

## New Trechine Beetles (Coleoptera, Trechinae) from the Gaoligong Shan Mountains in Western Yunnan<sup>1)</sup>

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**Abstract** Three new species of trechine beetles are described from the Gaoligong Shan Mountains near the Myanmar borders of western Yunnan, Southwest China. One of them is tentatively placed in the genus *Stevensius*, though different in certain respects from the typical Himalayan species. The other two are regarded as aberrant derivatives of the *hingstoni* group of *Trechus*, being characterized by reduction in the number of setiferous dorsal pores on the third elytral stria. The new names given are: *Stevensius minutus*, *Trechus asetosus* and *T. unisetiger*.

The Gaoligong Shan Mountains lie at the western end of Yunnan, stretching from north to south for more than 300 km along the western side of the Nu Jiang River, which is the upper course of the Thanlwin (Salween). They are higher in the north on the Myanmar borders, attaining to a height of more than 5,000 m, and mostly exceed 3,000 m in altitude even in the south. Because of their geographical situation, these mountains were closed to foreign scientists until recently, and therefore, their fauna was very poorly known to science except for vertebrate animals.

In the autumn of 1996, a team of zoologists from China and Japan had an opportunity to visit the southern part of this mountain range under my leadership. The expedition was planned as a part of the Sino-Japanese cooperative study on the soil fauna of Southwest China, and covered many places in Baoshan Xian and Tengchong Xian. Unfortunately, however, we were able to climb up to the *Rhododendron* zone of the mountain range only at three points, mainly because of very steep topography and of difficulty in following uncertain trails through impenetrable forests. Contrary to our expectation, our collection cannot be said very rich, but contains very interesting things in many groups of soil-living animals. For instance, the new trechine beetles to be described in the present paper are considerably different from their relatives occurring in the neighbouring areas, and can be regarded as peculiar offshoots of two phylogenetic groups isolated at the southern part of the Gaoligong Shans.

The abbreviations used herein are the same as those explained in previous papers

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of mine. The type specimens to be designated are preserved in the collections of the Shanghai Institute of Entomology, Academia Sinica, Shanghai, and the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo, and partly in the Institute of Zoology, Academia Sinica, Beijing.

Before going into further details, I wish to express my heartfelt thanks to Professor YIN Wen-ying and Professor ZHANG Han Yun for their kindness extended to me in the course of this study. Hearty thanks are also due to all the members of the expedition, above all to Dr. Shûhei NOMURA and Mr. ZHAO Lijun, without whose kind help this study could never have been completed.

*Stevensius minutus* S. UENO, sp. nov.

(Fig. 1)

Length: 2.60–2.80 mm (from apical margin of clypeus to apices of elytra).

Recognized at first sight on its small size, presence of two setiferous dorsal pores on elytra whose humeral borders are complete, and absence of external groove on each protibia. Body constricted between prothorax and hind body, fore body small, hind one semispherical. Fore body pitchy black, partially somewhat brownish, polished, with dark brown labrum and mandibles and yellowish brown maxillae and palpi; hind body dark brown, also polished, partially infuscated on venter; antennae brown, becoming paler towards apices; legs yellowish brown. Apterous. Microsculpture evanescent altogether.

Head large, transverse, and depressed above, with deep frontal furrows not angulate at middle and widely divergent posteriad; frons and supraorbital areas moderately convex, the latter bearing a foveole at the root of each supraorbital seta; two pair of supraorbital setae lying on lines divergent posteriad; eyes small but fairly protrudent, more or less longer than genae, which are gently convex, completely glabrous, and five-sevenths to seven-eighths as long as eyes; neck very wide, neck constriction distinct at the sides though shallow; labrum transverse, with the apical margin shallowly but widely emarginate; mandibles short and stout, feebly arcuate in apical halves, and obtusely bidentate; mentum fused with submentum, labial suture partially traceable though incomplete, mentum tooth porrect, slightly emarginate at the tip; submentum sexsetose; palpi short and thick, with apical segments subulate in apical halves; antennae short and fairly stout, filiform, reaching basal third of elytra or extending slightly beyond that level, scape thick, shorter but obviously broader than terminal segment, segments 2 and 5–10 subequal in length, each subcylindrical and fully twice as long as wide, segment 3 slightly longer than the neighbouring ones and about five-sevenths as long as the terminal, which is the longest.

Pronotum cordate, wider than head, wider than long, widest at about five-sevenths from base, and more gradually but strongly contracted towards base than towards apex, with the sides narrowly but entirely bordered; PW/HW 1.21–1.25 (M 1.23), PW/PL 1.21–1.35 (M 1.28), PW/PA 1.43–1.49 (M 1.46), PW/PB 1.73–1.77 (M 1.75); sides

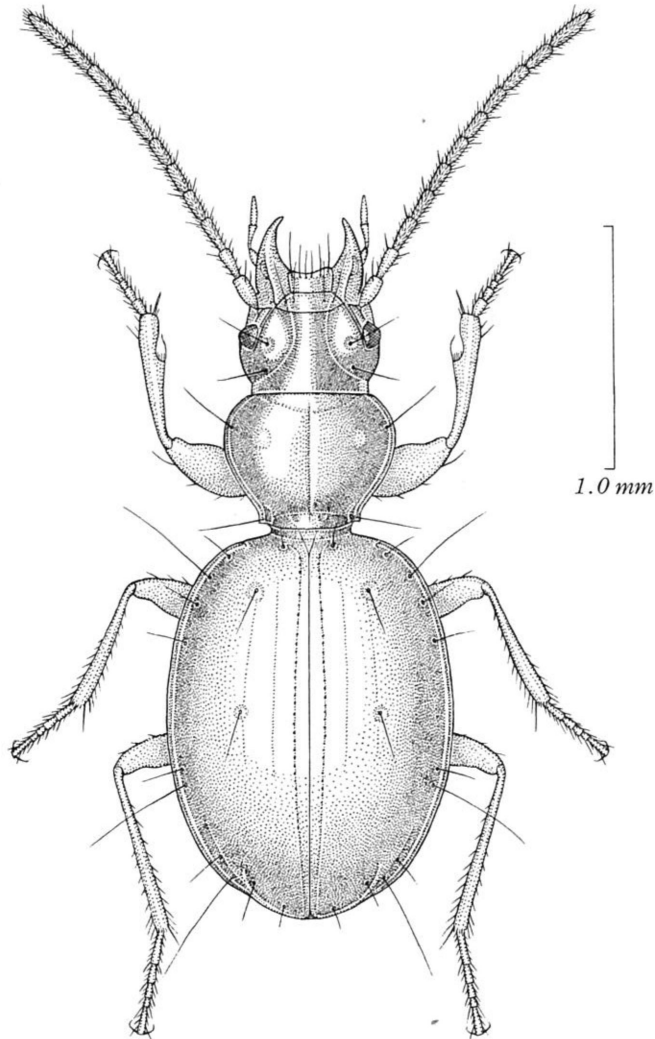


Fig. 1. *Stevensius minutus* S. UÉNO, sp. nov., ♀, from Dabei on the Gaoligong Shan Mountains.

strongly rounded near the widest part, rather gently so behind middle, and briefly but deeply sinuate at about basal eighth or a little before that level, with two pair of marginal setae, of which the anterior one lies just before the widest part and the posterior one on hind angles; apex either slightly arcuate or nearly straight, with front angles very obtuse; base much narrower than apex, PA/PB 1.16–1.22 (M 1.20), slightly arcuate, and briefly and obliquely emarginate on each side just inside hind angle; hind angles nearly rectangular though more or less obtuse at the tips, usually somewhat produced laterad; dorsum well convex, smooth, with sharply impressed median line reach-

ing base and usually with a small round depression on each side at the level of the widest part; apical transverse impression shallow but distinct, usually uneven; basal transverse impression continuous, laterally joining basal foveae, which are small and narrow; basal area narrow and smooth.

Elytra oval, short and broad, widest at about four-ninths from bases, and equally narrowed towards bases and towards apices; EW/PW 1.65–1.68 (M 1.67), EL/EW 1.29–1.36 (M 1.30); shoulders rounded and indistinct; sides entirely bordered, rather strongly arcuate in basal third, less so in median parts, and conjointly rounded at apices, each margin forming a distinct terminal point at the humeral part; dorsum very strongly convex, with a small depression on each side just behind scutellum; striae vestigial except stria 1, which is always sharply impressed throughout and sometimes obviously punctate, striae 2–3 usually traceable on the disc though very shallow, stria 8 impressed only behind the middle set of marginal umbilicate pores; scutellar striole not clearly defined; apical striole short but distinct, divergent anteriorly, and free at the anterior end; apical carina very obtuse; two setiferous dorsal pores, usually foveolate, present on the site of stria 3 at  $1/8$ – $1/6$  and about  $2/5$  from base, respectively; no preapical pore; humeral set of marginal umbilicate pores nearly regular though not perfectly equidistant.

Ventral surface smooth and glabrous; anal sternite with two pair of setae in ♀. Legs short but fairly slender; protibiae nearly straight, moderately dilated towards apices, entirely pubescent, and not externally grooved; tarsi fairly thin.

Male unknown.

*Type series.* Holotype: ♀, paratypes: 5 ♀♀, 11–X–1996, S. UÉNO & S. NOMURA leg.

*Type locality.* Dabei, 2,430–2,440 m [2,430 m] in altitude, on the Gaoligong Shan Mountains, in Tengchong Xian, western Yunnan, Southwest China.

*Notes.* This remarkable species is tentatively placed in the genus *Stevensius*, though differing from the Himalayan members in several critical points. It cannot be keyed to a known genus by my key to the genera of the *Agonotrechus* series (cf. UÉNO, 1987, pp. 334–335), and though three more genera of the same series have been described since then (*Queinnectrechus* DEUVE, 1992, *Junnanotrechus* S. UÉNO et YIN, 1993, and *Deuveotrechus* S. UÉNO, 1995), none of them seem to have a direct relationship to the present species. On the other hand, the known Himalayan species of *Stevensius* form a compact group within the *Agonotrechus* series. The six species hitherto described are closely related to one another (cf. UÉNO, 1977b; DEUVE, 1987, 1988; DEUVE & HODEBERT, 1991), and share all the diagnostic characters delineated in my revision (UÉNO, 1977b, pp. 246–247). I have collected hundreds of specimens of *Stevensius* at many localities in eastern Nepal, West Bengal and Sikkim, and though this collection contains all but one of the described species and several new forms, I have been unable to set up a satisfactory classification of the Himalayan species as yet, mainly because of close similarity of the species involved and geographical variability of certain species.



In general appearance, the present species looks like a miniature of certain Himalayan *Stevensius* and also resembles *Taiwanotrechus subglobosus* S. UENO (1987, p. 338, figs. 1–3). From the latter, it is evidently different in the complete side borders of the pronotum and elytra, the presence of the postangular pair of marginal setae on the pronotum, and the fused labium, a combination of which can be said radical, or generic. From the former, it differs in the elytral chaetotaxy, the complete humeral borders of the elytra, and absence of the external groove on the protibia, the differences that could be found within the same genus. Besides, the character states exhibited by the Yunnanese species seem plesiomorphic and could be regarded as representing an ancestral state of *Stevensius*. Unfortunately, we were unable to obtain any males of the Yunnanese species in spite of painstaking efforts. Under this situation, I prefer to regard it, for the time being at least, as an archaic form of *Stevensius*, leaving a final conclusion for future investigations.

The six specimens of the type series of *Stevensius minutus* were obtained by sifting moist dead leaves accumulated in a thick *Rhododendron* forest together with many specimens of *Trechus asetosus* to be described below. They were recognized on the spot on their small size and rather leisurely manner of locomotion as compared with the larger trechine beetle.

*Trechus* (s. str.) *asetosus* S. UENO, sp. nov.

(Figs. 2–4)

Length: 2.85–3.45 mm (from apical margin of clypeus to apices of elytra).

Rather a variable species most probably derived from the *hingstoni* group, recognized at first sight on the total absence of setiferous dorsal pores on the 3rd elytral stria.

Body usually short and broad, but sometimes more elongate due to narrower hind body; apterous. Colour dark brown to blackish brown, shiny, faintly iridescent on elytra, head usually infuscated except for clypeus; buccal appendages, antennae, epipleura and legs yellowish brown to light brown, more or less lighter than body.

Head small, transverse, and depressed above, with deep frontal furrows not angulate at middle and widely divergent posteriad; frons and supraorbital areas moderately convex, the latter bearing a foveole at the root of each anterior supraorbital seta; microsculpture distinct, mostly formed by wide meshes; eyes small and flat, variable in size but not protrudent beyond the contour of genae, which are tumid, usually about two-thirds as long as eyes but sometimes shorter than that (about three-fifths as long as eyes) and rarely longer than eyes (about 1.2 times as long as eyes); neck wide, neck constriction sharply marked at the sides; labrum shallowly emarginate at apex; mandibles stout, right mandible with a small premolar tooth; mentum tooth broad and simple; palpi short and stout; antennae short, usually reaching basal fifth of elytra though variable in length, segment 2 only a little shorter than each of segments 3–5, segments 6–10 each subcylindrical, less than twice as long as wide, and slightly

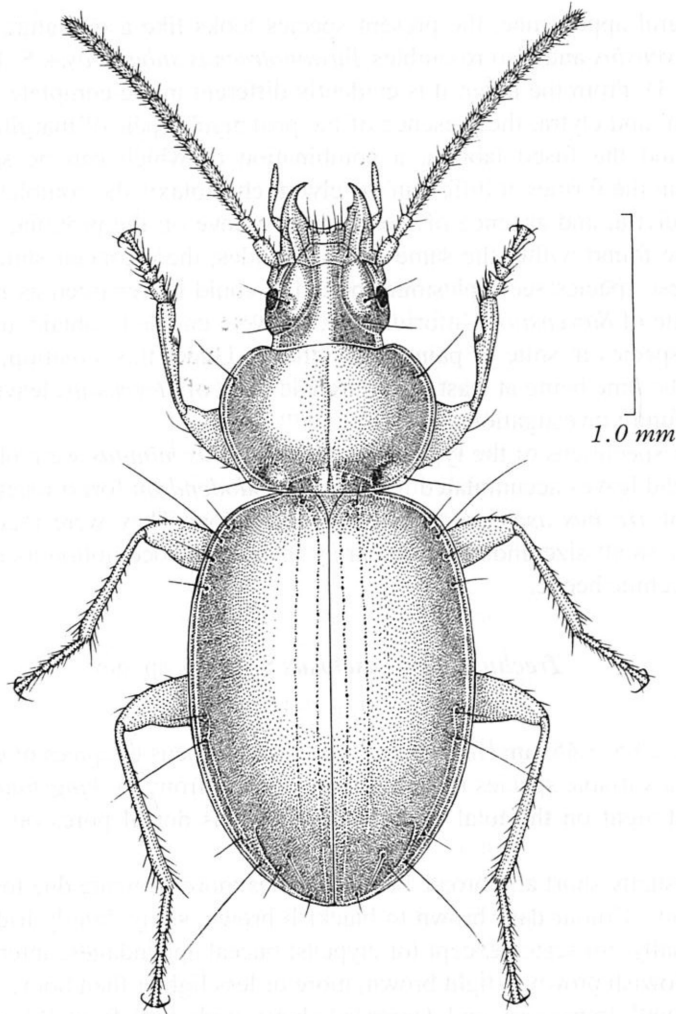


Fig. 2. *Trechus* (s. str.) *asetosus* S. UÉNO, sp. nov., ♂, from Dabei on the Gaoligong Shan Mountains.

shorter than segment 5, terminal segment slightly longer but narrower than scape.

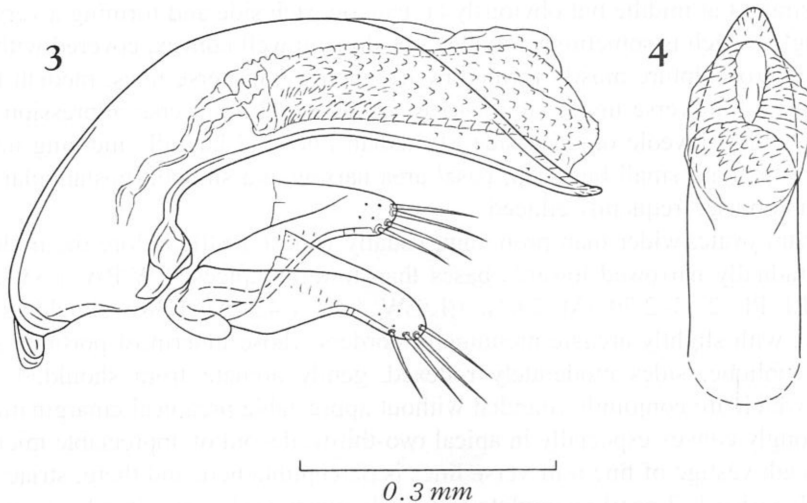
Pronotum large, transverse, much wider than head, wider than long, usually widest at about three-fifths from base, and a little more gradually narrowed towards base than towards apex; PW/HW 1.52–1.69 (M 1.59), PW/PL 1.32–1.49 (M 1.39), PW/PA 1.51–1.68 (M 1.60), PW/PB 1.26–1.42 (M 1.33); sides rounded from apex to base without ante-basal sinuation and narrowly bordered throughout, the curvature being stronger in front than behind, with two pair of marginal setae, the posterior one of which lies on hind angles; apex slightly bisinuate, narrower than base, PB/PA 1.08–1.30 (M 1.20), with front angles very obtuse and rounded, though still discernible; base

nearly straight at middle but obviously arcuate on each side and forming a very obtuse hind angle, which is sometimes rounded off; dorsum well convex, covered with degenerative microsculpture mostly formed by irregularly transverse lines; median line distinct; apical transverse impression usually vague; basal transverse impression narrow, arcuate, with a foveole on each side of median line, and laterally merging into basal foveae, which are small but deep; basal area narrow and smooth; postangular carinae short and obtuse, frequently effaced.

Elytra ovate, wider than pronotum, usually widest a little before the middle, and more gradually narrowed towards bases than towards apices; EW/PW 1.33–1.41 (M 1.37), EL/PL 2.43–2.79 (M 2.62), EL/EW 1.32–1.43 (M 1.38); shoulders widely rounded, with slightly arcuate prehumeral borders whose innermost portions are very slightly oblique; sides moderately reflexed, gently arcuate from shoulders to near apices, which are conjointly rounded without appreciable preapical emargination; dorsum strongly convex especially in apical two-thirds, devoid of appreciable microsculpture though vestige of fine transverse lines is perceptible here and there; striae superficial, only striae 1–2 nearly complete and finely punctate though often becoming obsolete on apical declivity, stria 3 usually traceable on the disc, 4 very slight and fragmentary, 8 impressed behind the middle set of marginal umbilicate pores and often interrupted, others effaced; scutellar striole short but sharply impressed; apical striole clearly impressed though shallow, weakly curved, and free at the anterior end though seemingly directed to the site of stria 7; intervals flat even near suture, apical carina very narrow but distinct; setiferous dorsal pores totally absent; preapical pore unusually close to apex, lying considerably behind the level of the terminus of apical striole, and much nearer to apical striole than to suture; humeral set of marginal umbilicate pores perfectly aggregated.

Ventral surface smooth; anal sternite provided with a pair of marginal setae in ♂, with two pair of the setae in ♀. Legs short and fairly stout; protibiae nearly straight, moderately dilated towards apices, and deeply grooved on the external faces; tarsi fairly thin, segment 1 about as long as segments 2–3 together in mesotarsus, longer than segments 2–3 together but shorter than segments 2–4 together in metatarsus, segment 4 provided with a long ventral apophysis in pro- and mesotarsi; in ♂, two proximal segments of each protarsus widely dilated, stoutly produced inwards at apices, and furnished beneath with sexual adhesive appendages.

Male genital organ rather lightly sclerotized. Aedeagus about three-eighths as long as elytra, arcuate, lightly compressed, with the dorsal margin semicircularly rounded in profile; basal part gently curved ventrad, rather small, with small basal orifice whose sides are shallowly emarginate; sagittal aileron small but heavily sclerotized, narrowly produced ventrad; viewed laterally, apical part rather rapidly attenuate towards short apical lobe, which is slightly reflexed and almost pointed at the extremity; viewed dorsally, apical lobe rather narrow, subtriangular, and narrowly rounded at the extremity; ventral margin widely emarginate at middle in profile. Inner sac wholly covered with scales, which are moderately sclerotized in proximal half; no differenti-



Figs. 3–4. Male genitalia of *Trechus* (s. str.) *asetosus* S. UÉNO, sp. nov., from Dabei on the Gaoligong Shan Mountains; left lateral view (3), and apical part of aedeagus, dorso-apical view (4).

ated copulatory piece. Styles short and broad; left style longer than the right, with short ventral apophysis; each style provided with four short setae at the apex.

*Type series.* Holotype: ♂, allotype: ♀, paratypes: 31 ♂♂, 33 ♀♀ [incl. teneral 1 ♂, 4 ♀♀], 11–X–1996, S. UÉNO, S. NOMURA & ZHAO L. leg.

*Type locality.* Dabei, 2,430–2,440 m in altitude, on the Gaoligong Shan Mountains, in Tengchong Xian, western Yunnan, Southwest China.

*Notes.* This remarkable species is regarded as a peculiar offshoot of the *hingstoni* group (cf. JEANNEL, 1928, pp. 288–289, 1935, pp. 276–279; UÉNO, 1965, 1967, 1977 a, etc.), mainly because of the similarity of aedeagal conformation. It is true that the new species is unique in many respects: remarkably convex dorsum, obliteration of microsculpture, degeneration of elytral striae, outwardly directed apical striole, postero-laterally translocated preapical pore, and above all, total absence of setiferous dorsal pores. The last character state is quite exceptional for a species of *Trechus*, and has hitherto been known, so far as I am aware, only in a Nepalese species, *Trechus impunctus* CASALE (1979, p. 187, figs. 1–3). The Nepalese species was originally placed in the *indicus* group, but was later removed to the side of *T. thibetanus* (CASALE & LANEYRIE, 1982, pp. 131–133). I have collected this interesting species by myself (2 ♂♂, 1 ♀, Siwapuri Dara, 2,380 m alt., Kathmandu Valley, E. Nepal, 8–X–1981, S. UÉNO & M. SAKAI leg.; NSMT), and confirmed the accuracy of CASALE's later opinion. This means that the loss of elytral dorsal pores has taken place independently in two different phyletic groups of the genus.

As will be shown on later pages, a close relative of *T. asetosus*, also occurring on the Gaoligong Shan Mountains, bears a single (second) dorsal pore on the third elytral



Fig. 5. A dark *Rhododendron* forest at Dabei (2,440 mm in altitude) on the Gaoligong Shan Mountains in western Yunnan, one of the habitats of *Trechus* (s. str.) *asetosus* S. UÉNO, sp. nov. ZHAO Lijun is sifting the beetle out from a heap of dead leaves.

stria. It can be regarded as a missing link, suggesting an ancestral state of *T. asetosus*. The common ancestor of these species may have reached the Gaoligong Shans from the north, since the ordinary members of the *hingstoni* group are widely distributed from the Himalayas to Tibet and Sichuan, and have their relatives on the high mountains of Luzon, the Philippines (cf. UÉNO, 1992, p. 194).

The type specimens of *T. asetosus* were collected at three stations in the *Rhododendron* zone of Dabei at the southern part of the Gaoligong Shan Mountains. They were sifted out from heaps of dead leaves accumulated in humid places, and seemed to

assemble in certain particular spots. For instance, they were abundant in an area of 20 m<sup>2</sup> or so, but were never found outside that area even within the same *Rhododendron* forest. In one of the three habitats at a height of 2,430 m, which is not far from the headspring of a narrow stream, *T. asetosus* was found in coexistence with *Stevenius minutus*.

*Trechus* (s. str.) *unisetiger* S. UÉNO, sp. nov.

Length: 3.25–3.50 mm (from apical margin of clypeus to apices of elytra).

Closely allied to *T. asetosus*, but recognized at first sight on the presence of a setiferous dorsal pore on the third elytral stria. Also different from the latter species in the shape of prothorax and elytra.

Colour dark reddish brown with infuscated elytra (at least partly), shiny, faintly iridescent on elytra; palpi pale; propleura, epipleura, legs, and apical and lateral parts of sternites light brown to brown.

Head as in *T. asetosus*, but the eyes are smaller, shorter than genae (five-sixths as long as genae); antennae barely reaching basal sixth of elytra. Pronotum widest at four-sevenths from base, with the sides more strongly and evenly arcuate than in *T. asetosus*; PW/HW 1.56 in the holotype (H) and 1.57 in the paratype (P), PW/PL 1.40 (H) and 1.34 (P), PW/PA 1.64 (H) and 1.58 (P), PW/PB 1.34 (H) and 1.36 (P); base less oblique on each side inside hind angle, which is very obtuse but still more apparent than in *T. asetosus*, PB/PA 1.22 (H) and 1.16 (P). Elytra broader than in *T. asetosus* and relatively short, more strongly convex on dorsum; EW/PW 1.43 (H) and 1.46 (P), EL/PL 2.64 (H) and 2.57 (P), EL/EW 1.32 (H) and 1.31 (P); shoulders more widely rounded and sides more strongly and evenly arcuate than in *T. asetosus*; striae deeper and more clearly punctate on the disc, vestige of striae 4–7 perceptible in basal two-thirds though evanescent in basal area, stria 8 clearly impressed behind the middle set of marginal umbilicate pores; scutellar and apical strioles as in *T. asetosus*; stria 3 with one setiferous dorsal pore at about basal 1/3; preapical pore unusually close to apex and apical striole as in *T. asetosus*. Ventral surface and legs as in *T. asetosus*.

Male unknown.

*Type series.* Holotype: ♀, paratype: 1 ♀, 25–IV–1996, XIAO N.-n. leg.

*Type locality.* Hongxinshu, 2,700 m in altitude, on the Gaoligong Shan Mountains, in Baoshan Xian, western Yunnan, Southwest China.

*Notes.* Though males are unknown, this new species is a close relative of *T. asetosus* beyond all doubt, as is readily understood from close similarity of diagnostic characters including the peculiar position of the preapical pore on the elytra. The presence of a setiferous dorsal pore seems to indicate that both *T. asetosus* and *T. unisetiger* have been derived from an ancestor in which the internal series of the elytra consisted of two pores, as is seen in most species of the grand genus *Trechus*. It is to be hoped that future investigations will clarify the trechine fauna of the northern part of the Gaoligong Shan Mountains on the borders of Yunnan and Myanmar, which



might contain certain species exhibiting a closer affinity to the ordinary species of the *hingstoni* group.

The two specimens of the type series of *T. unisetiger* were sorted out from soil samples taken in a forest of *Lithocarpus variolosus*. I climbed up the mountain from Baihualing towards Hongxinshu, but failed in finding out any additional specimens of this trechine beetle.

### 要 約

上野俊一：中国云南省高黎贡山で採集されたチビゴミムシ類の新種。—— 云南省西部のミャンマー国境から南に延びる高黎貢山山脈からは、これまでチビゴミムシ類が知られていなかった。1996年の秋に実施した調査と同年春の予備調査で、この山脈の南部から3種のチビゴミムシが発見された。そのうちの2種は雄が未知で、とくにハバビロチビゴミムシ群の1種は所属に問題が残るが、分類学上の特異性と地理的な重要性を考慮して、*Stevensius minutus*, *Trechus* (s. str.) *asetosus* および *T.* (s. str.) *unisetiger* という新名を与え、この論文で記載した。近隣地域に生息する同系統の種に比べて、母集団からの断絶の顕著な点が特筆に値する。

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### 新 刊 紹 介

Opredelitel' Nasekomykh Dal'nego Vostoka Rossii v Shesti Tomakh. Tom 3. Zhestkokrylye, Ili Zhuki. Chast' 3. [Определитель Насекомых Дальнего Востока России в Шести Томах. Том 3. Жесткокрылые, Или Жуки. Часть 3]. Ed. P. A. LER [П. А. ЛЕР]. 556 pp. 1996. Dal'nauka, Vladivostok.

刊行を待たれていたロシア極東地方の昆虫分類検索のうち、第3巻第3部がこのほど上梓されて、甲虫類の部分はいちおう完結した。この本から、“Key to the insects of Russian Far East”という英文の副題が付き、発行地もウラジオストクに変わった。

第3部には、カミキリモドキ科 (N. B. NIKITSKY), アリモドキ科 (G. Sh. LAFER), ツチハンミョウ科 (S. I. AKSENTJEV), カミキリムシ科 (A. I. CHEREPANOV), マメゾウムシ科 (A. B. EGOROV) の5科とゾウムシ上科の11科 (A. B. EGOROV, V. V. ZHERIKHIN, B. A. KOROTYAEV および G. O. KRIVOLUTSKAYA) が含まれ、合わせてネジレバネ目の4科 (A. S. LELEJ) がまとめられている。また、後ろの3分の一が3部を通じての補遺に当てられ、オサムシ科、ゲンゴロウ科、コガネムシ科などが扱われているが、なんといっても重要なのは86ページを占めるゾウムシ科で、本篇の63ページよりも補遺の方が大きい。

注目に値するのは、ナガヒラタムシ亜目の新科が記載されたことで、新属新種の *Sikhotealinia zhiltzovae* LAFER に基づいて、*Sikhotealiniidae* と命名された。佐藤正孝教授とわたしは、雌の正基準標本のみが知られているこの甲虫を、ウラジオストクで実見したが、ほかにはどこもやり場のない奇妙なものだった。ロシアからは、ナガヒラタムシ亜目の甲虫化石が多数みつかっているが、それらの絶滅種のなかに、この新科の類縁関係が求められるかも知れない。後翅がよく発達しているのだから、北日本のどこかで、同じ仲間の甲虫が発見される可能性も考えられる。

ひとつ残念なのは、この分類検索からハネカクシ類が欠落していることである。ハネカクシ科を担当できる執筆者がなく、とくにヒゲブトハネカクシ亜科はほとんど手つかずのまま残されている、という事情を仄聞したが、重要な大きい科であるだけに、シリーズが完成するまでにはだれかの手で補完されることを期待したい。

(上野俊一)