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Megarthrus of Taiwan, with notes on phylogenetic relationships within the genus (Coleoptera: Staphylinidae: Proteininae)

Giulio CUCCODORO

Muséum d'histoire naturelle
C. P. 6434, CH-1211 Genève 6, Switzerland.
e-mail: giulio.cuccodoro@ville-ge.ch

Taxonomy, new species, phylogeny, systematics, Coleoptera, Staphylinidae, Proteininae, *Megarthrus*, Taiwan

Abstract. *Megarthrus* is reported here for the first time from Taiwan, where it appears to be represented by fifteen species, fourteen of which being new (*M. con* sp. nov., *M. festivus* sp. nov., *M. globulus* sp. nov., *M. lisae* sp. nov., *M. magnificus* sp. nov., *M. metanas* sp. nov., *M. mirabilis* sp. nov., *M. octopus* sp. nov., *M. phoenix* sp. nov., *M. ping* sp. nov., *M. splendidus* sp. nov., *M. tac* sp. nov., *M. taiwanus* sp. nov., and *M. tic* sp. nov.). The last species, *M. flavolimbatus* Cameron, is reported for the first time out of North India and becomes the first transoriental species of *Megarthrus*. These species are keyed, their genital segments and main diagnostic characters are figured, and their apparent phylogenetic relationships are discussed. They appear to belong to ten distinct *Megarthrus* species-complex, of which seven species are Himalayan and/or East-Palaearctic elements, two seem peculiar to Taiwan (i.e. *festivus*-complex and *M. phoenix*), while the last is dominant in the Palaearctic, Nearctic and Afrotropical realms and Taiwan shares only one species with the Eurasian continent.

INTRODUCTION

Megarthrus Curtis, 1829 is known from Japan since 1874 (Sharp 1874), from Phlippines since 1926 (Wendeler 1926) and from mainland China since 1938 (Bernhauer 1938). However, although J. L. Gressitt, Honolulu, collected the first Taiwanese *Megarthrus* in 1947, the genus has till now not been reported from this Island in the litterature. As the specimens collected by Gressitt are three females pertaining to two distinct species (i.e. *M. flavolimbatus* Cameron, 1924 and *M. taiwanus*, in BPBM), their accurate taxonomic statut was quite difficult to establish. Since then, only three additional females have been collected there independently between 1965 and 1983 (all *M. flavolimbatus*, in CNCI).

This was the situation in 1990 when Ales Smetana, Ottawa, went to Taiwan for the first of his six collecting trips to this island (1990, 1991, 1991, 1993, 1995, 1998). The systematic prospection of the staphylinid fauna of the forest floor litter he carried out in the mountains there resulted in the collection of over thousand *Megarthrus* specimens representative of fifteen species, of which fourteen are new to science and endemic to the island. These species are described below, illustrated and keyed.

The *Megarthrus* fauna of Taiwan appears amazingly diverse, notably with respect to the number of species-complexes represented. Thus I took the opportunity of its taxonomic treatment to investigate in more details the variation of some structures of potential interest to improve the characterization of several « obvious » species-complexes, notably the male

terminal abdominal segments. I also paid a close attention to the tridimensional structure of the female genitalia, which are drawn here for the first time undissected, and in three orthogonal views.

MATERIAL AND METHODS

This work is based on the examination of 1105 specimens, which are deposited in the Aleš Smetana private collection (ASPC), Bishop Museum, Honolulu (BPBM), the Canadian National Collection of Insects (CNCI) and the Museum of Natural History, Geneva (MHNG). Unless speciied othewise in the text, the material is shared between ASPC ans MHNG.

For detailed examination, specimens were dissected, cleared in 0.1N potassium hydroxide and mounted in Canada balsam on acetate slides. Drawings were made by using a drawing tube mounted on a compound microscope (average Magn. = 400x), after what the acetate slides ended up mounted on the same pin as the specimens. The data on natural history are based on unpublished field notes communicated by A. Smetana.

The term frons, as used in the present study, refers to the area anterior to the U-shaped impression, the vertex to the area behind. Abdominal sternites and tergites are counted from the first morphological segment.

TAXONOMY

KEY TO THE *MEGARTHRUS* SPECIES OF TAIWAN

1. Body predominantly dark brown 2
- Body predominantly pale brown or yellowish 6
2. Frons evenly deflexed toward clypeus; maxillary palpi with third palpomere swollen, slightly longer than half of fourth palpomere ..... *M. taiwanus* sp. nov. (Fig. 1)
- Frons forming ridge above clypeus; maxillary palpi with third palpomere fairly cylindrical, not longer than half of fourth palpomere 3
3. Anterior portion of pronotal hypomeron without oblique ridge; male with first protarsomere bearing tenent setae ..... *M. flavolimbatus* Cameron (Fig. 2)
- Anterior portion of pronotal hypomeron with marked oblique ridge (Fig. 115); male with first protarsomere lacking tenent setae 4
4. Pubescence on medial area of frons directed forward; antennae bearing short and fairly dense secondary pubescence on antenomeres five to eleven ..... *M. metanas* sp. nov. (Fig. 3)
- Pubescence on medial area of frons directed backward; antennae bearing short and fairly dense secondary pubescence only on antenomeres six or seven to eleven 5
5. Pronotum and elytra covered with pubescence markedly longer than that on frons; lateral outline of pronotum not forming four marked angles (Fig. 70); lateral outline of elytra arcuate ..... *M. globulus* sp. nov. (Fig. 4)
- Pronotum and elytra covered with pubescence not markedly longer than that on frons; lateral outline of pronotum forming four marked angles (Fig. 142); lateral outline of elytra straight, or sinuate ..... *M. octopus* sp. nov. (Fig. 5)
6. Posterior half of elytral disc blackish ..... *M. phoenix* sp. nov. (Fig. 6)
- Colouration of elytral disc different 7
7. Lateral outline of pronotum arcuate, not forming a distinct subbasal angle (Fig. 23) 8
- Lateral outline of pronotum forming at least a distinct subbasal angle (Fig. 237) 10
9. Elytra at most with a faint darkened area near middle portion of lateral edge; male metatibiae fairly straight, bearing a short subapical row of peg-like setae (Fig. 17) ..... *M. con* sp. nov. (Fig. 7)

- Elytra with two distinct and occasionally confluent blackish spots, one near the middle of lateral edge and the second near the posterior third of the sutural margin; male metatibiae triangular and compressed, lacking peg-like setae (Fig. 187)..... *M. ping* sp. nov. (Fig. 8)

10. Elytra unicolored..... 11
- Elytra bicolored..... 12

11. Male metatibiae bearing peg-like setae on its apical third (Fig. 224); aedeagal internal sac bearing a conspicuous medial sclerite (Figs 225-226); female with valvifers dorsally contiguous (Fig. 236) .... *M. tac* sp. nov. (Fig. 9)
- Male metatibiae bearing peg-like setae only on its apical tenth (Fig. 266); aedeagal internal sac without conspicuous medial sclerite (Figs 269-270); female with valvifers dorsally fused ..... *M. tic* sp. nov. (Fig. 10)

12 Scutellum blackish; elytra with blackish adhumeral spots ..... *M. splendidus* sp. nov. (Fig. 11)
- Scutellum yellowish; elytra lacking adhumeral spots 13

13 Male metatibiae bearing a conspicuously projecting subbasal adventral process forming a sharp hook (Fig. 76)..... *M. lisae* sp. nov. (Fig. 12)
- Male metatibiae bearing a conspicuously projecting subbasal adventral process not forming a sharp hook.... 14

14 Male metatrochanteral processes projecting at right angle with respect to metafemora (Fig. 131); male metatibial peg-like setae arranged in one group (Fig. 131) ..... *M. mirabilis* sp. nov. (Fig. 13)
- Male metatrochanteral processes projecting obliquely with respect to metafemora (Fig. 35); male metatibial peg-like setae arranged in two groups (Fig. 35) 15

15 Male metatibial process lobed (Fig. 35) ..... *M. festivus* sp. nov. (Fig. 14)
- Male metatibial process angled (Fig. 90)..... *M. magnificus* sp. nov. (Fig. 15)

Megarthrus con **sp. nov.**
(Figs 7, 16-32)

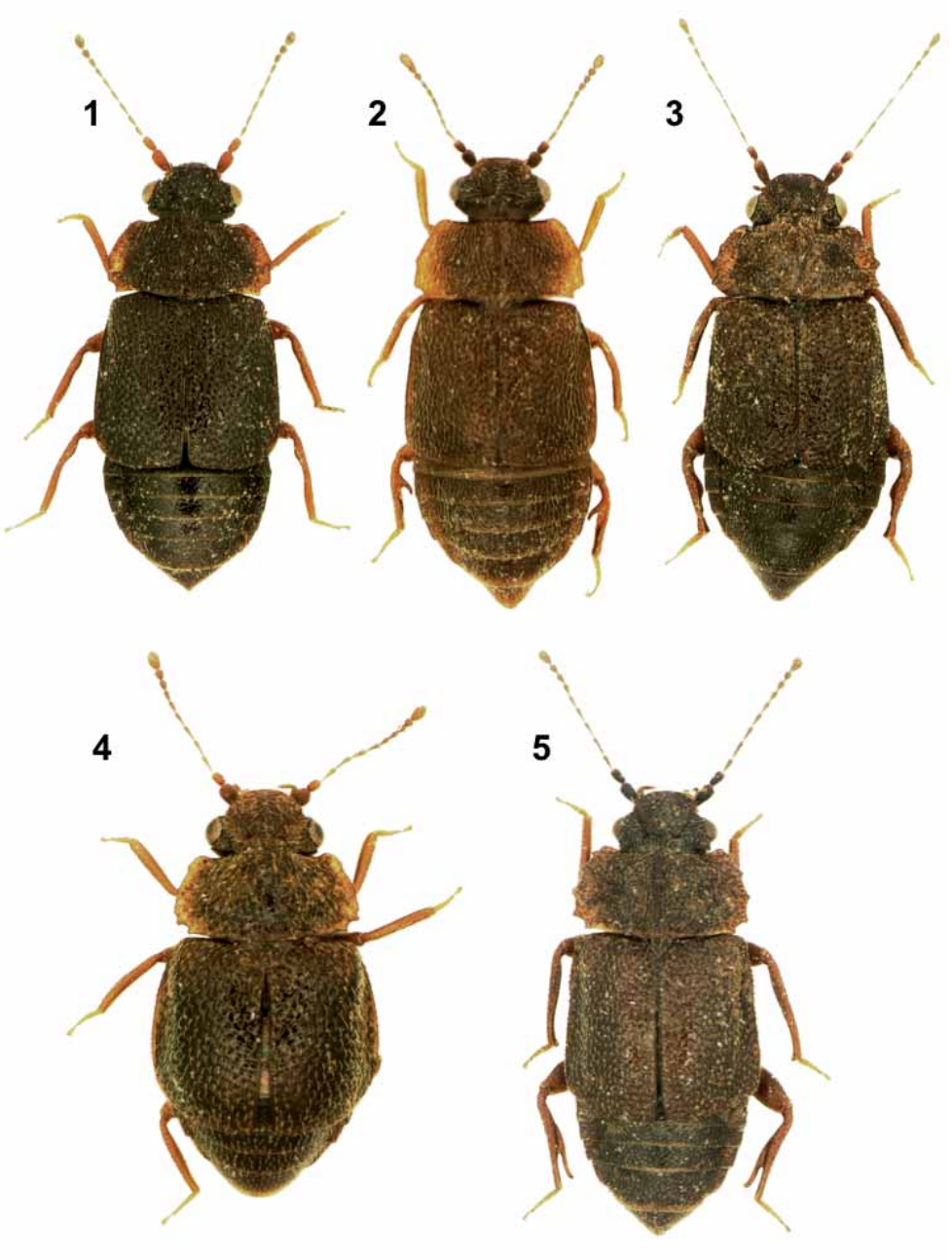
Type material. Holotype (♂): TAIWAN, Pingtung Hsien, Peitawushan, above Kuai-Ku Hut, 2325 m, 22.v.1991, leg. A. Smetana (T 90), in MHNG. Paratypes (9): TAIWAN, Kaohsiung Hsien, Rd. Above Tona For. Sta. Km 16-17, 1700-1800 m, 28.iv.1998 leg. A. Smetana (T 190), (3 ♂♂); Kaohsiung Hsien, Rd. Above Tona For. Sta. (Fork), 1850 m, 29.iv.1998 leg. A. Smetana (T 191), (2 ♂♂); Nantou Hsien, Meifeng, 2130 m, 3.v.1991, leg. A. Smetana (T 61), (1 ♂); Pingtung Hsien, Peitawushan Trail, 1500 m, 1.v.1992, leg. A. Smetana (T 110), (1 ♂); Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2125 m, 27.iv.1992, leg. A. Smetana (T 102), (1 ♂); Taichung Hsien, Anmashan, 2150 m, 13.v.1992, leg. A. Smetana (T 129), (1♂).

Description. Habitus as in Fig. 7. Combined length of pronotum and elytra = 1.4–1.6 mm; maximal pronotal width = 0.9-1.0 mm. Body and appendages yellowish brown, with darkened vertex and lateral portion of elytra.

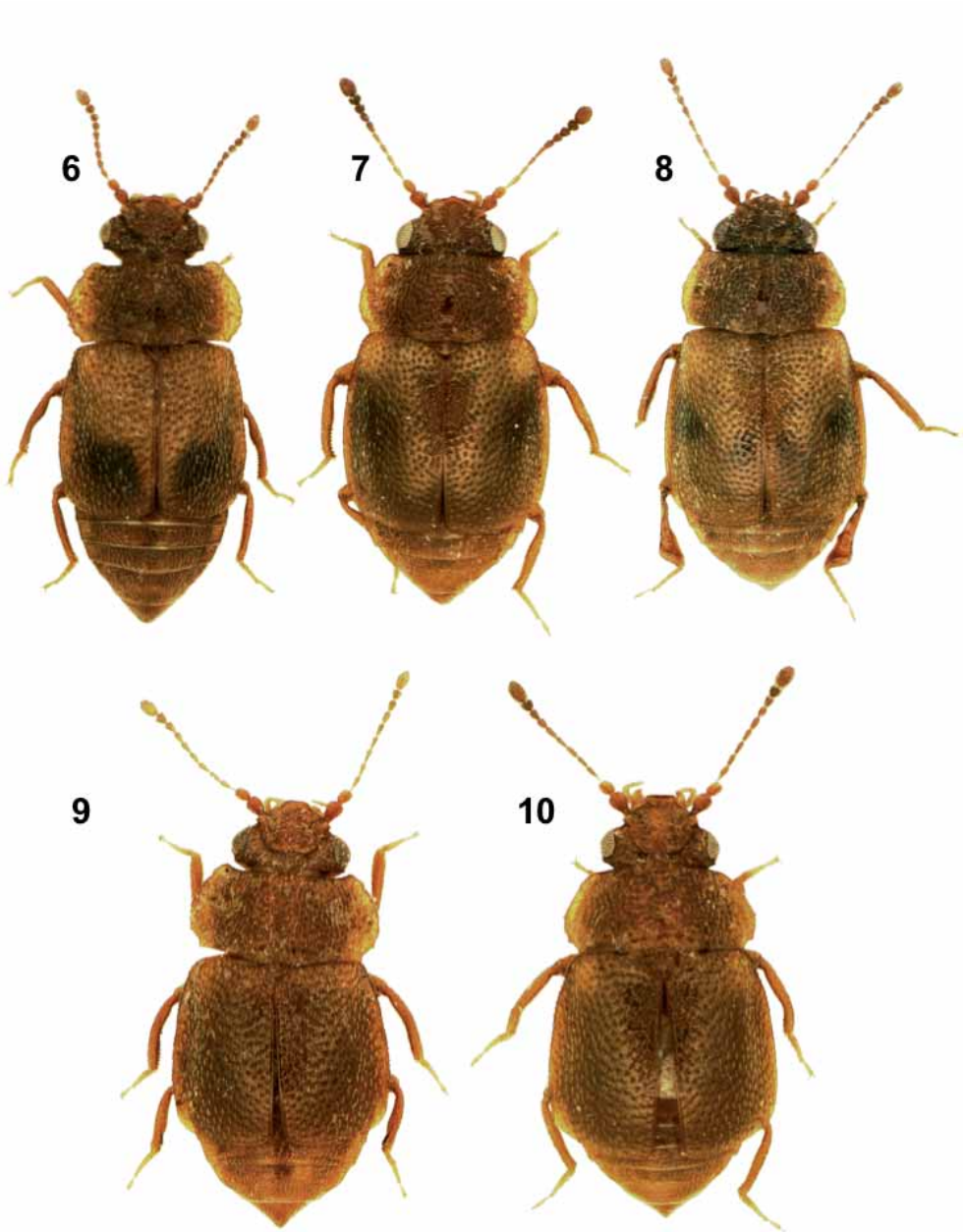
Dorsal pubescence fairly uniform, slightly sparser on elytral disc and shorter on abdomen; setae on medial area of frons directed backward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence fairly uniform, longer than that of prosternum; pubescence on abdominal tergites IV–VI converging; that on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite.

Frons and vertex granulate, with granula not more than half as high as their diameter; pronotum with central area granulofossulate and lateral areas oblongogranulate, moderately; elytra punctate, coarsely; metasternum moderately punctate laterally and impunctate medially.

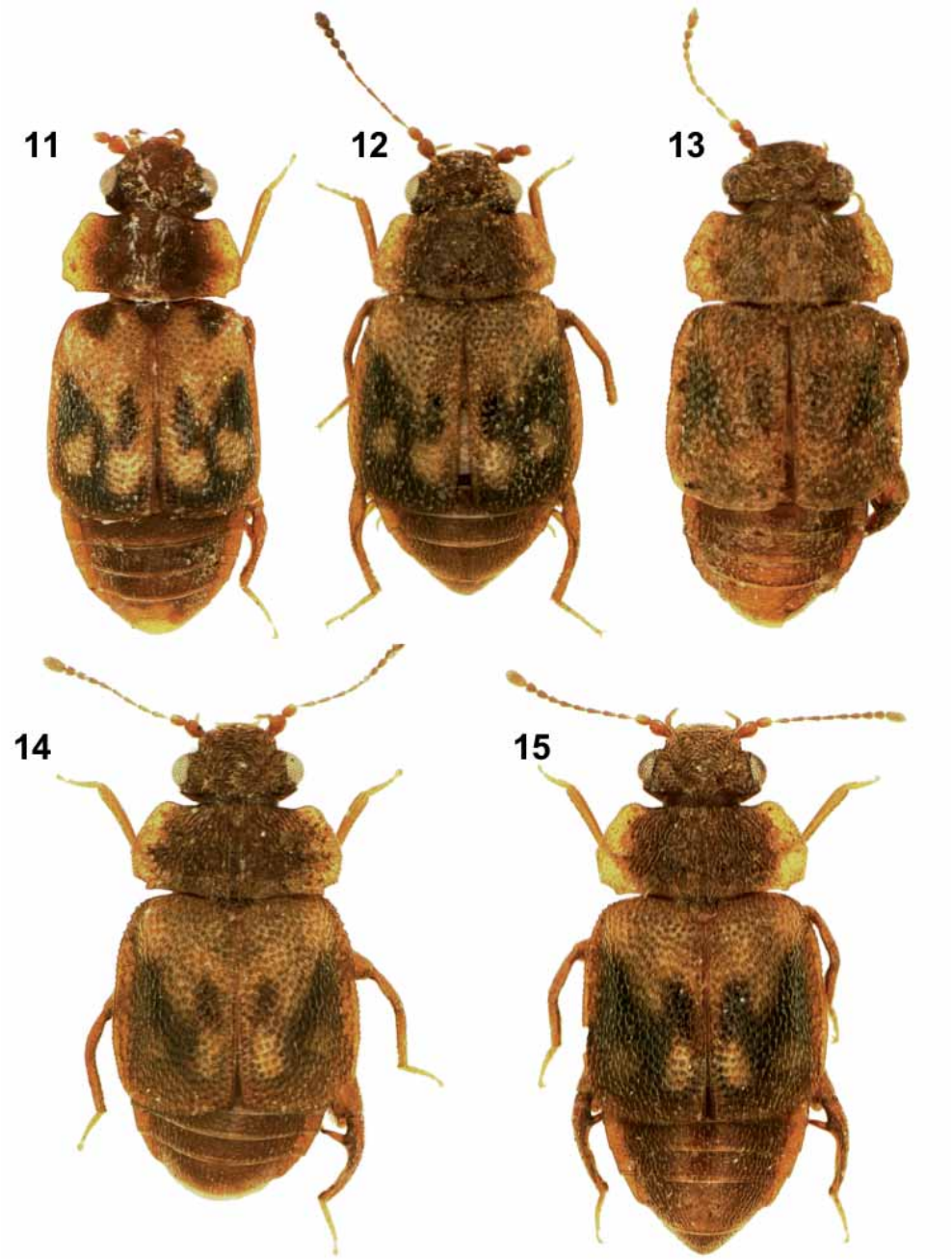
Frons forming above clypeus a sharp ridge, the latter conspicuously carinate; mesal portion of disc weakly convex in lateral view, evenly; entire U-shaped frontal impression moderately deep. Eyes moderately convex, with highest point slightly above level of vertex;



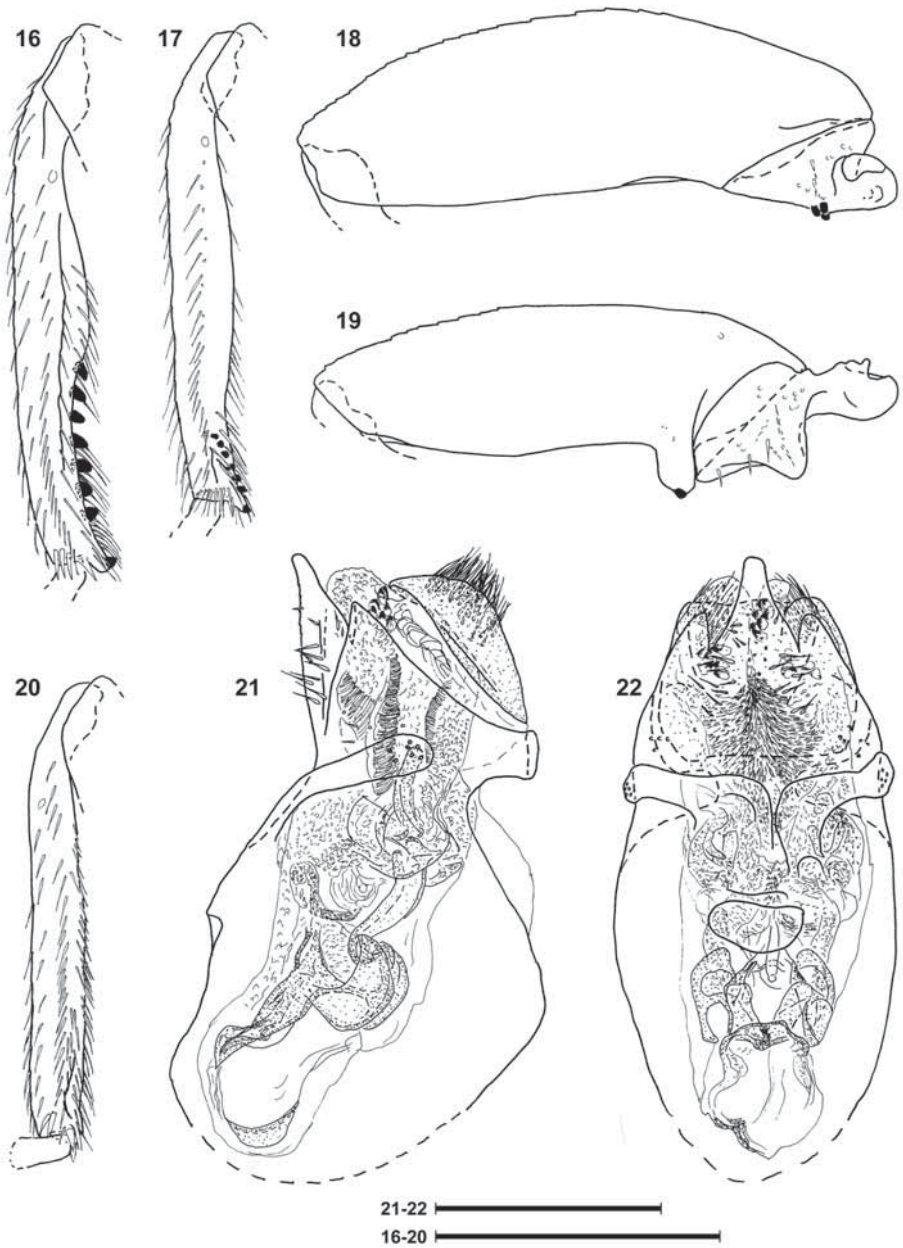
Figs 1-5. *Megarthrus*, habitus, male; *M. taiwanus* sp. nov. (1), holotype; *M. flavolimbatus* Cameron (2); *M. metanas* sp. nov. (3), holotype; *M. globulus* sp. nov. (4), holotype; *M. octopus* sp. nov. (5), holotype. Scale bars = 1.0 mm.



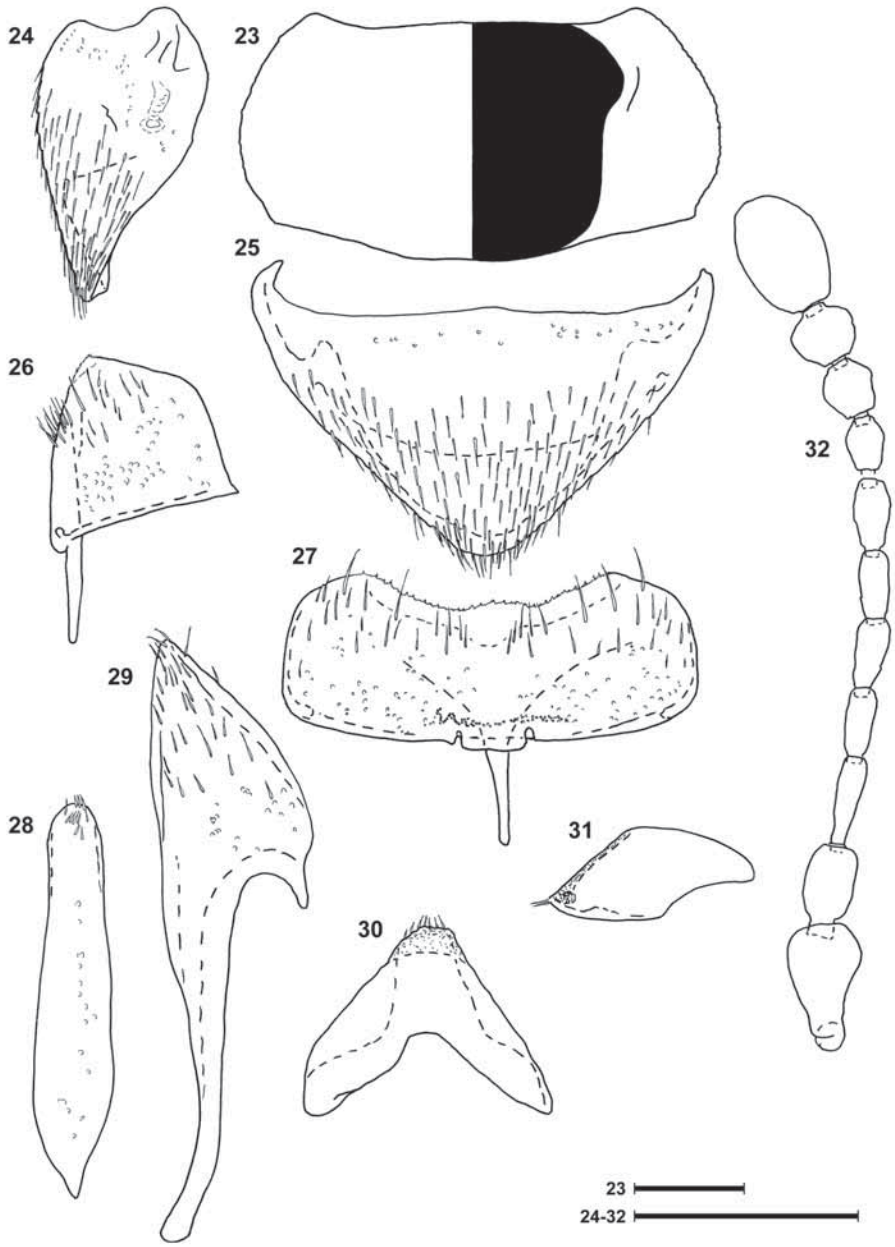
Figs 6-10. *Megarthrus*, habitus, male; *M. phoenix* sp. nov. (6), holotype; *M. con* sp. nov. (7), holotype; *M. ping* sp. nov. (8), holotype; *M. tac* sp. nov. (9), holotype; *M. tic* sp. nov. (10), holotype. Scale bars = 1.0 mm



Figs 11-15. *Megarthrus*, habitus, male; *M. splendidus* sp. nov. (11), holotype; *M. lisae* sp. nov. (12), holotype; *M. mirabilis* sp. nov. (13), holotype; *M. festivus* sp. nov. (14), holotype; *M. magnificus* sp. nov. (15), holotype. Scale bars = 1.0 mm.



Figs 16-22. *Megarthrus con* sp. nov., male. Mesotibia (16); metatibia (17); mesotrochanter and mesofemur (18); metatrochanter and metafemur (19); protibia (20); aedeagus in lateral (21) and ventral (22) views. Scale bars = 0.2 mm.



Figs 23-32. *Megarthrus con* sp. nov., male. Pronotum (23) in dorsal (left) and ventral (right) views; tergite VIII in lateral (24) and dorsal (25) views; sternite VIII in lateral (26) and ventral (27) views; sternite IX in ventral view (28); right hemitergite IX in ventral view (29); segment X in dorsal (30) and lateral (31) views; antenna (32). Scale bars = 0.2 mm.

supraocular margin sinuate in dorsal view. Temples nearly smooth, in dorsal view abruptly angled just behind the eyes, then flat; occipital ridge well marked, with lateral portions sinuate. Antenna (Fig. 32) without patches of sensilla; scape compressed, piriform; short and dense pubescence present on antennomeres 7–11. Maxillary palpi with palpomere 4 about 2 times as long as palpomere 3, the latter subcylindrical.

Pronotum (Fig. 23) with center weakly convex in frontal view; disc shallowly depressed along lateral portions of anterior and posterior margins, and transversely on mediolateral areas of disc and along anterior portion of lateral edges; the latter slightly raised anteriorly; medial groove very shallow, parallel-sided, slightly arcuate in lateral view; hypomera (Fig. 23) slightly ridged anteriorly, without a discal pit. Scutellum with anterior margin indistinct in middle, posterior margin oblique toward right-angled apex. Protrochanters without a longitudinal ridge. Elytra with humeral callus obsolete; disc without marked depression or hump; lateral edge conspicuously carinate, gently denticulate anteriorly, arcuate in dorsal view; sutural margin with posterior portion slightly arcuate in lateral view; posterior margin arcuate toward obtuse inner apical angle. Metasternum without foveiform impressions in front of metacoxae.

Male. Metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Frontoclypeal area raised, forming a pointed horn-like process. Protibiae (Fig. 20) shallowly depressed subapically. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 18) longer than metafemora (Fig. 19). Mesotibiae (Fig. 16) longer than metatibiae (Fig. 17). Metatarsomeres 1 about as long as metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on mesotrochanters (Fig. 18), mesotibiae, metafemora and metatibiae, and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 24-25; sternite VIII as in Figs 26-27; hemitergite IX as in Fig. 29; sternite IX as in Fig. 28; segment X as in Figs 30-31. Aedeagus as in Figs 21-22.

Female. Unknown.

Distribution and natural history. The species is known only from Taiwan, where it was found in the central counties of Nantou and Taichung, and in the southern counties of Kaohsiung and Pingtung, at elevations ranging from 1500 to 2350 meters above sea level, by sifting debris of vegetation, humus and fermenting tree buds shells in evergreen broadleaved forests.

Comments. *Megarthrus con* is easily distinguished from the other members of the genus by the unique shape of its male metafemora. It strongly resembles the East Palaearctic and Japanese *M. conformis* Sawada, 1962, *M. convexus* Sharp, 1874, *M. constrictus* Cuccodoro, 1996 and *M. conspirator* Cuccodoro, 1996, which have different sexual characters. Four other Taiwanese species of *Megarthrus* possess the frontoclypeal area modified in the male: *M. phoenix*, *M. ping*, *M. tac* and *M. tic*. See comments under these species.

The epiteth « con » is the first syllab of the species epiteths of *M. conformis*, *M. convexus*, *M. constrictus* and *M. conspirator*, to which this new species is closely related.

Megarthrus festivus sp. nov.
(Figs 14, 33-53)

Type material. Holotype (♂): TAIWAN, Kaohsiung Hsien, Peinantashan Trail, 2080 m, 6.vii.1993, leg. A. Smetana (T 141), in MHNG. Paratypes (8): Same data as holotype, (1 ♂); TAIWAN, Kaohsiung Hsien, Kuanshan Trail above Kaunshanshi River, 2550 m, 22.vii.1993, leg. A. Smetana (T 160), (1 ♂); Kaohsiung Hsien, Peinantashan Trail, 2390-2490 m, 5.vii.1993, leg. A. Smetana (T 138), (1 ♀); Kaohsiung Hsien, Peinantashan Trail, 2450 m, 2.v.1995, leg. A. Smetana (T 170), (1 ♀); Pingtung Hsien, Peitawushan, above Kuai-Ku Hut, 2750 m, 29.iv.1992, leg. A. Smetana (T 107), (1 ♂, 3 ♀♀).

Description. Habitus as in Fig. 14. Combined length of pronotum and elytra = 1.9–2.1 mm; maximal pronotal width = 1.2-1.4 mm. Body and appendages yellowish brown, with blackish spots on elytra.

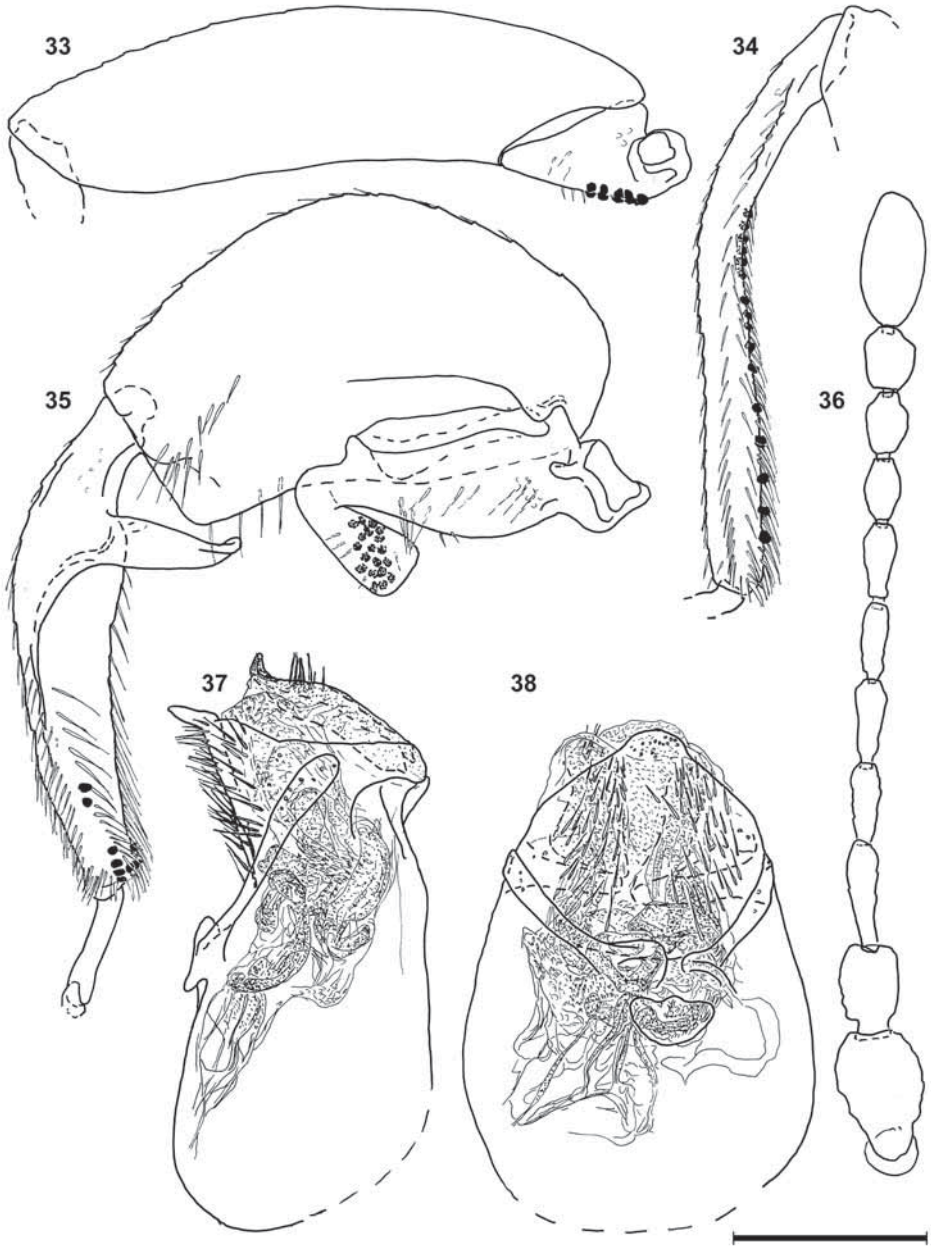
Dorsal pubescence fairly uniform, slightly sparser on elytral disc and shorter on abdomen; setae on medial area of frons directed backward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence fairly uniform, longer than that of prosternum; pubescence on abdominal tergites parallel; that on sternites IV-VII uniform

Frons, vertex, and anterior portion of prohypomera granulate, with granula on vertex about as high as their diameter, and those on frons and prohypomera only about half as high as their diameter; pronotum with central area granulofossulate and lateral areas oblongogranulate, coarsely; elytra granulopunctate, moderately; metasternum moderately punctate, fairly uniformly.

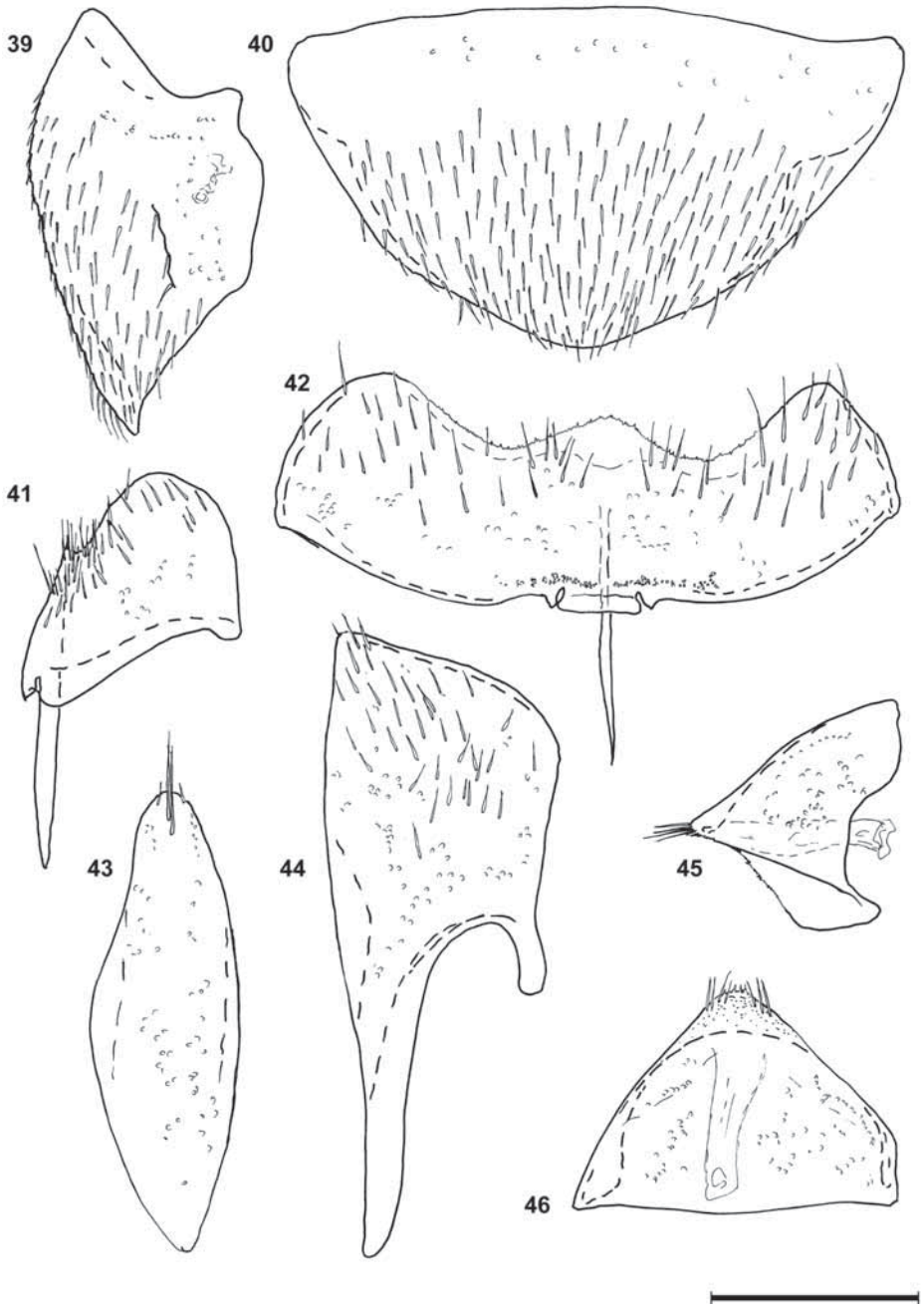
Frons forming above clypeus a sharp ridge, the latter very finely carinate, evenly aruate in dorsal view; mesal portion of disc weakly convex in lateral view, evenly; entire U-shaped frontal impression deep. Eyes moderately convex, with highest point slightly above level of vertex; supraocular margin sinuate in dorsal view. Temples microreticulate, in dorsal view abruptly angled just behind the eyes, then flat; occipital ridge well marked, with lateral portions sinuate. Antenna (Fig. 36) without patches of sensilla; scape compressed, piriform; short and dense pubescence present on antennomeres 7–11. Maxillary palpi with palpomere 4 about 2 times as long as palpomere 3, the latter subcylindrical.

Pronotum (Fig. 48) with centre moderately convex in frontal view; disc shallowly depressed along lateral portions of anterior and posterior margins, and along middle portion of medial groove, and deeply depressed transversely on mediolateral areas of disc toward foveiform impressions near lateral edges; the latter markedly raised; medial groove shallow, parallel-sided, slightly arcuate in lateral view; hypomera (Fig. 48) ridged anteriorly, with a small discal pit. Scutellum with anterior margin angulate in middle, posterior margin oblique toward rounded apex. Protrochanters without a longitudinal ridge. Elytra with humeral callus low; disc moderately depressed along entire lateral edge and outer portion of posterior margin; lateral edge conspicuously carinate, markedly denticulate, arcuate in dorsal view; sutural margin slightly arcuate in lateral view; posterior margin arcuate toward obtuse inner apical angle. Metasternum without foveiform impressions in front of metacoxae.

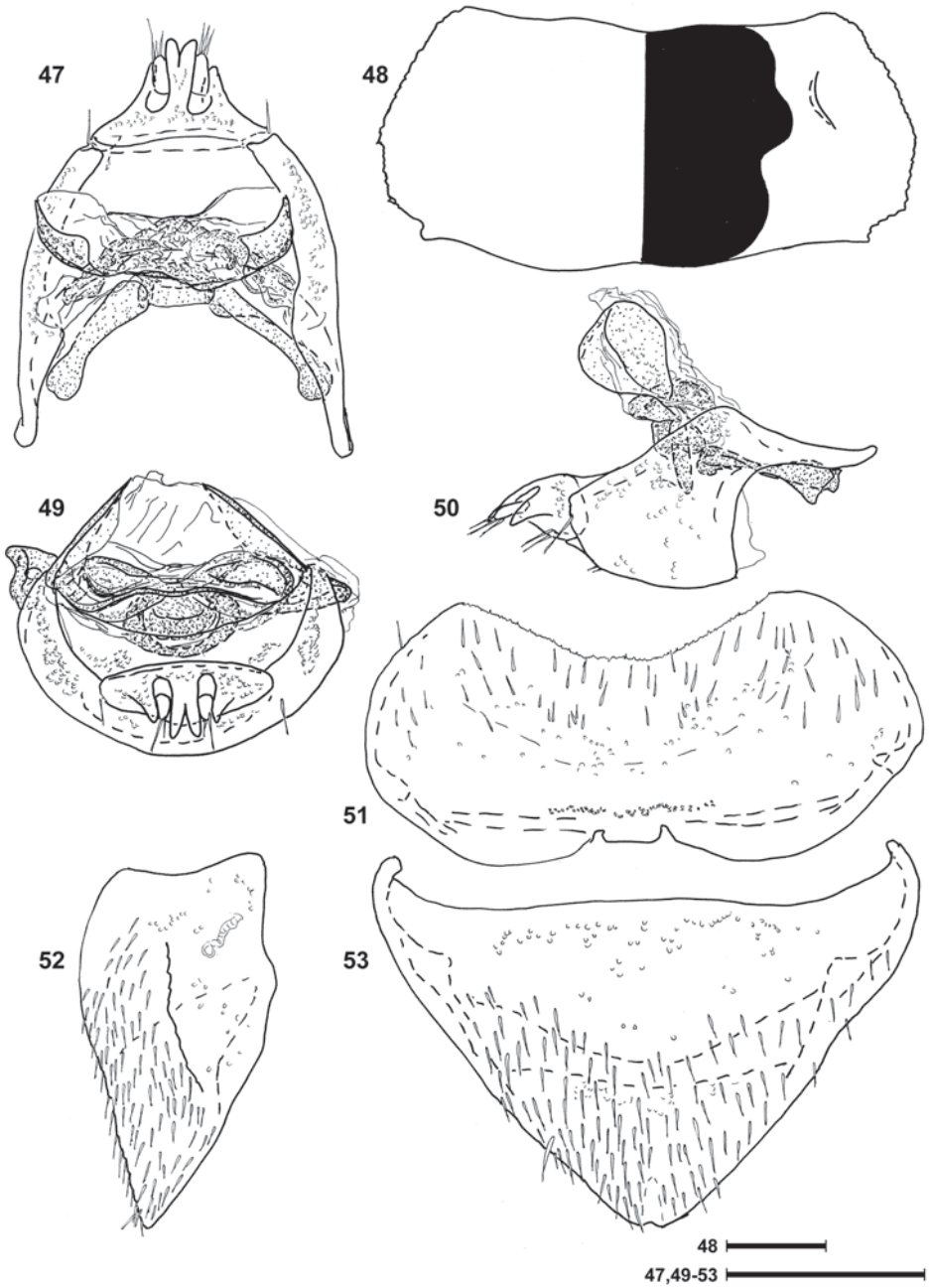
Male. Frontoclypeal area, metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 33) longer than metafemora (Fig. 35). Mesotibiae (Fig. 34) longer than metatibiae (Fig. 35). Metatrochanters (Fig. 35) with projecting process acutely angled at base and widened toward apex truncate.



Figs 33-38. *Megarthrus festivus* sp. nov., male. Mesotrochanter and mesofemur (33); mesotibia (34); metatrochanter, metafemur and metatibia (35); antenna (36); aedeagus in lateral (37) and ventral (38) views. Scale bar = 0.2 mm.



Figs 39-46. *Megarthrus festivus* sp. nov., male. Tergite VIII in lateral (39) and dorsal (40) views; sternite VIII in lateral (41) and ventral (42) views; sternite IX in ventral view (43); right hemitergite IX in ventral view (44); segment X in lateral (45) and dorsal (46) views. Scale bar = 0.2 mm.



Figs 47-53. *Megarthrus festivus* sp. nov., female. Genitalia in dorsal (47), posterior (49) and lateral (50) views; pronotum (48) in dorsal (left) and ventral (right) views; sternite VIII in ventral view (51); tergite VIII in lateral (52) and dorsal (53) views. Scale bars = 0.2 mm.

Metatarsomeres 1 about as long as metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on mesotibiae, in two rows on mesotrochanters (Fig. 33), grouped in a field on metatrochanters and metatibiae (Fig. 35), and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 39-40; sternite VIII as in Figs 41-42; hemitergite IX as in Fig. 44; sternite IX as in Fig. 43; segment X as in Figs 45-46. Aedeagus as in Figs 37–38.

Female. Abdominal tergite VIII as in Figs 52-53. Sternite VIII as in Fig. 51. Genital segments as in Figs 47, 49-50.

Distribution and natural history. The species is known only from Taiwan, where it was found in the southern counties of Pingtung and Kaohsiung, at elevations ranging from 2050 to 2750 meters a.s.l., by sifting debris of vegetation, humus, fallen leaves and moss in coniferous forest (*Abies*), in secondary broadleaved forest with intermixed *Chamaecyparis*, mixed broadleaved and coniferous forests, and under dense bushes.

Comments. *Megarthrus festivus*, *M. lisae*, *M. magnificus*, *M. mirabilis* and *M. splendidus* uniquely share bicolorous elytra in combination with spectacular projecting processes on the male metatrochanters and metabibiae (= « *festivus*-complex ». These species differ from each other mainly by the shape of these processes and the conformation of the aedeagus.

Like *M. lisae*, *M. magnificus* and *M. mirabilis*, *M. festivus* has the scutellum yellowish and lacks blackish adsutural elytral spots. Among these four species, it resembles most *M. magnificus*, notably with respect to the shape of the aedeagus and the unique conformation of the projecting process of their male metatrochanters, which are acutely recurved at base and gradually widened toward apex into a broad triangular surface bearing peg-like setae (Fig. 35). These two allopatric species are, however, easily distinguished one from another by the shape of the male metatibial processes, which are lobed and subapically recurved anterad in *M. festivus* (Fig. 35) instead of subapically angled posterad in *M. magnificus* (Fig. 90) and, in female, by the dorsobasal margin of the gonocoxal plate, which is straight in *M. festivus* (Fig. 47) instead of angled in *M. magnificus* (Fig. 100). See comments under *M. lisae* and *M. mirabilis*.

The species is named « festivus » because it is colorful and the male has funny legs.

Megarthrus flavolimbatus Cameron, , 1924

(Fig. 2)

Megarthrus flavolimbatus Cameron, 1924: 164.

Additional material (109). TAIWAN, Chiai Hsien, Alishan, Sister Ponds, 2180 m, 26.iv.1990, leg. A. Smetana (T 24), in 1 ♂ and 2 ♀, (MHNG); Chiai Hsien, Alishan, 2200 m, 26.iv.1990, leg. A. Smetana (T 25), 1 ♂, (MHNG); Chiai Hsien, Fenchihu, 1400 m, 3.vi.1977, leg. J. U. S. Klapperich, 1 ♂, 1 ♀, (CNCI); Hualien Hsien, Taroko National Park, Nanhunanfong Trail (W), 2700 m, 9.v.1990, leg. A. Smetana (T 49), 3 ♂ and 1 ♀; Kaohsiung Hsien, Kuanshan Trail above Kaunshanshi River, 2550 m, 22.vii.1993, leg. A. Smetana (T 160), 17 ♂ and 25 ♀ in MHNG; Kaohsiung Hsien, Kuanshan Trail at Kaunshanshi River, 2400 m, 20-23.vii.1993, leg. A. Smetana (T 159), 1 ♀; Kaohsiung Hsien, Kuanshan Trail at Kaunshanshi River, 2400 m, 20.vii.1993, leg. A. Smetana (T 158), 2 ♂ and 2 ♀; Kaohsiung Hsien, Peinantashan Trail, 1950 m, 8.vii.1993, leg. A. Smetana (T 145), 1 ♂ and 5 ♀; Kaohsiung Hsien, Peinantashan Trail, 2080 m, 6.vii.1993, leg. A. Smetana (T 141), 3 ♀; Kaohsiung Hsien, Peinantashan Trail, 2390-2490 m, 5.vii.1993, leg. A. Smetana (T 138), 1 ♂; Kaohsiung Hsien, Rd. Above Tona For. Sta. (Fork), 1850 m, 29.iv.1998 leg. A. Smetana (T 191), 3 ♂ and 2 ♀; Nantou Hsien, Arisan, 2130 m, 19.viii.1947, leg. J. L. Gressitt, 1 ♀ in BPBM; Nantou Hsien, Yushan National Park, 1.8 km W Pai-Yun Hut, 3375 m, 17.v.1991, leg. A. Smetana (T

85), 1 ♀; Nantou Hsien, Yushan National Park, Mun-Li Cliff, 2700 m, 13.v.1991, leg. A. Smetana (T 79), 1 ♂ and 1 ♀; Pingtung Hsien, Peitawushan Trail, 1500 m, 1.v.1992, leg. A. Smetana (T 110), 5 ♂ and 3 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2130 m, 30.iv.1992, leg. A. Smetana (T 109), 1 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2325 m, 21.v.1991, leg. A. Smetana (T 88), 9 ♂ and 8 ♀; Taichung Hsien, Anmashan, 2220 m, 14.v.1992, leg. A. Smetana (T 131), 3 ♂ and 2 ♀; Taichung Hsien, Anmashan, 2230 m, 1.v.1990, leg. A. Smetana (T 33), 1 ♀; Tainan Hsien, Kwantzeling, 250 m, 6-7.iv.1965, leg. C. M. Yoshimoto, 1 ♂ in BPBM.

Diagnosis. Habitus as in Fig. 2. Combined length of pronotum and elytra = 1.3-1.4 mm; maximal pronotal width = 0.9-1.0 mm. Body uniformly brown, except usually slightly darkened head. Frons ridged above clypeus, with medial pubescence directed backward. Antennae bearing short and dense pubescence on articles 5 to 11. Pronotum with lateral outline subangulate usually with two blunt angles; anterior portion of hypomera lacking an oblique ridge. Male with peg-like setae present on mesotrochanters, mesotibiae, and metatibiae; metatibiae with conspicuous tooth-like projecting process; protarsomeres 1 bearing tenent setae (detailed morphology in Cuccodoro 2003).

Distribution and natural history. Known so far only from North India (Simla Hills), *M. flavolimbatus* is recorded here as new to Taiwan and becomes thus the *Megarthrus* species the most widespread in the Oriental realm. In Taiwan, it was found in the central counties of Chiai, Hualien Nantou, Taichung and Tainan, and in the southern counties of Kaohsiung and Pingtung, at elevations ranging from 250 to 3375 meters above sea level, by sifting debris of vegetation, leaf litter, moss, humus, fungi, rotting wood and chicken excrements in evergreen broadleaved, deciduous broadleaved, mixed confiferous and evergreen broadleaved, and coniferous forests, as well as in orchards. It was particularly abundant (42 specimens) in a sifted sample of fallen leaves and other debris taken along fallen trees and in forest floor depressions under dense bushes at 2550 m. a.s.l. along the Kaunshanchi river (T 160).

Comments. *Megarthrus flavolimbatus* is the only Taiwanese member of the genus to possess the prosternal pubescence longer that on metasternum. It also has tenent setae on the first protarsomeres in male, a feature characteristic of the large Holarctic and Afrotropical *M. depressus*-supergroup (Cuccodoro 2011). It ressembles most the Chinese *M. dentipes* Bernhauer, 1938 (detailed morphology in Cuccodoro 2003), which has slightly different sexual characters.

***Megarthrus globulus* sp. nov.**
(Figs 4, 54-73)

Type material. Holotype ♂: TAIWAN, Kaohsiung Hsien, Road from Tengchih to Chuyenshan, 1400 m, 25.iv.1990, leg. A. Smetana (T 23), in MHNG. Paratypes (31): Same data as holotype, 2 ♂ and 4 ♀ in MHNG; TAIWAN, Ilian Hsien, Shen-Mi Lake <24°22'43''N ; 121°44'12''E>, 1110 m, 10.v.1995, leg. A. Smetana (T 177), 1 ♀ in MHNG; Ilian Hsien, Shen-Mi Lake <24°22'43''N ; 121°44'12''E> 1110 m, 10.v.1995, leg. A. Smetana (T 177), 5 ♂ and 2 ♀ in MHNG; Kaohsiung Hsien, Rd. Above Tona For. Sta. (Fork), 1850 m, 29.iv.1998 leg. A. Smetana (T 191), 1 ♂ and 1 ♀ in MHNG; Kaohsiung Hsien, Rd. Above Tona For. Sta. Km 16-17, 1700-1800 m, 28.iv.1998 leg. A. Smetana (T 190), 1 ♂ in MHNG; Kaohsiung Hsien, Tengchih, 1610 m, 24.iv.1990, leg. A. Smetana (T 20), 2 ♀ in MHNG; Kaohsiung Hsien, Tengchih, 1700-1800 m, 24.iv.1990, leg. A. Smetana (T 21), 1 ♂ and 2 ♀ in MHNG; Nantou Hsien, Highway 14, biw. Wushe, 1700 m, 21.iv.1990, leg. A. Smetana (T 15), 1 ♂ in MHNG; Nantou Hsien, Highway 14, Fengnan, 700 m, 22.iv.1990, leg. A. Smetana (T 17), 1 ♂ in MHNG; Nantou Hsien, Meifeng,

2130 m, 10.vii.1993, leg. A. Smetana (T 146), 1 ♀ in MHNG; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2125 m, 27.iv.1992, leg. A. Smetana (T 102), 1 ♂ in MHNG; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2130 m, 27.iv.1992, leg. A. Smetana (T 101), 1 ♂ in MHNG; Taichung Hsien, Anmashan, 2225 m, 3.v.1990, leg. A. Smetana (T 42), 1 ♂ in MHNG; Taichung Hsien, Anmashan, 2230 m, 12.v.1992, leg. A. Smetana (T 127), 1 ♀ in MHNG; Taitung Hsien, Hsinkangshan above Chengkang, 750 m, 18.iv.1998, leg. A. Smetana (T 182) , 1 ♂ in MHNG; Taitung Hsien, Hsinkangshan above Chengkang, 800 m, 26.iv.1995, leg. A. Smetana (T 167), 1 ♂ in MHNG.

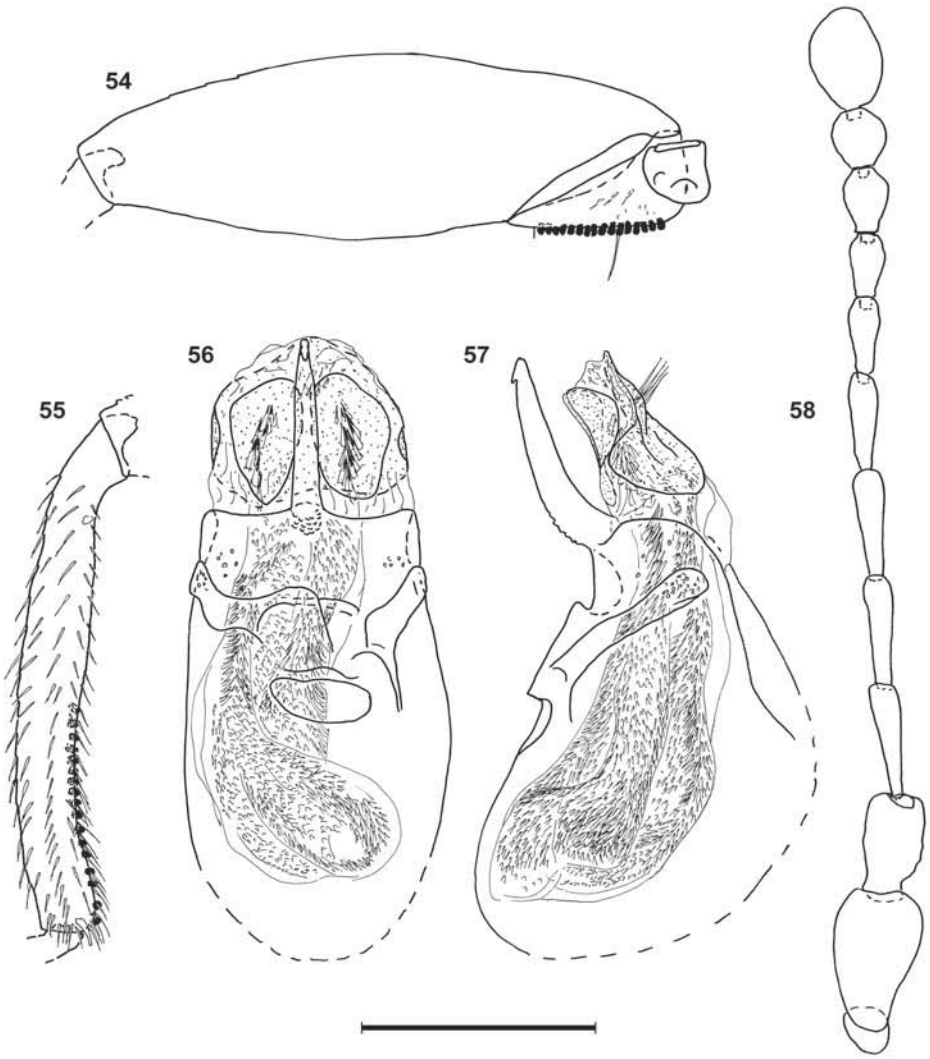
Description. Habitus as in Fig. 4. Combined length of pronotum and elytra = 1.3-1.5 mm; maximal pronotal width = 0.9-1.0 mm. Body dark brown with legs slightly paler. Dorsal pubescence fairly uniform, sparser and longer on elytral disc; setae on anteromedial area of frons directed backward; elytral and pronotal setae strongly arcuate, semi-erect; metasternal pubescence fairly uniform, about as long as that of prosternum; pubescence on abdominal tergites IV–V converging; that on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite.

Frons, vertex, and anterior portion of prohypomera granulate, with granula on vertex about as high as their diameter, and those on frons and prohypomera not more than half as high as their diameter; pronotum with central area granulofossulate, coarsely and lateral areas oblongogranulate, shallowly; elytra punctate, coarsely; metasternum coarsely punctate laterally, punctures becoming denser anteriorly and evanescent medially.

Frons forming above clypeus a sharp ridge, the latter finely carinate, arcuate in in dorsal view, evenly; mesal portion of disc slightly convex in lateral view, evenly; U-shaped frontal impression moderately deep. Eyes hemispherical, with highest point above level of vertex; supraocular margin sinuate in dorsal view. Temples nearly smooth, in dorsal view abruptly angled just behind the eyes, then flat; occipital ridge well marked, with lateral portions sinuate**.** Antenna (Fig. 58) without patches of sensilla; scape compressed, piriform; short and dense pubescence present on antennomeres 7–11. Maxillary palpi with palpomere 4 about 2 times as long as palpomere 3, the latter subcylindrical.

Pronotum (Fig. 70) with center strongly convex in frontal view; disc shallowly depressed along lateral portions of anterior and posterior margins, and deeply depressed transversely on mediolateral areas of disc; lateral edges slightly raised; medial groove very shallow, parallel-sided, moderately arcuate in lateral view; hypomera (Fig. 70) ridged anteriorly, without a discal pit. Scutellum with anterior margin slightly arcuate, posterior margin oblique toward arcuate apex. Protrochanters without a longitudinal ridge. Elytra with humeral callus low; disc with low anterior adsutural swelling, moderately depressed along entire lateral edge; the latter conspicuously carinate, markedly denticulate, arcuate in dorsal view; sutural margin moderately arcuate in lateral view; posterior margin arcuate toward obtuse inner apical angle. Metasternum without foveiform impressions in front of metacoxae.

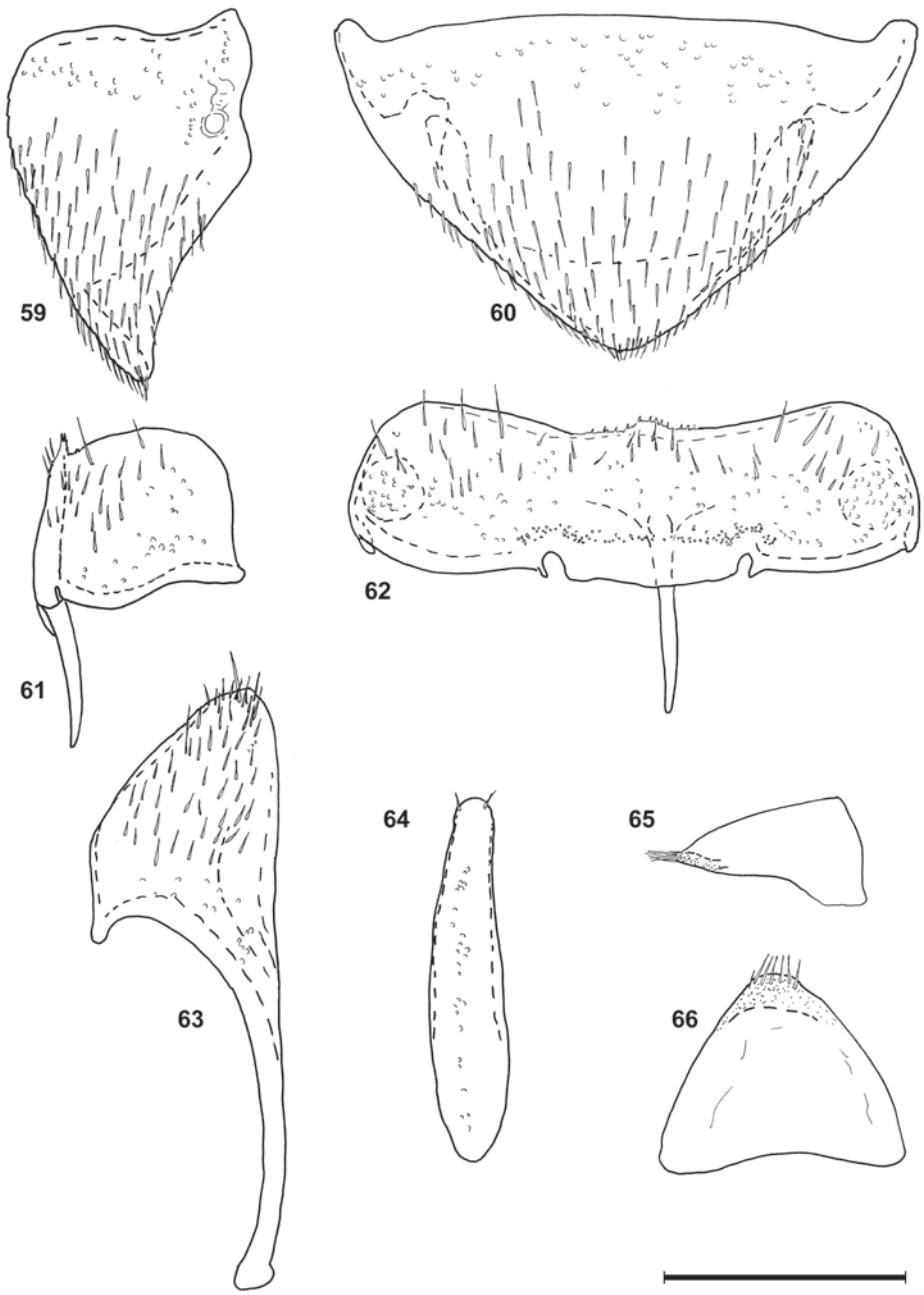
Male. Frontoclypeal area, metasternum, protarsomeres 5, and abdominal sternites IV–VI unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 54) shorter than metafemora. Mesotibiae (Fig. 55) slightly shorter than metatibiae, the latter slightly depressed on apical half. Metatarsomeres 1 about as long as metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on mesotrochanters (Fig. 54) and mesotibiae, and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 59-60; sternite VIII as in Figs 61-62; hemitergite IX as in Fig. 63; sternite IX as in Fig. 64; segment X as in Figs 65-66. Aedeagus as in Figs 56–57.



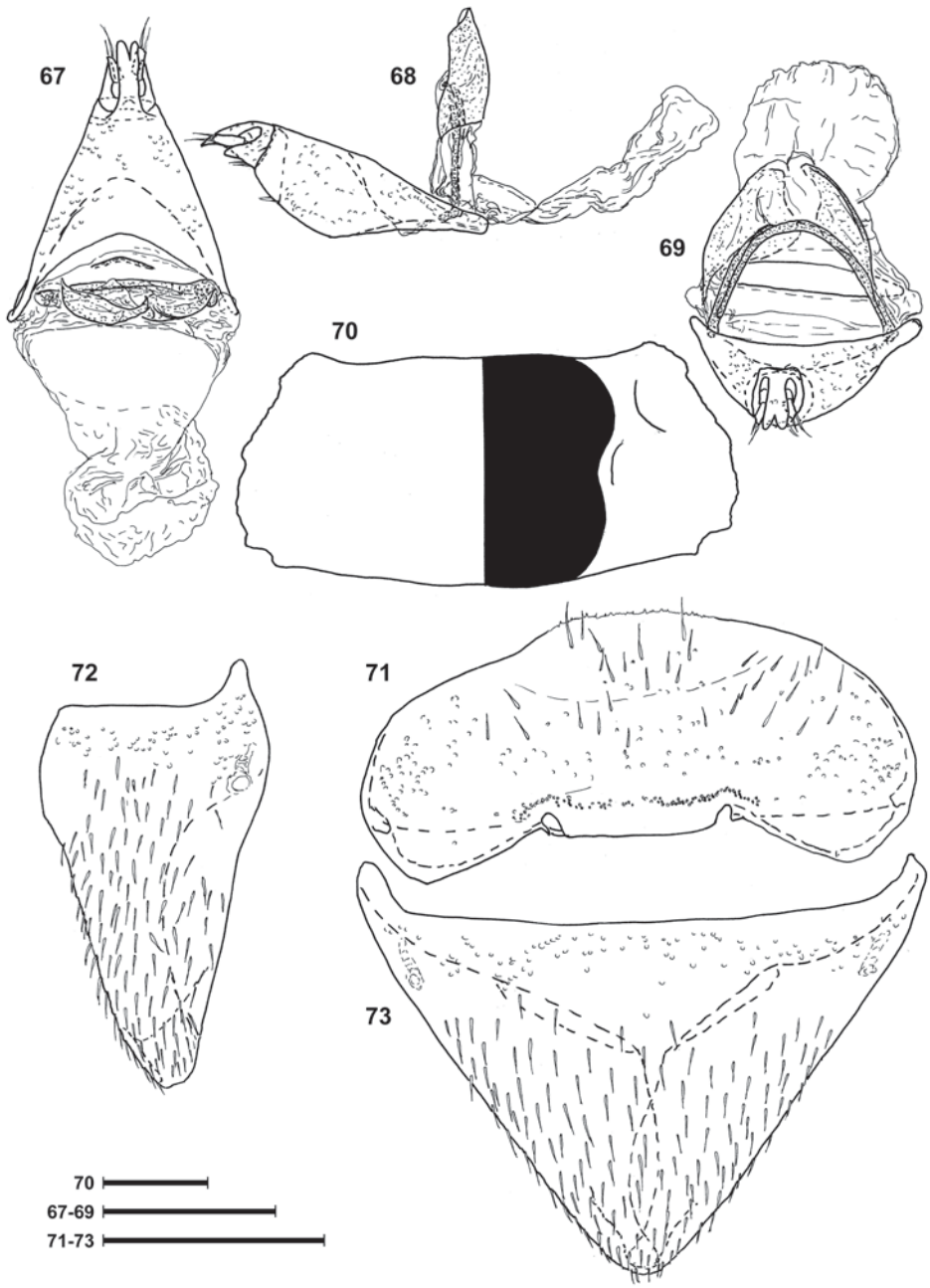
Figs 54-58. *Megarthrus globulus* sp. nov., male. Mesotrochanter and mesofemur (54); mesotibia (55); aedeagus in ventral (56) and lateral (57) views; antenna (36). Scale bar = 0.2 mm.

Female. Abdominal tergite VIII as in Figs 72-73. Sternite VIII as in Fig. 71. Genital segments as in Figs 67-69.

Distribution and natural history. The species is known only from Taiwan, where it was found in the northern county of Ilian, in the central counties of Nantou and Taichung, and in the southern counties of Kaohsiung, Taitung and Pingtung, at elevations ranging from 700 to 2250 meters a.s.l., by sifting debris of vegetation, humus, moss, fallen leaves and fermenting fruits in evergreen broadleaved and coniferous forests, and in an orchard.



Figs 59-66. *Megarthrus globulus* sp. nov., male. Tergite VIII in lateral (59) and dorsal (60) views; sternite VIII in lateral (61) and ventral (62) views; left hemitergite IX in ventral view (63); sternite IX in ventral view (64); segment X in lateral (65) and dorsal (66) views. Scale bar = 0.2 mm.



Figs 67-73. *Megarthrus globulus* sp. nov., female. Genitalia in dorsal (67), lateral (68) and posterior (69) views; pronotum (70) in dorsal (left) and ventral (right) views; sternite VIII in ventral view (71); tergite VIII in lateral (72) and dorsal (73) views. Scale bars = 0.2 mm.

Comments. *Megarthrus globulus* is the only Taiwanese *Megarthrus* to possess the elytral pubescence semi-erect and markedly longer than that on pronotum. It strongly resembles the Himalayan *M. trisinuatus* Cameron, 1924 and *M. umbonatus* Fauvel, 1985, from which can be easily distinguished in female by mediodorsal area the gonocoxal plate, which lacks a transverse ridge and is fused with the valvifers (Figs 67-68). *Megarthrus globulus* is also the only of these species to have the male mesotrochanteral peg-like setae arranged in a single row (Fig. 54).

The latin epiteth « globulus» refers to the rather round and compact aspect of this new species.

Megarthrus lisae sp. nov.
(Figs 12, 74-88)

Type material. Holotype (♂): TAIWAN, Nantou Hsien, Meifeng, 2130 m, 2.vii.1998, leg. A. Smetana (T 196), (MHNG).

Description. Similar to *M. festivus*, from which it differs as follows : Habitus as in Fig. 12. Combined length of pronotum and elytra = 1.6 mm; maximal pronotal width = 1.0. Frontal margin weakly arcuate in middle and oblique laterally in dorsal view; entire U-shaped frontal impression shallow. Antenna as in Fig. 77. Pronotum as in Fig. 88.

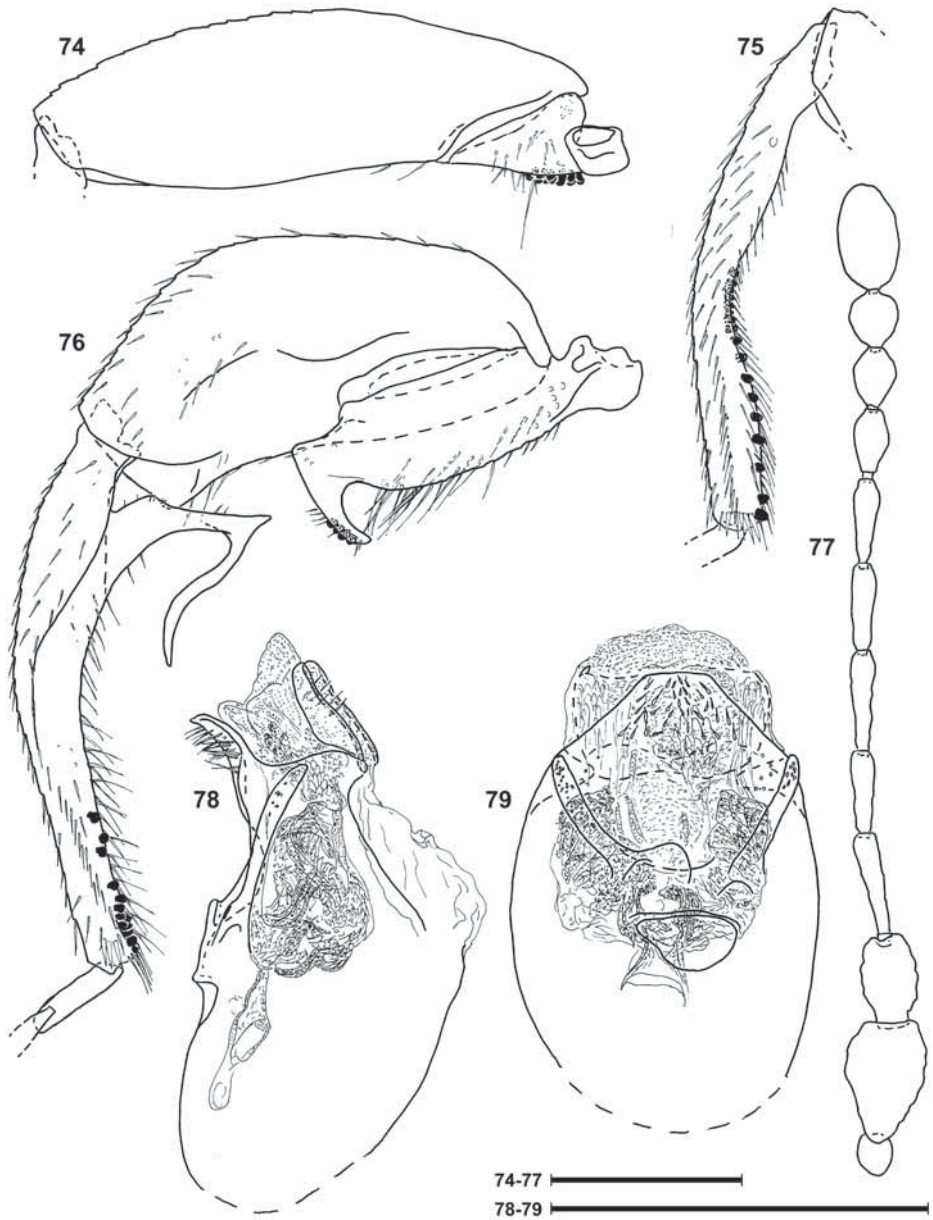
Male. Frontoclypeal area, metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 74) longer than metafemora (Fig. 76). Metatibiae (Fig. 76) longer than mesotibiae (Fig. 75). Metatrochanters (Fig. 76) with projecting process acutely angled at base and subcylindrical toward apex. Metatarsomeres 1 about as long as metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on apical portion of mesotibiae, in two rows on middle portion of mesotibiae, grouped in a field on mesotrochanters (Fig. 74), metatrochanters and metatibiae, and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 80-81; sternite VIII as in Figs 82-83; hemitergite IX as in Fig. 84; sternite IX as in Fig. 85; segment X as in Figs 86-87. Aedeagus as in Figs 78–79.

Female. Unknown.

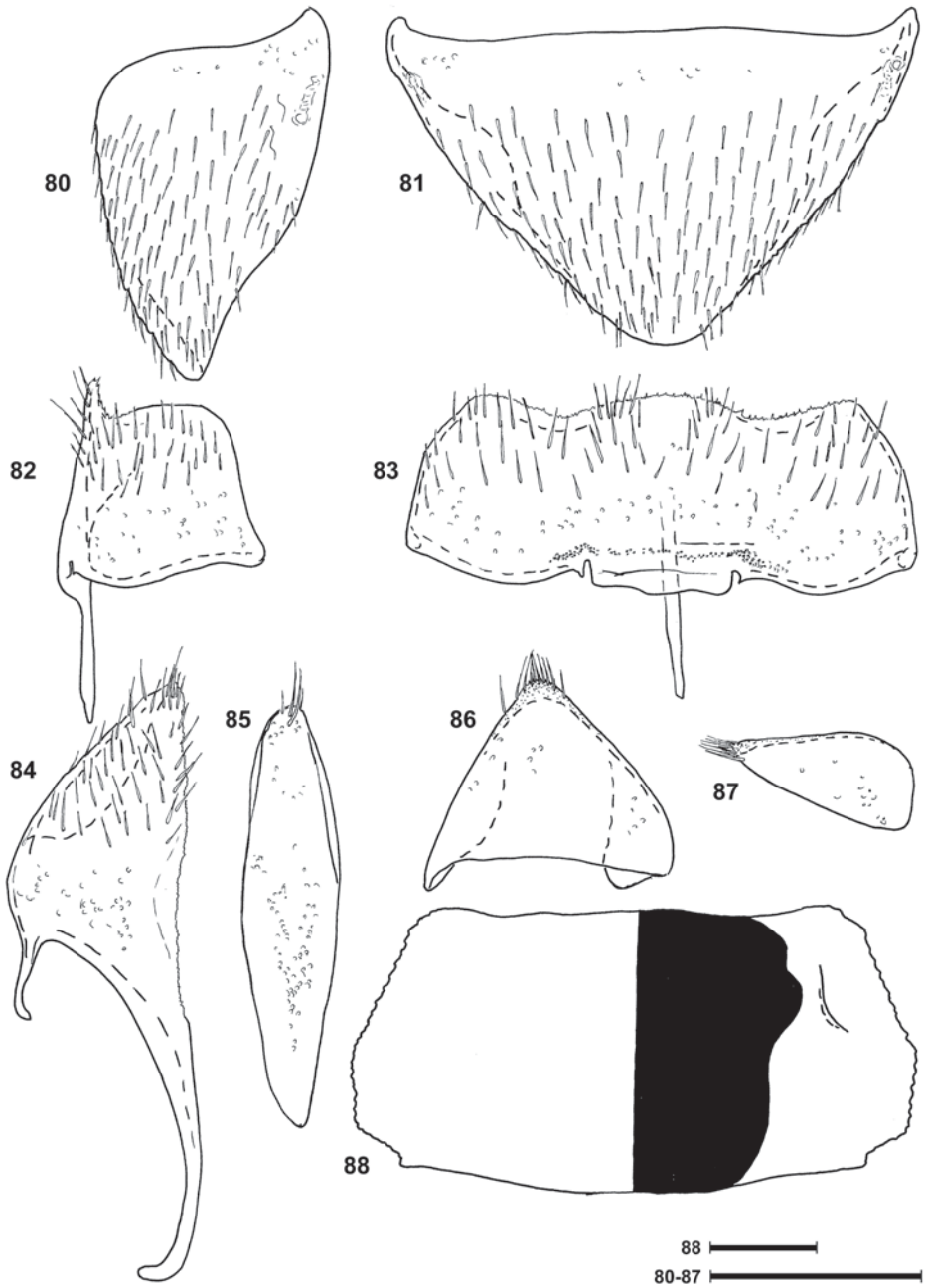
Distribution and natural history. The species is known only from the central Taiwanese county of Nantou, where it was found at an elevation of 2130 meters a.s.l., by sifting debris of vegetation in an original evergreen broadleaved forest.

Comments. Within the *festivus*-complex (see comments under *M. festivus*), *M. lisae* is easilydistiguished by the shape of the male metatibial process, which projects into an impressive hook.

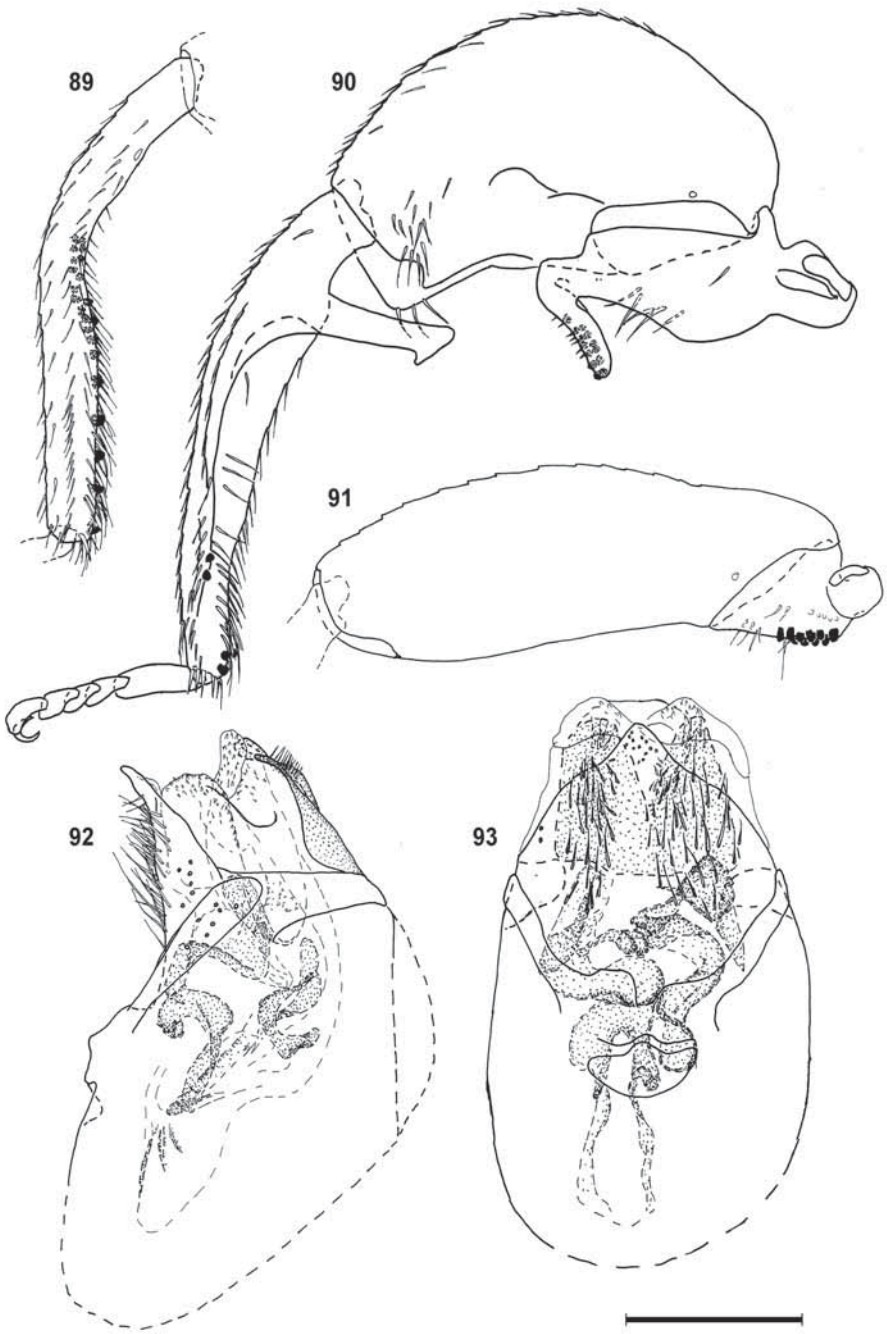
The species is named after Alès Smetana's wife Lise, who assisted him on the field in Taiwan. See comments under *M. metanas*.



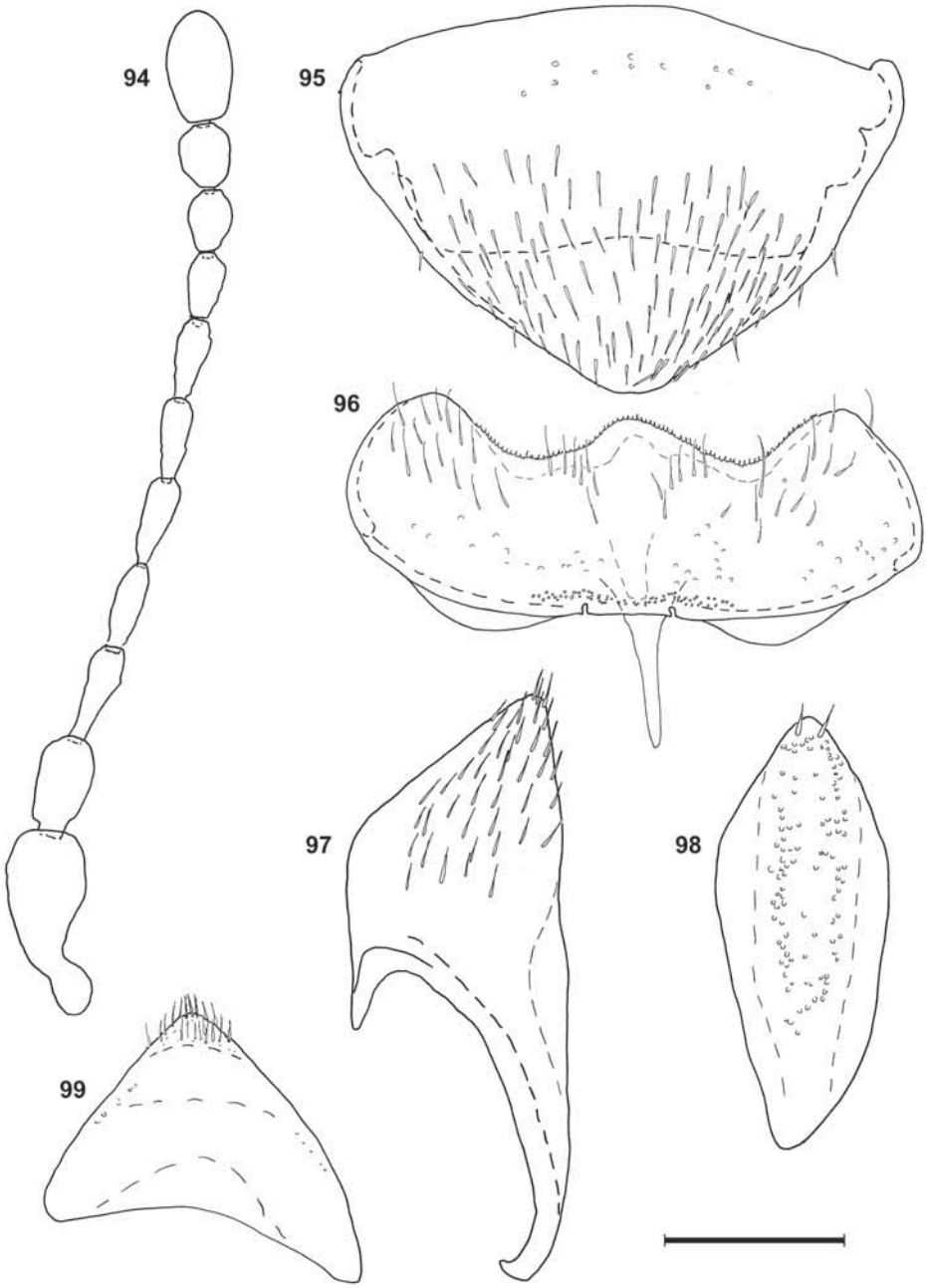
Figs 74-79. *Megarthrus lisae* sp. nov., male (holotype). Mesotrochanter and mesofemur (74); mesotibia (75); metatrochanter, metafemur and metatibia (76); antenna (77); aedeagus in lateral (78) and ventral (79) views. Scale bars = 0.2 mm.



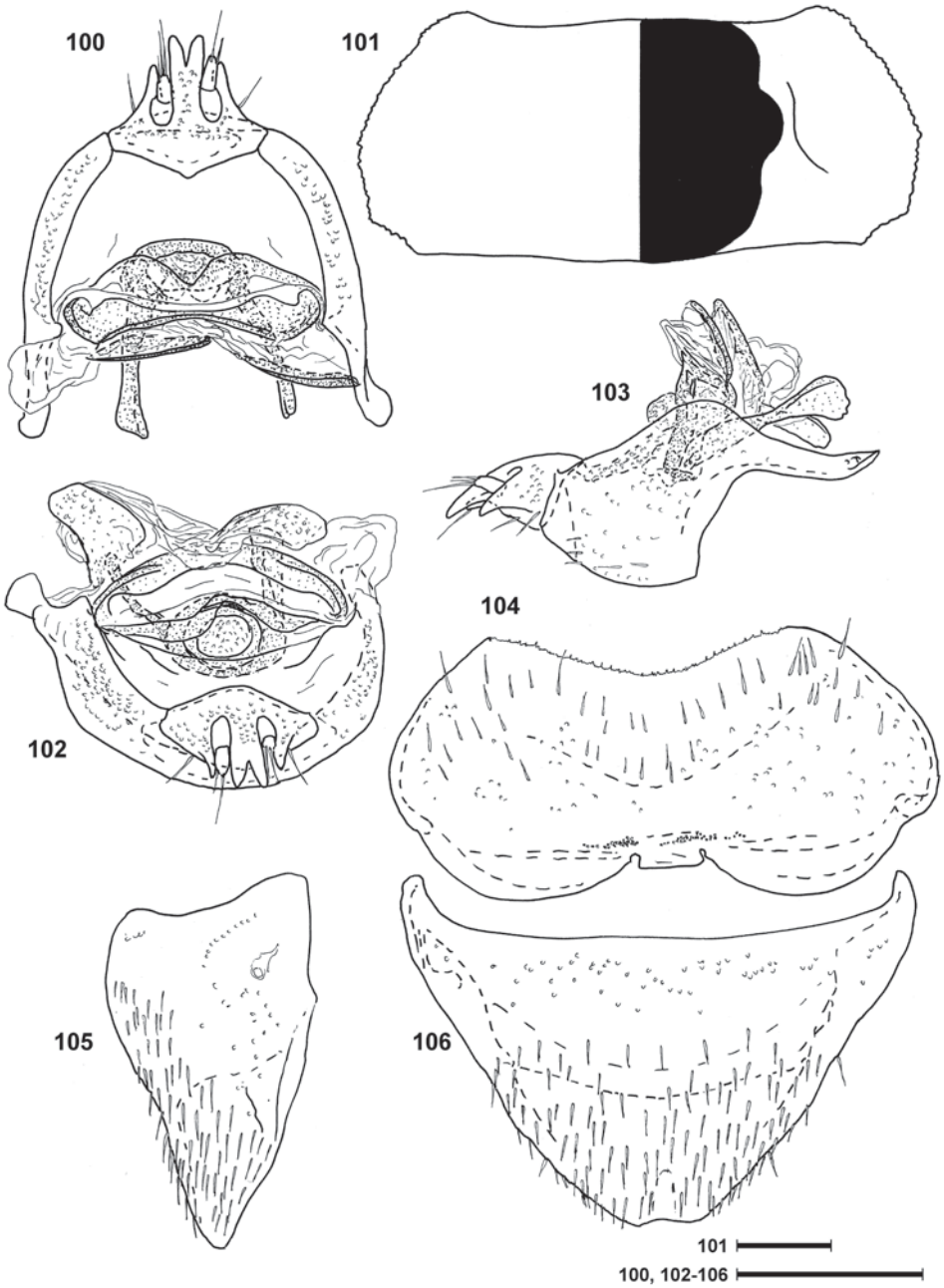
Figs 80-88. *Megarthrus lisae* sp. nov., male (holotype). Tergite VIII in lateral (80) and dorsal (81) views; sternite VIII in lateral (82) and ventral (83) views; left hemitergite IX in ventral view (84); sternite IX in ventral view (85); segment X in dorsal (86) and lateral (87) views; pronotum (88) in dorsal (left) and ventral (right) views. Scale bars = 0.2 mm.



Figs 89-93. *Megarthrus magnificus* sp. nov., male. Mesotibia (89); metatrochanter, metafemur, metatibia and metatarsi (90); mesotrochanter and mesofemur (91); aedeagus in lateral (92) and ventral (93) views. Scale bar = 0.2 mm.



Figs 94-99. *Megarthrus magnificus* sp. nov., male. Antenna (94); tergite VIII in dorsal view (95); sternite VIII in ventral view (96); left hemitergite IX in ventral view (97); sternite IX in ventral view (98); segment X in dorsal view (99). Scale bar = 0.2 mm.



Figs 100-106. *Megarthrus magnificus* sp. nov., female. Genitalia in dorsal (100), posterior (102) and lateral (103) views; pronotum (101) in dorsal (left) and ventral (right) views; sternite VIII in ventral view (104); tergite VIII in lateral (105) and dorsal (106) views. Scale bars = 0.2 mm.

Megarthrus magnificus sp. nov.
(Figs 15, 89-106)

Type material. Holotype ♂: TAIWAN, Nantou Hsien, Meifeng, 2130 m, 10.vii.1993, leg. A. Smetana (T 146), in MHNG. Paratypes (15): Same data as holotype, 1 ♂ and 1 ♀; TAIWAN, Hualien Hsien, Taroko National Park, Chungyantienshi (River), 2280 m, 10.v.1990, leg. A. Smetana (T 51), 1 ♂ ; Nantou Hsien, Houhuanshan, Kuenyang, 3050 m, 4.v.1991, leg. A. Smetana (T 64), 1 ♀; Nantou Hsien, Houhuanshan, Kuenyang, 3050 m, 27.iv.1990, leg. A. Smetana (T 29), 1 ♂; Nantou Hsien, Meifeng, 2130 m, 3.v.1991, leg. A. Smetana (T 62), 1 ♂; Nantou Hsien, Meifeng, 2130 m, 12.v.1991, leg. A. Smetana (T 78), 1 ♂ and 1 ♀; Nantou Hsien, Meifeng, 2130 m, 2.vii.1998, leg. A. Smetana (T 196), 1 ♀ ; Nantou Hsien, Nenkaoshan, Tenchi Hut, 2900 m, 5.v.1992, leg. A. Smetana (T 114), 1 ♀; Nantou Hsien, Yushan National Park, 2 km W Pai-Yun Hut, 3350 m, 16.v.1991, leg. A. Smetana (T 84), 1 ♂ ; Nantou Hsien, Yushan National Park, 1.8 km W Pai-Yun Hut, 3375 m, 17.v.1991, leg. A. Smetana (T 85), 1 ♀; Taichung Hsien, Anmashan, 2120 m, 1.v.1990, leg. A. Smetana (T 36), 1 ♀; Taichung Hsien, Anmashan, 2150 m, 13.v.1992, leg. A. Smetana (T 129), 1 ♀ ; Taichung Hsien, Hsuehshan, above Shan-Liu-Gieu Hut, 3150 m, 8.v.1991, leg. A. Smetana (T 68), 1♂.

Description. Similar to *M. festivus*, from which it differs as follows : Habitus as in Fig. 15. Antenna as in Fig. 94. Pronotum as in Fig. 101.

Male. Frontoclypeal area, metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 91) longer than metafemora (Fig. 90). Mesotibiae (Fig. 89) about as long as metatibiae (Fig. 90). Metatarsomeres 1 about as long as metatarsomeres 2–4 combined (Fig. 90). Peg-like setae arranged in a single row on apical portion of mesotibiae, in two rows on middle portion of mesotibiae and on mesotrochanters (Fig. 91), grouped in a field on metatrochanters (Fig. 90) and metatibiae (Fig. 90), and absent from the other parts of the legs. Abdominal tergite VIII as in Fig. 95; sternite VIII as in Fig. 96; hemitergite IX as in Fig. 97; sternite IX as in Fig. 98; segment X as in Fig. 99. Aedeagus as in Figs 92–93.

Female. Abdominal tergite VIII as in Figs 105-106. Sternite VIII as in Fig. 104. Genital segments as in Figs 100, 102-103.

Distribution and natural history. The species is known only from Taiwan, where it was found in the central counties of Hualien, Nantou and Taichung, at elevations ranging from 2100 to 3400 meters a.s.l., by sifting debris of vegetation, humus, bark, floor litter, fallen leaves, grasses and moss in coniferous forest (*Abies*), in evergreen broadleaved mature forests and original *Abies* forest with dense bamboo undergrowth.

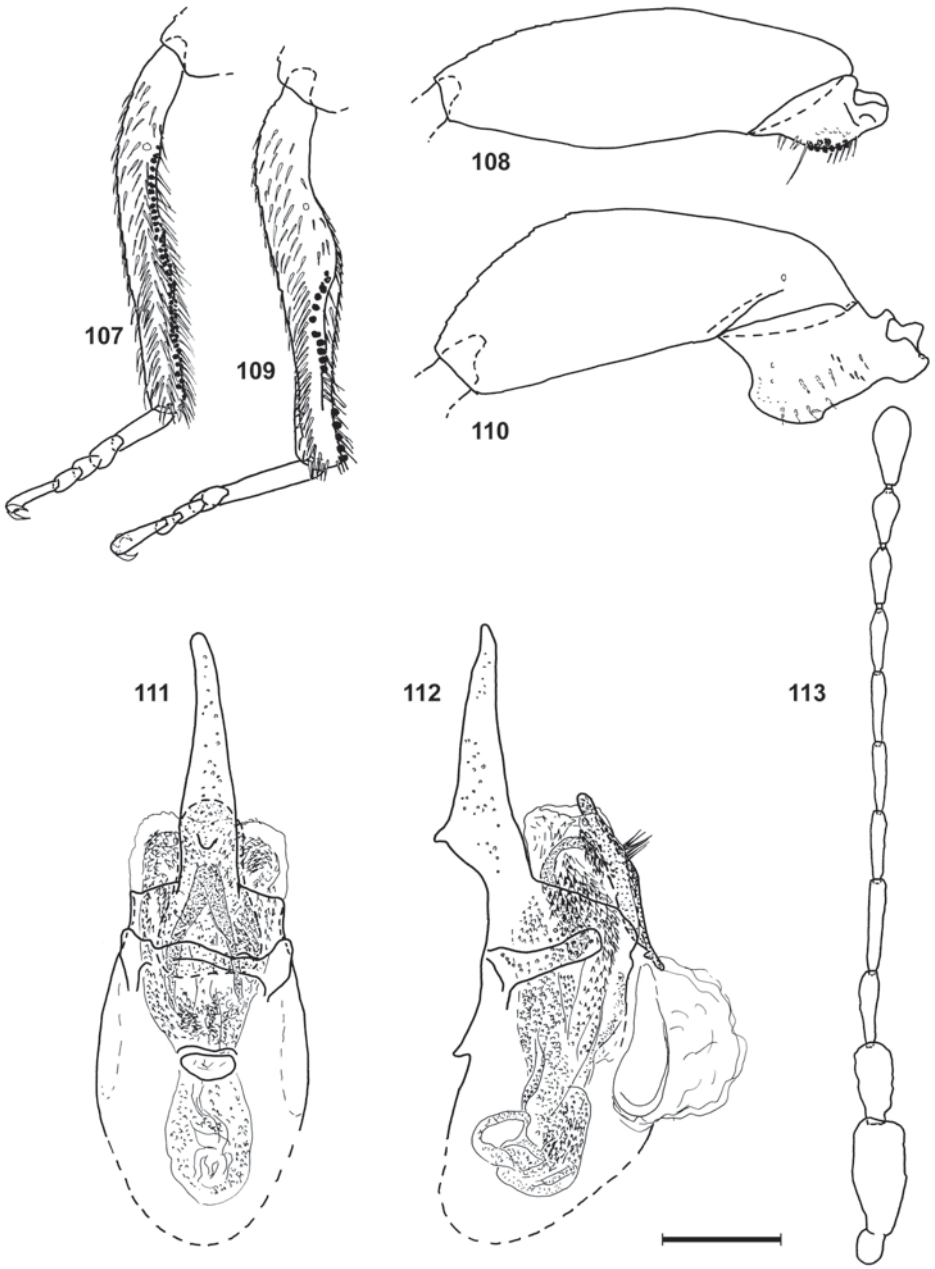
Comments. See comments under *M. festivus*.

The species is named « magnificus» because I find it beautiful.

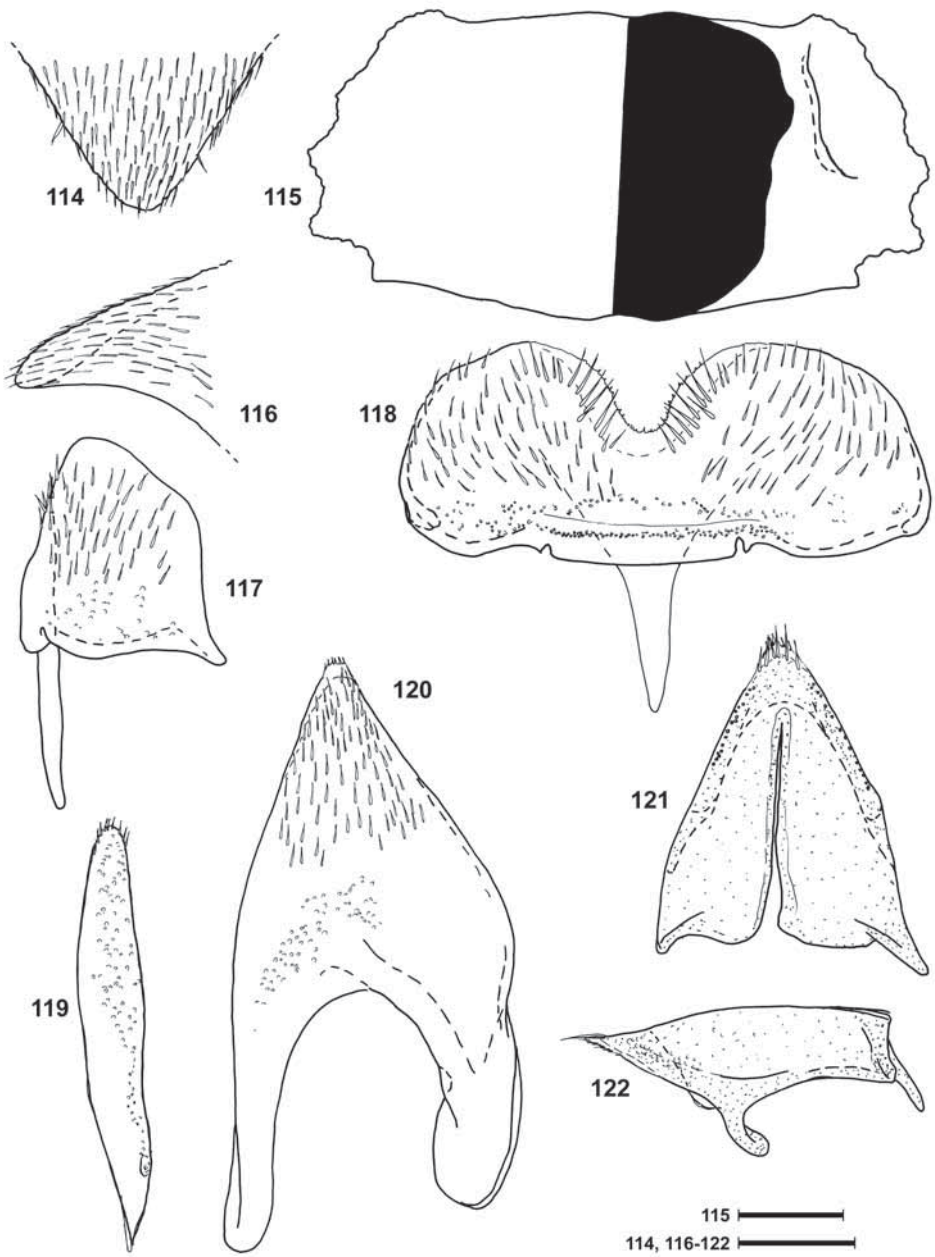
Megarthrus metanas sp. nov.
(Figs 3, 107-128)

Type material. Holotype ♂: TAIWAN, Taichung Hsien, Anmashan, 2225 m, 2.v.1990, leg. A. Smetana (T 37), in MHNG. Paratypes (59): same data as holotype, 33 ♂ and 24 ♀; TAIWAN, Nantou Hsien, Meifeng, 2130 m, 2.v.1998, leg. A. Smetana (T 196), 1♀; Nantou Hsien, Meifeng, 2130 m, 4.v.1998, leg. A. Smetana (T 197), 1 ♂.

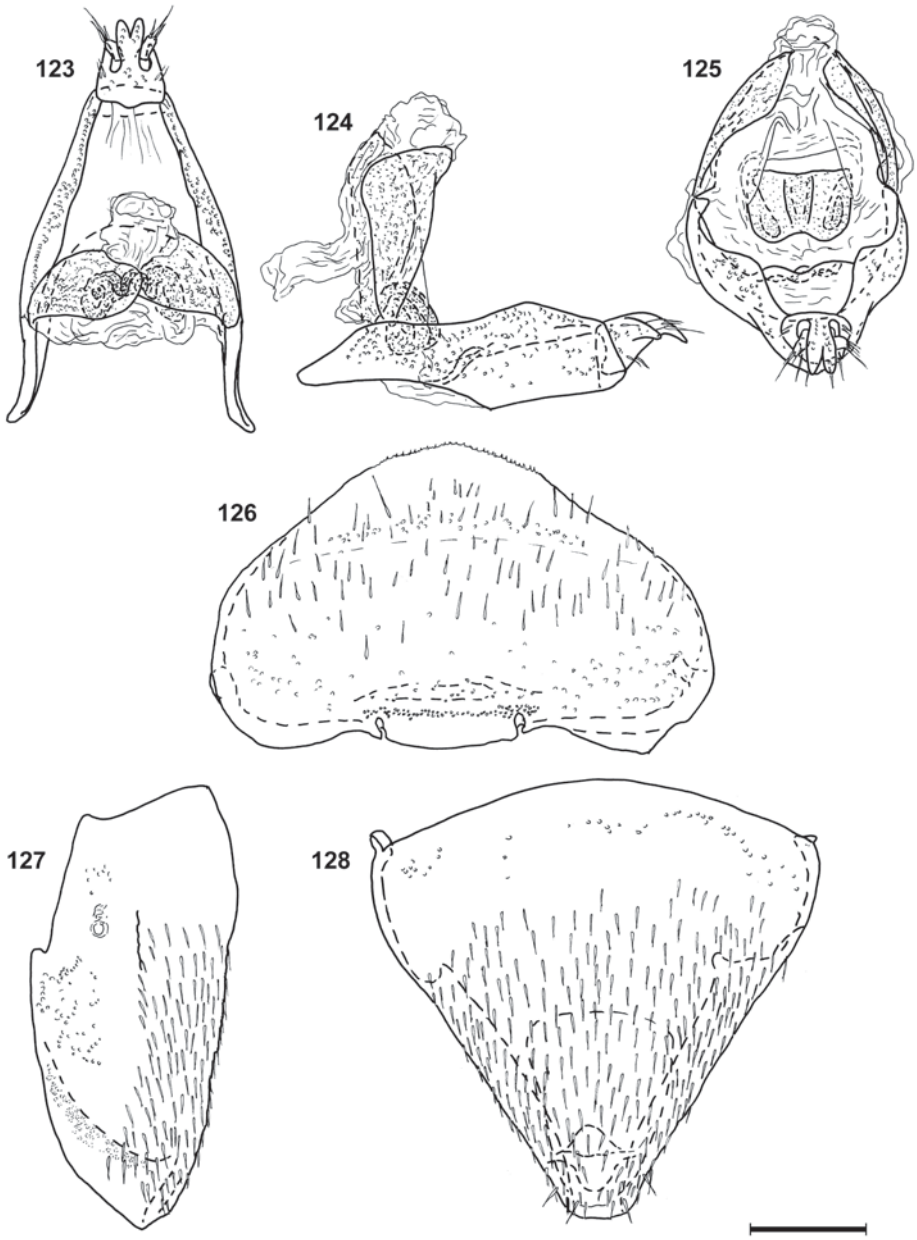
Description. Habitus as in Fig. 3. Combined length of pronotum and elytra = 1.7–1.9 mm; maximal pronotal width = 1.2-1.3 mm. Body dark brown with legs slightly paler. Dorsal



Figs 107-113. *Megarthrus metanas* sp. nov., male. Mesotibia (107); mesotrochanter and mesofemur (108); metatibia (109); metatrochanter and metafemur (110); aedeagus in ventral (111) and lateral (112) views; antenna (113). Scale bar = 0.2 mm.



Figs 114-122. *Megarthrus metanas* sp. nov., male. Apex of tergite VIII in dorsal (114) and lateral (116) view; pronotum (115) in dorsal (left) and ventral (right) views; sternite VIII in lateral (117) and dorsal (118) views; sternite IX in ventral view (119); right hemitergite IX in ventral view (120); segment X in lateral (121) and dorsal (122) views. Scale bars = 0.2 mm.



Figs 123-128. *Megarthrus metanas* sp. nov., female. Genitalia in dorsal (123), lateral (124) and posterior (125) views; sternite VIII in ventral view (126); tergite VIII in lateral (127) and dorsal (128) views. Scale bars = 0.2 mm.

pubescence fairly uniform, slightly sparser on elytral disc and shorter on abdomen; setae on medial area of frons directed forward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence becoming denser anteriorly, about as long as that of prosternum; pubescence on abdominal tergites IV–VII converging; that on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite.

Frons, vertex, and anterior portion of prohypomera granulate, with granula on frons and vertex about as high as their diameter, and those on prohypomera only about half as high as their diameter; pronotum with central area granulofossulate and lateral areas oblongogranulate, coarsely; elytra granulopunctate, coarsely; metasternum moderately punctate laterally, punctures becoming denser anteromedially.

Frons forming above clypeus a sharp ridge, the latter finely carinate, evenly arcuate in dorsal view; mesal portion of disc moderately convex in lateral view, evenly; entire U-shaped frontal impression deep. Eyes almost hemispherical, with highest point slightly above level of vertex; supraocular margin sinuate in dorsal view. Temples microreticulate, strongly convex in dorsal view; occipital ridge indistinct. Antenna as in Fig. 113, without patches of sensilla; scape not compressed, ovoid; short and dense pubescence present on antennomeres 5–11. Maxillary palpi with palpomere 4 about 2 times as long as palpomere 3, the latter subcylindrical.

Pronotum (Fig. 115) with centre strongly convex in frontal view; disc shallowly depressed along lateral portions of anterior and posterior margins, and along posterior portion of medial groove, and deeply depressed transversely on mediolateral areas of disc toward foveiform impressions near lateral edges; the latter slightly raised; medial groove deep, parallel-sided, slightly arcuate in lateral view; hypomera (Fig. 115) ridged anteriorly, without a discal pit. Scutellum with anterior margin rounded, posterior margin oblique toward rounded apex. Protrochanters without a longitudinal ridge. Elytra with humeral callus low, moderately convex; disc with moderate anterior and posterior adsutural humps, shallowly depressed along posterior portion of lateral edge; the latter very finely carinate, gently denticulate, straight in dorsal view; sutural margin slightly arcuate in lateral view; posterior margin straight toward obtuse inner apical angle. Metasternum with a deep foveiform impression in front of each metacoxa.

Male. Frontoclypeal area, metasternum and protarsomeres 5 unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 108) slightly longer than metafemora (Fig. 110). Mesotibiae (Fig. 107) slightly longer than metatibiae (Fig. 109). Metatarsomeres 1 about 1.3 times longer than metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on mesotrochanters (Fig. 108) and metatibiae, grouped in a field on mesotibiae, and absent from the other parts of the legs. Abdominal sternites IV–V each with a medial hump and sternites VI–VI each with a medial impression. Abdominal tergite VIII as in Figs 114-116; sternite VIII as in Figs 117-118; hemitergite IX as in Fig. 120; sternite IX as in Fig. 119; segment X as in Figs 121-122. Aedeagus as in Figs 111–112.

Female. Abdominal tergite VIII as in Figs 127-128. Sternite VIII as in Fig. 126. Genital segments as in Figs 123-125.

Distribution and natural history. The species is known only from the central Taiwanese counties of Nantou and Taichung, where it was found at elevations ranging from 2100 to

2250 meters a.s.l., by sifting fallen leaves and debris of vegetation in evergreen broadleaved forest.

Comments. The species resembles in most aspects the East Palaearctic *M. incubifer* Cuccodoro, 1996 and the Himalayan *M. dentatus* Coiffait, 1976, *M. elevatus* Coiffait, 1976, *M. fakir* Cuccodoro, 2003 and *M. ivani* Cuccodoro, 2003, which have different sexual characters. The shape of the male metatibiae of *M. metanas* is also unique (as that of the male metatrochanters).

The epiteth « metanas » is an anagram of the surname of Aleš Smetana, Ottawa, to which the species is dedicated. It is the forth *Megarthrus* member of the informal « *smetanai*-group », which accomodates Nepalese *M. alesi* Cuccodoro 2003, thw Neartctic *M. smetanai* Cuccodoro et Löbl 1996, and the above described Taiwanese *M. lisae*.

***Megarthrus mirabilis* sp. nov.**

(Figs 13, 129-141)

Type material. Holotype (♂): Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2750 m, 22.v.1991, leg. A. Smetana (T 89), (MHNG).

Description. Similar to *M. festivus*, from which it differs as follows : Habitus as in Fig. 13. Combined length of pronotum and elytra = 1.5 mm; maximal pronotal width = 1.0 mm. Antenna as in Fig. 141. Pronotum as in Fig. 140. Elytra with lateral edge somewhat sinuate in dorsal view.

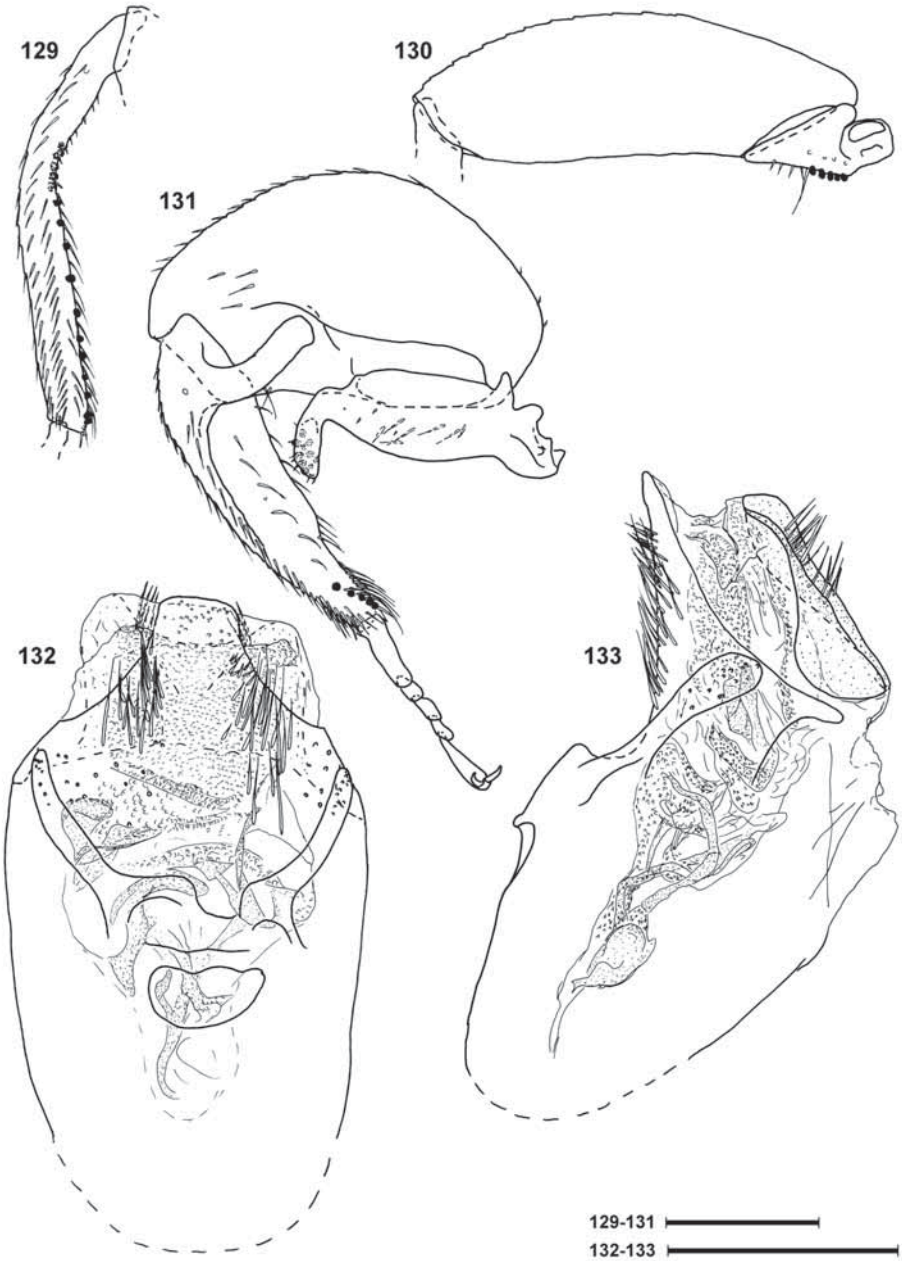
Male. Frontoclypeal area, metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 130) longer than metafemora (Fig. 131). Mesotibiae (Fig. 129) longer than metatibiae (Fig. 131). Metatrochanters (Fig. 131) with projecting process right angled at base and gradually widenting toward truncate apex. Metatarsomeres 1 about as long as metatarsomeres 2–4 combined (Fig. 131). Peg-like setae arranged in a single row on mesotibiae, in two rows on mesotrochanters (Fig. 130), grouped in a field on metatrochanters and metatibiae (Fig. 131), and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 134-135; sternite VIII as in Figs 136-137; hemitergite IX as in Fig. 138; sternite IX as in Fig. 139; segment X similar to that in Figs 45-46. Aedeagus as in Figs 132–133.

Female. Unknown.

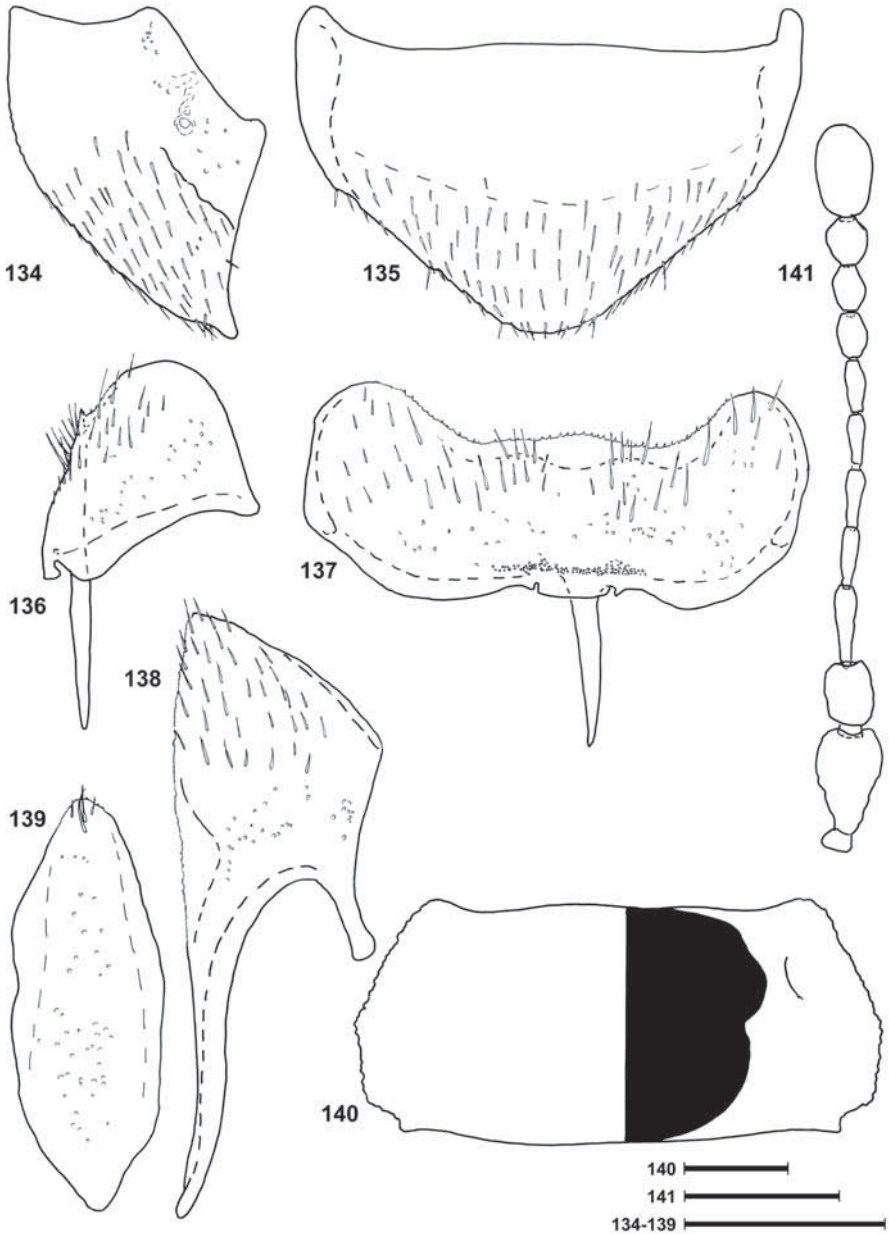
Distribution and natural history. The species is known only from the central Taiwanese county of Pingtung, where it was found at elevations of 2750 meters a.s.l., by sifting moss and debris of vegetation in rather wet seepage in a coniferous (*Abies*) forest.

Comments. Within the *festivus*-complex (see comments under *M. festivus*), only *M. festivus* and *M. mirabilis* have male metatibial processes simply lobed. The shape of the projecting process of their metatrochanters in male is, however, quite different, and the apex of the aedeagal ventral wall is truncate in *M. mirabilis* instead of pointed and ventrally recurved as in *M. festivus*.

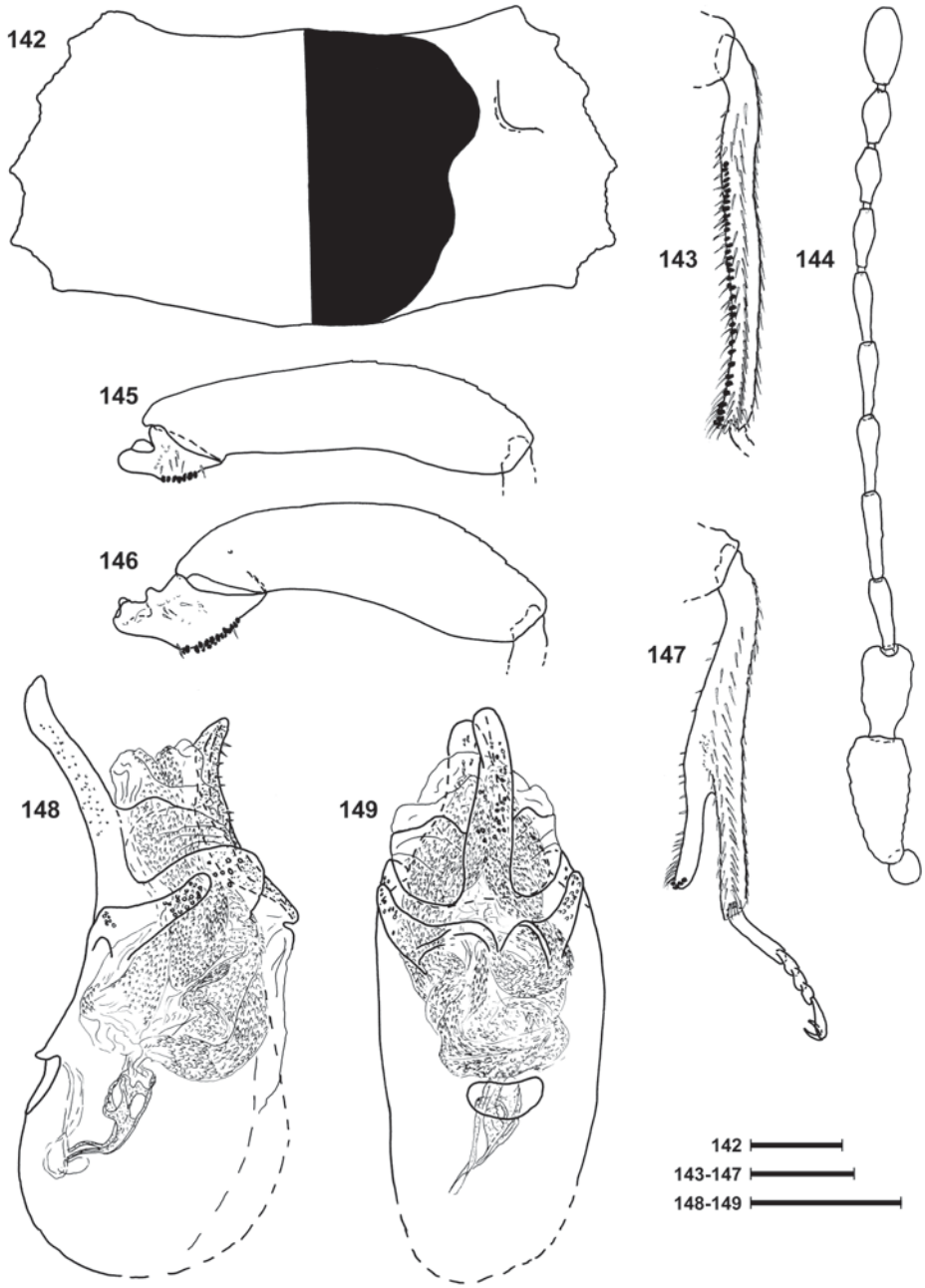
The species is named « mirabilis» because I find it marvelous.



Figs 129-133. *Megarthrus mirabilis* sp. nov., male (holotype). Mesotibia (129); mesotrochanter and mesofemur (130); metatrochanter, metafemur, metatibia and metatarsi (131); aedeagus in ventral (132) and lateral (133) views. Scale bars = 0.2 mm.



Figs 134-141. *Megarthrus mirabilis* sp. nov., male (holotype). Tergite VIII in lateral (134) and dorsal (135) views; sternite VIII in lateral (136) and ventral (137) views; sternite IX in ventral view (138); right hemitergite IX in ventral view (139); pronotum (140) in dorsal (left) and ventral (right) views; antenna (141). Scale bars = 0.2 mm.



Figs 142-149. *Megarthrus octopus* sp. nov., male. Pronotum (142) in dorsal (left) and ventral (right) views; mesotibia (143); antenna (144); mesotrochanter and mesofemur (145); metatrochanter and metafemur (146); metatibia (147); aedeagus in lateral (148) and ventral (149) views. Scale bars = 0.2 mm.

Megarthrus octopus sp. nov.
(Figs 5, 142-163)

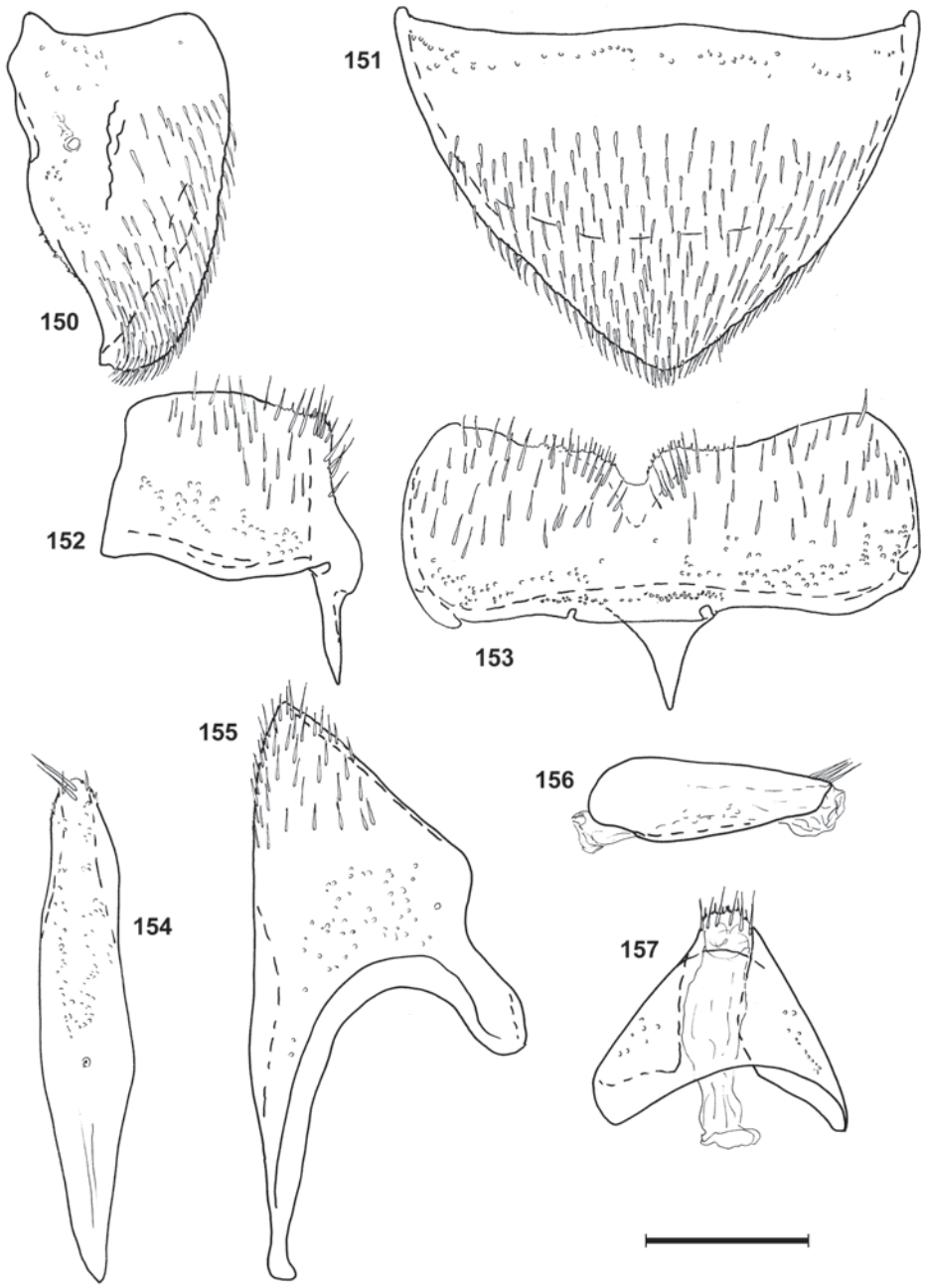
Type material. Holotype ♂: TAIWAN, Kaohsiung Hsien, Kuanshan Trail above Kaunshanshi River, 2550 m, 22.vii.1993, leg. A. Smetana (T 160), in MHNG. Paratypes (93): Same data as holotype, 7 ♂ and 10 ♀; TAIWAN, Hualien Hsien, Taroko National Park, Nanhushi Hut, 2200 m, 8.v.1990, leg. A. Smetana (T 48), 1 ♂; Kaohsiung Hsien, Peinantashan Trail, 2390-2490 m, 5.vii.1993, leg. A. Smetana (T 138), 6 ♂ and 10 ♀; Kaohsiung Hsien, Peinantashan Trail, 2500 m, 4.vii.1993, leg. A. Smetana (T 136), 3 ♂ and 3 ♀; Kaohsiung Hsien, Peinantashan Trail, 2450 m, 2.v.1995, leg. A. Smetana (T 170), 4 ♂ and 2 ♀; Nantou Hsien, Meifeng, 2130 m, 4.v.1998, leg. A. Smetana (T 197), 1 ♂; Nantou Hsien, Nenkaoshan Trail, 2050-2150 m, 8.v.1992, leg. A. Smetana (T 120), 6 ♂ and 2 ♀; Nantou Hsien, Nenkaoshan Trail, Yuenhai Hut, 2350 m, 4.v.1992, leg. A. Smetana (T 112), 4 ♂ and 3 ♀; Nantou Hsien, Nenkaoshan, Tenchi Hut, 2900 m, 5.v.1992, leg. A. Smetana (T 114), 2 ♂ and 1 ♀; Nantou Hsien, Yushan National Park, 2 km W Pai-Yun Hut, 3350 m, 16.v.1991, leg. A. Smetana (T 84), 1 ♀; Nantou Hsien, Yushan National Park, Mun-Li Cliff, 2700 m, 13.v.1991, leg. A. Smetana (T 79), 7 ♂ and 4 ♀; Nantou Hsien, Yushan National Park, SW Slope biw. Yushan Mountain Peak, 3650 m, 14.v.1991, leg. A. Smetana (T 80), 1 ♀; Taichung Hsien, Anmashan, 2225 m, 2.v.1990, leg. A. Smetana (T 37), 2 ♂ and 6 ♀; Taichung Hsien, Anmashan, 2230 m, 4.v.1990, leg. A. Smetana (T 43), 1 ♂ and 4 ♀; Taichung Hsien, Hseuhshan, near Hsuehshan-Tun-Feng , 3170 m, 11.v.1991, leg. A. Smetana (T 76), 1 ♂ and 1 ♀.

Description. Habitus as in Fig. 5. Combined length of pronotum and elytra = 1.8–2.0 mm; maximal pronotal width = 1.2-1.3 mm. Body dark brown with legs slightly paler. Dorsal pubescence fairly uniform, slightly sparser on elytral disc and shorter on abdomen; setae on medial area of frons directed forward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence becoming denser anteromedially, about as long as that of prosternum; pubescence on abdominal tergites IV–VII converging; that on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite.

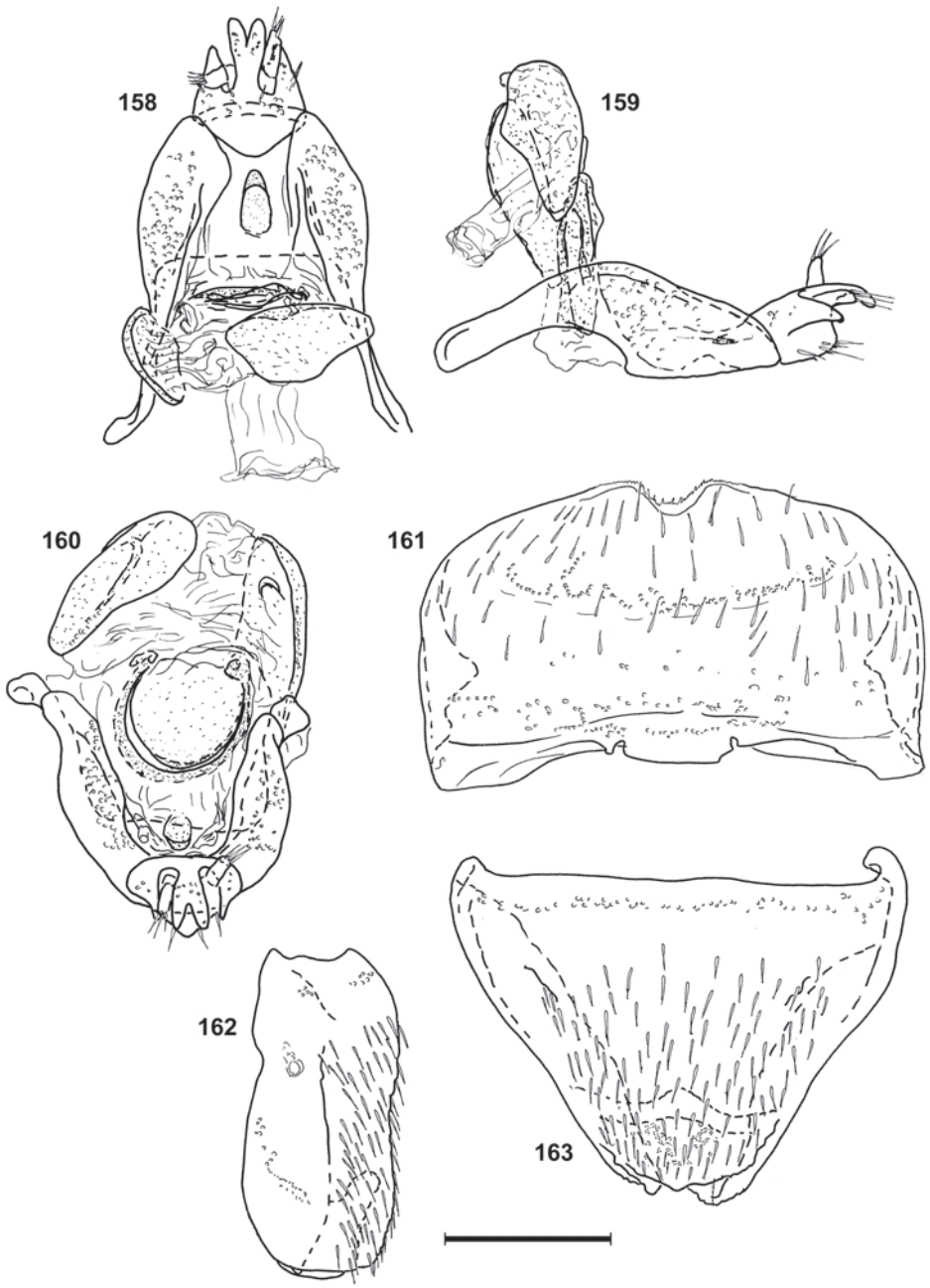
Frons, vertex, and anterior portion of prohypomera granulate, with granula on frons and vertex about as high as their diameter, and those on prohypomera only about half as high as their diameter; pronotum with central area granulofossulate and lateral areas oblongogranulate, coarsely; elytra granulopunctate, coarsely; metasternum moderately punctate laterally, punctures becoming denser anteromedially.

Frons forming above clypeus a sharp ridge, the latter very finely carinate, strongly arcuate in middle and laterally oblique in dorsal view; mesal portion of disc strongly convex apically and fairly flat posteriorly in lateral view; U-shaped frontal impression moderately deep in middle, shallow laterally. Eyes almost hemispherical, with highest point above level of vertex; supraocular margin sinuate in dorsal view. Temples microreticulate, strongly convex in dorsal view; occipital ridge indistinct. Antenna as (Fig. 144) without patches of sensilla; scape not compressed, ovoid; short and dense pubescence present on antennomeres 6–11. Maxillary palpi with palpomere 4 about 2 times as long as palpomere 3, the latter subcylindrical.

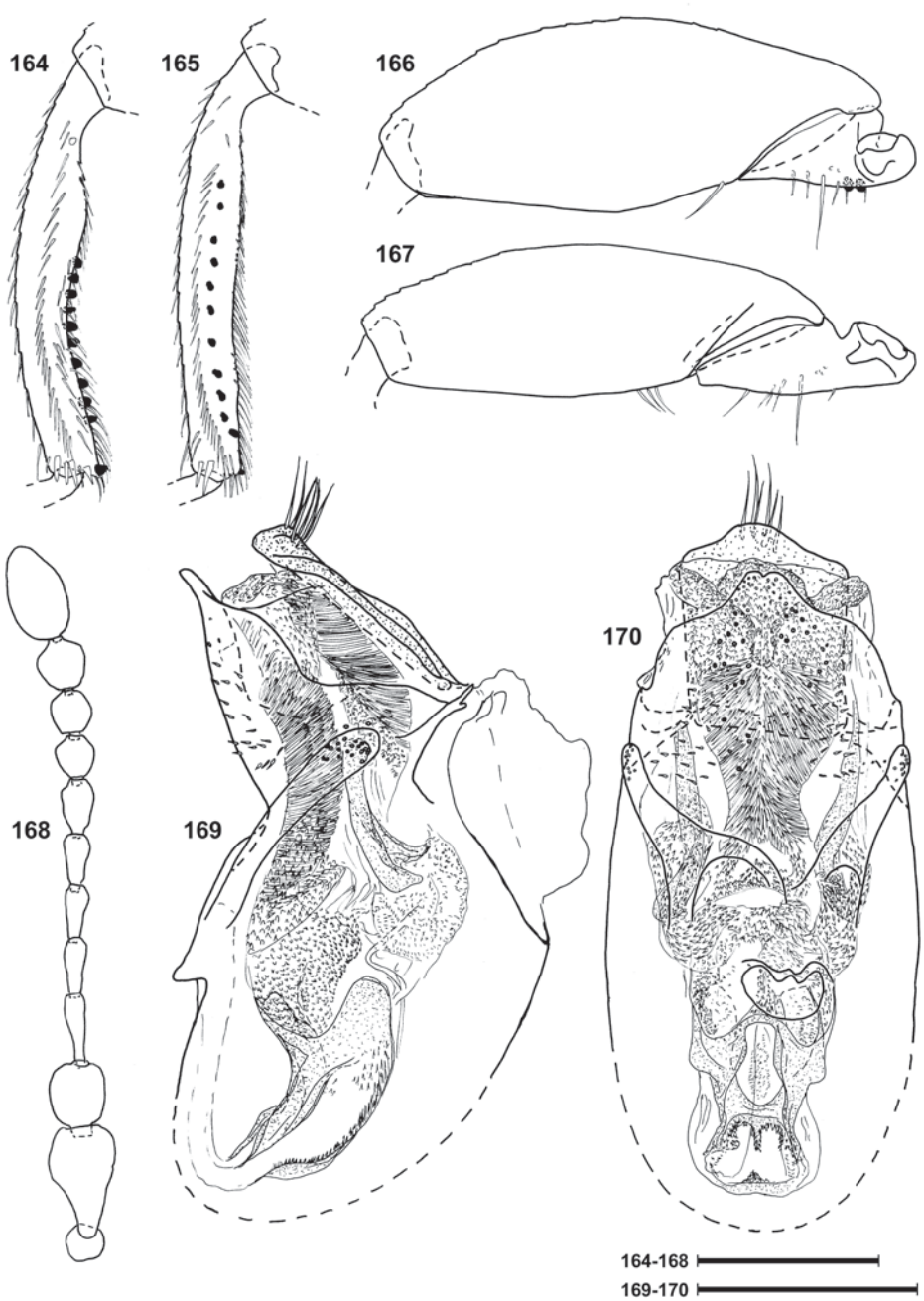
Pronotum (Fig. 142) with centre strongly convex in frontal view; disc shallowly depressed along lateral portions of anterior and posterior margins, and along posterior portion of medial groove, and deeply depressed transversely on mediolateral areas of disc; lateral edges slightly raised; medial groove deep, slightly widened anteriorly, moderately arcuate in lateral view; hypomera (Fig. 142) ridged anteriorly, without a discal pit. Scutellum with anterior margin angulate in middle, posterior margin oblique toward acutely angular



Figs 150-157. *Megarthrus octopus* sp. nov., male. Tergite VIII in lateral (150) and dorsal (151) views; sternite VIII in lateral (152) and dorsal (153) views; sternite IX in ventral view (154); right hemitergite IX in ventral view (155); segment X in lateral (156) and dorsal (157) views. Scale bar = 0.2 mm.



Figs 158-163. *Megarthrus octopus* sp. nov., female. Genitalia in dorsal (158), lateral (159) and posterior (160) views; sternite VIII in ventral view (161); tergite VIII in lateral (162) and dorsal (163) views. Scale bar = 0.2 mm.



Figs 164-170. *Megarthrus phoenix* sp. nov., male. Mesotibia (164); metatibia (165); mesotrochanter and mesofemur (166); metatrochanter and metafemur (167); antenna (168); aedeagus in lateral (169) and ventral (170) views. Scale bars = 0.2 mm.

apex. Protrochanters bearing a longitudinal ridge. Elytra with humeral callus obsolete, nearly flat; disc with moderate anterior adsutural hump, moderately depressed along entire lateral edge; the latter finely carinate, markedly denticulate, sinuate in dorsal view; sutural margin slightly arcuate in lateral view; posterior margin sinuate toward acutely angular inner apical angle. Metasternum without foveiform impressions in front of metacoxae.

Male. Frontoclypeal area, metasternum, protarsomeres 5, and abdominal sternites IV–VI unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 145) about as long as metafemora (Fig. 146). Mesotibiae (Fig. 143) longer than metatibiae (Fig. 147). Metatarsomeres 1 about 1.5 times longer than metatarsomeres 2-4 combined (Fig. 147). Peg-like setae arranged in a single row on mesotrochanters (Fig. 146), mesotibiae and metatibiae, grouped in a field on metatrochanters, and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 150-151; sternite VIII as in Figs 152-153; hemitergite IX as in Fig. 155; sternite IX as in Fig. 154; segment X as in Figs 156-157. Aedeagus as in Figs 148-149.

Female. Abdominal tergite VIII as in Figs 162-163. Sternite VIII as in Fig. 161. Genital segments as in Figs 158-160.

Distribution and natural history. The species is known only from Taiwan, where it was found in the southern county of Kaohsiung and in the central counties of Hualien, Nantou and Taichung, at elevations ranging from 2050 to 3650 meters a.s.l., by sifting moss, grasses, rotting bark and wood, humus, fallen leaves and other debris of vegetation in original coniferous forests with intermixed broadleaved trees, original *Abies* forest with dense bamboo undergrowth, broadleaved evergreen forests with intermixed pines, mature broadleaved evergreen forests and, in the subalpine zone, under dense *Rhododendron* growths with intermixed junipers.

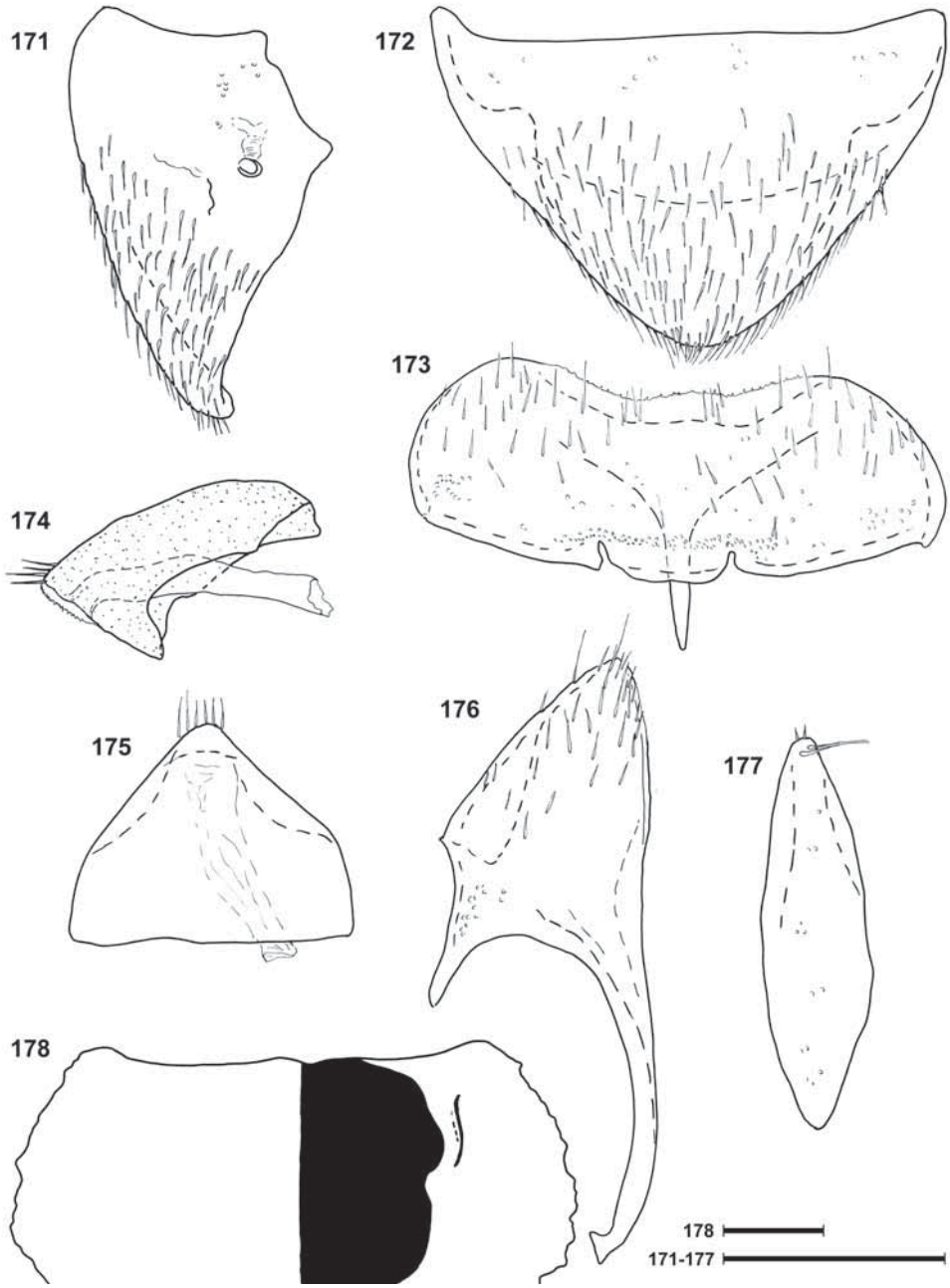
Comments. *Megarthrus octopus* resembles in most aspects the Nepalese *M. calcaratus* Coiffait, 1976, and the East Palaearctic *M. zerchei* Cuccodoro et Löbl, 1997, which have, however, slightly different sexual characters.

The epiteth « octopus» refers to the shape of the male metatibiae, which look doubles and gives the impression that this new species has eight legs.

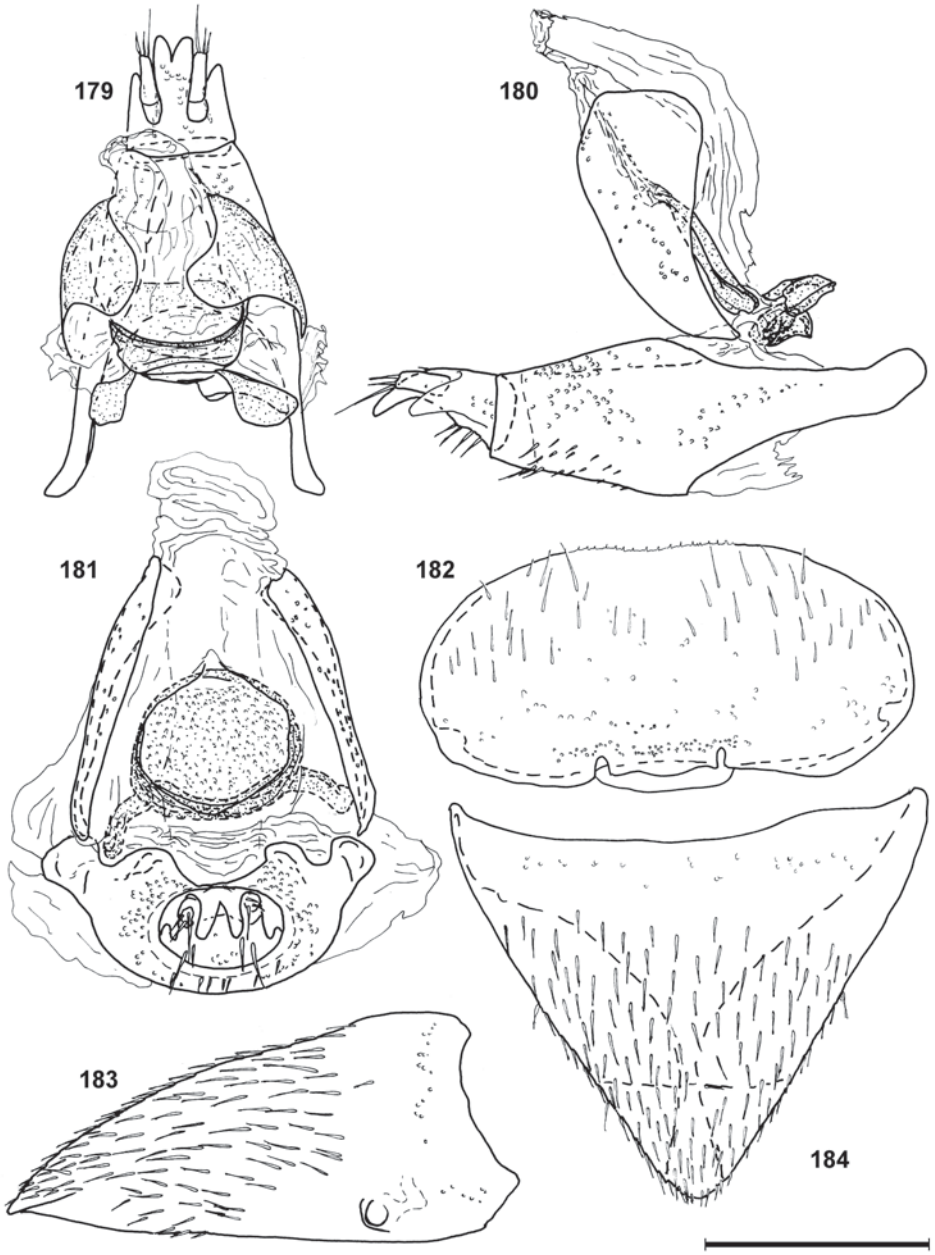
Megarthrus phoenix sp. nov.
(Figs 6, 165-184)

Type material. Holotype ♂: TAIWAN, Kaohsiung Hsien, Peinantashan Trail, 2390-2490 m, 5.vii.1993, leg. A. Smetana (T 138), in MHNG. Paratypes (4): Same data as holotype, 1 ♂ ; TAIWAN, Kaohsiung Hsien, Peinantashan Trail, 2250 m, 4.vii.1993, leg. A. Smetana (T 137), 1 ♀; Kaohsiung Hsien, Peinantashan Trail, 2400 m, 4.vii.1993, leg. A. Smetana (T 135), 1 ♀; Kaohsiung Hsien, Peinantashan Trail, Ridge at 2800 m, 3.vii.1993, leg. A. Smetana (T 134), 1 ♂.

Description. Habitus as in Fig. 6. Combined length of pronotum and elytra = 1.4–1.6 mm; maximal pronotal width = 0.9-1.0 mm. Body and appendages yellowish brown, with blackish elytral spots. Dorsal pubescence uniform, slightly shorter on abdomen; setae on medial area of frons directed backward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence fairly uniform, longer than that of prosternum; pubescence on abdominal tergites IV-VI converging; that on sternites IV-VII uniform.



Figs 171-178. *Megarthrus phoenix* sp. nov., male. Tergite VIII in lateral (171) and dorsal (172) views; sternite VIII in dorsal view (173); segment X in lateral (174) and dorsal (175) views; left hemitergite IX in ventral view (176); sternite IX in ventral view (177); pronotum (178) in dorsal (left) and ventral (right) views. Scale bars = 0.2 mm.



Figs 179-184. *Megarthrus phoenix* sp. nov., female. Genitalia in dorsal (179), lateral (180) and posterior (181) views; sternite VIII in ventral view (182); tergite VIII in lateral (183) and dorsal (184) views. Scale bars = 0.2 mm.

Frons almost smooth; vertex granulate, with granules about half as high as their diameter; pronotum with central area granulofossulate and lateral areas oblongogranulate, moderately; elytra punctate, moderately; metasternum moderately punctate laterally and impunctate medially.

Frons forming above clypeus a sharp ridge, the latter conspicuously carinate; mesal portion of disc weakly convex in lateral view, evenly; U-shaped frontal impression with lateral portions moderately deep and middle portion shallow. Eyes moderately convex, with highest point slightly above level of vertex; supraocular margin sinuate in dorsal view. Temples nearly smooth, in dorsal view abruptly angled just behind the eyes, then flat; occipital ridge well marked, with lateral portions sinuate. Antenna as in Fig. 168, without patches of sensilla; scape compressed, piriform; short and dense pubescence present on antennomeres 7–11. Maxillary palpi with palpomere 4 about 2 times as long as palpomere 3, the latter subcylindrical.

Pronotum (Fig. 178) with centre moderately convex in frontal view; disc shallowly depressed along lateral portions of anterior and posterior margins, transversely on mediolateral areas of disc, and deeply depressed along anterior portion of lateral edges; the latter moderately raised; medial groove very shallow, parallel-sided, slightly arcuate in lateral view; hypomera slighly ridged anteriorly, without a discal pit. Scutellum with anterior margin indistinct in middle, posterior margin oblique toward right-angled apex. Protrochanters without a longitudinal ridge. Elytra with humeral callus obsolete; disc shallowly depressed along midlle portion of lateral edge; the latter markedly carinate, moderately denticulate, sinuate in dorsal view; sutural margin with basal portion straight and apical portion moderately arcuate in lateral view; posterior margin arcuate toward obtuse inner apical angle. Metasternum without foveiform impressions in front of metacoxae.

Male. Metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Frontoclypeal area raised, forming a pointed horn-like process. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 166) longer than metafemora (Fig. 167). Mesotibiae (Fig. 164) as long as metatibiae (Fig. 165). Metatarsomeres 1 about 2 times longer than metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on mesotrochanters (Fig. 166), mesotibiae and metatibiae, and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 171-172; sternite VIII as in Fig. 173; hemitergite IX as in Fig. 176; sternite IX as in Fig. 177; segment X as in Figs 174-175. Aedeagus as in Figs 169–170.

Female. Anterior frontal margin in dorsal view arcuate toward angular apex. Abdominal tergite VIII as in Figs 183-184. Sternite VIII as in Fig. 182. Genital segments as in Figs 179-181.

Distribution and natural history. The species is known only from the southern Taiwanese county of Kaohsiung, where it was found at elevations ranging from 2250 to 2800 meters a.s.l., by sifting moss, debris of vegetation, layers of fallen leaves, pieces of wood and bark in mixed broadleaved and coniferous forests, mixed mature (original?) forest of *Pinus* (two species), *Chamaecyparis*, *Tsuga* and Quercus, and secondary broadleaved forest with intermixed *Chamaecyparis*.

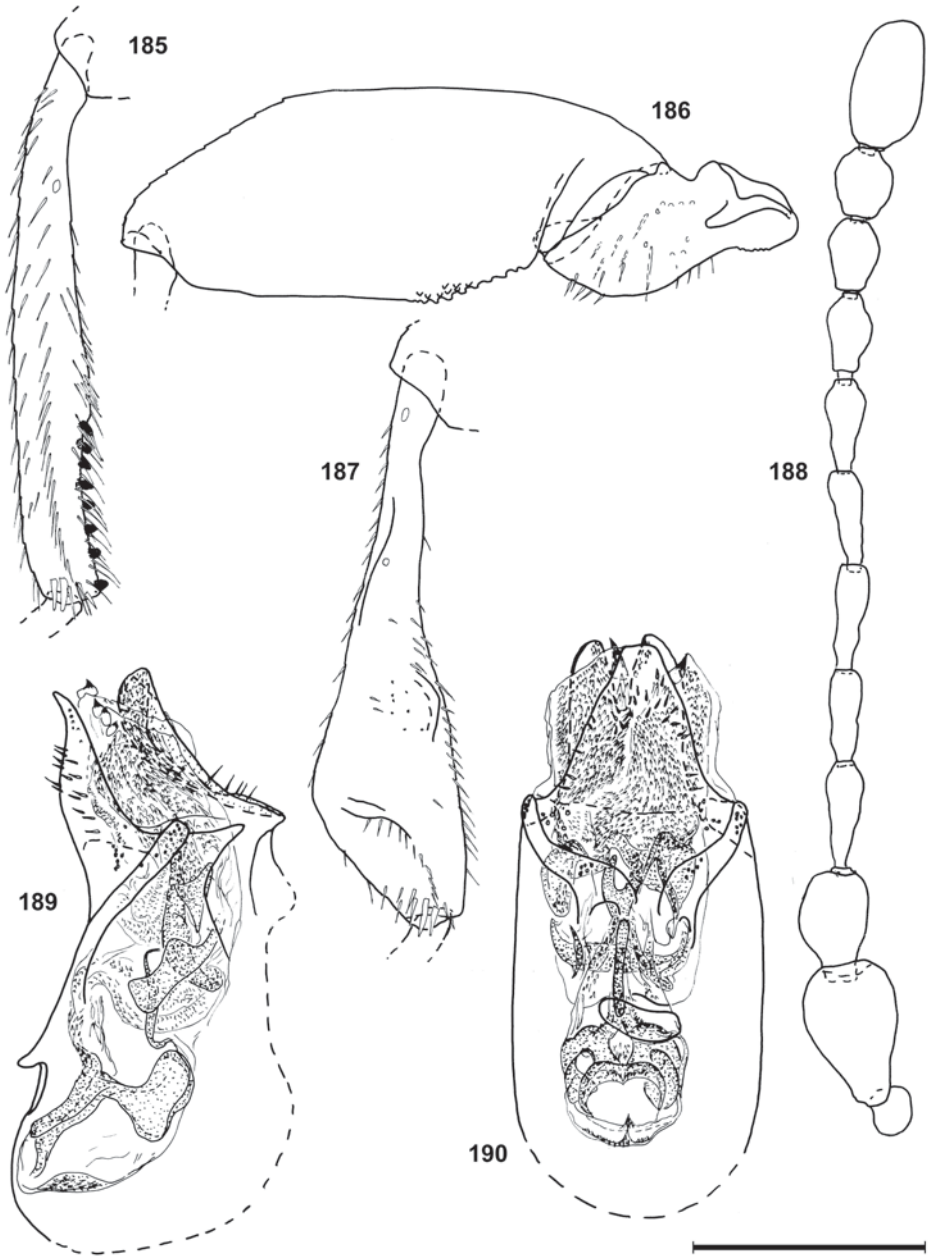
Comments. *Megarthrus phoenix* is the first member of the genus to possess the antennomeres 5-7 only about two times longer than wide in combination with the frontoclypeal area

modified into a pointed horn-like process in male. Its elytral colour pattern resembles that of the South Indian *M. bimaculatus* Fauvel, 1904 (detailed morphology in Cuccodoro 2003), which has, however, completely different sexual characters. See comment under *M. con*.

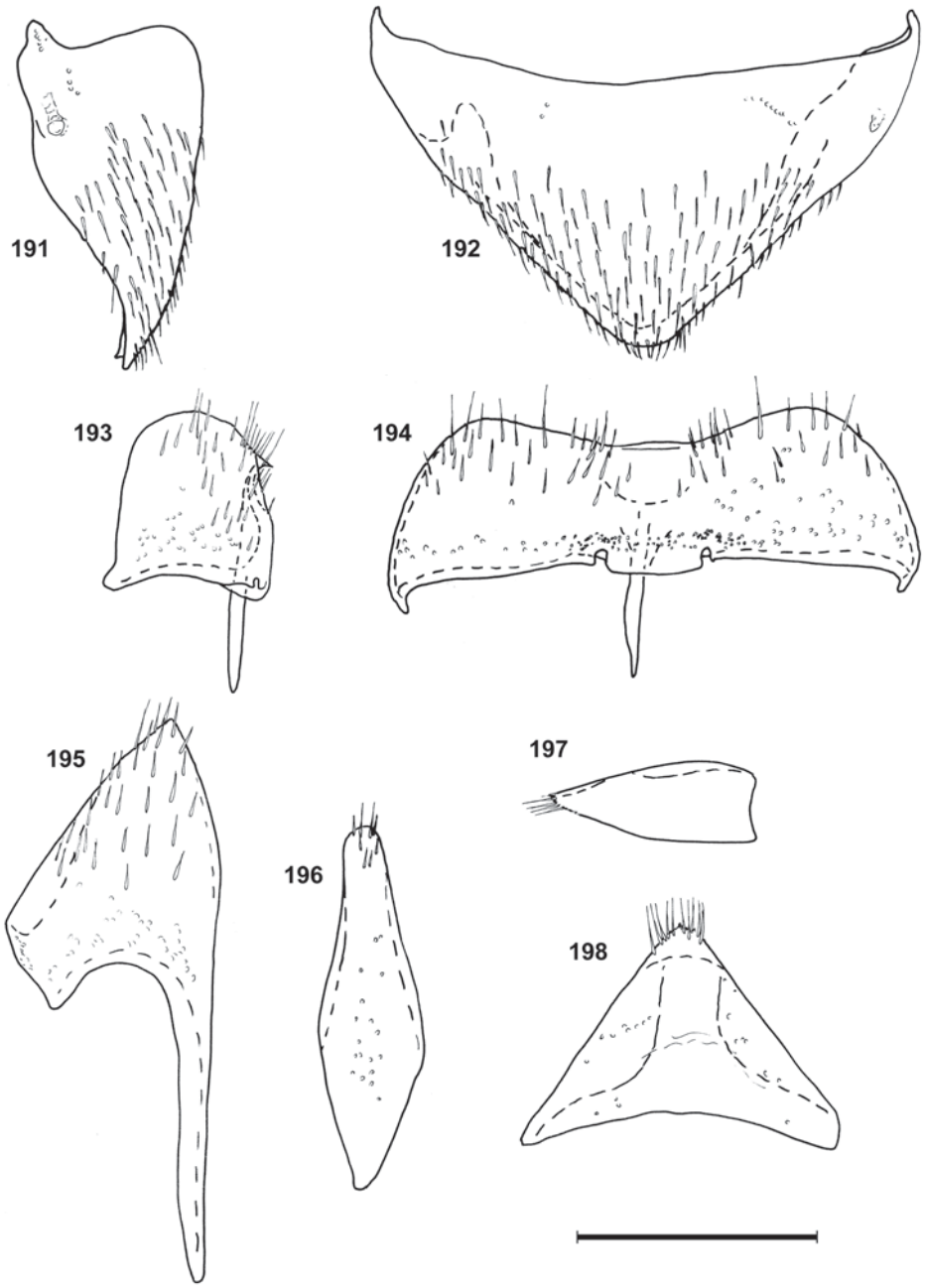
This amazing yellowish species is named after the mythical bird « phoenix» because it has the elytra posteriorly blackish as if they were burned.

Megarthrus ping sp. nov.
(Figs 7, 185-205)

Type material. Holotype ♂: TAIWAN, Taichung Hsien, Anmashan, 2225 m, 2.v.1990, leg. A. Smetana (T 37), in MHNG. Paratypes (136): same data as holotype, 4 ♂ and 3 ♀; TAIWAN, Chiai Hsien, Alishan, Sister Ponds, 2180 m, 26.iv.1990, leg. A. Smetana (T 24), 1 ♂; Hualien Hsien, Taroko National Park, Chungyantienshi (River) Waterfall, 2280 m, 10.v.1990, leg. A. Smetana (T 52), 1 ♀; Hualien Hsien, Taroko National Park, Chungyantienshi (River), 2300 m, 10.v.1990, leg. A. Smetana (T 50), 1 ♂; Hualien Hsien, Taroko National Park, Nanhushi Hut, 2200 m, 8.v.1990, leg. A. Smetana (T 48), 1 ♀; Hualien Hsien, Taroko National Park, Nanhushi Hut, 2200 m, 11.v.1990, leg. A. Smetana (T 53), 1 ♂ and 1 ♀; Hualien Hsien, Taroko National Park, Nanhushi Hut, 2220 m, 12.v.1990, leg. A. Smetana (T 54), 1 ♂; Hualien Hsien, Taroko National Park, Nanhushi Hut, 2220 m, 12.v.1990, leg. A. Smetana (T 55), 1 ♂; Ilian Hsien, Taipingshan, 1880 m, 14.vii.1993, leg. A. Smetana (T 152), 1 ♂ and 1 ♀; Kaohsiung Hsien, Kuanshan Trail above Kaunshanshi River, 2550 m, 22.vii.1993, leg. A. Smetana (T 160), 3 ♂; Kaohsiung Hsien, Kuanshan Trail at Kaunshanshi River, 2400 m, 20.iv.1992, leg. A. Smetana (T 94), 1 ♂ and 1 ♀; Kaohsiung Hsien, Kuanshan, Kuhanoshing Hut, 2950 m, 18.iv.1992, leg. A. Smetana (T 93), 1 ♂; Kaohsiung Hsien, Peinantashan Trail, 2080 m, 6.vii.1993, leg. A. Smetana (T 141), 1 ♀; Kaohsiung Hsien, Peinantashan Trail, 2250 m, 4.vii.1993, leg. A. Smetana (T 137), 1 ♂; Kaohsiung Hsien, Peinantashan Trail, 2390-2490 m, 5.vii.1993, leg. A. Smetana (T 138), 2 ♂ and 2♀; Kaohsiung Hsien, Peinantashan Trail, 2450 m, 2.v.1995, leg. A. Smetana (T 170), 1 ♂; Kaohsiung Hsien, Peinantashan Trail, 2500 m, 4.vii.1993, leg. A. Smetana (T 136), 2 ♂; Kaohsiung Hsien, Rd. Above Tona For. Sta. (Fork), 1850 m, 29.iv.1998 leg. A. Smetana (T 191), 1 ♂ and 1 ♀; Kaohsiung Hsien, Rd. Above Tona For. Sta. Km 16-17, 1700-1800 m, 28.iv.1998 leg. A. Smetana (T 190), 1 ♂ and 2 ♀; Kaohsiung Hsien, Tengchih, 1580 m, 24.iv.1990, leg. A. Smetana (T 19), 1 ♀; Nantou Hsien, Houhuanshan, 3175 m, 15.v.1990, leg. A. Smetana (T 59), 1 ♀; Nantou Hsien, Houhuanshan, Kuenyang, 3050 m, 27.iv.1990, leg. A. Smetana (T 29), 1 ♂; Nantou Hsien, Meifeng, 2130 m, 3.v.1991, leg. A. Smetana (T 61), 2 ♂ and 5 ♀; Nantou Hsien, Meifeng, 2130 m, 3.v.1991, leg. A. Smetana (T 62), 1 ♀; Nantou Hsien, Meifeng, 2130 m, 10.vii.1993, leg. A. Smetana (T 146), 2 ♂; Nantou Hsien, Meifeng, 2130 m, 12.v.1991, leg. A. Smetana (T 78), 2 ♀; Nantou Hsien, Meifeng, 2130 m, 2.v.1998, leg. A. Smetana (T 196), 1 ♂ and 5 ♀; Nantou Hsien, Nenkaoshan Trail, 2050-2150 m, 8.v.1992, leg. A. Smetana (T 120), 1 ♀; Nantou Hsien, Nenkaoshan Trail, Yuenhai Hut, 2350 m, 4.v.1992, leg. A. Smetana (T 112), 2 ♂ and 2 ♀; Nantou Hsien, Nenkaoshan, 1.5 km SW Tenchi Hut, 2830 m, 6.v.1992, leg. A. Smetana (T 116), 1 ♂; Nantou Hsien, Nenkaoshan, 2.5 km Tenchi Hut, 2720 m, 6.v.1992, leg. A. Smetana (T 115), 1 ♂ and 1 ♀; Nantou Hsien, Nenkaoshan, Tenchi Hut, 2900 m, 5.v.1992, leg. A. Smetana (T 114), 1 ♂ and 2 ♀; Nantou Hsien, Shanlinchi, 1650 m, 16.v.1990, leg. A. Smetana (T 60), 1 ♂; Nantou Hsien, Wushe, 1150 m, 23.iii.1983, leg. H. & M. Townes, 1 ♀ and in CNCI; Nantou Hsien, Yushan National Park, 1.8 km W Pai-Yun Hut, 3375 m, 17.v.1991, leg. A. Smetana (T 85), 1 ♂ and 3 ♀; Nantou Hsien, Yushan National Park, 2 km W Pai-Yun Hut, 3350 m, 16.v.1991, leg. A. Smetana (T 84), 1 ♂; Nantou Hsien, Yushan National Park, Mun-Li Cliff, 2700 m, 13.v.1991, leg. A. Smetana (T 79), 2 ♂ and 1 ♀; (2 ♂, 1 ♀); Nantou Hsien, Yushan National Park, Mun-Li Cliff, 2700 m, 18.v.1991, leg. A. Smetana (T 86), 1 ♂ and 5 ♀; Pingtung Hsien, Peitawushan Trail, 1500 m, 1.v.1992, leg. A. Smetana (T 110), 2 ♂ and 5 ♀; Pingtung Hsien, Peitawushan, above Kuai-Ku Hut, 2680 m, 29.iv.1992, leg. A. Smetana (T 106), 1 ♂ and 1 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2130 m, 27.iv.1992, leg. A. Smetana (T 101), 1 ♂ and 1 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2136 m, 30.iv.1992, leg. A. Smetana (T 108), 2 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2325 m, 21.v.1991, leg. A. Smetana (T 88), 1 ♂ and 1 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2750 m, 22.v.1991, leg. A. Smetana (T 89), 2 ♀; Pingtung Hsien, Peitawushan Trail, 2000 m, 23.v.1991, leg. A. Smetana (T 91), 1 ♀; Taichung Hsien, Anmashan, 2120 m, 1.v.1990, leg. A. Smetana (T 35), 2 ♀; Taichung Hsien, Anmashan, 2150 m, 13.v.1992, leg. A. Smetana (T 129), 1 ♂; Taichung Hsien, Anmashan, 2220 m, 14.v.1992, leg. A. Smetana (T 131), 3 ♀; Taichung Hsien, Anmashan, 2230 m, 1.v.1990, leg. A. Smetana (T 33), 1 ♀; Taichung Hsien, Anmashan, 2225 m, 2.v.1990, leg. A. Smetana (T 38), 2 ♀; Taichung Hsien, Anmashan, 2225 m, 3.v.1990,



Figs 185-190. *Megarthrus ping* sp. nov., male. Mesotibia (185); metatrochanter and metafemur (186); metatibia (187); antenna (188); aedeagus in lateral (189) and ventral (190) views. Scale bar = 0.2 mm.



Figs 191-198. *Megarthrus ping* sp. nov., male. Tergite VIII in lateral (191) and dorsal (192) views; sternite VIII in lateral (193) and dorsal (194) views; left hemitergite IX in ventral view (195); sternite IX in ventral view (196); segment X in lateral (197) and dorsal (198) views. Scale bars = 0.2 mm.

leg. A. Smetana (T 42), 1 ♀; Taichung Hsien, Anmashan, 2225 m, 11.v.1992, leg. A. Smetana (T 123), 1 ♂; Taichung Hsien, Anmashan, 2225 m, 14.v.1992, leg. A. Smetana (T 130), 3 ♂ and 2 ♀ ; Taichung Hsien, Anmashan, 2230 m, 4.v.1990, leg. A. Smetana (T 43), 1 ♂ and 2 ♀; Taichung Hsien, Anmashan, 2230 m, 12.v.1992, leg. A. Smetana (T 127), 2 ♀; Taichung Hsien, Anmashan, 2230 m, 15.v.1992, leg. A. Smetana (T 132), 1 ♂ and 1 ♀; Taichung Hsien, Hsuehshan, above Shan-Liu-Gieu Hut, 3200 m, 8.v.1991, leg. A. Smetana (T 72), 1 ♂; Taichung Hsien, Hseuhshan, near Hsuehshan-Tun-Feng , 3170 m, 11.v.1991, leg. A. Smetana (T 76), 1 ♂ and 3 ♀; Taoyuan Hsien, Takuanshan Forest, 1650 m, 17.iv.1990, leg. A. Smetana (T 5), 2 ♂ and 3 ♀.

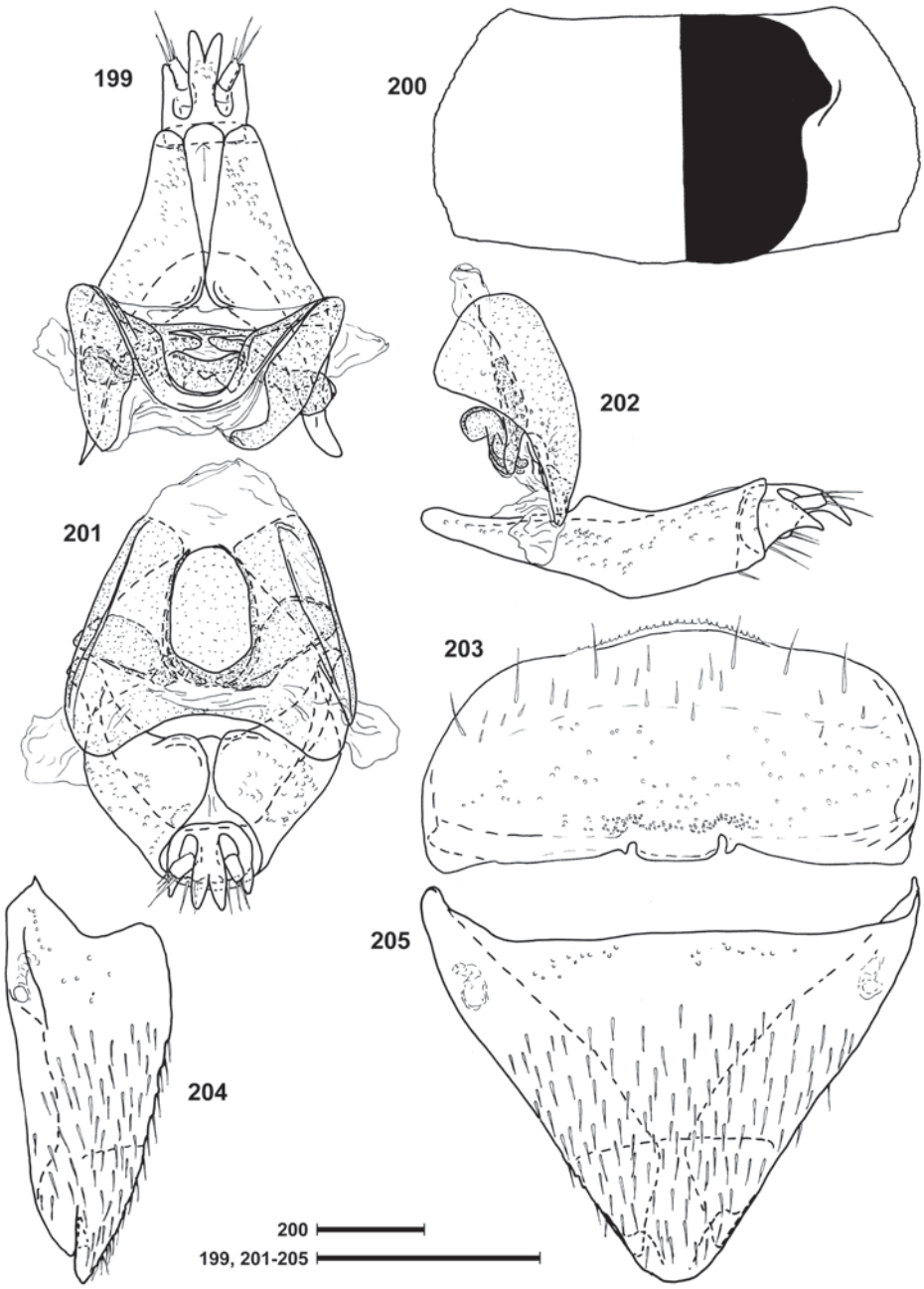
Description. Habitus as in Fig. 8. Combined length of pronotum and elytra = 1.6–1.7 mm; maximal pronotal width = 0.8-1.0 mm. Body and appendages yellowish brown, with darkened vertex and pronotal disc, and blackish elytral spots. Dorsal pubescence fairly uniform, slightly sparser on elytral disc and shorter on abdomen; setae on medial area of frons directed backward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence fairly uniform, longer than that of prosternum; pubescence on abdominal tergites IV–VI converging; that on sternites IV-VII uniform.

Frons almost smooth; vertex granulate, with granules not more than half as high as their diameter; pronotum with central area granulofossulate and lateral areas oblongogranulate, moderately; elytra punctate, moderately; metasternum moderately punctate laterally and almost impunctate medially.

Frons forming above clypeus a sharp ridge, the latter conspicuously carinate; mesal portion of disc weakly convex in lateral view, evenly; U-shaped frontal impression with lateral portions moderately deep and middle portion shallow. Eyes moderately convex, with highest point slightly above level of vertex; supraocular margin sinuate in dorsal view. Temples nearly smooth, in dorsal view abruptly angled just behind the eyes, then flat; occipital ridge well marked, with lateral portions sinuate. Antenna (Fig. 188) without patches of sensilla; scape compressed, piriform; short and dense pubescence present on antennomeres 7–11. Maxillary palpi with palpomere 4 about 2 times as long as palpomere 3, the latter subcylindrical.

Pronotum (Fig. 200) with centre weakly convex in frontal view; disc shallowly depressed along lateral portions of anterior margin, transversely on mediolateral areas of disc, and along anterior portion of lateral edges; the latter slightly raised; medial groove very shallow, parallel-sided, slightly arcuate in lateral view; hypomera (Fig. 200) ridged anteriorly, without a discal pit. Scutellum with anterior margin indistinct in middle, posterior margin oblique toward right-angled apex. Protrochanters without a longitudinal ridge. Elytra with humeral callus obsolete; disc shallowly depressed along midle portion of lateral edge; the latter moderately carinate, markedly denticulate, arcuate in dorsal view; sutural margin moderately arcuate in lateral view; posterior margin arcuate toward obtuse inner apical angle. Metasternum without foveiform impressions in front of metacoxae.

Male. Metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Frontoclypeal area raised, forming a pointed horn-like process. Protarsomeres 1 lacking tenent setae. Mesofemora longer than metafemora (Fig. 186). Mesotibiae (Fig. 185) as long as metatibiae (Fig. 187). Metatarsomeres 1 about 1.3 times longer than metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on mesotibiae (Fig. 185), and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 191-192; sternite VIII as in Figs 193-194; hemitergite IX as in Fig. 195; sternite IX as in Fig. 196; segment X as in Figs 197-198. Aedeagus as in Figs 189-190.



Figs 199-205. *Megarthrus ping* sp. nov., female. Genitalia in dorsal (199), posterior (201) and lateral (202) views; pronotum (200) in dorsal (left) and ventral (right) views; sternite VIII in ventral view (203); tergite VIII in lateral (204) and dorsal (205) views. Scale bars = 0.2 mm.

Female. Anterior frontal margin in dorsal view oblique toward subangular apex. Abdominal tergite VIII as in Figs 204-205. Sternite VIII as in Fig. 203. Genital segments as in Figs 199, 201-205.

Distribution and natural history. The species is known only from Taiwan, where it was found in the northern counties Ilian and Taoyuan, in the central counties of Chiai, Hualien, Nantou and Taichung, and in the southern counties Kaohsiung and Pingtung, at elevations ranging from 1150 to 3400 meters a.s.l., by sifting piles of cut grass, decaying rhododendron bloom, mainly old needles and rotting twigs, fermenting tree buds shells, moss, humus, rotting wood, bark and fallen leaves and other floor debris of vegetation in original coniferous forests, original coniferous forests with intermixed broadleaved trees, original broadleaved evergreen forests with intermixed conifers, original evergreen broadleaved forests, secondary coniferous forests, and secondary broadleaved forest with intermixed *Chamaecyparis*.

Megarthrus ping, *M. tac* and *M. taiwanus* are the only Taiwanese members of the genus distributed from the North to the South of the Island.

Comments. The species shares most features in common with the Nepalese *M. martensi* Coiffait, 1976, notably the elytral colour pattern, the male frontoclypeal area forming a pointed horn-like process, the broadly flattened male metatibiae and, in female, the presence of a lanceolate mediodorsal hyaline area between the valvifers (= « *martensi*-complex »). These two species differ mainly by aedaegal characters. See comment under *M. con*.

The epiteth « ping» refers to the shape of the male metatibiae, which resemble table–tennis bats.

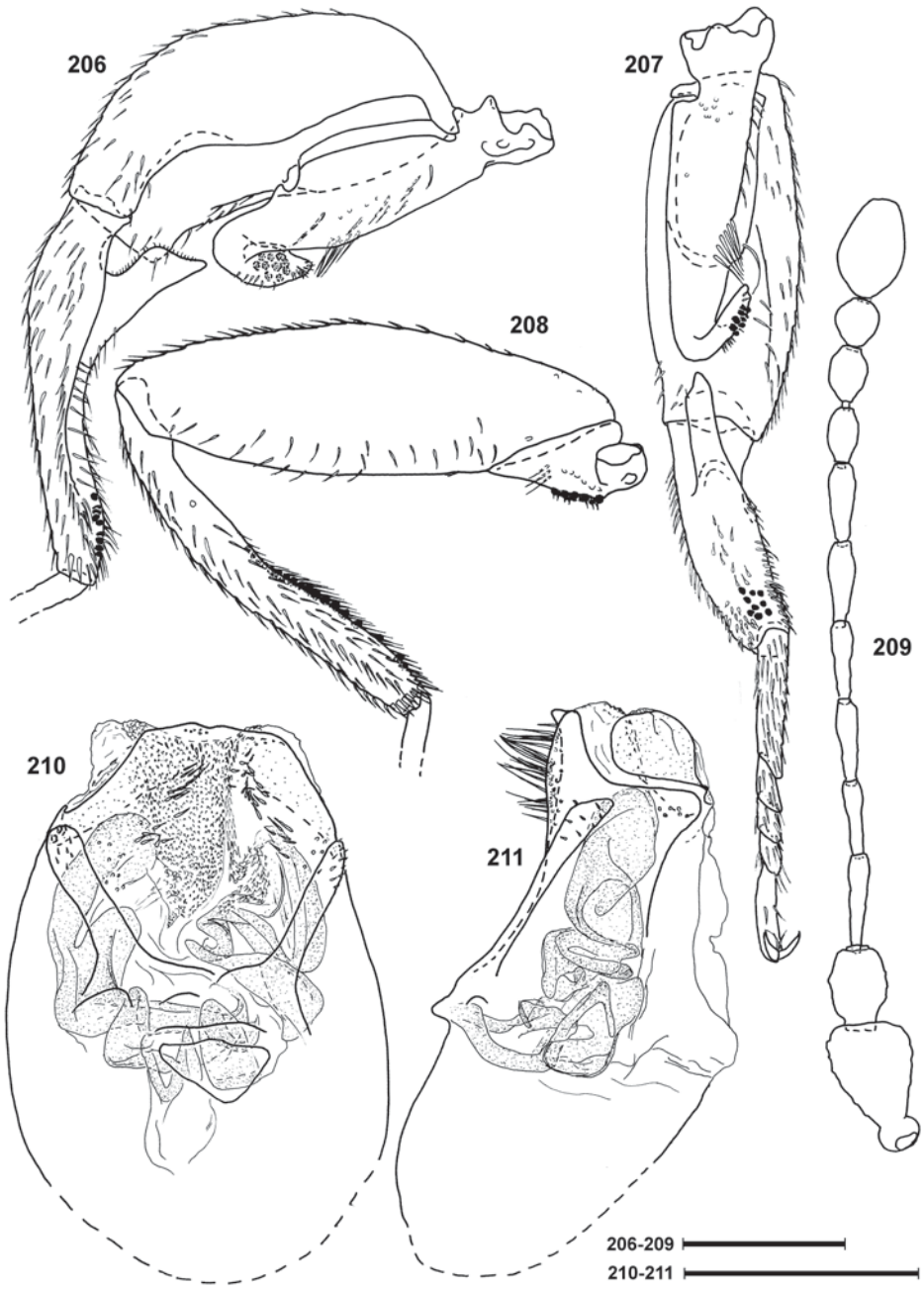
***Megarthrus splendidus* sp. nov.**

(Figs 11, 206-220)

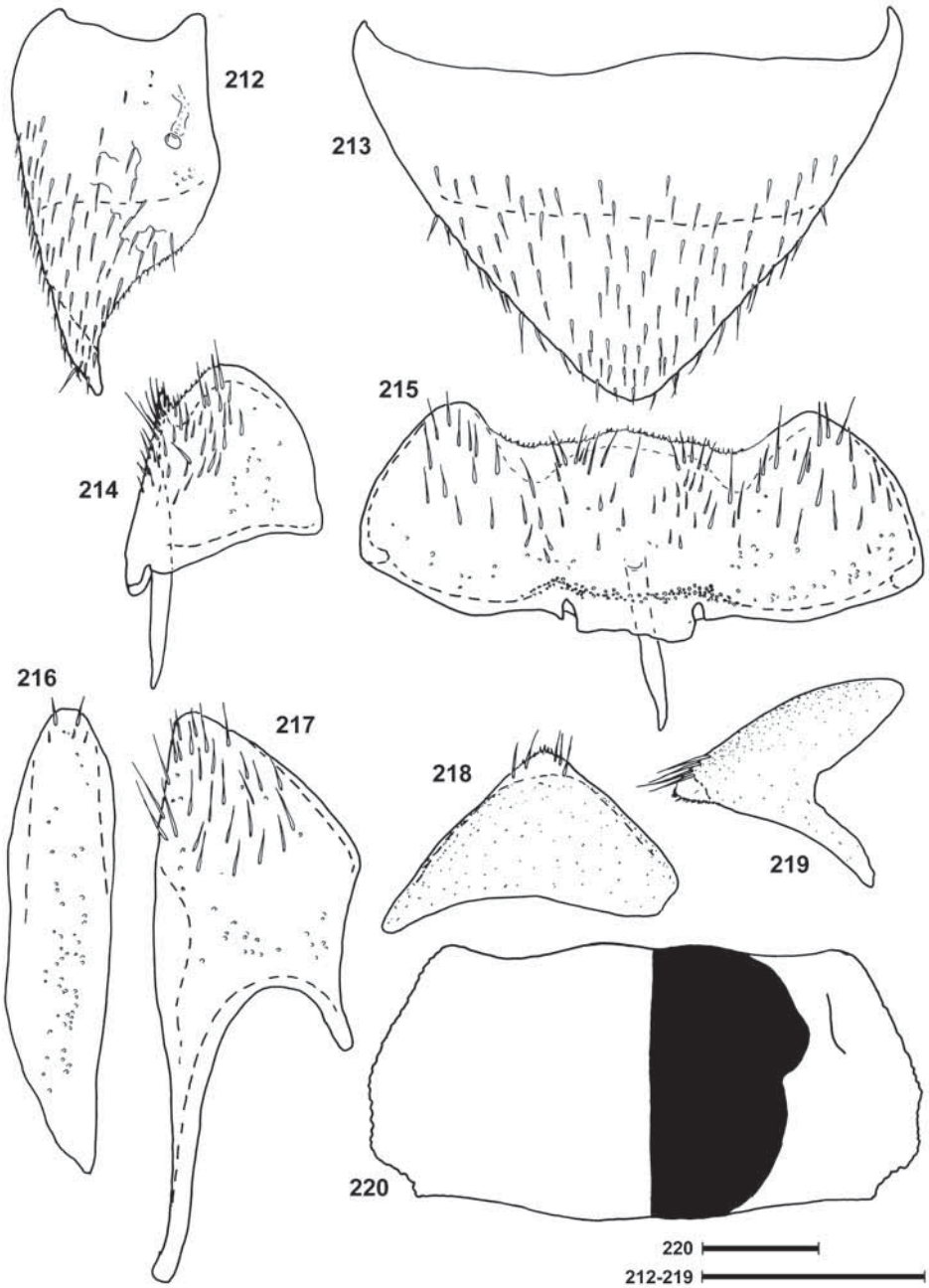
Type material. Holotype (♂): TAIWAN, Hualien Hsien, Taroko National Park, Nanhushi Hut, 2200 m, 8.v.1990, leg. A. Smetana (T 48), (MHNG).

Description. Similar to *M. festivus*, from which it differs as follows : Habitus as in Fig. 11. Combined length of pronotum and elytra = 1.7 mm; maximal pronotal width = 1.0 mm. Frontal margin weakly arcuate in middle and oblique laterally in dorsal view. Antenna as in Fig. 209. Pronotum (Fig. 220) with centre moderately convex in frontal view. Elytra with lateral edge conspicuously carinate, indistinctly denticulate.

Male. Frontoclypeal area, metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 208) longer than metafemora (Fig. 206). Mesotibiae (Fig. 208) longer than metatibiae (Fig. 206). Metatrochanters (Fig. 206) with projecting process acutely angled at base and acuminate. Metatarsomeres 1 about as long as metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on apical portion of mesotibiae, in two rows on middle portion of mesotibiae and on mesotrochanters (Fig. 208), grouped in a field on metatrochanters and metatibiae, and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 212-213;



Figs 206-211. *Megarthrus splendidus* sp. nov., male (holotype). Metatrochanter, metafemur and metatibia in dorsal (206) and mesal (207) views; mesotrochanter, mesofemur and mesotibia (208); antenna (209); aedeagus in ventral (210) and lateral (211) views. Scale bars = 0.2 mm.



Figs 212-220. *Megarthrus splendidus* sp. nov., male (holotype). Tergite VIII in lateral (212) and dorsal (213) views; sternite VIII in lateral (214) and ventral (215) views; sternite IX in ventral view (216); right hemitergite IX in ventral view (217); segment X in dorsal (218) and lateral (219) views; pronotum (220) in dorsal (left) and ventral (right) views. Scale bars = 0.2 mm.

sternite VIII as in Figs 214-215; hemitergite IX as in Fig. 217; sternite IX as in Fig. 216; segment X as in Figs 218-219. Aedeagus as in Figs 210–211.

Female. Unknown.

Distribution and natural history. The species is known only from the central Taiwanese county of Hualien, where it was found at an elevation of 2200 meters a.s.l.

Comments. Within the *festivus*-complex (see comments under *M. festivus*), the presence of adhumeral elytral spots is diagnostic for *M. splendidus*.

The species is named « splendidus» because I find it splendid.

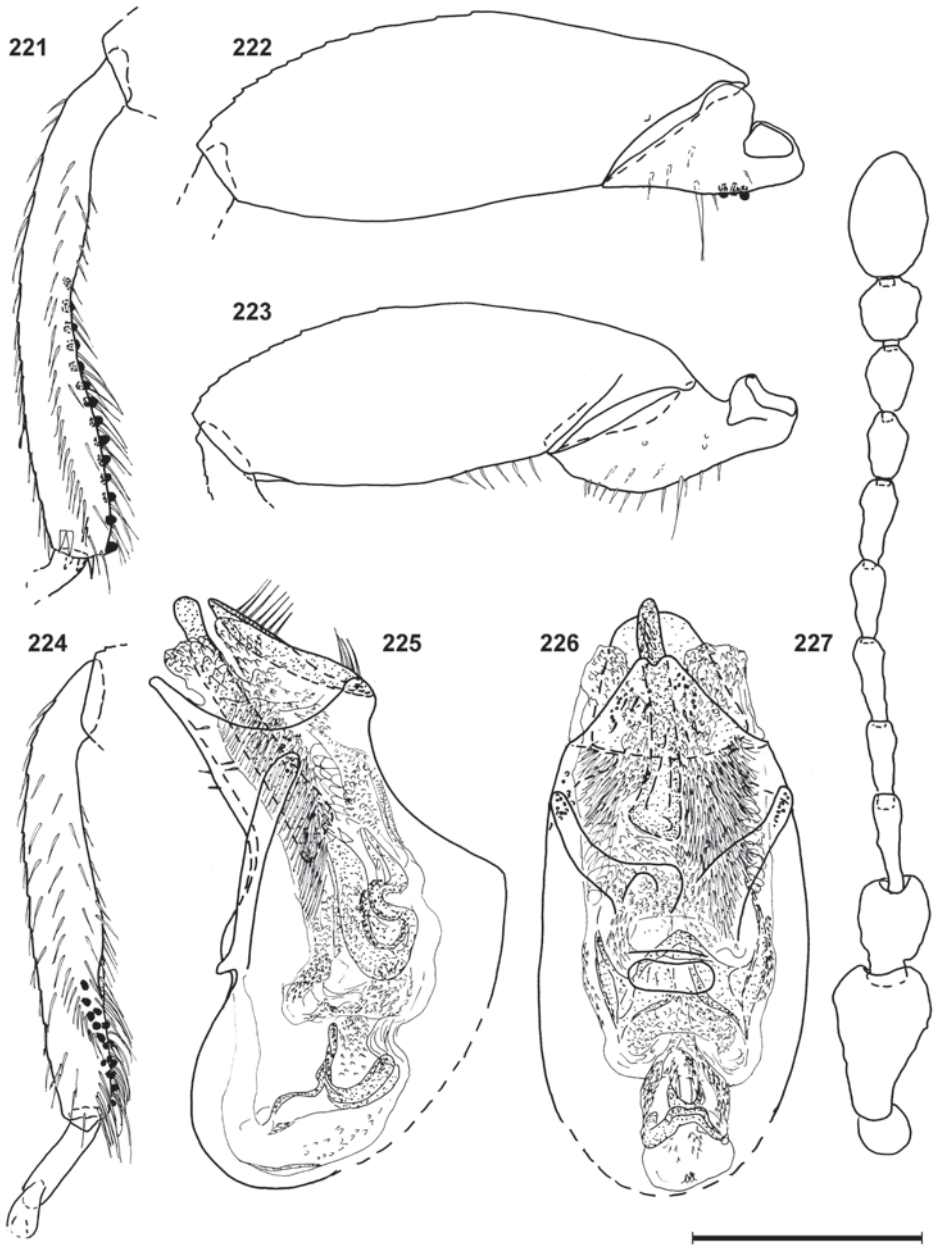
Megarthrus tac sp. nov.
(Figs 9, 221-242)

Type material. Holotype ♂: TAIWAN, Taichung Hsien, Anmashan, 2225 m, 2.v.1990, leg. A. Smetana (T 38), in MHNG. Paratypes (153): Same data as holotype, 2 ♂ and 4 ♀; TAIWAN, Taichung Hsien, Anmashan, 2225 m, 2.v.1990, leg. A. Smetana (T 38), 4 ♂ and 5 ♀; Kaohsiung Hsien, Peinantashan Trail, 1950 m, 8.vii.1993, leg. A. Smetana (T 145), 1 ♀; Kaohsiung Hsien, Peinantashan Trail, 2020 m, 7.vii.1993, leg. A. Smetana (T 143), 1 ♂ and 2 ♀; Kaohsiung Hsien, Peinantashan Trail, 2080 m, 6.vii.1993, leg. A. Smetana (T 141), 4 ♂ and 7 ♀; Kaohsiung Hsien, Rd. Above Tona For. Sta. (Fork), 1850 m, 29.iv.1998 leg. A. Smetana (T 191), 4 ♂ and 4 ♀; Kaohsiung Hsien, Rd. Above Tona For. Sta. Km 16-17, 1700-1800 m, 28.iv.1998 leg. A. Smetana (T 190), 12 ♂ and 18 ♀ ; Nantou Hsien, Meifeng, 2130 m, 3.v.1991, leg. A. Smetana (T 61), 2 ♀; same data, but 10.vii.1993 (T 146), 6 ♂ and 3 ♀; same data, but 2.v.1998 (T 196), 3 ♂ and 3 ♀; same data, but 4.v.1998 (T 197), 1 ♂; same data, but (T 199), 3 ♂ and 4 ♀;Nantou Hsien, Nenkaoshan Trail, 2050-2150 m, 8.v.1992, leg. A. Smetana (T 120), 4 ♂ and 2 ♀; Nantou Hsien, Shanlinchi, 1650 m, 16.v.1990, leg. A. Smetana (T 60), 5 ♂ and 7 ♀; Pingtung Hsien, Peitawushan Trail, 1500 m, 1.v.1992, leg. A. Smetana (T 110), 5 ♂ and 7 ♀; Pingtung Hsien, Peitawushan Trail, 2000 m, 23.v.1991, leg. A. Smetana (T 91), 1 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2125 m, 27.iv.1992, leg. A. Smetana (T 102), 1 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2325 m, 21.v.1991, leg. A. Smetana (T 88), 1 ♂ and 3 ♀; Taichung Hsien, Anmashan, 2225 m, 2.v.1990, leg. A. Smetana (T 37), 3 ♂ and 4 ♀; Taichung Hsien, Anmashan, 2225 m, 11.v.1992, leg. A. Smetana (T 123), 7 ♂; Taichung Hsien, Anmashan, 2225 m, 14.v.1992, leg. A. Smetana (T 130), 3 ♀; Taichung Hsien, Anmashan, 2230 m, 12.v.1992, leg. A. Smetana (T 127), 4 ♂ and 2 ♀; Taichung Hsien, Anmashan, 2230 m, 1.v.1990, leg. A. Smetana (T 33), 2 ♂; Taoyuan Hsien, Takuanshan Forest, 1650 m, 17.iv.1990, leg. A. Smetana (T 5), 2 ♂ and 3 ♀.

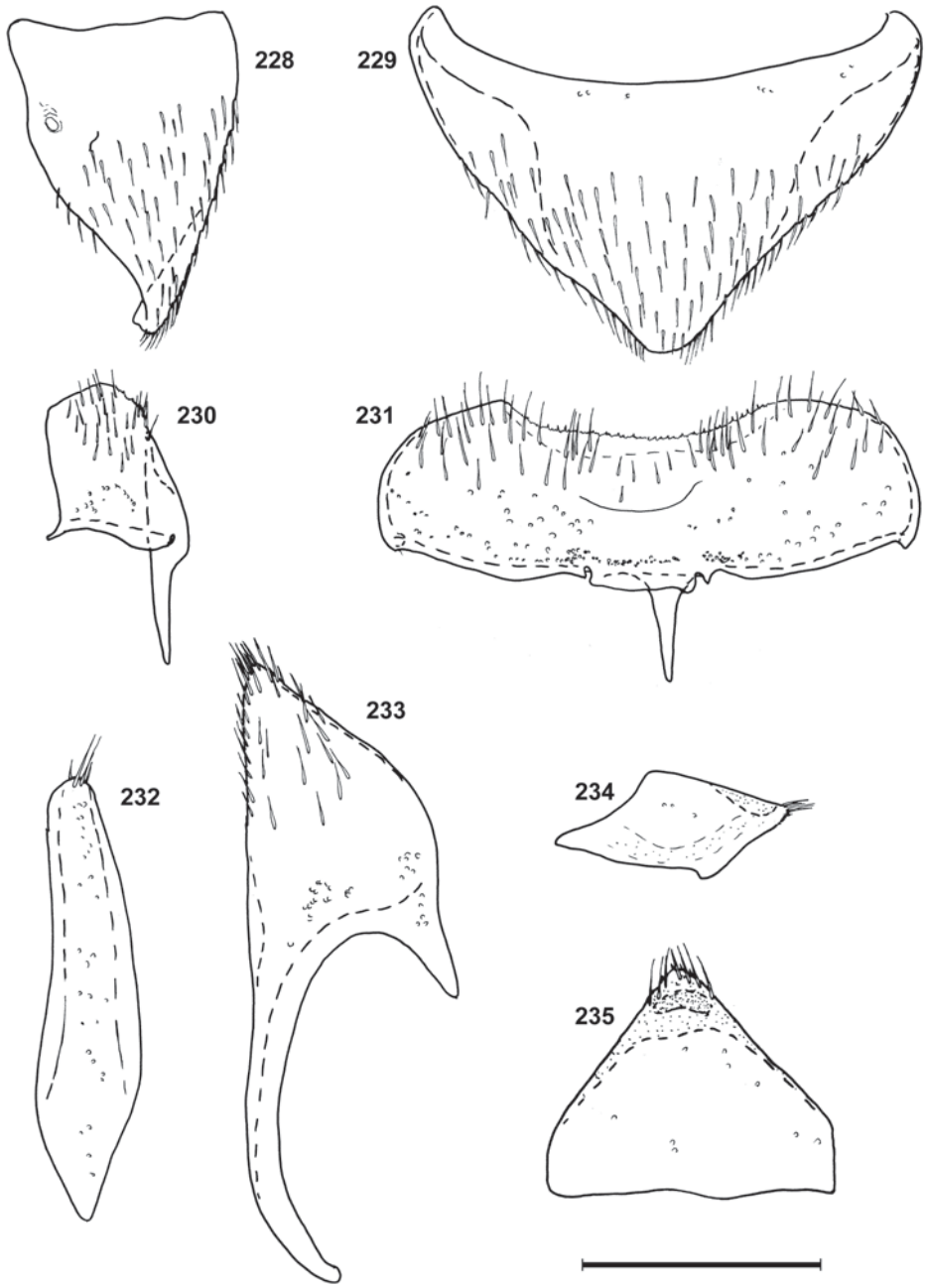
Description. Habitus as in Fig. 9. Combined length of pronotum and elytra = 1.2–1.4 mm; maximal pronotal width = 0.8-0.9 mm. Body and appendages reddish brown Dorsal pubescence fairly uniform, slightly sparser on elytral disc and shorter on abdomen; setae on medial area of frons directed backward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence fairly uniform, longer than that of prosternum; pubescence on abdominal tergites IV–VI converging; that on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite.

Frons, vertex, and anterior portion of prohypomera granulate, with granula on vertex about as high as their diameter, and those on frons and prohypomera not more than half as high as their diameter; pronotum with central area granulofossulate and lateral areas oblongogranulate, moderately; elytra granulopunctate, moderately; metasternum moderately punctate laterally, punctures becoming sparser medially.

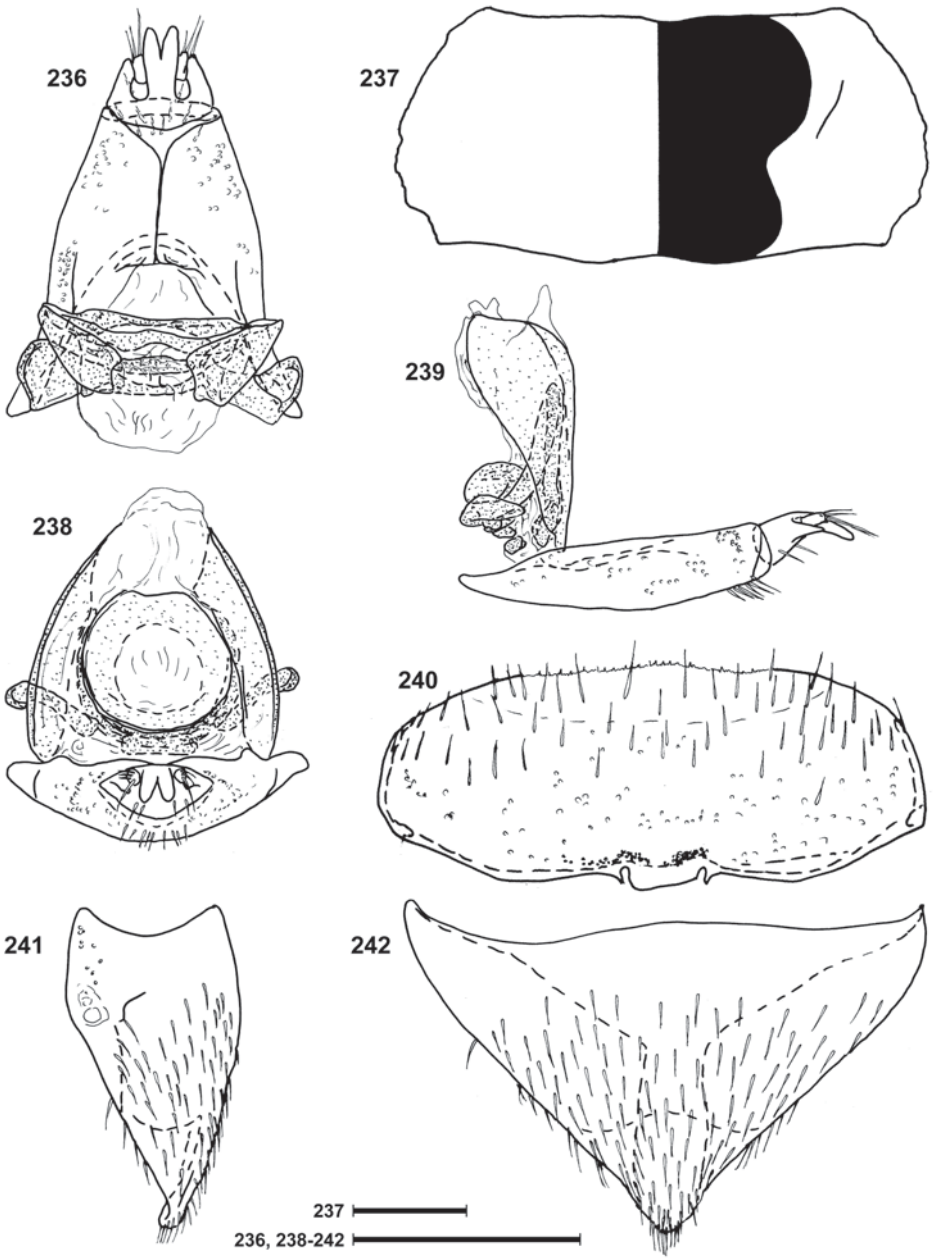
Frons forming above clypeus a sharp ridge, the latter conspicuously carinate; mesal portion of disc weakly convex in lateral view, evenly; entire U-shaped frontal impression deep. Eyes moderately convex, with highest point slightly above level of vertex; supraocular



Figs 221-227. *Megarthrus tac* sp. nov., male. Mesotibia (221); mesotrochanter and mesofemur (222); metatrochanter and metafemur (223); metatibia (224); aedeagus in lateral (225) and ventral (226) views; antenna (227). Scale bar = 0.2 mm.



Figs 228-235. *Megarthrus tac* sp. nov., male. Tergite VIII in lateral (228) and dorsal (229) views; sternite VIII in lateral (230) and dorsal (231) views; sternite IX in ventral view (232); right hemitergite IX in ventral view (233); segment X in lateral (234) and dorsal (235) views. Scale bar = 0.2 mm.



Figs 236-242. *Megarthrus tac* sp. nov., female. Genitalia in dorsal (236), posterior (238) and lateral (239) views; pronotum (237) in dorsal (left) and ventral (right) views; sternite VIII in ventral view (240); tergite VIII in lateral (241) and dorsal (242) views. Scale bars = 0.2 mm.

margin sinuate in dorsal view. Temples nearly smooth, in dorsal view abruptly angled just behind the eyes, then flat; occipital ridge well marked, with lateral portions sinuate. Antenna (Fig. 227) without patches of sensilla; scape compressed, piriform; short and dense pubescence present on antennomeres 7–11. Maxillary palpi with palpomere 4 about 2 times as long as palpomere 3, the latter subcylindrical.

Pronotum (Fig. 237) with centre moderately convex in frontal view; disc shallowly depressed along anterior portion of lateral edges; the latter slightly raised anteriorly; medial groove very shallow, parallel-sided, slightly arcuate in lateral view; hypomera (Fig. 237) slightly ridged anteriorly, without a discal pit. Scutellum with anterior margin indistinct in middle, posterior margin arcuate toward right-angled apex. Protrochanters without a longitudinal ridge. Elytra with humeral callus obsolete; disc shallowly depressed along anterior portion of lateral edge; the latter conspicuously carinate, gently denticulate, arcuate in dorsal view; sutural margin slightly arcuate in lateral view; posterior margin arcuate toward obtuse inner apical angle. Metasternum without foveiform impressions in front of metacoxae.

Male. Metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Frontoclypeal area raised, forming a truncate horn-like process. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 222) longer than metafemora (Fig. 223). Mesotibiae (Fig. 221) about as long as metatibiae (Fig. 224). Metatarsomeres 1 about as long as metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on mesotrochanters (Fig. 222) and mesotibiae, in a double row on metatibiae, and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 228-229; sternite VIII as in Figs 230-231; hemitergite IX as in Fig. 233; sternite IX as in Fig. 232; segment X as in Figs 234-235. Aedeagus as in Figs 225–226.

Female. Anterior frontal margin in dorsal view oblique toward subangular apex. Abdominal tergite VIII as in Figs 241-242. Sternite VIII as in Fig. 240. Genital segments as in Figs 236, 238-239.

Distribution and natural history. The species is known only from Taiwan, where it was found in the northern county of Taoyuan, in the central counties of Nantou and Taichung, and in the southern counties of Pingtung and Kaohsiung, at elevations ranging from 1500 to 2350 meters a.s.l., by sifting mushrooms, moss, humus, fallen leaves, rotting wood, twigs, bark and other forest floor debris in original evergreen broadleaved forests occasionally with intermixed conifers.

The only other Taiwanese members of the genus distributed from the North to the South of the island are *M. ping* and *M. taiwanus*.

Comments. *Megarthrus tac*, *M. tic* (also from Taiwan) and the Nepalese *M. integricollis* Coiffait are the only members of the genus to possess a truncate horn-like frontoclypeal process in the males (= « *integricollis*-complex»). *Megarthrus integricollis* has, however, the mediobasal process of the abdominat sternite VIII much wider than that in these two Taiwanese species, which differ mainly by the male sexual characters. See comments under *M. con*.

The epiteth « tac» sounds truncate, like the fronto-clypeal process of the males of this new species.

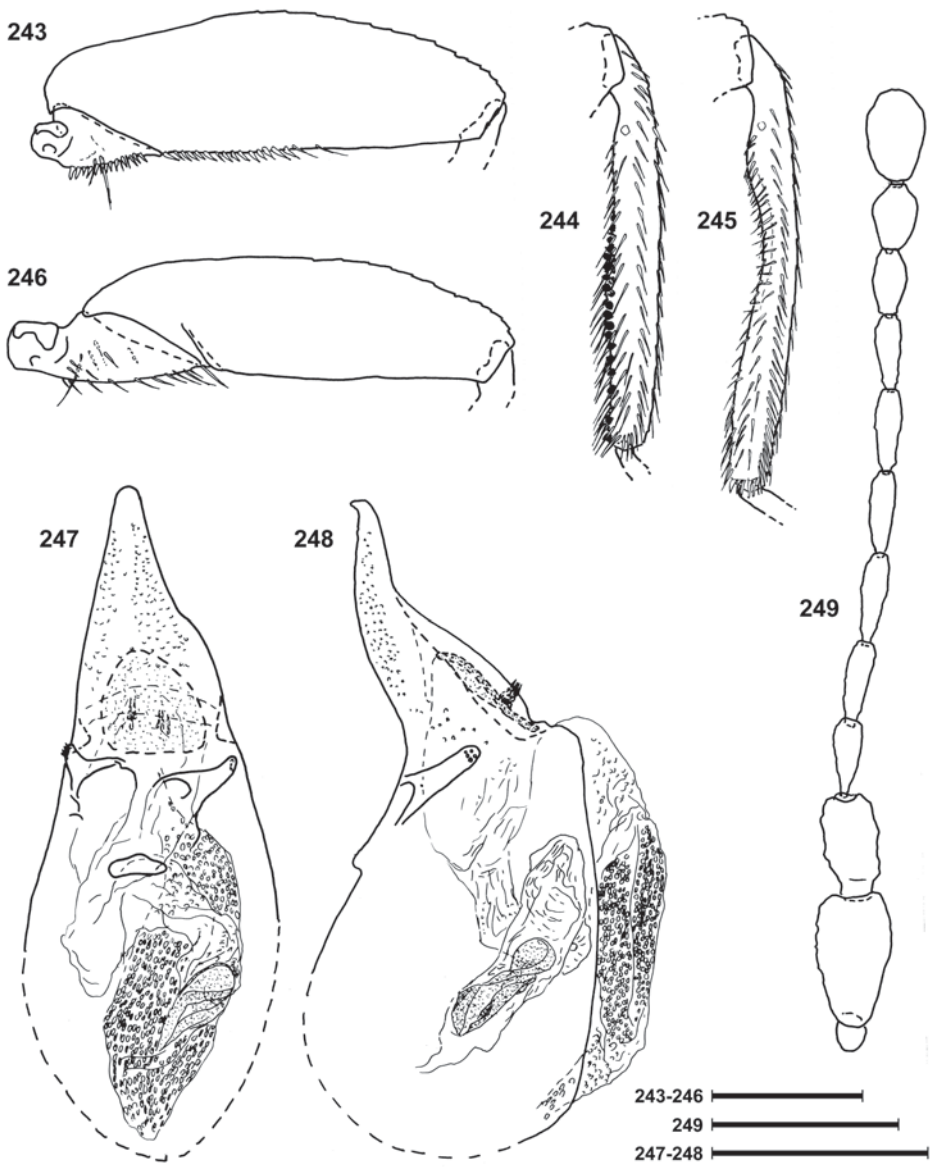
Megarthrus taiwanus sp. nov.
(Figs 1, 243-264)

Type material. Holotype ♂: TAIWAN, Taichung Hsien, Anmashan, 2150 m, 13.v.1992, leg. A. Smetana (T 129), in MHNG. Paratypes (448): Same data as holotype, 73 ♂ and 79 ♀; TAIWAN, Chiai Hsien, Alishan, 2130 m, 17.viii.1947, leg. J. L. Gressitt, 2 ♀ in BPBM; Hualien Hsien, Taroko National Park, Nanhushi Hut, 2200 m, 8.v.1990, leg. A. Smetana (T 48), 27 ♂ and 21 ♀ ; Hualien Hsien, Taroko National Park, Nanhushi Hut, 2200 m, 11.v.1990, leg. A. Smetana (T 53), 25 ♂ and 34 ♀; Hualien Hsien, Taroko National Park, Nanhushi Hut, 2220 m, 12.v.1990, leg. A. Smetana (T 54), 2 ♂ and 6 ♀; Ilian Hsien, Taipingshan, 1820 m, 15.vii.1993, leg. A. Smetana (T 153), 10 ♂ and 4 ♀; Ilian Hsien, Taipingshan, 1880 m, 14.vii.1993, leg. A. Smetana (T 152), 3 ♂ and 6 ♀; Kaohsiung Hsien, Kuanshan Trail at Kaunshanshi River, 2400 m, 20.iv.1992, leg. A. Smetana (T 94), 1 ♀; Kaohsiung Hsien, Kuanshan Trail at Kaunshanshi River, 2400 m, 20.vii.1993, leg. A. Smetana (T 158), 2 ♂; Nantou Hsien, Meifeng, 2130 m, 10.vii.1993, leg. A. Smetana (T 146), 1 ♂ in MHNG; same data, but 2.v.1998 (T 196), 1 ♀; same data, but 4.v.1998 (T 197), 1 ♂; Nantou Hsien, Nenkaoshan Trail, Yuenhai Hut, 2350 m, 4.v.1992, leg. A. Smetana (T 112), 3 ♂ and 2 ♀; Nantou Hsien, Shanlinchi, 1650 m, 16.v.1990, leg. A. Smetana (T 60), 20 ♂ and 10 ♀; Nantou Hsien, Shanlinchi, 1650 m, 19.v.1991, leg. A. Smetana (T 87), 1 ♂ and 1 ♀; Nantou Hsien, Yushan National Park, Mun-Li Cliff, 2700 m, 13.v.1991, leg. A. Smetana (T 79), 1 ♀; Nantou Hsien, Yushan National Park, Mun-Li Cliff, 2700 m, 18.v.1991, leg. A. Smetana (T 86), 2 ♀ G; Pingtung Hsien, Peitawushan Ridge, 2800-2910 m, 28.iv.1992, leg. A. Smetana (T 105), 1 ♂; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2130 m, 27.iv.1992, leg. A. Smetana (T 101), 1 ♀; Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2325 m, 21.v.1991, leg. A. Smetana (T 88), 2 ♂ and 6 ♀; Taichung Hsien, Anmashan, 2120 m, 1.v.1990, leg. A. Smetana (T 35), 1 ♂; Taichung Hsien, Anmashan, 2120 m, 1.v.1990, leg. A. Smetana (T 36), 8 ♂ and 14 ♀; Taichung Hsien, Anmashan, 2225 m, 14.v.1992, leg. A. Smetana (T 130), 3 ♂ and 2 ♀; Taichung Hsien, Anmashan, 2225 m, 2.v.1990, leg. A. Smetana (T 37), 24 ♂ and 37 ♀; Taichung Hsien, Anmashan, 2230 m, 4.v.1990, leg. A. Smetana (T 43), 2 ♂ and 6 ♀; Taichung Hsien, Hsuehshan, above Shan-Liu-Gieu Hut, 3150 m, 8.v.1991, leg. A. Smetana (T 71), 1 ♀; Taoyuan Hsien, Takuanshan Forest, 1600 m, 17.iv.1990, leg. A. Smetana (T 3), 1 ♀; Taoyuan Hsien, Takuanshan Forest, 1650 m, 17.iv.1990, leg. A. Smetana (T 5), 1 ♂.

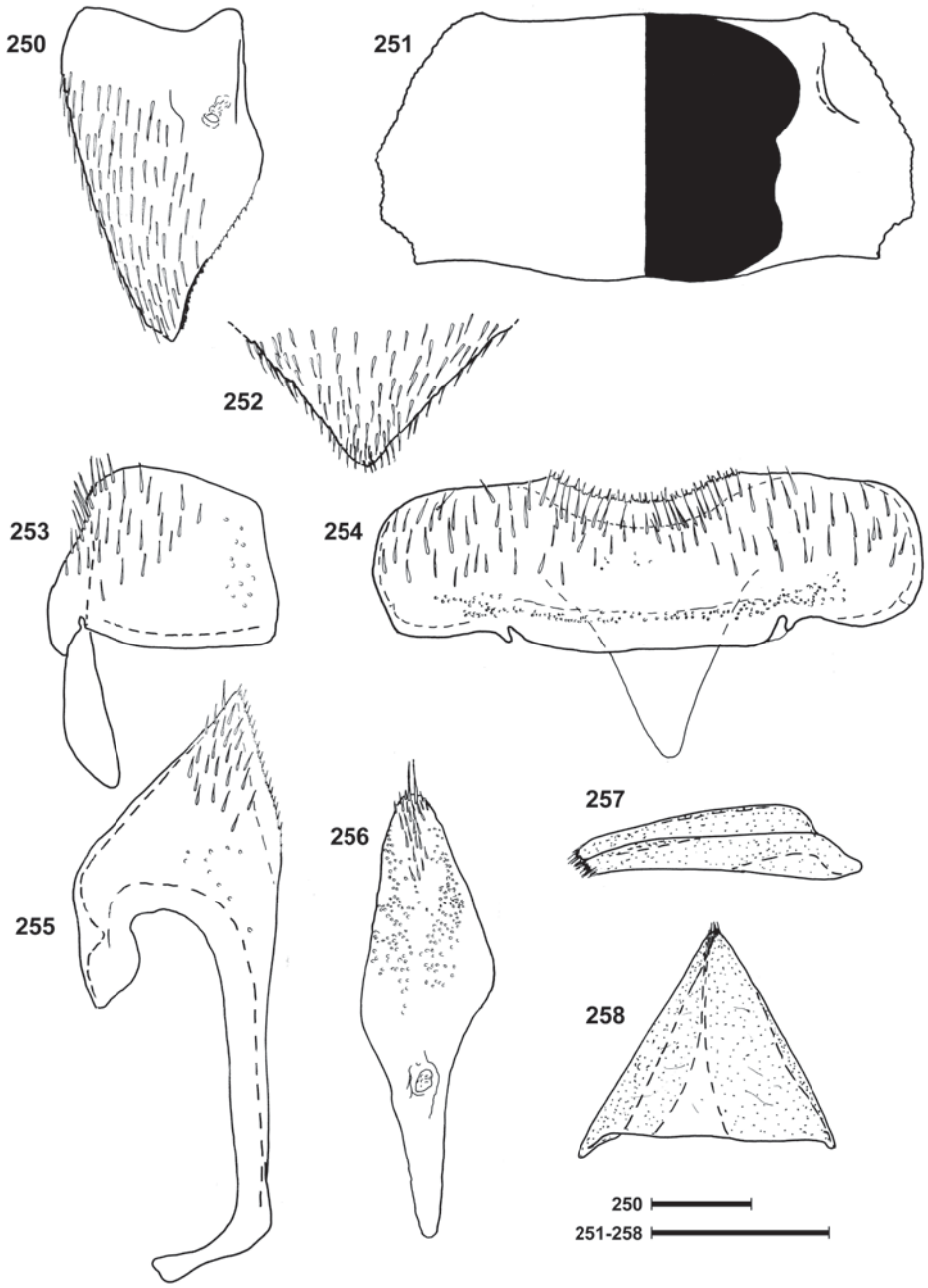
Description. Habitus as in Fig. 1. Combined length of pronotum and elytra = 1.7–2.0 mm; maximal pronotal width = 1.2-1.3 mm. Body dark brown with appendages paler. Dorsal pubescence fairly uniform, slightly sparser on elytral disc and shorter on abdomen; setae on medial area of frons directed backward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence becoming denser anteromedially, as long as or longer than that of prosternum; pubescence on abdominal tergites IV–VII converging; that on sternites IV-VII uniform.

Frons, vertex, and anterior portion of prohypomera granulate; granules on vertex about as high as their diameter, or higher, and those on frons only about and only about half as high as their diameter; pronotum with central area granulofossulate and lateral areas oblongogranulate, coarsely; elytra granulopunctate, coarsely; metasternum coarsely punctate laterally, punctures becoming denser and finer anteromedially.

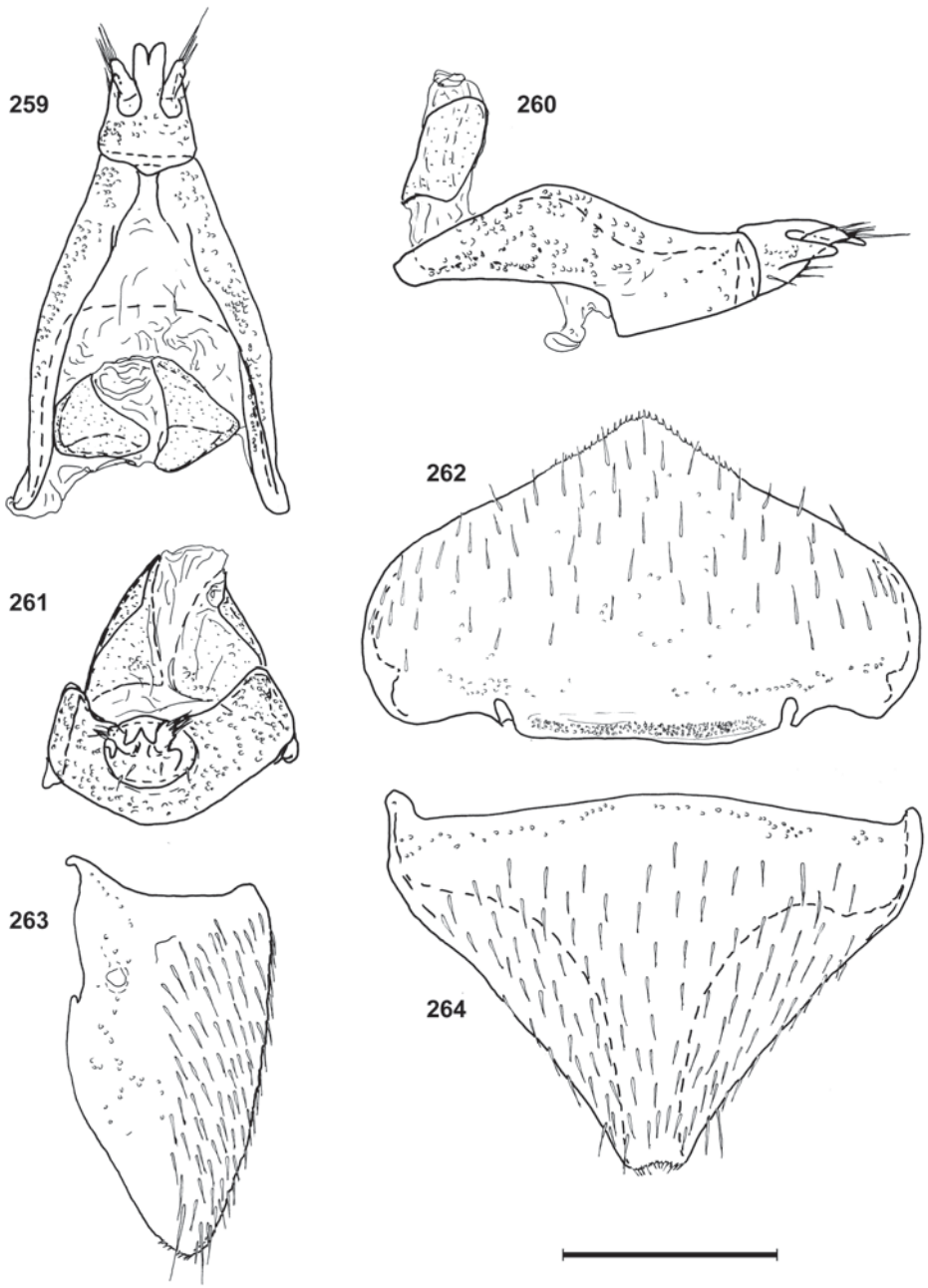
Frons raised above level of vertex and evenly deflected toward clypeus, not forming a ridge above the latter; anterior frontal margin in dorsal view weakly arcuate in middle, and laterally oblique or sinuate; mesal portion of disc strongly evenly convex in lateral view; U-shaped frontal impression moderately deep in middle, shallow laterally. Eyes almost hemispherical, with highest point above level of vertex; supraocular margin sinuate in dorsal view. Temples flat and smooth, markedly angled just behind the eyes in dorsal view; occipital ridge indistinct in middle, sinuate laterally. Antenna (Fig. 249) without patches of sensilla; scape not compressed, ovoid; short and dense pubescence present on antennomeres



Figs 243-249. *Megarthrus taiwanus* sp. nov., male. Mesotrochanter and mesofemur (243); mesotibia (244); metatibia (245); metatrochanter and metafemur (246); aedeagus in lateral (247) and ventral (248) views; antenna (249). Scale bars = 0.2 mm.



Figs 250-258. *Megarthrus taiwanus* sp. nov., male. Tergite VIII in lateral (250) and dorsal (252) views; pronotum (251) in dorsal (left) and ventral (right) views; sternite VIII in lateral (253) and dorsal (254) views; left hemitergite IX in ventral view (255); sternite IX in ventral view (256); segment X in lateral (257) and dorsal (258) views. Scale bars = 0.2 mm.



Figs 259-264. *Megarthrus taiwanus* sp. nov., female. Genitalia in dorsal (259), lateral (260) and posterior (261) views; sternite VIII in ventral view (262); tergite VIII in lateral (263) and dorsal (264) views. Scale bar = 0.2 mm.

5–11. Maxillary palpi with palpomere 4 about 1.6–1.8 times as long as palpomere 3, the latter swollen.

Pronotum (Fig. 251) with centre moderately convex in frontal view; disc deeply depressed along lateral portions of anterior and posterior margins, along posterior portion of medial groove, and transversely on mediolateral areas of disc; lateral edges slightly raised; medial groove moderately deep, widened anteriorly, almost straight in lateral view; hypomera (Fig. 251) ridged anteriorly, without a discal pit. Scutellum with anterior margin angulate in middle, posterior margin slightly subangulate toward acutely angular apex. Protrochanters lacking a longitudinal ridge. Elytra with humeral callus low, moderately convex; disc without swellings, very shallowly depressed anteriorly along lateral edge; the latter finely carinate, gently denticulate, almost straight in dorsal view; sutural margin slightly arcuate posteriorly in lateral view; posterior margin straight or weekly arcuate toward obtuse inner apical angle. Metasternum without foveiform impressions in front of metacoxae.

Male. Frontoclypeal area, metasternum, protarsomeres 5, and abdominal sternites IV–VI unmodified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 243) slightly longer than metafemora (Fig. 246). Mesotibiae (Fig. 244) shorter than metatibiae (Fig. 245). Metatarsomeres 1 about as long as metatarsomeres 2–4 combined. Peg-like present only on mesotibiae, where they are grouped in a field. Abdominal tergite VIII as in Figs 250, 252; sternite VIII as in Figs 253-254; hemitergite IX as in Fig. 255; sternite IX as in Fig. 256; segment X as in Figs 257-258. Aedeagus as in Figs 247-248.

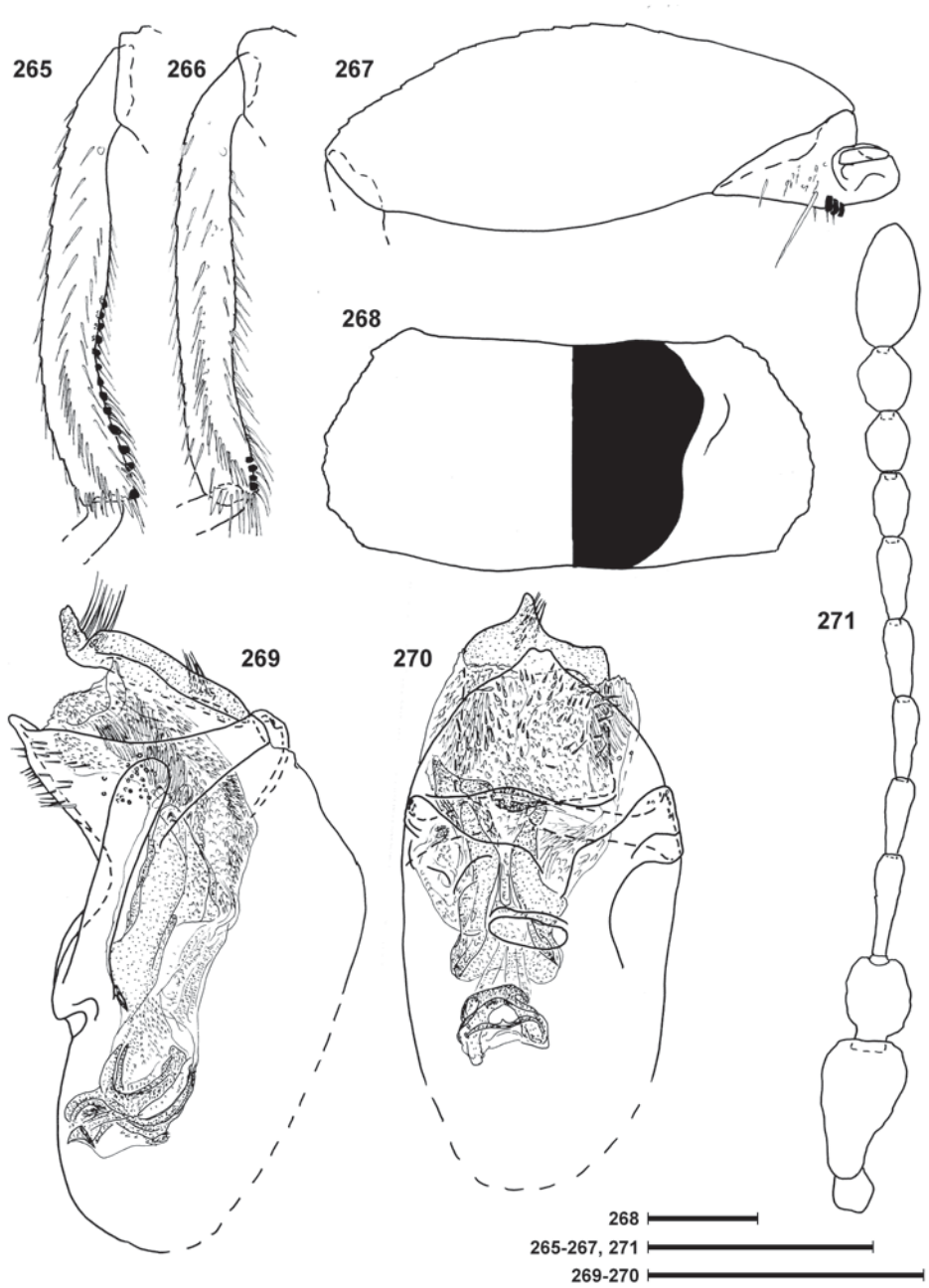
Female. Abdominal tergite VIII as in Figs 263-264. Sternite VIII as in Fig. 262. Genital segments as in Figs 259-261.

Distribution and natural history. The species is known only from Taiwan, where it was found in the northern counties Ilian and Taoyuan, in the central counties of Chiai, Hualien, Nantou and Taichung, and in the southern counties Kaohsiung and Pingtung, at elevations ranging from 1600 to 3150 meters a.s.l., by sifting moss, fermenting tree buds shells, humus, rotting branches and twigs, mouldy pieces of bark, fallen leaves and other floor debris in original coniferous forests, original coniferous forests with intermixed broadleaved trees, original broadleaved evergreen forests with intermixed conifers, original evergreen broadleaved forests, secondary coniferous forests, and open *Abies* forest with *Rhododendron* and *juniper* undergrowth. It was particularly abundant (153 specimens) in a sifted sample of layers of fallen leaves mixed with lots of fermenting tree buds shells accumulated on asphalt edges of a road in an evergreen broadleaved mature forest at an elevation of 2150 meters a.s.l. on Mt. Anmashan (Taichung county)

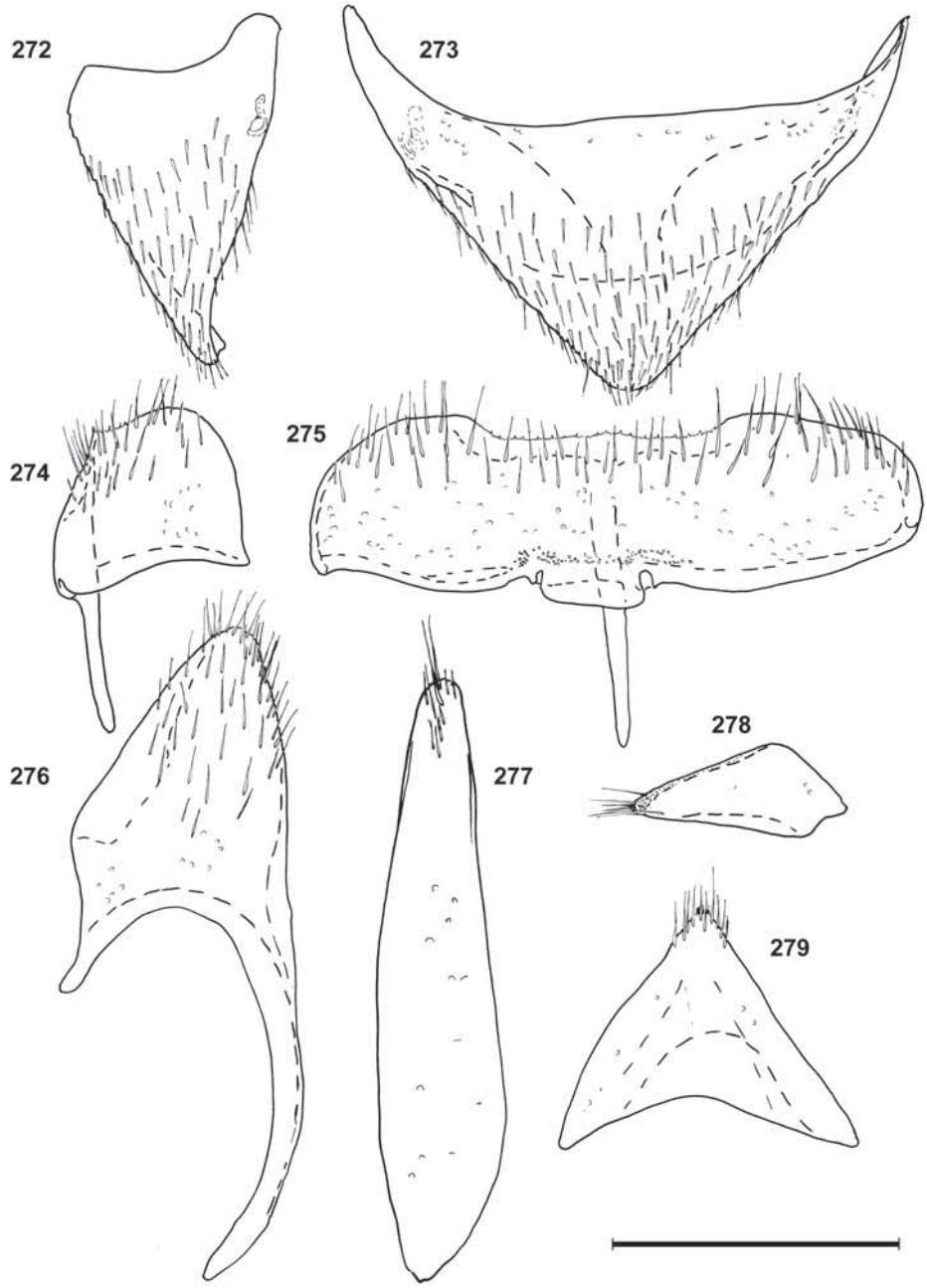
The only other Taiwanese members of the genus distributed from the North to the South of the island are *M. ping* and *M. tac*.

Comments. The species may be easily distinguished from the other Taiwanese *Megarthrus* by the frons gradually deflected toward clypeus and the third maxillary palpomeres swollen. It resembles in most aspects the East Palaearctic *M. montanus* Sawada, 1962, which has, however, different sexual characters.

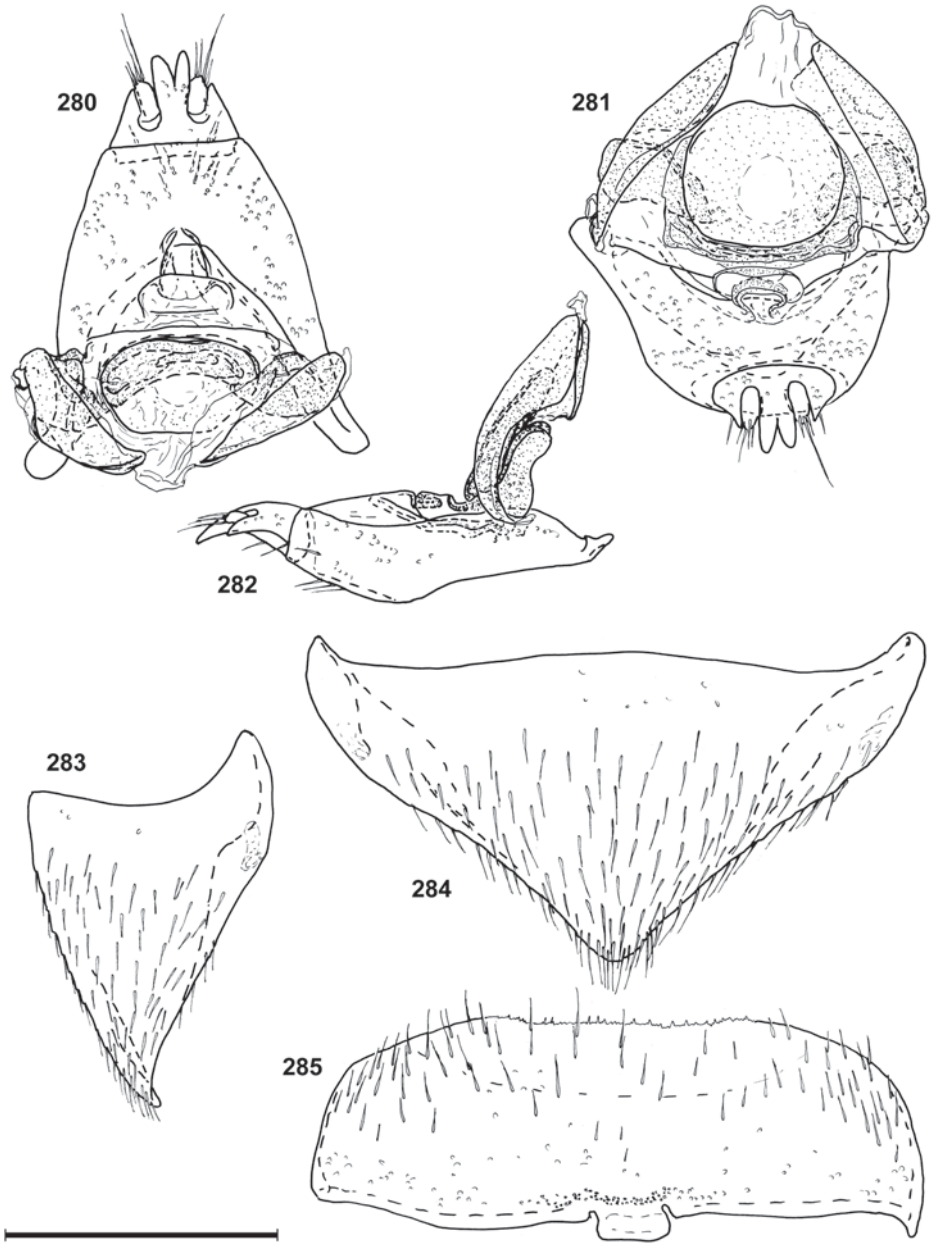
The species is named « taiwanus» because it is widely distributed in Taiwan.



Figs 265-271. *Megarthrus tic* sp. nov., male. Mesotibia (265); metatibia (266); mesotrochanter and mesofemur (267); pronotum (268) in dorsal (left) and ventral (right) views; aedeagus in lateral (268) and ventral (269) views; antenna (270). Scale bars = 0.2 mm.



Figs 272-279. *Megarthrus tic* sp. nov., male. Tergite VIII in lateral (272) and dorsal (273) views; sternite VIII in lateral (274) and dorsal (275) views; left hemitergite IX in ventral view (276); sternite IX in ventral view (277); segment X in lateral (278) and dorsal (279) views. Scale bar = 0.2 mm.



Figs 280-285. *Megarthrus tic* sp. nov., female. Genitalia in dorsal (280), posterior (281) and lateral (282) views; tergite VIII in lateral (283) and dorsal (284) views; sternite VIII in ventral view (285). Scale bar = 0.2 mm.

Megarthrus tic sp. nov.
(Figs 10, 265-285)

Type material. Holotype ♂: TAIWAN, Kaohsiung Hsien, Kuanshan Trail above Kaunshanshi River, 2550 m, 22.vii.1993, leg. A. Smetana (T 160), in MHNG. Paratypes (26): same data as holotype, 12 ♂ and 13 ♀; TAIWAN, Nantou Hsien, Nenkaoshan Trail, 2050-2150 m, 8.v.1992, leg. A. Smetana (T 120), 1 ♂.

Description. Similar to *M. modestus*, from which it differs as follows : Habitus as in Fig. 10. Combined length of pronotum and elytra = 1.2–1.4 mm; maximal pronotal width = 0.8-0.9 mm. Antenna as in Fig. 271. Pronotum as in Fig. 268.

Male. Metasternum, protarsomeres 5 and abdominal sternites IV–V unmodified. Frontoclypeal area raised, forming a truncate horn-like process. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 267) longer than metafemora. Mesotibiae (Fig. 265) about as long as metatibiae (Fig. 266). Metatarsomeres 1 about as long as metatarsomeres 2–4 combined. Peg-like setae arranged in a single row on mesotrochanters (Fig. 267), mesotibiae and metatibiae, and absent from the other parts of the legs. Abdominal tergite VIII as in Figs 272-273; sternite VIII as in Figs 274-275; hemitergite IX as in Fig. 276; sternite IX as in Fig. 277; segment X as in Figs 278-279. Aedeagus as in Figs 269–270.

Female. Anterior frontal margin in dorsal view oblique toward subangular apex. Abdominal tergite VIII as in Figs 283-284. Sternite VIII as in Fig. 285. Genital segments as in Figs 280-282.

Distribution and natural history. This Taiwanese species is known only from the central county of Nantou and the southern county of Kaohsiung, where it was found at elevations ranging from 2050 to 2550 meters a.s.l. Most specimens have been collected by sifting fallen leaves and other debris along fallen trees, in forest floor depressions and around bases of large trees under dense bushes along the Kaunshanchi river. One specimen was also found in a mature broadleaved evergreen forest by sifting fallen leaves and humus under it along vertical rock walls along the trail to Nenkaoshan.

Comments. See comments under *M. tac*.

The epiteth « tic» sounds truncate, like the fronto-clypeal process of the males of this new species.

DISCUSSION

DIVERSITY AND DISTRIBUTIONAL PATTERN

Of the fifteem *Megarthrus* species treated in this study, fourteen (95.5%) are known only from Taiwan. The only species shared with other areas of the World is *M. flavolimbatus*, which was recorded so far only from North India (Simla Hills) and becomes thus the first transoriental *Megarthrus*. It was caught in the centre and in the South of the Island at elevations ranging from 250 to 3375 meters above sea level, what indicates it has a particularly broad ecological span.

Except for *M. globulus*, which was also found as low as 700 m. a.s.l., the remaining Taiwanese species of *Megarthrus* were all collected above 1000 m a.s.l., with a maximal

diversity of thirteen species occurring at elevations ranging from 1500 to 2500 m a.s.l., and only three species species (i.e. *M. magnificus*, *M. octupus* and *M. ping*) above 3000 m a.s.l. The only other Taiwanese members of the genus distributed from the North to the South of the Island are *M. ping*, *M. tac* and *M. ping*.

Systematics

The *Megarthrus* fauna of Taiwan is phylogenetically the most diverse in the World, after that of the Himalayas. Pending a thorough phylogenetic analysis of the genus, I would associate these fifteen species as follows:

Megarthrus taiwanus clearly belongs to the « *montanus*-group », which consisted so far only of the East Palaearctic *M. montanus* Sawada, 1962, the Korean *M. coreanus* Kim et Cuccodoro, 2011, and the Nearctic *M. arcuatus* Hatch, 1957, and *M. smetanai* Cuccodoro et Löbl, 1996. These predominantly dark brown and average sized *Megarthrus* with the hypomera markedly ridged anteriorly and short and dense pubescence on the antennomeres 5 to 11 uniquely share in common the frons evenly deflexed toward the clypeus, the maxillary palpomeres 3 unusually long and swollen, and the presence of an obvious medial cupuliform protuberance on the basal third of the male abdominal sternite IX (Fig. 256). These species also have in males the hemitergites IX with normally developed lateral lobes, and a poorly sclerotized segment X. In my preliminary analytical investigations of the phylogenetic relationships within *Megarthrus* (Cuccodoro 1998), the *montanus*-group turned up consistently as the most basal and sister-group of the rest of genus.

Megarthrus flavolimbatus is the only Oriental member of the genus to possess tenent setae on the first protarsomere in the male. Within *Megarthrus*, this feature is charateristic of the « *M. depressus*-supergroup », which accomodates most species of the Palaearctic, Nearctic and Afrotropical realms. Like the other members of the *M. depressus*-supergroup, it has short and dense pubescence on the antennomeres 5 to 1, the prosternal pubescence markedly longer that that on metasternum, no distinct prohypomeral ridges, the male hemitergites IX with normally developed lateral lobes, and a poorly sclerotized segment X. It resembles in most aspects the Transpalaearctic *M. hemipterus* (Illiger, 1794) and the Chinese *M. dentipes*, notably with respect to the conformation of their genitalia, the quite characteristic shape of the male metatibiae, in combination with the lack of a medioapical projection on the female abdominal tergite VIII (= « *hemipterus*-complex »).

Megarthrus metanas has short and dense pubescence on the antennomeres 5 to 11, the frontal plubescence directed forward and the prohypomera ridged anteriorly (Fig. 115), a combination of characters it uniquely shares with the East Palaearctic *M. incubifer* Cuccodoro, 1996 (detailed morphology in Cuccodoro 1996; habitus picture in Cuccodoro & als 2011) and the Himalayan *M. dentatus* Coiffait, 1976, *M. elevatus* Coiffait, 1976, *M. fakir* Cuccodoro, 2003 and *M. ivani* Cuccodoro, 2003. These dark brown, rather robust and fairly rectangular *Megarthrus* form the « *elevatus*-supergroup», which is also characterized in the male by an unusually robust abdominal segment X (Fig. 122), and the presence of two minute mediobasal pit-like depressions on the metasternum. The four Himalayan species are moreover the only members of the genus to have the mediobasal margin of the metasterum modified in the males (=« *elevatus*-group»).

Also notable in the *elevatus*-supergroup are the terminal antennomeres piriform (Fig. 113) and the particularly well developed lateral lobes of the male abdominal hemitergites IX (Fig. 120). These features occur elsewhere in Proteininae only in the small New Guinean *auricola*-group (Cuccodoro 1998), in the large Neotropical *inaequalis*-group (Cuccodoro 2011), and in the two small East African « *africanus*-group » (i.e. *M. africanus* Eichelbaum, 1913, *M. mukankundiyeorum* Cuccodoro & Löbl, 1995, *M. selenitus* Cuccodoro et Löbl, 1995, and *M. spinosus* Cuccodoro et Löbl, 1995) and « *gigas*-group » (i.e. *M. basilewskyi* Fagel, 1957, *M. gigas* Fagel, 1957 and *M. major* Cuccodoro et Löbl, 1995). However, the Papuan and Neotropical species have the prohypomeron conspicuously ridged on entire length, while it is only slighly ridged anteriorly in the above-mentioned Afrotropical species.

Megarthrus octopus is very close to the Nepalese *M. calcaratus* (detailed morphology in Cuccodoro 2003) and the East Palaearctic *M. zerchei* (habitus picture in Cuccodoro & al. 2011), with which it shares notably a dark brown and fairly rectangular body, the lateral outlines of the pronotum forming four marked angles, the prohypomera markedly ridged anteriorly, and short and dense pubescence on the antennomeres 6 to 11 (misquoted as on 7 to 11 for *M. zerchei* in Cuccodoro and Löbl 1997 and for *M. calcaratus* in Cuccodoro 2003), and in the male the hemitergites IX with normally developed lateral lobes, and a poorly sclerotized segment X. These species also have a characteristic conformation of the male metatibiae and a sclerotized ring in the female genitalia. Within this « *calcaratus*-complex », *M. octopus* and *M. zerchei* are linked by an autapomorphic medioventral ridge on the gonocoxal plate (Figs159-160).

The species resembling most those of the *calcaratus*-complex are *M. paralellus* Sharp, 1874, from Japan (detailed morphology in Cuccodoro 2003), and *M. sawadai* Cuccodoro, 1996, from Japan and Korea (picture of habitus in Cuccodoro et al. 2011). Although these two species are slightly smaller, bear short and dense pubescence also on the fifth antennomeres, and have the lateral outline of their pronotum forming only three marked angles (= « *paralellus*-complex »), at least *M. paralellus* has female genitalia very similar to those of the members of the *calcaratus*-complex. In addition *M. paralellus*, *M. octopus* and *M. sawadai* are the only *Megarthrus* out of the *montanus*-group in which I noted the presence of something peculiar on the basal third of the male abdominal sternite IX, in occurrence a minute medial knot-like protuberance (Fig. 154).

Megarthrus globulus strongly resembles the Himalayan *M. trisinuatus* and *M. umbonatus* (detailed morphology of these species in Cuccodoro 2003), with which if forms the *« umbonatus*-complex ». These dark brown and rather globulose *Megarthrus* of average size have the elytral pubescence semi-erect and markedly longer than that on pronotum, the prohypomera markedly ridged anteriorly, bear short and dense pubescence on the antennomeres 7 to 11 setae, and the male abdominal segment X is poorly sclerotized. Their symmetrical aedeagus with two valves and a narrow and basally granulose projecting ventral wall (Figs 56-57) is very characteristic, but it exibits only very subtle interspecific differences. The members of the *umbonatus*- complex, some which (still undescribed) are distributed also in Myanmar and Thailand, are more reliably discriminated by the conformation of the female gonocoxal plate and valvifers. The only other *Megarthrus* to possess basically the same main combination of characters as that of the *umbonatus*-complex are the Nepalese *M. dissimetricus* Coiffait, 1976 and *M. yeti* Cuccodoro, 2003, which also have very similar

female genitalia, and the lateral lobes of the male abdominal hemitergites IX markedly reduced. They are, however, much more robust and hairy, have an asymmetrical aedeagus with only one robust dorsal valve, and the males bear amazing projecting processes on the abdominal sternites (= « *dissimetricus*-complex »).

Megarthrus festivus, *M. lisae*, *M. magnificus*, *M. mirabilis* and *M. splendidus* uniquely share bicolorous elytra in combination with spectacular projecting processes on the male metatrochanters and metabibiae, and the aedeagal ventral wall markedly pubescent (= « *festivus*-complex »). They also have in male the lateral lobes of the abdominal hemitergites IX markedly reduced and the abdominal segment X is poorly sclerotized. This rare and definitely beautiful *Megarthrus* species differ mainly by the shape of these processes as well as the conformation of their aedeagus. They share many unusual features in common with the East Palaearctic *M. corticalis* Sharp (detailed morphology in Cuccodoro 1996; habitus picture in Cuccodoro et als 2011), notably the body colour pattern, a markedly pubescent aedeagal ventral wall, the prohymora ridged anteriorly, and lateral outlines of the gonocoxal plate concave. The male of the latter species has, however, much more conventional posterior legs and the female has the ovipositor also less complex.

Megarthrus con, M. phoenix, *M. ping*, *M. tac* and *M. tic* are rather small and oval yellowish-brown species bearing short and dense pubescence only on the antennomeres 7 to 11. They also have in male the lateral lobes of the abdominal hemitergites IX markedly reduced and the abdominal segment X poorly sclerotized. They are mainly characterized by the frontoclypeal area modified into a short horn-like process in the male and by the presence of a complex subapical chair-like sclerite on the aedeagal internal sac (= « *convexus*-group »). These species are, however, representative of four distinct lineages of the *convexus*-group (i.e. *convexus*-complex, *integricollis*-complex, *martensi*-complex, and *M. phenix*).

Megarthrus tac and *M. tic* are unicolor and have the male frontoclypeal process truncate, like the Nepalese *M. integricollis* (= *« integricollis*-complex»).

Megarthrus con has the male frontoclypeal process pointed, the vertex and frons discolor, as well as the elytra faintly darkened laterally, like the East Palaearctic and Japanese *M. conformis*, *M. convexus*, *M. constrictus* and *M. conspirator* (= *« convexus*-complex»).

Megarthrus ping has the male frontoclypeal process pointed, the vertex and frons discolor and distinct blackish adhumeral and lateral elytral spots, like the Nepalese *M. martensi*, which also has the metatibiae broadly flattened in the male and, in the female, a lanceolate mediodorsal hyaline area between the valvifers (= *« martensi*-complex»).

With its pointed male frontoclypeal process and blackish posterior portion of the elytral disc*, Megarthrus phoenix* remains so far the only Taiwanese member of the *convexus*-group without a « sibling » continental counterpart.

It seems finally reasonable to assume that the fourteen *Megarthrus* endemic to Taiwan are the result of vicariant speciation from several ancient lineages present on the Eurasian plate prior the separation of Taiwan, with subsequent colonisation of the Island by *M. flavolimbatus* by dispersal.

ACKNOWLEDGEMENTS. I warmly thank Aleš Smetana, Ottawa, for the generous gift to the MHNG of the holotypes of the species described above, for arranging the loan of the material housed in CNCI, and for help at

various stages of this work. I also thank Scott E. Miller, Honolulu, for arranging the loan of the material housed in BPBM, and Florence Marteau, MHNG, for technical assistance with the figures.

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