

## Revision of the Japanese rove-beetles of the genus *Megarthus* (Coleoptera, Staphylinidae, Proteininae)<sup>1</sup>

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**Revision of the Japanese rove-beetles of the genus *Megarthus* (Coleoptera, Staphylinidae, Proteininae).** - The Japanese species of *Megarthus* are revised to include 16 species, five of which are described as new: *M. aino*, *M. constrictus*, *M. conspirator*, *M. incubifer* and *M. sawadai*. *Megarthus denticollis* (Beck) and *M. impressicollis* Eppelsheim are recorded for the first time from Japan, and *M. japonicus* Sharp and *M. montanus* Sawada from the Asian continent. Three names are relegated into synonymy: *M. heteropus* Sawada = *M. hemipterus* (Illiger); *M. montanus subangulatus* Sawada = *M. montanus* Sawada; *M. subparallelus* Sawada = *M. parallelus* Sharp). Lectotypes are designated for *M. convexus* Sharp, *M. corticalis* Sharp, *M. japonicus* Sharp, *M. parallelus* Sharp and *M. scriptus* Sharp. Descriptions are given and diagnostic characters are figured for all species, except for the widely distributed *M. denticollis* (Beck) and *M. hemipterus* (Illiger). A key to the Japanese species is provided, and biogeographical relationships are discussed.

**Key-words:** Staphylinidae - Proteininae - *Megarthus* - taxonomy - Japan.

### INTRODUCTION

In traditional biogeography a lot of emphasis was put on the delimitation of realms, regions, areas etc. In general the boundaries of zoogeographical realms defined by WALLACE (1876) are still used today. Two major interfaces, however, are problematic as the natural boundaries greatly depend on the group studied: the Nearctic / Neotropical and Palaearctic / Oriental boundaries, respectively. This is particularly relevant for the fauna of Japan, which is usually considered Palaearctic.

Among other staphylinoid groups, the Batrisinae and Scaphisomatini of Japan appear Oriental (LÖBL, 1981 & 1984; NOMURA, 1991), whereas *Bryaxis* Kugelann and *Micropeplus* Latreille have more Palaearctic affinities (CAMPBELL, 1968; JEANNEL,

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1950). STEEL (1966) considered the Proteinini a Holarctic taxon represented in Japan by two genera and 16 species (HAYASHI, 1988; SAWADA, 1962) but detailed phylogenetic and biogeographical relationships remain unknown.

Within the Proteinini, *Megarathrus* is of particular interest as it is very diverse in the Himalaya range (MHNG data) and penetrates into the Southern hemisphere as far South as New Caledonia, New Guinea (CUCCODORO, 1995), South Africa (CUCCODORO & LÖBL, 1995) and northern Argentina. Ten species and one subspecies of *Megarathrus* have been recorded so far from Japan. The present revision recognises 16 species and briefly discusses their biogeographical relationships.

## MATERIAL AND METHODS

The present study is based exclusively on adults (380 specimens). The material was mostly collected with Berlese and Winkler-Moczarsky electors, or with carrion, dung and Malaise traps. For detailed examination, specimens were dissected, cleared in 0.1 N potassium hydroxide and mounted in Eukit or Canada balsam on acetate slides. Drawings were made using a drawing tube. Detailed locality data are reproduced according to labels. The name of major administrative units are standardised according to KANO et al. (1967), and those of G. Lewis' collecting localities are taken from PARK (1948). Unless specified otherwise, material mentioned in the text has been examined. Diagnosis of *M. denticollis* and *M. hemipterus* are not given here, as these widely distributed species will be redescribed elsewhere. Generally only the distribution of species in Japan is recorded here in detail, but for three East Asian species - *M. conspirator*, *M. impressicollis*, *M. japonicus* and *M. montanus* - also some non Japanese records are included.

The term frons, as used in the present study refers to the area anterior of the U-shaped impression, the vertex to the area behind. Patches of sensilla on antennomeres 6 to 10 were detected by examining slide preparations. Abdominal sternites and tergites are counted from the first morphological segment. Measurements and ratios are defined as follows: length of specimens = interval from middle of anterior pronotal margin to inner apical angle of elytron; width of specimens = maximum pronotal width; AL = antennal length / pronotal length; EL = elytral sutural length / pronotal length; ET = elytral sutural length / shortest interval between sutural margin and lateral edge of elytron in dorsal view; EW = shortest interval between sutural margin and outer apical angle of elytron in dorsal view / shortest interval between sutural margin and lateral edge of elytron in dorsal view; EY = interval between posterior ocular margin and apex of frons in dorsal view / interval between anterior and posterior ocular margins in dorsal view; GT = posterior width of gula / median length of gula; GW = width of neck / posterior width of gula; HW = maximum pronotal width / interval between posterior ocular margins in dorsal view; ML = median metasternal length / median mesosternal length; MP = length of segment 4 of maxillary palpus / length of segment 3 of maxillary palpus; PT = maximum pronotal width / pronotal length; SP = maximum width of abdominal sternite 8 / width of the

basal projection: TPF = interval between basal angle and tip of medioapical projection of female abdominal tergite 8 / lateral length of medioapical projection of female abdominal tergite 8. The absence of that projection is indicated as "abs".

Material was examined from the following collections: ASPC = A. Smetana private collection, Ottawa; BMNH = The Natural History Museum, London; BPBM = Bishop Museum, Honolulu; CNCI = Canadian National Collection of Insects, Ottawa; DEI = Deutsches Entomologisches Institut, Eberswalde; FMNH = Field Museum of Natural History, Chicago; KSPC = K. Sawada private collection, Nishinomiya; MHNG = Muséum d'histoire naturelle, Geneva; NHMW = Naturhistorisches Museum, Vienna; ZMHB = Museum für Naturkunde der Humboldt-Universität, Berlin.

## NATURAL HISTORY AND ECOLOGY

Except for few a specimens of *M. montanus*, the Japanese members of *Megarthurus* possess fully developed wings. According to label data they have been found in forests, plantations and swamps, on and under the bark of logs, in leaf litter, moss, fungi and decaying vegetable matter.

## TAXONOMY

Pending a phylogenetic analysis defining natural species groups, the species are listed alphabetically.

### KEY TO SPECIES

- |   |  |                                |
|---|--|--------------------------------|
| 1 | Elytra yellow-brown with black spots. . . . .  | 2                              |
| - | Elytra unicolorous. . . . .  | 3                              |
| 2 | Male metatibia bearing peg-like setae; female valvifers with lateral margins distant (Fig. 13a). . . . .                       | <i>M. corticalis</i> Sharp     |
| - | Male metatibia lacking peg-like setae; female valvifers with lateral margins contiguous (Fig. 25a). . . . .                    | <i>M. scriptus</i> Sharp       |
| 3 | Temples, in dorsal view, flattened or weakly convex (Fig. 1h). . . . .   | 4                              |
| - | Temples, in dorsal view, strongly convex, subangulate or angulate (Fig. 1i-n). . . . .   | 7                              |
| 4 | Highest point of the eyes, in frontal view, reaching level of vertex . . . . .   | <i>M. hemipterus</i> (Illiger) |
| - | Highest point of the eyes, in frontal view, not reaching level of vertex. . . . .  | 5                              |
| 5 | Eighth abdominal sternite 3.5-5.0x as wide as its basal projection . . . . .   | <i>M. denticollis</i> (Beck)   |
| - | Eighth abdominal sternite 2.0-3.0x as wide as its basal projection. . . . .  | 6                              |
| 6 | Male metatrochanter lacking peg-like setae; female abdominal tergite 10 bearing two semicircular sclerites (Fig. 27b). . . . . | <i>M. shibatai</i> Sawada      |
| - | Male metatrochanter bearing peg-like setae; female abdominal tergite 10 without sclerites (Fig. 18b). . . . .                  | <i>M. japonicus</i> Sharp      |

- 7 Lateral edges of pronotum rounded. . . . . 8  
 – Lateral edges of pronotum angular or denticulate. . . . . 13  
 8 Anterior portion of prothoracic hypomeron with an oblique ridge. . . . . 9  
 Anterior portion of prothoracic hypomeron without ridge. . . . . 10  
 9 Elytra, in lateral view, with sutural area strongly arcuate. . . . . *M. aino* sp. n.  
 – Elytra, in lateral view, with sutural area almost straight  
 . . . . . *M. impressicollis* Eppelsheim  
 10 Male with tip of aedeagus incised (Fig. 4g); female abdominal tergite  
 10 with center of apical cupula hyaline (Fig. 5g). . . . . 11  
 – Male with tip of aedeagus pointed (Fig. 6a); female abdominal tergite  
 10 with center of apical cupula sclerotised (Fig. 7f). . . . . 12  
 11 Male with internal sac of aedeagus bearing laterobasal sclerites (Fig.  
 10b); female with lateral contours of apical portion of valvifers parallel-  
 sided (Fig. 11). . . . . *M. convexus* Sharp  
 – Male with internal sac of aedeagus without laterobasal sclerites (Fig.  
 4a); female with lateral contours of apical portion of valvifers tapering  
 (Fig. 5a). . . . . *M. conformis* Sawada  
 12 Male with internal sac of aedeagus bearing laterobasal sclerites (Fig.  
 8a); female abdominal tergite 10 with cupula bearing a pit (Fig. 9b)  
 . . . . . *M. constrictus* sp. n.  
 – Male with internal sac of aedeagus lacking laterobasal sclerites (Fig.  
 6a); female abdominal tergite 10 with cupula lacking a pit (Fig. 9b)  
 . . . . . *M. conspirator* sp. n.  
 13 Anterior portion of prothoracic hypomeron with an oblique groove. . . . . 14  
 – Anterior portion of prothoracic hypomeron without groove. . . . . 15  
 14 Frons forming a ridge above clypeus. . . . . *M. incubifer* sp. n.  
 – Frons not forming a ridge above clypeus. . . . . *M. montanus* Sawada  
 15 Male metatrochanter bearing peg-like setae; female genital segment as  
 in Fig. 22a, b. . . . . *M. parallelus* Sharp  
 – Male metatrochanter lacking peg-like setae (female unknown)  
 . . . . . *M. sawadai* sp. n.

**Megarathrus aino** sp. n.

(Figs 1g, 2a-g, 3a-f)

TYPE MATERIAL. Holotype ♂: Japan, Honshu, Iwate pref., Kawai, Yoshibezawa, 600-700 m, 16.viii.1991 (A. Smetana) #J57, MHNG. Paratypes (8): same data as holotype, 2♂ in ASPC and 1♂ in MHNG; Japan, Honshu, Iwate pref., Sugo, Takizawa, Iwate Un. Exp. For., 220 m, 11.viii.1991 (A. Smetana) #J44, 1♂ in ASPC; Kyoto pref., Seryō-Fōge, 13 Km N Kyoto, 500-600 m, 6.viii.1980 (C. Besuchet) ex leaf litter, moss and old log in plantation of *Cryptomeria japonica*, 1♀ in ASPC; same data, but (I. Löbl) ex leaf litter at foot of rocky cliff, 1♀ in ASPC and 2♀ in MIING.

DISTRIBUTION. Japan: Honshu (Kinki and Tohoku distr.).

DESCRIPTION. Length 1.1-1.2 mm; width 0.7-0.8 mm. Body and appendages yellow-brown. Dorsal pubescence fairly uniform, sparser on elytron. Anteromedian portion of frons with setae orientated backward. Elytral setae curved and recumbent. Metasternal setae longer than prosternal setae, becoming denser posteromedianly. Abdominal pubescence parallel, becoming longer near apical margins of sternites 4-7. Punctuation on anterior portion of hypomeron coarse, posteromedial portion of metasternum impunctate. Frons on level with or raised above level of vertex, forming a ridge above clypeus; frontal ridge sharp, fine. Anterior frontal edge weakly convex in middle, oblique laterally. Frontal impression shallow. Eye moderately convex, with highest point above level of vertex; supra-ocular margin sinuate in dorsal view. Temple and occipital ridge similar to that in Fig. 1i, occipital ridge indistinct in middle and sinuate laterally. Submentum weakly convex. Antenna (Fig. 2c) without patches of sensilla; scape not flattened; antennomeres 3-4 symmetrical; short and dense pubescence present on antennomeres 8-11. Pronotum (Fig. 3f) strongly convex in frontal view; mesal portion slightly arcuate in lateral view. Pronotal disc with deep depression along apical portion of lateral edge; median groove very shallow, parallel-sided. Hypomeral ridge present anteriorly, oblique. Median prosternal ridge fine and straight, interrupted in middle; anterior prosternal margin bordered by a regular row of conspicuous longitudinal ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge angulate, then bifid. Scutellum as in Fig. 1g. Elytron not or weakly narrowed basally; base abruptly inclined, then overhanging. Humeral callus low. Elytral disc without swellings, flat along lateral edge; lateral edge finely carinate, weakly convex in dorsal view; sutural area slightly arcuate basally and strongly arcuate apically in lateral view; apical margin convex near suture; inner apical angle obtuse. Metasternum with femoral line arcuate in middle; median ridge absent. Abdominal tergite 3 with anterior portion flat, then strongly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 2g, process of sternite 3 straight. Sternite 4 flat.

Ratios: AL 1.9; EL 1.7-1.8; ET 1.9; EW 1.2; EY 2.3-2.4; GT 2.1-2.2; GW 1.8-1.9; HW 1.4-1.5; ML 1.4-1.5; MP 2.0-2.2; PT 2.0-2.1; SP 3.5-4.5; TPF abs.

♂. Frontoclypeal area unmodified. Protarsomere 1 lacking tenent setae. Mesofemur longer than metafemur. Mesotibia about as long as metatibia. Metatarsomere 1 shorter than combined length of metatarsomeres 2-4. Legs unmodified. Apex of abdominal tergite 8 as in Fig. 2d, e. Sternite 8 as in Fig. 2f. Sternite 10 without subbasal protuberance. Aedeagus as in Fig. 2a, b.

♀. Abdominal tergite 8 (Fig. 3c, d) without medioapical projection. Sternite 8 as in Fig. 3b. Genital segment as in Fig. 3a, c.

COMMENTS. *Megarthus aino*, *M. conformis*, *M. conspirator*, *M. constrictus*, *M. convexus*, *M. corticalis* and *M. scriptus* are the only Japanese species to possess angulate temples. Among these, *M. aino* is characterised by the unicolorous elytra and an oblique hypomeral ridge. It resembles *M. minor* Coiffait (1976) from Nepal, from which it may be distinguished by the sexually unmodified mesotibia. See also comments under *M. impressicollis*.

**Megarathrus conformis** Sawada

(Figs 1a, i, 4a-g, 5a-i)

*Megarathrus conformis* SAWADA, 1962: 11.

TYPE MATERIAL. Holotype ♀: Japan, Honshu, Kyoto pref., Kyoto city, Kitashirakawa, 27.xii.1952 (S. Huéno), KSPC, not examined (probably lost, Sawada, pers. comm.).

Additional material (17). Japan, Honshu, Gunma pref., E Usui Pass, 850 m, 24.vii.1980 (I. Löbl) ex rotted wood and leaf litter on slope of ravine with stream in forest, 1 ♀ in MHNG; Nagano pref., Jō-shin-etsu Kogen N.P., Shiga, 1500 m, 23.vii.1980 (I. Löbl) ex leaf litter and mould on steep rocky slope of ravine with stream in forest, 1 ♂ and 4 ♀ in MJING; Shikoku, Ehime pref., Mt. Ishizuchi N. P., Mt. Ishizuchi, 13-14.viii.1980 (C. Besuchet) ex leaf litter and grass in dwarf bamboos above forest, 2 ♂ and 4 ♀ in MHNG; Ehime pref., Mt. Ishizuchi N. P., Mt. Ishizuchi, 1350 m, 13.viii.1980 (I. Löbl) ex leaf litter at foot of old *Fagus* with bamboos, 3 ♀ in MHNG; Ehime pref., Saragamine, 30.xii.1954 (K. Morikawa) 1 ♂ in BMNH; Tokushima pref., Gyō-ba, 4.viii.1967 (Y. T. Yoshida) 1 ♀ in KSPC.

DISTRIBUTION. Japan: Honshu (Chubu and Kanto distr.) and Shikoku.

DESCRIPTION. Length 1.3-1.5 mm; width 0.9-1.0 mm. Body and appendages predominantly yellow-brown with vertex, pronotum and scutellum usually darkened. Dorsal pubescence fairly uniform, sparser on elytron and near lateral edge of pronotum. Anteromedian portion of frons with setae orientated backward. Elytral setae curved and recumbent. Metasternal setae longer than prosternal setae, fairly uniform. Abdominal pubescence converging on tergites 4-6, uniform on sternites 4-7, but with a pair of long subapical setae on each sternite. Punctuation fine on anterior portion of hypomeron and posteriomedial portion of metasternum. Frons raised above level of vertex, forming a ridge above clypeus; frontal ridge sharp, fine in middle, conspicuous laterally. Anterior frontal edge subangulate in middle, oblique laterally. Frontal impression shallow in middle, deep laterally. Eye moderately convex, raised above level of vertex; supra-ocular margin sinuate in dorsal view. Temple and occipital ridge as in Fig. 1i, occipital ridge indistinct in middle and sinuate laterally. Submentum weakly convex. Antenna (Fig. 5d) without patches of sensilla; scape flattened; antennomeres 3-4 symmetrical; short and dense pubescence present on antennomeres 7-11. Pronotum (Fig. 5b) weakly convex in frontal view; mesal portion almost straight in lateral view. Pronotal disc with shallow depression along apical portion of lateral edge; median groove almost indistinct, parallel-sided. Hypomeral ridge absent. Median prosternal ridge present anteriorly, fine and straight; anterior prosternal margin not bordered by longitudinal ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge angulate, then bifid. Scutellum as in Fig. 1a. Elytron weakly narrowed basally; base abruptly inclined, then overhanging. Humeral callus low. Elytral disc without swellings, shallowly depressed, or flat along lateral edge; lateral edge conspicuously carinate, weakly convex in dorsal view; sutural area slightly arcuate basally and strongly arcuate apically in lateral view; apical margin convex near suture; inner apical angle obtuse. Metasternum with femoral line arcuate in middle; median ridge absent. Abdominal tergite 3 slightly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 5i, process of sternite 3 straight. Sternite 4 flat.

Ratios: AL 1.8-1.9; EL 2.0; ET 2.0; EW 1.0-1.1; EY 2.5-2.8; GT 2.1-2.2; GW 1.8-1.9; HW 1.6-1.8; ML 1.4-1.5; MP 1.9-2.0; PT 2.0-2.1; SP 5.5-7.0; TPF 5.0.

♂. Frontoclypeal area raised, horn-like. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 4d) longer than metafemur (Fig. 4c). Mesotibia (Fig. 4f) longer than metatibia (Fig. 4e). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia and metatrochanter (Fig. 4c); arranged in a single row on mesotrochanter (Fig. 4d), mesotibia and metatibia. Apex of abdominal tergite 8 as in Fig. 5h. Sternite 8 as in Fig. 4b. Sternite 10 without subbasal protuberance. Aedeagus as in Fig. 4a, g.

♀. Abdominal tergite 8 (Fig. 5c, f) with medioapical projection. Sternite 8 as in Fig. 5e. Genital segment as in Fig. 5a, g.

COMMENTS. The definition of this species is based on a female from Gyô-ba identified as *M. conformis* by K. Sawada. Its characters agree with the data given in the original description.

*Megarthus conformis*, *M. conspirator*, *M. constrictus* and *M. convexus* differ from other species with distinctly angulate temples (see comments under *M. aino*) by the absence of a hypomerall ridge. Within these species, *M. conformis* may be distinguished by the incised aedeagal tip and internal sac lacking laterobasal sclerites. The former character is shared only with *M. convexus*, in which the aedeagal internal sac bears laterobasal sclerites. See also comments under *M. impressicollis*.

### *Megarthus conspirator* sp. n.

(Figs 6a-g, 7a-i)

TYPE MATERIAL. Holotype ♂: Japan, Honshu, Gunma pref., Nikko N. P., below Konsei Pass, 1500-1600 m, 15.vii.1980 (I. Löbl) ex very wet leaf litter in a ravine, MHNG. Paratypes (15): same data as holotype, 1♂ in MHNG; Japan, Honshu, Gunma pref., 4 Km SW Tsumagoi, 1050 m, 18.vii.1980 (I. Löbl) ex trunk with fungi near river, 1♂ in MHNG; Gunma pref., Konsei Pass, 1800-1900 m, 13.viii.1980 (P. M. Hammond) 2♀ in BMNH and 1♀ in MHNG; Iwate pref., Kawai, Yoshibeizawa, 600-700 m, 16.viii.1991 (A. Smetana) #J57, 1♂ in ASPC; Shizuoka pref., Mt. Amagi, 4.v.1957 (K. Ishida) 1♂ in BMNH; Tochigi pref., Nikko N. P., Senjogahara, 1400 m, 15.vii.1980 (I. Löbl) ex leaf litter near stream, 1♂ in MHNG; Tochigi pref., Nikko N. P., Konsei Pass, 1800 m, 15.vii.1980 (I. Löbl) ex leaf litter under *Rhododendron* in very degraded forest on very steep slope, 1♀ in MHNG; Shikoku, Ehime pref., Mt. Ishizuchi N. P., Mt. Ishizuchi, 1550 m, 13.viii.1980 (I. Löbl) ex moss rotted wood and leaf litter under old *Abies* and *Fagus*, 1♂ in MHNG; Ehime pref., Mt. Ishizuchi N. P., Mt. Kamegamori, 1650 m, 15.viii.1980 (S. & J. Peck) ex *Abies* & moss litter, 1♂ and 2♀ in CNCI; Russia, Sakhalin, Aniva distr., Zunayiskiy Khrebet, Mt. Ishekovsk, 600-1000 m, 13.vii.1993 (A. Pütz & Wrase) 2♀ in DEI.

DISTRIBUTION. Japan: Honshu (Chubu, Kanto, and Tohoku distr.) and Shikoku; Russia: Sakhalin.

DESCRIPTION. Similar to *M. conformis* from which it differs as follows: Antenna as in Fig. 6c. Pronotum as in Fig. 7g. Abdominal sternites 2 and 3 with median processes as in Fig. 7i. Ratios: AL 1.8-2.0; EL 2.0-2.2; ET 2.2; TPF abs.

♂. Frontoclypeal area raised, horn-like. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 6f) longer than metafemur (Fig. 6g). Mesotibia (Fig. 6c) longer than metatibia (Fig. 6d). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia and metatrochanter (Fig. 6f), arranged in a single row on mesotrochanter (Fig. 6g), mesotibia and metatibia. Apex

of abdominal tergite 8 as in Fig. 7d. Sternite 8 as in Fig. 7b. Sternite 10 without subbasal protuberance. Aedeagus as in Fig. 6a, b.

♀. Abdominal tergite 8 (Fig. 7c, e) without medioapical projection. Sternite 8 as in Fig. 7h. Genital segment as in Fig. 7a, f.

COMMENTS. *Megarthus conspirator* is one of the four species with distinctly angulate temples and lacking hypomerid ridge (see comments under *M. conformis*). It may be distinguished by the pointed aedeagal tip and the internal sac without laterobasal sclerites. The former character is shared with *M. constrictus*, in which the internal sac bears laterobasal sclerites.

### *Megarthus constrictus* sp. n.

(Figs 8a-h, 9a-h)

TYPE MATERIAL. Holotype ♂: Japan, Honshu, Nagano pref., Minami Alps, Kitazawa Toge, 2000 m, 3.ix.1985 (S. T. Martin) BMNH. Paratypes (7): same data as holotype, 2♂, 3♀ in BMNH and 1♂, 1♀ in MHNG.

DISTRIBUTION. Japan: Honshu (Chubu distr.).

DESCRIPTION. Similar to *M. conformis* from which it differs as follows: Antenna as in Fig. 9c. Pronotum as in Fig. 9g. Elytral disc shallowly depressed along lateral edge; lateral edge weakly convex, except for median portion straight in dorsal view. Abdominal sternites 2 and 3 with median processes as in Fig. 9h. Ratios: EL 1.8; ET 2.1-2.2; TPF abs.

♂. Frontoclypeal area raised, horn-like. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 8g) longer than metafemur (Fig. 8h). Mesotibia (Fig. 8c) longer than metatibia (Fig. 8f). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia and metatrochanter (Fig. 8h), arranged in a single row on mesotrochanter (Fig. 8g), mesotibia and metatibia. Apex of abdominal tergite 8 as in Fig. 8b. Sternite 8 as in Fig. 8d. Sternite 10 without subbasal protuberance. Aedeagus as in Fig. 8a, c.

♀. Abdominal tergite 8 (Fig. 9c, f) without medioapical projection. Sternite 8 as in Fig. 9d. Genital segment as in Fig. 9a, b.

COMMENTS. See comments under *M. aino*, *M. conformis* and *M. conspirator*.

### *Megarthus convexus* Sharp

(Figs 10a-h, 11a-h)

*Megarthus convexus* SHARP, 1874: 100.

*M. convex* Sharp; SAWADA, 1962: 11 (incorrect spelling).

TYPE MATERIAL. Lectotype ♂: "Japan, Simabara, 10.iii.1870, G. Lewis" (Kyushu), BMNH. Paralectotypes (3): same data as lectotype, 2♀ in BMNH; "Japan, Lewis / 210" 1♂ in FMNH, by present designation.

Additional material (13). Japan, Honshu, Gunma pref., Nikko, 1430-1500 m, 11-12.viii.1980 (L. Maranuma) 2♂ and 1♀ in BMNH; Iwate pref., Kawai, Zaimokuzawa, 720 m, 15.viii.1991 (A. Smetana) #J54, 1♂ in ASPC; Kyoto pref., Kyoto city, Arashiyama, 18-20.viii.1980 (C. Besuchet) ex leaf litter and rotted wood in small ravine, 2♂ and 1♀ in MHNG; Kyoto pref., Mt. Hiei, Yaseyuen, 4.viii.1980 (C. Besuchet) ex leaf litter in ravine, 1♂ in MHNG; Osaka pref., Sakai, Hachi ga ne, Hodo-ji, 1.xii.1985 (K. Harusawa) Berlese, 1♂ in



DEI: Shizuoka pref., Ko-Myosan, 26.ii.1937 (Y. Saito) 1♀ in BPBM; Kyushu, Nagasaki, 21.iv.1881 (G. Lewis) 2♀ in BMNH; Shikoku, Ehime pref., Matsuyama, 15.iii.1953 (S. Hisamatsu) 1♀ in BMNH.

DISTRIBUTION. Japan: Honshu (Chubu, Kanto, Kinki and Tohoku distr.), Kyushu and Shikoku.

DESCRIPTION. Similar to *M. conformis* from which it differs as follows: Antenna as in Fig. 11e. Pronotum as in Fig. 11g. Abdominal sternites 2 and 3 with median processes as in Fig. 10e. Ratios: AL 1.9-2.1; EL 2.1-2.3; ET 2.1-2.4; ML 1.5-1.6; TPF 5.0.

♂. Frontoclypeal area raised, horn-like. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 10g) longer than metafemur (Fig. 10h). Mesotibia (Fig. 10c) longer than metatibia (Fig. 10f). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia and metatrochanter (Fig. 10h), arranged in a single row on mesotrochanter (Fig. 10g), mesotibia and metatibia. Apex of abdominal tergite 8 as in Fig. 10d. Sternite 8 as in Fig. 11a. Sternite 10 without subbasal protuberance. Aedeagus as in Fig. 10a-b.

♀. Abdominal tergite 8 (Fig. 11b, f) with medioapical projection. Sternite 8 as in Fig. 11c. Genital segment as in Fig. 11d, h.

COMMENTS. See comments under *M. aino* and *M. conformis*.

### *Megarthrus corticalis* Sharp

(Figs 12a-i, 13a-i)

*Megarthrus corticalis* SHARP, 1889: 468.

TYPE MATERIAL. Lectotype ♂: "Japan, Oyayama, 12.iii.1881, G. Lewis" (Honshu) BMNH. Paralectotype (♂): same data as lectotype, BMNH, by present designation.

Additional material (8). Japan (G. Lewis) ex bark, 1♂ in BMNH; Kuma (Honshu, Kumagaya?) 14.iii.1881 (G. Lewis) 1♀ in BMNH; same data, but 17.iii.1881 (written underneath the card bearing the specimen) and with a locality label "Nagasaki, 13.xi.1880-21.iv.1881", 1♂ in BMNH; Honshu, Kyoto distr., Kibuno, 9.iii.1951 (A. Nobuchi) 1♂ in BMNH; Shizuoka pref., Mt. Amagi, 3.v.1957 (Y. Watanabe) 1♂ in MHNG; Shikoku, Omogo kei, 15.vi.1956 (M. Miyatake) 1♀ in BMNH; Mt. Takanawa, 19.v.1956 (M. Miyatake) 1♀ in BMNH; Sakase, Omogo Iyo, 19.vi.1951 (M. Miyatake) 1♀ in MHNG.

DISTRIBUTION. Japan: Honshu (Chubu and Kinki distr.) and Shikoku.

DESCRIPTION. Length 1.5-1.6 mm; width 1.0-1.1 mm. Body and appendages predominantly yellow-brown with vertex, pronotum, scutellum and apical margins of abdominal tergites darkened; elytron with colour pattern as in Fig. 13d. Dorsal pubescence fairly uniform, sparser on elytron. Anteromedian portion of frons with setae orientated backward. Elytral setae curved and recumbent. Metasternal setae longer than prosternal setae, fairly uniform. Abdominal pubescence converging on tergites 4-6, uniform on sternites 4-7, but with a pair of long subapical setae on each sternite. Punctuation coarse on anterior portion of hypomerion and posteromedial portion of metasternum. Frons raised above level of vertex, forming a ridge above clypeus; frontal ridge fine, blunt in middle, sharp laterally. Anterior frontal edge weakly convex in middle, oblique laterally. Frontal impression shallow in middle, deep laterally. Eye strongly convex, raised above level of vertex; supra-ocular margin

sinuate in dorsal view. Temple and occipital ridge similar to that in Fig. 1i, occipital ridge indistinct in middle, sinuate laterally. Submentum weakly convex. Antenna (Fig. 13c) without patches of sensilla; scape flattened; antennomeres 3-4 symmetrical; short and dense pubescence present on antennomeres 6-11. Pronotum (Fig. 13i) strongly convex in frontal view; mesal portion almost straight in lateral view. Pronotal disc with shallow depressions along apical portion of lateral edge and beside median groove; median groove shallow, widened apically. Hypomerall ridge present anteriorly, oblique. Median prosternal ridge conspicuous, straight; anterior prosternal margin bordered by a regular row of conspicuous longitudinal ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge angulate, then bifid. Scutellum as in Fig. 1a. Elytron weakly narrowed basally; base abruptly inclined, then overhanging. Humeral callus low. Elytral disc with low swellings, shallowly depressed along lateral edge; lateral edge conspicuously carinate, weakly convex in dorsal view; sutural area straight basally and strongly arcuate apically in lateral view; apical margin convex near suture; inner apical angle obtuse. Metasternum with femoral line arcuate in middle; median ridge absent. Abdominal tergite 3 slightly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 13g, process of sternite 3 straight. Sternite 4 flat at base, then strongly transversely vaulted.

Ratios: AL 2.0; EL 2.0-2.1; ET 2.0; EW 1.0-1.1; EY 2.5-2.8; GT 2.2-2.3; GW 1.8; HW 1.6-1.8; ML 1.4-1.5; MP 1.9-2.0; PT 2.0-2.1; SP 3.1-3.3; TPF abs.

♂. Frontoclypeal area unmodified. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 12f) longer than metafemur (Fig. 12g). Mesotibia (Fig. 12d) about as long as metatibia (Fig. 12e). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia, arranged in a single row on mesotrochanter (Fig. 12f), mesotibia, metatrochanter (Fig. 12g) and metatibia. Apex of abdominal tergite 8 as in Fig. 12c, i. Sternite 8 as in Fig. 12h. Sternite 10 without subbasal protuberance. Aedeagus as in Fig. 12a, b.

♀. Abdominal tergite 8 (Fig. 13e, f) without medioapical projection. Sternite 8 as in Fig. 13h. Genital segment as in Fig. 13a, b.

COMMENTS. *Megarthus corticalis* differs from its Japanese congeners, *M. scriptus* excepted, by the bicolorous clytra. It may be distinguished easily from *M. scriptus* by the symmetrical aedeagus and, in the female, by the lateral margins of the valvifers widely separated. See also comments under *M. aino*.

### ***Megarthus denticollis* (Beck)**

*Omalium denticolle* Beck, 1817: 26.

*Megarthus denticollis*; ERICHSON, 1840: 906.

TYPE MATERIAL. Unknown. According to the original description from Bavaria, Germany. Additional material (1 ♀). Japan, Honshu, Shiga Pref. (Tshusuki) MIING.

DISTRIBUTION. Europe; Japan: Honshu (Kinki distr.). New to Japan.

COMMENTS. This species has been over a century currently identified as *M. denticollis* (e.g. Erichson, 1840; Ganglbauer, 1895; Lohse, 1964). It is the only member of the genus occurring in central Europe which has the metatibiae flat and

wide, and very stout metafemora in male. In *Megarathrus denticollis*, *M. japonicus* and *M. shibatai*, the highest point of the eyes is below the level of the vertex. *Megarathrus denticollis* differs from the other two species by the 8th abdominal sternite which is 3.6-5.0x as wide as its basal projection.

### *Megarathrus hemipterus* (Illiger)

*Silpha hemiptera* ILLIGER, 1794: 597.

*Megarathrus hemipterus*; ERICHRSON, 1839: 645.

*Megarathrus heteropus* SAWADA, 1962: 12 (syn. n.).

TYPE MATERIAL. *Megarathrus hemipterus*: not existing.

*Megarathrus heteropus*. Holotype, ♂; Japan, Honshu, Aomori Pref., Spa Tsuta, 19.viii.1959 (T. Shibata) KSPC.

*Additional material* (105). Japan, Simarima, 25-26.vii.1946 (I. Nakane) 1♀ in BMNH; Hokkaido, Sapporo, Ushetsu, Muine Bridge, 600 m, 7.viii.1991 (A. Smetana) #137, 4♂ and 3♀ in ASPC; Honshu, Bibi or Nikko (G. Lewis) 1♂ and 1♀ in BMNH; Aomori pref., Fukaura, Mt. Shirakami, Oku-akaishikawa-rindo, 270-400 m, 14.viii.1991 (A. Smetana) #153, 8♂ and 1♀ in ASPC; Iwate pref., Kawai, Yoshibezaawa, 1050 m, 12.viii.1991 (A. Smetana) #149, 1♀ in ASPC; Nagano pref., Minami Alps, Kitazawa Toge, 2000 m, 3.ix.1985 (S. T. Martin) 1♂ and 1♀ in BMNH; Tochigi pref., Nikko N. P., Senjogahara, 1400 m, 15.vii.1980 (I. Löbl) ex leaf litter near stream, 1♂ in MING; Wakayama pref., Arida, Shimizu T., Kamiyukawa, Nikko-jinja, 28.viii-23.ix.1989 (K. Harusawa) ex rotten chicken trap, 2♂ in DEI; Yamagata pref., Tachiyazawa-Village, 2.vii.1960 (Y. Watanabe) 1♀ in BMNH; Shikoku, Ehime pref., Mt. Ishizuchi N. P., Tsuchigoya, 1400 m, 11-18.viii.1980 (S. & J. Peck) ex carrion traps in *Fagus-Abies* forest, 4♂ and 4♀ in FMNH; same data, but ex dung cup traps in *Fagus-Abies* forest, 1♂ and 2♀ in FMNH; same data, but ex malaise trap trough in *Fagus-Abies* forest, 1♂ and 1♀ in FMNH; same data, but ex berlese, litter in *Fagus-Abies* forest, logs, stumps, moss and fungi, 1♀ in FMNH; Ehime pref., Mt. Ishizuchi N. P., Omogo Valley, 700 m, 18-25.viii.1980 (S. Peck) 12♂ and 18♀ in CNCI; same data, but ex rotted watermelon, 3♂ and 2♀ in CNCI; same data, but (S. & J. Peck) ex carrion traps in mixed warm temperate forest, 13♂ and 9♀, FMNH; same data, but ex malaise trap trough in mixed warm temperate forest, 1♀ in FMNH; same data, but ex berlese, litter under rotting water melon in warm temperate forest, 1♂ in FMNH; Ehime pref., Omogokei, 23.viii.1953 (M. Miyatake) 1♂ in BMNH; Ehime pref., Mt. Ishizuchi N. P., Tsuchigoya, 1400 m, 11-18.viii.1980 (S. & J. Peck) ex carrion traps in *Fagus-Abies* forest, 3♂ and 2♀ in CNCI.

DISTRIBUTION. Europe; Russia to Far East, China; Japan: Hokkaido, Honshu (Tohoku and Chubu distr.) and Shikoku.

COMMENTS. *Megarathrus hemipterus* is a common Palaearctic species, unique in Europe by its colour pattern, mentioned in the original description. Thus, it may be reliably identified though the type material does not exist. It is distinguished from its Japanese congeners by the eye which does not reach the level of the vertex, in combination with the temples similar to that in Fig. 1h.

### *Megarathrus impressicollis* Eppelsheim

(Figs 1c, m, 14a-i)

*Megarathrus impressicollis* EPPELSHEIM, 1893: 67.

*Type material*. Holotype ♀: "Ost-sibirien, Quellgebiet des Irkut. Leder 1891" NHMW.

*Additional material* (1♀). Japan, Honshu, Nagano pref., Jō-shin-etsu Kogen N. P., Shiga, 1500 m, 23.vii.1980 (I. Löbl) ex leaf litter and mould on steep rocky slope of ravine with stream in forest, MHNG.

*The specimen illustrated is the holotype from Siberia.*  
*I am convinced that the specimen from Japan belongs to an other species (a new one), but at this stage of my knowledge of this species group I cannot say what it is. I would like to refer it to *M. impressicollis*.*

DISTRIBUTION. Russia: Transbaikal; Japan: Honshu (Chubu distr.). New to Japan.

DESCRIPTION. Length 1.4-1.5 mm; width 0.8-0.9 mm. Body and appendages yellow-brown with vertex somewhat darkened. Dorsal pubescence fairly uniform, sparser on frons, denser along median pronotal groove. Anteromedian portion of frons with setae orientated backward. Elytral setae straight and recumbent. Metasternal setae longer than prosternal setae, becoming sparser posteromedianly. Abdominal pubescence somewhat converging on tergites 4-6, uniform on sternites 4-7, but with a pair of long subapical setae on each sternite. Punctuation line on anterior portion of hypomeron and posteromedial portion of metasternum. Frons raised above level of vertex; forming a blunt ridge above clypeus. Anterior frontal edge weakly convex in middle, oblique laterally. Frontal impression indistinct in middle, deep laterally. Eye almost hemispherical, reaching level of vertex; supra-ocular margin sinuate in dorsal view. Temple as in Fig. 1m. Occipital ridge indistinct. Submentum weakly convex. Antenna (Fig. 14a) without patches of sensilla; scape not flattened; antennomere 3 somewhat asymmetrical, antennomere 4 symmetrical; short and dense pubescence present on antennomeres 7-11. Pronotum (Fig. 14i) strongly convex in frontal view; mesal portion straight in lateral view. Pronotal disc with shallow depression along apical portion of lateral edge, and deep depression along median groove; median groove shallow, parallel-sided. Hypomeral ridge present anteriorly, oblique. Median prosternal ridge fine, straight; anterior prosternal margin bordered by a regular row of fine longitudinal ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge sinuate, then bifid. Scutellum as in Fig. 1e. Elytron not narrowed basally; base gradually inclined, then overhanging. Humeral callus low. Elytral disc with low swellings, flat along lateral edge; lateral edge finely carinate, almost straight in dorsal view; sutural area almost straight in lateral view; apical margin straight near suture; inner apical angle right-angled. Metasternum with femoral line arcuate in middle; median ridge absent. Abdominal tergite 3 slightly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 14h, process of sternite 3 straight. Sternite 4 flat.

Ratios: AL 2.0; EL 2.0; ET 2.2; FW 1.3; EY 2.6; GT 2.2; GW 1.8; HW 1.7; ML 1.9; MP 1.4; PT 1.8; SP 2.9; TPF abs.

♀. Abdominal tergite 8 (Fig. 14e, f) without medioapical projection. Sternite 8 as in Fig. 14k. Genital segment as in Fig. 14b-d, g.

♂. Unknown.

COMMENTS. Six Japanese species of *Megarthus*, *M. aino*, *M. conformis*, *M. conspirator*, *M. constrictus*, *M. convexus* and *M. impressicollis*, possess uniformly yellow-brown elytra and convex lateral edges of pronotum. *Megarthus impressicollis* may be distinguished by the sutural area almost straight in lateral view. The shape of the apical abdominal tergites in female is particularly notable.

#### *Megarthus incubifer* sp. n.

(Figs 11, k, 15a-i, 16a-g)

TYPE MATERIAL. Holotype ♂: Japan (G. Lewis), BMNH. Paratypes (2♀): Japan, Hokkaido, Mt. Daisetsu, 3.vii.1958 (M. Miyatake) MHNG; Shikoku, Ehime pref., Mt. Ishizuchi N.P., Tsuchigoya, 1400 m, 11-18.viii.1980 (S. & J. Peck) ex malaise trap trough in *Fagus-Abies* forest, FMNH.

DISTRIBUTION. Japan: Hokkaido and Shikoku.

DESCRIPTION. Length 1.4-1.5 mm; width 1.0-1.1 mm. Body uniformly dark brown with appendages paler. Dorsal pubescence fairly uniform, sparser on elytron, denser near medioapical margin of abdominal tergite 7. Anteromedian portion of frons with setae orientated forward. Elytral setae curved and recumbent. Metasternal setae as long as prosternal setae, fairly uniform. Abdominal pubescence converging on tergites 4-5, uniform on sternites 4-7, but with a pair of long subapical setae on each sternite. Punctation coarse on anterior portion of hypomeron and posteromedial portion of metasternum. Frons raised above level of vertex; forming a ridge above clypeus; frontal ridge sharp, fine. Anterior frontal edge evenly convex. Frontal impression deep. Eye almost hemispherical, with highest point above level of vertex; supra-ocular margin sinuate in dorsal view. Temple as in Fig. 1k. Occipital ridge indistinct. Submentum weakly convex. Antenna (Fig. 16a) without patches of sensilla; scape not flattened; antennomeres 3-4 symmetrical; short and dense pubescence present on antennomeres 5-11. Pronotum (Fig. 16e) strongly convex in frontal view; mesal portion almost straight in lateral view. Pronotal disc with deep depressions along apical portion of lateral edge, and beside median groove; median groove deep, parallel-sided. Hypomeral ridge present anteriorly, oblique. Median prosternal ridge conspicuous, Y-shaped; anterior prosternal margin bordered by a regular row of conspicuous longitudinal ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge sinuate, then bifid. Scutellum as in Fig. 1f. Elytron not narrowed basally; base abruptly inclined, then overhanging. Humeral callus low. Elytral disc with low swellings, flat along lateral edge; lateral edge finely carinate, weakly convex in dorsal view; sutural area slightly and evenly arcuate in lateral view; apical margin straight near suture; inner apical angle obtuse. Metasternum with femoral line arcuate in middle; median ridge absent. Abdominal tergite 3 slightly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 15e, process of sternite 3 straight. Sternite 4 flat at base, then strongly transversely vaulted.

Ratios: AL 2.1-2.2; EL 1.6-1.7; ET 1.6-1.7; EW 1.1-1.2; EY 2.4-2.5; GT 2.0-2.3; GW 1.9-2.0; HW 1.8-1.9; ML 1.5-1.6; MP 1.8-2.0; PT 2.0-2.1; SP 2.9-3.0; TPF abs.

♂. Frontoclypeal area unmodified. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 15g) longer than metafemur. Mesotibia (Fig. 15c) shorter than metatibia (Fig. 15d). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae arranged in a single row on mesotrochanter (Fig. 15g), mesotibia and metatibia, absent from protibia and metatrochanter. Apex of abdominal tergite 8 as in Fig. 15f, i. Sternite 8 as in Fig. 15h. Sternite 10 without subbasal protuberance. Aedeagus as in Fig. 15a, b.

♀. Abdominal tergite 8 (Fig. 16c, d) without medioapical projection. Sternite 8 as in Fig. 16b. Genital segment as in Fig. 16f, g.

COMMENTS. *Megarthus incubifer* and *M. montanus* differ from other Japanese members of the genus by their uniformly dark brown clytra and oblique hypomeral ridge. The former species may be distinguished by the Y-shaped prosternal ridge.

**Megarathrus japonicus** Sharp

(Figs 1c, h, 17a-k, 18a-h)

*Megarathrus japonicus* SHARP, 1874: 99.

TYPE MATERIAL. Lectotype ♂: Japan (G. Lewis) BMNH. Paralectotypes (14): same data as lectotype, 7♂, 6♀, BMNH and 1♂, FMNH, by present designation.

Additional material (50). China, Fukien prov., Chungan, Bohea Hills, 16.xi.1940 (T. C. Maa) 1♂ in BPBM; Japan (V. Quedenfeldt) # 59 037, 1♂ in MHNG and 2♂ in ZMHB; (Hiller) 2♀ in ZMHB; (Shönfeldt) 1♀ in DEI; Yokkaichi, Meer (Sauter) 1♂ in FMNH; Honshu, Gose pref., Mt. Kongo (= Watamaya pref., Mt. Kongodoji) 1100 m, 30.vii.1980 (C. Besuchet) ex leaf litter in forest, 1♀ in MHNG; Hyogo pref., Kobe, 25.i.1933, 2♂ in BMNH; Hyogo pref., Kobe, ii-v.1930, 1♀, BMNH; Hyogo pref., Mayasan, 15.x.1928 (J. Ea? unreadable, Lewis) 1♀ in BMNH; Kanagawa pref. (Sauter) 2♀ in FMNH; Kyoto distr., Kyoto, Midorogaike Pond, 7-8.viii.1980 (C. Besuchet) 1♀ in MHNG; Tokyo pref., Tokyo, 1925, 1♂, 3♀ in BMNH and 1♀ in MHNG; Tokyo, iv.1913 (F. Muir) 2♀ in BPBM; Tokyo, 1925 (Koch) 1♂ in FMNH; Tokyo pref., Inaginaganuma, 1.iv.1959 (Y. Watanabe) 1♂ in BMNH; Kanagawa pref., Yokohama (G. Lewis) 2♂, 5♀ in BMNH and 1♂, 1♀ in MHNG; Kyushu, Nagasaki pref., 7.iii.1881 (G. Lewis) 1♂ in BMNH; same data but 9.iii.1881, 1♀ in BMNH; same data but 3.iv.1881, 3♂ in BMNH; same data but 13.xi.1880-21.iv.1881, 2♂ and 3♀ in BMNH; Shikoku, Ehime pref., Matsuyama, 12.v.1951 (S. Hisamatsu) 1♂ in BMNH; same data, but 9.ii.1947 (M. Miyatake) 1♂ and 1♀ in BMNH; Kochi pref., Kuroson, 28.iv.1956 (S. Hisamatsu) 2♂ in BMNH and 1♂ in MHNG; Russia, Primorskij Kraj, Vladivostok, 11.vii.1993 (A. Pütz) 1♂ in DEI; Sakhalin, Aniva distr., Nuovo Alexandrovsk, 10 Km N Yussbno-Sakhalinsk, Zuzuya river, 12.vii.1993 (A. Pütz & Wrase) 1♀ in DEI.

DISTRIBUTION. Far East Russia; China: Fukien prov.; Japan: Honshu (Kanto and Kinki distr.), Kyushu and Shikoku. New to China and Russia.

DESCRIPTION. Length 1.3-1.4 mm; width 0.8-0.9 mm. Body predominantly dark brown or blackish with pronotum, elytron and appendages paler, sutural margin of elytron darkened; antennomeres 1-4 somewhat paler than antennomeres 5-11. Dorsal pubescence fairly uniform, somewhat denser along median pronotal groove, near humeral area of elytron and apical margin of abdominal tergite 7. Anteromedian portion of frons with setae orientated backward. Elytral setae curved and recumbent. Metasternal setae shorter than prosternal setae, becoming sparser posteriomedianly. Abdominal pubescence parallel, uniform on sternites 4-7, but with a pair of long subapical setae on each sternite. Punctuation fine on anterior portion of hypomeron, posteriomedial portion of metasternum impunctate. Frons raised above level of vertex, forming a blunt ridge above clypeus. Anterior frontal edge evenly convex. Frontal impression shallow or indistinct. Eye strongly convex, with highest point below level of vertex; supra-ocular margin sinuate in dorsal view. Temple similar to that in Fig. 1h. Occipital ridge indistinct. Submentum almost flat. Antenna (Fig. 18c) with patches of sensilla on antennomeres 6-10; scape not flattened; antennomere 3 somewhat asymmetrical, antennomere 4 strongly asymmetrical; short and dense pubescence present on antennomeres 5-11. Pronotum (Fig. 18h) weakly convex in frontal view; mesal portion almost straight in lateral view. Pronotal disc not depressed; median groove shallow, parallel-sided. Hypomeral ridge absent. Median prosternal ridge absent; anterior prosternal margin bordered by an irregular row of fine longitudinal ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge straight, then bifid. Scutellum similar to that in Fig. 1c. Elytron not

narrowed basally; base gradually inclined, then vertical. Humeral callus low. Elytral disc with low swellings, shallowly depressed along apical portion of lateral edge; lateral edge finely carinate, straight in dorsal view; sutural area almost straight in lateral view; apical margin somewhat sinuate near suture; inner apical angle right-angled. Metasternum with femoral line arcuate in middle; median ridge present posteriorly, fine and low. Abdominal tergite 3 slightly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 17h, process of sternite 3 straight. Sternite 4 flat at base, then slightly transversely vaulted.

Ratios: AL 1.8-2.0; EL 1.8-2.0; ET 1.8-2.0; EW 1.2; EY 2.3-2.5; GT 2.1-2.2; GW 1.7-1.8; HW 1.6-1.7; ML 1.6-1.7; MP 1.5-1.7; PT 2.2; SP 2.0-3.0; TPF 7.0-8.0.

♂. Frontoclypeal area unmodified. Frontal pubescence parallel. Protarsomere 1 with tenent setae. Metafemur (Fig. 17k) longer than mesofemur (Fig. 17g). Metatibia (Fig. 17d) longer than mesotibia (Fig. 17c). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia, arranged in a single row on mesotrochanter (Fig. 17g), grouped to form a field on mesotibia and metatrochanter (Fig. 17k), arranged in a single row on metatibia, but near metatibial apex grouped to form a field. Apex of abdominal tergite 8 as in Fig. 17c, f. Sternite 8 as in Fig. 18g. Sternite 10 with small subbasal protuberance (Fig. 17i). Aedeagus as in Fig. 17a, b.

♀. Frontal pubescence converging. Abdominal tergite 8 (Fig. 18c, e) with medioapical projection. Sternite 8 as in Fig. 18f. Genital segment as in Fig. 18a, b.

COMMENTS. *Megarthus japonicus* differs from other Japanese congeners, *M. shibatai* excepted, by the eyes which do not reach the level of the vertex, in combination with the 8th abdominal sternite which is 2.0-3.0x as wide as its basal projection. It differs from *M. shibatai* by the male metatrochanter bearing peg-like setae and, in female, by the hyaline 10th abdominal tergite. See also comments under *M. denticollis*.

### *Megarthus montanus* Sawada

(Figs 1d, n, 19a-i, 20a-h)

*Megarthus montanus* SAWADA, 1962: 14.

*Megarthus montanus subangulatus* SAWADA, 1962: 14 (syn.n.).

TYPE MATERIAL. *Megarthus montanus*. Holotype, ♂: Japan, Honshu, Nagano pref., Inago-Yu, 27.vii.1959 (T. Shibata) KSPC. Paratype, ♀: same data as holotype, KSPC.

*Megarthus montanus subangulatus*. Holotype, ♀: Japan, Honshu, Kanagawa pref., Osaka, Katsuoji, 24.xii.1954 (K. Sawada) KSPC. Paratype, ♀: Japan, Honshu, Kū, Mt. Kōjin, 1.vii.1956 (M. Hayashi) KSPC.

*Additional material* (10), China, Heilungkiang prov., Harbin, 16.vi.1966 (P. M. Hammond) #1364, 1♀ in BMNH; Japan, Honshu, Gunma pref., below Usui Pass, 750 m, 20.vii.1980 (I. Löbl) ex leaf litter in ravine, 1♀ in MHNG; Gunma pref., Nikko, Kozawa, 1000 m, 15.viii.1980 (P. M. Hammond) 1♀ in BMNH; Iwate pref., Kawai, Yoshiebezawa, 1050 m, 12.viii.1991, #J49 (A. Smetana), 1♂ in ASPC; Russia, slopes of Parwaja Rjetchka, Valley N Wladiwostok, 1918-1920 (H. Frieh) 2♀ in NHMW; Primorskiy Kray, Ussuriysky Zapovednik, 33 Km SE Ussuriysk <43°37' N; 132°18' E> 500 m, 13.vi.1993 (L. Zerche) 1♂, 1♀ in DEI and 1♂, 1♀ in MHNG.

DISTRIBUTION. Northeastern China; Japan: Honshu (Chubu, Kanto and Tohoku distr.); Far East Russia. New to Russia and China.

**DESCRIPTION.** Length 1.5-1.6 mm; width 0.9-1.1 mm. Body uniformly dark brown with sutural margin of elytron darkened, appendages paler; antennomeres 1-4 paler than antennomeres 5-11. Dorsal pubescence fairly uniform, sparser on elytron, denser near humeral area. Anteromedian portion of frons with setae orientated backward. Elytral setae curved and recumbent. Metasternal setae as long as prosternal setae, becoming denser posteromedianly. Abdominal pubescence converging on tergites 4-6, uniform on sternites 4-7. Punctuation coarse on anterior portion of hypomeron, fine on posteromedial portion of metasternum. Frons raised above level of vertex, evenly deflected toward clypeus. Anterior frontal edge weakly convex in middle, oblique or sinuate laterally. Frontal impression shallow in middle, deep laterally. Eye almost hemispherical, reaching level of vertex; supra-ocular margin sinuate in dorsal view. Temple and occipital ridge as in Fig. 1n, occipital ridge straight in middle and sinuate laterally. Submentum almost flat. Antenna (Fig. 20c) without patches of sensilla; scape not flattened; antennomere 3 slightly asymmetrical, 4 symmetrical; short and dense pubescence present on antennomeres 5-11. Pronotum (Fig. 20g) strongly convex in frontal view; mesal portion slightly arcuate in lateral view. Pronotal disc with deep depression along apical portion of lateral edge, and shallow depression beside median groove; median groove shallow, parallel-sided. Hypomeral ridge present anteriorly, oblique. Median prosternal ridge fine, straight, interrupted in middle; anterior prosternal margin bordered by a regular row of conspicuous longitudinal ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge sinuate, then bifid. Scutellum as in Fig. 1d. Elytron weakly narrowed basally; base abruptly inclined, then overhanging. Humeral callus low. Elytral disc with low swellings, flat along lateral edge; lateral edge finely carinate, weakly convex, or straight, in dorsal view; sutural area straight basally and slightly arcuate apically in lateral view; apical margin weakly convex near suture; inner apical angle obtuse. Metasternum with femoral line arcuate in middle; median ridge absent. Abdominal tergite 3 slightly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 20h, process of sternite 3 trifid. Sternite 4 flat.

Ratios: AL 1.7-1.8; EL 1.7-1.9; ET 1.8-2.0; FW 1.1-1.2; EY 2.4-2.8; GT 2.5-2.6; GW 1.7-1.8; HW 1.8-2.0; ML 1.3-1.9; MP 1.4-1.5; PT 2.0; SP 1.8-2-3; TPF abs.

♂. Frontoclypeal area unmodified. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 19b) longer than metafemur. Mesotibia (Fig. 19d) shorter than metatibia. Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from mesotrochanter (Fig. 19b), metatrochanter (Fig. 19c) and metatibia, grouped to form a field on mesotibia. Apex of abdominal tergite 8 as in Fig. 19h, i. Sternite 8 as in Fig. 19e. Sternite 10 (Fig. 19g) with large subbasal protuberance. Aedeagus as in Fig. 19a, f.

♀. Abdominal tergite 8 (Fig. 20c, f) without medioapical projection. Sternite 8 as in Fig. 20d. Genital segment as in Fig. 20a, b.

**COMMENTS.** *Megarthus montanus* is characterised by the male mesotibia deeply notched and, in female, the V-shaped posterior margin of the 8th abdominal sternite. See also comments under *M. incubifer*.



The two females collected respectively by I. Löbl and P. M. Hammond possess smaller eyes, shortened wings and metasternum.

**Megarathrus parallelus Sharp**

(Figs 1b, 21a-i, 22a-b)

*Megarathrus parallelus* SHARP, 1874: 99.

*Megarathrus subparallelus* SAWADA, 1962: 12 (syn.n.).

TYPE MATERIAL. *Megarathrus parallelus*. Lectotype, ♀: "Japan, G. Lewis", BMNH. Paralectotype, ♀: same data as lectotype. BMNH. by present designation.

*Megarathrus subparallelus*. Holotype, ♂: Japan, Honshu, Osaka pref., Minoo, Katsuoji, 24.xii.1954 (K. Sawada) KSPC. Paratype, ♀: Japan, Honshu, Nara pref., Mt Kasuga, 15.i.1953 (G. Imadate) KSPC.

*Additional material* (8). Japan (G. Lewis) 2♀ in BMNH, same data, but #228 (labelled as "*Megarathrus parallelus* var?") 1♀ in FMNH; Kaga (G. Lewis) 1♀ in BMNH; Fukuoji, Aki, 12.iv.1955 (M. Miyatake) 1♂ in BMNH; Honshu, Hyogo pref., Kobe, Mayasam, 13.vi.30, 350 m, 1♀ in BMNH; Kyushu, Nagasaki pref., 23.iii.1881 (G. Lewis) 1♀ in BMNH; Shikoku, Shirainot Aki, 13.xi.1949 (M. Miyatake) 1♀ in BMNH.

DISTRIBUTION. Japan: Honshu (Kinki distr.), Kyushu and Shikoku.

DESCRIPTION. Length 1.2-1.4 mm; width 0.8-0.9 mm. Body uniformly dark brown with sutural margin of elytron darkened, appendages somewhat paler. Dorsal pubescence fairly uniform, sparser on elytron. Anteromedian portion of frons with setae orientated forward. Elytral setae curved and recumbent. Metasternal setae as long as prosternal setae, becoming denser anteriorly. Abdominal pubescence converging on tergite 4, uniform on sternites 4-7, but with a pair of long subapical setae on each sternite. Punctuation line on anterior portion of hypomeron, coarse on posteromedial portion of metasternum. Frons raised above level of vertex, forming a ridge above clypeus; frontal ridge sharp, conspicuous. Anterior frontal edge evenly convex. Frontal impression deep. Eye almost hemispherical, highest point somewhat above level of vertex; supra-ocular margin sinuate in dorsal view. Temple as in Fig. 1m. Occipital ridge indistinct. Submentum weakly convex. Antenna (Fig. 22c) without patches of sensilla; scape not flattened; antennomeres 3-4 symmetrical; short and dense pubescence present on antennomeres 7-11. Pronotum (Fig. 22d) strongly convex in frontal view; mesal portion almost straight in lateral view. Pronotal disc with shallow depression along apical portion of lateral edge; median groove shallow, parallel-sided. Hypomeral ridge present anteriorly, oblique. Median prosternal ridge conspicuous and straight anteriorly, indistinct posteriorly; anterior prosternal margin bordered by a regular row of conspicuous longitudinal ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge sinuate, then bifid. Scutellum as in Fig. 1b. Elytron not narrowed basally; base abruptly inclined, then overhanging. Humeral callus low. Elytral disc with low swellings, flat along lateral edge; lateral edge finely carinate, almost straight in dorsal view; sutural area slightly and evenly arcuate in lateral view; apical margin straight near suture; inner apical angle obtuse. Metasternum with femoral line arcuate in middle; median ridge present anteriorly, fine and low. Abdominal tergite 3 slightly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 21c, process of sternite 3 straight. Sternite 4 flat at base, then slightly transversely vaulted.

Ratios: AL 2.1-2.2; EL 1.9-2.0; ET 1.7-1.8; FW 1.0-1.1; EY 2.6-2.7; GT 2.2-2.3; GW 1.9-2.0; HW 1.6-1.7; ML 1.7-2.2; MP 1.9-2.1; PT 2.0-2.1; SP 3.4-3.7; TPF abs.

♂. Frontoclypeal area unmodified. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 21h) longer than metafemur (Fig. 21k). Mesotibia (Fig. 21d) longer than metatibia (Fig. 21c). Metatarsomere 1 about 1.5x as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia, arranged in a single row on mesotrochanter (Fig. 21h), grouped to form a field on mesotibia, metatrochanter (Fig. 21k) and metatibia. Apex of abdominal tergite 8 as in Fig. 21f, i. Sternite 8 as in Fig. 22g. Sternite 10 (Fig. 21g) with small subbasal protuberance. Aedeagus as in Fig. 21a, b.

♀. Abdominal tergite 8 (Fig. 22f, h) without medioapical projection. Sternite 8 as in Fig. 22e. Genital segment as in Fig. 22a, b.

COMMENTS. Among the Japanese species of the genus, *M. parallelus* and *M. sawadai* are characterised by the uniformly dark brown elytra and the lateral edges of the pronotum forming six distinct denticles. *Megarthus parallelus* differs from *M. sawadai* by the aedeagal characters and the shape of the legs in male.

### *Megarthus sawadai* sp. n.

(Fig. 23a-n)

TYPE MATERIAL. Holotype ♂: Japan, Honshu, Gunma pref., below Usui Pass, 750 m, 20.vii.1980 (I. Löbl) ex leaf litter in ravine, MHNG. Paratype, ♂: Japan, Honshu, Kanagawa pref., Monomitouge, 18.iv.1959 (Y. Watanabe) BMNH.

DISTRIBUTION. Japan: Honshu (Kanto distr.).

DESCRIPTION. Similar to *M. parallelus* from which it may be distinguished as follows: Length 1.2 mm; width 0.8 mm. Anterior frontal edge weakly convex in middle and oblique laterally. Antenna as in Fig. 23i. Pronotum as in Fig. 23g. Abdominal sternites 2 and 3 with median processes as in Fig. 23n. Ratios: EL 1.9-2.0; GW 1.7-1.8; ML 1.5-1.6; SP 3.1-3.5.

♂. Frontoclypeal area unmodified. Protarsomeres 1 lacking tenent setae. Mesofemur (Fig. 23k) longer than metafemur. Mesotibia (Fig. 23b) longer than metatibia (Fig. 23c). Metatarsomeres 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia and mesotrochanter, arranged in a single row on mesotrochanter (Fig. 23k) and metatibia, arranged in a double row on mesotibia, but near mesotibial apex arranged in a single row. Apex of abdominal tergite 8 as in Fig. 23h, m. Sternite 8 as in Fig. 23e. Sternite 10 (Fig. 23i) with small subbasal protuberance. Aedeagus as in Fig. 23a, d.

♀. Unknown.

COMMENTS. See discussion under *M. parallelus*.

ETYMOLOGY. The species is named in honor of Mr Kohei Sawada, Nishinomyia.

### *Megarthus scriptus* Sharp

(Figs 24a-g, 24a-i)

*Megarthus scriptus* SHARP, 1889: 469.

TYPE MATERIAL. Lectotype ♂: Japan, Honshu, Gunma pref., Chuzenji, 19.viii.1881 (G. Lewis) BMNH, by present designation.

*Additional material* (89). Japan, Honshu, Aomori pref., Fukaura, Mt. Shirakami, Oku-akaishikawa-rindo, 270-400 m, 14.viii.1991 (A. Smetana) #J53, 2♂ in ASPC; Gifu pref., 8 Km SE Ōsaka, 750 m, 1.viii.1980 (I. Löbl) on and under bark of rotted trunk in *Cryptomeria* plantation, 4♂ and 4♀ in MHNG; Gunma pref., below Usui Pass, 700 m, 20.vii.1980 (I. Löbl) ex grass in abandoned field, 3♂ and 6♀ in MHNG; Gunma pref., E Usui Pass, 850 m, 24.vii.1980 (I. Löbl) ex rotted wood and leaf litter, forest on slope, 4♂ and 3♀ in MHNG; Gunma pref., Jō-shin-etsu Kogen N. P., Shirane, 1500 m, 22.vii.1980 (I. Löbl) ex swamp, 1♂ and 2♀ in MHNG; Gunma pref., Chuzenji, Natsasan, 18.viii.1965 (D. H., A. C. & A. H. Kistner) field # 1002, 2♂ and 3♀ in BPBM; Iwate pref., Iwaizumi, Hitsutori, 790 m, 11.viii.1991 (A. Smetana) #J45, 1♀ in ASPC; Iwate pref., Kawai, Yoshibe-zawa, 1050 m, 12.viii.1991 (A. Smetana) #J49, 7♀ in ASPC; Kanagawa pref., Sagami, Ohtakitoge, Nishi-tanzawa, 12.vi.1939 (H. Araki) 1♂ in BMNH; Nagano pref., Jō-shin-etsu Kogen N. P., Shiga, 1500 m, 23.vii.1980 (I. Löbl) under bark of dead *Abies*, 1♀ in MHNG; Nikko pref., 3-21.vi.1880 (G. Lewis) 1♂ in BMNH; Shizuoka pref., Mt. Amagi, 18.v.1957 (K. Ishida) 1♂ in BMNH; Tottori pref., Dai-sen-oki, 8.viii.1933 (H. Araki) 2♂ in BMNH; Shikoku, Ehime pref., Mt. Ishizuchi N. P., Tsuchigoya, 1400 m, 11-18.viii.1980 (S. & J. Peck) berlese, litter, logs, stumps, moss & fungi in *Fagus-Abies* forest, 1♂ in FMNH; same data, but ex malaise trap trough in *Fagus-Abies* forest, 1♀ in FMNH; Ehime pref., Mt. Ishizuchi N. P., Mt. Kamegamori, Siraza Pass, 1500 m, 15.viii.1980 (S. Peck) ex *Fagus* logs, 1♂ and 3♀ in CNCI; Ehime pref., Mt. Ishizuchi N. P., Omogo Valley, 700 m, 18-25.viii.1980 (S. Peck) 2♀ in CNCI; same data, but ex fungi on log & moss in mixed warm temperate forest, 2♂ and 1♀ in CNCI; same data, but (S. & J. Peck), litter under rotting watermelon, berlese, fungi on mossy logs, and malaise trap, 6♂ and 9♀ in FMNH; Ehime pref., Mt. Ishizuchi N. P., Mt. Ishizuchi, 1350 m, 13.viii.1980 (I. Löbl) ex leaf litter at foot of old *Fagus* with bamboos, 1♀ in MHNG; Ehime pref., Omogo-kei, 13.vi.1954 (S. Hisamatsu) 1♀ in BMNH; Ehime pref., Omogo, Sakase, 19.vi.1955 (M. Miyatake) 1♀ in BMNH; Ehime pref., Omogo-kei, 21, 22, 23.viii.1953 (M. Miyatake) 2♂, 1♀ in BMNH; same data, but 1 and 2.viii.1954, 3♀, 21.viii.1955, 1♀, 27.viii.1955, 3♂, and 15.vi.1956, 1♀ in BMNH; Ehime pref., Saragamine, 12.xii.1953 (T. Mohri) 1♀ in BMNH.

DISTRIBUTION. Japan: Honshu (Chubu, Kanto and Tohoku distr.) and Shikoku.

DESCRIPTION. Length 1.3-1.5 mm; width 0.8-1.0 mm. Body and appendages predominantly yellow-brown with vertex and pronotum occasionally darkened; elytra with colour pattern as in Fig. 25c. Dorsal pubescence fairly uniform, sparser on elytron. Anteromedian portion of frons with setae orientated backward. Elytral setae curved and recumbent. Metasternal setae as long as prosternal setae, becoming denser posteromedianly. Abdominal pubescence converging on tergites 4-6, uniform on sternites 4-7, but with a pair of long subapical setae on each sternite. Punctuation fine on anterior portion of hypomeron, posteromedial portion of metasternum impunctate. Frons raised above level of vertex, forming a ridge above clypeus; frontal ridge sharp, fine. Anterior frontal edge strongly convex in middle, oblique laterally. Frontal impression shallow in middle, deep laterally. Eye strongly convex, reaching level of vertex; supra-ocular margin sinuate in dorsal view. Temple and occipital ridge as in Fig. 1i, occipital ridge indistinct in middle and sinuate laterally. Submentum weakly convex. Antenna (Fig. 25d) without patches of sensilla; scape not flattened; antennomeres 3-4 symmetrical; short and dense pubescence present on antennomeres 6-11. Pronotum (Fig. 25g) weakly convex in frontal view; mesal portion almost straight in lateral view. Pronotal disc with shallow depressions along apical portion of lateral edge and beside median groove; median groove shallow, widened apically. Hypomeral ridge present anteriorly, oblique. Median prosternal ridge conspicuous, straight; anterior prosternal margin bordered by a regular row of conspicuous longitudinal

ridges. Protrochanter lacking transverse ridge. Lateral portion of prepectal ridge angulate, then bifid. Scutellum as in Fig. 1a. Elytron not narrowed basally; base abruptly inclined, then overhanging. Humeral callus low. Elytral disc with low swellings, flat along lateral edge; lateral edge conspicuously carinate, moderately convex in dorsal view; sutural area slightly and evenly arcuate in lateral view; apical margin convex near suture; inner apical angle obtuse. Metasternum with femoral line arcuate in middle; median ridge absent. Abdominal tergite 3 slightly transversely vaulted. Sternites 2 and 3 with median processes as in Fig. 25h, process of sternite 3 straight. Sternite 4 flat.

Ratios: AL 1.8-2.0; EL 2.0-2.1; ET 2.1-2.2; EW 1.1-1.2; EY 2.2-2.5; GT 1.9-2.1; GW 1.8; HW 1.6-1.8; ML 1.1-1.3; MP 1.6-1.8; PT 2.0; SP 2.5-3.0; TPF abs.

♂. Frontoclypeal area unmodified. Protarsomere 1 lacking tenent setae. Mesofemur (Fig. 24d) longer than metafemur. Mesotibia (Fig. 24c) about as long as metatibia. Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia, mesotibia and metatrochanter, arranged in a single row on metatibia and mesotrochanter (Fig. 24d). Apex of abdominal tergite 8 as in Fig. 24e, g. Sternite 8 as in Fig. 24f. Sternite 10 without basal protuberance. Aedeagus as in Fig. 24a, b.

♀. Abdominal tergite 8 (Fig. 25f, i) without medioapical projection. Sternite 8 as in Fig. 25e. Genital segment as in Fig. 24a, b.

COMMENTS. See discussion under *M. aino* and *M. corticalis*.

#### *Megarthritis shibatai* Sawada

(Figs 26a-m, 26a-h)

*Megarthritis shibatai* SAWADA, 1962: 13.

TYPE MATERIAL. Holotype ♂: Japan, Honshu, Nagano pref., Inago-yu, 1500-2000 m. 16.vii.1959 (T. Shibata) KSPC. Paratype (1 ♀): same data as holotype, but 24.vii.1959, KSPC.

Additional material (1 ♂). Japan, Honshu, Iwate pref., Kawai, Yoshibe-zawa, 1050 m. 12.viii.1991 (A. Smetana) #J49, MHNG.

DISTRIBUTION. Japan: Honshu (Chubu, and Tohoku distr.).

DESCRIPTION. Similar to *M. japonicus* from which it differs as follows: Dorsal pubescence fairly uniform. Submentum strongly convex. Antenna as in Fig. 27c, d. Pronotum as in Fig. 27e. Apical margin of clytron weakly convex near suture; inner apical angle obtuse. Abdominal sternites 2 and 3 with median processes as in Fig. 26m. Ratios: AL 1.6-1.7; EL 1.5-1.6; ET 1.6-1.7; ML 1.5; PT 1.8; TPF 6.0-7.0.

♂. Frontoclypeal area unmodified. Frontal pubescence parallel. Protarsomere 1 with tenent setae. Metafemur (Fig. 26f) somewhat longer than mesofemur (Fig. 26h). Metatibia (Fig. 26b) longer than mesotibia (Fig. 26a). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae absent from protibia and metatrochanter (Fig. 26f), arranged in a single row on mesotrochanter (Fig. 26h), grouped to form a field on mesotibia, arranged in a single row on metatibia, but near metatibial apex grouped to form a field. Apex of abdominal tergite 8 as in Fig. 26g, i. Sternite 8 as in Fig. 26k. Sternite 10 (Fig. 26d) with small subbasal protuberance. Aedeagus as in Fig. 26c, d.

♀. Frontal pubescence converging. Abdominal tergite 8 (Fig. 27f, g) with medioapical projection. Sternite 8 as in Fig. 27g. Genital segment as in Fig. 27a, b.

COMMENTS. See discussion under *M. japonicus*.

## DISCUSSION

All available Japanese material of *Megarthus* is from the main islands, totalling 16 species (Fig. 28, table 1). Most of the Japanese *Megarthus* are from Honshu, Chubu district (10 species). Altitudinal records indicate a preference of *Megarthus* for montane biotopes ranging from 700-1600 m a. s. l. Only 5 species were found between 200-700 m, and 3 above 1600 m. The surprisingly high number of species from Shikoku compared to that from Kyushu may be explained by gaps in the detailed knowledge of the distribution. The related Omaliinae are represented in both islands by an equal number of species (WATANABE 1990). In unrelated groups, such as Calliphoridae and Sarcophagidae (KANO *et al.*, 1967; KANO & SHINONAGA 1968) these figures are essentially the same. The relatively high proportion of species that also occur outside Japan (37.5%) is notable. In the Omaliini which usually inhabit similar habitats (Löbl, pers. comm.) only one of 17 Japanese species is also found in other countries (WATANABE 1990). All of the non-endemic Japanese species of *Megarthus* occur, outside Japan, in Russia, temperate China and Europe. This suggests that *Megarthus* represents a Palaearctic rather than an Oriental element in Japan.

## ACKNOWLEDGMENTS

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TABLE 1. Geographical distribution of the Japanese *Megarthus*.

Species	Localities	Hokkaido	Honshu					Shikoku	Kyushu	Europe	Russia	China
			Tohoku	Kanto	Chubu	Kinki	Chugoku					
<i>M. aino</i>			X									
<i>M. conformis</i>				X	X			X				
<i>M. conspirator</i>			X	X	X			X			X	
<i>M. constrictus</i>					X							
<i>M. convexus</i>			X	X	X	X		X	X			
<i>M. corticalis</i>					X	X		X				
<i>M. denticollis</i>						X				X		
<i>M. hemipterus</i>	X	X		X				X		X	X	X
<i>M. impressicollis</i>					X						X	
<i>M. incubifer</i>	X							X				
<i>M. japonicus</i>				X		X		X	X		X	X
<i>M. montanus</i>			X	X	X						X	X
<i>M. parallelus</i>						X		X	X			
<i>M. sawadai</i>				X								
<i>M. scriptus</i>			X	X	X		X	X				
<i>M. shibasaki</i>			X		X							
			7	7	10	6	1			2	5	3
<b>16</b>		<b>2</b>	<b>15</b>					<b>9</b>	<b>3</b>	<b>6</b>		

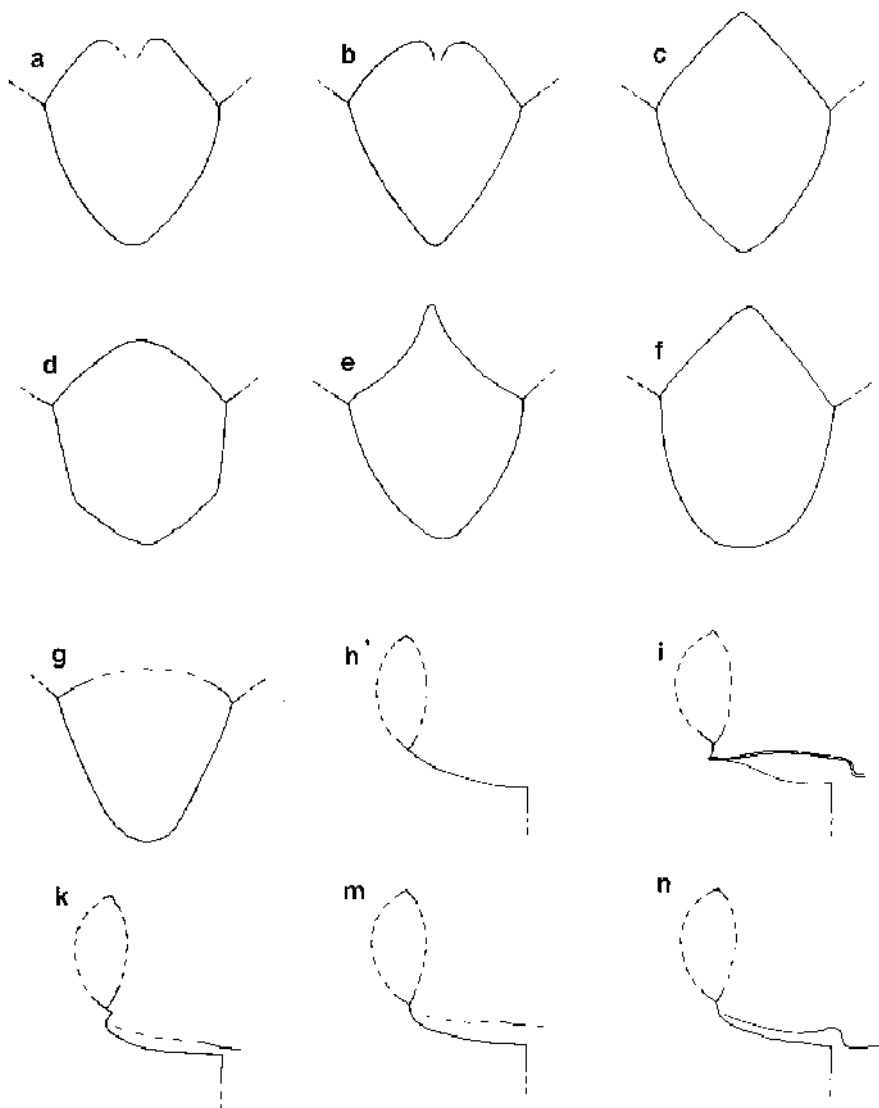


FIG. 1

Scutellum: a-g; Temple and occipital ridge: h-n; schematic. *Megarthus aino*: g; *M. conformis*: a, i; *M. impressicollis*: e, m; *M. incubifer*: l, k; *M. japonicus*: c, h; *M. montanus*: d, n; *M. parallelus*: b.

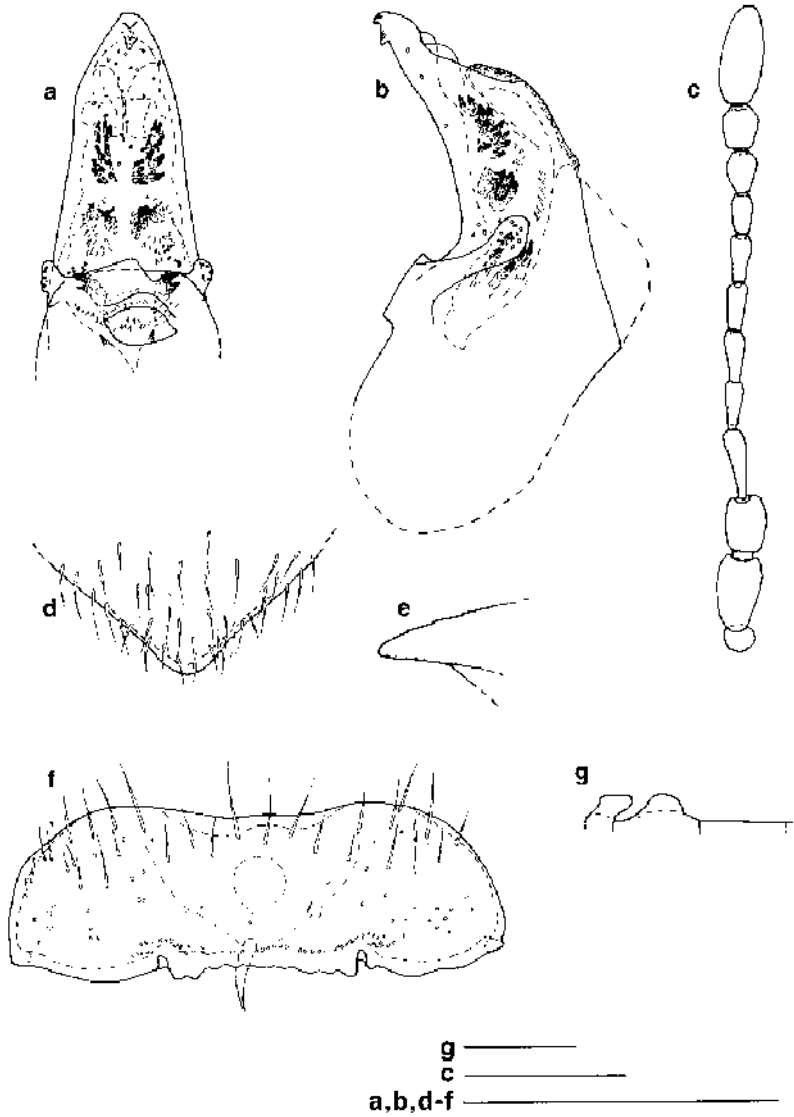


FIG. 2

*Megarthus aino*; a, b: aedeagus, ventral (apical portion) and lateral; c: antenna; d, e: male, apex of abdominal tergite 8, lateral and dorsal; f: male, abdominal sternite 8; g: median processes of abdominal sternites 2-4 (left to right), schematic. Scale bars = 0.2 mm.

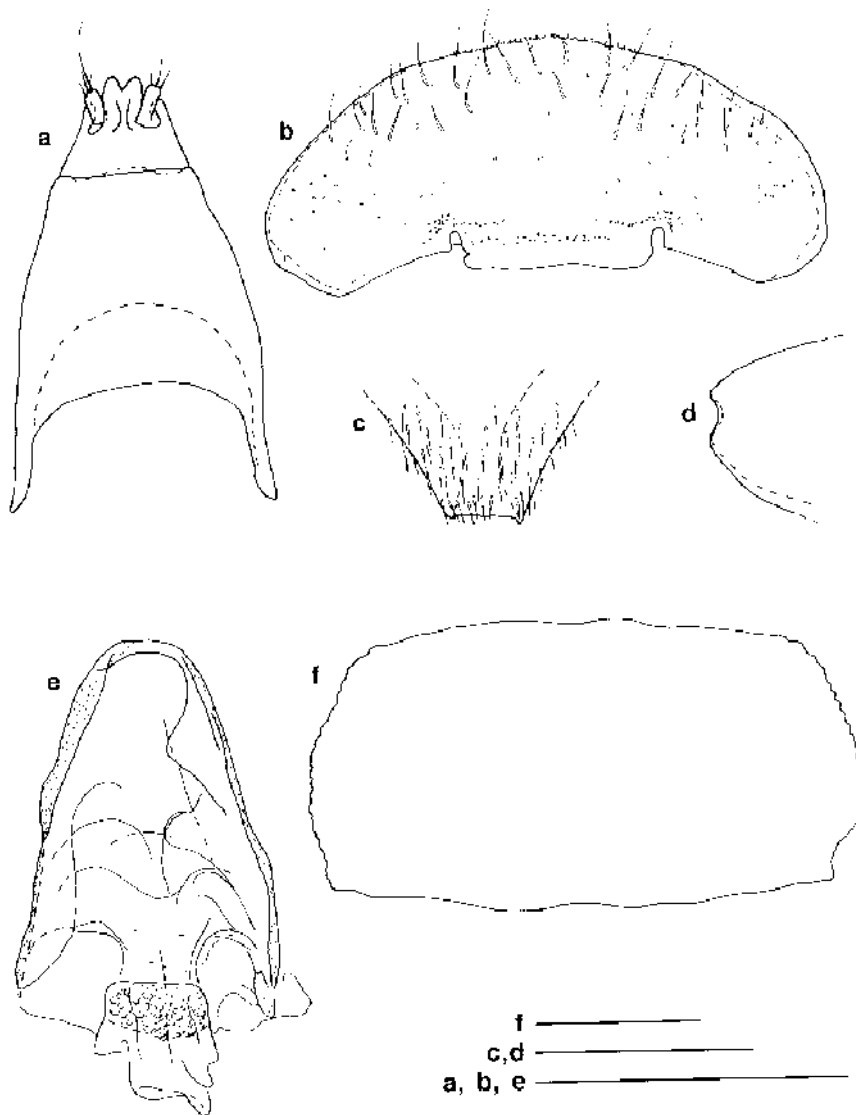


FIG. 3

*Megarthus aino*; a, e: female, genital segment, sternites (a) dorsal and tergites (e) ventral; b: female, abdominal sternite 8; c, d: female, apex of abdominal tergite 8, dorsal and lateral; f: pronotum. Scale bars = 0.2 mm.



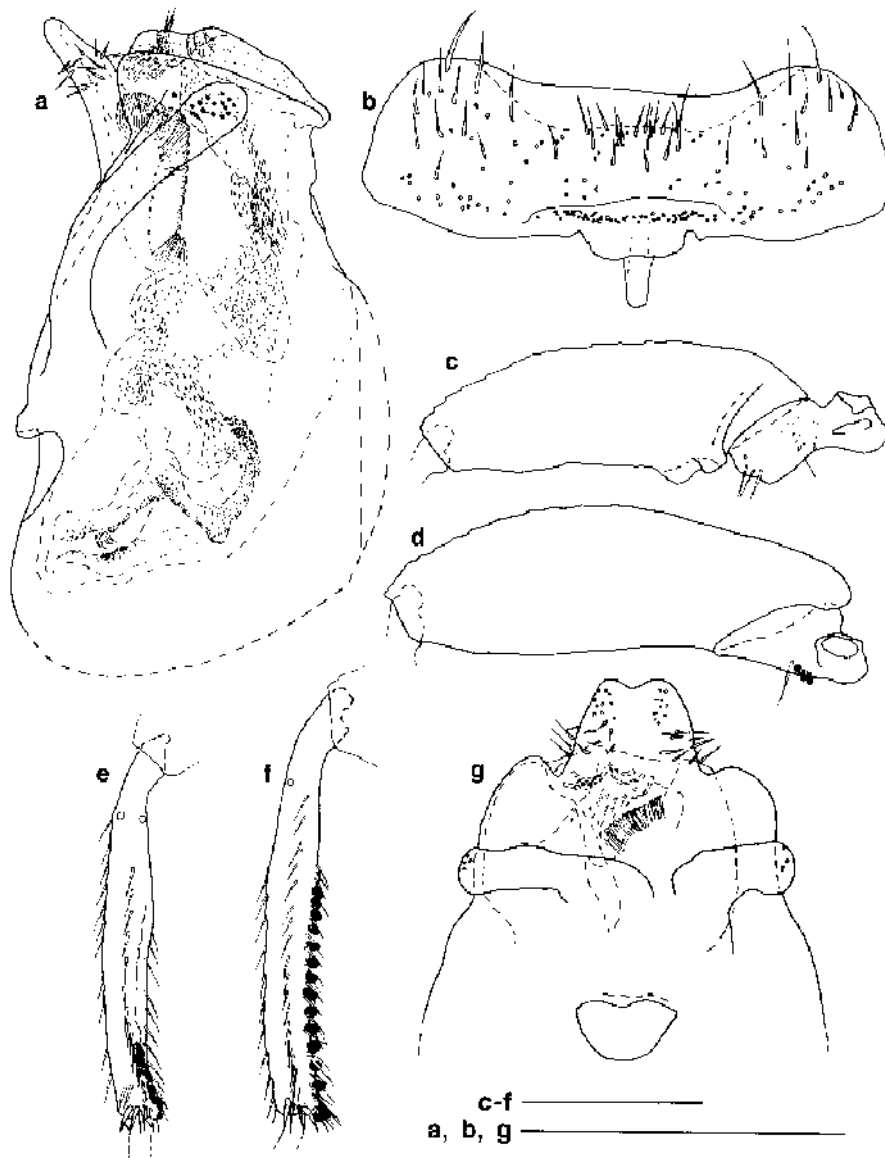


FIG. 4

*Megarthrus conformis*, male; a, g: aedeagus, lateral and ventral (apical portion); b: abdominal sternite 8; c: metafemur and metatrochanter; d: mesofemur and mesotrochanter; e: metatibia; f: mesotibia. Scale bars = 0.2 mm.

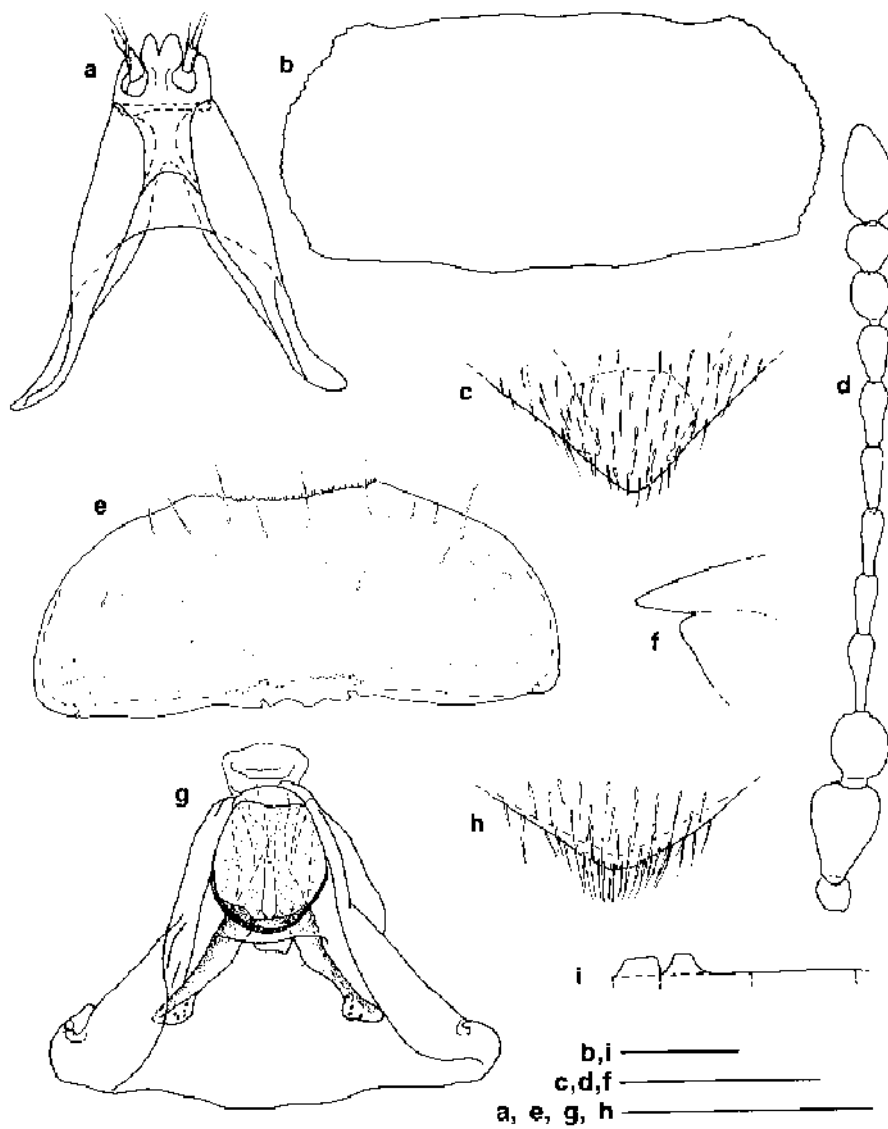


FIG. 5

*Megarthus conformis*: a, g: female, genital segment, sternites (a) dorsal and tergites (g) ventral; b: pronotum; c, f: female, apex of abdominal tergite 8, dorsal and lateral; d: antenna; e: female, abdominal sternite 8; h: male, apex of abdominal tergite 8, dorsal; i: median processes of abdominal sternites 2-4 (left to right), schematic. Scale bars = 0.2 mm.

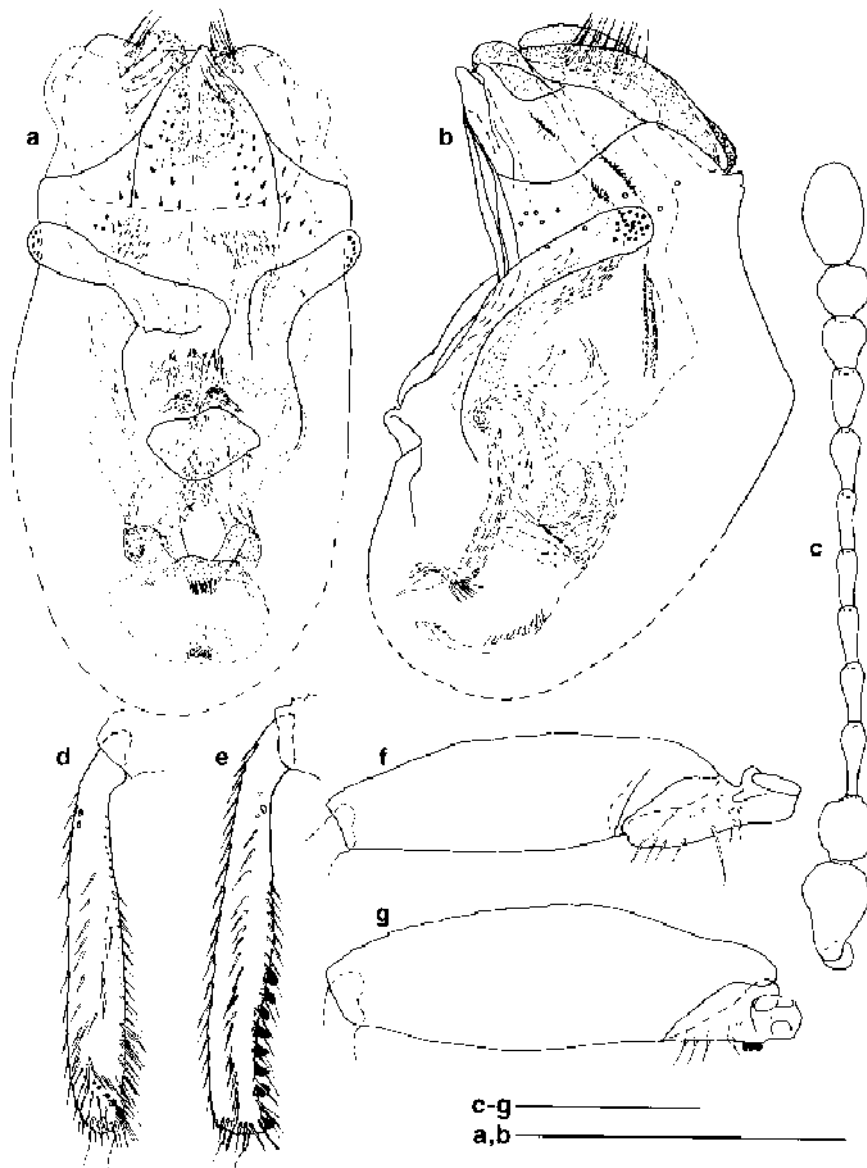


FIG. 6

*Megarthrus conspirator*; a, b: male, aedeagus, ventral and lateral; c: antenna; d: male, metatibia; e: male, mesotibia; f: male, metafemur and metatrochanter; g: male, mesofemur and mesotrochanter. Scale bars = 0.2 mm.

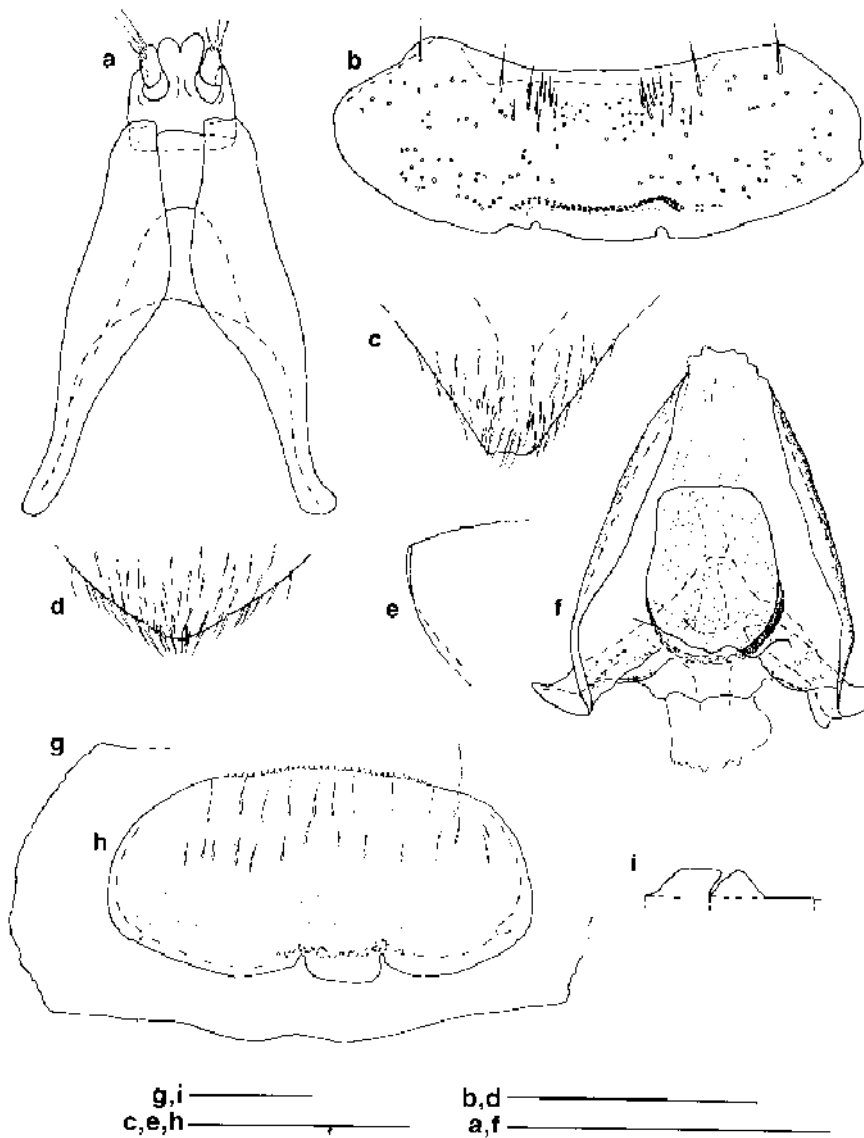


FIG. 7

*Megarthus conspirator*; a, f: female, genital segment, sternites (a) dorsal and tergites (f) ventral; b, h: abdominal sternite 8 (b) male and (h) female; c, e: female, apex of abdominal tergite 8, dorsal and lateral; d: male, apex of abdominal tergite 8, dorsal; g: pronotum, contour, basal and lateral; i: median processes of abdominal sternites 2-3 (left to right), schematic. Scale bars = 0.2 mm.

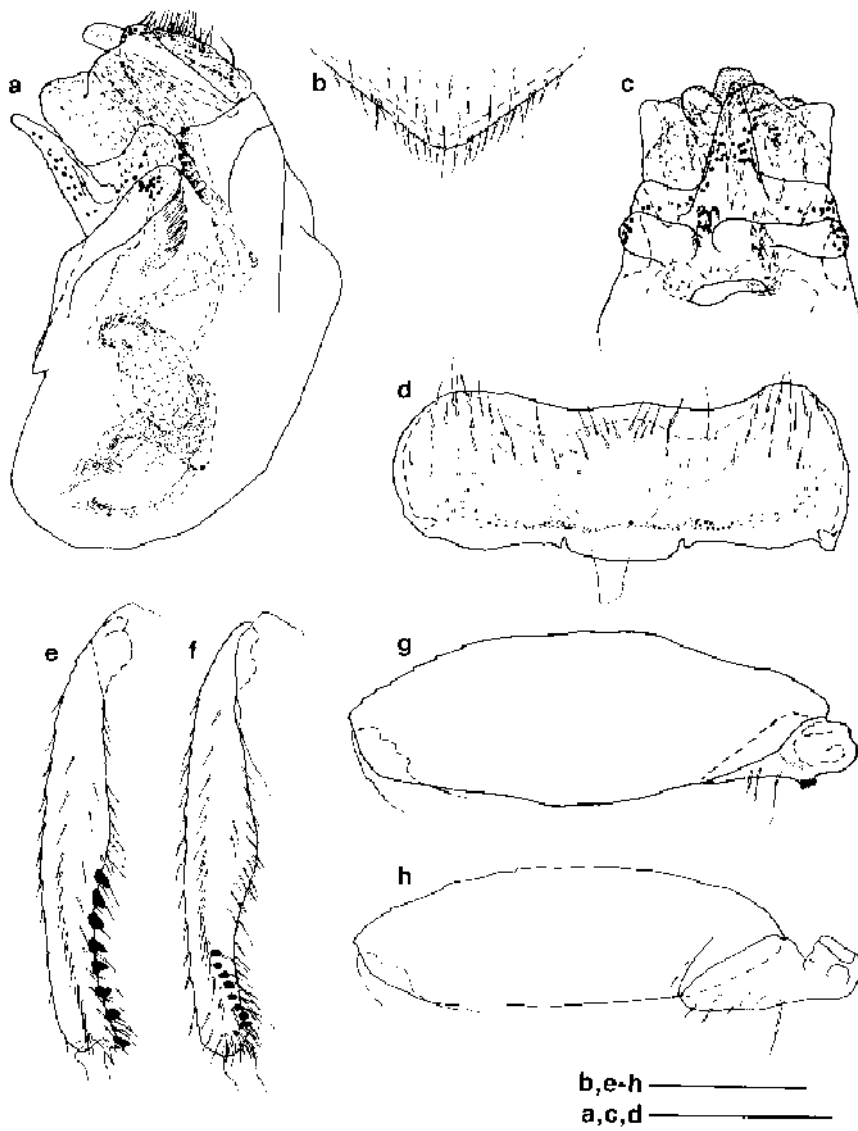


FIG. 8

*Megarthus constrictus*, male: a, c: aedeagus, lateral and ventral (apical portion); b: apex of abdominal tergite 8, dorsal; d: abdominal sternite 8; e: mesotibia; f: metatibia; g: mesofemur and mesotrochanter; h: metafemur and metatrochanter. Scale bars = 0.2 mm.

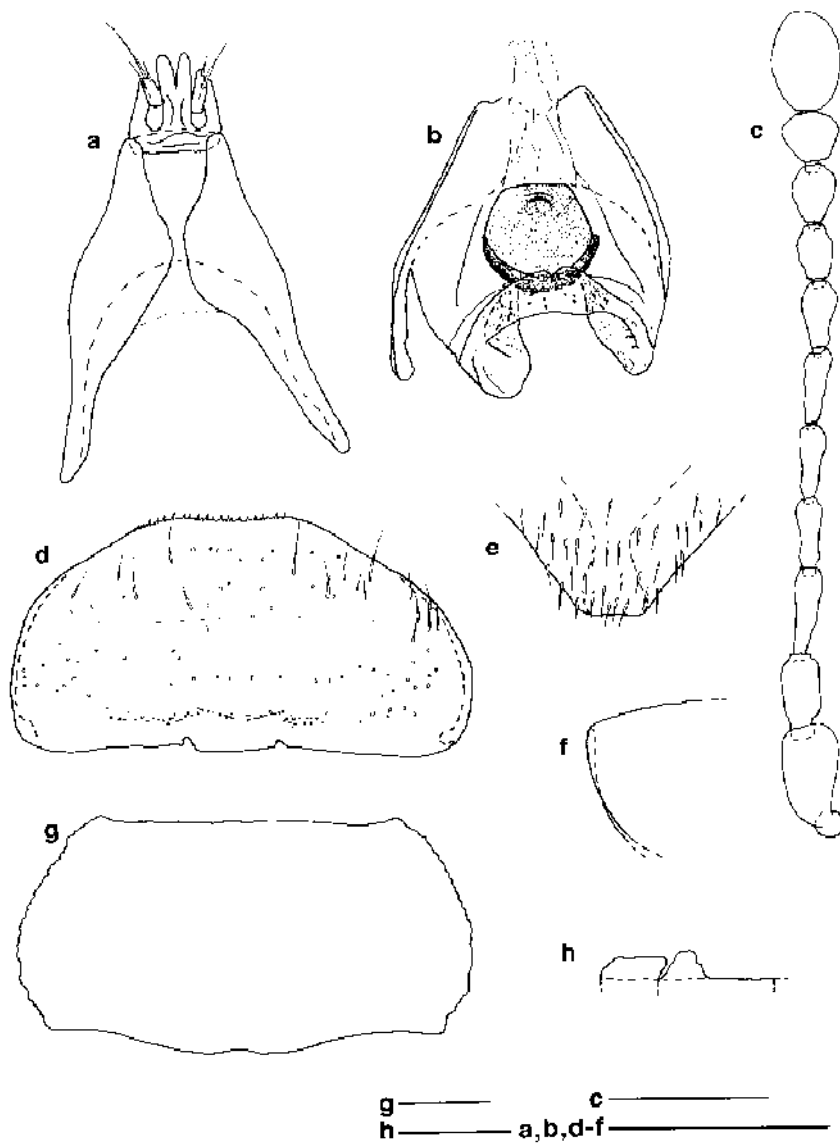


FIG. 9

*Megarthus constrictus*; a, b: female, genital segment, sternites (a) dorsal and tergites (b) ventral; c: antenna; d: female, abdominal sternite 8; e, f: female, apex of abdominal tergite 8, dorsal and lateral; g: pronotum; h: median processes of abdominal sternites 2-3 (left to right), schematic. Scale bars = 0.2 mm.

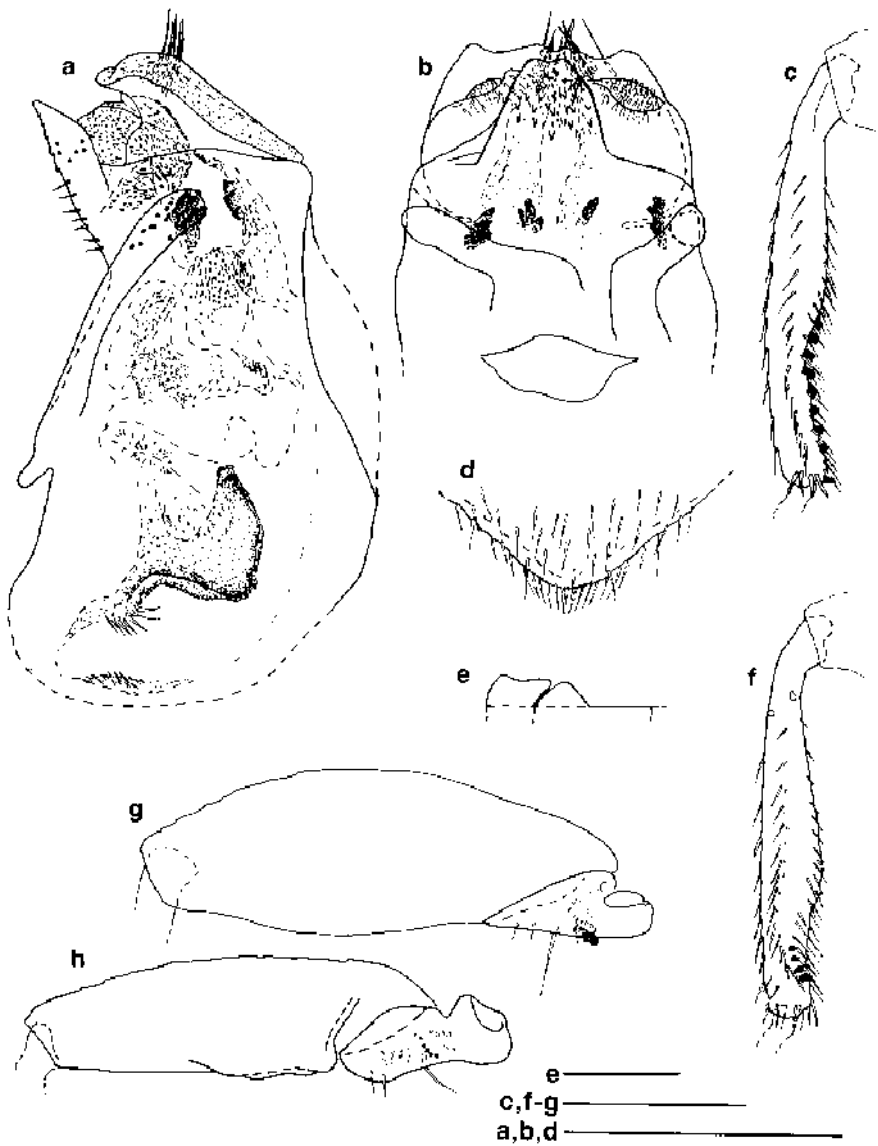


FIG. 10

*Megarthus convexus*; a, b: male, aedeagus, lateral and ventral (apical portion); c: male, mesotibia; d: male, apex of abdominal tergite 8, dorsal; e: median processes of abdominal sternites 2-3 (left to right), schematic; f: male, metatibia; g: male, mesofemur and mesotrochanter; h: male, metafemur and metatrochanter. Scale bars = 0.2 mm.

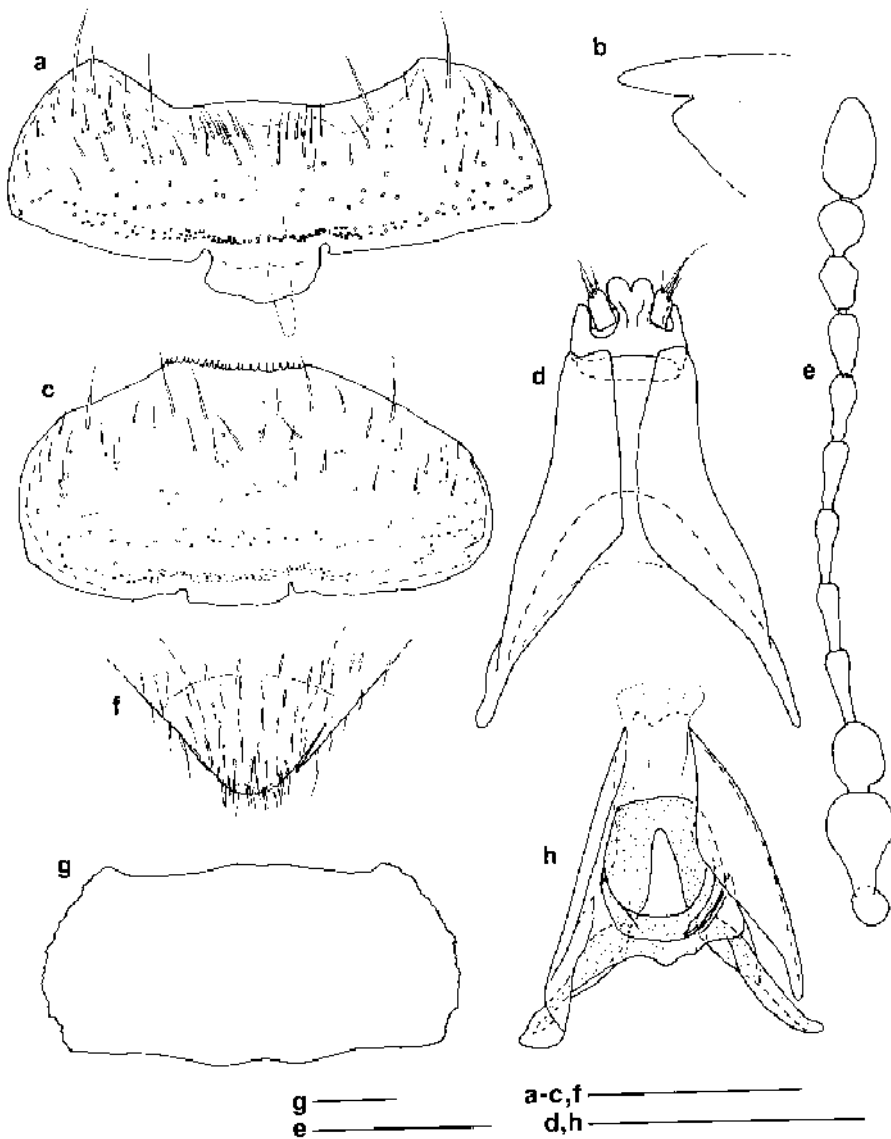


FIG. 11

*Megarthus convexus*; a, c: abdominal sternite 8 (a) male and (c) female; b, f: female, apex of abdominal tergite 8, lateral and dorsal; d, h: female, genital segment, sternites (d) dorsal and tergites (h) ventral; g: pronotum. Scale bars = 0.2 mm.



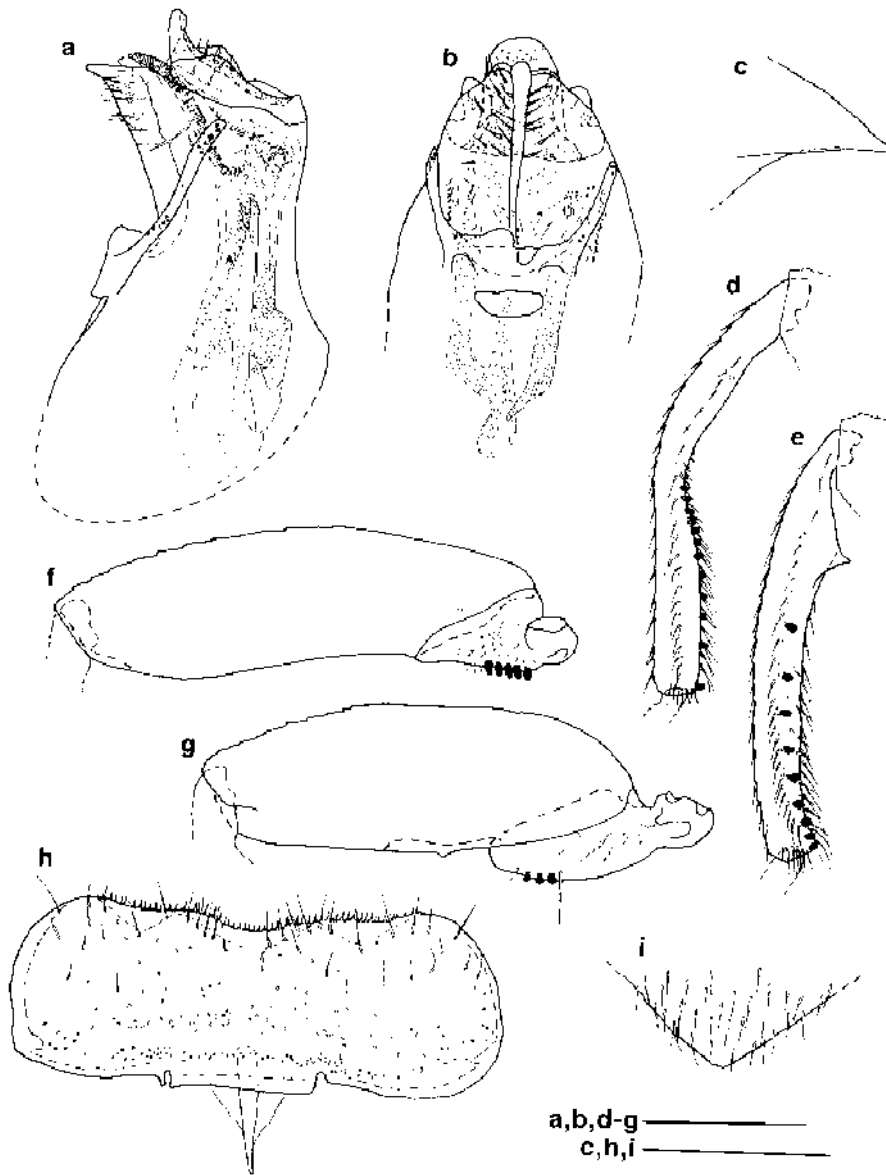


FIG. 12

*Megarthus corticalis*, male; a, b: aedeagus, lateral and ventral (apical portion); c, i: apex of abdominal tergite 8, lateral and dorsal; d: mesofibia; e: metatibia; f: mesofemur and mesotrochanter; g: metafemur and metatrochanter; h: abdominal sternite 8. Scale bars = 0.2 mm.

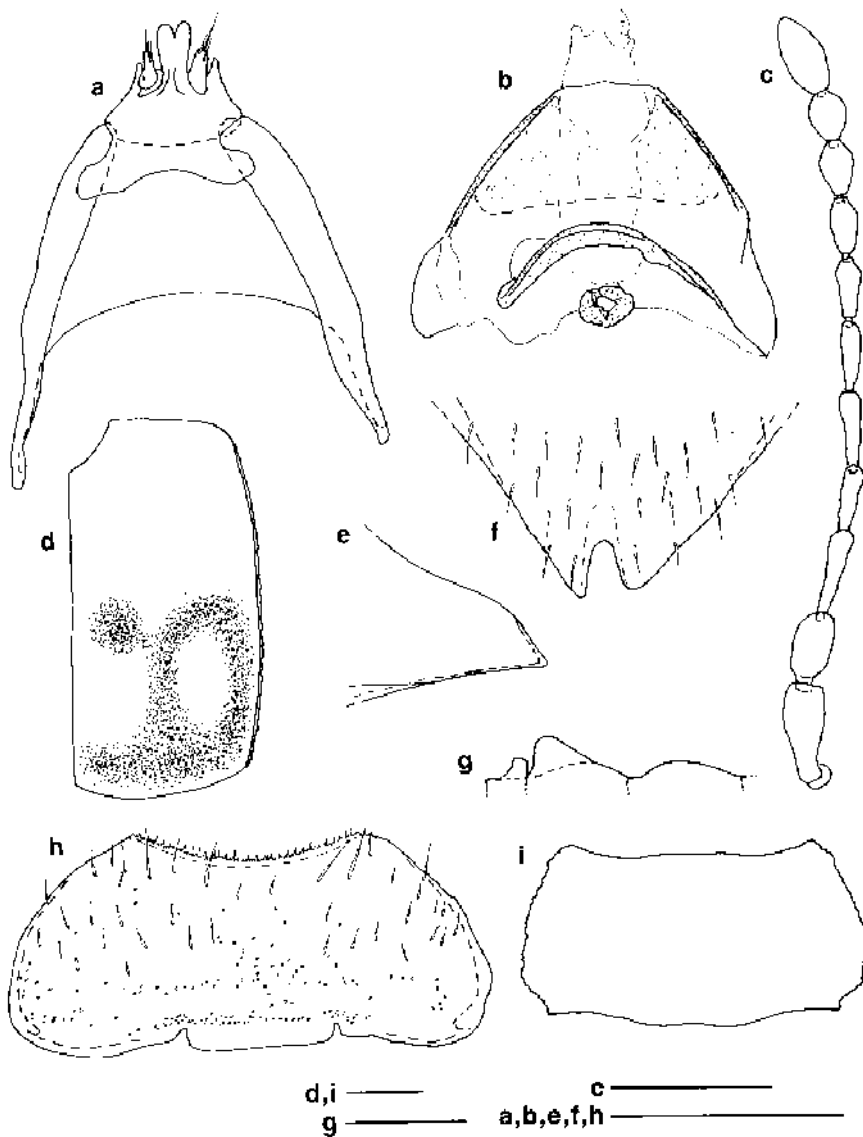


FIG. 13

*Megarthus corticalis*; a, b: female, genital segment, sternites (a) dorsal and tergites (b) ventral; c: antenna; d: right elytron; e, f: female, apex of abdominal tergite 8, lateral and dorsal; g: median processes of abdominal sternites 2-4 (left to right), schematic; h: female, abdominal sternite 8; i: pronotum. Scale bars = 0.2 mm.

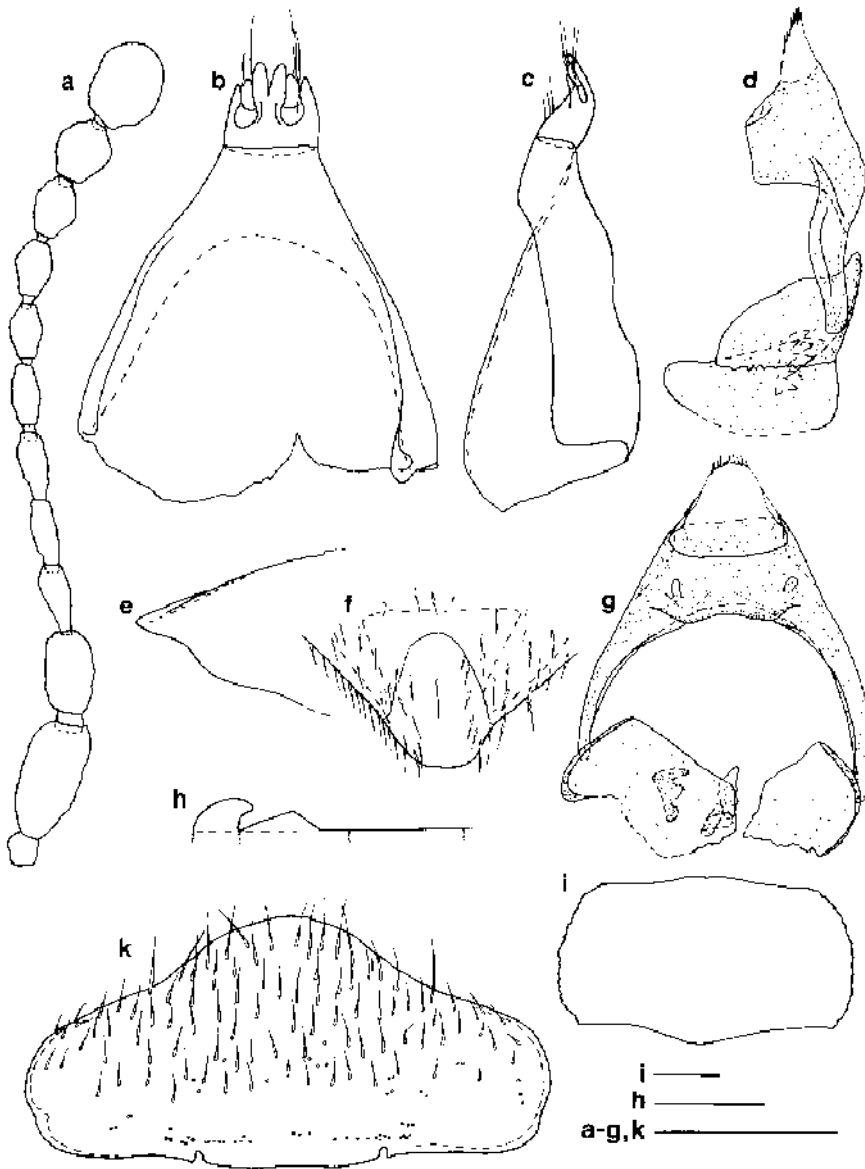


FIG. 14

*Megarthus impressicollis*; a; antenna; b-d, g; female, genital segment, sternites (b, c) dorsal and lateral, and tergites (d, g) lateral and ventral; e, f; female, apex of abdominal tergite 8, lateral and dorsal; h; median processes of abdominal sternites 2-4 (left to right), schematic; i; pronotum; k; female, abdominal sternite 8. Scale bars = 0.2 mm.

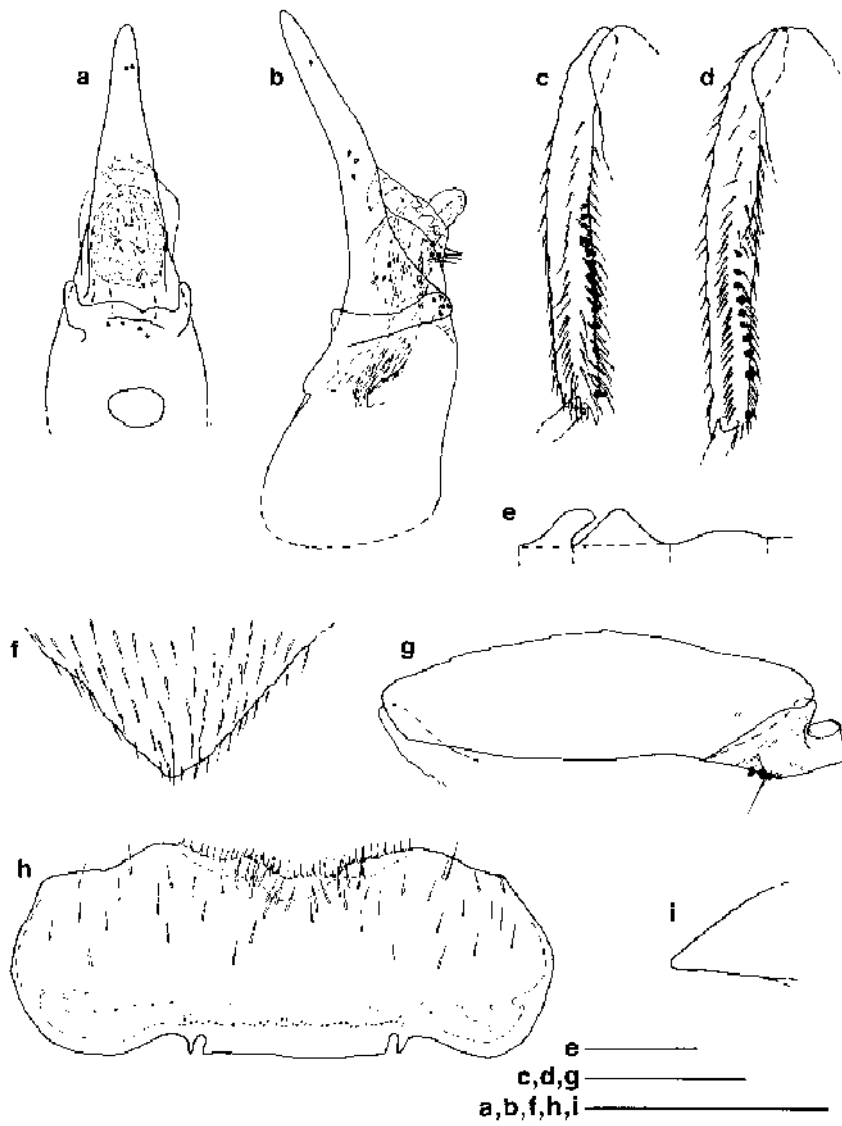


FIG. 15

*Megarthus incubifer*; a, b: male, aedeagus, ventral (apical portion) and lateral; c: male, mesotibia; d: male, metatibia; e: median processes of abdominal sternites 2-4 (left to right), schematic; f, i: male, apex of abdominal tergite 8, dorsal and lateral; g: male, mesofemur and mesotrochanter; h: male, abdominal sternite 8. Scale bars = 0.2 mm.

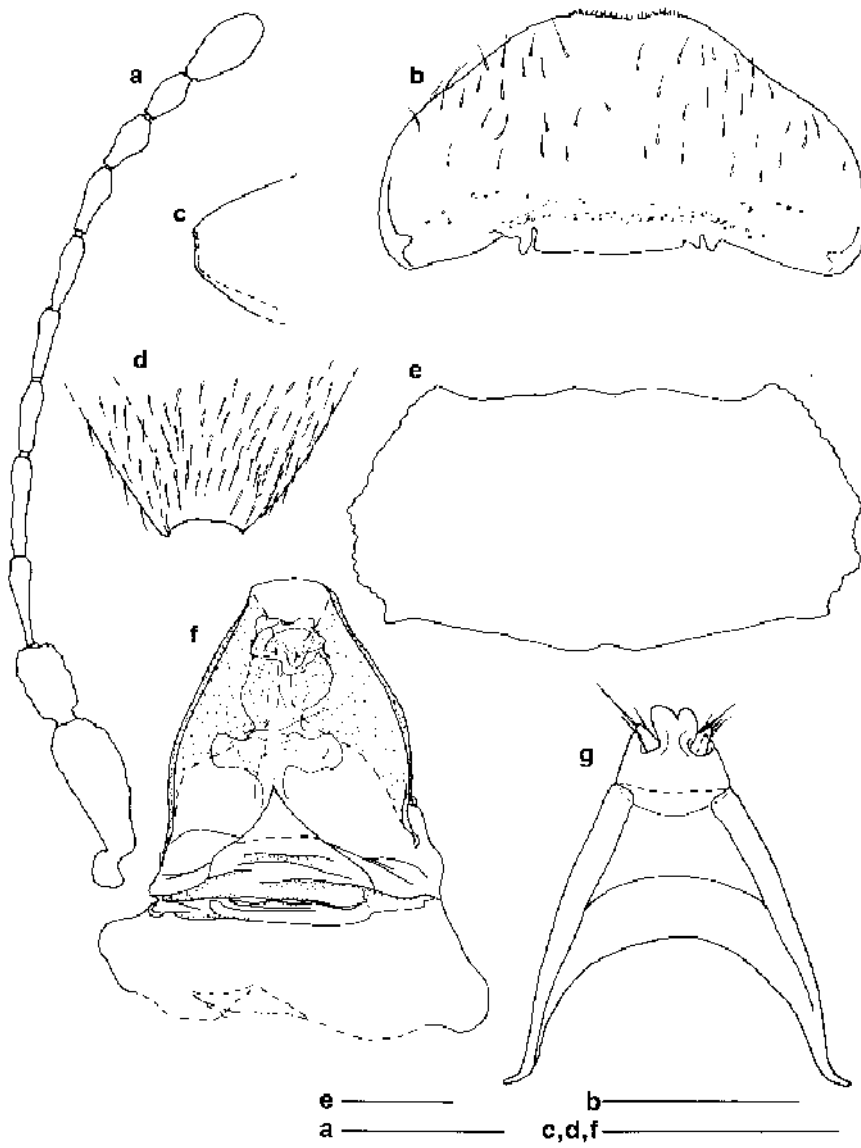


FIG. 16

*Megarthus incubifer*; a: antenna; b: female, abdominal sternite 8; c, d: female, apex of abdominal tergite 8, lateral and dorsal; e: pronotum; f, g: female, genital segment, tergites (f) ventral and sternites (g) dorsal. Scale bars = 0.2 mm.

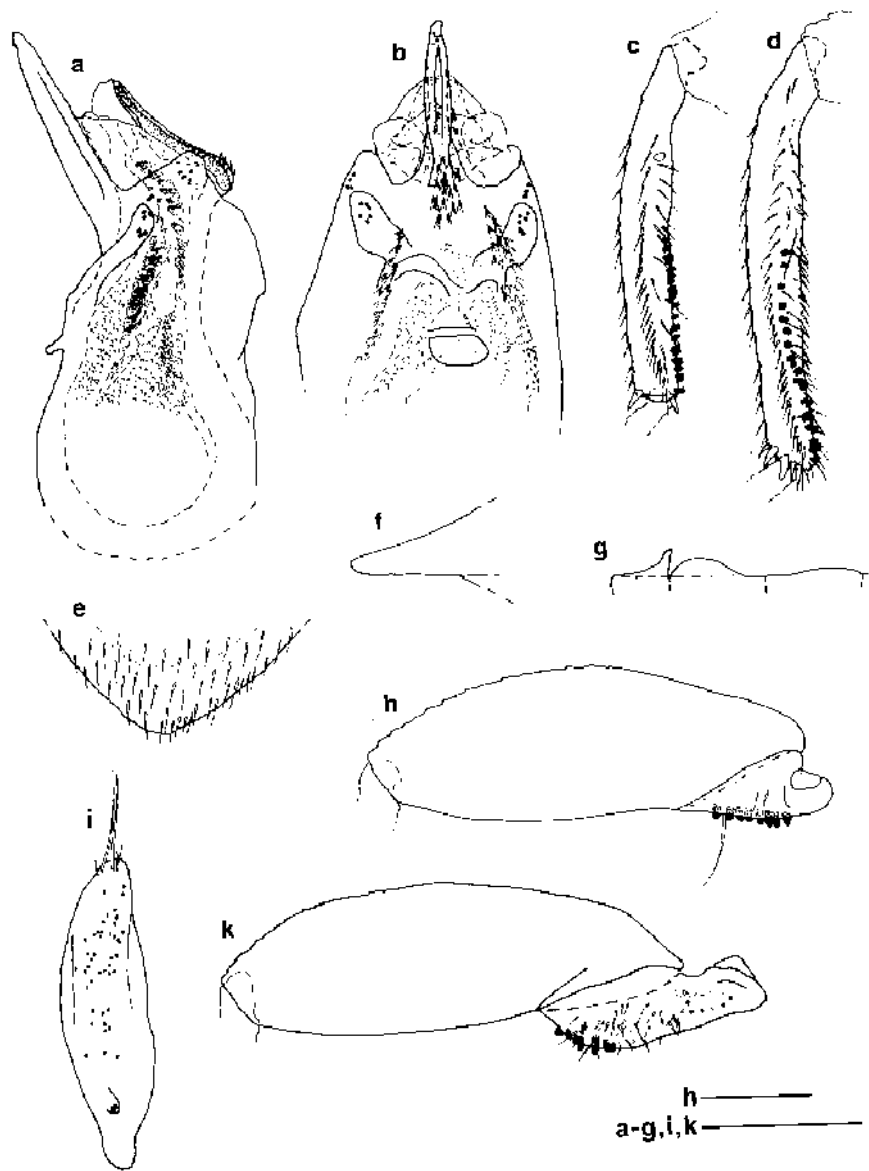


FIG. 17

*Megarthus japonicus*: a, b: male, aedeagus, lateral and ventral (apical portion); c: male, mesotibia; d: male, metatibia; e, f: male, apex of abdominal tergite 8, dorsal and lateral; g: median processes of abdominal sternites 2-4 (left to right), schematic; h: male, mesofemur and mesotrochanter; i: male, abdominal sternite 10; k: male, metafemur and metatrochanter. Scale bars = 0.2 mm.

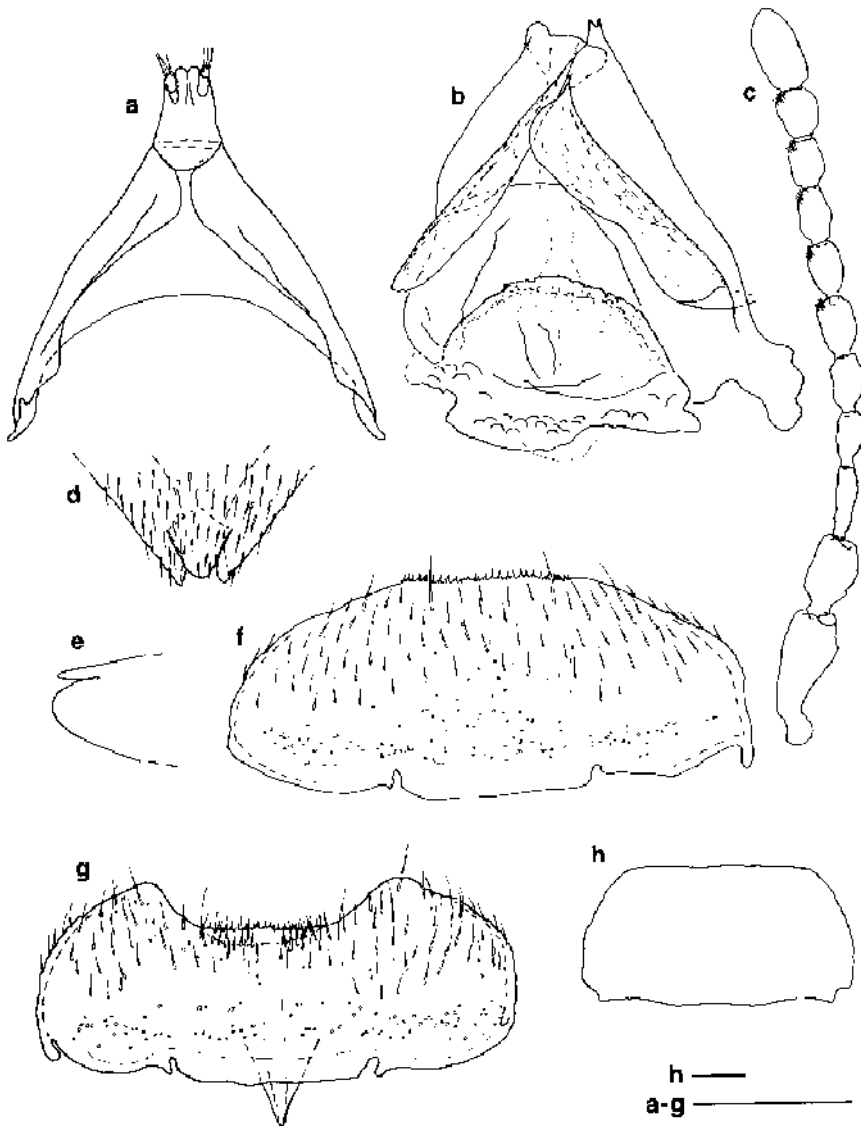


FIG. 18

*Megarthrus japonicus*; a, b: female, genital segment, sternites (a) dorsal and tergites (b) ventral; c: antenna; d, e: female, apex of abdominal tergite 8, lateral and dorsal; f, g: abdominal sternite 8 (f) female and (g) male; h: pronotum. Scale bars = 0.2 mm.

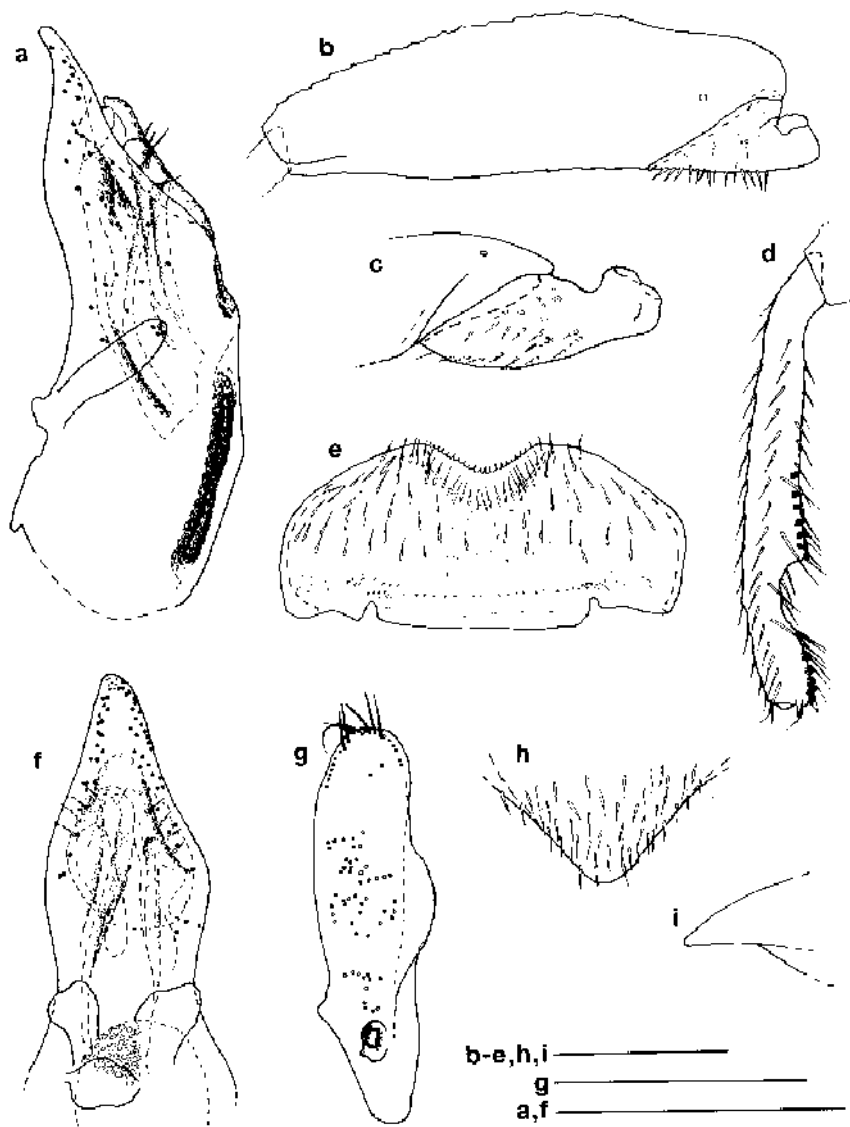


FIG. 19

*Megarthrus montanus*, male; a, f: aedeagus, lateral and ventral (apical portion); b: mesofemur and mesotrochanter; c: metatrochanter; d: mesotibia; e: abdominal sternite 8; g: abdominal sternite 10; h, i: apex of abdominal tergite 8, dorsal and lateral. Scale bars = 0.2 mm.



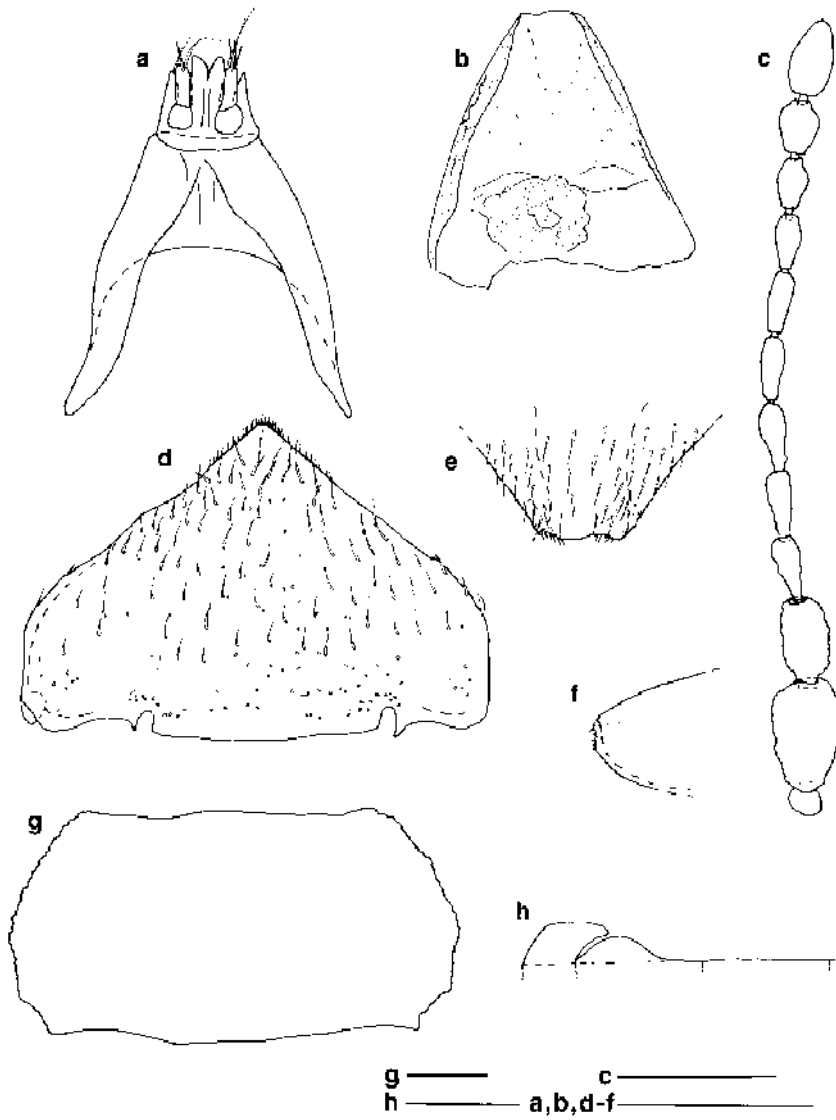


FIG. 20

*Megarthus montanus*; a, b: female, genital segment, sternites (a) dorsal and tergites (b) ventral; c: antenna; d: female, abdominal sternite 8; e, f: female, apex of abdominal tergite 8, lateral and dorsal; g: pronotum; h: median processes of abdominal sternites 2-4 (left to right), schematic. Scale bars = 0.2 mm.

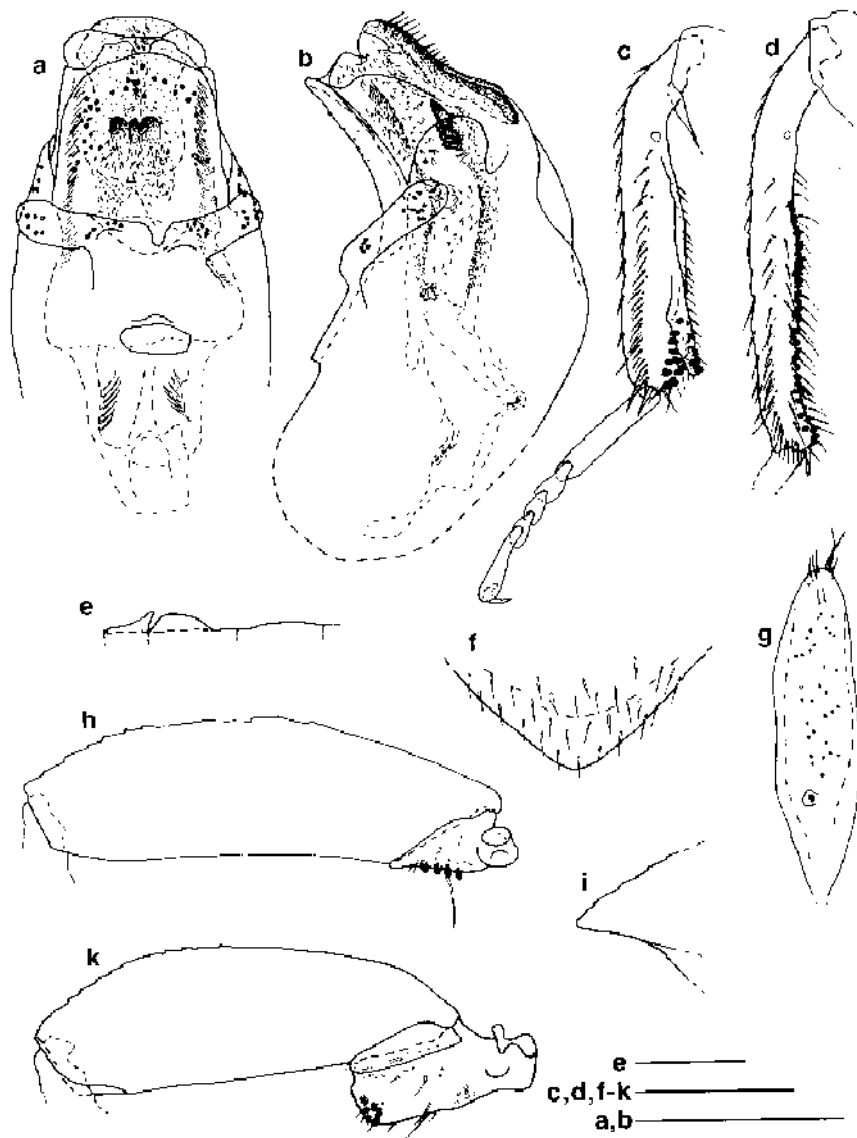


FIG. 21

*Megarthus parallelus*; a, b: male, acedeagus, ventral (apical portion) and lateral; c: male, metatibia and metatarsomeres; d: male, mesotibia; e: median processes of abdominal sternites 2-4 (left to right), schematic; f, i: male, apex of abdominal tergite 8, dorsal and lateral; g: male, abdominal sternite 10; h: mesofemur and mesotrochanter; k: metafemur and metatrochanter. Scale bars = 0.2 mm.

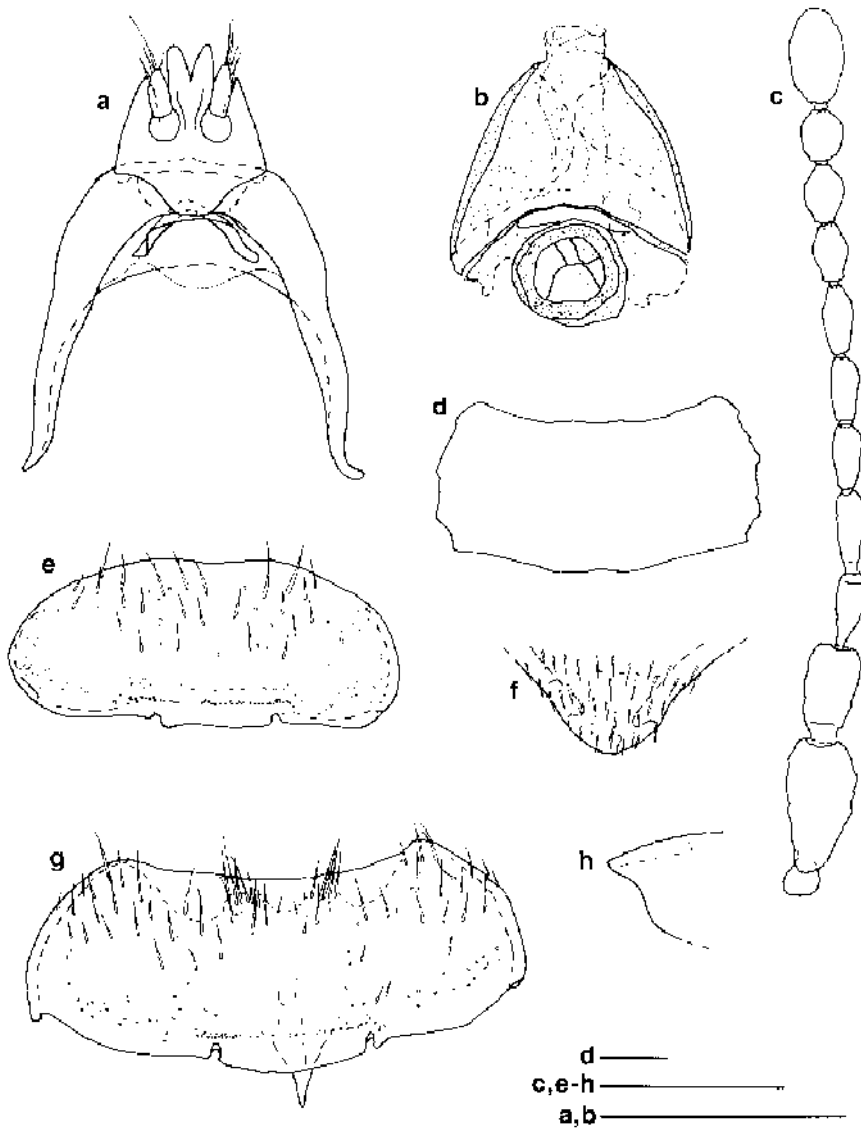


FIG. 22

*Megarthus parallelus*; a, b: female, genital segment, sternites (a) dorsal and tergites (b) ventral; c: antenna; d: pronotum; e, g: abdominal sternite 8 (c) female and (g) male; f, h: female, apex of abdominal tergite 8, dorsal and lateral. Scale bars = 0.2 mm.

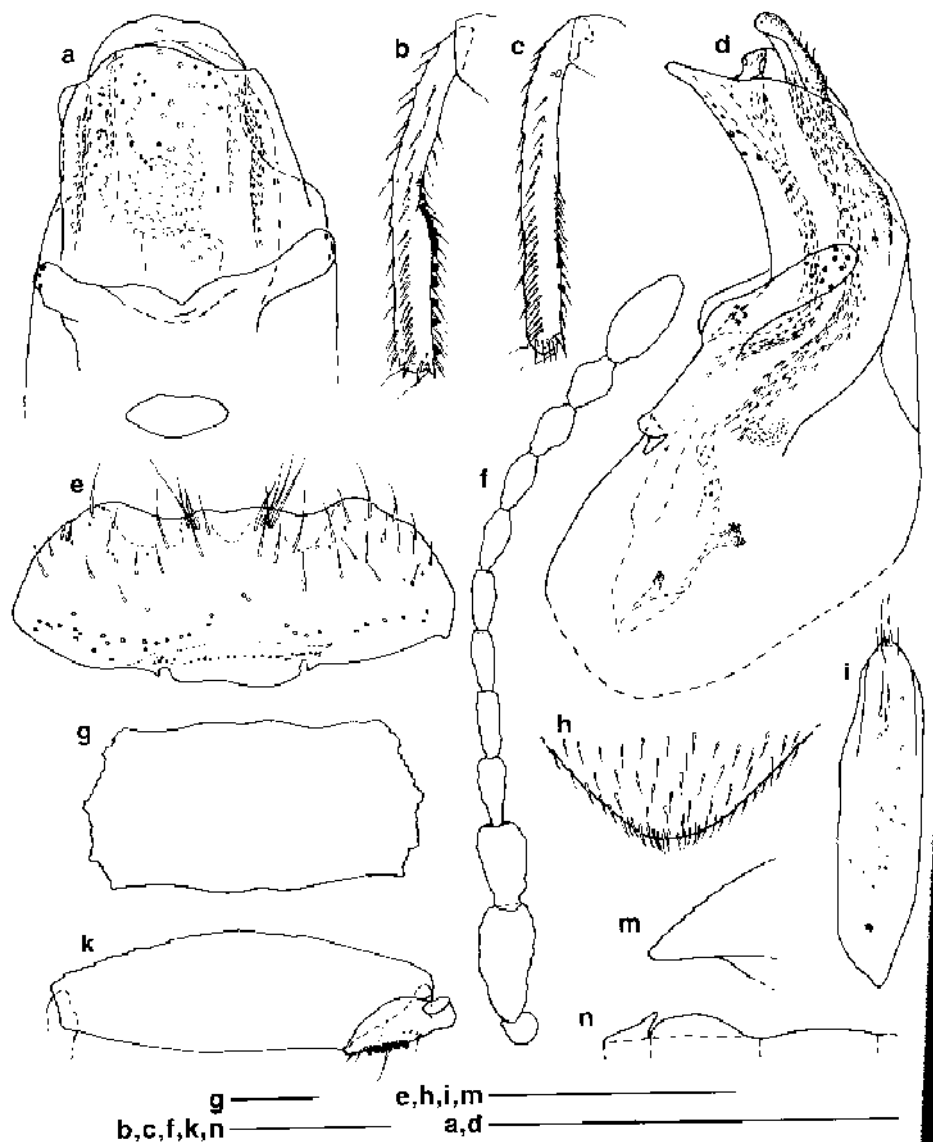


FIG. 23

*Megarthus sawadai*: a, d: male, aedeagus, ventral (apical portion) and lateral; b: male, mesotibia; c: male, metatibia; e: male, abdominal sternite 8; f: antenna; g: pronotum; h, m: male, apex of abdominal tergite 8, dorsal and lateral; i: male, abdominal sternite 10; k: mesofemur and mesotrochanter; n: median processes of abdominal sternites 2-4 (left to right), schematic. Scale bars = 0.2 mm.

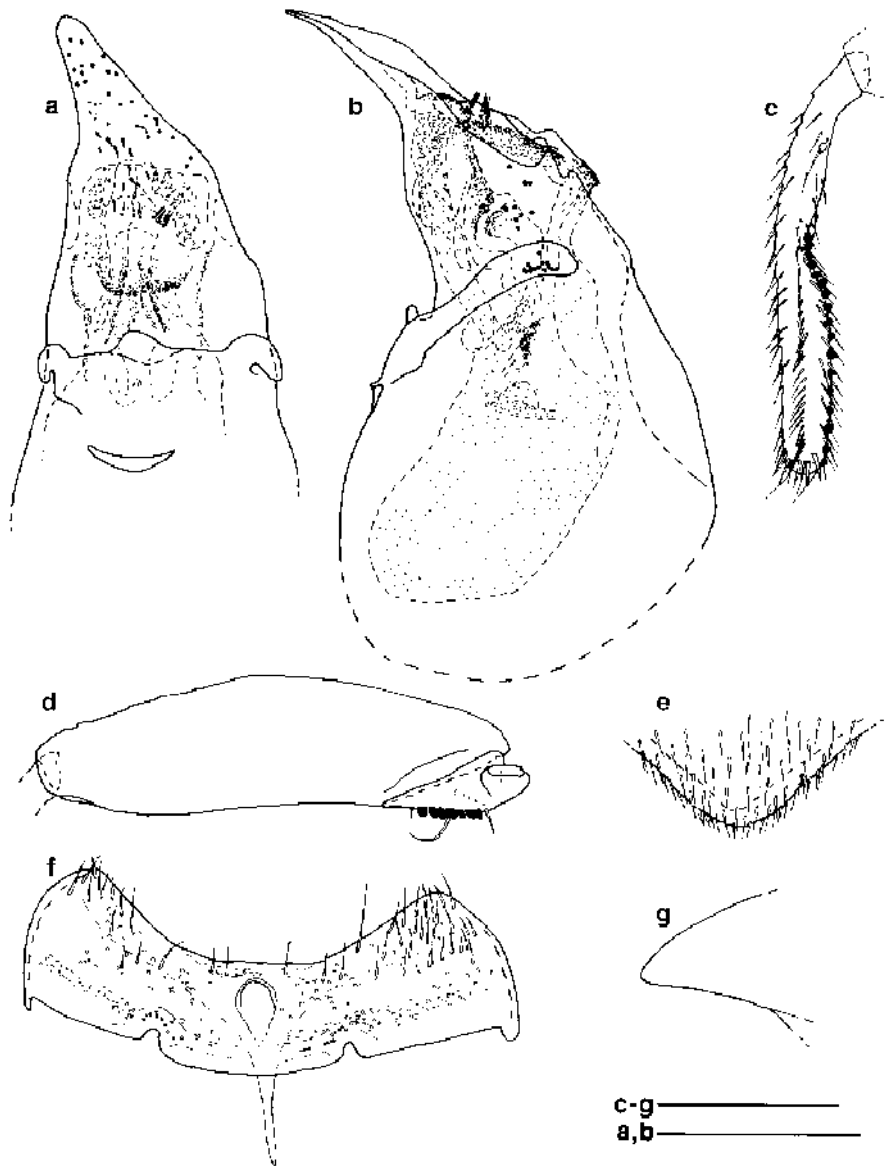


FIG. 24

*Megarthrus scriptus*, male; a, b: aedeagus, ventral (apical portion) and lateral; c: mesotibia; d: mesofemur and mesotrochanter; e, g: apex of abdominal tergite 8, dorsal and lateral; f: abdominal sternite 8. Scale bars = 0.2 mm.

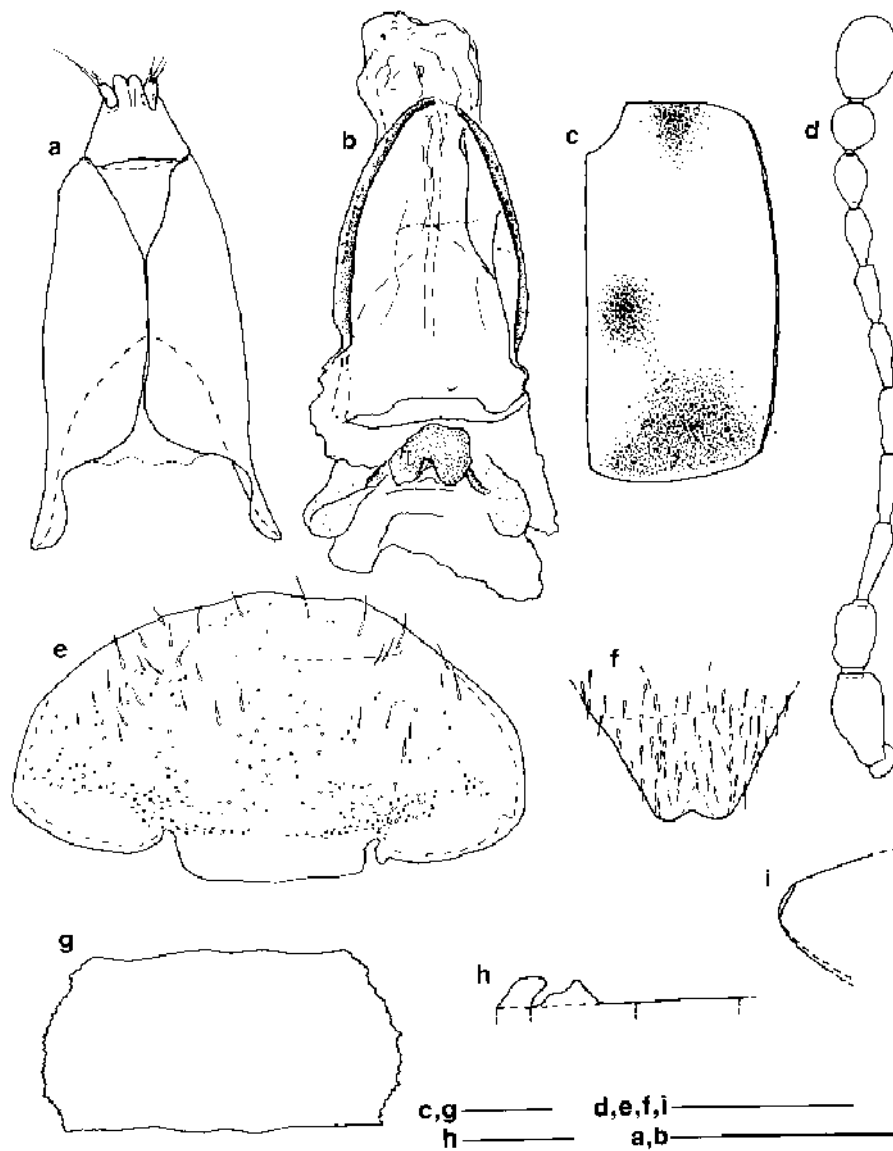


FIG. 25

*Megarthus scriptus*: a, b: female, genital segment, sternites (a) dorsal and tergites (b) ventral; c: right elytron; d: antenna; e: female, abdominal sternite 8; f, i: female, apex of abdominal sternites 2-4 (left right), schematic. Scale bars = 0.2 mm.

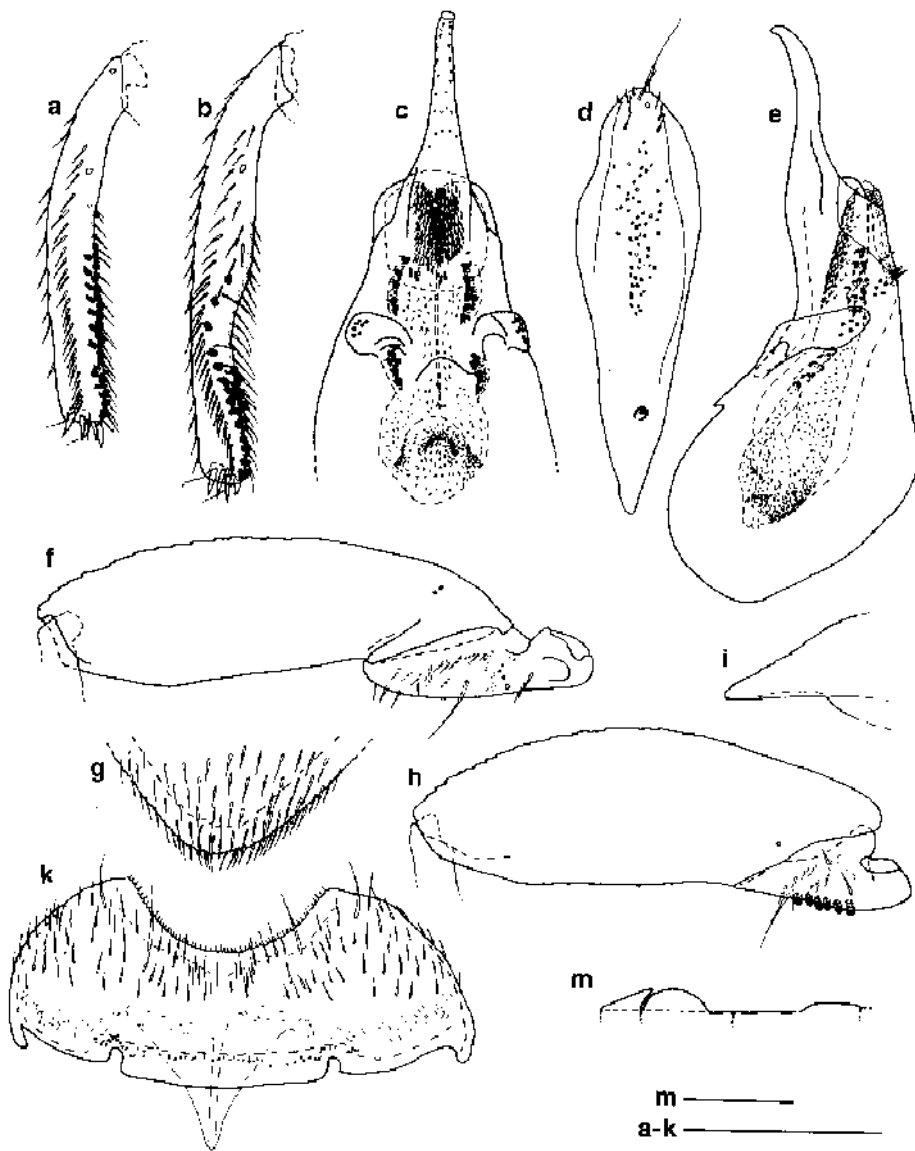


FIG. 26

*Megarthrus shibatai*: a: male, mesotibia; b: male, metatibia; c, e: male, aedeagus, ventral (apical portion) and lateral; d: male, abdominal sternite 10; f: male, metafemur and metatrochanter; g, i: male, apex of abdominal tergite 8, dorsal and lateral; h: male, mesofemur and mesotrochanter; k: male, abdominal sternite 8; m: median processes of abdominal sternites 2-4 (left to right), schematic. Scale bars = 0.2 mm.

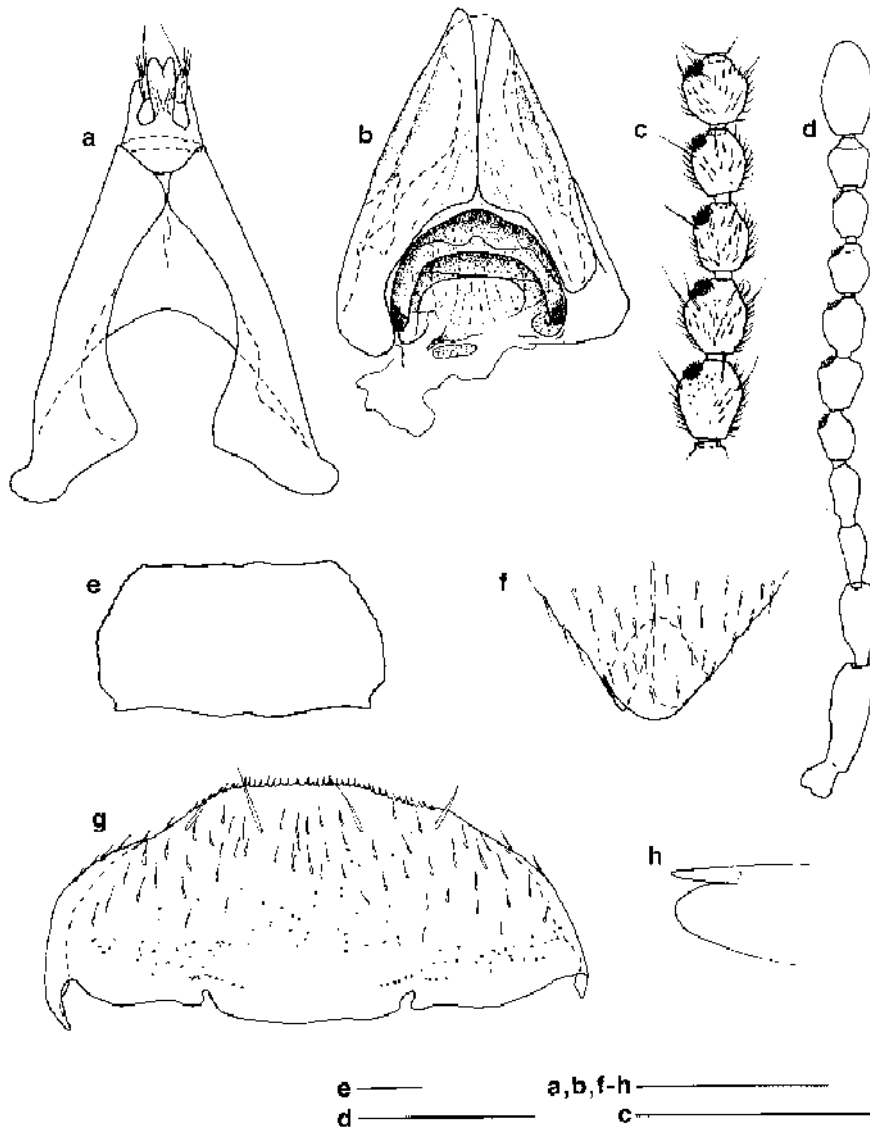


FIG. 27

*Megarthrus shibatai*: a, b: female, genital segment, sternites (a) dorsal and tergites (b) ventral; c: antennomeres 5-9; d: antenna; e: pronotum; f, h: female, apex of abdominal tergite 8, dorsal and lateral; g: female, abdominal sternite 8. Scale bars = 0.2 mm.



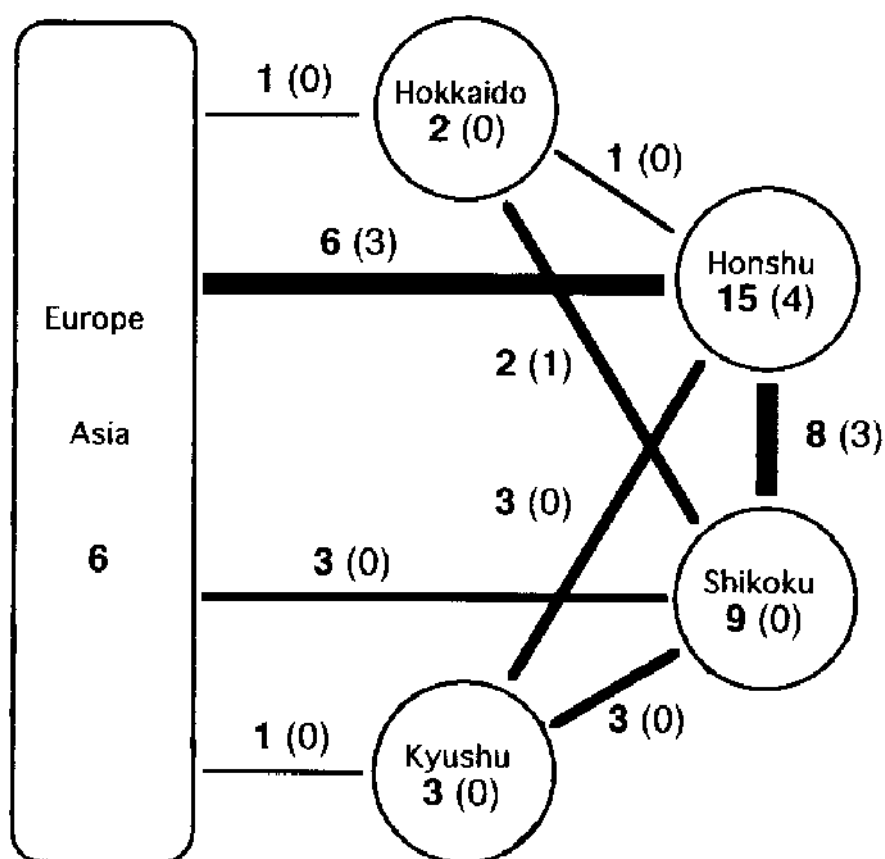


FIG. 28

Numerical relationships of 16 species of *Megarthus* between the main Japanese islands and the continent (bold numbers = total number of species in main islands and total number of species shared between them and the continent; number in parenthesis = number of species unique to a single island or uniquely shared).

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