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A New Cave Trechine from Southwestern Hubei, with Notes on the Genus *Cathaiaphaenops* (Coleoptera, Trechinae)

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Abstract A new anophthalmic trechine beetle of the genus *Cathaiaphaenops* is described from two limestone caves in southwestern Hubei, Central China, under the name of *C. amplipennis* S. UÉNO. Unusual variability of the members of this genus is pointed out, and *Amygdalotrechus* DEUVE is synonymized with *Cathaiaphaenops*.

The genus *Cathaiaphaenops* was erected by DEUVE (1996, pp. 42, 47) for a peculiar semi-aphaenopsoid trechine beetle found in a limestone cave in northwestern Hunan, South-Central China. Visiting the type locality, Feihu Dong Cave, in the autumn of 1997, we were able to collect more than thirty specimens of this species and were surprised to find that the beetle was unusually variable in size. More surprising was a population of another *Cathaiaphaenops* found in Laoxiao Dong Cave in southwestern Hubei to the north-northwest of Feihu Dong. The largest specimen from this population was well more than a third as large again as the smallest one, and had relatively small male genitalia as compared with the latter. They looked like two different species, though their male genitalia were perfectly identical in configuration with each other. Since the gap between them was bridged by various intermediate individuals, I felt certain that they represented the two extremes of individual variation of a single species however implausible it may appear, though I was not definitely confident of this view until long series of specimens of two *Guizhaphaenops* showing a similarly unusual size variation were collected in northwestern Guizhou in the autumn of the following year (cf. UÉNO, 2000).

In the present paper, I am going to describe the new species from southwestern Hubei under the name of *Cathaiaphaenops amplipennis*. It is closely similar in facies to the species recently described by DEUVE (2000, pp. 158–160) from the border areas of eastern Sichuan and southwestern Hubei, but is intermediate between the latter and the Feihu Dong species in other morphological features. I am therefore going to regard *Amygdalotrechus* DEUVE (2000, p. 157), a subgenus erected for his new species from the border areas, as a junior synonym of nominotypical *Cathaiaphaenops*. The abbreviations used herein are the same as those explained in previous papers of mine.

Before going into further details, I wish to express my deep indebtedness to Drs. Yoshiaki NISHIKAWA, WANG Fuxing and Toshio KISHIMOTO for their collaboration in the

field, and to Mr. FAN Ting and the authorities of Xianfeng Xian for their kind arrangement and support of our cave investigations.

Genus *Cathaiaphaenops* DEUVE, 1996

Cathaiaphaenops DEUVE, 1996, Revue fr. Ent., (N.S.), **18**, pp. 42, 47; type species: *Cathaiaphaenops delprati* DEUVE, 1996.

Cathaiaphaenops (*Amygdalotrechus*) DEUVE, 2000, Revue fr. Ent., (N.S.), **21** [for 1999], p. 157; type species: *Cathaiaphaenops chuandongziensis* DEUVE, 2000. (*Syn. nov.*)

This genus was carefully described by DEUVE (1996, 2000, *loc. cit.*), so that no redescription seems needed except for the male genitalia, which always bear an anisotopic copulatory piece. It is, however, necessary to give some comments on the unusual variability of the species involved.

As was pointed out in my accounts of the genus *Guizhaphaenops* and its type species (cf. UÉNO, 2000, pp. 248, 249, etc.), members of the genera *Guizhaphaenops* and *Cathaiaphaenops* exhibit unusual individual variation, above all in size but also in such characters as configuration of the prothorax and particularly of the elytra, length of the antennae, chaetotaxy, and size of the male genitalia. In *C. delprati*, these variations are not so strikingly pronounced except for the size (cf. Fig. 1), but "amygdaloid" modification of the elytra is observed to some extent in certain large specimens. On the other hand, the modification of the elytral configuration attains to its maximum in large individuals of *C. amplipennis* to be described in the present paper, though it is much less pronounced in small individuals of the same species (cf. Fig. 2). Thus, the peculiar "amygdaloid" shape of the elytra is a character state emphasized in large individuals of certain trechine beetles belonging to the genera *Cathaiaphaenops* and *Guizhaphaenops*. Its appearance may be regarded as a specific peculiarity but cannot be considered to bear supraspecific importance.

I therefore regard *Amygdalotrechus* DEUVE (2000, p. 157) as a junior synonym of *Cathaiaphaenops* DEUVE (1996, pp. 42, 47). I have not seen the type species of the former, *C. chuandongziensis* DEUVE (2000, p. 158, figs. 4, 11), whose male genitalia seem different from those of the other congeners in conformation of the inner armature, but it doubtless belongs to the same lineage as *C. draconis*, which seems closely related to *C. amplipennis*.

In establishing *Cathaiaphaenops*, DEUVE (1996, pp. 43, 44, fig.7) described that "l'endophallus de l'édéage est inerme." However, the male genitalia of its type species, *C. delprati*, possess an anisotopic copulatory piece as in *C. amplipennis* and *C. draconis*, though it is thin and hyaline and is apt to be overlooked, particularly when dissected specimens are not fully mature. DEUVE's illustration of the male genitalia of *C. delprati* may look appreciably different from my sketch of those of *C. amplipennis*, but this is merely due to the difference of optical angles. Direct comparion of specimens has proved that they are actually very similar to each other, though the aedeagus is a little less slender and less arcuate behind middle in *C. delprati* than in *C. amplipennis*.

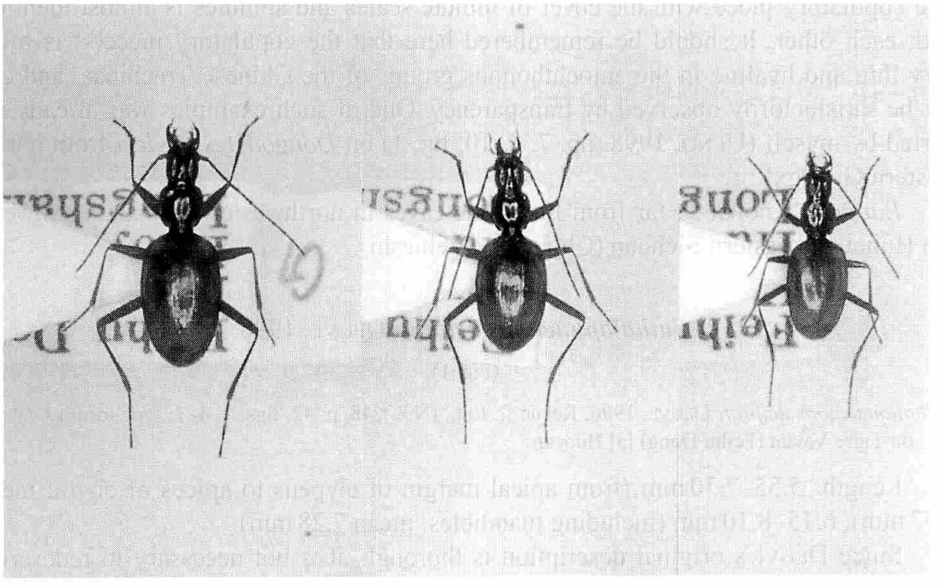


Fig. 1. Individual variation of *Cathaiaphaenops delprati* DEUVE, from Feihu Dong Cave. From left to right: largest, average-sized and smallest specimens examined, on the same scale. (Photo M. OWADA.)

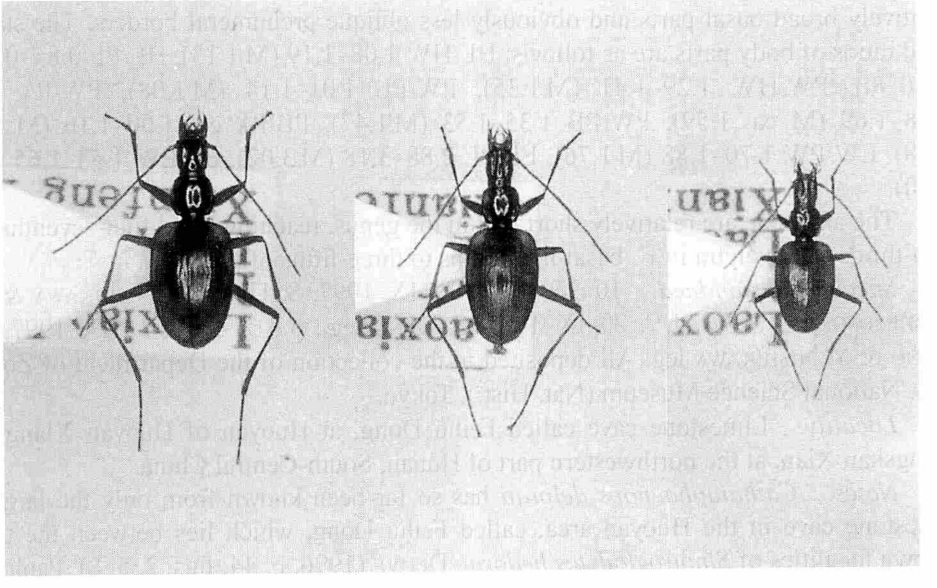


Fig. 2. Individual variation of *Cathaiaphaenops amplipennis* S. UÉNO, sp. nov., from Laoxiao Dong Cave. From left to right: largest, average-sized and smallest specimens examined, on the same scale. (Photo M. OWADA.)

The copulatory piece with the cover of minute scales and spinules is almost identical with each other. It should be remembered here that the copulatory piece(s) is often very thin and hyaline in the autochthonous groups of the Chinese Trechinae, and can not be satisfactorily observed by transparency. One of such examples was already reported by myself (UÉNO, 1998, pp. 7, 8, 10, fig. 1) on *Dongodytes fowleri* from northwestern Guangxi.

Range. Known so far from limestone caves in northwestern Hunan, southwestern Hubei and eastern Sichuan (Chongqing Tebieshi).

Cathaiaphaenops delprati DEUVE, 1996

(Fig. 1)

Cathaiaphaenops delprati DEUVE, 1996, Revue fr. Ent., (N.S.), **18**, p. 42, figs. 1, 4, 7; type locality: Grotte du Tigre Volant (Feihu Dong) [à] Huoyan.

Length: 5.55–7.30 mm (from apical margin of clypeus to apices of elytra; mean 6.57 mm); 6.15–8.10 mm (including mandibles; mean 7.28 mm).

Since DEUVE's original description is thorough, it is not necessary to redescribe this species, with the exception of the male genitalia, whose true characteristics were pointed out in the generic account above. As was already noticed, individual variation is not much pronounced in this species, though certain large specimens show a trend of "amygdaloid" modification of the elytra. In those large specimens, the elytra are widest at about basal two-fifths (at about basal three-sevenths in most other specimens), with relatively broad basal parts and obviously less oblique prehumeral borders. The standard ratios of body parts are as follows: HL/HW 1.08–1.19 (M 1.13), HL/PL 0.84–0.96 (M 0.90), PW/HW 1.29–1.41 (M 1.35), PW/PL 1.01–1.14 (M 1.08), PW/PA ca. 1.48–1.69 (M ca. 1.59), PW/PB 1.35–1.53 (M 1.47), PB/PA ca. 1.00–1.16 (M ca. 1.08), EW/PW 1.70–1.88 (M 1.76), EL/PL 2.88–3.18 (M 3.02), EL/EW 1.53–1.65 (M 1.60).

The antennae are relatively short within the genus, reaching basal four-sevenths to two-thirds of the elytra in ♂, basal five-ninths to three-fifths of the elytra in ♀.

Specimens examined. 10 ♂♂, 4 ♀♀, 19–IX–1997, S. UÉNO, Y. NISHIKAWA & T. KISHIMOTO leg.; 7 ♂♂, 1 ♀, 20–IX–1997, S. UÉNO leg.; 6 ♂♂, 4 ♀♀, 22–IX–1997, S. UÉNO & Y. NISHIKAWA leg. All deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Locality. Limestone cave called Feihu Dong, at Huoyan of Huoyan Xiang in Longshan Xian, at the northwestern part of Hunan, South-Central China.

Notes. Cathaiaphaenops delprati has so far been known from only the largest limestone cave in the Huoyan area, called Feihu Dong, which lies between the two known localities of *Sinotroglodytes bedosae* DEUVE (1996, p. 44, figs. 2, 5, 8), Panlong Dong Cave at Zhangjiacao and Remi Dong Cave at Yangliu Cun (erroneously cited as "Grotte Renmi Dong" in the original description). This is rather strange, since the three caves are developed in the same limestone formation and since *C. delprati* is the

commoner of the two species. However, none but Feihu Dong of the nine caves investigated in the Huoyan area and its vicinities were found to be inhabited by this remarkable species, which should be upper hypogean in nature judging from its occurrence in the type cave.

As was noticed in the *Notes* following the description of *Toshiaphaenops ovicollis* (UÉNO, 1999, p. 264), *Cathaiaphaenops delprati* is widely distributed in the type cave, but is commonest in the huge entrance room, most of which is in the twilight zone due to the sunlight coming from a very large entrance. The beetle is usually found from under stones lying on the muddy floor, even in light places so far as the floor is sufficiently moist. In deeper parts of the cave, the beetle becomes more cursorial and is often found on wet flowstones and rotten sticks abandoned by local people.

Cathaiaphaenops amplipennis S. UÉNO, sp. nov.

(Figs. 2–5)

Length: 5.15–7.40 mm (from apical margin of clypeus to apices of elytra; mean 6.26 mm); 5.70–8.25 mm (including mandibles; mean 6.94 mm).

The specimens from the Dishui Dong population are a little larger on an average and less variable in size than those from the type population; length from the apical margin of clypeus to the apices of elytra 5.70–7.40 mm (mean 6.48 mm) in the former, 5.15–7.10 mm (mean 6.02 mm) in the latter; total length including mandibles 6.35–8.25 mm (mean 7.18 mm) in the former, 5.70–7.80 mm (mean 6.68 mm) in the latter. However, this difference may be due to the fact that the Dishui Dong specimens were mostly taken on walls and flowstones, since larger individuals tend to be more cursorial than smaller ones.

Unusually variable species of medium to fairly large size, with narrow fore body and ample hind body. All the appendages long and slender. Colour reddish brown to dark reddish brown, shiny; palpi, apical antennomeres and venter of hind body usually a little lighter than the other parts.

Head longer than wide and usually a little shorter than prothorax, HL/HW 1.11–1.29 (M 1.20), HL/PL 0.82–1.01 (M 0.93), either subparallel-sided or widest at the level of anterior supraorbital pores and gradually narrowed posteriad from there; genae either straight except for posteriormost parts or very feebly convex, sparsely covered with short pubescence; neck wide, with the anterior constriction distinct at the sides and continuing onto both dorsum and venter; dorsum depressed though convex in fronto-vertexal area, with deeply impressed frontal furrows which are feebly arcuate and evanescent at posterior supraorbital pores; microsculpture fine but distinct, mostly consisting of wide meshes; labrum shallowly emarginate at the apex, which is either straight or slightly bisinuate at the median part; mandibles falciform, moderately arcuate inwards at the acute apices, right mandible strongly tridentate. Antennae relatively long and slender, reaching three-fifths to six-sevenths from the bases of elytra in ♂, four-sevenths to two-thirds from the bases of elytra in ♀; scape subequal in length to

pedicel, which is about five-eighths as long as segment 3, 4 or 5; segments 6–10 decreasing in length towards apex, 6–7 each 5 times or more as long as wide; segment 10 obviously shorter than 9 but longer than pedicel; terminal segment about as long as segment 9 and thin, evidently narrower than scape.

Pronotum subquadrate rather than barrel-shaped, distinctly wider than head, about as wide as long, widest at a level between five-ninths and two-thirds (usually at about three-fifths) from base, and more gradually narrowed towards base than towards apex; PW/HW 1.22–1.37 (M 1.31), PW/PL 0.96–1.08 (M 1.03), PW/PA ca. 1.49–1.74 (M ca. 1.60), PW/PB 1.22–1.49 (M 1.34); sides moderately bordered in front, more widely so in basal two-fifths, and widely reflexed in postangular parts, gently arcuate in apical third, either very slightly arcuate or nearly straight at the median parts, and feebly arcuate again near hind angles, with two pair of marginal setae, of which the anterior one is located at about apical seventh and the posterior one just in front of hind angles; apex either straight or shallowly emarginate, always narrower than base, PB/PA ca. 1.11–1.36 (M ca. 1.20), with front angles very obtuse, either slightly produced forwards or rounded off; base briefly produced at the median part whose posterior margin is either straight or lightly arcuate, and more or less obliquely emarginate on each side, with hind angles very obtuse though usually detectable; dorsum convex and completely glabrous, with vague transverse striations; microsculpture mostly clear, consisting of fine transverse lines; median line fine, reaching neither apex nor base; apical transverse impression usually distinct, either smooth or longitudinally wrinkled; basal transverse impression and basal foveae mal-defined, the latter extending anteriorly; basal area longitudinally strigose, though sometimes faintly. Propleura not expanded laterad.

Elytra variable in configuration, more or less ovate and ample, much wider than prothorax, usually widest at about basal third and a little more gradually narrowed towards bases than towards apices, sometimes widest at about basal two-fifths and only feebly narrowed towards bases, forming broad basal parts; EW/PW 1.87–2.08 (M 1.94), EL/PL 2.71–3.11 (M 2.96), EL/EW 1.46–1.56 (M 1.50); shoulders distinct, usually rounded but sometimes almost square in large individuals; prehumeral borders usually straight, a little less oblique in larger individuals than in smaller ones, sometimes gently arcuate and perpendicular to the mid-line at the innermost portions in small individuals; sides moderately bordered throughout, distinctly serrate and ciliated particularly at the humeral parts, gently arcuate in basal halves and less so posteriad in most specimens examined, nearly parallel-sided before middle and feebly arcuate posteriad in some large individuals, preapical emargination slight; apices narrowly rounded, usually forming a small re-entrant angle at suture; dorsum well convex, steeply declivous at the sides, obliquely depressed or sometimes shallowly hollowed in basal areas, and wholly covered with minute piliferous punctures; microsculpture distinct, consisting of fine transverse lines; striae superficial and not sharply impressed though traceable throughout, more or less distinctly punctate, 1–5 deepened in basal area, 1 approaching to suture behind middle, 2 usually forming apical anastomosis with 3, stria 8 not deepened apically; scutellar striole fairly long though shallow; apical

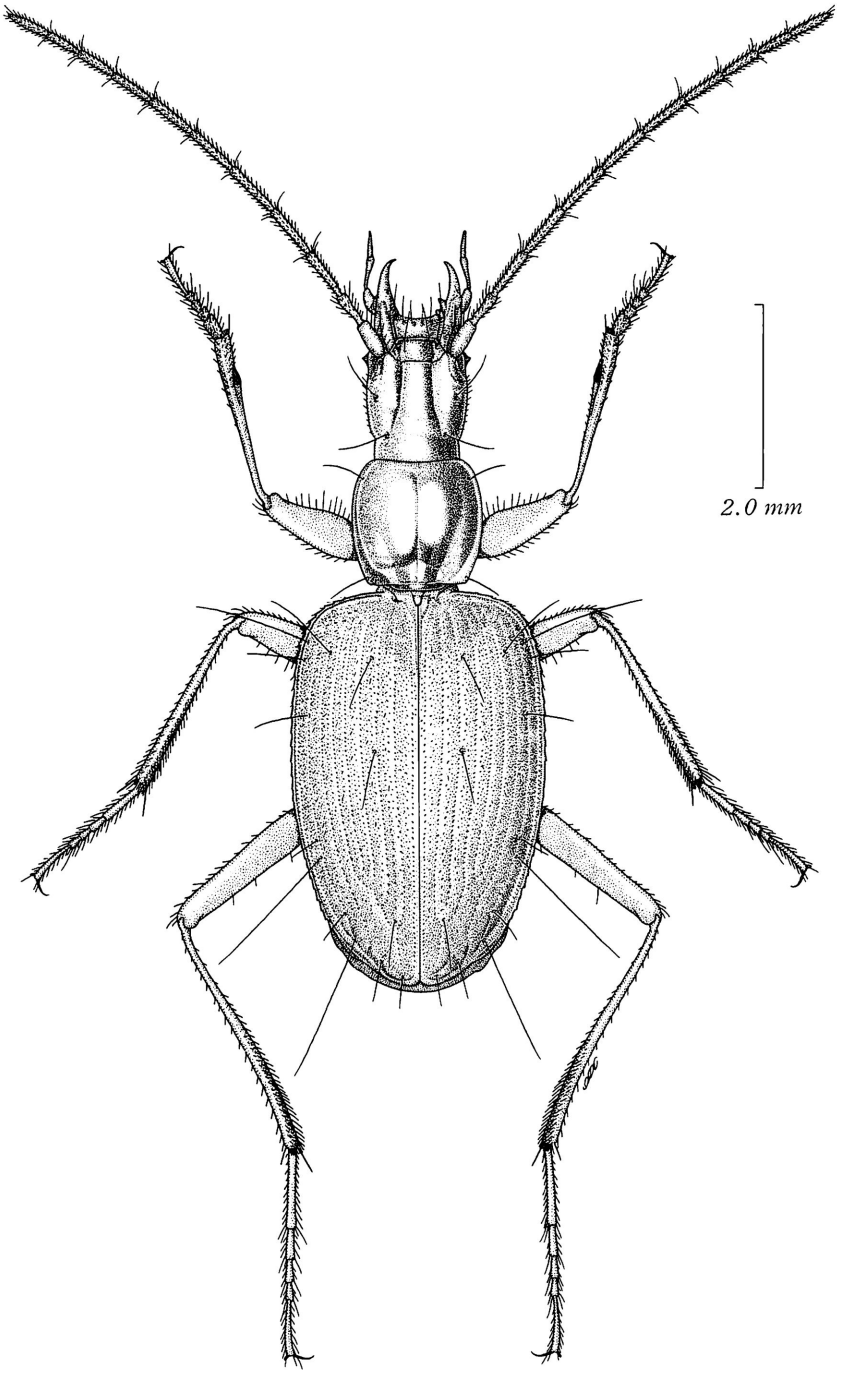
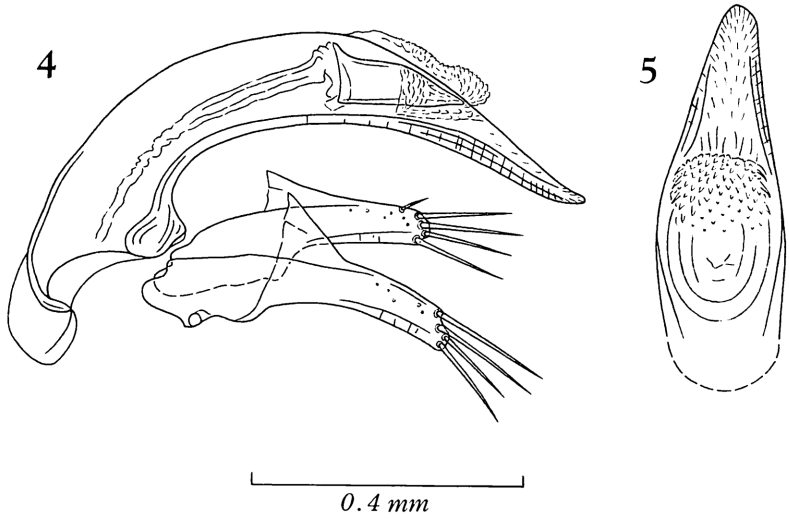


Fig. 3. *Cathaiaphaenops amplipennis* S. UÉNO, sp. nov., ♂, from Laoxiao Dong Cave at Nongjiagai.

striole very short but deep, usually free at the anterior end though directed to stria 7; intervals flat even near suture, apical carina short and obtuse; stria 3 with two setiferous dorsal pores at 1/8–1/7 and 2/5–4/9 from base, respectively; preapical pore located at the apical anastomosis of striae 2 and 3, and much nearer to suture than to apex; marginal umbilicate pores as in the other species of the genus.

Ventral surface minutely pubescent, the pubescence being particularly conspicuous on abdominal sternites, each of which bears a pair of paramedian setae; anal sternite bisetose in ♂, quadrisetose in ♀. Legs long and slender; protibia straight, wholly pubescent and not externally grooved; metatibia about two-thirds as long as elytra and more or less arcuate outwards in apical part, metatarsus about four-fifths as long as metatibia; tarsomere 1 about as long as or slightly longer than tarsomeres 2–4 combined in both meso- and metatarsi; in ♂, protarsomeres 1 and 2 moderately dilated and denticulate inwards at the apices.

Male genital organ closely similar to that of *C. delprati*, very small and lightly sclerotized. Aedeagus only two-ninths as long as elytra in large individuals, a little larger than that (more than three-thirteenths as long as elytra) in small ones, moderately arcuate, gently depressed, and gradually acuminate from behind middle in profile, with fairly large basal part and long flattened apical lobe; basal part curved ventrad, with large basal orifice whose sides are widely emarginate; sagittal aileron fairly large and ventrally protrudent; viewed dorsally, apical lobe nearly symmetrical, gradually narrowed towards the tip, which is obtusely subangulate; viewed laterally, apical lobe slender, gently reflexed at the apical portion, and narrowly blunt at the extremity; ventral margin widely emarginate in profile. Inner sac armed with a subspatulate copula-



Figs. 4–5. Male genitalia of *Cathaiaphaenops amplipennis* S. UÉNO, sp. nov., from Laoxiao Dong Cave at Nongjiagai; left lateral view (4), and apical part of aedeagus, dorso-apical view (5).

tory piece just inside apical orifice, which is very thin and hyaline, about two-ninths as long as aedeagus, tapered towards apex from behind middle, and apically enveloped with a creased sheet of minute scales and spinules extending to the outside of apical orifice. Styles fairly large with elongate apical parts but devoid of ventral apophysis even on the left one, each usually bearing four apical setae but sometimes supplemented by a fifth one; a minute extra seta rarely present on the dorsal margin (cf. Fig. 4).

Type series. Holotype: ♂, allotype: ♀, Laoxiao Dong Cave, 23–IX–1997, S. UÉNO leg. Paratypes: 7 ♂♂, 3 ♀♀, Laoxiao Dong Cave, 23–IX–1997, S. UÉNO, Y. NISHIKAWA & T. KISHIMOTO leg.; 11 ♂♂, 3 ♀♀ (incl. 1 teneral ♂), Dishui Dong Cave, 23–IX–1997, S. UÉNO, Y. NISHIKAWA & T. KISHIMOTO leg. All deposited at present in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo.

Localities. Limestone caves called Laoxiao Dong (type locality!) and Dishui Dong, at Nongjiagai of Laoli Xiang in Xianfeng Xian, at the southwestern part of Hubei, Central China.

Notes. It seems worth noting that the male genital organ of the present species is almost identical with that of *C. delprati*, though the two species are markedly different in facies and other morphological details. This species may be closest to *C. draconis* DEUVE (2000, p. 160, figs. 5, 8, 12) from eastern Sichuan, whose male genitalia are also similar to those of *C. delprati* and *C. amplipennis*.

The two limestone caves harbouring the present species were explored by a Franco-Chinese party of speleologists from the end of 1992 to the beginning of 1993, and were carefully described and illustrated (BARBARY *et al.*, 1995, pp. 77–80). They are located on the same hill but at different elevations: Laoxiao Dong Cave near the top of a ridge and Dishui Dong Cave at the bottom of a deep blind valley.

In Laoxiao Dong Cave (cf. BARBARY *et al.*, 1995, pp. 79–80, fig. 57), the trechine beetle was found in the steeply descending main gallery even near the entrance but mostly at the bottom of the muddy slope. Almost all the specimens were taken from under stones lying in wet places, but there were a few that were found crawling about among gravel. In Dishui Dong Cave (cf. BARBARY *et al.*, 1995, pp. 77–79, fig. 56) on the contrary, most specimens obtained were found crawling on moist walls or flowstones, sometimes more than 2 m above the floor, and only a few specimens were taken from under stones lying on the banks of a narrow underground stream. A single specimen of *Toshiaphaenops globipennis* S. UÉNO (1999, p. 624, fig. 4) was met on the same wall as was inhabited by two individuals of *C. amplipennis*.

要　　約

上野俊一：中国湖北省南西部産 *Cathaiaphaenops* 属アシナガメクラチビゴミムシの1新種. —— 中国湖北省南西部の咸丰县にある老硝洞から，*Cathaiaphaenops* 属のアシナガメクラチビゴミムシの1新種を記載し，これに *C. amplipennis* S. UÉNO という新名を与えた．また，この

属のメクラチビゴミムシ類の体の大きさや形状には，いちじるしい個体変異がみられることを指摘し，*Amygdalotrechus* DEUVE をその下位同物異名と認めて整理した．

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New Records of Staphylinid Beetles (Coleoptera) from Nii-jima Island of the Izu Islands, Central Japan

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No staphylinid beetles have hitherto been recorded from Nii-jima Island of the Izu Islands, Central Japan. Through the courtesy of Dr. Ienori FUJIYAMA, Wakô-shi, three species of staphylinid beetles were given to me for study. They were obtained by himself on July 23, 1974, at Honson on the island. All the species are new to the fauna of the island, as recorded below.

1. *Lithocharis nigriceps* KRAATZ, 1♂.
2. *Philonthus lewisius* SHARP, 1♂, 3♀♀.
3. *Philonthus amicus* SHARP, 1♀.

I thank Dr. I. FUJIYAMA for his kindness in giving me the specimens.