INSECTA MATSUMURANA

NEW SERIES 55: 37–74 MARCH 1999

A REVISION OF THE WORLD SPECIES OF SIGMOPHORA RONDANI (HYMENOPTERA, EULOPHIDAE)

EIJI IKEDA [1)]

Abstract

IKEDA, E. 1999. A revision of the world species of *Sigmophora* Rondani (Hymenoptera, Eulophidae). *Ins. matsum. n. s.* 55: 37–74, 89 figs.

The world species of the genus *Sigmophora* Rondani, a total of 13 species, are revised. Four Australian species, *S. otys* (Walker), *S. io* (Girault), *S. spenceri* (Girault), and *S. mediosulcata* (Girault), are redescribed. The Indian *S. polyseta* (Sarawat) is transferred from *Tetrastichus* and redescribed on the basis of the type material. Six species, *S. aceris* sp. n. and *S. divorsa* sp. n. from East Asia, *S. papuana* sp. n. from Papua New Guinea, and *S. tumidifrons* sp. n., *S. prolixa* sp. n., and *S. lutea* sp. n. from Africa, are described. *S. electra* (Girault) and *S. westwoodi* (Girault) are synonymized with *S. otys* (Walker); *Tetrastichus isaaci* Rohwer, *T. tricolor* Ashmead, and *T. sayatamabae* Ishii are synonymized with *S. brevicornis* (Panzer).

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Introduction

The genus *Sigmophora* Rondani was erected in 1867 with a single species, *S. scrophulariella* Rondani, which was reared from *Asphondylia scrophulariae* Schiner (Diptera, Cecidomyiidae). About 100 years later, Bouček (1974) synonymized *S. scrophulariella* with *Tetrastichus brevicornis* (Panzer, 1804) on the basis of the biological information and Rondani's description, and did not recognize *Sigmophora* as a distinct genus. However, Graham (1985) revived *Sigmophora* Rondani as the valid generic name, and transferred 3 species, *T. brevicornis* (Panzer), *T. italica* Domenichini, and *T. otys* (Walker), to the genus. Then, Graham (1987) and Bouček (1988) recognized 2 species from Europe and 7 species from Australia, respectively. In other regions, however, no taxonomic work of this genus has been done yet.

Members of *Sigmophora* are known as parasites of Cecidomyiidae (Graham, 1987). Since many species of Cecidomyiidae are serious pests in agriculture and forestry, the species of *Sigmophora* are potentially useful as biological control agents.

In this study I revise a total of 13 species of *Sigmophora*. Four Australian and 1 Indian species are redescribed. Two species from East Asia, 1 species from Papua New Guinea, and 3 species from Africa are newly described. New synonyms and a new combination are given. A key to the females of all these species is also given.

Doğanlar (1993) synonymized the genera *Tetrastichomyia* Girault, 1916, and *Kalopterna* Graham, 1987, with *Sigmophora*. In this study, however, I do not adopt his opinion.

Morphological terminology and measured parts generally follow those of Graham (1987), except for "side lobe", which is used instead of "scapula". Specimens from the following institutions were examined (abbreviations in the parentheses):

Australian National Insect Collection, Canberra, Australia (ANIC).
Bishop Museum, Honolulu, USA (BIM).
Canadian National Collection of Insects, Ottawa, Canada (CNCI).
Entomological Laboratory, Kyûshû University, Fukuoka, Japan (ELKU).
Institute of Zoology, Chinese Academy of Sciences, Beijing, P. R. China (IZCAS).
National Institute of Agro-Environmental Sciences, Tsukuba, Japan (NIAES).
Queensland Museum, South Bristbane, Australia (QM).
Systematic Entomology, Hokkaidô University, Sapporo, Japan (SEHU).
South Australian Museum, Adelaide, Australia (SAM).
The Natural History Museum, London, UK (BMNH).
United States National Museum of Natural History, Smithonian Institution, Washington, D.C., USA (USNM).

Genus *Sigmophora* Rondani

Sigmophora Rondani, 1867b: 40. Type species: *Sigmophora scrophulariella* Rondani (monotypy).

Lopodytes Rondani, 1867a: 8. Type species: *Lopodytes prunicola* Rondoni (monotypy). (Homonym of *Lopodytes* Stål, 1853.) Synonymized by Graham, 1985: 160.

Eulophotetrastichus Girault, 1913a: 70. Type species: *Eulophotetrastichus io* Girault (original designation and monotypy). Synonymized by Graham, 1985: 160.

Euplectrotetrastichus Girault, 1915: 262. Type species: *Euplectrotetrastichus spenceri* Girault

(original designation). Synonymized by Bouček, 1988: 687.

Lopodytiscus Ghesquière, 1946: 370. (Replacement name for *Lopodytes* Rondani.) Synonymized by Graham, 1985: 160.

Diagnosis

Occipital margin carinate (Figs. 2, 18). Transverse carina usually present between median and lateral ocelli (ocellar carina). Upper margin of scrobal groove occasionally carinate (scrobal carina) (Fig. 18). Clypeus (Figs. 4, 20) bilobed. Malar sulcus (Figs. 3, 19) with a triangular fovea below eye. Mandibles (Fig. 4) tridentate. Three anelli, 3-segmented funicle and 3-segmented clava present in female (Figs. 29, 39). Two anelli, 4-segmented funicle, and 3-segmented clava present in male (Figs. 30, 40). Petiole (Figs. 14, 26) usually short and indistinct. Lobe of callus (Fig. 7) usually carinate, covering outer rim of spiracle. Hind coxa (Figs. 27, 52) usually with dorsal carina. Longest cercal seta (Figs. 8, 28) about twice as long as the next longest. Body yellow to black, not metallic.

Sigmophora brevicornis (Panzer)
(Figs. 1–8)

Cynips brevicornis Panzer, in Schaeffer, 1804: 134.

Sigmophora scrophulariella Rondani, 1867b: 40. Synonymized by Bouček, 1974: 265.

Tetrastichus brevicornis (Panzer); Szelényi, 1941: 401–406. — Domenichini, 1966a: 146–147; 1966b: 20. — Kostjukov, 1978: 443.

Geniocerus brevicornis (Panzer); Erdös, 1954: 354.

Aprostocetus brevicornis (Panzer); Graham, 1961: 45.

Sigmophora brevicornis (Panzer); Graham, 1985: 161. — Graham, 1987: 77–79.

Tetrastichus tricolor Ashmead, 1904: 162. Syn. n.

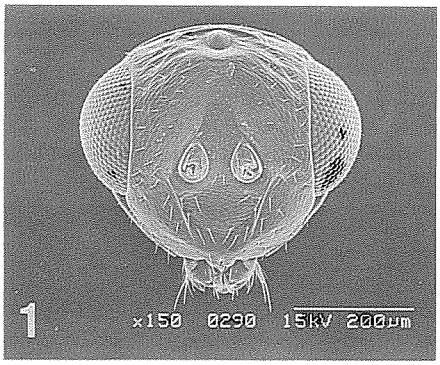
Tetrastichus isaaci Rohwer, 1921: 130–131. Syn. n.

Tetrastichus sayatamabae Ishii, 1950: 142–143. Syn. n.

Further synonymies are listed by Graham (1987).

I examined the holotypes of *Tetrastichus tricolor* Ashmead and *T. isaaci* Rohwer, both deposited in USNM. The holotype of *T. tricolor* is in good condition, but lacks both flagella. It is labelled: " Atami"; "JAPAN, KOEBELE"; "Type, No. 7207, U.S.N.M."; "*Tetrastichus tricolor* Ashm. ♀". The holotype of *T. isaasi* is also in good condition, though the right antenna is missing. It is labelled: "13. VI. 17, Coimbatore, from galls on *Maerua arenaria*, ISAAC COLL"; "24"; "antenna mounted"; "Hym Slide 817"; "Type No. 20935 U.S.N.M."; "*Tetrastichus isaaci* TYPE ♀ Roh.". Both types show the diagnostic character states of *S. brevicornis* given below; therefore, they clearly belong to this species.

I also examined syntypes of *T. sayatamabae* Ishii, which are deposited in NIAES. One female and one male are mounted on a slide, which is labelled: "Daizusayabae, Kisei (in Japanese), Ibaraki, Tamura"; "Syntypes, ♀♂"; "*Tetrastichus sayatamabae* n. sp.". These specimens are badly squashed in the mounting medium now with numerous cracks, so they are difficult to be examined. However, they show the presence of an occipital carina, foveate malar sulcus, dorsally carinate hind coxa, and other diagnostic features of *S. brevicornis*; therefore, they clearly belong to this species. The female is designated as lectotype, and the male as paralectotype.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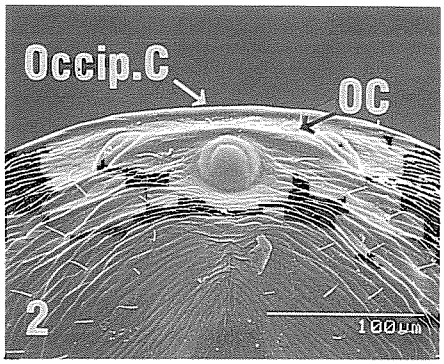
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OC
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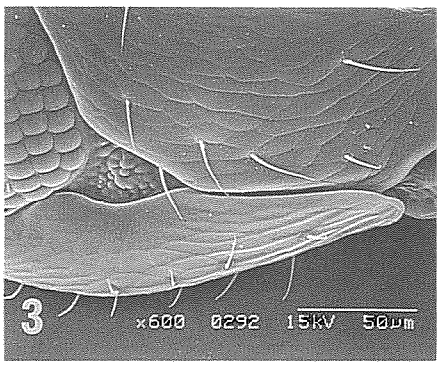
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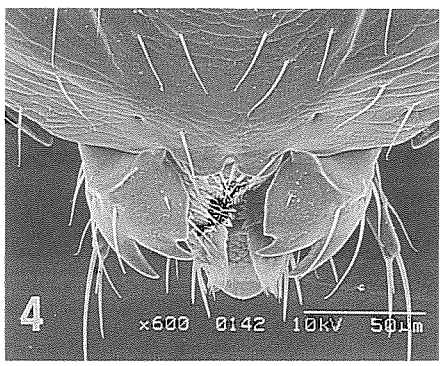
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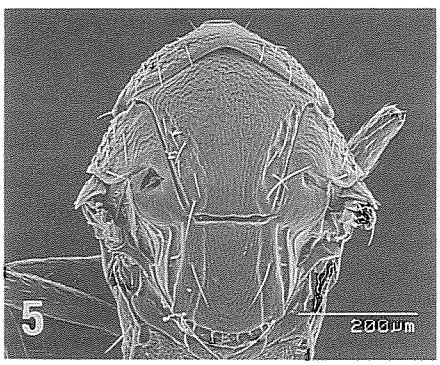
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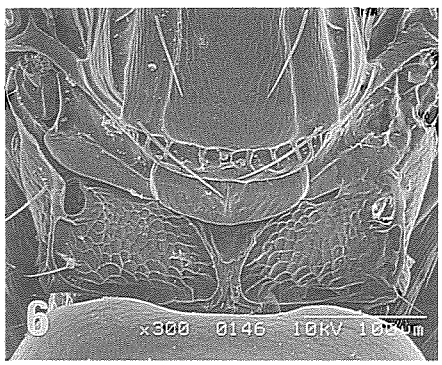
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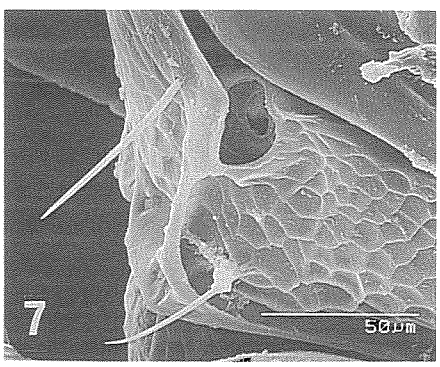
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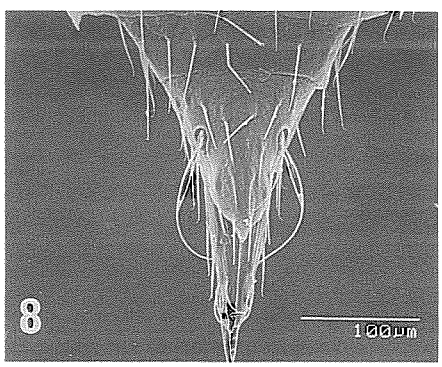
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100µm

Diagnosis (female and male)

Body yellow with black markings, sometimes predominantly black, rarely predominantly yellow. Ocellar carina (Fig. 2) present. Scrobal carina weak or absent. Triangular fovea in malar sulcus (Fig. 3) 0.3–0.6 length of malar space. Scape reaching or slightly exceeding vertex. Thorax (Fig. 5) 1.3–1.5 times as long as wide. Mesoscutum with 1–2, occasionally 3, rows of adnotaular setae in a weak depression; median line weak or absent. Scutellum with distinct submedian lines which are parallel or slightly diverging distad; median area between submedian lines at most twice as long as wide; anterior pair of setae situated before the middle of scutellum; sublateral line with costulae. Dorsellum (Fig. 6) with weak to strong median line. Propodeum (Fig. 6) 1.6–2.0 times as long as dorsellum, strongly raised-reticulate, with anteromedian triangular fovea which is slightly to distinctly shorter than half length of propodeum, and with median carina; callus (Fig. 7) with 2 setae. Hind coxa with distinct dorsal carina. Hind tibial spine slightly longer than hind basitarsus.

Specimens examined. 212 ♀ 41 ♂ from the following localities. Japan: Hokkaidô: Ashibetsu; Apoi-dake; Bibai; Ebetsu; Asari, Otaru; Naebo, Nagahashi, Otaru; Naganuma; Nukabira; Hokkaidô Univ., Sapporo; Maruyama, Sapporo; Shintoku; Tarumaegaro, Tomakomai. Honshû: Ajigasawa, near Mt. Shiragami, Aomori-ken; Tsukuba, Ibaraki-ken; Tsuchiura marsh, Ibaraki-ken; Hiratsuto, Kawai, Iwate-ken; Kyôto; Nagano; Higashiyamato, Tôkyô; Oume, Tôkyô; Hachijô Is., Tôkyô; Hirai, Kozagawa, Wakayama-ken; Nachi, Wakayama-ken. Shikoku: Kôchi-ken; Omogokei, Ehime-ken. Kyûshû: Mt. Hiko, Fukuoka-ken; Hisayama-machi, Fukuoka-ken; Shikanoshima, Fukuoka-ken; Okawauchi, Shiiba, Miyazaki-ken; Kamiozoegawa, Fuji, Saga-ken; Tsushima. Ryûkyûs: Amamioshima; Okinawa Is. Bergium: Brussels. P. R. China: Beijing; Fujian; Hong Kong; Hubei; Suchuang; Yunnan. Cyprus: Ay Epiktitos; Kremasti, Rhodes; Yermasoyia R.; Yialousa; Zyyi. Czeco Republic: Velky Vrestoy, Bohemia; Madarsko, Zamardi; Tvrdonice river, Kyjovka, Moravia; Vranov river, Dyje, Moravia. England: Dutham, Gibside; Surrey Chobham Common. France: Eurethoir. German: Stettin. Italy: Caldanadi Manziana, Lazio; Mandanici, Sicily; Boscodella, Ficuzza, Sicily; Penisola, Magniosi, Sicily. Jugoslavia: Beograd. Korea: Mt. Sudo-san, Kyongsanpuk-do. Portugal: Colmbra. Scotland: Nether foloage. Spain: Benicasim; Bilbao, Vizcaya; Scatiagode, Compostela. Thailand: Doi Inthanon National Park, 70 km SW. Chiang Mai. Vietnam: Dalat.

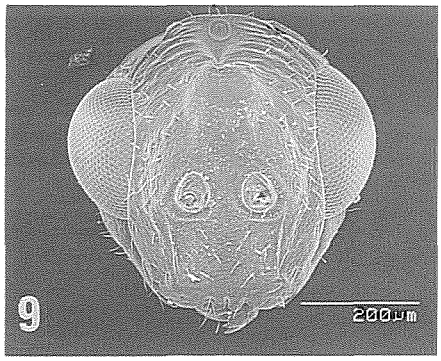
Distribution. Europe, India, Thailand, Vietnam, P. R. China, Korea, and Japan.

Hosts. This species is a gregarious ectoparasite of larvae and pupae of Cecidomyiidae. *Asphondylia* spp., *Contarinia* spp., *Eumarchalia gennadii* Marchal, *Kiefferia pericarpiicola* (Bremi), and *Schizomyia galiorum* Kieffer are recorded as hosts in Europe (Graham, 1987). Naito and Osaka (1959) recorded this species (as *Tetrastichus sayatamabae* Ishii) as a parasite of *Asphondylia* sp. on *Glysine max* Merr. *A. morivorella* (Naito) is also recorded as a host in Japan.

Remarks. *S. brevicornis* was fully redescribed by Graham (1987). He states that the propodeum of *S. brevicornis* is up to 1.5 times as long as the dorsellum, and the mesoscutum have 1–2 rows of adnotaular setae. However, the specimens I examined have the propodeum 1.6–2.0 times as long as the dorsellum and the mesoscutum with 1–3 rows of adnotaular setae. In other characters they agree with the redescription given by Graham (1987) and the European specimens identified as *S. brevicornis* by Z. Bouček.

This species is similar to *S. lutea* sp. n. in body shape and colour, but the latter has the hind coxa without dorsal carina, the anterior pair of the scutellar setae situated in or behind

Figs. 1–8. *Sigmophora brevicornis* (Panzer), ♀. — 1. Head; 2. Vertex; 3. Malar space; 4. Mouth; 5. Thorax; 6. Dorsellum and propodeum; 7. Callus; 8. Apex of gaster. OC: ocellar carina. Occip. C: occipital carina.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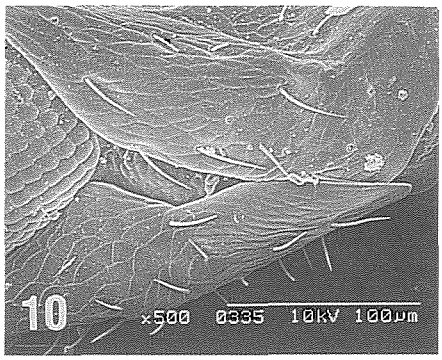
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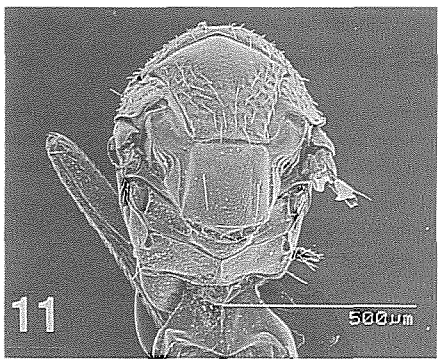
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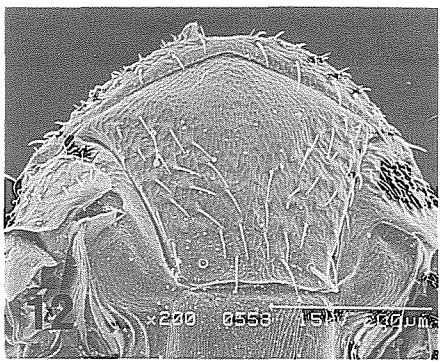
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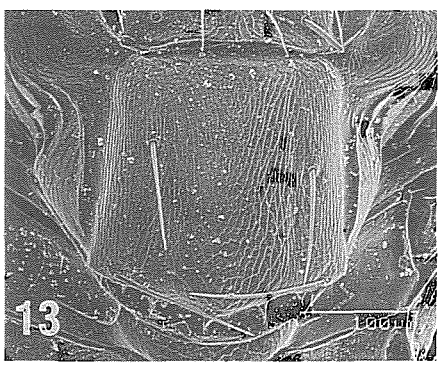
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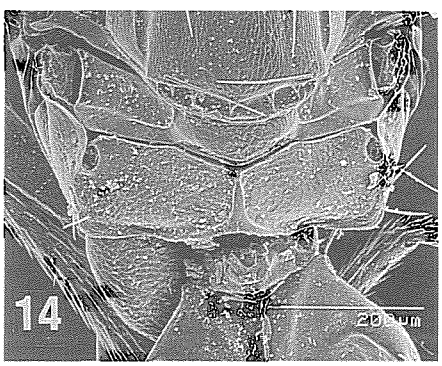
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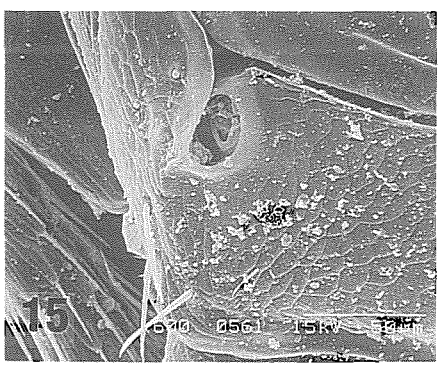
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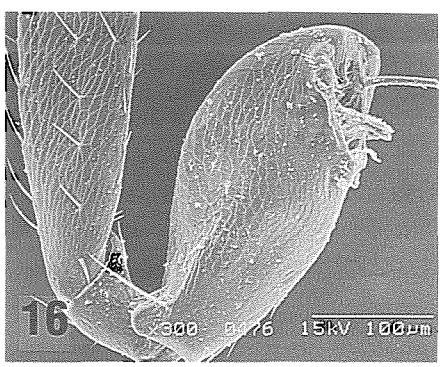

16
x300 0476 15kV 100µm

the middle of the scutellum, and the dorsellum without median line.

Sigmophora italica (Domenichini)
(Figs. 9–16)

Tetrastichus italicus Domenichini, 1967: 92. — Bouček, 1977b: 17. — Kostjukov, 1978: 443.
Sigmophora italica (Domenichini); Graham, 1985: 161. — Graham, 1987: 79–80.

Diagnosis(female and male)

Body yellow with black markings to predominantly black. Ocellar carina (Fig. 9) distinct. Scrobal carina weak or absent. Triangular fovea of malar sulcus (Fig. 10) long, 0.5–0.7 length of malar space. Scape not reaching vertex in female, reaching or slightly exceeding vertex in male. Pronotum (Fig. 12) setose except for median area narrow and bare. Mid lobe of mesoscutum (Figs. 11, 12) with 3–4 rows of decumbent white adnotaular setae, with 1 dark seta on each hind corner; side lobe uniformly setose. Submedian line of scutellum (Fig. 13) indistinct; sublateral line shallow, without costula. Dorsellum (Fig. 14) without median line. Propodeum (Fig. 14) without anteromedian fovea, with complete median carina; callus (Fig. 15) with 3–8 setae; lobe of callus not carinate. Hind coxa (Fig. 16) without dorsal carina; hind tibial spine slightly shorter than hind basitarsus.

Specimens examined. 13 ♀ 1 ♂ from the following localities. Italy: Caltagirone Santo Pietro area, Sicily. Spain: Alicante, Moravia; Castellon, Behicasim; Sierra Nevada. Yugoslavia: Croatia, Lipa nr. Rjeka; Dalm. Isl., Mljet National Park; Dalm., Peljesac, Trstenik; Mali Losinj; Jadran, Beograd.

Distribution. Europe.

Host. *Asphondylia dorycnii* F. Löw.

Remarks. *S. italica* was fully redescribed by Graham (1987). This species is similar to *S. brevicornis* and *S. lutea* sp. n., but the latter two differ from *S. italica* as follows: the mid lobe of the mesoscutum usually with 1–2 rows of adnotaular setae, only the outer half of the side lobe setose, the propodeum with the anteromedian fovea, and the callus with 2 setae.

Sigmophora aceris sp. n.
(Figs. 17–30)

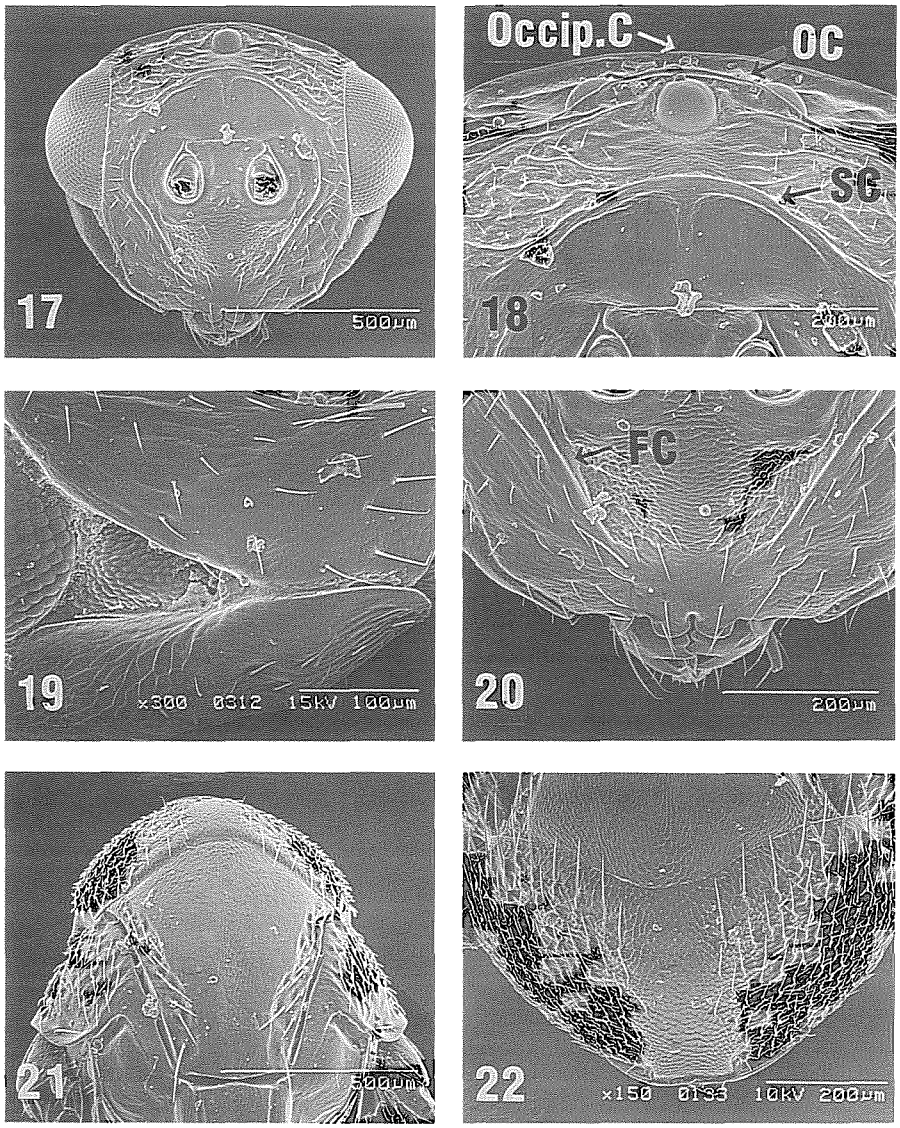
Diagnosis (female and male)

Head predominantly yellow. Thorax and gaster predominantly black. Occipital carina, ocellar carina, and scrobal carina very strong (Figs. 17, 18). Gena laterally expanded. Triangular fovea of malar sulcus (Fig. 19) large, about 0.6 length of malar space. Pronotum (Figs. 21, 22) rugose and densely setose except for median area bare and weakly engraved-reticulate. Mesoscutum (Fig. 21) with 2 rows of adnotaular setae in a weak depression. Dorsellum (Fig. 24) with median channel. Propodeum (Fig. 24) about 1.3 times as long as dorsellum. Anteromedian fovea of propodeum about 0.2 length of propodeum.

Description

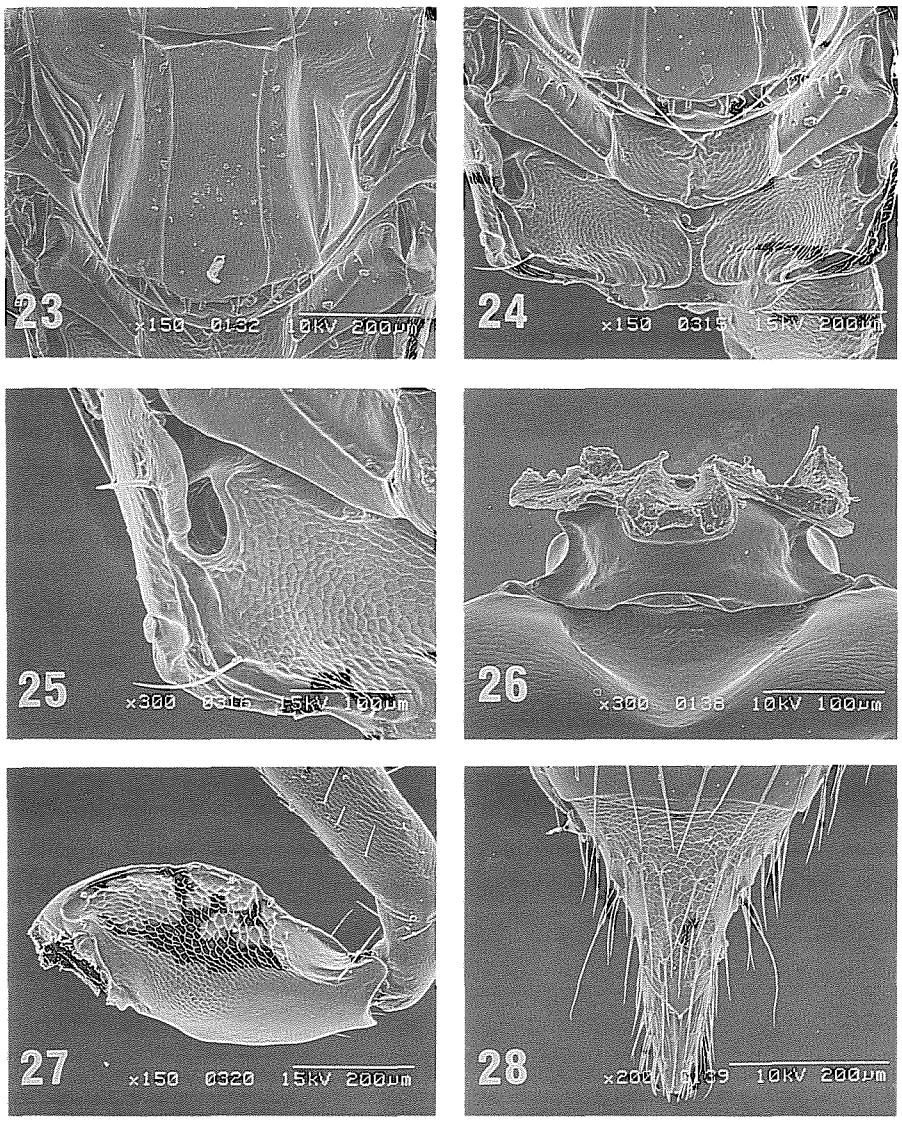
Female. Body length 3.1–3.6 mm. Head yellow: occiput, ocellar triangle, area between ocellar carina and scrobal carina, area between torulus and facial carina (Fig. 20) black.

Figs. 9–16. *Sigmophora italica* (Domenichini), ♀ . — 9. Head; 10. Malar space; 11. Thorax; 12. Mesoscutum; 13. Scutellum; 14. Dorsellum and propodeum; 15. Callus; 16. Right hind coxa.



Figs. 17–22. *Sigmophora aceris* sp. n., ♀. — 17. Head; 18. Vertex; 19. Malar space; 20. Mouth; 21. Pronotum and mesoscutum; 22. Pronotum. OC: ocellar carina. Occipt. C: occipital carina. SC: scrobal carina. FC: facial carina.

Thorax varying from mostly black to black with the following parts yellow: posterior marginal area of pronotum, posterior half of side lobe, inner half of axilla, tegula, frenal area of scutellum, and lateral area of dorsellum. Gaster varying from mostly black to black with the following parts yellow: dorsal median area of first tergite, dorsal surface of posterior marginal area of sixth tergite, ventral surface of first, second, and third tergites. Scape varying from mostly dark brown to mostly yellow with dorsal marginal area dark brown; pedicel black, sometimes ventrally yellow; flagellum black. Legs yellow: basal half of hind coxa black; tips of tarsi infuscate. Wings hyaline.



Figs. 23–28. *Sigmophora aceris* sp. n., ♀ . — 23. Scutellum; 24. Dorsellum and propodeum; 25. Callus; 26. Petiole; 27. Hind coxa; 28. Apex of gaster.

Head (Fig. 17) about 1.2 times as wide as high, 2.3–2.5 times as wide as long, and 0.9–1.0 times as wide as thorax. Occipital carina and ocellar carina very strong (Fig. 18). POL about 2.5, OOL about 2.0 length of median ocellus diameter. Vertex rugose except for areas around ocelli smooth. Scrobal groove deep; scrobal carina very strong. Face (Fig. 20) with a pair of carinae (facial carinae), area between the carinae weakly raised-reticulate. Eye 1.2–1.3 times as high as malar space length. Gena laterally expanded. Triangular fovea of malar sulcus (Fig. 19) large, about 0.6 length of malar space. Mouth 1.0–1.1 times as long as malar space. Antenna (Fig. 29): scape 3.5–3.8 times as long as wide, barely reaching vertex; combined length of pedicel and flagellum about 1.2 times as long as head width;

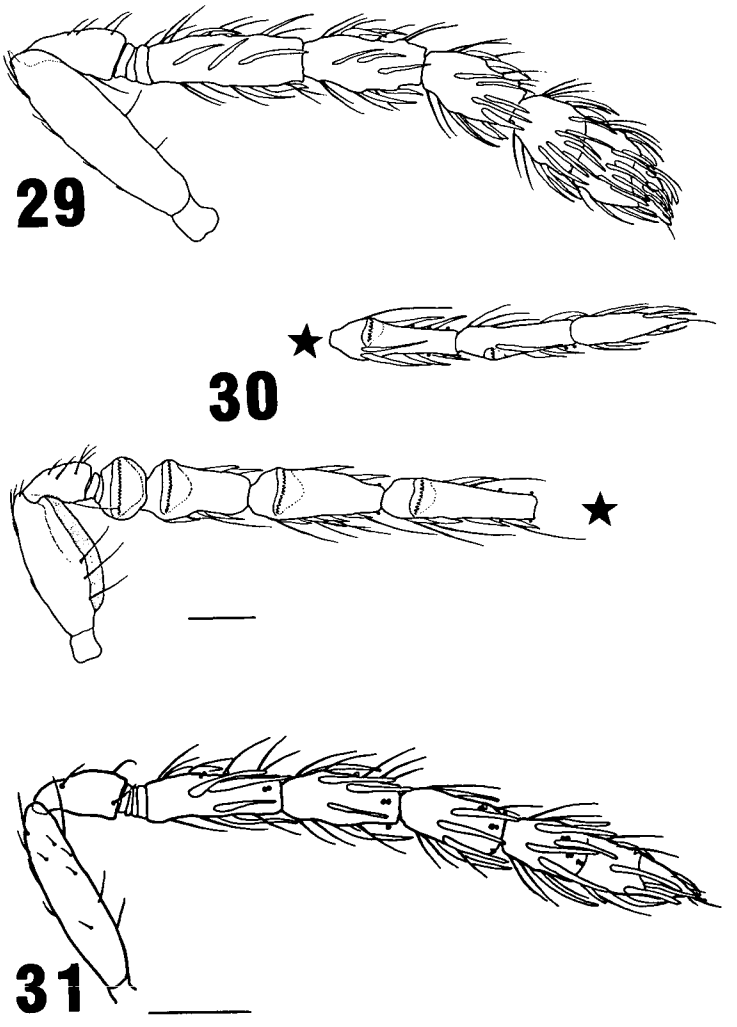
pedicel 0.3–0.4 times as long as scape; F1 2.8–3.2 times as long as wide, about 1.8 times as long as pedicel; F2 2.2–2.8 times as long as wide, about 0.8 times as long as F1; F3 1.7–2.5 times as long as wide, about 0.9 times as long as F2; clava 2.6–3.0 times as long as wide, 1.4–1.8 times as long as F3.

Thorax 1.4–1.5 times as long as wide. Pronotum (Figs. 21, 22) medially weakly engraved-reticulate and bare, laterally rugulose and densely setose. Mid lobe of mesoscutum (Fig. 21) very weakly engraved-reticulate, almost smooth, with 2 rows of adnotaular setae in a weak depression; median line absent or very weakly indicated; side lobe rugulose and densely setose, with scapular frange smooth and bare. Axilla (Fig. 21) strongly advanced. Scutellum (Fig. 23) 0.9–1.0 times as long as wide, very weakly engraved-reticulate, with distinct submedian and sublateral lines; sublateral line wide, without costula; anterior pair of scutellar setae situated distinctly before the middle of scutellum. Dorsellum (Fig. 24) weakly raised-reticulate, with median channel. Propodeum (Fig. 24) 1.3–1.6 times as long as dorsellum, weakly and densely raised-reticulate, with median carina and anteromedian fovea about 0.2 length of propodeum; spiracle large, about half length of propodeum; callus (Fig. 25) with 2 setae. Hind coxa (Fig. 27) weakly raised-reticulate, with strong dorsal carina; hind tibial spine as long as or slightly longer than hind basitarsus. Forewing 2.2–2.3 times as long as wide, densely setose; submarginal vein with 6–7 dorsal setae; costal cell:marginal vein:stigmal vein=4.0–4.6:5.6–6.2:1.0.

Petiole (Fig. 26) short and smooth. Gaster about 2.4–2.9 times as long as wide; 1.3–1.5 times as long as thorax.

Male. Body length 2.5–2.9 mm. Differs from female as follows. Body black: gena and tegula yellow; frons and face occasionally yellow; gaster with brown basal spot. Antenna yellow; apical two-thirds of scape black. Legs yellow: basal halves of hind and fore coxae black. Head about 1.3 times as wide as high, about 2.6 times as wide as long. Eye about 1.4 times as high as malar space length. Antenna (Fig. 30): scape 2.2–2.4 times as long as wide; ventral plaque about 0.8 length of scape; combined length of pedicel and flagellum about 1.9 times as long as head width; pedicel 0.4–0.5 times as long as scape; funicular segments and C1 with basal whorls of long and dark setae; F1 about 0.7 times as long as wide, about 0.7 times as long as pedicel; F2 about 1.7 times as long as wide, about 2.4 times as long as F2; F3 about 3.2 times as long as wide, about 1.3 times as long as F2; F4 about 3.6 times as long as wide, about 1.1 times as long as F3; clava 8.0–9.0 times as long as wide, about 2.4 times as long as F4. Gaster 1.9–2.8 times as long as wide, 0.9–1.0 times as long as thorax.

Holotype (♀). Japan: Hokkaidô: Sapporo, spring, 1994 (Y. Sakamaki). The holotype is deposited in the collection of Systematic Entomology, Faculty of Agriculture, Hokkaidô University. Paratypes. Japan: Hokkaidô: Bibai, 1♂, 6. VI. 1980 (K. Kamijo) (SEHU) / 1♀, 17. VII. 1992 (K. Kamijo) (SEHU); Nopporo, Ebetsu, 1♀, 27. VI. 1987 (K. Kamijo) (SEHU) / 1♂, 15. VI. 1992 (Y. Sakamaki) (SEHU); Sapporo, 1♂, 21. VIII. 1959 (K. Kamijo) (BMNH) / 1♀, 17. X. 1959 (K. Kamijo) (BMNH) / 1♀, 20. X. 1959 (K. Kamijo) (CNCI) / 1♂, 26. VI. 1960 (K. Kamijo) (CNCI) / 1♂, 3. VII. 1965 (SEHU)/ 2♀, spring, 1994 (Y. Sakamaki) (SEHU)/ 1♀1♂, em. 20. V. 1996 (Y. Sakamaki) (SEHU) / 4♂, V. 1996 (E. Ikeda) (SEHU) / 3♀4♂, VI. 1997 (E. Ikeda) (SEHU, CNCI, BMNH); Maruyama, Sapporo, 1♀, 11. VII. 1961 (S. Takagi) (SEHU). P. R. China: Huanggangshan, Fujian Province, 4♀ 1♂, VI. 1980 (J. Chen & J. Huang) (IZCAS) / 4♀, 27. VII. 1980 (X. Zhao) (IZCAS); Wuyi, Fujian Province, 1 ♀, 6. V. 1982 (J. Xu) (IZCAS); 1800m, Hunan Province, 1 ♀, 29. VI. 1987; Taibai, Shanxi Province, 1 ♀, 28. VIII. 1992 (Zh. Yang) (IZCAS); Lanpijinlai, Yunnan Province, 1 ♂, 24. VII. 1984 (Ch. Li) (IZCAS); Lijiang, 3200m, Yunnan Province, 1♀, 16. VIII. 1984 (Ch. Li) (IZCAS);



Figs. 29–31. — 29. *Sigmophora aceris* sp. n., ♀, antenna in inner view; 30. Ditto, ♂, antenna in outer view. Long and dark setae of the flagellum are omitted. 31. *S. divorsa* sp. n., ♀, antenna in inner view. Scale: 0.1 mm.

Motuo, 1000–1200m, Xizang Province, 1 ♀, 14. I. 1983 (Y. Han) (IZCAS). Nepal: Bokaihunde, 1 ♂, 20km N. of Trisuli (Nawakot), 2100m, 13–17. XI. 1965 (L. W. Quate) (BIM). Taiwan: Hsitsun-Chihtuan, 1000–1200m, Taoyuan Hsien, 1 ♂, 18. IV. 1981 (H. Takemoto) (SEHU).

Distribution. Japan (Hokkaidô), P. R. China (Fujian, Hunan, Shanxi, Yunnan, Xizang), Nepal, and Taiwan.

Host. Some specimens of this species were reared from galls in leaf buds of *Acer mono* (Aceraceae), which were made by *Asphondylia* sp.

Remarks. This species is easily distinguished from the other species of *Sigmophora* by the features mentioned in the diagnosis.

Sigmophora divorsa sp. n.
(Fig. 31)

Diagnosis (female)

Thorax predominantly yellow. Dorsal surface of gaster dark brown with basal and apical areas yellow; ventral surface yellow. Ocellar carina and scrobal carina present. Triangular fovea of malar sulcus about one-third length of malar space. Scape barely reaching vertex. Scutellum with distinct submedian and sublateral lines; submedian lines strongly diverging distad; width of narrowest part of median area between submedian lines about one-third length of scutellum; sublateral line without costula. Dorsellum without median line. Propodeum weakly raised-reticulate, 1.8–2.0 times as long as dorsellum, without paraspiracular carina; anteromedian fovea about 0.2 length of propodeum. Hind coxa with distinct dorsal carina.

Description

Female. Body length 2.0–2.2 mm. Body yellow: occiput, vertex, frons, median part of pronotum, anteromedian part of mesoscutum, and outer part of sublateral line of scutellum dark brown to black; dorsal surface of gaster dark brown, yellow basally and apically; ventral surface yellow. Antenna: scape and pedical pale brown; flagellum dark brown. Legs yellow. Wings hyaline.

Head 1.2–1.3 times as wide as high, 2.3–2.4 times as wide as long, and about 1.1 times as wide as thorax. Occipital carina and ocellar carina distinct. POL about 2.7, OOL about 1.3 length of median ocellus diameter. Area between ocellar carina and scrobal carina wrinkly. Scrobal carina weak. Eye about 2.2 times as high as malar space length. Triangular fovea of malar sulcus about one-third length of malar space. Mouth about 1.5 times as long as malar space. Antenna (Fig. 31): scape about 4.0 times as long as wide, barely reaching vertex; combined length of pedicel and flagellum about 1.3 times as long as head width; pedicel about 0.4 times as long as scape; F1 3.2–3.8 times as long as wide, 1.5–1.7 times as long as pedicel; F2 2.8–3.3 times as long as wide, about 0.9 times as long as F1; F3 2.5–3.3 times as long as wide, 0.9–1.0 times as long as F2; clava 3.8–4.1 times as long as wide, 1.8–2.0 times as long as F3.

Thorax about 1.4 times as long as wide, weakly engraved-reticulate. Pronotum laterally rugulose and with many setae. Mesoscutum with 4–5 pairs of adnotaular setae in very weak depression, without median line; side lobe bare with outer half having several setae. Axilla strongly advanced. Scutellum 0.8–0.9 times as long as wide, almost smooth, with distinct submedian and sublateral lines; submedian lines strongly diverging distad; width of narrowest part of median area between submedian lines about one-third length of scutellum; sublateral line laterally carinate, without costula; anterior pair of setae situated before the middle of scutellum. Dorsellum weakly raised-reticulate, without median line. Propodeum 1.8–2.0 times as long as dorsellum, distinctly raised-reticulate, with median carina and small anteromedian fovea about 0.2 length of propodeum, without paraspiracular carina; callus with 2 setae. Hind coxa weakly raised-reticulate, with distinct dorsal carina; hind tibial spine as long as or slightly longer than hind basitarsus. Forewing 2.3–2.4 times as long as wide; submarginal vein with 3–4 dorsal setae; costal cell:marginal vein:stigmal vein=4.8–5.6:7.2:1.0.

Petiole short and indistinct. Gaster 2.2–2.4 times as long as wide, about 1.3 times as long as thorax. Ovipositor sheath slightly produced.

Male. Unknown.

Holotype (♀). P. R. China: Lichuanxingdoushan, Hubei Province, 800m, 21. VII. 1989 (D. Huang). The holotype is deposited in the Institute of Zoology, Chinese Academy of Science. Paratypes. 1 ♀ , same data as the holotype (IZCAS).

Distribution. P. R. China (Hubei).

Host. Unknown.

Remarks. This species is similar to *S. brevicornis* in body shape and colour, but easily distinguished from the latter in the shape of the submedian lines and the size of the anteromedian fovea of the propodeum.

Sigmophora polyseta (Sarawat) comb. n.
(Figs. 32–35)

Tetrastichus polyseta Sarawat, 1975: 17–19.

Diagnosis (female)

Scrobal carina and scrobal groove absent (Fig. 33). A transverse carina present before median ocellus. Triangular fovea of malar sulcus small, 0.1 times as long as malar space. Scape (Fig. 32) setose on the outer surface. Scutellum (Fig. 34) with shallow sublateral line having no costula; anterior pair of setae situated behind the middle of scutellum; frenal area indistinct. Hind coxa very weakly engraved-reticulate, almost smooth; dorsal carina of hind coxa absent; hind tibial spine (Fig. 35) short, slightly shorter than half length of hind basitarsus.

Redescription

Female. Body length except for head 1.9 mm (body length 2.34 mm according to Sarawat, 1975). Body pale brown: frons dark brown. Antenna pale brown. Legs yellow. Wings hyaline.

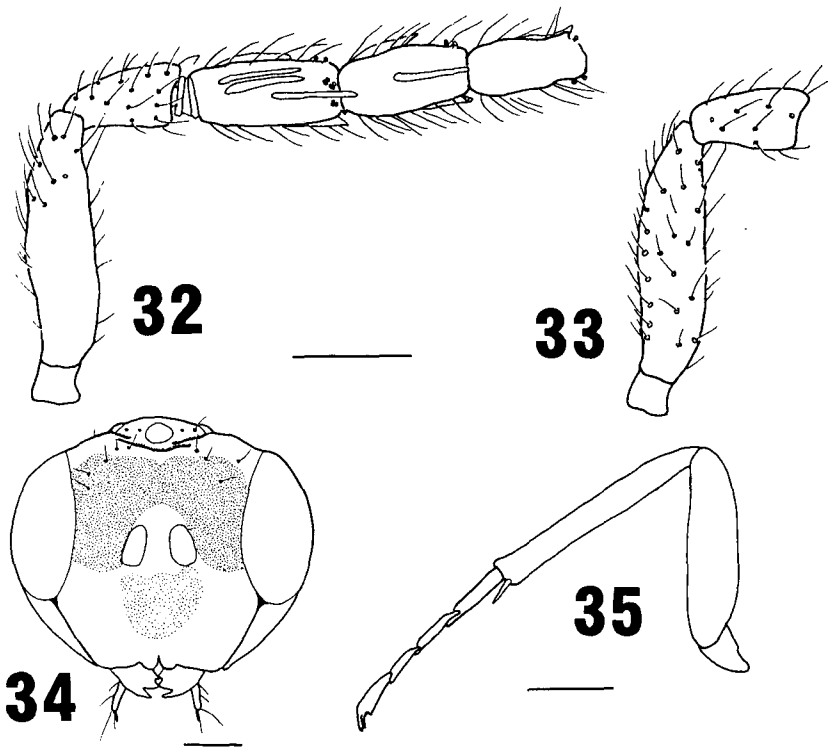
Head (Fig. 34) 1.2 times as wide as high. Ocellar carina present. Scrobal carina and scrobal groove absent. Frons with a short transverse carina. Eye 1.9 times as high as malar space length. Triangular fovea of malar sulcus small, 0.1 times as long as malar space. Mouth 1.7 times as long as malar space. Antenna (Figs. 32, 33): scape 3.8 times as long as wide, with many setae on the outer surface; combined length of pedicel and flagellum 1.1 times as long as head width; pedicel 0.4 times as long as scape; F1 2.3 times as long as wide, 1.3 times as long as pedicel; F2 2.1 times as long as wide; 0.9 times as long as F1.

Thorax slightly longer than wide. Mesoscutum with median line and 2 rows of adnotaular setae; area along notaulus not depressed. Axilla strongly advanced. Scutellum with shallow sublateral line having no costula; anterior pair of setae situated behind the middle of scutellum; frenal area indistinct. Propodeum with anteromedian fovea half length of propodeum, also with median carina; callus with 3 setae. Hind coxa very weakly engraved-reticulate, almost smooth, without dorsal carina; hind tibial spine (Fig. 35) short, slightly shorter than half length of hind basitarsus. Forewing 2.2 times as long as wide; submarginal vein with 6–7 dorsal setae; costal cell:marginal vein:stigmal vein=2.2:2.8:1.0.

Petiole short and indistinct. Gaster 1.4 times as long as thorax.

Male. Unknown.

Type material (♀). The holotype is mounted on a slide labelled: "School of Entomology, St. John's College, Agra-2, India", "9–5, Kargudi-Ooty Rd. (Nilgiri Hills), Coll. Mani & Party, 6–7. IV.



Figs. 32–35. *Sigmophora polyseta* (Sarawat) comb. n., ♀ . — 32. Antenna in inner view. Clava is omitted; 33. Scape and pedicel in outer view; 34. Head; 35. Right hind femur, tibia, and tarsi. Scale: 0.1 mm.

1973", "Holotype ♀", and "*Tetrastichus polyseta* Sarawat". The thorax and gaster are dorsoventrally squashed. The head is in relatively good condition, but both flagella are collapsed. The head, both antennae, pronotum, left forewing, both hindwings, and all legs are separated from the body. The holotype is deposited in the United States National Museum of Natural History.

Distribution. India.

Host. Unknown.

Remarks. *S. polyseta* is easily distinguished from the other species of *Sigmophora* by the absence of the scrobal carina and scrobal groove, the frenal area indistinct, the hind coxa very weakly engraved-reticulate and without dorsal carina, and the hind tibial spine which is slightly shorter than half length of the hind basitarsus.

Sarawat (1975) states that the female of this species has 4 anelli and the submarginal vein with 8 dorsal setae, but I have found that the holotype has 3 anelli and 6–7 dorsal setae on the submarginal vein.

Sigmophora otys (Walker)
(Figs. 36–45)

Cirrospilus otys Walker, 1839: 48.

Neomphaloidella glucki Girault, 1915: 248. Synonymized by Bouček, 1988: 688.

Neomphaloidea parkmani Girault, 1929: 327. Synonymized by Bouček, 1988: 688.

Sigmophora otys (Walker): Graham, 1985: 161. — Bouček, 1988: 688.

Neomphaloidella westwoodi Girault, 1913: 235–236. — Dahms, 1986: 652. Transferred to *Sigmophora* by Bouček, 1988: 688. Syn. n.

Neotetrastichodes electra Girault, 1915: 236. — Dahms, 1983: 240. Transferred to *Sigmophora* by Bouček, 1988: 687. Syn. n.

I examined 3 female syntypes of *Neomphaloidella westwoodi* and the holotype (♀) of *Neotetrastichodes electra*, all deposited in the Queensland Museum.

The syntypes of *Neomphaloidella westwoodi* are characterized in the thorax black and without yellow markings and the gaster uniformly dark brown. This colouration is not usual in *S. otys*. However, since there is no difference in other characters, I have synonymized *N. westwoodi* with *S. otys*. I here designate the most basally mounted female on the point as lectotype of *N. westwoodi* because it is the best in condition among the syntypes, and the 2 females apically mounted as paralectotypes. One of the paralectotypes has the head removed and mounted on a slide. For the data of the types, see Dahms, 1986: 652.

The holotype of *Neotetrastichodes electra* has the diagnostic character states of *S. otys*, and clearly belongs to this species. For the data of the holotype, see Dahms, 1983: 240.

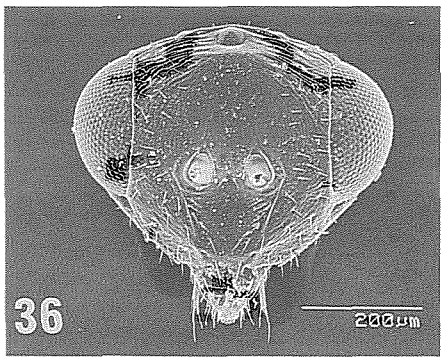
Diagnosis (female and male)

Head mostly black. Thorax black: dorsellum usually yellow. Gaster with dark brown or black longitudinal median line. Ocellar carina distinct. Scrobal carina weak. Triangular fovea of malar sulcus (Fig. 37) 0.1–0.4 length of malar space. Anteromedian fovea of propodeum (Fig. 41) slightly shorter than half length of propodeum. Mesoscutum (Fig. 39) with very weak median line. Hind coxa (Fig. 42) weakly raised-reticulate, with weak dorsal carina which is sometimes indistinct.

Redescription

Female. Body length 1.6–2.2 mm. Head black: lateral part of vertex rarely yellow; face occasionally yellow. Thorax black: posterior part of mesoscutum and scutellum rarely yellow to pale brown; tegula and dorsellum yellow; frenal area of scutellum pale brown. Petiole dark brown. Dorsal surface of gaster yellow with dark brown or black median longitudinal line which is rarely indistinct, sometimes with transverse dark brown bands, rarely predominantly dark brown with pale basal spot; ventral surface pale brown. Scape and pedicel pale brown; flagellum dark brown. Legs pale brown: fore coxa basally dark brown; hind coxa varying from only basally to predominantly dark brown. Wings hyaline.

Head (Fig. 36) 1.3–1.4 times as wide as high, 2.2–2.5 times as wide as long, about 1.1 times as wide as thorax. Ocellar carina distinct. Scrobal carina weak. POL 2.4–2.6, OOL 1.4–1.5 length of median ocellus diameter. Area between ocellar carina and scrobal carina wrinkly. Frons and face very weakly engraved-reticulate. Eye 1.9–2.2 times as high as malar space length. Triangular fovea of malar sulcus (Fig. 37) 0.1–0.4 length of malar space. Mouth 1.3–1.5 times as long as malar space. Antenna (Fig. 44): scape 3.0–4.2 times as long as wide, not reaching vertex; combined length of pedicel and flagellum 1.0–1.1 times as long as head width; pedicel 0.4–0.5 times as long as scape; F1 1.7–3.0 times as long as wide, 1.2–1.5 times as long as pedicel; F2 1.5–2.0 times as long as wide, 0.8–1.0 times as long as F1; F3 1.1–1.6 times as long as wide, 0.8–1.0 times as long as F2; clava 2.0–3.0 times as long as wide, 1.8–2.3 times as long as F3.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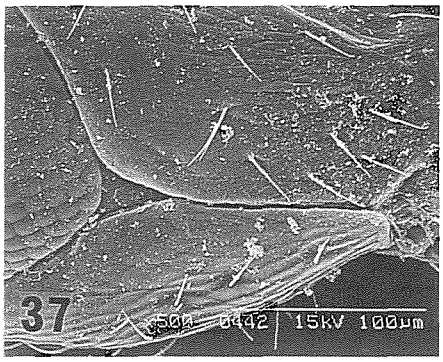
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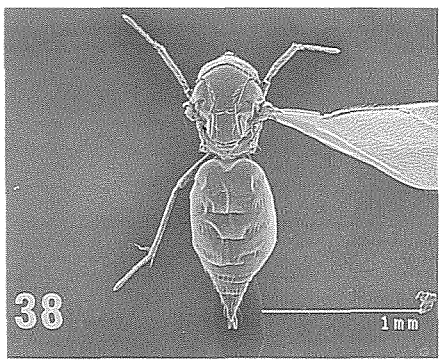
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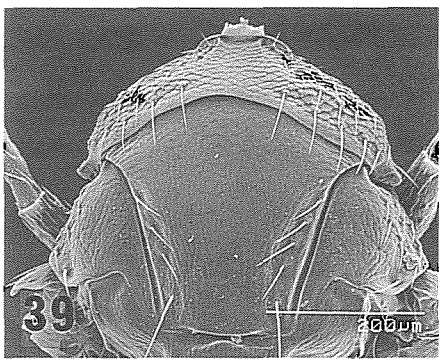
1mm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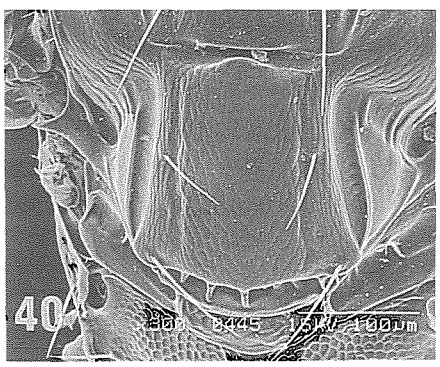
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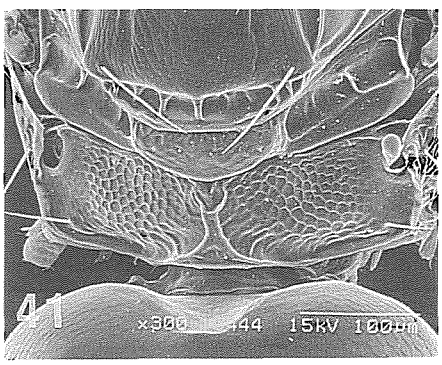
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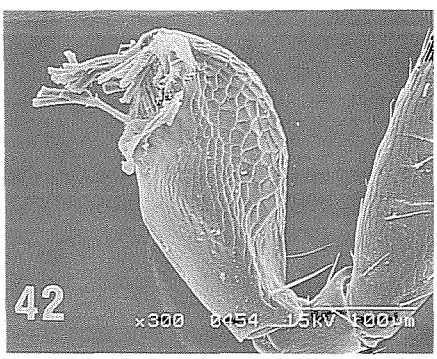
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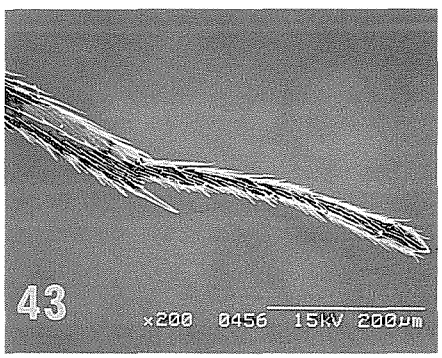
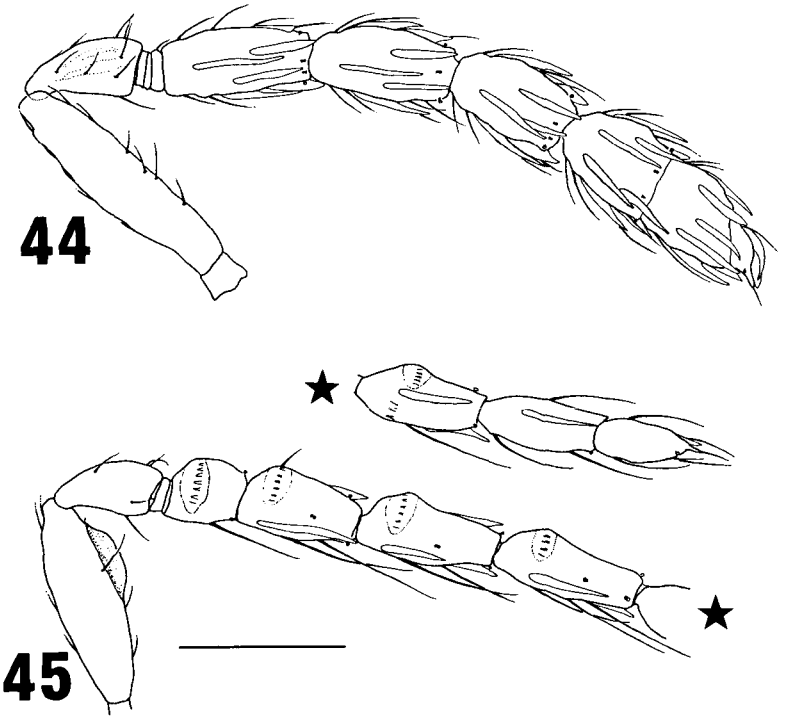
×300 0454 15kV 100µm


43
×200 0456 15kV 200µm

Thorax (Fig. 38) about 1.4–1.5 times as long as wide, weakly engraved-reticulate. Pronotum (Fig. 39) medially bare, laterally weakly rugulose and with many setae. Mesoscutum (Fig. 39) with a row of adnotaular setae in a weak depression; median line very weak or absent. Axilla strongly advanced. Scutellum (Fig. 40) about as long as wide; more weakly sculptured than mesoscutum, anterior pair of scutellar setae situated before the middle of scutellum; sublateral line deep and wide, usually with several costulae. Dorsellum weakly raised-reticulate; median line weak or absent. Propodeum (Fig. 41) 1.3–1.7 times as long as dorsellum, varying from distinctly raised-reticulate to almost smooth, with anteromedian fovea slightly shorter than half length of propodeum, and with median carina sometimes posteriorly forked; callus with 2 setae. Hind coxa (Fig. 42) weakly raised-reticulate, rarely smooth, with weak dorsal carina which is sometimes indistinct; hind tibial spine (Fig. 43) slightly longer than hind basitarsus. Forewing about 2.3 times as long as wide; submarginal vein with 4–6 dorsal setae; costal cell:marginal vein:stigmal vein = 4.5–5.3:5.0–5.6:1.0.

Gaster (Fig. 38) 1.2–1.6 times as long as thorax, 1.7–2.2 times as long as wide.

Male. Body length 1.1–1.5 mm. Differs from female as follows. Eye about 1.7 times as high as malar space length. Antenna (Fig. 45): combined length of pedicel and flagellum



Figs. 44–45. *Sigmophora otys* (Walker). — 44. ♀ , antenna in inner view; 45. ♂ , antenna in outer view. Long and dark setae of the flagellum are not shown. Scale: 0.1 mm.

Figs. 36–43. *Sigmophora otys* (Walker), ♀ . — 36. Head; 37. Malar space; 38. Body; 39. Pronotum and mesoscutum; 40. Scutellum; 41. Dorsellum and propodeum; 42. Left hind coxa; 43. Apex of left hind tibial spine and tarsi.

1.4–1.5 times as long as head width; scape 2.6–3.0 times as long as wide; ventral plaque 0.4–0.7 length of scape, rarely medially incised; pedicel 0.3–0.4 times as long as scape; funicular segments and C1 with basal whorls of long and dark setae; F1 about 1.1 times as long as wide, 0.7–1.0 times as long as pedicel; F2 about 1.8 times as long as wide, about 1.7 times as long as F1; F3 about 2.0 times as long as wide, 1.0–1.1 times as long as F2; F4 about 1.1 times as long as wide, about 1.1 times as long as F3; clava about 5.8 times as long as wide, 2.2–2.4 times as long as F4. Propodeum 1.1–1.3 times as long as dorsellum. Gaster 1.0–1.1 times as long as thorax, dark brown, with pale basal spot.

Specimens examined. 50 ♀ 12 ♂ from the following localities. Australia: New South Wales: Cabramatta; Casula. Queensland: Acasia Ridge near Bristbane; Chalamar; Rainforest along Pandanus Ck, Cathu State Forest; road to Mt. Macartney, Cathu State Forest; Cooloola; Corroy; Gatton; Miles; Port Alma; Yeerongpilly. South Australia: Mt. Lofty, Adelaide; Teatree Gulley. Victoria: 3 miles S. Hattah; Kinglake Natinal Park near Melbourne; Melbourne; Mitcham.

Distribution. Australia (New South Wales, Queensland, South Australia, Victoria).

Host. Unknown.

Remarks. This species is very similar to *S. io* Girault, but differs from the latter in the characters mentioned in the diagnosis

Sigmophora io (Girault)
(Figs. 46–56)

Eulophotetrastichus io Girault, 1913a: 70. — Dahms, 1984: 726–727.
Neomphaloidella io (Girault); Girault, 1913b: 234, 236. — Girault, 1915: 243.
Sigmophora io (Girault); Bouček, 1988: 687.

Diagnosis (female and male)

Differs from *S. otys* as follows: anteromedian fovea of propodeum (Fig. 51) slightly longer than half length of propodeum; mesoscutum (Fig. 49) with distinct median line; female gaster with pale longitudinal median line; hind coxa (Fig. 52) very weakly engraved-reticulate, with distinct dorsal carina.

Redescription

Female. Body length 1.7–3.0 mm. Body black with yellow markings. Head black: face sometimes brownish along mouth. Pronotum black to yellow; mid lobe of mesoscutum black to yellow, usually black or brown in anterior two-thirds to one-third, and yellow in the remainder; side lobe of mesoscutum varying from entirely black to brown in anterior one-third and yellow in posterior two-thirds; tegula yellow; axilla varying from entirely black to black with inner half yellow; scutellum yellow, with brownish median spot, rarely predominantly black; dorsellum yellow; propodeum black to pale brown; area around anteromedian fovea and median carina pale brown; callus dark brown; hind coxal frange brown. Petiole pale brown. Dorsal surface of gaster black, with median longitudinal yellow or pale brown line which is rarely indistinct; ventral surface of gaster yellow. Scape and pedicel pale brown; flagellum dark brown. Legs pale brown to yellow; hind coxa mostly black to mostly pale brown. Wings hyaline.

Head (Fig. 46) 1.3–1.4 times as wide as high, 2.1–2.4 times as wide as long, 1.0–1.1 times as wide as thorax, very weakly engraved-reticulate, almost smooth. Ocellar carina

and scrobal carina present; scrobal carina sometimes weak. POL 2.3–2.4, OOL 1.2–1.4 length of median ocellus diameter. Frons wrinkly between ocellar carina and scrobal carina. Face smooth. Eye 2.0–2.3 times as high as malar space length. Triangular fovea of malar sulcus (Fig. 47) 0.2–0.4 length of malar space. Mouth 1.4–1.7 times as long as malar space. Antenna (Figs. 54, 55): scape 3.0–3.6 times as long as wide, not reaching vertex; combined length of pedicel and flagellum 1.0–1.4 times as long as head width; pedicel 0.4–0.5 times as long as scape; F1 1.8–2.5 times as long as wide, 1.0–1.4 times as long as pedicel; F2 1.6–2.5 times as long as wide, 0.8–1.1 times as long as F1; F3 1.6–1.8 times as long as wide, 0.8–1.1 times as long as F2; clava 2.9–3.7 times as long as wide, 1.9–2.3 times as long as F3.

Thorax (Fig. 48) 1.4–1.6 times as long as wide, weakly engraved-reticulate. Pronotum (Fig. 49) medially bare, laterally rugulose and with many setae. Mesoscutum (Fig. 49) weakly engraved-reticulate, with distinct median line, with a row of adnotaular setae in a weak depression. Axilla strongly advanced. Scutellum (Fig. 50) about as long as wide; more weakly sculptured than mesoscutum; anterior pair of scutellar setae situated in or slightly before the middle of scutellum; sublateral line deep and wide, with several costulae. Dorsellum (Fig. 51) with weak median line. Propodeum (Fig. 51) 1.2–2.0 times as long as dorsellum, weakly raised-reticulate, with anteromedian fovea slightly longer than half length of propodeum, with median carina posteriorly forked, sometimes with weak paraspiracular carina; callus with 2 setae. Hind coxa (Fig. 52) very weakly engraved-reticulate, almost smooth, with distinct dorsal carina; hind tibial spine (Fig. 53) slightly longer than hind basitarsus. Forewing 2.2–2.3 times as long as wide; submarginal vein with 4–6 dorsal setae; costal cell:marginal vein:stigmal vein = 3.8–6.8:5.5–7.3:1.0.

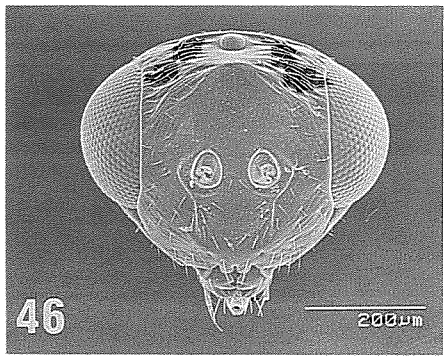
Gaster (Fig. 48) 1.3–2.0 times as long as thorax, 2.0–3.0 times as long as wide.

Male. Body length 1.5–1.9 mm. Differs from female as follows. Head 2.2–2.4 times as wide as long. Antenna (Fig. 56): scape 2.4–2.8 times as long as wide; ventral plaque 0.4–0.6 length of scape; combined length of pedicel and flagellum 1.5–1.7 times as long as head width; funicular segments and C1 with basal whorls of long and dark setae; F1 1.0–1.2 times as long as wide, 0.7–0.8 times as long as pedicel; F2 about 3.5 times as long as wide, 2.0–2.3 times as long as F1; F3 3.5–4.0 times as long as wide, 1.0–1.2 times as long as F2; F4 3.5–4.0 times as long as wide, about as long as F3; clava about 9.0 times as long as wide, about 2.0–2.3 times as long as F4. Petiole black. Gaster 0.8–1.0 times as long as thorax; dorsal surface mostly black to black with pale basal spot; ventral surface pale brown in basal half and black in apical half.

Type material. The holotype (♀) is card-mounted and in good condition. The head broken and one antenna is slide-mounted. For other data, see Dahms, 1984: 726–727. The holotype is deposited in the Queensland Museum.

Additional material examined. 56 ♀ 13 ♂ from the following localities. Australia: New South Wales: Cabramatta. Queensland: Graham Range, Babinda; 24.8 km west of Bauhinia; Mt Glorious near Brisbane; Broken River, Eungella National Park; Chalamar; Thannae Rainforest, Cooloola; St. Forest Camp Milo, Cooloola; National Park A. Road Fraser Island; Gatton; Indooroopilly; Kuranda; 3.4 km south of Port Dougras; Tooloom Scrub; Wilson's Peak. Panua New Guinea: Morobe Prov., Mt. Missim, south side. Vanuatu: New Hebrudes Is., Tanna Is., Lenekel. New Caledonia: Isle of Pines, Vao.

Distribution. Australia (New South Wales, Queensland), Panua New Guinea, Vanuatu,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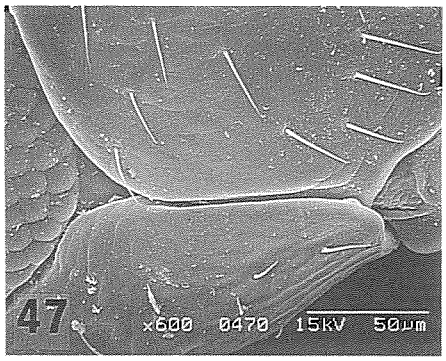
200µm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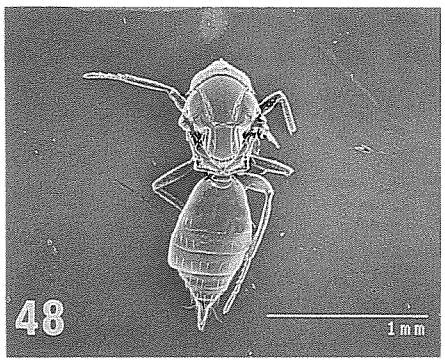
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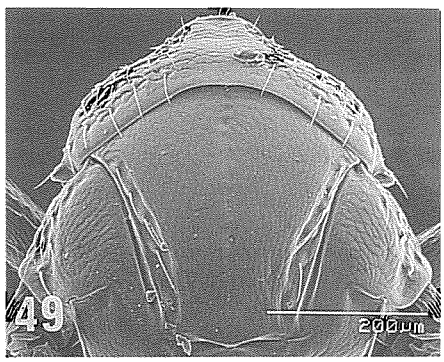
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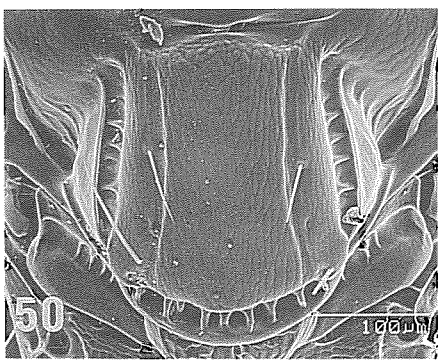
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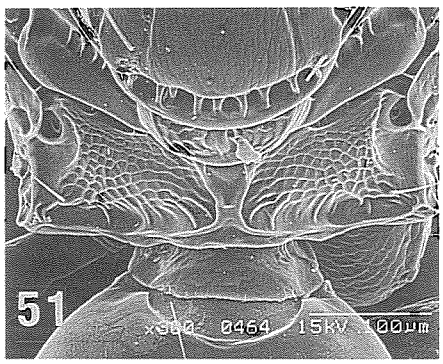
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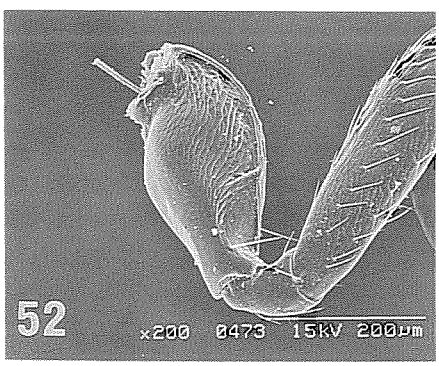
×300 0464 15kV 100µm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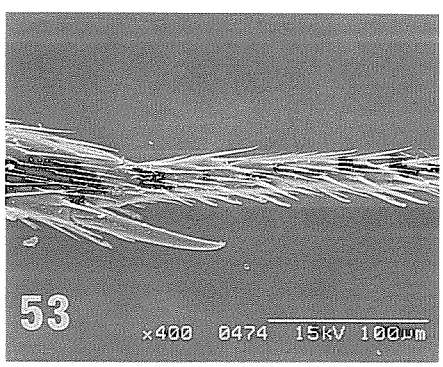
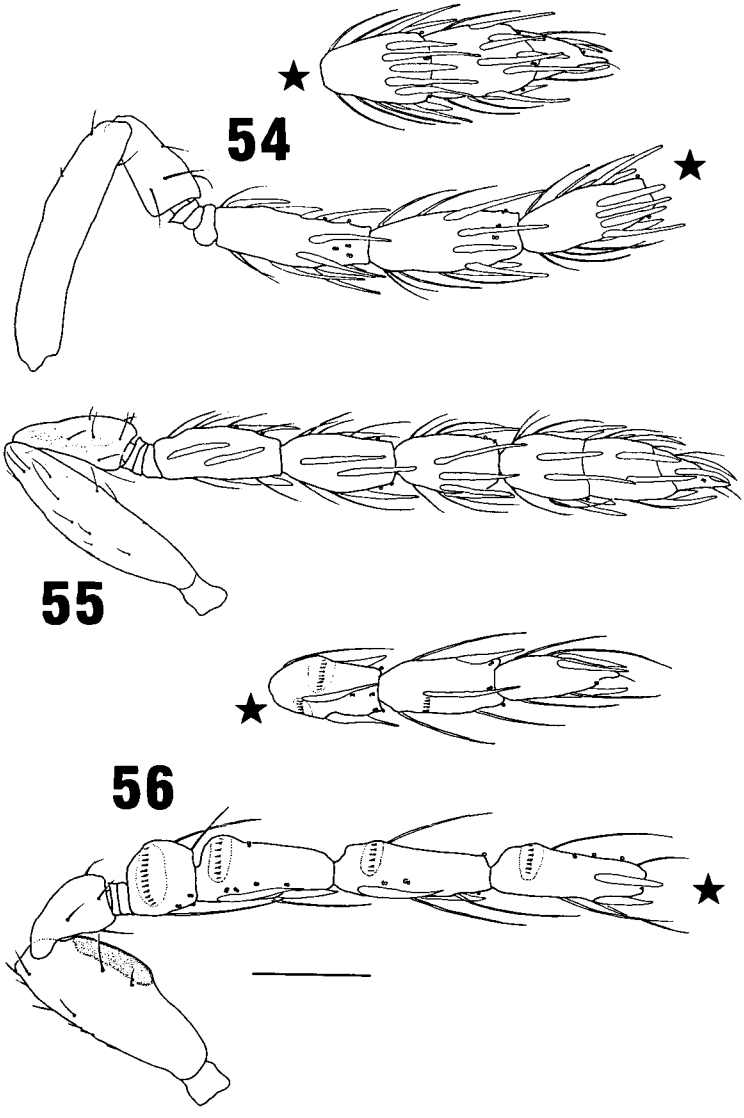

53
×400 0474 15kV 100µm

and New Caledonia.

Host. Unknown.

Remarks. This species is very similar to *S. otys*, but differs from the latter in the characters mentioned in the diagnosis.



Figs. 54–56. *Sigmophora io* (Girault). — 54. ♀, antenna in inner view, holotype; 55. ♀, antenna in inner view; 56. ♂, antenna in outer view. Long and dark setae of the flagellum are not shown. Scale: 0.1 mm.

Figs. 46–53. *Sigmophora io* (Girault), ♀. — 46. Head; 47. Malar space; 48. Body; 49. Pronotum and mesoscutum; 50. Scutellum; 51. Dorsellum and propodeum; 52. Left hind coxa; 53. Apex of left hind tibia and tarsi.

Sigmophora bilobata (Girault)

Neomphaloidella bilobata Girault, 1929: 327–328. — Dahms, 1983: 140.
Sigmophora bilobata (Girault); Bouček, 1988:

Dahms (1983) states that the holotype of *N. bilobata* is deposited in South Australian Museum. However, it is not present in the museum (E. G. Matthews, personal communication), and I could not find the depository. Moreover, no specimens referable to this species are available for the present study.

Distribution. Australia (South Australia) (Girault, 1929).
Host. Unknown.

Sigmophora spenceri (Girault)
(Figs. 57–62)

Euplectrotetrastichus spenceri Girault, 1915: 262. — Dahms, 1986: 554.
Sigmophora spenceri (Girault); Bouček, 1988: 688.

Diagnosis (female and male)

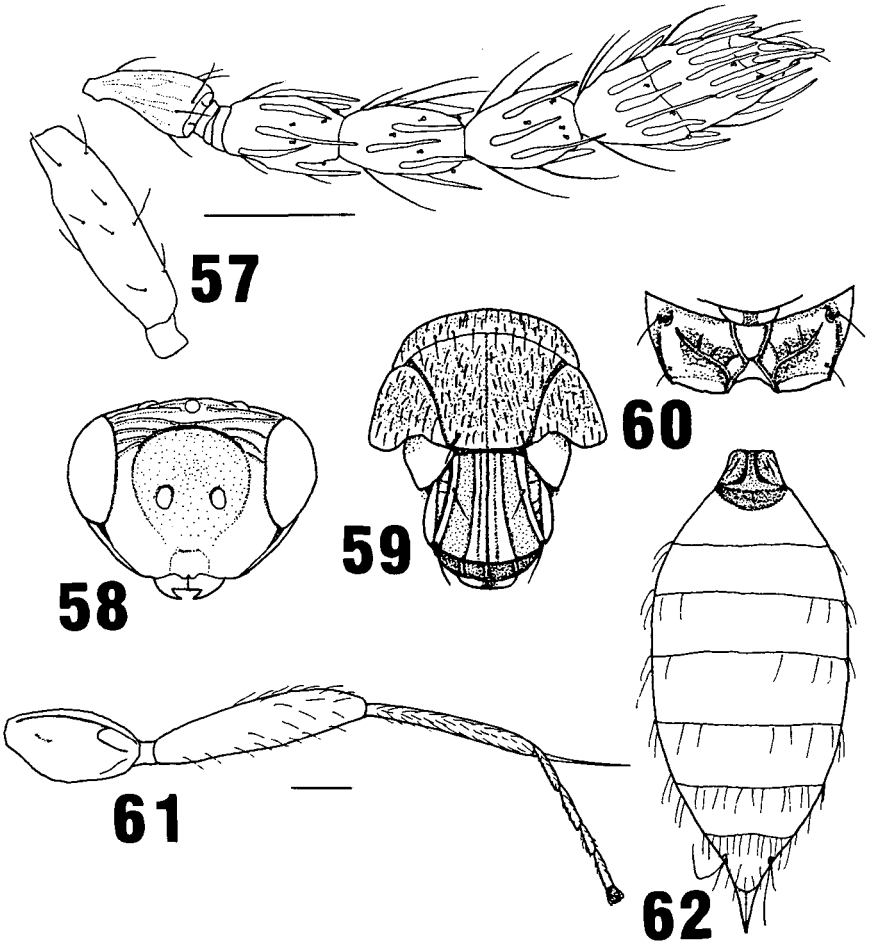
Pronotum and mesoscutum (Fig. 59) rugose, uniformly setose. Mesoscutum with distinct median line. Scutellum (Fig. 59) with median line; submedian line very wide, about 0.7 times as wide as median area. Axilla (Fig. 59) weakly advanced. Dorsellum (Fig. 60) very short. Propodeum (Fig. 60) 5.0–6.0 times as long as dorsellum in female, 3.0 times in male; anteromedian fovea 0.6–0.7 length of propodeum. Hind coxa (Fig. 61) smooth with weak dorsal carina; hind tibial spine (Fig. 61) long, about 0.5 times as long as hind tibia, as long as or slightly longer than the combined length of hind basitarsus and second tarsal segment. Petiole (Fig. 62) distinct, about 0.8 times as long as propodeum.

Redescription

Female. Body length 1.8 mm. Body mostly yellow to mostly dark brown. Scape and pedicel pale brown; flagellum dark brown. Legs pale brown: coxae pale to dark brown. Wings hyaline.

Head (Fig. 58) 1.3 times as wide as high, 2.4 times as wide as long, as wide as thorax. POL 3.0 and OOL 1.25 length of median ocellus diameter. Ocellar carina and scrobal carina present. Frons with several irregular transverse carinae between ocellar carina and scrobal carina. Scrobal groove shallow. Eye 2.0 times as high as malar space length. Triangular fovea of malar sulcus 0.2–0.3 length of malar space. Mouth 1.5 times as long as malar space. Antenna (Fig. 57): scape 3.3–3.5 times as long as wide, not reaching vertex; combined length of pedicel and flagellum as long as head width; pedicel half as long as scape; F1 1.7–2.0 times as long as wide, as long as pedicel; F2 1.8–2.3 times as long as wide, about 1.1 times as long as F1; F3 1.5–2.3 times as long as wide, 0.9–1.0 times as long as F2; clava 2.6–2.7 times as long as wide, 1.8–2.2 times as long as F3.

Thorax about 1.4 times as long as wide. Pronotum (Fig. 59) rugulose, uniformly setose. Mesoscutum (Fig. 59) rugose, uniformly setose, with distinct median line. Scutellum about as long as wide, with median line; submedian line very wide, about 0.7 times as wide as median area; sublateral line with a few very weak costulae; anterior pair of scutellar setae



Figs. 57–62. *Sigmophora spenceri* (Girault), ♀ . — 57. Antenna in inner view. 58. Head; 59. Mesoscutum and scutellum; 60. Dorsellum and propodeum; 61. Left hind leg; 62. Petiole and gaster. Scale: 0.1 mm.

situated distinctly before the middle of scutellum. Axilla weakly advanced. Dorsellum (Fig. 60) very short, with median line. Propodeum 5.0–6.0 times as long as dorsellum, partially raised-reticulate, with median carina H-shaped; anteromedian fovea 0.6–0.7 length of propodeum; plicae present, but anteriorly indistinct; callus with 2 setae; hind coxal frange distinct. Hind coxa (Fig. 61) smooth with weak dorsal carina; hind tibial spine long, 0.5 times as long as hind tibia, as long as or slightly longer than the combined length of hind basitarsus and second tarsal segment. Forewing 2.1 times as long as wide; speculum large, extending to basal one-third of marginal vein; submarginal vein with 4–5 dorsal setae; costal cell:marginal vein:stigmal vein = 3.5–3.8:4.0–4.8:1.0.

Petiole (Fig. 62) distinct, about 0.8 times as long as propodeum, with a few weak longitudinal carinae. Gaster 1.3–2.0 times as long as thorax, 2.0–3.0 times as long as wide.

Male. Body length 1.4 mm. Differs from female as follows. Body brown: occiput, ocellar triangle, inner half of side lobe, gaster, and flagellum dark brown; gaster with pale basal spot. Fovea of malar sulcus 0.15 length of malar space. Scape 2.3 times as long as

wide; combined length of pedicel and flagellum about 1.7 times as long as head width; ventral plaque white, 0.35 length of scape; funicular segments and C1 with basal whorls of long and dark setae; F1 1.3 times as long as wide, 0.6 times as long as pedicel; F2 2.8 times as long as wide, 2.2 times as long as F1; F3 3.0 times as long as wide, 1.1 times as long as F2; F4 3.0 times as long as wide, as long as F3; clava 6.5 times as long as wide, 2.2 times as long as F4. Thorax 1.6 times as long as wide. Propodeum 3.3 times as long as dorsellum. Gaster 1.9 times as long as wide, 0.8 times as long as thorax.

Type material (♀). The holotype without the head and right wings is mounted on a point in good condition. The gaster is separated from the thorax. The head squashed and having both scapes, and one antenna without its scape are mounted on a slide. For other data, see Dahms, 1986: 554. The holotype is deposited in the Queensland Museum.

Additional material examined. 1 ♀ 1 ♂ mounted on a card together with an unidentified specimen (QM). Labels are: "Gympie" and "*Euplectrotetrastichus spenceri* Gir. ♀ ". For other data of these specimens, see Dahms, 1986: 554. Australia: Queensland: 1 ♂ , Davies creek, Cairns dist., 3. XII. 1982 (Bouček) (BMNH). Solomon Is.: Guadalcanal, Hontara, 0–100m, 1 ♂ , XII. 1976 (N. L. H. Krauss) (BIM).

Distribution. Australia (Queensland) and Solomon Is.

Host. Unknown.

Remarks. *S. spenceri* is very similar to *S. papuana* sp. n. in the scutellum with a median line and a wide submedian line, the long hind tibial spine, the axilla only weakly advanced, and the propodeum about 5.0 times as long as the dorsellum, but the latter differs from the former in the characters mentioned in the diagnosis of *S. papuana* sp. n.

Sigmophora papuana sp. n.
(Figs. 63–66)

Diagnosis (female)

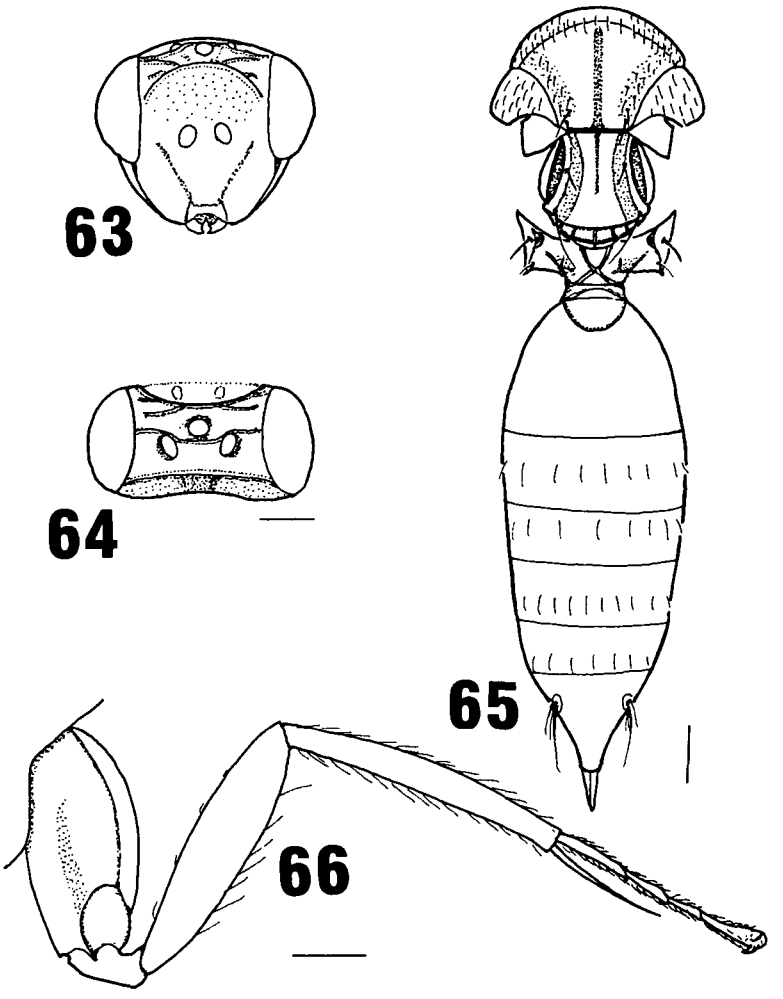
Differs from *S. spenceri* as follows: pronotum (Fig. 65) medially bare; mesoscutum with 1–3 rows of adnotaular setae; petiole very short and indistinct; and triangular fovea of malar sulcus 0.1 length of malar space.

Description

Female. Body length 2.0 mm. Body yellow. Antenna yellow: flagellum somewhat darker than scape. Legs pale brown. Wings hyaline.

Head (Figs. 63, 64) about 1.2 times as wide as high, about 2.2 times as wide as long, about 1.2 times as wide as thorax, very weakly engraved-reticulate. Ocellar carina and scrobal carina present. POL about 2.2 length of median ocellus diameter; OOL about as long as that diameter. Frons with a few transverse carinae between ocellar carina and scrobal carina. Eye about 1.9 times as high as malar space length. Triangular fovea of malar sulcus about 0.1 length of malar space. Mouth about 1.4 times as long as malar space. Antenna: scape 4.0 times as long as wide, not reaching vertex; combined length of pedicel and flagellum as long as head width; pedicel 0.4 times as long as scape; F1 1.5 times as long as wide, 1.1 times as long as pedicel; F2 1.5 times as long as wide, as long as F1; F3 1.5 times as long as wide, as long as F2; clava 2.6 times as long as wide, twice as long as F3.

Thorax (Fig. 65) about 1.4 times as long as wide. Pronotum medially weakly engraved-reticulate and bare, laterally rugulose and with many setae. Mid lobe of mesoscutum with extremely fine engraved-reticulation, almost smooth, with median line and 1–3 rows of



Figs. 63–66. *Sigmophora papuana* sp. n., ♀ . — 63. Head in facial view; 64. Head in dorsal view; 65. Body; 66. Left hind leg. Scale: 0.1 mm.

adnotaular setae in a weak depression. Axilla weakly advanced. Scutellum almost smooth, with median line on anterior two-thirds; submedian line wide, half as wide as median area; anterior pair of setae slightly before the middle of scutellum; sublateral line deep and narrow, without costula. Dorsellum very short, with weak median line. Propodeum about 5.0 times as long as dorsellum, with anteromedian triangular fovea half length of propodeum; median carina forked; plicae present, but indistinct anteriorly; callus with 2 setae. Hind coxa (Fig. 66) smooth, with weak dorsal carina; hind tibial spine long, half as long as hind tibia, as long as the combined length of hind basitarsus and second tarsal segment. Forewing about 2.3 times as long as wide; submarginal vein with 3–5 dorsal setae; costal cell:marginal vein:stigmal vein=5.4:5.4:1.0.

Petiole (Fig. 65) very short and indistinct. Gaster about 2.6 times as long as wide, about 1.7 times as long as thorax.

Male. Unknown.

Holotype (♀). Papua New Guinea: Laing Is., N. coast, 30. VI. 1982 (Grootaert). The holotype is deposited in The Natural History Museum, London. Paratypes. Papua New Guinea: Morobe Prov., Mt. Missim, south side, 2000m, 2♀, 15. VI. 1984 (W. C. Gagne & UREP session III, Colls. sample #9, tree #3309) (BIM).

Distribution. Papua New Guinea.

Host. Unknown.

Remarks. This species is similar to *S. spenceri*, but differs from the latter in the characters mentioned in the diagnosis.

Sigmophora mediosulcata (Girault)
(Figs. 67–73)

Ceratoneuronella mediosulcata Girault, 1924: 4. — Dahms, 1984: 805.
Sigmophora mediosulcata (Girault); Bouček, 1988: 671. — Bouček, 1989: 86.

Diagnosis (female and male)

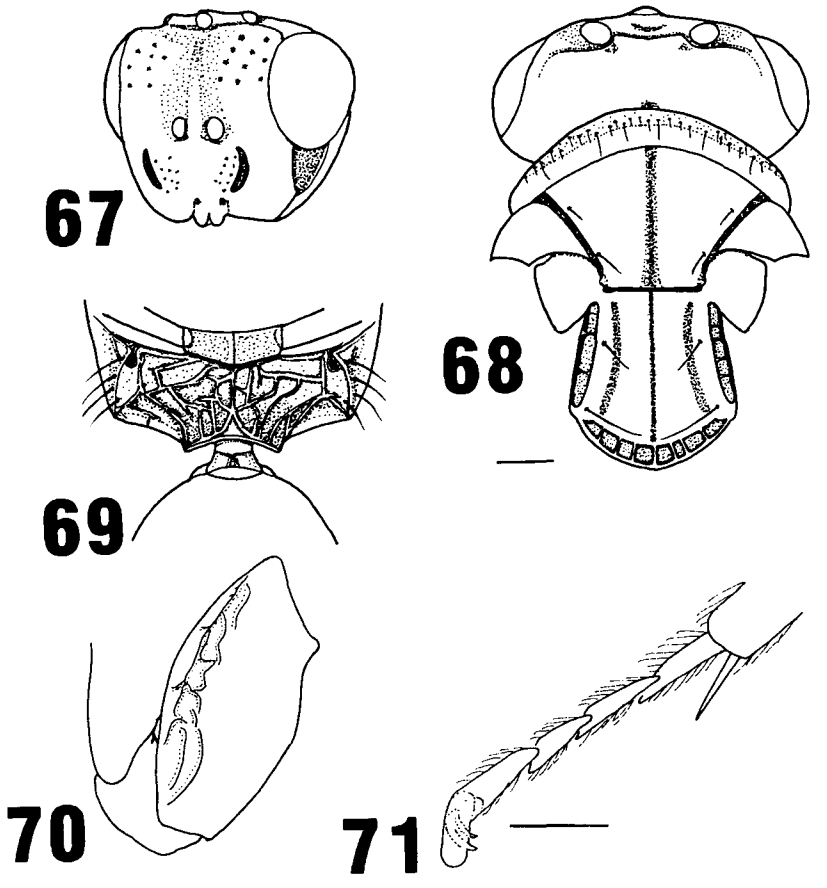
Body black to dark brown. Weak occipital carina (Fig. 68) present only behind ocellar triangle. Ocellar carina and scrobal carina (Fig. 67) absent. Face (Fig. 67) with a pair of large foveae. Triangular fovea of malar sulcus (Fig. 67) large, 0.5–0.6 length of malar space. Mesoscutum (Fig. 68) with distinct median line. Scutellum with distinct median line. Propodeum (Fig. 69) 2.0–2.7 times as long as dorsellum, with paraspiracular carina inverted Y-shaped and many strong irregular carinae. Petiole (Fig. 69) distinct, 0.5–0.7 times as long as propodeum.

Redescription.

Female. Body length 1.9–2.0 mm. Body black to dark brown: petiole brown; basal part of gaster rarely pale brown. Antenna dark brown to brown. Coxae and femora dark brown; tibiae pale to dark brown; tarsi pale brown. Wings hyaline.

Head (Figs. 67, 68) about 1.3 times as wide as high, 2.2–2.3 times as wide as long, about as wide as thorax, very weakly engraved-reticulate. Weak occipital carina present only behind ocellar triangle. Ocellar carina and scrobal carina absent. POL 2.5–2.8 and OOL 1.5–2.0 length of median ocellus diameter. Eye 1.3–1.6 times as high as malar space length. Scrobal groove shallow. Frons with weak median bulge. Face with a pair of large foveae. Triangular fovea of malar sulcus large, 0.5–0.6 length of malar space. Mouth 1.5–1.6 times as long as malar space. Antenna (Fig. 72): scape 4.0–5.0 times as long as wide, not reaching vertex; combined length of pedicel and flagellum about 0.9 times as long as head width; pedicel about 0.4 times as long as scape; F1 1.7–2.0 times as long as wide, 0.9–1.0 times as long as pedicel; F2 about 1.6 times as long as wide, about as long as F1; F3 1.3–1.5 times as long as wide, about as long as F2; clava 3.0–3.3 times as long as wide, 2.3–2.7 times as long as F3.

Thorax (Fig. 68) 1.3–1.4 times as long as wide. Pronotum medially very weakly engraved-reticulate and bare, laterally rugulose and with many setae. Mesoscutum with distinct median line and 3–4 pairs of adnotaular setae, not depressed along notaulus. Axilla weakly advanced. Scutellum as long as wide or slightly longer than wide, with distinct median line, shallow and relatively wide submedian line which is rarely indistinct anteriorly,



Figs. 67–71. *Sigmophora mediosulcata* (Girault), ♀ . — 67. Head in anterolateral view; 68. Head and thorax in dorsal view; 69. Propodeum and petiole; 70. Right hind coxa; 71. Apex of right hind tibia and tarsi. Scale: 0.1 mm.

wide and deep sublateral line having costulae, and 2–4 pairs of setae; anterior pair of setae situated before the middle of scutellum. Dorsellum with median line. Propodeum (Fig. 69) 2.3–2.7 times as long as dorsellum, with thin median carina, distinct paraspiracular carina inverted Y-shaped, and many strong irregular carinae; very small anteromedian fovea sometimes present; callus with 3–4 setae. Hind coxa (Fig. 70) very weakly raised- or engraved-reticulate, with weak to strong dorsal carina and weak irregular carinae; hind tibial spine (Fig. 71) as long as or slightly shorter than hind basitarsus. Forewing 2.1–2.2 times as long as wide; submarginal vein with 2–3 dorsal setae; costal cell:marginal vein:stigmal vein=3.0–4.0:2.4–3.1:1.0.

Petiole distinct, 0.4–0.7 times as long as propodeum, smooth or with a few weak longitudinal carinae. Gaster 1.4–1.9 times as long as wide, 1.1–1.3 times as long as thorax.

Male. Differs from female as follows. Antenna (Fig. 73): scape 3.0 times as long as wide; ventral plaque 0.3–0.4 length of scape; combined length of pedicel and flagellum about 1.3 times as long as head width; funicular segments and C1 with basal whorls of long and dark setae; F1 about 1.1 times as long as wide; F2 about 1.7 times as long as wide,

about 1.5 times as long as F1; F3 1.8–2.3 times as long as wide, about 1.2 times as long as F2; F4 2.0–2.5 times as long as wide, 1.0–1.1 times as long as F3; clava 5.1–6.3 times as long as wide, 2.5–2.6 times as long as F4. Propodeum about 2.0 times as long as dorsellum.

Type material. The syntypes contain 7 females and 4 males. I designate one female having no antennae, which is mounted on the card labelled: "Wynnum" and "*Ceratoneurella mediosulcata* Gir. ♀ ", as lectotype (card No.2, according to Dahms, 1984), because it is the best in condition among the specimens. The other specimens are designated as paralectotypes. For other data of the type material, see Dahms, 1984: 805. All types are deposited in the Queensland Museum.

Additional material examined. Australia: Queensland: 1 ♀ , Wynnum nr. Brisbane (Girault) (BMNH).

Distribution. Australia (Queensland).

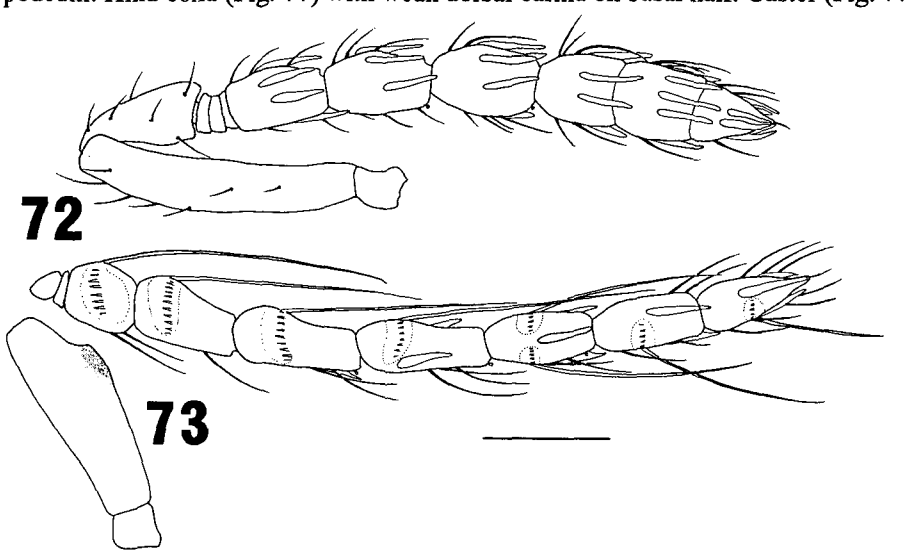
Host. This species was reared from large, reddish brown, velvety galls from the leaves of a forest bush (Girault, 1924). In his unpublished manuscript Girault says, "The bush from which this species was reared was the white leaf, *Alphitonia*" (Dahms, 1984).

Remarks. *S. mediosulcata* is easily distinguished from the other species of *Sigmophora* by the characteristics mentioned in the diagnosis, especially by having many strong irregular carinae on the propodeum.

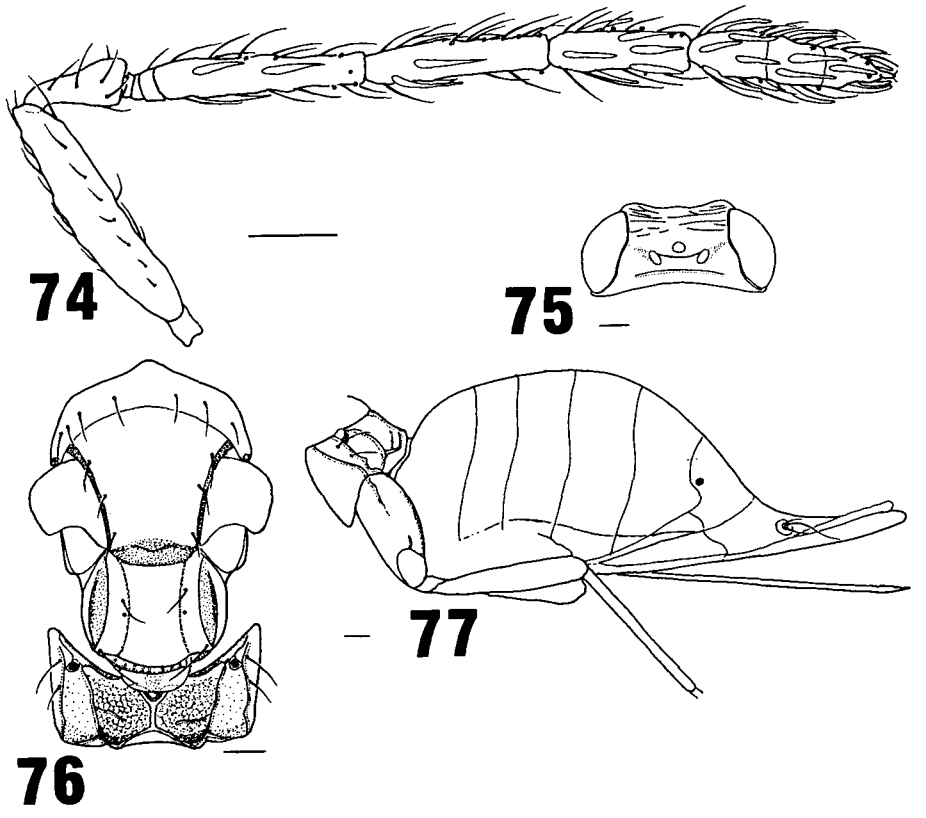
Sigmophora tumidifrons sp. n.
(Figs. 74–77)

Diagnosis (female)

Head (Fig. 75) without scrobal groove. Scrobal carina absent. Flagellum (Fig. 74) slender: F1 about 6.0 times as long as wide. Pronotum (Fig. 76) almost bare, with only several setae on the posterior marginal and lateral areas. Mesoscutum without median line. Scutellum with very weak submedian line. Axilla weakly advanced. Propodeum with distinct paraspiracular carina inverted Y-shaped, and with anteromedian fovea about 0.3 length of propodeum. Hind coxa (Fig. 77) with weak dorsal carina on basal half. Gaster (Fig. 77)



Figs. 72–73. *Sigmophora mediosulcata* (Girault). — 72. ♀, antenna in inner view; 73. ♂ antenna in outer view. The pedicel was not able to be observed. Scale: 0.1 mm.



Figs. 74–77. *Sigmophora tumidifrons* sp. n., ♀ . — 74. Antenna in inner view. 75. Head in dorsal view; 76. Thorax; 77. Gaster in lateral view. Scale: 0.1 mm.

lanceolate, 2.8–2.9 times as long as wide.

Description

Female. Body length 3.0–3.2 mm. Head yellow. Thorax brown: scutellum and propodeum darker than pronotum and mesoscutum. Gaster dorsally dark brown, ventrally pale brown. Scape, pedicel, and F1 pale brown; remaining parts of flagellum darker than F1. Legs pale brown: hind coxa dark brown. Wings hyaline.

Head (Fig. 75) about 1.3–1.4 times as wide as high, about 2.0 times as wide as long, about 1.1 times as wide as thorax. Ocellar carina present. POL 2.2–2.6 and OOL 1.7–2.0 length of median ocellus diameter. Scrobal groove and scrobal carina absent. Frons with some weak transverse carinae. Eye about 2.1 times as high as malar space length. Triangular fovea of malar sulcus slightly shorter than half length of malar space. Mouth about 1.4 times as long as malar space. Antenna (Fig. 74): scape 4.4–4.6 times as long as wide, reaching vertex; combined length of pedicel and flagellum about 1.3 times as long as head width; pedicel about 0.4 times as long as scape; F1 about 6.0 times as long as wide, about 1.8 times as long as pedicel; F2 about 5.3 times as long as wide, about 0.9 times as long as F1; F3 about 4.0 times as long as wide, about 0.8 times as long as F2; clava about 4.5 times as long as wide, about 1.4 times as long as F3.

Thorax (Fig. 76) about 1.5 times as long as wide. Pronotum weakly engraved-reticulate, only with several setae on posterior marginal and lateral areas. Mesoscutum and scutellum with extremely fine engraved-reticulation, almost smooth. Mesoscutum with 3 pairs of adnotaular setae, without median line, not depressed along notaulus; side lobe with a few setae on the outer edge. Axilla weakly advanced. Scutellum about 0.9 times as long as wide, with very weak submedian line; sublateral line wide, without costula; anterior pair of scutellar setae situated before the middle of scutellum. Dorsellum with or without median line. Propodeum (Fig. 76) about 2.7 times as long as dorsellum, weakly raised-reticulate, with anteromedian triangular fovea about 0.3 length of propodeum; median and Y-shaped paraspiracular carina present; area between paraspiracular carina and raised lobe of callus depressed and smooth; diameter of spiracle about 0.2 length of propodeum; callus with 2 setae. Hind coxa (Fig. 77) distinctly raised-reticulate, with dorsal carina in basal half; hind tibial spine slightly longer than hind basitarsus. Forewing about 2.6 times as long as wide; submarginal vein with 5 dorsal setae; costal cell:marginal vein:stigmal vein=3.8–4.2:5.0–5.6:1.0.

Gaster (Fig. 77) lanceolate, 2.8–2.9 times as long as wide, 2.1–2.2 times as long as thorax; postcercal part about 0.1 length of gaster.

Male. Unknown

Holotype (♀). Madagascar: Prov. Fianarantsoa, 7 km W. Ranomafana, 1100m, 1–7. XI. 1988 (W. E. Steiner) flight intercept - yellow pan trap in Malaise trap in a small montane rain forest in clearing. The holotype is deposited in the United States National Museum of Natural History. Paratypes. 1 ♀, with same data as the holotype (USNM).

Distribution. Madagascar.

Host. Unknown.

Remarks. *S. tumidifrons* sp. n. is similar to *S. prolixa* sp. n. in the large body, the shape of the gaster, and the presence of inverted Y-shaped paraspiracular carina, but in the latter the head is provided with a scrobal groove, the antenna is stouter, the axilla is strongly advanced, the anteromedian fovea of the propodeum is longer than half length of propodeum, and the propodeum is deeply emarginate posteromedially.

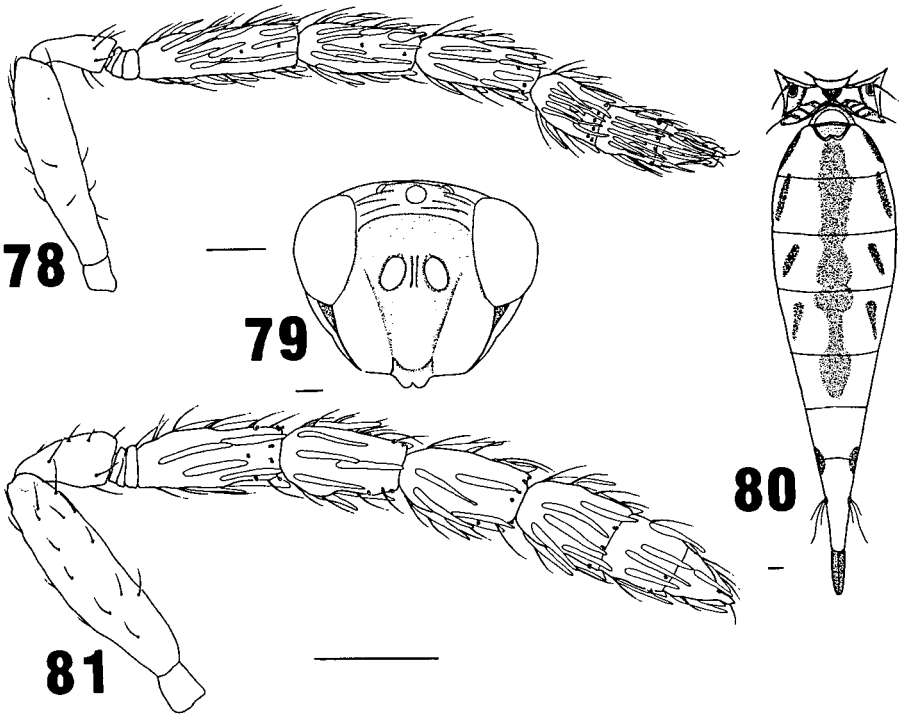
Sigmophora prolixa sp. n.
(Figs. 78–81)

Diagnosis (female)

Flagellum stouter than in *S. tumidafrons* sp. n.: F1 3.3–3.4 times (Fig. 78). Pronotum medially bare, laterally rugulose, with many setae. Mesoscutum without median line. Axilla strongly advanced. Propodeum (Fig. 80) deeply emarginate posteromedially, with large anteromedian fovea 0.6 length of propodeum, with weak paraspiracular carina inverted Y-shaped. Hind coxa weakly raised-reticulate, without dorsal carina. Gaster (Fig. 80) lanceolate, 3.4–4.0 times as long as wide, yellow with dark brown median longitudinal line and with 4–5 pairs of dark brown elongate spots, slightly to distinctly directing upwards in apical part.

Description

Female. Body length 3.8–4.6 mm. Body yellow: areas around foramen magnum and around pronotal spiracle black; gaster with dark brown median longitudinal stripe and 4–5 pairs of dark brown elongate spots; apex of ovipositor sheath dark brown to black. Scape pale brown; pedicel dark brown; flagellum black. Legs pale brown. Wings hyaline.



Figs. 78–81. — 78. *Sigmophora prolixa* sp. n., ♀, antenna in inner view; 79. Ditto, head; 80. Ditto, propodeum and gaster; 81. *S. lutea* sp. n., antenna in inner view. Scale: 0.1 mm.

Head (Fig. 79) about 1.3 times as wide as high, about 2.5 times as wide as long, about as wide as thorax, very weakly engraved-reticulate. POL 2.5 and OOL 1.2 length of median ocellus diameter. Ocellar carina and scrobal carina present; weak transverse carina running between the end of ocellar carina and eye. Scrobal groove shallow. Frons wrinkly between ocellar carina and scrobal carina. Eye about 1.7 times as high as malar space length. Triangular fovea of malar sulcus 0.4 length of malar space, slightly longer than wide. Mouth about 1.4 times as long as malar space. Antenna (Fig. 78): scape about 3.8–4.0 times as long as wide, reaching or slightly exceeding vertex; combined length of pedicel and flagellum about 1.3 times as long as head width; pedicel about 0.4 times as long as scape; F1 3.3–3.4 times as long as wide, 1.9–2.0 times as long as pedicel; F2 2.5–2.7 times as long as wide, about 0.8 times as long as F1; F3 2.7–2.8 times as long as wide, 1.0–1.1 times as long as F2; clava 3.4–4.3 times as long as wide, 1.6–1.8 times as long as F3.

Thorax 1.4–1.5 times as long as wide, weakly engraved-reticulate. Pronotum medially bare, laterally rugulose and with many setae. Mesoscutum without median line, with a row of adnotaular setae in a weak depression; outer half of side lobe rugulose, with many setae. Axilla strongly advanced. Scutellum about as long as wide; submedian line distinct; sublateral line with weak transverse costulae; anterior pair of scutellar setae situated before the middle of scutellum. Dorsellum without median line. Propodeum (Fig. 80) 1.7–2.3 times as long as dorsellum, deeply emarginate posteromedially, with large anteromedian fovea 0.6 length of propodeum, median carina forked, and weak Y-shaped paraspiracular carina; diameter of spiracle about 0.6 length of propodeum; callus with 2 setae. Hind coxa

weakly raised-reticulate, without dorsal carina; hind tibial spine slightly longer than hind basitarsus. Forewing 2.3 times as long as wide; submarginal vein with 6–8 dorsal setae; costal cell:marginal vein:stigmal vein=4.4:5.8–6.3:1.0.

Gaster (Fig. 80) lanceolate, 3.4–4.0 times as long as wide, 1.8–2.4 times as long as thorax, slightly to distinctly directing upwards in apical part; postcercus about 0.1 times as long as gaster; projecting part of ovipositor sheath 0.8 times as long as postcercus.

Male. Unknown.

Holotype (♀). Cameroon: Ottotomo F. R., 1. IX. 1951 (J. McGough) 9879. The holotype is deposited in the United State National Museum of Natural History. Paratypes. 2♀ with same data as the holotype (USNM).

Distribution. Cameroon.

Host. Unknown.

Remarks. This species is similar to *S. tumidifrons* sp. n., but differs from the latter in the characters mentioned in the diagnosis.

Sigmophora lutea sp. n.
(Figs. 81–89)

Diagnosis (female)

Body yellow. Gaster with dark median longitudinal line. Scutellum (Fig. 87) engraved-reticulate in median area between submedian lines, smooth in areas between submedian and sublateral lines. Propodeum (Fig. 88) 1.5–2.3 times as long as dorsellum, weakly raised-reticulate, with weak paraspiracular carina; anteromedian fovea half length of propodeum or slightly more, about twice as wide as long. Hind coxa (Fig. 89) raised-reticulate; dorsal carina absent or only weakly indicated.

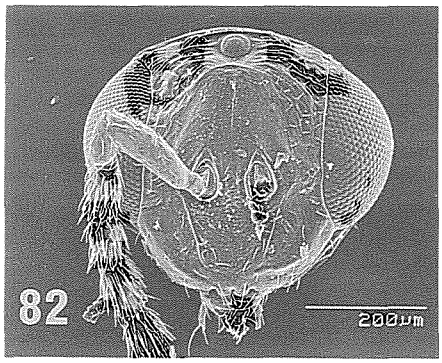
Description

Female. Body length 1.6–2.6 mm. Body yellow: area around foramen magnum, apex of ovipositor sheath dark brown; gaster with dark brown median longitudinal stripe and a pair of lateral dark brown longitudinal lines. Scape and pedicel brown; flagellum dark brown. Legs pale brown. Wings hyaline.

Head (Fig. 82) 1.2–1.3 times as wide as high, 2.0–2.4 times as wide as long, about 1.1 times as wide as thorax, almost smooth. Ocellar carina and scrobal carina present. POL 2.0–2.2 and OOL 1.1–1.5 length of median ocellus diameter. Frons wrinkly between ocellar carina and scrobal carina. Scrobal groove deep. Eye 1.6–2.0 times as high as malar space length. Triangular fovea of malar sulcus (Fig. 83) 0.3–0.4 length of malar space. Mouth about 1.5 times as long as malar space. Antenna (Fig. 81): scape 3.7–4.3 times as long as wide, not reaching vertex; combined length of pedicel and flagellum 1.2–1.3 times as long as head width; pedicel about 0.4 times as long as scape; F1 2.5–3.0 times as long as wide, 1.4–1.9 times as long as pedicel; F2 1.8–2.4 times as long as wide, 0.7–0.9 times as long as F1; F3 1.7–1.8 times as long as wide, 0.8–1.0 times as long as F2; clava 2.9–3.4 times as long as wide, 1.8–2.0 times as long as F3.

Thorax (Fig. 84) 1.4–1.5 times as long as wide. Pronotum (Fig. 85) medially very weakly engraved-reticulate and bare, laterally rugulose and with many setae. Mesoscutum

Figs. 82–89. *Sigmophora lutea* sp. n., ♀. — 82. Head; 83. Malar space; 84. Thorax; 85. Pronotum; 86. Mesoscutum; 87. Scutellum; 88. Dorsellum, propodeum, and petiole; 89. Propodeum and hind coxa in lateral view.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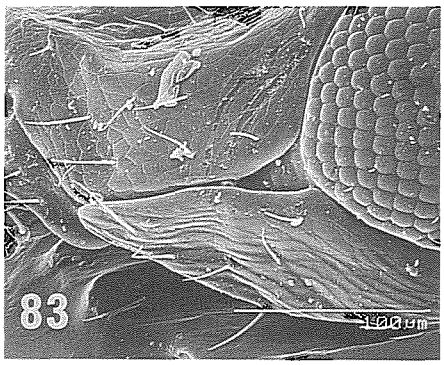
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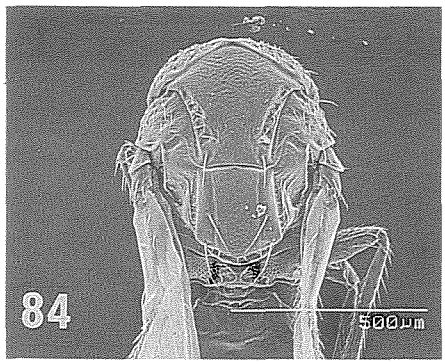
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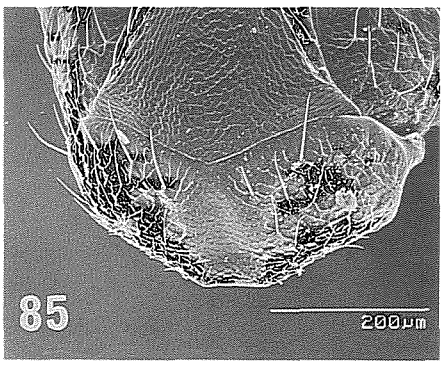
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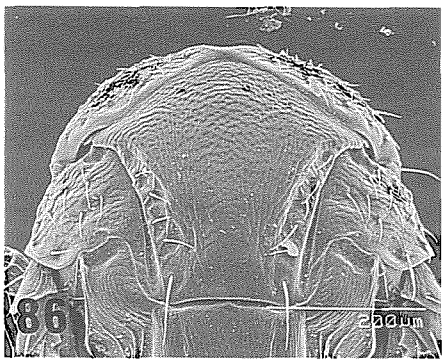
200µm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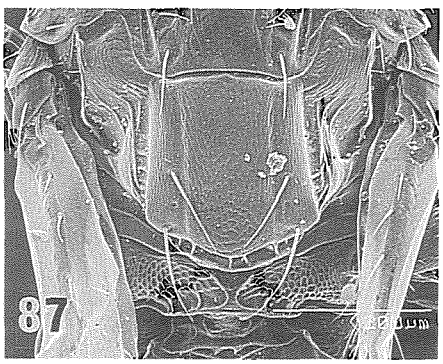
200µm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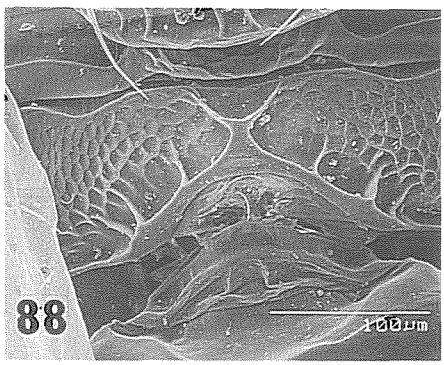
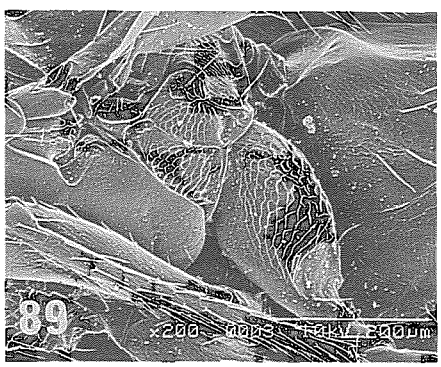

88
100µm


89
x200 500µm EHT 500µm

(Fig. 86) engraved-reticulate, without median line, with a row of adnotaular setae in a weak depression. Axilla strongly advanced. Scutellum (Fig. 87) about 0.9 times as long as wide; median area engraved-reticulate; area between submedian and sublateral lines smooth; submedian line distinct; sublateral line with weak costulae; anterior pair of setae situated in or slightly behind the middle of scutellum. Dorsellum without median line. Propodeum (Fig. 88) 1.5–2.3 times as long as dorsellum, weakly raised-reticulate, with anteromedian fovea half length of propodeum or slightly more, with median carina forked and paraspiracular carina very weak; area between lobe of callus and paraspiracular carina weakly depressed; diameter of spiracle about half length of propodeum; callus with 2 setae. Fore coxa weakly raised-reticulate; hind coxa raised-reticulate; dorsal carina of hind coxa absent or only weakly indicated; hind tibial spine as long as hind basitarsus or slightly longer. Forewing 2.2–2.3 times as long as wide; submarginal vein with 4–6 dorsal setae; costal cell:marginal vein:stigmal vein=4.7–6.0:6.7–8.3:1.0.

Gaster 2.1–2.8 times as long as wide, 1.5–2.1 times as long as thorax.

Male. Unknown.

Holotype (♀). Congo: Voka, 600m, 24. V. 1973 (O. More). The holotype is deposited in the Canadian National Collection of Insects. Paratypes. Congo: Voka, 600m, 4♀, 24. V. 1973 (O. More) (CNCI, SEHU). Ivory Coast: Bovake, 1 ♀, XII. 1980 (P. Cochereau), pan trap, rice field (BMNH); Lamto Research Station, 5°02'W, 6°13'N, 17., 3 ♀, VII. 1988, Malaise Trap (CNCI, SEHU).

Distribution. Congo and Ivory Coast.

Host. Unknown.

Remarks. This species is similar to *S. brevicornis*, but differs from the latter in the characters mentioned in the remarks of *S. brevicornis*.

Key to the species of *Sigmophora* (Female)

1. Scutellum (Figs. 59, 65, 68) with distinct median line. ..... 2.
– Scutellum (Figs. 5, 13, 23) without median line. ..... 4.
2. Hind tibial spine (Fig. 71) as long as hind basitarsus or slightly shorter. Propodeum (Fig. 69) shorter than 3.0 length of dorsellum, with many strong and irregular carinae in addition to median carina and distinct Y-shaped paraspiracular carina. Callus with 3–4 setae. Triangular fovea of malar sulcus (Fig. 67) large, 0.5–0.6 times as long as malar space. Ocellar carina and scrobal carina absent (Fig. 67). ..... *S. mediosulcata* (Girault)
– Hind tibial spine (Figs. 61, 66) about as long as the combined length of hind basitarsus and second tarsal segment. Propodeum (Figs. 60, 65) longer than 3.0 length of dorsellum, only with median carina and weak paraspiracular carina. Callus with 2 setae. Triangular fovea of malar sulcus at most 0.3 length of malar space. Ocellar carina and scrobal carina (Fig. 58, 63) present. ..... 3.
3. Pronotum and mesoscutum (Fig. 59) rugose and uniformly setose. Petiole (Fig. 62) distinct, 0.8 length of propodeum. Triangular fovea of malar sulcus 0.2–0.3 length of malar space. ..... *S. spenceri* (Girault)
– Pronotum very weakly engraved-reticulate and medially bare. Mesoscutum (Fig. 65) almost smooth and with 1–3 rows of adnotaular setae. Petiole short and indistinct. Triangular fovea of malar sulcus 0.1 length of malar space. ..... *S. papuana* sp. n.

4. Scape (Fig. 33) with many setae on the outer surface. Triangular fovea of malar sulcus very small, 0.1 length of malar space. Hind tibial spine (Fig. 35) shorter than half length of hind basitarsus. ..... *S. polyseta* (Sarawat) comb. n.
– Scape with only some setae on the outer surface. Triangular fovea usually larger. Hind tibial spine at least only slightly shorter than hind basitarsus. ..... 5.
5. Frons without scrobal groove. Flagellum (Fig. 74) slender: F1 about 6.0 times as long as wide. Scutellum with very weak submedian line. Axilla only weakly advanced. .... *S. tumidifrons* sp. n.
– Frons with scrobal groove. Flegellum stouter. Scutellum with distinct submedian line. Axilla strongly advanced. 6
6. Propodeum (Fig. 80) deeply emarginate posteromedially, with weak Y-shaped paraspiracular carina. Gaster (Fig. 80) lanceolate, 3.4–4.0 times as long as wide, slightly to distinctly directing upwards in apical part. ..... *S. prolixa* sp. n.
– Propodeum (Figs. 14, 24) only shallowly emarginate posteriorly, without Y-shaped paraspiracular carina. Gaster at most 2.9 times as long as wide, not directing upwards in apical part. ..... 7.
7. Mesoscutum (Fig. 12) with 3–4 rows of decumbent white adnotaular setae, with 1 black seta at each hind corner. Propodeum (Fig. 14) without anteromedian fovea. Callus with 3–8 setae. Dorsal carina of hind coxa absent (Fig. 16). ..... *S. italica* (Domenichini)
– Mid lobe of mesoscutum (Figs. 5, 21) with 1–2 rows of black adnotaular setae; propodeum (Figs. 6, 24) with anteromedian fovea; callus with 2 setae; dorsal carina of hind coxa present or absent. ..... 8.
8. Scrobal carina (Fig. 17) very strong. Gena laterally expanded. Lateral part of pronotum (Fig. 22) distinctly rugose and densely setose. Dorsellum (Fig. 24) with distinct median channel. ..... *S. aceris* sp. n.
– Scrobal carina (Figs. 1, 46, 79) weak. Gena laterally not expanded. Lateral part of pronotum at most rugulose and sparsely setose. Dorsellum (Figs. 6, 41, 51, 88) with weak median line or without median line. ..... 9.
9. Gaster without median longitudinal line. ..... 10.
– Gaster with yellow or dark brown median longitudinal line. ..... 11.
10. Submedian lines of scutellum (Fig. 5) parallel or only slightly diverging distad; width of median area between submedian lines at least half length of scutellum. Anteromedian fovea of propodeum (Fig. 6) slightly shorter than half length of propodeum. Scape reaching or slightly exceeding vertex. ..... *S. brevicornis* (Panzer)
– Submedian lines strongly diverging distad; width of narrowest part of median area between submedian lines about one-third length of scutellum. Anteromadian fovea of propodeum about 0.2 times as long as propodeum. Scape not reaching vertex. ..... *S. divorsa* sp. n.
11. Body yellow: only gaster with dark brown areas. Dorsellum without median line (Fig. 88). Side lobe of mesoscutum rugulose and with many setae (Fig. 86). ..... *S. lutea* sp. n.
– Body mostly dark brown to black. Dorsellum (Fig. 51) usually with median line. Side lobe of mesoscutum weakly engraved-reticulate and with only some setae (Figs. 39, 49). ..... 12.
12. Anteromedian fovea of propodeum (Fig. 51) longer than half length of propodeum. Mid lobe

of mesoscutum (Fig. 49) with distinct median line. Hind coxa (Fig. 52) very weakly engraved-reticulate, with distinct dorsal carina. Gaster black with pale brown longitudinal median line. ..... *S. io* (Girault)

– Anteromedian fovea of propodeum (Fig. 41) shorter than half length of propodeum. Mid lobe of mesoscutum (Fig. 39) with very weak median line only in posterior half. Hind coxa (Fig. 42) weakly raised-reticulate, with weak dorsal carina which is sometimes indistinct. Gaster usually yellow with dark brown or black longitudinal median line, rarely entirely dark brown. ..... *S. otys* (Walker)

Acknowledgments

I cordially thank C. Burwell (QM), E. G. Matthews (SAM), J. LaSalle (BMNH), M. E. Schauff (USNM), I. Naumann and J. C. Cardale (ANIC), J. Huber (CNCI), Ch. Zhu (IZCAS), K. Arakaki (BIM), K. Kamijo (Bibai, Hokkaidô), Y. Sakamaki (SEHU), M. Ôhara (Otaru Museum, Hokkaidô), T. Yabuki (Kutchan, Hokkaidô), K. Yamagishi (Meijo University, Nagoya), K. Morimoto, and S. Kamitani (ELKU) for their loan or gift of materials, J. LaSalle for many valuable advise, J. Yukawa (Laboratory of Plant Protection, Kagoshima University) for the identification of *Asphondylia* sp., T. Ito (Electron Microscope Laboratory, Faculty of Agriculture, Hokkaiudô University) for his help in taking SEM pictures, K. Kamijo, S. Takagi, and M. Suwa (SEHU) for the critical readings of the manuscript.

This study was partly supported by Research Fellowships of the Japan Society for the Promotion of Science for Young Scientists.

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