

A New Genus and Species of Aphaenopsoid Trechine Beetle from the Northern Side of the Yangtze River

Shun-Ichi UÉNO

Department of Zoology, National Science Museum (Nat. Hist.),
3–23–1 Hyakunin-chô, Shinjuku, Tokyo, 169–0073 Japan

Abstract A new genus and species of an aphaenopsoid trechine beetle is described from a cave in Shennongjia Linqu on the northern side of the Yangtze River in Central China, under the name of *Boreaphaenops angustus*. Its true affinity is not certain, though its type species exhibits the closest resemblance to the genus *Shenaphaenops* from northern Guizhou.

About fifty species of eyeless trechine beetles have been discovered from China in the past dozen years. Most of them have been found in limestone caves distributed on the southern side of the Yangtze River, though quite a few caves have been biologically investigated on the northern side, above all in Sichuan. Some of them lying near the eastern edge of the Tibetan Plateau may be too cold to harbour trechine beetles, but it is difficult to determine the cause of this sterility of the caves lying at lower elevations.

Late in the spring of this year, KISHIMOTO and I had an opportunity to investigate several caves in Shennongjia Linqu at the western part of Hubei on the northern side of the Yangtze River in Central China. Being thickly covered with beautiful natural forests, this area is rigidly protected by the Chinese Government and seldom investigated by foreign biologists. So far as concerned with limestone caves, only the exploration hitherto made was the one by a French party made in the summer of 1992 (LIPS *et al.*, 1993, pp. 61–76). In one of the caves visited, we found several specimens of an aphaenopsoid trechine beetle, which would be the first true cave-dweller to be reported from the northern side of the Yangtze River. Though not recorded in their account of “Grotte Chaude et Froide” (LIPS *et al.*, 1993, p. 62), two specimens of “Coléoptères, Carabidés, troglobies” appear on their “Liste des animaux cavernicoles récoltés” from that cave (p. 105), which may be conspecific with ours since the “Grotte Chaude et Froide” is a French translation of Lengre Dong, the locality of our material. In the present paper, I am going to describe this aphaenopsoid trechine under the name of *Boreaphaenops angustus*, since the French party’s material seems to have been never studied. The abbreviations used in this paper are the same as those explained in previous papers of mine.

I wish to express my heartfelt thanks to Dr. Toshio KISHIMOTO for his invaluable help in cave explorations, and to Mr. FAN Ting of the Academia Sinica and Mr. ZHAO

Ben Yuan of the Management of the Shennongjia National Nature Reserve for their kind arrangement in making biological investigations in the reserve.

Genus *Boreaphaenops* S. UENO, nov.

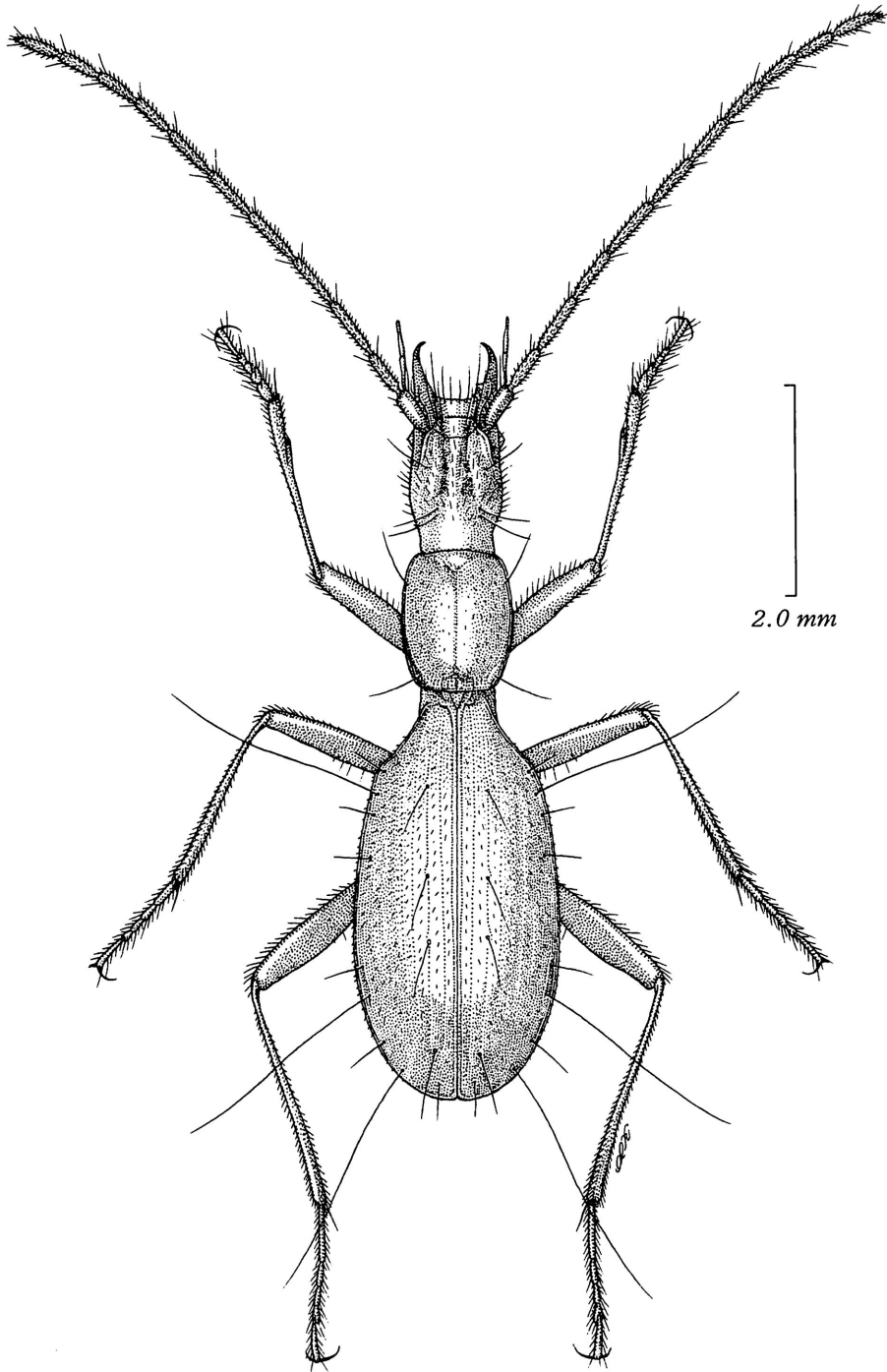
Type species: *Boreaphaenops angustus* S. UENO, sp. nov.

Erected for a medium-sized species of aphaenopsoid facies with elongate head, small prothorax and narrow elongate elytra. Somewhat similar to *Shenaphaenops* S. UENO (1999 a, p. 627; 1999 b, p. 42) of northern Guizhou, but decisively different in the narrower, more elongate and less convex elytra with effaced shoulders, duplicate posterior pair of supraorbital setae, sexsetose submentum, presence of the posterior pair of marginal setae on pronotum and of a third dorsal pore on elytra, equidistantly and marginally ranged first to third umbilicate pores of the humeral set, unusually posterior position of the two pores of the middle set, slender arcuate aedeagus with dorsally arcuate apical lobe, and unusually developed ventral apophysis on both parameres.

Body surface more or less pubescent, though the short pubescence is very sparse on pronotum; microsculpture distinctly impressed throughout, mostly consisting of transverse meshes on head and pronotum, and of transverse lines on elytra. Colour light reddish brown, shiny; elytra, palpi and apical antennomeres more or less paler.

Head fairly large and elongate, nearly parallel-sided, with wide neck and shallow neck constriction; frontal furrows unevenly impressed and slightly bisinuate before middle and abruptly vanishing behind the level of the anterior pair of supraorbital pores; dorsum sparsely covered with fairly long hairs; anterior pair of supraorbital pores widely spaced, located behind antennal sockets, their interspace being larger than that of the ordinary posterior pair; posterior pair of supraorbital pores almost always duplicate, the antero-internal (supplementary) pair of setae often a little shorter than the ordinary one; eyes completely absent; genae and subgenae covered with fairly long hairs. Labrum transverse, as long as clypeus, with the apical margin slightly bisinuate. Mandibles long and slender, falcate, with acute apices; right mandible bidentate, with fairly wide retinaculum, left mandible devoid of distinct teeth. Mentum fused with submentum though the trace of labial suture is usually perceptible throughout, shallowly concave on each side, with the tooth in apical emargination narrow and porrect, either subtruncate or very slightly bifid at the tip; submentum provided with a transverse row of six setae; ligula trapezoidal at the apical part, with two long setae at the middle of truncated portion and three lateral setae on each oblique part; paraglossae very thin and feebly arcuate, extending much beyond ligula; labial palpus very slender, with long, slightly arcuate penultimate segment bearing usually two (exceptionally one) setae on the internal side, apical segment a little shorter than the penultimate and grad-

Fig. 1. *Boreaphaenops angustus* S. UENO, gen. et sp. nov., ♂, from Lengre Dong Cave in Shennongjia Linqu.



ually attenuate from the middle to blunt apex. Maxillae very long and arcuate; galea with very long proximal and short apical segments; lacinia with rather sparse rows of recurved spines on the inner margin; maxillary palpus long and slender, penultimate segment gradually dilated towards apex and completely glabrous, apical segment similar to that of labial palpus though slightly longer than the penultimate. Antennae long but fairly stout, reaching apical fifth of elytra in ♂, more or less shorter than that in ♀; scape about as long as pedicel, slightly longer than terminal antennomere or antennomere 10, which is the shortest, antennomere 3 the longest, the remaining antennomeres gradually decreasing in length towards apex.

Prothorax about as long as head, a little wider than the latter and evidently longer than wide, widest before the middle and narrowed posteriorly; propleura narrowly visible from above; pronotum widest more in front, with lateral margins finely bordered throughout; both front and hind angles rounded; two pair of marginal setae present, the anterior pair before the widest part and the posterior pair removed forwards; dorsum convex, very sparsely covered with short suberect pubescence; no continuous transverse sulcus before base. Scutellum distinct.

Elytra elongated subovate, obviously wider than prothorax and much longer than wide, widest at about middle, and more pointed at bases than at apices; sides narrowly bordered throughout, straight and very oblique at the prehumeral parts where the borders are complete to basal peduncle, very obtuse at humeral angles, and then only slightly curved to apical fifth, sporadically ciliated, above all near humeral angles, though not serrulate; apices conjointly rounded and devoid of appreciable preapical emargination; dorsum convex in apical halves but gradually slanting before middle towards bases, wholly covered with short suberect pubescence which forms an irregular row on each interval; striae superficial, only indicated by rows of punctures at the side and obliterated in basal and apical areas; both scutellar and apical striae absent; interval 1 very narrow, particularly in apical half; stria 3 with three setiferous dorsal pores; preapical pore located at or at the site of apical anastomosis of striae 2 and 3 on apical declivity; anterior apical pore located near to apex at the middle of each elytron, posterior apical pore missing; marginal umbilicate pores not aggregated, first three pores of the humeral set ranged equidistantly and adjoining marginal gutter but the fourth pore is isolated and moderately distant from marginal gutter; middle set of marginal umbilicate pores removed backwards and approaching to the apical set, the sixth pore lying at about apical fourth and a little distant from marginal gutter; apical set of marginal umbilicate pores also removed backwards, the eighth pore being located at apical thirteenth to fourteenth evidently behind the level of preapical pore.

Ventral surface pubescent except for lateral parts; visible sternites 3–5 each usually bearing two pair of paramedian setae, sometimes three setae or only one seta on one side; anal sternite with apical margin more strongly arcuate in ♂ than in ♀, bisetose in the former and quadrisetose in the latter. Legs long and slender though seemingly fairly stout due to dark coloration; protibiae gradually dilated towards apices, each briefly arcuate at the apical portion, wholly pubescent and not externally grooved;

tarsi fairly long, tarsomere 4 with a long ventral apophysis in pro- and mesotarsi; in ♂, protarsomeres 1 and 2 moderately dilated, inwardly denticulate at apices, and furnished beneath with adhesive appendages.

Male genital organ very small; aedeagus tubular, slender, and strongly arcuate, with small basal part and narrow recurved apical lobe; basal orifice small, hardly emarginate at the sides; sagittal aileron large and protrudent; inner sac armed with a small anisotropic copulatory piece, which is narrowly produced apicad and is largely enveloped by a membrane covered with minute, poorly sclerotized scales; styles relatively wide, each bearing a well developed ventral apophysis; apical setae usually four in number, but sometimes supplemented with one or two extra setae.

Range. Known so far from only Shennongjia Linqu at the easternmost part of the Daba Shan Mountains at the western part of Hubei in Central China.

Notes. It is difficult to determine the true affinity of this new genus from our present knowledge of Chinese trechines. Its description given above was prepared mainly in comparison with *Shenaphaenops*, since it shares many characteristics with the latter genus. However, its elytra are radically different in the mode of convexity from those of *Shenaphaenops*, which are strongly convex as in many other cave trechines from China. On the contrary, the elongate elytra of *Boreaphaenops* are well convex only in apical halves and relatively flat in basal parts. The elytra of this type are known in *Dongodytes* DEUVE (1993, pp. 292, 295; UÉNO, 1998, p. 4) in a more specialized state, though this Guangxi genus is widely different from *Boreaphaenops* in many other respects.

In my view, an extreme of subterranean specialization of Chinese trechines is exhibited by *Sinaphaenops* S. UÉNO et F. WANG (1991, p. 128; UÉNO & RAN, 1998; UÉNO, 2002), whose elytra are wide at the humeral level and hemispherically convex on the dorsum, and another extreme may be represented by *Dongodytes*, whose elytra are very elongate, devoid of distinct shoulders and depressed in basal areas. *Boreaphaenops* may belong to the latter lineage, though we have to wait for further evidences to substantiate this opinion.

It seems worth noting that the submentum is invariably sexsetose in *Boreaphaenops angustus*. As was already noted (*e.g.*, UÉNO & RAN, 2001, p. 11), number of the submental setae is subject to considerable individual variation in many species of Chinese cave trechines. *Boreaphaenops* is therefore exceptional in this respect, though it shows some instability in the number of the supraorbital and the elytral dorsal setae.

***Boreaphaenops angustus* S. UÉNO, sp. nov.**

(Figs. 1–3)

Length: 5.15–6.00 mm (from apical margin of clypeus to apices of elytra); 5.70–6.60 mm (including mandibles).

Body elongate, with narrow fore body and elongate hind body. Colour as de-

scribed under the genus.

Head elongate, parallel-sided and only lightly constricted before neck; HL/HW 1.42–1.51 (M 1.46), HL/PL 0.92–1.07 (M 1.00); genae slightly convex in posterior halves; frontal furrows uneven, each deeply impressed at the anterior portion, posterior two-fifths and posterior end; frons and supraorbital areas gently convex; supraorbital pores laterally located, supplementary pores of the posterior pair lying just antero-internal to the ordinary ones, existing in four of the five specimens of the type series but missing in a female paratype; antennae reaching apical fifth of elytra in ♂, apical third to fourth of elytra in ♀, segment 3 about 1.5 times as long as pedicel or scape, segment 4 slightly shorter than 3, segment 5 or 6 each cylindrical and a little more than 5.5 times as long as wide, terminal segment about as long as pedicel, about five-sixths as wide as scape and about three times as long as wide.

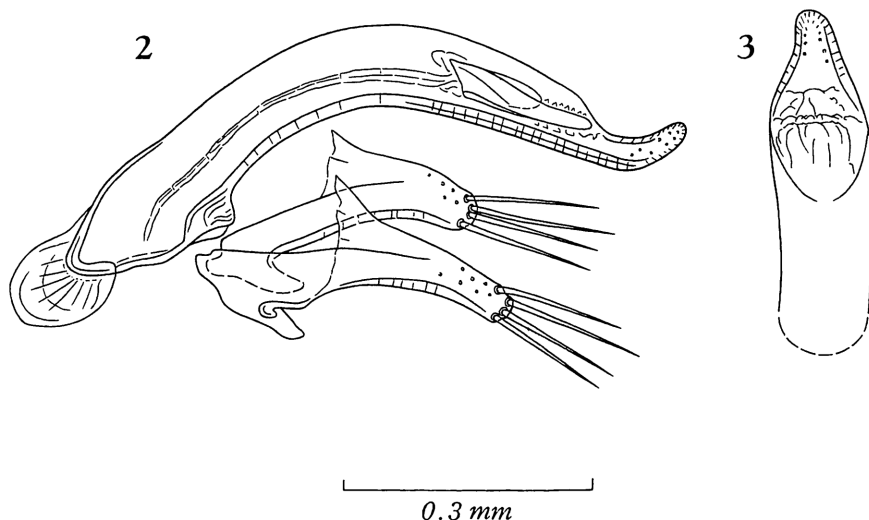
Prothorax a little wider than head, obviously longer than wide, widest at about four-sevenths from base, and contracted posteriorly; PW/HW 1.07–1.13 (M 1.11), PL/PW 1.29–1.39 (M 1.32). Pronotum elongated barrel-shaped, widest at about three-fourths from base; PNW/HW 1.03–1.11 (M 1.07), PL/PNW 1.32–1.45 (M 1.37); sides feebly arcuate in anterior four-sevenths, then nearly straight, and very briefly and very slightly sinuate just before the roots of posterior marginal setae; apex feebly arcuate, postero-ventrally rounded on each side and devoid of distinct front angles; base evidently narrower than apex, truncated at the median part but anteriorly rounded on each side and usually forming very obtuse angles near the roots of posterior marginal setae; PNW/PA ca. 1.29–1.34 (M ca. 1.31), PNW/PB ca. 1.54–1.61 (M ca. 1.57), PB/PA ca. 0.81–0.87 (M ca. 0.84); dorsum convex, steeply declivous at the antero-lateral portions; median line fine though distinct, not reaching apex but almost reaching base; apical transverse impression mal-defined, though obviously depressed at the median part; basal transverse impression fairly wide, not deep but almost continuous, merging on each side into shallow basal fovea; basal area narrow and smooth. Lateral expansion of propleura narrowly visible from above except for anterior third.

Elytra elongated subovate, about twice as wide as prothorax, nearly twice as long as wide, usually widest at about middle though widest at about four-sevenths from bases in a female paratype, and more pointed at bases than at apices; EW/PW 1.93–2.06 (M 1.98), EL/PL 2.82–3.00 (M 2.89), EL/EW 1.91–1.97 (M 1.94); humeral angles very obtuse, almost effaced though still recognizable, prehumeral borders long and straight, very oblique and reaching basal peduncle; sides slightly arcuate from humeral angles to apical fifth and rather narrowly rounded at apices; dorsum rather strongly convex in apical halves but much less so in basal parts, steeply declivous at the apical parts and more steeply so at the sides in apical halves; striae distinct and rather coarsely punctate though superficial and not sharply carved except stria 1, which is deep in basal area, clearly impressed throughout and approaches to suture in apical half, discal striae more or less deeper than lateral ones; intervals mostly flat, more or less uneven behind middle, apical carina absent; stria 3 with three setiferous dorsal pores at 1/6–1/5, 2/5–3/7 and 5/9–3/5 (usually 4/7) from base, respectively; in the allo-

type, a short extra dorsal seta present on stria 4 of the left elytron just before the level of the third pore on stria 3; preapical pore located on the apical declivity close to apex (one-tenth to one-seventh from apex), though still more distant from apex than from suture; apical pore and marginal umbilicate pores as described under the genus.

Ventral surface and legs as described under the genus, with the following additions: metatibia about three-fifths as long as elytra and slightly outcurved in apical third; mesotarsus about three-fifths as long as mesotibia, metatarsus about two-thirds as long as metatibia; tarsomere 1 slightly shorter than tarsomeres 2–4 combined in mesotarsus, slightly longer than that in metatarsus.

Male genital organ very small and rather lightly sclerotized. Aedeagus about two-ninths as long as elytra, strongly arcuate at middle but rather straight in both basal and apical parts; basal part small though proximally produced, hardly emarginate at the sides of small basal orifice, with a large sagittal aileron protrudent proximally; viewed laterally, apical lobe narrow, strongly arcuate dorsad, and gradually narrowed towards blunt extremity; viewed dorsally, apical part abruptly narrowed towards apical lobe, which is inclined to the right and rather widely rounded at the tip; in profile, ventral margin deeply emarginate at middle but nearly straight before apical lobe. Copulatory piece small, only one-fourth as long as aedeagus, rolled at the proximal half and divided apically into two lobes, short wide right and narrowly prolonged left, the latter of which forms a thin straight apical process blunt at the extremity. Styles relatively wide, right style obviously shorter than the left though bearing broader apical part, each usually bearing four long setae at the apex; in the male paratype, the left style bears five apical setae supplemented with a short extra seta at the ventral edge.



Figs. 2–3. Male genitalia of *Boreaphaenops angustus* S. UENO, gen. et sp. nov., from Lengre Dong Cave in Shennongjia Linqiu; left lateral view (2), and apical part of aedeagus, dorso-apical view (3).

Type series. Holotype: ♂, 13-V-2002, T. KISHIMOTO leg. Allotype: ♀, 13-V-2002, S. UENO leg. Paratypes: 1♂, 2♀♀, 13-V-2002, T. KISHIMOTO leg. All deposited at present in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Type locality. Limestone cave called Lengre Dong, 1,640 m in altitude, above Tianshengqiao of Caiqi Cun in Muyu Zhen, Shennongjia Linqu, at the western part of Hubei in Central China.

Notes. This interesting species has so far been known from only the limestone cave called Lengre Dong lying at the southwestern side of Huanghun Ling above the Heishui He Valley, a tributary of the Shennong Xi River. It is about 14 km distant in a beeline to the east-northeast from Dashennongjia, the highest point of the Shennongjia area. The cave was explored and described by a French party under the title “Grotte Chaude et Froide” (LIPS *et al.*, 1993, pp. 61–62, 1 pl., 1 map on a folder).

Boreaphaenops angustus was taken in a horizontal room at the end of the “grande galerie” (indicated as “four à nitrate” on the French party’s map) about 225 m removed from the entrance, which is open under a cliff above a forest of mainly deciduous broadleaved trees. The room “four à nitrate” is muddy and contains several shallow pools of groundwater fed by two trickles. These pools are the remains of saltpetre miners, who built them by piling up stones around the edges of shallow mud basins. All the specimens of the trechine beetle were found from beneath collapsed stones at the edges of groundwater. They were not so agile when exposed, and were easily caught by an aspirator.

要 約

上野俊一：揚子江の北側から見つかったアシナガメクラチビゴミムシの1新属新種。—— 中国湖北省西部で揚子江の北側に位置する、神农架国家級自然保护区内の石灰洞のひとつ、冷热洞から、アシナガメクラチビゴミムシの1種を新属新種として記載し、*Boreaphaenops angustus* S. UENOと命名した。この種は、外部形態が既知のどの属種とも異なっていて、真の類縁関係を判定するのがむずかしいが、多くの点で贵州省北部の洞窟に分布する*Shenaphaenops*属のものに似ている。ただし、現時点で、これが系統関係を確実に表わすものと断定するのは早計だろう。上翅が細長くて肩部が退化し、基半部の隆起が弱いという形態の特徴は、肩部の幅が広くて背面がいちじるしく膨隆する*Sinaphaenops*系列ではなく、これまで広西北部のみから知られている*Dongodytes*系列に、*Boreaphaenops*属が含まれる可能性を秘めているからである。

なお、これまでに中国で発見された洞窟性のメクラチビゴミムシ類は、約50種のすべてが揚子江の南側の地域からのもので、北側の地域の洞窟からはメクラチビゴミムシ類の見つかったことがなかった。したがって、今回の発見は、メクラチビゴミムシ類の中国における分布域が、揚子江北側の地域にも大きく広がっている可能性を示唆するものである。

References

- DEUVE, Th., 1993. Description de *Dongodytes fowleri* n. gen., n. sp., Coléoptère troglobie des karsts du Guangxi, Chine (Adephaga, Trechidae). *Bull. Soc. ent. Fr.*, **98**: 291–296.
- LIPS, B., J. LIPS, P. SCHALK & J. P. COTTET, 1993. Spéléologie au pays de l'homme sauvage. Une expédition organisée par Aventures Karstiques Lointaines. 139 pp., 7 col. pls., 8 folders. Fédération Française de Spéléologie, Paris.
- UÉNO, S.-I., 1998. Notes on *Dongodytes* (Coleoptera, Trechinae), with description of a new species. *J. speleol. Soc. Japan*, **23**: 1–15.
- 1999 a. New genera and species of aphaenopsoid trechines (Coleoptera, Trechinae) from South-Central China. *Elytra, Tokyo*, **27**: 617–633.
- 1999 b. Two new *Shenaphaenops* (Coleoptera, Trechinae) from northeastern Guizhou, South China. *J. speleol. Soc. Japan*, **24**: 41–50.
- 2002. New *Sinaphaenops* (Coleoptera, Trechinae) from southern Guizhou, with notes on *Thaumastaphaenops pulcherrimus*. *Elytra, Tokyo*, **30**: 57–72.
- & J. RAN, 1998. Notes on *Sinaphaenops* (Coleoptera, Trechinae), with descriptions of two new species. *Ibid.*, **26**: 51–59.
- & — 2001. *Uenotrechus liboensis* (Coleoptera, Trechinae) in a perfect condition, with notes on the reversed type localities of two trechine beetles from southeastern Guizhou. *J. speleol. Soc. Japan*, **26**: 5–17.
- & WANG, F., 1991. Discovery of a highly specialized cave trechine (Coleoptera, Trechinae) in South-east China. *Elytra, Tokyo*, **19**: 127–135.