Une Temple in Kanazu-machi at an altitude of about 120 m.

Etymology. The present new species is dedicated to Professor Hiroyuki SASAJI, who has made many important contributions to the taxonomy of the Japanese Coleoptera, in particular of the Cucujoidea.

要約

渡辺泰明：福井県から採集されたヒメコバネナガハネカクシ種群の1新種．———福井県の勝山市岩屋観音附近および金津町宇根で採集されたヒメコバネナガハカクシ種群に含まれる1種を検討した結果，未記載種であることが判明したので，*Lathrobium* (s. str.) *sasajii* と命名・記載した．本種は体長および概観がヒメコバネナガハネカクシに類似しているが，頭部は前方に向かってより強く狭まり，表面の点刻が弱いこと，前胸背板は両側がほぼ平行であること，翅鞘の点刻がよりまばらで，はるかに浅く粗雑であること，さらに雄の腹部の第二次性徴および交尾器の形状が異なることから区別される．本種はまた，石川県辰口町で採集された個体に基づいて記載されたナベタニヒメコバネナガハネカクシに外部形態が類似しているが，体がより小型で，雄交尾器の形状が明らかに異なることによって区別される．

なお，本種は本学会々長，佐々治寛之博士が本年度で福井大学教授を退官される記念として同博士に献名したものである．

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Systematic Study of *Xanthochroina* (Coleoptera, Oedemeridae), with Particular Reference to its Disjunct Distributional Pattern

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Abstract The genus *Xanthochroina* GANGLBAUER, is revised. *Anancosessinia tarsalis* KÔNO, is referable to the genus, and monotypical *Anancosessinia* KÔNO, is synonymized with *Xanthochroina*. *X. auberti* ABEILLE de PERRIN, the type species of the genus, is redescribed in detail for comparison with *X. tarsalis*. A key is provided for the three known species of the genus, *X. auberti* from northern Mediterranean region, *X. tarsalis*, comb. nov., from East Asia, and *X. bicolor* LECONTE from North America. The forming processes of the disjunct pattern of distribution are discussed.

Key words Systematics; *Xanthochroina*; *Anancosessinia*; New Synonym, New Combination, Coleoptera, Oedemeridae, Disjunct Distribution.

Introduction

This study began with my question — What is *Anancosessinia tarsalis* KÔNO? According to KÔNO (1937a, b), the monotypic genus *Anancosessinia* is characterized by having a short head, entire mandibles and simple claws. *A. tarsalis* KÔNO, 1937, the type species of the genus, is a rare and poorly known oedemerid species described on the basis of only two specimens: a male from Tane-ga-shima, an island in Southwest Japan, and a female from Baibara (now Maiyuan), central Taiwan. Some authors mentioned *Anancosessinia* in their studies (e.g., GRESSITT, 1939; NAKANE, 1954, 1955, 1963; MIYATAKE, 1985; ŠVIHLA, 1986; NIKITSKY, 1996), but their concepts of the genus, except that presented by MIYATAKE (1985), are erroneous, being based on misidentified species. Thus, there has been considerable confusion over the genus and species and their taxonomic positions. It seems that nobody has yet critically re-examined KÔNO's material.

Recently, I have had an opportunity to examine the two specimens, which should be syntypes. Although the specimens are not complete in condition, I have observed several important features such as male and female genitalia, which are generally useful in determining taxonomic positions in this group of insects.

As a result, it has become clear that *Anancosessinia tarsalis* has the diagnostic characters of the genus *Xanthochroina* GANGLBAUER, 1881, given by ŠVIHLA (1986) as such in his generic classification of the Old World Oedemeridae. I have, therefore, concluded that it should be transferred to *Xanthochroina*, and that *Anancosessinia* should be synonymized with that genus.

In the following lines, I revise *Xanthochroina*, giving a description of the genus. *X. tarsalis*

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comb. nov. is redescribed, with illustrations of its genitalia and a comment on its taxonomic position. *X. auberti* (ABEILLE de PERRIN, 1876), the type species of the genus, is also redescribed for comparison with *A. tarsalis*. A key is provided for the three known species of the genus.

I respectfully dedicate this paper to Prof. Hiroyuki SASAJI, who made a great contribution to the Japanese Coleopterology, on the occasion of his retirement in March, 2001 from Fukui University.

Materials and Methods

This study was based on dry specimens borrowed from some institutions and private collections. Depositories of the material examined are abbreviated as follows:

ELEU: Entomological Laboratory, Ehime University, Matsuyama: Dr. M. MIYATAKE & Dr. N. OHBAYASHI.

NSMT: National Science Museum (Nat. Hist.), Tokyo: Dr. S. NOMURA and Dr. M. TOMOKUNI.

SEHU: Systematic Entomology, Hokkaidô University, Sapporo.

VSPC: Dr. Vladimír ŠVIHLA's private collection, Praha.

The methods of genitalia dissection and measurements used here and the terminology should be referred to MIZOTA (1999).

Since virtually nothing has been known about the biology of the *Xanthochroina* species, contents in the alimentary canal were investigated with the aim of knowing their biology in natural condition. The procedure was as follows: (1) the whole abdomen was separated from the body and heated in 10% KOH solution; then (2) washed and dissected in 70% ethyl alcohol; (3) the alimentary canal was transferred into a small amount of glycerine jelly containing acid fuchsin mounted on slide and then gently heated; (4) contents in the alimentary canal were pushed out into the jelly; (5) a thin circular cover glass was applied on them; (6) the contents were observed under a stereoscopic microscope. If there exists any chitinized organization such as pollen grain, insect body fragment, etc. in the alimentary canal, it should be clearly stained with acid fuchsin.

Systematics

Genus *Xanthochroina* GANGLABAUER, 1881

Xanthochroina GANGLBAUER 1881, Verh. zool.-bot. Ges. Wien, 31: 98; SEMENOW, 1894, Horae Soc. Ent. Rossicae, 28: 456; SEIDLITZ, 1899, Nat. Ins. Deutsl., 5: 830; SEMENOW, 1900, Horae Soc. Ent. Rossicae, 34: 644; ŠVIHLA, 1986, Acta Mus. Nat. Pragae, 41B: 186.

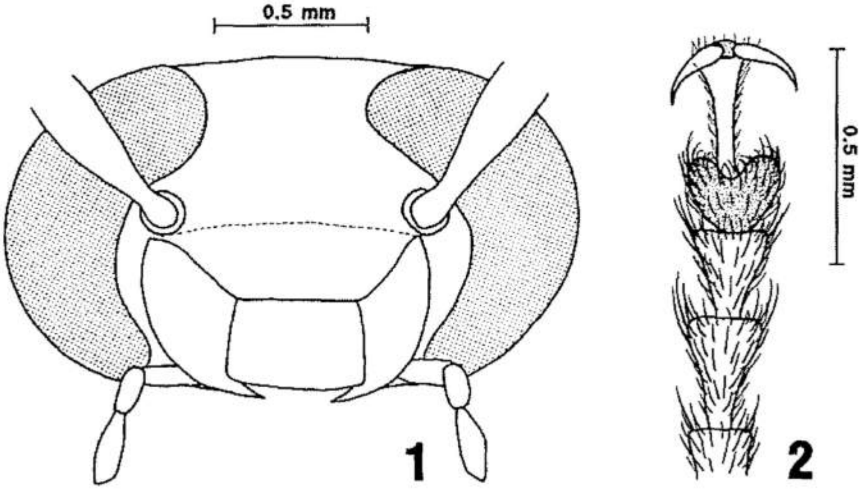
Type species: *Xanthochroa auberti* ABEILLE de PERRIN, 1876 (by monotypy).

Asclerostoma FLEISCHER, 1919, Ent. Blätt., 15: 169 (synonymized by ŠVIHLA, 1986).

Anancosessinia KÔNO, 1937a, Ins. Mats., 11: 139, **syn. n.**

Type species: *Ananncosessinia tarsalis*.KÔNO, 1937 (by monotype).

Diagnosis. With general characters of Oedemeridae-Oedemerinae-Asclerini. Body small to medium in size, cylindrical. Length: 4.1–12.0 mm. Both mandibles small, simple and sharp at



Figs. 1–2. *Anancosessinia tarsalis* KÔNO (= *Xanthochroina tarsalis* (KÔNO)). 1. head, dorso-frontal view; 2. apical part of protarsus, ventral view.

apex (Figs. 1 & 29). Eyes relatively large, strongly vaulted, with coarse facets, shallowly emarginate anteriorly. Head across eyes slightly broader than pronotum. Frons between eyes narrower than between antennal pits, head before eyes conspicuously short. Maxillary palpi small, the last segment securiform, with a marginal incision. Antennae a little exceeding the midlength of elytra. Pronotum cordiform with vague depressions. Elytra subparallel, moderately elongate, costae nearly distinct. Legs slender, the numbers of apical tibial spurs 2-2-2, all penultimate tarsal segments with velvet-like tomentum beneath, claws simple (Figs. 2 & 30).

Male. Pygidium exceeding well beyond last sternite, projections of urite VIII visible. Sternite IX without medial projection; parameres without pubescence; median lobe with apical teeth, basal apodeme with a small crest.

Female. Larger than male. Eyes somewhat smaller. Pygidium longer than last sternite. Bursa copulatrix moderately large, connected with spermatheca laterally.

Distribution. Northern Mediterranean region, North America and East Asia.

Biology. Fragmentary information was given by ARNETT (1951) and VÁZQUEZ (1993) on the biology of *X. bicolor* and *X. auberti* respectively, but nothing has been known on the biology of *X. tarsalis*. Some morphological characters, *e.g.* non-elongate antennae, very shortened front part of head, small mandibles and non-specialized maxillae and labium, seem to show that the species of *Xanthochroina* are not adapted to pollen eating. In fact, no pollen grain was found in the examined alimentary canals of *X. auberti* and *X. tarsalis*.

Taxonomic notes. In the current taxonomic system of Oedemeridae, four primary criteria proposed by ŠVIHLA (1986) and VÁZQUEZ (1996) are used for generic characterization: (1) the type of mandibles, (2) the type of tarsal claws, (3) the structure and pubescence of parameres, and (4) the structure of male sternite IX. Other characters such as median lobe structure, shape of last segment of maxillary palpi, shape of antennae, shape of male sternites VII and VIII are also used secondarily. *Anancosessinia tarsalis* shares character states with the two other species of *Xanthochroina* in regard to not only the four primary criteria but also the secondary ones mentioned above. Thus, *Anancosessinia* and *Xanthochroina* can be grouped together in the same genus.

Xanthochroina is closely resemble to *Alloxantha* Seidlitz, 1899 from Cabo Verdes Is., Canary Is., southern parts of Arabia, Iraq, and Iran (Švihla, 1986), which can, however, readily be distinguished from the former by the face not so shortened and by having no crest on the penis. *Xanthochroina* similar to the genus *Oxacis* LeConte, 1866 from the Nearctic Region too, but the latter can be distinguished from *Xanthochroina* by its elongate mandibles and clypeus.

Xanthochroina tarsalis (Kôno, 1937), **comb. nov.**

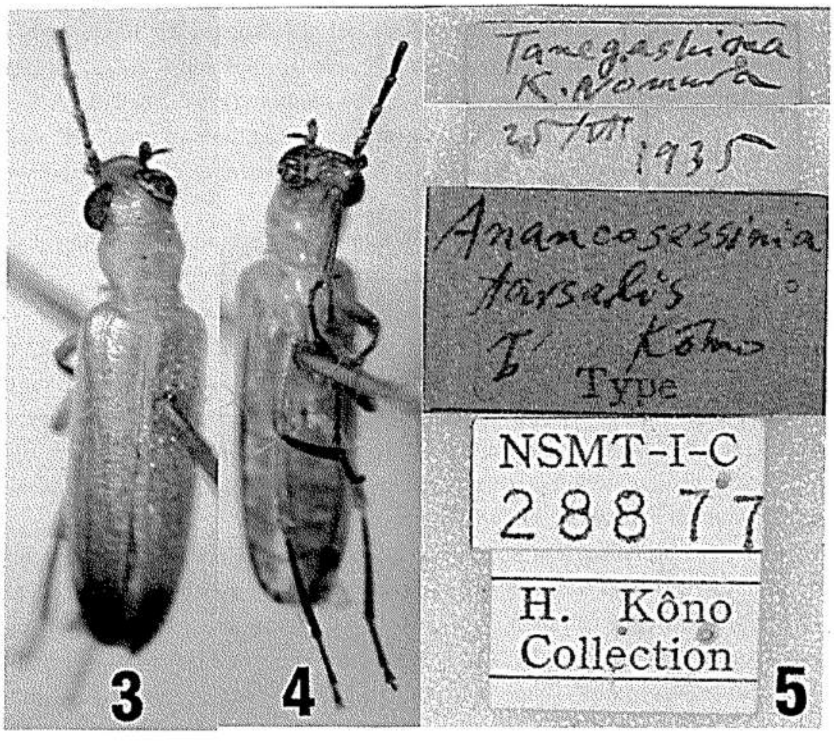
[Japanese name: Hosoashi-kamikiri-modoki]

(Figs. 1–27)

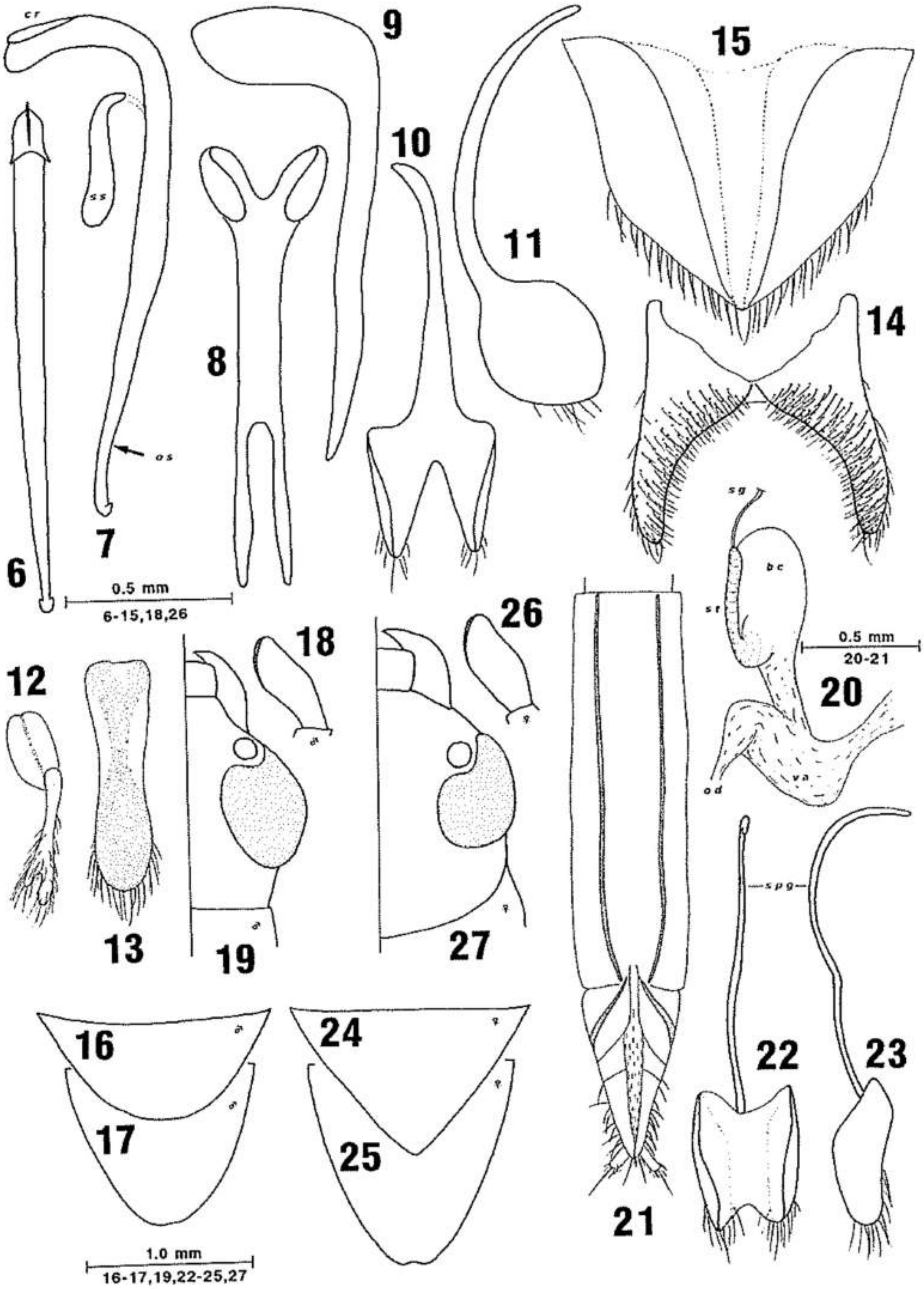
Anancosessinia tarsalis Kôno, 1937a, Ins. Mats., 11: 140; — 1937b, Fauna Nip.: 63; Gressitt, 1939, Lingnan Sci. Jour., 18: 220; Nakane, 1954, Sci. Rep. Saikyo Univ., 1: 178; Hisamatsu, 1955, Trans. Shikoku Ent. Soc., 4:102; Nakane 1963, Icon. Ins. Jap. Col. nat. ed.: 260; Miyatake, 1985, Col. Jap.: 407; Nikitsky, 1996, Key Ins. Russ. Far East, 3: 21.

Male. Body length 9.0 mm. Entirely flavous with apices of mandibles, maxillary palpi, antennae, apices of elytra, tibia and tarsi blackish brown; apical portion of femora brownish. Body clothed with flavous, thin, recumbent, moderately dense and short pubescence, which is sparse and inconspicuous on the head and prothorax.

Head (Figs. 1 & 19) short (HW/HL: 1.4), broader than pronotum (HW/PW: 1.1), with small and dense punctation, between punctures slightly microsculptured. Eyes large, vaulted,



Figs. 3–5. Lectotype of *Anancosessinia tarsalis* Kôno (= *Xanthochroina tarsalis* (Kôno)). 3, habitus, dorsal view; 4, ditto, ventral view; 5, labels.



Figs. 6–27. *Anancosessinia tarsalis* KÔNO (= *Xanthochroina tarsalis* (KÔNO)). 6-19: Male. 6, median lobe, dorsal view; 7, ditto, lateral view (cr: crest, os: ostium, ss: supporting sclerite); 8, tegmen, ventral view; 9, ditto, lateral view; 10, sternite IX, dorsal view; 11, ditto, lateral view; 12, tegminite; 13, tergite IX, dorsal view; 14, sternite VIII, dorsal view; 15, tergite VIII, ventral view; 16, sternite VII, ventral view; 17, tergite VII (= pygidium), dorsal view; 18, last segment of maxillary palpus; 19, head, dorsal view; 20-27: female. 20, internal copulatory organs (bc: bursa copulatrix, od: oviduct, sg: spermathecal gland, st: spermatheca, va: vagina); 21, ovipositor; 22, sternite VIII, dorsal view; 23, ditto, lateral view; 24, sternite VII, ventral view; 25, tergite VII (= pygidium), dorsal view; 26, last segment of maxillary palpus; 27, head, dorsal view.

gently emarginate on anterior margin. Frons between eyes narrower than between antennal pits (FWE/FWA: 0.7). Interocular area very narrow (FWE/EYW: 0.7). Both mandibles small, simple, sharp and acute at apex. Last segment of maxillary palpi (Fig. 18) feebly securiform, widest somewhat before middle, outer margin sinuate preapically. Segment I of antennae 1.8× as long as II, segment III 1.9× as long as II; segment IV more than 1.5× as long as III, segments V–XI missing (according to KÔNO's original description, segment XI is longer than X and constricted in apical portion).

Pronotum cordiform, as long as broad (PL/PW: 1.0), widest in apical third, basal margin sinuate medially. A pair of anterolateral depressions rather shallow, subcircular; mediobasal depression also shallow and vague. Punctation similar to that of head.

Elytra subparallel, moderately elongate (EL/EW: 2.9), each with three faint costae. Surface finely and rugosely punctate, between punctures densely microsculptured. Pubescence thin, dense and short.

Legs conspicuously slender. Tarsal segment I about 1.8× as long as II in protarsi, more than twice in mesotarsi, about three times in metatarsi, claws simple (Fig. 2).

Terminalia. Last sternite (Fig. 16) nearly half as long as pygidium (Fig. 17), both rounded at apex. Projections of urite VIII (Fig. 14) feebly tapered apically. Tergite VIII greatly membranous, shaped as shown in Fig. 15. Tergite IX (Fig. 13) long, with pubescence. Tegminite (Fig. 12) divided into two pieces, of which the apical one is bilobed. Sternite IX (Figs. 10 & 11) without medial projection, with pubescence in apical region. Parameres (Fig. 8) slender, incised to about 3/8 length of tegmen, not pubescent, slightly sinuous in apical region in lateral view (Fig. 9). Median lobe (Figs. 6 & 7) slender, slightly curved near apex, with a pair of teeth apically, ostium opening relatively far from apex, supporting sclerite attached to concavity of basal apodeme, basal apodeme with a very small crest.

Female. Body length 11.5–12.0 mm. Larger than male. Last segment of maxillary palpi (Fig. 26) securiform, widest in middle. Head (Fig. 27) short (HW/HL: 1.6–1.7), eyes somewhat smaller than in male, interocular area barely broader (FWE/FWA: 0.9, FWE/EYW: 1.2–1.3). Segment I of antennae 1.7× as long as II, segment III 1.9× as long as II, segments IV–X decreasing gradually in length, segment XI 1.2× as long as X and constricted in apical half. PL/PW: 1.0, EL/EW: 2.9.

Terminalia. Last sternite (Fig. 24) triangular, shorter than pygidium, tapered apically. Pygidium (Fig. 25) feebly emarginate at apex. Sternite VIII (Figs. 22 & 23) strongly sclerotized, with a rod-like spiculum gastrale. Ovipositor (Fig. 21) relatively short and narrow, coxite short. Bursa copulatrix globose; spermatheca large, as long as 3/4 length of bursa; apical part of spermathecal gland missing (Fig. 20).

Type material (Label data of the types are fully given as follows):

Lectotype (present designation, Figs. 3–5): Japan: ♂, "Tanegashima / K. NOMURA"; opposite side: "25/VII 1935" [white label, hand-written]; "*Anancosessinia tarsalis* KÔNO ♂ / Type" [red label, hand-written except for "Type" at the bottom]; "NSMT-I-C 28877" [white label, type-written]; "H. KÔNO Collection" [white label, type-written] (deposited in NSMT).

Paralectotype (present designation): Taiwan: 1♀, "Formosa / Y. MIWA" [white label, type-written]; opposite side: "Baibara / July" [hand-written in Japanese]; "*Anancosessinia tarsalis* KÔNO ♀ / Type" [red label, hand-written except for "Type" at the bottom] (deposited in SEHU).

Additional material. 1♀, Oki-no-shima, an islet off the southwest coast of Shikoku, Kôchi Pref., Japan, 11. VIII. 1951, S. HISAMATSU leg. (deposited in ELEU).

Distribution. Japan: Shikoku (Oki-no-shima, Kôchi Pref.) and Nansei Isles (Tane-gashima); Taiwan.

Biology. This species seems to be a very rare, since no specimens other than the three given above were available for examination. We have no information for the habitat or collecting sites of this species. Nothing was found in my examination of the alimentary canal.

Remarks. This species is quite similar to the other two species of the genus *Xanthochroina*, *X. auberti* (ABEILLE de PERRIN) and *X. bicolor* (LECONTE), so far as based on the structures of the mandible, claws and male genitalia. However, *X. tarsalis* can be easily distinguished from the other two species of the genus in the color pattern as before-mentioned.

Xanthochroina auberti (ABEILLE de PERRIN, 1876)

(Figs. 28–45)

Xanthochroa auberti ABEILLE de PERRIN, 1876, Bull. Soc. Ent. France: CLXVI.
Xanthochroina auberti GANGLBAUER, 1881, Verh. zool.-bot. Ges. Wien, 31: 105.

Male. Body length 5.5 mm. Head blackish brown. Mouthparts (except piceous for apices of mandibles) and basal two or three segments of antennae flavous, the rest of antennae piceous. Pronotum, legs and ventral part of body entirely flavous. Elytra almost completely blackish brown excluding mediolongitudinal area remaining flavous. Body clothed with flavous, thin, recumbent, dense and short pubescence, which is sparse and inconspicuous on the head and prothorax.

Head (Figs. 29 & 44) very short (HW/HL: 1.4), broader than pronotum (HW/PW: 1.1), with fine and sparse punctation; between punctures smooth and lustrous. Pubescence flavous, short and recumbent. Eyes moderately large, vaulted, gently emarginate on anterior margin. Frons between eyes slightly broader than between antennal pits (FWE/FWA: 1.2). Interocular area broad (FWE/EYW: 2.0). Both mandibles small, simple, sharp and acute at apex. Maxillary palpi (Fig. 43) small, the last segment feebly securiform, widest in middle. Antennae (Fig. 45) very stout, exceeding elytral midlength, segment I and III 1.7× as long as II, segments IV–VII gradually increasing in length, segments IX–X decreasing, segment XI oval, 0.6× as long as X and almost symmetric.

Pronotum cordiform, as long as broad (PL/PW: 1.0), widest in apical fourth. A pair of anterolateral depressions and mediobasal depression vague and almost obsolete. Punctation similar to that of head.

Elytra subparallel, moderately elongate

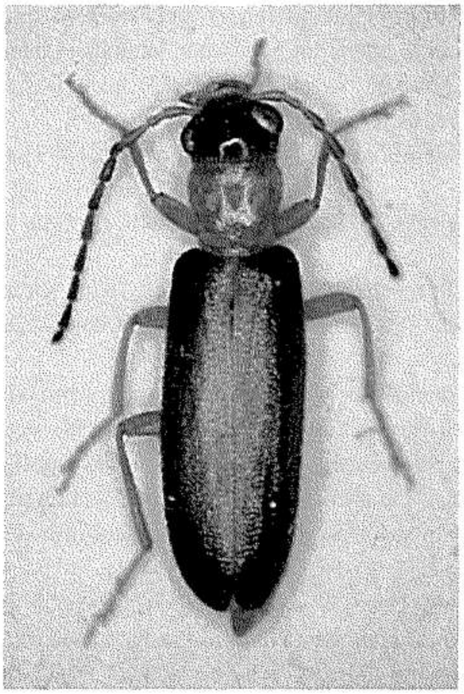
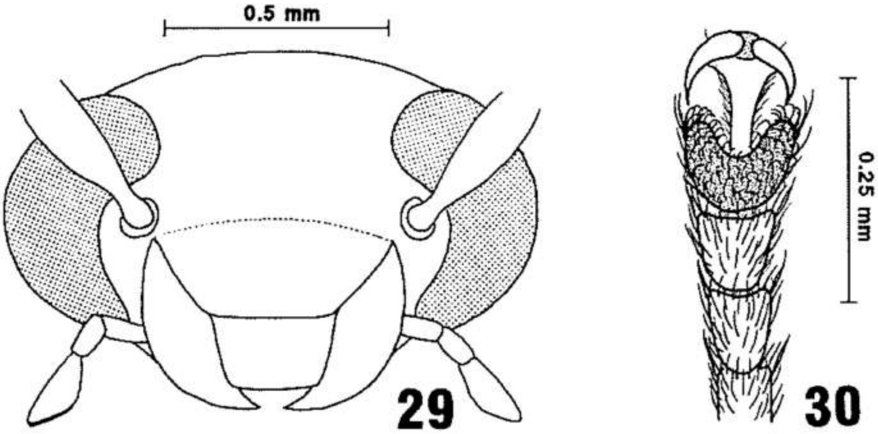


Fig. 28. Habitus of *Xanthochroina auberti* (ABEILLE de PERRIN), dorsal view.



Figs. 29–30. *Xanthochroina auberti* (Abeille de Perrin). 29, head, dorso-frontal view; 30, apical part of protarsus, ventral view.

(EL/EW: 2.8), costae nearly indistinct. Surface finely punctate, between punctures smooth and lustrous. Pubescence thin, dense and short.

Tarsi slender; segment I more than 2.0× as long as II in protarsi, less than 1.5× in mesotarsi, more than twice in metatarsi, claws simple (Fig. 30).

Terminalia. Last sternite (Fig. 41) about half as long as pygidium, truncate at apex. Pygidium (Fig. 42) elongate, rounded apically. Projections of urite VIII (Fig. 39) moderately stout, not concave. Tergite VIII (Fig. 40) membranous, with two short rods. Tergite IX (Fig. 38) small, slender, slightly narrowed medially. Sternite IX (Figs. 35 & 36) without medial projection, with pubescence in apical region. Tegminite (Fig. 37) small, slender, pubescent in apical half. Parameres (Fig. 33) incised to about 1/4 length of tegmen, not pubescent, sinuous in lateral view, with apex acute and bent inwardly (Fig. 34). Median lobe (Figs. 31 & 32) strongly sinuate, with a small apical gibba, basal apodeme of aedeagus with a small crest.

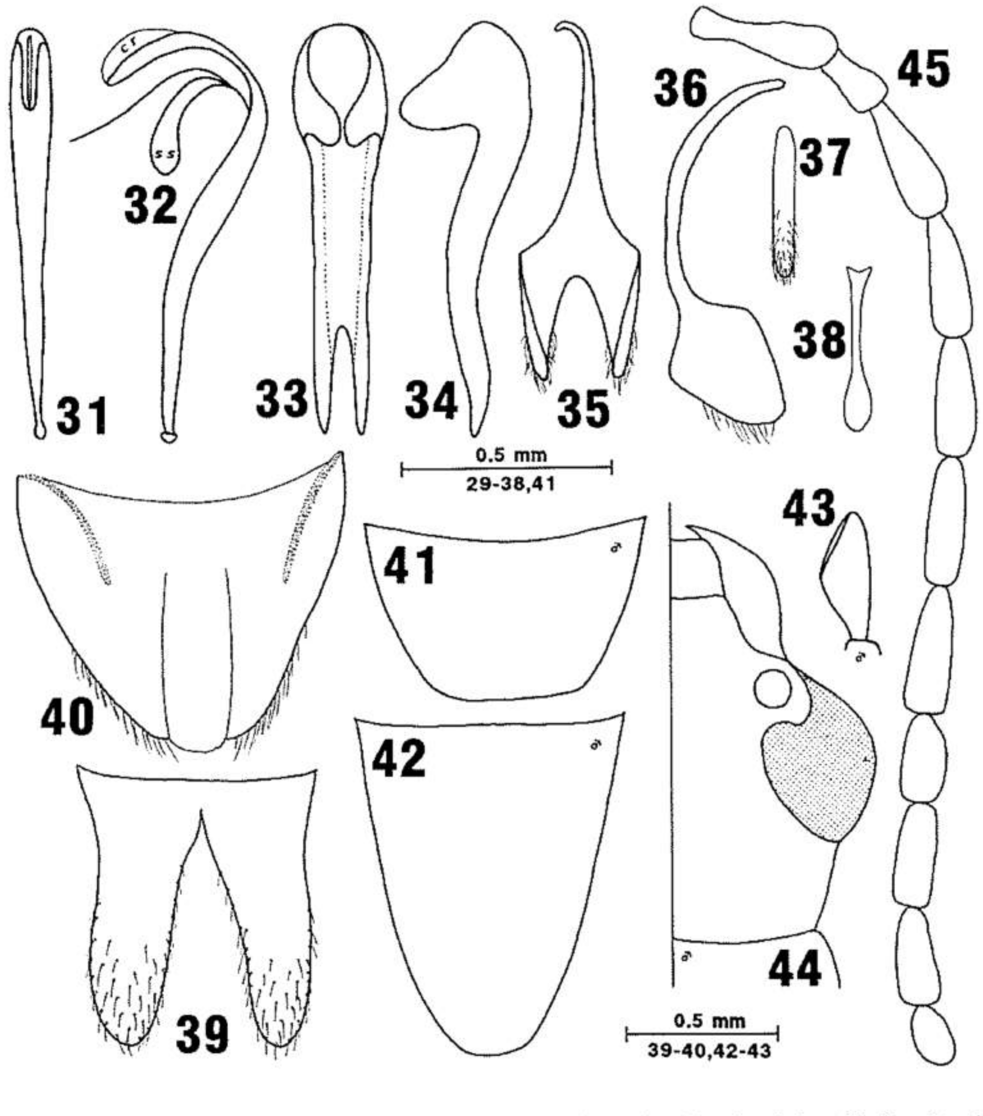
Female. No specimen has been available for this study. Refer VÁZQUEZ (1993) for description.

Specimen examined. 1 ♂, Katata, Zaharo env., Pelopones, Greek, 10–11. VII. 1996, J. Mertlik leg. (VSPC).

Distribution. Northern Mediterranean region: France (Abeille de Perrin, 1876), Greek, Syria (Ganglbauer, 1881), Baleares Isles (Compte, 1963), Iberian Peninsula (Vázquez and Lencina, 1991).

Biology. Abeille de Perrin (1876) reported that adults of *X. auberti* emerged from a fissure of dead pine, and Compte (1963) mentioned the association of the larva with *Pinus halepennis* Miller. Vázquez and Lencina (1991) reported that adults were attracted by light during the late summer. No pollen grain was found in the alimentary canal of the adult examined in the present study; some very minute pieces of wood-like tissue were observed instead (Fig. 46). This may suggest feeding on a kind of wood.

Remarks. This species somewhat resembles *X. tarsalis*, from which it can be distinguished by the much smaller eyes and the much stouter antennae in addition to the shape of the last antennal segment in male.



Figs. 31–45. *Xanthochroina auberti* (ABEILLE de PERRIN): Male. 31, median lobe, dorsal view; 32, ditto, lateral view (cr: crest, ss: supporting sclerite); 33, tegmen, ventral view; 34, ditto, lateral view; 35, sternite IX, dorsal view; 36, ditto, lateral view; 37, tegminite; 38, tergite IX, dorsal view; 39, sternite VIII, dorsal view; 40, tergite VIII, ventral view; 41, sternite VII, ventral view; 42, tergite VII (= pygidium), dorsal view; 43, last segment of maxillary palpus; 44, head, dorsal view; 45, antennae.

Xanthochroina bicolor (LECONTE, 1851)

Asclera bicolor LECONTE, 1851. Ann. Lyc. Nat. Hist. N. Y., 5: 158.

Oxacis bicolor: LECONTE, 1866. Smith. Misc. Coll., No.167: 166; HORN, 1896. Proc. Calif. Acad. Sci., 2: 417.

Oxacis (*Xanthochroina*) *bicolor*: ARNETT, 1951. Amer. Midl. Nat., 45: 332.

Xanthochroina bicolor: ARNETT 1961. Col. Bull., 14: 57.

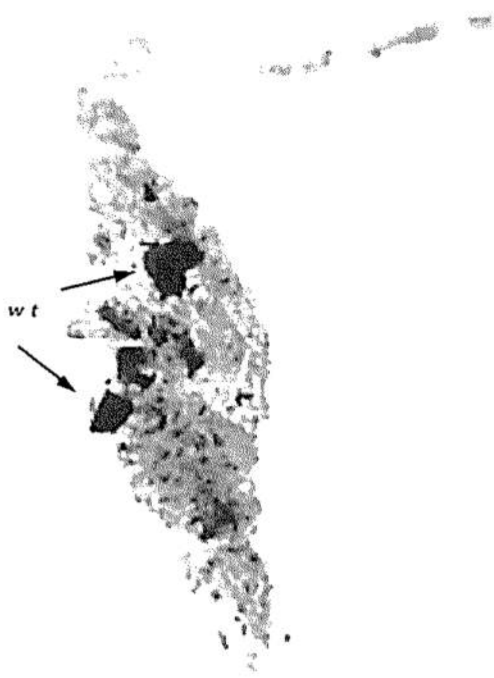


Fig. 46. Alimentary canal of *Xanthochroina auberti* (ABEILLE de PERRIN) (wt: wood-like tissue).

No specimen of the species has been available for this study. However, we can obtain de-tailed taxonomical and ecological information for this species in ARNETT's (1951) excellent work.

Distribution. North America: the Rocky Mountain states, U.S.A., and British Colombia, Canada (ARNETT, 1951). This species is widely distributed throughout the western mountain region where it is associated with dying pine (ARNETT, 1961).

Biology. The larva of this species is wood-boring in habit. Some larvae have been taken from the floor laid on basement concrete of a schoolhouse, the woodwork of another schoolhouse, and railroad ties. This species is a poisonous oedemerids, and the adult sometimes causes symptoms such as inflammation, itching and swelling on the human skin (ARNETT, 1951).

Key to the species of the genus *Xanthochroina*

1 (2) Elytra uniformly piceous .... *X. bicolor* (LECONTE)
2 (1) Elytra not uniformly colored.
3 (4) Body small (less than 8 mm long in length); eyes small (FWE/FWA: 1.2); elytra completely blackish brown excluding flavous mediolongitudinal area; the last segment of antennae oval .... *X. auberti* (ABEILLE de PERRIN)
4 (3) Body large (more than 9 mm long in length); eyes large (FWE/FWA: 0.7); elytra entirely flavous excluding blackish apices; the last segment of antennae constricted in apical portion .... *X. tarsalis* (KÔNO)

Discussions

Distribution

The distribution of *Xanthochroina* has acquired a new aspect, with *X. tarsalis* added from southern Japan and Taiwan (Fig. 47). It is worthy of attention because of its disjunct pattern exhibited on a worldwide scale. As generally recognized, the natural distributions of organisms provide one of the strong lines of evidence for their evolution. The three species of the genus are isolated from each other in northern Mediterranean region (*X. auberti*), western North

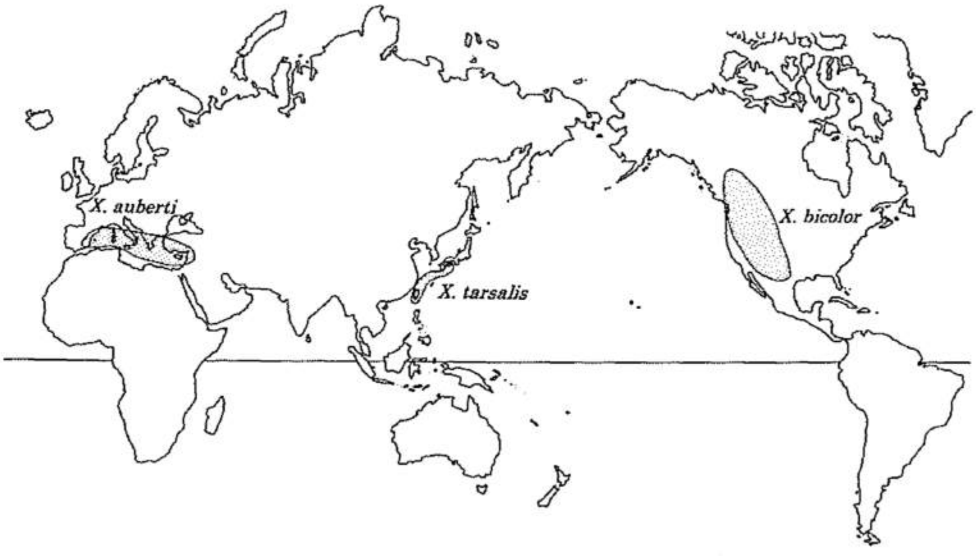


Fig. 47. Approximate distributions of the three *Xanthochroina* species.

America (*X. bicolor*) and East Asia (*X. tarsalis*). Similar disjunct distributions are known in other animals and also in plants, including fossils (examples are given by FLORIN, 1963, AKIMOTO, 1985 and WAGNER *et al.*, 2000, among others). The pattern common to them suggests a past extensive distributional range over northern high latitudes. In fact, fossils show that the Arcto-Tertiary Flora occupied the high-latitude areas north of the tropical flora in the early Tertiary. Remnants of it now survive in forest communities at much lower latitudes, namely in Europe, Asia and North America.

Host association

Oedemerid beetles are phytophagous insects. The vast majority, as larvae, feed on internal tissues of woody plants, and exhibit host specificity, which varies in degree from species to species and from group to group. No doubt the evolution and spread of oedemerids have been influenced by the evolution of plants and the spread of the major forests.

Xanthochroina is primarily associated with dying pine, so far as represented by *X. auberti* feeding on *Pinus* (ABEILLE de PERRIN, 1876; ARNETT, 1951, 1961; COMPTE, 1963; VÁZQUEZ, 1993). This conifer genus is widely distributed over the Northern Hemisphere except for the desert region of central Eurasia (HAYASHI, 1960). The distribution of the host plant genus alone cannot explain the disjunct distribution of *Xanthochroina*.

Mountain orientation and distribution

Geomorphology must have taken part in the formation of the present distribution ranges of the *Xanthochroina* species. The orientation of mountain ranges, in particular, exerts a strong influence on the climate and distribution patterns of biotas in the continents on a large scale. In Eurasia the east-west trend of the mountains forced many species of biotas to become regionally extinct, because they were unable to shift their ranges southward over the climatic and topographic barriers posed by the mountains. In contrast, in North America few biotas became extinct in that manner, because the main mountain ranges have been running from north to south, forming no east-west barriers. In this continent organisms had space to shift their ranges southwards during the age of maximum glaciation (FLINT, 1971).

X. auberti is distributed in northern Mediterranean region, which is surrounded to the north by the Alps and the Pyrenees. The Alps are part of the largest orogenic belt, extending from Spain on the west through southern central Europe to Greece and Turkey. The Pyrenees rise to more than 3,500 m above sea level along the border between France and Spain. Both these mountain ranges were formed by collisional orogeny in the Early to Late Tertiary (CONDIE and SLOAN, 1998). The ancestral stock of *X. auberti* may have survived south of the mountains, whereas the northern populations became extinct with the Pleistocene or Quarternary climatic alteration.

X. bicolor inhabits areas along the Rocky Mountains, which extend from western Canada to the southwestern United States. This range is composed of uplifted crustal blocks that were first deformed during the Laramide Orogeny in the Early Tertiary (CONDIE and SLOAN, 1998). According to AXELROD (1960), in western North America the Arcto-Tertiary Flora occupied the lowland stretching from high latitudes to southeastern Alaska and thence across central Montana during the Paleocene. By the middle Oligocene it had reached northern California, Nevada and central Colorado. During the Miocene it ranged somewhat farther south over the lowlands, but the rapid spread of dry climate over the southwestern part of the continent, which began in the Middle Oligocene, prohibited its southward migration. *X. bicolor* should have been adapted to that climate, and have survived as a remnant along the Rocky Mountains.

X. tarsalis is distributed from southeastern mainland Japan, probably through the Ryûkyû Islands, to Taiwan. These areas overlap the Sino-Japanese Region, which was proposed for warm-temperate plant species or species groups distributed in southwestern Japan, Taiwan, Southern continental China, and eastern Himalayas (KANAI, 1963). Through the Ice Age East Asia has relatively been stable climatically, providing one of the refuges for warm-temperate biotas (HAFFER, 1982). *X. tarsalis* may be among many organisms that have survived in this refuge. In this regard it may be widely distribution in this region.

Conclusion

The distribution pattern suggests that the genus *Xanthochroina* is a relict of an old stock of the Asclerini. To confirm this suggestion requires a phylogenetic analysis of the members of the tribe is required.

Acknowledgements

I wish to express my cordial thanks to Dr. Sadao TAKAGI, Dr. Masaaki SUWA, Dr. Kazunori YOSHIZAWA (SEHU) and Dr. Masahiro ÔHARA (The Hokkaidô University Museum) for their continuous guidance and critical reading of the manuscript. I am much indebted to Dr. Shûhei NOMURA and Dr. Masaaki TOMOKUNI (NSMT) for giving me the opportunity to examine the type specimens of *A. tarsalis* KÔNO, to Dr. Mutsuo MIYATAKE, Dr. Nobuo OHBAYASHI (ELEU) and Dr. Vladimír ŠVIHLA (National Museum, Praha) for their kind loan of the valuable material used in this study, and to Mr. Shen-Horn YEN (Imperial College at Silwood Park, Ascot) for his help in obtaining publications.

要　　　約

溝田浩二：*Xanthochroina* 属（鞘翅目，カミキリモドキ科）の体系学的研究，ならびにその隔離分布パターン形成過程に関する考察. —— *Anancosessinia* 属は，Kôno (1937) が種子島産の１♂ならびに台湾・眉原産の１♀を基に記載したホソアシカミキリモドキ *Anancosessinia tarsalis* のみを含む単模式属である．ホソアシカミキリモドキは非常な稀種である上に，模式標本が全く再検討されてこなかったという経緯から，*Anancosessinia* 属は多くの研究者に誤って認識されてきた．最近，筆者は本種のタイプ標本を検する機会に恵まれ，交尾器をはじめ分類学的に重要な形質を詳細に検討したところ，本種は地中海北方地域ならびに北米に分布している *Xanthochroina* 属に含まれることが判明し，*Anancosessinia* 属をこのシノニムとした．この結果，*Xanthochroina* 属には，*X. auberti*, *X. tarsalis* および *X. bicolor* の３種を認めることになり，これらに基づいて属の記載を行い，前２種を図示するとともに３種の検索表を作成した．最後に，*Xanthochroina* 属の示す特異な隔離分布パターンの形成過程について考察を行った.

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Two New Species of the Family Melandryidae from Indochina (Coleoptera, Melandryidae)

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Abstract Two new species of the family Melandryidae, *Stenoxylita sasajii* TOYOSHIMA, sp. nov. from Vietnam and *Perakianus kumei* TOYOSHIMA, sp. nov. from Thailand, are described. They are very peculiar in morphological features and easily distinguishable from their congeners. The former is a second member of the genus *Stenoxylita* NOMURA, 1959 which has been regarded as being endemic to Japan, and its discovery suggests a close relationship in the melandryid faunas between Indochina and Japan.

Recently I had an opportunity to examine some specimens of melandryid beetles from Indochina through the courtesy of Messrs. Masao ITÔ, Kunio KUME and Akira YAMASHITA, and after a careful study concluded that some of them were new to science. I will describe the following two new species in this paper.

One of them is a splendid species from Vietnam and a second member of the genus *Stenoxylita* NOMURA, 1959 (type species: *Dircaeomorpha*? *trialbofasciata* HAYASHI et KATO, 1956, by monotypy), which has been regarded as being endemic to Japan. I was unable to find any genera more or less related to it. Though this species is quite different from *S. trialbofasciata* (HAYASHI et KATO, 1956) in morphological features, I have recognized a close relationship in the melandryid faunas between Indochina and Japan with the discovery of such an interesting species. I will name it *Stenoxylita sasajii*, the new name being dedicated to Dr. Hiroyuki SASAJI who is one of the most excellent coleopteran taxonomists in Japan.

The other is also a distinct species discovered by Mr. Kunio KUME in Thailand and belonging to the genus *Perakianus* whose members are distributed mainly from Indochina to the Greater Sunda Islands. Up to the present, two species of this genus, *P. atriceps* PIC, 1914 and *P. lineaticollis* PIC, 1922 have been known from Indochina, but this new species is easily distinguishable from them by having the pronotum and elytra entirely unicolorous instead of being partly bicolorous in the latter. I will give a new name, *Perakianus kumei*, to this species.

Before going further, I wish to express my sincere gratitude to Dr. Shun-Ichi UÉNO of the National Science Museum (Nat. Hist.), Tokyo for his critical reading of the manuscript of this paper. My hearty thanks are due to Messrs. Yutaka ISHIKAWA of Maruko-machi, Nagano Pref., Masao ITÔ of Yokohama, Noboru KANIE of Nagoya, Kunio KUME of Tokyo and Akira YAMASHITA of Takarazuka for their kindness in supplying me with invaluable specimens and for useful advice. I am also indebted to Mr. Akemichi SUGIMURA of Nagoya for taking photographs inserted in this paper.

It is a pleasure for me to dedicate this short paper to Dr. Hiroyuki SASAJI in commemorating his contribution to the taxonomic study of the Japanese Coleoptera.

Both the holotypes to be designated in this paper will be preserved in the collection of the

National Science Museum (Nat. Hist.), Tokyo.

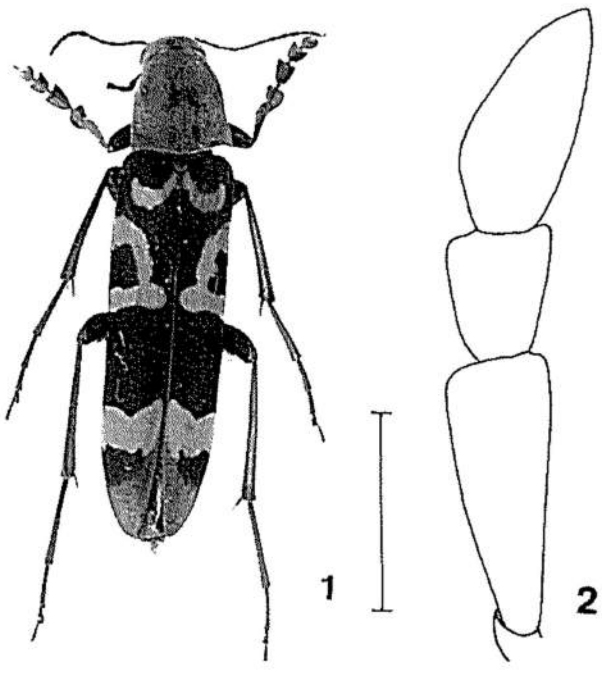
Stenoxylita sasajii TOYOSHIMA, sp. nov.

(Figs. 1–2)

Male. Length: 14.4 mm. Width: 3.3 mm. Elongate, cylindrical and medium in size. Blackish brown, almost opaque; mandibles black, shining; marginal portion of clypeus dark yellowish brown; eyes dark reddish brown; antennae, maxillary palpi and most parts of legs dark brown; elytra black, provided with four pairs of light brown bands and also with indistinct brownish apical pubescent markings.

Apical margin of labrum densely furnished with long yellowish brown hairs. Head, antennae, pronotum, scutellum, legs and abdomen covered with brown pubescence which is fine and short on antennae and legs, dense, rather short and decumbent on pronotum, fine and rather dense on scutellum, and very dense, rather long and recumbent on abdomen except for mesosternum on which the pubescence is shorter and sparser than that on metasternum. Elytra densely clothed with very short and blackish pubescence on the black-coloured portions; elytral bands very closely with short, thick, recumbent and light brown pubescence; apical black portions behind the 4th bands also rather closely with long, semirecumbent and brown pubescence which represents the indistinct apical markings.

Head including eyes a little wider than pronotal apex and moderately rounded in frontal view, surface finely and shallowly rugulose all over; frons longer than wide; clypeal apex very closely and microscopically punctate with apical border sharply margined; genae rather deeply sulcate just beside the mouthparts. Maxillary palpi very long and subcylindrical; 2nd segment the longest, gently thickened apicad, about twice as long as 3rd; 3rd short, obliquely obconical; 4th subcultriform in lateral view with outer margin obliquely truncate from basal 1/3 to tip, about 1.6 times as long as 3rd. Eyes moderately large, elongate-ovate, about 2.5 times as long as wide, antero-median portions feebly sinuate just behind the antennal insertions. Antennae slender, filiform, reaching just behind latero-basal corners of pronotum; 3rd segment longer than 5th which is almost as long as 6th; 4th the longest, slightly longer than 3rd; 7th to 11th each evidently shorter than 6th,



Figs. 1–2. *Stenoxylita sasajii* sp. nov. (holotype) ; 1, habitus; 2, maxillary palpus (scale: 0.5 mm).

gradually decreased in length; apex of 11th moderately rounded.

Pronotum subtrapezoidal with lateral sides feebly rounded, 1.07 times as long as basal width; apex apparently narrower than base (ratio: 0.61 : 1.0); anterior border almost straight, posterior one feebly though widely bisinuate; lateral borders margined from base to near apical 1/4, the marginal lines almost straight in lateral view; latero-basal angles rather acute and evidently angulate; disc moderately convex, finely and closely rugulose all over, without distinct punctures, bearing a narrow and shallow longitudinal furrow from base to the middle, feebly depressed just inside latero-basal corners and very feebly so at medio-basal portion.

Scutellum lingulate, moderately elongate, very finely and closely punctate.

Elytra about 3.4 times as long as wide, a little wider than pronotum, parallel-sided from base to apical 1/4, then roundly narrowed apicad; each apex narrowly rounded; suture smooth, not pectinate; disc somewhat convex behind scutellum and depressed behind the convexity, shallowly closely rugulose all over, sparsely scattered with shallow punctures. Elytral bands distinct and apical pubescent markings indistinct; 1st band narrow, arcuate backwards, extending from scutellum to a little inside humerus; 2nd oblique and strongly incurvate, extending from basal 1/6 to 1/3 of elytral disc, with outer end reaching lateral margin, and inner one in contact with 3rd band a little inside suture and conjointly forming a semiocelloid marking; 3rd almost straight with inner end reaching just before suture; 4th at apical 1/4, much broader than 3rd, feebly broadened towards suture, extending from suture to lateral margin with anterior border obliquely bent forwards at the middle, and posterior one somewhat sinuate near lateral and sutural margins; apical pubescent marking occupying most part of apical area behind the 4th band, joining the band near suture and broadly diffusing apicad.

Abdomen finely and closely rugulose, very sparsely scattered with punctures; median portion of prosternum very short and obtusely angulate; procoxae large, strongly contiguous and well convex; mesosternal process long and acute, reaching prebasal portions of middle coxae which are contiguous at the bases; middle portion of mesosternum not rugulose, only bearing several punctures; abdominal sternites visibly five-segmented, rugulae on each disc particularly fine and close, 5th sternite deeply and triangularly concave at apex, with emarginate apical margin.

Legs very long, stout, aciculately punctulate; femora somewhat flattened; tibiae subcylindrical; upper edges of all tibiae smooth, not pectinate; fore tarsi very large, strongly flattened, apparently broader and longer than tibiae, four basal segments each strongly dilated apicad, 2nd segment the longest, 5th very small and slender; middle tibiae a little longer than and hind ones much longer than respective femora; middle tarsi simple and subcylindrical; hind femora reaching a little beyond the apex of 2nd visible abdominal sternite; hind tarsi longer than tibiae, cylindrical, ratio of each segment as follows: 1.0: 0.51: 0.15: 0.21; hind tibial spurs simple and unequal in length, inner one longer than outer one; claws simple.

Female. Unknown.

Holotype: ♂, Mt. Tam Dao, Vinh Phu Prov., N. Vietnam, V. 2000, natives lgt.

Distribution. Northern Vietnam.

Notes. This new species is easily distinguished from *Stenoxylita trialbofasciata* (HAYASHI et KATO, 1956) by having differently coloured pubescence on the pronotum and abdomen, and the peculiar markings on the elytra.

Perakianus kumei TOYOSHIMA, sp. nov.

(Fig. 3)

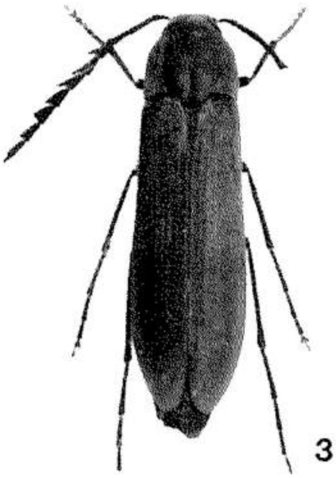
Female. Length: 6.9–12.1 mm. Width: 1.6–2.9 mm. Elongate, cylindrical and medium in size. Black; maxillary palpi brownish yellow, eyes somewhat brownish, upper surface of head except for partly infuscate frons and blackish hind ocular portions, a median stripe on gula, prothorax, elytra except for infuscate humeral rugulae, median process of mesosternum and apical portions of 3rd to 5th abdominal sternites brownish red; tibial spurs reddish brown.

Head, pronotum, scutellum and elytra covered with brownish red pubescence which is rather sparse and suberect on frons, moderately dense, rather long and recumbent on pronotum and elytra; antennae closely covered with short, recumbent and blackish pubescence; legs and abdomen with fine, recumbent and brownish pubescence which are rather dense on abdominal sternites and very short on legs.

Head including eyes as wide as pronotal apex, moderately arcuate forwards and visible in dorsal view; apical border of clypeus finely marginate; surface rather closely, shallowly and rugulosely punctate; frons wider than long. Maxillary palpi serrate; 2nd to 4th segments flat, almost equal in width; 2nd wider than long, broadly subtriangular with apical margin slightly arcuate inwards; 3rd much wider than long and much narrower than 2nd, narrowly subtriangular with apical margin moderately arcuate inwards; 4th longer than wide and as broad as 3rd, subtriangular with apical and basal angles moderately rounded, apical margin between these angles very slightly sinuate. Eyes elongate-ovate, about 2.1 times as long as wide; antero-superior portions emarginate just behind antennal insertions. Antennae strongly serrate, reaching near or a little beyond the middle of elytra; 1st segment obconical, a little longer than 3rd; 2nd small, subcupulate; 3rd to 10th flattened, subtriangular in shape; 7th to 10th distinctly wider and longer than 4th; 11th the longest, flattened, narrower than 10th, gradually broadened from base to apical 1/4, then rapidly and incurvately narrowed apicad, apex acute with tip very narrowly rounded.

Pronotum roundly quadrate in shape, a little wider than long (ratio: 1.2 : 1.0), broadest just before base; base almost as wide as elytral base; sides feebly constricted near middle; apical border almost straight, finely marginate; basal border distinctly bisinuate near middle, median portion between the sinuations moderately arcuate backwards; edges of lateral borders indistinct, only marginate near basal corners; apical and basal corners widely rounded; disc evidently uneven, shallowly, closely and rugulosely punctate, bearing an elongate-ovate fovea at mediobasal portion, and an indistinct and shallow median longitudinal furrow extending from the tip of fovea to the middle, antero- and medio-lateral portions somewhat depressed, basal portions beside the middle also rather strongly depressed.

Scutellum longer than wide with apex moderately rounded, closely and rugulosely punctate.



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Figs. 3. *Perakianus kumei* sp. nov. (holotype).

Elytra long, moderately convex above, about 3.3 times as long as basal width, parallel-sided or slightly broadened from base to apical 1/3, then rather rapidly narrowed apicad, with apices separated and each widely rounded; suture pectinate posteriorly; each disc finely, shallowly and transversely rugulose, bearing six rows of shallow and indistinct striae which are vanished near base and apex; intervals somewhat ridged; humerus weakly raised, and the corner widely rounded, bearing several rows of distinct transverse rugulae.

Legs slender, moderately long, very shallowly punctulate; upper edges of middle and hind tibiae distinctly notched; fore tarsi slender, 1st segment cylindrical, longer than 2nd to 4th united, 2nd and 3rd subtriangular, longer than wide, almost equal in width, 4th somewhat flattened, rather strongly dilated apicad, wider and longer than 3rd; middle tibiae cylindrical; three basal segments of middle tarsi subcylindrical, 4th segment triangular, flattened, dilated apicad and wider than 3rd; hind tibiae subcylindrical; middle and hind tibial spurs unequal in length, inner ones longer than outer ones.

Prosternum very shallowly and rather closely punctate; intercoxal portion broad, triangularly projecting backwards, the apex of the projection reaching bases of fore coxae which are narrowly contiguous at the bases. Mesosternum and mesepisterna very shallowly and coarsely punctate; mesosternal process long and acute, reaching bases of middle coxae which are narrowly separated. Abdominal sternites visibly five-segmented; surface of each segment smooth, extremely finely rugulosely punctulate; 5th sternite acute triangular in shape, with apex very narrowly rounded.

Male. Length: 9.5 mm. Width: 2.2 mm. Body somewhat slenderer than in female. Coloration the same as in female. Antennae longer than in female, reaching near apical 1/3 of elytra. Tarsi almost the same in shape as in female.

Holotype: ♀, Waiang Papao, Chiang Rai, N. Thailand, 31. V. 1993, Kunio KUME lgt. Paratypes: 3♀♀, same data as the holotype.; 5♀♀, same locality as the holotype, 1. VI. 1993, Kunio KUME lgt.; 1♂, Pass near Soppong (19°27'N/98°20'E), *ca.* 1500 m in alt., Mae Hong Son, Thailand, 7–10. V. 1997, S. BEČVÁŘ, J. & Sen. lgt.

Distribution. Northern Thailand.

Notes. This new species is easily distinguished from the other congeners by having the prothorax and elytra entirely brownish red.

Additionally, I was able to examine a female specimen from Chiang Mai through the courtesy of Mr. Masao ITÔ. This specimen is closely similar to this new species, but the prothorax, elytra and head are entirely carmine red in colour, whereas every type specimen of *P. kumei* has a partly infuscate frons, blackish hind ocular areas and a narrow red stripe on gula. This fact seems to indicate that the coloration is stable in *P. kumei*. Unfortunately, the single specimen in question is not in a good condition, so that I was unable to make adequate comparison with *P. kumei* in some important characteristics which are indispensable for determining its identity. I prefer to exclude the Chiag Mai specimen from the type series of this new species and to leave a final conclusion for the future.

要約

豊嶋 亮司：インドシナで発見されたナガクチキムシ科の2新種.——— ベトナム北部で発見された *Stenoxylita* 属の１種とタイ北部で発見された *Perakianus* 属の１種は, ともに翅鞘の斑紋あるいは色彩が特徴的であり, 新種と認められるので次のとおり命名して記載した.

1. *Stenoxylita sasajii* TOYOSHIMA, sp. nov.：本種は *Stenoxylita* 属に所属する種であるが, 日本

に分布するミスジナガクチキ *S. trialbofasciata* (HAYASHI et KATO, 1956)とは，翅鞘の斑紋の形や前胸背板上の微毛の色彩がまったく異なるので容易に区別できる．従来 *Stenoxylita* 属にはミスジナガクチキ１種が知られていたにすぎず，日本に固有の属と考えられていたが，今回の本種の発見によりインドシナと日本のナガクチキムシ相には密接な関係のあることがより明確となった．本種の種名は佐々治 寛之先生に献名した．

2. *Perakianus kumei* TOYOSHIMA, sp. nov.：本種はおもにインドシナから大スンダ列島にかけて分布する *Perakianus* 属に所属するが，本属の他の種とは前胸および翅鞘がすべて褐赤色であることにより容易に区別できる．なお基準標本とは別に，本種に非常によく類似しているが頭部等の色彩が若干異なる Chiang Mai 産の1♀個体を検したが，十分な比較検討ができなかったので将来の検討課題とした．本種の種名は最初の発見者である粂 久仁雄氏に因んで命名した．

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Two New Tenebrionid Species from Japan

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Abstract Two new tenebrionid species from Japan are described under the names *Boletoxenus sasajii* sp. nov. and *Lorelus sasajii* sp. nov.

In the course of the senior author's studies on the Japanese tenebrionid beetles for these 40 years, Prof. Dr. Hiroyuki SASAJI has always given expert advice and warmhearted encouragement to him. For commemorating his retirement from official duties, he wishes to express his thanks to the professor and is going to describe new tenebrionid species from Japan in collection with the junior author.

Before going into details, the authors would like to express their heartfelt thanks to Dr. Ryûtarô IWATA, Nihon University, Dr. Stanislav BEČVÁŘ, Institute of Entomology, Czech Academy of Sciences, Messrs. Yukihiko HIRANO, Odawara City, and Masahiro SAITO, Fukui City, for submitting important materials to the authors the present study. The authors also thank Dr. Makoto KIUCHI, National Institute of Sericultural and Entomological Science, for taking photographs inserted in this paper. Deepest appreciation should be expressed to Dr. Shun-Ichi UÉNO, National Science Museum (Nat. Hist.), Tokyo, for his critical reading of the manuscript of this paper.

The depositories of the holotypes to be designated are the collections of the National Science Museum (Nat. Hist.), Tokyo, Japan (NSMT) or Faculty of Agriculture, Kyushu University (FAKU).

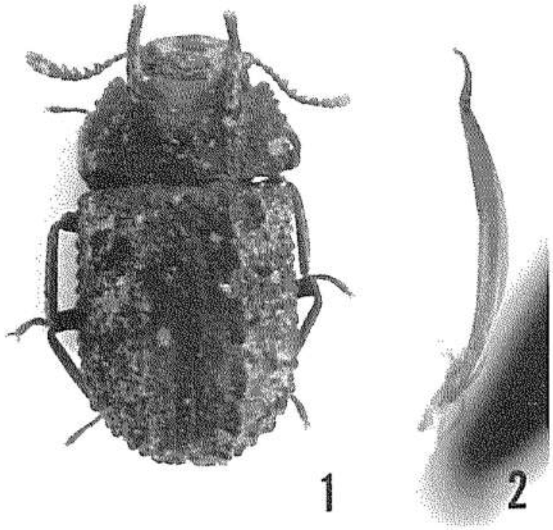
Tribe **Bolitophagini**

Boletoxenus sasajii sp. nov.

[Japanese name: Amami-kobusuji-gomimushidamashi]

(Figs. 1–2)

This new species closely resembles *Boletoxenus bellicosus* (LEWIS, 1894), originally described from Honshu and later collected from the neighboring areas, but can be distinguished from the latter by the following characteristics.



Figs. 1 - 2. *Boletoxenus sasajii* sp. nov.: 1, habitus; 2, male genitalia (lateral view).

Body slightly smaller (4.3–6.8 mm). Head narrower; genae before eyes a little noticeably projected. Antennae shorter but more dilated apicad, with anterior face more sharply serrate; ratio of the length of each segment from basal to apical: 0.55, 0.2, 0.35, 0.26, 0.35, 0.33, 0.34, 0.35, 0.37, 0.38, 0.34.

Pronotum 1.54 times as wide as long, more noticeably produced laterad, more distinctly explanate along lateral margins; front angles a little more acutely projected; disc less strongly raised, more closely punctate, more weakly granulate, with a pair of obviously slenderer horns, whose apical tufts are less abundant.

Elytra 1.2 times as long as wide; disc with rows of shorter and smaller ridges, whose posterior parts are covered with fine setae; intervals less densely granulate.

Abdominal sternites strongly and closely punctate; anal sternite longitudinally depressed in apico-medial part, each side of the depression ridged. Legs obviously slenderer; ratios of the lengths of pro-, meso- and metatarsomeres: 0.2, 0.14, 0.16, 0.17, 1.2; 0.16, 0.13, 0.16, 0.17, 1.23; 0.23, 0.21, 0.24, 1.29.

Male genitalia shorter, 2.3 mm in length, 0.35 mm in width, noticeably bent at the border of basal piece and lateral lobes; basal piece 2 mm in length, gently curved medially in lateral view; lateral lobes acuminate, 0.5 mm in length, rather strongly curved in lateral view.

Female: Pronotal apex more strongly produced anteriad with a pair of gibbosities located more anteriorly; elytra less depressed in medial parts, ridges and granules less distinct.

Holotype: ♂, Uken-son, Chûô-rindô, 150–300 m alt., Amami-Ôhima Is., Kagoshima Pref., Ryukyu Isls., Japan, 22–24. VII. 1999, K. AKITA leg. (NSMT). Paratypes: 263 exs., same data as for the holotype.

Tribe Lupropini*

Lorelus sasajii sp. nov.

[Japanese name: Shiro-arinosu-gomimushidamashi]

(Figs. 3–6)

Brown, with eyes black; each surface moderately, somewhat vitreously shining. Rather elongate, gently flattened.

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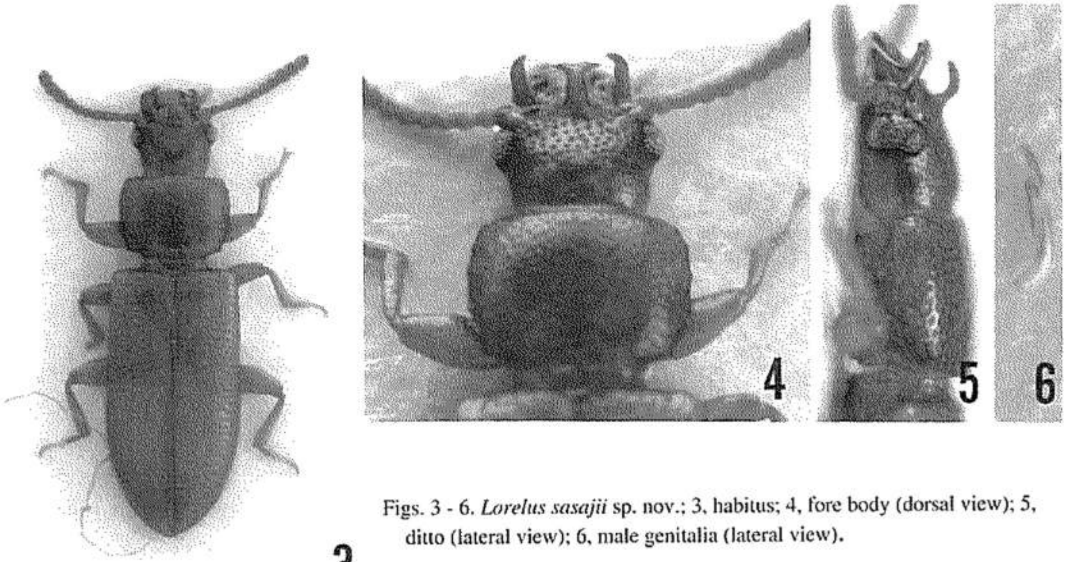
*In the GEBIEN catalogue (1941, p. 675), the genus *Lorelus* SHARP, 1876, is placed in the tribe Heterotarsini, but the diagnostic features of its members, as pointed out by KASZAB (1982), are obviously those of the Lupropini. The tribe Lupropini is usually treated as a member of the family Tenebrionidae, though M. T. CHÛJÔ (1985) placed it in the family Lagriidae.



Figs. 3 - 6. *Lorelus sasajii* sp. nov.; 3, habitus; 4, fore body (dorsal view); 5, ditto (lateral view); 6, male genitalia (lateral view).

Head transverse, raised basad, coarsely and frequently punctate; clypeus rather elliptical, roundly produced in front and sinuous on each side, armed with a horn at the middle of posterior part in male, the horn in a small individual simply projected and gently bent anteriad, and in a large one noticeably bifurcate (Fig.4); fronto-clypeal border indistinct; genae somewhat rhombic, raised and produced obliquely outwards, with areas close to clypeus rather noticeably depressed; frons rather broad, not modified; diatone about 5 times the width of transverse diameter of an eye. Eyes gently convex laterad, weakly, roundly inlaid into head. Antennae subclavate, reaching base of pronotum, ratio of the length of each segment from basal to apical: 0.34, 0.2, 0.31, 0.19, 0.2, 0.19, 0,18, 0.2, 0.29, 0.26, 0.38.

Pronotum subtrapezoidal, 1.33 times as wide as long, widest at apical 2/5, rather noticeably narrowed posteriad from widest parts; apex feebly emarginate, not margined; base weakly produced, finely but roughly rimmed; front angles obtuse and rounded, hind angles obtusely angulate; sides gently declined to lateral margins, which are rimmed and crenulate; disc gently convex, coarsely and moderately punctate, the punctures almost of the same size as those on head. Scutellum somewhat semicircular, inclined forwards, scattered with a few coarse punctures.

Elytra about twice as long as wide, 3.4 times the length and 1.2 times the width of pronotum; dorsum weakly convex, feebly flattened in middle; disc with rows of coarse punctures, which are about 4 times the size of those on pronotum; humeri normal; apices gently rounded.

Male mandible with a curved projection directed dorso-internally. Male 4th visible sternite ridged along posterior margin. Legs not modified except femora which are rather noticeably broad; ratios of the lengths of pro-, meso- and metatarsomeres: 0.35, 0.21, 0.18, 0.2, 1.2; 0.37, 0.28, 0.23, 0.24, 1.21; 0.39, 0.24, 0.22, 1.24.

Male genitalia very small and rather slender, 0.44 mm in length, 0.05 mm in width, rather strongly curved near basal part in lateral view; lateral lobes fused, 0.12 mm in length, with pointed apices.

Body length: 2.6–3.2 mm.

Holotype: ♂, Omoto, Ishigaki-jima Is., Ryukyu Isls., Okinawa Pref., Japan, 2. V. 1999,

M. SAITO leg. (FAKU). Paratypes: 2 exs., Omoto-dake, Ishigaki-jima Is., 1. V. 1999, M. SAITO leg.; 1 ex., Banna-dake, Ishigaki-jima Is., 23. X. 1996, Y. HIRANO leg.; 2 exs., Funaura, Iriomote-jima Is., Ryukyu Isls., Okinawa Pref., Japan, 24. V. 2000, J. SHIMAMURA leg.; 3 exs., Funaura, Iriomote-jima Is., 7. V. 2000, Y. TAKAHASHI leg.; 1 ex., Shirahama, Iriomote-jima Is., 24. II. 1993, Y. HIRANO leg.; 1 ex., Chûô-rindô, Amami-Ôhima Is., Kagoshima Pref., Japan, 7. V. 1998, Y. HIRANO leg.

Notes. This new species somewhat resembles *Lorelus armatus* (MONTROUZIER, 1860), from New Caledonia, in having a clypeal horn and armed mandibles, but can be discriminated from the latter by the smaller body, with pronotum narrowed basad and crenulate along lateral margins.

This is the first record of the *Lorelus* species from Japan. Some of the type specimens are collected from the nest of the termite *Coptotermes formosanus* SHIRAKI. This seems to suggest a close relationship of this species to the termite.

Dr. Ryûtarô IWATA asked Prof. Dr. Hiroyuki SASAJI to determine unknown tenebrionid beetles collected by Mr. Jun-ichi SHIMAMURA and Ms. Yûko TAKAHASHI from nests of the termite in the Ryukyu Islands. Besides, Dr. R. IWATA showed the senior author (K. M.) a photograph of this species at the annual meeting of the Japanese Society of Coleopterology. At a glance, he recalled someone's illustrated of a *Lorelus* and believed that the insect as shown on the photograph belongs to the same genus. He sent it to Dr. Stanislav BEČVÁŘ, Czech Academy of Sciences, and received his confirmation that the determination was correct. Meanwhile, Mr. Masahiro SAITO and Mr. Yukihiko HIRANO had collected materials of the same species, which were also offered to this study. Prof. Dr. H. SASAJI kindly allowed the authors to examine and describe this species.

要　　約

益本仁雄・秋田勝巳：日本産ゴミムシダマシ科の2新種. ―――奄美大島に分布するカブトゴミムシダマシ族 (Tribe Bolitophagini) で，コブスジツノゴミムシダマシ *Boletoxenus bellicosus* (LEWIS, 1894) に近縁な種を新種と認め，*Boletoxenus sasajii* sp. nov. とした．また、南西諸島に分布するヒゲブトゴミムシダマシ族 (Tribe Lupropini) の不明種を検討した結果，日本から初の*Lorelus* 属（太平洋諸島・東南アジア等に分布）の種であることが判明した．*Lorelus armatus* (MONTROUZIER, 1860) に近いが，小型で前胸背板が基部に向かって狭まり両縁が鋸目状を呈しており，別種と認め *L. sasajii* sp. nov. と命名した．

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New Taxa of the Genus *Stelidota* (Nitidulinae) from Asia with Reexamination of *Stelidota besucheti* Complex (Coleoptera, Nitidulidae)

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Abstract Taxonomy of Asian *Stelidota* ERICHSON, 1843 related or similar to *S. besucheti* JELÍNEK, 1984 is reexamined and following new taxa are described: *Stelidota besucheti borneensis* ssp. nov. (Borneo), *S. kejvali* (S India), *S. loebli* (Thailand, India) *S. olexai* (Vietnam) and *S. sasajii* (Thailand) spp. nov. New synonymy *Stelidota multiguttata* REITTER, 1877 = *S. gomyi* ENDRÖDY-YOUNGA, 1982 is proposed.

The genus *Stelidota* ERICHSON, 1843, containing some 50 phytosaprophagous species, has an essentially circumtropical distribution with some species occurring also in North America and in the eastern part of the Palaearctic region (Japan, China and the Himalayas). Species from Asia, Australia and adjacent Pacific area were revised by JELÍNEK (1984) and a comprehensive bibliography of the genus was published by WEISS & WILLIAMS (1980). The systematics of the genus is rather difficult because of the similarity and considerable intraspecific variability of some species.

Stelidota besucheti JELÍNEK, 1984 was described from Sri Lanka, Borneo and Laos and placed, along with a widely distributed *S. multiguttata* REITTER, 1877, in the *S. multiguttata* species-group, characterized by the long stout setae at ventrolateral margins of tegmen. Some morphological differences between the representatives of various populations were observed already by JELÍNEK (1984), but they could not be appropriately evaluated because of the limited material available. Recent examination of a more extensive material revealed that several closely related and partly allopatric taxa can be distinguished, namely *S. besucheti besucheti* JELÍNEK, 1984 (Sri Lanka, southern India), *S. b. borneensis* ssp. nov. (Borneo), *S. loebli* sp. nov. (India, Thailand) and *S. sasajii* sp. nov. (Thailand), referred to as *S. besucheti* complex.

Among the Asian species of *Stelidota*, the members of the *S. besucheti* complex are matched for their body size only by two species, both described as new below. Among them, *S. kejvali* sp. nov. from southern India agrees in many external characters with members of the *S. besucheti* complex and can be confused with them.

Following acronyms are used throughout the paper to indicate the deposition of material examined:

BMNH: The Natural History Museum, London
MHNG: Muséum d'Histoire naturelle, Genève
MHNP: Museum National d'Histoire naturelle, Paris

NMPC: National Museum, Praha

TMPC: Transvaal Museum, Pretoria

P/A index means the ratio distance between posterior: distance between anterior angles of pronotum. Length of pronotum is measured along the median axis, length of elytra from the base of scutellum to the tips of elytra.

Stelidota besucheti complex

All members of the *Stelidota besucheti* complex are externally very similar and can be characterized by the following combination of characters. They differ from most other Oriental *Stelidota* already in their larger size, the body length being equal to or exceeding 3.0 mm in most specimens. Antennae with three-segmented club broadly oval to obovate, antennomere III at least as long as IV and V combined. Pronotum widest at base, 1.8–2.0 times wider than long, P/A index usually between 1.65–1.80. Lateral margins of pronotum rectilinear to shallowly concave in their basal portion, posterior angles subrectangular. Sides of pronotum narrowly explanate, nearly as wide as the length of the second antennomere or narrower. Their exact width is difficult to estimate because they pass fluently into the convex surface of pronotal disc and their light coloration is extended over the adjacent portions of the disc. Pronotal disc broadly convex, without distinct impressions. Punctation of pronotum consists of larger flat to umbilicate punctures irregularly intermixed with smaller ones, spaces between them smooth and shining, sometimes, especially at base, rugulose. At least four inner interstries of elytra usually flat in their basal portion. Prosternal process broad, somewhat depressed behind procoxae. Metasternum flattened between metacoxae, with narrow impunctate border along posterior intercoxal margin. Outer recurrent portions of mesocoxal lines reaching metasternopleural sutures at one third of their length, axillary spaces small and impunctate. First abdominal ventrite flattened in the middle, with punctures larger than those of metasternum and separated by about one diameter, punctation of the following ventrites smaller and closer. Posterior margin of hind femur with a tooth in basal portion in males, male meso- and metatibiae curved inwards and sometimes dilated in their apical portions. All femora and tibiae simple in females. Dorsal surface of body chestnut brown to black-brown, sides of pronotum, elytral spots corresponding to the generalized pattern illustrated by JELÍNEK (1984), legs and antennae yellow-brown, terminal antennomere usually paler than the preceding ones.

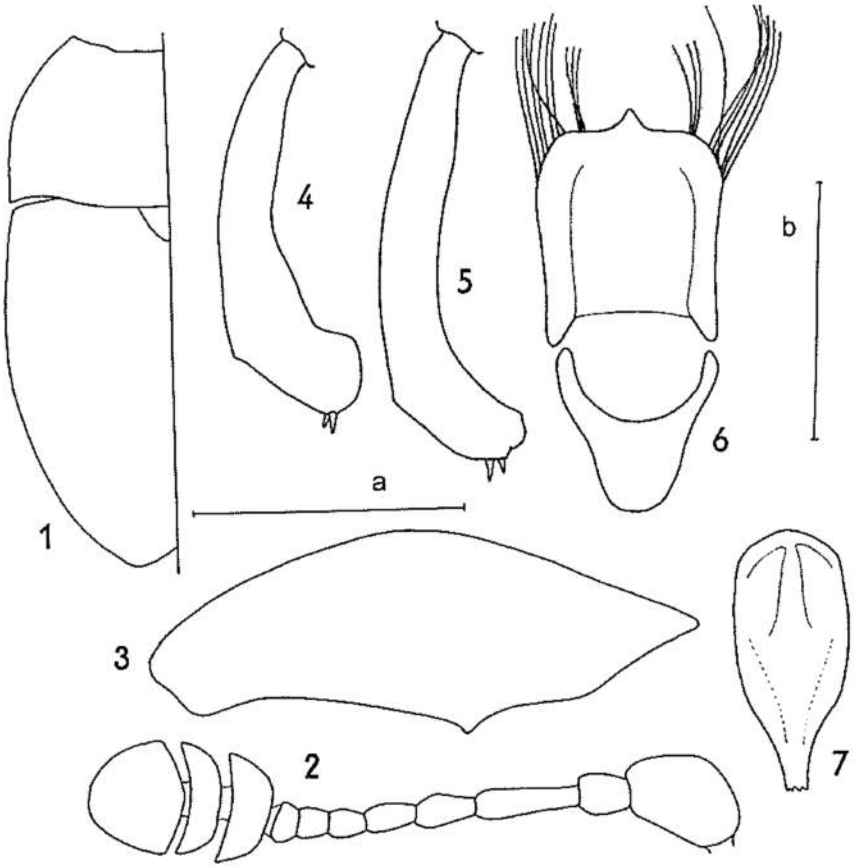
As in other *Stelidota* (JELÍNEK, 1984), the external characters are subject to several kinds of variation: (i) sexual dimorphism is manifested especially by the dentate posterior margins of hind femora and the modified meso- and metatibiae in males; males are generally larger, often with higher values of P/A index; (ii) allometric variation concerns especially the degree of the expression of the secondary sexual characters; the size of femoral teeth as well as the modifications of meso- and metatibiae are generally less pronounced in smaller males and, in the extremely small specimens, the shape of the tibiae hardly differs from that in females. In a few exceptionally small females the lateral margins of pronotum are not quite rectilinear in their basal portion; (iii) individual variation concerns many external characters, such as the proportions of pronotum and elytra, the width of explanate pronotal sides, the size and density of pronotal punctures and the degree of rugosity of pronotal surface, proportions of the segments of antennal club, the distinctness of colour pattern, etc.; some of these characters seem to be rather constant within one population and somewhat different in others, but the relevant samples are too scarce to allow any sound conclusions. With respect to this variation, even the observed morphological differences between the taxa of the *S. besucheti* complex must be considered with precaution and the principal diagnostic characters provides the shape of the male genitalia.

Stelidota besucheti besucheti JELÍNEK, 1984

(Figs. 1–7)

Stelidota besucheti JELÍNEK, 1984. Acta ent. bohemoslov., **81**: 152 (partim).

Chestnut brown to black-brown with yellow-brown pattern, elytral spots as a rule small and isolated. Antennomere III as long as IV and V combined, antennal club obovate, antenomere XI as long as IX and X combined, X shorter than IX (Fig. 2). Pronotum 1.80–1.97 times wider than long, P/A index 1.65–1.86. Explanate sides of pronotum narrow, nearly as wide as the second antennomere and vaguely delimited against pronotal disc. Pronotal punctures comparatively small and uniform, separated by less than their diameter. Elytra widest at about one third of their length, 1.05–1.14 times longer than their combined width, somewhat narrowed also towards the base (Fig. 1). Meso- and metatibiae in male curved inwards but not dilated in



Figs. 1-7. Morphology of the male of *Stelidota besucheti besucheti* JELÍNEK. 1, Body form; 2, Antenna; 3, Hind femur; 4, Mesotibia; 5, Metatibia; 6, Tegmen, dorsal view; 7, Median lobe of aedeagus, dorsal view. Scale a = 0.5 mm (Figs. 3–5), b = 0.3 mm (Figs. 2, 6–7).

their apical portion (Figs. 4–5). Male genitalia as figured (Figs. 6–7), tegmen subquadrangular with distinct pointed apical protuberance and numerous lateral setae. To this subspecies refer also Figs 85–91 in JELÍNEK (1984).

Material examined: 1♀, India, Kerala, Cardamon H., Periyar env. Aranya Nivas, 950 m, 4. XI. 1972, BESUCHET, LÖBL et MUSSARD (MHNG) leg.; 2♀♀, ditto, 5. XI. 1972 (MHNG); 1 ♂, 4♀♀, ditto, 7. XI. 1972, (MHNG, NMPC); 1♀, India, Kerala, Cardamon H., Qambanar Peermade, 950 m, 9. XI. 1972, BESUCHET, LÖBL et MUSSARD (MHNG) leg.; 2♂♂, India, Kerala, Nelliampathi Hills, Kaikatty, 900 m, 30. XI. 1972 (MHNG, NMPC); 5♂♂, Sri Lanka, Kandy, 600 m, 22. I. 1970, MUSSARD, BESUCHET et LÖBL leg. (paratypes of *S. besucheti*, NMPC).

Geographic distribution: Sri Lanka and southern India (Kerala).

Stelidota besucheti borneensis ssp. nov.

(Figs. 8–14)

Stelidota besucheti JELÍNEK, 1984. Acta ent. bohemoslov., **81**: 152 (partim)

Black-brown to black, explanate sides of pronotum and elytral spots yellow-brown, tibiae and antennae brown to black-brown, terminal antennomere paler. Elytral spot 4 usually enlarged, subquadrangular, narrowly interconnected with preapical band along suture, and sometimes also with spot 3.

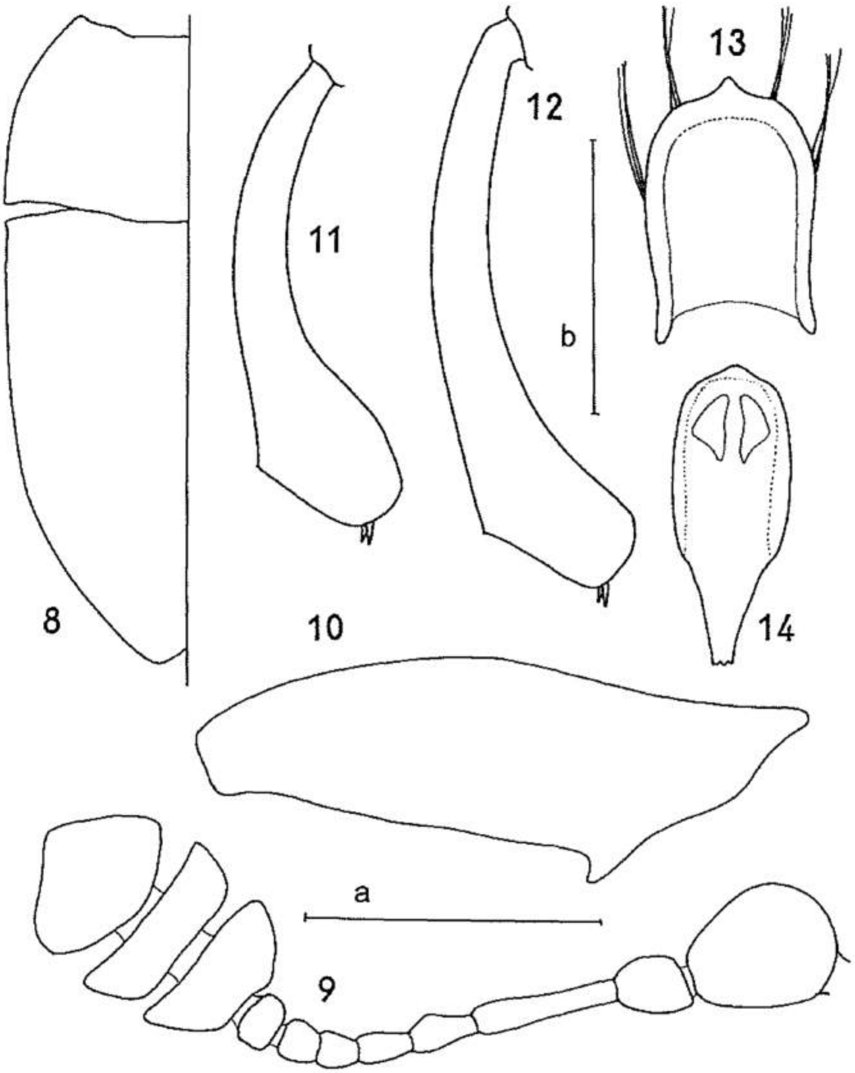
Male. Antennal club broadly oval to obovate, terminal antennomere slightly narrower than the penultimate one, antennomere III longer than IV and V combined (Fig. 9). Pronotum about twice as wide as long, widest at base, lateral margins subparallel, rectilinear to slightly concave in basal half, P/A index 1.66–1.75. Explanate pronotal sides nearly as wide as the length of the second antennomere, pronotal disc sloping more steeply down towards the anterior margin than in *S. b. besucheti*. Punctures of pronotal disc as in the nominotypical subspecies. Elytra widest at base, 1.12–1.19 times longer than their combined width, rather strongly narrowed posteriorly (Fig. 8). Posterior margin of hind femora distinctly dentate (Fig. 10). Mesotibiae curved and arcuately dilated inwards in two distal fifths (Fig. 11). Metatibiae curved inwards but not dilated in their apical portion (Fig. 12). Male genitalia as figured (Figs. 13–14), tegmen somewhat narrower, more rounded apically and setae at lateral margins of tegmen less numerous than in the nominotypical subspecies. See also Figs 92–98 in JELÍNEK (1984).

Length 3.0–3.9 (2.5) mm. Width 1.7–2.0 (1.4) mm.

Female. Generally corresponding to male, meso- and metatibiae as well as hind femora simple. Lateral margins of elytra often less converging posteriorly in their basal third than in males. P/A index 1.58–1.76, length 2.5–3.5 mm, width 1.4–1.8 mm.

Variation. One exceptionally small male (measurements in parentheses), has meso- and metatibiae simple, as in females. Size of the terminal protuberance of tegmen varies in examined males, being sometimes almost indistinct. The colour pattern in the specimens from Sabah very contrasting and constant (see above), specimens from Sarawak (NHMB, NMPC) red-brown with indistinct traces of yellowish spots (teneral specimens?).

Holotype: ♂, Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Liwagu Riv., 1490 m, 5. VIII. 1988, A. SMETANA (B84) (MHNG); paratypes: 1♀, Borneo, Sabah, Mt. Kinabalu Nat. Pk., HQ Liwagu Riv., 1500 m, 21. V. 1987, A. SMETANA (MHNG); 6♂♂, 4♀♀, ditto, 1490 m, 5. VIII. 1988, A. SMETANA (B84) (MHNG, NMPC); 2♂♂, 1♀, ditto, 10. VIII. 1988 (B97) (MHNG); 3



Figs. 8–14. Morphology of the male of *Stelidota besucheti borneensis* ssp. nov.; 8, Body form; 9, Antenna; 10, Hind femur; 11, Mesotibia; 12, Metatibia; 13, Tegmen, dorsal view; 14, Median lobe of aedeagus, dorsal view; Scale a = 0.5 mm (Figs. 10–12), b = 0.3 mm (Figs. 9, 13–14).

♂♂, 3♀♀, ditto, 3. IX. 1988 (B174) (MHNG, NMPC); 1♀, Borneo, Sabah, Mt. Kinabalu Nat. Pk., Poring Hot Springs, 480 m, 8. V. 1987, A. SMETANA (MHNG); 3♂♂, 5♀♀, Sabah, Crocker Ra., 1600 m, km 51 rte Kota Kinabalu-Tambunan, 18. V. 1987, BURCKHARDT-LÖBL (MHNG, NMPC); 4 exs., Sarawak, Gn. Mulu NP, 5th Division, nr. camp 5, Kerangas, V. 1978, N. M. COLLINS (BMNH, NMPC, paratypes of *S. besucheti*); 1 ex., ditto, VI. 1978 (BMNH, paratype of *S. besucheti*); 1 ex., Sarawak, Gn. Mulu NP, 4th Division, III–V. 1978, 400–600 m (BMNH, paratype of *S. besucheti*); 1 ex., ditto, 100–500 m (BMNH, paratype of *S. besucheti*); 2 exs., ditto, near camp, 5. III. 1978, N. M. COLLINS (BMNH, NMPC, paratypes of *S. besucheti*);

1 ex., ditto, site C, 200 m, V. 1978 (BMNH, paratype of *S. besucheti*).

Differential diagnosis. Stelidota besucheti borneensis ssp. nov. differs from the nominotypical subspecies from Sri Lanka and southern India in having comparatively longer elytra widest at the base and more strongly narrowed posteriorly, in the antennomere III distinctly longer than IV and V combined (as long as the two segments combined in *S. b. besucheti*) and in the shape of male mesotibiae, which are arcuately dilated inwards in their distal portion.

Explanate sides of pronotum are generally somewhat wider and pronotal disc more strongly convex longitudinally and the tegmen is more rounded distally, with less numerous lateral setae than in *S. b. besucheti*. The shape and proportions of elytra resemble the conditions in *S. kejvali* sp. n., which differs in having broadly explanate pronotal sides, two pairs of shallow impressions on the pronotal disc, non-dilated male mesotibia and, being a member of the *S. nigrovaria* species-group, tegmen without lateral setae.

Geographic distribution: Malaysia (Borneo: Sabah, Sarawak).

Name derivation. The name of the new subspecies refers to its occurrence in Borneo.

Stelidota sasajii sp. nov.

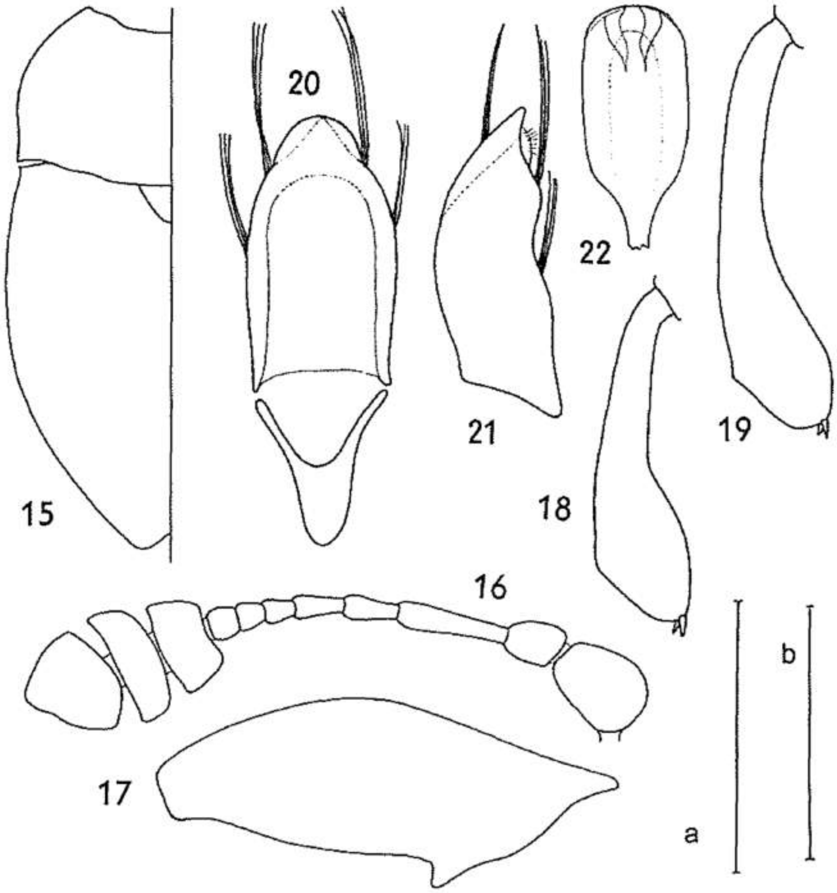
(Figs. 15–22)

Oval, convex. Black-brown to black, sides of pronotum, elytral spots, legs and antennae yellow-brown, antennal club infuscate, terminal segment as a rule paler. Elytral spots 1, 3 and 4 subequal, latter ones separated from the transverse preapical bands.

Male. Frons very shallowly impressed between insertions of antennae, with large umbilicate punctures separated by less than one diameter, often almost contiguous. Antennal club oval, antennomere XI narrower than X and hardly as long as IX and X combined (Fig. 16).

Pronotum widest at base, 1.80–1.96 times wider than long, P/A index 1.68–1.79; disc convex, without impressions, sides narrowly explanate, nearly as wide as the length of the second antennomere; punctures of variable size, shallow, generally sparser than in *S. besucheti*, lateral margins straight to slightly concave and subparallel in basal half. Elytra widest before their midlength, 1.08–1.14 times longer than their combined width (Fig. 15). Punctures of postmentum deep, large, nearly equal in size to antennomere VII, separated by less than one diameter, sometimes almost contiguous. Spaces between them smooth.

Prosternum transversely convex, prosternal process depressed behind procoxae, its apical margin bluntly V-shaped. Punctures of prosternum larger than those of postmentum, flat, separated by less than one diameter, spaces between them smooth and shining. Hypomera densely microreticulate with fine, widely spaced granules smaller than eye facets and separated by several diameters. Metasternum flattened between metacoxae, with fine mediolongitudinal line all along its length, more deeply incissed in its anterior fourth. Punctures nearly equal in size to those of postmentum, but flat, shallow, mostly separated by less than one diameter, becoming larger, sparser and umbilicate laterally; interspaces smooth and shining in the middle, alutaceous and dull laterally. Mesoxocal lines reaching metasternopleural sutures at one third of their length. Axillary spaces small, impunctate. Posterior intercoxal margin of metasternum with narrow impunctate border. Ventrite I somewhat flattened between metacoxae, with flat to umbilicate punctures larger than those of metasternum and separated by about one diameter. Following ventrites with smaller and closer punctures, alutaceous. Posterior margin of hind



Figs. 15–22. Morphology of the male of *Stelidota sasajii* sp. nov. 15, Body form; 16, Antenna; 17, Hind femur; 18, Mesotibia; 19, Metatibia; 20, Tegmen, dorsal view; 21, Ditto, lateral view; 22, Median lobe of aedeagus, dorsal view; Scale a = 0.5 mm (Figs. 17–19), b = 0.3 mm (Figs. 16, 20–24).

femur bluntly dentate in its basal portion (Fig. 17). Meso- and metatibiae gently curved, arcuately dilated in distal portion (Figs. 18–19).

Male genitalia: tegmen almost twice as long as wide, apical portion somewhat dilated, subtriangular, with tuft of short hairs at its base on ventral side (Fig. 21). Ventrolateral margins with two tufts of long stout setae, distal tufts longer than the proximal ones (Figs. 20–22).

Length 2.8–3.3 mm. Width 1.6–1.8 mm.

Holotype: ♂, Thailand, Chiang Mai, Doi Suthep, 1100 m, Barber F., IV. 1986, P. SCHWENDINGER leg. (MHNG). Paratypes: 2 ♂♂, Thailand, Chiang Mai, Doi Suthep, 1550 m, 4. XI. 1985, BURCKHARDT et LÖBL leg. (MHNG, NMPC); 1 ♂, Thailand, Doi Suthep, 1180 m, I–II. 1986, (BF), P. SCHWENDINGER leg. (MHNG); 1 ♂, ditto, II. 1986 (MHNG); 3 ♂♂, ditto, III. 1986 (MHNG, NMPC); 2 ♂♂, ditto, 1100 m, Barber F., IV. 1986 (MHNG, NMPC); 5 ♂♂, Thailand, Doi Chiang Dao Wildlife Sanctuary, Chiang Dao Distr., 510 m, 23. XI– 22. XII. 1990, P. SCHWENDINGER leg. (MHNG, NMPC); 1 ♂, ditto, 22. XII. 1990–15. I. 1991 (MHNG).

Differential diagnosis. *Stelidota sasajii* sp. n. is generally smaller than the other members of the *S. besucheti* complex, from which it differs especially in the shape of male genitalia. The shape of male mesotibia resembles that of *S. besucheti borneensis* ssp. nov., from which it differs in moderately dilated metatibia, narrower antennal club, sparser pronotal punctation and the more arcuate outline of comparatively shorter elytra, reaching their maximum width before their midlength. It is externally very similar to the sympatric *S. loebli* sp. nov., which has wider, distinctly obovate antennal club, subapical dilatation of the male mesotibia rather obtusely angulate (Fig. 24), male metatibia more strongly curved, but not dilated, apically and the tooth on posterior margin of male metafemur situated more distally (Fig. 26).

Geographic distribution: *Stelidota sasajii* sp. n. is known only from northern Thailand.

Name derivation. I dedicate this new species to Professor H. SASAJI as acknowledgement of his merits in the taxonomy of Cucujoidea.

Note. The single paratype of *S. besucheti* from Laos (JELÍNEK, 1984), which could not be reexamined, probably belongs to this species.

Stelidota loebli sp. nov.

(Figs. 23–29)

Brown-black, sides of pronotum and elytra, elytral spots and sometimes also tips of elytra red-brown, legs and antennae yellow-brown, antennomeres IX and X infuscate.

Male. Head transversely impressed between insertions of antennae. Punctures of frons larger than eye facets, umbilicate, separated by less than one diameter, often almost contiguous. Antennomere III hardly as long as IV and V combined, antennomeres IV and V 1.5 and 2 times longer than wide respectively. Antennal club obovate, terminal segment paler than the two preceding ones (Fig. 23). Pronotum widest at base, lateral margins rectilinear and subparallel in basal half. Sides of pronotum narrowly explanate.

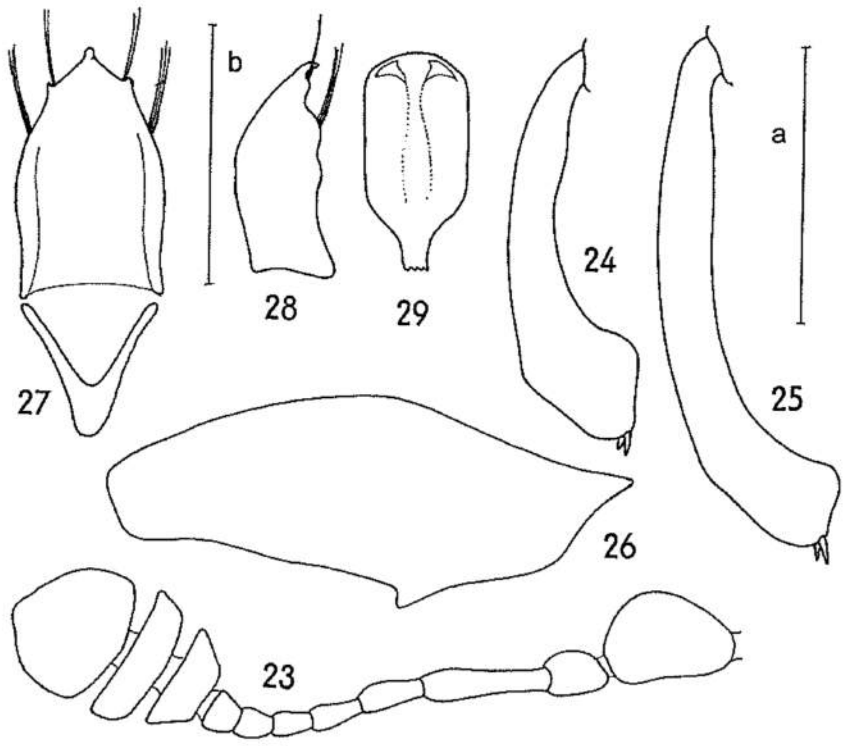
Posterior margin of hind femur with low, obtuse to rectangular tooth situated more distally than in *S. sasajii* sp. nov. (Fig. 26). Mesotibia by one fourth shorter than corresponding femur, curved inwards, with modest obtusely angulate dilatation in the apical third (Fig. 24). Metatibia almost as long as corresponding femur and about 5.6 times longer than wide, curved inwards but not distinctly dilated in the apical third (Fig. 25).

Male genitalia. Tegmen about 1.6 times longer than wide, subtriangular with claw-shaped apical protuberance and two small teeth at lateral margins, without hairs on ventral surface of its apical portion. Distal tufts of long stout setae at most as long as the proximal ones (Figs. 27–29).

Length: 3.0–3.5 mm, width 1.8–2.0 mm.

Holotype: ♂, Thailand, Chiang Mai, Doi Suthep, 1100 m, IV. 1986, Barber F., P. SCHWENDINGER leg. (MHNG). Paratypes: 1 ♂, Thailand, Chiang Mai, Doi Suthep, 1400 m, 5. XI. 1985, BURCKHARDT et LÖBL leg. (MHNG); 1 ♂, Thailand, Chiang Mai, Doi Suthep, 1120 m, Barber F., I. 1986, P. SCHWENDINGER leg. (MHNG); 1 ♂, ditto, 1180 m, I–II. 1986 (BF), P. SCHWENDINGER leg. (NMPC); 1 ♂, 1 ♀, India, W. Bengal, Darjeeling dist., Algarah, 1800 m, 9. X. 1978, BESUCHET et LÖBL leg. (MHNG).

Differential diagnosis. This species is externally extremely similar to the sympatric *S. sasajii* sp. nov., so that a detailed description would be redundant. It differs from the latter species in the male sex in following minute features: teeth on posterior margin of hind femora



Figs. 23–29. Morphology of the male of *Stelidota loebli* sp. nov.23, Antenna; 24, Mesotibia; 25, Metatibia; 26, Hind femur; 27, Tegmen, dorsal view; 28, Ditto, lateral view; 29, Median lobe of aedeagus, dorsal view. Scale a = 0.5 mm (Figs. 24–26), b = 0.3 mm (Figs. 23, 27–29).

broad, obtuse, and situated somewhat more distally than in *S. sasajii*. Metatibiae curved as in *S. sasajii*, but narrower and less dilated apically than in the latter species. The only reliable distinguishing character remains the shape of male genitalia. The females collected together with males at Doi Suthep, Thailand (11 spec. in MHNG) cannot be attributed with certainty to either of the two species.

Geographic distribution. Known from northern Thailand and the Darjeeling District in the West Bengal (India).

Name derivation. Dedicated to one of the collectors, my friend, I. LÖBL (Genève).

Stelidota multiguttata REITTER, 1877

Stelidota multiguttata REITTER, 1877. D. Ent. Zeitschr., 21: 110.
Stelidota gomyi ENDRÖDY-YOUNGA, 1982, Ann. Transvaal Mus., 33: 271. **Syn. nov.**

Stelidota multiguttata shares with the members of *S. besucheti* complex the long setae at lateral margins of tegmen, but it differs from them in smaller size (length 2.4–2.9 mm), oval antennal club, arcuate lateral margins of pronotum converging both anteriorly and posteriorly and, in the male sex, in simple mesotibiae and feebly curved metatibiae. It is a widely distributed species, ranging from Japan to Reunion.

The synonymy of *S. gomyi* from Reunion, considered possible by JELÍNEK (1984), was confirmed by the examination of the holotype from TMPC, kindly sent to me by Dr. ENDRÖDY-YOUNGA several years ago.

Material examined: 1 male, Reunion, Bras Panon, Bassin de la Paix, 31. I. 1972, Y. GOMY leg. (Holotype of *S. gomyi*, TMPC).

Stelidota kejvali sp. nov.

(Figs. 30–37)

Oval, convex. Chestnut brown to black-brown, ventral surface dark red-brown, sides of pronotum, elytral spots, legs and antennae yellow-brown, antennal club safe the terminal segment usually infuscate. Elytral spots 1, 3 and 4 subequal, latter ones separated from the pre-apical band.

Male. Frons arcuately impressed between insertions of antennae. Punctures of frons large, umbilicate, separated by less than one diameter. Antennal club oval, antennomere XI somewhat narrower and distinctly shorter than IX and X combined (Fig. 31).

Pronotum widest at base or slightly before it, 1.79–1.86 times wider than long, P/A index 1.66–1.74. Lateral margins in basal half subparallel, rectilinear or shallowly concave, posterior angles rectangular. Broadly explanate sides nearly as wide as antennomere I, not narrowed posteriorly, distinctly delimited against the vaulted pronotal disc. Pronotal disc flattened in the middle, with two pairs of shallow impressions, one near basal margin and one just before its midlength.

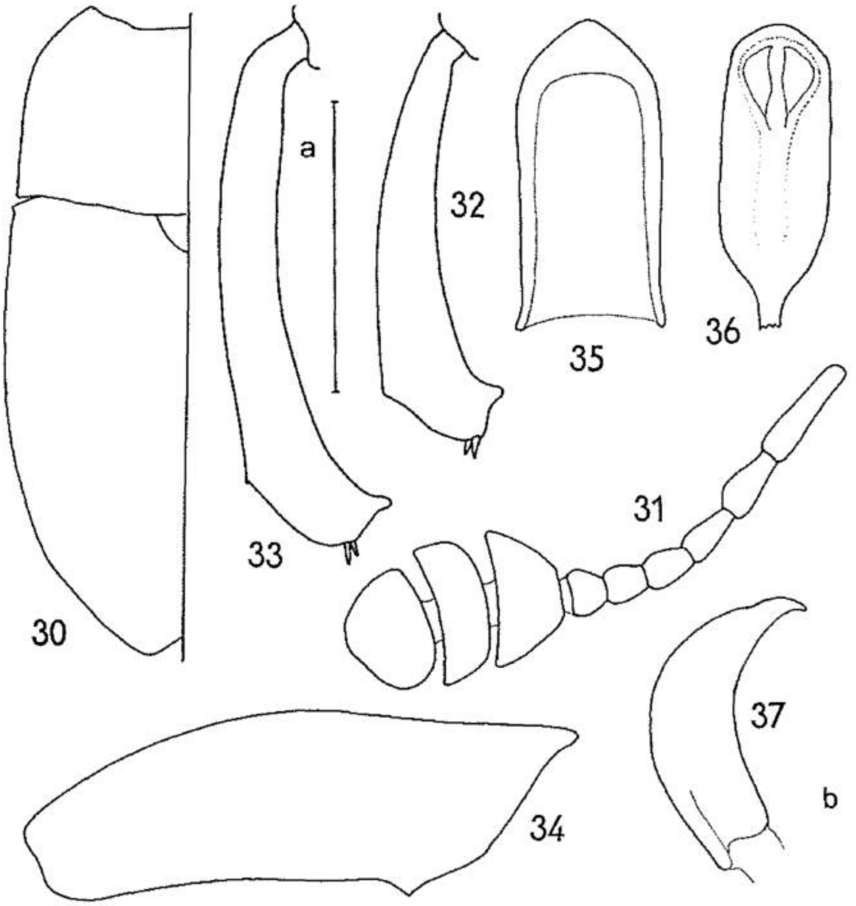
Elytra nearly parallel-sided in basal portion, 1.12–1.18 times longer than their combined width (Fig. 30). Elytral interstries I, III and V usually somewhat raised even in their basal half, with punctures of striae partly indented into them laterally. Posterior margin of hind femur obtusely dentate near its base (Fig. 34). Meso- and metatibiae curved inwards, but not dilated, in their apical portion, with inner subapical angle somewhat prominent (Figs 32–33). Inner edges of meso- and metatibiae more or less distinctly crenulated (visible in dorsolateral view).

Postmentum with punctures larger than eye facets and separated by less than one diameter, between them smooth and shining. Prosternum transversely convex, punctate like postmentum; prosternal process flat, broadly rounded apically, with punctures separated by one diameter or less. Hypomera dull, without distinct punctures. Mesosternum roof-shaped, with silky appearance, with a few small and shallow indistinct punctures at posterior margin.

Metasternum flat in the middle, with punctures somewhat smaller than those of prosternum, separated by about one diameter, between them smooth and shining. Outer recurrent portion of mesocoxal lines running parallel to metasternopleural sutures and vanishing before their midlength. Punctation of the first abdominal ventrite equal to that of metasternum, punctures on following ventrites somewhat finer and shallower.

Male genitalia as figured (Figs. 35–37), tegmen parallel-sided and bluntly pointed apically, ventrolateral margins without long stout setae. Median lobe of aedeagus with claw-shaped apex (lateral view).

Female corresponding to male in external appearance, generally smaller (length 2.6–3.2 mm), with pronotum less narrowed anteriorly (P/A index 1.50–1.62). Hind femora as well as



Figs. 30–37. Morphology of the male of *Stelidota kejvali* sp. nov. 30, Body form; 31, Antenna, segments I and II omitted; 32, Mesotibia; 33, Metatibia; 34, Hind femur; 35, Tegmen, dorsal view; 36, Median lobe of aedeagus, dorsal view; 37, Ditto, lateral view; Scale a = 0.5 mm (Figs. 31–34), b = 0.3 mm (Figs. 35–37).

meso- and metatibiae simple.

Length 2.5–3.8 mm, width 1.4–1.9 mm.

Variation. Secondary sexual characters on male legs are subject to allometric variation. The tooth on posterior margin of hind femur may be low and broad and distal portions of meso- and metatibiae less curved inwards in small males than in the large ones, in extremely small specimens tibiae simple, gently arcuate, as in females. Lateral margins of pronotum in some small females slightly converging posteriorly. Anterior pair of pronotal depressions rarely indistinct and inner interstries of elytra exceptionally as flat as in the species of *S. besucheti* complex. Two specimens from Tamil Nadu, Kodaikanal, 1800 m, 8. I. 1972, R. MUSSARD, 2 spec. (MHNG) perfectly agree with other specimens, but are completely black, without elytral spots. Three specimens from Sri Lanka, Uva, Haputale, 1350 m, 23. I. 1970, MUSSARD, LÖBL, BESUCHET, 1 ♂, 2 ♀ ♀ (MHNG) have identical male genitalia, but in external characters (obovate antennal club with very short antennomeres IX and X, narrowly explanate sides of pronotum, pronotal disc without distinct impressions, four internal interstries of elytra rather flat) resemble rather *S. besucheti besucheti.*

Holotype: ♂, S. India, Kerala, Cardamon hills, Kallar vall. 15 km SW Munnar, 1000 m, 6–18. XII. 1993, BOUKAL & KEJVAL leg. (NMPC). Paratypes: 1♂, ditto, (NMPC); 8♂♂, 7♀♀, India (Madras), Nilgiri, 6 km E Coonoor, 1400 m, 22. XI. 1972, BESUCHET, LÖBL, MUSSARD leg. (MHNG, NMPC); 4♂♂, 4♀♀, ditto, 7 km E Coonoor, 1350 m, 19. XI. 1972 (MHNG); 10♂♂, 10♀♀, India (Madras), Palni H., Berijam Lake, 2150 m, 14. XI. 1972, BESUCHET, LÖBL, MUSSARD leg. (MHNG, NMPC); 10♂♂, 6♀♀, India (Madras), Palni H., Kodaikanal, 2100 m, 11. XI. 1972, BESUCHET, LÖBL, MUSSARD leg. (MHNG, NMPC); 4♀♀, India (Madras), Palni H., 7 km E Kodaikanal, 1750 m, 12. XI. 1972, BESUCHET, LÖBL, MUSSARD leg. MHNG); 4♂♂, 5♀♀, India (Madras), Anamalai H., 18 km N Valparai, 1250 m, 18. XI. 1972, BESUCHET, LÖBL, MUSSARD leg. (MHNG, NMPC); 2♂♂, 1♀, India (Madras), Anamalai H., Valparai, 1100 m, 20. XI. 1972, BESUCHET, LÖBL, MUSSARD leg. (MHNG); 3♀♀, India, Kerala, Cardamon H., Muttapatti pr. Munnar, 1700 m, 24. XI. 1972, BESUCHET, LÖBL, MUSSARD leg. (MHNG); 1♂, India, Kerala, Cardamon H., Valara Fall, 450–500 m, 25. XI. 1972, BESUCHET, LÖBL, MUSSARD leg. (MHNG); 1♂, 1♀, India, Kerala, Nelliampathi Hills, Kaikalty, 900 m, 30. XI. 72, MUSSARD, BESUCHET, LÖBL leg. (MHNG).

Additional material examined: 1♀, India, Nilgiri, 15 km E Coonoor, 19. XI. 1972, 900 m, BESUCHET, LÖBL, MUSSARD leg.; 1♂, 1♀, India, Tamil Nadu, Kodaikanal, 1800 m, 8. I. 1972, R. MUSSARD leg.; 1♀, India, Kerala, Cardamon H., Valara Fall, 450–500 m, 25. XI. 1972, BESUCHET, LÖBL, MUSSARD leg.; 1♂, 2♀♀, Sri Lanka, Uva, Haputale, 1350 m, 23. I. 1970, MUSSARD, BESUCHET, LÖBL leg. (all MHNG).

Differential diagnosis. Even though it is a member of *Stelidota nigrovaria* species-group, *S. kejvali* sp. nov. resembles species of the *S. besucheti* complex by its large size, lateral margins of pronotum subparallel, straight to shallowly concave in basal half and curved meso- and metatibiae in males. Comparatively longer elytra with lateral margins subparallel in basal portions resemble conditions in *S. besucheti borneensis* ssp. nov. *S. kejvali* sp. n. differs from the members of the latter complex in two pairs of shallow, more or less distinct, impressions on pronotal disc, broadly explanate sides of pronotum and in different male genitalia with parallel-sided tegmen bluntly pointed apically and lacking long setae at ventrolateral margins.

Geographic distribution. Known from the states Kerala and Tamil Nadu (referred to as Madras on most locality labels) in southern India and from Sri Lanka, thus being sympatric with *S. besucheti besucheti.*

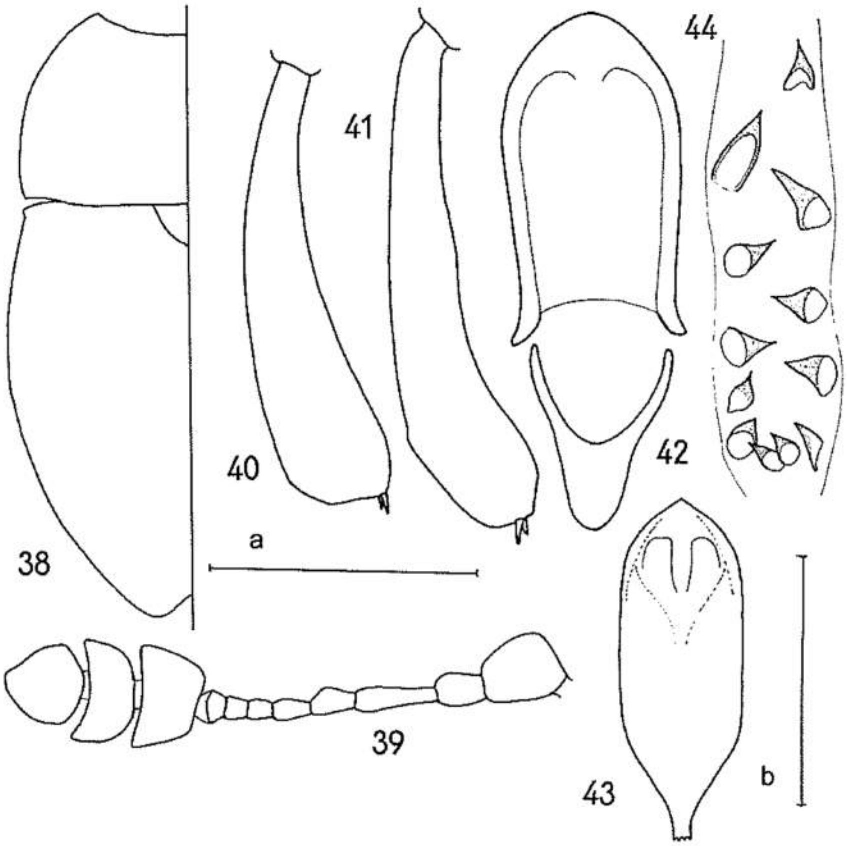
Name derivation. Dedicated to one of the collectors of this new species, Mr. Z. KEJVAL, Domalice, Czech Republic.

Note. Three specimens of *S. kejvali* from India, Chambaganore (MHNP) were tentatively attributed to *S. nigrovaria* (FAIRMAIRE, 1849) by JELÍNEK (1984), but the examination of an extensive material revealed constant differences in body size, shape of pronotum and male meso- and metatibiae, which justify its species status.

Stelidota olexai sp. nov.

(Figs. 38–44)

Large, oval, broadly convex. Brown black, sides and anterior margin of pronotum as well



Figs. 38–44. Morphology of the male of *Stelidota olexai* sp. nov. 38, Body form; 39, Antenna; 40, Mesotibia; 41, Metatibia; 42, Tegmen, dorsal view; 43, Median lobe of aedeagus, dorsal view; 44, Armature of endophallus; Scale a = 0.5 mm (Figs. 39–41), b = 0.3 mm (Figs. 42–44).

as explanate sides and base of elytra red-brown, legs and antennae yellow-brown, antennal club infuscate. Pubescence concolorous, yellowish.

Male. Frons arcuately impressed between insertions of antennae. Punctures umbilicate, larger than eye facets, separated by one diameter or less; spaces between them smooth. Antennae longer than the width of head across eyes, antennomere III as long as IV and V combined; antennomere IV with obtusely angulate inner margin, as long as and wider than V, nearly 1.2 times longer than wide; antennomere V simple, 1.5 times longer than wide; antennal club elongate, nearly twice as long as wide, occupying one third of the antenna length (Fig. 39).

Pronotum widest at basal fourth, narrowed both anteriorly and posteriorly. Anterior angles obtuse, prominent, posterior ones rectangular. Lateral margins regularly arcuate, fringed with indistinct yellow hairs, explanate sides nearly as wide as the first antennomere anteriorly, gradually narrowed posteriorly. Punctures of pronotal disc nearly equal to those of frons, separated by one diameter or less; spaces between them smooth. Pubescence long, recumbent.

Scutellum subtriangular, rounded apically, finely punctulate.

Elytra widest at basal fourth, 1.17 times longer than their combined width, narrowly separately rounded apically, reaching their maximum width against the third interstria (Fig. 38). Sides narrowly explanate, nearly as wide as the antennomere II. Surface of elytra with simple regular series of large, flat, almost contiguous punctures, bearing short recumbent hairs, each of them nearly reaching the base of the following one. Interstries bluntly carinate in apical portion, bearing simple series of simple, fine, hair-bearing punctures; hairs of odd interstries semierect, dense, more conspicuous than sparser and rather recumbent hairs on even interstries.

Postmentum with punctures larger than eye facets, very dense, almost contiguous. Prosternum transversely convex, with punctures equal in size to those of postmentum, but shallow, separated by less than one diameter; prosternal process broadly rounded apically, depressed behind procoxae, shining, with punctures somewhat larger than those of prosternum and separated by less than one diameter. Hypomera finely punctulate along outer margins, moderately shining. Mesosternum roof-shaped, shining, with large and dense umbilicate punctures at posterior margin. Metasternum flat in the middle, with fine and shallowly incised medio-longitudinal line all along its length. Mesocoxal lines reaching metasternopleural sutures at one third of their length. Punctures of metasternum equal in size to those of prosternal process, but shallower, separated by one diameter or less, becoming somewhat larger laterally; spaces between them smooth and shining. Punctures of the first abdominal ventrite larger than those of metasternum, separated by less than one diameter, those of following ventrites smaller and closer.

Posterior margin of hind femur bluntly angulate in basal portion. Pro- and mesotibiae simple, metatibiae prolonged, nearly seven times longer than wide, moderately curved inwards, but not dilated, in the distal third. (Figs. 40–41).

Male genitalia. Tegmen parallel-sided, broadly rounded apically, without long setae at lateral margins. Median lobe finely pointed apically, endophallus with two irregular rows of short strong teeth (Figs. 42–44).

Female. Externally corresponding to male, pronotum 1.91 times wider than long, P/A index 1.71. Metatibiae simple, straight, 4.3 times longer than wide.

Length 3.8–3.9 mm, width 2.1 mm.

Holotype: ♂, N. Vietnam, Tam Dao, 900 m, 13–24. V. 1989, A. OLEXA leg. (NMPC). Paratype: 1♀, N. Vietnam, Tam Dao, 20.–27. VI. 1990, A. OLEXA leg. (NMPC).

Differential diagnosis. Stelidota olexai sp. nov. can be distinguished from other Asian *Stelidota* of comparable size according to its pronotum distinctly narrowed posteriorly, absence of elytral spots and comparatively thicker antennae with elongate club. As suggested by the shape of pronotum and the tegmen without long lateral setae, it does not belong to *S. besucheti* complex. Characteristic trait of this species is also the peculiar armature of endophallus, not observed in other Asian species of the genus (Fig. 44).

Distribution. Hitherto known only from the Tam Dao mountains in northern Vietnam.

Name derivation. Dedicated to the collector and my friend A. OLEXA, Prague.

Key to large Oriental species of *Stelidota*

All species dealt with in the present paper, except for *S. multiguttata*, are the largest Oriental representatives of the genus, with body length equal to or exceeding 3 mm in most specimens. They can be distinguished according to the following key.

1 (2) Pronotum widest before its base, its lateral margins regularly arcuate (Fig. 38). Explanate sides rather broad anteriorly, gradually narrowed towards posterior angles. Elytra concolorous. Male: mesotibia simple, metatibia gently curved inwards at distal end (Figs. 40–41). Male genitalia as figured, endophallus with two series of strong thorns (Figs. 42–44). Vietnam. .... *S. olexai* sp. nov.

2 (1) Pronotum widest at base, its posterior margins as a rule straight to shallowly concave and subparallel in basal portion. Elytra with distinct light spots.

3 (6) Elytra comparatively longer, 1.12–1.19 times longer than their combined width, their lateral margins subparallel to moderately converging posteriorly in basal portion (Figs. 8, 30).

4 (5) Disc of pronotum as a rule flattened, with two pairs of shallow impressions, explanate pronotal sides nearly as broad as antennomere I, well defined, not narrowed posteriorly. Inner interstries of elytra as a rule bluntly carinulate also in basal portion. Male: meso- and metatibiae curved inwards, but not dilated, in apical portion (Figs. 32–33). Tegmen without lateral setae (Fig. 35). South India, Sri Lanka. .... *S. kejvali* sp. nov.

5 (4) Disc of pronotum convex, without impressions, explanate pronotal sides narrower, nearly as wide as the length of the second antennomere. Inner interstries of elytra flat in basal portion. Male: mesotibiae curved and arcuately dilated in distal portion, metatibiae curved (Figs. 11–12). Tegmen with apical protuberance and long lateral setae (Fig. 13). Borneo. .... *S. besucheti borneensis* ssp. nov.

6 (3) Elytra comparatively shorter, 1.05–1.14 times longer than their combined width, widest before their midlength, with lateral margins arcuate and converging both anteriorly and posteriorly (Figs. 1, 15).

7 (8) Sides of pronotum narrowly and rather indistinctly explanate. Male: meso- and metatibiae curved inwards but not dilated in their distal portion (Figs. 4–5). Tegmen subquadrate with terminal protuberance and numerous lateral setae (Fig. 6). South India, Sri Lanka. .... *S. besucheti besucheti* JELÍNEK, 1984

8 (7) Sides of pronotum somewhat wider and more distinctly explanate. Male: at least mesotibia dilated in distal portion. Tegmen of different shape, with two narrow tufts of setae laterally.

9 (10) Male: Tooth at posterior margin of hind femur situated more proximally (Fig. 17), meso- and metatibiae arcuately dilated in distal portion (Figs. 18–19). Tegmen bluntly angulate apically (Fig. 20). Thailand. .... *S. sasajii* sp. nov.

10 (9) Male: Tooth at posterior margin of hind femur situated more distally (Fig. 26), dilated distal portion of mesotibia rather bluntly angulate, metatibia curved, not dilated (Figs. 24–25). Tegmen shorter, with three small teeth (Fig. 27). Thailand, Darjeeling. .... *S. loebli* sp. nov.

Acknowledgements

I wish to express my thanks to the following entomologists and institutions, who provided me with the material, upon which the present paper is based: late Dr. S. ENDRÖDY-YOUNGA (Transvaal Museum, Pretoria), Mr. Z. KEJVAL (Domažlice, Czech Republic), Dr. I. LÖBL (Muséum d'Histoire naturelle, Genève) and Mr. A. OLEXA (Praha).

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Spec. Publ. Japan Coleopt. Soc., Osaka, (1): 267–270, June 11, 2001

A New Ciid Beetle of the Genus *Cis* from Hokkaido, Japan (Coleoptera: Ciidae)

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Abstract A new ciid species belonging to the genus *Cis* is described from Hokkaido, Northeast Japan, under the name of *Cis sasajii*.

The genus *Cis* is the largest and most widespread in the family Ciidae, and contains various heterogeneous species (KAWANABE, 1998). Until now, 23 species of *Cis* have been recorded from Japan, but some taxonomical problems still remain about them. In the present paper, I am going to describe a remarkable new species from Hokkaido as a part of my revisional study of the genus *Cis*. The abbreviations used herein are as follows: PL – medio-longitudinal length of pronotum; PW – greatest width of pronotum; EL – medio-longitudinal length of elytra from the base of scutellum to the elytral apices; EW – greatest combined width of elytra; TL – sum of PL and EL.

Before going further, I wish to express my hearty thanks to Dr. M. SAKAI, Entomological Laboratory, College of Agriculture, Ehime University, for his critically reading the manuscript of this paper.

Cis sasajii M. KAWANABE, sp. nov.

[Japanese name: Marumunetosaka-tsutsukinokomushi]
(Figs. 1–4)

Holotype (Male). Body length (excluding head): 1.7 mm; greatest breadth of elytra: 0.82 mm.

Body oblong, 2.08 times as long as elytral breadth, strongly convex, opaque on dorsum. Color reddish black though elytra somewhat paler; anterior area of head and mandibles dark reddish brown; antennae, palpi and legs yellowish brown.

Head rather strongly convex, deeply and ovally concave in the middle of vertex and weakly convex at posterior part of the concavity, closely and inconspicuously punctate; punctures uniform in size, relatively small, bearing short, robust and yellowish bristles; interstices between punctures finely reticulated; fronto-clypeal ridge produced forward, slightly reflexed above, forming an arcuate small lamella on each side, and armed with a conspicuous triangular protuberance on the inner margin of each lamella. Antennal 3rd segment 1.17 times as long as 4th.

Pronotum 0.8 times as long as broad, transversely and strongly convex; anterior margin

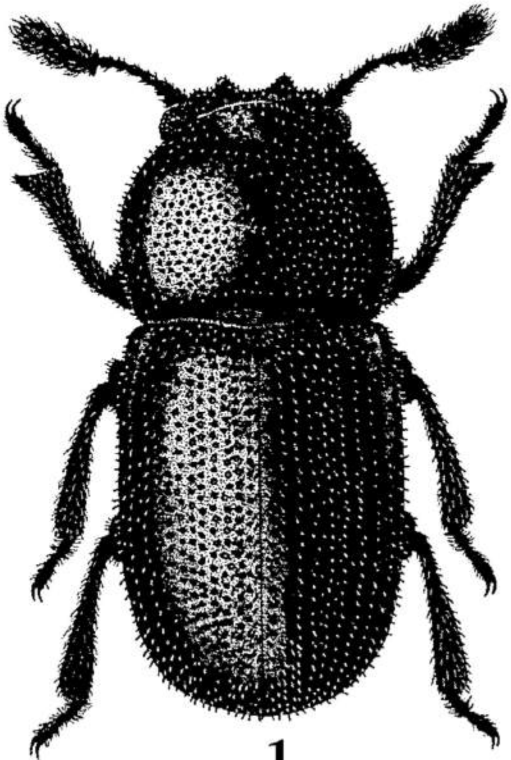

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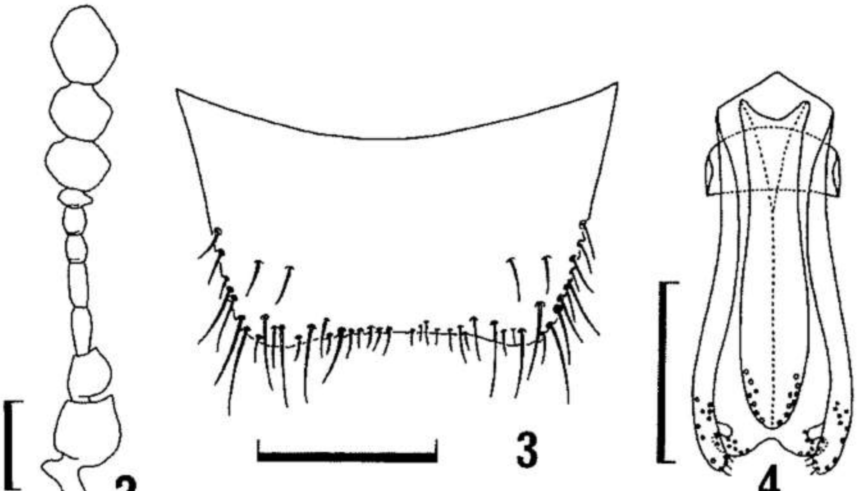
Fig. 1. *Cis sasajii* sp. nov, holotype, from Maruyama, Sapporo.



Figs. 2-4. *Cis sasajii* sp. nov, paratype, male, from Maruyama, Sapporo; 2, Antenna; 3, 8th abdominal sternite; 4, genitalia, dorsal view. Scale: 0.1 mm.

not ridged, broadly rounded; anterior corners obtusely angulate in lateral view, forming an angle of about 135°; lateral margins narrowly ridged, weakly reflexed, finely denticulate, barely visible from above; sides nearly arcuate in dorsal view; basal margin narrowly ridged, and fairly sinuate; hind angles broadly rounded in lateral view; dorsum irregularly, closely and distinctly punctate; punctures uniform in size and each bearing a short, robust, inclined and yellowish bristle, separated by a distance about 0.5 to 2.0 times their diameters; interstices between punctures finely reticulate. Scutellum small, subtriangular, with some punctures and hairs. Elytra 1.33 times as long as broad, 1.78 times as long as pronotum; sides subparallel in basal two-thirds, then gradually convergent apicad, invisible from above except for basal corners; disc irregularly and very closely punctate; punctures dual in size, the larger ones shallow and umbiliform, somewhat smaller than those on pronotum, the smaller ones inconspicuous, bearing bristles which are partially seriate and similar to those on pronotum; interstices between punctures somewhat rugulose; suture not margined.

Prosternal disc in front of coxae weakly tumid medio-longitudinally, weakly and shallowly depressed just before each coxa; prosternal process broad, almost on the same level as the base of prosternum. First abdominal sternite with a small, circular and marginally pubescent fovea at the middle.

Male genital organs in a paratype: Eighth abdominal sternite subtrapezoidal, with apical margin weakly emarginate at the middle, armed with mixed long and short hairs on the lateral corners. Tegmen rather stout, nearly parallel-sided though slightly divergent apicad, apical corners bilobed and strongly emarginate on the outer margin of each lobe, about 0.35 times as long as the combined length of visible abdominal sternites.

Female. Head not depressed at the vertex; fronto-clypeal ridge slightly reflexed and forming an arcuate lamella on each side; first abdominal sternite devoid of pubescent fovea.

Variation in the type series.

	Male (n=15)		Female (n=14)
TL (mm):	1.48–1.9 (1.66±0.11)	TL (mm):	1.48–1.92 (1.72±0.15)
EW (mm):	0.68–0.94 (0.78±0.06)	EW (mm):	0.71–0.92 (0.82±0.07)
TL/EW:	2.02–2.23 (2.13±0.07)	TL/EW:	2.04–2.18 (2.11±0.04)
PL/PW:	0.71–0.86 (0.79±0.03)	PL/PW:	0.77–0.84 (0.79±0.02)
EL/EW:	1.32–1.5 (1.41±0.05)	EL/EW:	1.38–1.5 (1.43±0.03)
EL/PL:	1.78–2.13 (1.97±0.09)	EL/PL:	2.06–2.29 (2.14±0.06)

Type series. Holotype: ♂, Maruyama, Sapporo, Hokkaido, 3. VII. 1990, M. KAWANABE leg. Paratypes: 15♂♂, 14♀♀, same data as holotype. All the type specimens are preserved in the collection of the Entomological Laboratory, College of Agriculture, Ehime University, Matsuyama.

Distribution. Hokkaido.

Host fungus. Cerrena unicolor (FR.) MURR. (Midareamitake in Japanese).

Notes. This new species is closely allied to *C. fukudai* CHÛJÔ, 1940, from Japan and *C. comptus* GYLLENHAL, 1827, from Eurasia, in the general features. But in *C. fukudai*, the body is smaller, the pronotal punctation is sparser and the punctures on head are as large as eye facets, while in *C. comptus*, the body is much larger (TL about 1.8–2.3 mm) and the bristles on elytra are not seriate.

This specific name is dedicated to Dr. Hiroyuki SASAJI for his great contribution to the coleopterology on the occasion of his retirement.

要　　約

川那部　真：北海道からの *Cis* 属の1新種．—— 北海道札幌市円山の落葉広葉樹林内の倒木上に生育していたミダレアミタケから，ツツキノコムシ科 *Cis* 属の新種が採集されたので *Cis sasajii* と命名して記載した．この種は，*C. fukudai* 及び *C. comptus* に類似するが，前者とは体が大きく前胸背板の点刻が密であること等により，また後者とは体が小さく上翅に剛毛列が形成されることにより容易に区別できる．なお本種は，長年にわたり甲虫類の研究を行い，日本の甲虫学の発展に尽くされた，佐々治寛之博士に献名したものである．

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New Records of *Cerchus lignarius monticola* NAKANE, 1978 (Coleoptera, Lucanidae) from Fukui Prefecture, Central Japan, with the Reference to Lucanid Fauna of Fukui Prefecture[1][2]

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Abstract *Cerchus lignarius monticola* NAKANE, 1978 is newly recorded from Fukui Prefecture as 16th member of the family Lucanidae from the prefecture. Lucanid fauna of Fukui Prefecture and habitat of each species are also discussed briefly.

Up to the present, 15 species of the family Lucanidae have been recorded from Fukui Prefecture, central Japan (Fukui Prefecture Survey Group for Nature Conservation, 1998; TSUCHIYA, 2000). There includes all the lucanid members, excepting for *Cerchus lignarius* LEWIS, 1883, which is relatively rare, and distributed only in primary forests in the cool temperature zone of Hokkaido, Honshu, Shikoku and Kyushu in Japan. This species consists of three subspecies (FUJITA, 1987; MIZUNUMA and NAGAI, 1994), *C. l. lignarius* LEWIS, 1883 (distributed in Hokkaido and Northeastern Honshu), *C. l. monticola* NAKANE, 1978 (in Central Honshu), and *C. l. nodai* FUJITA, 1987 (in Shikoku and Kyushu). Of these, *C. l. monticola* has been recorded from Gifu and Ishikawa Prefectures neighboring of Fukui Prefecture.

Recently, I have confirmed the inhabiting of *C. l. monticola* in three localities of eastern part of Fukui Prefecture. Therefore, in the present brief report, I will record this species for the first time from Fukui Prefecture.

Cerchus lignarius monticola NAKANE, 1978.

Specimens examined. 3♂♂, Nukumi-Toge, Ono City, Fukui Pref., 10. VI. 1996, K. ARAYA leg.; 1 ♀ Ohara-Toge, Mt. Akausagiyama, Katuyama City, Fukui Pref., 23. XI. 1999, K. ARAYA leg.; 4 exs (larvae), Mt. Sannomine, Ono City, Fukui Pref., 24. XI. 1999, K. ARAYA leg.

Three males from Nukumi-Toge are small to middle sized whose body length including mandibles is 13.3–17.8 mm. The body length of single female from Ohara-Toge is 13.2 mm. All the specimens are preserved in the collection of Biosystematics Laboratory, Graduate School of Social and Cultural Studies, Kyushu University, Fukuoka (BLKU).

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[2] Contribution from the Biosystematics Laboratory, Graduate School of Social and Cultural Studies, Kyushu University (No. 71).

All the collection sites mentioned above are geographically located in western to southwestern slope of Ryohaku Mountain Range stretching on the borders of Ishikawa, Fukui and Gifu Prefectures. Prior to present report, only two localities, Mt. Hakusan (Ishikawa and Gifu Pref.) and Mt. Dainichidake (Gifu Pref.), which harbor *C. l. monticola*, have been known in this mountain range. Further field researches may possibly yield this taxon from other localities in the same mountain range.

In the revision on *C. lignarius*, FUJITA (1987) recognized three geographical forms in *C. l. monticola*, Nagano form, Yamanashi form and Shizuoka - Kii Peninsula form on the basis of male mandibular characters. However, he did not mention the status of the population of Ryohaku Mountain Range. From the geographical point of view, the population should belong to the Nagano form, but the present male specimens from Nukumi-Toge look like having intermediate mandibular characteristics between the Nagano form and Shizuoka – Kii Peninsula one. Further studies on the basis of a large number of specimens collected from various localities are need to evaluate the geographical variation of *C. lignarius*, as already pointed out by TSUCHIYA (2000).

Adding the present *C. l. monticola*, 16 species of the family Lucanidae are recorded from Fukui Prefecture. This species number is almost 90% of which have been recorded from Honshu Island, and this fact means that various natural habitats for lucanid beetles such as pri-

Table 1. List of lucanid beetles and their main habitats recorded from Fukui Prefecture. The taxonomic treatment follows MIZUNUMA & NAGAI (1994).

Species	Main habitat
Genus *Nicagus*	
Nicagus japonicus NAGEL, 1928	CTDBLF
Genus *Aesalus*	
Aesalus asiaticus asiaticus LEWIS, 1883	WTDBLF, CTDBLF
Genus *Ceruchus*	
Ceruchus lignarius monticola NAKANE, 1978	CTDBLF, SACF
Genus *Platycerus*	
Platycerus delicatulus delicatulus LEWIS, 1883	CTDBLF
P. acuticollis akitai FUJITA, 1987	CTDBLF
Genus *Lucanus*	
Lucanus maculifemoratus maculifemoratus MOTSCHULSKY, 1861	WTDBLF, CTDBLF
Genus *Prismognathus*	
Prismognathus angularis angularis WATERHOUSE, 1874	CTDBLF
Genus *Prosopocoilus*	
Prosopocoilus inclinatus inclinatus (MOTSCHULSKY, 1857)	WTDBLF, CTDBLF
Genus *Dorcus*	
Dorcus striatipennis striatipennis (MOTSCHULSKY, 1861)	WTDBLF, CTDBLF
D. rectus rectus (MOTSCHULSKY, 1861)	EGBLF, WTDBLF, CTDBLF
D. rubrofemoratus (VOLLENHOVEN, 1865)	WTDBLF, CTDBLF
D. montivagus montivagus (LEWIS, 1883)	CTDBLF
D. curvidens binodulosus WATERHOUSE, 1874	WTDBLF, CTDBLF
D. titanus pilifer (VOLLENHOVEN, 1861)	EGBLF, WTDBLF
Genus *Aegus*	
Aeges laevicollis subnitidus WATERHOUSE, 1873	EGBLF, WTDBLF
Genus *Figulus*	
Figulus binodulus WATERHOUSE, 1873	EGBLF, WTDBLF

SACF: subalpine coniferous forest; CTDBLF: cool-temperate deciduous broad-leaved forest; WTDBLF: warm -temperate deciduous broad-leaved forest (inckuding so-called village forest); EGBLF: evergreen broad-leaved forest.

mary beech forest on high mountains and ever green forest near the coast have been left in Fukui Prefecture (see Table 1).

In closing the present brief report, the author wishes to dedicate this report to Prof. Hiroyuki SASAJI, who has taken the leadership in inventorying the insect fauna and in conserving its diversity in Fukui Prefecture, in commemoration of his retirement from Fukui University.

要　約

荒谷邦雄：ミヤマツヤハダクワガタ *Cerchus lignarius monticola* NAKANE, 1978（鞘翅目、クワガタムシ科）の福井県からの新記録および同県のクワガタムシ相に関する考察 —— ミヤマツヤハダクワガタ *Cerchus lignarius monticola* NAKANE, 1978 を福井県から初めて記録した。本種の追加によって、福井県で生息が確認されたクワガタムシ科甲虫は本州から記録されている同科甲虫の約90%にあたる16種となった。

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Description of a New Species of the Genus *Tritoma* (Coleoptera, Erotylidae) from the Ryukyu Islands, Japan

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Abstract A new species of the genus *Tritoma* is described from the Ryukyu Islands, Japan, under the name *Tritoma sasajii* sp. nov.

Up to the present, 33 species of the genus *Tritoma* of the family Erotylidae have been known to occur in Japan (NARUKAWA, 2000), but none from the Ryukyu Islands (SASAJI, 1985). Recently, I had an opportunity to examine 3 specimens of *Tritoma* collected from the Ryukyu Islands, Japan. My careful examination revealed that they belong to a new member of *Tritoma* and I will describe this new species under the name, *Tritoma sasajii* sp. nov., in the present paper.

Before going further, I wish to express my hearty thanks to Mr. Yoshihiro MATSUNAGA and Mr. Teruo MATSUO for their kind offer of these valuable materials, and to Dr. Hideto HOSHINA (Yokohama Nat. Univ.) for reading the manuscript of this paper.

Tritoma sasajii sp. nov.

(Japanese name: Matsunaga-chibi-ohkinokomushi)
(Figs. 1: A–L)

Body oval, strongly convex on dorsum, about 1.7 times as long as wide; general colour yellowish brown and bright; pronotum with one small black spot along the middle of apical margin and a pair of black spots along basal margin (Fig. 1–A), scutellum black (Fig. 1–A); elytra with 8 black spots placed as follows (Fig. 1–A); the two spots suboval, somewhat angulate in part, situated a little behind the base and distant from the suture; the single largest spot transverse, on about apical one-third of the suture; the apical spot smallest and transverse; the other 4 spots along lateral margins; antennae with 1st to 7th segments yellowish brown and 8th to club dark brown.

Head (Fig. 1–D) about half as wide as pronotum, with punctures sparse, large and rough; clypeus rather sharply narrowed anteriorly, slightly emarginate at apical margin and finely marginate at apical and lateral sides (Fig. 1–D); eyes moderate in size, interocular distance 0.76 times as wide as head; maxillary palpus with terminal segment (Fig. 1–B) securiform and about 2.1 times as wide as long; mentum (Fig. 1–G) pointed apically, strongly gouged at apical two-thirds of lateral margins. Antennae (Fig. 1–B) eleven segmented; three terminal segments form-

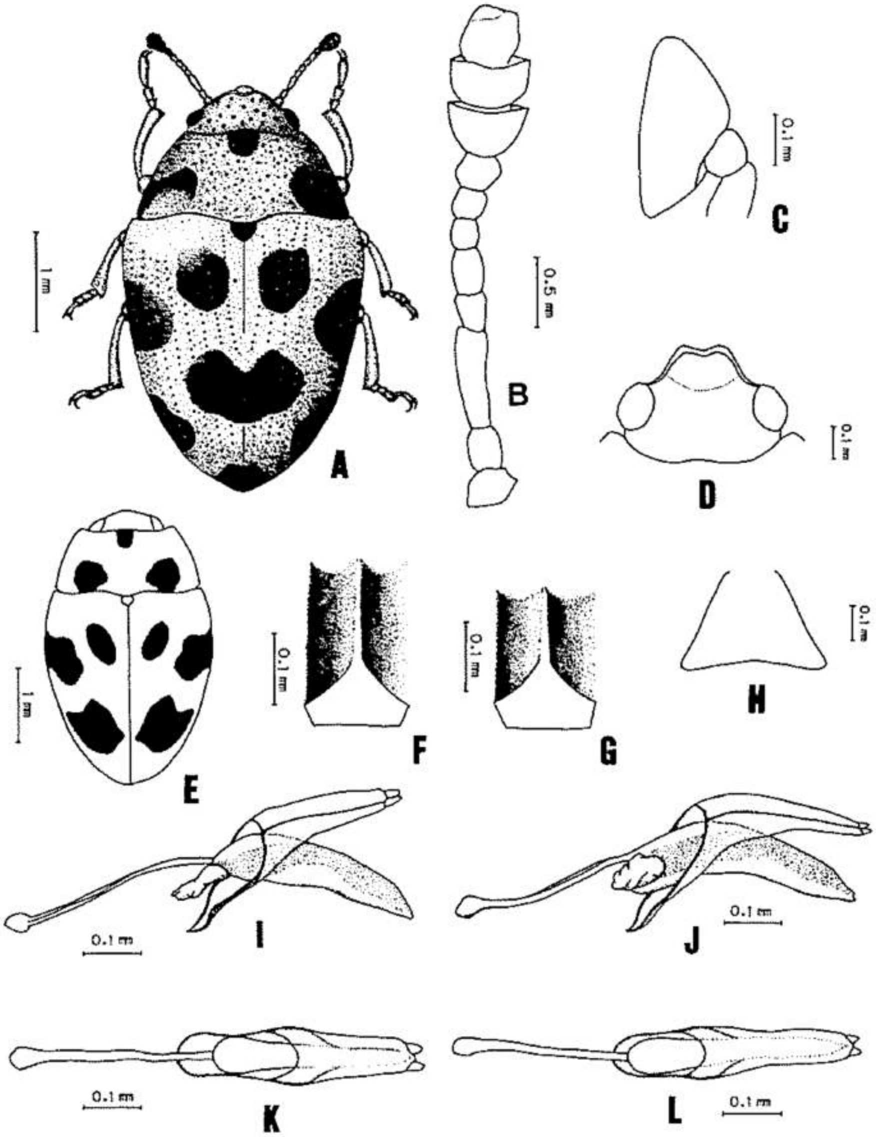

Fig. 1 *Tritoma sasajii* sp. nov. (A–D, G, H, J, L) and *Tritoma asahinai* NAKANE (E, F, I, K). A, E, dorsal view; B, antenna; C, maxillary palpus; D, head in dorsal view; F, G, mentum; H, prosternal process; I, J, aedeagus, lateral view; K, L, aedeagus, dorsal view.

ing a club; 1st segment cylindrical, wider than long, weakly constricted near apex; 2nd longer than wide; 3rd about 3.2 times as long as wide, and about 2.5 times as long as 2nd; 4th slightly longer than wide; 5th longer than wide; 6th and 7th as long as wide; 8th wider than long; 9th about 1.6 times as wide as long; 10th about 1.7 times as wide as long; 11th about 1.2 times as wide as long, rounded at apex.

Pronotum about 2.2 times as wide as long, widest at base, gradually narrowed from base to middle, then strongly so to apex, similarly punctured as on head; anterior margin gently arched and produced anteriorly at middle; anterior corners roundly projected anteriorly; posterior corners nearly rectangular; lateral margins clearly marginate.

Elytra oblong-oval, about 1.2 times as long as wide, widest at basal one-fourth and slightly wider than pronotum, weakly arcuate laterally from base to basal one-fourth, sharply narrowed thence to apex, marginate at basal margin, with eight seriate rows of punctures, which are relatively finer than those of pronotum; intervals between rows sparsely and minutely punctured; humeri slightly produced anteriorly and rather pointed at the tops.

Prosternum sparsely punctured; prosternal process longer than wide, divergent posteriad, slightly arcuate at posterior margin, with lateral edges evenly produced (Fig. 1-H); metasternum coarsely punctured, covered with short and sparse hairs; first abdominal segment with metacoxal line incomplete, only extending near posterior margin of the segment.

Aedeagus (Figs.1–J and 1–L) slender, curved in an arc, tumid at basal one-third, then narrowed apically, and emarginated at apex in lateral view, triangular apically in dorsal view; parameres almost as long as median lobe in lateral view; median strut very short, about 0.7 times as long as the median lobe.

Body length: 3.6–4.4 mm; width: 2.1–2.4 mm.

Holotype: ♂, Mt. Yonahadake, Okinawa Is., Okinawa Pref., 5. X. 1986, Y. MATSUNAGA leg. (preserved in the Collection of the Osaka Museum of Natural History, Type No. OMNH-TI-132). Paratypes: 2♀♀, Mt. Nishimedake, Okinawa Is., Okinawa Pref., 10. VII. 1986, Y. MATSUNAGA leg. (1♀ preserved in the Collection of the Osaka Museum of Natural History and 1♀ in my collection).

Distribution. Japan: the Ryukyu Islands (Okinawa Is.).

Food-fungus: unknown.

Remarks. This new species resembles *Tritoma asahinai* (NAKANE, 1950), but the former is easily distinguished from the latter by having a head and pronotum sparsely punctured, scutellum black, elytra with 8 black spots (Fig. 1–A), mentum relatively slender (Fig. 1–G), and aedeagus emarginated apically in lateral view (Fig. 1–J), whereas in *Tritoma asahinai,* head and pronotum densely punctured, scutellum yellowish brown, elytra with 6 black spots (Fig. 1–E), mentum relatively thick (Fig. 1–F), and aedeagus not emarginated apically in lateral view (Fig. 1–I).

Etymology. The specific name of the new species is dedicate to Dr. Hiroyuki SASAJI, a president of the Japan Coleopterological Society.

要　約

生川展行：琉球列島（沖縄本島）からの*Tritoma*属の1新種の記載——— 琉球列島（沖縄本島）からチビオオキノコムシの1新種 *Tritoma sasajii*（マツナガチビオオキノコムシ）を記載した．本種はトモンチビオオキノコムシ *Tritoma asahinai* NAKANE に似ているが，後者に比べて頭部，前胸背の点刻が小さくまばらで，小楯板が黒色，上翅の黒色紋の数が8個，下唇が短い，雄交尾器の先端が湾入する（側面）点で区別できる．

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Male and Female Mating History in Relation to Density in the Armyworm, *Pseudaletia separata* (Lepidoptera: Noctuidae)

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Abstract Effects of adult density on mating history of male and female in *P. separata* were investigated in laboratory. Competition between males for females at high density was suggested to be more serious than that at low density. Although no significant influence of adult density on lifetime mating times was observed, both males and females at high density showed larger daily mating probabilities than those at low density. Compared with those at low density, males initiated their mating earlier and females tended to remate more frequently at high density. The density-related variance in males' sexual maturity might be an adaptation to tackling sperm competition. The results support the hypotheses (HE & TSUBAKI 1992, HE & MIYATA 1997, HE *et al.*, 1995) that larval density-related variations observed in spermatophore size and in number of apyrene sperm by males may be adaptations to tackling variations of sperm competition at adulthood.

Key Words *Pseudaletia separata*, density, mating history, sperm competition

The armyworm, *P. separata* (WALKER), a lepidopteran pest of gramineous crops, appears occasionally in large numbers, and assume the "army habit" if its hostplants are devoured. Previous studies have shown that in *P. separata*, 1) males emerged from crowded larvae produced larger spermatophores (HE & TSUBAKI 1992, HE & MIYATA 1977) and more apyrene sperm (HE *et al.* 1995) than those from solitary larvae, 2) females that received large spermatophores remated less frequently than those received small spermatophores (HE & TSUBAKI 1991, HE & MIYATA 1977). Based on the theory of sperm competition (competition between males for females) that there should be a positive association between the number of sperm a male should inseminate and the risk that while in the female tract his sperm will encount fertile sperm from rival males (PARKER 1982), these larval density-related variations in spermatophore size and in number of apyrene sperm were suggested to be adaptations of the male that serves to reduce the increased sperm competition from other rival males at high density (HE & TSUBAKI 1992, HE *et al.* 1995, HE & MIYATA 1997). As one important precondition in these suggestions, it was hypothesized that the intensity of competition between males for females was positively related with density. In this study we will test this hypothesis by investigating the influences of adult density on male and female mating history.

Materials and Methods

The insects were reared in a constant temperature room (25 ℃ and 16L–8D). Larvae were reared in plastic cups (3.5 cm in depth × 7.5 cm in diameter, 90cc in volume) and fed on artificial diet (Insecta LFR, Nihon Nonsan-Kogyo Limited Company) under solitary condition (one larva/cup) until pupation (HE & TSUBAKI 1991).

In the morning following adult eclosion, moths were sexed and individually marked with a quick-drying colour pen (Magic Inc, Opaque Color, Japan) on wings, and released into meshed mating cages (25×35×26 cm) for copulation. Cotton-absorbed 10% honey solution was supplied as nutrition for the adult. Paraffin papers were used as oviposition substrates.

Effects of adult density on either female or male mating history were investigated by allowing the moths to two treatments of adult density: high (20 pairs per cage) and low (two pairs per cage) density. Moths were randomly introduced to the mating cage after eclosion and copulations were monitored and recorded until the moths' death. Males and females in the same cage eclosioned on the same day, with a few exceptions in which moths eclosioned on the same two days.

Three replicates of such procedure were carried out. In both high and low density treatment some pairs (seven pairs among the 60 tested pairs at high density and seven pairs among the 46 tested pairs at low density) experienced an unsuccessful copulation, or failed to separate each other after copulation. Data from these individuals were included only for the calculation of age at first mating, when the unsuccessful copulation occurred after the first mating. While for all the other data analysis, in the case of high density, data from the failed couples were discarded; and in the case of low density, data from the cage that the failed couple belonged to were dismissed if either of the two pairs caged together experienced an unsuccessful copulation.

We choose larvae under solitary condition for origins of both high and low adult density in considering that larvae under the same rearing condition is necessary to detect the influence of adult density, and that larvae under solitary condition could form not only low adult density but also high density (by aggregation) in field, and mating history might also be influenced by larval crowding, as showed in the spermatophore size (HE & TSUBAKI 1992, HE & MIYATA 1977) and in the number of apyrene sperm (HE *et al.* 1995).

Results

Effects of adult density on mating history of males

Table 1 showed the male's lifetime mating frequency at high and low adult density. No significant difference was observed between the two density treatments (average lifetime mating times = 1.7 ± 1.1 ($n = 53$) at high density and 1.4 ± 1.1 ($n = 32$) at low density, Mann-Whitney U-test, $U = 747.0$, $Z = -0.916$, $p = 0.360$).

With the data from mated individuals, average ages at the first and the last mating were obtained and also listed in Table 1. Compared to those at low density, males at high density significantly initiated their first mating earlier (Mann-Whitney U-test, $U = 624.0$, $Z = -1.992$, $p = 0.046$, Table 1 and Fig. 1), but did not finish their last mating earlier (Mann-whitney U-test, $U = 577.5$, $Z = -0.349$, $p = 0.727$), and thus had a longer time period available for mating.

Table 1. Mating history of male and female at high (20 pairs/cage) and low (two pairs/cage) adult density. Males at high density significantly initiated their first matings earlier than those at low density (Mann-Whitney U-test, U = 624.0, Z = −1.992, p = 0.046). While for all the other items, no significant difference was observed between the two density treatments (Mann-Whitney U-test, p>0.05).

sex	density	lifetime mating times No.	mean ± D (min–max)	age at 1st mating (days) No.	mean ± SD (min–max)	age at last mating (days) No.	mean ± SD (min–max)
male	high	53	1.7 ± 1.1 (0–4)	51	2.6 ± 0.8 (2–6)	45	3.8 ± 1.4 (2–7)
	low	32	1.4 ± 1.1 (0–4)	33	2.8 ± 0.6 (2–4)	27	3.7 ± 0.8 (2–5)
female	high	53	1.7 ± 0.9 (0–4)	52	2.9 ± 1.0 (2–6)	48	4.0 ± 1.2 (2–7)
	low	32	1.4 ± 1.1 (0–3)	32	2.8 ± 0.7 (2–4)	25	3.6 ± 1.0 (2–5)

Effects of adult density on mating history of females

Effects of adult density on the female's lifetime mating frequency were investigated at the same time (Table 1), and no significant difference was observed between the high and low density (average lifetime mating times = 1.7 ± 0.9 (n = 53) at high density and 1.4 ± 1.0 (n = 32) at low density, Mann-Whitney U-test, U = 684.5, Z = −1.483, p = 0.138). With the data of mated individuals of the three replicates of experiment, percentage of females mating more than once was 71.6 ± 7.3% (n = 3) at high density, and 55.1 ± 4.5% (n = 3) at low density (Fig. 2). Females at high density tended to remate more frequently than those at low density (Chi-square

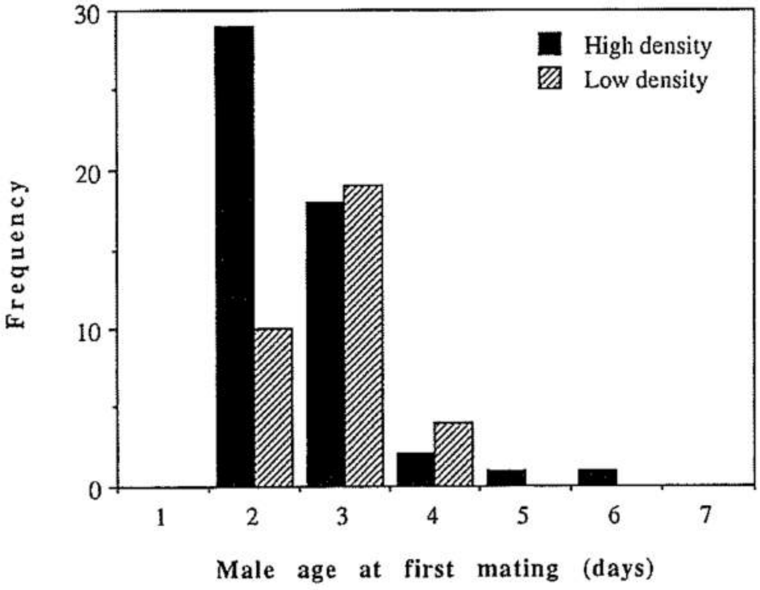

Fig. 1. Frequency distribution of males' age at first mating at high (20 pairs/cage) and low (two pairs/cage) adult density.

Table 2. Longevity and daily mating probability (DMP, = lifetime mating times/longevity) (mean ± SD) of male and female at high (20 pairs/cage) and low (two pairs/cage) adult density.

sex	density	No.	longevity (days)	DMP
male	high	53	12.8 ± 3.2	0.140 ± 0.104
	low	32	16.0 ± 3.3	0.094 ± 0.077
female	high	53	10.2 ± 2.1	0.174 ± 0.098
	low	32	12.7 ± 2.7	0.120 ± 0.089

test, $X^2 = 1.606$, df = 1, p = 0.205, but Student t-test of the arcsine root transformed percentage of females mating more than once, t = 3.672, n = 3, p = 0.014).

Average ages at first and last mating were also compared between the high and low density (Table 1). Differing from the male, the female showed no significant difference in neither the age at first mating nor the age at last mating between the two density treatments (Mann-Whitney U-test, U = 768.0, Z = –0.590, p = 0.556 and U = 491.5, Z = –1.261, p = 0.207 for ages at first and last mating, respectively).

Effects of adult density on longevity and daily mating probability

Table 2 showed longevity of males and females at high and low adult density. Both males and females at high density had shorter adult life-span than those at low density (12.8 ± 3.2 (n = 53) at high density and 16.0 ± 3.3 (n = 32) at low density, Mann-Whitney U-test, U = 440.5, Z = –3.696, p = 0.0002 for the male; 10.2 ± 2.1 (n = 53) at high density and 12.7 ± 2.7 (n = 32) at low density, Mann-Whitney U-test, U = 405.0, Z = –4.018, p = 0.0001 for the female).

As mating experience affected females' longevity (females that have never mated had a longer longevity than those that mated) (HE 1994), the longevities were also compared with only those that mated. The result was similar: females that mated had shorter adult life-span at high density than at low density (10.2 ± 2.1 (n = 48) and 11.8 ± 2.1 (n = 25) for the high and low density, respectively; Mann-Whitney U-test, U = 343.5, Z = –2.982, p = 0.003).

The differences in longevity led to differences in daily mating probability (DMP, = lifetime mating times/longevity) between the high and low density, as the lifetime mating times (Table 1) were not different. Table 2 showed that males and females at high density had larger daily mating probability than those at low density (Mann-Whitney U-test, U = 604.0, Z = –2.213, p = 0.027 and U = 579.0, Z = –2.440, p = 0.015 for the male and female, respectively). Similarly for the females, comparison with only the mated individuals also showed the same trend: females that mated had larger daily mating probability at high density than at low density (0.192 ± 0.084 (n = 48) and 0.153 ± 0.071 (n = 25) at the high and low density, respectively; Mann-Whitney U-test, U = 435.0, Z = –1.918, p = 0.055).

Discussion

It is widely accepted that population density often influences reproductive behavior of insects (THORNHILL & ALCOCK 1983). Many studies have suggested that intensity of competition

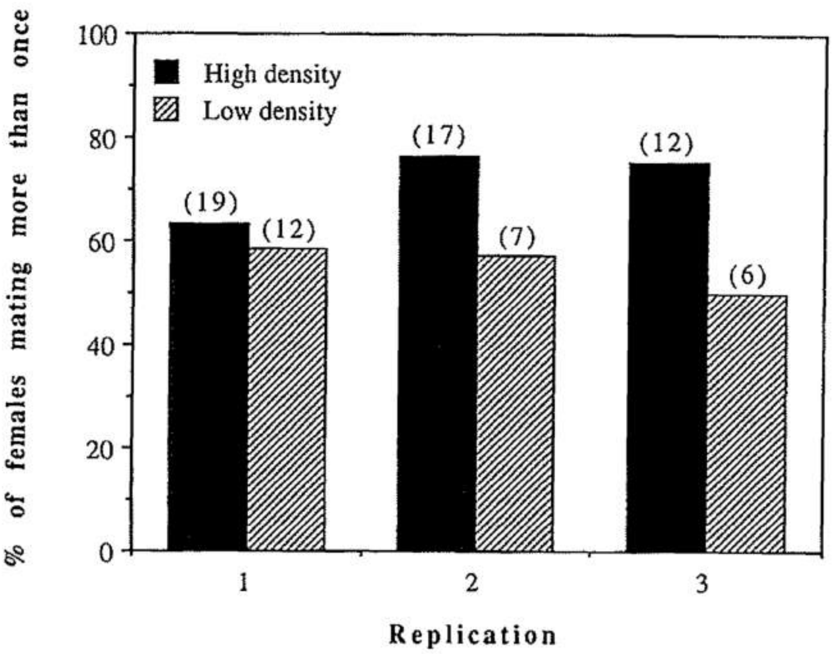

Fig. 2. Percentage (%) of females mating more than once at high (20 pairs/cage) and low (two pairs/cage) adult density. Numbers in parentheses are sample size.

between males for females was positively related with population density (GOODWIN & MADSEN 1964, GRAHAM *et al.* 1965, PLISKE 1973, HARSHMAN *et al.* 1988, CONNER 1989, MCLAIN 1992). Some studies even suggested that frequency of remating might be affected by density (BOORMAN & PARKER 1976, RICHMOND 1976, LEVINE *et al.* 1980), although that in laboratory populations of *Drosophila melanogaster* (MEIGEN), regressions of percent remating on density indicated no significant dependence of remating on density, and increased density did not increase remating frequency (GROMKO & GERHART 1984).

In the present study, no significant influence of adult density on lifetime mating times was observed in *P. separata*. However, both males and females at high density showed shorter longevities, and thus larger daily mating probabilities than those at low density, which suggested a stronger pressure of sperm competition (competition between males for females) at high density. Factors responsible for this density-related variance in longevity are unclear. One possible explanation could be given that energy budget for mating behavior might be larger at high density than at low density. Although quantitative data were absent, flying behavior (males' courtship behavior and females' responses to males' courtship behavior) were observed more frequently at high density than at low density.

In *P. separata*, males at high density initiated their mating earlier than those at low density. Two explanations are possible to correspond to this phenomenon. One is that competition between males for females or sperm competition might be more serious at high density than that at low density.

Protandry, a phenomenon of males attaining reproductive maturity earlier than females, is common in insects with non-overlapping generations (THORNHILL & ALCOCK 1983). Although *P. separata*, a species with overlapping generations, do not show protandry (males eclose the same day or one day later after females in the present laboratory study), the males' earlier mating at high density, which imply an earlier sexual maturity, could also treated as a kind of "protandry". Theoretically male-benefit protandry may evolve due to either intra-sexual selection when first-male sperm precedence exists and/or female mate only once (THORNHILL & ALCOCK 1983), or inter-male competition when a first mating advantage does not hold (WANG *et al.* 1990). WANG *et al.* (1990) suggested that inter-male competition for female-encounter sites might lead to the evolution of protandry in *Ligurotettix coquilletti* (MCNEILL). Early-maturated males might experience more female encounters than the later-maturated males, and the number of encounters might be proportional to lifetime mating success. In fact, our study did showed that in laboratory the lifetime mating times (y) of males were negatively related with the age at first mating (x) at both high and low adult density (regression analysis, $y = 2.8–0.3\ x$, $r^2 = 0.089$, $n = 45$, $p = 0.047$ and $y = 4.0–0.8\ x$, $r^2 = 0.342$, $n = 27$, $p = 0.001$ for the high and low density, respectively). Thus the males' earlier sexual maturity (earlier initiating of mating) at high density in *P. separata*, a species showing a pattern of sperm precedence of the last male to mate (HE 1994), might be evolved due to increased pressure of sperm competition at high density, and might be an adaptation for increasing lifetime mating success.

Another explanation is that the difference observed might be due to more suitable mates available resulted from large population density, or that the opportunity for a male to find and select a suitable mate might be dependent on density. In the present study, the unsuccessful pairs that failed to separate each other after copulation tended to take place more frequently at low density than at high density (seven pairs among the 60 tested pairs at high density and seven pairs among the 46 tested pairs at low density), although the difference was not significant (Chi-square test, $X^2 = 0.286$, $df = 1$, $p = 0.593$). These unsuccessful matings may be due to mismatch between mates. It is not unreasonable to suppose that not all the males (or females) could match every one of the adversary sex, for example, small males might be less possible to copulate with large females. Generally speaking, when density increases, variation in some characteristics (for instance, body size) would also become great, and males that could not obtain a suitable mate would decrease. Therefore, increased density would make the male mate at a younger age.

Although we prefer the first to the second, those two explanations are not exclusive each other, and both of them might play an effect. Whatever the cause may be, the eventual outcome that males and females had larger daily mating probability and males initiated their mating earlier (thus have longer time period available for mating) at high density than at low density did implied that in *P. separata*, the intensity of competition between males for females was more serious at high density as predicted.

The present study also showed that females at high density tended to remate (mate more than once) more frequently than those at low density, although the tendency was not significant, maybe due to small sample size. Except for the two explanations mentioned above, male's earlier mating could also lead to female's higher frequency of remating. Spermatophore size was positively related with male age at mating (HE & TSUBAKI 1992) and a smaller spermatophore was less effective in delaying female remating than a large one (HE & TSUBAKI 1991), thus the males' earlier mating at high density would make a smaller spermatophore, and then a higher frequency of female remating.

A same "mean" mating frequency of males and females was obtained in the present study

(Table 1). This could be the outcome of our experiment design. As pairs of moths were housed in enclosures with a 1:1 adult sex ratio and the mating histories measured for males and females were not independent (for both sexes within each enclosure), the mating frequency of males will be dependent on the mating frequency of females and vice versa, and thus only variance in mating frequency of the competitive sex is expected to change with density, as it appeared in Table 1. As newly males (females) were not replaced in the cages, female mating frequency and male competition measured might be underestimates. Further experiments having the numbers of sexually active individuals of the opposite sex being maintained by continually replacing mated individuals with virgins, and experiments on influences of larvae density on adult mating frequency (*e.g.*, with rearing the larvae for the high adult density treatments at high density) are necessary for future study to understand fully the mating history of subjects (either males or females).

Finally, it must be stressed that this was just a laboratory result. Mating behavior, especially males' courtship in field might be different from that in cages. The limited space of mating cages may make it easy for males to find and capture females, and females may become difficulty to escape from males' sexual harassment. Thus the mating frequency may become enlarged. And also from the limited space in mating cages, one may suspect the effectiveness of the density treatment, especially that of the low density design. One may argue that even a two-pair density could mean a high density in field. Really it would lead to such suspect if just comparing the space of the mating cage with that of the vast field. However, the conclusion could be the contrary if the density was evaluated based on the amount of individuals (especially the amount of the adversary sex) a male or female met for his or her adulthood, rather than the space. Under the low density condition, the male or female had only two mates available for choosing and mating, and had only one rival in the competition for mates. However, under high density condition, the male or female had 20 mates available for choosing and mating, and had 19 rivals in competition for mates. Therefore we acknowledged the effectiveness of the two density treatments, and believe that the high and low density could represent at least some density-related difference in field in mate availability and strength of competition, although studies on mating behavior and mating frequency in field populations are necessary and important in complete understanding of the relationship between mating history and population density.

Acknowledgments

We express our thanks to Dr. Yoshitaka TSUBAKI, Director, National Institute for Environmental Studies, Tsukuba, for his precious guidance and advice during the course of this study, and for critical reading of earlier versions of this manuscript. Sincere gratitude is also due to Emeritus Professor Yoshiaki ITÔ, Associate Professor Toshiharu TANAKA and Assistant Professor Takao ITIOKA, Nagoya University, for their previous advice and kind encouragement.

要約

賀　亦斌・宮田　正：アワヨトウの成虫期の密度に関連した交尾様式について――― アワヨトウの成虫期の密度に関連した交尾様式について，実験室条件下で調査した．高密度下での雌をめぐる雄間の競争は，低密度下よりも激しかった．成虫密度は生涯中の総交尾回数には影響

はなかったが，高密度下では低密度下に比べ，雌雄とも日当たり交尾確率が高かった．低密度下に比べ，高密度下では雄は早く初交尾するようになり，雌は早く再交尾するようになった．雄の性成熟の密度に関連した変異は，精子競争に対する適応と考えられた．これらの結果は，幼虫密度と関連した精包サイズならびに雄による無核精子数の変異は成虫期における精子競争に対する適応であるという仮説（賀・椿, 1992; 賀・宮田, 1997; 賀ラ, 1995）を支持している．

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Notes on the Weevil Genus *Trachodes* in Japan (Coleoptera: Curculionidae: Acicnemidini)

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Abstract As a result of the revisional study on the genus *Trachodes* in Japan, present paper includes description of a new species, *T. kannohi* sp. nov., notes on the variations of *T. ovipennis*, *sasajii* and *monticola*, a revised key to species, and drawings of their important features.

It is with my great pleasure that I dedicate this paper to my longtime friend, Prof. Hiroyuki SASAJI on the occasion of his retirement from Fukui University. Since my earliest contact with him in 1954 when he was a freshman in Kyushu University, he has been my great friend not only on entomology but also in private matters.

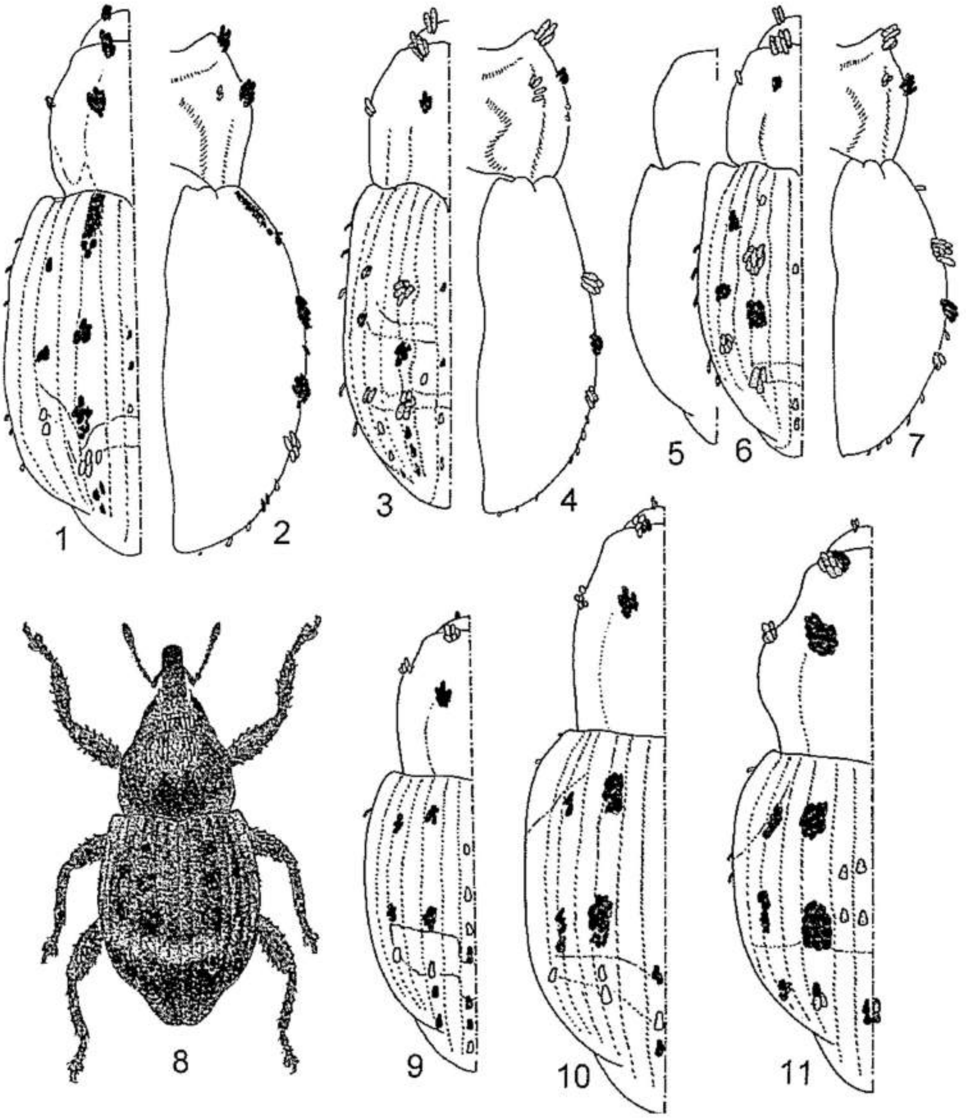
Present paper deals with weevils of the genus *Trachodes* in Japan as the supplement to "The family Curculionidae of Japan. VIII. Subfamily Acicnemidinae, by MORIMOTO and MIYAKAWA" which appeared in Esakia no. 35 in 1995, based mostly on the rich materials taken by Mr. Kenji KANNÔ, Mie Pref. Besides the weevils of the genus are fairly variable in scaly color pattern and conditions of scaly patches in addition to the loss of scaly patches and tufts by discoloration, falling-off or greasing in some timeworn specimens, several species have considerable variation in the shapes of the pronotum and elytra, and sizes of the femoral teeth. Moreover, presence of a new species close to *Trachodes sasajii* makes it difficult to full application of the key to species in the previous paper. Therefore, the taxonomy of the weevils in this genus is revised, and the results including description of a new species, notes on the variations of *T. sasajii* and *monticola*, and a revised key to species are given in this paper.

I wish to express my gratitude to Mr. K. KANNÔ for his kind offer of materials, and to Prof. J. YUKAWA and Dr. H. KOJIMA of Kyushu University for their favors in various ways.

Trachodes kannohi sp. nov.

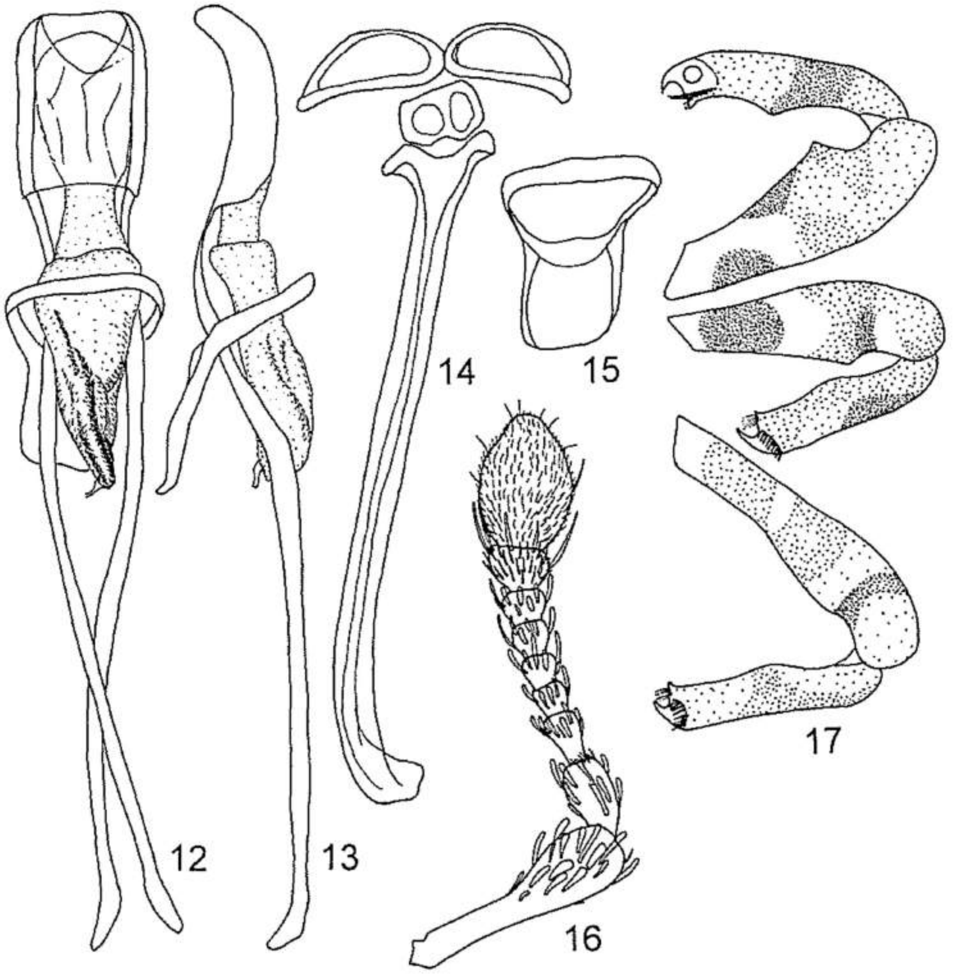
(Figs. 3, 4, 12–17)

Derm dark reddish brown to reddish brown, rostrum, antennae and claws reddish brown; scaling dense, completely concealing derm except for bare rostrum before antennal sockets and ventral surface of head, rostrum at base and head brownish grey, with greyish crescent patch along hind margin of each eye, scaly tufts brownish grey, pronotum brownish grey, with dark brown to blackish quadrate median broad area behind median tufts, anterior and lateral scaly tufts brownish grey, median scaly tufts almost blackish, often with a short dark brown stripe in front of 6th stria; elytra dark brownish mixing with grey, the latter dominant and forming vague



Figs. 1-7. *Trachodes* spp. left half, dorsal, and lateral view showing convexity of elytra. 1–2, *T. monticola* MORIMOTO et MIYAKAWA; 3–4, *T. kannohi* sp. nov.; 5-7, *T. sasajii* MORIMOTO et MIYAKAWA. Fig. 8. *Trachodes murakamii* MORIMOTO. Figs. 9–11. *Trachodes* spp., left half; 9, *T. subfasciatus* VOSS; 10-11, *T. ovipennis* MORIMOTO et MIYAKAWA (showing variation).

short stripes at base of 5th interval and on shoulder, with a narrow grey transverse band across postmedian scaly tufts on 3rd and 5th intervals as far as side margins, and sometimes with indefinite greyish band between 5th intervals behind antemedian scaly tufts, 3rd interval with postbasal scaly tuft vestigial, antemedian scaly tuft always conspicuous, brownish grey, median scaly tuft conspicuous, black, postmedian scaly tuft conspicuous, brownish grey, scaly tufts on 5th interval smaller, antemedian scaly tuft at most indefinite, median scaly tuft small, black, lying much anterior to that of 3rd interval, postmedian scaly tuft composed of one or two brownish grey scales.



Figs. 12-17. *Trachodes kannohi* sp. nov., male. 12–13, Penis, dorsal and lateral views; 14, Eighth and ninth sternites and spiculum gastrale; 15, Tegmen; 16, Antenna; 17, Femora and tibiae.

Rostrum with 3 rows of punctures before antennal sockets, which more or less longitudinally confluent between antennal sockets for a short distance, and becoming weaker towards apex. Antennae scaled and setose from scape to 6th segment of funicle, only setose on 7th segment of funicle, length excluding basal neck (width) of segments from scape to club as 95(25) : 33(19) : 22(13) : 12(13) : 12(14): 12(15) : 14(18) : 15(24): 50(36). Pronotum as broad as to 1.1 times as broad as long, with sides almost parallel from base to middle, then evenly arcuate and narrowing to indefinite subapical constriction, disc weakly depressed longitudinally in middle and sides in front of 3rd to 6th striae, the depressions becoming weaker and obsolete anteriorly, side margins obtusely edged; lateral sides of pronotum weakly depressed longitudinally above procoxae. Scutellum minute or concealed. Elytra oblong ovate, 1.45–1.56 times as long (maximum) as broad, sides from round humeri to middle straight and weakly dilating, basal margin distinctly concave at bases of 6th and 7th intervals, dorsal contour when viewed laterally almost straight from base to middle, then evenly rounded to apex, 3rd and 4th intervals conjointly arcuate anteriorly at base, scaled striae visibly narrow. Legs robust; femora with tooth triangular on fore legs, obtuse on middle legs, obsolete on hind legs; tibiae straight externally, bisinuate internally; tarsi with 1st segment as long as 2nd and 3rd combined.

Male. Rostrum as long as pronotum; 1st and 2nd ventrites shallowly depressed in middle; 5th ventrite subtruncate at apex, with ovate depression in posterior half between round laterocaudal corners, inside of depression shiny, minutely punctate, and bordered with a few longer and erect setae on each side and a few suberect scales on anterior edge in general. Penis parallel-sided, internal sac asperate near base.

Female. Rostrum a little longer than pronotum; 1st and 2nd ventirtes not depressed, 5th ventrite broadly rounded at caudal margin, evenly punctate.

Length: 2.8–3.6 mm (excl. rostrum).

Holotype: ♂(Type no. 3216, Kyushu Univ.), Tatedani, Mt. Suzukita, Fujiwara-machi, Mie Pref., 23. XI. 1996, K. KANNÔ leg. Paratypes: 6♂♂, 4♀♀, same data as holotype; same locality as holotype, 1♀, 18. V. 1996 and 2♂♂, 8. XII. 1996, K. KANNÔ leg. Mt. Hikosan, Fukuoka Pref., 2♂♂, 1♀, 13. X. 1992, T. UENO leg; 1♀, 5. IX. 1993, H. KOJIMA leg.

Distribution. Japan (Honshu, Kyushu).

Etymology. The specific name is dedicated to Mr. K. KANNÔ, who collected this interesting weevil for the first time.

Biodata. Specimens were collected from litter around a root of living large *Pterocarya rhoifolia* (Juglandaceae) at 23rd of November .

Comparison. Present new species is very close to *T. sasajii* and *T. monticola*, but is separable from known species of *Trachodes* in Japan by the characters given in the key.

Trachodes ovipennis MORIMOTO et MIYAKAWA, 1995

(Figs. 10, 11)

Trachodes ovipennis MORIMOTO et MIYAKAWA 1995, Esakia, (35): 22, figs 2, 45, 46 (Ohdaigahara, Mt. Manzaburodake in Izu, and Mt. Daigatake in Hakone).

Present species was described on 7 specimens and drawings were made on a male from Mt. Manzaburodake. Among 26 specimens examined in this study, the femoral teeth are always sharp triangular and conspicuous in the fore legs, but are small and sharp in 17 specimens, small and obtuse in 6 specimens, or almost obsolete and at most with a erect scale in 2 specimens in the middle legs, and are smaller than those on middle legs and small to minute in 5 specimens, small and obtuse angular in 13 specimens, or obsolete in 6 specimens in the hind legs. The teeth of the middle and hind femora are generally sharper in the specimens from Tokyo, Kanagawa and Shizuoka as illustrated in the previous paper in 1995 than those from Mie and Nara, but the separation of their local populations into subspecies will be discussed in the future after the accumulation of much materials from many localities. The pronotum is variable in shape and size, as long as broad and almost parallel-sided in 2 specimens (Fig.10), as long as broad and weakly rounded at sides in 10 specimens, or broader than long and strongly expanded laterally in the middle in 12 specimens (Fig. 11). No correlation of the shape of the pronotum and conditions of the femoral teeth are noticed in the present study.

Trachodes sasajii MORIMOTO et MIYAKAWA, 1995

(Figs.5–7)

Trachodes sasajii MORIMOTO et MIYAKAWA, 1995, Esakia, (35): 24 , figs. 4, 58–61; Koike in Fukui, Hokkaido, Aomori, Iwate, Niigata, Gunma, Nagano, Shizuoka, Fukui and Wakayama).

This species is easily recognized by the brownish grey antemedian and postmedian scaly tufts on the third interval of elytra in contrast to the black median tuft like *T. kannohi*. The elytra are ovate, with sides evenly arcuate laterally (Fig.6) or almost straight for a short distance in the middle (Fig.5) when viewed dorsally, and evenly arcuate dorsally from the base to the apex when viewed laterally (Fig.7). The elytra are 0.70 to 0.81 times as broad as long, and 1.94 to 2.23 times as long as pronotum, whereas in *T. kannohi*, the elytra are 0.65 to 0.69 times as broad as long and 2.14 to 2.26 times as long as pronotum, and parallel-sided from humeri to the middle when viewed dorsally, and the dorsal contour is almost straight from the base to the middle when viewed laterally.

Key to Species of *Trachodes* in Japan

1(4) Elytra with basal margin almost straight from humeri to 3rd striae, then evenly curved caudad to suture, or at most slightly produced anteriorly at bases of 3rd and 4th intervals (Figs. 9–11); tarsi with 1st segment slightly longer than two followings combined; male aedeagus with ostium of penis as widely distant from apex as width of penis.

2(3) Elytra oblong-ovate, 1.3 times as long as broad, pronotum almost straight or weakly rounded laterally (Fig. 9); scaly vestiture behind greyish postmedian band predominantly dark brownish, blackish tufts on third and fifth intervals usually smaller and often inconspicuous.……………………*Trachodes subfasciatus* VOSS

3(2) Elytra ovate, 1.1–1.2 times as long as broad, pronotum rounded laterally and rapidly narrowing anteriorly to subapical constriction from middle in general (Fig. 11) or rarely almost parallel-sided (Fig. 10); scaly vestiture concolorous ochreous behind postmedian band, blackish tufts on third and fifth intervals conspicuous.……………………
……………………*Trachodes ovipennis* MORIMOTO et MIYAKAWA

4(1) Elytra with basal margin markedly sinuate, strongly concave between humeral callus and 4th stria, distinctly produced anteriorly at bases of 3rd to 5th intervals in an arc (Figs. 1–8), tarsi with 1st segment as long as two followings combined; male aedeagus with ostium of penis close to apex.

5(8) Elytra with antemedian and postmedian scaly tufts brownish grey in contrast to black median tuft on 3rd interval; legs robust; penis about 1.5 times as long as broad, parallel-sided.

6(7) Elytra ovate, 1.24–1.43 times as long as broad, with sides evenly arcuate (Fig. 6) or straight for a short distance in the middle (Fig. 5), with dorsal contour evenly arcuate from base to apex in lateral aspect (Fig. 7); 5th ventrite in male weakly depressed at middle on caudal third.……………………*Trachodes sasajii* MORIMOTO et MIYAKAWA

7(6) Elytra oblong-ovate, 1.45–1.56 times as long as broad, with sides straight from humeri to the middle (Fig. 3), with dorsal contour almost straight from base to middle, then arcuate to apex in lateral aspect (Fig. 4); 5th ventrite in male distinctly depressed in oval shape on caudal half.……………………………………*Trachodes kannohi* sp. nov.

8(5) Elytra with antemedian scaly tuft black like median tuft (Figs.1, 2, 8); penis slenderer, 1.7– 2.0 times as long as broad.

9(10) Elytra with definite brownish greyish humeral patch and white postmedian band in sharp contrast to black general scaling, lateral and latero-caudal areas to postmedian band often brownish grey, parallel-sided from a little behind humeri to middle, 1.60–1.65 times as long as broad, scaly tufts black except for those on postmedian band.……………………………………*Trachodes simulator* MORIMOTO et MIYAKAWA

10(9) Elytra ovate to oblong-ovate, variegated with greyish, brownish and dark brownish scales, humeral patch less definite.

11(12) Elytra ovate, broadest at or a little behind middle, 1.2 times as long as broad, evenly rounded at sides from humeri to apex, postmedian greyish band evenly arcuate caudad (Fig. 8); penis weakly dilated apically.……………………*Trachodes murakamii* MORIMOTO

12(11) Elytra oblong-ovate, more than 1.4 times as long as broad, parallel-sided for a short distance before middle, postmedian greyish band W-shaped (Fig.1); penis parallel-sided.……………………………………*Trachodes monticola* MORIMOTO et MIYAKAWA

要　　約

森本　桂：日本産ダルマカレキゾウムシ属 *Trachodes* の分類ノート.—— 日本産のカレキゾウムシ亜科を1995年にまとめたが (MORIMOTO & MIYAKAWA, Esakia (35): 17–62), 最近 *Trachodes* 属について標本多数を官能健次氏らのご厚意で調べる機会を得たので再検討を行った. その結果, 新種カンノウカレキゾウムシ *T. kannohi*（三重県藤原町鈴北岳たて谷）を記載し, またササジカレキゾウムシ *T. sasajii*, ハバビロカレキゾウムシ *T. ovipennis*, ミヤマカレキゾウムシ *T. monticola* 3種の個体変異を明らかにして, これらを含めた新たな検索表を作成した. カンノウカレキはササジカレキに似るが, 上翅側縁は肩から中央までがほぼ平行で, 背面への隆起も弱く, 全体としてかなり細長い感じがする. 官能氏によると, 11月23日に太いサワグルミ生立木根元の落葉下から採集したという. ハバビロカレキは前胸の形と中・後腿節の歯の状態に一見別種を思わせるほどの個体変異があり, 関東産は三重県以西産よりも腿節の歯がやや顕著な傾向が認められる.

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A Remarkable New Species of the Genus *Mordella* (Coleoptera: Mordellidae) from the Central Ryukyus

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Abstract A new mordellid beetle, *Mordella sasajii* sp. nov., is described from Okinawa Is. of the Ryukyu Islands. This may be allied to *Mordella onaga* NOMURA from Japan at a glance, but evidently differs from it particularly in the characters of maxillary palpi, antennae and male genitalia.

The mordellid genus *Mordella* comprises many species including unnamed ones in East Asia. Nevertheless, only three species of this genus have been known from the Ryukyu Islands of Southwest Japan at present. Of these, *Mordella niveoscutellata* NAKANE et NOMURA is relatively widely distributed in the central and northern groups of the Ryukyus, but the remainder two, *Mordella onaga* NOMURA and *Mordella kanpira* TAKAKUWA, both are recorded from the confined islands in the archipelago: the former only from Yaku-shima Is., northern group, and the latter from Iriomote Is., southern group and Okinawa Is., central group. Why does *Mordella* rarely occur in the Ryukyus? That is a greatly interesting subject.

To confess the truth, there is another species belonging to this genus from the Ryukyus. That is unnamed species, and only one specimen was collected in 1974 by Mr. Heikichi IRIE, one of the most famous Japanese catchers of Coleoptera. It is doubtless new to science according to its characteristic features, though the second specimen has not still been examined. I am going to describe it as a new species in the present paper.

Before going further, I wish to express my hearty gratitude to Prof. Dr. H. SASAJI of the Biological Laboratory, Fukui University, for his encouragement given me when I entered the study of mordellids. Thanks are also due to Mr. H. IRIE of Fukuoka for supplying me with a valuable material used in this paper.

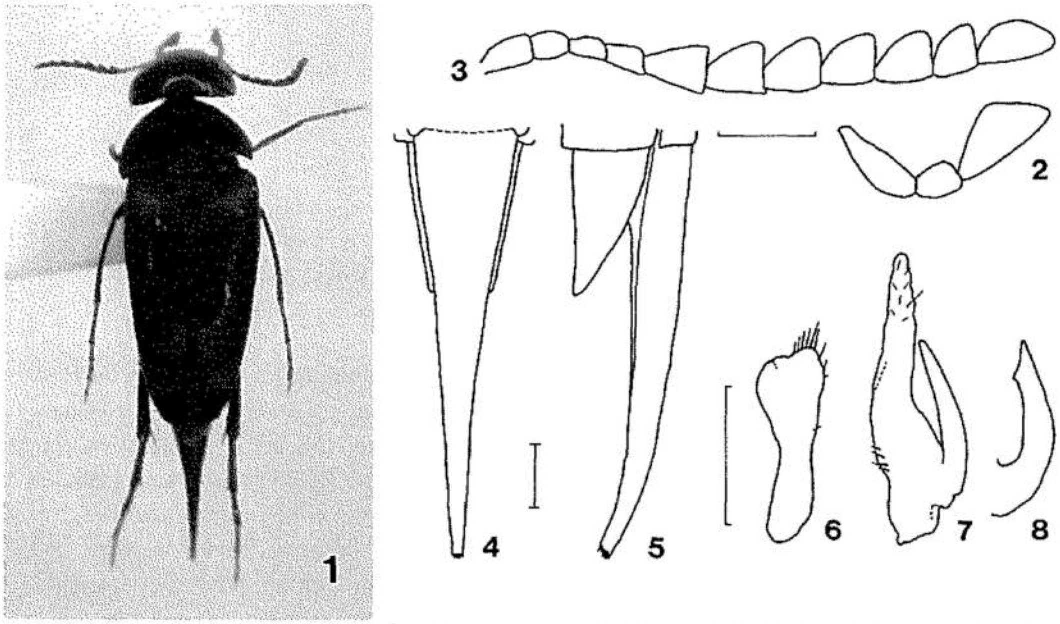
This short paper is dedicated to Professor Dr. Hiroyuki SASAJI of Fukui University for the commemoration of his retirement.

Mordella sasajii sp. nov.

(Figs. 1–8)

Male. Black almost all over; mouth-parts, maxillary palpi and antennal segments 1–4 more or less brownish; legs dark brown to blackish, becoming lighter towards each apex, with tibial spurs dark reddish brown.

Body clothed with dark pubescence on almost parts which obscurely has golden to reddish golden lustre in head, cyaneous or purplish one in pronotum and fulvous one in elytra; scutellum densely covered with whitish pubescence though tinged yellow in apical part; mesepisterna, mesocoxae and anterior part of metasternum clothed with yellowish pubescence; metepisterna densely covered with whitish pubescence; metacoxae clothed with yellowish pubescence except for whitish one on anterior margins; abdomen decorated with whitish pubescence as follows: latero-basal spots of segments 1–3, and basal fasciae of segments 4 and 5, the former fascia of which is apparently broader than the latter.



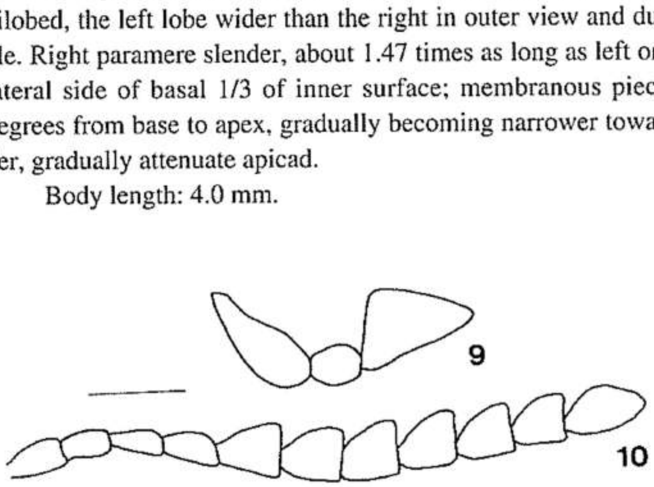
Figs. 1–8. *Mordella sasajii* sp. nov., ♂, holotype. 1, habitus; 2, right maxillary palpus; 3, right antenna; 4, anal sternite and pygidium, dorsal view; 5, same, lateral view; 6, left paramere, outer view; 7, right paramere, inner view; 8, sclerotized branch of same, lateral view. Scales: 0.25 mm.

Head moderately convex, about 1.3 times as wide as the distance from apex of clypeus to apex of occiput; eyes fairly elongate in the member of the genus, about 1.6 times as long as wide, very sparsely with minute erect hairs. Maxillary palpi distinctly slender; segment 1 about 2.88 times as long as wide, about as wide as the following, shorter than the last (0.88 : 1.0); segment 2 simple-shaped, about 0.73 times as long as wide; last segment slightly over twice as long as wide, with apical margin shorter than the inner (0.9 : 1.0) and evidently shorter than the outer (0.58 : 1.0) which is about 0.65 times as long as the inner. Antennae rather short, 1.26 times as long as the width of head; relative lengths of segments as follows: 1.5 : 1.0 : 1.0 : 1.06 : 1.76 : 1.64 : 1.61 : 1.53 : 1.59 : 1.26 : 2.29; segments 5–10 dully serrate, 5th 1.36 times as long as wide, 6–9th a little longer than wide, 10th about as long as wide; terminal segment elongate-semicircular, about 2.05 times as long as wide. Pronotum 1.3 times as wide as long, widest behind the middle; anterior margin slightly shorter than posterior one; sides weakly arcuate in dorsal view; hind angles rather angulate though narrowly rounded at each apex. Scutellum parabolical, wider than long. Elytra feebly wider than pronotum (1.03 : 1.0), widest at basal 3/10, about 1.9 times as long as wide, distinctly declined apicad; sides broadened to basal 3/10, then narrowed posteriad with slight excavating near middle; each apex rather narrowly rounded.

Pygidium slender, abruptly curved downwards at apical 1/4, about 0.61 times as long as elytra, 1.14 times as long as elytral width, about 2.8 times as long as anal sternite; sides rather strongly attenuate just before the middle, then gently so apicad; dorsal aspect highly carinate, higher than wide in apical part. Anal sternite of abdomen parabolical, about 1.25 times as long as wide. Eighth abdominal sternite lost. Legs slender; fore tarsi with relative lengths of segments as follows: 2.11 : 1.67 : 1.29 : 1.0 : 1.78, with segment 4 apparently longer than wide (1.3 : 1.0) and semicircularly emarginate at apex; inner spur of hind tibia a half longer than outer one; hind tarsi shorter than pygidium (0.84 : 1.0), about 2.08 times as long as hind tibiae, with segment 1 about 0.84 times as long as the following 3 segments combined.

Left paramere rather short, fully constricted just behind the middle; apex indistinctly bilobed, the left lobe wider than the right in outer view and dully and feebly incised at the middle. Right paramere slender, about 1.47 times as long as left one, provided with several setae on lateral side of basal 1/3 of inner surface; membranous piece distorted at angle of about 90 degrees from base to apex, gradually becoming narrower towards apex; sclerotized branch slender, gradually attenuate apicad.

Body length: 4.0 mm.



Figs. 9–10. *Mordella onaga* NOMURA, ♂, from Shimokoshiki-jima Is., off western Kyushu, SW Japan. 9, right maxillary palpus; 10, right antenna. Scale: 0.25mm.

Holotype: ♂, Mt. Yonaha-dake, northern Okinawa Is., central Ryukyus, SW Japan, 3. VI. 1974, H. IRIE leg. (deposited in the collection of the Kanagawa Prefectural Museum of Natural History, Odawara).

This new species is very unique in the member of the genus from Japan and its adjacent area especially on the following three characters: terminal segment of maxillary palpi distinctly slender, with apical margin shorter than inner one; pygidium abruptly curved downwards at apical 1/4; membranous piece of right paramere gradually becoming narrower towards apex. At first sight, it may somewhat be allied to *Mordella onaga* NOMURA distributed from Yaku-shima Is. of the northern Ryukyus to Hokkaido of northern Japan, but readily distinguished from the latter by the entirely different features of maxillary palpi, antennae and right paramere.

要約

高桑正敏：琉球列島中部からのハナノミ属の1新種. —— 沖縄島からハナノミ属の1新種 *Mordella sasajii* sp. nov.（新称：ササジクロハナノミ）を記載した．本種は本属にあって，小顎肢の末端節が細長く，前縁は内縁より短い点，尾節板は高く隆起し，端前で急に下方に曲がる点，さらに交尾器右側葉片の膜質状片は基部から端に向け徐々に狭まる点で特徴的である．一見すると，屋久島から北海道にかけて分布するオナガクロハナノミに似るが，それとは上述の点などで容易に区別される．

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The Coccinellids (Coleoptera) Predacious on Adelgids, with Notes on the Biocontrol of the Hemlock Woolly Adelgid (Homoptera: Adelgidae)

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Abstract The present paper lists 48 species of lady beetles predacious on adelgids recorded from all over the world, and many of them were introduced into North America as bioagents for control of balsam woolly adelgid, *Adelges piceae*, in 1934–1969. Of 54 lady beetles collected from 3 Chinese hemlocks (*Tsuga dumosa*, *T. forrestii* and *T. chinensis*) infested with the hemlock woolly adelgid (HWA), *Adelges tsugae*, 9 species were found to be predators of HWA. It also discusses some aspects concerning the biological control of HWA. Predators selected for introduction should prey on or at least mainly on HWA in native country, and produce on hemlocks. Higher latitude or colder areas of predator collection in China, such as Shaanxi, need to be exploited. Monophagous predators are preferred if they are found and their life cycle is very well synchronized with that of HWA, or they are able to survive the summer aestivation period of HWA by feeding on the sessile first instar nymphs; Multiple species of introduction seems to be necessary.

Key words: adelgids; coccinellids; predators; *Adelges tsugae*; biological control

1. Introduction

The hemlock woolly adelgid (HWA) (*Adelges tsugae* ANNAND = *Aphrastasia funitecta* DREYFUS) is a destructive introduced pest of forest and ornamental hemlock trees (*Tsuga* spp.) in the eastern United States. HWA is native to Asia. It is an innocuous inhabitant of hemlock trees in China, apparently because of many arthropod predators and host resistance. Presently we find it common in Yunnan, Sichuan, and Shaanxi provinces on *T. dumosa*, *T. forrestii* and *T. chinensis*. It is quite possible that HWA also distributes in other parts of China or inhabits on other species of *Tsuga*. Investigation for potential natural enemies has been carried out in Japan, Mainland China and Taiwan. *Pseudoscymnus tsugae* SASAJI et MCCLURE was introduced from Japan and successfully wintered for 3 years (MCCLURE, 1998). *Scymnus* (*Neopullus*) *sinuanodulus* YU et YAO and *S.* (*N.*) *ningshanensis* YU et YAO, introduced from China, were safe candidates with good potential for biological control of HWA in the U.S.A (MONTGOMERY *et al.*, 1998; YU *et al.*, 2000). As usual, there are no known parasitoids found. Lady beetles are rather abundant in China, and 54 species were collected from the hemlocks, all infested with HWA (YU *et al.*, 2000). The present paper reviews the lady beetles predaceous on the adelgids in the world and discusses some aspects concerning the biological control of HWA.

2. Research Progress on the Lady Beetle Predacious on Adelgids in China

Studies on the natural enemies of adelgids are scare in China. Cheng *et al.* (1992) recorded 3 lady beetles (*Coccinella septempunctata* L., *C. trifasciata* L. and *Harmonia axyridis* (PALLAS)) as predators of *Adelges laricis potaninilaris*. WANG, Z. *et al.* (1998) studied the control effort of *H. axyridis* on *A. laricis*. YU *et al.* (1997) recorded 8 coccinellids collected from *Tsuga* infested with HWA. Two species, *Scymnus* (*Neopullus*) *camptodromus*, *S.* (*N.*) *sinuanodulus*, were recorded as predators of HWA.

Natural enemies (lady beetles in particular) of HWA are abundant in China. After more than 3 years collection in Yunnan, Sichuan and Shaanxi Provinces, 54 species of lady beetles are identified, all from the hemlocks infested with HWA. YU *et al.* (2000) studied lady beetles from hemlocks and recorded additional 7 species as predators of HWA: *Calvia championorum* BOOTH, *Adalia conglomerata* (L.), *Oenopia billieti* (MULSANT), *Pseudoscymnus ocellatus* YU, *Scymnus* (*Pullus*) *yunshanpingensis* YU, *S.* (*P.*) *geminus* YU et MONTGOMERY, and *S.* (*N.*) *ningshanensis* YU and YAO. First three of above 7 species are widespread and feed on other Homoptera besides adelgids. Most of lady beetles collected from hemlocks are still uncertain whether they feed on the adelgids or not, and much work need to do further.

3. Lady Beetles Predacious on Adelgids : A World List

The following statement gives a list of the species of Coccinellidae that have been hitherto known to feed upon the adelgids in different parts of the world. However, many of them take adelgids as secondary food rather than principal food. Of the 48 species recorded there is uncertainty regarding the identity of the host-insect in a dozen of cases. The distribution is general, and some species listed as Palearctic distribute in Oriental region too. All lady beetles (except two, *Aphidecta obliterata* and *Scymnus* (*Pullus*) *impexus*) introduced into North America for control of *Adelges piceae* prey on some adelgids other than *A. piceae*, and they were expected to adapt to the new host. Several of these species, especially those released in small numbers, are known to general predators on Aphididae, while one, *Chilocorus kuwanae*, is well known as a predator of diaspine Coccidae. Their adaptability to Adelgidae is, therefore, somewhat questionable (CLAUSEN 1978). Only valid names are used for the adelgids, and the synonymy has not been listed here.

List of Coccinellidae recorded as predators on the Adelgidae in different parts of the world.

No. Species	Distri.	Host	References
I. Coccinellinae			
1 *Aphidecta obliterata*	P	*A. piceae*	BROWN & CLARK 1956; SMITH & COPPEL 1957; SMITH 1958; CLARK & BROWN 1961; AMMAN 1966; MITCHELL & WRIGHT 1967; CLAUSEN 1978; HARRIS & DAWSON 1979; SCHOOLEY *et al.* 1984
		A. cooleyi	SMITH & COPPEL 1957; PARRY 1992; HUMBLc 1994
		A. nordamanianae	BROWN & CLARK 1956; SMITH 1958; BINAZZI & COVESSI 1991; HUMBLE 1994
2 *Adalia conglomerata*	P	*A. piceae*	CLAUSEN 1978; SCHOOLEY *et al.* 1984
(as *A. ronina*)		*A. japonicus*	KAMIYA 1965

		A. tsugae	Yu *et al.* 2000
3 *A. bipunctata*	P	Adelgids	Majerus 1994
4 *A. decempunctata*	P	Adelgids	Majerus 1994
5 *A. tetraspilota*	P	*A. piceae*	Mitchell & Wright 1967; Amman & Speers 1971; Clausen 1978; Schooley *et al.* 1984
(as *Adalia simmondsi*)		*Adelges* spp.	Kapur & Rao 1962
6 *Hippodamia variegata*	P	*A. piceae*	
(as *Adonia variegata*)			Amman & Speers 1971
7 *Propylea quatuordecimpunctata*	P	*A. piceae*	Iablokoff-Khnzorian 1982
8 *Harmonia breiti*	P	*Adelges* sp.	Iablokoff-Khnzorian 1982
		A. piceae	Mitchell & Wright 1967; Amman & Speers 1971; Clausen 1978; Schooley *et al.* 1984
(as *H. expallida*)		*Adelges* spp.	Kapur 1963
9 *H. dimidiata*	P	*A. piceae*	
(as *Leis dimidiata*)			Mitchell & Wright 1967; Clausen 1978
10 *H. eucharis*	P	*A. piceae*	
(as *Ballia eucharis*			Amman & Speers 1971; Clausen 1978; Mitchell & Wright 1967; Schooley *et al.* 1984
and *B. diana*)			Mitchell & Wright 1967
11 *H. aryxidis*	P	*A. laricis potaninilaris*	Cheng *et al.* 1992
		A. laricis	Wang, Z. *et al.* 1998
		A. tsugae	Montgomery *et al.* 1998
12 *H. quadripunctata*	P	Adelgids	Majerus 1994
13 *Coccinella monticola*	N	*Adelges* sp.	Brown & Clark 1956
		A. piceae	Brown & Clark 1956
14 *C. trifasciata*	P	A. *laricis potaninilaris*	Cheng *et al.* 1992
15 *C. luteopicta*	P	*A. piceae*	Mitchell & Wright 1967; Schooley *et al.* 1984
(as *Adalia luteopicta*)			
16 *C. quinquepunctata*	P	Adelgids	Majerus 1994
17 *C. undecimpunctata*	P	Adelgids	Majerus 1994
18 *C. septempuncatat*	P	*A. piceae*	Schooley *et al.* 1984
		A. laricis potaninilaris	Cheng *et al.* 1992
19 *Mulsantina picta*	N	*A. piceae*	
(as *Cleis picta*)			Brown & Clark 1956
20 *Anatis labiculata*	N	*A. piceae*	
(as *A. quindecimpunctata* Oliv.)			Brown & Clark 1956
21 *A. ocellata*	P	Adelgids	Majerus 1994
22 *Calvia breiti*	P	*Adelges* spp.	Booth 1997
23 *C. championorum*	P	*A. tsugae*	Yu *et al.* 2000
24 *Myzia gebleri*	P	*Pineus cembrae*	Kuznetsov 1997
25 *M. oblongoguttata*	P	Adelgids	Majerus 1996
26 *Myrrha octodecimguttata*	P	Adelgids	Majerus 1994
27 *Oenopia conglabata*	P	*A. piceae*	
(as Synharmonia conglabata)			Mitchell & Wright 1967; Clausen 1978
28 *O. sauzeti*	P	*A. piceae*	Mitchell & Wright 1967; Amman & Speers 1971

29 *O. billieti*	P	*A. tsugae*	Yu *et al.* 2000
II. Scymninae			
30 *Scymnus (Scymnus) nigrinus*	P	*A. cooleyi*	Gourreau 1974
31 *S. (S.) nebulosus*	N	*A. piceae*	
(as *Scymnus phelpsii* Cresson)			Harris & Dawson 1979
32 *S. (Pullus) impexus*	P	*A. piceae*	
(as *Pullus impexus*)			Delucchi 1954; Brown & Clark 1956; Smith & Coppel 1957; Smith 1958; Clark & Brown 1961; Mitchell & Wright 1967; Clausen 1978; Harris & Dawson 1979; Schooley *et al.* 1984
		A. nordamanianae	Binazzi & Covessi 1991
33 *S. (Pullus) suturalis*	P	*A. tsugae*	Lyon & Montgomery 1995; Montgomery *et al.* 1998
34 *S. (P.) yunshanpingensis*	P	*A. tsugae*	Yu *et al.* 2000
35 S. (P.) *geminus*	P	*A. tsugae*	Yu *et al.* 2000
36 *S. (Neopullus) sinuanodulus*	P	*A. tsugae*	Yu *et al.* 1997; Montgomery *et al.* 1998
37 *S. (N.) camptodromus*	P	*A. tsugae*	Yu *et al.* 1997
38 S. (N.) *ningshanensis*	P	*A. tsugae*	Yu *et al.* 2000
39 *Pseudoscymnus tsugae*	P	*A. tsugae*	McClure 1996; Sasaji & McClure 1997
40 *P. ocellatus*	P	*A. tsugae*	Yu *et al.* 2000
41 *Dionus pumilio*	A	*A. piceae*	
(as *Scymnus pumilio*)			Mitchell & Wright 1967; Clausen 1978; Harris & Dawson 1979; Schooley *et al.* 1984
III. Chilocorinae			
42 *Chilocorus stigma*	N	*A. piceae*	Brown & Clark 1956
43 *Ch. kuwanae*	P	*A. piceae*	Mitchell & Wright 1967; Clausen 1978
44 *Ch. renipustulatus*	P	Adelgids	Majerus 1994
45 *Ch. bipustulatus*	P	Adelgids	Majerus 1994
46 *Exochomus lituratus*	P	*A. piceae*	Mitchell & Wright 1967; Clausen 1978; Schooley *et al.* 1984
47 *E. quadripustulatus*	P	*Pineus strobi*	Wilson,1938 (from Smith & Coppel 1957)
		P. laevis	Clausen 1978
		A. piceae	Smith & Coppel 1957; Clausen 1978
		A. nordamanianae	Smith & Coppel 1957
48 *E. uropygialis*	P	*A. piceae*	Mitchell & Wright 1967; Clausen 1978; Schooley *et al.* 1984

P = Palearctic; N = Neoarctic; A = Australian.

4. Notes on the Biological Control of HWA

The hemlock woolly adelgid became a destructive introduced pest of forest and ornamental hemlock trees in the eastern United States since 1985. It is probably of Asian origin (Van

DRIESCHE *et al.*, 1996). Only two resident lady beetles were found to prey on HWA. One is native to Europe, *Scymnus suturalis* THUNBERG (MONTGOMERY & LYON, 1996), and the other is native to Asia, *Harmonia axyridis* (PALLAS) (MONTGOMERY *et al.*, 1998). Extensive surveys have been conducted in China and Japan to locate predators for introduction into the eastern United States. Of the several predators that were found, *Pseudoscymnus tsugae* SASAJI et MCCLURE from Japan has great potential for biological control. Field experiments and release of this beetle has been conducted in the eastern United States (CHEAH & MCCLURE, 1996) and established (MCCLURE, 1998). However, its numbers in spring are too few to indicate sustained attack on adelgid populations (MCCLURE, 1998). *Scymnus (Neopullus) sinuanodulus* YU et YAO and *S. (N.) ningshanensis* YU et YAO, introduced from China, are also currently being tested to determine its value for control. Current information indicates that *S. sinuanodulus* is a safe candidate with good potential for biological control of *A. tsugae* in the USA (MONTGOMERY *et al.*, 1998). From the lesson of biological control program for balsam woolly adelgid in North America, following points should be taken into consideration.

4.1 Predators selected for introduction should prey on or at least mainly on HWA in native country, and produce on hemlocks

Only two species of various lady beetles introduced into North America for control of *Adelges piceae*, namely *Scymnus (Pullus) impexus* and *Aphidecta obliterata*, are European predators of the balsam woolly adelgid, and both established in North America. Native prey of other lady beetles, in all cases, was some adelgids other than the balsam woolly adelgid. None of these predators became established in North America. Other 4 established predators introduced from Europe prey principally on the balsam woolly adelgid in native country (MITCHELL and WRIGHT 1967). Some of the adult lady beetles that were found on hemlock trees in China may have been there only to feed, even just visit, but not to reproduce. *Coccinella septempunctata* and *Hippodamia variegata* are considered as visitors rather than predators, since there are abundant in surrounding plants and only 1 and 3 specimens were collected from the hemlocks respectively (YU *et al.*, 2000). The selected predators should have been on hemlocks not only to feed but also to reproduce there.

4.2 Higher latitude or colder areas of predator collection in China, such as Shaanxi, need to be exploited

The climate in collection areas of Sichuan and Yunnan is a little warmer than that in the outbroken area in the U.S.A in winter (WANG H. *et al.*, 1998). None of the predators from India and Pakistan has been recovered in the field in North Carolina (AMMAN and SPEERS, 1971) and in eastern Canada (SCHOOLEY *et al.*, 1984) following release. Climatic may be responsible (AMMAN & SPEERS, 1971). The winter temperature in Ningshan (Shaanxi province) is close to the eastern HWA infested area in U.S.A. Although the adelgids originally introduced into eastern North America were from a less cold-hardy stock (MCCLURE, 1996), it is essential to exploit the higher latitude or colder areas in China. Shaanxi is the north-most distribution of Chinese hemlock tree (*Tsuga chinensis*). The expedition to Ningshan (April, 1998) shows the hemlocks are infested with HWA. Five species of lady beetles were collected, and *Scymnus (Neopullus) ningshanensis* YU et YAO, is the dominant species, easy to rear in laboratories in Beijing and U.S.A (YU *et al.*, 2000). It is considered as the potential bioagent for control of HWA.

4.3 Monophagous predators are preferred if they are found and their life cycle is very well synchronized with that of HWA, or they are able to survive the summer aestivation period of HWA by feeding on the sessile first instar nymphs

Adelgid is a kind of cool-loving insects with a long period of aestivation. Monophagous predators are hard to survive the summer aestivation if their life cycle is not very well synchronized with that of HWA, or they are unable to feed on the sessile first instar nymphs. HWA populations multiply rapidly in the U.S.A. They attain peak density during the first year of the infestation when trees are producing abundant new growth, and populations decline sharply during the second year when very little new growth is produced (McCLURE, 1996). Oligophagous predators can survive by using other preys when HWA population is very low or when the first nymphs aestivate in summer. The life cycle of *Pseudoscymnus tsugae* SASAJI and McCLURE has been determined to be very well synchronized with that of its prey (CHEAH & McCLURE, 1996). Adult beetles are able to survive the summer aestivation period of the adelgid by feeding on the settled first instar nymphs, and no other preys have been reported. It is considered to be a favorable candidate for biological control of *A. tsugae*. *S. sinuanodulus* YU et YAO has been introduced into U.S.A. from China. It is reared successfully in laboratory, and has been found associated with *A. tsugae* on two species of hemlock (*Tsuga dumosa* and *T. forrestii*) and *Pinus armandii* in Yunnan, China (MONTGOMERY *et al.*, 1998). It was rare on spruce (*Picea*), yew (*Taxus*), *Keteleeria* and *Pinus yunnanensis*. It is an oligophagous predator. *S. ningshanensis* has not been surveyed thoroughly, and now it was only collected from the hemlock trees. Hence, it is hard to determine whether it is monophagous or oligophagous.

4.4 Multiple species of introduction seems to be necessary

An important dilemma is whether to introduce one predator or parasite species, or their complex (HODEK & HONEK, 1996). MYERS *et al.* (1989) analyzed the available information and found that introducing a single bioagent species may often result in better control than introduction of a complex. However, the examples where successful control should be attributed to joint action of several biocontrol agents are also frequent. It seems likely that successful biological control of *A. tsugae* will involve multiple species (MONTGOMERY & LYON, 1996), simply for no theoretical guidelines for determining which species or combination of species should be introduced.

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Metallidascillus (Coleoptera: Dascillidae) found in Taiwan

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Abstract A new species of the genus *Metallidascillus* is described from Taiwan under the name of *M. sasajii* and illustrated. This discovery is interesting from a zoogeographical view point of the Vietnamise fauna in relation to the evergreen broadleaved forest.

The genus *Metallidascirus* PIC is one of the small genera in the family Dascillidae and characterized by a robust and polished body and serrate antennae. Only two species belonging to the genus have been known to occur in Vietnam.

Recently, an additional species of the genus from Taiwan has been brought to our hand through the kindness of Mr. Chin-Kin YU to whom we are grateful. After a careful examination of the specimens, we have come to the conclusion that it is new to science, and are going to describe it as the third species of the genus in the following lines.

The fauna of Taiwan has a similarity with that of Vietnam in connection with the distributional pattern of the evergreen broadleaved forest, and thus occurrence of the *Metallidascillus* species from Taiwan is of considerable significance in this case from the zoogeographical viewpoint.

Metallidascillus sasajii sp. nov.

(Fig. 1)

Female. Body robust, elongate oval and polished. Head, pronotum, scutellum, ventral surface except for epipleura and abdomen, antennae and legs black; lateral and posterior margins of pronotum in parts, elytra, epipleura, abdomen and claws reddish brown.

Head almost as long as wide and smooth in integument; vertex somewhat flat, sparsely punctate on anterior part and obsoletely so on posterior part and sparsely pubescent in front; mandibles stout, distinctly punctate and pubescent on posterior halves, and each provided with an evident tooth at the middle; labrum prolonged anteriad, sparsely pubescent, and furnished with 3 pairs of long hairs which are longitudinally arranged along the lateral corners; clypeus transverse, sparsely punctate and pubescent; eyes hemispherical, lateral and ratio of the diameter of an eye to interocular space 1.0: 4.5. Antennae strongly serrate, attaining to the basal fifth

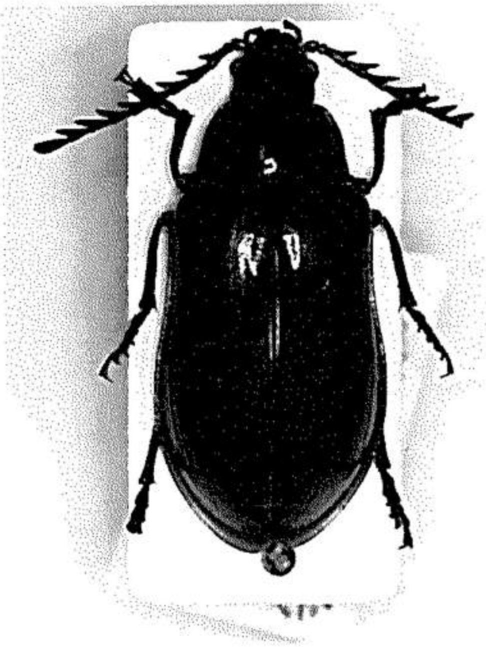

Fig. 1. *Metallidascillus sasajii* sp. nov.

of elytra, 1st segment stout and 2.5 times as long as 2nd which is the shortest, 3rd subtriangular and 1.4 times as long as 1st , 3rd to 10th subequal, 11th oblong and 1.7 times as long as 10th. Terminal segment of maxillary and labial palpi dolabriform.

Pronotum trapezoidal, 1.7 times as wide as head, 1.9 times as wide as long, moderately convex and smooth in integument; posterior and lateral margins bordered; each angles rounded; disc sparsely and obsoletely punctate. Scutellum cordate and smooth.

Elytra elongate, 1.5 times as wide as pronotum, 1.8 times as long as wide, well convex, though somewhat concave at basal third, highest at center and smooth in integument; shoulders distinct; lateral sides reflexed, gently dilated posteriad, with rounded apices, though constricted at basal fourth and broadest at apical third; disc sparsely and obsoletely punctate, and provided with 11 punctate striae which consist of minute punctures and become disappeared anteriad and posteriad.

Ventral surface and legs sparsely covered with pubescence. Prosternal process prolonged into midintercoxae, with rounded apex. Mesosternum lanceolate and pointed at the apex. Legs moderate in length; tarsi 5-segmented, 1st to 4th bilobate, 5th simple; claws simple, but slightly dilated at the base.

Length of body: 18.4 mm; breadth of body: 8.5 mm.

Male. Unknown.

Type series. Holotype: ♀, Upper Paling, Taoyuan Hsien, Taiwan, 8. V. 1990, Chin-Kin YU leg. Paratype: 1♀, same data as for the holotype.

The holotype is deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo and the paratype in the Nagoya Women's University.

This new species can easily be distinguished from other known species of the genus *Metallidascillus* from Vietnam by different coloration and antennal conformation.

This new specific name is dedicated to Prof. Hiroyuki SASAJI in commemorating of his retirement from Fukui University.

We are much pleased to take part in this issue to honor Prof. Hiroyuki SASAJI, who has made excellent contribution to the field of coleopterology.

要約

佐藤正孝・大澤省三：*Metallidascillus* 属の台湾での発見. —— 従来，*Metallidascillus* 属に含まれる種は，ヴェトナムから２種だけが知られていた．それが台湾で得られたので検討した結果，新種であるとの結論に達しここに命名記載した．この種の台湾での発見は，常緑広葉

樹林帯要素のひとつとして生物地理学的にヴェトナムの昆虫相との類似性の上で興味深い事実といえる．

Reference

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Taxonomical Notes on *Petaloscapus temporalis* JEANNEL, and its New Allied Species (Coleoptera: Staphylinidae: Pselaphinae) from Honshu and Shikoku, Japan

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Abstract *Petaloscapus temporalis* JEANNEL, 1958 described as a subspecies of *P. fissifrons* SHARP is ranked as a full species. Its new allied species, *P. sasajii* and a new subspecies, *P. temporalis yoshidai* are described.

The genus *Petaloscapus* belongs to the supertribe Batrisitae and is known only from Japan. It includes five species and two subspecies distributed in Honshu and Kyushu. Three species, *P. basicornis*, *P. ornatus* and *P. fissifrons* were described by SHARP (1883) as species of *Batrisus*. JEANNEL (1958) established the genus *Petaloscapus* together with redescriptions of these three species, and newly added a new species, *P. nasutus* and two new subspecies of *P. fissifrons* (SHARP), namely *P. f. stricticollis* and *P. f. temporalis*. Later, TANOKUCHI (1986) described *P. hirsutus* from Shizuoka Prefecture, central Honshu.

In my study of the type specimens of *Petaloscapus* species in the Natural History Museum, London (BMNH) and in the Muséun Nationale d'Histoire Naturelle, Paris (MHNP), I found that the JEANNEL's redescriptions of two SHARP's species is wrong, probably because they were not based on the type series in BMNH, but on misidentified specimens in MHNP.

Up to the present, more than forty species have been recognized in this genus from northern Honshu to Kyushu. There are many undescribed species occurring in this area and their distributional ranges are complicatedly overlapped. In the present study, *P. fissifrons temporalis* JEANNEL described from Mizuho-chô, Kyoto Prefecture is ranked at the level of species based on the reexamination of their holotypes. A new subspecies of *P. temporalis* from Tokushima Prefecture, Shikoku, and its new allied species, *P. sasajii* from Fukui and Osaka Prefectures are herein described.

Petaloscapus sasajii sp. nov.

[Japanese name: Sasaji-munetoge-arizukamushi]

(Figs. 1A, 2A, B)

Male. Length 2.40–2.45 mm. Width 0.80–0.85 mm. Body reddish brown to dark brown, large, elongate and stout.

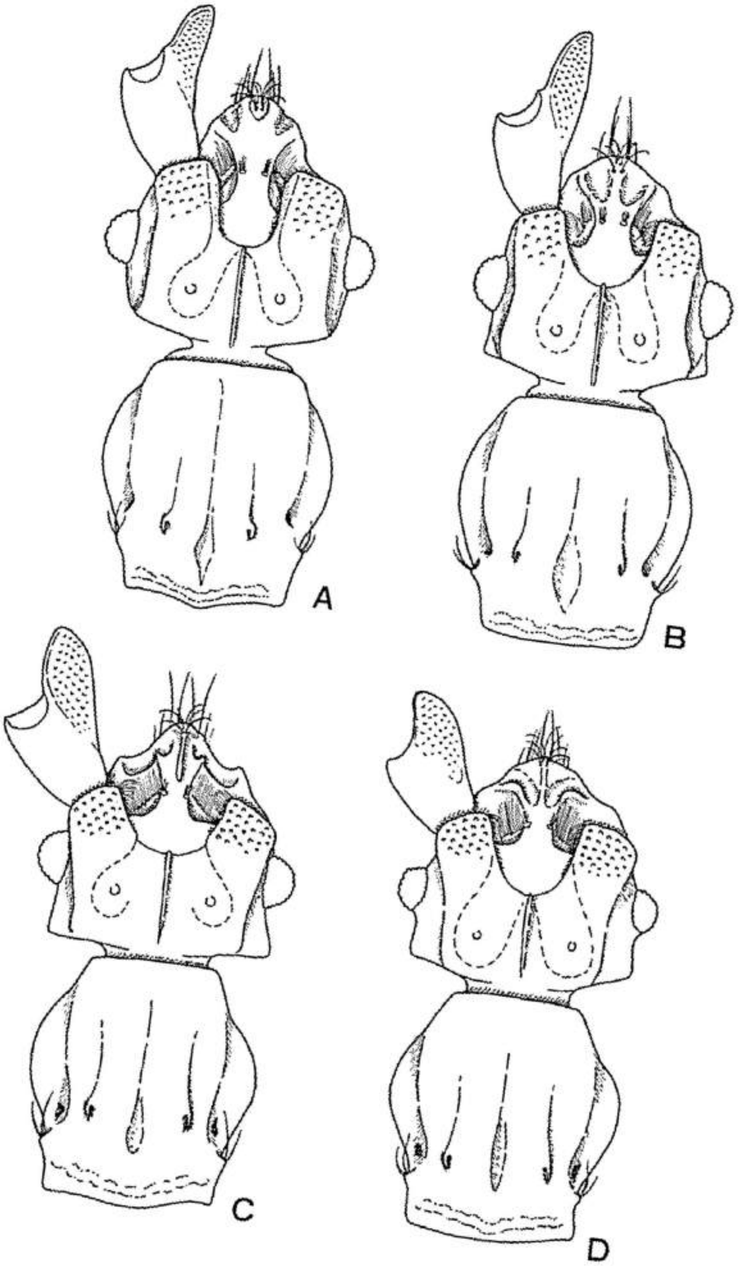

Fig. 1. Male head and pronotum in dorsal view. A, *Petaloscapus sasajii*, sp. nov.; B, *P. temporalis temporalis* JEANNEL, from Otomi, Takahama-chô, Fukui Pref.; C, ditto, from Mt. Ohmoriyama, Hirai, Kozagawa-chô, Wakayama Pref.; D, *P. t. yoshidai*, subsp. nov.

Head about as long as wide, expanded anteriorly, thickened on lateral sides of frons; clypeus very large, angulate on anterior margin, with about 3 pairs of long and straight setae on median part of anterior margin, clypeal tubercle broad and thick, well convex in anterior part, depressed in basal part, with a small anteromedian nodule, curved hairs on the nodule, a pair of small depressions on lateral sides of the nodule, and two pairs of small fringes near base; frons strongly projected at lateral sides to form a pair of rectangular and coarsely punctate antennal tubercles, strongly concave and glabrous between antennal tubercles; vertex gently convex, with a pair of lateral longitudinal and a median longitudinal carinae and a pair of dorsal tentorial pits, each lateral carina running from external side of antennal tubercle to tempora; postgenae rounded, covered with long and dense hairs. Eyes large and semiglobular, each composed of more than 30 facets. Antennae each reaching basal margin of pronotum, elongate and thick, 1st segment the largest, very thick and nearly ovoid, with a large lingulate lobe at internal side, 2nd to 8th segments moniliform, each subglobose, 9th to 10th large, each subglobose, 10th slightly larger than 9th, 11th very large and ovoid, widest at basal 1/3, relative length (width) of each segment from base to apex (excluding internal lobe of 1st segment): 3.0 (1.6): 1.3 (1.0): 0.8 (0.8): 0.8 (0.8): 1.0 (1.0): 0.8 (0.9): 1.0 (1.0): 0.8 (0.9): 1.2 (1.2): 1.3 (1.4): 2.8 (1.7).

Pronotum about as large as head, subglobose, gently convex, covered with sparse punctures and long sparse pubescence on dorsal surface, with a short median longitudinal sulcus, a pair of short medio-lateral carinae and a pair of shallow lateral sulci, and with a pair of hooks on medio-lateral carinae at basal 2/3, a pair of lateral foveae on lateral sulci at basal 2/3 and a pair of conical projections just behind lateral foveae. Legs elongate and stout, mid trochanters short, each with a small spine on its ventral side.

Elytra wider than long, nearly trapezoidal, weakly convex, covered with sparse punctures and long sparse pubescence, each elytron with 3 basal foveae and a short and indistinct longitudinal sulcus running from outer basal fovea.

Abdomen about as large as elytra, rounded posteriorly, 4th segment the largest, weakly broadened posteriad, 4th tergite transverse and nearly rectangular, with a pair of short basimedian carinae, a pair of oblique lateral carinae, shallow and transverse basimedian fovea and a pair of large basilateral foveae, 5th to 7th segments successively shortened and narrowed posteriorly, each short and transverse, 8th tergite wider than long, semicircular, gently convex, 8th sternite semicircular, almost flat on ventral side.

Aedeagus very large and flattened dorso-ventrally; median lobe nearly rectangular, slightly narrowed basad, left half of its venrtal wall extending and projected apically, with large and circular basal foramen on ventral side, and a small projection at basal end of basal foramen, endophallus consisting of large lamellar lobe including right and left sclerites, right sclerite gently narrowed apicad, with 3 denticles on the right side of the apex, left sclerite elongate and rectangularly bent near the middle, then, slightly narrowed and falcate at the distal part.

Female. Unknown.

Holotype: ♂, Otomi, Takahama-chô, Fukui Pref., 16. VIII. 1992, T. UENO leg., preserved in the National Science Museum, Tokyo. Paratypes: 1♂, Asuwa, Fukui-shi, Fukui Pref., 24. VIII. 1993, K. NAKATA leg.; 1♂, Shôbo, Ibaraki-shi, Osaka Pref., 22. XII. 1991, Y. NISHIKAWA leg.

Distribution: Honshu (Chubu to Kinki districts).

Remarks. This species is apparently allied to *P. temporalis* JEANNEL in having the apically denticulate right sclerite and the elongate left sclerite of the aedeagal endophallus. It is distinguished from *P. temporalis* by the rounded postgenae, the medially convex clypeal tubercle, the basally broadened right sclerite and the rectangularly bent left sclerite of the aedeagus.

This new species is dedicated to Dr. Hiroyuki SASAJI for his continuous guidance and kind encouragement in the course of my study.

Petaloscapus temporalis JEANNEL

[Japanese name: Erahari-munetoge-arizukamushi]

Petaloscapus fissifrons temporalis JEANNEL, 1958, Mém. Mus. Hist. nat., Paris, (A), 18: 37; NOMURA, 1989, Check List Jpn. Ins., Fukuoka, 1: 289.

Distribution: Honshu (Chubu to Kinki districts), Shikoku.

Remarks. I examined the holotypes of *P. fissifrons* (SHARP) from Higo (Kumamoto Pref., Kyushu) in BMNH and *P. fissifrons temporalis* JEANNEL from Mizuho-chô, Kyoto Pref. in MHNP. As the result, *temporalis* is regarded as a species different from *P. fissifrons*. This species is easily distinguished from the other species of this genus by having a median carina on the clypeal tubercle, the angulate postgenae and the endophallus of the aedeagus including the apically denticulate right sclerite and the elongate and weakly curved left sclerite.

Petaloscapus temporalis temporalis JEANNEL

(Figs. 1B, C, 2C)

Male. Length 2.45–2.63 mm. Width 0.8–0.83 mm. Similar to *P. sasajii*, but separated by the following characters: head slightly longer than wide, widest at hind line of postgenae, thence narrowed anteriorly, clypeus well projected anteriorly, clypeal tubercle broad, convex in anteromedian part, with an anteromedian carina and a pair of carinae or projections on lateral sides, antennal tubercles more widely distant from each other than in *sasajii*, postgenae strongly angulate postero-laterad.

Aedeagus similar in structure to *sasajii*, median lobe nearly rectangular, with broad and nearly circular basal foramen, endophallus including 2 large sclerites connected with each other by membrane at their bases, right sclerite elongate, weakly broadened distad, with many small denticles near apex, left sclerite slightly longer than right, elongate, weakly curved near the middle, then gently narrowed apicad.

Female. Length 2.15–2.38 mm. Width 0.78–0.80 mm. Similar in general appearance to male, but body smaller, head ovoid, clypeus arcuate on anterior margin, almost flat, frons with a pair of weakly convex antennal tubercles, postgenae normally rounded.

Type specimen examined: Holotype ♂ labelled: *P. fissifrons temporalis*/ TYPE/ 40/ Japon Pref. Kyoto Mizuho-cho 24/ VII/ 57 H. C. (MHNP).

Additional specimens: 2♂♂, 1♀, Tokuyama, Fujihashi-mura, 320m alt., Gifu Pref., 15. X. 1986, K. SUZUKI leg.; 2♂♂, Otomi, Takahama-chô, Fukui Pref., 16. VIII. 1992, T. UENO leg.; 1♂, Totsukawa, Mizuho-chô, Kyoto Pref., 10. VI. 1986, S. NOMURA leg.; 1♂, Kibune, Kyoto-shi, Kyoto Pref., 22. VI. 1952, A. NOBUCHI leg.; 1♂, 2♀♀, Mt. Jubusan, Wazuka-chô, Kyoto Pref., 16. VI. 2000, K. MIZUNO leg.; 1♂, Kohata, Uji-shi, Kyoto Pref., 10. V. 1997, K. MIZUNO leg.; 19♂♂, 26♀♀, Mt. Mikusayama, Nose-chô, Osaka Pref., 17. XII. 1992–26. XI. 1993, Y. SAWADA leg.; 1♂, Katsuô-ji, Minoo-shi, Osaka Pref., 25. V. 1985, S. NOMURA leg.; 4♂♂, 8♀♀, Yoshinoyama, Yoshino-chô, Nara Pref., 27. V. 1985, S. NOMURA

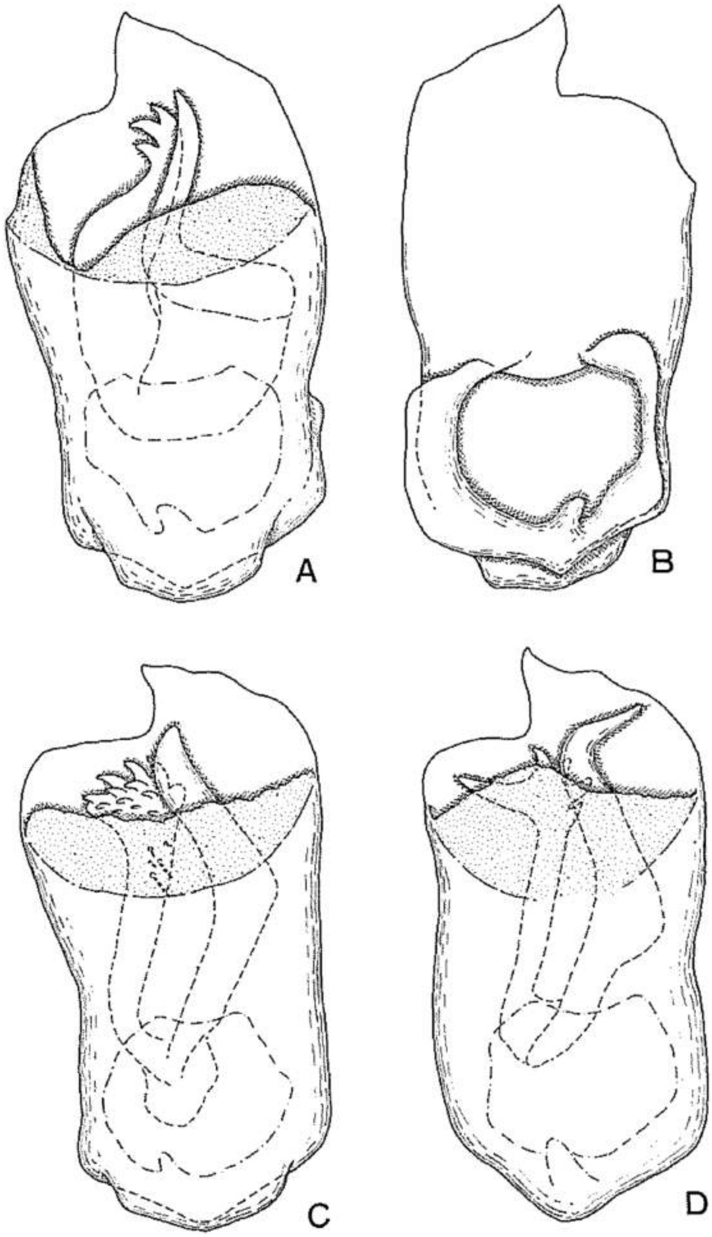

Fig. 2. Aedeagus. A, *Petaloscapus sasajii*, sp. nov., dorsal view; B, ditto, ventral view; C, *P. temporalis temporalis* JEANNEL, dorsal view; D, *P. t. yoshidai*, subsp. nov., dorsal view.

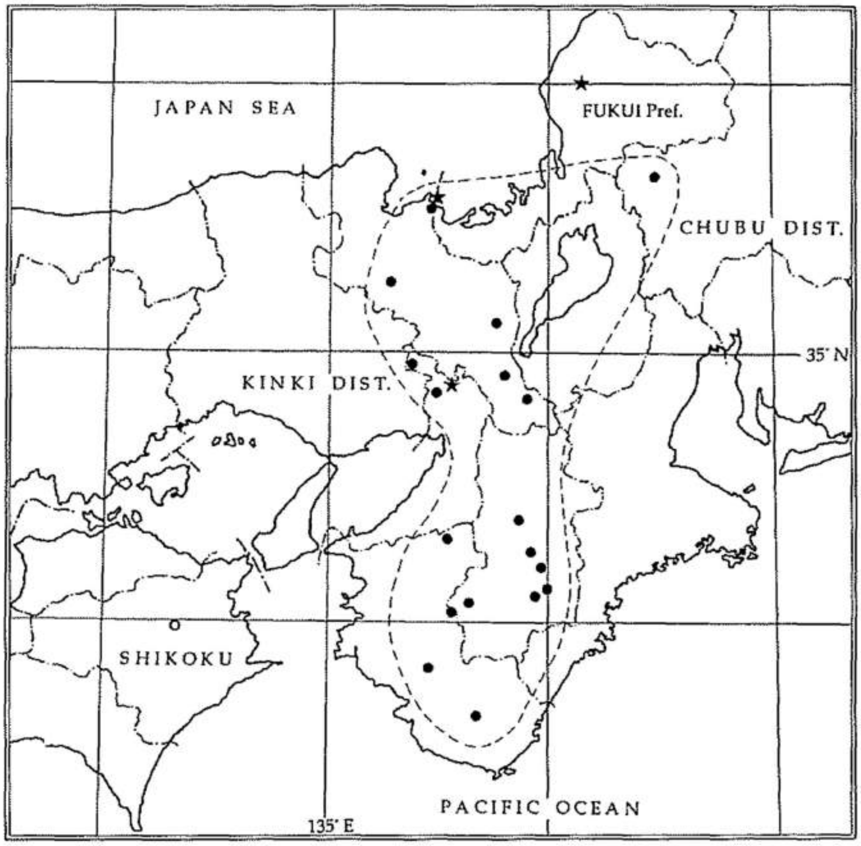

Fig. 3. Distributional map of *Petaloscapus* spp. Black stars indicate collecting sites of *P. sasajii*, sp. nov.; black circles show those of *P. temporalis temporalis* JEANNEL, and broken line delimits its possible distributional range; open circle indicates the collecting site of *P. t. yoshidai*, subsp. nov.

leg.; 2♂♂, 1♀, Mt. Obakodake, Totsukawa-mura, Nara Pref., 7. V. 1994, S. NOMURA leg.; 1♂, Mt. Sanjôgatake, 1,520m alt., Tenkawa-mura, Nara Pref., 16. VII. 1999, S. NOMURA leg.; 2♂♂, Mt. Wasamatayama, Kami-Kitayama-mura, Nara Pref., 4. XI. 1996, K. MIZUNO leg.; 1♂, same locality as above, 11. VII. 1999, M. MARUYAMA leg.; 1♂, 3 km S of Mt. Nehandake, 1,140m alt., Shimo-Kitayama-mura, Nara Pref., 29. VI. 1998, S. NOMURA leg.; 1♂, Zenki Vall., 700m alt., Shimo-Kitayama-mura, Nara Pref., 29. VI. 1998, S. NOMURA leg.; 2♂♂, 1♀, Mt. Gomadan, Ryûjin-mura, Wakayama Pref., 22–23. VI. 1981, S. NAOMI leg.; 1♂, Tahara, Kôyaguchi-chô, Wakayama Pref., 6. I. 1993, I. MATOBA leg.; 1♂, Mt. Ohmoriyama, 770 m alt., Hirai, Kozagawa-chô, Wakayama Pref., 14. VII. 1999, S. NOMURA leg.; 1♂, Toragamine Pass, 590 m alt., Minabegawa-mura, Wakayama Pref., 15. VII. 1999, S. NOMURA leg.

Distribution: Honshu (Chubu to Kinki districts).

Remarks. The nominotypical subspecies is characterized by the form of the right and left sclerites of the endophallus of the aedeagus, namely, the right sclerite is elongate and is weakly broadened distad, with large and small denticles at apex, the left being longer than the right, elongate and curved near the middle.

Geographical variation is recognized on the clypeal tubercle in some collecting sites. For example, the clypeal tubercle bears three short and indistinct carinae in the males from Takahama-chô, Fukui Prefecture, while it bears a well projected median carina and a pair of lateral conical projections in Hirai, Wakayama Prefecture.

Petaloscapus temporalis yoshidai subsp. nov.

(Figs. 1D, 2D)

Male. Length 2.38–2.43 mm. Width 0.80–0.83 mm. Very similar to the nominotypical subspecies in general appearance.

Head as long as wide, gently narrowed anteriad, clypeus less projected anteriorly than in the nominotypical subspecies, clypeal tubercle well convex, with an anteromedian carina and a pair of short transverse carinae on lateral sides, postgenae less angulate posterolaterally than in the nominotypical subspecies. Eyes smaller than in the nominotypical subspecies, each composed of about 30 facets.

Aedeagus similar in structure to that of the nominotypical subspecies, but the right sclerite of the endophallus is almost straight and less broadened distally than in the nominotypical subspecies, with a very long and sharp spine at the right side of apex and 4 small denticles near the apex, and the left sclerite is elongate, narrowed distally, rectangularly bent leftwards at apical 1/5, and weakly curved mesad near the middle.

Female. Length 2.18–2.38 mm. Width 0.75–0.78 mm. Very similar to the female of the nominotypical subspecies.

Holotype: ♂, Mt. Shôsanji, 780 m alt., Kamiyama-chô, Tokushima Pref., 5. V. 1999, M. YOSHIDA leg. Paratypes: 1♂, 2♀♀, same data as the holotype.

Distribution: Shikoku.

Remarks. This subspecies is separable from the nominotypical subspecies by the clypeal tubercle with a pair of short transverse carinae at the sides of the anteromedian carina and the endophallus of the aedeagus including the right sclerite with a long and sharp spine and the left spine rectangularly bent leftwards at apical 1/5.

The new subspecific name is associated with Mr. Masataka YOSHIDA in Tokushima Prefecture, the collector of the type series of this species.

Acknowledgement

I wish to express my sincere thanks to Dr. Hiroyuki SASAJI for his continuous guidance and encouragement extended to my study. My special thanks are due to Dr. Shun-Ichi UÉNO for his kind assistance and critical reading of the manuscript. I am also much indebted to Dr. Martin J. D. BRENDELL (BMNH) and Dr. Nicole BERTI (MHNP) for their kind support for reexamination of the type material. I extend my sincere thanks to many entomologists for their gift or loan of the invaluable specimens and kind help in various ways.

要　約

野村周平：本州および四国産エラハリムネトゲアリヅカムシ（和名新称）とその近似1新種

(ハネカクシ科，アリヅカムシ亜科）に関する分類学的ノート．—— 京都府瑞穂町から記載されたエラハリムネトゲアリヅカムシ（和名新称）*Petaloscapus temporalis* Jeannel は原記載では *P. fissifrons* (Sharp) の亜種とされていたが，パリ国立自然史博物館とロンドンの自然史博物館に所蔵される両種のホロタイプ標本を比較した結果に基づき，前者を独立種として認めた．四国徳島県から得られた本種の個体は明らかな形態的差異が見られたため，これを本種の1新亜種 *P. t. yoshidai* として記載した．また，福井県および大阪府から得られた本種の近似種を新種と認め，ササジムネトゲアリヅカムシ *P. sasajii* と命名記載した．

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New Anophthalmic *Trechiama* (Coleoptera, Trechinae) from the Northwestern Part of the Kaétsu Hills, Central Japan

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Abstract Three new anophthalmic species of the trechine genus *Trechiama* are described from the upper hypogean zone in the northwestern part of the Kaétsu Hills on the borders of Fukui and Ishikawa Prefectures in Central Japan. All belong to the *subparallelus* subgroup of the group of *T. ohshimai*, though differing to some extent from the previously described species in the conformation of the male genitalia. The new names given are *T. hiroyukii*, *T. une* and *T. erecticedrus*.

This paper is designed for dedication to Dr. Hiroyuki SASAJI in commemorating his retirement from Fukui University at which he has taught as a professor of biology. SASAJI is a leading coleopterologist in Japan and a good friend of mine. I have been personally acquainted with him since his student days at Kyushu University, and always have deep respect for his wide knowledge in entomology, particularly the coleopterology. He has helped me in various ways, and in 1977, led me to the discovery of a new anophthalmic *Trechiama*, which was then a very important addition to the Japanese fauna from both the biospeological and zoogeographical viewpoints.

For contributing to his Festschrift, I took up without hesitation a new anophthalmic *Trechiama* discovered at Maruoka where he resides now. I am going to name it *Trechiama hiroyukii*, since I already gave the name *Trechiama sasajii* to the species described in 1980. I believe that this is the best way to express my congratulations for his contributions to the advancement of the Japanese coleopterology, and also hope that SASAJI would be pleased to have both the first and family names of his on the trechine beetles endemic to Fukui Prefecture.

At this opportunity, I will also describe two more new species of the same genus discovered on the same hill range, under the names *T. une* and *T. erecticedrus*. Both of them belong to the same lineage as *T. hiroyukii* and are very similar to the latter in external morphology, but the three species are incredibly different in the conformation of the male genitalia. All the three occur in a small area at the northwestern part of the Kaétsu Hills, and though allopatric, there are no appreciable barriers between their localities. It is difficult to elucidate at present how such a striking speciation took place in the hilly area near the coast of the Sea of Japan, but the differentiation of this kind is one of the characteristics of the trechine fauna of Japan.

The abbreviations employed in this paper are the same as those explained in previous papers of mine.

I am much indebted to Dr. Yoshiaki NISHIKAWA for his unfailing collaboration in obtaining necessary materials, upon which are based the descriptions of the new species given in the present paper.

Trechiama (s. str.) *hiroyukii* S. UÉNO, sp. nov.

(Figs. 1–3)

Length: 5.05–6.05 mm (from apical margin of clypeus to apices of elytra).

Identical with *T. sasajii* S. UÉNO (1980, pp. 200, 206, figs. 4–6) in coloration, size and standard ratios except for the larger value of EL/EW, which means that the elytra are more elongate in *T. hiroyukii*. Readily distinguished from the latter by the elytra, which are similar in configuration and striation to those of *T. medicirex* S. UÉNO (1989, p. 80, figs. 7–9). Definitely different from both the species in the absence of differentiated copulatory piece in the aedeagal inner sac, though the aedeagus itself looks similar in configuration to that of *T. medicirex*.

Colour of body usually a little darker than in *T. sasajii*. Head and prothorax as in the latter species, though the genae are a little more convex, particularly at the posterior parts, forming deeper neck constriction, and the pronotum is usually parallel-sided at the basal part, with the side margins more distinctly sinuate at about basal fourth; antennae usually reaching the middle of elytra; PW/HW 1.43–1.54 (M 1.48), PW/PL 1.10–1.21 (M 1.16), PW/PA 1.44–1.49 (M 1.46), PW/PB 1.17–1.25 (M 1.22), PB/PA 1.17–1.23 (M 1.20).

Elytra somewhat narrower on an average and distinctly more elongate than in *T. sasajii*, with more distinct shoulders, more feebly and less evenly arcuate sides, and deeper striations, usually widest a little before the middle; almost indistinguishable from those of *T. medicirex* except that the dorsum is more convex, particularly in the male; EW/PW 1.45–1.59 (M 1.50), EL/PL 2.75–3.04 (M 2.92), EL/EW 1.64–1.70 (M 1.68); shoulders salient, forming wide basal areas, with prehumeral borders short, oblique and slightly arcuate; sides rather widely reflexed, particularly at the humeral parts, more or less emarginate behind shoulders, then very feebly arcuate to the level of the apicalmost umbilicate pore of the marginal series just before preapical emargination, and rather narrowly rounded at apices, which usually form a small re-entrant angle at suture; dorsum moderately convex, though depressed on the disc in ♀; striae entire, evidently deeper than in *T. sasajii*, particularly at the side, finely crenulate, striae 1–5 deepened in basal area; apical striole clearly impressed, moderately curved, either joining or almost joining stria 5 at the anterior end; intervals more or less convex near suture; stria 3 with two setiferous dorsal pores at 1/8–1/7 and 3/10– 2/5 from base, respectively, the anterior one lying on or near the level of the 2nd pore of the marginal umbilicate series; stria 5 also with two setiferous dorsal pores at 1/11–1/10 (usually 1/11) and 1/2–3/5 (usually 5/9) from base, respectively, the anterior one being located more or less behind the level of the 1st pore of the marginal umbilicate series.

Legs as in *T. medicirex*, somewhat slenderer than in *T. sasajii*.

Male genital organ moderately sclerotized, looking something between those of *T. sasajii* and *T. medicirex* but differing from both of them in the absence of differentiated copulatory piece. Aedeagus about three-tenths as long as elytra, similar in general appearance to that of *T. medicirex*, but the basal part is not bent ventrad and the apical lobe is shorter, broader, and with modified tip as in *T. sasajii*; basal part large, only a little curved ventrad, and deeply emarginate at the sides of basal orifice; sagittal aileron small, narrow and hyaline; viewed dorsally, apical lobe broad at the base and abruptly narrowed towards the tip which is narrowly rounded; viewed laterally, apical lobe attenuate and ventrally curved, with a sharp ventral hook at the extremity, which resembles that of *T. suzukii* S. UÉNO (1989, p. 77, figs. 5–6); ventral margin slightly sinuate in profile. Inner sac armed with two teeth-patches but devoid of copulatory

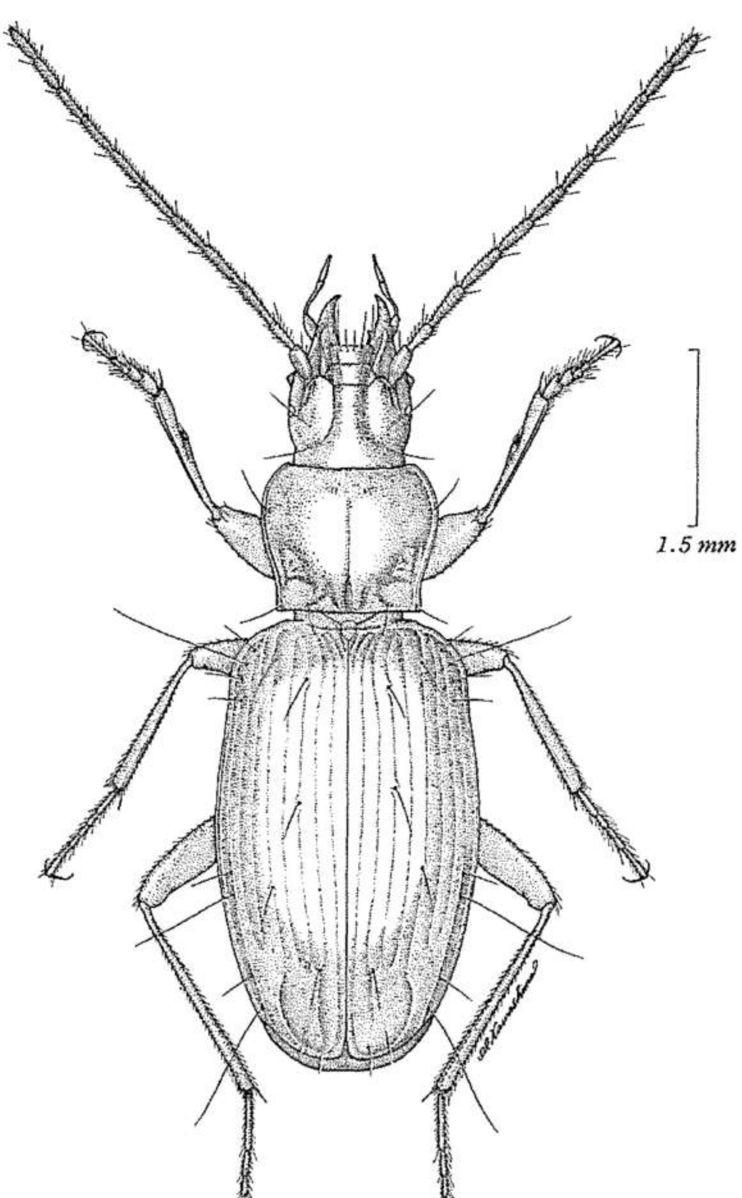


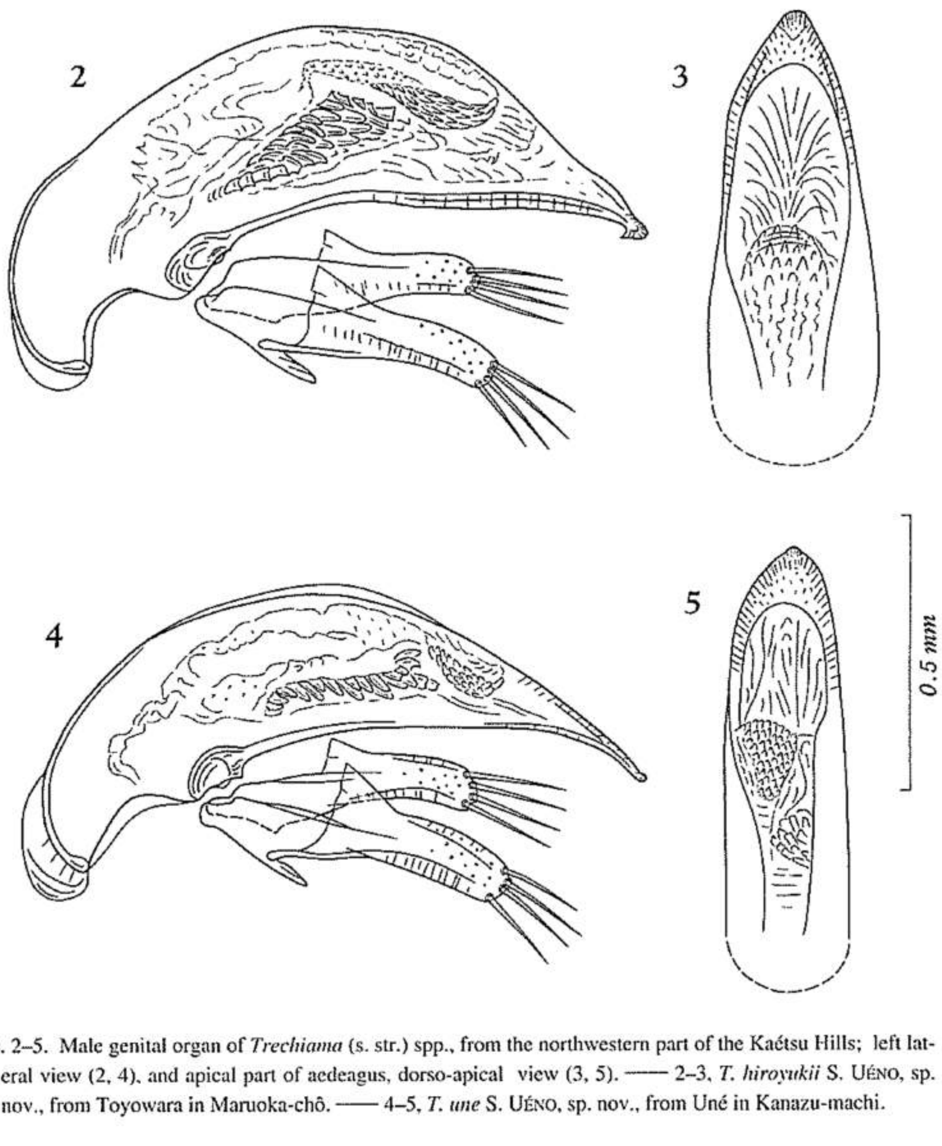
Fig. 1. *Trechiama* (s. str.) *hiroyukii* S. UÉNO, sp. nov., ♂, from Toyowara in Maruoka-chô.

piece; left proximal teeth-patch much smaller than in *T. medicirex* but obviously larger than in *T. sasajii*, consisting of large, heavily sclerotized teeth and dilated apically; dorsal teeth-patch longitudinally rolled with the concave face below, consisting of smaller but sharper teeth, which are fused together at the apical part and form a false sclerite widely rounded at the apex just inside apical orifice. Styles fairly broad, left style being longer than the right, each bearing four apical setae.

Type series. Holotype: ♂, 130 m alt., 19. VI. 2000, Y. Nishikawa leg. Allotype: ♀, 110 m alt., 3. VI. 1985, Y. Nishikawa leg. Paratypes: 3♂♂, 110 m alt., 3. VI. 1985, Y. Nishikawa leg.; 2♂♂, 2♀♀ (incl. teneral 1♂, 1♀), 130 m alt., 19. VI. 2000, Y. Nishikawa leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Toyowara, 110–130 m in altitude, in Maruoka-chô of Fukui Prefecture, on the northern side of Central Japan.

Notes. This interesting species was discovered by Nishikawa at the right side of the Gomi-gawa near the western foot of a low hill on the southern extension of Kariyasu-yama. The type specimens of the trechine beetle were dug out from colluvia deposited in two side gullies of the stream. The locality is 14.5 km distant to the northeast from Nanatsuoguchi-kô Adit, the type locality of *T. sasajii*, and about 60 km distant to the southwest from Mt. Iô-zen, that of



Figs. 2–5. Male genital organ of *Trechiama* (s. str.) spp., from the northwestern part of the Kaétsu Hills; left lateral view (2, 4), and apical part of aedeagus, dorso-apical view (3, 5). —— 2–3, *T. hiroyukii* S. Uéno, sp. nov., from Toyowara in Maruoka-chô. —— 4–5, *T. une* S. Uéno, sp. nov., from Uné in Kanazu-machi.

T. medicirex.

This geographical situation appears to suggest that *T. hiroyukii* is more closely related to *T. sasajii* than to *T. medicirex*, but the assumption cannot be verified by close scrutiny. It is true that the proportions of body parts are mostly identical between *T. hiroyukii* and *T. sasajii*, and that both the species possess a peculiar ventral hook at the apical ends of their aedeagi. However, they are clearly different in configuration of the elytra as described above, and even the characteristic ventral hook is different in detailed conformation between them, that is, the hook is formed by a simple bend of the terminal portion of the aedeagal apical lobe in *T. sasajii*, whereas it is additionally developed by modification of the apical lobe in *T. hiroyukii*. In this respect, *T. hiroyukii* resembles *T. suzukii* known from the southern part of the Hôdatsu Hills at the base of the Noto Peninsula, though the two species are considerably different in other features, above all in the presence or absence of the copulatory piece inside the aedeagal inner sac.

In the anophthalmic trechines belonging to the group of *Trechiama ohshimai*, the copulatory sclerite is almost always present even if thin and hyaline. Its absence is quite exceptional and hitherto known only in two relatively primitive species (*T. subparallelus* S. UÉNO, 1980, pp. 200, 203, figs. 1–3; *T. nagahinis* S. UÉNO, 1976, p. 2, figs. 1–3) and one of the most specialized species with highly modified aedeagi (*T. inermis* S. UÉNO, 1980, pp. 203, 250, figs. 55–56). It is, therefore, most unexpected that the present species, which is neither very primitive nor exceedingly specialized, lacks in differentiated sclerite in its male genitalia, particularly in view of the fact that the male genitalia of its close relative to be described next also lacks in the sclerite, though the genitalia as a whole resemble those of *T. medicirex* which possess a very large copulatory piece.

Trechiama (s. str.) ***une*** S. UÉNO, sp. nov.

(Figs. 4–5)

Length: 5.45–6.05 mm (from apical margin of clypeus to apices of elytra).

Very closely similar to the preceding species and not reliably discriminated by external morphology alone, but incredibly different in the configuration of male genitalia though their basic conformation is the same as that of the latter species. Usually distinguished from *T. hiroyukii* by broader pronotal base, less convex elytra widely depressed on the disc, more posteriorly located anterior dorsal pore of the internal series, and more anteriorly located anterior dorsal pore of the external series, but the ranges of individual variation overlap each other between the two species.

Head as in *T. hiroyukii* though the genae are a little less convex, particularly at the posterior parts; antennae usually reaching the middle of elytra as in *T. hiroyukii*, but sometimes shorter in females and in a female paratype, only reaching basal three-sevenths of elytra. Pronotum usually wider at base than in *T. hiroyukii*, with the sides usually more feebly arcuate in front and more shallowly sinuate behind; PW/HW 1.44–1.50 (M 1.47), PW/PL 1.11–1.18 (M 1.15), PW/PA 1.43–1.50 (M 1.47), PW/PB 1.12–1.22 (M 1.18), PB/PA 1.17–1.30 (M 1.25). Elytra similar in shape to those of *T. hiroyukii* but evidently less convex on dorsum and widely depressed on the disc as in certain females of *T. hiroyukii*; EW/PW 1.43–1.54 (M 1.48), EL/PL 2.73–2.88 (M 2.82), EL/EW 1.62–1.69 (M 1.65); two setiferous dorsal pores on stria 3 located at 1/7–1/5 and 1/3–2/5 from base, respectively, the anterior one being usually located on or behind the level of the 3rd pore of the marginal umbilicate series, rarely between the levels of the 2nd and 3rd umbilicate pores; two setiferous dorsal pores on stria 5 located at 1/16–1/12 and 1/2–5/8 from base, respectively, the anterior one being located on or near the level of the 1st pore of the marginal umbilicate series. Legs as in *T. hiroyukii.*

Male genital organ similar in basic conformation to that of *T. hiroyukii*, particularly in the absence of differentiated copulatory piece, but decisively different in the configuration of aedeagal apical lobe and endophallic teeth-patches as well as in other details. Aedeagus three-tenths as long as elytra, moderately compressed, only slightly arcuate in profile though the dorsal margin is regularly arcuate from base to near apical lobe, which is strongly flattened and produced ventro-apically; basal part narrower than in *T. hiroyukii*, less curved ventrad, with fairly large basal orifice whose sides are widely emarginate; sagittal aileron fairly large, ventro-proximally produced; viewed dorsally, apical lobe nearly parallel-sided in proximal half and then abruptly narrowed towards the tip which is bluntly subtuberculate; viewed laterally, apical lobe very narrow, very slightly curved ventrad, dorsally subtuberculate at the extremity, and devoid of ventral hook; ventral margin nearly straight behind middle or very slightly sinuate. Inner sac armed with two teeth-patches and devoid of copulatory piece as in *T. hiroyukii*, but the teeth-patches are much less developed than in the latter; left proximal teeth-patch consisting of an irregular row of large teeth except at the apical portion; dorsal teeth-patch compact and removed to the right dorsal side, consisting of small teeth, and obviously smaller than in *T. hiroyukii* as a whole. Styles large, with broad apical parts, left style obviously larger than the right, each bearing four apical setae.

Type series. Holotype: ♂, allotype: ♀, 120 m alt., 26. IX. 1993, Y. NISHIKAWA leg. Paratypes: 1♀ (teneral), 130 m alt., 19. IX. 1993, Y. NISHIKAWA leg.; 2♂♂, 4♀♀, 120 m alt., 26. IX. 1993, Y. NISHIKAWA leg.; 1♀, 120 m alt., 19. VI. 2000, Y. NISHIKAWA leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Uné, 120–130 m in altitude, in Kanazu-machi of Fukui Prefecture, on the northern side of Central Japan.

Notes. Though practically indistinguishable from the preceding species in external morphology, this trechine beetle is markedly different from it in the configuration of the aedeagal apical lobe lacking in the ventral hook and of the teeth-patches inside the inner sac. In general appearance, its male genitalia resemble those of *T. medicirex* mainly due to the close similarity of the aedeagal apical lobe, but are decisively different from them in the absence of copulatory piece, much smaller endophallic teeth-patches, well developed sagittal aileron, and much broader apical part of each style. It is most probable that *T. hiroyukii* and *T. une* have become differentiated at the northwestern part of the Kaétsu Hills from a common ancestor belonging to the *subparallelus* lineage, which somehow lost the copulatory sclerite. Otherwise, such an exceptional character state as the absence of the copulatory piece could not have been developed in only the two species occurring at the two different sides of the same hill merely 10 km apart from each other.

The specific name *une* is given after the type locality Uné, which is an uninhabited shrine place about 800 m east-southeast of the small village called Unéichinono at the west-northwestern foot of Kariyasu-yama (548 m in height), the northwesternmost head of the Kaétsu Hills. It is 10 km distant to the north from Toyowara, the type locality of *T. hiroyukii*, and though separated from the latter by the narrow valley of the Takeda-gawa River, the two places could be considered to lie on the same hill. The shrine place is surrounded by deciduous broadleaved trees and plantation of the cryptomeria cedar. A narrow stream passes through the back of the shrine and flows down in the plantation towards the village of Unéichinono. NISHIKAWA and I visited this secluded place first on September 19, 1993, and unexpectedly came across a teneral female specimen of this trechine beetle at the streamside behind the shrine. Though no additional specimens were obtained on that day, NISHIKAWA revisited the place one week later and succeeded in taking a series of them. All the specimens were dug out from the muddy banks of the stream in the dusky cryptomeria plantation. He visited the collecting site again seven years later, only finding deterioration of the environment. A single female specimen of the beetle was all that was collected then after careful searches.

Trechiama (s. str.) ***erecticedrus*** S. UÉNO, sp. nov.

(Figs. 6–8)

Length: 5.10–5.70 mm (from apical margin of clypeus to apices of elytra).

Externally similar to *T. hiroyukii* and *T. une*, but radically different from them in the conformation of male genitalia, which indicates a close relationship to *T. subparallelus*. Discriminated from *T. subparallelus* by the following combination of external features, though most of them are subject to individual variation: more convex genae, shallowly emarginate clypeal apex, relatively wide pronotum with the sides more strongly arcuate in front, more deeply sinuate at about basal fourth and then usually divergent towards sharper hind angles, somewhat shorter elytra with the anterior dorsal pore on stria 5 located more posteriorly, and a little shorter and stouter legs. Definitely different from *T. subparallelus* in the male genitalia, particularly in the development of teeth-patches.

Colour as in *T. une*, dark brown, partially reddish, with yellowish brown palpi and legs; scape, apical antennomeres and venter of hind body more or less lighter than fore body. Head as in *T. hiroyukii*, with gently convex genae, distinctly marked neck constriction, rather strongly arcuate frontal furrows, and fairly short antennae usually reaching the middle of elytra; clypeus shallowly emarginate at apex.

Pronotum transverse subcordate, much wider than head, always wider than long, widest at about two-thirds from base, and either equally contracted in front and behind or a little more strongly contracted anteriad than posteriad; PW/HW 1.38–1.51 (M 1.44), PW/PL 1.10–1.18 (M 1.14), PW/PA 1.42–1.51 (M 1.46), PW/PB 1.17–1.24 (M 1.20); sides moderately bordered, moderately arcuate from front angles to near fairly deep ante-basal sinuation, and then usually divergent towards hind angles though rarely subparallel to each other; apex always narrower than base, PB/PA 1.19–1.26 (M 1.22), the latter usually straight, sometimes slightly oblique at the lateral portions; front angles usually distinct and a little produced forwards, rarely obtuse and hardly produced; hind angles usually sharp and a little produced laterad, sometimes rectangular; dorsum gently convex.

Elytra as in *T. hiroyukii* though a little shorter on an average, moderately convex in ♂, widely depressed on the disc in ♀, widest at about or a little before the middle; EW/PW 1.40–1.58 (M 1.48), EL/PL 2.69–2.88 (M 2.78), EL/EW 1.57–1.71 (M 1.65); striation and chaetotaxy as in *T. hiroyukii* including the position of anterior setiferous pores of the dorsal series; two pores of the internal dorsal series located at 1/8–1/6 and 1/3–2/5 from base, respec-

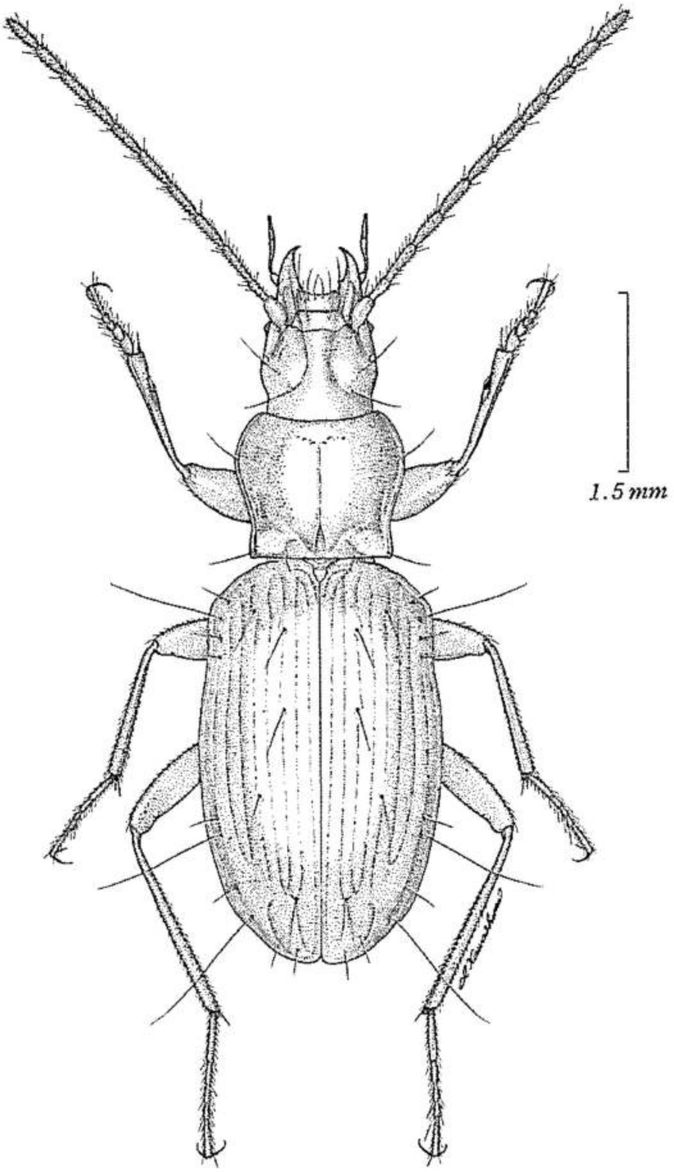
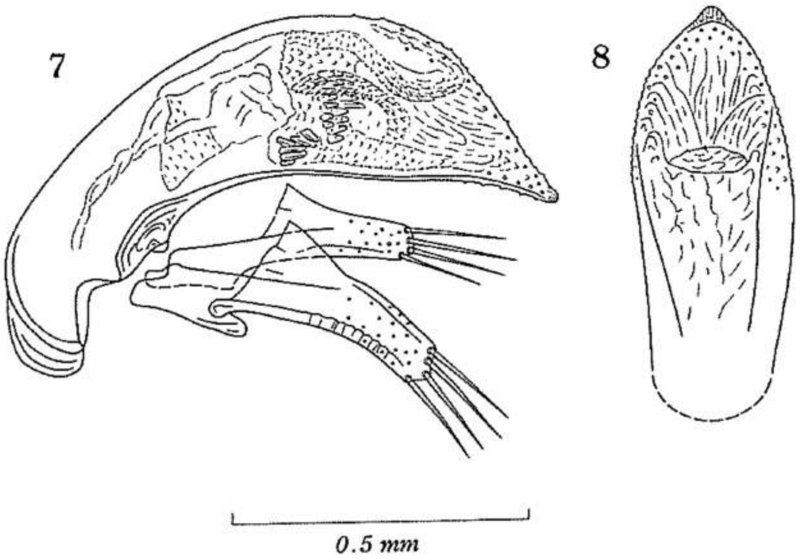


Fig. 6. *Trechiama* (s. str.) *erecticedrus* S. Uéno, sp. nov., ♂, from the Tachisugi-tôgé in Yamanaka-machi.

tively; two pores of the external dorsal series located at 1/13–1/9 and 5/9–3/5 from base, respectively; in the male paratype from the upper collecting site, the left elytron bears an extra setiferous dorsal pore at about 2/5 from base on stria 5, and the right elytron bears an extra setiferous dorsal pore at about 5/9 from base on stria 3.

Legs relatively short and stout, a little shorter and less slender than in *T. subparallelus*.

Male genital organ small and moderately sclerotized, identical in basic conformation with that of *T. subparallelus* but evidently different in the configuration of aedeagus with long straight basal part and short straight apical lobe and more conspicuously differentiated teeth-patches inside the inner sac. Aedeagus two-sevenths as long as elytra, widely dilated towards



Figs. 7–8. Male genital organ of *Trechiama* (s. str.) *erecticedrus* S. UÉNO, sp. nov., from the Tachisugi-tôgé in Yamanaka-machi; left lateral view (7), and apical part of aedeagus, dorso-apical view (8).

apical orifice in profile, and abruptly narrowed towards apex, with the dorsal margin semicircularly rounded in profile; apical part minutely tuberculose, around apical orifice in particular; viewed dorsally, apical part broad, with the sides arcuately narrowed to the tip which is rather widely tuberculate; viewed laterally, apical part subtriangular with blunt tip, not produced into deflexed lobe; basal part elongate and straight, not ventrally bent at the parameral articulation, with rather small basal orifice whose sides are deeply emarginate; sagittal aileron fairly large; ventral margin very slightly bisinuate in profile. Inner sac armed with three teeth-patches homologous with those in *T. subparallelus* but much more conspicuously developed than in the latter; no differentiated copulatory piece; dorso-apical teeth-patch widely separated into two portions by a deep fold of sac membrane and lying at the right apical and left proximal sides just inside apical orifice; median patch of heavily sclerotized teeth much larger than in *T. subparallelus*, consisting of more than a dozen large teeth, but largely concealed by the scales covering sac membrane, particularly by the left proximal portion of the dorso-apical teeth-patch; left proximal teeth-patch also evidently larger than in *T. subparallelus*, consisting of five or six large teeth; sac membrane wholly covered with scales variable in the degree of sclerotization besides the three differentiated teeth-patches described above. Styles broad at the apical parts, left style much larger than the right, each bearing four setae at the apex.

Type series. Holotype: ♂, allotype: ♀, 230 m alt., 25. IX. 1993, S. UÉNO leg. Paratypes: 4♂♂, 9♀♀, 230 m alt., 25. IX. 1993, S. UÉNO & Y. NISHIKAWA leg.; 1♂, 1♀, 400 m alt., 25. IX. 1993, S. UÉNO leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Tachisugi-tôgé, 230 m and 400 m in altitude on the northern slope, in Yamanaka-machi of Ishikawa Prefecture, on the northern side of Central Japan.

Notes. Though externally similar to the two preceding species, *Trechiama erecticedrus* does not seem to be directly related to those trechines, but doubtless has a close relationship to

T. subparallelus S. UÉNO known from Awazu-onsen, as is clearly indicated by the similarity of their male genitalia. This can be understood also from the geographical situation of its type locality, which is only 10 km distant to the south from that of *T. subparallelus* and lies on the same range of low hills. On the other hand, Kariyasu-yama, at the western foot of which lies the type locality of *T. une*, is separated by the Daishôji-gawa Valley from the hill on which lies the Tachisugi-tôgé, though one of the branch streams of the river has its source on the southern slope of that hill.

This new species was found at two spots at different altitude in the Iburibashi-gawa drainage on the northern slope of the Tachisugi-tôgé, which lies at the northern side of the Kaétsu Hills. They are 14.2 km distant to the east by south from Uné, the type locality of *T. une*. The lower collecting site is the meeting point of a short gully with a paved road and is shaded with deciduous broadleaved trees. The concrete side drain of the paved road opens out into the gully and moistens the colluvium below. Most specimens of the type series of *T. erecticedrus* were found out from beneath a large broken concrete block at the lower end of the drain and also from the deposit of muddy gravel below. The upper collecting site is a rather steeply slanting gully in a plantation of the Japanese cypress not far from the pass and is 170 m higher than the lower one in altitude. Here two specimens of the trechine beetle were dug out from thin colluvia deposited at the sides of the gully.

The new specific name *erecticedrus* is derived from the name of the type locality "Tachisugi-tôgé", which means the Pass of the Upright Cedar in Japanese.

要　約

上野俊一: 加越山地北西部の新しい盲目性ナガチビゴミムシ類．——— 福井県と石川県との県境に沿って延びる加越山地の北西部から，ナガチビゴミムシ属の盲目種3種を記載し，これらにそれぞれマルオカメクラチビゴミムシ *Trechiama* (s. str.) *hiroyukii* S. UÉNO，ウネメクラチビゴミムシ *T.* (s. str.) *une* S. UÉNO およびタチスギメクラチビゴミムシ *T.* (s. str.) *erecticedrus* S. UÉNO の新名を与えた．いずれもヨシイメクラチビゴミムシ種群のアワズメクラチビゴミムシ系に属し，外部形態がたがいによく似ているが，雄交尾器の分化がいちじるしく，とくに中央片先端部の形状や棘状小片群の状態に驚くほどの差異がある．しかも，福井県の刈安山周辺に生息する2種と石川県側の立杉峠に生息する種とは類縁関係がやや異なり，前者にごく近縁のものは，これまでのところ，ほかのどこからも知られていない．したがって，この論文で公表したメクラチビゴミムシ類は，北陸地方のチビゴミムシ相に重要な知見を加えるものとなる．なお，この論文は，日本の甲虫類研究の第一人者であり，とくに福井県の昆虫相の解明に尽くしてこられた佐々治寛之博士が，福井大学教授の職から 停年退官されるに当たり，そのご功績をたたえて奉献したものである．

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Spec. Bull. Japan Coleopt. Soc., Osaka, (1): 327–332, June 11, 2001

Leptaleus sasajii, a New Species and the First Representative of the Genus *Leptaleus* from Japan (Coleoptera, Anthicidae)[1]

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Abstract A new species, *Leptaleus sasajii*, is described from Nagasaki and Kumamoto Prefectures, Kyushu, as the first and correctly identified representative of the genus *Leptaleus* from Japan. The probable relationship between this new species and *Anthicus monstrosicornis* MARSEUL, 1867 is discussed.

Although the first author knows the occurrence of an unknown *Leptaleus* species in Japan, further study to determine the species name is not advanced because of an insufficiency of specimens. Recently many anthicid specimens were sent to the first author for identification from Mr. S. IMASAKA and they were undoubtedly agreed with that species of *Leptaleus*. The subsequent examination revealed that they belonged to a new species relating to *Leptaleus testaceonotatus* PIC, 1922 from Tonkin (Vietnam). In the following lines, the species is named as *Leptaleus sasajii* sp. nov. and described.

On the other hand, as shown by NOMURA (1963) and SAKAI (1985), the male of *Anthicus monstrosicornis* MARSEUL, 1876 also has not only the dilated antennomeres but also the similar elytral pattern, and this species was transferred later to the genus *Leptaleus* (UHMANN, 1983). Because of the subtriangular head and subcordate pronotum as mentioned in MARSEUL's description, this species apparently is not *Leptaleus* but *Anthicus*. The cause of this incorrect treatment must be the confusion of two species which are possibly included in the type series of *Anthicus monstrosicornis* MARSEUL. Even on that occasion, the specimen which exactly agree with the original description should be designated as the lectotype of *Anthicus monstrosicornis* MARSEUL.

Abbreviations used in this paper are as follows: HL = maxim length of head measured from the apex of clypeus to hind margin; HW = width of head except for eyes; WAE = width of head across eyes.

Before going further, the first author wishes to express his sincere gratitude to Dr. S. HISAMATSU who collected the original series of this interesting species and gave information

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[1] Studies on Anthicidae of Japan (Coleoptera), III.

about the habitat, and to Mr. S. IMASAKA for offering many additional specimens. It is great pleasure for the first author to dedicate this species to Prof. Hiroyuki SASAJI in commemoration of his retirement from Fukui University.

Leptaleus sasajii SAKAI et TELNOV sp. nov.

(Japanese name: Ariake-hosohime-arimodoki)

(Figs. 1–6)

Length: 2.20–2.60 mm; width: 0.68–0.80 mm.

Male. Body slender, 3.24–3.28 times as long as wide, well shining, but slightly dull on abdominal sternites because of the sculptures. Color brown to blackish brown; head except for gula, elytral nebulose band extending from the middle to apical 1/6, and 2nd to 5th visible abdominal sternites clouded with black; prothorax usually with a tint of orange; basal 4 segments of antennae and palpal segments light brown; legs except for weakly infuscate knees and apical 1/6 of elytra yellowish brown. Pubescence fine, fairly long, sparse and suberect on dorsum, shorter, denser and entirely appressed on venter; pubescence on head and pronotum approximately directed to meson, and those on elytra uniformly inclined posteriad.

Head gently and uniformly convex above, roundish, but varying from elongate oval to more shortened oval in the range as HW/HL = 1.27–1.41, WAE/HL = 1.17–1.26; lateral margins behind eyes gently and arcuately convergent posteriad, and occipital margin distinctly notched at the middle; punctures rather deep, irregular in density and size; smaller punctures so sparse as easily countable, predominant at interocular area except for glabrous mesal portion and at temporal area; several large punctures sparsely scattered on vertex also except for the middle; interstices polished; fronto-clypeal suture barely detectable as a fine depressed and nearly straight line; clypeus large and subquadrate, devoid of any hairs and punctures. Eyes large, oval in profile, roughly facetted, and moderately to weakly prominent, separated by 1.45 times their entire diameter. Antennae about 0.7 times as long as the length of elytra; antennomere relative lengths 6 : 4 : 5 : 4 : 5 : 5 : 5 : 5 : 4 : 4 : 7; 2nd relatively long, 5th and 6th strongly and subtriangularly dilated apicad, slightly longer than wide; 7th to 11th moniliform. Last segment of maxillary palpus (Fig. 3) large, thickened cultriform, about 1.6 times as long as wide. Last segment of labial palpus very small, reniform. Gula broad, shining, with gular sutures faintly convergent basally. Neck short but distinct.

Pronotum inverted gourd-shaped, about 1.18 times as long (including collar) as wide, and as wide as the width of head across eyes, widest at apical 3/10, and narrowest at basal 3/10; anterior lobe well expanded; surface gently declivous in apical 1/3, not constricted dorsally; punctures on disc shallow, nearly equal or slightly smaller than those on head, uneven in density, especially few along mesal portion; punctures on lateral constriction dense and rugose; interstices smooth; basal groove fine, but entire throughout. Scutellum subtriangular, moderate in size, not punctate but finely strigose.

Elytra conjointly about 1.8 times as long as wide, widest near the middle, very gently arcuate throughout at sides; surface weakly convex, obscurely flattened behind base (postbasal impression); punctures large and deep, but fine at just base and gradually becoming finer in apical 1/3, separated by 2.0 to 3.5 times their diameters at post-scutellary portion, usually denser at lateral declivities; sutural striae very fine, discernible in apical half; apical fulvous marking

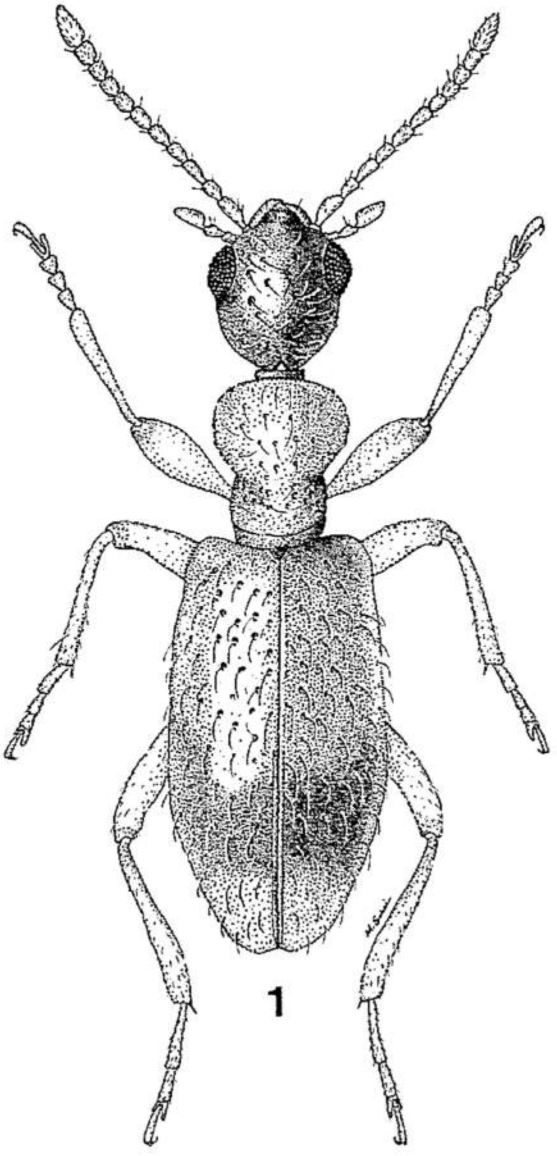

Fig. 1. *Leptaleus sasajii* sp. nov., female. Habitus.

usually conspicuous in contrast with preceding infuscate band. Hind wings fully developed.

Prosternum subquadrate, polished, with lateral sutures fine but distinct; prosternal process broad and shortened triangular. Mesosternum scattered with several large punctures; mesosternal process very narrow, barely reaching metasternum. Metasternum strongly and triangularly notched between metacoxae, rather densely punctured, with punctures larger and denser at sides, hardly discernible along mesocoxal cavities; medio-longitudinal groove indistinct in basal half. Metepisternum large, provided with a longitudinal row of punctures which are small basally. Abdominal sternites very finely punctured, relative lengths in meson of visible sternites from basal to apical 16 : 6 : 6 : 6 : 7; rarely a part of 8th sternite visible externally; apical margin of 7th marginate and subtruncate at the middle. Pygidium large, always exposed, folded internally (internal fold); apex bent downward; prepygidial tergite usually exposed only at apex.

Legs slender; front femora relatively stout, penultimate talsomeres simply bilobular, not expanded laterally; two tibial spurs short, nearly equal in length in hind ones, outer spur longer than inner spur in the middle pair.

Male genitalia slender; medial lobe without distinct sclerites, with transparent and little sclerotized long flagellum; the ratio between basal piece and lateral lobe about 3:2.

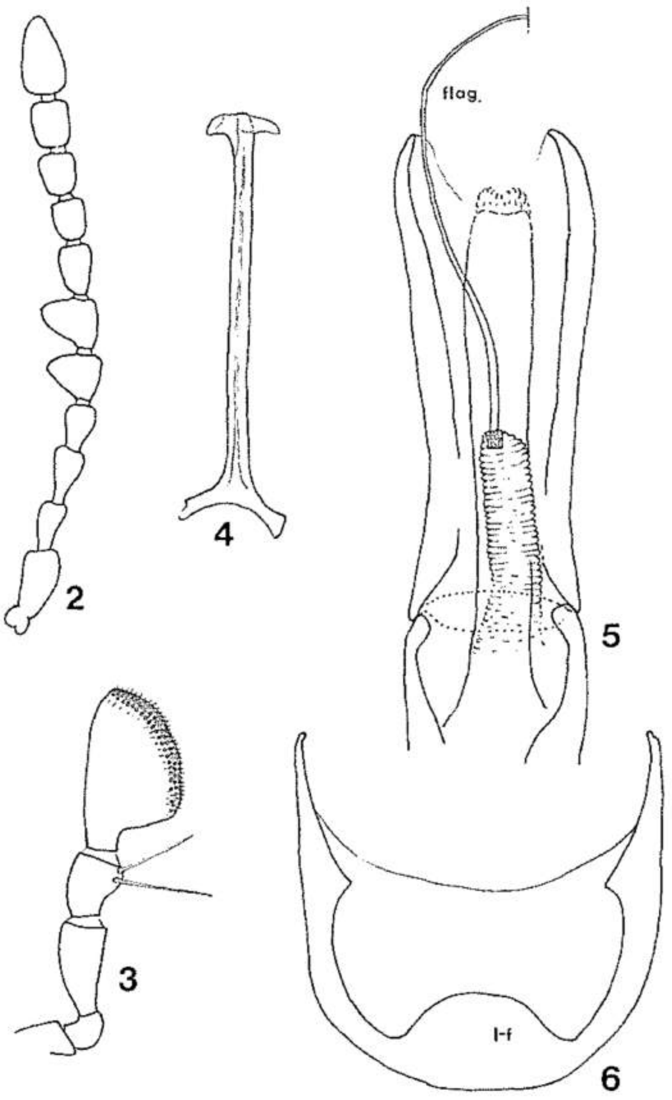

Fig. 2–6. *Leptaleus sasajii* sp. nov., female. 2, male antenna; 3, male maxillary palpus; 4, 9th abdominal sternite of male; 5, male genitalia, dorsal view; 6, pygidium of male, internal view. I-f. : Internal fold; flag.: flagella.

Female. The external sexual dimorphism is not distinct except for the antennal and pygidial features. The following female features may be available for sexual distinction: head more shortened, about 1.25 times as long as wide (HW/HL = 1.23–1.28), antennomere 5–6th normal, not dilated apically; apical margin of 7th (5th visible) abdominal sternite evenly rounded; pygidium not exposed externally and never bent downward at apex.

Distribution: Japan (Western Kyushu: Nagasaki and Kumamoto Prefectures). Mainly distributed around Ariake Sea.

Type-series. Holotype ♂: Yoshikawa, Minami-arima-cho, Nagasaki Pref., 23. IX. 2000, S. IMASAKA leg. Paratypes: 23♂♂, 22♀♀, same data as holotype; 2♂♂, 1♀(teneral), Aba Beach, Nagasaki Pref., 2. VI. 1967, S. HISAMATSU leg.; 1♂, 1♀, Arima-river, Kita-arima, Nagasaki Pref., 23. II. 1976, S. IMASAKA leg.; 1♂, Reikyû-park, Shimabara City, Nagasaki Pref., 12. VIII. 1977, S. IMASAKA leg.; 1♂, Arima-river, Kita-arima, Nagasaki Pref., 23. II. 1976, S. IMASAKA leg.; 1♀, Mizunashi-river, Shimabara City, Nagasaki Pref., 4. I. 1976, S. IMASAKA leg.; 1♀,Yoshikawa, Minami-arima-cho, Nagasaki Pref., 20. IX. 1977, S. IMASAKA leg.; 1♂, Shirakawa,, Kumamoto Pref., 30. III. 1977, S. NAOMI leg.; 1♂, Senrigahama, Hirado City, Nagasaki Pref., 5. IV. 1979, A. ODA leg.

Etymology. The specific name is in honor of Prof. Dr. Horoyuki SASAJI, Fukui University.

Type-depository. The holotype and some paratypes are deposited in the collection of the Entomological Laboratory, College of Agriculture, Ehime University, Matsuyama and several paratypes are in the collections of Mr. S. IMASAKA and the junior author in Latvia.

Remarks: In external configuration and coloration this new species is rather exactly similar to *Leptaleus testaceonotatus* PIC, 1922 from Vietnam, but at once distinguished from it by the slightly thickened and more pigmented body, more nebulose band of elytra, the denser punctuation on head, and decidedly the dilated 6th and 7th segments of male antennae. The genital features of the new species (Figs. 4–5) must be different from those of *L. testaceonotatus*, though it has not been examined until now.

要　約

酒井雅博， Dmitry TELNOV：日本新記録の属 *Leptaleus* の新種について——— 日本に *Leptaleus* 属のアリモドキが生息していることはかなり以前からわかっていたが，標本数が少なかったため，その種名を決定することを保留していた．今回，今坂正一氏から同定依頼を受けたアリモドキがこの種名未確定の *Leptaleus* に合致し，同氏のご好意により十分な標本が揃ったので調査したところ，ベトナム（トンキン）から記載された*Leptaleus testaceonotatus* PIC, 1922に近似の新種であることがわかったので記載した．なお *Anthicus monstrosicornis* MARSEULは本種と同様の触角の特徴を持っているが，原記載から判断する限り，明らかに *Anthicus* に属する．しかし *monstrosicornis* は近年になって *Leptaleus* に転属されていることから，*monstrosicornis* のタイプには真の *Anthicus monstrosicornis* と今回記載した種の２種が混在している可能性がある．その場合でも当然原記載に合致する標本が *Anthicus monstrosicornis* の Lectotype に指定されるべきであり，本種には名前を与えねばならない．なお本種は，長年にわたり甲虫類の研究を行い，日本の甲虫学の発展に尽くされた，福井大学教授佐々治寛之博士に献名された．

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A New Species of *Glipostenoda* from Shikoku, Japan (Coleoptera: Heteromera: Mordellidae)

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Abstract A new species, *Glipostenoda sasajii*, is described based on two male specimens from Shikoku, Japan. This new species is peculiar in coloration: head is yellowish brown while thorax, abdomen and elytra are black. The other diagnostic characters including genitalia are also observed and figured.

One of the most conspicuous characters in biotaxonomy would be the coloration. Many of the species of the tribe Mordellistenini are, however, monotonous: some are wholly black and others are wholly yellowish to reddish brown. This fact would have been leading the classification very difficult. In rare cases, such as the genus *Mordellina*, the coloration is a little various and available for the classifications. In this paper, a new bicolorous species of *Glipostenoda* is described, based on two male specimens from Shikoku, Japan. Figures of diagnostic parts are also shown.

The author would dedicate this article in honor of Prof. Hiroyuki SASAJI who is now performing the president of the Japan Coleopterological Society and who has been contributing vigorously to the knowledge on Coleopterology. I would like to congratulate him on his retirement from Fukui University in March, 2001.

Glipostenoda sasajii sp. nov.

(Figs. 1–2)

(Japanese name: Sasaji-hime-hananomi)

Description. Coloration (Figs. 1-A and 2) bicolorous: Body black, head, antennae, four anterior legs, hind tibial spurs yellowish brown, terminal part of hind femora, hind tibiae and tarsi reddish brown. Hairs on almost whole body yellowish with luster.

Eyes (Fig. 2) oval, somewhat large and pubescent without emargination, with coarse facets. Tempora present but very narrow. Antennae (Fig. 1-B) somewhat short, reaching the basal edge of pronotum at most when laid backward, slightly serrate, 2nd segment the longest, 3rd the shortest and 2/3 of 2nd in length, 4th a little longer than 3rd, each of 5th to 10th about 1.2 times as long as 4th, and 1.2 times as long as wide. Maxillary palpi (Fig. 1-D) of Mordellistena-type, terminal segment triangular with inner margin almost as long as apical margin, penultimate segment not dilated. Pronotum a little wider than long, lateral margins nearly

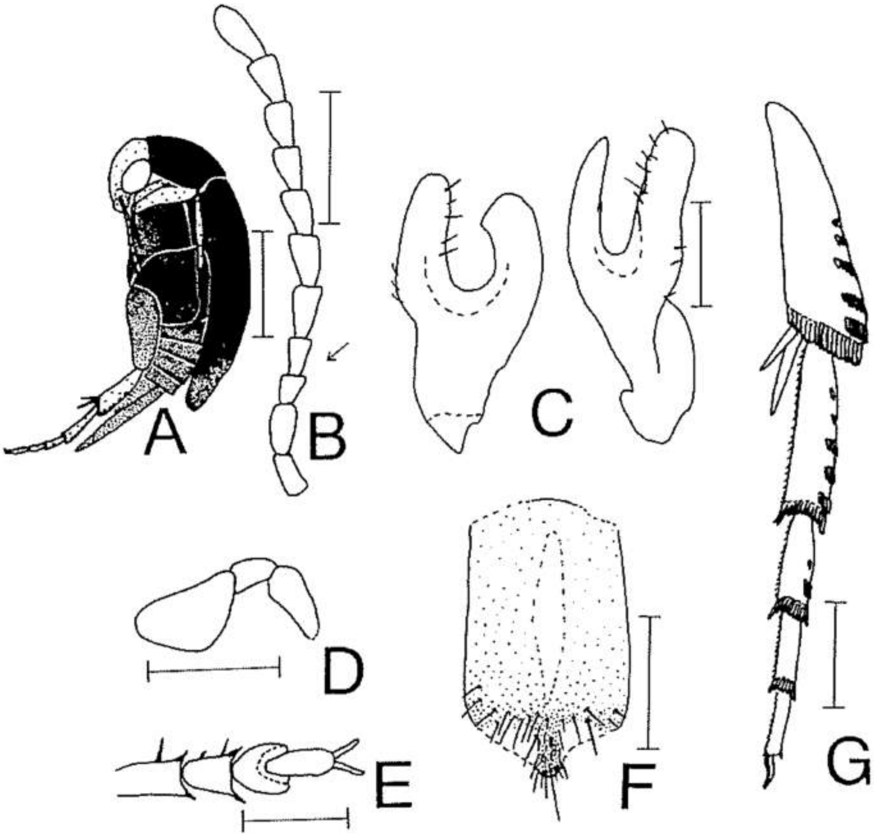

Fig. 1. *Glipostenoda sasajii* sp. nov. — A, Lateral view; B, antenna (4th segment arrowed); C, parameres of male genitalia; D, maxillary palpus; E, distal segments of fore tarsus; F, 8th abdominal urosternum; G, hind leg. Scales: A = 1.0mm; B, D, F and G = 0.25mm, C and E = 0.1mm.

straight in profile and converging anteriorly when seen above, anterior angle broadly rounded at tip, posterior angles a little obtuse than rectangle and sharp at tip, apical and basal margins protrudent in usual way. Elytra 2.1 times as long as their humeral breadth, about 2.5 times as long as pronotum, tapered posteriorly. Apical margin of anal sternite not emarginate but straight. Pygidium moderately long and formed as in usual species of Mordellistenini, about 1/2 as long as elytron.

Penultimate segments of fore tarsi (Fig. 1-E) dilated, almost as long as wide, depressed for receiving ultimate segment and jointed with terminal segment at center of dorsal surface. Penultimate segment of middle tarsi almost the same as that of fore tarsi. Hind legs (Fig. 1-G) with short ridges, formulated as 4–6, 4–5, 1–2, 0; tibiae provided with 4 short ridges, apical ridge the longest, lying on the dorsal 1/3 of the tibial breadth, one or two more rudimental ridges present basally; 1st segment of tarsi with 4 to 5 ridges; 2nd segment with 1 or 2 ridges; 3rd segment without ridge. Outer spur on hind tibia about 3/5 as long as inner one.

Eighth abdominal urosternum in male (Fig. 1-F) 1.6 times as long as wide, median lobe protrudent with sparse hairs, lateral wings protrudent and broadly rounded at apices.

Parameres of male genitalia (Fig. 1-C) of usual shape of the tribe Mordellistenini, provided with a ventral branch on each one, left paramere with moderately long main lobe, two basal process recognizable at apical 1/4 and 1/5, ventral branch a little shorter than the main lobe; right paramere with thick main lobe, ventral branch shorter than the main lobe and provided with a process.

Female unknown.

Body length: 3.1 mm. (excl. pygidium)

Holotype. ♂, Mt. Ohtaki-san, alt. 940 m, Shionoe-cho, Kagawa Pref., 2. VIII. 1997, K. AKITA leg. (preserved in Osaka Museum of Natural History, Osaka). Paratype. 1♂, Mt. Kohtsu, Tokushima Pref., 21. VII. 1968, M. SAKAI leg. (preserved in College of Agriculture, Ehime University, Matsuyama).

Distribution. Japan (Shikoku).

Affinities. The coloration of this new species seems to be peculiar. *Falsomordellistena satoi* (NOMURA, 1951) may be somewhat similar in coloration, but is different from the new species in possessing reddish brown head and humeral spots on elytra, and larger body size. *Glipostenoda shibatai* NOMURA, 1961 may also be allied to the new species, but can be distinguished from the new species by the coloration, presence of ridges on 3rd segment of hind tarsi, and the shape of male genitalia.

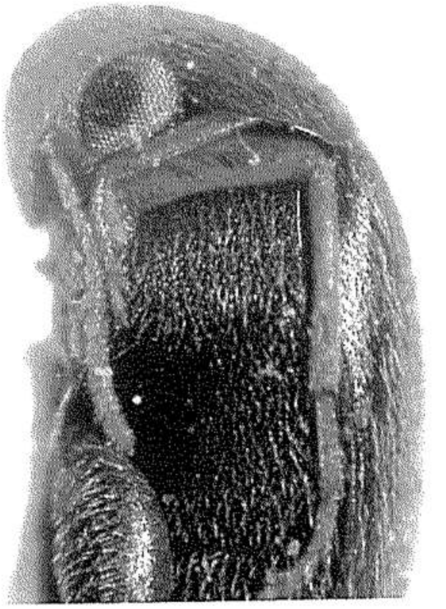

Fig. 2. Latero-ventral view of *Glipostenoda sasajii* sp. nov.

Etymology. The specific name is dedicated to Prof. Hiroyuki SASAJI in commemoration of his retirement from Fukui University in March, 2001.

Remarks. This new species seems to be somewhat different from the typical *Glipostenoda* species in the following points: antennae are very short, coloration is not monotonously castaneous but bicolorous, ridges on hind legs are very short. The systematic position may have to be reconsidered in the future as well as *Glipostenoda shibatai* NOMURA.

Acknowledgment

I thank Mr. Katsumi AKITA (Hisai, Mie Pref.) and Dr. Masahiro SAKAI (College of Agriculture, Ehime University, Matsuyama) for offering materials.

要約

初宿成彦：四国からのチャイロヒメハナノミ属の1新種．—— 四国産の2♂♂標本に基づき，チャイロヒメハナノミ属の1新種を記載し，ササジヒメハナノミと命名した．本種は頭部が黄褐色，胸部，腹部，上翅が黒色と色彩が特異である．交尾器など他の標徴も観察し，図示した．

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Spec. Publ. Japan Coleop. Soc. Osaka, (1): 337–342, June 11, 2001

Pidonia neglecta hizena n. subsp., a New Subspecies from Western Kyushu, Japan (Coleoptera, Cerambycidae)*

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Abstract A new subspecies of the genus *Pidonia* is described from Western Kyushu, Japan under the name of *Pidonia neglecta hizena* subsp. nov.

Pidonia neglecta KUBOKI, 1982, previously known as *Pidonia muneaka* TAMANUKI, 1942, has been known from Shikoku and Kyushu (the type-locality: Daisen-rindô, Mt. Kujû) and is found in the mountainous areas from 300 to 1000 m above sea level. This species was recorded by IMASAKA (1978) in Mt. Unzen, western Kyushu together with 7 other species of the genus *Pidonia*, based 14 specimens collected from flowers of *Sorbus commixta* HEDLUND, *Stephanandra incisa* ZABEL [Rosaceae], and *Symplocos coreana* OHWI [Symplocaceae].

AMANO (1996a) examined the genitalia of two male specimens that were collected from Mt. Unzen on other occasions and found a small ventral process at the apex of the median lobe in the male genitalia, while it is absent in the males from Mts. Hiko and Sobo. In addition, AMANO (1996b) noted the absence of this process in a male from Mt. Taradake, where is a neighboring mountain of Mt. Unzen. However, we found later the process in the specimens from Mt. Taradake.

A careful examination of this process and other features using a plenty of specimens collected from various localities in *P. neglecta* distribution range revealed that there are morphological differences between populations from western Kyushu and other localities. Based on these results, we reached a conclusion that the population of western Kyushu should be described as a new subspecies of *P. neglecta*.

Pidonia (Pidonia) neglecta hizena IMASAKA et AMANO, ssp. nov.

[Japanese name: Himiko-hime-hanakamikiri-nishikyushu-ashu]

(Figs.1–2, 7–11)

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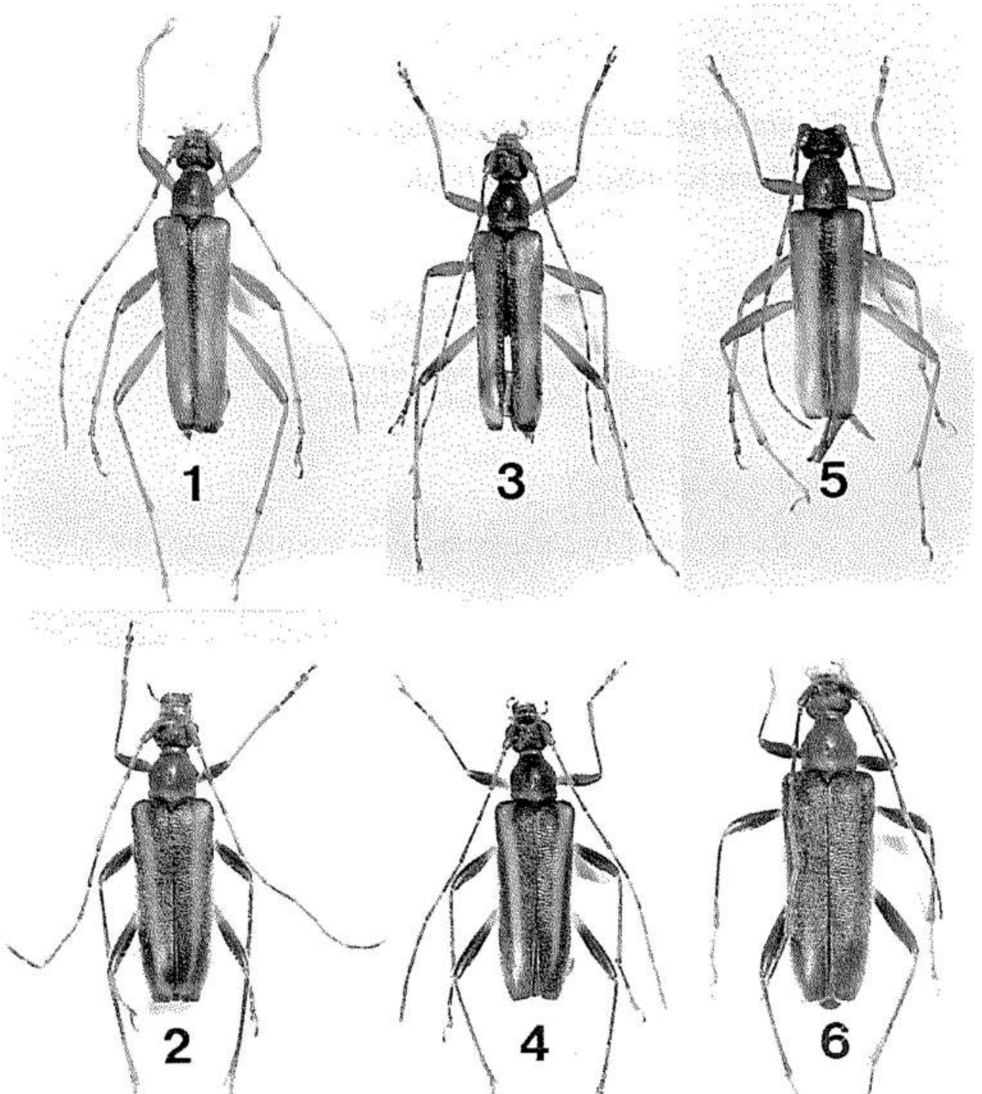
*Contribution from the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka (Ser. 5, No. 53).



Figs.1–6, Dorsal view of *Pidonia* spp., 1, 3, 5, Male, 2.4.6. Female; 1–2, *Pidonia* (*Pidonia*) *neglecta hizena* IMASAKA et AMANO, ssp. nov.; 3–4, *Pidonia* (*Pidonia*) *neglecta neglecta* KUBOKI, 1982 (from Mt. Kurodake, Mts. Kujuzan, Oita Pref.); 5–6, Ditto, (from Mt. Ishizuchisan, Ehime Pref.).

Pidonia neglecta: OGATA *et al.*, 1986, Saga-no-Konchû, (18): 131 (Okuhiratani, Mt. Taradake and Mt. Kyogatake, Mts. Taradake, Saga Pref.), — IMASAKA *et al.*, 1987, Saga-no-Konchû, (19): 235 (Mt. Taradake, Saga Pref. and Nagasaki Pref.), — AMANO, 1996a, Shin-tsukushi-no-konchû, (5): 13–14, 2 photos (Nitatôge, Mt. Unzen, Nagasaki Pref.). — AMANO, 1996b, Gekkan-mushi, (310): 11, 1 photo (Mt. Kyôgatake, Mts. Taradake., Saga Pref.).

Pidonia muneaka: IMASAKA *et* IWASAKI, 1974, Kitakyushu-no-konchû, 20 (2): 41 (Mt. Unzen, Nagasaki Pref.), — IMASAKA, 1977, Koganemushi, (31): 35 (Todoroki-no-taki, Mt. Taradake, Nagasaki Pref.), — IMASAKA, 1978, Koganemushi, (32): 1–15 (Mt. Unzen, Nagasaki Pref.).

Male. Body elongate and brownish yellow; head behind antennal sockets, meso- and metasterna, 1st and 2nd ventrites and lateral portions of 3rd ventrite blackish brown; sometimes tarsi and apices of tibiae and femora blackish brown; pronotum brownish fulvous with blackish brown spots at lateral margins; scutellum brownish fulvous; elytra brownish yellow with black stripe at suture, with three blackish spots along lateral side and blackish marking at the apex (Fig. 1).

Fifth ventrite roundly produced caudad on each side of acute median notch at caudal margin (Fig. 10).

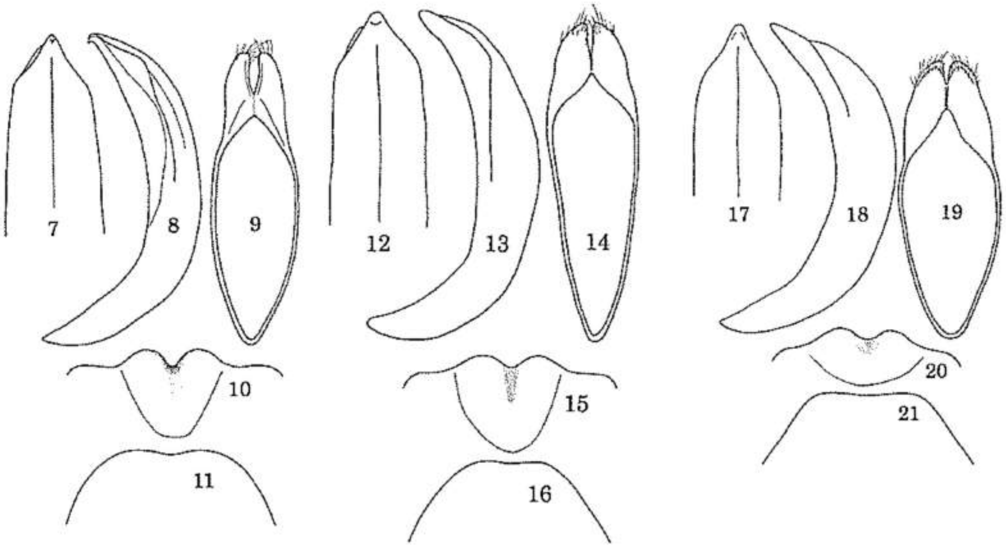
Male genitalia moderately sclerotized; median lobe relatively slender, curved ventrally, with an acute and small prominence ventrally at apex (Figs. 7, 8); tegmen shorter than median lobe with dense short terminal hairs (Fig. 9).

Length: 8.3–11.2 mm; breadth: 2.3–2.9 mm.

Female. Robuster and darker than in male; elytra black with brownish yellow stripe in middle (Fig. 2); antennae barely attaining elytral apices; pygidium more rounded at caudal margin, with slight emargination in middle; fifth ventrite rounded at caudal margin (Fig. 11).

Length: 7.8–11.1 mm; breadth: 2.1–3.0 mm.

Type series. Holotype: ♂(Deposited in the Entomological Laboratory, Kyushu University, type No. 3125), Mt. Unzen, Obama Town, Nagasaki Pref., Kyushu, Japan, 8. VI. 1976, S. IMASAKA leg. Paratypes: [Saga Pref.] 1♀, Mt. Kusenbuyama, Tosu City, 12. VI. 1983, M. NISHIDA leg.; 2♂♂, Mt. Hachimandake, Taku City, 4. VI. 1999, F. HIROKAWA leg.; 1♂, Mt.



Figs. 7–21. *Pidonia neglecta* ssp., males except for females in 11, 16 and 21; 7-11, *Pidonia* (*Pidonia*) *neglecta hizena* IMASAKA et AMANO, ssp. nov.; 12–16, *Pidonia* (*Pidonia*) *neglecta neglecta* KUBOKI, 1982 (from Mt. Kurodake, Mts. Kujuzan, Oita Pref.); 17–21. *Pidonia* (*Pidonia*) *neglecta neglecta* KUBOKI, 1982 (from Mt. Ishizuchisan, Ehime Pref.); 7, 12, 17, Median lobe, ventral view; 8, 13, 18, Median lobe, lateral view; 9, 14, 19, Tegmen, dorsal view; 10, 15, 20, Apex of fifth ventrite; 11, 16, 21, Apex of pygidium.

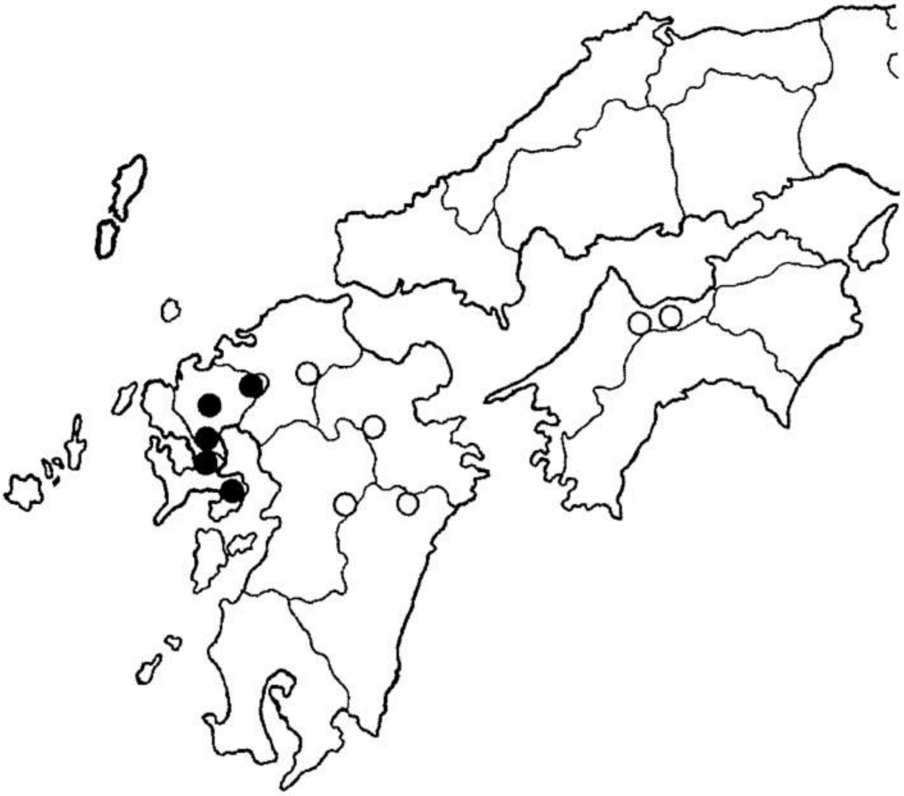


Fig. 22. Distribution map of *Pidonia* (*Pidonia*) *neglecta* KUBOKI, 1982
○: *neglecta* s. str.; ●: *hizenia* ssp. nov.

Taradake, 1–30. VI. 1969, M. EJIMA leg. (Kitakyushu Mus. Hist. Coll.); 1♂, Mt. Kyôgatake, 22. V. 1982, N. NISHIDA leg. (Kitakyushu Mus. Hist. Coll.); 1♂, Hiratani, Mt. Kyôgatake, 11. V. 1985, F. HIROKAWA leg.; 1♀, Okuhiratani, Mt. Taradake, 29. V. 1983, M. NISHIDA leg.; 1♀, ditto, 3. V. 1985, M. NISHIDA leg.; 1♀, Mt. Taradake, 6.VI.1981, M. NISHIDA leg.; 1♀, ditto, 4. VI. 1994, M. NISHIDA leg.; [Nagasaki Pref.] 1♂, Minamikawachi-rindô, Mt. Taradake, Ohmura City, 4. VI. 1985, S. IMASAKA leg.; 2♀♀, ditto, 10. V. 1986, S. IMASAKA leg.; 1♀, Todoroki-no-taki, Mt. Taradake, Takagi Town, 31. V. 1978, S. IMASAKA leg.; 1♂, ditto, 4. V. 2000, S. IMASAKA leg.; 1♂, Ditto, 5. V. 2000, S. IMASAKA leg.; 1♂, Kinsenji, Mt. Taradake, Takagi Town, 4. V. 1998, S. IMASAKA leg.; 1♂, Nita-toge, Mt. Unzen, Obama Town, 9. VI. 1975, D. IWASAKI leg. (Kitakyushu Mus. Hist. Coll.); 2♂♂, same data of holotype; 2♀♀, same locality, 6. VI. 1977, S. IMASAKA leg.; 1♂, ditto, 1. VI. 1983, S. IMASAKA leg.; 1♂, 1♀, ditto, 12. VI. 1986, S. IMASAKA leg.; 1♀, ditto, 31. V. 1989, S. IMASAKA leg.; 1♀, Nodake, Mt. Unzen, Obama Town, 14. VI. 1994, S. IMASAKA leg.; 1♂, Akamatsu-dani, Mt. Unzen, Shimabara City, 14. V. 1980, S. IMASAKA leg.; 1♂, Tashirobaru, Unzen, Kunimi Town, 7. V. 1991, S. IMASAKA leg.

Distribution. Japan: Western Kyushu (Saga Pref., Nagasaki Pref.).

Remarks. This new subspecies resembles nominate subspecies *Pidonia* (*Pidonia*) *neglecta*

neglecta (KUBOKI, 1982) from other localities (Figs. 3–6, 12–21) than western Kyushu. In the new subspecies, however, the median lobe of male genitalia is produced ventrally at the apex; the fifth ventrite of abdomen is more sharply depressed and more acutely notched at the center in the male; the pygidium is more rounded at the apex in the female. Also general coloration in the new subspecies is paler in both sexes.

Biodata. The adults appear from May to June, and visit flowers of *Sorbus commixta* HEDLUND, *Stephanandra incisa* ZABEL and *Symplocos coreana* OHWI.

Etymology. The subspecies is named after the old name of locality.

Specimens of the nominate subspecies examined. KYUSHU: 4♂♂, 2♀♀, Mt. Kurodake, Mts. Kujûzan, Oita Pref., 6. VI. 1992, M. NISHIDA leg.; 2♂♂, 2♀♀, Notôge Pass, Mt. Hikosan, Fukuoka Pref., 20. V. 1992, S. IMASAKA leg.; 1♀, Siiya-tôge Pass, Yabe Vill., Kumamoto Pref., 6. VI. 1989, S. IMASAKA leg.; 1♂, 1♀, Mt. Goyôdake, Hinokage Town, Miyazaki Pref., 15. VI. 1996, S. IMASAKA leg.; SHIKOKU: 2♂♂, 1♀, Mt. Ishizuchiyama, Saijyô City, Ehime Pref., 29. VI. 1997, M. SHIRAISHI leg.; 1♀, Mt. Higashi-akaishiyama, Besshiyama Vill., Ehime Pref., 11. VI. 2000, M. SHIRAISHI leg.

Acknowledgements

I wish to express my hearty thanks to Dr. Katsura MORIMOTO (Professor Emeritus of Kyushu University), for his kind guidance and constant encouragements. Special thanks are due to Prof. Junichi YUKAWA (Entomological Laboratory, Faculty of Agriculture, Kyushu University), Associate Prof. Osamu TADAUCHI (Entomological Laboratory, Faculty of Agriculture, Kyushu University), Mr. Mitsuyasu NISHIDA (Ureshino Town, Saga Pref.), Mr. Masaharu NODA (Nagasaki City), Mr. Fuminori HIROKAWA (Yamato Town, Saga Pref.) and Mr. Masato SHIRAISHI (Imabari City, Ehime Pref.) for their kind guidance and valued specimens and also with literature.

要約

今坂正一・天野昌次：西九州産のヒミコヒメハナカミキリの一新亜種 ——— 西九州産のヒミコヒメハナカミキリは，雄交尾器の中央片先端腹面側に小突起が存在すること，雄腹節の第5腹板において，後縁中央はより鋭角的にえぐれること，雌の第５腹節においては，背板の後縁はより強く丸みを帯びること，などで大分県九重山を基産地とする原亜種とは区別され，*Pidonia (Pidonia) neglecta hizena* IMASAKA et AMANOとして，新亜種の記載を行った。

西九州新亜種は背振山系、多良山系、雲仙山系に分布しており、福岡－大牟田ラインを境界として、英彦山山系以東に分布する原亜種と棲み分けていると考えられる．なお、四国産についても愛媛県石鎚山の個体を調査したところ，原亜種によく似ていて，中央片先端に小突起はなく，原亜種に含まれると考えられる．

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A New Species of the Genus *Megopis* (Coleoptera: Cerambycidae) from Borneo with Notes on *Megopis ossea*, AURIVILLIUS, 1897

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Abstract A new species is described under the name of *Megopis* (*Aegosoma*) *annulicornis* sp. nov. *M.* (*A.*) *ossea* AURIVILLIUS, 1897 is not a synonym of *M.* (*A.*) *gigantea* but a distinct species and the taxonomic notes about it are also given.

Through the examinations of a series of specimens which have been supposed to be *Megopis* (*Aegosoma*) *gigantea* LANSBERGE, brought about from northern Borneo, a new species is found and I am going to describe it in this paper. At the same time, *M.* (*A.*) *ossea* AURIVILLIUS is confirmed to be a definite species although it was considered by LAMEERE (1909, 1919) to be one of the synonym for *M.* (*A.*) *gigantea*. In this paper, I will also give notes on the specific relation between *gigantea* and *ossea*.

I am very glad to dedicate this paper to Prof. Hiroyuki SASAJI on the occasion of his retirement from Fukui University.

Before going further, I would like to express my sincere gratitude to an anonymous reviewer for critically reading the original manuscript. I also owe to Mr. H. KARUBE of the Kanagawa Prefectural Museum of Natural History and Mr. G. WOESTYN, Blandain, Belgium for their kind help not only to gain copies of references but also to collect photographs of type specimens concerning this study. I am also grateful to the stuffs of the Natural History Museum, London and l'Institute Royal des Sciences Naturelles de Belgique for their kind help to refer the type specimens of related species.

Megopis (*Aegosoma*) *annulicornis* sp. nov.

(Figs. 1–2)

A large species of slightly depressed and elongated body form. Integument largely yellowish brown, partly dark brown or black and clothed with pale yellow pubescence.

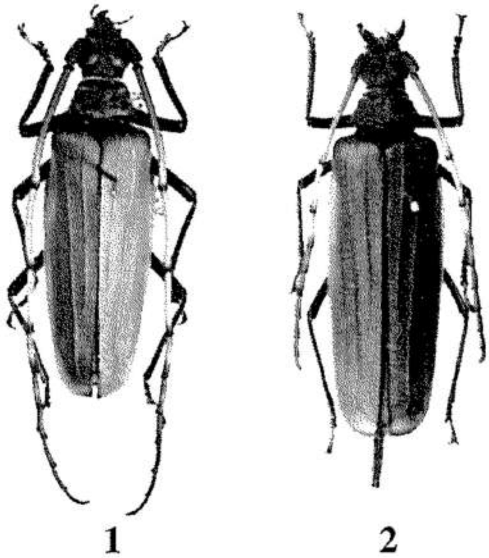
Male. Head dark brown, clothed with pubescence, about 1.3 times as long as wide; eyes black and bulging; mandibles black, clothed with pubescence except on inner blades, 0.36 times as long as head, sharply curved inwards, each with a small internal dent close to the base.

Antennae about 1.1–1.3 times as long as body, furnished with very thin pubescence and rough granules on segments 1–3, with granules only and without pubescence on segments 4–5 or 6 and glabrous and smooth at the remainders; segments 1 and 2 dark brown and thick, segments 3–11 slender and gradually decreasing width, segments 3–7 yellowish brown with each apical part annulatedly black, segment 3 about four times as long as segment 1, segments 3 and

4 furnished with longitudinal groove internally, united length of segments 4 and 5 about as long as segment 3, segment 8 and more apical segments almost black; segment 11 longer than each of segments 7–10 and as long as segment 6.

Pronotum dark brown, clothed with thin pubescence, transverse, about a half as long as wide, widest at the base, straightly narrowed apicad, furnished with rather distinct marginal carinae at the base and the apex and with obtusely edged lateral margins. Scutellum lingulate, thinly pubescent and widely convex at the middle.

Elytra yellowish brown and dark colored only at the lines of the extreme bases, finely granulated and thinly pubescent throughout, about 2.50 times as long as wide, widest at about basal third and almost straightly narrowed to round apices, with distinct sutural teeth; each disk furnished with two distinct internal costae which starting from humerus and ending on sutural margin just before the apex and also with one or two feeble and short external costae.



Figs. 1–2, Habitus of *Megopis annulicornis* sp. nov. 1, male; 2, female.

Ventral surface smooth, finely pubescent throughout; legs dark brown, long, slender, with thick pubescence on the ventral side of tibiae; tarsal segments slender, segment 1 longer than segment 3, segment 2 the shortest, segment 3 about as long as wide and broader than basal two segments, claw segment about as long as united length of three tarsal segments.

Body length: 36.6–51.1 mm.

Female. Similar to the male in general appearance. Antennae about 0.8 times as long as body, slenderer than in male, glabrous throughout and granulated at basal three segments. Legs slenderer than in male, pubescence on the ventral side of tibiae not thick, third tarsal segments not widened, claw segment slightly longer than united length of three tarsal segments.

Body length: 45.3 mm.

Type series. Holotype: ♂, Keningau, Sabah, Borneo (East Malaysia), IV. 1992, M. ITOH leg. (Deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo). Paratypes: 2♂♂, Same locality as the holotype, V. 1994, M. ITOH leg; 1♂, Ranau, Sabah, Borneo, 10. IV. 1992; 2 ♂♂, same locality as the holotype, 13. IV. 1997; 3♂♂, Mt. Trus Madi, Sabah, Borneo, IV. 1995; 6♂♂, Kimanis, Sabah, Borneo, 1–10. IV. 1999; 1♀, same locality, 13. IX. 1999.

Notes. This new species is allied to *M.* (*A.*) *gigantea* LANSBERGE, but can easily be distinguished from the latter by pubescent pronotum and elytra. It can also be distinguished from *M.* (*A.*) *ossea* AURIVILLIUS by the same characteristics because the latter species as well as *gigantea* has glabrous dorsum. This species is also distinguished from these two congeners in having elytra margined with pale colored lines instead of dark ones.

Megopis (*Aegosoma*) *ossea* Aurivillius,1897

Aegosoma ossea Aurivillius, 1897, Entomol. Tidskr. vol. 18: 242.
Megopis gigantea: Lameere, 1909 (nec Lansberge), Annls. Soc. ent. Belg.: 140. (pro part)
Megopis gigantea: Lameere, 1919 (nec Lansberge), Genera Insectorum: 73. (pro part)

Notes. This species was described by Aurivillius (1897) on a male from Mt. Kina Balu, Borneo and later Lameere (1909, 1919) considered it as a synonym of *M. gigantea* Lansberge (1884) noted after surveyed the type specimen that it was probably an immature example. This time, I examined 10 specimens of this beautiful species along with 23 examples of *M. gigantea* from many localities and came to the conclusion that it is distinct species independent from the latter. *M.* (*A.*) *ossea* can easily be distinguished from *gigantea* in having elytra cream-colored with the margins yellow while *gigantea* having elytra semitransparently brown with the margins black. In addition, *M.* (*A.*) *ossea* has the body smaller, the elytral costae weaker, the pronotum accompanied with somehow purplish tint and so on.

Body length. Male: 36.5–56.1 mm. Female: 38.8–43.5 mm (Body length of *gigantea*. Male: 43.5–83.1 mm. Female: 41.4–65.5 mm)

Specimens examined. 3♂♂, Keningau, Sabah, 30. III. 1992, M. Itoh leg.; 1♂, Mt. Kinabaru, III. 1995; 1♂, Ranau, Sabah, 12. IV. 1997; 1♀, same locality, 20. IV. 1997, and other 2♂♂, 2♀♀.

Distribution. Mountainous area of Sabah, Borneo (East Malaysia) in altitude of 1000–2000 m. *M.* (*A.*) *ossea* and *M.* (*A.*) *annulicornis* sp. nov have almost the same range to each other while *gigantea* is much widely distributed and the range includes over the area of the former two species.

要 約

小宮次郎：ボルネオ産ウスバカミキリ属 *Aegosoma* 亜属の１新種及び *M.* (*A.*) *ossea* Aurivillius, 1897 に関する覚書 —— ボルネオから*M.* (*A.*) *gigantea* に近似した新種を *M.* (*A.*) *annulicornis* sp. nov として記載する．本種は *gigantea* 及びこれと近似の *ossea* に似るが前胸背及び上翅が微毛に覆われる事で容易に区別できる．また Lameere (1909, 1919) により *gigantea* の synonym とされた *Aegosoma ossea* Aurivillius, 1897 は独立した種であることが判明した．この種はシロウスバカミキリの和名で１０年ほど前から日本国内で標本を見かけるようになった種で，上翅が黄色味を帯びた乳白色で，縁部が黄色であり，一方 *gigantea* は上翅が褐色で半透明であり，黒く縁取られるので，区別は容易である．

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Spec. Publ. Japan Coleopt. Soc. Osaka, (1): 347–350, June 11, 2001

A New Species of the Genus *Hymenalia* (Coleoptera: Tenebrionidae: Alleculinae) from the Yaeyama Islands, Japan with Notes of Japanese species

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Abstract A new tenebrionid beetle of the genus *Hymenalia* is described under the name of *H. sasajii* sp. nov. from Ishigaki-jima of the Yaeyame Islands, Southwest Japan. Taxonomy and distribution on the other Japanese species are noted.

Until now, the genus *Hymenalia* has been commonly known from the Japan proper, but have not been recorded from the Ryukyu Archipelago, Southwest Japan. Recently, I collected some specimens of this genus on Ishigaki-jima of the Yaeyama Islands, Ryukyu Archipelago, and as a result of careful examination, I have come to realize that the specimens from Ishigaki-jima are markedly different from those of the mainland of Japan and concluded to be a new species.

In this paper, I describe it as a new species under the name *Hymenalia sasajii*. Additionally, some notes on the taxonomy and distribution of very similar known species, *H. rufipennis* (MARSEUL) and *H. unicolor* NAKANE are also provided.

Before going further, I wish to express my deep gratitude to Professor Hiroyuki SASAJI, Fukui for his continuous advice and encouragement, still more for critically reading the manuscript of this paper. Hearty thanks are also due to Messrs. Nobuyuki NARUKAWA (Mie) and Masataka YOSHIDA (Tokushima) for their kind help in offering materials.

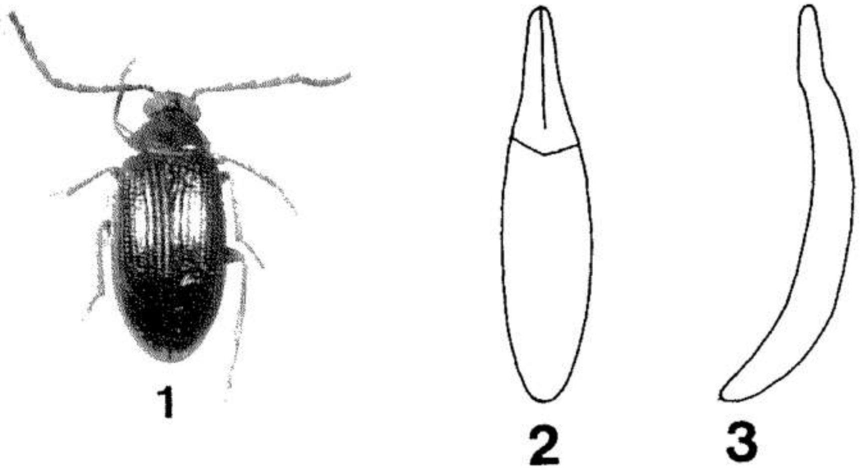
Hymenalia sasajii M. SAITÔ sp. nov.

(Japanese name: Yaeyama-tuyabane-kuchikimushi)

(Figs. 1–2)

Male. Body oblong oval, about 2.4 times as long as wide, dorsum weakly convex. Dorsal surface very sparsely covered with minute pale hairs, underside with somewhat close short pale hairs on metasternum and abdominal sternites, legs with close short pale hairs, and antennae with mixed blackish hairs. Body light reddish brown and shining, head rather dark in color.

Head globular with well developed eyes; frontal disc coarsely and sparsely punctate; frons narrow, about 0.2 times the width of an eye diameter; frontoclypeal furrow distinct, widely arcuate. Eyes large, hemispherical, concave at a small antennal insertion. Clypeus transverse, about 2.9 times as wide as long. Antennae filiform, reaching basal 2/3 of elytra, ratio of the length of each segment from base to apex: 0.44, 0.25, 0.32, 0.90, 0.96, 1.00, 1.01, 1.05, 1.01,



Figs. 1–3. *Hymenalia sasajii* M. SAITÔ, sp. nov. 1, male in dorsal view; figs. 2-3. male aedeagus: 2, dorsal view; 3, lateral view.

1.02, 1.05. Terminal segment of maxillary palpus cultrate with a rounded tip.

Pronotum subquadrate, about 1.7 times as wide as long, widest at base; apex slightly arcuate, distinctly marginate; sides strongly arcuate to the front corners in anterior half, sub-parallel in posterior half, distinctly marginate; base almost straight, widely produced posteriorly at the center, distinctly marginate; front corners widely and strongly rounded; hind corners rectangular. Disc somewhat sparsely and roughly punctate, very weakly depressed at the inside of hind angles. Scutellum triangular, both sides dully angled.

Elytra oblong oval, about 1.7 times as long as wide, widest at middle; humeri rounded; lateral margins weakly arcuate; elytral disc with 9 rows of large and strong punctures, and weakly striate; intervals very weakly convex, each with an irregular row of indistinct punctures.

Metasternum and abdominal sternites somewhat closely punctate, punctures on metasternum larger and clearer than those on abdominal sternites.

Aedeagus as shown in Figs. 2 and 3, small as compared with body size, about 0.3 times the length of elytra.

Female. Similar to male, but the body is larger and stouter, about 2.2–2.3 times as long as wide; antennae not reaching to the middle of elytra.

Length : ♂, 4.2–4.5 mm (4.3 mm in the holotype) ; ♀, 4.5–5.1 mm.

Type series. Holotype: ♂, Mt. Omoto-dake, Ishigaki Is, Okinawa Pref., Japan, 11. III. 2000, M. SAITÔ leg. Paratypes : 4♂♂, 9♀♀, same data as holotype.

The holotype is preserved in the collection of the Osaka Museum of Natural History, Osaka.

Distribution. Ishigaki Is. , Yaeyama Group, the Ryukyu, Japan.

The present new species is very similar to the other members of the genus *Hymenalia* from Japan, but is characteristic in the following features: the body is smaller, slenderer and paler in color; the punctures in the elytral striae are larger, stronger, and deeper than the other species; and the aedeagus is small as compared with body like *H. rufipennis*, but more thinner at the tip.

The specific name is dedicate to Prof. Hiroyuki SASAJI in memory of his retirement from

Fukui University and contribution to the Coleopterology as the president of the Japan Coleopterological Society.

Notes on the other Japanese Species of the Genus *Hynenalia*

In 1876, MARSEUL described a species of heteromera under the name *Cistela rufipennis* from Nagasaki and Hyogo, Japan, and it had been only a known species of the genus *Hymenalia* in Japan for a long time until NAKANE described the second species under the name *H. unicolor* from Nagano and Niigata, central Honshû of Japan in 1963.

The NAKANE's second species is very similar to *H. rufipennis*, and it was distinguished by the aedeagus and condition of punctures. On the other hand, NIKITSKY (1992) compared the pronotum and clypeus. In the course of this study, I cannot find out clear difference between *H. rufipennis* and *H. unicolor* except the larger aedeagus, antennae with fourth to tenth each segments urgently extended at the tip in *H. unicolor* (especially not extended at the tip in *H. rufipennis*). As NAKANE (1991) stated, their coloration is not so different as imaged by specific names, *H. rufipennis* and *unicolor*, because of variation in *H. rufipennis*, and inadequate for separating them.

It is not clear in their distributions, but *H. unicolor* is seemed to be distributed in the Northeast Japan from the Kinki district of Honshû, and *H. rufipennis* is in the southwest Japan from the Chûbu districts. Their range are overlapping in the Kinki and Chûbu district to cite an example of Yashagaike, Fnkui Pref. in my collection.

As to the third species described by NAKANE (1991) under the name *H. asahiensis* from Mts. Asahi, Niigata Pref. of Honshu, I have no chance to examine it.

Additional Distribution Data of *H. rufipennis* (MARSEUL)

Specimens examined: 1♂, Uchiyama, Tsushima Is, Nagasaki Pref. , 21. VI. 1991, N. OKIMOTO leg. ; 1♂, Mt. Ariake, Tsushima Is. (alt. 460 m) , Nagasaki Pref. , 24. VII. 1992, M. YOSHIDA leg. ; 1♂, Mt. Yuwan, Amami-Ôshima, Kagoshima Pref. , 21. VII. 1997, M. YOSHIDA leg.

The specimens from Mt. Ariake of Tsushima are of blackish type (*obscurissima*-form) in the whole body. The one from Mt. Yuwan of Amami-Oshima is the new record from the Ryûkyû Archipelago, Southwest Japan.

要約

斎藤昌弘：八重山からツヤバネクチキムシ属（ゴミムシダマシ科ークチキムシ亜科）の1新種と日本産種について．―― 従来，琉球から記録のなかったツヤバネクチキムシ属 *Himenalia* の１新種を八重山からヤエヤマツヤバネクチキムシ *H. sasajii* sp. nov. として記載した．種名はこのたび，福井大学を退官され，一方，日本甲虫学会の会長を務められる事になった佐々治寛之博士に献名した．本属はこれまでに日本からは３種が知られるが，アカバネツヤクチキムシ *H. rufipennis* (MARSEUL) とクロッヤバネクチキムシ *H. unicolor* NAKANE は交尾器以外は極めて類似しており，特に色彩では区別出来ない，クロツヤバネクチキムシは近畿地方から北東日本に，アカバネツヤクチキムシは中部地方から南西日本に分布しているが，近畿及び中部地

方では混棲している，最近記載されたニセツヤバネヒメクチキムシ *H. asahienis* NAKANE については筆者は未見である．なお，奄美大島からアカバネツヤクチキムシを記録したが，これは琉球列島から最初のものである．

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A New Genus of Valdivian Scirtidae (Coleoptera) with Comments on Scirtoidea and the Beetle Suborders

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Abstract *Stenocyphon* and *S. sasajii*, gen. et sp. nov., are described from the Valdivian region of Chile. Comments are made on the placement of the genus, which is considered to be basal within Scirtidae, and the relevance of certain scirtoid features to the problem of subordinal relationships in beetles.

Introduction

The Scirtidae (= Helodidae and Cyphonidae) is probably one of the least understood families of Coleoptera. Although most of the Holarctic species have been assigned to genera, as have a portion of the New Zealand and Australian species treated by SHARP (1878), BROUN (1880, 1893) and ARMSTRONG (1953), many Notogean species are either unnamed or incorrectly placed, and a number of superspecific taxa remain to be described from these areas. The works of NYHOLM (1969, 1972) on the scirtid aedeagus and HANNAPPEL and PAULUS (1987) on larval morphology have provided a solid foundation for understanding two complex and highly variable character systems, but both are based primarily on Palaearctic genera, and larval descriptions of Australian and New Zealand taxa by the HANNAPPEL and PAULUS (1991) are based on material not associated with adults. KLAUSNITZER (1974) has employed both larval and adult characters in his phylogenetic analyses of Palaearctic Scirtidae, but similar studies are unavailable for the much larger and diverse fauna inhabiting the Southern Hemisphere.

Given the poor state of knowledge of the Notogean Scirtidae, it may seem premature to describe yet another monotypic genus from the region. However, the unusual taxon described below differs in many respects from all other members of the family, and at least some of its unique features may be primitive for the group. The generic description will be used as a basis for discussing, not only its placement within Scirtidae, but also the limits of the family and related Scirtoidea, and the position of scirtoids among the basal coleopteran lineages.

In the descriptions and discussions below the term "protrochantin" has been used to refer to the external, more or less sclerotized portion of the polyphagan pleurotrochantin. According to SNODGRASS (1935), trochantin is defined as "the precoxal sclerite of a thoracic pleuron derived from the anterior part of the primitive coxopleurite; usually articulated at its ventral end to the anterior margin of the coxa...". In Polyphaga, as in Myxophaga, the primitive beetle trochantin has fused with the propleuron; however since there is rarely, if ever, any indication of where this fusion has taken place, pleurotrochantin would be a more appropriate term for the entire structure as well as any exposed portion. However, "trochantin' has been used here for convenience. The term "endopleuron" has been used when referring only to the internal, more lightly sclerotized portion of the propleuron.

The terms "mesoventrite" and "metaventrite" were proposed by LAWRENCE (1999) to replace "mesosternum" and "metasternum", respectively, as used by most coleopterists. The latter two terms have been misapplied to regions consisting of paired subcoxal elements (preepisterna) combined with paired katepisterna; the true sternal elements of the meso- and metathoraces have been invaginated along the midline forming endosternites, and the line of invagination is often indicated by the discrimen, usually referred to as a median longitudinal "suture". These terms are also discussed by BEUTEL and HAAS (2000) and LAWRENCE *et al.* (1999). Wing vein nomenclature follows that of KUKALOVÁ-PECK and LAWRENCE (1993).

The following abbreviations were used for ratios: BL = body length (without head), PL = median length of pronotum; PW = greatest pronotal width; EL = length of elytra along suture, EW = greatest width of elytra.

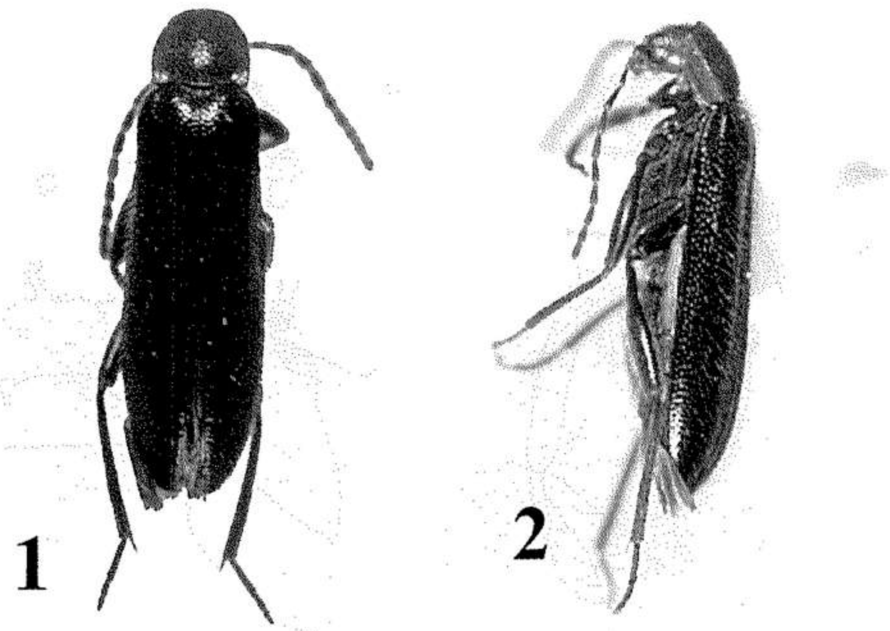
Abbreviations used for specimen depositories: AA (Albert ALLEN Collection, Boise, Idaho, U.S.A.); ANIC (Australian National Insect Collection, CSIRO Entomology, Canberra, Australia); CMN (Canadian Museum of Nature, Ottawa, Canada); FMNH (Field Museum of Natural History, Chicago, Illinois, U.S.A.); MHNS (Museum de Historia Natural, Santiago, Chile); MSU (Montana State University, Bozeman, Montana, U.S.A.).

Stenocyphon LAWRENCE, gen. n.

Diagnosis. Stenocyphon differs from all other scirtid genera examined in having bidentate mandibles with well-developed molae, lacinia with apical hooks, a broadly exposed trochantin, distinctive aedeagus and blade-like ovipositor without styli, and lacking the paired tibial carinae found in almost all other Scirtidae. The very long and narrow body form occurs only in *Cyphotelus*, the impressed frontoclypeal suture only in *Microcara*, the contiguous mesocoxal cavities in *Sarabandus*, *Elodes* and *Flavohelodes*, the reduced metacoxal plates in *Cyphotelus*, *Scirtes* and *Ora*, and the highly unequal metatibial spurs in *Scirtes* and *Ora*.

Description. Body (Figs. 1–2) elongate and narrow. Head slightly longer than wide, strongly declined and more or less concealed from above by pronotum; eyes moderately large, broadly oval, strongly protuberant, finely facetted; sides of head behind eyes very slightly convergent to base; transverse occipital carina present, continued ventrally on each side as strong subgenal ridges; paired, posteriorly curved, supra-antennal carinae joined mesally to an anteriorly curved frontal ridge, the frons anterior to this steeply sloping and almost vertical; paired antennal fossae lying below carinae and extending laterally to edge of eye and ventrally for a short distance but not beyond middle of eye; antennal insertions moderately large and partly visible from above. Frontoclypeal suture moderately well impressed, slightly curved, with distinct tentorial pits at either end; clypeus strongly transverse, the sides subparallel. Ventral portion of head behind occipital carina and between subgenal carinae flat to somewhat concave, except for gular area, which is slightly convex; corporotentorial bridge very broad. Antennae long and filiform, extending about as far as middle of elytra when head is declined in resting position; antennomere 1 shortest and broadest, all others longer and more elongate.

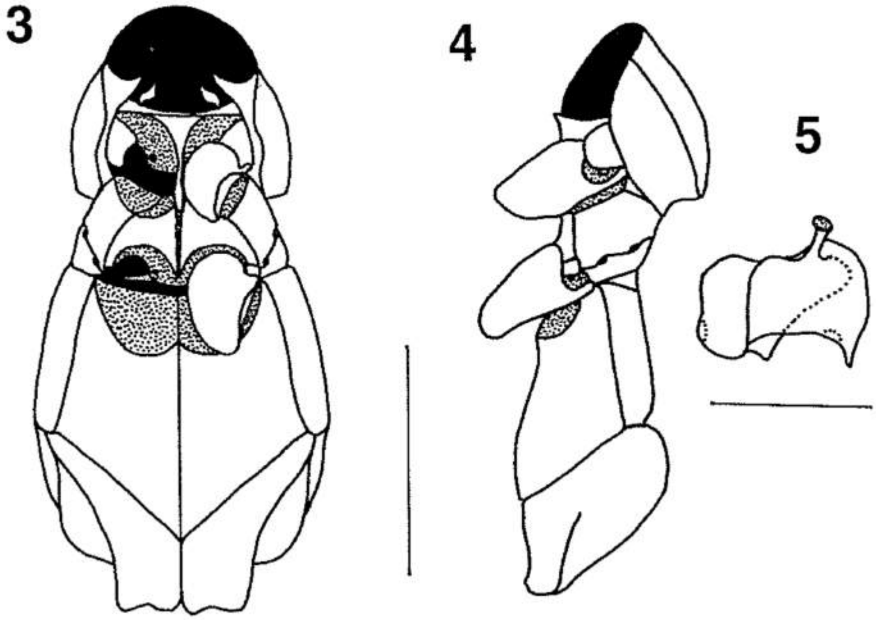
Labrum completely exposed, slightly transverse, anterior edge truncate, anterior angles



Figs. 1–2. Habitus of *Stenocyphon sasajii* LAWRENCE; 1, dorsal view; 2, lateral view.

broadly rounded. Mandibles about one and a half times as long as wide at base, moderately strongly and abruptly curved towards apex and sharply bidentate; basal half of outer edge with sharp dorsal carina dividing exposed surface from that concealed beneath clypeus and labrum; molae well-developed, asymmetrical, left one larger, concave, with blunt tooth at apical end, right one smaller, convex; surfaces of both very finely tuberculate or papillate. Prostheca well-developed, consisting of membrane lined with long hairs. Maxillae with galea moderately broad, expanded apically and densely clothed with hairs; lacinia with inner edge lined with long setae and apex bearing hook-like, tridentate process; apical palpomere more or less subulate or slightly expanded apically, with obliquely truncate apex. Labium with mentum slightly transverse, sides slightly converging towards apex; ligula broad and apically expanded, truncate at apex, with internal longitudinal, basally forked strut; apical palpomere subulate, with obliquely truncate apex.

Prothorax about almost as long as wide, widest at basal third; sides slightly curved posteriorly, more strongly so anteriorly where they join strongly rounded anterior edge; anterior angles absent; posterior angles more or less right; lateral carinae complete but not margined; base slightly bisinuate with fine marginal bead; disc very slightly convex at middle and with paired shallow posterolateral impressions; each hypomeron sharply bent near ventral edge, so that a pair of ventral hypomeral ridges are formed which join anterior edge of pronotum. Prosternum (Fig. 3) highly reduced anteriorly, consisting of small, triangular area in front of intercoxal process, which is long and very narrow, extending well behind coxae but not ventrally between them, and pair of very narrow strips of cuticle extending in front of coxal cavities. Propleuron (Figs. 4–5) with more or less quadrate, well sclerotized, exposed portion ("trochantin") forming



Figs. 3–5. *Stenocyphon sasajii* LAWRENCE; 3–4, Prothorax and pterothorax; 3, ventral view; 4, lateral view (line = 1 mm); 5, Protrochantinopleuron in lateral view (line = 0.4 mm).

part of lateral wall and broadly attached to endopleuron, which is slightly expanded apically with a narrow anterior projection. Procoxae more or less cylindrical and strongly projecting, with longitudinal carina at apical half of lateral edge. Procoxal cavities very broadly open internally and externally, with no trace of postcoxal, notal projections.

Scutellum subtriangular, but with sides somewhat curved and apex somewhat rounded or angulate, rather than acute; anterior edge abruptly raised, straight, simple. Elytra elongate, only slightly wider at base than prothorax; humeri well-developed but not carinate; apices somewhat rounded; epipleura narrow and extending almost to apex; punctation confused.

Mesoventrite (Fig. 3) short; sides strongly oblique; anterior edge with pair of strongly elevated coxal rests; discrimen more or less complete, anterior portion widened forming narrow cavity for reception of prosternal process; mesoventral process short and acute not extending to metaventrite; mesepisternum sharply elevated anteriorly to form procoxal rest; mesepimeron much smaller, separated by groove containing two foveae; mesocoxal cavities broadly confluent and closed laterally by both mesepisternum and mesepimeron; internal meso-metathoracic joint membranous; mesocoxae conical and projecting; mesotrochantin moderately well-developed and exposed, subquadrate.

Metaventrite (Fig. 4) moderately long and strongly convex; discrimen complete; metepisternum subrectangular, about 4 times as long as wide; metepimeron not visible. Metacoxae large, strongly oblique, extending laterally to elytral epipleura; metacoxal plate well developed only at mesal third, almost absent laterally. Metendosternite with long stalk, moderately long arms, well-developed ventrolateral processes, long anterior process and approximate anterior

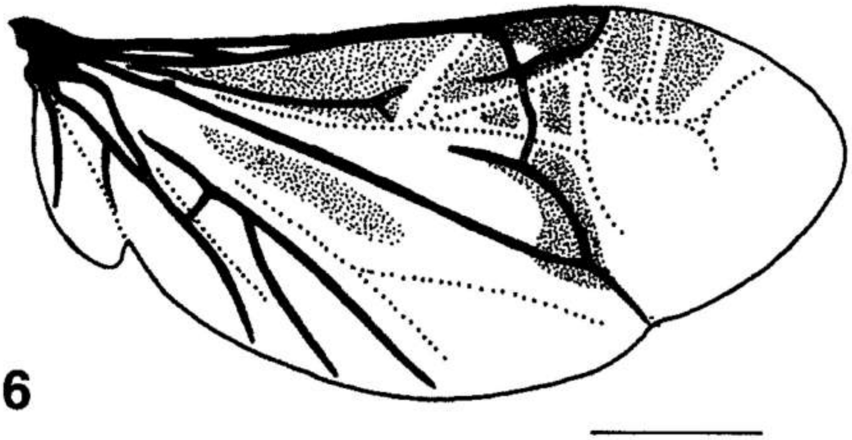


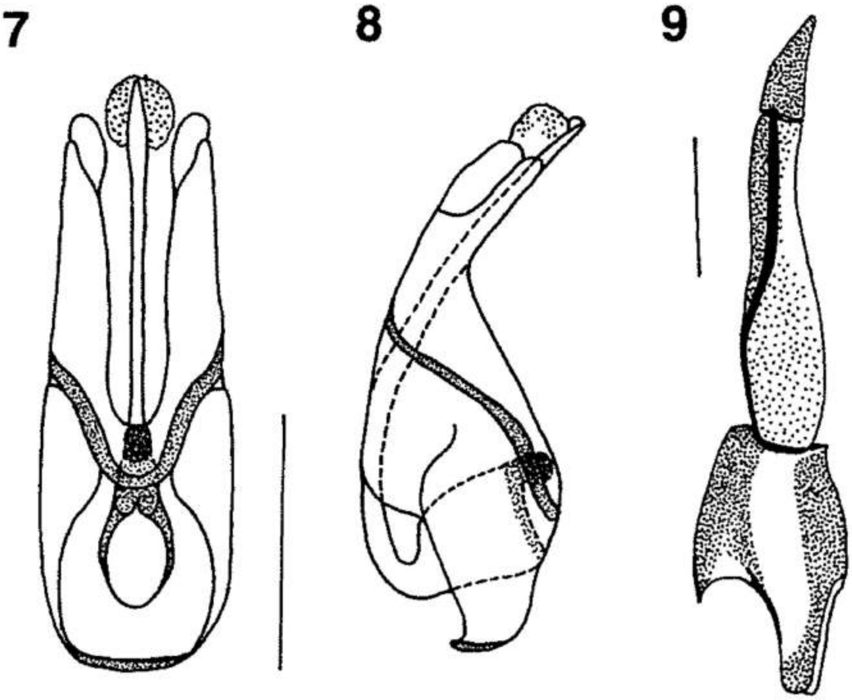
Fig. 6. Hind wing of *Stenocyphon sasajii* LAWRENCE (line = 1 mm).

tendons.

Hind wing (Fig. 6) slightly more than twice as long as wide; radial cell about 1.5 times as long as wide; basal portion of RP weakly sclerotized and forked apically forming base of r3; apical portion of r3 moderately long, well sclerotized and obliquely longitudinal; cross-vein r4 long, complete but lightly sclerotized where crossed by 2 folds; 4 free veins in medial field; MP_{3+4} joined by cross-vein to CuP + AA_3; wedge cell absent; AA_4 meeting anal fold; anal lobe well developed; several pigmented areas located as follows: radial field proximad of radial cell, anterior portion of radial cell (pterostigma), two patches in apical field delimiting transverse folds, vicinity of r4, radio-medial loop and medial field.

Legs moderately long and slender; trochanter moderately long; trochanterofemoral joint strongly oblique but without contact between femur and coxa; femora and tibiae subequal in length, the former slightly enlarged at middle, the latter slender and only barely expanded apically; tibial surfaces longitudinally rugose but without longitudinal carinae or spines; tibial spurs well-developed, moderately long, pubescent, those on fore and mid legs subequal in length, those on hind legs unequal, one being more than 1.5 times as long as the other; tarsus more than half as long as tibia, tasomere 1 as long as 2–4 combined, 2 to 4 gradually decreasing in length, 4 lobed below. 5 as long as 3 and 4 taken together; claws simple; empodium absent.

Abdomen almost twice as long as wide, moderately convex; ventrites 1–4 more or less equal in length, 5 slightly longer; 1 and 2 connate; laterosternites sharply delimited, narrow, that on segment 7 (ventrite 5) disappearing before apex. Tergites 1–8 moderately well sclerotized; spiracles located in pleural membrane, absent on segment 8; tergite 8 in male narrowly truncate apically, with pair of diverging basal struts; sternite 8 lightly sclerotized apically on each side but not in middle, and basally around edge of narrowly rounded anterior plate (thus forming a U). Tergite 9 in male narrowly truncate apically, with paired basal struts; tergite 10 not evident (completely fused with 9); sternite 9 with a moderately lightly sclerotized narrow posterior



Figs. 7–9. *Stenocyphon sasajii* LAWRENCE; 7–8, Aedeagus; 7, dorsal view; 8, lateral view (line = 0.5 mm.); 9, Ovipositor in lateral view (line = 0.5 mm).

process, rounded at apex, and an anterior plate sclerotized around edge and narrowed to form a short, truncate anterior strut.

Aedeagus (Figs. 7–8) laterally compressed; phallobase consisting of a pair of broad lateral sclerites joined ventrally by a narrow sclerotized bridge and partly fused apically to the parameres, which are broad at base, abruptly narrowed and dorsally curved towards apex, where they are flattened, lightly sclerotized and setose (not shown in figures) with slightly emarginate apex; bases of parameres joined dorsally by narrow, heavily sclerotized, broadly curved bridge which is closely associated with base of penis; penis with broad, vertically oriented, basal plate bearing a heavily sclerotized knob which articulates with dorsal bridge and narrow, subcylindrical apical portion, which arises from the ventral surface of plate and then abruptly curves dorsally; apex of penis slightly narrowed, but usually with a bulbous, membranous, spiculate endophallus protruding above the genital opening.

Ovipositor (Fig. 9) about as long as last two ventrites combined and 4 times as long as wide, widest at basal third; paraprocts fused with proctiger to form convex dorsal sheath, which is slightly emarginate at base, broadly rounded laterally with longitudinaly sclerotized baccculi, narrowed anteriorly, 3 times as long as coxites, which are fused into single, laterally compressed, sclerotized blade; styli absent. Internal tract with vulva gradually enlarged anteriorly, forming a bursa, which is sclerotized at anterior end.

Type species: *S. sasajii* LAWRENCE

Distribution. Central Chile.

Biology. Most specimens have been collected in flight intercept traps. An unusual larval biology is suggested by the presence of a blade-like ovipositor, unknown in other Scirtidae. A similar type of blade-like ovipositor found in some Ptilodactylidae (especially Cladotominae) appears to be associated with the occurrence of larvae in sand or gravel bordering streams.

Comments. In addition to the species described below, a second closely related form has been seen from Tasmania. This species, which is known from two females only, has most of the features of *Stenocyphon*; however, the extruded ovipositor on one of the specimens is of a more typical scirtid type, with apically articulated styli. For this reason, it has not been included in the genus, and its description must await the discovery of male specimens.

Stenocyphon sasajii LAWRENCE, sp. n.

With the characters of the genus. Ratios: BL/EW = 3.75–4.35, PL/PW = 0.83–1.00, EL/EW = 3.05–3.6, EL/PL = 4.3–4.8. Head, prothorax and usually antennomeres 1–3 reddish-orange; scutellum, elytra, pterothorax, abdomen, and usually legs and antennomeres 4–11 black; mouthparts usually yellow or yellowish-brown; in some specimens most antennomeres, mesoventrite, mesopleura, all coxae, trochanters, and basal portions of femora may also be reddish-orange or yellowish-red. Most body surfaces clothed with moderately long, suberect, yellow hairs. Ratio of antennal lengths: 1.0: 1.15: 1.29: 2.21: 1.71: 1.71: 1.57: 1.43: 1.29: 1.29: 1.43. Antennomere length/width ratios: 1.84, 2.67, 4.1, 5.17, 4.0, 4.0, 3.67, 3,33, 2.81, 2.81, 3.33. Head and pronotal punctation moderately fine and dense, punctures along midline of pronotum somewhat finer and vertically oriented, without margins, those on either side of midline facing laterally, with a margin on the mesal edge, giving a spiculate appearance; setae on each side of midline subdecumbent and laterally inclined. Elytral punctation coarser and denser than on pronotum; setae more or less uniform and posteriorly inclined.

Length 4.5–6.0 mm.

Holotype, ♀, Chile: Cautin Prov.: Bellavista, n. shore Lago Villarica, 310 m, Site 655, 15-30. XII. 1982, Valdivian rainforest, A. NEWTON, M. THAYER (MHNS). Paratypes: CHILE: Cautin Prov.: 1♀, same data as holotype (FMNH); Llanquihhue Prov.: 1♂, 7♀♀, Lago Chapo, 34 km E Pto. Montt, 300m, 24. XII. 1984–2. II. 1985, 2nd growth Nothofagus, S. & J. PECK (ANIC, CMN); Malleco Prov.: 1♀, Cabreria, I. 1977, L. E. PENA (FMNH); Nuble Prov.: 1♀, Cord. Chillan, Pie Narchant, 15. I. 1978, Vidal-TARINA (AA); 1♂, 1♀, Las Trancas, 19.5 km ESE Recinto, 1250 m, Site 647, 10. XII. 1982–1. III. 1983, Nothofagus forest, A. NEWTON, M. THAYER (ANIC); 1♀, La Tranca [sic], 15. XII. 1983, L. PEÑA (MSU); Talca Prov.: 1♀, Alto Vilches, 1100 m, 10–12. XII. 1976, H. F. HOWDEN (ANIC).

Comments. This species is named in honor of Dr. Hiroyuki SASAJI in celebration of his retirement and in recognition of his many excellent contributions to the study of Coleoptera.

Discussion

Placement of *Stenocyphon*

Stenocyphon appears to belong to the family Scirtidae, in spite of its unusual, elongate form and the presence of a suite of attributes not found in other members of the family. Some of the more typical scirtid features include the strongly declined head, sharp subgenal ridges, relatively small prothorax without a basal interlocking mechanism, highly reduced prosternum, large, projecting procoxae, broadly open mesocoxal cavities, large, mesally excavate metacoxae extending laterally to meet elytral epipleura, metendosternite with an anterior process, approximate anterior tendons, relatively long arms, no laminae and a pair of ventrolateral processes, free third ventrite (not in *Amplectopus*), absence of the 8th abdominal spiracles (also in *Declinia*), and fusion of the 9th and 10th tergites. The hind wing venation is more or less typical for the group, with a large, triangular, pigmented radial cell, large anal lobe and reduced venation in the medial field; the slight elongatation of the radial cell and more longitudinal orientation of radial cross-vein (r3), are correlated with a lengthening of the body, as they are in several elateriform families (e.g. Callirhipidae, Eulichadidae, Elateridae) The confluence of AA_{3+4} with the anal fold distinguishes scirtid wings from those of Eucinetidae but not Decliniidae.

Among those features which appear to be unique or atypical in *Stenocyphon*, the presence of a frontoclypeal suture occurs in Decliniidae, basal Clambidae and Eucinetidae, and in the scirtid genus *Microcara*. Bidentate mandibles have not been seen in any other scirtid, but also occur in some *Eucinetus*; they could be autapomorphic in *Stenocyphon*. A well-developed mandibular mola and terminal spines or hooks on the lacinia are also unique in Scirtidae, although reduced molae may be found in the Australian genera *Macrohelodes* and *Pseudomicrocara*. Since both of these structures are also found in Decliniidae, Clambidae, basal Eucinetidae, as well as Derodontidae and various basal Staphyliniformia, they are probably plesiomorphic for Polyphaga and possibly for the order as a whole.

The large, exposed, subquadrate trochantin, broadly attached to the endopleuron, is also unique in Scirtidae; however the condition in *Cyphotelus* from New Zealand appears to be more or less intermediate between that in *Stenocyphon* and that in typical scirtids, where the trochantin is elongate and slender, narrowly attached to the endopleuron, and often concealed by the retraction of the head against the procoxae. Among the scirtoids, *Declinia* has a similarly exposed trochantin, and it may represent a basal condition in the superfamily.

The mesoventrite in *Stenocyphon* has a complete discrimen dividing the sclerite at midline; this basal coleopteran feature occurs in several genera, including *Macrodascillus*, *Macrocyphon*, *Heterocyphon*, *Veronatus*, *Atopida*, *Byrrhopsis*, *Scirtes* and *Ora*; however it has been reduced or entirely lost in many scirtids, including the New Zealand *Cyphotelus* and most of the Northern Hemisphere groups. The contiguous mesocoxal cavities in *Stenocyphon*, occur also in *Elodes*, *Flavohelodes* and *Sarabandus*, and only in Clambinae among the other scirtoids. The reduction of the metacoxal plates occurs also in *Cyphotelus*, *Scirtes* and *Ora*; in the last two genera this is associated with the saltatorial modifications of the hind legs.

The presence of paired longitudinal carinae on the tibiae appears to be almost universal in Scirtidae; in *Amplectopus* there is a single carinae only. The absence of these carina in *Stenocyphon* may well be primitive, since they do not occur in other scirtoids. The highly unequal lengths of the metatibial spurs, however, is probably an autapomorphic feature, which has developed independently in *Scirtes* and *Ora*.

The genitalia of both male and female are unique in Scirtidae. In the case of the aedeagus, the presence of a phallobase is probably plesiomorphic, well-developed in all other Scirtoidea and represented in some scirtid genera (*Prionocyphon*, *Mesocyphon*, *Macrohelodes*) by two lateral sclerites connected by membrane (Basalsklerite of NYHOLM, 1972). In *Stenocyphon* the lateral portions of this basal sclerite are fairly extensive and they are joined basally by a slender sclerotized ventral bridge. The dorsal connection between an expanded penile base and the bridge joining the bases of the parameres is somewhat similar to that occurring in *Declinia versicolor* SAKAI and SATÔ (1996). The blade-like ovipositor, on the other hand, has no counterpart in other Scirtoidea and is almost certainly autapomorphic.

If *Stenocyphon* is to be included in Scirtidae, it almost certainly occupies a basal position within the family. However, it would be premature to propose a family-group name for its inclusion until a more thorough study of scirtid genera is undertaken. Another equally likely candidate for subfamily or tribal status is the New Zealand genus *Amplectopus*, which was placed in Chelonariidae by KASAP and CROWSON (1975). This has been discussed by LAWRENCE and NEWTON (1995) and LAWRENCE *et al.* (1995).

The Superfamily Scirtoidea and Relationships of the Beetle Suborders

CROWSON (1960) hypothesized a Triassic divergence of basal Polyphaga into staphyliniform, eucinetoid and dermestoid stocks. The second of these included a basal group, the Eucinetoidea (now Scirtoidea), from which the Dascilloidea, Scarabaeoidea, and Elateriformia may have evolved. LAWRENCE and NEWTON (1982) followed this scheme, referring to the three lineages as staphyliniform, elateriform and cucujiform. On the basis of wing venation and folding, KUKALOVÁ-PECK and LAWRENCE (1993) divided Polyphaga into two groups: the hydrophiloid lineage with Hydrophiloidea, Staphylinoidea and Scarabaeoidea, and the eucinetoid lineage with the remaining beetle superfamilies. The inclusion of scarabaeoids in the staphyliniform rather than elateriform lineage has been followed by several recent workers (SCHOLTZ *et al.*, 1994, BROWNE and SCHOLTZ 1995, HANSEN 1997). LAWRENCE and NEWTON (1995) and LAWRENCE *et al.* (1995) redefined Elateriformia to include Scirtoidea, Dascilloidea, Buprestoidea, Byrrhoidea and Elateroidea.

The constitution of Scirtoidea, as defined by CROWSON (1960), has remained more or less unchallenged, except for the doubt expressed by NYHOLM (1972) based on aedeagal differences between Eucinetidae and Scirtidae, and the addition of Decliniidae (NIKITSKY *et al.* 1994, LAWRENCE *et al.*, 1995, SAKAI and SATÔ, 1996), differing from all other scirtoids in having a well developed prosternum, while resembling Scirtidae in wing characters and the loss of the 8th spiracles, and Eucinetidae in the form of the trilobed aedeagus.

There is little doubt that Scirtoidea have a large suite of plesiomorphic features which occur in none of the other polyphagan groups, with the possible exception of Derodontidae (see below). A plesiomorphic feature for Coleoptera recently pointed out by BEUTEL and HAAS (2000) is the membranous joint between the mesothorax and metathorax, which is only visible when the mesocoxae are removed from their housings. This character is claimed to occur only in Archostemata and Adephaga, but in the latter group the two body segments are secondarily joined by the interlocking of meso- and metaventrites. One of the synapomorphies uniting Myxophaga and Polyphaga is considered by these authors to be the loss of this membranous connection by a fusion within the coxal cavities (often accompanied by a meeting of the two ventrites). As can be seen in Fig. 3, a similar membranous joint occurs in *Stenocyphon*, but it is also present in other Scirtidae, Decliniidae, Eucinetidae, Clambidae and Derodontidae.

Another apparently primitive feature seen in *Stenocyphon* is the enlarged external trochantin and the broad connection between it and the fused endopleuron. A similar condition occurs in *Declinia*, in which a projecting pleural flange extends anteriorly to separate the notum and sternum. An small anterior flange also occurs in the derodontid genus *Peltastica*, but it does not extend to the anterior edge of the prothorax (HLAVAC, 1975). The propleural structure in these basal polyphagans is reminiscent of that in Myxophaga, where the true trochantin and pleuron have also fused. The condition in Myxophaga, however, is much more like that in Archostemata and Adephaga, where the largest portion of the external pleuron extends posteriorly behind the coxa, a situation never occurring in Polyphaga.

The presence of these two primitive features in basal Polyphaga suggests that there may be a direct relationship between Polyphaga and the ancestral coleopterans which does not require the interposition of Myxophaga. LAWRENCE (1999) criticized some of the data used to support the BEUTEL and HAAS (2000) subordinal cladogram: Archostemata (Adephaga (Myxophaga + Polyphaga)). The occurrence of a membranous meso-metathoracic joint in several families of basal Polyphaga eliminates another synapomorphy of Myxophaga and Polyphaga, unless one postulates a reversal in both Derodontoidea and Scirtoidea. Another "missing" piece in the subordinal puzzle is the Eastern Palaearctic genus *Sikhotealinia*, which has been described and illustrated by LAFER (1996) and placed in the Jurassic family Jurodidae by KIREJTSHUK (1999). Unfortunately, this taxon, which appears from the illustrations to have features of both Archostemata and Polyphaga, is based on a single specimen, probably male, which lacks an aedeagus.

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A New Genus and Species of the Subtribe Anisolinina from Sabah, East Malaysia (Coleoptera: Staphylinidae)

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Abstract A new genus *Pseudodysanellus* is established on *Pseudodysanellus sasajii* sp. nov. from Sabah, East Malaysia

About ten years before, I got very interesting species of Anisolinina through the kindness of my research fellow, Mr. Tateo ITO. This species is well similar in the structures of labial palpi to the genus *Dysanellus* BERNHAUER from South America. But the genus includes one species from Borneo described by BERNHAUER himself, and these Bornean species have been in my mind about its generic position. Having examined various characters on a species before me I came to the conclusion that this is not a species of true *Dysanellus* because of having the different structures in limbic conformation of pronotum, but the generic position of BERNHAUER'S species is unclear. The genus *Dysanellus* must be a member of Xanthopygini judging from limbic conformation in BERNHAUER'S original description. In this paper I am going to describe the species as *Pseudodysanellus sasajii* gen. et sp. nov. and give a differential key to these genera.

Terminology and abbreviations used herein are the same as those explained in HAYASHI, 1993.

My sincere thanks are due to Mr. Tateo ITO for his kind offer of very interesting materials and to Dr. Katsura MORIMOTO, the Emerites Professor of Kyûshû University for his kindness of critically reading of this manuscript.

Differential Diagnosis of *Dysanellus* BERNHAUER and *Pseudodysanellus* gen. nov.

1. Pronotum with superior lateral line ending at anterior angle and not linked with anterior margin; last segment of maxillary palpi short .... *Dysanellus*

— Pronotum with superior lateral line not ending at anterior angle and linked with anterior margin of pronotum; last segment of maxillary palpi very long, nearly twice as long as 3rd .... *Pseudodysanellus* gen. nov

Pseudodysanellus gen. nov.

(Figs. 1–15)

Type species: *Pseudodysanellus sasajii* sp. nov.

Body moderate in size, elongate, subfusiform, rather flattened above, weakly shiny in fore body and a little more so in hind body.

Head roundly subquadrate, small, gently convex, coarsely punctured, without microsculp-

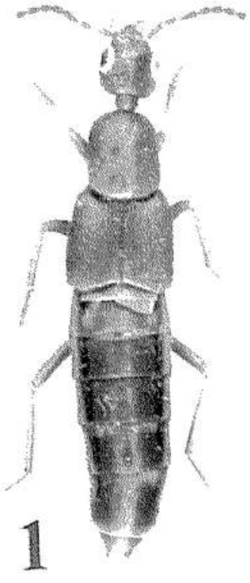


Fig. 1, *Pseudodysanellus sasajii* sp. nov., habitus.

ture and with a black spot (tentorial pit?) at each intra-posterior portion of supra-orbital macroseta and smooth in interstices; preclypeus (sensu BLACKWELDER, 1936) membranous; hind margin feebly emarginate and post genae widely rounded. Eyes large, a little longer than post genae and feebly convex. Chaetotaxy on head composed of 6 pairs of macrosetae; genal ones absent, front-marginal, supra-antennal, supra-orbital, postgenal, infraorbital and occipital ones well developed, and occipital ones located near hind margin. Antennae filiform, long; 1st segment with a long seta at about basal third. Neck rather slender, less than half as wide as head, with several coarse setiferous punctures in median part.

Genae sharply ridged at the inferior border from mandibular insertion near to inferior corner of eyes. Subgenae flattened, coarsely and sparsely punctured; infragenal line absent; subgenal macroseta well developed.

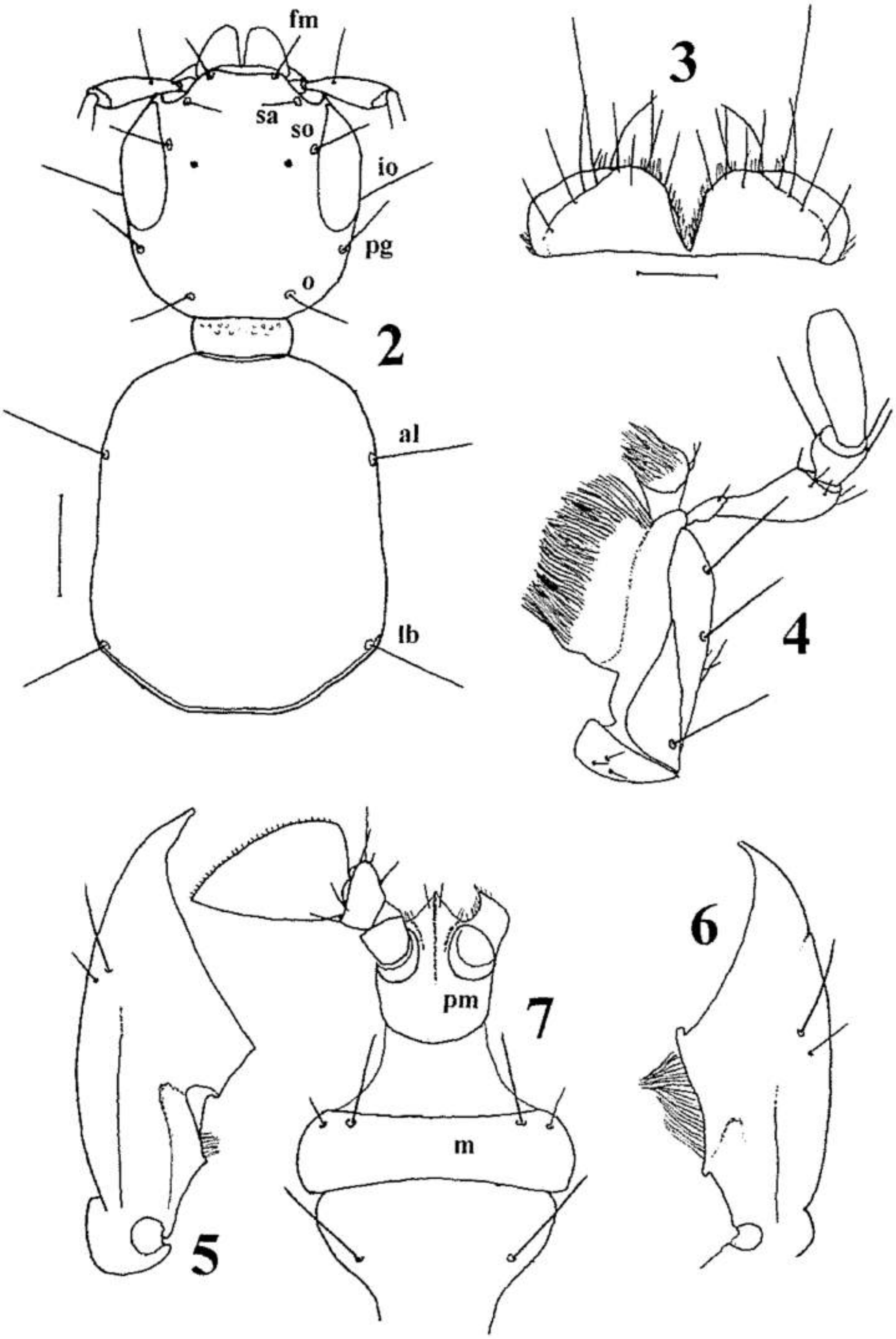
Mandibles short and wide, much shorter than head, sharply ridged dorsally in basal half, each with a long stout seta at apical third of dorsum and a wide and short subtriangular tooth, the left tooth obtusely angulate at the tip and right one bearing a small denticle at the tip.

Labrum rather short, strongly transverse, about one-sixth as long as head, deeply excised medially, nearly glabrous on dorsum except for marginal parts, which bear several long setae of various length and densely pubescent along the incision.

Galea strongly dilated apicad and densely pubescent in distal lobe; proximal sclerite obtrapezoidal, with 2 terminal setae. Lacinia rather narrow, with dense long pubescence along inner margin. Maxillary palpi (Fig. 4, in oblique view) filiform; 1st segment the shortest, feebly curved, slightly longer than wide, without any setae (at least in ventral view); 2nd much longer than 1st, strongly thickened apicad and gently curved, about twice as long as wide, much thicker and a little longer than 3rd, very sparsely pubescent in apical half and a few setae of various length near apex; 3rd thick, straight, slightly longer than wide, with several setae of various length at apex; 4th very long, nearly twice as long as 2nd, glabrous, gradually thickened apicad in male, subcylindrical, somewhat tapered apicad in female, then more narrowed in apical portion, truncate at apex, which is narrowly membranous.

Labial palpi rather short, similar in shape to those of *Oxyporus*; 1st segment short, a little shorter than long and with a very fine and short seta near base; 2nd strongly dilated apicad, strongly transverse, a little shorter and wider than 1st and with a few rather stout setae at apex; 3rd markedly securiform, thinned apicad, sparsely ciliate at apical margin, glabrous, much longer than the preceding 2 segments combined together, and apex narrowly membranous and ciliate at the margin. Ligura long, subtriangular, entirely unilobed, bearing a pair of fine setae, with a pigmented median line. Paraglossae short, reaching apex of 1st segment of labial palpi. Prementum subquadrate, nearly as long as wide and widely depressed medially.

Mentum short, widely emarginate at anterior margin and rounded at sides, with a pair of erect setae in each lateral corner, the outer seta thin and short, and inner one very long and stout. Submentum and gular plate together evenly convex; submentum glabrous except a very long



Figs. 2–7. *Pseudodysanellus sasajii* sp. nov. 2, head and pronotum, with macrosetal chaetotaxy (fm=front marginal; io=infra-orbital; o=occipital; pg=postgenal; sa=supra-antennal; so=supra-orbital); 3, labrum; 4, maxilla; 5, left mandible; 6, right mandible; 7, labium (m=mentum; pm=orementum).

seta in each side, with a few shallow pits; gular palate wide at base, about a half as wide as submentum, thence straightly narrowed posteriad and very narrow at neck constriction.

Pronotum suboblong, longer than wide, widely rounded at each angle, narrower and shorter than elytra; disc gently convex, with rather small and sparse punctures with recumbent stiff pubescence, and interstices smooth, not microsculptured; superior lateral line barely visible in the basal half in dorsal view, nearly contiguous with inferior lateral line a little behind anterior angle in short length but both line not unificated and clearly discernible respectively, thence the former line only linked with anterior margin, and the latter one ended at outer hind angle of prosternum; hypomeron wide, nearly horizontal but fully visible in lateral view; anterior margin visible in half length of pronotal width; chaetotaxy composed of two pairs of macrosetae, viz. antero-lateral macroseta and latero-basal one. Epimera (hypomeral projection) absent.

Scutellum triangular, densely asperate-punctate, the punctures convex at margins and somewhat cupped; prescutum well developed.

Elytra subquadrate, flattened, coarsely asperate-punctate with strongly recumbent pubescence; surface weakly uneven as a ripple; hind margin feebly emarginate, obtusely angulate at about lateral third; sutural space convex but not limited by line; chaetotaxy indistinct, without developed macrosetae; epipleura not bordered above.

Prosternum gently convex in middle, not ridged medially, without long paired setae; lateral border long, nearly two-thirds as long as median length, bounded with superior lateral line of pronotum at anterior angles; prosternal process acute and a little prominent at the tip. Furcasternum two-thirds as long as prosternum, sharply carinate medially in basal half.

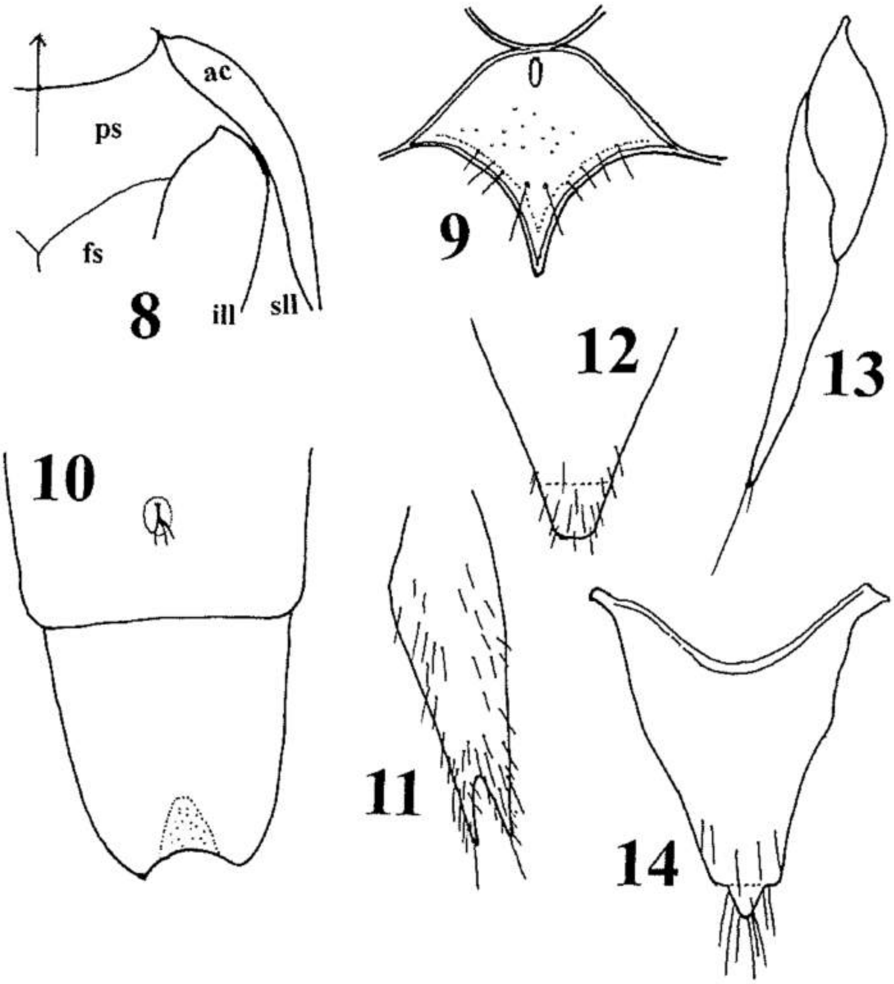
Mesosternum narrow, subpentagonal, nearly as long as wide, nearly flattened, weakly carinate medially in basal fourth, almost glabrous except hind marginal portion, which is shallowly impressed along hind margin, with fine and sparse setae; mesosternal process narrow, subacute at the tip, not long, reaching basal third of mesocoxae, which are contiguous to each other; intersternal piece narrow, deeply sunken.

Abdomen elongate, gradually narrowed posteriad, not depressed at base of each segment, finely and rather sparsely punctured, without stout setae or bristle. In male 7th sternite with a suboval smooth fovea which bears a hair bundle; 8th sternite widely emarginate at apical margin; 9th sternite narrow, subfoliaceous and deeply excised at apex; 10th tergite produced posteriad and rounded at apical margin. In female 8th sternite subtruncate at apex, very feebly rounded at apical margin; 9th tergite rather slender, with a long seta at about apical third and bears 2 very short setae at apex; 2nd gonocoxcite slender, with only a few fine inconspicuous setae; minute stylus with a long but thin seta at the tip; 10th tergite trapezoidal, narrow, truncate and with a small triangular process.

Legs slender and long; tibiae nearly straight, very sparsely and finely spinous, with short pubescence; tarsi 5-segmented, slender, nearly as long as respective tibiae; protarsi not dilated, somewhat wider in male than in female, a little narrower than apex of protibia, sparsely pubescent on dorsum, with modified pubescence on planta, and each segment nearly as long as wide; 1st segment of metatarsi as long as the following 2 segments combined together and a little longer than 5th segment; empodial setae paired, very thin and short.

Male genitalia thick, symmetrical and suboval in ventral view; dorsum of penis widely membranous in about basal two-thirds; parameres unilobed, rather short, with peg-setae on inner face.

Notes. The present genus distinctly belongs to Anisolinina in having combination of the



Figs. 8–14. *Pseudodysanellus sasajii* sp. nov. 8, prothorax, under view of left front corner (ac=anterior corner; fs=furcasternum; ill=inferior lateral line; ps=prosternum; sll=superior lateral line); 9, mesosternum; 10, 7th and 8th abdominal sternite of male; 11, male 9th abdominal sternite; 12, male 10th tergite; 13, female 2nd gonocoxcite; 14, female 10th tergite.

following features: 1. pronotum with the superior lateral line not unificated with the inferior lateral line, and the former line only is linked with anterior margin of pronotum, while the latter ends at latero-posterior angle of prosternum; 2. legs with a pair of empodial setae; 3. chaetotaxy of pronotum consists of two pairs of macrosetae, viz. antero-lateral macrosetae and latero-basal ones; 4. pronotal epimera (hypomeral projection) absent. This genus is closely related to *Pammegus* in similar structure of labial palpi and slender neck, but in the latter genus 3rd segment of the labial palpi is cupped and upper surface of fore body is much less sculptured, smooth, viz. punctures are minute and very sparse. The present genus is also well similar in the structure of labial palpi to the genus *Barygnathus* BERNHAUER from Ceylon, but in the latter genus the superior lateral line of pronotum is discernible near to anterior angle of pronotum and united with inferior lateral line of pronotum, 4th segment of maxillary palpi is much longer, about three times as long as 3rd.

BERNHAUER, 1934, described *Dysanellus elegans* (spelled as *Disanellus elegans*) from Sarawak. Judging from his original description, this species is similar in general appearance to *Pseudodysanellus sasajii* sp. nov. except the blackish colour, shagreened derm of fore body, but I cannot assert that *D. elegans* belongs to the genus *Dysanellus*.

Etymology. From the Greece, "Pseudo" (false; sham) is combined with the generic name *Dysanellus* BERNHAUER.

Pseudodysanellus sasajii sp. nov.

(Figs. 1–15)

Body elongate-subfussiform, reddish brown in fore body and dark brown in hind body; antennae with 3rd to 7th segments black and apical 4 segments white; elytra somewhat dark, with apical margin weakly yellowish; abdomen weakly iridescent, narrowly reddish brown at hind margin of each segment, with 3rd segment and paratergites a little paler, dark reddish yellow, base of 8th segment widely yellowish; 3rd tergite in lateral sides, 6th to 8th in each base covered with golden pubescence and the rest with strongly recumbent blackish pubescence; legs yellowish. Length: 14.1–14.4 mm.

Head nearly as long as wide (width/length = 27.0 : 26.0), a little narrower and much shorter than pronotum (27.0 : 32.0 & 26.0 : 39.0); upper surface weakly convex, coarsely and sparsely punctured except that frons and vertex are narrowly impunctate, the punctures umbilicate. Eyes large, not so prominent, a little longer than postgenae (13.0 : 11.0). Antennae slender, reaching at about base of pronotum; all segments longer than wide, not thickened apicad; 1st segment the longest, 2nd much shorter than 3rd, 8th to 10th segments each only slightly longer than wide, and each segment with the following relative length: 16.0 : 9.0 : 13.0 : 8.0 : 8.0 : 8.0 : 8.0 : 7.0 : 7.0 : 7.0 : 7.5.

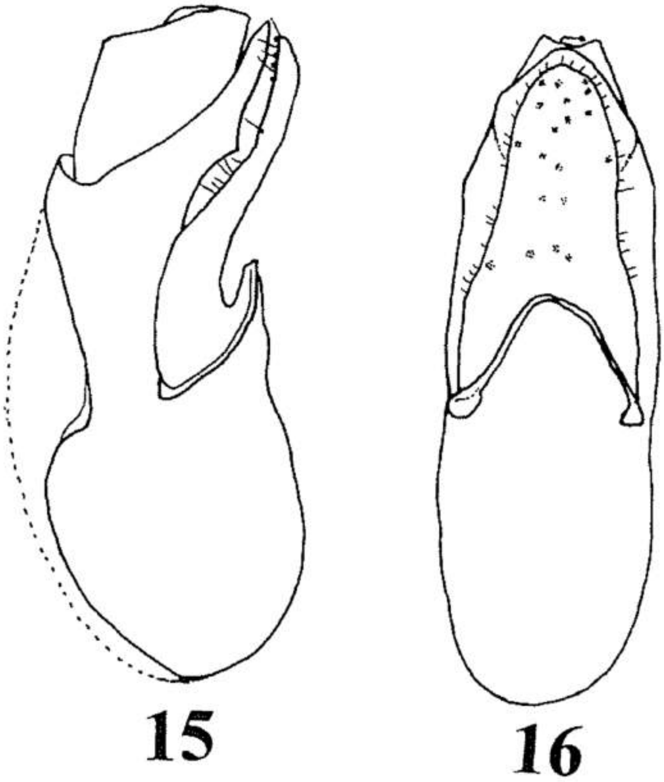
Ventral side of head flattened, sparsely and very coarsely punctured, the punctures becoming shallower anteriad and smaller laterally.

Pronotum a little longer than wide (37.0 : 32.0), much narrower and a little shorter than elytra (32.0 : 47.0 & 39.0 : 45.0), feebly emarginate at sides, straight at anterior margin and gently arcuate at basal one, slightly narrowed anteriad and widest near base; disc with punctures much smaller and denser those on head, interstices narrower than a longitudinal diameter of those on head; apical corner in ventral view wide and long.

Scutellum flat, densely asperate-punctate.

Elytra subtrapezoidal, slightly wider than long (47.0 : 45.0), feebly arcuate at sides, feebly emarginate at apical margin, lateral end of the emargination obtusely angulate, and latero-apical angles rounded at the tip; upper surface coarsely and densely punctured, the punctures a little coarser, denser and deeper than those on head; sutural space narrowly convex, finely and densely punctured.

Abdomen finely and sparsely punctured with recumbent straight pubescence, without microsculpture, the punctures much finer and denser in base of each tergite, becoming sparser posteriorly on each segment asperate on paratergites and a little larger on sternites; in male 7th sternite bearing a smooth fovea in middle, which has a bundle of hairs, 8th sternite shallowly emarginate at apical margin and triangularly depressed before the emargination; in female 10th



Figs. 15–16. *Pseudodysanellus sasajii* sp. nov. 15, male genitalia, lateral view; 16, ditto, ventral view

tergite truncate at apex and with a small triangular process at apical margin.

Male genitalia symmetrical, elongate-suboval in ventral view, thick, gently narrowed apicad and nearly straight in lateral view; penis widely and subelliptically membranous in basal two-thirds of dorsum, projecting at apical fifth of ventral side and with a pair of subquadrate plate being protrudent from apical orifice, which is large and obliquely truncate; parameres short, about a half as long as penis, subtriangular, fringed with very sparse pubescence of various length, rounded at apex in ventral view, which is reaching apex of penis, and the inner face bearing several sparse peg-setae along margins and about 10 or more ones along median line.

Holotype: ♂, Mt. Trus Madi (SW slope, 1000–1200 m), Sabah, N. Borneo, Malaysia, 16–20. IV. 1991, M. SAWAI leg. (In the collection of Osaka Museum of Natural History, Osaka). Paratype: 2♀♀, same locality of the holotype, 26–30. IV. 1991, M. SAWAI leg.

Notes. This new species is readily recognized by the combination of peculiar head and pronotum, and the somber brownish body colour.

要　約

林　靖彦：ボルネオ産 Anisolinina 亜族の一新属新種 ——— 口器の形態が一見南米産の *Dysanellus* (BERNHAUER) 属ハネカクシに非常に良く似たボルネオ産のハネカクシを検討した結果，前胸や体背面の構造の差などから別属と考えるに至ったので，新属・新種として発表した．なおボルネオからは *Dysanellus elegans* BERNHAUER が報告されているが色彩や体表の構造などから本新種と容易に区別できるが，真に同属のものかどうかは不明である．

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Notes on the Coprophagous Scarab-Beetles (Coleoptera, Scarabaeidae) from South-East Asia (III)
A New Species of the Genus *Onthophagus* from the Philippines*

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Abstract A new coprophagous scarabaeid-species is described from the Philippines under the name of *Onthophagus (Gibbonthophagus) sasajii*. This species is closely related to *Onthophagus (Gibbonthophagus) duporti* BOUCOMONT.

Onthophagus gestroi was described from Sulawesi and Sumatra by HAROLD (1877). Later, this species was recorded from Borneo, the Philippines, and small islands of the Sunda Islands (BOUCOMONT, 1914).

When we examined many specimens, which were identified as *Onthophagus gestroi* by BALTHASAR's (1963) key, from various localities, we found specimens from the Philippines are different from those of the other localities including Sulawesi and Sumatra in some external characters. In addition, this form appears to be similar to *O. duporti* BOUCOMONT. After a careful examination, we concluded that the form from the Philippines is specifically distinct from *O. gestroi* and also *O. duporti*. Thus, we herewith describe a new species of *Onthophagus* from the Philippines based on these specimens.

***Onthophagus* (*Gibbonthophagus*) *sasajii* sp. nov.**

(Figs. 1–5)

Length: 5.0–7.4 mm; width: 2.9–3.9mm. (n = 60).

Body small, oval, strongly convex; dorsal side shining, somewhat densely clothed with short yellowish-white hairs; ventral side including pygidium also shining, partly clothed with a little long yellowish hairs. Colour black to brownish-black, sometimes partly paler; head and pronotum usually brownish-black except for yellowish lateral margins of the latter, and tinged with weak greenish to cupreous lustre; elytra blackish-brown, each with two variable yellow to yellowish-brown transverse bands; the basal band extending from the 2nd to 7th interstriae, often

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constricted at the 3rd and 5th interstriae; the apical band extending from the 2nd to 8th interstriae, sometimes well developed at the 6th and 7th; the two bands frequently joined at the 6th interstria; pygidium, apical and lateral parts of abdomen, and all femora yellow to yellowish-brown; mouth parts, palpi, antennae including club-segments, and tarsi reddish-brown.

Male. Head a little produced forwards and broader than long; clypeus subtrapezoidal in outline, with anterior margin usually truncated and a little reflexed in the middle, frequently gently rounded at the apical median portion; clypeal suture often briefly carinate at the frontal section in the middle, not carinate and finely defined at the genal section; genae a little produced laterad, with genal angles rounded; frons with a pair of short subconical horns which are a little separated and joined by a fine sharp carina at base; vertex slightly and transversely depressed at the middle; surface rather densely and unevenly punctured, the punctures becoming sparser and smaller on vertex.

Pronotum rather convex, about 1.37–1.41 times as wide as long (n = 5), with a very obtuse median longitudinal impression along midline in basal half; anterior margin bisinuate and finely bordered, with median portion slightly produced forwards; lateral margins evenly rounded anteriad, weakly sinuate posteriad, finely bordered; anterior angles well protrudent, with apices subquadrate; posterior angles distinctly obtuse; basal margin widely rounded, finely but clearly bordered; disc gently declivous in anterior two-fifths, the declivity with three tubercles; an anterior tubercle placed just behind anterior margin at the middle, and a pair of posterior tubercles placed at the upper edge of the declivity and a little separated, the interspace between them shallowly and logitudinally depressed forwards; surface shining on the posterior part and slightly micro-granulose on the anterior declivity, somewhat densely and strongly punctured, with smaller punctures intermixed, the strong punctures becoming asperate or granulate anteriad.

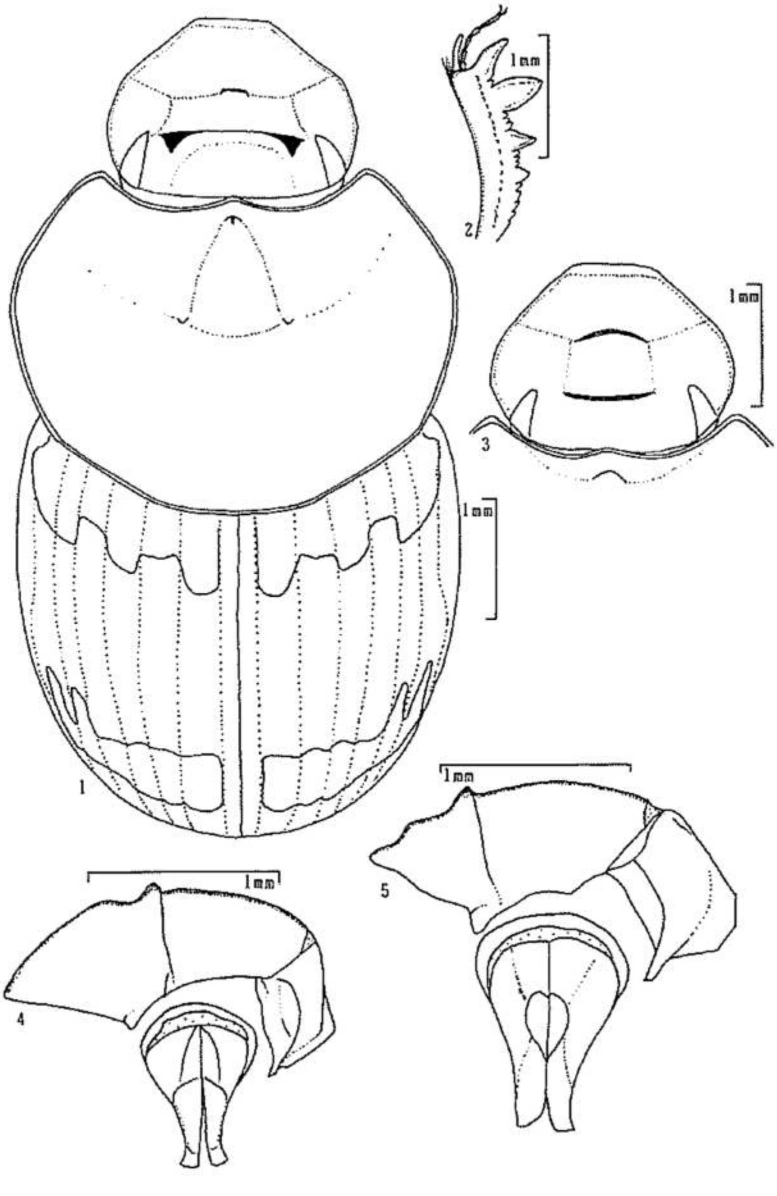
Elytra about 1.36–1.44 times as wide as long (n = 5); striae finely and shallowly impressed, with strial punctures small, shallow, and a little transverse; the 7th striae clearly curved; interstriae weakly convex, more or less shining though slightly micro-granulose, a little sparsely, finely and asperate-punctured; sutural interstriae sometimes weakly and longitudinally raised in the middle.

Pygidium slightly convex, carinate at base, strongly shining, somewhat densely and strongly punctured. Protibiae stout and broad, with four lateral teeth; the 1st tooth sharp, the 2nd the largest, the 3rd clearly smaller than the 2nd, the 4th small.

Aedeagus: phallobase relatively long, about 1.35–1.50 mm in length (n = 5); parameres about 0.70–0.75 mm in length (n = 5), with apices flattened and a little broadened in dorsal view.

Female. Head more transverse than in male; clypeus more widely subtrapezoidal in outline; clypeal suture with the frontal section strongly carinate, well raised, and weakly procurved, the clypeo-genal section only finely defined, not carinate; vertex with a slightly postcurved transverse carina, the carina more strongly raised and longer than the frontal one; surface more strongly and rugosely punctured, especially on clypeus. Pronotum less convex than in male, 1.38–1.47 times as wide as long (n = 5); disc narrowly declivous just behind anterior margin, with the median upper edge of the declivity produced forwards as a boss-like tubercle; surface more strongly and densely punctured. Elytra 1.32–1.44 times as wide as long (n = 5). Protibiae broader with stronger lateral four teeth.

Type series. Holotype: ♂, Bicol National Park, Nr. Daet, C. Luzon, Luzon Is., the Philippines, 8. VIII. 1988, D. MOHAGAN leg. Paratypes: 28♂♂, 25♀♀, the same data as the



Figs. 1–5, *Onthophagus* spp.; figs. 1–4. *Onthophagus* (*Gibbonthophagus*) *sasajii* sp. nov., 5, *Onthophagus* (*Gibbonthophagus*) *duporti* BOUCOMONT, male, 1, body, dorsal view (male); 2, right protibia, dorsal view (male); 3, head and apical part of pronotum, dorsal view (female); 4, lateral and dorsal views of male genitalia; 5, lateral and dorsal views of male genitalia.

holotype; 1♂, 2♀♀, Asin Hot Spring, Nr. Baguio, N. Luzon, Luzon Is., the Philippines, 10. V. 1978. The holotype will be deposited in the Entomological Laboratory, Kyushu University.

Further specimens examined: 1♂, 2♀♀, Mt. Kanlaon, Negros Is., the Philippines, 19. V. 1988.

Etymology. This species is named in honor of Prof. H. SASAJI, one of the dominant figures in coleopterology in Japan.

Notes. This species is closely related to *Onthophagus* (*Gibbonthophagus*) *duporti* BOUCOMONT, 1914 from India, Myanmar, and Indochina, but is easily distinguished from the latter by the following characteristics: 1) body much smaller; 2) head with each gena more strongly produced laterad, whereas in *O* (*G*). *duporti* it is clearly narrow and less produced laterad, especially in the male; 3) pronotum more strongly and more densely punctured; 4) in the male, a pair of cephalic horns placed a little behind anterior margin of eyes, whereas in *O* (*G*). *duporti*, they are placed a little before the anterior margin of eyes; 5) in the male genitalia, aedeagus clearly smaller with parameres slender near each apex in dorsal view.

要　　約

越智輝雄・近 雅博：フィリピン産のコブマルエンマコガネの一新種 —— これまでフィリピンに広く分布する *Onthophagus gestroi*とされてきた種は，今回再検討を行った結果 *Onthophagus* (*Gibbonthophagus*) *duporti* BOUCOMONTに近縁の新種であることが判明し，佐々治寛之博士に献命して，*Onthophagus* (*Gibbonthophagus*) *sasajii* と命名し新種記載を行った.

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Notes on Some Coleopteran Groups of the Himalo-Japanese Element in Northern Vietnam*

II. On the genus *Ischalia* (Anthicidae: Ischaliinae)

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Abstract Two new species of the Anthicid genus *Ischalia*, *I.* (s. str.) *sasajii* sp. nov. and *I.* (*Pseudohomalisus*) *acco* sp. nov. are described with a checklist of the genus. The discovery of the latter species from Northern Vietnam proves that the subgenus *Pseudohomalisus* is an element of Himalo–Japanese fauna.

We have fortunately obtained two species of the genus *Ischalia* which are collected by a member of faunal research for Vietnam in 1995 arranged by the National Science Museum (Nat. Hist.), Tokyo, under the leadership of Dr. S.-I. UÉNO. After careful studies of the specimens, we recognized them as new species belonging to the subgenus *Ischalia* s. str. and the subgenus *Pseudohomalisus* respectively.

They will be described in the following lines.

In addition, we will enumerate the species of the genus *Ischalia* at the end of this. As was shown in the list, the distribution pattern of the most members belonging to the subgenus *Pseudohomalisus* seems to be a group of the Himalo-Japanese Element.

The abbreviations used in the present paper are as follows: TW – transverse diameter of each eye in dorsal aspect; HW – greatest width of head including eyes; PW – greatest width of pronotum; PL – length of pronotum along median line; EW – greatest width of elytra; EL – greatest length of elytra.

All the type series are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo.

This paper is dedicated to Prof. Hiroyuki SASAJI in commemoration of his retirement from the Fukui University.

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Genus *Ischalia* PASCOE

This genus consists of 25 species in the present knowledge, though divided into two subgenera by the structure of mesepisternum. The subgenus *Ischalia* s. str. of which the mesepisterna is separated to each other contains 12 species and they are distributed over China, Southeast Asia, Sunda Islands, Philippines, and North America. The other one, *Pseudohomalisus* has contiguous mesepisterna and contains 13 species which are distributed over from Nepal to Japan and Far East Russia via Thailand, Taiwan and China.

The distribution pattern of the latter subgenus is assigned to the Himalo-Japanese Element. However, the distribution of *I.* (*P.*) *brachyptera*, *kunashirica* and *takane* extends toward the northern district of the element. It is presumed that the subgenus *Pseudohomalisus* may have differentiated from *Ischalia* at the Paleotertiary era when the climate was warmer and have spread to Far Eastern Asia. But the succeeding cold climate limited their distribution to the Himalo-Japanese belt and some of them seem to have remained as relics. It is possible to regard the distribution pattern of *Pseudohomalisus* as the West-Chinese Elements by SHIROZU (1947) in a broad sense.

Ischalia* (s. str.) *sasajii M. SATÔ et N. OHBAYASHI, sp. nov.

(Fig. 1)

Female. Body elongate and closely covered with pubescence, which is more erect and sparse on elytra than on the other parts. Color almost brownish black to dark brown, with brownish tarsi and mandibles. Lateral and posterior margins of pronotum, elytra and labrum reddish orange, but each elytron furnished with a longitudinal black stripe along the suture on basal half.

Head suboval, transversely concave behind clypeus and shallowly longitudinally so between antennal sockets, and microreticulate on the surface; clypeus distinct and its anterior margin straight, with rounded angles; eyes lateral and moderately prominent; HW/TW 3.17. Antennae filiform, somewhat loose and attaining to the middle of elytra, 1st segment stout and 2.6 times as long as 2nd, which is the shortest, 3rd as long as the 1st, 4th to 10th elongate and becoming slightly shorter in order, 11th 1.8 times as long as 10th.

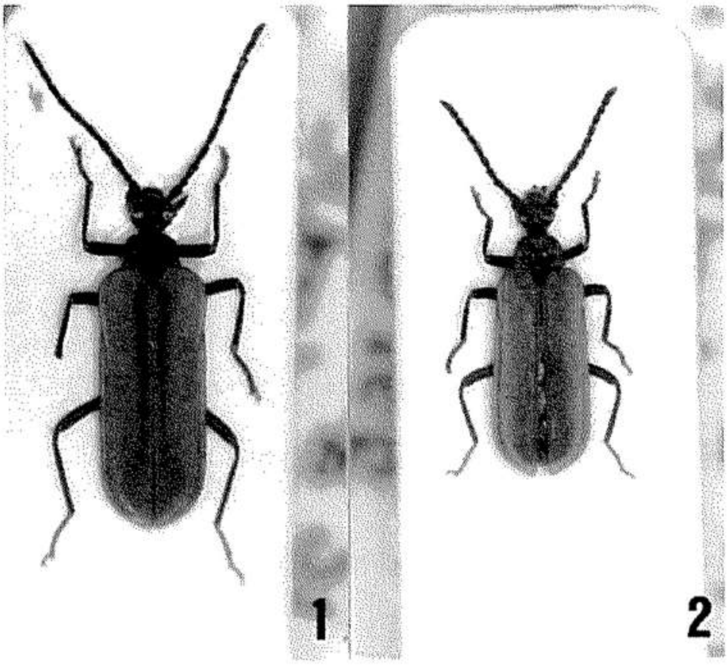
Pronotum subtrapezoidal, irregularly concave postriad, gibbous anteriad; PW/HW 1.21, PW/PL 1.64; lateral margins ridged and evenly rounded, but distinctly sinuate at basal third; front angles rounded, hind angles triangularly prominent; disc finely punctate, provided with a median carina on basal third, a pair of transverse impression on lateral sides of the carina and ovate one at postero-lateral margins; integument microreticulate.

Elytra elongate, flat; EW/PW 1.74, EL/EW 2.43; shoulders distinct; sides gently arcuate, with rounded apices; surface strongly, contiguously and somewhat rugosely punctate; each elytron provided with a prominent costa which extends from humerus to near apex and is evenly curved, though sinuate at basal fourth, and with a short distinct carina at humerus.

Mesepisternum extending from side to apical portion of mesosternum, but not contiguous each other.

Length: 6.2 mm; breadth: 2.0 mm.

Male. Unknown.



Figs. 1–2. Habitus. 1, *Ischalia* (s. str.) *sasajii* M. Satô et N. Ohbayashi, sp. nov.; 2, *Ischalia* (*Pseudohomalisus*) *acco* M. Satô et N. Ohabayashi, sp. nov.

Holotype: ♀, Mt. Phang Si Pang, N. rdg., alt. 1,950 m, Lai Chau Prov., N. Vietnam, 13. V. 1995, A. Saito leg.

The present new species resembles *I. chinensis* Young, but can be distinguished from the latter by median carina of pronotum short, each elytron with black stripe and different proportion of antennal segments.

This species is named after Prof. Hiroyuki Sasaji in honor of his great contribution in Coleopterology.

Ischalia* (*Pseudohomalisus*) *acco M. SATÔ et N. OHBAYASHI, sp. nov.

(Fig. 2)

Female. Body elongate, depressed and closely covered with pubescence, which is more erect and sparse on elytra than on the other parts. Color almost brownish black to dark brown, with brownish tarsi and labrum. Margins of pronotum and elytra yellowish orange.

Head suboval, transversely concave behind clypeus and rather longitudinally so between antennal sockets, and microreticulate on the surface; clypeus distinct and its anterior margin slightly emarginate, with rounded angles; eyes lateral and moderately prominent; HW/TW 3.75. Antennae filiform, rather loose and attaining to the basal third of elytra; 1st segment stout and 1.9 times as long as 2nd, which is the shortest, 3rd 0.9 times as long as the 1st, 4th to 6th elongate and becoming shorter in order, 7th to 10th suboval, 11th 1.5 times as long as 10th.

Pronotum subtrapezoidal, irregularly concave postriad, gibbous anteriad; PW/HW 1.27, PW/PL 1.46; lateral margins ridged and evenly rounded, but distinctly sinuate at a prebasal portion; front angles rounded, hind angles triangularly prominent; disc finely punctate, provided with a median carina on basal two-thirds, and a pair of transverse groove on lateral sides of the carina at basal third; integument microreticulate.

Elytra elongate, flat; EW/PW 1.79, EL/EW 2.24; shoulders distinct; sides gently arcuate, with rounded apices; surface strongly and closely punctate; each elytron provided with prominent costa which extends from humerus to near apex and is evenly curved, though sinuate at basal fourth, and with a short distinct carina at humerus.

Mesosternum somewhat triangularly swollen; mesepisternum extending from side to the apex of mesosternum and contiguous each other.

Length: 5.2 mm; breadth: 1.7 mm.

Male. Unknown.

Holotype: ♀, Mt. Phang Si Pang, N. rdg., alt. 1,950 m, Lai Chau Prov., N. Vietnam, 13. V. 1995, A. SAITO leg.

The present new species is similar to *I. arisana* KÔNO, but can be distinguished from the latter by entirely yellowish orange elytra, a pair of transverse and deep groove on the pronotum and different conformation of antennae.

The latinized specific epithet, acco is named after a nickname Akko of Dr. Akiko SAITO who collected this interesting species.

A check list of the genus *Ischalia* PASCOE, 1860

Subgenus *Ischalia* s. str.

1. *I.* (s. str.) *apicalis* BLAIR, 1912: 532	Burma, Thailand
2. *I.* (s. str.) *atricornis* PIC, 1938: 286	Malaysia
3. *I.* (s. str.) *basalis* WATERHOUSE, 1877: 28	Java, Sumatra
4. *I.* (s. str.) *blairi* PIC, 1912: 221	Sumatra
= *I.* (s. str.) *apicalis* PIC, 1912: 6	
5. *I.* (s. str.) *bryanti* BLAIR, 1914: 318	Borneo
6. *I.* (s. str.) *californica* VAN DYKE, 1938: 190	N.America
7. *I.* (s. str.) *chinensis* YOUNG, 1976: 213	China
8. *I.* (s. str.) *dimidiata* BLAIR, 1920: 134	Philippines
9. *I.* (s. str.) *indigacea* PASCOE, 1860: 54	Borneo
10. *I.* (s. str.) *philippina* BLAIRR 1920: 135	Philippines
11. *I.* (s. str.) *sasajii* M. SATO et N. OHBAYASHI, **sp. nov.** 2001:376	Vietnam
12. *I.* (s. str.) *vancouverensis* HARRINGTON, 1892: 132	N.America

Subgenus *Pseudohomalisus* PAULUS, 1971

1. *I.* (*Pseudohomalisus*) *acco* M. SATO et N. OHBAYASHI, **sp. nov.** 2001:377	Vietnam
2. *I.* (*Pseudohomalisus*) *arisana* KONO, 1935: 158	Taiwan
3. *I.* (*Pseudohomalisus*) *brachyptera* NIKITSKY,1994: 35	Far East Russia
4. *I.* (*Pseudohomalisus*) *kunashirica* NIKITSKY,1994: 33	Kunashiri Is.
5. *I.* (*Pseudohomalisus*) *latemarginata* N. OHBAYASHI et TOYAMA, 1994: 146	Taiwan
6. *I.* (*Pseudohomalisus*) *luteolineata* PIC, 1912: 142	Japan
7. *I.* (*Pseudohomalisus*) *martensis* PAULUS, 1971: 78	Nepal
8. *I.* (*Pseudohomalisus*) *nepalensis* PAULUS, 1971: 78	Nepal

9. *I.* (*Pseudohomalisus*) *patagiata* LEWIS, 1879: 463	Japan
10. *I.* (*Pseudohomalisus*) *suturalis* BLAIR, 1912: 532	Assam
11. *I.* (*Pseudohomalisus*) *takane* M. SAITO, 1994: 339	Japan
12. *I.* (*Pseudohomalisus*) *tsuyukii* N. OHBAYASHI et TOYAMA,1994: 148	Thailand
13. *I.* (*Pseudohomalisus*) *uenoi* M. SATO, 1990: 102	Taiwan

要約

佐藤正孝・大林延夫：ヴェトナムを経由するヒマラヤー日本系分布要素の甲虫. II.ヘリハネムシ属について. —— 国立科学博物館が組織し，1995年に行われたヴェトナム昆虫相調査で得られたヘリハネムシ属 *Ischalia* の2種を調べた結果，それぞれ2つの異なった亜属に含まれる新種であることがわっかた．ここに *I.* (s. str.) *sasajii* M. SATÔ et N. OHBAYASHI と *I.* (*Pseudohomalisus*) *acco* M. SATÔ et N. OHBAYASHI の名を与へ記載し，併せてこの属の目録を作成した．後者の亜属に含まれるほとんどの種の分布は，ヒマラヤー日本系分布要素と考えられるが，北方に拡張して分布する3種は後の寒冷化による遺存分布と考えられる．

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A Revision of the Japanese Species of the Subgenus *Badister* (Coleoptera: Carabidae)

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Abstract The Japanese licinine carabid species of the subgenus *Badister* are revised. *B. pictus* is redescribed. A new species is described from Hokkaido, under the name of *B. sasajii*, but differs from it mainly in the less convex eyes and structure of aedeagus.

Introduction

Since a female specimen of the genus *Badister* was collected by myself in Hokkaido, North Japan, twenty-five years have already passed. At that time, it was evident on the spot that nothing like this form had previously been known from Japan. Since my discovery, additional specimens of the same species have been taken in Hokkaido, and materials from Sakhalin Is., Siberia and Europe have been accumulated for comparative study.

In this paper, therefore, I am going to deal with the species in question and the single known species previously described by an old author. I am pleased to have this opportunity to dedicate the present study to Dr. Hiroyuki SASAJI, who will soon retire from Fukui University. He has affectionately watched my study of carabid beetles for a long time.

Abbreviations

The abbreviations used herein are as follows: L – body length, measured from apical margin of clypeus to apices of elytra; HW – greatest width of head; PW – greatest width of pronotum; PL – length of pronotum, measured along the mid-line; PA – width of pronotal apex; PB – width of pronotal base, measured between post angular setae; EW – greatest width of elytra; EL – greatest length of elytra; TL – length of metatarsus; M – arithmetic mean; NSMT – National Science Museum (Nat. Hist.), Tokyo.

Acknowledgments

Before going further, I wish to express my deep gratitude to Dr. Shun-Ichi UÉNO of the National Science Museum (Nat. Hist.), Tokyo, for critically reading the original manuscript of this paper. My deep indebtedness is also due to the following colleagues and friends, whose kind aid and support enabled me to complete this study: Dr. Alexander DOSTAL, Dr. German Sh. LAFER, Dr. Toshihiro OZAKI, Dr. Luca TOLEDANO, the late Mr. Atsuo IZUMI, Messrs. Oleg

BERLOV, Shigehisa HORI, Masahiro ISONO, Erich KIRSCHENHOFER, Hideaki MATSUMOTO, Masato MORI, Akira SATO, and Katsumi SHIRAI.

Genus *Badister* CLAIRVILLE, 1806

Type species: *Carabus bipustulatus* FABRICIUS, 1792.

The two dominant subgenera, *Badister* and *Baudia*, are represented in Japan. Almost all the known species were redescribed by NAKANE in 1985.

In addition to the features pointed out by BALL (1959, p. 189), I am going to add the following peculiarities. The basal foveae of the pronotum have a minute spot at the apex of the bottom on each side, which is brown to blackish brown. The apex of the antennal segment XI has a microscopic spine on each side, though it is difficult for me to observe it in detail. A similar structure in certain species of the genus *Mormolyce* was previously discovered (BALL, 1975, p. 149, figs. 14–A, 14–B).

Badsiter (*Badister*) *pictus* BATES

[Japanese name: Yotsumon-katakiba-gomimushi]

(Figs.1–9)

Badister pictus BATES, 1873, Trans. ent. Soc. London, 1873: 257: type locality: Kawachi. — NAKANE, 1963, Icon. Ins. Japon. Col. nat. ed., Tokyo, **2**: 45, pl. 23, fig. 10. — KASAHARA, 1985, Coleopt. Japan Col., Osaka, 2: 153, pl. 28, fig. 5.

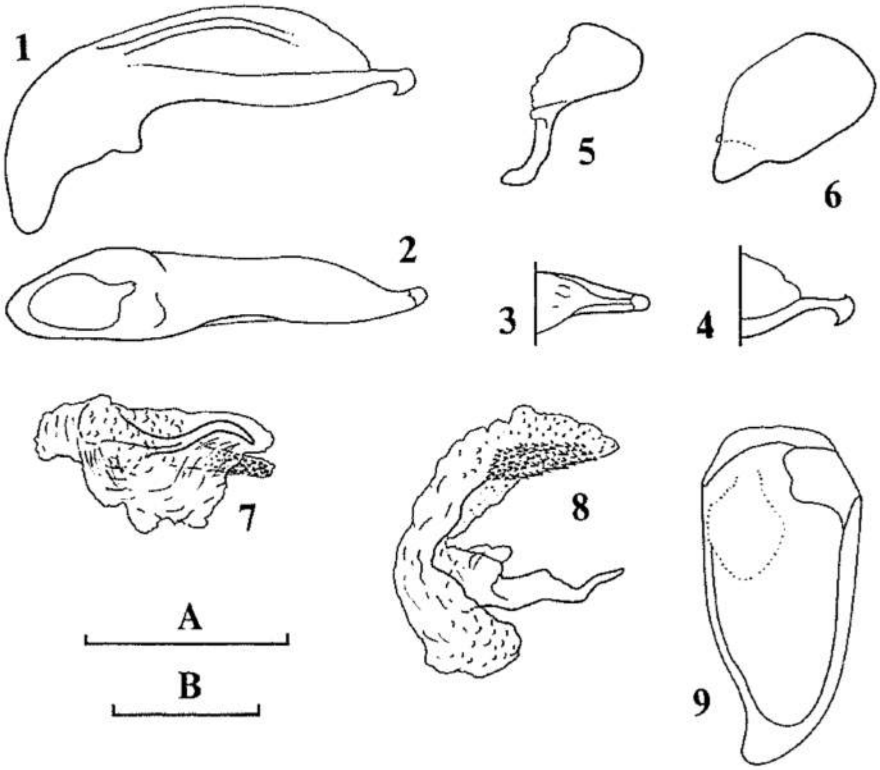
Badister (s. str.) *pictus*: NAKANE, 1985, Nat. & Ins., Tokyo, 20 (11) : 22, 23, fig. 1. — KOMAROV, 1991, Ent. Obozr., 70: 95, 102, figs.13, 26.

Diagnosis. Body elongate and fragile with slender appendages; elytra with two isolated spots on each side; mesosternum, mesepisternum, mesepimeron and elytral epipleura orange; apical lobe of aedeagus dilated in lateral view, and with a tooth on ventral side.

Redescription. L: 5.43–6.29 mm. Body elongate, fragile, and with slender appendages. Head black; prothorax, elytra, scutellum, mesosternum, mesepisterna, mesepimera and elytral epipleura orange; elytra with strong iridescent lustre and two black spots on each side; elytral spots seldom fused laterally on each side; metepisternum orange to brown; metasternum, metepimera, sternites blackish brown to brown; mouth parts, antennal segments I and legs reddish brown; antennal segments II-IV or V blackish brown, becoming paler towards apices; palpi reddish brown, but the apical segments brown; mandibles, labrum and clypeus dark brown to blackish brown.

Head not large; PW/HW 1.21–1.34 in 6♂♂, 1.22–1.29 in 4♀♀ from Ojaga-ike; eyes moderately convex; frontal furrows obliterated; two pair of supraorbital pores lying on parallel lines; genae very short and oblique in dorsal view; antennae filiform and reaching the middle of elytra; relative lengths of antennal segments as follows: I : II : III : IV : V : VI : XI ≒ 1.0 : 0.37: 0.98 : 1.08 : 1.05 : 1.01 : 0.98.

Pronotum transverse, flat and widest at apical 1/4 (measured along mid-line); PW/PL 1.36–1.42 (M 1.39) in 6♂♂, 1.38–1.54 (M 1.46) in 4♀♀, PW/PA 1.35–1.39 (M 1.37) in 6♂♂, 1.33–1.44 (M 1.38) in 4♀♀, PW/PB 1.23–1.29 (M 1.28) in 6♂♂, 1.24–1.31 (M 1.30)



Figs. 1–9. Male genital organ of *Badister* (*Badsiter*) *pictus* BATES.—1, Aedeagus, left lateral view; 2, aedeagus, ventral view; 3, apical part of aedeagus, dorsal view, 4, same, left lateral view; 5, right paramere, left lateral view; 6, left paramere, left lateral view; 7, extracted inner sac, left lateral view; 8, extracted and everted inner sac, almost dorsal view, showing copulatory piece and teeth-patch; 9, genital segment. Scale: A – 0.6 mm for 1–6; B – 0.3 mm for 7, 8; 0.6 mm for 9.

in 4♀♀ from Ojaga-ike; apex moderately emarginate, and narrower than base; PA/PB 0.91–0.97 (M 0.93) in 6♂♂, 0.91–1.00 (M 0.94) in 4♀♀ from Ojaga-ike; sides weakly arcuate in front, convergent or very weakly arcuate posteriad; reflexed parts rather wide and not prominent, and becoming wider posteriad and merging into basal fovea on each side; hind angles widely rounded, or slightly angulate at the position of post angular setae; base straight at middle, and arcuately oblique at the sides; apical angles produced and rounded at the tips; anterior pair of marginal setae inserted at the widest part; anterior transverse impression obsolete; posterior transverse impression very shallowly impressed; median line fine, distinct, reaching neither apex nor base, and with fine transverse wrinkles at the basal part; basal foveae wide and very shallow; microsculpture composed of isodiametric meshes.

Elytra elongate and narrow; EW/PW 1.44 –1.52 (M 1.49) in 6♂♂, 1.43–1.61 (M 1.52) in 4♀♀; EL/EW 1.67–1.70 (M 1.68) in 6♂♂, 1.61–1.67 (M 1.64) in 4♀♀; basal part narrow; basal border narrowly and strongly arcuate and joining or close to stria 1; sides weakly arcuate, and then moderately so towards apices; epipleuron narrow at base, becoming wider towards the level of mid coxa, which is the widest, and gradually narrowed towards apex; apices separately rounded, with a re-entrant angle at suture; scutellar striole very long, lying on interval II, and joining stria 2 at base, usually joining stria 1 at apex, rarely free; basal pore weak and situated at the base of stria 2; intervals flat; striae fine and smooth; interval 3 with 2 dorsal pores, anterior one at 3/10–2/5, posterior one at 13/20–7/10 from base, respectively; microsculpture composed of very fine transverse meshes.

Ventral side impunctate; sternites 1 and 2 with several wrinkles; anal sternite usually widely arcuate at apex, rarely shallowly emarginate.

Legs slender; segments of meso- and metatarsi each with inner and outer longitudinal carinae on dorsal side; claw segment of each metatarsus with many hairs on ventro-lateral sides; TL/HW 1.60–1.67 (M 1.63) in 3♂♂, 1.45–1.63 (M 1.52) in 4♀♀.

Genital segment elongate, and with a narrow and short handle (*cf.* MORITA, 1999, p. 601); aedeagus elongate and high in apical 1/3 in lateral view; bifurcated point of the left strip situated near the basal part; left strip very narrow and weakly arcuate; apical lobe elongate and inclined to the left in dorsal view; apex dilated in lateral view, and with a tooth on ventral side. Inner sac armed with a copulatory piece and a teeth-patch; copulatory piece strongly bent, and with wide basal part; a teeth-patch lying near the ventral side of aedeagus. Right paramere elongate, left one wide, the left being longer than the right.

Specimens examined. 2♂♂, 4♀♀, Ojaga-ike, Tôgane-shi, Chiba Pref., 2. X. 1997, S. MORITA leg.; 4♂♂, Ojaga-ike, Tôgane-shi, Chiba Pref., 16. XI. 1991, A. IZUMI leg.; 1♂, Ichikawa-shi, Chiba Pref., 19. IX. 1973, S. MORITA leg.; 1♀, Toride, Riv. Tone-gawa, Ibaraki Pref., 5. VIII. 1982, S. MORITA leg.; 1♂, Toride, Riv. Tone-gawa, Ibaraki Pref., 3. VIII. 1985, A. IZUMI leg.; 2♀♀, Toride, Riv. Tone-gawa, Ibaraki Pref., 26. VII. 1986, A. IZUMI leg.; 1♂, Toride, Riv. Tone-gawa, Ibaraki Pref., 29. IX. 1991, S. MORITA leg.; 2♂♂, Sugiyama-chô, Toyohashi-shi, Aichi Pref., 18. V. 1995, K. SHIRAI leg.

Range. Japan (Honshu, Shikoku, Kyushu); Formosa.

Notes. This is a remarkable species evidently isolated from the other members occurring in the Eurasian Continent. It is unique in fragile body with slender appendages, modified elytral spots and apical lobe of aedeagus.

So far as I am aware, the northern limit of its distribution is Takisawa-mura, Iwate Prefecture, Tôhoku district, Honshu (SATAKE & KASAHARA, 1985, p. 189), though there is a possibility of its discovery in the Russian Far East (KRYZHANOVSKIJ *et al.*, 1995, p. 159).

According to the illustration shown by KOMAROV (1991, Fig. 26) and to my own study, apex of aedeagus of this species is strongly dilated and dentate at dorsal side in lateral view, and the dorsal membranous part was produced near the apex of the aedeagus, though this part was reduced in dried condition.

Badister* (*Badister*) *sasajii MORITA, sp. nov.

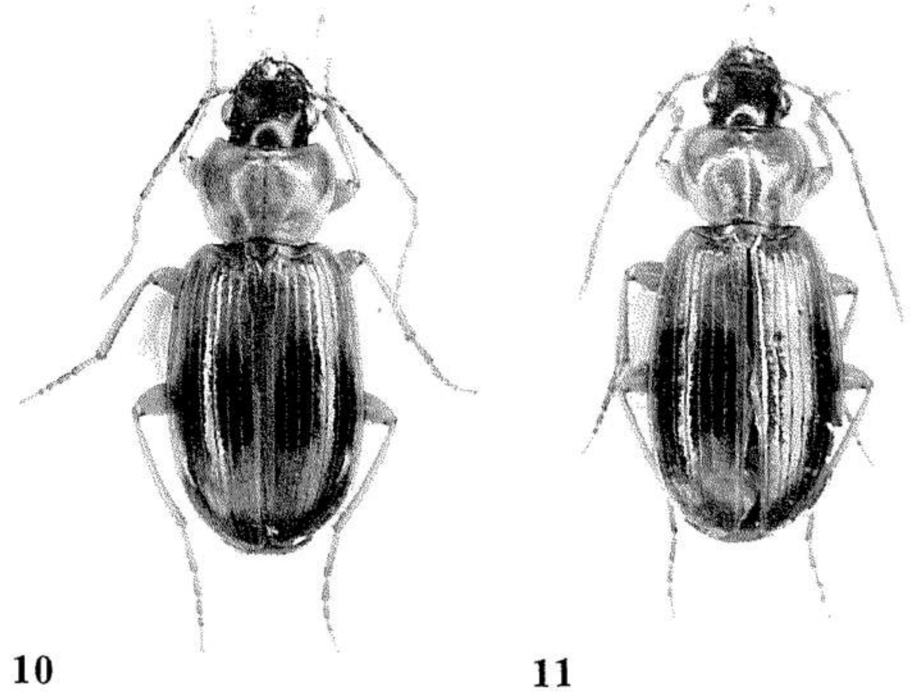
[Ezo-katakiba-gomimushi]

(Figs. 10, 12-18)

Badister pictus: MORI, 1979, Jessoensis, (6): 74.

Diagnosis. Body robust; head not large; eyes weakly convex; elytral spots anteriorly with transverse limit (not rounded limit); mesosternum, mesepisterna and mesepimera black; copulatory piece of aedeagal inner sac with apical part strongly produced, twisted and wide at the apex.

Description. L: 5.90–6.58 mm. Body robust; head not large. Colour as in *B.* (*B.*) *lacerto-*



Figs.10–11. *Badister* spp.; 10, *Badister* (*Badister*) *sasajii* MORITA, sp. nov.; 11, *B*.(*B*.) *lacertosus* STURM.

sus STURM (1815, p. 188); head black; pronotum, elytra and scutellum reddish brown; elytra slightly darker at basal parts, with a black spot on each side, anterior margin of the spot transverse (not rounded); ventral side black, but prothorax and elytral epipleura reddish brown; mouth parts and legs reddish brown; mandibles antennal segments II–IV brown; palpi and antennal segments I, V–XI reddish brown to brown.

Head not large; PW/HW 1.39–1.48 (M1. 42) in 11♂♂, 1.38–1.41 in 7♀♀; eyes small and weakly convex; genae very short and slightly rounded; anterior supraorbital pore larger than the posterior one; mentum tooth very slightly porrect and simple at the tip; antennae filiform and reaching a little before the middle of elytra; relative lengths of antennal segments as follows: I : II : III : IV : V : VI : XI ≒ 1.0 : 0.41 : 0.75 : 0.89 : 0.81 : 0.79 : 0.80 in 11♂♂ and 7♀♀.

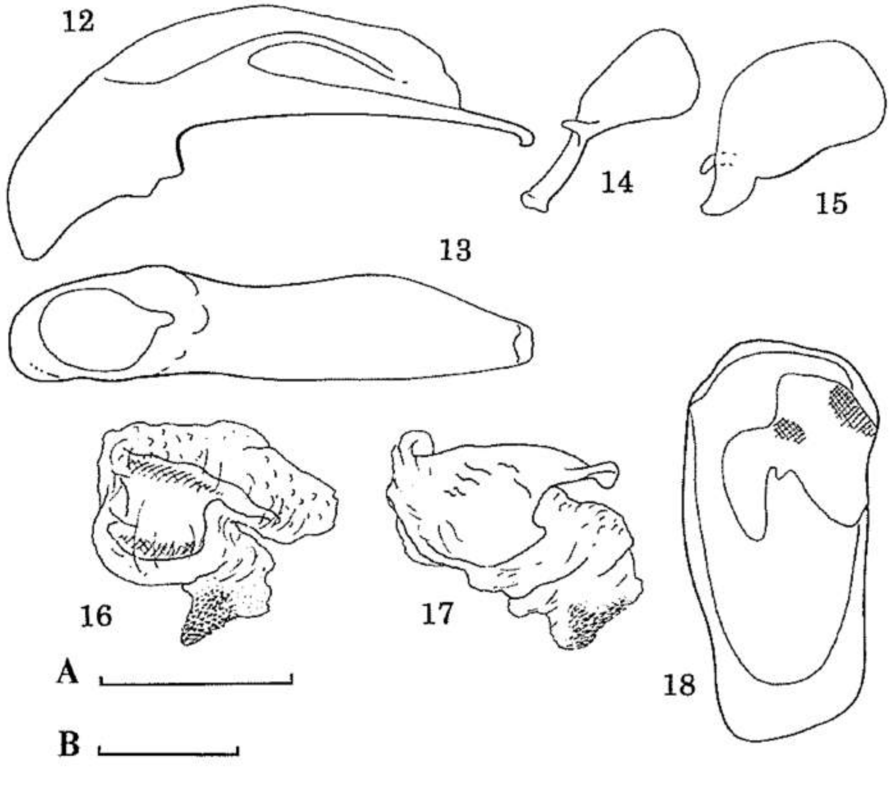
Pronotum convex and widest at apical 1/4 (measured along mid-line); PW/PL 1.35–1.45 (M1. 39) in 11♂♂, 1.37–1.46 (M 1.43) in 7♀♀; PW/PA 1.37–1.44 (M 1.41) in 11♂♂, 1.37–1.41 (M 1.39) in 7♀♀; PW/PB 1. 29–1.33 (M 1.32) in 11♂♂, 1.30–1.40 in 7♀♀; apex usually strongly emarginate; apical angles produced and rounded at the tips; PA/PB 0.89–1.05 (M 0.95) in 11♂♂, 0.95–1.01 (M 0.97) in 7♀♀; sides strongly arcuate in front and weakly so posteriad; reflexed lateral parts narrow, and becoming wider posteriad, rarely reaching basal fovea on each side; hind angles widely rounded; anterior pair of marginal setae inserted at the widest part; anterior transverse impression distinct near the median line, but obsolete at the sides; posterior transverse impression very shallowly impressed; median line clearly impressed on the disc, reaching apical margin, and obsolete at the basal part; basal foveae rather deep and usually rounded; microsculpture composed of isodiametric meshes.

Elytra convex; shoulders widely rounded; striae not clearly impressed, usually weakly crenulate, but becoming indistinct at apices; scutellar striole rather long and situated on interval I, free or joining stria 1 at the apex, rarely situated on interval II; intervals weakly convex; sides moderately arcuate throughout; EW/PW 1. 38–1.51 (M 1.44) in 11♂♂, 1.39–1.46 (M 1.43) in 7♀♀; EL/EW 1. 50–1.59 (M 1.54) in 11♂♂, 1.47–1.56 (M 1.53) in 7♀♀; basal pore distinct; two dorsal pores distinct, the anterior one situated at basal 3/10–2/5, the posterior one at 3/5–7/10; microsculpture composed of fine transverse lines or meshes.

Ventral side impunctate; sternites 1–3 with several wrinkles; anal sternite narrowly arcuate at apex in ♂, slightly emarginate at apex in ♀.

Legs slender; segments of meso- and metatarsi each with inner and outer longitudinal carinae on dorsal side; claw segment of each metatarsus with many hairs on ventro-lateral sides; TL/HW 1.34–1.52 (M 1.45) in 9♂♂, 1.24–1.26 (M 1.25 in 5♀♀).

Genital segment wide and without handle; aedeagus elongate and weakly arcuate in lateral view; viewed laterally, bifurcated point of left strip at about middle; left strip short, arcuate, poorly sclerotized at the bifurcated part, but gradually and moderately so towards apex; apical lobe produced in lateral view; apex rather wide, and with a tooth on ventral side, which is wide



Figs. 12–18. Male genital organ of *Badister (Badsiter) sasajii* MORITA, sp. nov.—12, Aedeagus, left lateral view; 13, same, ventral view; 14, right paramere, left lateral view; 15, left paramere, left lateral view; 16, extracted inner sac, left lateral view; 17, extracted and everted inner sac, almost dorsal view, showing copulatory piece and teeth-patch; 18, genital segment. Scale: A – 0.6 mm for 12–15; B – 0.3 mm for 16, 17; 0.6 mm for 18.

and obtuse at the apex.

Inner sac partially covered with poorly sclerotized scales and armed with a copulatory piece and a teeth-patch; copulatory piece wide, rough on the surface, and with some wrinkles; apical part strongly produced, twisted, and with wide apex; teeth-patch composed of small spines and lying on the ventral side of inner sac; right style narrow; left one wide.

Type series. Holotype: ♂, allotype: ♀, Sapporo-shi, Riv. Toyohira-gawa, 19–26. VI. 1997, S. HORI leg. (NSMT). Paratypes: 1♀, Ebetsu, Riv. Ishikari-gawa, 13. VI. 1975, S. MORITA leg.; 1♀, Iwaobetsu Spa, 28. VII. 1978, H. DETANI leg.; 1♂, Kenbuchi-chô, Riv. Wassamu-gawa, 1. VI. 1980, H. MATSUMOTO leg.; 1♀, Ishikari-chô, 7. VII. 1981, M. MORI leg.; 1♂, estuary of Riv. Ishikari-gawa, 18. VIII. 1981, H. MATSUMOTO leg.; 1♀, Abashiri-ko, 3. VI. 1990, H. MATSUMOTO leg.; 1♀, Rishiri Is., 15. VIII. 1992, A. SATO leg.; 1♀, Chimikeppu-ko, Tsubetsu-machi, 3–17. VIII. 1994, S. HORI leg.; 2♂♂, Sapporo-shi, Riv. Toyohira-gawa, 19–26. VI. 1997, S. TAKENAKA leg.; 1♀, Nanporo-cho, 1–15. VI. 1999, T. KATO leg.; 1♂, Shinshinotsu-mura, 15–29. VI. 1999, T. YOSHIDA leg.; 2♂♂, Shinshinotsu-mura, 29. VI–13. VII. 1999, M. SHIMOMURA leg.; 1♂, 1♀, Benkebetsu, Toubetsu, 16. V–1. VI. 1999, K. OZAKI leg.; 1♂, Benkebetsu, Toubetsu, 1–15. VI. 1999, K. FUKUYAMA leg.; 1♂, Benkebetsu, Toubetsu, 15–29. VI. 1999, M. ISONO leg.; 4♂♂, 5♀♀, Kurisawa-chô, 16. V–1. VI. 1999, M. SHIMOMURA and K. OZAKI leg.; 3♂♂, 4♀♀, Kurisawa-chô, 1–15. VI. 1999, M. ISONO and K. FUKUYAMA leg.; 4♂♂, 2♀♀, Kurisawa-chô, 15–29. VI. 1999, M. ISONO leg.; 1♂, Kurisawa-cho, 29. VI–13. VII. 1999, T. YOSHIDA leg.; 1♂, Oyafuru, Ishikari-chô, 14. V–1. VI. 1999, T. KATO leg.; 1♂, 1♀, Oyafuru, Ishikari-chô, 15–29. VI. 1999, T. YOSHIDA leg.; 2♂♂, Oyafuru, Ishikari-chô, 29. VI–13. VII. 1999, M. SHIMOMURA leg.; 1♀, Oyafuru, Ishikari-chô, 10–24. VIII. 1999, T. KATO leg.

Range. Japan (Hokkaido; Rishiri Is.)

Notes. This new species is most closely allied to the European species, *B.* (*B.*) *lacertosus* STURM widely known from the Eurasian Continent, but is distinguished from it by the following points: 1) eyes less convex, 2) elytra more strongly arcuate at the sides, and 3) shape of copulatory piece of aedeagal inner sac. [In *B.* (*B.*) *lacertosus*, copulatory piece wide; its apical part strongly produced, gradually narrowed towards the apex and not twisted.]

Through the courtesy of Dr. LAFER, I was able to examine two females of *Badister* from the Primorskij Territory, Russia, determined by himself as *Badister bipustulatus* FABRICIUS. They are different from the type series of *B. sasajii* in several details: small size (5.57 mm, 5.86 mm); robust body; prominent eyes. They do not agree with the latter in the following ratios of body parts: PW/HW 1.33, 1.34; PW/PB 1.23, 124; PA/PB 0.87, 0.89. Most pronounced difference between them is in the large elytral spots filling apical 7/10 of the elytra on each side; in one specimen, the anterior margin of the spot transverse, and in the other it is rounded.

Also, taxonomic status of two female specimens from Mt. Chekhov, South Sakhalin are questionable. They share almost all the diagnostic characters with the Primorye specimens mentioned above, though larger (6.29 mm, 6.43 mm). One specimen has less convex eyes. Their elytral spots are anteriorly with transverse limit.

Of two females obtained from Abashiri-ko, East Hokkaido, Japan, one is determined as *B. sasajii* sp. nov., and included in the type series. The other is identical in every external feature with the specimens from the Primorskij Territory. Its elytral spots are very large and anteriorly with slightly oblique limit. For this reason, it is excluded from the type series. The ratios of body parts in this specimen are as follows: PW/HW 1.42, PW/PL 1.42, PW/PA 1.42, PW/PB

1.33, PA/PB 0.94, EW/PW 1.32, EL/EW 1.53. I cannot decide with confidence true systematic status of these forms. This may mean that the criteria used for the European species do not fit in the species from the Far East. Besides, I was unable to determine variation, particularly body size, form, convexity of eyes, form of elytral spots, and so on.

要　約

森田誠司：日本産 *Badister* 亜属の種について ―― わが国に分布する *Badister* 亜属の２種を記載した．そのうちの１種は新種で，筆者の研究活動を暖かく見守って下さっている佐々治寛之先生に献名した．

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Spec. Publ. Japan Coleopt. Soc. Osaka, (1): 389–403, June 11, 2001

Note on the *Orientalis* Group of the Genus *Trichotichnus*, I. (Coleoptera: Carabidae: Harpalini)

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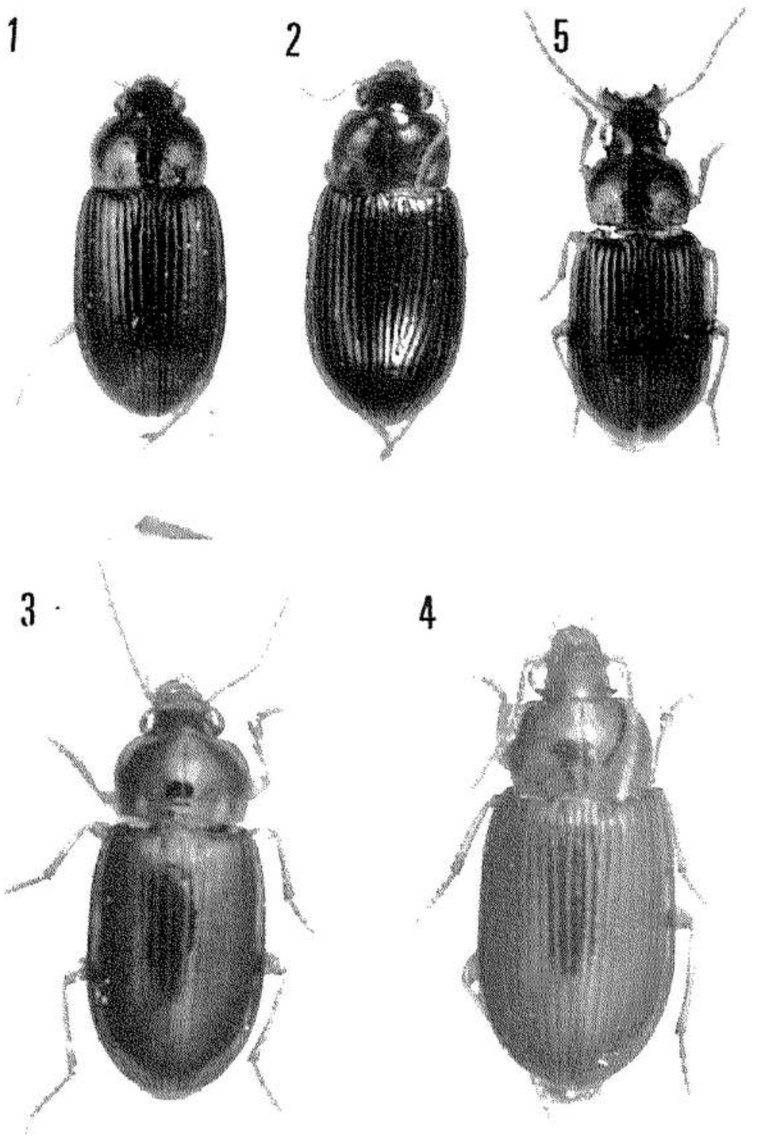
1–7–18 Higashiuneno, Kawanishi City, Hyogo, 666–0117 Japan

Abstract Three new species and one subspecies of the orientalis group of the genus *Trichotichnus* MORAWITZ are described under the name of *Trichotichnus* (*Trichotichnus*) *parvus*, *T.* (*T.*) *malayanus malayanus*, *T.* (*T.*) *malayanus insulicola*, and *T.* (*T.*) *sasajii*. Also, redescription of *Trichotichnus* (*Trichotichnus*) *szekessyi* (JEDLIČKA) and *T.* (*T.*) *philippinus* JEDLIČKA is given. Former new species are similar to *Trichotichnus szekessyi* and *T. philippinus*. They have peculiar character as presence of single spine only along ventral margin of stylus.

Species of orientalis group of the genus *Trichotichnus* MORAWITZ are widely distributed from subtropical region of Asia to New Guinea through Sunda Is. They have, however, been unknown from Indo-China region except for Malay peninsula (ITO, 1991). Only species from Malay was recorded as *Trichotichnus* (*Trichotichnus*) *szekessyi* (JEDLIČKA). Recently I obtained numerous specimens from Taiwan, Laos, Thailand, Malaysia, Sumatra Is. in Indonesia, and the Philippines including two types, *Trichotichnus szekessyi* (JEDLIČKA) and *Trichotichnus philippinus* JEDLIČKA. At the result of careful examination, I found that the latter known species are valid species in spite that they are very similar in external characteristics to each other and also malayan species which I determined as *T. szekessyi* is new species. Further two new species and one subspecies were recognized.

In this paper I am going to describe three new species under the names, *Trichotichnus* (*Trichotichnus*) *parvus* from Laos and Thailand, *T.* (*T.*) *malayanus malayanus* from Malay peninsula, *T.* (*T.*) *malayanus insulicola* from Sumatra Is., and *T. sasajii* from Taiwan. Also I redescribe two species, *Trichotichnus* (*Trichotichnus*) *szekessyi* (JEDLIČKA) and *T.* (*T.*) *philippinus* JEDLIČKA with types and additional material together. The species dealt here resemble in external characteristics one another except for *T. sasajii* and was able to recognize the valid species by careful observation of aedeagi.

I wish to express my deep gratitude to Dr. Josef JELÍNEK of the National Museum of Czech Republic, Praha, Dr. Ottó MERKL of the Hungarian Natural History Museum, Budapest, for their kind loan of JEDLIČKA's types and important material under their care. My hearty thanks are due to Dr. Martin BAEHR of the Zoologische Staatssammlung, Munchen, Dr. Shozo OSAWA, of the JT Biohistory Research Hall, Takatsuki, Dr. Masataka SATÔ of Nagoya Women's University, Nagoya, Dr. Masahiro SAKAI of Ehime University, Matsuyama, Dr. Katsuro YAHIRO of the Lake Biwa Museum, Kusatsu, and Mr. Motoshige YOSHIDA, Hidaka-gun in Wakayama. I would like to dedicate this paper to Dr. Hiroyuki SASAJI, the president of the



Figs. 1–5. Habitus of the genus *Trichotichnus* spp. 1, *Trichotichnus* (*Trichotichnus*) *szekessyi* (Jedlička), holotype; 2, *T.* (*T.*) *philippinus* Jedlička, cotype; 3, *T.* (*T.*) *parvus* N. Ito, sp. nov.; 4, *T.* (*T.*) *malayanus malayanus* N. Ito, sp. nov.; 5, *T.* (*T.*) *sasajii* N. Ito, sp. nov.

Japan Coleopterological Society, commemorating on his retirement from Fukui University. He have been greatly contributing to taxonomy on Coleoptera, especially on the Family Coccinellidae. *T. sasajii* is named after him.

Abbreviation of Depository

OMNH: the Osaka Museum of Natural History, Osaka
HNHM: the Hungarian Natural History Museum, Budapest

NM: the Nationa Museum, Praha
ZSS: the Zoologische Staatssammlung, München
NWU: Nagoya Women' s University, Nagoya
ELEU: Laboratory of Entomology in Ehime University, Matsuyama
NHMI: the Natural History Museum and Institute, Chiba
NIc: the author' s collection

Trichotichnus* (*Trichotichnus*) *szekessyi (JEDLIČKA)

(Figs. 1, 6 and 12-A)

Iridessus szekessyi JEDLIČKA, 1954. Ann. Hist. Nat. Mus. Natl. Hung. 5: 225.
Trichotichnus ryukyuensis HABU, 1869. Ent. Rev. Japan, 22: 7–8.
Trichotichnus szekessyi (JEDLIČKA): HABU, 1975. Trans. Shikoku ent. Soc., 12: 71

Body suboval, relatively convex, slightly to rather brownish brown, with iridescent lustre and slightly bluish reflection on elytra; labrum, palpi and legs yellowish brown, antennae yellowish brown to light brown, lateral margins of pronotum light reddish brown to yellowish brown.

Head somewhat small, 0.61–0.63 times as wide as pronotum, weakly elevated on vertex, very sparsely furnished with minute punctures; labrum slightly convergent forwards, roundedly

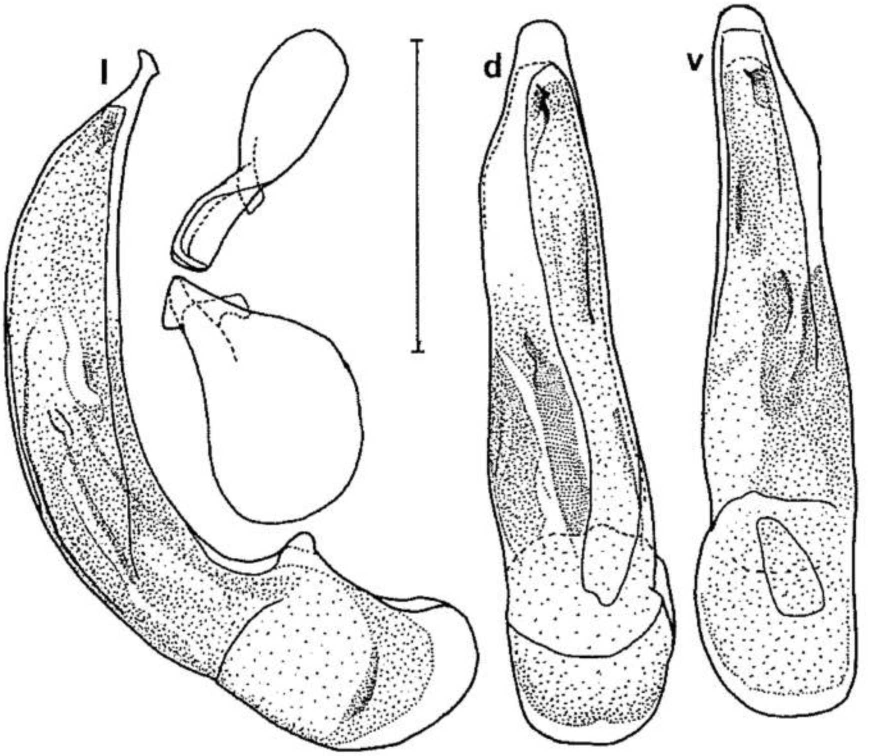


Fig. 6 Male genitalia of *Trichotichnus* (*Trichotichnus*) *szekessyi* (JEDLIČKA), holotype. d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

and weakly protruding at apical corner; clypeus shallowly emarginate at apex, almost flattened; clypeal suture weakly to moderately impressed, from which of each end frontal impression arcuately runs to supraorbital groove and are moderate in depth; interocular space narrow, three-fifths times of the maximum width of head; eyes large and strongly prominent; temples steeply convergent behind, very short, one-seventh time of eye length; genuine ventral margin of eye adjoining buccal fissure; antennae short, only apical segments reaching elytra; palpi relatively thick, 3rd segment of labial palpus tumid medially, one-seventh longer than the 2nd; ligula almost parallel-sided, slightly and sharply protruding laterad at apical corners; paraglossae narrow, not surpassing ligular apex; mentum sharply toothed at middle, epilobes rather expanded apicad; surface finely and clearly reticulated and partly square-meshed.

Pronotum quadrate, widest at a little behind middle, 1.53–1.60 times as wide as long, widely and rather convex, arcuate at sides, a little more strongly convergent anteriad than posteriad; apex almost straight or weakly emarginate, bordered throughout; base one-third wider than apex, sublinear or hardly arcuate, with border not interrupted; apical angles widely rounded; basal angles a little larger than rectangle, angulate, sometimes very slightly protrudent at tips; lateral furrows narrow apically, gradually widened basad; basal foveae rounded, isolated from the furrows by vague elevation; both front and hind transverse impression almost obsolete; median line fine, shallow, extending near apex and base; surface smooth on disc, sometimes very sparsely punctate near base, coarsely and moderately so in lateral furrows and basal foveae; microsculpture clear, consisting of mixtures with fine square and isodiametric meshes.

Elytra 1.47–1.50 times as long as wide, ovally oblong, fairly convex, with very sparse microscopic punctures; sides gently sloping in humeri, gradually strongly curved backwards from apical third, with shallow preapical sinus; apices not produced, weakly arcuate at margins, angulate or slightly blunt at sutural angles, narrowly separated from each other; bases shallowly emarginate, obtusely countered with lateral margins, minutely toothed at humeral angles; striae wide, moderate in depth, clearly crenulate, scutellar striole long; intervals flat on disc, a little convex near apices and bases, a dorsal pore of 3rd interval situated nearly at middle; marginal series rather narrowly to somewhat widely interrupted medially, composed of (8–10) + (10–12) umbilicate pores; microsculpture more or less clearly visible as transverse lines and meshes. Hind wings entire.

Ventral surface mostly smooth, with several punctures on meso- and metepisterna, almost glabrous, except for abdominal sternites distinctly sparsely and tiny-pubescent; metepisternum well convergent behind, two-thirds longer than wide; 6th abdominal sternite bisetose at each side in both sexes, apical margin almost undistinguished in both sexes, slightly arcuate in ♀.

Hind femur bisetose along hind margin; fore tibia bi- or trispinous apico-externally, in basal half with vague and interrupted sulcus, terminal spur long and lanceolate; tarsi relatively long, 2nd to 4th mid tarsal segments of ♂ bearing biseriate adhesive hairs, hind tarsus subequal in length to the width of head, somewhat longer in ♂ than in ♀, the ratio 0.95–0.97 in ♂ and 0.93–0.95 in ♀, 1st segment as long as the 2nd and 3rd taken together, 2nd one-third longer than the 3rd and about twice the 4th, claw segment bisetose along each ventral margin.

Aedeagus (Fig. 6) gently arcuate, rather thick, strongly constricted before tip which is knob-shaped and obliquely directed; apical orifice widely opening, inner sac without any sclerites; apical lobe weakly convergent forwards and rounded at distal margin; ventral surface somewhat thickly bordered, depressed from apex to near basal bulb. Stylus (Fig. 12-A) rather slender, clearly curved outwards, with a small spine only at ventral margin; basal segment bisetose apico-externally; valvifer bisetose at apex.

Specimens examined. **Taiwan:** ♂ (holotype), Fuhosho, Formosa, IV. 1909, Sauter leg. "Fuhosho 1909. IV." black machine print on white paper, "Formosa Sauter" black machine print on on white paper, "TYPUS" black machine print on red paper, "Trichotichnus Szekessyi sp. nov." and "det. ING. Jedlička" handwriting and black machine print, respectively, on same pink paper (preserved in HNHM); 1 ♂, Musha (Wushe), Nantou Hsien, Formosa, 7. VIII. 1969, Y. Maeda et T. Kobayashi leg.; 1 ♂, ditto, 6. V. 1970, A. Rin leg.; 1 ♀, ditto, 7. IV. 1974, S. Takeda leg.; 1 ♂, ditto, 23. IV. 1983, F. Kimura leg.; 1 ♂, ditto, 5. VI. 1992, Chin-Kin Yu leg.; 1 ♂, Kenting Park, Tainan Hsien, 1. V. 1983, H. Miyata leg.; 1 ♀, Liukuei, Kaoshiung Hsien, 20. V. 1980, K. Kuzugami leg.; 1 ♂, Kwenashan, Taitung Hsien, Taiwan, 2. V. 1985, N. Ito leg.; 1 ♀, Mailiru, Taitung Hsien, 6. V. 1983, N. Ito leg.; 2 ♀ ♀, Chipen, Taitung, Taiwan, 30. IV. 1985, N. Ito leg.; 1 ♂, 1 ♀, ditto, 30. IV. 1985; 1 ♂, 1 ♀, Yangming Shan, Taipei City, Taiwan, 30. IV. 1982, T. Ito leg.; 2 ♂ ♂, same locality and collector, Nanshanchi, Nantou Hsien, Taiwan, Chin-Kin YU leg., 31. V. 1991 and 25. V. 1992.; 2 ♀ ♀, ditto, 1. V. 1989 and 3. VII. 1992. (preserved in NHMI and NIC). **Japan:** 2 ♂ ♂, same locality, Mt. Omoto, Ishigaki Is., Okinawa Pref., 27. VI. 1964, H. Konishi leg. and 19. III. 1965, T. Ito leg.; 1 ♀, ditto, 5. VI. 1990, S. Kawahara leg.; 1 ♂, 3 ♀ ♀, Isobe, Ishigaki Is., 2. V. 1978, S. Tsukaguchi leg.; 1 ♂, Sonai, Iriomote Is., 23. IV. 1963, H. Nomura leg. (preserved in NIc). **Vietnam:** 1 ♂, 15 Km S of Bao Loc, Duc Me (Maria stream), Lam Dong prov., 23. X. 1988, S. Mahunka et T. Vasarhery leg.; 1 ♀, Sapa, 1,500 m, Lao Cai, 16. V. 1995, M. Sato leg.; 1 ♀, Deo Tram Man, 1,100–1,220 m, Phong Tho, 9. V. 1995, M. Satô leg. (preserved in NWU and NIc). **Laos:** 6 ♂ ♂, 3 ♀ ♀, Nakai env., Rout No. 8, 17°42.8'N, 105°8.9'E, alt. 560±20 m, Khammouan Prov., central Laos, 4–8. V. 1998, M. Strba et R. Hergovits leg.; 30 ♂ ♂, 30 ♀ ♀, Ban Nape – Kaew Nua pass, 18°22.3'N, 105°9.1'E, alt. 600±10 m, Bolikhamsai prov., central Laos, 18. IV.–1. V. 1998, M. Strba et R. Hergovits leg.; 3 ♂ ♂, 1 ♀, 15 Km NW from Louang Namtha, 21°7.5'N, 101°21'E, alt. 750±100 m, north Laos, 13–24. V. 1997, E. Jendek et O. Šauša leg.; 1 ♂, 1 ♀, 20 Km NW from Louang Namtha, 21°9.2'N, 101°18.7'E, alt. 900±100 m, north Laos, 24–30. V. 1997, E. Jendek et O. Šauša leg.; 1 ♂, 1 ♀, 20 Km NW from Louang Namtha, 21°9.2'N, 101°18.7'E, alt. 900±100 m, north Laos, 5–11. V. 1997, E. Jendek et O. Šauša leg.; 2 ♂ ♂, Ban Phabat env., 70 Km NE from Vientiane, alt. 150 m, 18°16.1'N, 103°10.9'E, alt. central Laos, 27. IV.–1. V. 1997, E. Jendek et O. Šauša leg.; 3 ♀ ♀, Mong Lom (Lake) env., 15 Km SE from Ban Houaykong, 15°2'N, 106°35'E, alt. 800 m, Bolaven Plateau, Attapu prov., south Laos, 18–30. IV. 1999, E. Jendek et O. Šauša leg. (preserved in NIc). **Thailand:** 1 ♂, Doi Inthanon, 10–17. VII. 1990, Malicky leg.; 1 ♂, Chiang Mai 26. III.–2. IV. 1990, Malicky leg.; 1 ♂, Chiang Mai zoo 7–14. III. 1988, Malicky leg.; 1 ♀, Doi Suthep, Chiang Mai, 30. IV. 1990, N. Ito leg.; 3 ♂ ♂, 2 ♀ ♀, Mon Angget, Chiang Mai, 28. IV. 1992. N. Ito leg. (preserved in ZSS and NIc).

Trichotichnus (*Trichotichnus*) *philippinus* Jedlička

(Figs. 2, 7 and 12-B)

Trichotichnus philippinus Jedlička, 1936. Acta Soc. ent. Cech., 33: 118.

Body oblong-ovate, considerably convex, brownish black, shiny, with rather clearly iridescent lustre on elytra; labrum, antennae and labial palpi light brown, mandibles, lateral margins of pronotum and legs reddish brown.

Head gently convex, not wide, a little less than two-thirds the pronotal width, very sparsely and microscopically punctate; labrum transversely trapezoidal, shallowly emarginate at apex; clypeus flat, obscurely rugose near sides, with truncate and unbordered apex; clypeal suture fine and shallow, almost obsolete in middle; frontal impressions not deep, but clearly marked,

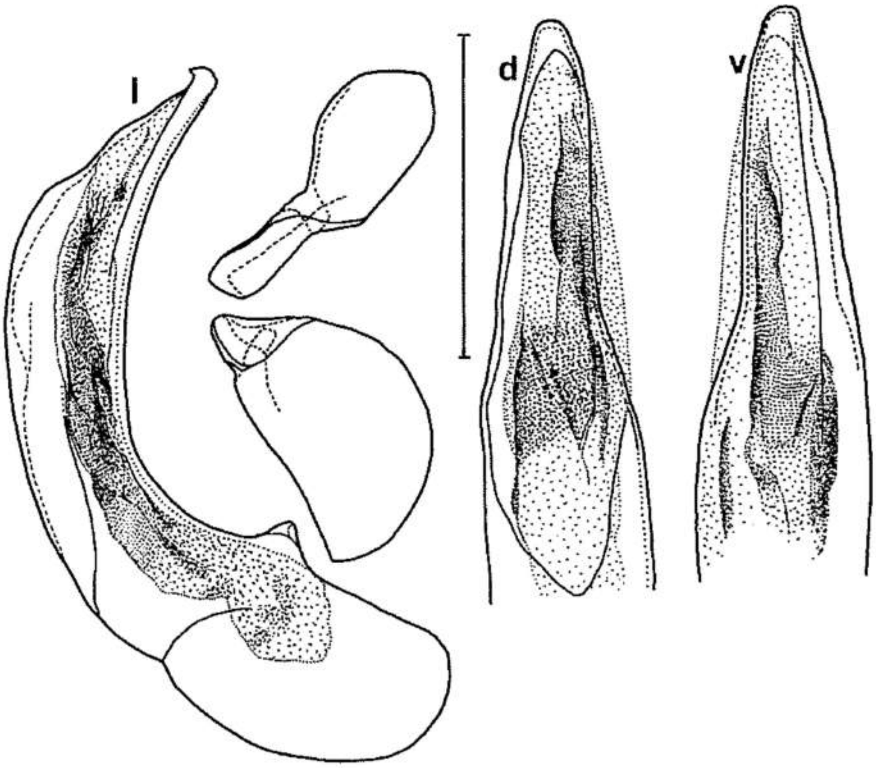


Fig. 7 Male genitalia of *T.* (*T.*) *philippinus* JEDLIČKA, cotype. d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

straightly divergent behind, and reaching eyes; eyes hemispherically prominent, but less prominent than in *Trichotichnus* (s. str.) *szekessyi* (JEDLIČKA), so large that temples are not able to be found; genuine ventral margin of eye adjoining buccal fissure; mandibles robust and short, sharp at tip of right mandible; antennae somewhat thick and short, extending a little beyond pronotal base, 3rd segment relatively dilated distad, pubescent in apical half, as long as the 4th and one-fourth longer than the 2nd; labial palpi missing; ligula parallel-sided, weakly expanded before apex, which is arcuate; paraglossae prolonged forwards a little beyond ligula, free from in the expansion; mentum not transverse, clearly sutured with submentum, narrowly toothed at middle of apical emargination, epilobes more weakly widened than in *T. szekessyi*; microsculpture finely observable as mixtures with square and transverse meshes in most portions and as isodiametric ones on clypeus.

Pronotum transverse, a little larger than one and a half as wide as long, gently convex, widest a little before middle, smooth on disc, coarsely and rather densely punctate in lateral furrows and basal foveae; sides arcuately in front and almost straightly contracted behind from the widest point; apex subtruncate, with an entire border; base two-fifths wider than apex, hardly bisinuate, bordered throughout; apical angles never produced and narrowly rounded; basal angles obtusely angulate, not or feebly protruding at tips; lateral furrows narrow and weakly widened towards base; basal foveae each shallow and obliquely elongate, isolated from lateral furrow by a gentle and large swell; front transverse impression vague and shallow, but a little clearer than in *T. szekessyi*; hind transverse one invisible; microsculpture rather clearly visible on the most area and a little clearer in basal foveae, consisting of transverse meshes.

Elytra ovate and well convex evenly, three-sevenths longer than wide, without puncture; sides gently curved in humeral portions, subarcuate from there to apical one-third, thence clearly rounded behind and shallowly sinuate before apices; apices more narrowly separated from each other than in *T. szekessi* and angulate at tips; bases very shallowly emarginate, with humeral angles fully wide and angulate; striae moderately deep on disc and more deepened apicad and laterad, finely crenulate, scutellar striole long like *T. szekessi*; intervals more or less convex on disc, becoming a little more convex laterad and apicad, 3rd interval bearing a setiferous pore at apical two-fifths; marginal series interrupted medially, composed of (7–8) + 10 umbilicate pores; surface very obscurely microlined. Hind wings fully developed.

Ventral surface bearing punctures and pubescence in same manner as *T. szekessyi*; metepisternum well contracted behind, a half longer than wide; 6th abdominal sternite bisetose at each side in both sexes, shallowly emarginate in ♂ and gently arcuate in ♀ at apex.

Hind femur bisetose; fore tibia bi- or trisetose apico-externally, not or very obscurely sulcate; mid tarsus in ♂ without adhesive squamae in 1st segment, hind tarsus one-sixth to one-seventh shorter in both sexes than the width of head including eyes, 1st segment as long as the 2nd and 3rd combined together and seven-tenths longer than the 2nd, 3rd one and one-third the 4th, claw segment bisetose along each ventral margin.

Aedeagus (Fig. 7) moderately arcuate, fairly thick, sharply and minutely hooked at tip, with basal bulb somewhat small; apical orifice widely opening, inner sac with microtrichia field near apex; apical lobe short, a little wider than long, rounded at tip; ventral surface bordered at sides, rather deeply depressed between the borders. Stylus (Fig. 12-B) similar in shape chaetotaxy to T. szekessyi.

Length: 5.5–6.1 mm. Width: 2.5–2.7 mm.

Specimens examined: 1♀ (Cotype), Philippine Is., 1929, B. M. BOTTCHER leg. "Philippine Is. Coll. Bottcher. B. M. 1929-201." black machine print on yellow paper; "COTYPUS" black machine print on red label; "philippinus sp. n." and "det. Ing. Jedlicka" handwriting and black machine print, respectively, on same white paper; "Mus. Nat. Pragae", "65 688" and "Inv.", only number by handwriting and the remainings by black machine print on same red paper. (preserved in NM); 2♂♂, 1♀, NW slope of Mt. Tagdalit, alt. 1,000 m, Mindanao Is., Philippines, 8–10. V. 1996; 1♂, 1♀, Sungko Vill., alt. 1,500 m, Mt. Kaatoan, Mindanao Is., 5–7. V. 1996; 2♀♀, N slope of Mt. Apo, alt. 1,100 m, Baracatan, Eagle Centre, Mindanao Is., Philippines, 17. VIII. 1985, M. SAKAI leg. (preserved in LEEU and NIc).

This species is allied to *Trichotichnus* (*Trichotichnus*) *szekessyi* JEDLIČKA, but is distinguished from the latter, in addition to the characters mentioned above, by the body smaller in size, the elytra more weakly iridescent and not cyanescent, and the aedeagus with apex rounded and hooked above instead of obliquely directed.

Trichotichnus (*Trichotichnus*) *parvus* N. ITO, sp. nov.

(Figs. 3, 8 and 12-C)

This new species is closely allied to *Trichotichnus* (s. str.) *szekessyi* (JEDLIČKA), but the body is smaller in size (5.9–6.1 mm in length and 2.6–2.8 mm in width), the color is almost black instead of being brownish and with much more weakly iridescent lustre and not bluish reflection on elytra, and the microsculpture is clearer.

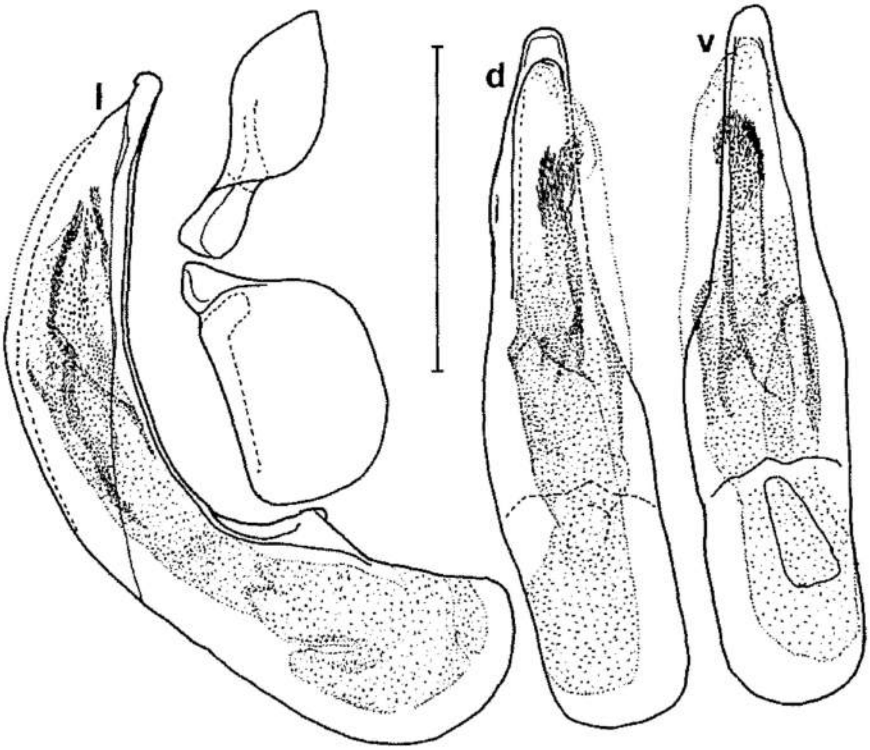


Fig. 8 Male genitalia of *T.* (*T.*) *parvus* N. ITO, sp. nov. d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

Head small, 0.61–0.64 times as wide as the pronotal width, gently convex, finely and sparsely punctate; clypeal suture clearly carved; frontal impressions relatively deep; innerocular space narrow, 0.67–0.63 times as wide as the maximum width of head. Pronotum transverse, 1.55–1.60 times as wide as long, fairly convex; sides arcuate forwards and almost straightly or rarely somewhat arcuately oblique backwards from the widest point at a little behind apical two-fifths; base slightly smaller than one and one-third as wide as apex; basal angles relatively larger than rectangle, never prominent at tips. Elytra widely oblong, a half longer than wide; humeri more gently curved than in *T. szekessyi*; intervals flat, hardly elevated even near apices an bases, a dorsal pore of 3rd interval near apical two-fifths; marginal series widely interrupted in middle, composed of (7–8) + (8–9) umbilicate pores. Hind wings fully developed. Metepisternum a half longer than wide. Sixth abdominal sternite bisetose at each side in both sexes. Fore tibia not sulcate. Hind tarsus 0.89–0.92 times as long as the width of head in both sexes, 1st segment one-tenth shorter than the 2nd and 3rd taken together, 2nd a half longer than the 3rd and twice the 4th, claw segment bisetose ventrally along each side. Aedeagus (Fig. 8) similar in outline to *T. szekessyi*, apex slightly thickened, rounded at tip; apical orifice wide, inner sac two microtrichia portions. Stylus as figured (Fig. 12-C), similar shape to *T. szekessyi*.

Holotype: ♂, Rout (No. 23) Pakse–Paksong, 15°10.4'N, 106°5.8'E, alt.800 m, Ban Itou env., Bolaven Plateau, Champasak Prov., south Laos, 10–18. IV. 1999, M. STRABA leg. (preserved in OMNH). Paratypes: 8♂♂, 12♀♀, same data as the holotype; 14♂♂, 16♀♀, 5 Km SE from Ban Houaykong, 15°2'N, 106°35' E, alt.800 m, Nong Lom (Lake) env., Bolaven Plateau, Attapu Prov., south Laos, 18–30. IV. 1999, E. JENDEK et O. ŠAUŠA leg.; 3♂♂, 3♀♀, 20 Km NW from Louang Namtha, 21°9.2' N, 101°8.7' E, alt. 900±100m, north Laos, 5–11. V. 1997, E. JENDEK et O. ŠAUŠA leg.; 1♀, Ban Nape – Kaew Nua Pass, 18° 22.3′ N, 105° 9.1′ E, alt. 600±100m, Bolikhamsai prov., north Laos, 18. IV.–1. V. 1998, E. JENDEK et O. ŠAUŠA leg.; 1♀, 30 Km SE from Muang Xai, Nam Miang riv., Oudon Xia prov., north Laos, V. 1999, LAO leg.; 1♂, Doi Suthep, Chaing Mai, Thailand, 30. IV. 1990, N. ITO leg.; 2♂♂, 1♀, Doi Inthanon, Chiang Mai, Thailand, 10–17. V. 1990, MALICKY leg.; 2♂♂, 1♀, ditto, 1–3. V. 1990; 2♀♀, ditto, 27. III.–3. V. 1990. (preserved in ZSS and NIc).

Distributional note: This new species is sympatric with *Trichotichnus szekessyi* in Laos and Thailand.

Trichotichnus* (*Trichotichnus*) *malayanus N. ITO, sp. nov.

(Figs. 4, 9 and 12-D)

Trichotichnus (*Trichotichnus*) *szekessyi* (JEDLIČKA): ITO, 1991, Ent. Rev. Japan, 46: 157

This new species is closely allied to *Trichotichnus* (*Trichotichnus*) *szekessyi* (JEDLIČKA), but the microsculpture on dorsal surface of body is more clearly impressed, the pronotum is a little more transverse (1.60–1.67 times as wide as long) and a little more deeply sinuate prebasally at sides, and the aedeagus is roundly thickened at tip instead of being obliquely directed and sharp at dorsal tip.

On comparison with the previous new species, *Trichotichnus* (s. str.) *parvus*, this new species is a little larger, the iridescent lustre is a little clearer, and the elytra is often somewhat

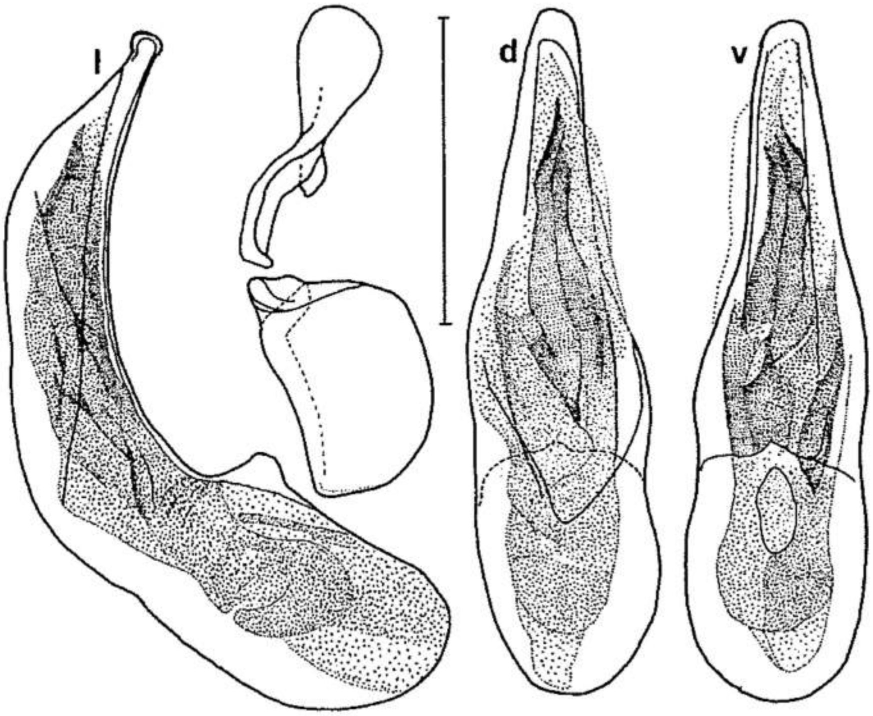


Fig. 9 Male genitalia of *T.* (*T.*) *malayanus malayanus* N. ITO, sp. nov. d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

bluish instead of being almost black.

Description: Body ovally oblong, black, shiny, weakly to somewhat clearly iridescent on elytra. Head somewhat small, 0.63–0.65 times as wide as the pronotal width, interocular space narrow, almost three-fifths of the maximum width of head; genuine ventral margin of eye adjoining buccal fissure. Pronotum arcuately convergent in front and weakly arcuate or sublinearly so behind from the widest point at middle; base 1.36–1.43 times as wide as apex, entirely bordered in the both; basal angles angulate, a little larger than the rectangle, not or weakly protuberant at tips; lateral furrows each narrow in apical half, thence widened backwards, isolated from small basal fovea by weak hump. Elytra 1.47–1.58 times as long as wide, rather well convex, with very sparse and minute punctures; apices widely rounded at tip, widely separated from each other; intervals weakly convex on disc, becoming a little more convex near apices and bases, a dorsal pore on 3rd interval situated a little before apical two-fifths; marginal series rather widely interrupted in middle, composed of (7–8) + (8–9) umbilicate pores. Hind wings fully developed. Metepisternum almost 1.6 times as long as wide; 6th abdominal sternite bisetose at each side in both sexes, truncate at apex in ♂ and gently arcuate in ♀. Fore tibia weakly sulcate in basal third or half; mid tarsus in ♂ without adhesive squamae in 1st segment, hind tarsus one-eleventh short in ♂ and one-fifth in ♀ than the width of head, 1st segment equal in length to the 2nd and 3rd taken together, 2nd one-third longer than the 3rd and twice the 4th, claw segment bisetose along each ventral margin. Aedeagus (Fig. 9) robust, rather well arcuate, roundedly knob-shaped at apex; apical orifice wide, narrowly arcuate at apex. Stylus (Fig. 12-D) resembling that of T. szekessyi.

Length: 6.5–7.1 mm. Width: 2.9–3.2 mm.

Holotype: ♂, Tanah Rata, edge of degraded rainforest, Cameron Highlands, Pahang, Malaysia, at light, 21. III.–2. IV. 1995, O. MERKL leg. (preserved in HNHM). Paratypes: 11♂♂, 26♀♀, same data as the holotype (preserved in HNHM and NIc); 5♂♂, 19♀♀, Tanah Rata, Malaysia, 22. VIII. 1987, M. SATO leg. (preserved in NWU and NIc); 1♂, 19M, Cameron highlands, Malaysia, 31. III. 1974, Y. KIYOYAMA leg.; 1♂, ditto, 24. III. 1975; 1♂, Gap, Malaysia, 8. VI. 1970, Y. KIYOYAMA leg.; 2♂♂, 2♀♀, Fraser Hill, Malaysia, 22. III. 1993, M. YOSHIDA leg. (the remaining paratypes preserved in NIc).

***Trichotichnus* (*Trichotichnus*) *malayanus insulicola* N. ITO, sp. nov.**

(Fig. 10)

This new subspecies is distinguished from the nominotypical subspecies by the pronotum slightly more deeply sinuate before base and a little wider at base and the apex of aedeagus much less thickened.

Description: Body brownish black, shiny, with iridescent lustre and bluish reflexion on elytra. Head relatively small, 0.63–0.66 times as wide as the pronotal width, narrow at interocular space which is three-fifths of the maximum width of head; clypeus transversely depressed before apex; clypeal suture comparatively clear; genuine ventral margin of eye adjoining buccal fissure; microsculpture clearly impressed, composed of mixtures with isodiametric and square meshes. Pronotum moderately convex, 1.51–1.58 times as wide as long; all margins entirely bordered; surface vaguely and transversely rugose on disc, finely and sparsely punctate near apex, somewhat coarsely so in lateral furrows and basal foveae; microsculpture clearly visible

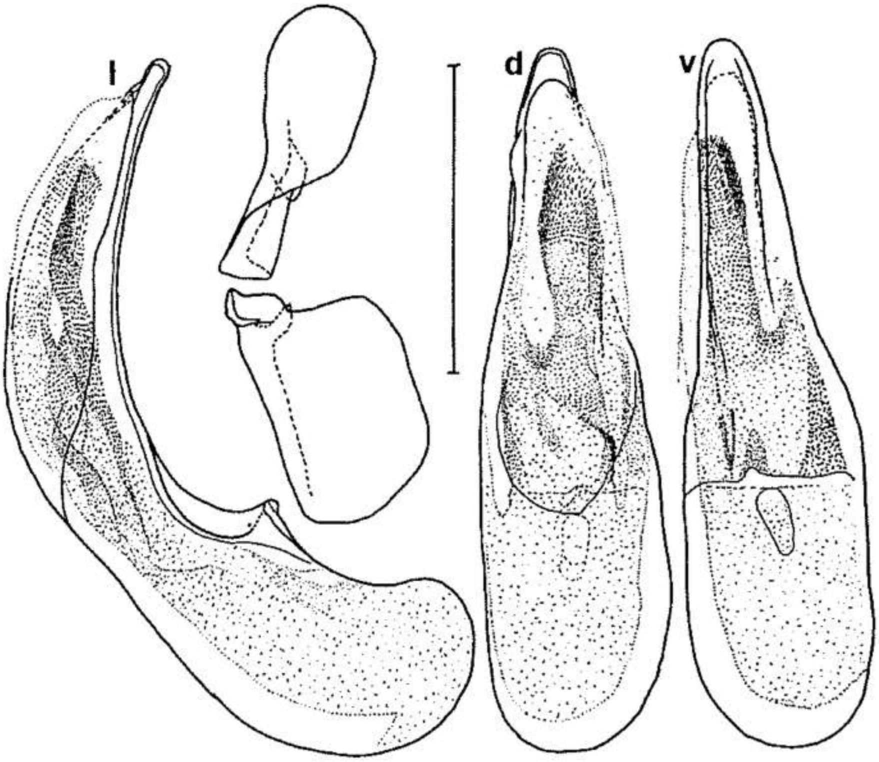


Fig. 10 Male genitalia of *T.* (*T.*) *malayanus insulicola* N. ITO, sp. nov. d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

as both transverse and square meshes. Elytra one-fourth to three-fifths wider than the pronotal width, about a half longer than wide; interval weakly convex on disc; marginal series divided in middle, (8–9) + (10–11) umbilicate pores; microsculpture rather clear, composed of transverse meshes. Metepisternum two-thirds longer than wide; shape and chaetotaxy of abdominal sternite in same manner of the nominotypical species. Hind tarsus one-ninth shorter in ♂ and one-sixth to one-fifth in ♀ than the width of head, 1st segment 0.91–0.93 times as long as the 2nd and 3rd taken together, 2nd one-fourth longer than the 3rd which is one and three-eighths as long as the 4th. Aedeagus (Fig. 10) gently curved, thinned apically, hardly thickened at tip; apical orifice wide, rounded at front margin; apical lobe wide, arcuate distally. Stylus similar in curvature to other species of same group, with a very minute spine basally along ventral margin; basal segment unisetose apico-externally; valvifer bisetose at apex.

Holotype: ♂, Sinabung, alt. 1,500–2,000 m, Brastagi, North Sumatra, Indonesia, 14–17. III. 1998, L. BOCAK leg.(preserved in OMNH). Paratypes: 7♂♂, 2♀♀, same data as the holotype; 30♂♂, 32♀♀, Brastagi, alt. 1,300m, Sumatra, Indonesia, 3–10. XII. 1989, K. YAHIRO leg.; 2♂♂, 8♀♀, ditto, T. YASUNAGA leg.; 2♂♂, 1♀, 15 Km SSE from Takengon, alt. 1,600m, Sumatra, Indonesia, 26. II.–13. III. 1998, L. BOCAK leg.; 2♂♂, Kedah, 1,700m, 20 Km S from Blangkeieren, Sumatra, Indonesia, 4–8. III. 1998, L. BOCAK leg.; 1♀, Bukit Lawang, alt. 400 m, North Sumatra, Indonesia, 24–25. II. 1998, L. BOCAK leg. (preserved in NIc)

Trichotichnus (*Trichotichnus*) *sasajii* N. ITO, sp.nov.

(Figs. 5, 11 and 12-E)

Body subovally oblong, weakly convex, brownish black, clearly iridescent on elytra; lateral margins of pronotum yellowish brown, palpi, 1st segments of antennae, legs, and lateral margins of elytra light brown, the remaining antennal segments blackish brown, middle portions of mandibles reddish brown, sutural intervals of elytra slightly brownish.

Head weakly elevated, moderate in width, two-thirds as wide as pronotum, very sparsely punctulate; labrum quadrate, rounded at apical corners, truncate apically; clypeus finely and shallowly grooved before apex which is shallowly emarginate and weakly swollen, or rarely smooth; clypeal suture fine and shallow lengthwise; frontal impressions shallow, but clear, arcuately divergent behind; interocular space rather wide, a little more than three-fifths of the maximum width of head; eyes large and hemispherical; temples each abruptly convergent to neck constriction, very short, about one-eighth of longitudinal length of eye; genuine ventral margin of eye narrowly isolated from buccal fissure; antennae submoniliform, short, reaching apical one-tenth of elytra, 3rd segment sparsely pubescent in apical half, fairly dilated apicad, as long as the 4th and a half longer than the 2nd; palpi massive, 3rd segment of labial palpus strongly tumid in middle, one-third longer than the 2nd; ligula narrow, truncate at apex; paraglossae not protruding forwards beyond ligular apex; mentum with epilobes narrow, not widened distad, median tooth rounded and not large; microsculpture more or less clear on clypeus, almost invisible on vertex, consisting of mixtures with square and isodiametric meshes.

Pronotum transversely quadrate, widest at a little behind apical two-fifths, one-third wider than long, gently convex, almost flattened centrally; sides a little stronger in convergence anteriad than posteriad, arcuate apically and straight basally; apex straight, finely and clearly bordered throughout; base three-tenths wider than apex, hardly oblique at sides, rather thickly and entirely bordered; apical angles widely rounded; basal angles a little larger than right angle, very narrowly rounded; lateral furrows each somewhat wide even in apical portions, gradually expanded basad, fused with basal fovea, which is subquadrate and bears a longitudinal vague hump; both front and hind transverse impressions obscure; surface very sparsely and minutely punctate on disc, coarsely so in apical and baso-lateral portions; microsculpture rather clear, observed as mixtures with square and transverse meshes.

Elytra oblong-oval, 1.44–1.53 times as long as wide, rather steeply declivous near sides, about one-fourth wider than pronotum, without punctures; sides rather strongly curved in humeri, regularly arcuate before spices, with more or less deep preapical sinus; apices narrowly rounded at tips, acute at sutural angles, narrowly separated from each other; bases shallowly emarginate, humeral angles very larger than rectangle and angular or somewhat blunt; striae wide, moderately deep on disc, gradually deepened apicad and basad, and finely and clearly crenulate, scutellar striole long; intervals flat on disc, gently raised towards apices and bases, a dorsal pore on 3rd interval situated near middle; marginal series somewhat widely interrupted in middle, consisting of (7–8) + (9–10) umbilicate pores; surface very finely and transversely microlined. Hind wings fully developed.

Ventral surface almost smooth, scattered by only several punctures laterally on metasternum, with very sparse and short pubescence medially on 2nd and 3rd abdominal sternites; metepisternum steeply contracted behind, a half longer than wide; 6th abdominal sternite bisetose at each side in both sexes, truncate in ♂ and widely arcuate in ♀ at apex.

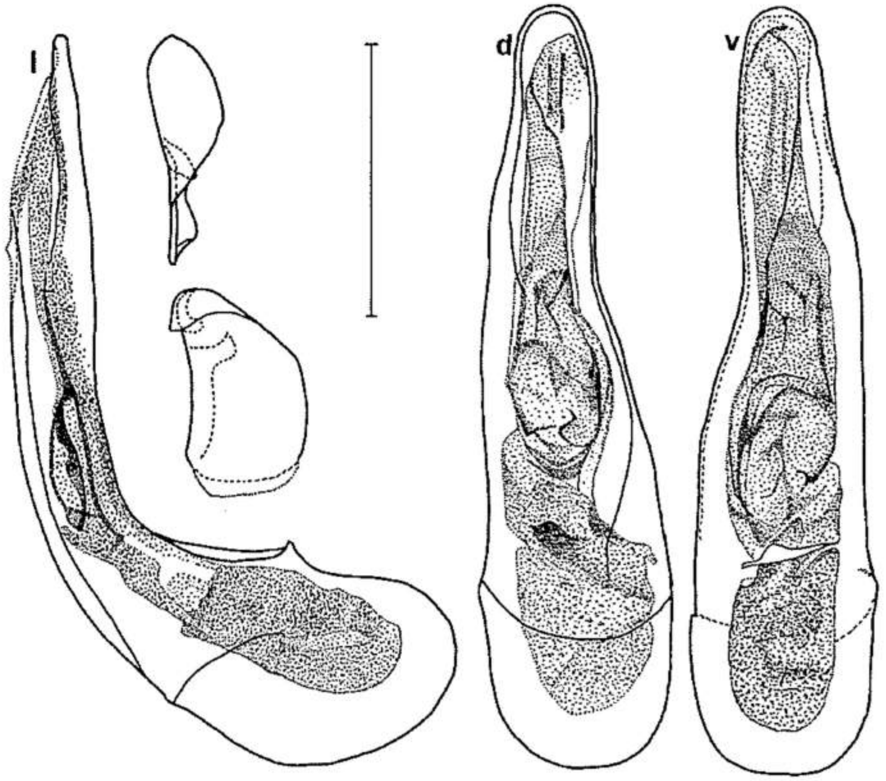


Fig. 11 Male genitalia of *T.* (*T.*) *sasajii* N. ITO, sp. nov. d, dorsal aspect; v, ventral aspect. Scale: 1 mm.

Hind femur bisetose along hind margin; fore tibia obscurely and brokenly sulcate only in basal half, trispinous along apico-external margin, terminal spur long and lanceolate; tarsi relatively long, mid tarsus of ♂ bearing ventral adhesive squamae on 2nd to 4th segments, hind tarsus one-ninth in ♂ and one-seventh in ♀ shorter than the width of head, 1st segment as long as the 2nd and 3rd taken together, 3rd two-sevenths shorter than the 2nd and one-fourth longer than the 4th, claw segment bisetose along each ventral margin.

Aedeagus (Fig. 11) thin, not thickened at apex, with large basal bulb; apical orifice wide in apical half, inner sac without any sclerites; apical lobe very narrow, present like border along apical margin; ventral surface depressed near apex, vaguely bordered. Stylus (Fig. 12-E) rather slender, gently curved, bearing a small spine only along ventral margin; basal segment with a single seta; valvifer trisetose at apex.

Length: 5.2–5.7 mm. Width: 2.3–2.6 mm.

Holotype: ♂, Lanyu Is., Taiwan, 18. VIII. 1970, T. KOBAYASHI leg. (preserved in OMNH). Paratypes: 4♂♂, 3♀♀, same data as the holotype. (preserved in NIc).

This new species is allied to *Trichotichnus szekessyi* (JEDLIČKA), but the body is much smaller in size, the head is more obscurely microsculptured, and the pronotum is more widely punctate, less convex and not arcuate basally at sides.

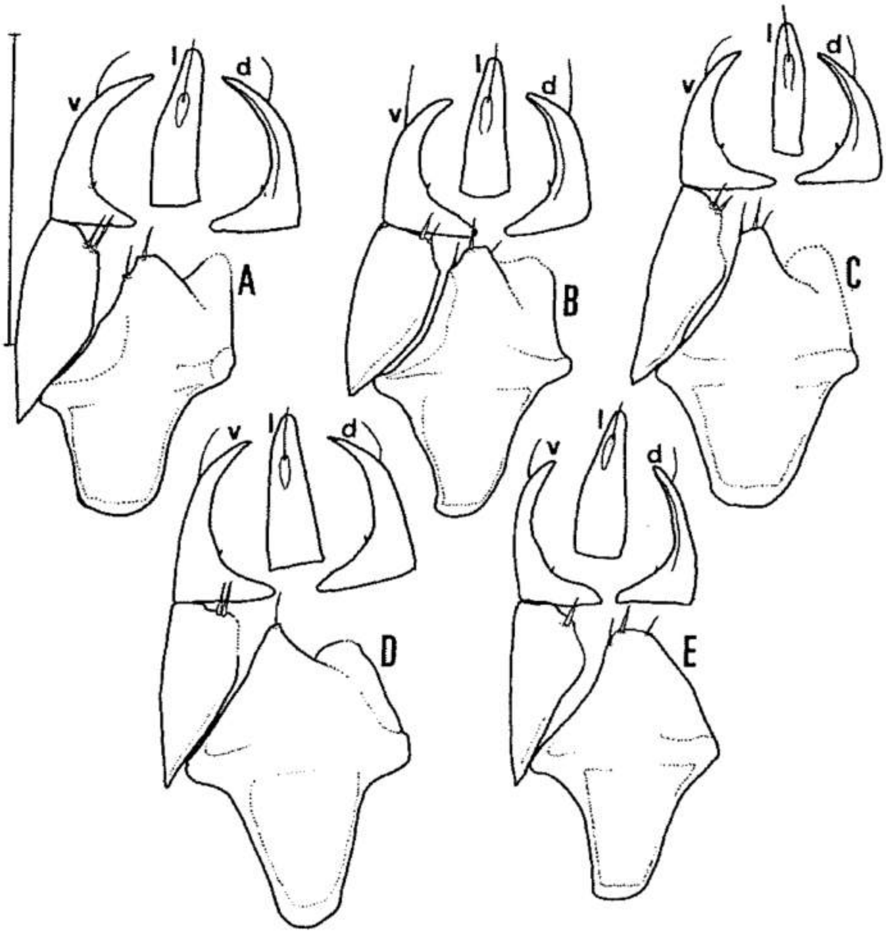


Fig. 12 Female genitalia of genus *Trichotichnus* spp. A, *Trichotichnus* (*Trichotichnus*) *szekessyi* (JEDLIČKA), holotype; B, *T.* (*T.*) *philippinus* JEDLIČKA, cotype; C, *T.* (*T.*) *parvus* N. ITO, sp. nov.; D, *T.* (*T.*) *malayanus malayanus* N. ITO, sp. nov.; E, *T.* (*T.*) *sasajii* N. ITO, sp. nov.; d, sorsal aspect; v, ventral aspect; l, lateral aspect. Scale: 0.5 mm.

要　　約

伊藤　昇：*Trichotichnus* 属 *orientalis* group について（1）—— *orientalis* group の種は琉球・台湾からスンダ諸島を経てニューギニアまで広く分布するが、インドシナからマレーシア半島にいたる地域からは *Trichotichnus szekessyi* (JEDLIČKA) としてマレー半島から記録された個体以外空白地帯となっていた．著者は最近この空白地域、スマトラ島、フィリッピンからの本種群の標本を入手した．これらは何れも外観が酷似しており判別が容易でないが，マレー半島産の再検討と共にこれらを詳細に検討した結果，*Trichotichnus szekessyi* とされたマレー半島産の個体は別種であるとの結論に達したと共に，インドシナ，台湾にはにはそれぞれ別に新種が分布すること，スマトラ島にはマレー半島産の亜種が存在することが分かった． また *T. szekessyi* と *T. philippinus* の Type を含む複数の標本を検した結果、独立の種である事が判明した。 これらの事より，ラオスから *Trichotichnus* (*Trichotichnus*) *parvus* を，*T.* (*T.*) *malayanus malayanus* をマレー半島から，*T.* (*T.*) *malayanus insulicola*をスマトラ島から，*T.* (*T.*) *sasajii*を

台湾からそれぞれ記載した．また，*T. szekessyi* と *T. philippinus* を交尾器の図と共に再記載した。これらの種は外見が似ているだけでなく、雌交尾器 stylus の腹側外縁にのみ微弱な棘を有する特異な特徴を有する点で近縁関係にある一群と推定される。

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