Revision of the genus *Spinaria* Brullé (Hymenoptera: Braconidae: Rogadinae), with keys to genera and species of the subtribe Spinariina van Achterberg

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Eight new species of the genus *Spinaria* Brullé (Hymenoptera: Braconidae: Rogadinae) are described and illustrated: *Spinaria altimontana* spec. nov. and *S. campania* spec. nov. from Papua, *S. australiensis* spec. nov. from Australia, *S. incisa* spec. nov. and *S. eburata* spec. nov. from Philippines, *S. triangulifera* spec. nov. from Myanmar, *S. sundana* spec. nov. from West Malaysia and *S. hyalinata* spec. nov. from Sumatra. Three species (and two varieties) are synonymised: *Spinaria fuscipennis* Brullé, 1846, *S. curvispina* Cameron, 1902, *S. curvispina* var. *nigricauda* Enderlein, 1905, and *S. curvispina* var. *udei* Enderlein, 1905, with S. *armator* Fabricius, 1804, and *S. bhotanensis* Cameron, 1906, with *S. flavipennis* Cameron, 1906. A lectotype is designated for *Batotheca dohrniana* Enderlein, 1905, *Spinaria westwoodi* Cameron, 1906 and *S. curvispina* Cameron, 1902, to stabilize the nomenclature of the group. Three taxa are re-instated: *Spinaria bicolor* Szépligeti, 1902, *S. philippinensis* Enderlein, 1905 and *S. flavipennis* Cameron, 1906. For the first time a key to species of the genus *Spinaria* Brullé is given. A key to genera of the subtribe Spinariina van Achterberg is included and the type species (but a closely related species for *Cornutorogas*) of each genus is fully illustrated. Keys to the known species of the genera *Spinariella* Szépligeti (with *S. nigrita* spec. nov. from Sarawak and *S. tulungi* spec. nov. from Sulawesi), *Batotheca* Enderlein (with *B. quickei* spec. nov. from Australia), *Conspinaria* Schulz (with *C. chenhei* spec. nov. from China and Japan, *C. olthofi* spec. nov. from Papua and *C. sundana* spec. nov. from Malaysia) and *Cornutorogas* Chen et al. are also provided.

Introduction

Spinaria Brullé, 1846 (Braconidae: Rogadinae: Rogadini) is a small genus containing conspicuous species restricted to the East Palaearctic, Oriental and Australian regions. It belongs to the subtribe Spinariina van Achterberg, 1988, of the tribe Rogadini Foerster, 1862 (van Achterberg, 1991). Originally the group was defined as the tribe Spinariini, defined by the presence of the metasomal carapace and included *Spinaria* Brullé, *Batothecoides* Watanabe, 1958 and *Batotheca* Enderlein, 1905 (van Achterberg, 1988b). In this paper the group is treated as a subtribe and three genera are added: *Spinariella* Szépligeti, 1906, *Conspinaria* Schulz, 1906, and *Cornutorogas* Chen, Belokobylskij, van Achterberg & Whitfield, 2004. They have the ovipositor depressed (van Achterberg, 1988b) and the tegula rather up curved anteriorly, either the first and the second metasomal tergites are immovably united or the pronotum is elongated; all have the fifth

metasomal tergite convex (but only slightly so in *Conspinaria* and *Spinariella*) and with a sharp lateral margin. An analysis of the anatomical data indicate that the *Rogas*-group of genera (which includes the Spinariina) is monophyletic (Zaldivar-Riverón et al., 2004). According to the rDNA analysis by Chen et al. (2003) the Spinariina belong to the group of genera near *Rogas* and recognition of the monophyletic Spinariina would cause the subtribe Rogadina to be a paraphyletic group. Areekul et al. (2005) included *Spinaria*, *Rogas* and *Conspinaria* as outgroups in their molecular analysis of the rogadine genus *Yelicones* Cameron and recovered a monophyletic *Spinaria* plus *Conspinaria* in their successive approximation analysis. In a different analysis by Zaldivar-Riverón et al. (2006) using the same nuclear gene as Chen et al. (2003) but a different protocol, shows *Spinaria* to be closely related to *Rogas*. Collectively these studies suggest that the Spinariina need to be regarded as a subtribe, within an enlarged concept of tribe Rogadini. Further, Areekul et al.'s (2005) study hint that the genus *Conspinaria* Schulz should be included as is done in this paper. If this genus is included than also the genus *Cornutorogas* Chen et al. should be included considering the following synapomorphies. Both share the possession of a pair of often large propodeal spines and an elongated pronotum, which are features that are absent in the other genera of the *Rogas*-group and partly present in the subtribe Spinariina as treated in the past. The *Rogas*-group of genera contains endoparasitoids of Zygaenidae and Limacodidae (both Zygaenoidea) (Quicke et al., 2004; Quicke & Shaw, 2005). The species of the genera *Spinaria* and *Batotheca* are, as far as known, solitary endoparasitoids of Limacodidae with pupation inside the mummified caterpillar and *Conspinaria* of Zygaenidae (Quicke et al., 2004). The members of the family Zygaenidae are considered difficult to parasitise (Quicke et al., 2004) and this may be a secondary development within the Rogadini. Two groups can be recognized: the *Spinaria*-subgroup (*Spinaria*, *Spinariella, Conspinaria, Cornutorogas*) with an elongate pronotum and mesoscutum, a normal mesosoma in lateral view, and the tarsal claws with a lobe or lamella (but small in *Cornutorogas*) and the more derived *Batotheca*-subgroup (*Batotheca*, *Batothecoides*) with a short pronotum and a robust mesoscutum, an enlarged mesosoma in lateral view, and the tarsal claws without a lobe or lamella.

The genus *Spinaria* can be recognized by the unaided eye because of the large spines on the pronotum and on the metasoma (figs 105, 107), the relatively small head and its medium size. The genus has never been revised in full; only preliminary revisions with some suggestions for synonymy were published by Watanabe (1937, 1958). Some local keys have been published, e.g., Chen & He (1997) and He et al. (2000) for China, and Belokobylskij (2000) for the East Palaearctic and North Oriental regions. In this paper a key to all known species is presented. Twelve previously described species are considered to be valid, plus five new species described from Vietnam in a companion paper (Long & van Achterberg, 2007), and eight new species are added in this paper, resulting in a total of 25 species.

For recognition of the subfamily Rogadinae, see van Achterberg (1990, 1993, 1997). For recognition of the tribe Rogadini, see van Achterberg (1991) and Chen & He (1997). For the terminology used in this paper, see van Achterberg (1988a). For an up-to-date interactive catalogue, see Yu et al. (2005). An asterisk indicates a new record for the area.

Fig. 1, *Spinaria altimontana* spec. nov., ♀, holotype; fig. 2, *S. triangulifera* spec. nov., ♀, holotype; fig. 3, *S. campania* spec. nov., ♀, holotype; fig. 4, *S. armator* (Fabricius), ♀, Sabah, Danum Valley Field Centre. 1-4, habitus, lateral aspect. Scale-line = 1 mm.

The colour photographs have been made with an Olympus SZX12 motorized stereomicroscope with AnalySIS Extended Focal Imaging Software.

Key to genera of the subtribe Spinariina van Achterberg

1. First metasomal tergite immovably joined to second tergite (figs 62, 70, 108), **or** if movably joined (figs 49, 75, 89), **then** pronotum elongate (figs 46, 78, 91); ovipositor depressed, more or less widened in dorsal view (figs 71, 72, 96, 97); fourth tergite with lateral tubercles (figs 69, 113), if absent (in *Spinariella:* fig. 49; *Cornutorogas*: figs 89, 99 and *Conspinaria:* fig. 75) then propodeum with pair of tubercles (figs 49, 75, 89); second tergite without a smooth triangular area medio-basally (figs 47, 56, 67, 114) or with transverse area (figs 83, 94); temples strongly declivous (figs 48, 58, 68, 85, 109), but less so in *Conspinaria* (fig. 77); occipital carina absent, but present in *Batothecoides, Cornutorogas* and *Conspinaria* (figs 58, 77, 85); apex of hind tibia with comb at inner side (figs 50, 59, 76, 95); vein m-cu of fore wing angularly connected to vein 2-CU1 (figs 43, 53, 63, 74, 104), but less so in *Cornutorogas* (fig. 84 and sometimes in *Conspinaria*); tegula weakly up curved anteriorly (fig. 111); spiracles of first tergite often dorsally situated (figs 47, 67, 114); subtribe Spinariina van Achterberg 2
- First tergite movably joined to second tergite; pronotum medium-sized and without long spine; ovipositor normal, not widened in dorsal view; fourth tergite and propodeum without lateral tubercles or spines; second tergite variable, often with smooth triangular area medio-basally; temples usually not strongly declivous; occipital carina present, rarely reduced; apex of hind tibia variable, if with comb at inner side then usually vein m-cu of fore wing gradually merging into vein 2-CU1; tegula flat anteriorly or slightly up curved anteriorly; spiracles of first tergite laterally situated or nearly so ..... other Rogadinae
2. Second tergite with a costate semi-circular area medio-basally (figs 23, 47, 190); hind femur with a small scale-like protuberance ventrally (in lateral view tooth-shaped; figs 21, 44); tarsal claws with conspicuous thin rectangular lobe (fig. 51); vertex strongly declivous (figs 22, 24, 49, 187); second tergite with a coarse median carina (figs 23, 47); first metasomal tergite movably joined to second tergite (figs 23, 47, 49); fourth and fifth tergites without teeth (fig. 49); pronotum with a short tooth dorsally (figs 49, 186); Borneo, Sulawesi ..... ***Spinariella*** Szépligeti, 1906
- Second tergite without a costate semi-circular area medio-basally (figs 56, 67, 83, 94, 114); hind femur simple, without a minute scale or tooth ventrally (fig. 106); tarsal claws simple, without lobe (figs 54, 64) or with a more or less rounded lobe (figs 81, 90, 112, 182); vertex less declivous (figs 62, 75, 89, 108), but intermediate in *Batotheca* (figs 70, 193); second tergite without a coarse median carina (figs 56, 67, 114), but present in *Conspinaria* (fig. 83) amd *Cornutorogas* (fig. 94); first, fourth and fifth tergites variable; pronotum without a tooth (figs 62, 70, 75, 89) or with a long spine (fig. 108) 3
3. First metasomal tergite immovably joined to second tergite (figs 62, 70, 107); fourth and fifth tergites with teeth or tubercles (figs 61, 62, 69, 108, 113); second tergite without a smooth area medio-basally (figs 56, 67, 114); occipital carina variable, often absent (figs 68, 70, 109) 4
- First tergite movably joined to second tergite (figs 75, 89); fourth and fifth tergites

simple, without lateral teeth (figs 75, 89); second tergite with a transverse smooth area medio-basally (figs 83, 94); occipital carina present (figs 77, 85) 6

4. Occipital carina present (figs 58, 62); pronotum rounded and scarcely lamelliform anteriorly and without spine posteriorly (figs 60, 62); metasomal teeth obtuse, tuberculate (figs 61, 62); metanotum without distinct protuberance (fig. 62); East Palaearctic ..... ***Batothecoides*** Watanabe, 1958
- Occipital carina absent (figs 68, 109); pronotum often widened and lamelliform anteriorly and frequently with a spine posteriorly (figs 108, 111); metasomal teeth acute (figs 69, 113); metanotum with a small dorsal protuberance (figs 70, 107) 5
5. Pronotum of ♀ without a spine posteriorly, and anteriorly with a narrow lamella (fig. 70); apex of fifth tergite with four teeth posteriorly (fig. 69); notauli more or less reduced posteriorly (fig. 66); lateral tubercles of propodeum obsolescent (figs 67, 70); first and second metasomal sutures shallow (fig. 70); scutellum smooth subposteriorly (fig. 66); third and fourth tergites without a median tooth or tubercle (figs 69, 70); Oriental (including Sulawesi) ..... ***Batotheca*** Enderlein, 1905
- Pronotum of ♀ with a long spine posteriorly (fig. 108), and anteriorly with a wide lamella (fig. 111); apex of fifth tergite with one tooth posteriorly (fig. 113); notauli complete (fig. 111); propodeum with a pair of short tubercles (fig. 108); first and second metasomal sutures deep (fig. 108); scutellum crenulate subposteriorly (fig. 111); third and fourth tergites with a median tooth or tubercle (figs 108, 113); East Palaearctic, Indo-Australian ..... ***Spinaria*** Brullé, 1846
6. Propodeum with a pair of often large tubercles (figs 75, 78, 200); tarsal claws with large lobe (fig. 81); mesopleuron often with a protuberance ventro-posteriorly (figs 75, 80); both first and second metasomal tergites with three longitudinal (very strong) lamelliform carinae (fig. 83); pair of subpronope very large and deep (figs 75, 78); antescutal depression large (fig. 78), sometimes dish-like (fig. 201); fifth metasomal tergite depressed and transverse (fig. 75) ..... ***Conspinaria*** Schulz, 1906
- Propodeum with a pair of large spines (or horns; figs 89, 94); tarsal claws simple, without distinct lobe and only medially widened (fig. 90); mesopleuron without a protuberance ventro-posteriorly (fig. 89); first and second tergites with one longitudinal carina (fig. 94); pair of subpronope absent (fig. 89); antescutal depression medium-sized to small (figs 91, 103); fifth tergite distinctly convex and semi-circular (figs 89, 99) ..... ***Cornutorogas*** Chen, Belokobylskij, van Achterberg & Whitfield, 2004

Genus *Spinaria* Brullé, 1846

(figs 1-18, 27-42, 104-185)

Spinaria Brullé, 1846: 512; Shenefelt, 1975: 1257-1259; Chen & He, 1997: 23; Belokobylskij, 2000: 105-106; He et al., 2000: 122-127; Yu et al., 2005: Taxapad database. Type species: *Bracon armator* Fabricius, 1804 (examined).

Brownius Ashmead, 1905: 7; Shenefelt, 1975: 1257; Yu et al., 2005: Taxapad database. Type species: *Brownius armatus* Ashmead, 1905 (examined).

Diagnosis.— Occipital carina absent; head narrowed directly behind eyes and comparatively small, much narrower than mesoscutum (figs 108, 109); eyes strongly emarginate near level of antennal sockets (fig. 110); eyes of male strongly enlarged dorsally, touching ocelli (fig. 124); prosternal sclerites present, wide, flat, semi-circular; notauli

Fig. 5, *Spinaria armata* (Ashmead), ♀, holotype; fig. 6, *S. philippinensis* Enderlein, ♀, Mindanao, Surigao; fig. 7, *S. dimidiata* Westwood, ♀, Ceram, near Wahai; fig. 8, *S. eburata* spec. nov., ♀, holotype. 5-8, habitus, lateral aspect. Scale-line = 1 mm.

Fig. 9, *Spinaria sulcata* Smith, ♀, Ternate; fig. 10, *S. spinator* (Guérin-Méneville), ♀, Sumatra, Bengkoelen; fig. 11, *S. incisa* spec. nov., ♀, holotype; fig. 12, *S. australiensis* spec. nov., ♀, holotype. 9-12, habitus, lateral aspect. Scale-line = 1 mm.

complete, deep; dorsal face of scutellum comparatively small and subposteriorly with a transverse crest connected to crenulae (fig. 111); anteriorly tegula up curved (fig. 111) and axilla lamelliform protruding laterally; metanotum more or less protruding dorsally (fig. 108); anterior incision of pronotum variable (figs 111, 136, 146, 181); propodeal spines rather acute (fig. 108) and spiracle elliptical; vein r of fore wing emitted beyond middle of pterostigma; vein m-cu of hind wing absent; vein cu-a of hind wing long and strongly reclivous; tarsal claws with large rounded lobe (figs 112, 139, 153), but sometimes acute (fig. 182); hind tibial spurs straight and setose; inner apex of hind tibia with pale yellowish comb; first tergite immovably joined to second tergite and with large dorsope, its dorsal carinae united into a median carina submedially; first-fifth tergites with acute lateral margin; third and fourth tergites with a pair of robust lateral teeth (fig. 108) and with a more or less developed lamelliform medio-posterior tooth; fifth tergite distinctly convex subbasally and with a medio-posterior tooth or spine; ovipositor sheath narrow, hardly or not widened subapically. Males (immediately recognizable by the enlarged eyes touching the stemmaticum or nearly so) have often have a less developed pronotal spine. The length and the shape of the pronotal spine are rather variable within species.

Distribution.— East Palaearctic, Oriental, Australian. The record of one species (*S. inermis* Guérin-Méneville, 1848) from the Afrotropical region (Ethiopia) is erroneous; it belongs to the genus *Mesobracon* Szépligeti, 1902 of the subfamily Braconinae (van Achterberg, 1991: 23).

Biology.— Solitary endoparasitoids of Limacodidae with the pupation inside the mummified caterpillar (known of nine of the 25 species).

Key to species of the genus *Spinaria* Brullé

1. Pterostigma and at least apical 0.7 of membrane of wings dark brown (figs 1-7, 9, 31), if intermediate (figs 8, 37, 38) then basal half of fore wing distinctly bicoloured and hind tarsus black or dark brown 2
- At least basal quarter of pterostigma yellow and at least basal half of wings more or less pale yellowish (figs 10-18, 34-36); if rarely pterostigma completely dark brown then basal half of fore wing completely yellow or evenly weakly infuscate and hind tarsus pale yellowish (fig. 16) 12
2. Hind femur partly brownish; pronotal spine straight (fig. 3); median lamella of pronotum reaching anterior margin of pronotum (figs 118, 119, 126); fifth metasomal tergite comparatively transverse and subbasally rounded (figs 29, 120, 122); Australian & Papuan 3
- Hind femur black, dark brown or yellowish-brown; if yellowish-brown then pronotal spine curved; median lamella of pronotum absent anteriorly (figs 134, 136, 146, 156, 170), except *S. dimidiata* (fig. 174); fifth tergite usually less transverse and/or subbasally angulate (figs 131, 148, 158); Oriental, Moluccas 5
3. Propodeum only with a medial areola and some rugae, without a carina or rugae near lateral tubercle; metasoma strongly shiny; second-fourth tergites laterally and fifth tergite largely smooth (figs 1, 117, 120); lamella in front of pronotal spine comparatively wide anteriorly (fig. 118); montane (1600-1800 m) New Guinea ..... ***S. altimontana*** spec. nov.

- Propodeum areolate, rugulose or vermiculate-rugose, with a distinct curved carina and some rugae near lateral tubercle; metasoma weakly shiny, second-fourth metasomal tergites laterally and fifth tergite longitudinally striate (fig. 112); lamella in front of pronotal spine somewhat narrower (fig. 126) 4

4. Second metasomal suture dark brown; propodeum largely coarsely punctate-reticulate; vein 3-SR of fore wing 1.1-1.3 times as long as vein 2-SR (fig. 123); medio-posterior tubercle of third metasomal tergite distinct; median carina of second-fourth tergites similar to surrounding sculpture; precoxal sulcus completely crenulate; mostly lowland New Guinea ..... ***S. campania*** spec. nov.
- Second metasomal suture yellowish-brown; propodeum mainly areolate, with some rugae medially (fig. 28); vein 3-SR of fore wing about as long as vein 2-SR (fig. 30); medio-posterior tubercle of third tergite weakly developed; median carina of second-fourth tergites stronger than surrounding sculpture (fig. 29); precoxal sulcus largely smooth; Australia (Queensland) ..... ***S. aliciae*** Turner, 1917

5. Fifth metasomal tergite elongate and largely triangular (fig. 131); prepectal carina comparatively narrow (fig. 129); median tubercle of fourth tergite large (fig. 130); Myanmar ..... ***S. triangulifera*** spec. nov.
- Fifth tergite more robust and less triangular (fig. 113); if intermediate (fig. 33) then prepectal carina widened and lamelliform (fig. 177); medial tubercle of fourth tergite medium-sized to small (cf. fig. 140), but sometimes large (cf. fig. 157) 6

6. Hind leg black or dark brown, but hind coxa may yellowish; middle leg more or less infuscate apically; first metasomal tergite (except laterally) largely black, but may be pale yellowish in *S. philippinensis*; fifth tergite more slender; third tergite with a pair of shallow submedial depressions, but absent in *S. armata*; median tubercle of third and fourth tergites often somewhat larger (fig. 108); colour of basal third of wings variable 7
- Hind and middle legs yellowish-brown, but tarsi blackish in *S. westwoodi*; first tergite orange- or yellowish-brown; fifth tergite robust; third tergite beside median tubercle slightly depressed, flat or convex; median tubercle of third and fourth tergites less developed (fig. 147); basal 0.2-0.3 of wings pale yellowish 9

7. Pronotum shallowly incised medio-anteriorly (fig. 111); basal 0.3 of wings dark brown; length of fore wing of ♀ 9.0-10.5 mm; Sunda area; [metasoma after first tergite partly or largely blackish or black dorsally; fifth tergite varies from whitish (Java, Sabah), bicoloured (Sumatra) to largely black (mainly Sarawak)] ..... ***S. armator*** (Fabricius, 1804)
- Pronotum moderately to deeply incised medio-anteriorly (fig. 136); basal 0.1-0.4 of wings pale yellowish, rarely completely dark brown; length of fore wing of ♀ 9.5-14.3 mm; Philippines 8

Note.— If basal 0.2-0.4 of pterostigma yellow, cf. *S. bicolor* Szépligeti.

8. Fifth metasomal tergite of ♀ white, ivory or pale yellowish beyond basal transverse groove; hind coxa more or less dark brown dorsally; posterior half of first tergite largely dark brown; median tubercle of third and fourth tergites somewhat smaller (fig. 169); length of fore wing of ♀ 10.2-12.5 mm; Luzon ..... ***S. armata*** (Ashmead, 1905)
- Fifth tergite of ♀ black; hind coxa yellowish-brown dorsally; posterior half of first tergite usually largely or completely brownish-yellow; median tubercle of third and

Fig. 13, *Spinaria suliana* Westwood, ♀, Sula Islands, Mangole, Mandafui; fig. 14, *S. sundana* spec. nov., ♀, holotype; fig. 15, *S. bicolor* Szépligeti, ♀, Java, Soekaboemi; fig. 16, *S. hyalinata* spec. nov., ♀, holotype. 13-16, habitus, lateral aspect. Scale-line = 1 mm.

Fig. 17, *Spinaria albiventris* Cameron, ♀, Thailand, Chiangmai; fig. 18, *S. vietnamica* Long & van Achterberg, ♀, paratype, Vietnam, Cuc Phuong National Park; figs 19, 20, *Spinariella tulungi* spec. nov., ♀, holotype. 17-19, habitus, lateral aspect; 20: habitus, lateral aspect. Scale-line = 1 mm.

fourth tergites somewhat larger (fig. 171); length of fore wing of ♀ (9.5-)11.5-14.3 mm; Mindanao ..... ***S. philippinensis*** Enderlein, 1905

9. Setose part of ovipositor sheath 0.7-0.8 times combined length of second and third hind tarsal segments (fig. 173); pronotum with a wide lamelliform median carina reaching anterior margin or nearly so and anterior margin hardly or not incised (fig. 174); second-fourth metasomal tergites largely dark brown or blackish, but mainly yellowish-brown in *S. westwoodi*; third tergite beside median tubercle flat or convex 10
- Setose part of ovipositor sheath about as long as combined length of second and third hind tarsal segments (fig. 149); pronotum without a lamelliform carina, anteriorly without carina and rather incised (fig. 146); second-fourth tergites yellowish-brown; third tergite beside median tubercle slightly depressed 11
10. Hind tarsus yellowish-brown; second-fourth metasomal tergites largely dark brown or blackish; pronotal spine slightly curved or straight; Moluccas ..... ***S. dimidiata*** Westwood, 1882
- Hind tarsus black; second-fourth tergites largely or completely yellowish-brown; pronotal spine strongly curved; Borneo ..... ***S. westwoodi*** Cameron, 1906
11. Fifth metasomal tergite and first-fourth tergites laterally ivory, paler than remainder of tergites (fig. 8); hind tibia and tarsus dark brown; setae of middle basitarsus 1.5-2.0 times width of basitarsus (fig. 168); Philippines ..... ***S. eburata*** spec. nov.
- Fifth tergite and first-fourth tergites laterally yellowish-brown, similarly coloured as remainder of tergites (fig. 9); hind tibia and often basitarsus yellowish-brown, remainder of hind tarsus more or less infuscate or dark brown, but sometimes apex of hind tibia and complete tarsus dark brown; setae of middle basitarsus about equal to width of basitarsus (fig. 167); [spine of fifth tergite may be reduced; rarely second-fourth tergites infuscate but first tergite yellowish-brown, male may have dark brown third and fourth tergites]; Moluccas ..... ***S. sulcata*** Smith, 1865
12. Metasoma of ♀ pale yellowish to yellowish-brown dorsally; apical third of pterostigma more or less infuscate, sometimes most of pterostigma infuscate and only its base yellow or completely yellow (*S. flavipennis* and rarely *S. spinator*); medio-posterior tubercle of fourth tergite hardly protruding posteriorly 13
- Metasoma of ♀ at least partly with well-defined dark brown or black patches dorsally; colour of apical third of pterostigma and shape of medio-posterior tubercle of fourth tergite variable 18
13. Fore wing without a distinct dark brown parastigmal spot or band (figs 11, 12, 35) 14
- Fore wing with a distinct dark brown parastigmal spot or band (figs 13, 176) 15
14. Pronotum deeply incised medio-anteriorly (fig. 136); vein 3-SR of fore wing (1.0-) 1.2-1.4 times vein 2-SR (fig. 138); fore wing distinctly bicoloured (fig. 11); Philippines ..... ***S. incisa*** spec. nov.
- Pronotum straight medio-anteriorly (fig. 181); vein 3-SR of fore wing 1.0-1.1 times vein 2-SR (fig. 179); fore wing faintly infuscate or yellowish (fig. 12); North Australia ..... ***S. australiensis*** spec. nov.
15. Basal half of pterostigma dark brown (figs 37, 38), at most with an indistinct brownish patch basally; lamella of pronotum medium-sized, but in small specimens largely absent; precoxal sulcus with short crenulae or only punctate; hind tarsus

blackish; lamella of medio-posterior tubercle of fourth tergite medium-sized or narrow (fig. 42); Borneo ..... ***S. westwoodi*** Cameron, 1906

- Basal half of pterostigma yellow; lamella of pronotum narrow or absent; sculpture of precoxal sulcus, colour of hind tarsus and size of lamella of medio-posterior tubercle of fourth tergite variable 16

16. Vein 3-SR of fore wing (1.2-)1.3-1.4 times vein 2-SR (figs 34, 36); hind tarsus yellowish-brown; apical half of pterostigma yellow; fifth metasomal tergite ivory, paler than fourth tergite; lamella of medio-posterior tubercle of fourth tergite comparatively wide (fig. 41); North India and up to China and Japan ..... ***S. flavipennis*** Cameron, 1906

- Vein 3-SR of fore wing 1.0-1.2(-1.3) times vein 2-SR (fig. 10); hind tarsus largely dark brown or black; apical half of pterostigma dark brown; colour of fifth tergite variable; lamella of medio-posterior tubercle of fourth tergite often medium-sized (fig. 165) 17

17. Setae of back of head about as long as diameter of posterior ocellus in lateral view (fig. 185); hind basitarsus dark brown or black; colour of fifth metasomal tergite variable; India up to Sunda area and to China ***S. spinator*** (Guérin-Méneville, 1830)
Note.— According to the original description (in translation) the holotype from Bengal has the fifth tergite ivory, paler than the yellowish-brown fourth tergite. Female specimens from Sumatra and China have this, but some females from Sumatra, most of the specimens from the Indian subcontinent and the males of Sumatra have the fourth and fifth tergites similarly yellowish-brown.

- Setae of back of head 1.2-1.3 times longer than diameter of posterior ocellus in lateral view (fig. 184); hind basitarsus yellowish-brown, rarely largely dark brown; fifth metasomal tergite yellowish-brown, similar to fourth tergite; Sulawesi & Sula Islands ..... ***S. suliana*** Westwood, 1882

18. First metasomal tergite completely yellowish-brown, at most faintly infuscate; hind femur and tibia yellowish; second and third tergites light or dirty brown medially; Vietnam 19
Note.— Membrane of the fore wing faintly yellowish or its apical third distinctly infuscate. If the membrane of the fore wing is faintly and evenly infuscate, the apex of the propodeal tubercle ivory, and the second and third tergites are dark brown medially, cf. ♂ from New Guinea.

- First tergite with blackish or black patch; if patch is reduced or absent then hind femur and tibia largely dark brown; second and third tergites black or blackish medially 21

19. Precoxal sulcus distinctly densely punctate; hind telotarsus comparatively slender ..... ***S. similis*** Long & van Achterberg, 2007

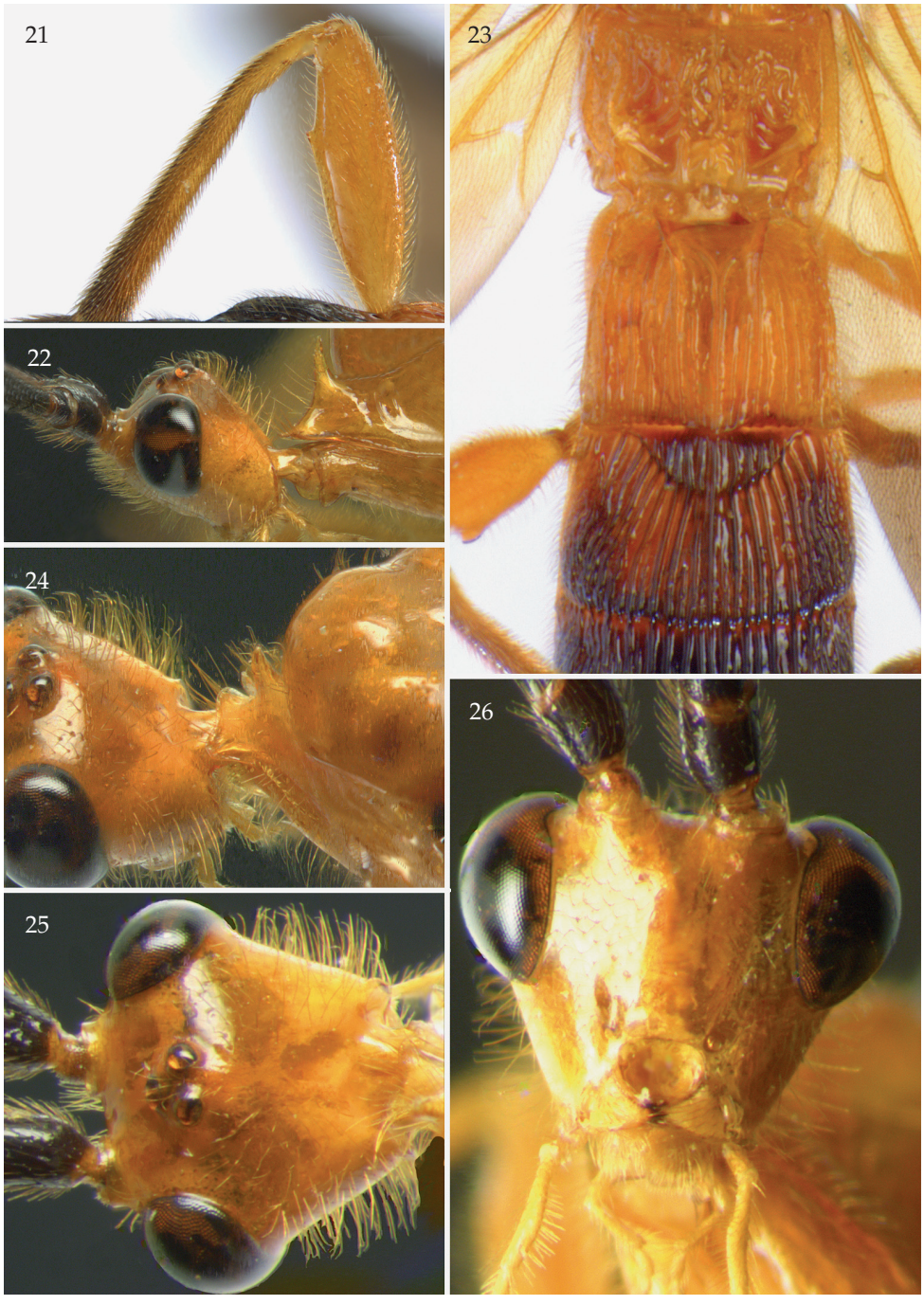
- Precoxal sulcus distinctly crenulate; hind telotarsus comparatively robust 20

20. Apical third of fore wing infuscate; latero-basal areas of propodeum largely smooth; propodeum brownish-yellow ..... ***S. truongsonensis*** Long & van Achterberg, 2007

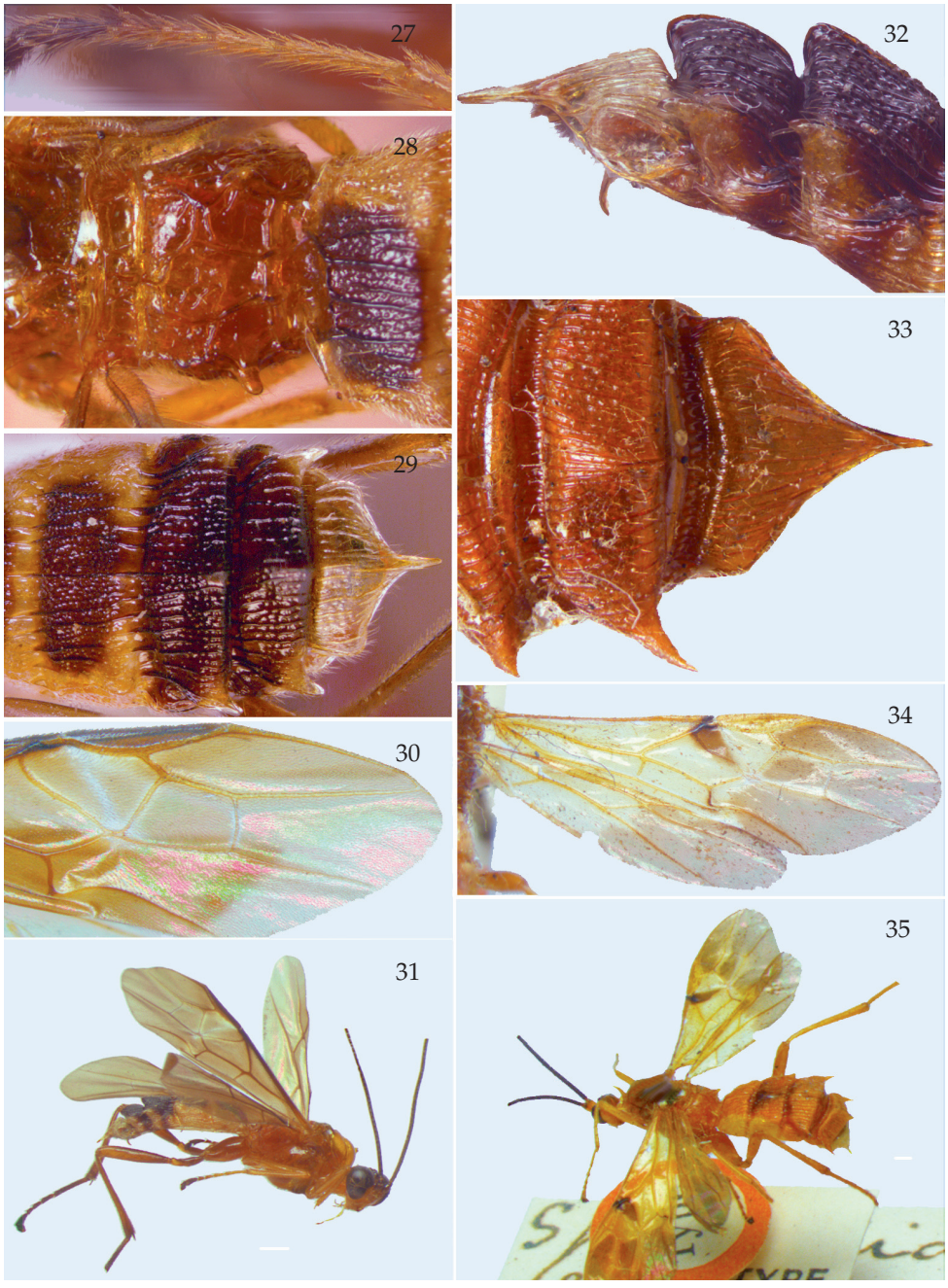
- Apical third of fore wing pale yellowish; latero-basal areas of propodeum coarsely granulate; propodeum more or less dark brown ..... ***S. bachmana*** Long & van Achterberg, 2007

21. Antenna yellowish-brown; membrane of fore wing yellowish apically; parastigma, veins 1-SR and apex of 3-CU1 brownish; Vietnam ..... ***S. fulvicornis*** Long & van Achterberg, 2007

- Antenna largely black or nearly so; membrane of fore wing infuscate apically; parastigma, veins 1-SR and apex of 3-CU1 dark brown 22



Figs 21-26, *Spinariella tulungi* spec. nov., ♀, holotype. 21, hind femur and tibia, lateral aspect; 22, pronotum, lateral aspect; 23, propodeum, first and second metasomal tergites, dorsal aspect; 24, pronotum, dorso-lateral aspect; 25, head, dorsal aspect; 26, head, anterior aspect.



Figs 27-32, *Spinaria aliciae* Turner, ♂, holotype; fig. 33, *S. westwoodi* Cameron, ♀, lectotype; figs 34, 35, *S. flavipennis* Cameron, holotype of *S. bhotanensis* Cameron, ♀. 27, middle tarsus, lateral aspect; 28, propodeum, dorsal aspect; 29, second-fifth metasomal tergites, dorsal aspect; 30, fore wing; 31, habitus, lateral aspect; 32, third-fifth tergites, lateral aspect; 33, fourth and fifth tergites, dorsal aspect; 34, wings; 35, habitus, dorso-lateral aspect. Scale-line = 1 mm.

22. Transverse basal groove of fourth metasomal tergite yellowish-brown, pale yellowish or white, rarely medially infuscate; apical third of pterostigma more or less dark brown; first tergite often largely yellowish-brown; Sunda area, Myanmar 23
- Transverse basal groove of fourth tergite black; apical third of pterostigma completely yellow; first tergite usually largely black; China, Vietnam, Laos, Myanmar, India 25
23. Vein cu-a of fore wing comparatively far postfurcal (fig. 150); mesoscutum, mesopleuron (except posteriorly) and propodeum largely black; only apical third or half of pterostigma dark brown and remainder yellow (fig. 150); apical third of hind tibia dark brown; hind tarsus ivory; [second submarginal cell of fore wing comparatively wide, fig. 150] ..... ***S. sundana*** spec. nov.
- Vein cu-a of fore wing narrowly postfurcal (fig. 159); mesoscutum, mesopleuron (except posteriorly) and propodeum yellowish-brown; apical half of pterostigma at least partly dark brown and remainder yellow or dark brown; colour of apical third of hind tibia variable, if dark brown then hind tarsus also dark brown 24
24. Basal 0.2-0.4 of pterostigma yellow (figs 15, 175); hind tibia and tarsus largely dark brown (fig. 15); fore wing membrane near parastigma and subapically infuscate (fig. 15); dark patch of second tergite subtruncate posteriorly, if narrowed posteriorly then first tergite complete yellowish-brown ..... ***S. bicolor*** Szépligeti, 1902
- Pterostigma completely dark brown (fig. 16); hind tibia and tarsus brownish-yellow (fig. 16); fore wing membrane completely subhyaline (fig. 16); dark patch of second tergite distinctly narrowed posteriorly **and** first tergite with a posteriorly narrowed blackish patch ..... ***S. hyalinata*** spec. nov.

  Note.— If hind tarsus dark brown, veins of apical half of fore wing dark brown and of basal half of fore wing largely yellow, cf. *S. westwoodi* Cameron.
25. Brownish hind leg weakly contrasting with middle leg (fig. 17); dark patch of second metasomal tergite parallel-sided or nearly so; third tergite besides median tubercle with shallow transverse depression; hind tarsus more or less brown (fig. 17); China, Vietnam, Laos, Thailand, Myanmar, India; [propodeum black in typical *albiventris* (fig. 17) and yellowish in *S. armator* auctt.] ..... ***S. albiventris*** Cameron, 1899
- Black hind leg strongly contrasting with pale yellowish middle leg (fig. 18); dark patch of second tergite distinctly narrowed posteriorly, sometimes tergite pale yellowish posteriorly; third tergite besides median tubercle flat or nearly so; hind tarsus black or blackish (fig. 18); Vietnam [colour of propodeum and of fourth tergite varies from black to yellowish] ..... ***S. vietnamica*** Long & van Achterberg, 2007

Descriptions

Spinaria albiventris Cameron, 1899
(fig. 17)

Spinaria albiventris Cameron, 1899: 82; Shenefelt, 1975: 1257; Yu et al., 2005: Taxapad database.
Spinaria armator auctt.; Shenefelt, 1975: 1257 (except type series from Sumatra).

Material.— 1 ♀ (RMNH), "**Thailand**, Chiangmai, 18º47'N, 98º59'E, 300 m, 4.vii.1986, R. Hensen"; 1 ♀ (BMNH), L. **Burma**, Taungu, v.[18]98, Bingham coll."; 1 ♀ (RMNH), "**Laos**, Vientiane, 18.v.1915, R.V. de Salvaza"; 1 ♀ (RMNH), "**China**: Yunnan, Menghai, ex Limacodid, 15-28.vii.1982, Luo Hengwen,

RMNH'95"; 1 ♀ (RMNH), "China: Guangdong, Xinhui, 20.ix.1980, Zhang Lian'an, RMNH'95"; 1 ♀ (BMNH), "China, Foochow, vi.1936, M.-S. Yang"; 2 ♀♀ + 1 ♂ (BMNH, RMNH), "China, Kanton, 49-466, W.E. Hoffman"; 1 ♀ (BMNH), Hong Kong"; 1 ♀ (BMNH), "[**Vietnam**], Tonkin, Hoabinh, viii.1918, R.V. de Salvaza"; 1 ♀ (BMNH), "[China], Taiwan, Fushan, 2005, D. Quicke", "RJF009, C9, BF00801".

Biology.— Reared from *Setora nitens* Walker and *Parasa consocia* (Walker) (Limacodidae).

Distribution.— China (Fujian, Guangdong, Guangxi, Hainan, Yunnan, Taiwan, Zhejiang), India, Laos, *Myanmar, *Thailand, Vietnam.

Spinaria aliciae Turner, 1917
(figs 27-32)

Spinaria aliciae Turner, 1917: 244; Shenefelt, 1975: 1257; Yu et al., 2005: Taxapad database.

Material.— Holotype, ♀ (BMNH), "Type H.T.", "B.M. Type 3.c.546", "*Spinaria aliciae* Turn., Type", "[**Australia**], N. Queensland, Kuranda, 1100 ft, 21.vi-24.vii.1913, R.E. Turner, 1913-438".

Distribution.— Australia (Queensland).

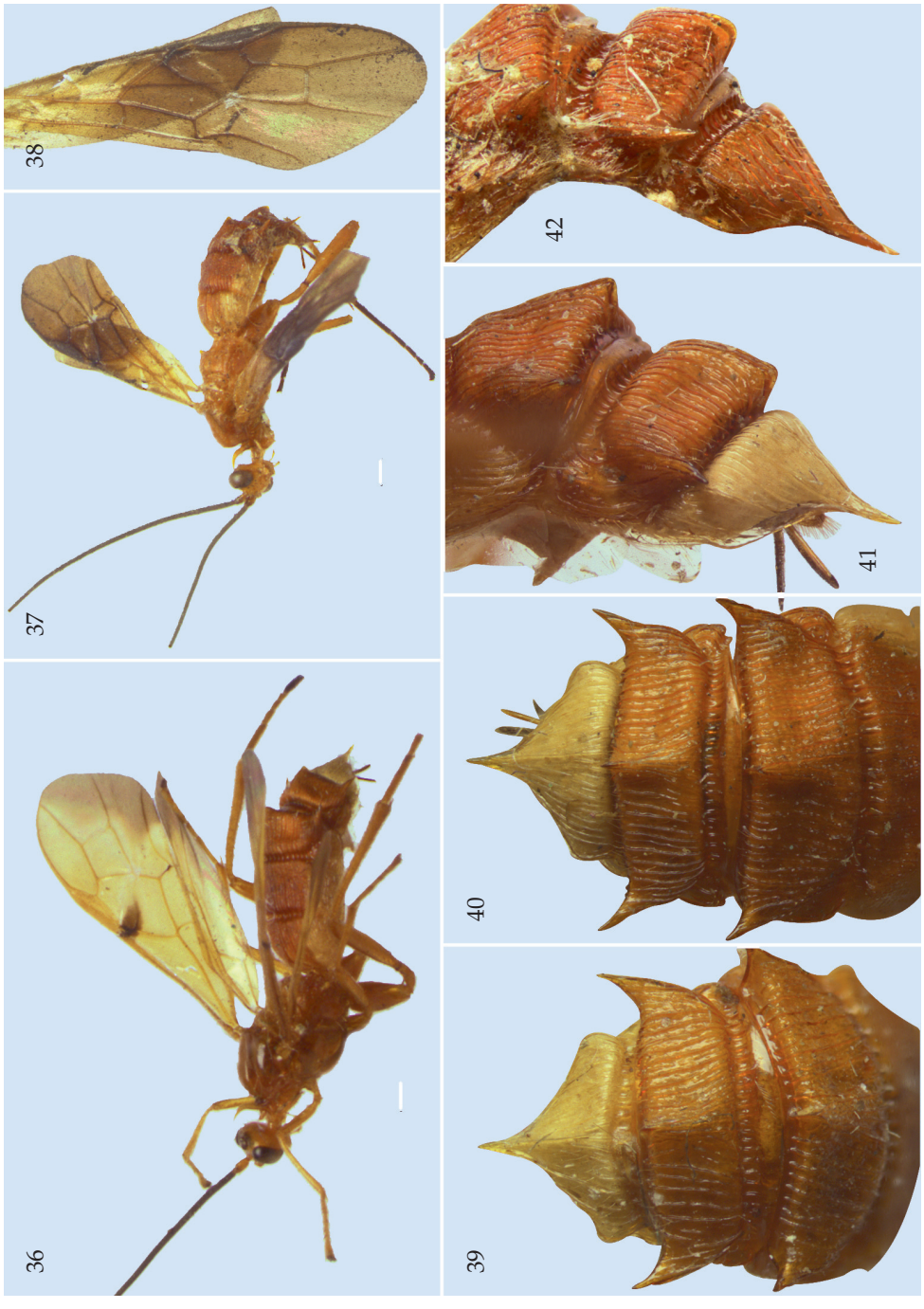
Notes.— The holotype is a ♂ (and not a ♀ as indicated in the original description) which is obvious because of the enlarged eyes and the clearly visible aedeagus. The middle tarsus is slender and long setose (fig. 27), the fifth metasomal tergite is distinctly transverse (fig. 29) and the hind basitarsus is comparatively slender (fig. 31). The second suture of the metasoma is yellowish-brown, the pterostigma, the hind trochanter, femur and tibia dark brown, the middle tarsus with long setae and the second tergite distinctly undulate sublaterally. I have examined a male from Papua New Guinea (BMNH: SE Port Moresby) belonging to a very similar species, which has the second suture of the metasoma yellowish-brown and the second tergite distinctly undulate sublaterally, but the pterostigma is partly brown, the hind trochanter, femur and tibia are yellowish-brown, the median carina of the second-fourth tergites is similar to the surrounding sculpture and the setae of the middle tarsus are short.

Spinaria altimontana spec. nov.
(figs 1, 115-120)

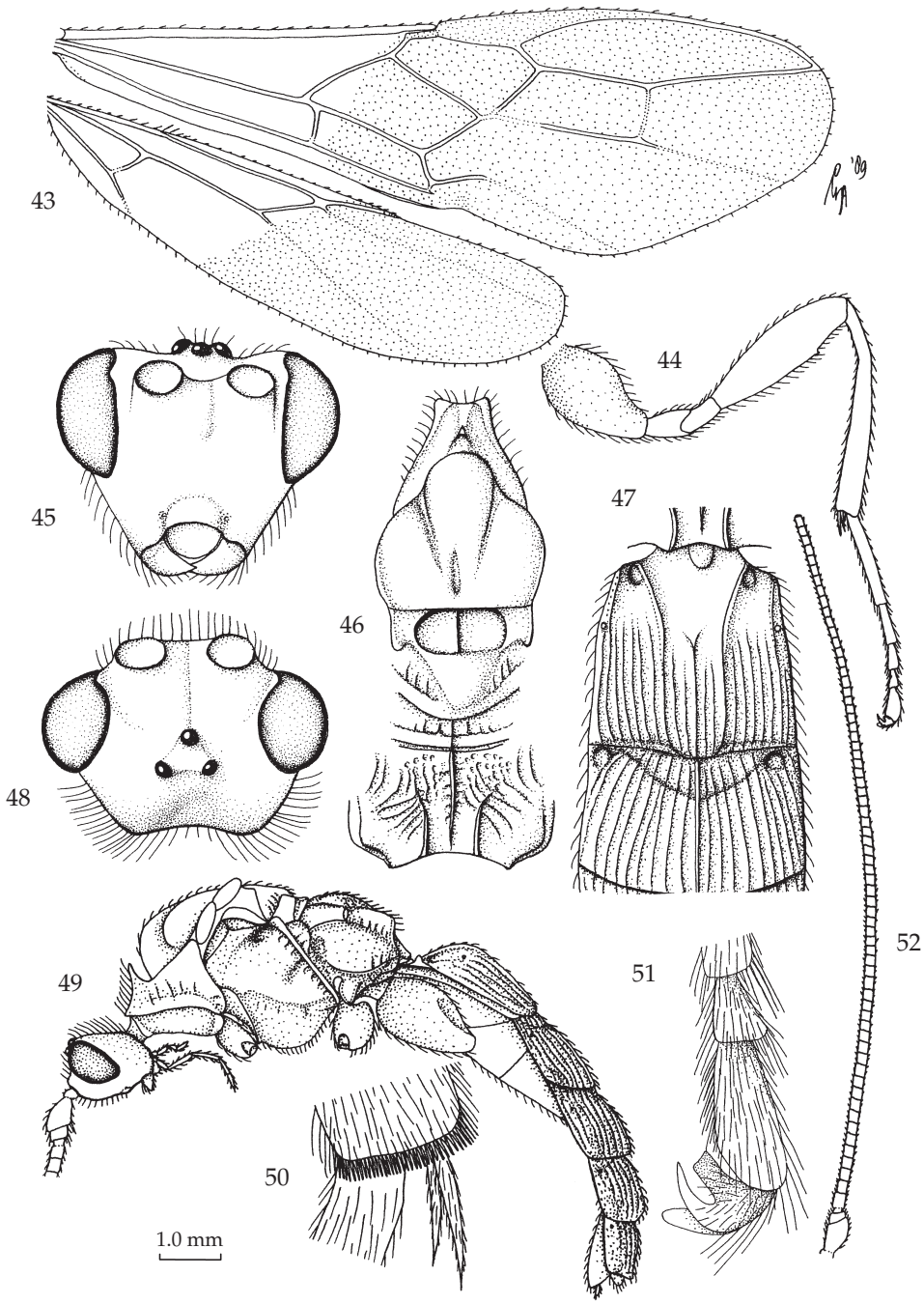
Material.— Holotype, ♀ (RMNH), "Neth. Ind.-American **New Guinea** Exped., Sigi Camp, 1600 m, 20. ii.1939, L.J. Toxopeus", "Museum Leiden, *Spinaria aliciae* Turn., Balt[azar], [19]66". Paratype, ♀ (RMNH), "Neth. Ind.-American New Guinea Exped., Mist Camp, 1800 m, 11.i.1939, L.J. Toxopeus".

Holotype, ♀, length of fore wing 10.7 mm, of body 9.4 mm.

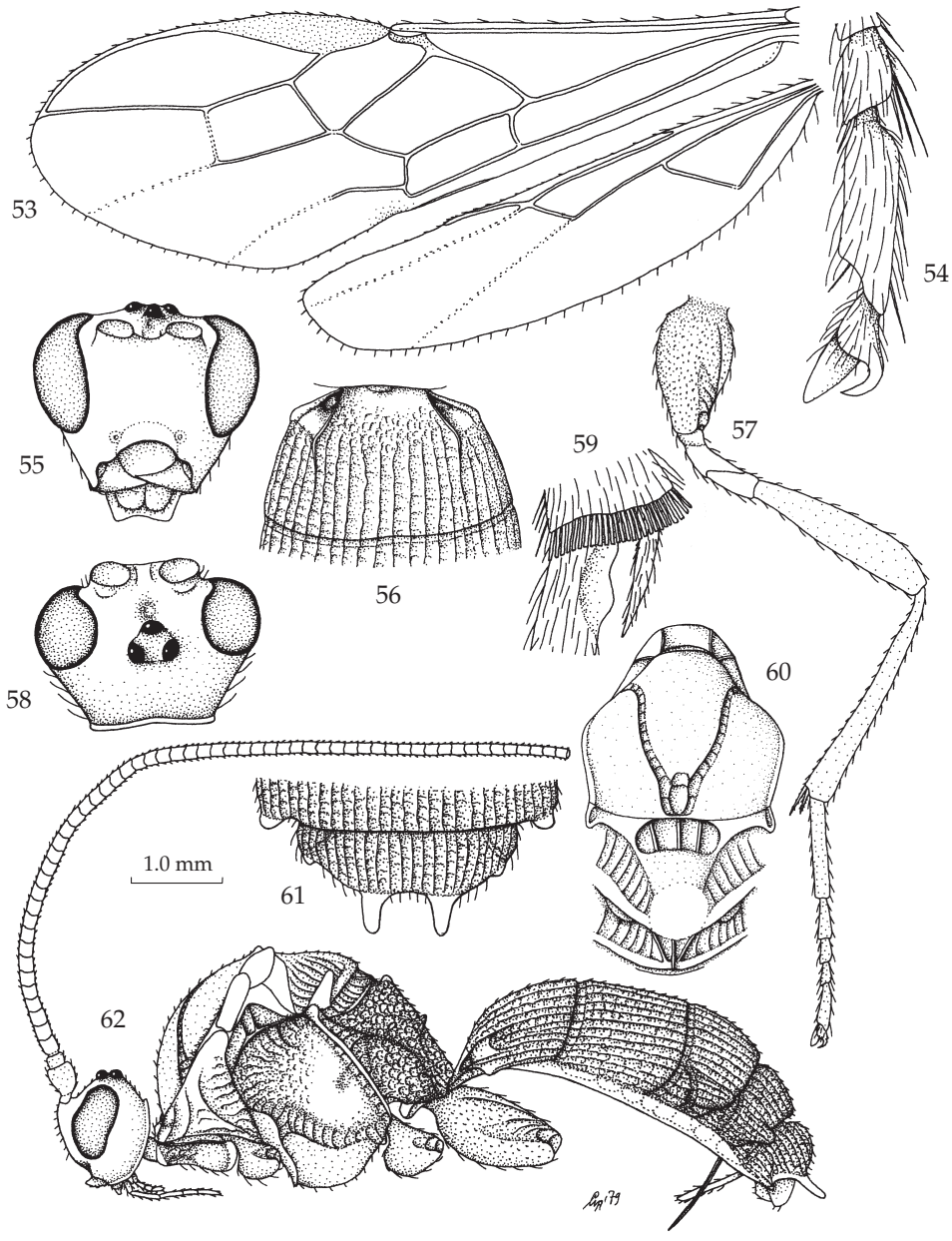
Head.— Antenna incomplete, with 64+ segments, length of third segment 1.2 times as long as fourth segment, third and fourth segments 1.6 and 1.3 times as long as wide, respectively; length of maxillary palp equal to height of head; frons largely flat and smooth; OOL and POL equal to diameter of posterior ocellus; vertex flattened, smooth and shiny; face and clypeus smooth; length of eye 2.8 times temple in dorsal view; medio-ventrally rim of clypeus near lower level of eyes; length of malar space equal to basal width of mandible and 0.3 times height of eye in lateral view; width of face 2.5



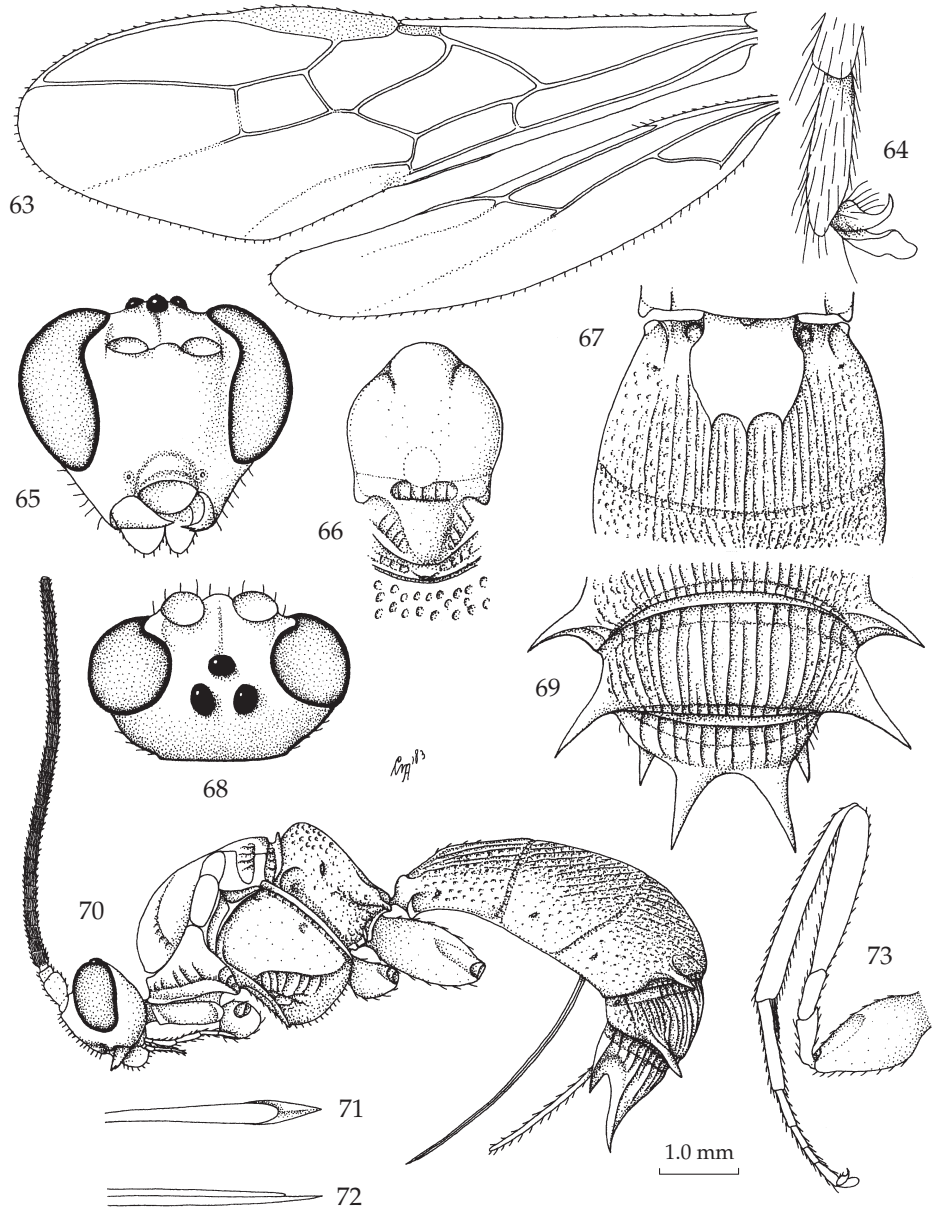
Figs 36, 39-41, *Spinaria flavipennis* Cameron, holotype, ♀, but 39, holotype of *S. bhotanensis* Cameron, ♀; figs 37, 38, 42, *S. westwoodi* Cameron, lectotype, ♀. 36, 37, habitus, lateral aspect; 38, wings; 39, 40, third-fifth metasomal tergites, dorsal aspect; 41, 42, third-fifth tergites, lateral aspect. Scale-line = 1 mm.



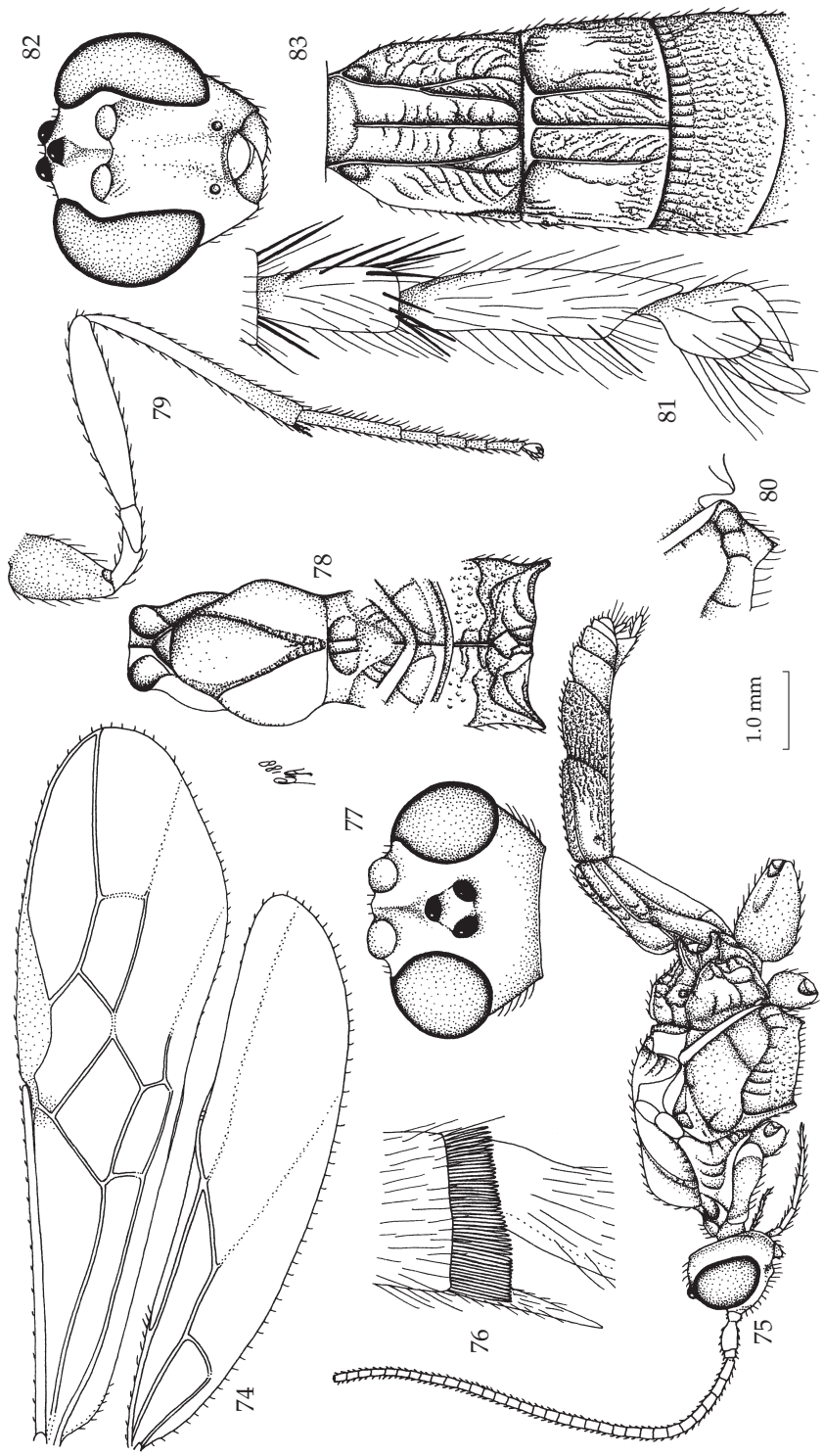
Figs 43-52, *Spinariella mutica* (Szépligeti), ♀, holotype. 43, wings; 44, hind leg; 45, head, anterior aspect; 46, mesosoma, dorsal aspect; 47, first and second metasomal tergites, dorsal aspect; 48, head, dorsal aspect; 49, habitus, lateral aspect; 50, apex of hind tibia and tibial spurs; 51, outer hind claw; 52, antenna. 43, 44, 49, 52: 1.0 × scale-line; 45, 48: 2.4 ×; 46: 1.6 ×; 47: 1.5 ×; 50: 9.0 ×; 51: 7.2 ×.



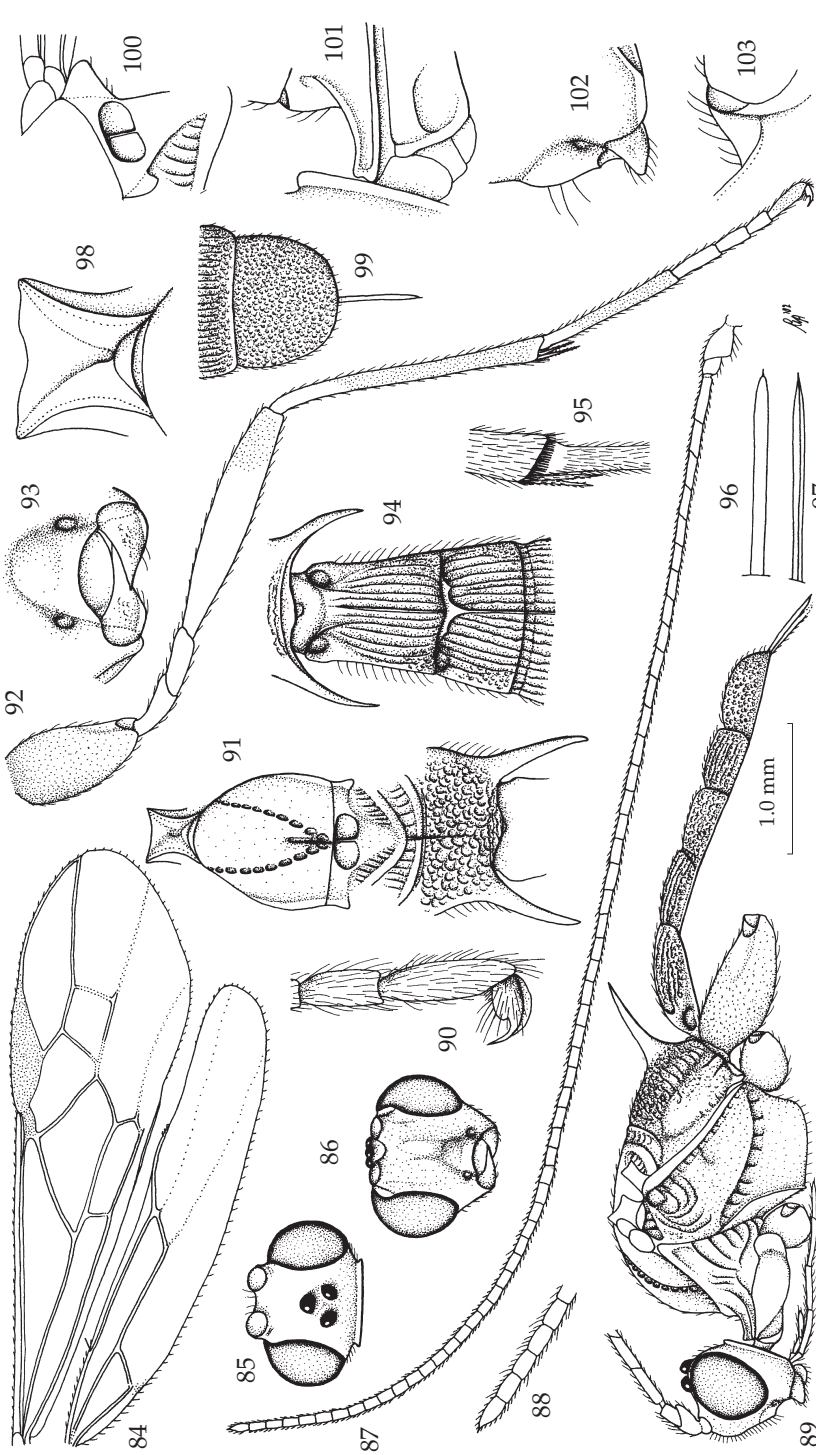
Figs 53-62, *Batothecoides yakushimensis* (Watanabe), ♀, holotype. 53, wings; 54, outer hind claw; 55, head, anterior aspect; 56, first metasomal tergite, dorsal aspect; 57, hind leg; 58, head, dorsal aspect; 59, apex of hind tibia and tibial spurs; 60, mesosoma, dorsal aspect; 61, fifth metasomal tergite, dorsal aspect; 62, habitus, lateral aspect. 53, 56, 57, 62: 1.0 × scale-line; 54, 59: 5.0 ×; 55, 58: 2.0 ×; 60, 61: 1.4 ×.



Figs 63-73, *Batotheca dohrniana* Enderlein, ♀, lectotype. 63, wings; 64, outer hind claw; 65, head, anterior aspect; 66, mesosoma, dorsal aspect; 67, first metasomal tergite, dorsal aspect; 68, head, dorsal aspect; 69, fourth and fifth metasomal tergites, dorsal aspect; 70, habitus, lateral aspect; 71, apex of ovipositor, dorsal aspect; 72, apex of ovipositor, lateral aspect; 75, hind leg. 63, 70, 73: 1.0 x scale-line; 64, 71, 72: 5.0 ×; 65, 68: 2.4 ×; 66, 67, 69: 1.2 ×.



Figs 74-83, *Conspinaria pilosa* (Cameron), ♀, holotype. 74, wings; 75, habitus, lateral aspect; 76, apex of hind tibia and tibial spur; 77, head, dorsal aspect; 78, mesosoma, dorsal aspect; 79, hind leg; 80, posterior tubercle of mesopleuron, latero-ventral aspect; 81, outer hind claw; 82, head, anterior aspect; 83, first-third metasomal tergites, dorsal aspect. 74, 75, 79: 1.0 × scale-line; 76, 81: 4.0 ×; 77, 80, 82: 2.0 ×; 78, 83: 1.3 ×.



Figs 84-103, *Cornutorogas maetoi* van Achterberg, ♀, holotype. 84, wings; 85, head, dorsal aspect; 86, head, anterior aspect; 87, antenna; 88, apex of antenna; 89, habitus, lateral aspect; 90, outer hind claw; 91, mesosoma, dorsal aspect; 92, hind leg; 93, clypeus, anterior aspect; 94, first-second metasomal tergites, dorsal aspect; 95, apex of hind tibia and tibial spurs; 96, ovipositor, dorsal aspect; 97, ovipositor, lateral aspect; 98, pronotum, dorsal aspect; 99, fifth metasomal tergite, dorsal aspect; 100, axilla, dorso-lateral aspect; 101, pronotum, lateral aspect; 102, clypeus, lateral aspect; 103, antescutal depression, dorso-lateral aspect. 84, 87, 89, 92: 1.0 × scale-line; 85, 86, 91, 94, 99: 1.3 ×; 88, 95: 2.0 ×; 90, 92, 93, 96-98, 100-103: 3.0 ×.

times width of hypoclypeal depression, 0.9 times height of eye and 1.1 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.5 times longer than its height; pronotum anteriorly slightly incised and with complete and rather wide median lamella (fig. 118); spine on pronotum rather slender and straight (fig. 119); mesoscutal lobes smooth and strongly shiny; notauli deep, and largely smooth, posteriorly with a pair of coarse longitudinal crenulae; scutellar sulcus largely smooth laterally and about 0.7 times as long as part of scutellum in front of subposterior crest; scutellum slightly convex and sparsely punctate medially; prepectal carina hardly lamelliform; precoxal area impressed but dorsally largely smooth, with some punctures ventrally and posteriorly with a few crenulae; remainder of mesopleuron smooth; mesosternal sulcus nearly smooth, anteriorly very finely crenulate; metapleuron coarsely rugose ventrally and remainder sparsely punctate; propodeum largely smooth, but medio-posteriorly with some coarse rugae and antero-laterally with some coarse punctures, only anterior half of median carina and areola distinct, with a pair of robust medium-sized lateral tubercles.

Wings.— Fore wing (fig. 115): r slightly widened; r:3-SR:SR1 = 5:16:34; 1-CU1:2-CU1 = 1:19; 2-SR:3-SR:r-m = 25:32:22; cu-a weakly inclivous, but posteriorly subvertical; m-cu narrowly antefurcal. Hind wing: marginal cell slightly widened, 1r-m weakly curved; M+CU:1-M:1r-m = 20:21:10; 2-SC+R longer than wide.

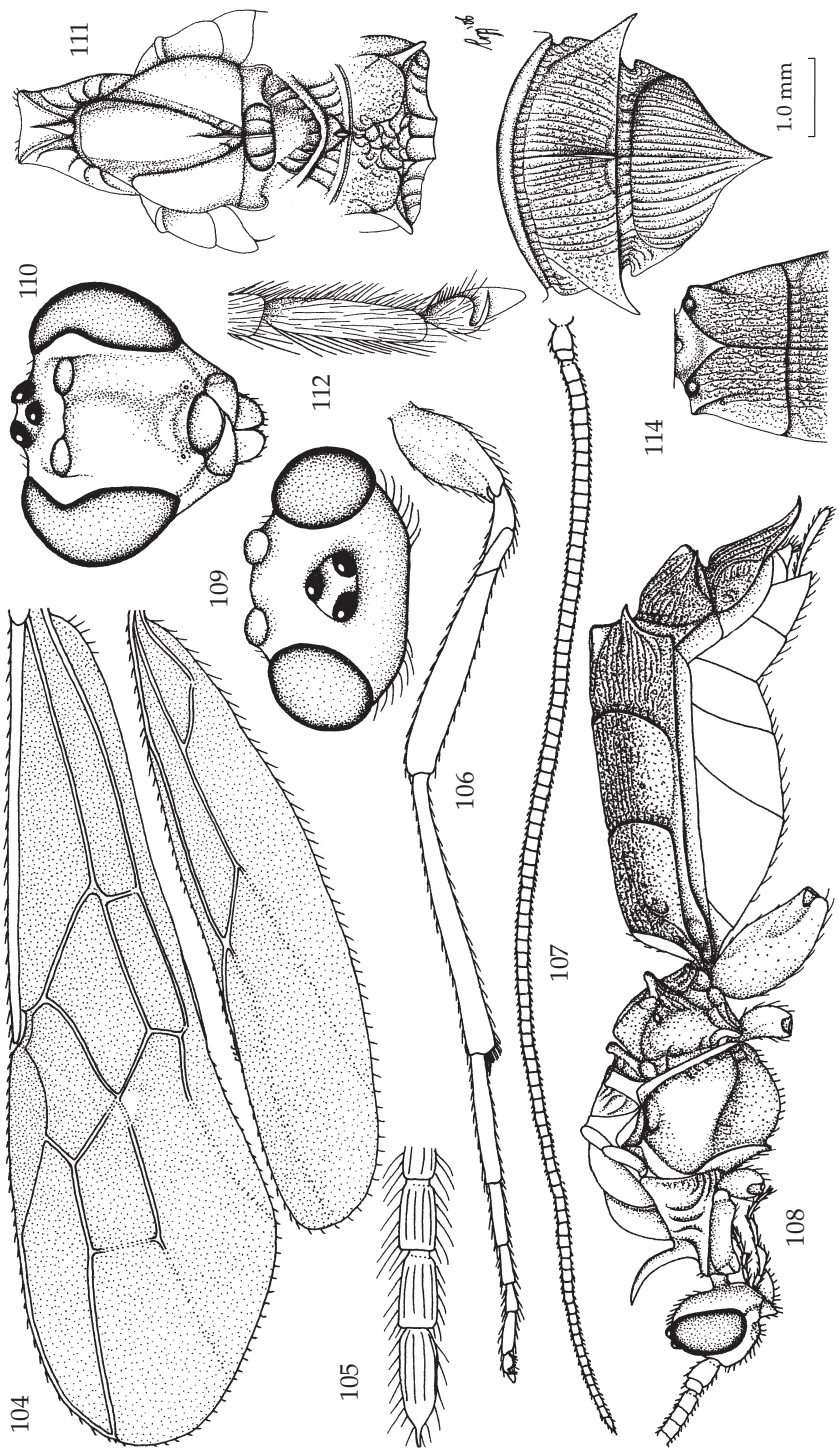
Legs.— Hind coxa sparsely punctulate; ventral lobe of tarsal claws rather small (fig. 116); length of femur, tibia and basitarsus of hind leg 6.2, 10.8 and 10.0 times their width, respectively; length of hind tibial spurs 0.20 and 0.22 times hind basitarsus; hind tarsus 1.1 times as long as hind tibia.

Metasoma.— Length of first tergite 0.6 times as long as its apical width; first-fourth tergites strongly shiny, rather coarsely and widely spaced longitudinally striate, with interspaces punctate and laterally largely smooth; dorsally first tergite with a complete median carina; medio-posterior teeth of third and fourth tergites obsolescent, lateral tooth comparatively short and robust (fig. 117), without submedial depression; fifth tergite semicircular, without sublateral protruding carina, with a slender medio-posterior spine, laterally rounded, largely smooth, shiny and strongly convex subbasally (figs 117, 120); length of setose part of ovipositor sheath 0.08 times as long as fore wing and sheath narrow.

Colour.— Yellowish-brown; antenna (but scapus and pedicellus largely dark brown), first and second tergites (except laterally), third and fourth tergites (except antero-laterally), middle tarsus (except for basitarsus), apex of hind femur narrowly, hind tibia and tarsus blackish or black; dark parts of first and second tergites rather roundly narrowed posteriorly; remainder of metasoma pale yellowish; hind trochanter, trochantellus and femur rather infuscate; pterostigma, veins and wing membrane dark brown, but membrane basally narrowly yellowish (fig. 1).

Variation.— Paratype is very similar to holotype, but apical spine of fifth tergite somewhat shorter than in holotype and vein cu-a of fore wing curved.

Distribution.— Indonesia (Papua).



Figs 104-114, *Spinaria armator* (Fabricius), ♀, Indonesia, Sumatra, Soraya. 104, wings; 105, apex of antenna; 106, hind leg; 107, antenna; 108, habitus, lateral aspect; 109, head, dorsal aspect; 110, head, anterior aspect; 111, mesosoma, dorsal aspect; 112, outer hind claw; 113, fourth-fifth metasomal tergites, dorsal aspect; 114, first tergite, dorsal aspect. 104, 106-108: 1.0 × scale-line; 105, 112: 3.8 ×; 109, 110: 2.2 ×; 111, 113, 114: 1.3 ×.

Spinaria armata (Ashmead, 1905)
(figs 5, 169, 170)

Brownius armatus Ashmead, 1905: 8; Shenefelt, 1975: 1258.
Spinaria fuscipennis var. *armata*; Roman, 1913: 43.
Spinaria fuscipennis var. *armatus*; Shenefelt, 1975: 1258.
Spinaria armata; Yu et al., 2005: Taxapad database.
Spinaria luzonensis Enderlein, 1905: 231 (synonymised by Roman, 1913).

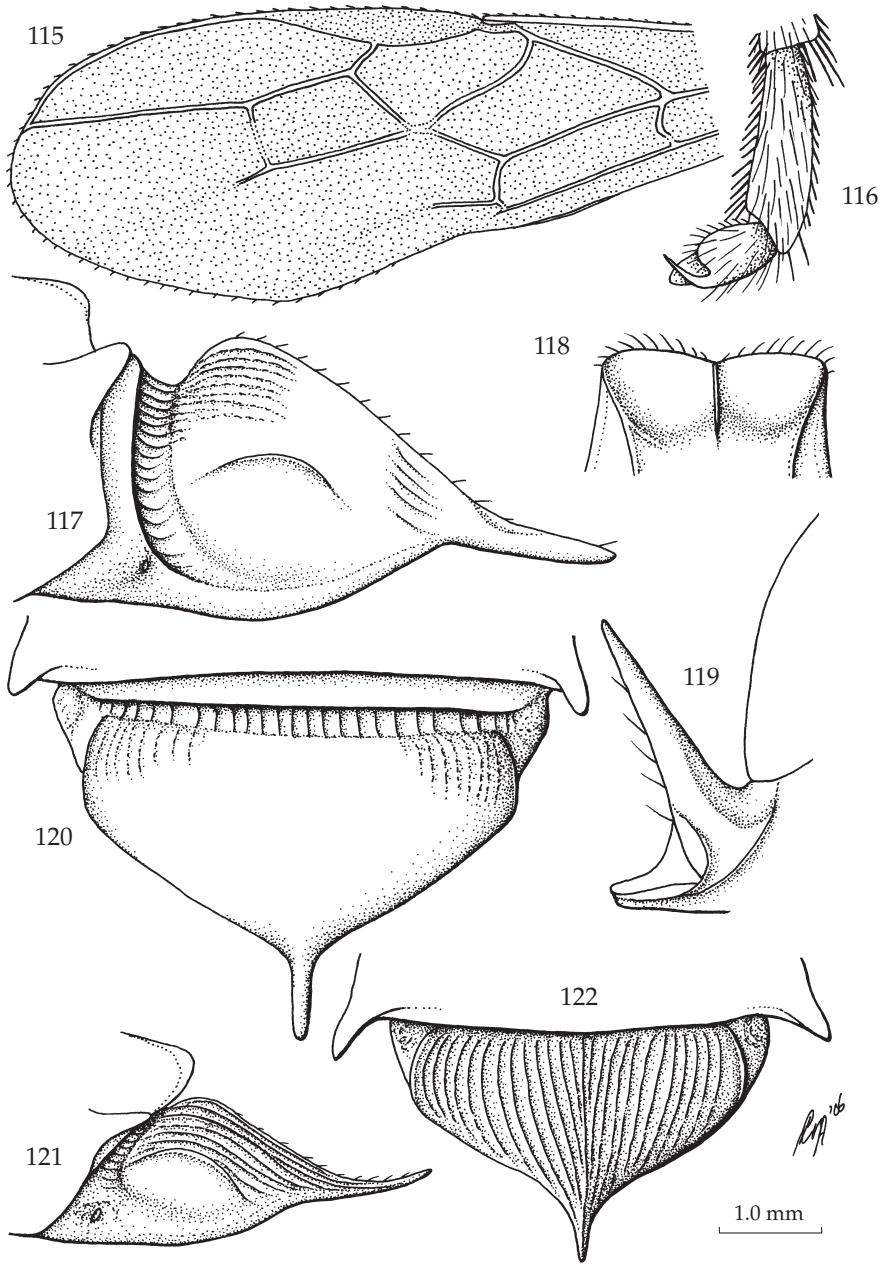
Material.— Holotype (fig. 5) of *S. armata*, ♀ (USNM), "P[hilippine] I[slands], [Luzon], Manila", "Robt Brown Collector", "*Brownius armatus* Ashm., ♀", "♀ Type No. 8123 U.S.N.M."; 2 ♀♀ + 1 ♂ (USNM, RMNH), "[**Philippines**], Luzon, Mt. Makiling, Baker"; 1 ♀ (USNM), "[Philippines], Luzon, Mt. Tuma, Baker"; 2 ♀♀ (USNM), "P.I. [Philippine Islands, Luzon], Los Banos, Baker"; 1 ♀ (USNM), id., but Mt. Banakao; 1 ♀ (BMNH), "Philippine Is., Luzon, Benquet Prov., Irisan, 1906-44"; 1 ♀ (BMNH), "[Philippines], N. Luzon, Isabella, 94-185".

Biology.— Reared from *Microthosea minima* Semper (Limacodidae; Austin, 1987).
Distribution.— Philippines (Luzon).

Spinaria armator (Fabricius, 1804)
(figs 4, 104-114)

Bracon armator Fabricius, 1804: 107 (type series examined).
Spinaria armator; Shenefelt, 1975: 1257 (only type series); van Achterberg, 1982: 133 (lectotype designation); Yu et al., 2005: Taxapad database (only type series).
Spinaria armatrix Schulz, 1906: 138 (invalid emendation).
Ichneumon furcator Thunberg, 1822: 261 (invalid emendation).
Spinaria fuscipennis Brullé, 1846: 514; Shenefelt, 1975: 1258; Yu et al., 2005: Taxapad database. **Syn. nov.**
Spinaria curvispina Cameron, 1902: 34; Shenefelt, 1975: 1258. **Syn. nov.**
Spinaria curvispina var. *nigricauda* Enderlein, 1905: 232; Shenefelt, 1975: 1258. **Syn. nov.**
Spinaria curvispina var. *udei* Enderlein, 1905: 232; Shenefelt, 1975: 1258. **Syn. nov.**

Material.— Lectotype of *B. armator*, ♀ (Copenhagen Museum), "Type", "[**Indonesia**], Sumatra, Daldorff, Mus. T. Lund., *Bracon armator* Fabr."; 1 ♀ (PAN), holotype of *Spinaria curvispina* var. *udei*, "Soekaranda, i.1894, Dohrn", "Type", "*Spinaria curvispina* Cam. var. *Udei* Enderl., det. Dr. Enderlein"; 1 ♀ (RMNH), "Indonesia: Sumatra, Aceh, Soraya (Bengkung), i.1996, Mal. trap, Y. van Nierop & Dolly, RMNH'03"; 1 ♀ (RMNH), "Indonesia: N. Sumatra, nr Gn. Leuser N.P., Ketambe, c 400 m, nr edge rainforest, 7.iii-15.iv.1994, C. v. Achterberg & Y. v. Nierop, RMNH'94"; 1 ♀ (RMNH), "Indonesia: N. Sumatra, Ketambe, c 400 m, near N.P. Gn. Leuser, Mal. trap, i.1995, Y. v. Nierop & C. v. Achterberg, RMNH'85"; 1 ♀ (RMNH), "[Indonesia], Sumatra, Manna, M. Knappert", "*Spinaria armator* F., Balt.'66"; 16 ♀♀ + 6 ♂♂ (RMNH), "[Indonesia], Sumatra, Deli, Medan"; 1 ♀ (RMNH), "[Indonesia], Sum[atra], Aur Kumanis, ?1914, Edw. Jacobson"; 1 ♀ (RMNH), "[Indonesia], Java, Semarang, teak forest, 12.v.1926, no. 334, L.G.E. Kalshoven"; 1 ♀ (RMNH), "[Indonesia], Java, Muller"; 1 ♀ (BMNH), "West Java, South Bantam, Bajah, 300 ft., i.1938"; 1 ♀(?) (RMNH), "[Indonesia], Borneo, Muller"; 1 ♀ (RMNH), "[Indonesia, probably Sumatra, B. Hagen], Sid., vii.[18]77"; 1 ♀ (RMNH), id., but Spjg, iv.1877; 1 ♀ (RMNH), "[Indonesia], Borneo, Schwaner"; 1 ♀ (RMNH), "**Malaysia**: SE. Sabah, nr Danum Valley Field C., c. 150 m, W0N0, Mal. trap 5, 19.iii-19.iv.1988, C. v. Achterberg & T. Burghouts, RMNH'89"; 1 ♀ (RMNH), id., but 19.iv-22.v.1988; 1 ♀ (lectotype of *S. curvispina* here designated; BMNH), "[Sarawak], Borneo, 21.xi.[18]98, Shelford", "*Spinaria curvispina* Cam., Type, Borneo" (in Cameron's handwriting); 1 ♀ (paralectotype of *S. curvispina*; BMNH), "*Spinaria curvispina* Cam., Type, Borneo" (in Cameron's handwriting); 1 ♀ (paralectotype of *S. curvispina*; BMNH), "[Sarawak], Kuching, 26.iv.1900", "*Spinaria curvispina* Cam., Borneo"(in Cameron's handwriting); 1 ♀



Figs 115-120, *Spinaria altimontana* spec. nov., ♀, holotype; figs 121, 122, *S. campania* spec. nov., ♀, holotype. 115, fore wing; 116, inner hind claw; 117, 121, fifth metasomal tergite, lateral aspect; 118, anterior part of pronotum, dorsal aspect; 119, pronotal spine, lateral aspect; 120, 122, fifth metasomal tergite, dorsal aspect. 115: 1.0 × scale-line; 116-119: 3.6 ×; 120, 121: 2.5 ×; 122: 2.0 ×.

(BMNH), "Sarawak, C.J. Brooks, B.M. 1928-193"; 1 ♀, "Sarawak: 1907-1909, C.J. Brooks, B.M. 1936-681"; 1 ♀ (BMNH), "Sarawak, Bau, 1-6.viii.1909, C.J. Brooks, B.M. 1936-681"; 1 ♂ (BMNH), "[? Sarawak], Fed. Malay States: 1909, C.J. Brooks, B.M. 1931-570"; 1 ♀ + 1 ♂ (BMNH), "Sarawak, Shelford, 1900-117"; 1 ♀ (BMNH), "[Sabah], N. Borneo, Samawang, nr Sandakan, jungle, 9.vii.1927"; 1 ♀ (BMNH), "[Sabah], B. N. Borneo, Kabayau, nr Kinabalu, 600 [ft.], 8.v.1929"; 2 ♀♀ (BMNH), "Sarawak, iv.1913" (one without label but on similar aberrant round card); 1 ♀ (BMNH), "Sarawak, Baram, 13.ix.[19]20, J.C. Moulton".

Biology.— Reared from *Thosea* spec. (Limacodidae).

Distribution.— Indonesia (Kalimantan, Sumatra, Java), Malaysia (Sarawak, *Sabah). Also reported from China by Brullé (1846) as *S. fuscipennis*, but this record is most likely erroneous and is not accepted in this paper. The other records from China result from the misidentification of *S. armator* (Fabricius) and belong to *S. albiventris* Cameron.

Notes.— The fourth and fifth metasomal tergites of the female varies from ivory or largely so to completely black or largely so. In males these tergites are more or less blackish. Var. *udei* Enderlein has the fourth metasomal tergite medially largely ivory and middle leg yellowish-brown.

The new synonyms are based on the information from the original descriptions, the observed variation, the types examined and the origin of the types.

Spinaria australiensis spec. nov.
(figs 12, 179-183)

Material.— Holotype, ♀ (BMNH), "[**Australia**; Queensland], Prince of Wales I., Cape York Is.", "J.A. Kusche coll.". Paratypes (2 ♀♀): 1 ♀ (BMNH), "P.D.", "N. Australia, [Northern Territory], Port Darwin, R.C.L. Perkins coll., B.M. 1942-95"; 1 ♀ (RMNH), id., but "R.C.L. Perkins".

Holotype, ♀, length of fore wing 9.6 mm, of body 10.1 mm.

Head.— Antenna with 32+ segments, length of third segment 1.1 times as long as fourth segment, third and fourth segments 1.7 and 1.6 times as long as wide, respectively; length of maxillary palp 1.1 times height of head; frons largely flat and smooth, with small depression in front of anterior ocellus; OOL:diameter of posterior ocellus: POL = 13:10:4; vertex flat, smooth and shiny; face and clypeus smooth; length of eye 2.8 times temple in dorsal view; medio-ventrally rim of clypeus just below lower level of eyes; length of malar space 1.2 times basal width of mandible and just 0.3 times height of eye in lateral view; width of face 2.6 times width of hypoclypeal depression, 0.9 times height of eye and 1.3 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.4 times longer than its height; pronotum anteriorly slightly incised and narrow median lamella present anteriorly (fig. 181); spine on pronotum rather slender and straight (fig. 183); mesoscutal lobes smooth and strongly shiny, middle lobe comparatively protuberant; notauli deep and largely smooth anteriorly, subposteriorly finely crenulate and medio-posteriorly with a longitudinal carina; scutellar sulcus with three strong carinae and about 0.7 times as long as part of scutellum in front of subposterior crest; scutellum slightly convex and finely punctate; prepectal carina distinctly lamelliform (fig. 180); precoxal area more or less impressed, distinctly crenulate and below it punctate; remainder of mesopleuron smooth, but with distinct punctation dorsally and anteriorly; mesosternal sulcus nearly smooth, very finely crenulate; metapleuron moderately long and rather densely setose, with some

coarse rugae ventrally and the remainder sparsely and moderately punctate; propodeum latero-dorsally largely coarsely punctate, submedially with some coarse longitudinal rugae and with a complete and coarse median carina, sublaterally with a longitudinal carina posteriorly, and with a pair of rather slender and medium-sized lateral tubercles with area near tubercles coarsely rugose.

Wings.— Fore wing (fig. 179): r slender and slightly curved; r:3-SR:SR1 = 10:21:60; 1-CU1:2-CU1 = 1:18; 2-SR:3-SR:r-m = 20:20:15; cu-a vertical; m-cu narrowly antefurcal. Hind wing: marginal cell subparallel-sided apically, 1r-m straight; M+CU:1-M:1r-m = 20:20:9; 2-SC+R narrowly transverse.

Legs.— Hind coxa densely setose and moderately punctate; apical tooth of fore tarsal claws weakly bent (fig. 182; other claws missing); length of femur, tibia and basitarsus of hind leg 5.2, 11.4 and 8.6 times their width, respectively; hind tarsus distinctly bristly setose; length of hind tibial spurs 0.28 and 0.34 times hind basitarsus; hind tarsus partly missing.

Metasoma.— Densely short setose; length of first tergite 0.5 times as long as its apical width; first-fourth tergites moderately shiny, coarsely longitudinally rugose, with interspaces densely and more finely rugose-punctate and laterally mainly coarsely punctate, but third-fifth tergites rugose laterally; dorsally first tergite with a coarse median carina and median carina of second and third tergites weakly developed and similar to surrounding sculpture; medio-posterior teeth of third and fourth tergites with narrow lamella and rather small, submedially without a depression; fifth tergite robust triangular, but slightly more transverse than of *S. incisa* (cf. fig. 141), sublaterally with a weakly protruding curved carina, with a comparatively slender medio-posterior spine, densely longitudinally striate and subbasally moderately convex; length of setose part of ovipositor sheath 0.09 times as long as fore wing and sheath somewhat widened.

Colour.— Yellowish-brown (including scapus, except apically); remainder of antenna, hind coxa largely (except baso-ventrally), hind trochanter, hind femur (except apically), hind tarsus, apical third of metasoma ventrally and ovipositor sheath dark brown; first and second tergites laterally largely, spines of third and fourth tergites and fifth tergite pale-yellowish; wing membrane and apex of hind tibia dorsally faintly infuscate but below pterostigma and basally faintly yellowish; veins yellow, but veins 1-SR, 2-CU1, 3-CU1 and CU1a (except basally) darkened and apical third of hind wing membrane slightly infuscate; pterostigma yellow but basally narrowly dark brown; parastigmal spot largely absent (fig. 179).

Variation.— Length of fore wing 8.7-9.6 mm, and of body 9.3-10.1 mm; the base of the pterostigma yellow and wing membrane slightly more infuscate in both paratypes, one paratype has the hind leg yellowish-brown, except for the partly darkened hind tarsus; the median carina of the propodeum is only anteriorly developed; one paratype has the precoxal sulcus largely smooth, and the first and second metasomal sutures and the basal grooves of the fourth and fifth tergite darkened.

Distribution.— Australia (Queensland, Northern Territory).

Spinaria bachmana Long & van Achterberg, 2007

Spinaria bachmana Long & van Achterberg, 2007: 161-174.

Distribution.— Vietnam.

Spinaria bicolor Szépligeti, 1902, stat. nov.
(figs 15, 175)

Spinaria bicolor Szépligeti, 1902: 46; Shenefelt, 1975: 1258; Chen & He, 1997: 26 (as synonym of *S. armator* (Fabricius)); Yu et al., 2005: Taxapad database (id.).

Material.— 4 ♀♀ + 1 ♂ (RMNH), [**Indonesia**], Java, Soekaboemi, 550-600 m, 1933, Verbeek"; 1 ♀ (RMNH), "[Indonesia], Java, Omg. [= near) Soekaboemi, iv.1933, F.A.Th.H. Verbeek, Mus. Leiden"; 1 ♀ (RMNH), [Indonesia, Java], G[unung] Bentang, iii.1938, J. v.d. Vecht, Museum Leiden"; 1 ♀ (RMNH), [Indonesia], Banca, v.d. Bossche"; 1 ♀ (RMNH), [Indonesia, probably Sumatra, B. Hagen], Sid., ii.[18]72", "*Spinaria albiventris* Cam., Balt.'66"; 1 ♀ (RMNH), [Indonesia], Java, K. & v. H[asselt]"; 1 ♀ (RMNH), [Indonesia], W. Java, Buitenzorg, Tjiboerial, 9.viii.1936, J. v.d. Vecht, Museum Leiden"; 1 ♀ (RMNH), [Indonesia], W. Java, Tdjng Alang2 [= Tandjung Alang-Alang], Udjung Kulon, 10.vii.1955, A.H.R. Wegner"; 1 ♀ (RMNH), [Indonesia], Java, Gng Moeria, xii.[19]35, Widd."; 1 ♀ (USNM), "[Indonesia: Java,] Soekamadjoe, 19.iv.1937, ex *Setora nitens* [caterpillar], Proefst[ation] [= experimental station] W[est] Java", "290", "*Spinaria bicolor* Szépl., det. Muesebeck"; 1 ♂ (USNM), "[Indonesia: Java,] Soewarna, iv.[19]37, ex cat[erpillar] *Setora nitens*, coll. Tjoa"; 1 ♀ (BMNH), "[Indonesia: Java,] Tjipatat Bolang, 6.iv.[19]37, ex cat[erpillar] *Setora nitens*, coll. Tjoa Tjien Mo"; 1 ♀ (BMNH), "[**Malaysia**, Sabah], Borneo, Sandakan, Baker"; 1 ♀ (BMNH), "[Malaysia, Sabah], B.N. Borneo, nr Kinabalu, Kabayau, 600, 9.viii.1929"; 1 ♀ "**Singapore**, coll. Baker".

Biology.— Reared from *Setora nitens* Walker (Limacodidae).

Distribution.— Indonesia (*Banka, *Java, Kalimantan, *Sumatra), Malaysia (*Sabah), *Singapore.

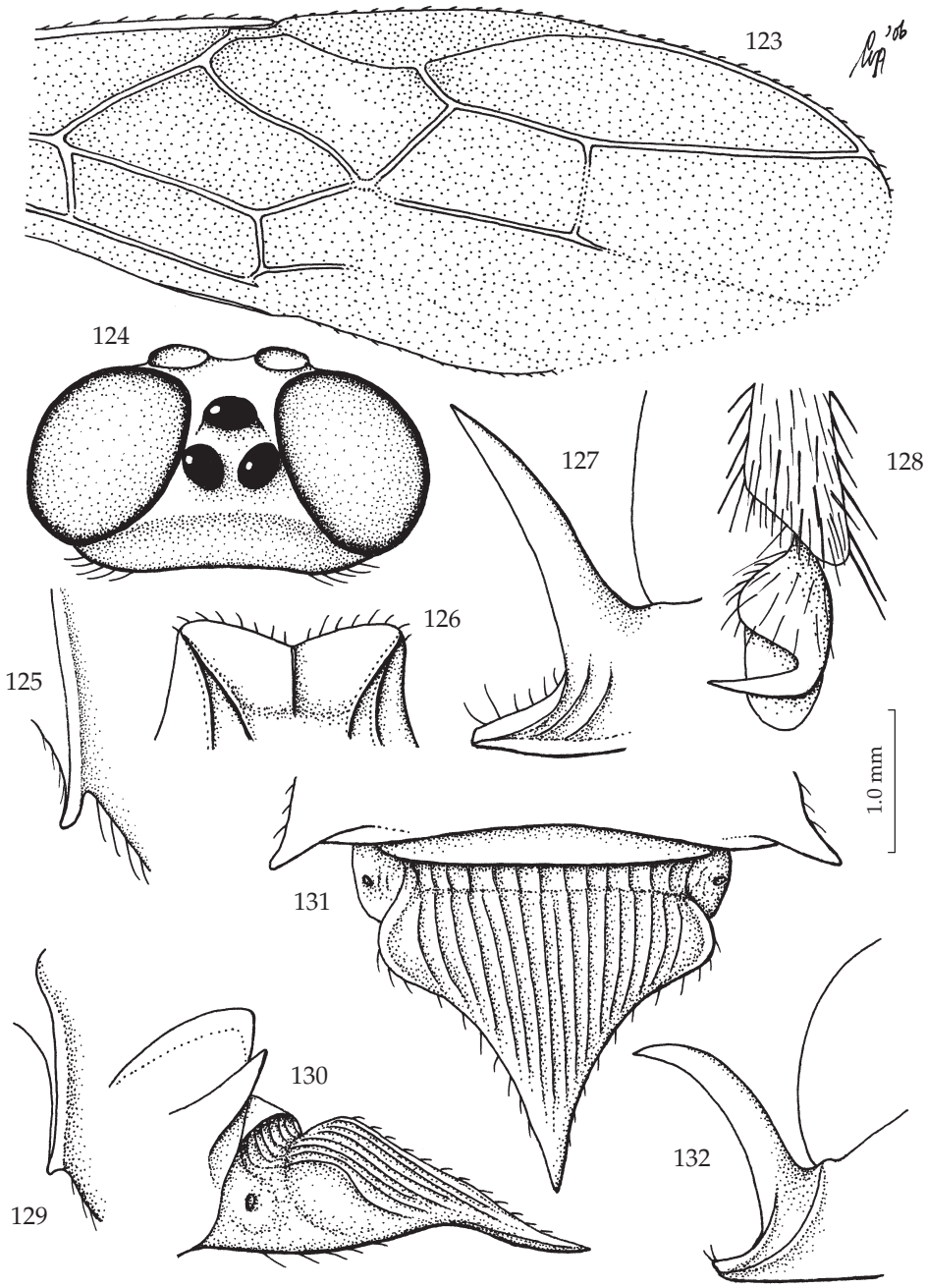
Notes.— Fourth metasomal tergite of female varies from largely blackish to largely yellowish-brown.

Spinaria campania spec. nov.
(figs 3, 121-128)

Material.— Holotype, ♀ (RMNH), "Neth. Ind.-American **New Guinea** Exped., Bernhard Camp, 50 m, 16.ix.1939, L.J. Toxopeus". Paratypes (6 ♀♀ + 4 ♂♂): 1 ♀ (RMNH), with same label data as holotype; 1 ♀ + 1 ♂ (RMNH), id., but vii-ix.1938, J. Olthof; 1 ♀ (BMNH), "Neth. New Guinea, Waris, S. of Hollandia, 450-500 m, 24-31.vii.1959", "T.C. Maa collector"; 1 ♀ (RMNH), "**Papua** [**New Guinea**], Northern Dist., Saiho Road, 5.vii.[19]72, W. Bumana"; 1 ♀ (BMNH), "Papua New Guinea, Northern Prov., Popondetta Higaturu, 3.ix.[19]82", "Ex Papua New Guinea, D.P.I., C.R.I.C.", with large mummy of a Limacodid (cf. *Setora* spec.) larva; 1 ♂ (BMNH), id., but no. 1982/87 and wth small Limacodid mummy; 1 ♀ (BMNH), "Dutch New Guinea: Cyclops Mts., 3,400-3,500 ft., iii.1936, L.E. Cheesman, B.M. 1936-271"; 1 ♂ (RMNH), Papua [New Guinea], Kokoda, 1,200 ft., ix.1933, L.E. Cheesman, B.M. 1934-321"; 1 ♂ (BMNH), "Neth. New Guinea, Kutsime, West of Swart Val., 1500 m, 14.xi.1958", "J.L. Gressitt collector".

Holotype, ♀, length of fore wing 9.2 mm, of body 9.4 mm.

Head.— Antenna incomplete, with 21+ segments, length of third segment 1.3 times as long as fourth segment, third and fourth segments 1.5 and 1.2 times as long as wide, respectively; maxillary palp missing, but length of palp equal to height of head in a paratype; frons largely flat (but rather depressed in front of anterior ocellus) and smooth; OOL:diameter of posterior ocellus:POL = 9:5:4; vertex flattened, smooth and shiny; face and clypeus smooth; length of eye 2.7 times temple in dorsal view; medio-



Figs 123-128, *Spinaria campania* spec. nov., ♀, holotype, but 124, ♂, paratype; figs 129-132, *S. triangulifera* spec. nov., ♀, holotype. 123, fore wing; 124, head, dorsal aspect; 125, 129, prepectal carina; 126, anterior part of pronotum, dorsal aspect; 127, 132, pronotal spine, lateral aspect; 128, outer hind claw; 130, fifth metasomal tergite, lateral aspect; 131, fifth metasomal tergite, dorsal aspect. 123: 1.0 × scale-line; 124, 129-132: 2.0 ×; 125-127: 3.0 ×; 128: 4.5 ×.

ventrally rim of clypeus near lower level of eyes; length of malar space 1.1 times basal width of mandible and 0.3 times height of eye in lateral view; width of face 2.3 times width of hypoclypeal depression, 0.9 times height of eye and 1.1 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.3 times longer than its height; pronotum anteriorly rather incised, with a complete and anteriorly rather narrow median lamella (fig. 126); spine on pronotum robust and nearly straight (fig. 127); mesoscutal lobes smooth and strongly shiny; notauli deep and finely crenulate, posteriorly with a pair of coarse longitudinal crenulae; scutellar sulcus with a strong lamelliform carina laterally and about 0.7 times as long as part of scutellum in front of subposterior crest; scutellum slightly convex and sparsely punctate medially; prepectal carina distinctly lamelliform (fig. 125); precoxal area impressed, but shallow anteriorly, completely crenulate and only anteriorly with some punctures; remainder of mesopleuron smooth, except for some punctures dorsally; mesosternal sulcus nearly smooth, very finely crenulate; metapleuron coarsely vermiculate rugose ventrally and remainder sparsely punctate; propodeum coarsely punctate-reticulate, but anteriorly narrowly mainly smooth and with some punctures, only anterior half of median carina distinct irregular and rather weak, with a pair of robust medium-sized lateral tubercles.

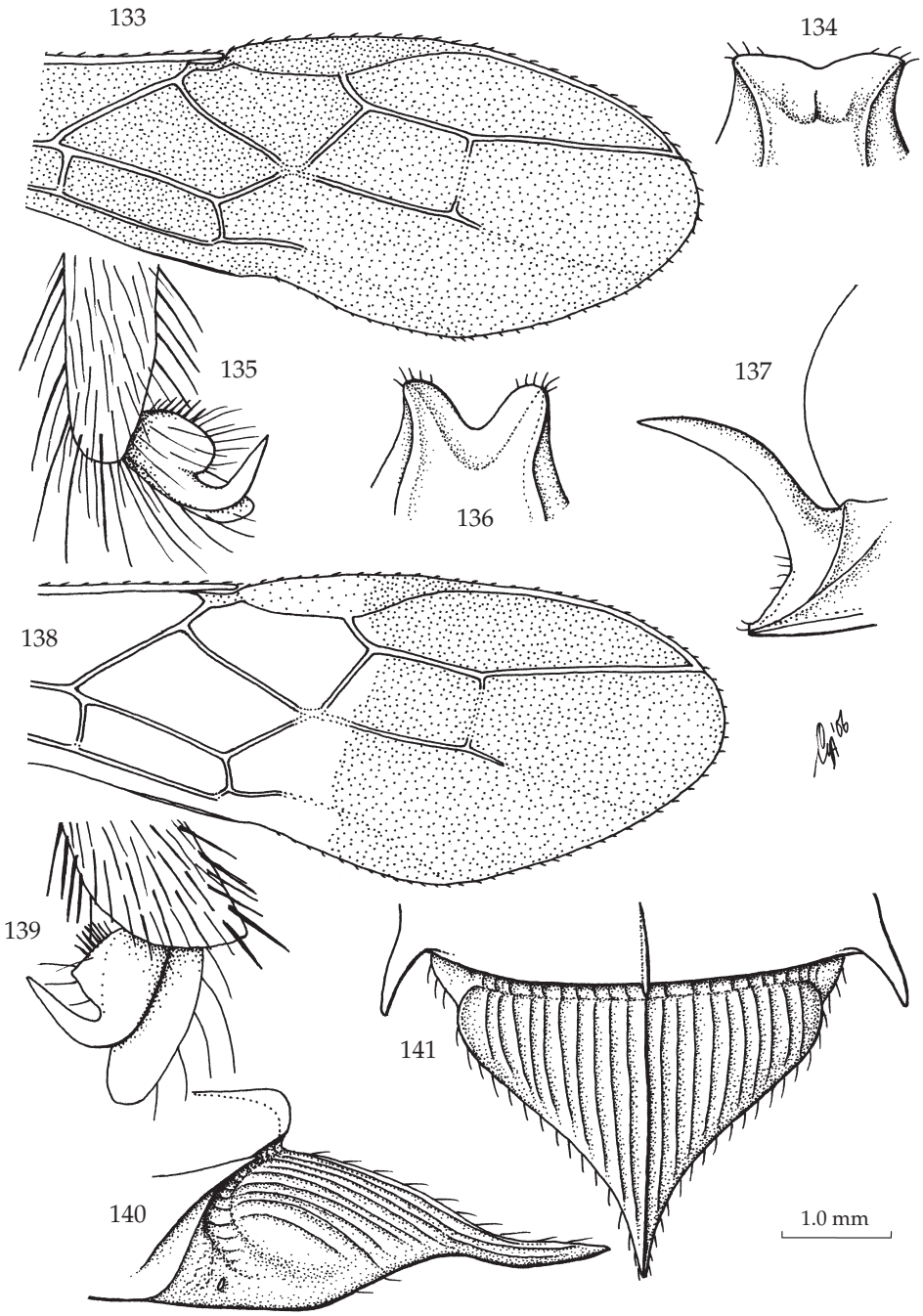
Wings.— Fore wing (fig. 123): r slender; r:3-SR:SR1 = 10:29:55; 1-CU1:2-CU1 = 1:23; 2-SR:3-SR:r-m = 23:29:19; cu-a vertical; m-cu narrowly antefurcal. Hind wing: marginal cell parallel-sided, 1r-m straight; M+CU:1-M:1r-m = 40:38:19; 2-SC+R longitudinal.

Legs.— Hind coxa rather densely punctulate; lobe of tarsal claws hardly protruding (fig. 128); length of femur, tibia and basitarsus of hind leg 4.6, 9.4 and 8.8 times their width, respectively; length of hind tibial spurs 0.20 and 0.23 times hind basitarsus; hind tarsus 1.1 times as long as hind tibia.

Metasoma.— Length of first tergite 0.5 times as long as its apical width; first-fourth tergites moderately shiny, coarsely and widely spaced longitudinally rugose, with interspaces densely and coarsely punctate and laterally similarly sculptured but less regularly so; dorsally first tergite with a complete median carina; medio-posterior teeth of third and fourth tergites medium-sized and lateral teeth rather slender, medium-sized (fig. 121), and submedially shallowly depressed; fifth tergite semicircular, sublaterally with protruding curved carina, with a slender medio-posterior spine, laterally rounded, coarsely sublongitudinally rugose and moderately convex subbasally (figs 121. 122); ovipositor and its sheath missing, but 0.08 times as long as fore wing and sheath narrow in a paratype.

Colour.— Yellowish-brown; first and second tergites (except laterally and base of first tergite), third and fourth tergites (except laterally fourth tergite) blackish or black; antenna (but scapus and pedicellus largely brown) and hind tarsus (as its bristles) largely dark brown; dark parts of first and second tergites parallel-sided posteriorly; remainder of metasoma, apex of lateral teeth of third tergite and lateral teeth of fourth tergite pale yellowish or ivory; pterostigma laterally, veins and wing membrane brown, but membrane basally narrowly yellowish and darker near veins 1-SR and 1-M; pterostigma pale brown medially.

Variation.— Length of fore wing 6.8-7.5 mm, and of body 7.3-9.6 mm; vein 3-SR of fore wing 1.1-1.3 times as long as vein 2-SR; spine of pronotum slender and straight to robust and slightly bent; hind femur and tibia yellowish-brown or largely dark brown,



Figs 133-135, *Spinaria triangulifera* spec. nov., ♀, holotype; figs 136-141, *S. incisa* spec. nov., ♀, holotype. 133, 138, fore wing; 134, 137, anterior part of pronotum, dorsal aspect; 135, 139, outer hind claw; 137, pronotal spine, lateral aspect; 140, fifth metasomal tergite, lateral aspect; 141, fifth metasomal tergite, dorsal aspect. 133, 138: 1.0 × scale-line; 134, 136, 137, 140, 141: 2.5 ×; 135, 139: 5.5 ×.

if darkened then often apical third of hind tibia paler than remainder of tibia; fifth tergite a with a slender medio-posterior spine or robust striate tooth; eyes of male paratypes touching posterior ocelli and lateral spines of third and fourth tergites black (only the female from Cyclops Mts. has also these lateral spines black), the paratypes from Waris and Saiho Road have the propodeal areola indistinctly developed anteriorly and the precoxal sulcus largely smooth; pterostigma usually evenly dark brown; paratypes from Papua New Guinea have the postero-lateral corners of the fifth tergite more protruding than the types from Papua; precoxal sulcus often largely smooth or narrowly crenulate.

Biology.— Reared from a Limacodid larva (possibly a *Setora* spec.).

Distribution.— Indonesia (Papua), Papua New Guinea.

Spinaria dimidiata Westwood, 1882
(figs 7, 173, 174)

Spinaria dimidiata Westwood, 1882: 31; Shenefelt, 1975: 1258; Yu et al., 2005: Taxapad database.

Material.— 1 ♀ (RMNH), "**Indonesia**: N. Ceram, 9 km E Wahai, nr PHPA-Q. [= forestry department quarter], 9.iii.1997, (nr) rainforest, C. v. Achterberg & R. de Vries, RMNH'97"; 1 ♂ (RMNH), "[Indonesia], S. Moluccas, Ambon, Waai, 10.ix.1959, A.M.R. Wegner"; 1 ♀ (BMNH), "[Indonesia], Amboina, F. Muir"; 6 ♀♀ (BMNH, RMNH), "[Indonesia], Moluccas: Amboina, , 19, R.C.L. Perkins coll., B.M. 1942-95"; 4 ♀♀ + 3 ♂♂ (BMNH, RMNH), "[Indonesia], Moluccas: Amboina", "R.C.L. Perkins coll., B.M. 1942-95".

Distribution.— Indonesia (*Ambon, Ceram).

Notes.— The vein 1-M of fore wing is largely yellowish-brown in most specimens from Ambon, but may be dark brown as in the specimen from Ceram, the fifth tergite is black in most specimens from Ambon, but rarely dark reddish-born or brown (♂) and in the specimen from Ceram more or less dark chestnut brown and the apical half of vein M+CU of fore wing is dark brown in the specimen from Ceram and only apical third in specimens from Ambon.

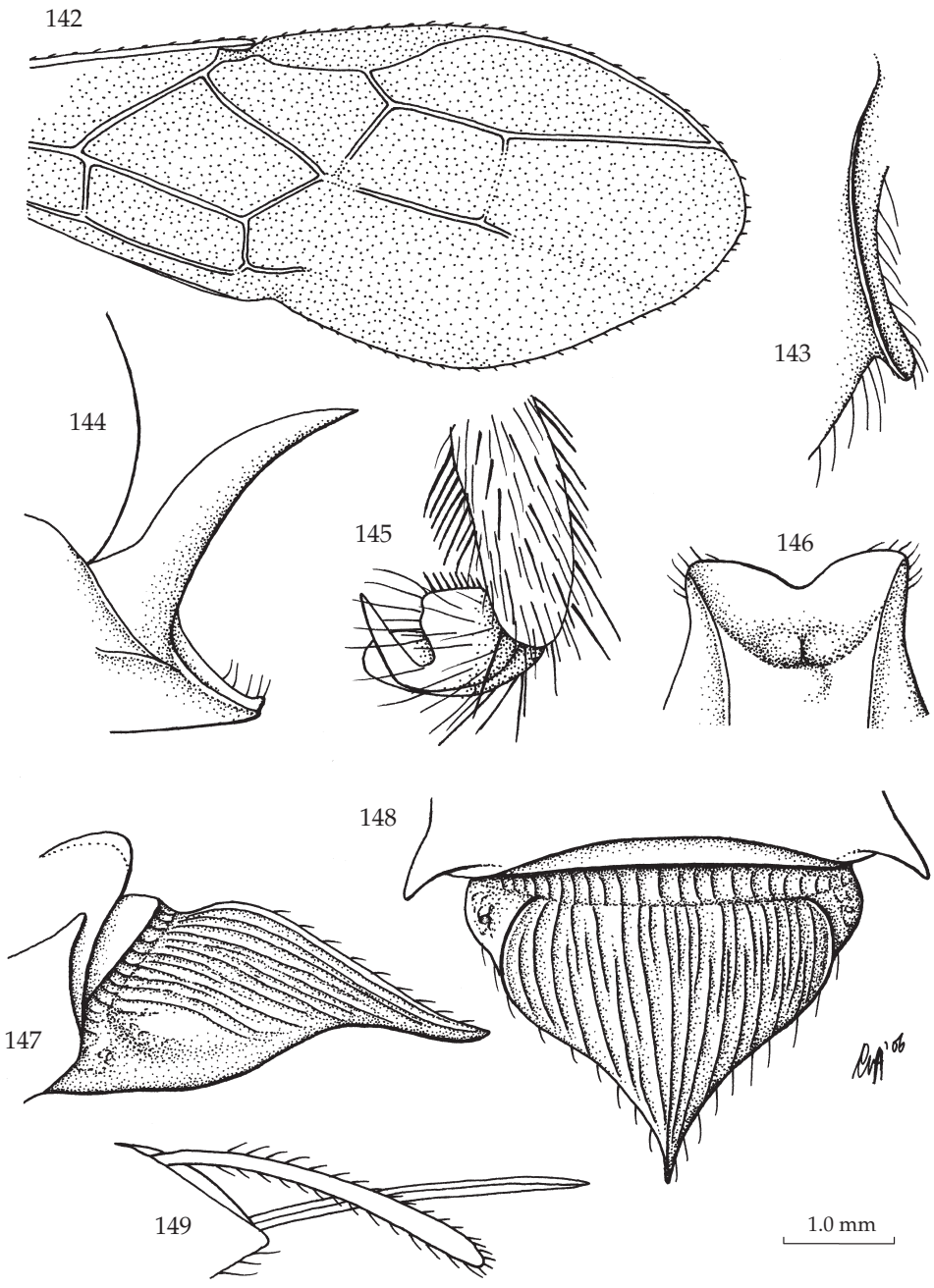
Spinaria eburata spec. nov.
(figs 8, 142-149, 168)

Material.— Holotype, ♀ (USNM), "P. I. [= **Philippines**, Luzon], Los Banos, Baker".

Holotype, ♀, length of fore wing 10.1 mm, of body 9.8 mm.

Head.— Antenna incomplete, with 54+ segments, length of third segment 1.2 times as long as fourth segment, third and fourth segments 1.5 and 1.3 times as long as wide, respectively; length of maxillary palp 1.1 times as long as height of head; frons largely slightly convex (but in front of anterior ocellus slightly depressed) and smooth; OOL: diameter of posterior ocellus:POL = 5:5:4; vertex flat, smooth and shiny; face and clypeus smooth; length of eye 2.1 times temple in dorsal view; medio-ventrally rim of clypeus below lower level of eyes; length of malar space 1.2 times basal width of mandible and 0.3 times height of eye in lateral view; width of face 2.5 times width of hypoclypeal depression, 0.9 times height of eye and 1.3 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.5 times longer than its height; pronotum ante-



Figs 142-149, *Spinaria eburata* spec. nov., ♀, holotype. 142, fore wing; 143, prepectal carina; 144, pronotal spine, lateral aspect; 145, outer hind claw; 146, anterior part of pronotum, dorsal aspect; 147, fifth metasomal tergite, lateral aspect; 148, fifth metasomal tergite, dorsal aspect; 149, ovipositor sheath and ovipositor, lateral aspect. 142: 1.0 × scale-line; 143, 144, 146: 3.6 ×; 145: 5.5 ×; 147, 149: 2.5 ×; 148: 2.0 ×.

riorly moderately incised and median lamella absent anteriorly but short carina present in depression in front of pronotal spine (fig. 146); spine on pronotum rather robust and curved (fig. 144); mesoscutal lobes smooth and strongly shiny, middle lobe moderately protuberant; notauli deep and smooth, with a short carina medio-posteriorly; scutellar sulcus with a strong crenula laterally and about 0.8 times as long as part of scutellum in front of subposterior crest; scutellum slightly convex and smooth medially; prepectal carina distinctly lamelliform (fig. 143); precoxal area distinctly impressed, area largely sparsely punctate with interspaces much larger than diameter of punctures and some posterior crenulae; remainder of mesopleuron smooth, except for a few punctures dorsally; mesosternal sulcus finely crenulate; metapleuron medium-sized and rather sparsely setose, with some short very coarse rugae ventrally and remainder sparsely but rather coarsely punctate; propodeum latero-dorsally largely smooth, but laterally coarsely punctate, medially very coarsely vermiculate-rugose and with a short median carina, and with a pair of rather short and robust lateral tubercles.

Wings.— Fore wing (fig. 142): r slender and straight; r:3-SR:SR1 = 10:29:52; 1-CU1:2-CU1 = 3:38; 2-SR:3-SR:r-m = 21:29:21; cu-a vertical and about 4 times as long as 1-CU1; m-cu narrowly antefurcal. Hind wing: marginal cell parallel-sided apically, 1r-m straight; M+CU:1-M:1r-m = 30:33:19; 2-SC+R subquadrate.

Legs.— Hind coxa densely setose and punctulate; tarsal claws distinctly pectinate basally, rather robust submedially and distinctly bent (fig. 145); length of femur, tibia and basitarsus of hind leg 5.2, 10.7 and 9.0 times their width, respectively; hind tarsus distinctly bristly setose; length of hind tibial spurs 0.20 and 0.22 times hind basitarsus; hind tarsus 1.1 times as long as hind tibia; ventral setae of middle basitarsus 1.5-2.0 times width of basitarsus (fig. 168).

Metasoma.— Densely but inconspicuously setose; length of first tergite 0.7 times as long as its apical width; first-fourth tergites moderately shiny, coarsely longitudinally rugose, with interspaces densely and more finely punctate-rugose and laterally mainly coarsely punctate; dorsally first tergite without a coarse median carina, medially rugae as surrounding ones; medio-posterior teeth of third and fourth tergites slender and rather large (fig. 147), submedially third tergite with and fourth tergite without a shallow depression; fifth tergite robust triangular, sublaterally with a weakly protruding curved carina, with a comparatively wide triangular medio-posterior spine, rather sparsely and incompletely longitudinally striate and subbasally moderately convex (figs 147, 148); length of setose part of ovipositor sheath about as long as combined length of second and third hind tarsal segments (in other species 0.7-0.8 times), 0.22 times as long as fore wing, and sheath narrow (fig. 149).

Colour.— Yellowish-brown; antenna (but scapus largely brown), telotarsi, hind tibia and tarsus, ovipositor sheath, wing membrane (but basal third yellow), pterostigma completely and veins (including veins 1-SR, 1-M, 1-CU1 and cu-a of fore wing, but veins of basal third of wing yellow) dark brown; first-fourth tergites laterally and fifth tergite ivory or pale yellowish.

Distribution.— Philippines (Luzon).

Spinaria flavipennis Cameron, 1906, stat. nov.
(figs 34-36, 39-41, 178)

Spinaria flavipennis Cameron, 1906: 205; Shenefelt, 1975: 1258; Yu et al., 2005: Taxapad database (as synonym of *S. spinator* (Guérin-Méneville).

Spinaria bhotanensis Cameron, 1906: 206; Shenefelt, 1975: 1257; Yu et al., 2005: Taxapad database (as synonym of *S. spinator* (Guérin-Méneville). **Syn. nov.**

Material.— Holotype of *S. flavipennis*, ♀ (BMNH), "Type", "B.M. Type Hym. 3.c.548", "*Spinaria flavipennis* Cam., Type, Sikkim", "[**India**], Sikkim", "Cameron Coll. 1909-182"; holotype of *S. bhotanensis*, ♀ (BMNH), "Type", "B.M. Type Hym. 3.c.549", "*Spinaria bhotanensis* Cam., Type, Bhotan", "Buxa, **Bhotan**", "Cameron Coll. 1909-182"; 1 ♀ (BMNH), "[**China**], Hong Kong"; 1 ♀ (BMNH), "[China], Taiwan, Fushan, 2005, D. Quicke", "RJF009, C10, BF00802"; 1 ♀ (RMNH), "China, Taiwan, Taichung Co., Ginguan, 23.vi.2005, D.L.J. Quicke, RMNH'06" (with large mummy of a *Setora* spec.).

Biology.— Reared from a *Setora* spec. (Limacodidae).

Distribution.— Bhutan, China (Taiwan, Yunnan), India (Sikkim).

Notes.— The types of *S. flavipennis* and *bhotanensis* have a comparatively slender fifth metasomal tergite and basally rather flat in lateral view (fig. 41); *S. bhotanensis* has most of apical third of fore wing infuscate except near the veins (figs 34, 35). *S. flavipennis* is considered to be different from *S. spinator* because of the differences in colour of the hind tarsus (infuscate according to the original description of *S. spinator*) and of the fore wing, and the shape of the pronotum. *S. flavipennis* seems to have a northern Oriental distribution.

Spinaria fulvicornis Long & van Achterberg, 2007

Spinaria fulvicornis Long & van Achterberg, 2007: 161-174.

Distribution.— Vietnam.

Spinaria hyalinata spec. nov.
(figs 16, 156-162)

Material.— Holotype, ♀ (RMNH), "[**Indonesia**: Sumatra], Boekit Itam, vi.1935", "Sumatra, Res. Bengkoelen, leg. Walsh".

Holotype, ♀, length of fore wing 10.1 mm, of body 10.2 mm.

Head.— Antenna with 79 segments and 1.2 times as long as fore wing, length of third segment 1.2 times as long as fourth segment, third, fourth and penultimate segments 1.5, 1.3 and 1.9 times as long as wide, respectively; length of maxillary palp equal to height of head; frons largely flat and smooth; OOL:diameter of posterior ocellus:POL = 5:5:3; vertex flat, smooth and shiny; face and clypeus smooth; length of eye 2.4 times temple in dorsal view; medio-ventrally rim of clypeus just below lower level of eyes; length of malar space equal to basal width of mandible and 0.3 times height of eye in lateral view; width of face 2.5 times width of hypoclypeal depression, 0.9 times height of eye and 1.1 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.5 times longer than its height; pronotum anteriorly slightly incised and with median lamella narrow and anteriorly absent (fig. 156); spine on pronotum robust and curved (fig. 160); mesoscutal lobes smooth and shiny; notauli deep and smooth, posteriorly with a coarse longitudinal carina; scutellar sulcus with an oblique crenula laterally and about 0.9 times as long as part of scutellum in

front of subposterior crest; scutellum slightly convex and smooth medially; prepectal carina rather lamelliform (fig. 161); precoxal area impressed, dorsally smooth, distinctly punctate medially (with interspaces usually wider than diameter of punctures) and posteriorly with a few crenulae; remainder of mesopleuron smooth, except for some punctures dorsally; mesosternal sulcus finely crenulate; metapleuron very coarsely vermiculate rugose ventrally and remainder rather punctate; propodeum anteriorly largely smooth except for some coarse punctures, medio-posteriorly coarsely rugose, only anterior half with median carina distinct, with a pair of robust rather short lateral tubercles.

Wings.— Fore wing (fig. 159): r slender, slightly curved; r:3-SR:SR1 = 5:15:32; 1-CU1:2-CU1 = 3:44; 2-SR:3-SR:r-m = 24:30:21; cu-a vertical; m-cu narrowly antefurcal; fore wing comparatively slender (figs 16, 159) compared to most other species. Hind wing: marginal cell subparallel-sided apically; 1r-m straight; M+CU:1-M:1r-m = 20:22:11; 2-SC+R quadrate.

Legs.— Hind coxa rather punctulate; tarsal claws rather slender submedially and weakly bent (fig. 162); length of femur, tibia and basitarsus of hind leg 5.9, 9.6 and 7.8 times their width, respectively; length of hind tibial spurs 0.24 and 0.28 times hind basitarsus; hind tarsus as long as hind tibia.

Metasoma.— Length of first tergite 0.7 times as long as its apical width; first-fourth tergites moderately shiny, rather coarsely and widely spaced longitudinally rugose, with interspaces densely and more finely rugose, and laterally densely longitudinally rugose; dorsally first tergite with a medium-sized median carina; lateral teeth of third and fourth tergites comparatively slender (fig. 157); medio-posterior teeth of third and fourth tergites strongly developed, submedially without distinct depression; fifth tergite robust triangular (figs 157, 158), sublaterally with protruding curved carina, with a rather slender medio-posterior spine, striate shiny and rather weakly convex subbasally; length of ovipositor sheath 0.07 times as long as fore wing and sheath somewhat widened subapically.

Colour.— Yellowish-brown; antenna (but scapus and pedicellus narrowly brownish), first tergite medially and medio-posteriorly and second tergite medially (but narrowly posteriorly), third tergite basally, third and fourth tergites laterally black or blackish; hind coxa dorsally, trochanter, trochantellus, basal half of hind femur and inner side of hind femur more or less dark brown; remainder of third tergite orange-brown, different from other tergites; remainder of metasoma and remainder of legs (including hind tarsus) pale yellowish; dark patches of first and second tergites strongly narrowed posteriorly; pterostigma dark brown; veins of basal half of wings dark brown (except blackish veins C+SC+R and 1-SR), but of apical half mainly pale yellowish; wing membrane subhyaline, except for a small infuscation below parastigma (figs 16, 159).

Distribution.— Indonesia (Sumatra).

Spinaria incisa spec. nov.
(figs 11, 136-141)

Spinaria westwoodi var. *flavipennis* Roman, 1913: 44; Shenefelt, 1975: 1259 (not Cameron, 1906).

Material.— Holotype, ♀ (USNM), "[**Philippines**], Island Samar, Baker". Paratypes (70 ♀♀ + 77 ♂♂; USNM, RMNH): 22 ♀♀ + 10 ♂♂, topotypic; 48 ♀♀ + 67 ♂♂, "[Philippines], Mindanao, Surigao, Baker". Excluded from the type series are the following more melanistic specimens: (37 ♀♀ + 16 ♂♂;

USNM, RMNH): 8 ♀♀ + 1 ♂, "[Philippines], Island Samar, Baker"; 16 ♀♀ + 11 ♂♂, "[Philippines], Mindanao, Surigao, Baker" (1 ♂ with "*Spinaria westwoodi flavipennis* Roman, Balt. '57"); 9 ♀♀ + 2 ♂♂, "[Philippines], Mindanao, Butuan, Baker"; 2 ♂♂, "[Philippines], Negros, Cuernos Mts., Baker"; 2 ♀♀, "[Philippines], Mindanao, Davao, Baker"; 2 ♀♀, "[Philippines], N.W. Panay, Baker".

Holotype, ♀, length of fore wing 9.7 mm, of body 10.1 mm.

Head.— Antenna with 83 segments, 1.4 times as long as fore wing, length of third segment 1.3 times as long as fourth segment, third, fourth and penultimate segments 1.3, 1.0 and 1.7 times as long as wide, respectively; length of maxillary palp equal to height of head; frons largely flat and smooth; OOL:diameter of posterior ocellus:POL = 7:5:4; vertex flat, smooth and shiny; face and clypeus smooth; length of eye 2.1 times temple in dorsal view; medio-ventrally rim of clypeus below lower level of eyes; length of malar space equal to basal width of mandible and nearly 0.3 times height of eye in lateral view; width of face 2.3 times width of hypoclypeal depression, 0.9 times height of eye and 1.2 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.5 times longer than its height; pronotum anteriorly deeply incised and narrow median lamella narrowly absent anteriorly (fig. 136); spine on pronotum rather slender and curved (fig. 137); mesoscutal lobes smooth and strongly shiny, middle lobe comparatively protuberant; notauli deep and largely smooth, subposteriorly with a few crenulae and medio-posteriorly with a longitudinal carina; scutellar sulcus with a strong crenula laterally and about 0.6 times as long as part of scutellum in front of subposterior crest; scutellum slightly convex and smooth medially; prepectal carina distinctly lamelliform; posterior half of precoxal area impressed, area largely distinctly punctate with part of interspaces about equal to diameter of punctures; remainder of mesopleuron smooth, but with distinct punctation dorsally and anteriorly; mesosternal sulcus nearly smooth, very finely crenulate anteriorly; metapleuron long and densely setose, with some short coarse rugae ventrally and the remainder rather coarsely and partly densely punctate; propodeum latero-dorsally largely smooth, except for some punctures, medially with some very coarse longitudinal rugae and with a complete and very coarse median carina, and with a pair of rather slender medium-sized lateral tubercles.

Wings.— Fore wing (fig. 138): r slender and slightly curved; r:3-SR:SR1 = 10:29:58; 1-CU1:2-CU1 = 1:15; 2-SR:3-SR:r-m = 11:15:10; cu-a vertical; m-cu narrowly antefurcal. Hind wing: marginal cell subparallel-sided apically, 1r-m straight; M+CU:1-M:1r-m = 20:23:10; 2-SC+R subquadrate.

Legs.— Hind coxa densely setose and punctulate; tarsal claws rather slender submedially and distinctly bent (fig. 139); length of femur, tibia and basitarsus of hind leg 5.5, 9.6 and 9.5 times their width, respectively; hind tarsus distinctly bristly setose; length of hind tibial spurs 0.20 and 0.23 times hind basitarsus; hind tarsus as long as hind tibia.

Metasoma.— Densely short setose; length of first tergite 0.7 times as long as its apical width; first-fourth tergites moderately shiny, coarsely longitudinally rugose, with interspaces densely and more finely punctate-rugose and laterally mainly coarsely punctate; dorsally first tergite with a coarse median carina; medio-posterior teeth of third and fourth tergites slender and rather large (fig. 140), submedially without a depression; fifth tergite robust triangular, sublaterally with a weakly protruding curved

carina, with a comparatively wide triangular medio-posterior spine, densely longitudinally striate and subbasally moderately convex (figs 140, 141); length of setose part of ovipositor sheath 0.09 times as long as fore wing and sheath somewhat widened.

Colour.— Yellowish-brown (including scapus and pedicellus, but the latter with a minute dark patch); remainder of antenna, hind tarsus and ovipositor sheath dark brown; wing membrane and veins yellow, but apical third of fore wing membrane (figs 11, 138) and apical fifth of hind wing membrane (including most of second submarginal cell of fore wing) dark brown and veins brown; pterostigma yellow but apical fifth more or less dark brown.

Variation.— Length of fore wing of ♂ 5.6-9.5 mm, and of ♀ 7.7-10.6 mm; apical infuscation of wing membrane may be very faint (Mindanao, but males sometimes more infuscate) compared to the typical form from Samar; infuscation of pterostigma may extend up to most of anterior border of pterostigma and most of its apical half; precoxal sulcus sometimes with a few weak crenulae. Males may have the pterostigma, the hind tibia and tarsus largely or completely dark brown, rarely also part of (or complete) hind femur dark brown.

The more melanistic form excluded from the type series has the entire pterostigma and the veins 1-SR and 3-CU1 of the fore wing dark brown. The extent of the infuscation of the fore wing is variable; from the level of the parastigma (common) up to veins 1-M and cu-a. The veins 1-M and cu-a of fore wing are yellowish-brown and the fifth metasomal tergite of ♀ is yellowish-brown. The variation is rather discrete with few intermediates examined, but some of the specimens are known from the same localities as the typical form.

Distribution.— Philippines (Samar, Mindanao). The more melanistic forms also from Negros and Panay.

Notes.— The holotype of *S. flavipennis* Roman, 1913, is a female from Jahongon, an unknown village in the Philippines, and is probably lost. It was collected by C. Semper, probably in November 1864 and it has the infuscation up to the second submarginal cell of the fore wing as in the females from Samar Island.

Spinaria philippinensis Enderlein, 1905, stat. nov.
(figs 6, 171, 172)

Spinaria philippinensis Enderlein, 1905: 230; Roman, 1913: 43 (as synonym of *Spinaria fuscipennis* var. *armata* (Ashmead, 1905)); Shenefelt, 1975: 1258 (id.).

Material.— 15 ♀♀ + 3 ♂♂ (USNM, RMNH), "[**Philippines**], Mindanao, Surigao, Baker"; 3 ♀♀ (USNM, RMNH), "[Philippines], Mindanao, Davao, Baker"; 7 ♀♀ (USNM, RMNH), "[Philippines], Mindanao, Dapitan, Baker"; 1 ♂ (USNM), "Island Sibuyan, Baker"; 1 ♂ (BMNH), "Philippines, Mindanao, Zamboanga", "ex large larva mummy [of] white stripe *Thosea*, ix.1984, E. Piesta, ZRC"; 2 ♀♀ + 1 ♂ (BMNH, RMNH), "Philippines, Mindanao Is., Davao Research Center, L[arva]. on coconut", "ex white stripe *Thosea*, coll. 30.vii.1984 or 2.viii.1984, adult 9, 13 or 19.viii.1984".

Biology.— Reared from *Thosea philippina* Holloway (Limacodidae; Austin, 1987, but under *S. armata* (Ashmead)).

Distribution.— Philippines (Mindanao).

Notes.— The largest known specimens of the genus belong to this species with

length of the fore wing up to 14.3 mm, but the males are much smaller (length of fore wing 7.5-8.0 mm). The male from Sibuyan Island has the base of the fore wing dark brown. The basal cell of the fore wing is narrowly or widely darkened apically and rarely the cell is completely yellowish.

Spinaria similis Long & van Achterberg, 2007

Spinaria similis Long & van Achterberg, 2007: 161-174.

Distribution.— Vietnam.

Spinaria spinator (Guérin-Méneville, 1830)
(figs 10, 185)

Bracon spinator Guérin-Méneville, 1830: 199-200.
Spinaria spinator; Shenefelt, 1975: 1259; Yu et al., 2005: Taxapad database.
Spinaria spinatrix Schulz, 1906: 138 (invalid emendation).

Material.— 1 ♀ (BMNH), "**India**: Kerala, Periyar A. Sanc., 5-15.ix.1979, J.S. Noyes"; 1 ♂ (BMNH), "India: Karnataka, Bangalore, 19-23.ix.1979, J.S. Noyes"; 1 ♀ (BMNH), "India, Namkum, 14.xi.1951, C. Turhy"; 1 ♀ (BMNH), "India, Namkum, 99, 11.x.[1931", "Ex *Thosea* sp."; 1 ♀ (BMNH), id., but 13. ii.1931; 1 ♂ (BMNH), id., but only "1931"; 1 ♀ (RMNH), id., but "89"and 3.ii.1939"; 1 ♀ (BMNH), "S. India, Tinnevelly Dt., Naraikkadu, 2500-3000 ft, 11-13.iii.[19]36"; 1 ♀ (BMNH), "[India], North Salem, Jawalagiri, 20.xi.[19]30, F.R.I. Sandal Insect Survey"; 1 ♀ (BMNH), id., but Ayur, 13.ii.1931; 1 ♀ (RMNH), id., but 15.xii.1930; 1 ♀ (BMNH), "[India], Dukhun", "Ind. Mus. 79.64"; 1 ♀, "S. India: Malabar, Walayar Forests, 6.ix.1938, P.S. Nathan, B.M. 1939-63"; 2 ♀♀ (BMNH, RMNH), "**Ceylon**, Kegalle, 31.xii.1928, [ex] larvae of *Thosea aperiens* on *Dunbaria heynei*"; 1 ♀ (BMNH), "**Nepal**"; 2 ♀♀ (BMNH, RMNH), "**China**, Foochow, 1937-38, M.-S. Yang"; 1 ♀ (BMNH), "[**Malaysia**], Malaya, Teluk Ansin, 18.iv.1930, 6783, Entom. Div. Agric. Dept.", "[ex] *Setora nitens*", with a large mummy of *Setora nitens*; 1 ♀ (BMNH), "[Malaysia], Malay Penin., ex coll. Agr. Dept. Kuala Lumpur", with a large mummy of probably *Setora nitens*; 1 ♀ (RMNH), id., but without mummy; 1 ♂ (BMNH), "Malaya, Serdang, 31.i.1936, H.T. Pagden, Agric. Dept., [ex] *Setora nitens* larva"; 1 ♀ (BMNH), id., but Bukit, Pasir, ii.1917, "Braconidae parasitic on Limacodid, B. Pasir, ii.[19]17"; 1 ♀ "[**Thailand**], Peninsular Siam, Khao Rampilum, 12.iii.1922"; 1 ♀ (RMNH), "Thailand, Khao Koh Hong, 07º01'00''N 100º31'12''E, 410 m, 6.vi.2000, D.L.J. Quicke & N. Laurenne, RMNH'07"; 1 ♂ (BMNH), "**Singapore**, H.N. Ridley, 1900-116"; 3 ♂♂ (BMNH, RMNH), "**Indonesia**, S. Sumatra, BEKRI", "ex larva of *Setora nitens* on oil palm", "coll. 16.iv.1980, R. Desmier de Chenon"; 1 ♀ (BMNH), id., but Lampung, Bergen, from fourth instar, 20.iv.1980; 1 ♀ (BMNH), id., but Lonsum, SIPEF, vi.1981; 1 ♀ (BMNH), "[Sumatra], Naga Hoeta, 1918"; 1 ♀ (BMNH), "Sumatra, Pematang Siantar, E.C., 2.ix.[19]31, R.I. Nel", "Naga Hoeta Estate, 1750 ft."; 2 ♀♀ (BMNH, RMNH), id., but 21.iii.1931; 1 ♀ (BMNH), id., but 29.ix.1931; 1 ♂ (BMNH), "East Sumatra, Asahan, 50-60 m, from gambir [= *Uncaria gambir* (Hunter) Roxb.; Rubiales]-pests, F. Schneider 1934-38, 1901/x"; 1 ♂ (BMNH), "Sumatra, OK, Asahan, 5-60 m, Goenoeng Malajoe, Gambirplanzung, Schneider 1934-36"; 8 ♀♀ + 3 ♂♂ (RMNH), "[Indonesia], Sumatra, Deli, Medan"; 2 ♀♀ (RMNH), "[Indonesia], Sumatra, Res. Bengkoelen, leg. Walsh", "Bengkoelen, v.1935".

Biology.— Reared from *Thosea aperiens* Walker (Limacodidae) on *Dunbaria heynei* Spanoghe (Fabaceae) and *Setora nitens* Walker (Limacodidae) on oil palm.

Distribution.— Bangladesh, *China, India, Indonesia (Sumatra, Java, Kalimantan), Malaysia (Sarawak, Peninsular Malaysia), Nepal, *Singapore, *Sri Lanka, Thailand, Vietnam.

Notes.— Females have the fifth metasomal tergite ivory, paler than the yellowish-brown fourth tergite or similar to the yellowish-brown fourth tergite (the latter especially in India); males have the fifth and fourth tergites similarly yellowish-brown. Melanistic specimens are known from Vietnam and Sumatra with the apical half of the pterostigma dark brown and the area below the parastigma and the pterostigma largely infuscate.

Spinaria sulcata Smith, 1865
(figs 9, 167)

Spinaria sulcata Smith, 1865: 67; Shenefelt, 1975: 1259; Yu et al., 2005: Taxapad database.
Spinaria sulcator Westwood, 1882: 27 (invalid emendation).

Material.— 2 ♀♀ (RMNH), "[**Indonesia**], Ternate, Forsten", "*Spinaria westwoodi flavipennis* Roman, Balt.'66"; 1 ♀ (BMNH), "[Indonesia], N. Moluccas, Batjan, 22.viii.1954, A.H.G. Alston, B.M. 1954-414", "Mt. Sitela"; 1 ♀ (BMNH), "[Indonesia], S.E. Halmaheira, xii.1929, F. Shaw-Meyer".

Distribution.— Indonesia (*Bacan, Gilolo, *Halmahera, *Ternate).

Notes.— The specimen from Bacan has the apex of the hind tibia and the complete hind tarsus dark brown.

Spinaria suliana Westwood, 1882
(figs 13, 163, 164, 176, 184)

Spinaria suliana Westwood, 1882: 32; Shenefelt, 1975: 1259; Yu et al., 2005: Taxapad database (type series examined).

Material.— 1 ♀ (RMNH), "**Indonesia**: Sulawesi, nr Bantimurung, Leang-Leang, 17.iv.1991, c 60 m, C. v. Achterberg, RMNH'91"; 1 ♂ (RMNH), "Indonesia: Sulawesi, Bantimurung N.P., nr entrance, 23. iv.1991, c 30 m, C. v. Achterberg, RMNH'91"; 1 ♀ (RMNH), "Indonesia: Sulawesi (SW), Ciakar Alam Laiya, c 15 km S of Camba, c 400 m, 28.xi.1991, C. v. Achterberg, RMNH'91"; 1 ♀ (RMNH), id., but 26.xi.1981; 1 ♀ (RMNH), id., but 23.xi.1991; 1 ♀ (RMNH), "Indonesia: SE. Sulawesi, nr Sanggona, Mt. Watuwila, Base Camp, c 200 m, 21.x.1989, C. v. Achterberg & S. Kahono, RMNH'89"; 1 ♀ (RMNH), "[Indonesia: N. Sulawesi], Tondano, Forsten"; "; 1 ♂ (RMNH), "[Indonesia: N. Sulawesi], Gorontalo, Forsten"; 1 ♀ (RMNH), "Indonesia: Sula Isl., Mangole, Mandafuhi Camp, c 50 m, 27.x.1993, C. v. Achterberg & Y. Yasir, RMNH'93"; 1 ♀ (RMNH), "Indonesia: Sula Isl., Mangole, near Buya, c 450 m, 21.x.1993, C. v. Achterberg & Y. Yasir, RMNH'93"; 1 ♀ (RMNH), id., but c 430 m, Malaise trap 18, 13.x-2.xi.1993; 1 ♀ (BMNH), "[Indonesia], Sulawesi Utara, Dumoga Bone [N.P.], Toraut area", "RJF009, B12, BF00792"; 1 ♂ (BMNH), id., but iv.1985.

Distribution.— Indonesia (*Sulawesi, Sula Islands).

Spinaria sundana spec. nov.
(figs 14, 150-155)

Material.— Holotype, ♀ (RMNH), "W. **Malaysia**: Perak, Bukit Larut, Malaise tr[ap] 3, 7-11.v.2006, Ruslan, RMNH'06". Paratype (2 ♀♀): 1 ♀ (BMNH), "[W. Malaysia], Cameron Highlands, Pahang, 4000-4500 ft, 21.vi.1935, F.M.S."; 1 ♀ (BMNH), "Birmah" [**Myanmar**].

Holotype, ♀, length of fore wing 9.1 mm, of body 9.6 mm.

Head.— Antenna nearly complete, with 73+ segments, length of antenna about 1.4 times as long as fore wing, length of third segment 1.2 times as long as fourth segment, third, fourth and penultimate segments 1.8, 1.5 and about 1.6 times as long as wide, respectively; length of maxillary palp 1.1 times height of head; frons slightly convex and smooth; OOL:diameter of posterior ocellus:POL = 5:5:3; vertex flattened, smooth and shiny; face and clypeus smooth; length of eye 2.1 times temple in dorsal view; medio-ventrally rim of clypeus near lower level of eyes; length of malar space 1.2 times basal width of mandible and 0.27 times height of eye in lateral view; width of face 2.9 times width of hypoclypeal depression, equal to height of eye and 1.3 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.4 times longer than its height; pronotum anteriorly slightly emarginate and no median lamella (fig. 152); spine on pronotum rather slender and curved (fig. 151); mesoscutal lobes less steep anteriorly (fig. 151), smooth, largely glabrous and shiny; notauli narrow, deep, and only posteriorly crenulate, medio-posteriorly with a droplet-shaped depression connected to short crenula apically; scutellar sulcus with a strong crenula laterally and about 0.7 times as long as part of scutellum in front of subposterior crest; scutellum weakly convex, long setose, and smooth medially; prepectal carina distinctly lamelliform; precoxal area impressed, dorsally largely smooth (except some very short indistinct crenulae and a pair of coarse crenulae posteriorly), medially and ventrally sparsely punctate with interspaces much wider than diameter of punctures; remainder of mesopleuron smooth, except for sparse punctation dorsally; mesosternum densely setose; mesosternal sulcus finely but distinctly crenulate; metapleuron very coarsely rugose ventrally, long setose and the remainder sparsely punctate; propodeum latero-dorsally largely smooth, except for some punctures, medio-posteriorly and medio-anteriorly coarsely rugose and posteriorly with three subparallel carinae, anteriorly with short median carina, and with a pair of rather slender medium-sized lateral tubercles.

Wings.— Fore wing (fig. 150): pterostigma comparatively wide, r slender and nearly straight; r:3-SR:SR1 = 10:24:62; 1-CU1:2-CU1 = 5:46, 1-CU1 about half as long as cu-a; 2-SR:3-SR:r-m = 22:24:21; cu-a vertical and narrow; m-cu narrowly antefurcal. Hind wing: marginal cell parallel-sided apically, 1r-m slightly curved; M+CU:1-M:1r-m = 20:25:11; 2-SC+R just elongate.

Legs.— Hind coxa distinctly sparsely punctate; tarsal claws distinctly bent and with a small rounded protuberance (fig. 153); length of femur, tibia and basitarsus of hind leg 5.1, 10.5 and 8.8 times their width, respectively; length of hind tibial spurs 0.18 and 0.24 times hind basitarsus; hind tarsus nearly 1.1 times as long as hind tibia.

Metasoma.— Length of first tergite 0.6 times as long as its apical width; first-fourth tergites moderately shiny, coarsely and widely spaced longitudinally rugose, with interspaces densely and coarsely punctate and laterally coarsely longitudinally rugose; dorsally first tergite with a coarse median carina; second and third tergites with transverse and shallow medial depression; medio-posterior teeth of third and fourth tergites large and lateral teeth slender (fig. 154), tergites near medial tooth without depression; fifth tergite short triangular, sublaterally without protruding curved carina, with a comparatively narrow triangular medio-posterior spine, tergite coarsely and regularly longitudinally striate, shiny and rather convex subbasally (figs 154, 155);

length of setose part of ovipositor sheath 0.08 times as long as fore wing and sheath rather narrow.

Colour.— Ivory; antenna (including scapus and pedicellus largely), mesoscutum (except narrowly medio-posteriorly), axilla largely, mesopleuron behind prepectal carina (but ivory posteriorly), propodeum nearly completely and including tubercles, dorsal patch of metanotum, hind coxa (except apically), femur (except basally), apical third of tibia, and telotarsus, large medial patches of first and second tergites (patches roundly narrowed posteriorly), third tergite, fourth tergite laterally and basally (but basal transverse groove ivory) and apical half of middle and hind telotarsi blackish or black; medial streak of face, frons (except orbit), vertex (id.), occiput, patch on propleuron, pronotal spine, sixth and seven tergites largely, patches on hypopygium and ovipositor sheath dark brown; apical third of pterostigma, parastigma and small patch around it, veins 1-SR and 3-CU1 of fore wing dark brown (fig. 150); remainder of pterostigma yellow, most veins brown; wing membrane slightly yellowish with slight infuscation (fig. 14).

Variation.— Length of fore wing 7.2-9.1 mm, and of body 8.6-9.8 mm; pronotum straight or weakly incised anteriorly, apical 0.3-0.5 of pterostigma dark brown; pronotal spine distinctly to weakly curved and median lamella of pronotum absent or short.

Distribution.— West Malaysia, Myanmar.

Spinaria triangulifera spec. nov.
(figs 2, 129-135)

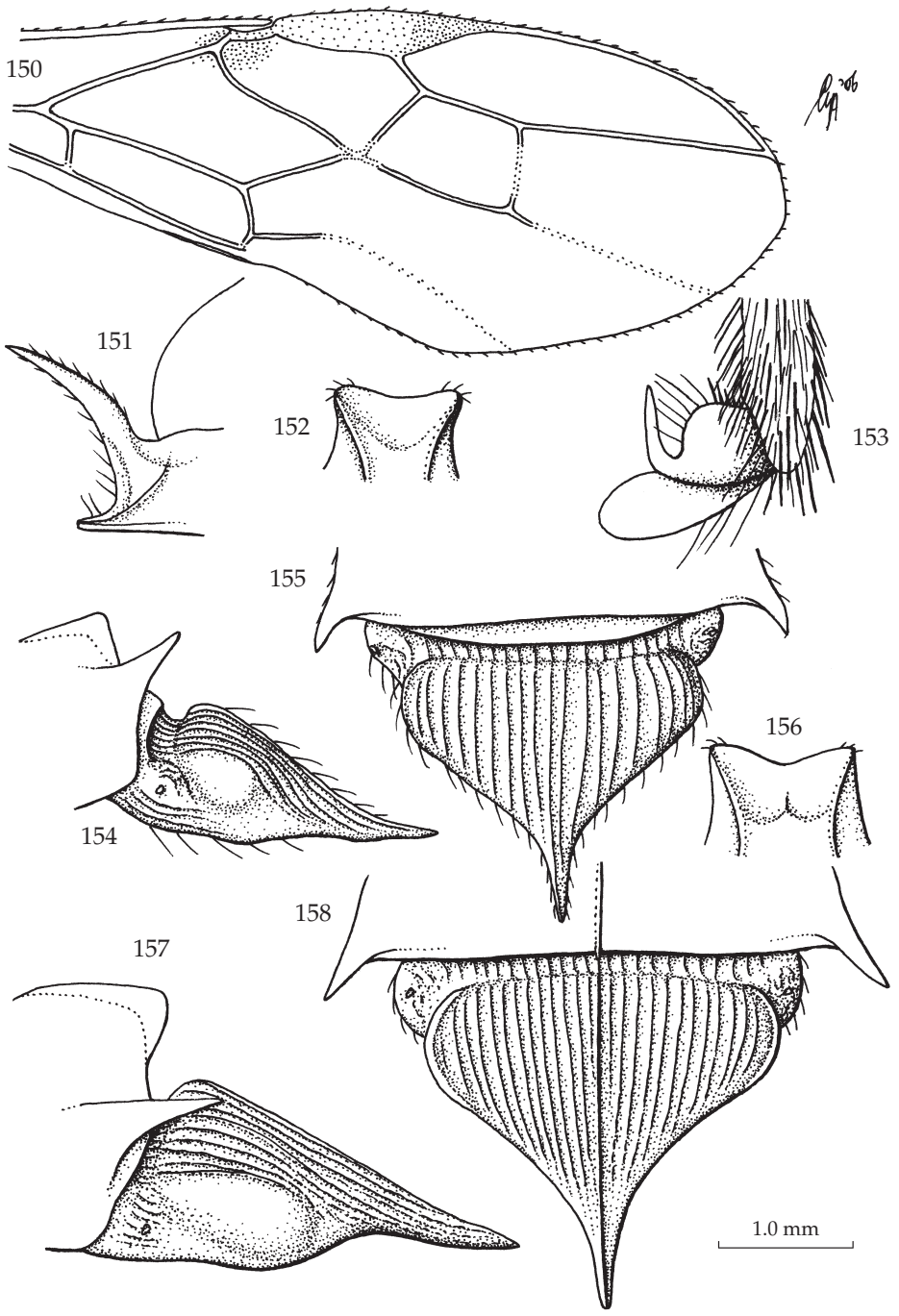
Material.— Holotype, ♀ (USNM), "[**Myanmar**], Mergue, 7125-10", "S. Burma, Mergue". Paratypes (7 ♀♀ (including one ♀ without head and metasoma); USNM, RMNH): topotypic, but with the following numbers: "6950-10", "6951-10", "6958-10", "6962-10", "7018-10", "7021-10" and "7022-10".

Holotype, ♀, length of fore wing 9.2 mm, of body 9.9 mm.

Head.— Antenna incomplete, with 41+ segments, length of third segment 1.2 times as long as fourth segment, third and fourth segments 1.4 and 1.2 times as long as wide, respectively; maxillary palp missing, but length 1.1 times height of head in a paratype; frons largely flat and smooth; OOL:diameter of posterior ocellus:POL = 5:5:2; vertex flattened, smooth and shiny; face and clypeus smooth; length of eye 2.2 times temple in dorsal view; medio-ventrally rim of clypeus slightly below lower level of eyes; length of malar space equal to basal width of mandible and nearly 0.3 times height of eye in lateral view; width of face 2.4 times width of hypoclypeal depression, 0.9 times height of eye and 1.2 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.5 times longer than its height; pronotum anteriorly rather incised and narrow median lamella absent anteriorly (fig. 134); spine on pronotum rather slender and curved (fig. 132); mesoscutal lobes smooth and

Figs 150-155, *Spinaria sundana* spec. nov., ♀, holotype; figs 156-158, *S. hyalinata* spec. nov., ♀, holotype. ▶
150, fore wing; 151, pronotal spine, lateral aspect; 152, 156, anterior part of pronotum, dorsal aspect; 153, outer hind claw; 154, 157, fifth metasomal tergite, lateral aspect; 155, 158, fifth metasomal tergite, dorsal aspect. 150: 1.0 × scale-line; 151, 152, 154-157: 2.0 ×; 153: 4.5 ×; 158: 1.6 ×.


150
151
152
153
155
154
156
158
157
1.0 mm

strongly shiny; notauli deep and smooth, posteriorly with a pair of coarse anteriorly diverging crenulae; scutellar sulcus with a strong crenula laterally and about 0.9 times as long as part of scutellum in front of subposterior crest; scutellum flat and smooth medially; prepectal carina distinctly lamelliform but comparatively narrow (fig. 129); precoxal area impressed, dorsally largely smooth (except some superficial rugulae and short indistinct crenulae), medially and ventrally distinctly punctate with interspaces mostly wider than diameter of punctures; remainder of mesopleuron smooth, except for sparse punctulation dorsally; mesosternal sulcus nearly smooth, very finely crenulate; metapleuron coarsely rugose ventrally and remainder sparsely punctate; propodeum latero-dorsally largely smooth, except for some punctures, medio-posteriorly with some coarse rugae and a pair of lamelliform and subparallel carinae, anteriorly with a short median carina, and with a pair of rather slender medium-sized lateral tubercles.

Wings.— Fore wing (fig. 133): r slender and slightly curved; r:3-SR:SR1 = 10:29:55; 1-CU1:2-CU1 = 2:39; 2-SR:3-SR:r-m = 20:28:19; cu-a vertical; m-cu narrowly antefurcal. Hind wing: marginal cell parallel-sided apically, 1r-m straight; M+CU:1-M:1r-m = 20:21:11; 2-SC+R subquadrate.

Legs.— Hind coxa sparsely punctulate; tarsal claws rather slender submedially (fig. 135); length of femur, tibia and basitarsus of hind leg 6.3, 10.8 and 8.8 times their width, respectively; length of hind tibial spurs 0.18 and 0.22 times hind basitarsus; hind tarsus 1.1 times as long as hind tibia.

Metasoma.— Length of first tergite 0.5 times as long as its apical width; first-fourth tergites moderately shiny, coarsely and longitudinally rugose, with rather wide interspaces densely and coarsely punctate and laterally rather weakly rugose; dorsally first tergite with a complete coarse median carina; medio-posterior teeth of third and fourth tergites large (fig. 130), submedially without depression; fifth tergite elongate triangular, sublaterally with protruding curved carina, with a comparatively wide triangular medio-posterior spine, rather sparsely striate, shiny and comparatively weakly convex subbasally (figs 130, 131); length of setose part of ovipositor sheath 0.10 times as long as fore wing, and sheath rather narrow.

Colour.— Yellowish-brown; scapus and pedicellus largely, hind coxa, trochanter, trochantellus and femur largely dark brown; remainder of antenna, triangular spine of fifth tergite, hind tibia and tarsus, first and second tergites medially (with patches distinctly narrowly posteriorly), third and fourth tergites (except narrowly laterally) and base of fifth tergite and ovipositor sheath blackish or black; remainder of metasoma (including transverse subbasal band of fifth tergite) pale yellowish; pterostigma, veins and wing membrane brown (fig. 2).

Variation.— Length of fore wing 9.1-10.3 mm; head and mesosoma yellowish-brown or largely brown to dark brown; precoxal sulcus often largely smooth; scutellar sulcus smooth or with a crenula laterally.

Distribution.— Myanmar.

Notes.— Closely related to *S. armator* (Fabricius), but the fifth tergite of *S. armator* is in lateral view (fig. 108) and in dorsal view (fig. 113) less elongate, the median lamella of the pronotum is medium-sized and nearly up to anterior margin of pronotum, the prepectal carina is wider than in *S. triangulator* and the hind coxa is black.

Spinaria truongsonensis Long & van Achterberg, 2007

Spinaria truongsonensis Long & van Achterberg, 2007: 161-174.

Distribution.— Vietnam.

Spinaria vietnamica Long & van Achterberg, 2007 (fig. 18)

Spinaria vietnamica Long & van Achterberg, 2007: 161-174.

Material.— Paratypes: 2 ♀♀ (IEBR, RMNH), "N. **Vietnam**: Ninh Binh, Cuc Phuong N.P., n[ea]r entrance, c. 225 m, 1-15.v.2000, Mal[aise]. trap II, Mai Phu Quy, RMNH'00"; 2 ♀♀ (RMNH), id., but 15.iv-1.v.2000; 1 ♀ (RMNH), id., but 29.vi-18.vii.2000 and near centre (= Malaise trap I)"; 1 ♀ (BMNH), "[**India**], Sikkim, iv-vi. 1900, Bingham coll."; 1 ♀ (BMNH), id., but iv.1891; 3 ♀♀ (BMNH, RMNH), ""Upper **Burma**, Nam Tamai valley, 12.viii. or 26.viii. or 16.ix.1938, R. Kaulback, B.M. 1938-41", "Alt. 3,000 ft. (or 5,000 ft.), lat. N 27°42', long. E. 97°54' ".

Distribution.— *India, *Myanmar, Vietnam.

Spinaria westwoodi Cameron, 1906 (figs 33, 37, 38, 42, 177)

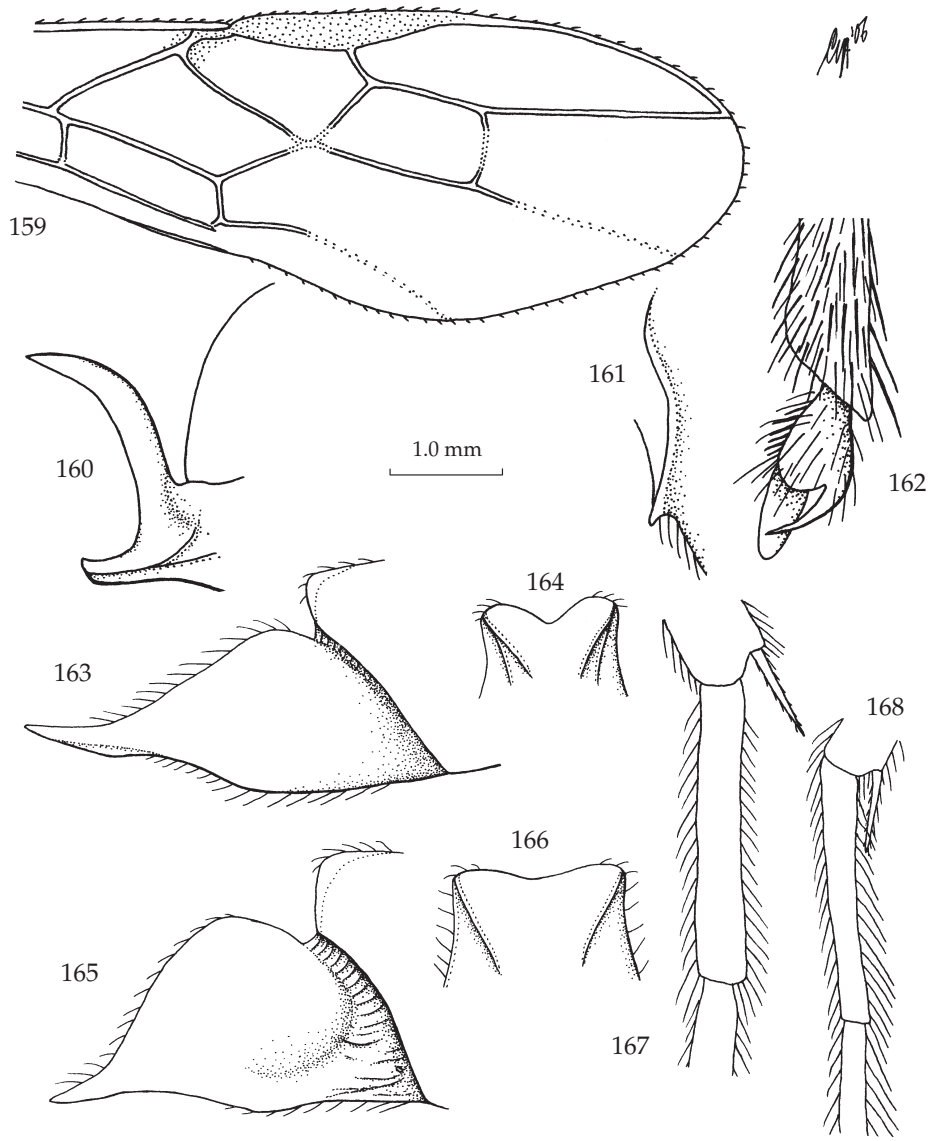
Spinaria westwoodi Cameron, 1906: 109; Shenefelt, 1975: 1259; Yu et al., 2005: Taxapad database.

Material.- Lectotype here designated, ♀ (BMNH), "Type Hym.", "B.M. Type Hym. 3.c.547", "*Spinaria westwoodi* Cam., Type, Borneo", "4", "[E. **Malaysia**, Sarawak], Kuching, 23.vi.1903", "P. Cameron Coll. 1914-110"; 1 paralectotype without wings, fore legs and antennae) ♀ (BMNH), "Cotype", "Kuching, 12.xi.1903", "*Spinaria westwoodi* Cam., Type, Borneo"(in Cameron's handwriting); 1 ♀ without head (BMNH), "Kuching, 14.ix.1903", "*Spinaria westwoodia* [sic!] Cam." (in Cameron's handwriting); 1 ♀ (BMNH), "Sarawak, Shelford, 1900-117"; 2 ♀♀ (BMNH, RMNH), "Sarawak, Mt. Dulit, 4000 ft, moss forest, 25 or 26.x.1932"; 1 ♀ (BMNH), "Malaysia, Sabah, G.T. Lim", "Larval parasite of *Setora nitens*, 11.vi.[19]84"; 1 ♀ (BMNH), "Sarawak, 4th Div., Gn. Mulu, RGS Exp., 27.vi.-19.vii.1978, H. Vallack"; 2 ♀♀ (BMNH, RMNH), id., but v.-vi.1978, N.M. Collins"; 1 ♀ (BMNH), id., but iii.-iv.1978; 2 ♀♀ (BMNH, RMNH), "Sabah, Tawau, iii.1972, Salman Shah, 362 & 359, C.I.E. A6623"; "ex *Setora nitens* on *Elaeis guineensis*"; 1 ♀ (BMNH), "**Brunei**: Telisai, *Gymnocarpus* scrub, 10 m, iv.[19]81, I. Gauld"; 1 ♂ (BMNH), "Brunei: Bukit Sulang, nr Lamanin, N.E. Stork"; 1 ♀ (BMNH), "Brunei: U. Temburong, Bukit Retak, 1500 m, iv.1981", 1 ♀ id., but 16-22.ii.1982, M.C. Day; 1 ♀ (BMNH), "**Singapore**, coll. Baker".

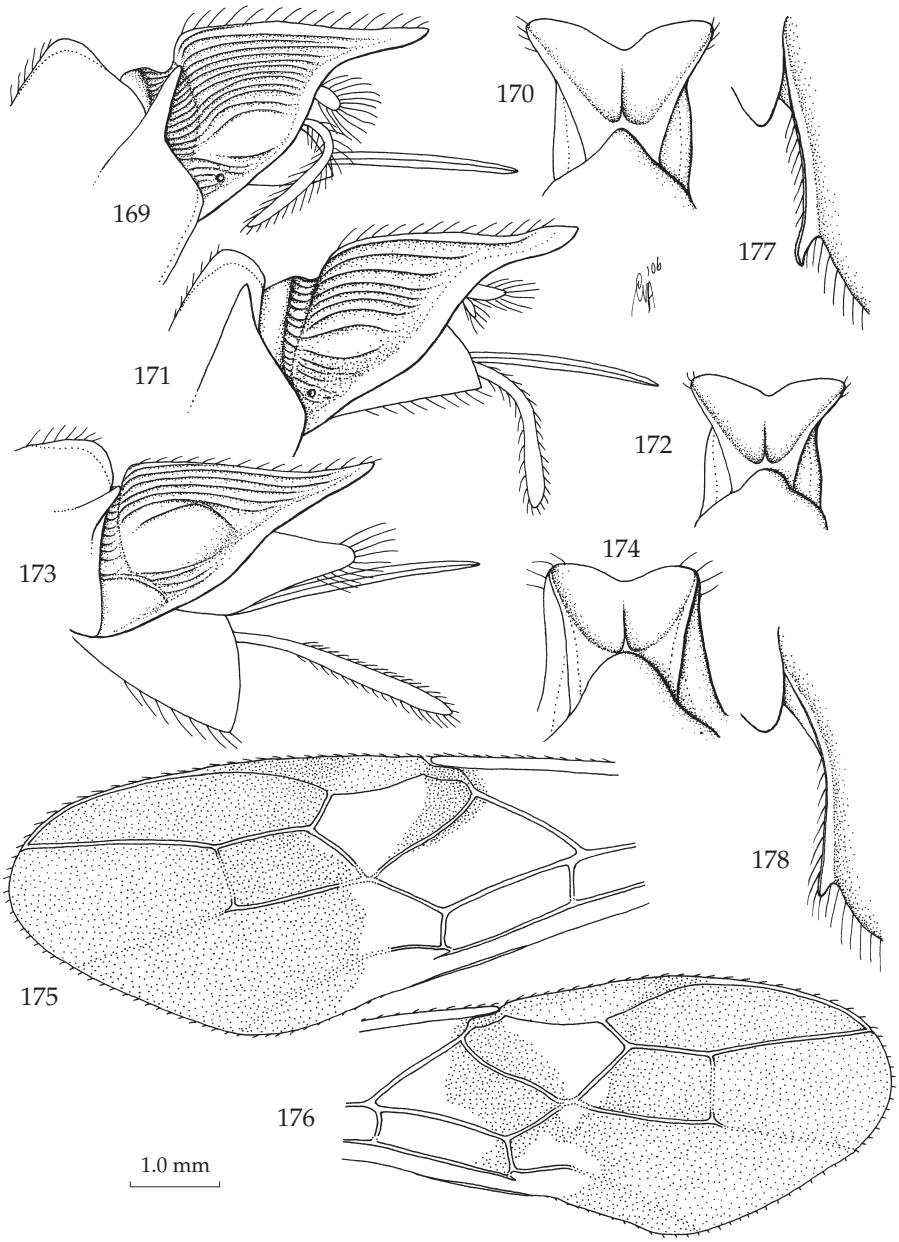
Biology.— Reared from *Setora nitens* Walker (Limacodidae) on African oil palm (= *Elaeis guineensis* Linnaeus; Arecaceae).

Distribution.— *Brunei, Malaysia (Sarawak, *Sabah), *Singapore.

Notes.— Very close to *S. spinator*, but *S. spinator* has the fore wing somewhat less darkened (fig. 10), the basal third of the pterostigma distinctly yellow and the fifth tergite of the female often paler than the fourth tergite (at least in the Sunda area; fig. 10).



Figs 159-162, *Spinaria hyalinata* spec. nov., ♀, holotype; figs 163, 164, *S. suliana* Westwood, ♀, Indonesia, Sula Islands, Mangole; figs 165, 166, *S. spinator* (Guérin-Méneville), ♀, China, Taiwan, Fuhosho; fig. 167, *S. sulcata* Smith, ♀, Indonesia, Ternate; fig. 168, *S. eburata* spec. nov., ♀, holotype. 159, fore wing; 160, pronotal spine, lateral aspect (without sculpture); 161, prepectal carina; 162, outer middle claw; 163, 165, fifth metasomal tergite, lateral aspect; 164, 166, anterior part of pronotum, dorsal aspect; 167, 168, middle basitarsus, lateral aspect. 159: 1.0 × scale-line; 160, 161: 2.5 ×; 162: 5.5 ×; 163-166: 2.2 ×; 167, 168: 2.9 ×.



Figs 169, 170, *Spinaria armata* (Ashmead), ♀, holotype; figs 171, 172, *S. philippinensis* Enderlein, ♀, Philippines, Mindanao, Surigao; figs 173, 174, *S. dimidiata* Westwood, ♀, Indonesia, Ceram; fig. 175, *S. bicolor* Szépligeti, ♀, Indonesia, Java, Buitenzorg (= Bogor); fig. 176, *S. suliana* Westwood, ♀, Indonesia, Sula Islands, Mangole; fig. 177, *S. westwoodi* Cameron, ♀, lectotype; fig. 178, *S. flavipennis* Cameron, ♀, holotype. 169, 171, 173, fifth metasomal tergite, lateral aspect; 170, 172, 174, anterior part of pronotum, dorsal aspect; 175, 176, fore wing; 177, 178, prepectal carina, lateral aspect. 169, 172, 173: 2.0 ×; 170, 174, 177, 178: 3.0 ×; 171: 1.7 ×; 175, 176: 1.0 × scale-line.

Genus *Spinariella* Szépligeti, 1906
(figs 19-26, 43-52, 186-191)

Spinariella Szépligeti, 1906: 595; Shenefelt, 1975: 1259-1260; Yu et al., 2005: Taxapad database. Type species: *Spinaria mutica* Szépligeti, 1902 (examined; the holotype is a ♀, not a ♂ as indicated in the original description).

Diagnosis.— Occipital carina absent; head directly narrowed behind eyes and comparatively small, much narrower than mesoscutum and temples long and strongly declivous and with long setae (figs 24, 25, 48, 49); eyes moderately emarginate near level of antennal sockets (figs 26, 45); size and shape of eyes of male unknown; prosternal sclerites present, rather wide, concave, semi-circular; notauli reduced posteriorly and mesoscutum with isolated medio-posterior depression (fig. 46); dorsal face of scutellum medium-sized and subposteriorly smooth (fig. 46); anteriorly tegula up curved and laterally axilla lamelliform protruding; metanotum not protruding dorsally (fig. 49) or narrowly triangularly protruding; pronotum without distinct anterior incision (figs 24, 46); propodeal tubercles blunt (fig. 49) and spiracle elliptical; vein r of fore wing emitted near middle of pterostigma (fig. 43); vein m-cu of hind wing absent; vein cu-a of hind wing medium-sized and slightly reclivous (fig. 43); tarsal claws with conspicuous rectangular thin lobe (fig. 51); hind femur with a small scale-like protuberance ventrally (in lateral view tooth-shaped; figs 21, 44); hind tibial spurs straight and setose (fig. 50); inner apex of hind tibia with pale yellowish comb (fig. 50); first metasomal tergite movably joined to second tergite and with large dorsope, its dorsal carinae remain separated (figs 23, 47, 49), but connected to median carina in *S. tulungi* (fig. 23); second tergite with a semi-circular or -elliptical area medio-basally and a distinct median carina (figs 23, 47); first-fifth tergites with acute lateral margin; third-fifth tergites without teeth (fig. 49); fifth tergite slightly convex subbasally and without a medio-posterior tooth or spine (fig. 49); ovipositor sheath very short, narrow, hardly or not widened subapically (fig. 49).

Distribution.— Indonesia (Sulawesi); Malaysia (Sarawak). Three species, of which two are described below.

Biology.— Unknown.

Key to species of the genus *Spinariella* Szépligeti

1. Three large patches of mesoscutum, propodeum and large patch of first metasomal tergite black or blackish; setae of temple and of back of head comparatively short (fig. 187); head black, in dorsal and anterior view comparatively short (fig. 191); third and to some degree fourth segments of maxillary palp widened (fig. 188); third segment of labial palp subapically inserted on second segment (fig. 188); Malaysia (Sarawak) ..... ***S. nigrita*** spec. nov.
- Mesoscutum, propodeum and first tergite black or blackish; setae of temple and of back of head long (figs 22, 24, 25, 48, 49); head yellowish-brown, in dorsal (figs 25, 48) and anterior (fig. 45) view comparatively long; third and fourth segments of maxillary palp slender (figs 26, 49); third segment of labial palp apically inserted on second segment (fig. 49); Sulawesi 2

2. Length of eye in dorsal view 1.5-1.8 times as long as temple (fig. 48); second tergite with a comparatively short semi-elliptical elevation medio-basally and more or less with latero-basal depressions (fig. 47); propodeum with a regular median carina (fig. 46); eyes less protuberant in lateral view (fig. 49); length of malar space of ♀ 1.7-1.9 times (of ♂: about 1.5 times) basal width of mandible; vein cu-a of hind wing hardly to moderately reclivous (fig. 43); spine of pronotum comparatively short (fig. 49); South and Central Sulawesi ..... ***S. mutica*** (Szépligeti, 1902)
- Length of eye in dorsal view about as long as temple (figs 20, 25); second tergite without latero-basal depressions and with comparatively long semi-circular elevation medio-basally (fig. 23); propodeum with irregular rugae medially (fig. 23); eyes more protuberant in lateral view (figs 22, 24); length of malar space about 1.4 times basal width of mandible; vein cu-a of hind wing distinctly reclivous (fig. 20); spine of pronotum comparatively long (fig. 22); Central Sulawesi ..... ***S. tulungi*** spec. nov.

Spinariella mutica (Szépligeti, 1902)
(figs 43-52)

Spinaria mutica Szépligeti, 1902: 46.
Spinariella mutica; Szépligeti, 1906: 595; Shenefelt, 1975: 1260; Yu et al., 2005: Taxapad database.

Material.— Holotype, ♀ (Budapest Museum), "[**Indonesia**], S. Celebes, [Mt] Bouthain, C. Ribbe, 1884"; "781/4", "*Sp. mutica* det. Szépligeti", "Holotype *Spinaria mutica* Szépl. 1902, ♂, Papp'69", "Hym. Typ. No. 1599, Mus. Budapest"; 1 ♀ + 1 ♂ (BMNH), "[Indonesia], Sulawesi Tengah, nr Morowali, Ranu river area, 27.i-20.iv.1980", "M.J.D. Brendell, B.M. 1980-280".

Distribution.— Indonesia (South and Central Sulawesi).

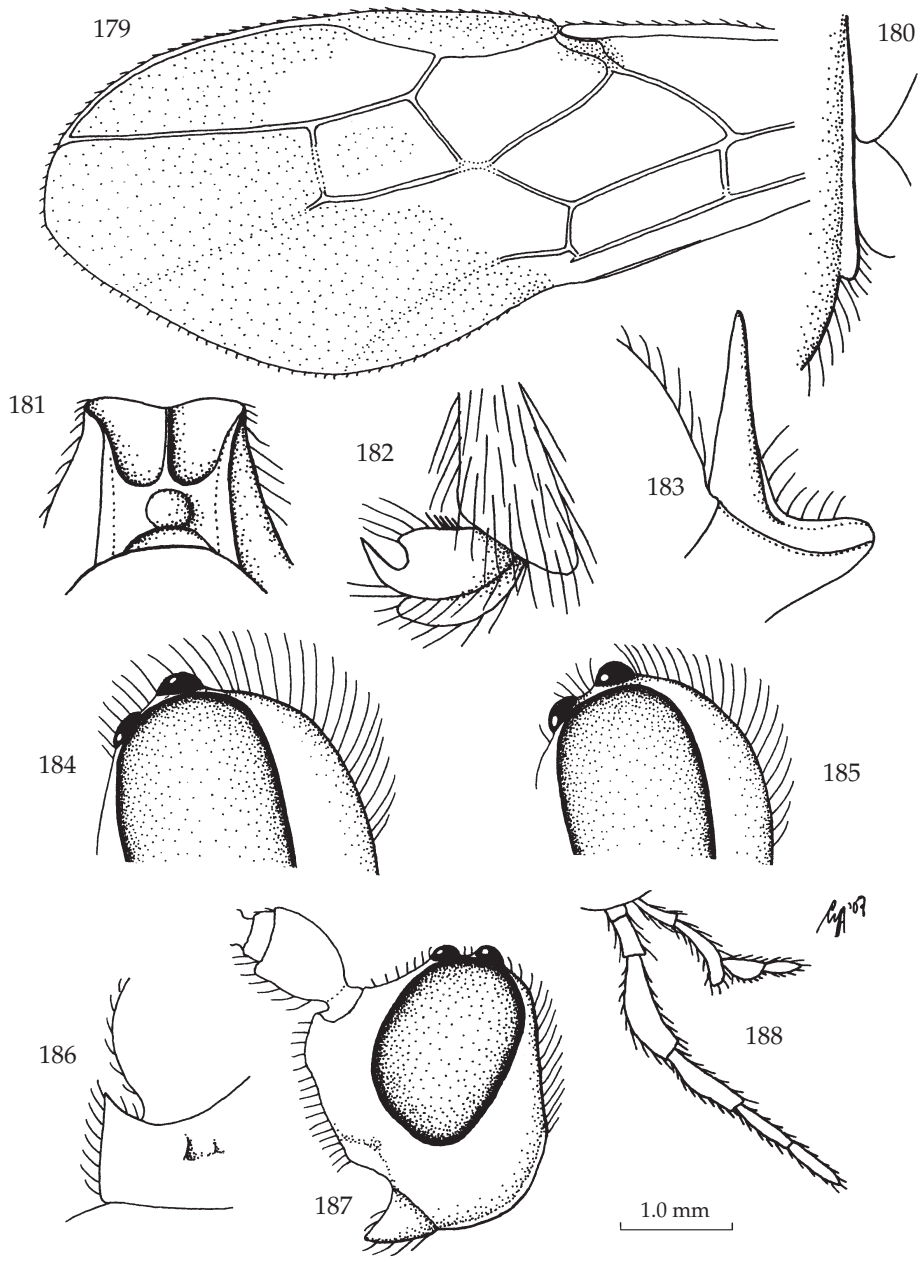
Notes.— The male has the eyes and vertex similar to that of the female, but the pterostigma is largely yellow and the apical half of the fore wing is rather weakly infuscate.

Spinariella nigrita spec. nov.
(figs 186-191)

Material.— Holotype, ♀ (BMNH), "**[E. Malaysia]**; Sarawak, Mt. Matang, 9.xii.1913, 3000 ft., G.E. Bryant, 1914-382". Paratypes (2 ♀♀): 1 ♀ (BMNH), id., but 19.xii.1913; 1 ♀ (RMNH), id., but 20.xii.1913.

Holotype, ♀, length of fore wing 10.9 mm, of body 12.2 mm.

Head.— Antenna with 70+ segments, length of third segment 1.2 times as long as fourth segment, third and fourth segments 1.3 and 1.1 times as long as wide, respectively; length of maxillary palp 1.1 times height of head, third and to some degree fourth segment of maxillary palp widened (fig. 188); third segment of labial palp subapically inserted on second segment; frons shallowly depressed medially and smooth, with small depression in front of anterior ocellus; OOL:diameter of posterior ocellus:POL = 7:5:4; vertex flat, smooth and shiny; face and clypeus smooth; length of eye 1.3 times temple in dorsal view; temple and back of head comparatively short setose (fig. 187); medio-ventrally rim of clypeus below lower level of eyes; length of malar space equal to basal width of mandible and nearly 0.4 times height of eye in lateral view; width of



Figs 179-183, *Spinaria australiensis* spec. nov., ♀, holotype; fig. 184, *S. suliana* Westwood, ♀, Indonesia, Sulawesi, Mt Watuwila; fig. 185, *S. spinator* (Guérin-Méneville), ♀, India, Ayum; figs 186-188, *Spinariella nigrita* spec. nov., ♀, holotype. 179, fore wing; 180, prepectal carina, lateral aspect; 181, anterior part of pronotum, dorsal aspect; 182, outer fore claw; 183, 186, anterior part of pronotum, lateral aspect; 184, 185, dorsal part of head, lateral aspect; 187, head, lateral aspect; 188, palpi. 179: 1.0 × scale-line; 180, 181, 183, 188: 2.5 ×; 182: 5.6 ×; 184, 185: 2.7 ×; 186, 187: 2.0 ×.

face 2.4 times width of hypoclypeal depression, 0.9 times height of eye and 1.2 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.6 times longer than its height; pronotum anteriorly slightly concave and its spine robust triangular and short (fig. 186); mesoscutal lobes smooth and glabrous; notauli only anteriorly shallowly impressed, smooth, its posterior half absent and medio-posterior depression slightly impressed; scutellar sulcus with one strong carina and about 0.6 times as long as scutellum (= part in front of level of lateral crenulation); scutellum slightly convex and smooth; prepectal carina distinctly lamelliform and wide; posterior half of precoxal area impressed and narrowly crenulate, remainder of it largely smooth and punctate below it; remainder of mesopleuron smooth, but with some punctures dorsally; mesosternal sulcus smooth and shallow; metapleuron rather sparsely and short setose; propodeum latero-dorsally partly smooth and partly distinctly punctate, medially shallowly depressed, except for anterior part with a distinct median carina, laterally with a pair of smooth convexities beside a shallow oblique wide depression with some oblique crenulae and with a pair of carinae in posterior half of propodeum.

Wings.— Fore wing (fig. 189): r slender and nearly straight; r:3-SR:SR1 = 10:35:46; 1-CU1:2-CU1 = 1:18; 2-SR:3-SR:r-m = 20:40:21; cu-a slightly inclivous and posteriorly subvertical; m-cu antefurcal. Hind wing: marginal cell slightly widened apically, 1r-m straight; M+CU:1-M:1r-m = 30:40:17; 2-SC+R subquadrate.

Legs.— Hind coxa rather densely setose and distinctly and densely punctate, but largely smooth dorsally; tarsal claws typical for the genus (cf. fig. 51); scaly tooth of hind femur medium-sized; length of femur, tibia and basitarsus of hind leg 3.6, 8.7 and 6.8 times their width, respectively; hind tarsus distinctly bristly setose; length of hind tibial spurs 0.2 and 0.3 times hind basitarsus; hind tarsus 0.85 times as long as hind tibia.

Metasoma.— Rather sparsely setose; length of first tergite 0.9 times as long as its apical width; first-fourth tergites strongly shiny, coarsely longitudinally costate, with interspaces mainly smooth and laterally mainly longitudinally rugose; branches of median carina of first tergite connected to sublateral carinae; second tergite with semi-circular convexity (fig. 190) and with distinct median carina; fifth tergite robust transverse, superficially longitudinally striate and posteriorly slightly concave; sixth tergite slightly exposed and distinctly concave posteriorly; length of setose part of ovipositor sheath 0.06 times as long as fore wing and concealed in hypopygium, apically sheath somewhat widened.

Colour.— Black; clypeus ventrally, malar space and temple narrowly ventrally, palpi, propleuron largely, pronotum postero-dorsally, tegulae, fore and middle legs, hind coxa ventrally, mesopleuron posteriorly and speculum, metapleuron, mesoscutum medio-posteriorly and notaulic courses, scutellum, metanotum largely, first tergite (except medially), first-fifth tergites narrowly laterally, sixth tergite narrowly posteriorly, outer side of hind femur (except ventrally) and ventral basal 0.7 of metasoma yellowish-brown or brownish-yellow; remainder of hind leg dark brown; membrane of basal 0.4 of fore wing and basal half of hind wing and veins yellow; basal half of pterostigma yellowish-brown, but base of pterostigma narrowly dark brown; apex of vein C+SC+R of fore wing and parastigma dark brown, remainder of pterostigma, veins and wing membrane dark brown.

Variation.— Length of fore wing 10.2-11.4 mm, and of body 11.5-13.0 mm; paratypes have pterostigma largely dark brown; hind femur may be largely dark brown; mesopleuron sometimes chestnut brown medio-posteriorly; palpi of both paratypes distinctly less widened than of holotype.

Distribution.— Malaysia (Sarawak).

Spinariella tulungi spec. nov.
(figs 19-26)

Material.— Holotype, ♀ (RMNH), "**Indonesia**, C. Sulawesi, n[ea]r Luwuk, Salodik, 300-400 m, 3.xi.1989, C. van Achterberg & M. Tulung, RMNH'89".

Holotype, ♀, length of fore wing 11.4 mm, of body 11.9 mm.

Head.— Antenna with 101 segments, 1.4 times as long as fore wing, third segment as long as fourth segment, third, fourth and penultimate segments 1.3, 1.3 and 2.0 times as long as wide, respectively; length of maxillary palp 1.4 times height of head (measured from ventral rim of clypeus, 1.1 times if measured from ventral border of cheek); frons largely flat and smooth; OOL:diameter of posterior ocellus:POL = 10:10:21; vertex strongly reclivous, smooth and shiny (figs 22, 24); face and clypeus smooth, clypeus weakly convex and hardly separated from face, its dorsal border of clypeus near lower level of eyes (fig. 26); eye as long as temple in dorsal view (fig. 25); length of malar space 1.4 times basal width of mandible and 0.4 times height of eye in lateral view; width of face 3.0 times width of hypoclypeal depression, 0.9 times height of eye and 1.1 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.5 times longer than its height; pronotum anteriorly slightly incised, convex medially, with a narrow lamella anteriorly and a wide lamella laterally and medially convex and no median lamella (fig. 24); spine on pronotum robust and straight, not reaching upper level of mesoscutum (fig. 22); mesoscutal lobes smooth and strongly shiny; notauli rather deep, and smooth anteriorly, absent on disc and posteriorly with a large elliptical depression; scutellar sulcus with one strong median carina; scutellum rather flat and smooth medially; median carina of metanotum narrowly triangularly protruding dorso-apically; prepectal carina distinctly lamelliform; precoxal sulcus absent anteriorly, medially and subposteriorly moderately impressed; mesopleuron dorsally largely smooth (except some punctures), ventrally rather distinctly punctate with punctures partly in rows and spaces mostly wider than diameter of punctures; mesosternal sulcus narrow, nearly smooth and shallow; metapleuron coarsely rugose ventrally and remainder sparsely punctate; propodeum with complete and nearly straight coarse median carina and posteriorly with a pair of parallel carinae (fig. 23), anteriorly surface coarsely punctate and with some coarse rugae posteriorly and medially (especially near tubercles) coarsely rugose, remainder largely smooth and with a pair of obtuse, nearly rectangular medium-sized lateral tubercles.

Wings.— Fore wing (fig. 20): r slightly curved; r:3-SR:SR1 = 10:34:57; 1-CU1:2-CU1 = 2:21; 2-SR:3-SR:r-m = 18:34:19; cu-a subvertical; m-cu narrowly antefurcal. Hind wing: cu-a distinctly reclivous (fig. 20); marginal cell parallel-sided apically, 1r-m straight; M+CU:1-M:1r-m = 20:27:14; 2-SC+R subquadrate.

Legs.— Hind coxa finely and rather densely punctate; tarsal claws as of type species (fig. 51); length of femur, tibia and basitarsus of hind leg 3.6, 9.4 and 7.6 times their width, respectively; length of hind tibial spurs 0.25 and 0.30 times hind basitarsus; hind tarsus as long as hind tibia.

Metasoma.— Length of first tergite 0.9 times as long as its apical width; first-fourth tergites moderately shiny and coarsely longitudinally rugose, with mainly smooth interspaces (fig. 23) and laterally rugose-punctate; dorsally first tergite with an coarse and anteriorly branched median carina, branches remain somewhat separated from dorsal carinae; second tergite with a distinct semi-circular elevation medio-basally and without latero-basal depressions (fig. 23); fifth tergite broadly truncate posteriorly and slightly concave medio-apically, its surface rather weakly striate, shiny and comparatively weakly convex subbasally; length of setose part of ovipositor sheath 0.01 times as long as fore wing and sheath rather narrow.

Colour.— Yellowish-brown; antenna, middle telotarsus, hind tarsus, second-fifth metasomal tergites, ovipositor sheath, apical 0.6 of wings and veins of this part, pterostigma (except subbasal yellowish-brown patch) and parastigma dark brown; remainder of wings and of veins yellow (fig. 20).

Distribution.— Indonesia (Central Sulawesi).

Notes.— It is a pleasure to name this species after our very helpful counterpart during the expedition to Central Sulawesi, Ir M. Tulung (Menado).

The new species is the first known member of the subfamily Rogadinae to have 100 or more antennal segments. All other Ichneumonoidea with 100 or more antennal segments belong to the subfamilies Braconinae and Alysiinae (Yu et al., 2005).

Genus *Batothecoides* Watanabe, 1958
(figs 53-62)

Batothecoides Watanabe, 1958: 53; Shenefelt, 1975: 1186; Yu et al., 2005: Taxapad database. Type species: *Batotheca yakushimensis* Watanabe, 1938 (examined).

Diagnosis.— Occipital carina present (fig. 58); head directly narrowed behind eyes and comparatively small, much narrower than mesoscutum and temples long and moderately declivous and with medium-sized setae (figs 58, 62); eyes distinctly emarginate near level of antennal sockets (fig. 55); prosternal sclerites partly visible; notauli complete and including medio-posterior depression (fig. 60); dorsal face of scutellum medium-sized and subposteriorly probably smooth (fig. 60); anteriorly tegula nearly flat and laterally axilla lamelliform protruding; metanotum not protruding dorsally, but propodeum protruding anteriorly (fig. 62); pronotum truncate and scarcely lamelliform anteriorly, short, and without a spine posteriorly (figs 60, 62); propodeal tubercles acute (fig. 62) and spiracle elliptical; vein r of fore wing emitted in front of middle of pterostigma (fig. 53); vein m-cu of hind wing absent; vein cu-a of hind wing long and moderately reclivous (fig. 53); tarsal claws simple (fig. 54); hind femur without a minute tooth ventrally (fig. 57); hind tibial spurs straight and setose (fig. 59); inner apex of hind tibia with pale yellowish comb (fig. 59); first metasomal tergite immovably joined to second tergite and with large dorsope, its dorsal carinae remain far separated from each other (fig. 56), without a median carina; second tergite without a semi-circular area medio-basally or a

median carina (fig. 56); first-fifth tergites with acute lateral margin; third-fifth tergites with obtuse teeth (figs 61, 62); fifth tergite strongly convex subbasally (fig. 62) and with a pair of medio-posterior teeth (fig. 61); ovipositor sheath medium-sized, narrow, not widened subapically (fig. 62).

Distribution.— East Palaearctic; one species.

Biology.— Unknown.

Batothecoides yakushimensis (Watanabe, 1938)
(figs 53-62)

Batotheca yakushimensis Watanabe, 1938: 173.
Batothecoides yakushimensis; Watanabe, 1958: 53; Shenefelt, 1975: 1186; Yu et al., 2005: Taxapad database.

Material.— Holotype, ♀ (Kyushu University, Fukuoka), "[**Japan**, Kyushu, Yakushima], Onoaida, 2. viii.1929, Hiroshi Hori", "*Batotheca yakushimensis* Watanabe, ♀, Type"; 1 ♂ (BMNH), "[**China**], Taiwan, Tienchih, 16.vii.2005, 2200 m, [D.L.J. Quicke]".

Distribution.— Japan (Kyushu), *China (Taiwan).

Notes.— The male from Taiwan has the anterior half of the propodeum yellowish-brown, the eyes and the vertex similar to that of the female and all wing veins dark brown.

Genus *Batotheca* Enderlein, 1905
(figs 63-73, 192-196)

Batotheca Enderlein, 1905: 227; Shenefelt, 1978: 1458-1459; Yu et al., 2005: Taxapad database. Type species: *Batotheca dohrniana* Enderlein, 1905 (examined).

Diagnosis.— Occipital carina absent (fig. 68); head directly narrowed behind eyes and comparatively small, much narrower than mesoscutum and temples rather long and strongly declivous and with short setae (figs 68, 70); eyes deeply emarginate near level of antennal sockets (fig. 65); size and shape of eyes of male similar to that of female; prosternal sclerites largely visible, semicircular and concave; notauli largely absent (but rarely complete) and no medio-posterior depression (fig. 66); dorsal face of scutellum large and subposteriorly smooth (fig. 66); anteriorly tegula slightly up curved and laterally axilla lamelliform protruding; metanotum protruding dorsally (figs 70, 195, 196); pronotum without spine posteriorly, and with a narrow lamella anteriorly (fig. 70); propodeal tubercles obsolescent, only lateral carina somewhat protruding (figs 67, 70) and spiracle elliptical; vein r of fore wing emitted in front of middle of pterostigma (fig. 63); vein m-cu of hind wing absent; vein cu-a of hind wing long, sinuate and moderately reclivous (fig. 63); tarsal claws simple (fig. 64); hind femur without a minute tooth ventrally (fig. 73); hind tibial spurs straight and setose; inner apex of hind tibia with fine comb; first metasomal tergite immovably joined to second tergite and with rather large dorsope, its dorsal carinae united submedially (fig. 67), with a weak median carina posteriorly; first and second metasomal sutures shallow (fig. 70); second tergite without a semi-circular area medio-basally or a median carina (fig. 67); first-fifth tergites with acute lateral margin; third-fifth tergites with

acute teeth (figs 69, 70); third and fourth tergites without a median tooth or tubercle (figs 69, 70); fifth tergite hardly convex subbasally (fig. 70) and with 4 acute teeth posteriorly (fig. 69); ovipositor sheath comparatively long, narrow, not widened subapically (fig. 70).

Distribution.— Oriental (including Sulawesi) and tropical Australia.

Biology.— Endoparasitoids of Limacodidae.

Key to species of the genus *Batotheca* Enderlein

1. Hind femur and tibia yellowish-brown; propodeum largely smooth, with some medium-sized punctures; metasoma without a blackish pattern; first-third metasomal tergites distinctly punctate-striate laterally; Sulawesi, ?Moluccas ..... ***B. beccarii*** (Mantero, 1900)
- Hind femur and tibia dark brown or blackish; propodeum with large punctures (fig. 66) and often with some reticulate sculpture; metasoma with a blackish pattern; first-third tergites partly smooth laterally (fig. 70), but distinctly sculptured in *B. quickei* 2
2. Mesoscutum, scutellum, fore and middle femora dark brown or blackish; [fourth and fifth metasomal tergites black]; Cambodia, Thailand, North India ..... ***B. leucomelaena*** (Westwood, 1882)
- Mesoscutum and scutellum yellowish-brown; fore and middle femora often brownish-yellow 3
3. Head yellowish-brown; metanotum without a median carina subbasally and with a straight protuberance posteriorly (figs 66, 70) or with a lamella (fig. 195); propodeum (fig. 196) mainly punctate (fig. 70) or reticulate 4
- Head largely blackish or dark brown; metanotum in dorsal view with a median carina subbasally and in lateral view with a tooth curved towards base of propodeum (fig. 196); propodeum partly reticulate; Sri Lanka to South China ..... ***B. nigriceps*** (Cameron, 1897)
4. Propodeum mainly punctate (fig. 70); first-third metasomal tergites partly smooth laterally; metanotum in dorsal view without a median lamella subbasally and only posteriorly in lateral view with a distinct tooth (fig. 70); notauli distinct basally (fig. 70); Sundaland (Sumatra) ..... ***B. dohrniana*** Enderlein, 1905
- Propodeum mainly reticulate; first-third tergites coarsely punctate-rugose laterally; metanotum in dorsal view with a median lamella subbasally and in lateral view with a wide truncate protuberance (fig. 195); notauli obsolescent basally; Australia (Queensland) ..... ***B. quickei*** spec. nov.

Batotheca beccarii (Mantero, 1900)

Spinaria beccarii Mantero, 1900: 543.
Batotheca beccarii; Shenefelt, 1978: 1458; Yu et al., 2005: Taxapad database.

Material.— 1 ♀ (BMNH), "[**Indonesia**], Sulawesi Utara, Paniki, v.[19]88", "Parasit *Thosea* sp.", "CIEA 19768 Sp. 5".

Biology.— Reared from a *Thosea* spec. (Limacodidae).

Distribution.— Indonesia (Sulawesi). Also reported from Sumatra and Moluccas, but this needs reconfirmation.

Batotheca dohrniana Enderlein, 1905
(figs 63-73)

Batotheca dohrniana Enderlein, 1905: 228; Shenefelt, 1978: 1458; van Achterberg, 1988b: 109, figs 58-60; Yu et al., 2005: Taxapad database.

Material.— Lectotype here designated, ♀ (PAN), "[**Indonesia**], Sumatra, Soekaranda, Dohrn", "Type", "*Batotheca Dohrniana* Enderl., 1905, det. Dr. Enderlein"; 1 ♀ paralectotype (PAN) same label data as the lectotype. Two additional ♀ paralectotypes have not been examined.

Distribution.— Indonesia (Sumatra).

Notes.— The paralectotype has the hind tarsus yellowish (dark brown in the holotype), the fourth tergite anteriorly, the third tergite largely and the second tergite medially (except its apical margin) blackish (partly yellowish-brown in the lectotype).

Batotheca leucomelaena (Westwood, 1882)

Spinaria leucomelaena Westwood, 1882: 31.
Batotheca leucomelaena; Shenefelt, 1978: 1459; Yu et al., 2005: Taxapad database.

Material.— 1 ♀ (BMNH), "**India**: Kerala, Periyar A. Sanc., 5-15.x.1979, J.S. Noyes"; 1 ♀ (BMNH), "? S. India, T.R. Bell, B.M. 1934-394"; 1 ♀ (BMNH), "[India], Sikkim", "*Batotheca leucomelaena* West., Sikkim" (in Cameron's handwriting), "Cameron Coll. 1909-182".

Biology.— Reared from *Scopelodes venosa* Walker (Limacodidae).

Distribution.— Cambodia, India, Thailand.

Notes.— I have seen a damaged female of a similar species (BMNH: "Singapore, H.N. Ridley, 1901-79") with the first-third metasomal tergites partly smooth laterally, the fourth and fifth tergites completely black and the metanotal tooth robust. *S. leucomelaena* has laterally the first-third tergites usually distinctly sculptured, the fourth (except laterally) and fifth tergites ivory and the metanotal tooth rather slender in lateral view. The specimen from Sikkim has the notauli complete and distinctly crenulate and the first-third tergites coarsely sculptured laterally. Normally the notauli are largely obsolescent dorsally and anteriorly only finely crenulate and the first-third tergites rather weakly sculptured laterally.

Batotheca nigriceps (Cameron, 1897)

Spinaria nigriceps Cameron, 1897: 37.
Batotheca nigriceps; Shenefelt, 1978: 1459; Yu et al., 2005: Taxapad database.

Material.— 1 ♀ (BMNH), "[**Vietnam**], Tonkin, Hoabinh, viii.1918, R.V. de Salvaza"; 5 ♀♀ + 6 ♂♂ (BMNH, RMNH), "**India**, Namkum, 59, 7.xi.[19]27 (♀), 12.xi.[19]31 (♀♀), 13.xi.[19]31 (♂), 15.xi.[19]31 (♂♂), 16.xi.[19]31 (♂♂) or 23.xi.[19]31 (♀♀)", "Ex *Belippa* sp. [Limacodidae]"; 1 ♀ (BMNH) without head, "[India], Sikkim", "*Batotheca* sp. 7 *dohrniana*? End., Balt[azar] [19]65"; 1 ♀ (BMNH), "[India], Pusa, Behar, 31.x.[19]07, parasitic on *Parasa lepida* Cram., C.C.G."; 2 ♂♂ (BMNH, RMNH), "India, Karnataka,

Bangalore, 1993, Pradeep", "Parasitoid on Lepidoptera", "India, 22946"; 1 ♀ (USNM), "[India], Sikkim"; 1 ?♀ (USNM), "[India], Calcutta, 3864/14, Country ..... Supl. 1901".

Biology.— Reared from *Parasa lepida* (Cramer), *Belippa* spec., *Phobetron laleana* (Moore) and *Cheromettia apicata* Moore (Limacodidae).

Distribution.— China (Guangxi, Guizhou), India, Sri Lanka, *Vietnam.

Notes.— Fourth (except laterally and more or less anteriorly) and fifth metasomal tergites ivory or pale yellowish, notauli basally obsolescent or distinct and propodeum largely reticulate.

Batotheca quickei spec. nov.
(figs 192-195)

Batotheca sp.; Quicke, 1995: 17-18.

Material.— 1 ♂ (BMNH), "**Australia**: [Queensland], Gordonvale", "G'vale, "W.A.M.C.O., 7.xi.[19]29", "Br 154".

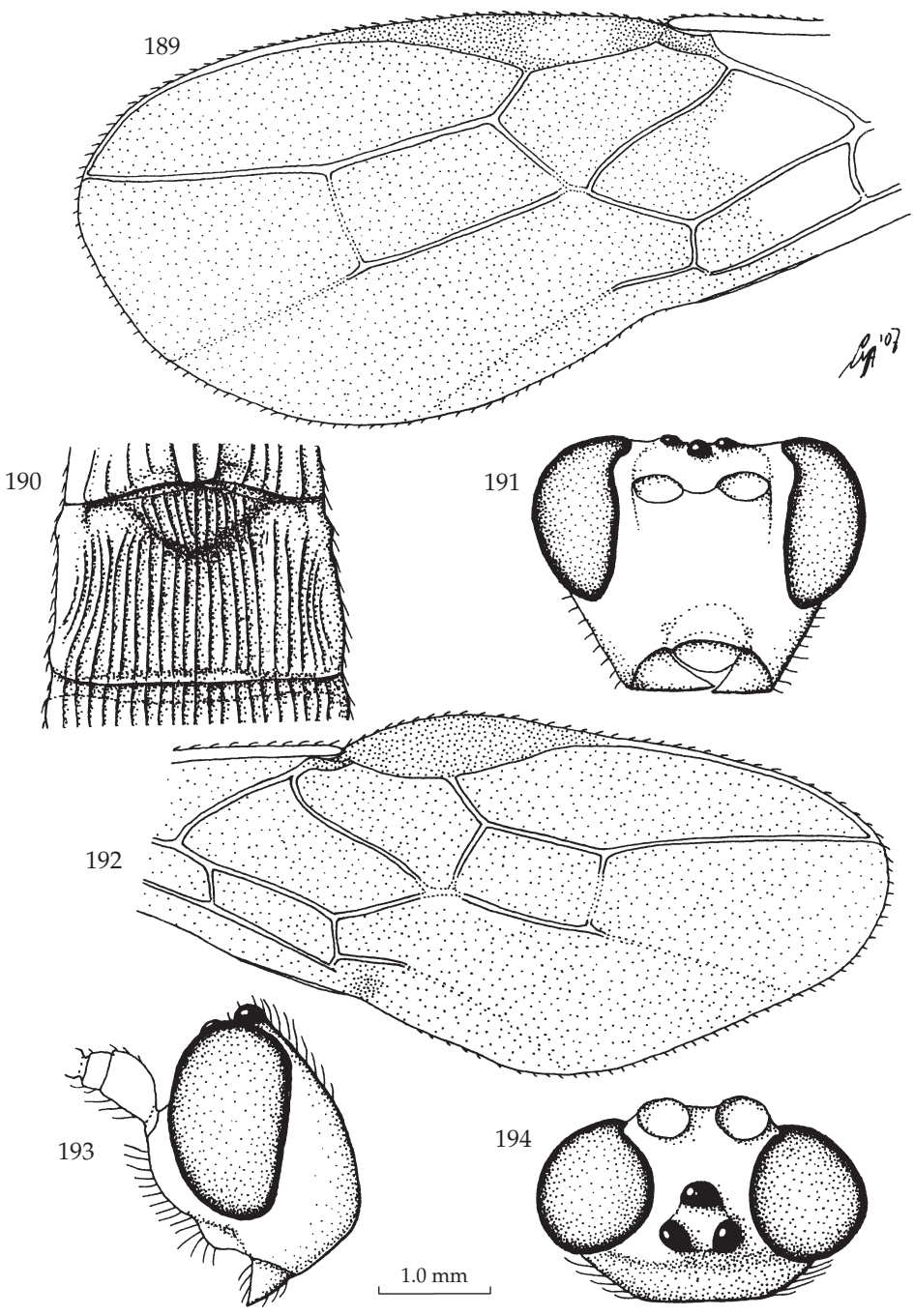
Holotype, ♂, length of fore wing 7.8 mm, of body 9.1 mm.

Head.— Antenna with 59 segments and 1.1 times as long as fore wing, length of third segment 1.2 times as long as fourth segment, third, fourth and penultimate segments 1.7, 1,4 and 1.7 times as long as wide, respectively; length of maxillary palp 0.9 times height of head, frons nearly flat and smooth; OOL:diameter of posterior ocellus: POL = 3:9:6; vertex narrow dorsally, strongly declivous, smooth and shiny; face and clypeus smooth; length of eye 1.7 times temple in dorsal view; temple and back of head comparatively short setose (fig. 193); medio-ventrally rim of clypeus above lower level of eyes; length of malar space 0.9 times basal width of mandible and 0.2 times height of eye in lateral view; width of face 1.9 times width of hypoclypeal depression, 0.7 times height of eye and equal to height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.2 times longer than its height; pronotum dorsally distinctly convex, anteriorly truncate and antero-laterally with a wide lamella; mesoscutal lobes smooth and glabrous; notauli only anteriorly shallowly impressed, smooth, its posterior half absent and medio-posterior depression not visible because of pin; scutellar sulcus with three coarse carinae and about 0.6 times as long as scutellum (= part in front subposterior elevation); scutellum nearly flat and smooth, except for a few punctures; prepectal carina distinctly lamelliform and medium-sized; precoxal area completely coarsely crenulate, remainder of it largely smooth but punctate below it; remainder of mesopleuron smooth, but with some punctures dorsally; mesosternal sulcus distinctly crenulate and rather deep; metapleuron rather sparsely and short setose, punctate with some rugae; propodeum coarsely punctate-reticulate, no distinct median carina and laterally with a pair of small smooth convexities.

Wings.— Fore wing (fig. 192): r slender and straight; r:3-SR:SR1 = 10:22:52; 1-CU1:2-CU1 = 5:18; 2-SR:3-SR:r-m = 20:31:19; cu-a subvertical; m-cu antefurcal. Hind wing: marginal cell subparallel-sided apically, 1r-m straight; M+CU:1-M:1r-m = 48:37:20; 2-SC+R subquadrate; cu-a long and sinuate.

Legs.— Hind coxa rather densely setose and moderately punctate, postero-dorsally flattened and with short oblique crenulae; tarsal claws simple; length of femur, tibia



Figs 189-191, *Spinariella nigrita* spec. nov., ♀, holotype; figs 192-194, *Batotheca quickei* spec. nov., ♂, holotype. 189, 192, fore wing; 190, second metasomal tergite, dorsal aspect; 191, head, anterior aspect; 193, head, lateral aspect; 194, head, dorsal aspect. 189: 1.0 × scale-line; 190-192: 1.2 ×; 193, 194: 2.0 ×.

and basitarsus of hind leg 4.9, 8.8 and 5.8 times their width, respectively; hind tarsus long bristly setose; length of hind tibial spurs 0.4 and 0.5 times hind basitarsus; hind tarsus 0.9 times as long as hind tibia.

Metasoma.— Rather densely short setose; length of first tergite 0.6 times as long as its apical width; first-third tergites slightly shiny, regularly obliquely and coarsely striate, with interspaces finely punctate-reticulate and laterally coarsely longitudinally rugose-striate; median carina of second tergite similar to surrounding sculpture; fourth and fifth tergites longitudinally costate, with similar spines as *B. dohrniana*.

Colour.— Yellowish-brown; large medio-posterior patch of first tergite, second tergite medially, third tergite nearly completely (including spines, but antero-lateral corner yellowish-brown), spines of fifth tergite and their surroundings black; middle telotarsus and hind leg (except hind coxa basally and ventrally, and narrowly apex of trochanter) dark brown; fore telotarsus slightly darkened; pterostigma and veins dark brown; wing membrane moderately infuscate.

Distribution.— Australia (Queensland).

Notes.— It is a real pleasure to name this species after Dr D.L.J. Quicke (London) who was the first to recognise that this genus occurs in Australia (Quicke, 1995) and because of his important contributions to our knowledge of Rogadinae.

Genus ***Conspinaria*** Schulz, 1906
(figs 74-83, 197-212)

Conspinaria Schulz, 1906: 139; Shenefelt, 1975: 1194; Chen & He, 1997: 65; He, Chen & Ma, 2000: 658; Yu et al., 2005: Taxapad database. Type species: *Paraspinaria pilosa* Cameron, 1905 (examined).

Paraspinaria Cameron, (Oct.) 1905a: 88 (not Cameron, (Jan.) 1905b); Type species: *Paraspinaria pilosa* Cameron, 1905 (examined).

Paragyroneuron Baker, 1917: 284, 318. Type species: *Paragyroneuron bicolor* Baker, 1917 (examined).

Diagnosis.— Occipital carina present (fig. 77); head gradually narrowed behind eyes and medium-sized, temples rather long and weakly declivous and with short setae (figs 75, 77); eyes deeply emarginate near level of antennal sockets (fig. 82); pair of subpronope large and deep (figs 75, 78); antescutal depression triangular and large (fig. 78); prosternal sclerites largely visible and concave; mesopleuron with protuberance ventroposteriorly (figs 75, 80), but absent in *C. olthofi* (and probably *C. nigritarsis*); notauli complete and no medio-posterior depression (fig. 78); dorsal face of scutellum medium-sized and subposteriorly depressed and with carina (fig. 78); anteriorly tegula slightly up curved and laterally axilla weakly protruding; metanotum not protruding dorsally (fig. 75); pronotum of ♀ rather elongate and without a spine posteriorly (fig. 78); propodeum with a pair of large tubercles (figs 75, 78); and spiracle round; vein r of fore wing emitted from middle of pterostigma (fig. 74); vein m-cu of hind wing absent; vein cu-a of hind wing long, weakly curved and moderately reclivous (fig. 74); tarsal claws with large lobe (fig. 81); hind femur without a minute tooth ventrally (fig. 79); hind tibial spurs straight and setose; inner apex of hind tibia with distinct comb (fig. 76); first metasomal tergite movably joined to second tergite and with rather large dorsope, both first and second metasomal tergites with three longitudinal (very strong) lamelliform carinae (fig. 83); first and second metasomal sutures deep (fig. 75); second tergite with a smooth transverse area medio-basally (fig. 83); first-fifth tergites with acute lateral margin; third-fifth

tergites without teeth (fig. 75); third and fourth tergites without a median tooth or tubercle (fig. 75); fifth tergite depressed and transverse hardly convex (fig. 75); ovipositor sheath short, narrow, hardly widened subapically (fig. 75).

Distribution.— Oriental.

Biology.— Endoparasitoids of Zygaenidae(-Chalcosiinae) (Quicke et al., 2004).

Key to species of the genus *Conspinaria* Schulz

1. Pterostigma dark brown; at most basal 0.4 of fore wing yellowish; fourth and fifth metasomal tergites densely longitudinally rugose-punctate; mesopleuron without protuberance ventro-posteriorly (unknown for *C. nigritarsis*); hind tibia and tarsus dark brown, but hind basitarsus blackish; precoxal sulcus with short crenulae; prepectal carina absent ventrally (unknown for *C. nigritarsis*); propodeal tubercles comparatively small and obtuse (fig. 200; unknown for *C. nigritarsis*) 2
- Pterostigma yellow; basal 0.7 of fore wing more or less yellowish; sculpture of fourth and fifth metasomal tergites variable; mesopleuron with protuberance ventro-posteriorly (figs 75, 80); colour of hind tibia and tarsus variable; precoxal sulcus with long crenulae or rugae; prepectal carina complete ventrally; propodeal tubercles large, acute (figs 75, 78), except of *C. bicolor* 3
2. Head and second-sixth metasomal tergites yellowish-brown; basal 0.4 of fore wing yellowish; anterior half of propodeum moderately reticulate; Indonesia (Sumatra) ..... ***C. nigritarsis*** (Enderlein, 1920)
- Head largely and second-sixth metasomal tergites blackish-brown; basal 0.4 of fore wing nearly completely dark brown; anterior half of propodeum obliquely rugose; Indonesia (Papua) ..... ***C. olthofi*** spec. nov.
3. Occipital carina strongly developed; eye in dorsal view about as long as temple; second metasomal tergite somewhat longer than first tergite; vein cu-a of hind wing rather angularly bent; fifth metasomal tergite finely punctate-rugose; palpi dilated; propodeal tubercles blunt; notauli smooth; Philippines (Luzon) ..... ***C. bicolor*** (Baker, 1917)

   Note.— Shenefelt (1975: 1194) considers this species to be a subspecies of *C. pilosa*, but there are too many differences (also in the original description) for accepting this action.
- Occipital carina moderately developed; eye in dorsal view 1.8-2.5 times as long as temple (figs 77, 205, 211); second tergite somewhat shorter than first tergite; vein cu-a of hind wing moderately curved (figs 206, 210); fifth tergite rather sparsely punctate; palpi slender (fig. 75); propodeal tubercles rather acute (figs 75, 78); sculpture of notauli variable 4
4. Apical 0.3-0.5 of hind tibia dark brown, contrasting with pale yellowish base of tibia; vein SR of hind wing nearly straight basally (figs 74, 206); second metasomal suture rather widely crenulate (figs 83, 207); mesoscutum without medio-posterior groove (fig. 78); fore wing 9-10 mm 5

   Note.— A male from Indonesia (Java) (RMNH: collected by "Piepers" [= M.C. Piepers (1835-1919), who was the vice-president of the High Court of Justice in the Dutch East Indian Government]) may belong to a new species. It has the fore wing about 7 mm, the antenna with about 52 segments, the apex of the pterostigma narrowly darkened, the sublateral depressions of the second tergite partly smooth, the hind tibia apically yellowish-brown, the base of veins 1-M and 1-SR+M of the fore wing dark brown and the fourth tergite sparsely punctate.

- Apical 0.3-0.5 of hind tibia yellowish-brown or pale yellowish, at most infuscate apically and hardly contrasting to colour of base of tibia; vein SR of hind wing distinctly curved basally (fig. 210); second metasomal suture narrowly crenulate (fig. 212; unknown of *C. flava*); mesoscutum with a medio-posterior groove impressed (unknown of *C. flava*); fore wing 12-14 mm 6

5. Temples directly narrowed behind eyes (fig. 77); base of propodeum punctate (fig. 78); metapleuron largely smooth anteriorly (fig. 75); median carina of first metasomal tergite without branches anteriorly (fig. 83); Sri Lanka, Nepal ..... ***C. pilosa*** (Cameron, 1905)
- Temples gradually narrowed behind eyes (fig. 205); base of propodeum and metapleuron anteriorly distinctly rugose; median carina of first metasomal tergite with pair of branches anteriorly and connected to lateral carinae; West Malaysia ..... ***C. sundana*** spec. nov.

6. Notauli smooth; hind tarsus (except telotarsus) yellowish-brown; vein m-cu of fore wing rather curved; first metasomal tergite with five longitudinal carinae medially; fore wing about 14 mm; Indonesia (Sumatra) ..... ***C. flava*** (Enderlein, 1920)
- Notauli finely to moderately crenulate; hind tarsus dark brown; vein m-cu of fore wing straight (fig. 209); first tergite with three longitudinal carinae medially; fore wing about 12 mm; China, Japan (Okinawa) ..... ***C. chenhei*** spec. nov.

Conspinaria chenhei spec. nov.
(figs 208-212)

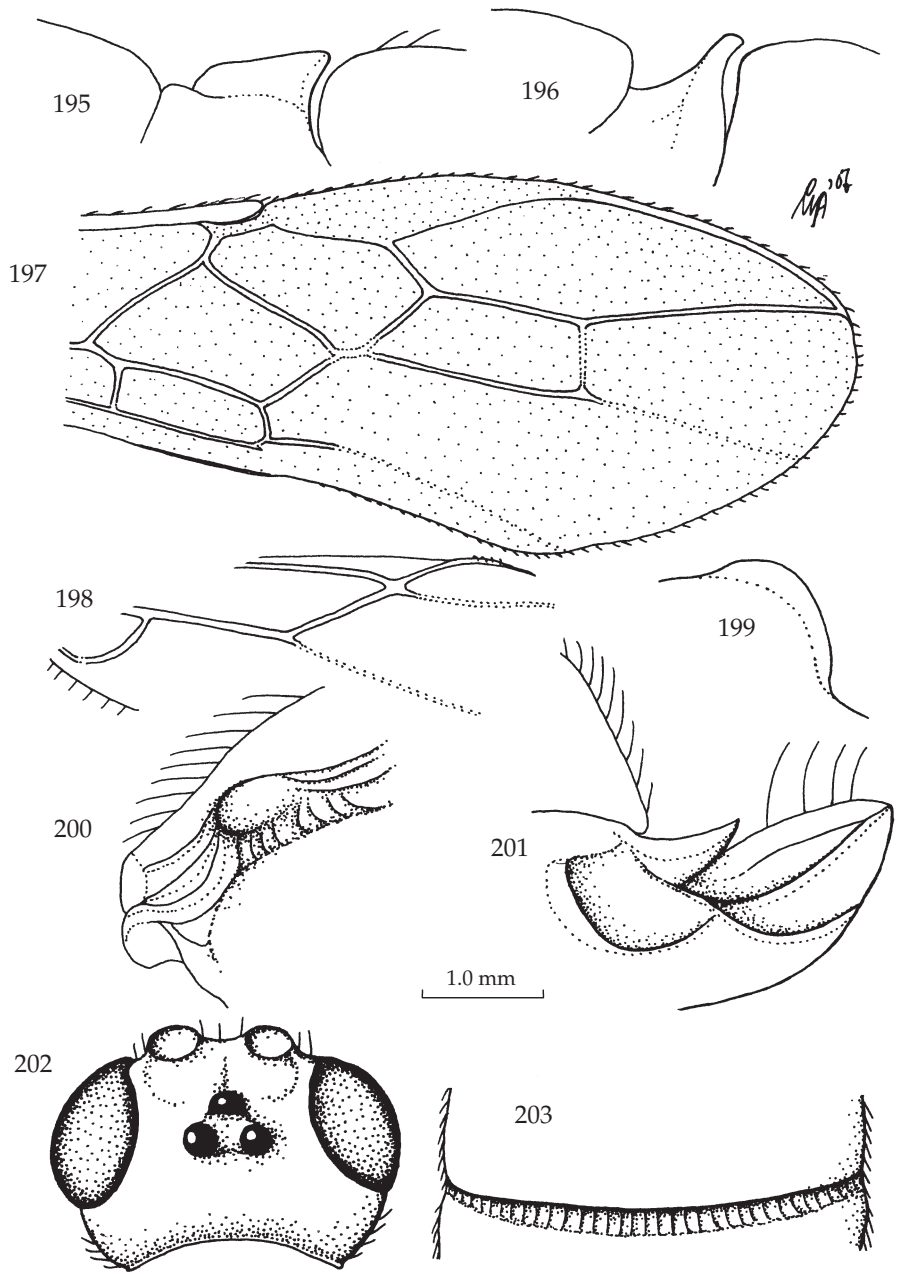
Conspinaria flavum; Shenefelt, 1975: 1194 (p.p.); He, Chen & Ma, 2000: 658.
Conspinaria flava; Chen & He, 1997: 65; Quicke, Yen, Mori & Shaw, 2004: 1438; Yu et al., 2005: Taxapad database.

Material.— Holotype, ♀ (RMNH), "**China**: Guangxi, Zhuang Autonomous Region, Longzhou, 22º3'N, 106º8'E, 20.v.1982, no. 821623, He Junhua, RMNH'95".

Holotype, ♀, length of fore wing 12.3 mm and of body 12.7 mm.

Head.— Antenna with 70 segments, 1.1 times as long as fore wing, length of third segment 1.2 times as long as fourth segment, third, fourth and penultimate segments 2.3, 2.0 and 2.1 times as long as wide, respectively, and apical segment with distinct spine-like apex; length of maxillary palp 1.3 times height of head, slender; frons shallowly depressed and smooth; OOL:diameter of posterior ocellus:POL = 3:5:3; distance from posterior ocellus to occipital carina 2.5 times diameter of ocellus; occipital carina rather wide (fig. 211); vertex flat, smooth and shiny; face and clypeus smooth; length of eye 2.6 times temple in dorsal view; medio-ventrally rim of clypeus distinctly below lower level of eyes; length of malar space equal to basal width of mandible and 0.2 times height of eye in lateral view; width of face 1.5 times width of hypoclypeal depression, 0.7 times height of eye and 1.2 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.6 times longer than its height; pronotum anteriorly straight; mesoscutal lobes sparsely punctate and densely setose; notauli complete, completely finely to moderately crenulate and mesoscutum medio-posteriorly with crenulate groove and bordered by costae laterally; scutellar sulcus with four strong carinae and 0.5 times as long as scutellum (= part in front of subposterior transverse



Figs 195, *Batotheca quickei* spec. nov., ♂, holotype; fig. 196, *B. nigriceps* (Cameron), ♀, India, Namkum; figs 197-203, *Conspinaria olthofi* spec. nov., ♂, holotype. 195, 195, metanotum, lateral aspect; 197, fore wing; 198, part of hind wing; 199, axillar "wing", latero-dorsal aspect; 200, propodeal tubercle, lateral aspect; 201, anterior part of pronotum, lateral aspect; 202, head, dorsal aspect; 203, second metasomal suture. 195, 196, 200, 201: 6.7 ×; 197, 198: 1.0 × scale-line; 199: 3.6 ×; 202: 1.9 ×; 203: 1.4 ×.

depression); scutellum slightly convex and distinctly sparsely punctate; prepectal carina distinctly lamelliform and wide; precoxal area impressed and with long coarse crenulae, remainder of mesopleuron rather sparsely but coarsely punctate and more densely so below precoxal sulcus; mesosternal sulcus narrow and very finely crenulate; ventro-posterior protuberance of mesopleuron comparatively large (larger than of *C. pilosa*: fig. 80) and obtuse; metapleuron anteriorly very coarsely punctate and ventrally with coarse costae; propodeum antero-dorsally largely smooth except some rugae, anterior half of propodeum with a nearly straight median lamelliform carina and posteriorly with two very coarse transverse carinae, areola complete, subtriangular and distinctly narrowed anteriorly but sides curved, near large tubercles with some oblique and very coarse carinae, posteriorly smooth except for four submedial and sublateral carinae.

Wings.— Fore wing (fig. 209): r issued from basal 0.45 of pterostigma, slender and nearly straight; r:3-SR:SR1 = 1:2:4; 1-CU1:2-CU1 = 5:32; 2-SR:3-SR:r-m = 9:20:8; r-m slightly inclivous; 1-SR 0.7 times apical part of parastigma (fig. 209); cu-a subvertical, but apically slightly curved basad; m-cu rather far antefurcal and straight. Hind wing: marginal cell slightly widened apically, SR of hind wing rather slightly curved (fig. 210); 1r-m straight; with five hamuli; M+CU:1-M:1r-m = 32:17:20; 2-SC+R subquadrate; 1r-m 2.3 times SC+R1.

Legs.— Hind coxa rather densely setose and densely punctate, but largely smooth dorsally; tarsal claws typical for the genus (cf. fig. 81), with short bristles subbasally; length of femur, tibia and basitarsus of hind leg 5.2, 12.2 and 9.0 times their width, respectively; hind tarsus distinctly bristly setose; length of hind tibial spurs 0.25 and 0.30 times hind basitarsus; hind tarsus 0.85 times as long as hind tibia.

Metasoma.— Densely setose; length of first tergite 1.1 times as long as its apical width; first tergite basally and medially with three coarse carinae (cf. fig. 83), and it surface coarsely reticulate-rugose, middle carina branched anteriorly and remain just removed from both sublateral carinae; second suture comparatively narrowly crenulate (fig. 212); second tergite 0.8 times as long as first tergite, with five more or less longitudinal carinae, lateral ones rather diverging posteriorly and remainder (including sublateral depressions) largely rugose; third tergite longitudinally striate, but laterally and posteriorly mainly coarsely punctate; fourth tergite coarsely and densely punctate (with interspaces less than diameter of punctures); fifth tergite moderately and more sparsely punctulate; length of ovipositor sheath 0.04 times as long as fore wing, somewhat widened apically.

Colour.— Yellowish-brown; palpi, tegulae and hind tibia largely (but apically somewhat infuscate), pale yellowish; stemmaticum and hind telotarsus brown, antenna (except scapus and pedicellus) and remainder of hind tarsus blackish-brown; apex of veins C+SC+R and 1-SR of fore wing and parastigma dark brown; remainder of veins and medially pterostigma yellow; wide lateral margin of pterostigma brownish-yellow; wing membrane (except dark brown parastigmal spot) pale yellowish, but distinctly yellow near veins.

Biology.— Reared from *Chalcosia thaivan owadai* Wang and *Erasmia pulchella hobsoni* Butler (Zygaenidae; Quicke et al., 2004). They suggested that more than one species might be involved because of the differences in darkening of the hind leg of both males. In several species of Rogadinae this character is variable to some extent and it may be

also so in this species. Therefore, provisionally the host records are considered to refer to this species.

Distribution.— China (including Taiwan), Japan (Okinawa).

Notes.— Named after Prof. Dr Junhua He and Prof. Dr Xuexin Chen (Hangzhou) for their important contributions to our knowledge of the taxonomy of the Ichneumonidae and Braconidae from China.

Conspinaria olthofi spec. nov.
(figs 197-203)

Material.— Holotype, ♂ (RMNH), "[**Indonesia**: Papua], Neth. Ind.-American New Guinea Expedit[ion], Bernhard Camp, 50 m, vii-xi.1938, J. Olthof".

Holotype, ♂, length of fore wing 9.5 mm and of body 9.4 mm.

Head.— Antenna with 58 segments, 1.1 times as long as fore wing, length of third segment 1.3 times as long as fourth segment, third, fourth and penultimate segments 2.5, 2.0 and 2.5 times as long as wide, respectively, and apical segment with distinct spine-like apex; length of maxillary palp 1.4 times height of head, slender; frons shallowly depressed and smooth; OOL:diameter of posterior ocellus:POL = 7:5:3; distance from posterior ocellus to occipital carina twice diameter of ocellus; occipital carina rather narrow (fig. 202); vertex flat, smooth and shiny; face and clypeus smooth; length of eye 2.3 times temple in dorsal view, temple slightly curved; medio-ventrally rim of clypeus distinctly below lower level of eyes; length of malar space equal to basal width of mandible and 0.3 times height of eye in lateral view; width of face twice width of hypoclypeal depression, 0.8 times height of eye and 1.1 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.4 times longer than its height; pronotum anteriorly slightly convex, antescutal depression dish-like and situated above anterior part of pronotum (fig. 201); mesoscutal lobes sparsely punctate and densely setose; notauli complete, minutely crenulate, nearly smooth and mesoscutum medio-posteriorly with a smooth depression, laterally bordered by somewhat diverging costae; axillar "wings" evenly rounded dorsally (fig. 199; rather protruding in other examined species); scutellar sulcus probably with one median carina and 0.6 times as long as scutellum (= part in front of obsolescent subposterior transverse depression); scutellum slightly convex and sparsely finely punctate; prepectal carina absent ventrally, only laterally present and rather strong; precoxal area impressed and with short crenulae, remainder of mesopleuron sparsely punctulate, also below precoxal sulcus; mesosternal sulcus narrow and very finely crenulate; ventro-posterior protuberance of mesopleuron absent; metapleuron sparsely finely punctate and ventrally with coarse vermiculate rugae; anterior half of propodeum coarsely obliquely rugose, with some punctures and with a nearly straight median lamelliform carina, no transverse carinae, areola absent, near tubercles carinate-rugose, medio-posteriorly with six coarse longitudinal carinae and interspaces smooth; propodeal tubercles comparatively small and obtuse (fig. 200).

Wings.— Fore wing (fig. 197): r issued from basal 0.42 of pterostigma and straight; r:3-SR:SR1 = 4:10:17; 1-CU1:2-CU1 = 5:27; 2-SR:3-SR:r-m = 10:21:9; r-m slightly inclivous;

1-SR 0.6 times apical part of parastigma (fig. 197); cu-a subvertical; m-cu antefurcal and straight. Hind wing: marginal cell parallel-sided apically, SR of hind wing nearly straight (fig. 198); 1r-m straight; with four hamuli; M+CU:1-M:1r-m = 34:25:20; 2-SC+R subquadrate; 1r-m 2.4 times SC+R1.

Legs.— Hind coxa rather densely setose and sparsely punctate, but largely smooth dorsally; tarsal claws typical for the genus (cf. fig. 81), with short bristles subbasally; length of femur, tibia and basitarsus of hind leg 3.9, 10.0 and 9.2 times their width, respectively; hind tarsus distinctly bristly setose; length of hind tibial spurs 0.25 and 0.30 times hind basitarsus; hind tarsus as long as hind tibia.

Metasoma.— Densely setose; length of first tergite 0.8 times as long as its apical width; first tergite basally and medially with three coarse carinae (cf. fig. 83), and it surface coarsely reticulate-rugose, middle carina indistinctly branched anteriorly and remain far removed from both sublateral carinae; second suture comparatively widely crenulate (fig. 203); second tergite 0.85 times as long as first tergite, with seven more or less longitudinal carinae, lateral ones subparallel but posteriorly similar to surrounding sculpture and remainder (including sublateral depressions) coarsely longitudinally rugose and interspaces punctate; third-fifth tergites longitudinally striate, but laterally and posteriorly mainly coarsely punctate, interspaces finely punctate.

Colour.— Yellowish-brown; palpi, malar space and temple ventrally, tegulae and basal two thirds of first tergite pale yellowish; scapus and pedicellus ventrally, clypeus, temple largely, hind femur narrowly apically and fore and middle telotarsi brown; remainder of antenna and hind tibia and tarsus dark brown, but hind basitarsus and second-sixth tergites largely, blackish-brown; basal two thirds of veins C+SC+R and 1-A of fore wing yellowish-brown; pterostigma, parastigma and remainder of veins dark brown; apical third of first tergite mostly rather dark brown; subbasal and first subdiscal cells of fore wing and membrane of hind wing only slightly infuscate; remainder of wing membrane largely dark brown, without parastigmal spot.

Distribution.— Indonesia (Papua).

Notes.— Named after Mr J. Olthof, the young and very active assistant curator of entomology at the Bogor Museum, who died in 1945 of the consequences of the Japanese imprisonment. During the Netherlands Indian-American Expedition to Central and North New Guinea (1938-39) he was the main assistant of the expedition leader Dr L.J. Toxopeus and assembled an important collection of Braconidae.

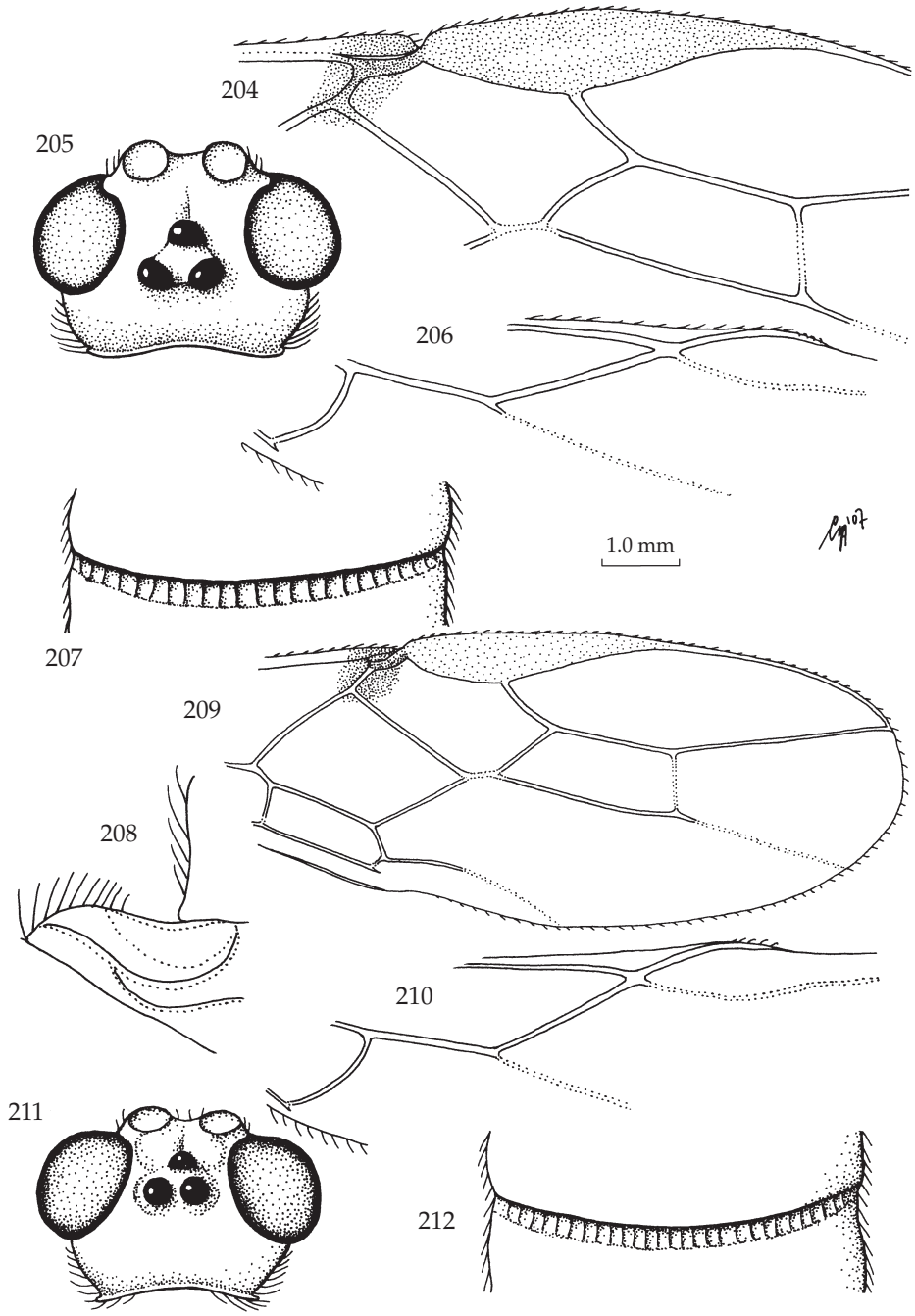
Conspinaria pilosa (Cameron, 1905)
(figs 74-83)

Paraspinaria pilosa Cameron, 1905: 88.
Conspinaria pilosa; Shenefelt, 1975: 1194; Yu et al., 2005: Taxapad database.

Material.— Holotype, ♀ (BMNH), "Type", "B.M. Type, 3.c.248", "*Paraspinaria pilosa* Cam., Type, **Ceylon**" (in Cameron's handwriting), "Kandy, Ceylon, vi.[19]02", "P. Cameron coll. 1914-110"; 1 ♂ (BMNH), "**Nepal**, Pokhara, 950 m, secondary veg[etatio]n, 5.iii.1984".

Distribution.— *Nepal, Sri Lanka. The report of the Philippines by Baker (1917) needs reconfirmation.

Notes.— The male has similar eyes and vertex as the female holotype.



Figs 204-207, *Conspinaria sundana* spec. nov., ♂, holotype; figs 208-212, *C. chenhei* spec. nov., ♀, holotype. 204, 209, part of fore wing; 205, 211, head, dorsal aspect; 206, 210, part of hind wing; 207, 212, second metasomal suture; 208, anterior part of pronotum, lateral aspect. 204, 206: 1.5 ×; 205, 207: 2.8 ×; 208: 5.0 ×; 209: 1.0 × scale-line; 210: 1.4 ×; 211, 212: 2.0 ×.

Conspinaria sundana spec. nov.
(figs 204-207)

Material.— Holotype, ♂ (BMNH), "[W. **Malaysia**], Malay Penin.: Selangor, Bukit Kutu, at light, 3,500 ft., 12.iv.1926, H.M. Pendlebury / ex coll: F.M.S. Museums".

Holotype, ♂, length of fore wing and of body 11.2 mm.

Head.— Antenna with 52+ segments, length of third segment 1.2 times as long as fourth segment, third and fourth segments 2.3 and 2.1 times as long as wide, respectively; length of maxillary palp 1.3 times height of head, slender; frons shallowly depressed medio-posteriorly and smooth; OOL:diameter of posterior ocellus:POL = 3:5:4; distance from posterior ocellus to occipital carina twice diameter of ocellus; occipital carina rather wide (fig. 205); vertex flat, smooth and shiny; face and clypeus smooth; length of eye 1.8 times temple in dorsal view; medio-ventrally rim of clypeus distinctly below lower level of eyes; length of malar space equal to basal width of mandible and 0.3 times height of eye in lateral view; width of face 1.7 times width of hypoclypeal depression, 0.7 times height of eye and 1.2 times height of face and clypeus combined.

Mesosoma.— Length of mesosoma 1.5 times longer than its height; pronotum anteriorly slightly concave; mesoscutal lobes sparsely punctate and densely setose; notauli complete, smooth anteriorly, its posterior half with a few minute crenulae and mesoscutum medio-posteriorly flat and with some vermiculate rugae; scutellar sulcus with one strong carina and 0.6 times as long as scutellum (= part in front of subposterior convexity); scutellum slightly convex and distinctly punctate; prepectal carina distinctly lamelliform and rather wide; precoxal area impressed and medium-sized to long crenulae, remainder of mesopleuron sparsely punctate; metapleuron anteriorly rugose and remainder largely coarsely punctate and ventrally with coarse carinae; propodeum antero-dorsally coarsely rugose, median carina lamelliform and rather undulating, areola complete, parallel-sided, near large tubercles with some oblique carinae, posteriorly smooth except for carinae.

Wings.— Fore wing (fig. 204): r issued from basal 0.45 of pterostigma, slender and straight; r:3-SR:SR1 = 20:43:85; 1-CU1:2-CU1 = 1:6; 2-SR:3-SR:r-m = 26:40:23; r-m slightly inclivous; 1-SR 0.7 times apical part of parastigma (fig. 204); cu-a subvertical; m-cu antefurcal and straight. Hind wing: marginal cell slightly widened apically, SR of hind wing nearly straight (fig. 206); 1r-m straight; M+CU:1-M:1r-m = 34:18:20; 2-SC+R subquadrate; 1r-m 2.4 times SC+R1.

Legs.— Hind coxa rather densely setose and distinctly punctate, but largely smooth dorsally; tarsal claws typical for the genus (cf. fig. 81), with short bristles subbasally; length of femur, tibia and basitarsus of hind leg 4.9, 10.1 and 8.0 times their width, respectively; hind tarsus distinctly bristly setose; length of both hind tibial spurs 0.2 times hind basitarsus; hind tarsus 0.9 times as long as hind tibia.

Metasoma.— Densely setose; length of first tergite 0.9 times as long as its apical width; first tergite with three coarse carinae (cf. fig. 83), and it surface coarsely reticulate-rugose, middle carina branched anteriorly and connected to both sublateral carinae; second suture widely crenulate (fig. 207); second tergite 0.8 times as long as first tergite, with three longitudinal carinae, lateral ones converging posteriorly and remainder

largely rugose; third tergite longitudinally striate, but posteriorly mainly punctate; fourth tergite coarsely and densely punctate (with interspaces less than diameter of punctures); fifth tergite moderately and more sparsely punctate.

Colour.— Yellowish-brown; palpi, tegulae and basal half of hind tibia largely, pale yellowish; antenna (except scapus and pedicellus), stemmaticum, remainder of hind tibia and hind tarsus black; second-fifth tergites slightly infuscate; apex of veins C+SC+R and 1-SR of fore wing and parastigma dark brown; remainder of veins and medially pterostigma yellow; wide lateral margin of pterostigma brownish-yellow; wing membrane (except dark brown parastigmal spot) pale yellowish, but distinctly yellow near veins.

Distribution.— Malaysia (Sarawak).

Genus ***Cornutorogas*** Chen, Belokobylskij, van Achterberg & Whitfield, 2004 (figs 84-103)

Cornutorogas Chen, Belokobylskij, van Achterberg & Whitfield, 2004: 2212-2216; Yu et al., 2005: Taxapad database. Type species: *Cornutorogas orientalis* Chen & Belokobylskij, 2004 (examined).

Diagnosis.— Occipital carina present (fig. 85); head directly narrowed behind eyes and medium-sized, temples short and strongly declivous and with short setae (figs 85, 89); eyes moderately emarginate near level of antennal sockets (fig. 86); size and shape of eyes of male normal; pair of subpronope absent (fig. 89); antescutal depression medium-sized to small (figs 98, 103); prosternal sclerites largely visible and concave; mesopleuron without a protuberance ventro-posteriorly (fig. 89); notauli complete and an elongate medio-posterior depression (fig. 91); dorsal face of scutellum medium-sized and subposteriorly convex and smooth (fig. 91); anteriorly tegula slightly up curved and laterally axilla distinctly protruding; metanotum flat dorsally (fig. 89); pronotum of ♀ elongate and without a spine posteriorly (figs 89, 98, 101); propodeum with a pair of large horns (figs 89, 94) and spiracle round; vein r of fore wing emitted from middle of pterostigma (fig. 84); vein m-cu of hind wing absent; vein cu-a of hind wing long, straight and distinctly reclivous (fig. 84); tarsal claws nearly simple, with minute lobe (fig. 90); hind femur without a minute tooth ventrally (fig. 92); hind tibial spurs straight and setose; inner apex of hind tibia with medium-sized comb (fig. 95); first metasomal tergite movably joined to second tergite and with large dorsope, both first and second metasomal tergites with one coarse longitudinal carina (fig. 94); first and second metasomal sutures deep (fig. 89); second tergite with a smooth transverse area medio-basally (fig. 94); first-fifth tergites with acute lateral margin; third-fifth tergites without teeth (fig. 89); third and fourth tergites without a median tooth or tubercle (figs 89, 99); fifth tergite convex and semicircular (figs 89, 99); ovipositor sheath rather short and narrow (fig. 89).

Distribution.— Oriental.

Biology.— Unknown.

Note.— The following key is after Chen et al. (2004). For the descriptions, see this paper.

Key to species of the genus *Cornutorogas* Chen et al.

1. Occipital carina strong, lamelliform (fig. 85); second hind tarsal segment ivory or white; axillar "wings" of mesonotum smaller (fig. 100); Thailand, China 2
- Occipital carina obsolescent or weakly developed dorsally, and laterally more or less developed but not lamelliform (figs 26, 30 in Chen et al., 2004); second hind tarsal segment dark brown; axillar "wings" of mesonotum comparatively large (figs 24, 28 l.c.); Sundaland 3
2. Pronotum medio-posteriorly (in dorso-lateral view) distinctly convex (fig. 21 l.c.), and in front with a deep pronope (fig. 23 l.c.); metasoma dark brown medially; fifth tergite laterally coarsely punctate-rugose (fig. 15 l.c.); scutellum dark brown; pronotum narrower dorsally (figs 8, 23 l.c.) and laterally more robust (fig. 22 l.c.); China, Vietnam ..... ***C. orientalis*** Chen & Belokobylskij, 2004
- Pronotum medio-posteriorly (in dorso-lateral view) rather flat (fig. 103), and in front with an indistinct pronope (fig. 98); metasoma completely yellowish; fifth tergite laterally very coarsely punctate (fig. 89); scutellum yellowish-brown; pronotum wider dorsally (fig. 98) and laterally more slender (fig. 101); Thailand ..... ***C. maetoi*** van Achterberg, 2004
3. Mesosoma (except for ivory propodeal spines and pronotum anteriorly) completely black; crests of pronotum shorter (figs 29, 30 in Chen at al., 2004) and pronotum medio-posteriorly more narrowly convex (fig. 29 l.c.); ivory or white ring of antenna of ♀ consists of about 7 segments; Java ..... ***C. javensis*** van Achterberg, 2004
- At least mesosternum medially, metapleuron and propodeum yellowish-brown; crests of pronotum longer (figs 25, 26 l.c.) and pronotum medio-posteriorly more widely convex (fig. 25 l.c.); ivory or white ring of antenna of ♀ consists of 11-13 segments; Sumatra, Borneo (Brunei) ..... ***C. sumatrensis*** van Achterberg, 2004

Cornutorogas sumatrensis van Achterberg, 2004

Cornutorogas sumatrensis van Achterberg (in Chen et al.), 2004: 2222-2223, figs 24-27.

Material.— Holotype, ♀ (RMNH), "**Indonesia**: N. Sumatra, Aceh, Bengkung (Soraya), N.P. Gn. Leuser, Mal[aise] trap, ii.1995, Y. v. Nierop & Dolly, RMNH'95"; 1 ♀ (BMNH), "**Brunei**: Bk. Retak, 1600 m, ix.1979, I. Gauld".

Distribution.— *Brunei, Indonesia (Sumatra).

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