

Systematic Position of *Carabus yunnanus* and the Allied Species (Coleoptera, Carabidae) from China, with Description of a New Species

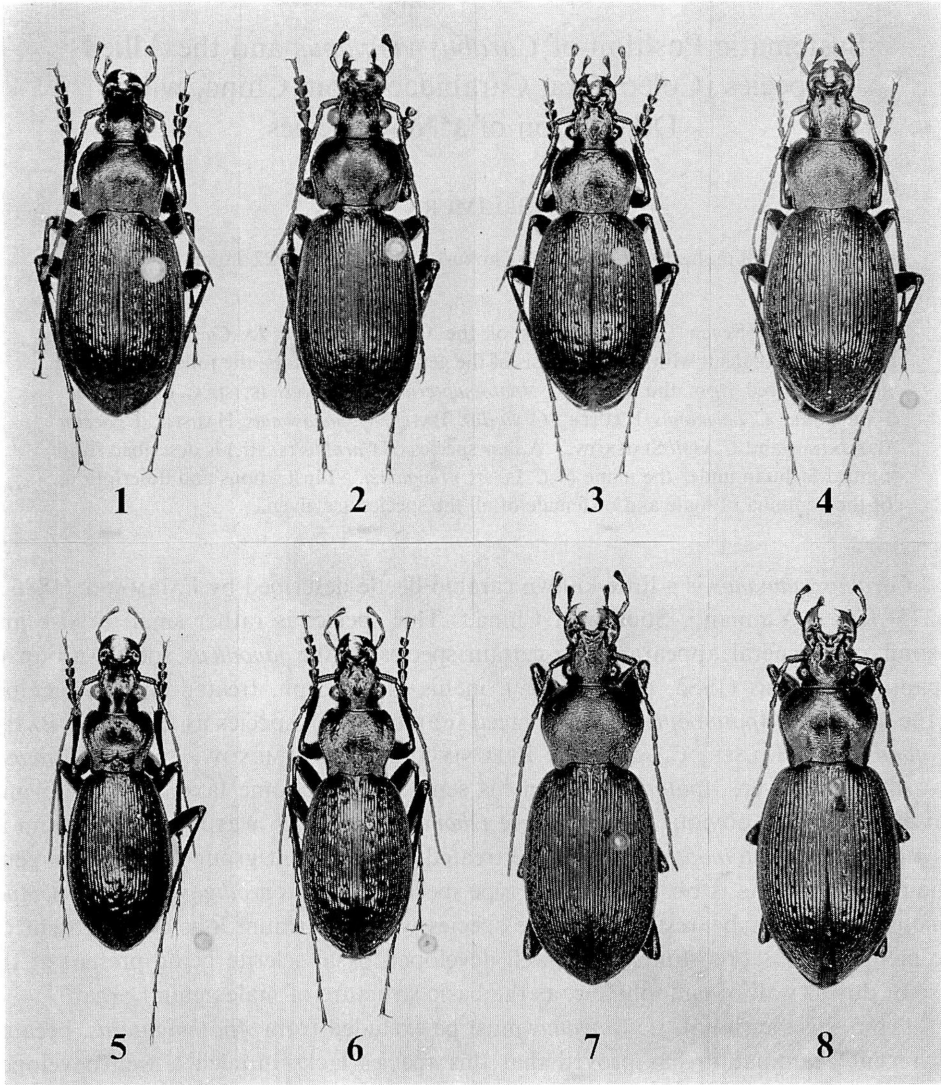
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Abstract Seven Chinese species of the Carabina allied to *Carabus yunnanus* FAIRMAIRE are dealt with. On the basis of the genitalic characters, the following species are transferred from the subgenus *Apotomopterus* to *Carabus* (s. str.): *C. yunnanus* FAIRMAIRE, *C. bornianus* HAUSER, *C. vigilax* BATES, *C. nanosomus* HAUSER, *C. nestor* BREUNING, and *C. vigil* SEMENOW. A new species of *Carabus* (s. str.) is described from central Sichuan under the name of *C.* (s. str.) *tieguanzi*. Illustrations and descriptions of the genitalia of male and/or female of all the species are given.

Carabus yunnanus is a little known carabid beetle described by FAIRMAIRE (1886 a, p. 223) from “Yunnan”, Southwest China. This species is rather small in size and is similar in general appearance to certain species of the *japonicus* species-group of Japan. BREUNING (1932, pp. 228, 229), in his monograph, treated it as a member of the subgenus *Apotomopterus*, and placed it among such species as *C. vigilax* BATES, *C. nanosomus* HAUSER, *C. latipennis* BREUNING, *C. vigil* SEMENOW, and *C. bornianus* HAUSER. However, *Apotomopterus* in his sense includes some taxonomic problems. For example, it is obvious that Japanese *Ohomopterus* which was regarded by him as a synonym of *Apotomopterus* should be treated as a different group based upon genitalic characters. As is observed in the type species (*Carabus prodigus* ERICHSON), *Apotomopterus* should be restricted to the species with the ostium lobe being absent on the membraneous preostium and a well developed basal sclerite being present at the base of dorsal wall of endophallus, as the basic structure of male genital organ.

From this viewpoint, *C. yunnanus* must be excluded from *Apotomopterus*, because my recent examination has proved that this species lacks in such a well developed basal sclerite but has a copulatory piece on the dorsal wall of endophallus. In addition, through the courtesy of the Naturhistorisches Museum Basel, the Muséum National d'Histoire Naturelle, Paris, and Dr. Hisatoshi KEZUKA, Tokyo, I was able to examine the following five species: *C. vigilax*, *C. nanosomus*, *C. vigil*, *C. bornianus* and *C. nestor*. The last one was described by BREUNING (1934, p. 30) as a member of *Apotomopterus*, after the publication of the first volume of his monograph. After a careful examination of their genitalia, I have come to the conclusion that they should also be excluded from *Apotomopterus*. In this paper, I will transfer them from the subgenus *Apotomopterus* to *Carabus* (s. str.), and will give illustrations and descriptions of the male genitalia including the endophallus and/or of the female genitalia.



Figs. 1-8. — 1, *Carabus* (s. str.) *yunnanus* FAIRMAIRE, ♂ (paratype), from "Yunnan"; 2, *C.* (s. str.) *bornianus* HAUSER, ♂, from Dali, Yunnan; 3-4, *C.* (s. str.) *tieguanzi* IMURA, sp. nov., from Mt. Emei Shan, central Sichuan, 3, ♂ (holotype), 4, ♀ (allotype); 5, *C.* (s. str.) *vigilax* BATES, ♂, from Mt. Emei Shan, central Sichuan; 6, *C.* (s. str.) *nanosomus* HAUSER, ♂, from Mt. Jinfo Shan, Southeast Sichuan; 7, *C.* (s. str.) *nestor* BREUNING, ♂ (paratype), from Mt. Jinfo Shan, Southeast Sichuan; 8, *C.* (s. str.) *vigil* SEMENOW, ♀, from Minchow, Gansu.

On the other hand, in the course of the present study, I had an opportunity to examine the specimens of a species of the Carabina from Mt. Emei Shan, central Sichuan, with the general appearance similar to that of *C. yunnanus* or of *C. bornianus*.

It also belongs to *Carabus* (s. str.) from the genitalic characters, and is considered to be new to science. On this occasion, I am going to describe it under the name of *C.* (s. str.) *tieguanzi* nov., and place it at the side of *C. bornianus*.

The classification system employed herein is fundamentally equivalent to that proposed by ISHIKAWA (1973). I prefer to treat the Carabina as a single genus, *Carabus*, as is generally adopted by most European authors, which means that his genera *Apotomopterus* and *Carabus* are ranked as subgenera of the genus *Carabus* (s.l.).

The abbreviations used in this paper are as follows: HW – greatest width of head including eyes; PAW – approximate width of pronotal apex, measured between the most advanced points on both sides; PW – greatest width of pronotum; PBW – approximate width of pronotal base, measured between the most protrudent points of hind angles; PL – length of pronotum, measured along the mid-line; EW – greatest width of elytra; EL – greatest length of elytra; M – arithmetic mean; CP – copulatory piece; BS – basal sclerite; BSL – lobe at the side of basal sclerite; LBL – left basal lobe; RBL – right basal lobe; BC – bursa copulatrix; OLA – outer plate of ligular apophysis; VLA – vertical plate of ligular apophysis; ILA – inner plate of ligular apophysis; VA – vaginal appendix; ES – epivaginal sclerite; NSMT – Department of Zoology, National Science Museum (Nat. Hist.), Tokyo; MP – Muséum National d'Histoire Naturelle, Paris; NMB – Naturhistorisches Museum Basel.

Before going further I wish to express my deep gratitude first of all to Dr. Shun-ichi UÉNO of the National Science Museum (Nat. Hist.), Tokyo, for critically reading the manuscript of this paper. I am greatly indebted to Dr. Hisatoshi KEZUKA, Tokyo, who gave me permission to examine invaluable specimens in his collection, and to Dr. Michel BRANCUCCI of the Naturhistorisches Museum Basel, who kindly took the trouble of making arrangement for the loan of the specimens of *C. nestor* and *C. vigil* preserved in the museum. I am also grateful to Miss Pamela GILBERT of the Entomology Library, British Museum (Natural History), London, to Mr. Armin KORELL, Kassel-Nordshausen, and to Dr. Achille CASALE, Museo Regionale di Scienze Naturali, Torino, for their kind help in providing with photocopies of the necessary literature. I am especially grateful to Dr. Thierry DEUVE of the Muséum National d'Histoire Naturelle, Paris, not only for his constant guidance but for taking the trouble for the loan of necessary specimens.

1. *Carabus* (s. str.) *yunnanus* FAIRMAIRE, 1886

(Figs. 1, 9, 15)

Carabus Yunnanus FAIRMAIRE, 1886, Le Naturaliste, **26**, p. 223; type area: "Yunnan"; 1886, Annlis.

Soc. ent. Fr., **6**, pp. 309, 310.—DEUVE & IMURA, 1990, Elytra, Tokyo, **18**, p. 2.

Carabus (Ohomopterus) Yunnanus: REITTER, 1896, Verh. naturf. Ver. Brünn, **34**, p. 169.

Apotomopterus yunnanus: BREUNING, 1926, Koleopt. Rdsch., **12**, pp. 69, 70.

Morphocarabus (Isiocarabus) yunnanus: LAPOUGE, 1932, Gen. ins., (192 c), p. 662.

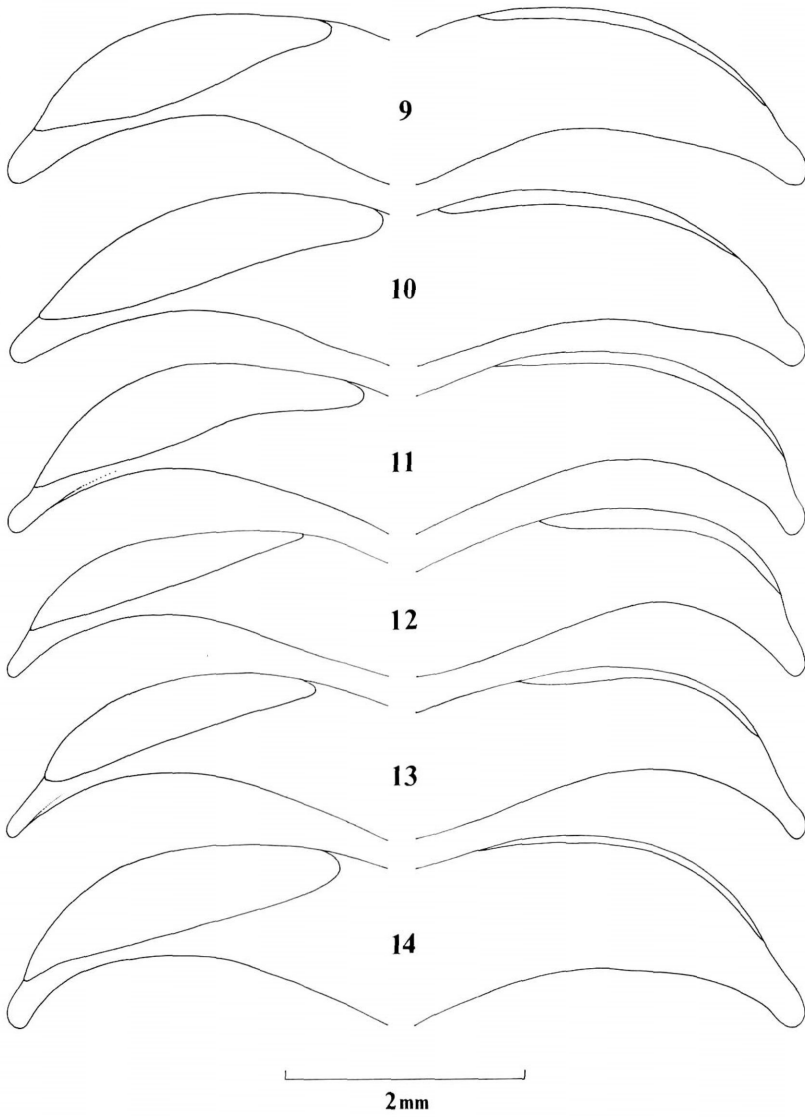
Carabus (Apotomopterus) yunnanus: BREUNING, 1932, Best.-Tab. eur. Coleopt., (104), pp. 228, 229.

Male genitalia. Aedeagus a little shorter than half the elytral length; apical lobe rather robust, slightly compressed laterad, gradually narrowed to the apex which is gently rounded in lateral view; ostium lobe absent at the membranous preostium; endophallus with a well developed CP situated a little behind the middle on the dorsal wall; CP rather stout, tongue- or fingertip-shaped, somewhat asymmetric, widest at the base, rather gradually narrowed towards the apex which is broadly rounded, with the surface densely coated with granules; basal part of CP strongly raised to form a transverse ridge which is subtriangularly protuberant dorsad in lateral view, and rather smoothly connecting with the membranous swelling of the dorsal wall of endophallus; the swelling a little dilated towards the endophallic apex, with the surface moderately concave to form a round depression at the centre; BS situated a little to the left of the longitudinal mid-line at the dorsal base of endophallus, reduced to a small patch and a few accessory spots indicated by assemblage of pigmented granules, with the surface sparsely scattered with minute hairs; BSL developed, indicated by subtriangular membranous projection; LBL well developed; RBL barely recognisable.

Female genitalia. BC not so large and rather depressed, somewhat visor-like in shape, with the ventral surface widely concave to form a pair of lateral lobes extending ventrad; OLA pear-shaped, about 1.5 times as long as wide, widest before the middle, with the sides sinuate behind; posterior margin of OLA triangularly and rather distinctly re-entrant at the middle; vertical plate rather low; ILA ovoid, about 1.3 times as long as wide, widest a little before the middle, much gradually narrowed posteriad than anteriorly, with the anterior margin broadly rounded, the posterior with a slight notch at the middle; VA recognisable though very small; ES small, with the basal pigmentation rhomboidal in shape and the vertical plate well developed and somewhat twisted in dorsal view.

Specimens examined. 1 ♂, "Yunnan, R. P. DELAVAY"/"PARATYPE"/"*Apotomopterus yunnanus* FM. BREUNING dét." in coll. H. KEZUKA; 1 ♂, "Yunnan, R. P. DELAVAY"/"*Carabus yunnanus* FAIRM." (MP); 1 ♂, "YUNNAN-TA-PIN-TZE, R. P. DELAVAY REC."/"Muséum Paris, ex. coll. R. OBERTHÜR" (MP); 1 ♀, Mt. Yulong-Xue Shan, 2,700–2,800 m alt., near Lijiang, Northwest Yunnan, VI-1988, in coll. Y. IMURA.

Notes. The aedeagal apical lobe of this species seems a little different in shape according to individuals; it is relatively short and robust in the paratype specimen from "Yunnan" as shown in Fig. 9, whereas it is obviously slenderer and more elongate in the specimen with the same data preserved in MP. Only one female specimen I was able to examine is from Mt. Yulong-Xue Shan which may be a newly recorded locality, and I have been unable to examine the female genitalia of topotypical specimens. In fact, nothing has been known about details of the type locality of this species except that it was described from "Yunnan". Further investigations are therefore needed for solving the problems of the type locality and of the geographical and individual variations.



Figs. 9-14. Apical part of aedeagus of *Carabus* (s. str.) spp.—9, *Carabus* (s. str.) *yunnanus* FAIRMAIRE, from “Yunnan”; 10, *C.* (s. str.) *bornianus* HAUSER, from Dali, Yunnan; 11, *C.* (s. str.) *tieguanzi* IMURA, sp. nov., from Mt. Emei Shan, central Sichuan; 12, *C.* (s. str.) *vigilax* BATES, from Mt. Emei Shan, central Sichuan; 13, *C.* (s. str.) *nanosomus* HAUSER, from Mt. Jinfo Shan, Southeast Sichuan; 14, *C.* (s. str.) *nestor* BREUNING, from Mt. Jinfo Shan, Southeast Sichuan; left, right lateral view; right, subventral view.

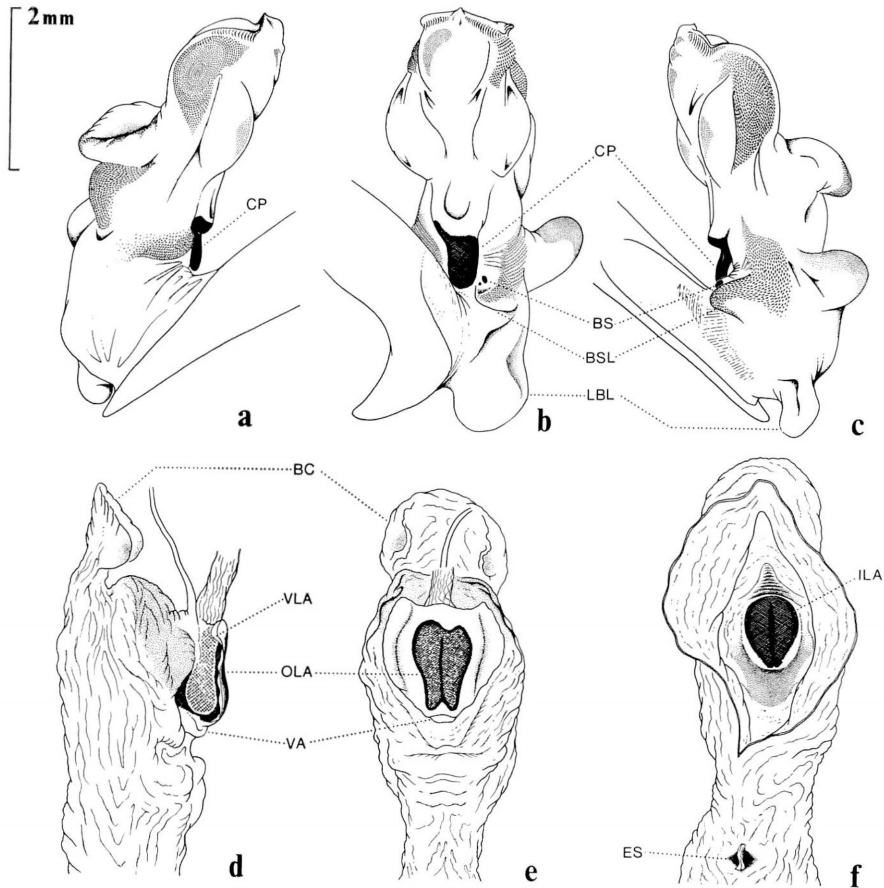


Fig. 15. Genital organ of *Carabus* (s. str.) *yunnanus* FAIRMAIRE, from "Yunnan" (♂) and from Mt. Yulong-Xue Shan, near Lijian, Northwest Yunnan (♀).—a-c, Endophallus; a, right lateral view; b, dorsal view; c, left lateral view.—d-f, Female genitalia; d, right lateral view; e, ventral view; f, dorsal view (dorsal wall of vagina partly removed to show inner plate of ligular apophysis). Abbreviations: CP, copulatory piece; BS, basal sclerite; BSL, lobe at the side of basal sclerite; LBL, left basal lobe; BC, bursa copulatrix; OLA, outer plate of ligular apophysis; VLA, vertical plate of ligular apophysis; ILA, inner plate of ligular apophysis; VA, vaginal appendix; ES, epivaginal sclerite.

2. *Carabus* (s. str.) *bornianus* HAUSER, 1922

(Figs. 2, 10, 16)

- Carabus* (*Apotomopterus* ?) *Yunnanus* FRM. subsp. *Bornianus* HAUSER, 1922, Arch. Naturg., (A), 17, pp. 108, 109; type locality: Bei Tali-fu und Kuh-tsin-fu in der chinesischen Provinz Yun-nan.
Carabus (*Morphocarabus*) *Albrechti*: MAINDRON, 1906, Bull. Soc. ent. Fr., 1906, p. 216.
Apotomopterus yunnanus bornianus: BREUNING, 1926, Koleopt. Rdsch., 12, p. 69.
Carabus (*Apotomopterus*) *bornianus*: BREUNING, 1932, Best.-Tab. eur. Coleopt., (104), p. 230.

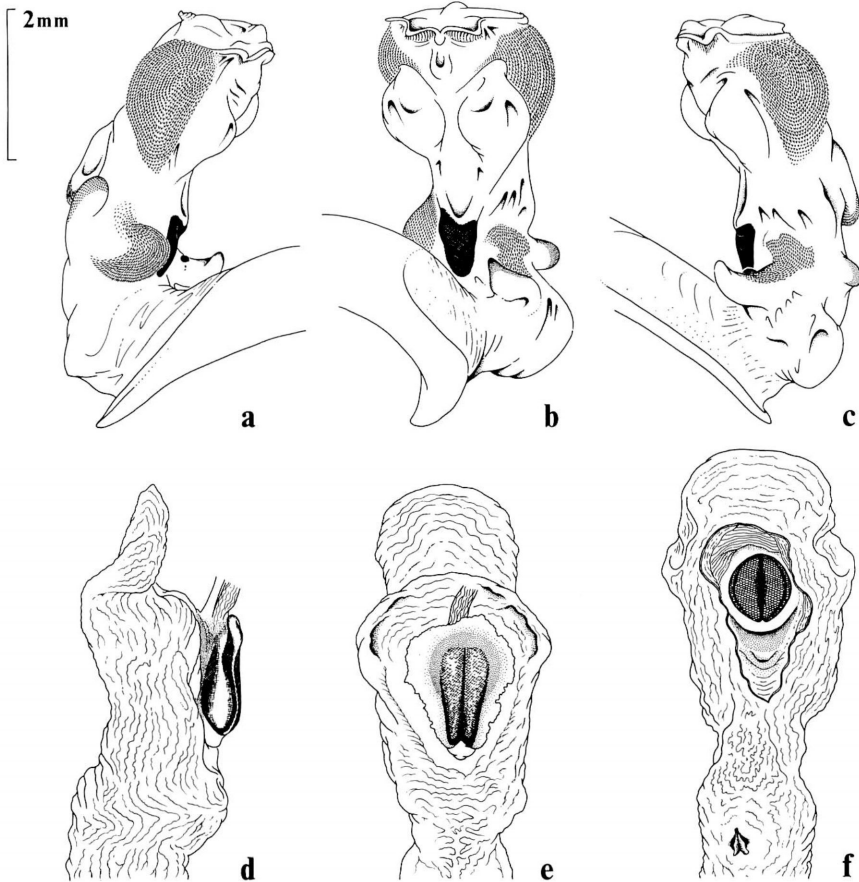


Fig. 16. Genital organ of *Carabus* (s. str.) *bornianus* HAUSER, from Dali, Yunnan (♂) and from “Kuhtsingfu”, Yunnan (♀).—a–c, Endophallus; a, right lateral view; b, dorsal view; c, left lateral view.—d–f, Female genitalia; d, right lateral view; e, ventral view; f, dorsal view (dorsal wall of vagina partly removed to show inner plate of ligular apophysis).

Male genitalia Very closely similar to those of *C.* (s. str.) *yunnanus*, and barely distinguishable by the following points: CP a little larger in size and a little different in shape, with the basal part a little less protuberant dorsad; BSL more elongate; RBL obviously recognisable though not so distinctly inflated.

Female genitalia. Also closely similar to those of *C.* (s. str.) *yunnanus*, but more easily distinguishable from it than in male genitalia by the following points: BC a little larger; OLA slenderer, with the sides hardly sinuate behind; ILA walnut-shaped, only a little longer than wide, and widest at about the middle; ES sagittate in dorsal view, with the vertical plate gradually divergent and bilobed posteriad.

Specimens examined. 1 ♂, “Tali, Yunnan” in coll. H. KEZUKA; 1 ♂, “Yunnan, 909” (MP); 1 ♂, “Yunnan, Yunnanfou, R. P. J. SOUYRIS, 1917”/“MUSEUM PARIS,

1952, COLL. R. OBERTHÛR" (MP); 1 ♀, "Kouang Si Hien, alt. 2,100 m, Sud Est Yunnan" in coll. H. KEZUKA; 1 ♀, "Yunnan, Kuhtsingfu" in coll. Y. IMURA.

Notes. The aedeagal apical lobe of this species is also a little variable in shape. It is not much different from that of *C. (s. str.) yunnanus* in the Dali (=Tali) specimen (Fig. 10), the topotypical one, but is a little shorter and broader in the Yunnanfou specimen.

3. *Carabus* (s. str.) *tieguanzi* IMURA, sp. nov.

(Figs. 3-4, 11, 17)

Description. Length: 19.6–21.8 mm (from apical margin of labrum to apices of elytra). Width: 7.8–8.9 mm. Relatively small-sized species with general appearance similar to that of *C. (s. str.) yunnanus* or of *C. (s. str.) bornianus*. Black, more or less shiny, sometimes with faint blue-purplish lustre on elytral margins.

Head subquadrate, slightly convex above with protruding eyes; apical margin of labrum weakly emarginate; frontal furrows rather distinctly carved, with the surface irregularly punctate, more densely so on the posterior halves; posterior margins of these furrows not reaching the level of the anterior orbital margin; lateral grooves narrow but distinct; frons slightly convex above, with the surface irregularly and rather densely punctate; dorsal surface of head behind eyes irregularly rugoso-punctate; supraorbital margins complete though narrow; mandibles rather stout, arcuate inwards and sharply pointed at the apices; retinaculum of mandible bidentate, the right one being a little smaller than the left; apical segment of maxillary palpus slightly dilated, more widely in male than in female; penultimate segment of labial palpus bisetose; antennae filiform, barely reaching the middle of elytra in male and reaching basal third in female, pubescent from segment 5, without hairless ventral depressions in both sexes; relative lengths of scape and segments 2–4, 8, 10 in male as follows:—1: 0.56: 0.95: 0.71: 0.90: 0.74; each segment from the fifth to the seventh subequal in length to segment 3; segment 9 subequal in length to the terminal, each 0.82 times as long as scape; each segment from the fifth to the terminal a little shorter in female than in male; median tooth of mentum much shorter than the lateral lobe, with the apex triangularly pointed; submentum bisetose, with the surface smooth.

Pronotum subquadrate, wider than long, widest a little before the middle, rather gradually narrowed towards base than towards apex; PW/HW 1.40–1.53 (M 1.45), PW/PL 1.30–1.40 (M 1.36), PW/PAW 1.54–1.61 (M 1.57), PW/PBW 1.39–1.45 (M 1.41), PBW/PAW 1.07–1.17 (M 1.12); apical margin feebly emarginate; front angles obtuse, slightly produced anteriad with rounded tips; sides gently rounded in front, rather weakly sinuate behind, then almost parallel before hind angles; hind angles subtriangular, moderately protrudent posteriad, with the apices rounded and a little bent ventrad; basal margin either almost straight or evenly bisinuate; disc slightly convex above, with the surface asperous, more so scattering with punctures on the peripheral portion, less so on the central portion; lateral margins feebly reflexed and

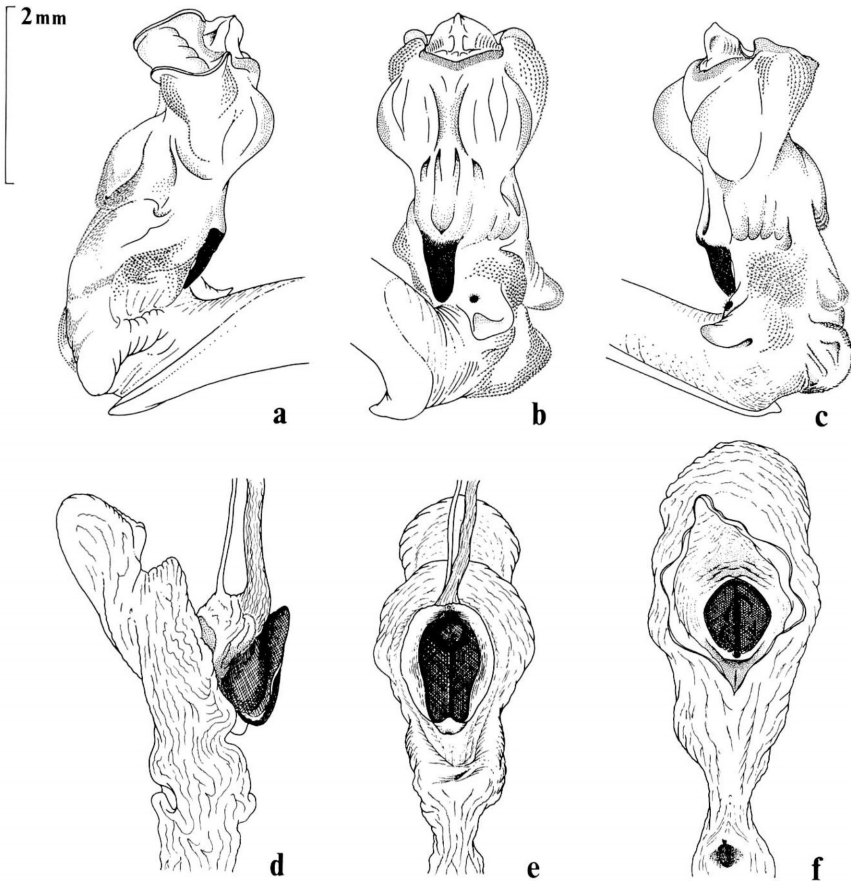


Fig. 17. Genital organ of *Carabus* (s. str.) *tieguanzi* IMURA, sp. nov., from Mt. Emei Shan, central Sichuan. —a–c, Endophallus; a, right lateral view; b, dorsal view; c, left lateral view. —d–f, Female genitalia; d, right lateral view; e, ventral view; f, dorsal view (dorsal wall of vagina partly removed to show inner plate of ligular apophysis).

clearly bordered throughout, the borders becoming a little narrower towards front angles; two pairs of marginal setae inserted near the widest part and slightly before hind angles; basal foveae very weak or barely recognisable; median longitudinal line very narrow and finely impressed, slightly raised to form a very short low-ridge just before basal margin.

Elytra ovate, moderately convex above, widest at about the middle, more gradually narrowed towards bases than towards apices; EW/PW 1.43–1.49 (M 1.45), EL/EW 1.51–1.57 (M 1.54); shoulders more effaced in female than in male; preapical emargination faintly recognised only in female; lateral margins feebly reflexed throughout and clearly bordered; elytral sculpture triploid; striae between intervals clearly recognised though not so deep, and sparsely scattered with vague punctures; primary intervals

the widest, moderately convex above, rather frequently and somewhat irregularly segmented by primary foveoles; each foveole not so deeply concave but always invading the adjacent tertiaries; both secondary and tertiary intervals a little narrower and a little more weakly convex than primaries, not segmented, but transversely notched except for the central part, rather conspicuously so on the periphery where the intervals are sometimes composed of rows of granules; umbilicate series indicated by frequently segmented low costa or rather regularly set row of granules, at the outside of which are recognised three more rows of granules.

Pro- and mesepisterna almost smooth, very finely and irregularly wrinkled, microsculpture visible, forming isodiametric meshes; metepisterna and sides of sternites vaguely punctate, with the surface partly becoming uneven; sternal sulci completely and prominently carved; metacoxa trisetose, or sometimes bisetose (without inner seta); legs normal, basal four segments of male foretarsus dilated, with hair pads on the ventral surface.

Male genitalia. Aedeagus a little shorter than half the elytral length, gently arcuate and subcylindrical, with the apical part slightly compressed laterad; apical lobe rather slender, weakly constricted at the base, then only a little dilated towards the apex which is rounded in lateral view; ostium lobe absent at the membranous preostium; endophallus astonishingly similar to that of *C. (s. str.) bornianus*, though a little smaller in size, and barely distinguishable from it by a little slenderer CP.

Female genitalia. BC as in *C. (s. str.) bornianus*; OLA strongly sclerotized, about 1.7 times as long as wide, widest before the middle, with the anterior margin rounded, the posterior being re-entrant at the middle; disc of OLA flat and smooth, with a round depression very shallowly concave near the apex; vertical plate a little higher than in *C. bornianus*; ILA almost round in shape, subangulate on both sides at the middle, cup-like, and strongly sclerotized, with the basal portion somewhat granulate; VA recognisable though small, with mildly pigmented area on the posterior margin; ES not so large, with the basal pigmentation rhomboidal in shape and the vertical plate well developed.

Type series. Holotype: ♂, Mt. Emei Shan, central Sichuan, central China, 24-VI-1989 (NSMT). Paratypes (including allotype): 1 ♂, 2 ♀♀, same data as for the holotype, in colls. H. KEZUKA and Y. IMURA.

Notes. Because of close similarity in the conformation of endophallus, this new species is doubtless related to *C. (s. str.) yunnanus* and *C. (s. str.) bornianus*, more closely to the latter, but is distinguished from them by the following points: 1) penultimate segment of labial palpus bisetose in all the type specimens, while it is often multisetose in *C. yunnanus*; 2) male antennae without hairless ventral depressions as in *C. bornianus*, whereas they are clearly recognised from segment 5 to 8 in *C. yunnanus*; 3) median tooth of mentum much shorter; 4) pronotal disc less convex above; 5) sides of pronotum less reflexed in the posterior parts; 6) hind angles of pronotum narrower and more triangularly protrudent than in *C. bornianus*; 7) elytra a little shorter and more broadly ovate; 8) apical lobe of aedeagus slenderer and a little

constricted at the base. It seems worth noting that these three species are rather readily discriminated from one another by the external morphology in spite of the close similarity in the conformation of endophallus.

The name of this new species, *tieguanzi*, comes from that of a legendary wizard who appears in the story of "Duzichun-chuan", one of the Chuanqi novels written in the Tang Age, and is said to have lived on Mt. Emei Shan.

4. *Carabus* (s. str.) *vigilax* BATES, 1890

(Figs. 5, 12, 18)

Carabus vigilax BATES, 1890, Entomologist, **23**, p. 211; type locality: Wa-shan, alt. 6,000 feet; Chia-ting Fu, alt. 1,000 feet.

Apotomopterus (Acoptopterus) vigilax: LAPOUGE, 1927, Misc. ent., **30**, pp. 219, 220; 1932, Gen. ins., (192 C), p. 672.

Carabus (Apotomopterus) vigilax: BREUNING, 1932, Best.-Tab. eur. Coleopt., (104), pp. 225, 226.

Male genitalia. Aedeagus less arcuate especially in the basal portion, with the apical lobe moderately elongate and gradually narrowed to the apex which is rounded in lateral view; endophallus with the basic structure similar to that of *C.* (s. str.) *yunnanus*; CP amber-coloured, rather lightly sclerotized, luffa-like in shape, much longer than wide, widest before the middle, with the apex broadly rounded and densely coated with granules; basal part of CP strongly ridged, forming a wide V in dorsal view, with the central part rather roundly protuberant dorsad in lateral view; BS as in the other species mentioned above; BSL strikingly developed to form a flap-like membraneous inflation; LBL well developed and bilobed; RBL absent.

Female genitalia. BC well developed, though the lateral lobes being not so clear; OLA about twice as long as wide, widest much before the middle, with the anterior margin broadly rounded, the posterior being slightly re-entrant at the middle; VLA rather high and well sclerotized; ILA large, almost perfectly round in shape, cup-like, and strongly sclerotized; the sclerotization partly becoming more conspicuous with marked pigmentation to give the surface of ILA mottled pattern; VA recognizable though small; ES small, with the vertical plate rather well developed.

Specimens examined. 1 ♂, Mt. Emei Shan, 1,700 m alt., central Sichuan, 15-V-1986, in coll. H. KEZUKA; 1 ♀, Mt. Emei Shan, 1,800 m alt., central Sichuan, 24-VI-1987, in coll. H. KEZUKA.

Notes. LAPOUGE (1927, p. 220) erected the subgenus *Acoptopterus* for *C. vigilax* mainly based upon its strongly cordate pronotum and much elongate terminal segment of labial palpus. BREUNING (1932, pp. 178, 179) treated it as a synonym of *Apotomopterus*, because he regarded the subgeneric characters of the former as secondarily developed ones common to some Sichuanese species belonging to the latter. Actually, this species is rather peculiar in some external features, which remind us of certain species of the Nepalese subgenus, *Meganebrius*. However, basic structure of the genitalia proves that this species is nothing but a member of *Carabus* (s. str.), and

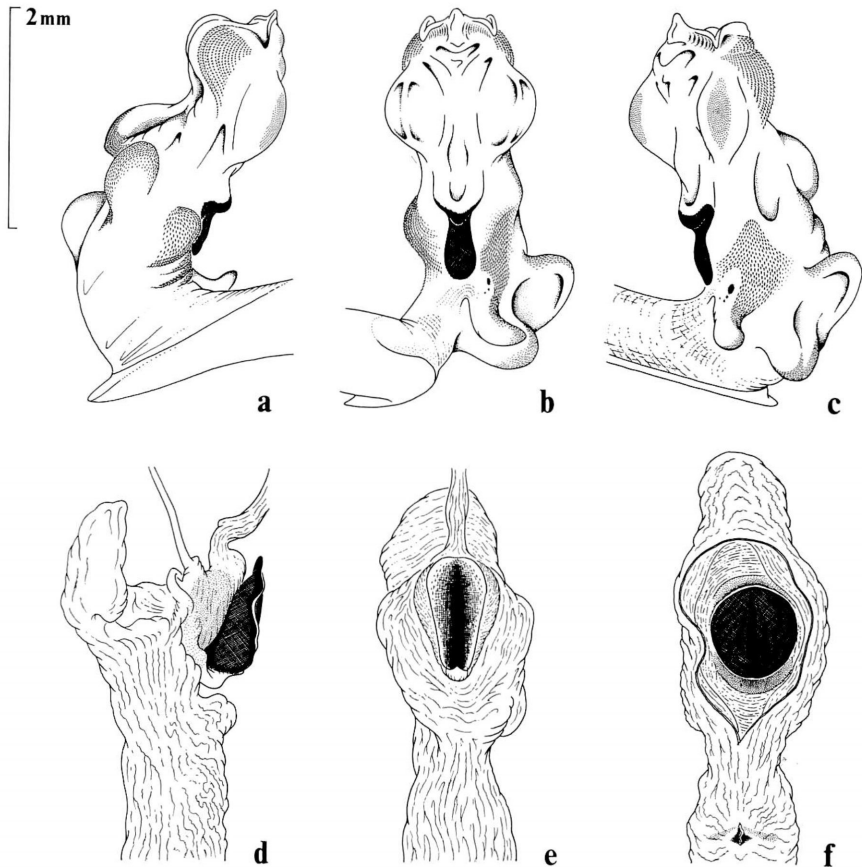


Fig. 18. Genital organ of *Carabus* (s. str.) *vigilax* BATES, from Mt. Emei Shan, central Sichuan. —a-c, Endophallus; a, right lateral view; b, dorsal view; c, left lateral view. —d-f, Female genitalia; d, right lateral view; e, ventral view; f, dorsal view (dorsal wall of vagina partly removed to show inner plate of ligular apophysis).

LAPOUGE's subgenus seems to have little taxonomic significance also from this viewpoint.

5. *Carabus* (s. str.) *nanosomus* HAUSER, 1931

(Figs. 6, 13, 19)

Carabus (*Apotomopterus*) *nanosomus* HAUSER, 1931, Mitt. dt. ent. Ges., 2, p. 5; type locality: Prov. Chinae Szechuan mer., Mts. Kingfushan, 2,000 m, prope flum.; Sungkanho.—BREUNING, 1932, Best.-Tab. eur. Coleopt., (104), pp. 226, 227.

Apotomopterus (s. str.) *nanosomus*: LAPOUGE, 1932, Gen. ins., (192 c), p. 677.

Male genitalia. Aedeagus with the apical lobe a little more elongate than

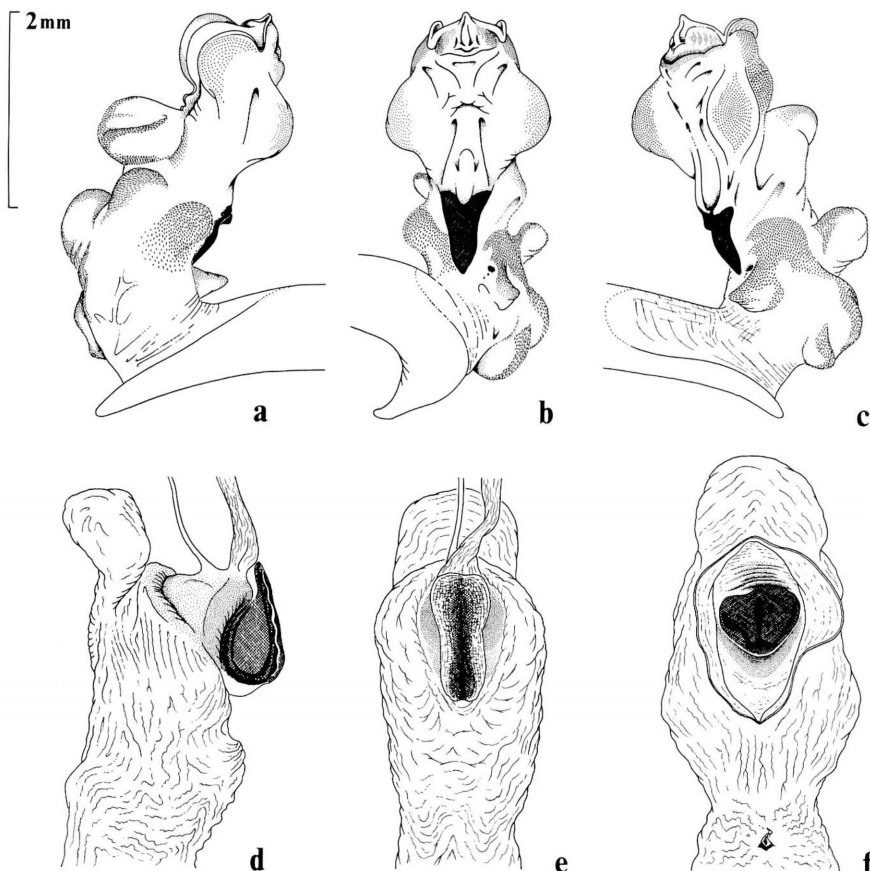


Fig. 19. Genital organ of *Carabus* (s. str.) *nanosomus* HAUSER, from Mt. Jinfo Shan, Southeast Sichuan.—a–c, Endophallus; a, right lateral view; b, dorsal view; c, left lateral view.—d–f, Female genitalia; d, right lateral view; e, ventral view; f, dorsal view (dorsal wall of vagina partly removed to show inner plate of ligular apophysis).

in *C.* (s. str.) *vigilax*; CP sagittiform, about 1.6 times as long as wide, widest at the base, and gradually narrowed to the apex which is rather sharply pointed; viewed laterally, central part of the basal ridge strikingly protuberant to form a subtriangular projection, and median portion of CP gently convex dorsad; BS, BSL and LBL as in *C.* (s. str.) *vigilax*, RBL also absent.

Female genitalia. BC as in *C.* (s. str.) *vigilax*; OLA very narrow, about twice as long as wide, rather weakly constricted at the middle, with the anterior margin broadly rounded, the posterior also rounded and slightly re-entrant at the middle; VLA rather high and moderately sclerotized; ILA a little wider than long, widest before the middle, much gradually narrowed posteriad than antieriad, with the posterior margin obtusely rounded and not clearly re-entrant at the middle; ES very small,

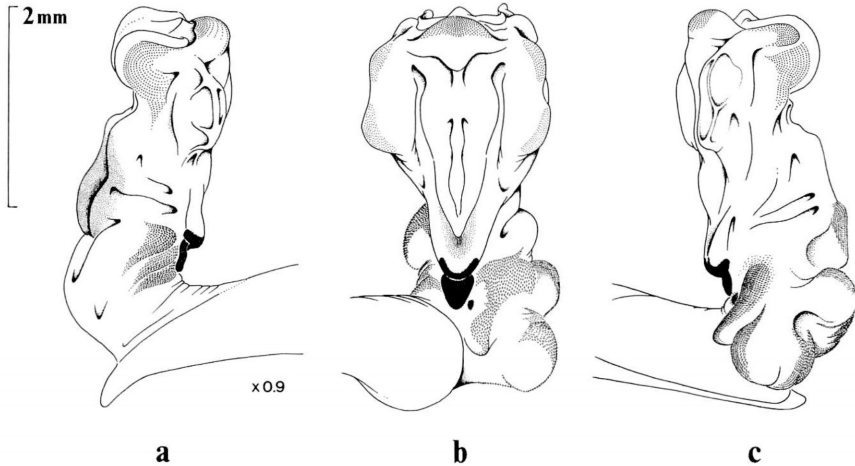


Fig. 20. Endophallus of *Carabus* (s. str.) *nestor* BREUNING, from Mt. Jinfo Shan, Southeast Sichuan; a, right lateral view; b, dorsal view; c, left lateral view.

with the vertical plate rather high.

Specimens examined. 1 ♂, “Giuifu Shan (=error of Ginfu Shan=Jinfo Shan !), Szechuan, 1,500–2,000 m, REITTER, E.” in coll. H. KEZUKA; 1 ♂, “same data”, in coll. Y. IMURA; 1 ♀, “same data”/“*Apotomopt. nanosomus*”/“MUSEUM PARIS, COLL P. RAYNAUD” (MP).

Notes. This species has some peculiar external features common to *C.* (s. str.) *vigilax*, e. g., long and slender palpi and legs, strongly cordate prothorax, but is much different from the latter in the shape of CP and ligular apophysis. The presence of hairless ventral depressions on the segments 5 to 7 of male antennae is also diagnostic.

6. *Carabus* (s. str.) *nestor* BREUNING, 1934

(Figs. 7, 14, 20)

Apotomopterus nestor BREUNING, 1934, Folia zool. hydrobiol., **6**, p. 30; type locality: Szetschuan, Kin-fu-shan in Höhe von 1,000 bis 2,000 m.

Male genitalia. Aedeagus with the ventral margin more strongly arcuate near the apex than in the other species; endophallus large and rather depressed, with relatively wide and inflated apical part; CP situated a little behind the middle, rather small and strawberry-shaped, with the surface fully coated with dense granules; basal part of CP strikingly ridged, forming a wide U in dorsal view, and conspicuously protuberant dorsad in lateral view; dorsal wall of endophallus connecting with CP also conspicuously swollen, forming a long U in dorsal view, and the swelling is much more elongate longitudinally than in the other species; BS and BSL almost as in the other species; LBL large and bilobed; RBL absent.

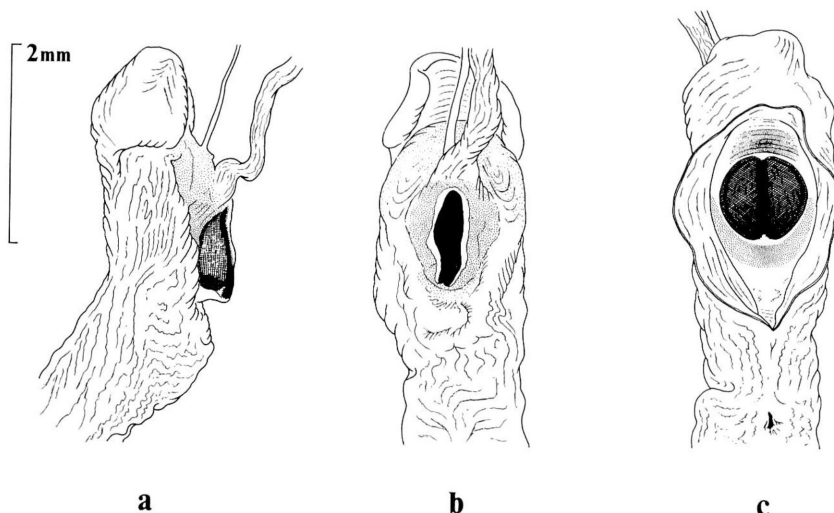


Fig. 21. Female genitalia of *Carabus* (s. str.) *vigil* SEMENOW, from "Minchow", Gansu; a, right lateral view; b, ventral view; c, dorsal view (dorsal wall of vagina partly removed to show inner plate of ligular apophysis).

Specimen examined. 1 ♂, "Kin-fu-Shan, Szetschuan"/"PARATYPES"/"*Apotomopterus nestor*, mihi, Paratyp, det. BREUNING" (NMB).

Notes. This species is rather unique in the conformation of endophallus, above all in the shape of CP. The type locality of this interesting species, Mt. Jinfo Shan (=Kinfu Shan), situated near the Guizhou border at the southeastern end of Sichuan Sheng, is the same as that of *C.* (s. str.) *nanosomus*, though I do not know whether they really coexist. Sympatry of the two species belonging to *Carabus* (s. str.) is also observed on Mt. Emei Shan, central Sichuan, where both *C.* (s. str.) *tieguanzi* nov. and *C.* (s. str.) *vigilax* are recorded.

7. *Carabus* (s. str.) *vigil* SEMENOW, 1898

(Figs. 8, 21)

Carabus striatus: SEMENOW, 1887, Horae Soc. ent. ross., **21**, pp. 398–400; type locality: "entre les villages Syr-gou et Katapou, non loin de la ville Min-tchéou dans la prov. Kan-sou". [Nec CHAUDOIR, 1869, Rev. Mag. Zool., **1869**, p. 25.]

Carabus vigil SEMENOW, 1898, Horae Soc. ent. ross., **31**, p. 351.

Apotomopterus (Ohomopterus) vigil: LAPOUGE, 1932, Gen. ins., (192 c), p. 673.

Carabus (Apotomopterus) vigil: BREUNING, 1932, Best.-Tab. eur. Coleopt., (104), pp. 227, 228.

Female genitalia. BC developed, with the ventral side deeply concave to form a pair of distinct lateral lobes extending ventrad; OLA strongly pigmented, narrow and slender, somewhat spindle-shaped with the posterior part a little distorted; VLA not so high; ILA almost circular in the outline, somewhat hinge-like, with hemi-

circular discs on either side of the mid-line gently convex above; both the anterior and posterior margins of ILA a little re-entrant at the middle; VA recognisable though small; ES very small, hardly pigmented at the base, with a spine-like vertical plate.

Specimen examined. 1 ♀, “Minchow, Kansu”/“*Apotomopterus vigil* SEM.” (NMB).

Notes. Since I have been unable to examine the male genitalia, taxonomic status of this species is not definitive at present. So far as concerned with the characteristic conformation of female genitalia, however, this species is considered to belong to *Carabus* (s. str.), and I place it tentatively at the side of the above species. Its slender, somewhat spindle-shaped OLA and large, circular ILA may suggest an affinity of *C.* (s. str.) *vigil* to *C.* (s. str.) *granulatus*.

要 約

井村有希: *Carabus yunnanus* およびその近縁種の帰属。—— *Carabus yunnanus* FAIRMAIRE は、中国雲南省から記載された小型のオサムシで、日本のヒメオサムシ種群の各種によく似た外部形態をもち、長いあいだトゲオサムシ亜属 *Apotomopterus* に置かれてきた。しかし、交尾器を検討した結果、本種は内袋の基本形質においてトゲオサムシとは大きく異なっていることがあきらかになった。さらに、じゅうらいトゲオサムシとして扱われてきたいくつかの小型種についても、その交尾器を検討したところ、以下の各種がトゲオサムシから除外されるべきであるとの結論が得られた: *C. bornianus* HAUSER, *C. vigilax* BATES, *C. nanosomus* HAUSER, *C. nestor* BREUNING, *C. vigil* SEMENOW.

本論文では、上記の種をすべてオサムシ亜属に移し、その根拠となる♂♀交尾器の図示と記載を行なった。また最近、四川省中部の峨眉山より得られた小型の種を調べた結果、オサムシ亜属に属する新種と判明したので、*C.* (s. str.) *tieguanzi* という名を与えて記載した。本新種は、♂交尾器内袋の形質や、♂の触角腹側に無毛凹陷部を欠く点などから、*C.* (s. str.) *bornianus* にもっとも近縁のものと思われる。*tieguanzi* という名は、中国唐代の伝奇小説、杜子春伝に登場し、峨眉山に住んでいたといわれる仙人、鉄冠子にちなんでつけたものである。

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