

New taxa of the subfamilies Betylobraconinae, Cenocoeliinae, Ecnomiinae, Homolobinae, and Sigalphinae (Hymenoptera: Braconidae) from East Indonesia

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Achterberg, C. van. New taxa of the subfamilies Betylobraconinae, Cenocoeliinae, Ecnomiinae, Homolobinae, and Sigalphinae (Hymenoptera: Braconidae) from East Indonesia.

Zool. Med. Leiden 69 (24), 29.xii.1995: 307-328, figs 1-39.— ISSN 0024-0672.

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Key words: Hymenoptera; Braconidae; Betylobraconinae; Cenocoeliinae; Cenocoeliini; Ecnomiinae; Homolobinae; Homolobini; Sigalphinae; Sigalphini; *Conobregma*; *Ecnomios*; *Homolobus*; *Rattana*; *Sigalphus*; Indo-Australian; Oriental; Papuan; Palaearctic; Indonesia; keys; distribution.

Six new species of Braconidae from Sulawesi and Sula Islands (East Indonesia) are described and partly illustrated: *Conobregma sulaensis* spec. nov. from Taliabu and Mangole (Sula Islands); *Ecnomios brevitarsus* spec. nov., and *E. yasiri* spec. nov. from SW Sulawesi; *Homolobus (Apatia) celebensis* spec. nov. from SW Sulawesi; *Rattana nigriscapa* spec. nov. from Mangole (Sula Islands); and *Sigalphus chrysopharus* spec. nov. from SW Sulawesi. In addition one species, *Ecnomios infuscatus* spec. nov. is described from Lombok. *Acampsis nigrifemur* van Achterberg & Austin, (December) 1992, is a new junior synonym of *A. chinensis* Chen & He, (September) 1992.

Introduction

In this paper seven remarkable new species belonging to five subfamilies of the family Braconidae Nees, 1812, collected during three expeditions of the Nationaal Natuurhistorisch Museum to Indonesia (two to East Indonesia in 1993 and 1995, and one to Lombok in 1991), are described.

The members of the genus *Sigalphus* Latreille, 1802, of the subfamily Sigalphinae Blanchard, 1845, are uncommonly collected and mainly known from the Holarctic and Afrotropical regions (van Achterberg & Austin, 1992). Recently, some new species were published from China (He & Chen, 1993; He, Chen & Ma, 1994) and a reared species from Costa Rica will be published soon (Sharkey, pers. comm.). In this paper a new species of the genus *Sigalphus* from Sulawesi (Indonesia) is described; it is the second Oriental species known, and the first report of the genus from Southeast Asia. The only other Oriental species is *S. gyrodontus* He & Chen, 1994, from South China. The species of the genus *Sigalphus* are endoparasites of Noctuidae (van Achterberg & Austin, 1992). In the last named paper another Sigalphine species is listed, which in 1992 has been described twice as new from the East Palaearctic: as *Acampsis nigrifemur* van Achterberg & Austin, 1992, and as *A. chinensis* Chen & He, 1992, of which the latter name has priority by three months.

The subfamily Homolobinae van Achterberg, 1979, has been completely revised by van Achterberg (1979). Few species of the genus *Homolobus* Foerster, 1862, are known from Southeast Asia and New Guinea (van Achterberg, 1979, 1992; Maetô, 1982). During the expedition of the Nationaal Natuurhistorisch Museum to East Indonesia in 1995, the genus *Homolobus* was collected for the first time on Sulawesi: a specimen of

an undescribed species. The biology of this new species is unknown, but its Oriental sister-species is an endoparasite of larvae of Noctuidae (van Achterberg, 1979).

The genus *Ecnomios* Mason, 1979, of the subfamily Ecnomiinae van Achterberg, 1985, contains four described species, one from Papua New Guinea, one from Australia (Queensland), and two from Vietnam. The late Dr W.R.M. Mason (in litt.) examined two species from Africa. Obviously the genus *Ecnomios* has a Palaeotropical distribution (Park & van Achterberg, 1994). The biology is unknown; members of related subfamilies parasitise larvae of microlepidoptera.

The genus *Conobregma* van Achterberg, 1995, of the subfamily Betylobraconinae Tobias, 1979 sensu lato, has been described from the Neotropical region by van Achterberg (1995). Surprisingly, a new species turned up among material collected on the Sula Islands during the expedition of the Nationaal Natuurhistorisch Museum to East Indonesia in 1995. The biology of the Betylobraconinae is completely unknown, but members of the closely related subfamily Rogadinae Foerster, 1862, are endoparasites of lepidopterous larvae.

The small genus *Rattana* van Achterberg, 1994, of the subfamily Cenocoeliinae Szépligeti, 1901, has been described from New Guinea and Sulawesi (van Achterberg, 1994). The new species collected on Mangole (Sula Islands) in 1993 fills partly the gap between New Guinea and Sulawesi. The Cenocoeliinae are almost cosmopolitan, though not (yet) known from the Afrotropical region. The biology of the genus *Rattana* is unknown, but species of other genera are endoparasites of coleopterous larvae belonging to the families Cerambycidae, Curculionidae, and less commonly Buprestidae and Scolytidae, usually boring in wood and bark of both deciduous and coniferous trees. In the Neotropical region some species are reported to be parasites of seed-eating Curculionidae and Cerambycidae (Saffer, 1977).

For the identification of the subfamilies, see van Achterberg (1990, 1993), and for the terminology used in this paper, see van Achterberg (1988, 1993). For the identification of the genera of the Homolobinae, see van Achterberg (1979), of the genera of Sigalphinae, see van Achterberg & Austin (1992), of the genera of Ecnomiinae, see Park & van Achterberg (1994), of the genera of Cenocoeliinae, see van Achterberg (1994), and of the genera of Betylobraconinae, see van Achterberg (1995).

Descriptive part

Subfamily Sigalphinae Blanchard, 1845

Tribe Sigalphini Blanchard, 1845

Genus *Sigalphus* Latreille, 1802

Key to the Old World species of the genus *Sigalphus* Latreille

1. Head and mesosoma reddish-brown; Afrotropical 2
- Head and mesosoma black, but propodeum and metanotum may be reddish 3
2. Head medio-dorsally and apex of hind tibia black; vein r of fore wing about one-third as long as vein 3-SR; southern Africa *S. fulvus* Brues, 1926
- Head and tibia completely reddish-brown; vein r of fore wing about one-seventh as long as vein 3-SR; Malagasy *S. testaceus* Granger, 1949
3. Third metasomal tergite with pair of acute triangular teeth apico-ventrally (fig. 47 in van Achterberg & Austin, 1992); pterostigma slightly wider (fig. 37 l.c.);

- propleuron with transverse subapical depression (fig. 48 l.c.); (*S. irrorator*-group; Palaeartic) 4
- Third tergite without pair of acute teeth apico-ventrally, at most with triangular or rounded lamella protruding (figs 2, 5); pterostigma slightly narrower (fig. 1); propleuron without distinct transverse subapical depression 6
4. Face mainly flat; vein m-cu of fore wing antefurcal; vein r of hind wing situated near basal third of marginal cell; vein 2-M of hind wing straight apically; wing membrane at most brown or faintly infuscate; basal segments of antennal flagellum usually black; colour of pterostigma variable 5
- Face distinctly convex; vein m-cu of fore wing interstitial; vein r of hind wing situated near middle of marginal cell; vein 2-M of hind wing distinctly curved apically; wing membrane blackish-brown; basal segments of flagellum reddish-yellow; pterostigma yellow; China *S. flavistigmus* He & Chen, 1993
5. Apical third of fore wing much darker than remainder of fore wing; pterostigma yellowish(-brown); precoxal sulcus completely crenulate; third tergite black basally; hind tibia (except apically) yellowish; propodeal areola narrowed basally; Palaeartic *S. irrorator* (Fabricius, 1775)
- Note. In *S. mongolicus* Tobias, 1974, the base of the flagellum, and of the third tergite is yellowish. From the original description no other differences with West Palaeartic specimens could be inferred, so it may be only a colour variety of *S. irrorator*.
- Apical third of fore wing similarly darkened as remainder of fore wing; pterostigma dark brown; precoxal sulcus (except anteriorly) smooth; third tergite reddish-brown basally; hind tibia (except its yellowish base) black; propodeal areola broadly sessile basally; China, S Korea *S. humanus* You & Tong, 1991
- Note. *S. anomis* You & Zhou, 1991, and *S. nigripes* He & Chen, 1993, are synonyms of this species (He, Chen & Ma, 1994).
6. Third metasomal tergite about as long as second tergite (fig. 41); first tergite somewhat longer than its apical width; third tergite without teeth ventro-apically (figs 41, 47); southern Africa *S. neavei* (Turner, 1917)
- Third tergite longer than second tergite (fig. 2); length of first tergite variable, if somewhat longer than its apical width then third tergite with teeth or protruding lamella ventro-apically (fig. 2); Palaeartic, Oriental 7
7. Third metasomal tergite of ♀ widened medially and wider than second tergite (fig. 4; ♂ unknown); second tergite at least partly reddish-yellow; at most apical half of fore wing brownish (fig. 1); second tergite without strong transverse rugae between carinae posteriorly (fig. 4); sides of first tergite distinctly concave (fig. 4) 8
- Second and third tergites of ♂ parallel-sided and of equal width (♀ unknown); second tergite black; fore wing entirely brownish (fig. 1); second tergite with strong regular transverse rugae between carinae posteriorly; sides of first tergite straight; Oriental China *S. gyrodonus* He & Chen, 1994
8. Second tergite only with a strong median crest, its surroundings reticulate, without distinct transverse rugae (fig. 4); precoxal sulcus smooth; basal half of fore wing slightly infuscate; entire third tergite black; second tergite medially black; Oriental (Indonesia: Sulawesi) *S. chrysopharus* spec. nov.
- Second tergite with two parallel carinae medio-basally, connected by strong transverse rugae; precoxal sulcus crenulate; basal half of fore wing yellowish-brown; only apical half of third tergite black; second tergite entirely reddish-yellow; Palaeartic (China) *S. rufiabdominalis* He & Chen, 1994

Sigalphus chrysopharus spec. nov.
(figs 1-5)

Material.— Holotype, ♀ (RMNH), "Indonesia: SW Sulawesi, Gn. Bulusaraung, nr [= near] Camba, Malawa, Mal. trap 1, c. 750 m, 7.ii-28.iii.1995, C. v. Achterberg & Y. Yasir, RMNH'95".

Holotype, ♀, length of body 10.1 mm, of fore wing 9.3 mm; whole body (especially face and temples) with long and dense golden setosity.

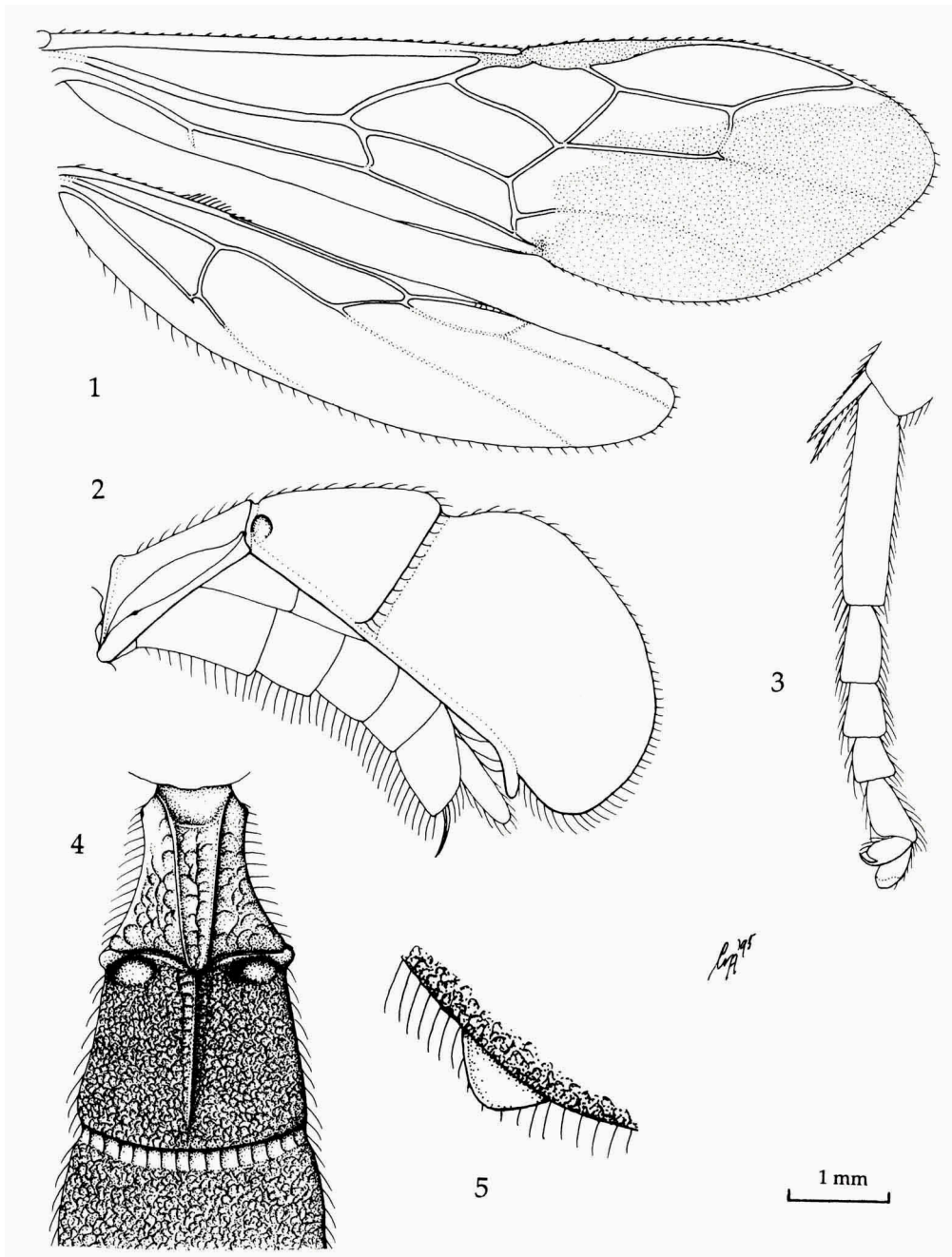
Head.— Antennal segments 45, length of third segment 1.3 times fourth segment, length of third, fourth and penultimate segments 3.4, 2.6 and 1.7 times their width, respectively; length of maxillary palp 0.9 times height of head; in dorsal view length of eye equal to length of temple; temple finely and densely punctate; OOL:diameter of ocellus:POL = 11:3:8; frons largely smooth and somewhat concave medially, rather vermiculate laterally, largely setose; vertex coarsely punctate, rather flat; face densely punctate and rather convex but near tentorial pits and area above it depressed; clypeus evenly convex, punctate, its ventral margin slightly concave; occipital flange medium-sized, concave; occipital carina widely interrupted medio-dorsally; malar suture weakly impressed; length of malar space 1.3 times basal width of mandible; mandible strongly twisted apically.

Mesosoma.— Length of mesosoma 1.3 times its height; side of pronotum coarsely punctate medially, rugose anteriorly, crenulate posteriorly, and largely smooth dorsally; propleuron without distinct transverse depression or ridge subposteriorly, only gradually depressed and smooth; mesosternal sulcus deep, only anteriorly with few crenulae; prepectal carina complete, strong ventrally, reaching precoxal sulcus, with some very coarse punctures near dorsal part of carina, and dorsally at epicnemial area; precoxal sulcus deep and largely smooth; remainder of mesopleuron finely punctate, except glabrous part near precoxal sulcus; pleural sulcus coarsely crenulate; metapleuron largely smooth anteriorly and remainder very coarsely vermiculate; notauli deep and distinctly crenulate; mesoscutum rather flat, smooth, but its middle lobe punctate laterally, without distinct depression medio-posteriorly; scutellar sulcus deep, with one long and two shorter carinae; scutellum rather flat and punctulate, without medio-posterior depression or crenulae; side of scutellum very coarsely crenulate; metanotum with indistinct median carina, which is somewhat protruding posteriorly; propodeum coarsely reticulate, but anteriorly finely punctate, and medially with a narrow elliptical areola with transverse crenulae.

Wings.— Fore wing: r:3-SR:SR1 = 8:25:27; apical half of subbasal cell evenly setose, but basal half only sparsely so; area basally of 2A glabrous; 1-SR+M and SR1 nearly straight (fig. 1); 1-CU1:2-CU1 = 4:33; 2-SR:3-SR:r-m = 16:25:10. Hind wing: basal cell evenly setose; subbasal cell partly glabrous; 2-SC+R shortly vertical (fig. 1); with 5 hamuli; 1-M slightly sinuate; M+CU:1-M = 36:29.

Legs.— Hind coxa sparsely punctulate; length of femur, tibia and basitarsus of hind leg 3.6, 8.0 and 4.2 times their width, respectively; length of hind tibial spurs 0.4 and 0.5 times hind basitarsus.

Metasoma.— Length of first tergite 1.1 times its apical width, its sides concave (fig. 4), its surface coarsely reticulate-rugose, medially strongly protruding (including complete dorsal carinae (figs 2, 4), concave basally; second and third tergites densely reticulate-rugose and medially only longitudinally rugulose; second tergite with pair of large depressions anteriorly, medially with triangular area elevated and with coarser reticulation and only a median crest (fig. 4); third tergite distinctly wider



Figs 1-5, *Sigalphus chrysothorus* spec. nov., ♀, holotype. 1, wings; 2, metasoma, lateral aspect; 3, hind tarsus, lateral aspect; 4, first and second metasomal tergites, dorsal aspect; 5, apico-ventral flange of third metasomal tergite, latero-ventral aspect. 1, 2, 4: 1 × scale-line; 3: 2 ×; 5: 3 ×.

than second tergite in dorsal view (fig. 4) and in lateral view distinctly convex, large, bulging basally (fig. 2); third tergite with pair of apically rounded, semi-circular, lamellae (fig. 5) and with a smooth rim (fig. 2); length of ovipositor sheath 0.08 times length of fore wing; ovipositor sheath widened, nearly parallel-sided (fig. 2).

Colour.— Black; eight basal segments of antenna, labial palp, apical segment of maxillary palp, femora dorsally, tarsi partly, and tegulae yellowish-brown; fore tibia largely, basal halves of middle and hind tibiae, humeral plate, metasoma ventrally largely, and second tergite (except T-shaped area medially) brownish-yellow; pterostigma, parastigma, and veins largely dark brown; wing membrane slightly yellowish-brown, but apical third of fore wing largely dark brown (fig. 1).

Distribution.— Indonesia (Sulawesi).

Acampsis nigrifemur van Achterberg & Austin, 1992

Acampsis chinensis Chen & He, (September) 1992: 218-219, 221, figs 1-3.

Acampsis nigrifemur van Achterberg & Austin, (December) 1992: 15-17, figs 13-18, 20-24; Belokobylskij, 1993: 70. Syn. nov.

The description of *Acampsis chinensis* Chen & He pre-dates that of *A. nigrifemur* by van Achterberg & Austin (1992) by three months. It is obvious from the descriptions that both names belong to the same species and, therefore, the valid name is *A. chinensis* Chen & He, 1992.

Subfamily Homolobinae van Achterberg, 1979

Tribe Homolobini van Achterberg, 1979

Genus *Homolobus* Foerster, 1862

Homolobus (Apatia) celebensis spec. nov.

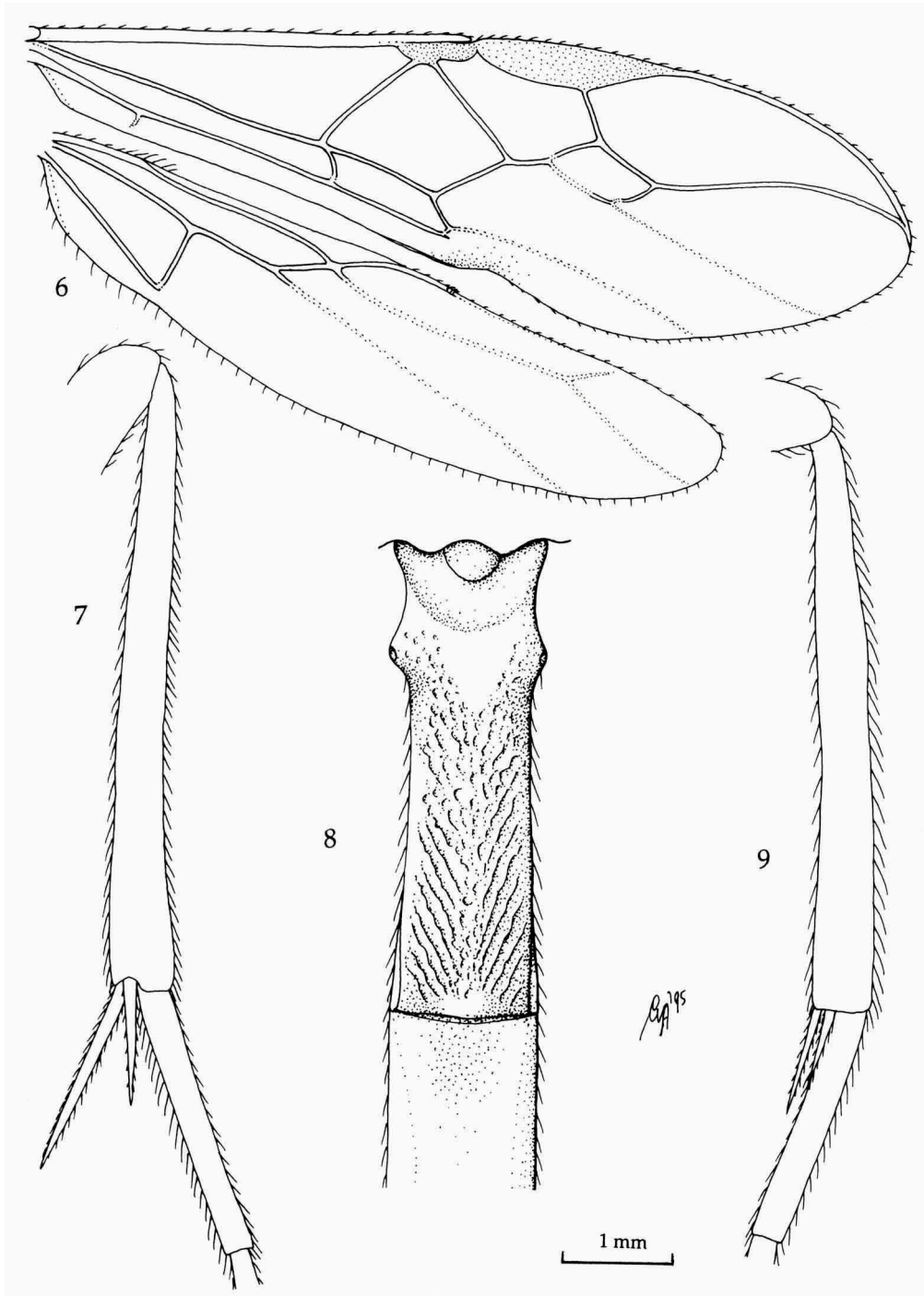
(figs 6-8, 10, 12, 13)

Material.— Holotype, ♀ (RMNH), "Indonesia: SW Sulawesi, Gn. Bulusaraung, nr Camba, Malawa, Mal. trap 1, c. 750 m, 7.ii-28.iii.1995, C. v.Achterberg & Y. Yasir, RMNH'95".

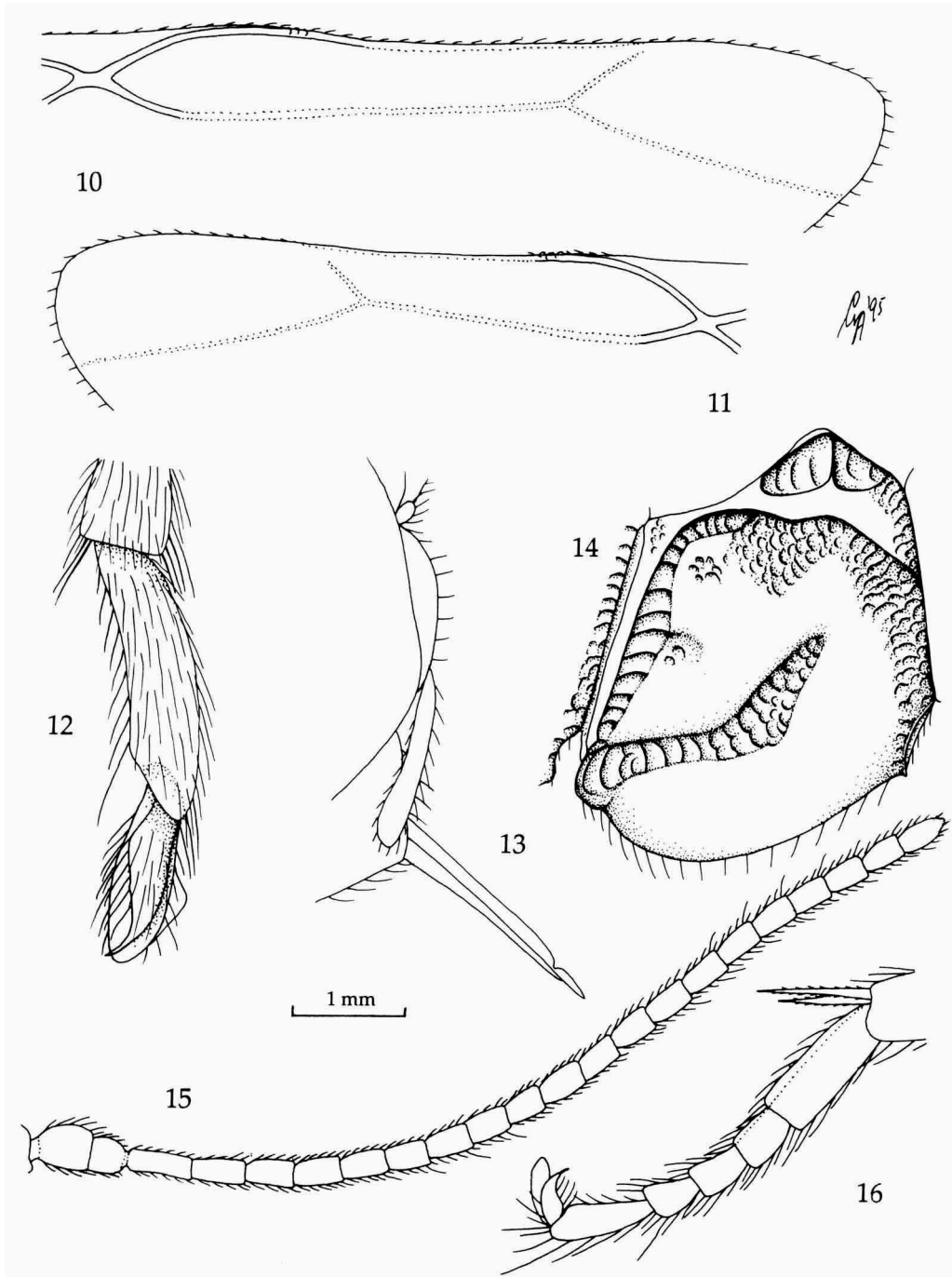
Holotype, ♀, length of body 7.3 mm, of fore wing 7.1 mm.

Head.— Antennal segments 50, length of third segment 1.3 times fourth segment, length of third, fourth and penultimate segments 3.8, 3.0 and 2.0 times their width, respectively; length of maxillary palp 1.5 times height of head; length of fourth segment of labial palp 2.5 times length of third segment; in dorsal view length of eye 2.4 times temple; temple directly narrowed posteriorly; OOL:diameter of ocellus:POL = 3:9:4; frons nearly flat and largely smooth; vertex densely punctulate; face rather flat, densely and finely punctulate; clypeus rather convex, long setose and sparsely punctate, its ventral margin rather thin, and straight medially; length of malar space 0.4 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.5 times its height; side of pronotum largely smooth, with some crenulae medio-anteriorly and narrowly crenulate posteriorly; epicnemial area largely smooth; mesopleuron punctate-rugose dorsally; precoxal sulcus distinctly punctate-rugose, and remainder punctulate; metapleural flange large, rounded apically; metapleuron mainly smooth, but coarsely rugose ventrally; notauli narrow anteriorly, widened posteriorly, crenulate; mesoscutum largely smooth, only near notauli punctate; surface of propodeum smooth anteriorly and remainder retic-



Figs 6-8, *Homolobus (Apatia) celebensis* spec. nov., ♀, holotype; fig. 9, *H. (A.) elagabalus* (Nixon), ♀, Thailand. 6, wings; 7, 9, hind tibia and tarsus; 8, first metasomal tergite, dorsal aspect. 6: 1 × scale-line; 7, 9: 1.8 ×; 8: 2.8 ×.



Figs 10, 12, 13, *Homolobus (Apatia) celebensis* spec. nov., ♀, holotype; fig. 11, *H. (A.) elagabalus* (Nixon), ♀, Thailand; fig. 14, *Ecnomios yasiri* spec. nov., ♀, holotype; figs 15, 16, *E. brevitarsus* spec. nov., ♀, holotype. 10, 11, marginal cell of hind wing; 12, inner hind claw; 13, ovipositor and its sheath; 14, mesopleuron, lateral aspect; 15, antenna; 16, hind tarsus, lateral aspect. 10, 11: 1.8 × scale-line; 12: 6.5 ×; 13: 2.8 ×; 14: 4.7 ×; 15: 2.0 ×; 16: 7.5 ×.

ulate-rugose, its median carina indistinct, except for some rugae medio-anteriorly.

Wings.— Fore wing: SR1 distinctly curved (fig. 6); r:3-SR:SR1 = 9:12:45; first discal cell truncate anteriorly (fig. 6); cu-a distinctly inclivous, slightly curved basad apically (fig. 6); 2-SR:3-SR:r-m = 8:12:6; 1-CU1:2-CU1 = 1:19; r-m distinctly curved basad (fig. 6); area basally of 2A sparsely setose; 2A only pigmented. Hind wing: r present, dividing marginal cell into a long basal part (about 1.6 times length of apical part) and a much shorter apical part (figs 6, 10); SC+R1 evenly curved (fig. 10); 2-SC+R horizontal (fig. 10); SR largely unsclerotized and basally slightly curved.

Legs.— All claws without small subapical tooth, spiny setose (fig. 12); inner claw of hind tarsus equal to its outer claw; length of femur, tibia and basitarsus of hind leg 6.1, 9.6, and 9.4 times their width, respectively; length of hind tibial spurs 0.45 and 0.75 times hind basitarsus; outer side of hind tibia with eleven spiny setae, which are more conspicuous than in *H. elagabalus* (Nixon, 1938).

Metasoma.— Length of first tergite 3.4 times its apical width, its surface distinctly rugose, its dorsal carinae absent (fig. 8); second tergite punctate medio-basally, its remainder largely smooth; length of ovipositor sheath 0.06 times fore wing.

Colour.— Brownish-yellow; stemmaticum black; antenna brown, with outer side of scapus dark brown; veins of fore wing largely dark brown, of hind wing only veins SR and 2-M, remainder of veins yellowish-brown.

Notes.— The holotype of *H. celebensis* has vein r-m of fore wing distinctly curved (fig. 6), which may be also the case in *H. elagabalus*, but to a lesser degree.

The key to species of the subgenus *Apatia* Enderlein, 1920 (of the genus *Homolobus* Foerster) by van Achterberg (1979: 278) may be changed as follows:

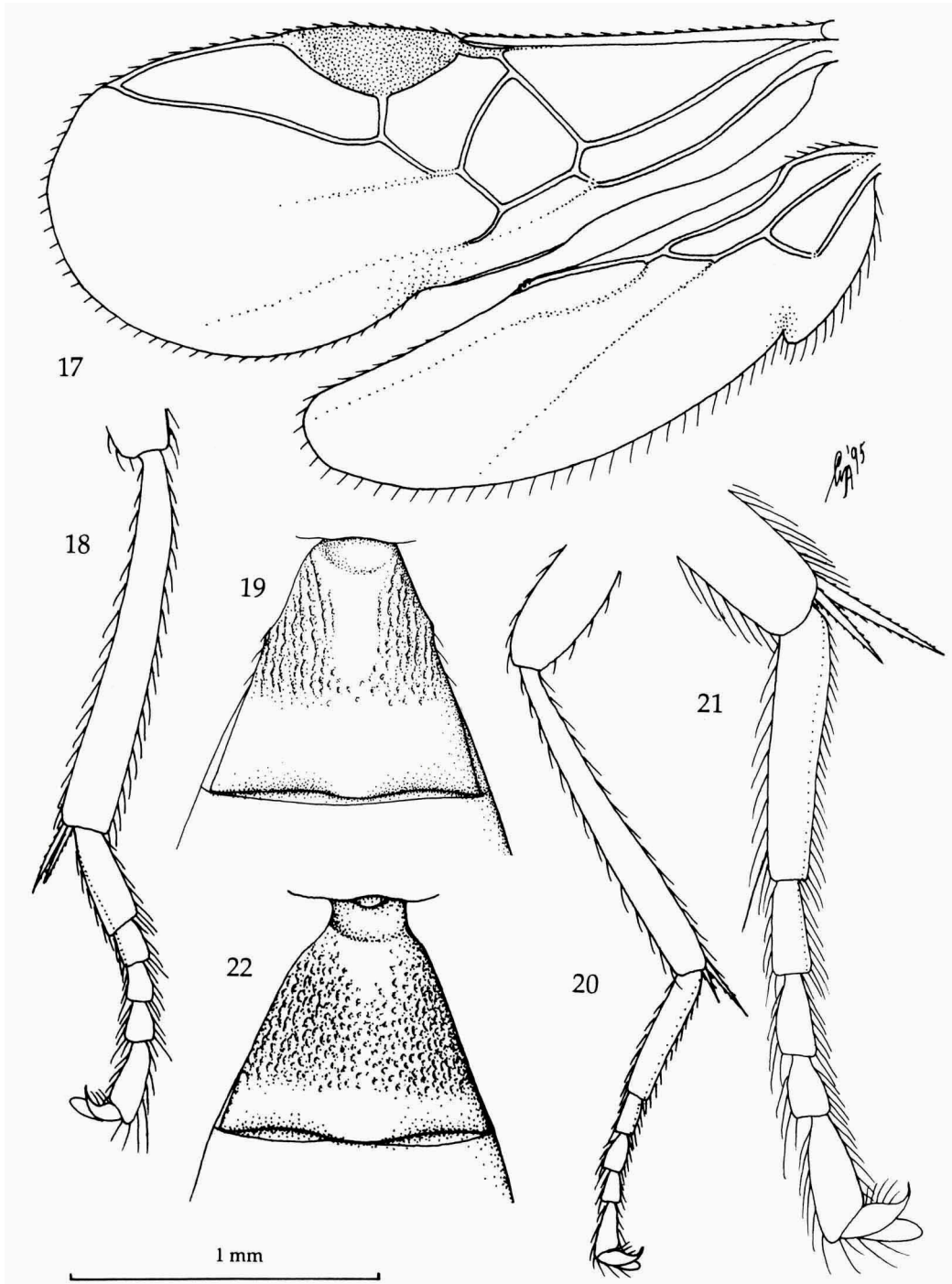
1. Vein r of hind wing present, at least posteriorly (figs 6, 10, 11); vein SR of hind wing weakly curved (fig. 10); Oriental 1a
- Vein r of hind wing absent (fig. 130 in van Achterberg, 1979); vein SR of hind wing variable 2
- 1a. Basal part of vein SR of hind wing 1.1-1.2 times longer than second part of vein (fig. 11); hind basitarsus comparatively robust, about 7 times longer than wide (fig. 9); veins SR and 2-M of hind wing similarly yellowish as veins of basal part of wing; second submarginal cell of fore wing comparatively robust (fig. 122 in van Achterberg, 1979); first tergite smooth or sculptured; India, Thailand, China, Philippines *H. elagabalus* (Nixon, 1938)
- Basal part of vein SR of hind wing about 1.6 times longer than second part of vein (fig. 10); hind basitarsus slender, about 9 times longer than wide (fig. 7); veins SR and 2-M of hind wing distinctly darker than veins of basal part of wing; second submarginal cell of fore wing more slender (fig. 6); first tergite partly finely sculptured; Indonesia (Sulawesi) *H. celebensis* spec. nov.

Subfamily Ecnomiinae van Achterberg, 1985
Genus *Ecnomios* Mason, 1979

Key to species of the genus *Ecnomios* Mason

1. Hypostomal flange in lateral view of head strongly acutely protruding below mandible (fig. 49 in Belokobylskij, 1993); vein 2-SC+R of hind wing longer than

- vein 1r-m (fig. 53 l.c.); vein SR of hind wing sclerotized basally (fig. 53 l.c.); vein SR1 of fore wing straight and marginal cell wide triangular (fig., 53 l.c.); mesosoma black; Vietnam *E. nigra* Belokobylskij, 1993
- Hypostomal flange in lateral view of rounded, somewhat protruding below mandible (fig. 53 l.c.); vein 2-SC+R of hind wing shorter than vein 1r-m (figs 17, 23); vein SR of hind wing unsclerotized basally (fig. 17); vein SR1 of fore wing more or less sinuate or curved and marginal cell (somewhat) more slender (figs 17, 23); colour of mesosoma variable 2
 - 2. Precoxal sulcus present anteriorly, connected with crenulation of epicnemial area (fig. 2 in Austin & Wharton, 1992; fig. 22 in Park & van Achterberg, 1994); vein 2-CU1 at somewhat lower level than level of vein M+CU1 (fig. 3 in Austin & Wharton, 1992; fig. 12 in Park & van Achterberg, 1994); Australian, Papuan 3
 - Precoxal sulcus absent anteriorly, and not connected with crenulation of epicnemial area (fig. 14); vein 2-CU1 at much lower level than level of vein M+CU1 (figs 17, 23); Oriental, Wallacea (Sulawesi) 4
 - 3. Body largely dark brown to black; notauli comparatively deep (fig. 19 in Park & van Achterberg, 1994); first subdiscal cell of fore wing robust (fig. 12 l.c.); Papua New Guinea *E. papuensis* Mason, 1979
 - Body largely light yellowish-brown, but metasoma behind first tergite partly darkened; notauli very shallow (fig. 1 in Austin & Wharton, 1992); first subdiscal cell of fore wing comparatively slender (fig. 2 l.c.); Australia (Queensland) *E. stenosoma* Austin & Wharton, 1992
 - 4. Hind basitarsus in lateral view robust, about 2.5 times its maximum width (figs 16, 18); inner hind spur about 0.8 times hind basitarsus (fig. 16); first metasomal tergite smooth medially or largely so (fig. 19); hind tarsus 0.7-0.8 times as long as hind tibia (fig. 18); notauli absent anteriorly; Indonesia (Sulawesi) *E. brevitarsus* spec. nov.
 - Hind basitarsus in lateral view rather slender, 4-5 times its maximum width (figs 20, 21, 38); inner hind spur about 0.5 times hind basitarsus (fig. 21); first tergite sculptured medially (fig. 22); hind tarsus 0.8-1.0 times as long as hind tibia (fig. 20); notauli variable 5
 - 5. Head dorsally and mesoscutum dark brown; notauli nearly entirely absent, except some coarse punctures medio-posteriorly and rugosity anteriorly; hind tarsus as long as hind tibia; Indonesia (Lombok) *E. infuscatus* spec. nov.
 - Head dorsally and mesoscutum brownish-yellow or reddish-brown; notauli shallow, but completely rugose; length of hind tarsus 0.8-0.9 times hind tibia 6
 - 6. Face mainly finely granulate; first metasomal tergite rugulose and light reddish-brown, paler than second tergite; propodeum light reddish-brown; vein SR1 of fore wing straight basally; first subdiscal cell of fore wing comparatively robust (fig. 60 in Belokobylskij, 1993); Vietnam *E. caophongi* Belokobylskij, 1993
 - Face mainly smooth, except for punctulation; first tergite partly punctate (fig. 22) and dark brown, similar to colour of second tergite; propodeum dark brown; vein SR1 of fore wing slightly curved basally; first subdiscal cell of fore wing comparatively slender (fig. 23); Indonesia (Sulawesi) *E. yasiri* spec. nov.



Figs 17-19, *Ecnomios brevitarsus* spec. nov., ♀, holotype; figs 20-22, *E. yasiri* spec. nov., ♀, holotype. 17, wings; 18, 20, hind tibia and tarsus, lateral aspect; 19, 22, first metasomal tergite, dorsal aspect; 21, hind tarsus, lateral aspect. 17, 22: 1.4 × scale-line; 18: 2.2 ×; 19: 1.6 ×; 20: 1.0 ×; 21: 2.7 ×.

Ecnomios brevitarsus spec. nov.
(figs 15-19)

Material.— Holotype, ♀ (RMNH), "Indonesia: SW Sulawesi, Gn. Bulusaraung, nr Camba, Malawa, Mal. trap 3, c. 750 m, 7.ii-28.iii.1995, C. v. Achterberg & Y. Yasir, RMNH'95". Paratypes (2 ♀ ♀): topotypic and same date, but 1 ♀ (MZB) from trap 1, and 1 ♀ (RMNH) from trap 3.

Holotype, ♀, length of body 2.1 mm, of fore wing 1.8 mm.

Head.— Antennal segments 22, length of third segment 1.2 times fourth segment, length of third, fourth and penultimate segments 2.7, 2.0 and 1.7 times their width, respectively (fig. 15); length of maxillary palp 0.5 times height of head; in dorsal view length of eye 1.1 times temple; temple roundly narrowed posteriorly, directly behind eyes subparallel-sided, smooth; OOL:diameter of ocellus:POL = 5:3:6; frons medially nearly flat and smooth, and laterally convex and setose; face rather convex, largely smooth; clypeus convex, and distinctly punctate; length of malar space twice basal width of mandible.

Mesosoma.— Length of mesosoma 1.5 times its height; antescutal depression absent; side of pronotum sparsely crenulate medially, remainder smooth; epicnemial area rugulose; precoxal sulcus absent anteriorly and narrow posteriorly, remainder crenulate; remainder of mesopleuron smooth, except punctulation below precoxal sulcus; metapleuron largely reticulate-rugose, but smooth antero-dorsally; notaulic area in lateral view of mesoscutum rather narrow and superficially rugulose; middle lobe of mesoscutum densely punctate, lateral lobes sparsely punctulate, densely setose; only posterior half of notauli distinct, shallow and mainly indicated by rugosity, remainder of notauli obsolescent or absent, not impressed; scutellum slightly convex and sparsely punctulate; surface of anterior half of propodeum reticulate-rugose, posterior part separated from it by a weak transverse carina, ending in a lateral carina and no tubercles, largely smooth and with some micro-sculpture.

Wings.— Fore wing: r:3-SR+SR1:2-SR = 6:39:9; 2-CU1 much lower than M+CU1 (fig. 17); SR1 sinuate basally (fig. 17); first subdiscal cell slender (fig. 17); 1-CU1:2-CU1 = 1:4. Hind wing: M+CU:1-M = 17:8; base of SR unsclerotized; 2-SC+R shorter than 1r-m (fig. 17).

Legs.— Hind coxa with some rugae anteriorly, remainder smooth; all tarsal claws simple and slender (fig. 16); length of femur, tibia and basitarsus of hind leg 3.0, 4.1, and 2.3 times their width, respectively; length of hind tibial spurs 0.7 and 0.8 times hind basitarsus; length of hind tarsus 0.8 times hind tibia (fig. 18).

Metasoma.— Length of first tergite 0.9 times its apical width, its surface largely smooth except antero-laterally and some punctures medially (fig. 19), its dorsal carinae absent, tergite rather flattened posteriorly and concave medio-basally (fig. 19); second and following tergites smooth; second suture absent; length of ovipositor sheath 0.08 times fore wing; only apex of ovipositor sheath setose.

Colour.— Yellowish-brown; stemmaticum, mesopleuron dorsally, sides of scutellum, metanotum, metapleuron, propodeum, base of first tergite somewhat, and fourth and fifth tergites dark brown; remainder of metasoma, prothorax largely, temple and vertex posteriorly, occiput, antenna (except scapus and pedicellus), pterostigma (except small part basally and apically), and vein C+SC+R of fore wing brown; tegulae, palpi, remainder of veins, legs, and ovipositor sheath (pale) yellowish; wing membrane hyaline.

Variation.— Antennal segments 22(2); length of body 1.9-2.1 mm, fore wing 1.7-

1.8 mm; length of vein r-m of hind wing 1.2-1.3 times vein 1-M; length of hind tarsus 0.7-0.8 times length of hind tibia; length of first metasomal tergite 0.9-1.0 times its apical width, tergite completely smooth medially or with some punctures; length of ovipositor sheath 0.07-0.08 times fore wing.

Ecnomios infuscatus spec. nov.
(figs 36-39)

Material.— Holotype, ♀ (RMNH), "Indonesia: Lombok, Pusuk, nr [= near] Mataram, Mal. trap 7, c. 450 m, 21-27.iii.1991, C. v. Achterberg, RMNH'91".

Holotype, ♀, length of body 3.2 mm, of fore wing 2.6 mm.

Head.— Antennal segments 23, length of third segment 1.5 times fourth segment, length of third, fourth, and penultimate segments 2.4, 1.6, and 1.3 times their width, respectively (fig. 39); occipital carina complete; length of maxillary palp 0.4 times height of head; in dorsal view length of eye 1.1 times temple; temple subparallel-sided behind eyes, largely smooth; OOL:diameter of ocellus:POL = 7:4:9; medially frons slightly concave and smooth, and laterally convex and punctulate, setose; face rather flat, shiny and punctulate; clypeus convex, and finely punctate; length of malar space 2.0 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.9 times its height; side of pronotum strongly depressed posteriorly, shiny, smooth dorsally and medially, remainder rather sparsely crenulate; epicnemial area rugulose; precoxal sulcus absent anteriorly and narrow posteriorly, remainder distinctly crenulate-rugose and impressed; remainder of mesopleuron (except dorsally) smooth; metapleuron densely rugose, but smooth in front of oblique groove; notaulic area in lateral view narrow, rugose; mesoscutum shiny, largely smooth, only medio-posteriorly with some coarse punctures, setose; notauli absent; scutellum flat and sparsely punctulate; surface of anterior half of propodeum rather superficially punctate-rugose, posterior part superficially punctate, and separated from anterior part by a comparatively strong transverse carina, no distinct tubercles.

Wings.— Fore wing: r:3-SR+SR1:2-SR = 5:34:10; 2-CU1 much lower than M+CU1 (fig. 36); SR1 sinuate basally (fig. 36); first subdiscal cell slender (fig. 36); 1-CU1:2-CU1 = 9:17. Hind wing: M+CU:1-M = 3:1; base of SR unsclerotized; 2-SC+R shorter than 1r-m (fig. 36).

Legs.— Hind coxa with some rugae anteriorly, remainder largely smooth; all tarsal claws simple and rather slender; length of femur, tibia and basitarsus of hind leg 3.5, 8.2, and 5.0 times their width, respectively; length of hind tibial spurs 0.4 and 0.5 times hind basitarsus; hind tarsus as long as hind tibia (fig. 38).

Metasoma.— Length of first tergite 0.8 times its apical width, its surface smooth posteriorly, remainder coarsely longitudinally rugose (fig. 37), its dorsal carinae absent, tergite flattened posteriorly and medio-basally; second and following tergites smooth; second suture absent; length of ovipositor sheath 0.07 times fore wing; ovipositor sheath glabrous.

Colour.— Dark brown; palpi, pronotum dorso-posteriorly, tegulae, and veins (except vein C+SC+R) pale yellowish; clypeus, face medially, and legs (except hind coxa) brownish-yellow; remainder of face, hind coxa, antenna, ovipositor sheath, and vein C+SC+R of fore wing brown; pterostigma apically and basally narrowly pale yellowish, remainder dark brown; wing membrane subhyaline.

Ecnomios yasiri spec. nov.
(figs 14, 20-23)

Material.— Holotype, ♀ (RMNH), "Indonesia: SW Sulawesi, Gn. Bulusaraung, nr Camba, Malawa, Mal. trap 3, c. 750 m, 7.ii-28.iii.1995, C. v. Achterberg & Y. Yasir, RMNH'95". Paratype 1 ♀ (MZB), topotypic, same date and trap.

Holotype, ♀, length of body 3.2 mm, of fore wing 2.6 mm.

Head.— Antennal segments more than 26, its apical segment(s) missing, length of third segment 1.6 times fourth segment, length of third, and fourth segments 2.8, and 1.8 times their width, respectively; occipital carina complete; length of maxillary palp 0.5 times height of head; in dorsal view length of eye 1.4 times temple; temple strongly retracted posteriorly, largely smooth; OOL:diameter of ocellus:POL = 2:1:2; medially frons slightly concave and smooth, and laterally convex and punctulate, setose; face rather flat, shiny and punctulate; clypeus convex, and finely punctate; length of malar space 2.4 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.6 times its height; side of pronotum mainly reticulate-rugose, but with a smooth patch posteriorly; epicnemial area rugose; precoxal sulcus absent anteriorly and narrow posteriorly, remainder distinctly rugose and impressed; remainder of mesopleuron (except dorsally) smooth; metapleuron densely rugose, but smooth antero-dorsally; notaulic area in lateral view of mesoscutum wide and densely rugose; middle lobe of mesoscutum finely and densely punctate, lateral lobes more sparsely punctulate, densely setose; notauli complete, shallow, narrow anteriorly and wide posteriorly; scutellum flat and sparsely punctulate; surface of anterior half of propodeum coarsely and densely rugose, posterior part densely coarsely punctate, and separated from anterior part by a comparatively strong transverse carina ending in a pair of medium-sized tubercles.

Wings.— Fore wing: r:3-SR+SR1:2-SR = 6:39:12; 2-CU1 much lower than M+CU1 (fig. 23); SR1 sinuate basally (fig. 23); first subdiscal cell slender (fig. 23); 1-CU1:2-CU1 = 1:2. Hind wing: M+CU:1-M = 19:8; base of SR unsclerotized; 2-SC+R shorter than 1r-m (fig. 23).

Legs.— Hind coxa with some rugae anteriorly, remainder largely smooth; all tarsal claws simple and rather slender (fig. 21); length of femur, tibia and basitarsus of hind leg 3.7, 8.3, and 4.5 times their width, respectively; length of hind tibial spurs 0.4 and 0.5 times hind basitarsus; length of hind tarsus 0.9 times hind tibia (fig. 20).

Metasoma.— Length of first tergite 0.9 times its apical width, its surface smooth posteriorly, remainder largely coarsely rugose-punctate (fig. 22), its dorsal carinae absent, tergite rather flattened posteriorly and concave medio-basally; second and following tergites smooth; second suture absent; length of ovipositor sheath 0.06 times fore wing; only apex of ovipositor sheath setose.

Colour.— Brownish-yellow; pterostigma (except minute whitish basal part), scutellum laterally, metanotum, propodeum, mesopleuron (except part below precoxal sulcus), metapleuron, first tergite basally, and posterior half of metasoma mainly dark brown; antenna (except scapus and pedicellus), and remainder of metasoma brown; palpi, legs, ovipositor sheath, tegula, and veins mainly pale yellowish; wing membrane hyaline.

Variation.— Length of fore wing 2.5-2.6 mm; length of hind basitarsus 4.0-4.5 times its width; length of first metasomal tergite 0.7-0.9 times its apical width; length

of ovipositor sheath 0.06-0.08 times fore wing; side of pronotum yellowish or largely dark brown.

Note.— It is pleasure to name this species in honour of the Yasir Family (Ujung Pandang), especially Ir. Muhammad Yasir Baeda, who has been very helpful to make the fieldwork in East Indonesia a success.

Subfamily Betylobraconinae Tobias, 1979

Tribe Facitorini van Achterberg, 1995

Genus *Conobregma* van Achterberg, 1995
(figs 25-28, 33, 34)

Key to species of the genus *Conobregma* van Achterberg

1. Vein 3-CU1 of fore wing distinctly longer than vein m-cu (fig. 24); scutellum with deep transverse groove (fig. 25); first subdiscal cell of fore wing comparatively elongate (fig. 24); second metasomal tergite smooth posteriorly (fig. 34); vein 1-M of hind wing comparatively long (fig. 24); vein cu-a of hind wing reduced; Indo-Australian *C. sulaensis* spec. nov.
- Vein 3-CU1 of fore wing about as long as vein m-cu (figs 507, 518 in van Achterberg, 1995) or shorter than vein m-cu (fig. 528 l.c.); scutellum with shallow transverse groove (fig. 511 l.c.); first subdiscal cell of fore wing comparatively robust, short (figs 507, 518, 528 l.c.); second metasomal tergite sculptured posteriorly (figs 515, 524, 526, 530 l.c.); vein 1-M of hind wing somewhat shorter (figs 507, 518 l.c.); vein cu-a of hind wing distinct (figs 507, 518 l.c.); New World 2
2. Length of vein r of fore wing about 0.5 times maximum width of pterostigma (figs 528, 532, 583 l.c.); head (largely) brownish-yellow; vein 1-M of hind wing 1.3-1.4 times vein M+CU (figs 528, 532, 583 l.c.); second metasomal tergite without narrow triangular area medio-basally (figs 530, 580 l.c.) 3
- Length of vein r of fore wing about 0.8 times maximum width of pterostigma (figs 507, 518 l.c.); head dark brown; vein 1-M of hind wing as long as vein M+CU (figs 507, 518 l.c.); second tergite with narrow triangular area medio-basally (figs 524, 526 l.c.) or area obsolescent 5
3. Fourth and fifth metasomal tergites finely rugulose and with some punctures; pterostigma comparatively wide, vein r 0.4 times maximum width of pterostigma (fig. 583 l.c.); basal antennal segments slender (fig. 585 l.c.); precoxal sulcus short, oval *C. brevistigmus* van Achterberg, 1995
- Fourth and fifth tergites completely smooth; pterostigma narrower, vein r 0.5 times maximum width of pterostigma (figs 528, 532 l.c.); basal antennal segments comparatively robust (figs 527, 533 l.c.); precoxal sulcus variable 4
4. Apical segment of antenna of ♀ ivory; length of third antennal segment of ♀ about 1.4 times fourth segment (fig. 527 l.c.); third metasomal tergite (except apically) largely densely rugulose (fig. 530 l.c.); precoxal sulcus smooth, short and oval *C. masneri* van Achterberg, 1995
- Apical segment of antenna of ♀ dark brown; length of third antennal segment of ♀ 1.1-1.2 times fourth segment (fig. 533 l.c.); third tergite (largely) smooth, at most with some indistinct micro-sculpture; precoxal sulcus with few crenulae, elongate and narrow *C. stigmaticum* van Achterberg, 1995

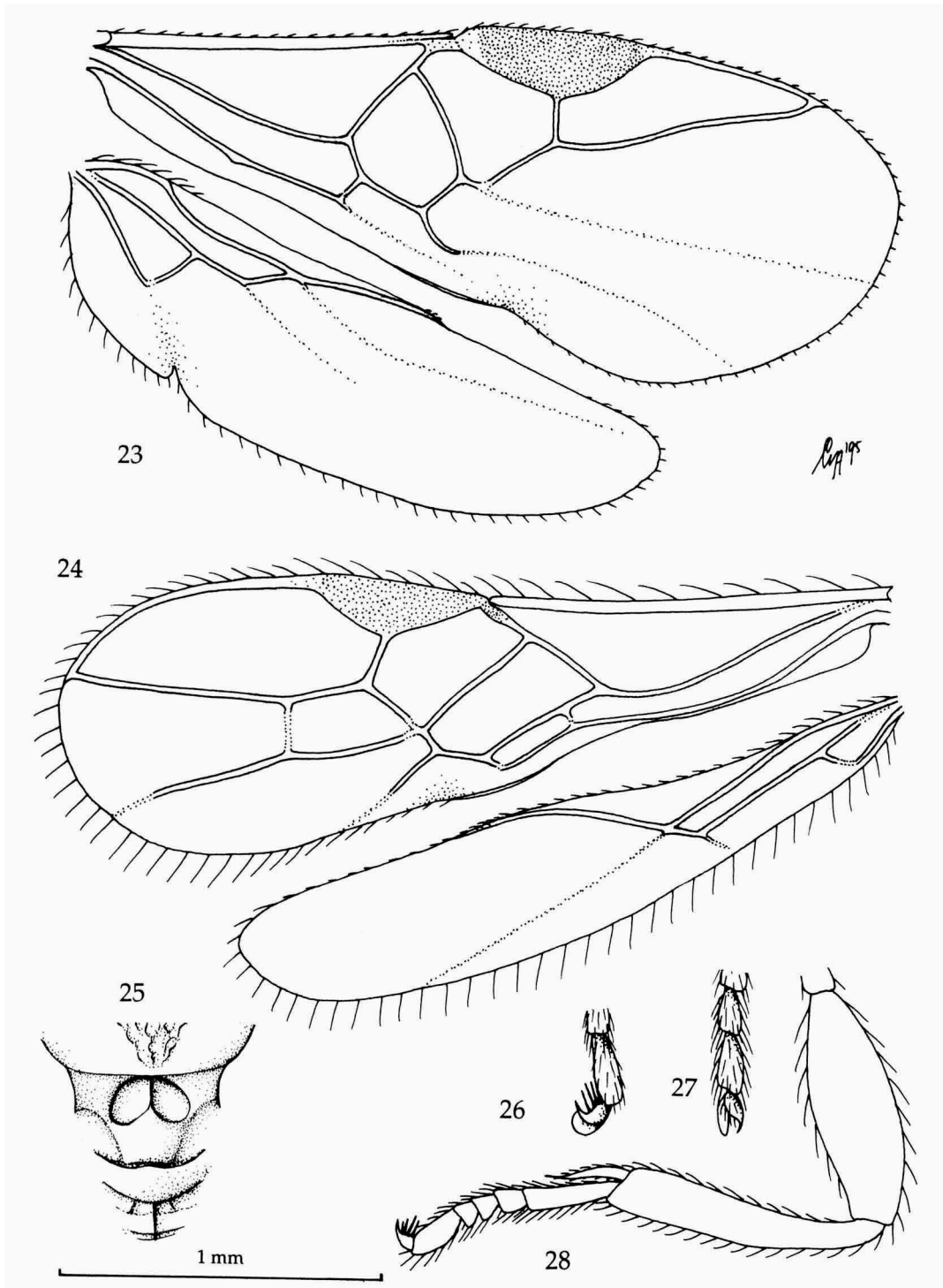


Fig. 23, *Ecnomios yasiri* spec. nov., ♀, holotype; figs 24-28, *Conobregma sulaensis* spec. nov., ♀, holotype. 23, 24, wings; 25, scutellum, dorsal aspect; 26, outer middle claw; 27, outer hind claw; 28, fore leg. 23: 1.0 × scale-line; 24: 2.0 ×; 25: 2.2 ×; 26-28: 2.8 ×.

5. Length of eye in dorsal view about 2.7 times temple (♀: fig. 509 l.c.); vein 1r-m of hind wing somewhat longer (fig. 507 l.c.); precoxal sulcus narrower, and weaker rugose (fig. 510 l.c.); hind femur more robust (fig. 516 l.c.); middle lobe of mesoscutum smooth posteriorly (except some rugae; fig. 511 l.c.); third tergite largely smooth (fig. 515 l.c.) *C. cometes* van Achterberg, 1995
- Length of eye in dorsal view 1.9-2.1 times temple (♀ ♂: figs 519, 520 l.c.); vein 1r-m of hind wing shorter (fig. 518 l.c.); precoxal sulcus wider and coarser rugose medially (fig. 523 l.c.); hind femur less robust (fig. 525 l.c.); middle lobe of mesoscutum completely granulate; anterior half of third tergite densely rugulose (fig. 526 l.c.) *C. brevinervis* van Achterberg, 1995

Conobregma sulaensis spec. nov.
(figs 24-28, 33, 34)

Material.— Holotype, ♀ (RMNH), "Indonesia: Sula Isl., Taliabu, near Tubang, Mal. trap 20, c 40 m [altitude], 9-20.iii.1995, C. v. Achterberg & Y. Yasir, RMNH". Paratype: 1 ♀ (MZB), "Indonesia: Sula Isl., Mangole, Buluhaya, Mal. trap 18, c 90 m [altitude], 6-23.iii.1995, C. v. Achterberg & Y. Yasir, RMNH".

Holotype, ♀, length of body 1.8 mm, and of fore wing 1.3 mm.

Head.— Antennal segments 17, length of third segment 1.2 times fourth segment, length of third, fourth and penultimate segments 2.3, 1.7 and 2.2 times their width, respectively (fig. 33); length of maxillary palp 0.9 times height of head; occipital carina complete, distinct medio-dorsally; length of eye in dorsal view 2.6 times temple; OOL:diameter of ocellus:POL = 4:3:2; head rather concave posteriorly in dorsal view; face finely pimply dorsally, largely smooth ventrally, strongly protruding; clypeus strongly convex and smooth; length of malar space 1.6 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.5 times its height; side of pronotum largely smooth, but anteriorly coriaceous and somewhat elevated; epicnemial area rugose dorsally; precoxal sulcus distinctly impressed anteriorly, largely smooth, and obsolete posteriorly; remainder of mesopleuron smooth; anterior half of metapleuron smooth, and posterior half rugose; notauli complete, rather wide, especially posteriorly crenulate-rugose; mesoscutum shiny, coriaceous (but superficially on lateral lobes), and (as head) long setose; scutellum mainly smooth, with deep groove sub-posteriorly (fig. 25); propodeum rugose-reticulate, its median carina short.

Wings.— Fore wing: r:3-SR:SR1 = 8:13:35; 1-SR+M straight; r oblique (fig. 24); 1-CU1:2-CU1 = 5:14; 3-CU1 horizontal, distinctly longer than m-cu (fig. 24); 2-SR:3-SR:r-m = 21:25:16; first subdiscal cell comparatively slender (fig. 24); m-cu subinterstitial, somewhat diverging to 1-M posteriorly (fig. 24). Hind wing: M+CU:1-M = 8:23.

Legs.— Hind coxa smooth; fore and middle claws pectinate, hind claws only setose (figs 26-28); length of femur, tibia and basitarsus of hind leg 3.3, 8.0 and 3.5 times their width, respectively; length of hind tibial spurs 0.2 and 0.4 times hind basitarsus; hind femur compressed, widened; fore and middle tarsi robust, its second-fourth segments shortened (fig. 28).

Metasoma.— Length of first tergite 0.9 times its apical width, its surface coarsely longitudinally rugose, mingled with weaker transverse sculpture (fig. 34); second tergite rather coarsely rugose, but medio-posteriorly smooth and laterally partly punctate, without distinct basal area, and no median carina; second suture deep, curved and finely crenulate; third tergite largely smooth, with some micro-sculpture antero-laterally (fig. 34); only second tergite with sharp lateral crease; medial length

of second tergite 1.7 times medial length of third tergite; length of ovipositor sheath 0.09 times fore wing.

Colour.— Yellowish-brown; pronotal side and mesopleuron partly, metapleuron largely, propodeum, first and second tergites blackish-brown; pterostigma (except narrowly whitish apex), and third-fifth tergites (except apical margin) dark brown; antenna (except for scapus and pedicellus), and most veins brown; palpi, legs, and metasoma ventrally pale yellowish; wing membrane slightly infusate.

Variation.— Length of body 1.5-1.8 mm, and fore wing 1.2-1.3 mm; antennal segments 17(2); length of first metasomal tergite 0.9-1.1 times its apical width; length of ovipositor sheath 0.09-0.12 times fore wing; third antennal segment yellowish or brown.

Distribution.— Indonesia (West Moluccans, Sula Islands: Taliabu, Mangole).

Subfamily Cenocoeliinae Szépligeti, 1901

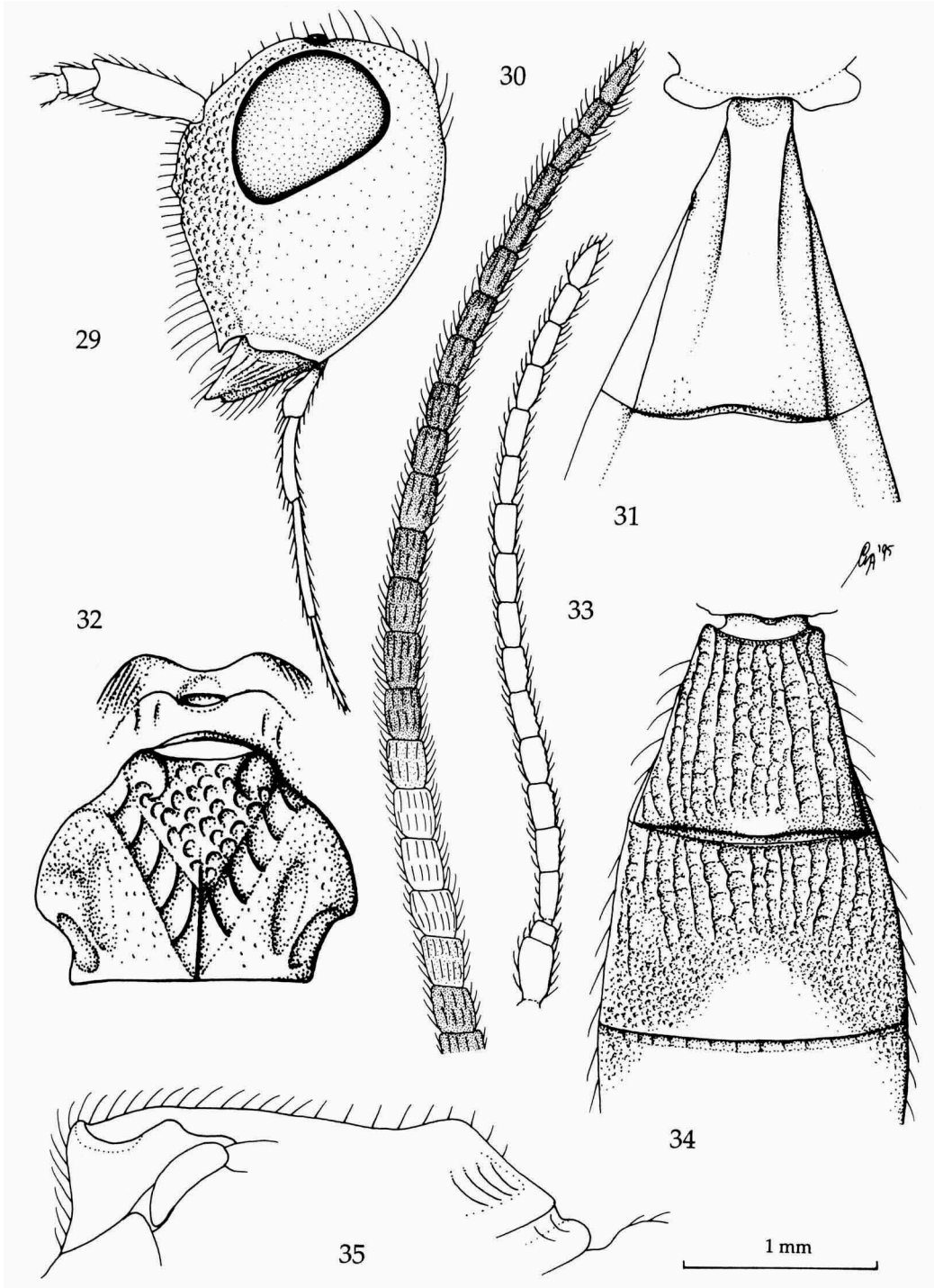
Tribe Cenocoeliini Szépligeti, 1901

Genus *Rattana* van Achterberg, 1994

(figs 29-32, 35)

Key to species of the genus *Rattana* van Achterberg

1. Oblique anterior carina of mesoscutum distinctly protruding, often forming a pair of horn-like protrusions (fig. 102 in van Achterberg, 1994), which may be small (fig. 35); propodeum normally setose, with underlying sculpture well visible; antenna of ♀ with pale brownish-yellow band near its apical third (fig. 103 in van Achterberg, 1994, but absent in ♂; fig. 30); propodeum with wing-like flanges beside insertion of metasoma (fig. 100 in van Achterberg, 1994); vein cu-a of hind wing straight or nearly so (fig. 99 l.c.); frons coarsely and densely punctate laterally; scapus slender, 3.0-4.0 times its width, and long, in upright position protruding above upper level of head (fig. 104 l.c.); propodeum and hind leg black(ish); colour of scapus and pedicellus variable 2
- Oblique anterior carina of mesoscutum forming a pair of crests, but not protruding horn-like (fig. 35 l.c.); propodeum long and densely setose, obscuring underlying sculpture; apical half of antenna of ♀ dark brown; propodeum with only wide flange-like carina besides insertion of metasoma (fig. 35 l.c.); vein cu-a of hind wing distinctly curved (fig. 34 l.c.); frons sparsely and finely punctate laterally; scapus less slender, about 2.5 times its width, and shorter, in upright position at most reaching somewhat above upper level of head (figs 35, 105 l.c.); colour of propodeum and hind leg variable; scapus and pedicellus dark brown 3
2. Fore and middle legs, scapus, and pedicellus yellowish-brown; scutellum and horn-like protrusions of mesoscutum more protruding dorsally (fig. 102 in van Achterberg, 1994); length of vein r-m of hind wing 1.6-2.3 times vein 1-M (fig. 99 l.c.); vein m-cu of fore wing (slightly) antefurcal (fig. 99 l.c.); apical antennal segments of ♀ less slender (fig. 103 l.c.); length of fore wing 9.8-12.7 mm; Sulawesi *R. cephalotes* (Smith, 1860)
- Fore leg, and tibia and tarsus of middle leg dark brown; scapus, pedicellus, and remainder of middle leg black; scutellum and horn-like protrusions of mesoscutum less protruding dorsally (fig. 35); length of vein r-m of hind wing 1.2-1.3



Figs 29-32, 35, *Rattana nigriscapa* spec. nov., ♀, holotype. 29, head, lateral aspect; 30, apical 0.4 of antenna; 31, first metasomal tergite, dorsal aspect; 32, mesoscutum and pronotum, dorsal aspect; 33, antenna; 34, first and second metasomal tergites, dorsal aspect; 35, mesonotum, lateral aspect. 29, 31, 35: 1.0 × scale-line; 30, 32: 1.8 ×; 33: 2.8 ×; 34: 4.7 ×.

- times vein 1-M; vein m-cu of fore wing interstitial; apical antennal segments of ♀ more slender (fig. 30); length of fore wing 7.8-9.9 mm; Sula Islands (Mangole)
 *R. nigriscapa* spec. nov.
3. Scapus in upright position not reaching upper level of head, and more robust (fig. 35 in van Achterberg, 1994); precoxal sulcus distinct medially; vein cu-a of fore wing (sub)interstitial (fig. 34 l.c.); propodeum and hind leg yellowish-brown; New Guinea *R. albopilosella* (Cameron, 1911)
- Scapus in upright position reaching upper level of head, and more slender (fig. 105 l.c.); precoxal sulcus interrupted medially; vein cu-a of fore wing distinctly postfurcal; propodeum black and hind leg dark brown; Misoöl, New Guinea
 *R. insidiator* (Smith, 1863)

Rattana nigriscapa spec. nov.
 (figs 29-32, 35)

Material.— Holotype, ♀ (RMNH), "Indonesia: Sula Isl., Mangole, near Buya, Mal. trap 10, c 480 m [altitude], 12.x-2.xi.1993, C. v. Achterberg, RMNH'93". Paratype, 1 ♀ (MZB), topotypic, same date, but Malaise trap no. 12, 495 m.

Holotype, ♀, length of body 10.0 mm, of fore wing 9.8 mm.

Head.— Antennal segments 41, antenna about as long as fore wing, length of third segment 1.1 times fourth segment, length of third, fourth and penultimate segments 3.2, 3.0 and 2.0 times their width, respectively; length of scapus 3.5 times its maximum width, in upright position protruding above top of head (fig. 29); length of maxillary palp 1.1 times height of head; length of eye in dorsal view 1.8 times temple; temple sparsely punctate; OOL:diameter of ocellus:POL = 3:1:2; anterior ocellus of similar size as lateral ocelli and situated slightly lower; vertex flat, smooth, except some punctures laterally; medial depression of frons smooth and with medium-sized rounded lamella, not protruding above depression (fig. 29), and laterally coarsely and densely punctate; face medially and clypeus (but latter smooth ventrally) densely and coarsely punctate (interspaces usually less than diameter of punctures); maximum width of eye equal to length of malar space (fig. 29); length of malar space 1.9 times basal width of mandible; mandible striate and somewhat twisted apically.

Mesosoma.— Length of mesosoma 1.2 times its height; pronope deep and rather large, narrow elliptical; pronotum somewhat protruding and striate antero-dorsally; side of pronotum coarsely crenulate medially and posteriorly, and remainder finely punctate; propleuron coarsely punctate, medially with some transverse rugae; oblique anterior carina of mesoscutum strong, but not distinctly protruding above upper level of mesoscutal lobes, not horn-like (figs 32, 35); prepectal and postpectal carinae complete and strong; epicnemial area and precoxal sulcus coarsely crenulate, vertical dorsal depression short, and largely smooth; remainder of mesopleuron sparsely punctate; metapleuron and propodeum very coarsely reticulate; propodeum with pair of large flanges beside insertion of metasoma (fig. 31); propodeum long erect and densely whitish setose, not obscuring underlying sculpture; notauli moderately wide, coarsely crenulate; lateral lobes of mesoscutum sparsely punctate, and with longitudinal lateral depression; middle lobe of mesoscutum slightly concave antero-medially, and coarsely and densely punctate (fig. 32); scutellum rather convex, slightly protruding above upper level of mesoscutal lobes (fig. 35), and sparsely coarsely punctate.

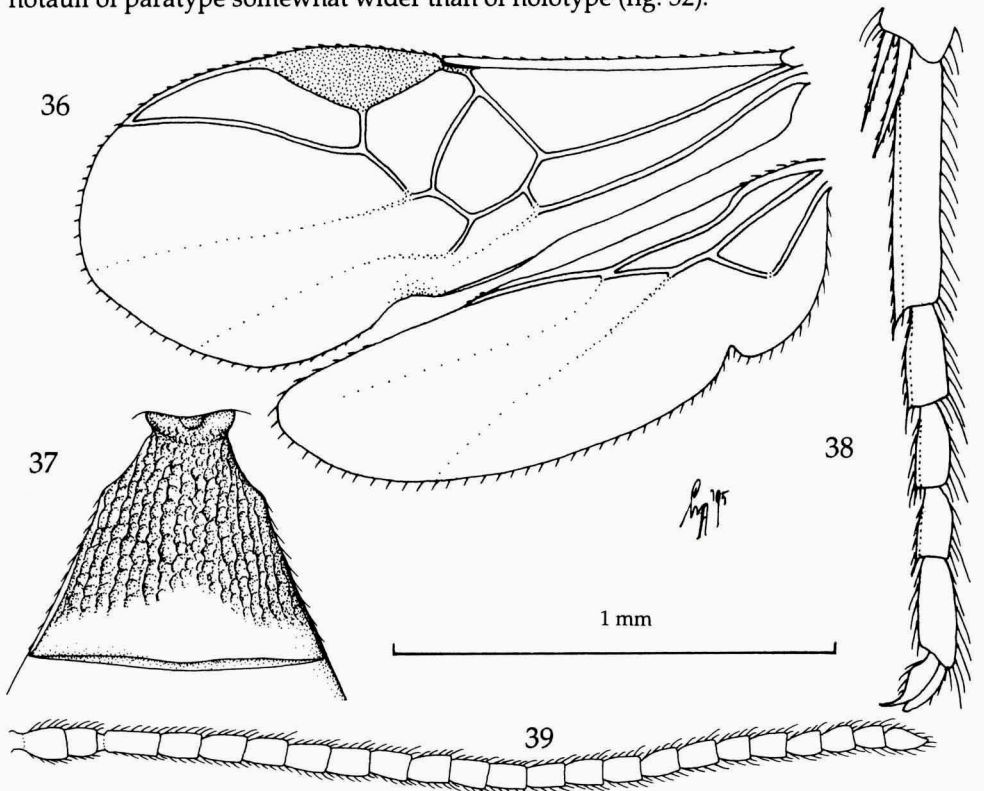
Wings.— Fore wing: r:3-SR:SR1 = 10:11:64; 2-SR:3-SR:r-m = 14:11:12; m-cu interstitial; cu-a just postfurcal, 1-CU1:2-CU1 = 1:13. Hind wing: M+CU:1-M = 28:10; 1-M:1r-m = 10:24; cu-a straight; anterior margin with 3 hamuli.

Legs.— Tarsal claws with minute, and acute, ventral lobe; length of femur, tibia and basitarsus of hind leg 4.5, 9.0, and 7.2 times their width, respectively; length of hind tibial spurs 0.30 and 0.35 times hind basitarsus; length of fore tarsus 1.1 times fore tibia.

Metasoma.— Length of first tergite 1.5 times its apical width, slender (fig. 31), its surface smooth, except for some punctures latero-posteriorly, its dorsal carinae present in basal half of tergite, posterior quarter of tergite distinctly flattened; length of ovipositor sheath 0.97 times fore wing.

Colour.— Black; 23rd-25th antennal segments pale yellowish, its 22nd and 26th segments pale brown, remainder of antenna black (fig. 30); head, and antero-lateral corner of mesoscutum brownish-orange; pronotum, and tegulum brownish-yellow; palpi, humeral plate, fore leg, middle tarsus and tibia, most veins, and wing membrane dark brown, except pale patch below pterostigma; veins of basal half of fore wing, and pterostigma brownish-black.

Variation.— Length of body 8.6-11.0 mm, of fore wing 7.8-9.9 mm; antennal segments of ♀ 41(1), and 43(1); 23rd-25th or 22nd-27th antennal segments pale yellowish-ivory, 21st and 28th segments may be brown; length of first metasomal tergite 1.5-1.6 times its apical width; length of ovipositor sheath 0.84-0.97 times fore wing; notauli of paratype somewhat wider than of holotype (fig. 32).



Figs 36-39, *Ecnomios infuscatus* spec. nov., ♀, holotype. 36, wings; 37, first metasomal tergite, dorsal aspect; 38, hind tarsus, inner aspect; 39, antenna. 36: 1.0 × scale-line; 37: 1.6 ×; 38: 2.3 ×; 39: 1.1 ×.

Acknowledgements and abbreviations

I wish to thank Mr C. O'Toole (Oxford) for his hospitality during my stay in Oxford, Ir Harrys Hutapea (Falabisahaya, Mangole), Ir Bettawati (Tubang, Taliabu), Ir Yohanis (Samuya, Taliabu), and the officers of LIPI and the Barito Pacific Timber Group (especially of PT Kalpika Wanatama/HTI-Trans) for the possibility to perform fieldwork in Mangole and Taliabu. The Yasir family (Ujung Pandang, especially Ida Yasir SSi (now Palangkaraya) and Ir M. Yasir Baeda) for the invaluable help during my stay in Indonesia. Mr Rob de Vries (RMNH) for the assistance during the expedition to East Indonesia in 1995, and for the excellent preparation of the Hymenoptera collected during this expedition.

Abbreviations: MZB = Museum Zoologicum Bogoriense, Bogor; RMNH = Nationaal Natuurhistorisch Museum, Leiden.

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Received: 29.ix.1995

Accepted: 9.x.1995

Edited: J.C. den Hartog