

A Preliminary Revision of the Species-complex of *Carabus* (*Apotomopterus*) *sauteri* (Coleoptera, Carabidae)

Yûki IMURA

Shinohara-chô 1249-8, Kôhoku-ku, Yokohama, 222 Japan

Abstract Five Chinese species belonging to the subgenus *Apotomopterus* of the genus *Carabus* (s. lat.), namely, *C. (A.) changi* HAUSER, *C. (A.) kleinfeldianus* DEUVE, *C. (A.) phami* DEUVE, *C. (A.) eleganticollis* DEUVE et IMURA, and *C. (A.) yunkaicus* DEUVE, are downgraded to the subspecies of *C. (A.) sauteri* ROESCHKE, with description of a new subspecies from South Taiwan under the name of *C. (A.) s. shimizuianus* nov.

All the species belonging to the subgenus *Apotomopterus* of the genus *Carabus* (s. lat.) have a well developed chitinous piece, named spinula¹⁾, at the dorsal base of endophallus, as the basic structure of male genital organ. Although its taxonomic importance has not always been taken into account by previous authors, this small sclerite is peculiar in size and shape according either to species or to subspecies, and seems useful for identification and classification of lower taxa. On the basis of this genitalic character, taxonomic relationship among the members of the same subgenus should be reconstructed, at least partly.

In *Carabus (A.) sauteri*, which was described by ROESCHKE (1912, p. 4) from the central part of Taiwan, the spinula is well-developed, spine- or peg-like in shape, and is obliquely situated a little to the left of the mid-line at the dorsal base of endophallus. Although once regarded by BREUNING (1932, p. 206) as a synonym of *C. (A.) changi* HAUSER, this species is now widely known to be distinct, since the same author recognised so in his other article (1957, p. 275). However, little has been revised on its taxonomic status based upon the morphology of genitalia, above all of the spinula, by contrast with its relatives distributed in the southeastern part of the Chinese Continent.

Through my recent study on the detailed structure of male genital organ, I have become aware of the fact that several forms of continental *Apotomopterus* hitherto described as independent species are in fact not so remarkably different from *C. (A.) sauteri*, and have come to the conclusion that they should be unified into a single taxon at the species level. So far as I have examined, the following five taxa are considered to be conspecific with the Taiwanese species: *C. (A.) changi* HAUSER, *C. (A.) kleinfeld-*

1) Terms used for this small sclerite are different according to authors, e.g., "phanère" or "épine chitinisée" (MEURGUES et LEDOUX, 1966), "dente sclerificato" (STULANI, 1967), "ligula" (ISHIKAWA, 1973), "sclérite basal" (DEUVE, 1988, 1990; DEUVE et IMURA, 1990), "sclérite dentiforme" (DEUVE, 1991; DEUVE et IMURA, 1991), "spinula" (DEUVE et IMURA, 1993), etc. Here I am adopting, though provisionally, the term "spinula."

anus DEUVE, *C. (A.) phami* DEUVE, *C. (A.) eleganticollis* DEUVE et IMURA, and *C. (A.) yunkaicus* DEUVE.

In this paper, I am going to downgrade all of them to the subspecies of *C. (A.) sauteri* which has the priority over the other five names. In addition, I will describe a new subspecies of the latter from the southern part of Taiwan under the name of subsp. *shimizuianus* nov. As the result, ROESCHKE's species is classified into seven subspecies.

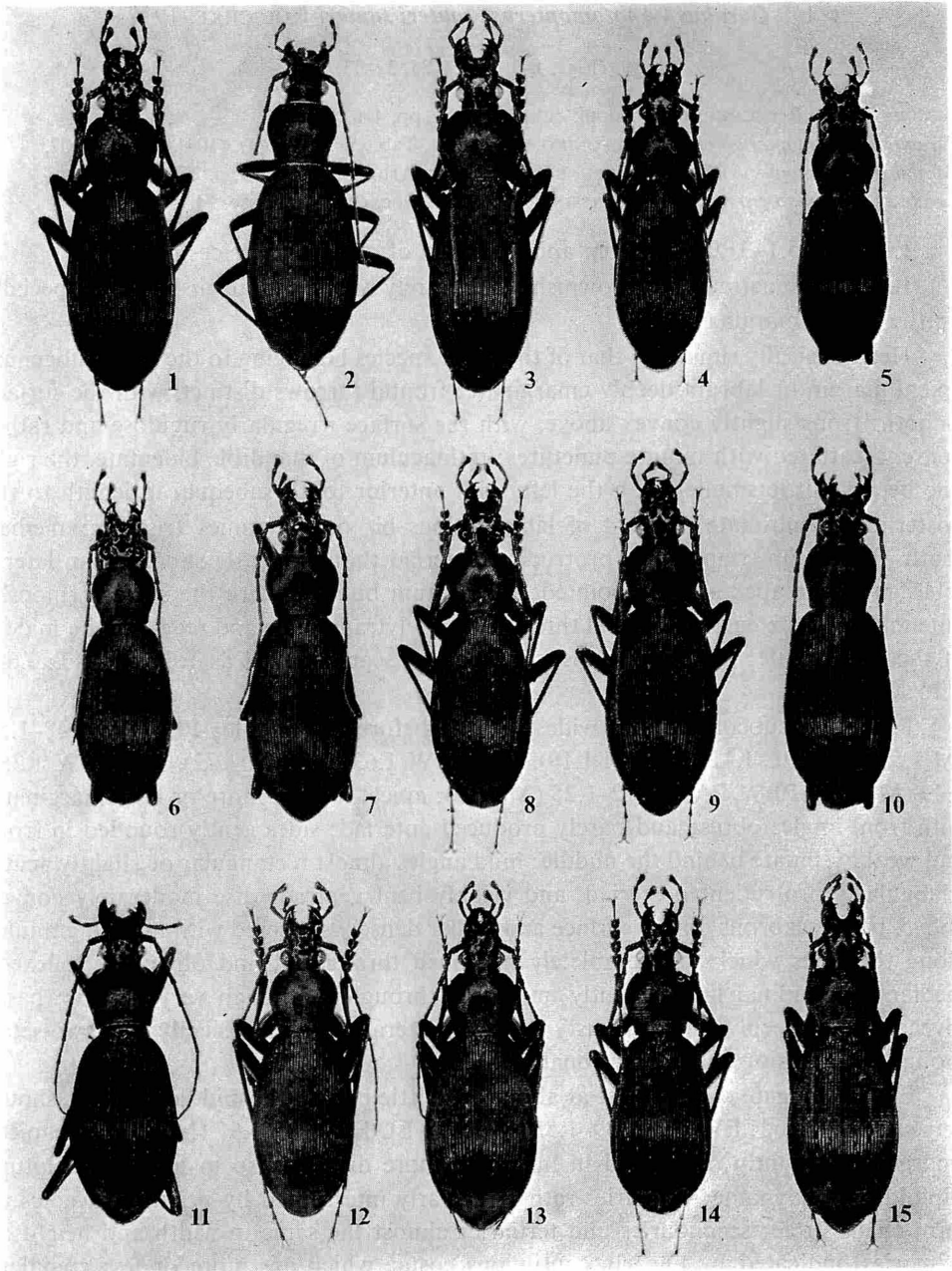
I have been unable to examine some other taxa²⁾ which seem very similar at least superficially to the species under consideration. Besides, our knowledge is still too poor about the *Carabina* distributed in China and the neighbouring areas to make a satisfactory discussion on the geographical variation of such a polytypical species. For these reasons, I will only give a preliminary revision in this paper.

The abbreviations used herein are the same as those explained in my previous papers except for the following ones which will additionally be employed in the present paper: IZP – Institute of Zoology, Academia Sinica, Pekin; IZSP – Institute of Zoology, St.-Petersburg; ZMA – Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam; DEI – Deutsches Entomologisches Institut.

Before going further, I wish to express my deep appreciation to Dr. Shun-Ichi UÉNO of the National Science Museum (Nat. Hist.), Tokyo, not only for critically reading the manuscript of this paper but also for permitting me to examine the specimens from the Tian-mu Shan Mts. brought by the Sino-Japanese Cooperative Study on Soil Fauna of Subtropical Forest in China made in 1989. In having the loan of the holotype specimens of *Apotomopterus* carabid beetles, I am greatly indebted to the following three doctors: Dr. Ben BRUGGE of the Instituut voor Taxonomische Zoölogie, Zoölogisch Museum – Universiteit van Amsterdam (*C. changi* and *C. phami*), Dr. Frank KLEINFELD, Fürth (*C. kleinfeldianus*), and Dr. Lothar ZERCHE of the Deutsches Entomologisches Institut (*C. sauteri*). Deep gratitude is also due to Messrs. Bernard LASSALLE, Kiyoyuki MIZUSAWA, Seiji MORITA, Hiroyuki SAKAINO, Shōhei SHIMIZU, and Motohiko TANIKADO for their kind help in various ways.

2) *E.g.*, *Carabus (Apotomopterus) gracilithorax* DEUVE, 1989 (only 1 ♀ is known from Guangxi, in coll. IZP), *C. (A.) guangdongicus* DEUVE, 1991 (only 1 ♀ is known from Gunagdong, in coll. IZP), *C. (A.) cheni* DEUVE, 1991 (only 1 ♂ is known from Yunnan, in coll. IZSP), *C. (A.) tianpingensis* DEUVE et YU, 1992 (only 1 ♂ is known from Hunan, in coll. IZP), etc.

Figs. 1–15. *Carabus (Apotomopterus) sauteri* subsp. — 1–3, Subsp. *sauteri* ROESCHKE, 1, ♂, from Mt. Kuan-tao Shan, C. Taiwan; 2, ♀ (holotype), from Shui-she-liao, C. Taiwan; 3, ♂, from Mt. La-la Shan, N. Taiwan; 4, subsp. *shimizuianus* IMURA, nov., ♂ (holotype), from Mt. Nan-feng Shan, S. Taiwan; 5, subsp. *changi* HAUSER, ♂ (holotype), from Mt. Yun-ling Shan, Fujian Prov., China; 6–9, subsp. *kleinfeldianus* DEUVE, 6 (♂)–7 (♀), from the Tian-mu Shan Mts., Zhejiang Prov., China, 8 (♂)–9 (♀), from Mt. Huang Shan, Anhui Prov., China; 10–11, subsp. *phami* DEUVE, from Kienchang (=Nan-cheng), Jiangxi Prov., China, 10, ♂ (holotype), 11, ♀; 12–13, subsp. *eleganticollis* DEUVE et IMURA, from Mt. Lu Shan, Jiangxi Prov., China, 12, ♂ (holotype), 13, ♀ (allotype); 14–15, subsp. *yunkaicus* DEUVE, from Mt. Miao'er Shan, Guangxi Prov., China, 14, ♂, 15, ♀.



1. *Carabus (Apotomopterus) sauteri sauteri* ROESCHKE, 1912

(Figs. 1-3, 16, 24-25, 32-33)

Carabus Sauteri ROESCHKE, 1912, Suppl. ent., Berlin, 1, pp. 4-6.*Carabus (Apotomopterus) changi*: BREUNING, 1932, Best.-Tab. eur. Coleopt., (104), pp. 204-207.*Carabus (Apotomopterus) Sauteri*: BREUNING, 1957, Ent. Arb. Mus. Frey, 8, p. 275.*Carabus (Apotomopterus) sauteri*: BREUNING, 1966, Bull. Soc. ent. Mulhouse, 24, p. 23.

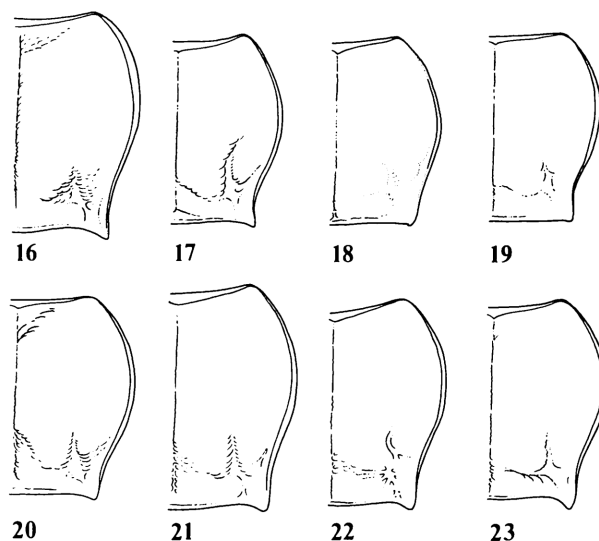
Length: 25.1-31.0 mm (from apical margin of clypeus to apices of elytra).

Black or sometimes red-brownish black, rarely with faint purplish lustre especially on the elytral margins.

Head basically similar to that of the other species belonging to the same subgenus; apical margin of labrum deeply emarginate; frontal furrows distinct, with the surface smooth; frons slightly convex above, with the surface irregularly rugulose and rather densely scattered with minute punctures; retinaculum of mandible bidentate, the right one being a little smaller than the left, with anterior tooth subequal in length to the posterior; penultimate segment of labial palpus bi- or sometimes trisetose; median tooth of mentum triangularly protrudent anteriorly though a little shorter than lateral lobes, with the apex sharply pointed; submentum bisetose, with the surface smooth; antennae long, extending to basal three-fifths of elytra in male and reaching the middle of them in female; relative lengths of scape and segments 2-4 as follows:— 1: 0.68: 1.15: 0.88.

Pronotum subcordate and widest a little before the middle; PW/HW 1.48-1.57 (M 1.52), PW/PL 1.12-1.27 (M 1.19), PW/PAW 1.63-1.83 (M 1.72), PW/PBW 1.38-1.49 (M 1.44), PBW/PAW 1.12-1.25 (M 1.19); apical margin more or less emarginate, with front angles obtuse and barely produced anteriorly; sides gently rounded in front and weakly sinuate behind the middle; hind angles almost rectangular or slightly acute, triangularly protrudent posteriorly, and weakly bent ventrad; disc moderately convex above, being scabrous on the surface and rather densely scattered with minute granules along the sides which are completely margined throughout and obviously reflexed; median longitudinal line evidently impressed throughout though very narrow; basal foveae not so deeply but obviously concave; lateral margins basically with two setae though the anterior one is occasionally absent.

Elytra elongate oval, widest at about or a little behind the middle, with the shoulders rather effaced; EW/PW 1.39-1.55 (M 1.49), EL/EW 1.85-1.97 (M 1.92); preapical emargination faintly recognised in male and more distinctly so in female; sculpture triploid, homodyname; primaries rather regularly interrupted by primary foveoles to form chain-striae; secondaries and tertiaries almost the same in width and height as primaries, indicated by linearly continuous costae which are more or less crenulate near bases and from apical halves to thirds; striae between intervals irregularly scattered with small granules; umbilicate series indicated by a regularly set row of granules extending nearly to elytral apices, outside of which are recognised two or three rows of minute granules.



Figs. 16–23. Pronotum (♂, right half in dorsal view) of *Carabus (Apotomopterus) sauteri* subsp. — 16, Subsp. *sauteri* ROESCHKE, from Mt. Kuan-tao Shan; 17, subsp. *shimizuianus* IMURA, nov. (holotype), from Mt. Nan-feng Shan; 18, subsp. *changi* HAUSER (holotype), from Mt. Yun-ling Shan; 19–20, subsp. *kleinfeldianus* DEUVE, 19, from the Tian-mu Shan Mts., 20, from Mt. Huang Shan; 21, subsp. *phami* DEUVE (holotype), from Kienchang (=Nan-cheng); 22, subsp. *eleganticollis* DEUVE et IMURA (holotype), from Mt. Lu Shan; 23, subsp. *yunkaicus* DEUVE, from Mt. Miao'er Shan.

Pro- and mesepisterna smooth, metepisterna and sides of sternites rather densely punctate; sternal sulci completely and prominently carved; metacoxa trisetose.

Aedeagus long and slender, with the basal part weakly curved ventrad, median portion subcylindrical, almost parallel-sided or faintly swollen on the ventral side a little before the middle, apical lobe moderately elongate, gently curved ventrad, slightly compressed and subtriangularly pointed; spinula strongly sclerotized and peg-like in shape, approximately 4 times as long as wide, widest at the base, then gradually or rather acutely narrowed towards apex which is abruptly hooked ventrad to form triangularly shaped small spine with the tip sharply pointed; dorsal surface of spinula either almost smooth or more or less rugulose obliquely.

Type depository. DEI.

Type locality. “Suisharyo” (=Shui-she-liao, 1,150 m alt, situated on the western slope of the Ali Shan Mts. in Chu-chi Hsiang of Chi-ai Hsien, central Taiwan).

Specimens examined. 1 ♀ (holotype of *C. sauteri*), “Suisharyo, Formosa, H. SAUTER, 1911”/“7. XII”/“TYPUS”/“Holotypus”/“*Apotomopterus sauteri* mihi, nov. sp., Typ.”/“coll. DEI, Eberswalde”; 1 ♂, 3 ♀♀, Mt. Kuan-tao Shan in Jen-ai Hsiang of Nan-tou Hsien, central Taiwan, 1–V–1990, C.-C. Lo leg.; 2 ♂♂, 3 ♀♀, same locality, 5–V–1991, M. TANIKADO leg.; 2 ♀♀, Nan-shan-hsi Valley, I–1970’s; 3 ♂♂, 3 ♀♀, central Taiwan (no more available data), III~XII–1986; 1 ♂, Mt. La-la Shan, Tao-yuan Hsien, northern Taiwan, 22–VI–1980, H. SAKAINO leg.

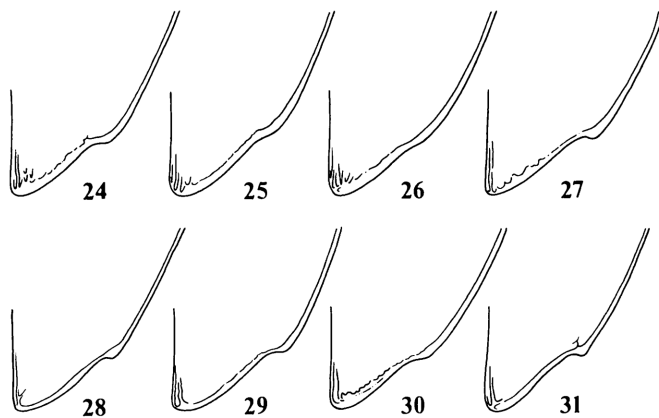
Notes. In central and northern Taiwan, this species appears to vary a little in external features according to localities. In the holotype specimen from Shui-she-liao (Fig. 2), the basal foveae of the pronotum are very shallow, the elevated parts of elytral intervals are rather distinctly prominent, and the preapical emargination of the elytra is rather deep (cf. Fig. 24). However, in the specimens from Mt. Kuan-tao Shan (Fig. 1), about 70 km distant to the north by east from the type locality, the basal foveae of the pronotum are deeper (cf. Fig. 16), the elytral sculpture is smoother, and the preapical emargination is shallower (cf. Fig. 25). Besides, as shown in Fig. 3, the La-la Shan specimen is also peculiar in facies, which is characterised by larger size, large and strongly convex pronotum, and comparatively slender elytra, though a single male specimen I was able to examine is not sufficient for a discussion on its true taxonomic position. Further investigations are therefore needed for solving the problem of geographical and individual variations of this species even in the Island of Taiwan.

2. *Carabus (Apotomopterus) sauteri shimizuianus* IMURA, subsp. nov.

(Figs. 4, 17, 26, 34)

Length: 25.3–28.5 mm (from apical margin of clypeus to apices of elytra).

Distinguished from the nominotypical subspecies by the following points: size a little smaller; pronotum slenderer, with the sides more strongly contracted before hind angles which are narrower and a little less strongly protrudent posteriad, and disc a little more weakly rugulose; elytra also slenderer, with the sides nearly parallel-sided, and shoulders more effaced; elytral sculpture with primary foveoles a little deeper,



Figs. 24–31. Right elytron (♀, apical part in dorsal view) of *Carabus (Apotomopterus) sauteri* subsp. — 24–25, Subsp. *sauteri* ROESCHKE, 24 (holotype), from Shui-she-liao; 25, from Mt. Kuan-tao Shan; 26, subsp. *shimizuianus* IMURA, nov., from Mt. Nan-feng Shan; 27–28, subsp. *kleinfeldianus* DEUVE, 27, from the Tian-mu Shan Mts., 28, from Mt. Huang Shan; 29, subsp. *phami* DEUVE, from Kienchang (=Nan-cheng); 30, subsp. *eleganticollis* DEUVE et IMURA, from Mt. Lu Shan; 31, subsp. *yunkaicus* DEUVE, from Mt. Miao'er Shan.

elevated part of each interval a little less strongly crenulate; preapical emargination of elytra in female shallower. Apical lobe of aedeagus usually a little more strongly bent ventrad and a little more sharply pointed. Spinula a little slenderer and less acutely narrowed to the apex.

Type series. Holotype: ♂, allotype: ♀, 30-VII-1984 (NSMT). Paratypes: 3 ♂♂, same data as for the holotype; 1 ♀, same locality as for the holotype, 22-VII-1983, in coll. Y. IMURA and S. SHIMIZU.

Type locality. Mt. Nan-feng Shan, ca. 1,000 m alt., near Liu-kuei in Kaohsiung Hsien, southern Taiwan.

Notes. The type locality, Mt. Nan-feng Shan near Liu-kuei, may be the southern limit of the distributional range of the species. This new subspecies is named after Mr. Shôhei SHIMIZU who kindly submitted most of the type series to me for study.

3. *Carabus (Apotomopterus) sauteri changi* HAUSER, 1913, stat. nov.

(Figs. 5, 18, 35)

Apotomopterus Tientei subsp. *Changi* HAUSER, 1913, Dt. ent. Z., 1913, pp. 468, 469.

Carabus (Apotomopterus) changi: BREUNING, 1932, Best.-Tab. eur. Coleopt., (104), pp. 204-207.

Length: 23.3 mm (from apical margin of clypeus to apices of elytra).

More closely allied to subsp. *shimizuianus* nov. than to the nominotypical subspecies, but different from both of them in the following points: size smaller; median tooth of mentum longer, almost the same in length as lateral lobes, with the apex very sharply pointed; sides of pronotum less strongly sinuate behind the middle; hind angles of pronotum barely protrudent postero-laterad and more strongly bent ventrad, with the postero-lateral margins not divergent but obviously convergent backwards in dorsal view; pronotal disc more weakly scabrous, with the basal foveae much shallower; elytra slenderer, widest at about apical third, with shoulders more effaced; striae between elytral intervals either very sporadically or barely granulate; prepisterna and sides of sternites far more weakly punctate; apical lobe of aedeagus a little longer and slenderer; spinula also slenderer, rather abruptly narrowed towards apex which is faintly but obviously hooked ventrad, with the dorsal surface hardly rugulose.

Type depository. ZMA.

Type locality. Eastern slope of Mt. Yun-ling Shan, Fujian Province, Southeast China.

Specimen examined. 1 ♂ (holotype of *C. changi* HAUSER), “♂, Yunlingshan, Koatung, Ch., XI. 1912”/“*A. changi*, G.H. Type”/“TYPE”/“*changi* t, BREUNING, c.”/“Collectie C. & O. VOGT, Acq. 1960”.

Notes. In the first volume of his monograph, BREUNING (1932, p. 206) tentatively treated *C. sauteri* as a synonym of *C. changi*, though he was aware of the fact that the former (described in 1912) had the priority over the latter (described in 1913), because he was unable to see any specimen of ROESCHKE's species at that time. Later, he (1957, p. 275 and 1966, p. 23) succeeded in examining specimens of the former, at first

a female from Mt. Rarasan (=La-la Shan), then a male from Mt. Hinohi yama (mis-reading of Hinoki-yama=Kuai Shan), and concluded that the Taiwanese form was specifically different from the continental one. In my view, however, the two taxa should belong to the same species, judging from close similarity in conformation of the male genitalia, above all in that of the spinula.

4. *Carabus (Apotomopterus) sauteri kleinfeldianus* DEUVE, 1991, stat. nov.

(Figs. 6–9, 19–20, 27–28, 36–37, 41)

Carabus (Apotomopterus) kleinfeldianus DEUVE, 1991, Entomologiste, **47**, p. 20. figs. 7, 16.

Length: 25.3–28.0 mm (from apical margin of clypeus to apices of elytra).

Allied to subsp. *changi*, but distinguished from it by the following points: size larger; eyes also a little larger and more strongly protrudent laterad; pronotum with the widest part situated at a level a little more forwards, and hind angles barely protrudent posteriad; elytra with secondary and tertiary intervals more strongly crenulate in posterior halves, and striae between intervals a little more prominently granulate; apical lobe of aedeagus a little longer; spinula with the apical part a little stouter and more distinctly hooked ventrad.

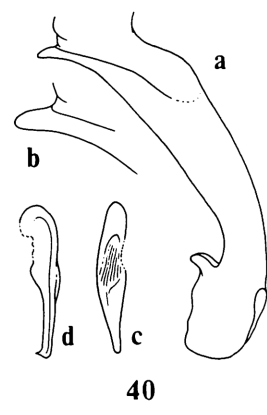
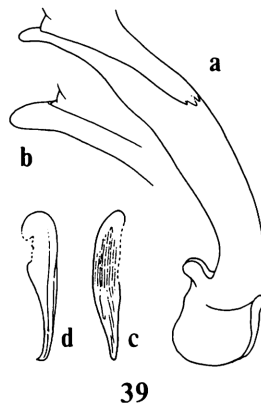
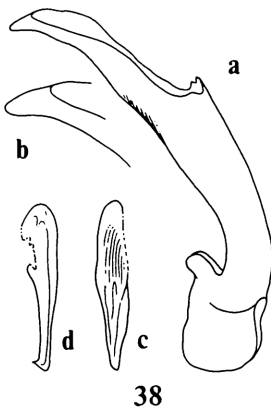
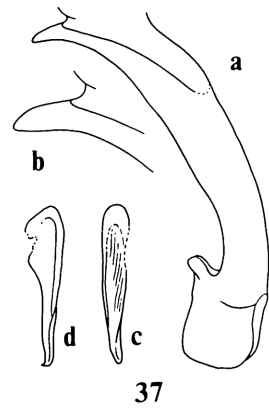
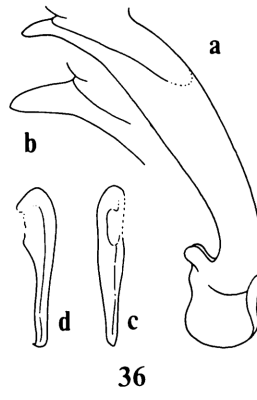
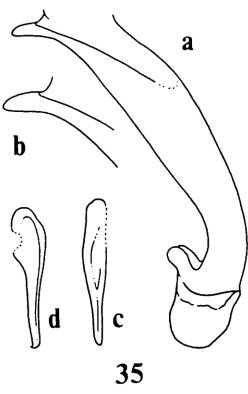
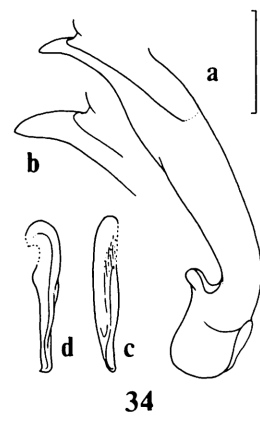
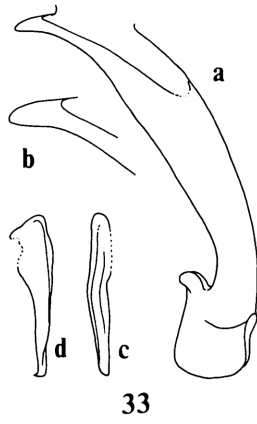
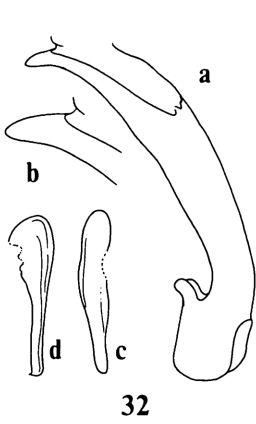
Type depository. Private collection of F. KLEINFELD, Fürth, Germany.

Localities. Mt. Tian-mu Shan (Zhejiang Province) and Mt. Huang Shan (Anhui Province), East China.

Specimens examined. 1 ♂ (holotype of *C. kleinfeldianus* DEUVE), “Chine, Zhejiang, Tienmu Shan (=Tian-mu Shan), SUENSON, 29-VI-1937” in coll. F. KLEINFELD; 1 ♂, 1 ♀, above Laodian, 1,170 m alt., Mt. Xi Tian-mu Shan, Zhejiang Province, 4-IX-1989, S. UÉNO leg. in coll. Y. IMURA; 3 ♂♂, 6 ♀♀, Mt. Huang Shan, 700–1,000 m alt., Anhui Province, 1~4-VIII-1992, in colls. K. MIZUSAWA and Y. IMURA.

Notes. The present subspecies was originally described by DEUVE as an independent species based upon an old specimen preserved in the private collection of F. KLEINFELD. Through his courtesy, I was able to examine the holotype specimen. Before then, a pair from the same mountain range have already been brought to me by Dr. Shun-Ichi UÉNO in 1989. After a careful examination, I have come to the conclusion that these specimens are specifically identical with *C. sauteri*, though rather peculiar in large and strongly prominent eyes and barely protrudent hind angles of

Figs. 32–40. Male genital organ of *Carabus (Apotomopterus) sauteri* subspp. — 32–33, Subsp. *sauteri* ROESCHKE, 32, from Mt. Kuan-tao Shan, 33, from Mt. La-la Shan; 34, subsp. *shimizuianus* IMURA, nov. (holotype), from Mt. Nan-feng Shan, 35, subsp. *changi* HAUSER (holotype), from Mt. Yun-ling Shan; 36–37, subsp. *kleinfeldianus* DEUVE, 36, from the Tian-mu Shan Mts., 37, from Mt. Huang Shan; 38, subsp. *phami* DEUVE (holotype), from Kienchang (=Nan-cheng); 39, subsp. *eleganticollis* DEUVE et IMURA, from Ku-ling, Mt. Lu Shan; 40, subsp. *yunkaicus* DEUVE, from Mt. Miao'er Shan; a, aedeagus in right lateral view; b, ditto (apical part) in right lateral view; c, spinula in dorsal view; d, ditto in basal view. Scale: 2 mm for a, 1 mm for b, 1.5 mm for c and d.



pronotum, etc. It is shown in Figs. 36 and 41 that the Laodian specimen is a little different in the shape of aedeagus from the holotype specimen; in the former, the apical lobe is a little less strongly bent ventrad, and the dorsal margin is less strongly rounded. Since only the male type and another male specimen are now available for study, it is difficult to decide if the difference is geographical or individual.

In addition, I was able to examine a short series of the same form from Mt. Huang Shan situated at the southern part of Anhui Province, which is about 120 km distant to the west from the type locality of the present subspecies. Though somewhat different in details, the Huang Shan specimens almost agree with the diagnostic characters of subsp. *kleinfeldianus*.

5. *Carabus (Apotomopterus) sauteri phami* DEUVE, 1988, stat. nov.

(Figs. 10–11, 21, 29, 38)

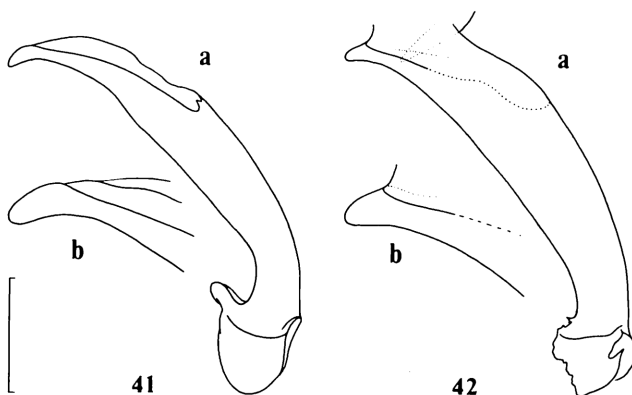
Carabus (Apotomopterus) phami DEUVE, 1988, *Revue fr. Ent.*, (n.s.), 10, pp. 249–251, figs. 1, 8.

Length: 27.3–27.5 mm (from apical margin of clypeus to apices of elytra).

Most closely allied to the nominotypical subspecies, but distinguished from it by the following points: pronotum a little slenderer, with the lateral margins less strongly rounded, basal foveae shallower; elevated parts of elytral intervals hardly crenulate; central part of aedeagus weakly rugulose on the ventral side; spinula a little robuster, with the dorsal surface more distinctly rugulose, its apex more strongly hooked ventrad to form a remarkable triangular spine.

Type depository. ZMA.

Localities. Kienchang (=Jianchang=Nan-cheng at present, situated at the eastern part of Jiangxi Province near the Fujian borders), Southeast China.



Figs. 41–42. Male genital organ of *Carabus (Apotomopterus) sauteri* subspp. — 41, Subsp. *kleinfeldianus* DEUVE (holotype), from Mt. Tien-mu Shan; 42, subsp. *eleganticollis* DEUVE et IMURA (holotype), from Mt. Lu Shan; a, aedeagus in right lateral view; b, ditto (apical part) in right lateral view. Scale: 2 mm for a, 1 mm for b.

Specimens examined. 1 ♂ (holotype of *C. phami* DEUVE), “Kiangsi, Kienchang”/“*Apot. cyanopterus*, G.H.”/“Collectie C. & O. VOGT, Acq. 1960”/“HOLOTYPE”/“*Apotomopterus phami* n.sp., Th. DEUVE det., 1988”; 1 ♀, Kiang-si, Kienchang, *changit*. BREUNING c., Collectie C. & O. VOGT, Acq. 1960. (ZMA).

Notes. DEUVE (1988, pp. 249–251) described this taxon as a distinct species on the basis of an old specimen preserved in ZMA as “*Apotomopterus cyanopterus* HAUSER” [= *cyanipennis* BREUNING]. In the original description, the author compared it with *C. lushanensis* [sic] HAUSER and *C. cyanipennis* BREUNING. However, my recent examination of the holotype specimen proved that this race agree with the specific characters of *C. sauteri*, not only in the external features but also in the shape of genitalia including spinula. It is therefore downgraded to a subspecies of the latter. The female specimen from the same locality preserved in ZMA is considered to be conspecific with it.

6. *Carabus (Apotomopterus) sauteri eleganticollis* DEUVE et IMURA, 1991, stat. nov.

(Figs. 12–13, 22, 30, 39, 42)

Carabus (Apotomopterus) eleganticollis DEUVE et IMURA, 1991, Elytra, Tokyo, 19, pp. 142–144, figs. 1, 5.

Length: 25.2–27.7 mm (from apical margin of clypeus to apices of elytra).

Most closely similar to subsp. *kleinfeldianus* in general appearance, but easily distinguishable from it by the following points: hind angles of pronotum more strongly and triangularly protrudent posteriad; pronotal disc more weakly rugulose; striae between elytral intervals more prominently granulate near bases and apices; preapical emargination of elytra in female a little shallower; apical lobe of aedeagus shorter and less strongly bent ventrad, with the apex rather broadly rounded; spinula rather acutely narrowed towards apex in dorsal view, and more strongly hooked ventrad in basal view.

Type depository. NSMT.

Type locality. Mt. Lu Shan, northern end of Jiangxi Province near the Anhui borders, Southeast China.

Specimens examined. 1 ♂ (holotype of *C. eleganticollis* DEUVE et IMURA), Mt. Lu Shan, Jiangxi Province, China, X–1987”; 1 ♂, 9 ♀♀ (paratypes of the same species), same data as for the holotype, in coll. Y. IMURA; 1 ♂, “Ku-ling (name of a resort situated at an elevation of 1,100 m on Mt. Lu Shan), I–VII–36, Musée Heude” in coll. K. MIZUSAWA.

Notes. In the original description of *C. (A.) eleganticollis*, the authors used its genitalia as one of the important diagnostic characters. However, the two males belonging to the type series are more or less teneral, and the aedeagus is considerably swollen and somewhat deformed after soaking in the mixture of ethanol and lactic acid. I cannot but regard such insufficient condition of genitalia as being available for reliable diagnosis. Through the courtesy of Mr. K. MIZUSAWA, I was recently given an

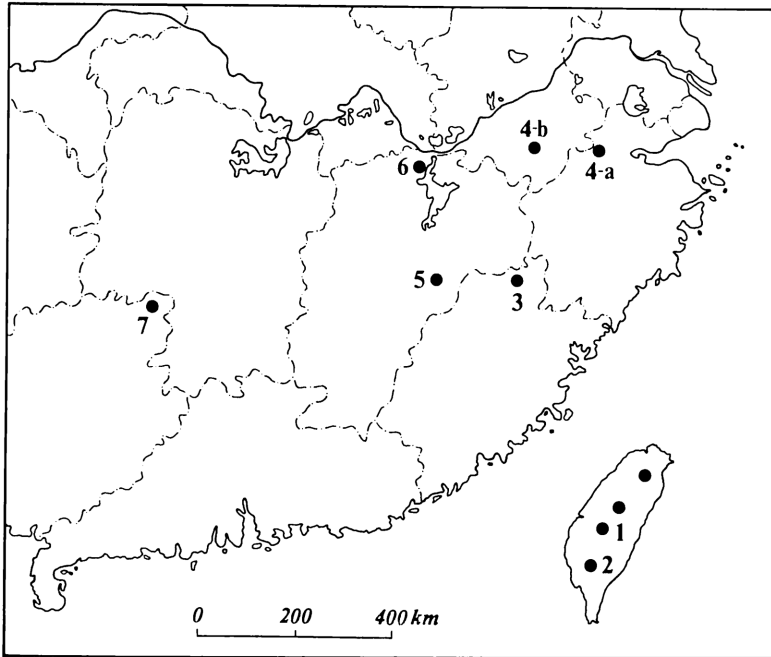


Fig. 43. Map showing the distribution of *Carabus (Apotomopterus) sauteri* in East Asia. — 1, Subsp. *sauteri* ROESCHKE; 2, subsp. *shimizuianus* IMURA, nov. (Mt. Nan-feng Shan); 3, subsp. *changii* HAUSER (Mt. Yun-ling Shan); 4, subsp. *kleinfeldianus* DEUVE (a, Tian-mu Shan Mts., b, Mt. Huang Shan); 5, subsp. *phami* DEUVE (Kienchang=Nan-cheng); 6, subsp. *eleganticollis* DEUVE et IMURA (Mt. Lu Shan); 7, subsp. *yunkaicus* DEUVE (Longsheng Xian, Guangxi).

opportunity to examine a mature male from the type locality. Its aedeagus and spinula are as illustrated in Fig. 39. Judging from a close similarity in the basic structure of genitalia, the Lu Shan form is also considered to be a geographical race of *C. sauteri*.

7. *Carabus (Apotomopterus) sauteri yunkaicus* DEUVE, 1991, stat. nov.

(Figs. 14–15, 23, 31, 40)

Carabus (Apotomopterus) yunkaicus DEUVE, 1991, Bull. Soc. ent. Fr., 96, pp. 224, 226, fig. 3.

Length: 25.5–27.5 mm (from apical margin of clypeus to apices of elytra).

Most closely allied to subsp. *eleganticollis*, but distinguished from it by the following points: dorsal surface faintly but obviously bearing dark bluish tinge; antennae longer, extending to basal five-sevenths of elytra in male; hind angles of pronotum a little more strongly protrudent posteriad and more sharply pointed; shoulders a little more effaced; elevated parts of primary intervals a little more strongly raised; preapical emargination of elytra in female deeper; aedeagus a little shorter and robuster, with the apical lobe a little slenderer; apical tip of spinula more strongly hooked to form a

triangular spine.

Type depository. IZP.

Type locality. Longsheng Xian, 1,420 m alt., Guangxi, South China.

Specimens examined. 1 ♂, 1 ♀, Mt. Miao'er Shan, 1,500 m alt., Longsheng Xian, Northeast Guangxi, VI-1993, in colls. Y. IMURA (♂) and K. MIZUSAWA (♀).

Notes. Though unable to see the holotype specimen now preserved in Beijing, I was recently able to examine specimens of the same species from Mt. Miao'er Shan situated in the same prefecture as the type locality. A careful examination of these specimens led me to the conclusion that the Guangxi race is also referable to *C. sauteri*. The long antennae, which extend to basal five-sevenths of elytra in male, is its most noticeable subspecific character.

要 約

井村有希: ザウテルトゲオサムシ群の再検討 (予報). — ザウテルトゲオサムシ *Carabus (Apotomopterus) sauteri* は, ROESCHKE により 1912 年, 台湾中部の水社寮から記載され, BREUNING (1957) がいらい, 台湾特産の独立種として扱われている. いっぽう, 対岸の中国大陸南東部からも, いっけん本種によく似たトゲオサムシが何種か記載されていて, 筆者は以前より, これらのうちのいくつかは台湾の種と同じものではないか, という疑問を抱いてきた. こんかい, おもに交尾器の研究に基づいて検討を加えた結果, 中国大陸から独立種として記載されている以下の 5 種は, *C. sauteri* と同種であろうという結論が得られた. *C. changi* HAUSER, *C. kleinfeldianus* DEUVE, *C. phami* DEUVE, *C. eleganticollis* DEUVE et IMURA, *C. yunkaicus* DEUVE. 本論文では, これら 5 種すべてを, 記載年において先行する *C. sauteri* の亜種とみなし, その主たる根拠となる陰茎および内袋基棘 *spinula* (=舌状片 *ligula*, *sensu* ISHIKAWA) の形態を図示した. また同時に, 台湾南部, 六龜近郊の南峰山から, 新亜種 *shimizuianus* nov. を記載した. この結果, 現時点において本種は 7 亜種に分類されることになるが, 検し得た標本数が少ないうえ, 大陸産の近似種すべてについて検討を加えることができたわけではないので, 本研究はあくまで予報とするにとどめておきたい.

References

- BREUNING, S., 1932-'37. Monographie der Gattung *Carabus* L. *Best.-Tab. eur. Coleopt.*, (104-110): 1-1610, 41 pls. Reitter, Troppau.
- 1957. Weiterer Beitrag zur Kenntnis der Gattung *Carabus* L. *Ent. Arb. Mus. Frey*, **8**: 275.
- 1966. Quelques nouvelles formes du genre *Carabus* L. (Coleoptera, Carabidae). *Bull. Soc. ent. Mulhouse*, **24**: 23-24.
- DEUVE, Th., 1988. Nouveaux Carabidae et Trechidae de Chine (Coleoptera). *Revue fr. Ent.*, (n.s.), **10**: 249-259.
- 1990. Carabidae nouveaux ou mal connues des provinces chinoises du Hubei et du Sichuan (Coleoptera, Carabini, Cychrini). *Entomologiste*, **46**: 109-119.
- 1991. Descriptions et diagnoses de nouveaux Coléoptères Carabidae asiatiques. *Ibid.*, **47**: 13-27.
- 1991. Contribution à l'inventaire des Carabidae de Chine (Coleoptera) (19^e note). *Bull. Soc. ent. Fr.*, **96**: 223-242.
- & Y. IMURA, 1990. Nouveaux *Carabus* (*Apotomopterus*, *Morphocarabus*, *Scambocarabus*)

- (Coleoptera, Carabidae) des régions montagneuses de Chine. *Elytra, Tokyo*, **18**: 1–13.
- DEUVE, Th., & Y. IMURA, 1991. Nouveaux *Carabus* (*Apotomopterus*, *Eucarabus*, *Oreocarabus*, *Megodontus*) du Yunnan, du Qinghai et du Jiangxi. *Ibid.*, **19**: 141–149.
- HAUSER, G., 1913. Species novae generis *Apotomopterus* REITTER (Col.). *Dt. ent. Z.*, **1913**: 464–471.
- ISHIKAWA, R., 1973. Notes on some basic problems in the taxonomy and the phylogeny of the subtribe Carabina. *Bull. natn. Sci. Mus., Tokyo*, **16**: 191–215.
- MEURGUES, G., & G. LEDOUX, 1966. Intérêt de l'étude du sac interne dévaginé et en extension. *Annls. Soc. ent. Fr.*, (n.s.), **2**: 661–669.
- ROESCHKE, H., 1912. H. SAUTER's Formosa-Ausbeute. Carabini (Col.). *Suppl. ent., Berlin*, **1**: 4–6.
- STULANI, M., 1967. Ligula ed endofallo in alcune specie appartenenti generi *Carabus* LINNAEUS (s.l.), *Calosoma* WEBER e *Campalita* MOTSCHOULSKY (Coleoptera Carabidae). *Boll. Soc. ent. ital.*, **97**: 9–21.
- XIE, W.-P., & P.-y. YU, 1992. Carabidae. In DAI G.-Y. (ed.), *Iconography of Forest Insects in Hunan China*, 343–362. Changsha, Hunan, China.

Elytra, Tokyo, **22** (1): 14, May 15, 1994

A New Record of *Cychnus sinicus* (Coleoptera, Carabidae) from the Northern Slope of the Qinling Mountains in Shaanxi Province, Central China

Yûki IMURA

Shinohara-chô 1249-8, Kôhoku-ku, Yokohama, 222 Japan

Cychnus sinicus DEUVE (1989, p. 229, figs. 2, 4) is one of the least known species of the genus *Cychnus* in China, described on the basis of a single male specimen from Ningshan situated on the southern slope of the Qinling Mountains in Shaanxi Province. Recently, I had an opportunity to examine three males of this species obtained from the northern slope of the same mountain range. The collecting data are as given below:

3 ♂♂, near Banfangzi, ca. 1,300 m alt., S. of Zhouzhi Xian, Shaanxi Province, Central China, 13~23-V-1993, in coll. Y. IMURA.

So far as judged from the original description, the Banfangzi specimens almost agree with the nominotypical form in both the external and genitalic features. The above specimens were collected together with the following carabid beetles: *Carabus* (s. str.) *pseudolatipennis* DEUVE, *C.* (s. str.) *vigil pseudoparis* DEUVE, *C.* (*Lasiocoptolabus*) *sunwukong* IMURA, and *Calosoma inquisitor* LINNÉ.

Reference

- DEUVE, Th., 1989. Carabidae et Trechidae nouveaux des collections entomologiques de la North-West Agricultural University de Yangling, Shaanxi (Coleoptera). *Entomotaxonomia*, **11**: 227–235.