

Records of Four Carabid Beetles (Coleoptera, Carabidae) from Southwest Hubei and Northwest Hunan, China

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Abstract Four species of the genus *Carabus* (s. lat.) are recorded from southwestern Hubei and northwestern Hunan of South-Central China. One of them is described as *C. (Apotomopterus) infirmior kishimotoi* subsp. nov.

Early in the summer of 2000, I made an investigative trip to southwestern Hubei and northwestern Hunan of South-Central China, with a view to clarify the carabid fauna of these areas, which has been poorly known as yet. Unfortunately, almost all the forests have been extensively cut down and most parts of the original vegetation have already disappeared even in and around such nature reserves as Xingdou Shan and Badagong Shan. After making every effort by setting nearly 2,000 traps at nine different sites, I was able to collect only four species of the members of the genus *Carabus* (s. lat.). All these are already known and rather widely distributed species, but are still worth introducing into science from morphological and zoogeographical viewpoints. One of them is considered to be a new race of *C. (Apotomopterus) infirmior*. In this article, I am going to record all the four taxa with necessary descriptions and exact collecting data.

Before going further, I wish to express my sincere thanks to Mr. FAN Ting (Chengdu International Academic Exchange Centre of the Chinese Academy of Science) and Dr. Toshio KISHIMOTO (Tokyo University of Agriculture) for their kind collaboration throughout my field works. Also I acknowledge Mr. Kiyoyuki MIZUSAWA for his support in various ways. Special thanks are due to Dr. Shun-Ichi UÉNO of the National Science Museum, Tokyo, for revising the manuscript of this paper.

1. *Carabus (Apotomopterus) protenes protenes* BATES, 1889

(Fig. 1)

Carabus (Apotomopterus) protenes: IMURA, 2000, Gekkan-Mushi, Tokyo, (356), p. 11, figs. 1–2.

Length: 26.7–33.5 mm (including mandibles).

Male genitalia. As shown in Fig. 1, basic structure of the male genital organ of this species is almost identical with that of *C. (A.) sauteri* (cf. IMURA, 1994; IMURA

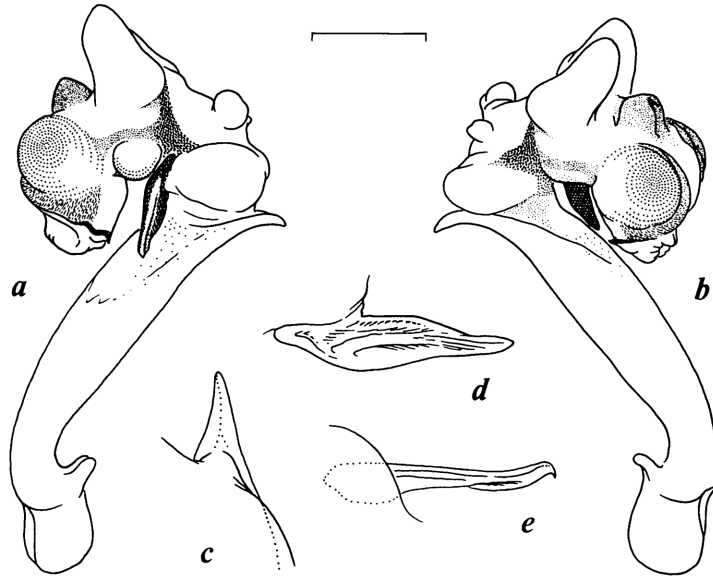


Fig. 1. Male genital organ of *Carabus (Apotomopterus) protenes protenes* from near Dahong-cun in Da'an Xiang of Longshan Xian, NW. Hunan. — a, Aedeagus with fully everted endophallus in left lateral view; b, ditto in right lateral view; c, apical part of aedeagus in dorsal view; d, spinula in dorsal view; e, ditto in basal lateral view. Scale: 2 mm for a & b; 1 mm for c–e.

et al., 1998), though the former is peculiar in bearing two irregularly shaped small membraneous projections on the dorsal wall of the endophallus at the place for the median lobe.

Specimens examined. [SW. Hubei]: 6♂♂, 22♀♀, Hongchun [红椿] (1,350 m), in Yuanbao-qu [元堡区] of Lichuan Xian [利川县], 14–VI–2000; 9♂♂, 27♀♀, Bajiao-cun [芭蕉村] (730–800 m), in Maoba-qu [毛坝区] of Lichuan Xian, 14–VI–2000; 1♂, Gaodongzi [高洞子] (700 m) at Dashaba-cun [大沙坝村], in Huangjindong-qu [黄金洞区] of Xianfeng Xian [咸丰县], 14–VI–2000; 24♂♂, 54♀♀, Baiyan [白岩] (900 m), in Xianfeng Xian, 14–VI–2000; 6♂♂, 19♀♀, eastern side of Pass Fenshuiling [分水岭] (1,320 m), at Taiping-qu [太平区] of Hefeng Xian [鹤峰县], 12–VI–2000. [NW. Hunan]: 3♂♂, 6♀♀, near Dahong-cun [大红村] (1,020–1,080 m), in Da'an Xiang [大安乡] of Longshan Xian [龙山县], 13–VI–2000; 4♂♂, 17♀♀, Liangshuijing-cun [凉水井村] (780–800 m), in Da'an Xiang of Longshan Xian, 13–VI–2000, all collected by Y. IMURA & T. KISHIMOTO.

Notes. *Carabus protenes* was described by BATES over a hundred years ago based upon the materials brought by PRATT, and is one of the well-known *Apotomopterus* in China. Nevertheless, our knowledge is still very poor on its distribution, variation and even on the detailed morphology. In fact, the male genital organ of this species is illustrated and precisely described for the first time in this paper. The identi-

fication of the above specimens was made based upon a comparison with the lectotype of *C. protenes* now preserved in the National Museum of the Natural History in Paris, but the assigned taxonomic position is still tentative, since the lectotype of BATES' species is a female. As shown in Fig. 1, the male genitalia of this taxon and those of *C. sauteri* are closely similar to each other, and it may be appropriate to unify these two taxa into a single category at a species level, at least from the morphological view.

2. *Carabus (Apotomopterus) infirmior kishimotoi* IMURA, subsp. nov.

(Fig. 2)

Carabus (Apotomopterus) infirmior ssp.: IMURA, 2000, Gekkan-Mushi, Tokyo, (356), p. 11, figs. 3–4.

Length: 28.7–32.5 mm (including mandibles).

Black with faint brownish tinge. One of the largest subspecies of all the known races of *infirmior*, with robust body and homodyname elytral sculpture. Male genitalia as shown in Fig. 2, with the apical lobe of aedeagus moderately elongate for the species, gently curved ventrad in lateral view, and not remarkably protruded left laterad in dorsal view. Endophallus short and gradually narrowed towards gonopore, with a pair of well-developed basal lateral lobes; median lobe absent, prepraeputal lobes weakly recognizable on both sides, apical lobes rather remarkably protruded though very small, and podian lobes inconspicuous. Spinula short and small, arrowhead-shaped in dorsal view, with the dorsal margin gently arcuate in lateral view.

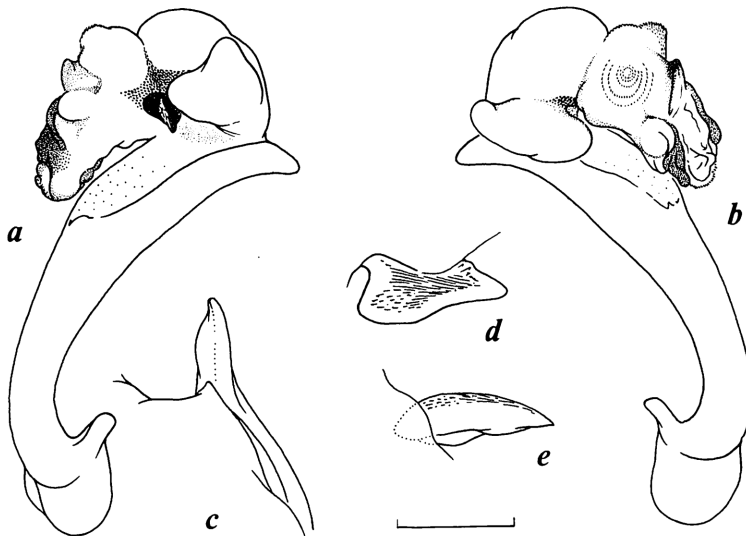


Fig. 2. Male genital organ of *Carabus (Apotomopterus) infirmior kishimotoi* subsp. nov., from Liangshuijing-cun in Da'an Xiang of Longshan Xian, NW. Hunan. — a, Aedeagus with fully everted endophallus in left lateral view; b, ditto in right lateral view; c, apical part of aedeagus in dorsal view; d, spinula in dorsal view; e, ditto in basal lateral view. Scale: 2 mm for a & b; 1 mm for c–e.

Type series: Holotype: ♂, Liangshuijing-cun [凉水井村] (780–800 m) in Da'an Xiang [大安乡] of Longshan Xian [龙山县], NW. Hunan, China, 13–VI–2000, Y. IMURA & T. KISHIMOTO leg., in coll. Department of Zoology, National Science Museum (Nat. Hist.), Tokyo. Paratypes (including allotype): 17♂♂, 40♀♀, same data as for the holotype; 1♂, 3♀♀, eastern side of Pass Fenshuiling [分水岭] (1,320 m), at Taiping-qu [太平区] of Hefeng Xian [鹤峰县], SW. Hubei, China, 12–VI–2000; 3♀♀, near Xuelaozhai [雪落寨] (1,250–1,300 m), in Shaping-qu [沙坪区] of Xuan'en Xian [宣恩县], SW. Hubei, China, 12–VI–2000; 1♀, near Dahong-cun [大红村] (1,020–1,080 m), in Da'an Xiang [大安乡] of Longshan Xian [龙山县], NW. Hunan, China, 13–VI–2000, all collected by Y. IMURA & T. KISHIMOTO and preserved in colls. Y. IMURA & K. MIZUSAWA.

Notes. The elytral sculpture of the present new subspecies is homodyname, and distinguished at a glance from such forms with heterodyname elytral sculpture as nominotypical *infirmior*, *loccai* and *lisanlingae*. From subspp. *homodynamus*, *normodynamus*, *tribulatus* and *jiucaishan*, all with homodyname sculpture, the new form is discriminated by larger size (most specimens of *kishimotoi* nov. measure more than 30 mm even in male), robuster pronotum with more protruded hind angles, and differently shaped aedeagal apex. From subspp. *changdensis* of north-central Hunan, the new subspecies is discriminated mainly by differently shaped aedeagus (cf. DEUVE, 1997, p. 218, fig. 13). The new race cannot be identical with subspp. *longshengensis* described by DEUVE and TIAN (1999) from northeastern Guangxi, since the coloration of legs and the shape of the aedeagal apex seem different, though the description of the Guangxi race is too poor to be cited for a comparative study. Judging from the basic structure of the endophallus, *Carabus infirmior* doubtless belongs to the same lineage containing *laoshanicus* and *cyanopterus*, which constructs one of the sub-clusters of the lineage 3 on the genealogical trees given by KIM *et al.* (1999, pp. 644–645, figs. 1 A & B). The new subspecies is named after Dr. Toshio KISHIMOTO of Tokyo University of Agriculture.

3. *Carabus (Coptolabrus) principalis principalis* BATES, 1889

Carabus (Coptolabrus) principalis: IMURA, 2000, Gekkan-Mushi, Tokyo, (356), p. 11, fig. 5.

Length: 41.1 mm (including mandibles).

Specimen examined. 1♀, eastern side of Pass Fenshuiling [分水岭] (1,320 m), at Taiping-qu [太平区] of Hefeng Xian [鹤峰县], SW. Hubei, China, 12–VI–2000, Y. IMURA & T. KISHIMOTO leg.

Notes. A single female specimen was trapped on rather a dried floor of a thin forest composed of planted lacquer trees on the eastern slope of the Pass Fenshuiling. It is sympatric with *Carabus (Apotomopterus) protenes* and *C. (A.) infirmior kishimotoi* nov.

4. *Carabus (Coptolabrus) augustus ignigena* HAUSER, 1914

Carabus (Coptolabrus) augustus ignigena: IMURA, 2000, *Gekkan-Mushi*, Tokyo, (356), p. 11, fig. 6.

Length: 42.5 mm (including mandibles).

Specimen examined. 1♀, Liangshuijing-cun [凉水井村] (780–800 m) in Da'an Xiang [大安乡] of Longshan Xian [龙山县], NW. Hunan, China, 13–VI–2000, Y. IMURA & T. KISHIMOTO leg.

Notes. This species was collected, together with *Carabus (Apotomopterus) protenes* and *C. (A.) infirmior kishimotoi* nov., from a rather deep secondary forest remaining on the eastern slope of a small hill behind the village of Liangshuijing-cun.

要 約

井村有希：中国湖北省南西部と湖南省北西部におけるオサムシ4種の記録。—— 2000年度の中国調査において、湖北省南西部と湖南省北西部から得られた4種のオサムシ（トゲオサムシ2種とカブリモドキ2種）を記録した。これらのうち、ヒメトゲオサムシ *Carabus (Apotomopterus) infirmior* については新亜種と認め、*kishimotoi* nov. という名を与えて記載した。

References

- CAVAZZUTI, P., 1995. Terzo contributo alla conoscenza dei *Carabus* L. della Cina. Nuove specie e sottospecie di *Apotomopterus* HOPE, *Isiocarabus* REITTER e *Coptolabrus* SOLIER del Guizhou (Coleoptera, Carabidae). *Lambillionea*, (95): 289–300.
- DEUVE, Th., 1994. Contribution à l'inventaire des genres *Carabus* et *Cychrus* en Chine (Coleoptera, Carabidae). *Bull. Soc. Sci. Nat.*, (82): 23–34.
- 1997. Nouveaux *Carabus* L. et *Cychrus* F. de la Chine, de l'Asie Centrale et de la Turquie d'Asie (Coleoptera, Carabidae). *Coléptères, Guyancourt cedex*, **3**: 209–229.
- 1998. Nouveaux *Carabus* L. et *Cychrus* F. de la Chine, de la Corée et du Liban (Coleoptera, Carabidae). *Ibid.*, **4**: 105–126.
- & M.-Y. TIAN, 1999. Diagnoses préliminaires de nouveaux *Carabus* L. de Chine méridionale (Coleoptera, Carabidae). *Ibid.*, **5**: 139–147.
- HAUSER, G., 1924. Neue *Apotomopterus*-Arten. *Soc. ent., Stuttgart*, **39**: 6–7.
- IMURA, Y., 1994. A preliminary revision of the species-complex of *Carabus (Apotomopterus) sauteri* (Coleoptera, Carabidae). *Elytra, Tokyo*, **22**: 1–14.
- , C.-G. KIM, Z.-H. SU & S. OSAWA, 1998. An attempt at the higher classification of the Carabina (Coleoptera, Carabidae) based on morphology and molecular phylogeny, with special reference to *Apotomopterus*, *Limnocarabus* and *Euleptocarabus*. *Ibid.*, **26**: 17–35.
- & K. MIZUSAWA, 2000. Notes on carabid beetles collected from China in 2000. *Gekkan-Mushi, Tokyo*, (356): 10–13. (In Japanese, with English title.)
- KIM, C.-G., Z.-H. SU, Y. IMURA & S. OSAWA, 1999. Origin and evolution of the *Apotomopterus* ground beetles (Coleoptera, Carabidae) as deduced from mitochondrial ND5 gene sequences. *Elytra, Tokyo*, **27**: 643–649.
- KLEINFELD, F., 2000. Beschreibung einer neuen Unterart des *Carabus (Apotomopterus) infirmior* HAUSER, 1924, sowie ergänzende Anmerkungen zu *Carabus (Oreocarabus) titanus* BREUNING, 1933 (Coleoptera: Carabidae: Carabini). *Ent. Z.*, **110**: 100–102.