

Revision of the *Euagathis* species (Hymenoptera: Braconidae: Agathidinae) from China and northern Vietnam

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Key words: Braconidae; Agathidinae; Disophrini; *Euagathis*; *Balцемena*; key; distribution; synonyms; Indo-Australian; Oriental; China; Vietnam; Tonkin; India.

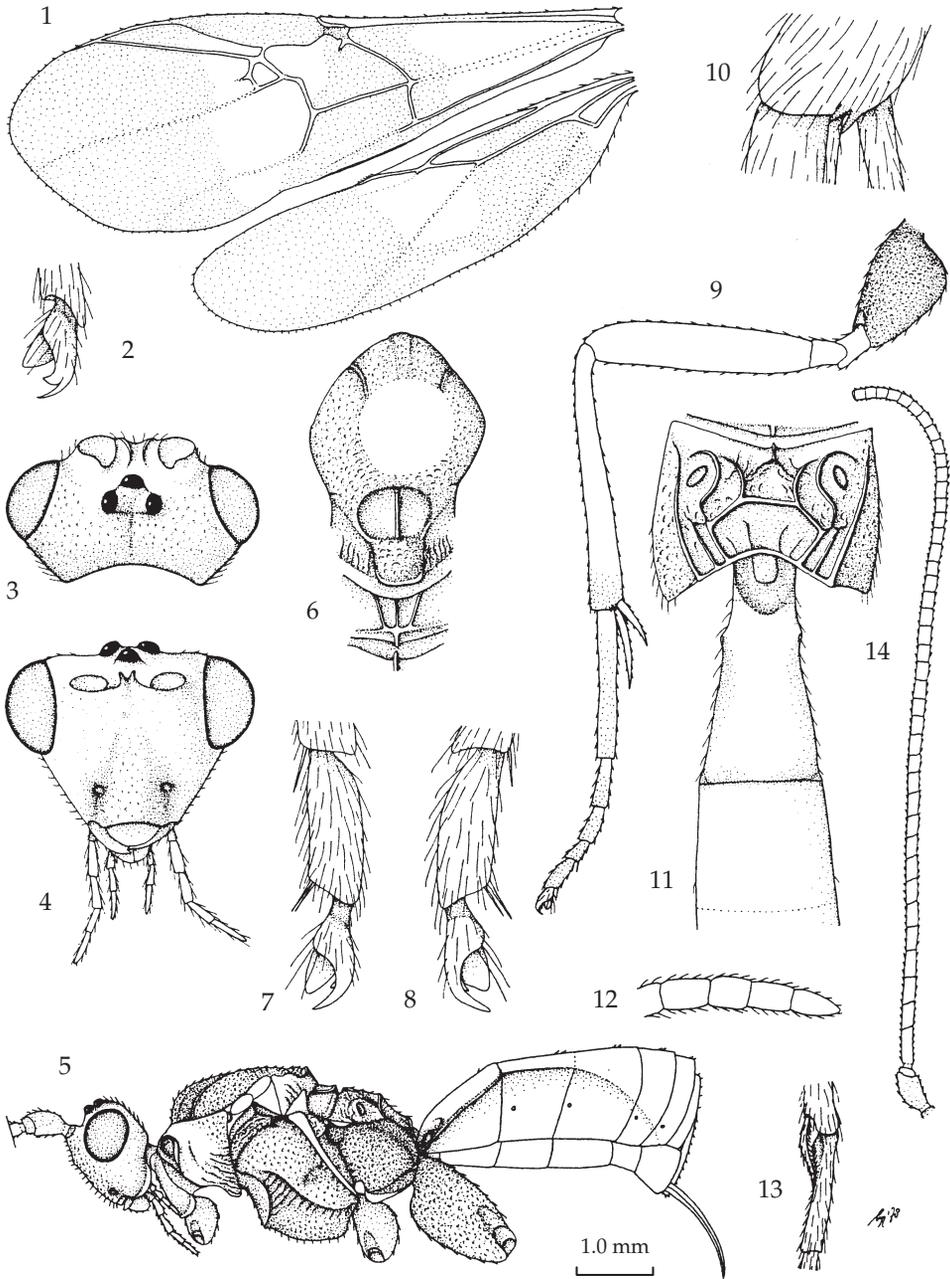
The species of the genus *Euagathis* Szépligeti, 1900 (including *Balцемena* Cameron, 1903; Braconidae: Agathidinae) from China and northern Vietnam are revised and keyed. Twelve species are recognised, of which six are new: *Euagathis argentosa* spec. nov. and *E. gracilitarsis* spec. nov. from Yunnan (China), *E. maxichora* spec. nov. and *E. mayunae* spec. nov. from Fujian (China), *E. parallela* spec. nov. and *E. robusta* spec. nov. from Tonkin (Vietnam), the latter also from Yunnan. The following are new synonyms: *Euagathis chinensis* Szépligeti, 1902, *E. asiatica* Fahringer, 1937, *E. semenovi* Shestakov, 1940, and *E. relativa* Bhat & Gupta, 1977, of *E. ophippium* (Cameron, 1899); *E. nigratarsis* (Cameron, 1899), *E. hongkongensis* Fullaway, 1919, *E. nigrithorax* Bhat & Gupta, 1977, *E. varuni* Bhat & Gupta, 1977, and *E. transcarinata* Bhat & Gupta, 1977, of *E. forticarinata* (Cameron, 1899); *E. albiventris* Enderlein, 1920, *E. sikkimensis* Enderlein, 1920 and *E. chinensis* (Bhat & Gupta, 1977) of *E. borneoensis* Szépligeti, 1902; *E. melanocera* (Cameron, 1899), *E. japonica* Szépligeti, 1902, *E. semiflavus* Szépligeti, 1908, *E. horniana* Enderlein, 1920, *E. formosana* Enderlein, 1920, *E. formosana* var. *obscurior* Enderlein, 1920, *E. nigrifrons* Enderlein, 1920, *E. tricarinata* Enderlein, 1920, of *E. chinensis* (Holmgren, 1868).

The genus *Balцемena* Cameron, 1903, is synonymised with *Euagathis* Szépligeti, 1900, consequently, *Euagathis ruficollis* (Cameron, 1902; not Cameron, 1899) is replaced by *E. rufonigra* Enderlein, 1920.

Introduction

The members of the subfamily Agathidinae Nees, 1814 (Hymenoptera: Braconidae) of China (except Taiwan) and Vietnam are hardly known and, consequently, no reliable keys to the species are available. In this area, members of the genus *Euagathis* Szépligeti, 1900, are rather uncommon but conspicuous. The genus *Euagathis* has a Palaetropical and SE Palaearctic distribution, with most of the species in the Indo-Australian region. The key to the Oriental *Euagathis* species published by Bhat & Gupta (1977), proved to be unreliable for the identification of the described species, and in addition several new ones have been discovered; therefore, a new key had to be made. More reliable keys to part of the SE Asian *Euagathis* species has been published by Simbolotti & van Achterberg (1990, 1995) for the species from the Sunda area and Sulawesi. The study of variation of most species is severely hampered by the lack of specimens, so the key presented in this paper is just a start to a better understanding of the diversity of the genus in this area.

The phylogenetic position of the subfamily Agathidinae is in the Sigalphoid subgroup of the Helconoid lineage (Quicke & van Achterberg, 1990). It forms the most



Figs 1-14, *Euagathis bifasciata* Szépligeti, ♀, holotype, but 12 from Irian Jaya, Bernhard Camp. 1, wings; 2, inner fore claw; 3, head, dorsal aspect; 4, head, frontal aspect; 5, habitus, lateral aspect; 6, thorax, dorsal aspect; 7, inner hind claw; 8, outer hind claw; 9, hind leg; 10, apex of hind tibia, outer aspect; 11, propodeum and first metasomal tergite, dorsal aspect; 12, apex of antenna; 13, fore tibial spur; 14, antenna. 1, 5, 9, 14: 1.0 × scale-line; 2, 7, 8, 10, 12: 5.0 ×; 3, 4, 6, 11, 13: 2.0 ×.

speciose part of it. The Sigalphoid subgroup is placed near the base of the Helconoid lineage by Belshaw & Quicke (2002), and is one of the basal groups of the non-cyclostomes. The morphology of the sperm of Agathidinae is intermediate between the cyclostomes and other non-cyclostomes. The unique combination of the very long axonemes and the straight but short nucleus points to the cyclostome clade (Quicke, 1994; Quicke et al, 1999), the reduction of the central microtubules of the axoneme and probably also of the mitochondrial derivatives along the axoneme of the mature spermatozoa indicate a relation to the non-cyclostome grade. The subfamily as treated by Quicke & van Achterberg (1990) is certainly monophyletic, possessing several autapomorphies, e.g. the shape of its sperm, the presence of a distinct pre-apical bulla in the vein r-m of the fore wing (figs 23, 25, 44), the specialised tergal glands on the sixth and seventh metasomal tergites of the males (Buckingham & Sharkey, 1988), and the basally extremely narrow and rather long marginal cell of the fore wing (fig. 1). Additional apomorphies concern the loss of the occipital carina, and of the vein CU1b of the fore wing, and the posteriorly diverging veins m-cu and 1-M of the fore wing (van Achterberg, 1993).

The genus *Euagathis* has been placed in the tribe Disophrini Sharkey, 1992, separated from the tribe Cremnoptini Sharkey, 1992 (= Vipionini sensu van Achterberg, 1993) by Sharkey (1992). The tribe Disophrini is recognised because its members have the ovipositor curved and short (length of its sheath less than half the length of the metasoma), the hind basitarsus with a serrate ventral row of setae, and the tarsal claws are not pectinate. Obviously, its members seem to be specialised for parasitizing more or less exposed hosts (Sharkey, 1992), which agrees with the few hosts known for *Euagathis* species. The biology of most species is unknown, but in general the Agathidinae are endoparasitoids of larvae of Lepidoptera. Some species of the genus *Euagathis* Szépligeti have been reared as larval parasitoids of Lymantriidae and Arctiidae (Bhat & Gupta, 1977; Simbolotti & van Achterberg, 1995). The record of a tortricid (for *E. cryptophlebiae* Viereck, 1913; Shenefelt, 1970) is incorrect because the holotype of *E. cryptophlebiae* belongs to the genus *Bassus* Fabricius. Larvae of Tortricidae are in any case too small to support *Euagathis* species and they have a concealed way of life.

For the identification of the subfamily Agathidinae, see van Achterberg (1990, 1993, 1997) and for the terminology used in this paper (except for the stigmal spot and the ramellus), see van Achterberg (1988, 1993). The stigmal spot is a well defined and more or less circular dark brown patch below the parastigma present in many species (figs 63, 113, 122; fig. 113 in Bhat & Gupta, 1977; figs 19-21, 26-28 in Simbolotti & van Achterberg, 1995). The ramellus is the short vein externally connected to the second submarginal cell of the fore wing (figs 33, 44, 108).

Genus *Euagathis* Szépligeti, 1900

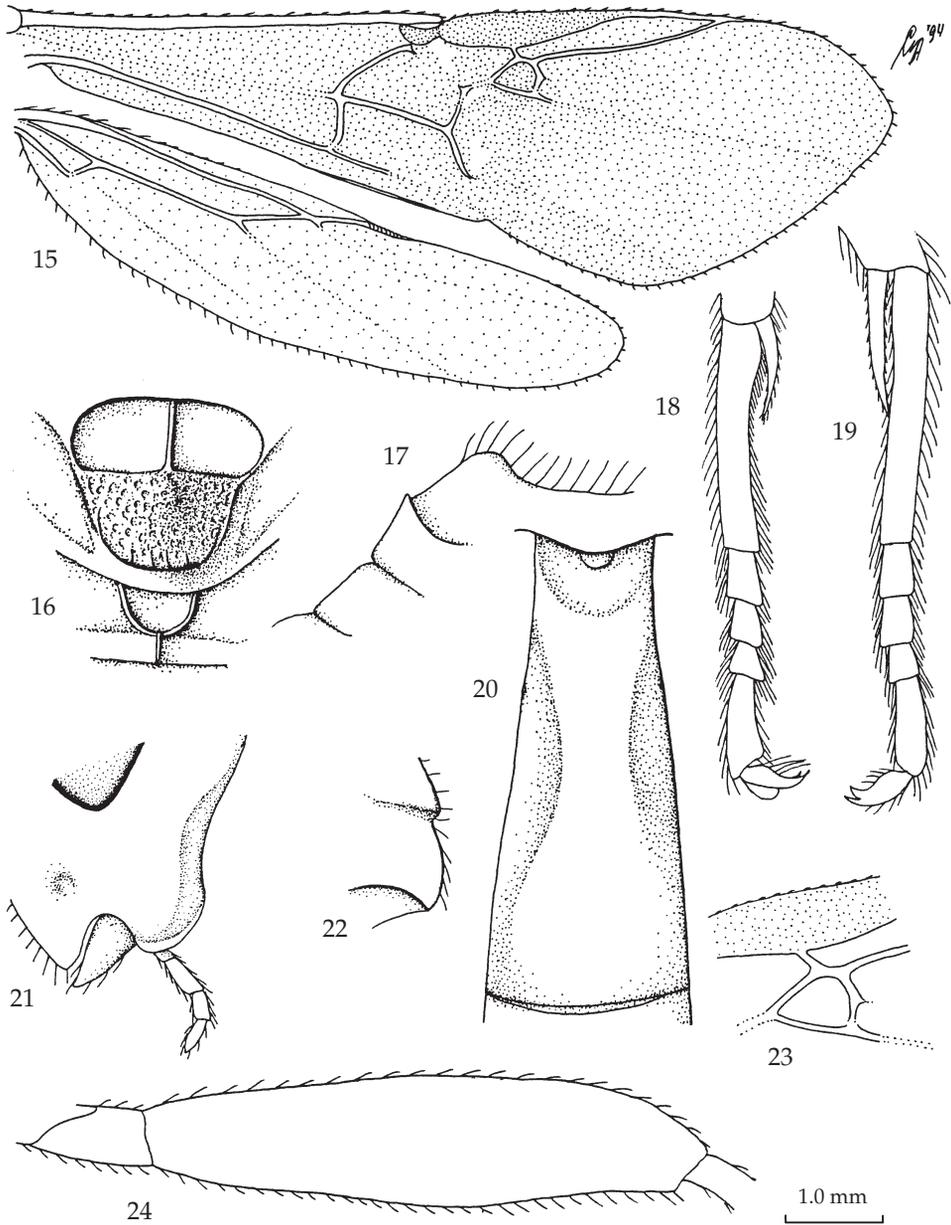
Euagathis Szépligeti, (Jan.) 1900: 62; Shenefelt, 1970: 408; Bhat & Gupta, 1977: 183; Chou & Sharkey, 1989: 186; Sharkey, 1992: 441; Simbolotti & van Achterberg, 1995: 6; Sharkey, 1996: 21, 1998: 531.

Type-species (designated by Viereck, 1914): *Euagathis bifasciatus* Szépligeti, 1900 [examined].

Chromomicrodus Ashmead, (July) 1900: 129; Shenefelt, 1970: 409. Type species (by original designation):

Chromomicrodus abbotti Ashmead, 1900 [examined]. Synonymised by Baltazar, 1961.

Holcotroticus Cameron, 1902: 41; Shenefelt, 1970: 417; Sharkey, 1992: 441. Type species (by original des-



Figs 15-24, *Euagathis ophippium* (Cameron), ♀, holotype. 15, wings; 16, scutellum, dorsal aspect; 17, scutellum, lateral aspect; 18, fore tarsus, lateral aspect; 19, middle tarsus, lateral aspect; 20, first metasomal tergite, dorsal aspect; 21, malar space; 22, clypeus, lateral aspect; 23, detail of second submarginal cell of fore wing; 24, hind femur, lateral aspect. 15: 1.0 × scale-line; 16, 17, 20: 3.3 ×; 18, 19, 21: 2.8 ×; 22: 2.8 ×; 23: 2.0 ×; 24: 1.6 ×.

ignation): *Holcotroticus ruficollis* Cameron, 1902 [examined]. Synonymised by Simbolotti & van Achterberg, 1995.

Balцемena Cameron, 1903: 130; Shenefelt, 1970: 368; Sharkey, 1992: 441. Type species (by original designation): *Balцемena longicollis* Cameron, 1903 [examined]. **Syn. nov.**

Diagnosis.— Length of fore wing 7-16 mm; head distinctly elongated ventrally, its malar space distinctly longer than basal width of mandible (figs 4, 5, 29, 49); antenna distinctly longer than body, with 42-60 segments, its apex acute and without apical spine (figs 12, 14); labio-maxillary complex not enlarged (fig. 5); area between antennal sockets with a pair of crests (fig. 3); area behind antennal sockets slightly depressed (fig. 3) or flat; frons without lateral carinae (fig. 3), at most with pair of non-carinate elevations; temple in lateral view concave medio-posteriorly (fig. 5); precoxal sulcus present and (largely) crenulate or costate (fig. 5); notauli present (figs 5, 6), but sometimes shallow; scutellum with crest-like elevation subposteriorly (fig. 6); propodeal spiracle medium-sized to large and elliptical (figs 11, 49); propodeum (partly) areolate and costulae usually (largely) present (figs 11, 49, 50); vein M+CU of hind wing shorter than vein 1-M (figs 1, 79, 107, 132); hind wing with 4-12 hamuli; fore tarsal claw bifurcate, its inner tooth large (fig. 2); middle and hind tarsal claws similar, with smaller inner tooth (figs 7, 8); fore tibial spur about 0.7 times fore basitarsus, without long glabrous apical spine (fig. 13); length of inner middle spur 0.3-0.6 times middle basitarsus; outer face of middle tibia without submedial pegs, only with 1-3 pegs apically (fig. 10); hind trochantellus with its lower edges rounded, without ventral carinae; hind basitarsus with serrate ventral row of strong setae; first metasomal tergite usually smooth, but may be partly or completely sculptured, without lateral depressions (fig. 80) or depressions slightly developed (fig. 11), but sometimes rather distinctly depressed (figs 95, 103), its length 1.0-2.7 times its apical width, and laterope present (fig. 5); second and third tergites smooth; second metasomal suture at most slightly impressed dorsally (fig. 11); ovipositor short, gradually narrowed apicad, without teeth and curved downwards (fig. 5); ovipositor sheath subparallel-sided, apically subtruncate, and ventrally glabrous, and about as long as apical height of metasoma (fig. 5).

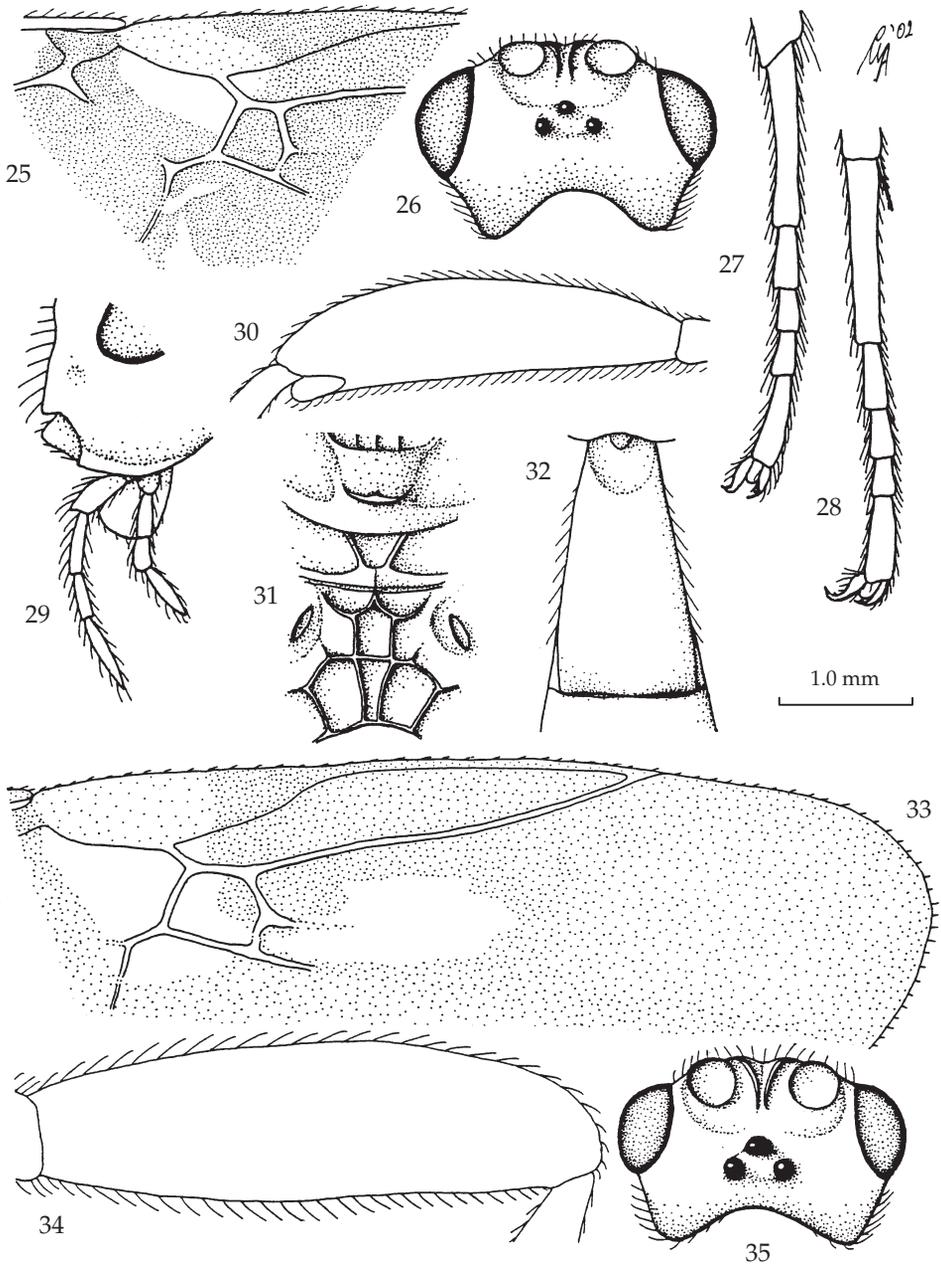
Distribution.— Indo-Australian, SE Palaearctic, Afrotropical.

Biology.— Endoparasitoids of Lymantriidae and Arctiidae.

Note.— The genus *Balцемena* Cameron, 1903, is here synonymised with *Euagathis* because the only difference found (the widened first metasomal tergite with sublateral depressions) is intermediate in several species occurring in China. The difference indicated by Bhat & Gupta (1977), viz., the reduction of the costulae of the propodeum, is not correlated with the shape of the first tergite and is (as can be expected from a reduction) variable, even within a species.

Key to species of the genus *Euagathis* Szépligeti from China and northern Vietnam

1. Scutellum strongly protruding (fig. 17); propodeum distinctly depressed and without carinae medio-posteriorly; propodeum with large postero-dorsal lamelliform protuberance and laterally with long setae; metapleuron (very) coarsely vermiculate-rugose; area below precoxal sulcus very coarsely punctate; wings of males evenly dark brown, of females paler brown and with basal half of fore wing more or less with yellowish tinge; stigmal spot absent or nearly so, rarely present;



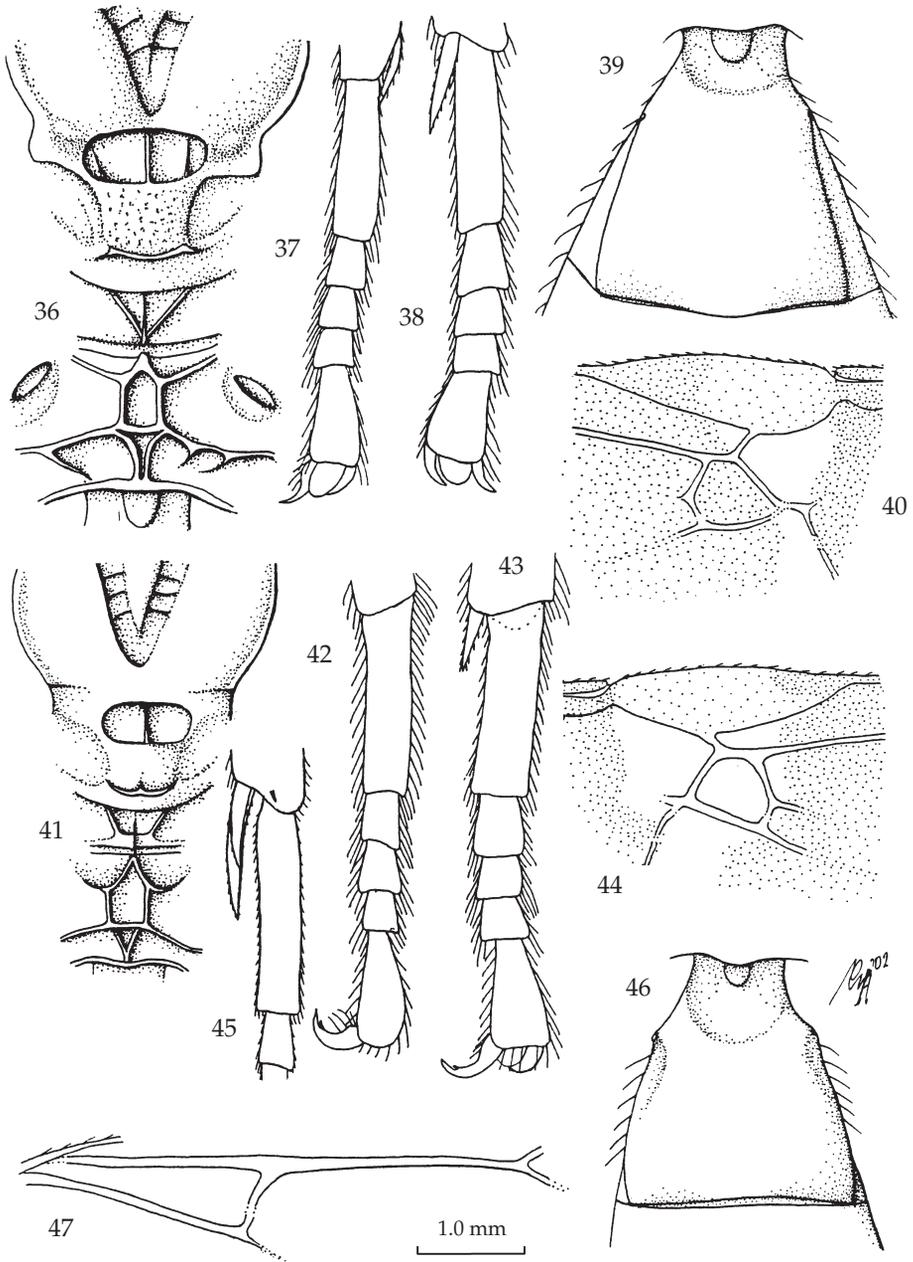
Figs 25-32, *Euagathis gracilitarsis* spec. nov., ♀, holotype; figs 33-35, *E. maxichora* spec. nov., ♀, holotype. 25, 33, detail of pterostigma and second submarginal cell of fore wing; 26, 35, head, dorsal aspect; 27, fore tarsus, dorsal aspect; 28, middle tarsus, dorsal aspect; 29, malar space and palpi; 30, 34 hind femur, lateral aspect; 31, scutellum and propodeum, dorsal aspect; 32, first metasomal tergite, dorsal aspect. 25-28, 30-32: 1.0 × scale-line; 29: 3.6 ×; 33, 35: 0.8 ×; 34: 1.3 ×.

- lateral border of scutellar sulcus more or less protruding; hind femur of ♀ dark brown or black *E. ophippium* (Cameron, 1899)
- Scutellum flat or weakly convex (fig. 62); propodeum without distinct depression and with carinae medio-posteriorly (figs 31, 36, 41), but only rugose in *E. dravida* (fig. 75); propodeum without large postero-dorsal tooth-like protuberance, at most with short flange, and propodeum with moderately short setae laterally; metapleuron and area below precoxal sulcus usually less coarsely punctate or smooth; wings usually with distinct stigmal spot or with spot being part of dark band and wings apically infusate, but sometimes evenly dark brown (*E. dravida*); lateral border of scutellar sulcus not protruding; hind femur of ♀ nearly always completely or partly yellowish-brown, but black in *E. dravida* 2
 - 2. Notauli coarsely crenulate subposteriorly (figs 36, 41); second submarginal cell of fore wing wide anteriorly (figs 25, 33, 40, 44); middle tibial spurs short (figs 28, 38, 43); length of fore wing 11-15 mm; vein 1-M of hind wing somewhat longer than vein M+CU (figs 47, 58); costulae of propodeum behind middle of propodeum (figs 36, 41), but submedial in *E. gracilitarsis* (fig. 31); propodeal spiracle comparatively large (fig. 36); area of mesopleuron below precoxal sulcus and metapleuron largely smooth; scapus black 3
 - Notauli smooth subposteriorly (figs 75, 94, 102), at most punctate and with some rugae (fig. 70); second submarginal cell of fore wing narrow anteriorly (figs 52, 63, 72, 81), but comparatively wide in *E. borneoensis* and *E. parallela* (figs 100, 108); middle tibial spurs medium-sized (figs 68, 105, 126); length of fore wing usually 6-11 mm, rarely longer; vein 1-M of hind wing at least 1.4 times longer than vein M+CU (figs 55, 63, 76, 79, 101, 107, 132); costulae of propodeum near middle of propodeum (fig. 57) or absent (figs 94, 102); propodeal spiracle usually medium-sized (fig. 57); sculpture of area of mesopleuron below precoxal sulcus and metapleuron, and colour of scapus variable 5
 - 3. Fore tarsus of ♀ slender (fig. 27); temple with large dark brown or blackish patch ventrally; length of first metasomal tergite about 1.7 times its apical width (fig. 32); costulae of propodeum near middle of propodeum (fig. 31); length of fore wing 10-12 mm *E. gracilitarsis* spec. nov.
 - Fore tarsus of ♀ very robust (figs 37, 42); temple usually completely yellowish or blackish; length of first tergite 0.9-1.0 times its apical width (figs 39, 46); costulae of propodeum behind middle of propodeum (figs 36, 41); length of fore wing 13-15 mm 4
 - 4. Hind femur normal (fig. 34); dark apical part of fore wing with pale spot near ramellus (fig. 33); head completely yellowish; second segment of middle tarsus of ♀ somewhat longer (fig. 38) *E. maxichora* spec. nov.
Note. Similar to *E. indica* Enderlein, 1920, from India and Sri Lanka (e.g. in the black scapus), but *E. indica* has the tarsi and the tibial spurs normal, the hind femur slender and the second submarginal cell of fore wing small.
 - Hind femur very robust (fig. 48); dark apical part of fore wing without pale spot near ramellus (fig. 40); head completely or at least temple ventrally dark brown; second segment of middle tarsus of ♀ somewhat shorter (fig. 43) *E. robusta* spec. nov.
 - 5. Metapleuron, hind coxa and metasoma laterally velvety silvery setose, more or less with yellowish tinge; precoxal sulcus very coarsely and long crenulate (fig. 61);

- hind leg completely black; stigmal spot minute (fig. 52); lateral carina of scutellum strong, lamelliform (fig. 57) *E. argentosa* spec. nov.
 Note. *E. clathrata* (Brullé, 1864), which is known to occur north up to West Malaysia, has similar pilosity of the metapleuron and possesses lateral carinae of the scutellum, but differs mainly by having the wings and the middle legs completely dark brown.
- Metapleuron, hind coxa and metasoma laterally sparsely setose; precoxal sulcus moderately crenulate (fig. 116); hind leg usually partly yellowish, but completely blackish in *E. dravida* and partly so in *E. forticarinata* which have the lateral carina of scutellum not lamelliform or partly absent (figs 66, 75); stigmal spot more or less developed (figs 63, 81, 113, 122), but absent in *E. dravida*; lateral carina of scutellum usually absent or weakly developed (figs) 6
 - 6. Lateral lobes of mesoscutum distinctly convex posteriorly and medially distinctly punctate (fig. 70); surroundings of vein cu-a of hind wing glabrous or sparsely setose (figs 76, 79); ovipositor sheath narrow; metapleuron very densely punctate; second submarginal cell of fore wing comparatively slender and subparallel-sided (fig. 72) or somewhat widened posteriorly (fig. 63); first metasomal tergite 1.7-2.0 times its apical width and without sublateral depressions (figs 67, 80); area below precoxal sulcus and metapleuron coarsely and densely punctate, its interspaces at most about as wide as punctures; hind coxa and femur coarsely and densely punctate; second-fourth segments of middle tarsus of ♀ comparatively slender (figs 68, 74); hind femur slender (figs 69, 71, 77); veins 1-M and cu-a of fore wing dark brown if membrane around veins is infuscate; lateral carinae of scutellum usually more or less developed (fig. 75), but may be completely absent in *E. forticarinata* (fig. 66) 7
 - Lateral lobes of mesoscutum weakly convex or flat posteriorly and medially largely smooth (figs 94, 102); surroundings of vein cu-a of hind wing normally setose (fig. 111), rarely sparsely so; ovipositor sheath widened (fig. 92); metapleuron sparsely punctate; second submarginal cell of fore wing less slender and more or less pentagonal or triangular (figs 81, 100, 108, 113, 122, 132); first metasomal tergite 1.0-1.7 times its apical width (figs 90, 95, 115, 129, 131), if twice as long as apically wide (fig. 103) then first tergite with sublateral depressions; area below precoxal sulcus and metapleuron smooth, punctulate or sparsely punctate; hind coxa and femur at most densely finely punctate; second-fourth segments of middle tarsus of ♀ comparatively robust (figs 83, 126), but more slender in *E. parallela* (fig. 105); hind femur less slender (figs 84, 85, 118, 133), but slender in *E. parallela* (fig. 112); veins 1-M and cu-a of fore wing yellowish if membrane around veins is infuscate; scutellum without lateral carinae (figs 93, 102, 121) 8
 - 7. Body completely yellowish-brown or nearly so; fore wing frequently with isolated stigmal spot (fig. 63), or spot part of distinct dark band; wing membrane basally yellowish and apically distinctly infuscate, rarely weakly so; metapleuron with few or no rugae ventrally; vein M+CU of hind wing comparatively long (fig. 79); vein 1-M about twice as long as M+CU; length of fore wing 8-9 mm
 *E. forticarinata* (Cameron, 1899)
 - Body completely black; stigmal spot of fore wing absent (fig. 72); wing membrane weakly infuscate; metapleuron with rugae ventro-posteriorly; vein M+CU of hind wing comparatively short (fig. 76), vein 1-M about 3 times as long as M+CU; length of fore wing 6-8 mm *E. dravida* Bhat & Gupta, 1977

Note. Similar to *E. nigrisoma* Simbolotti & van Achterberg, 1995, from the Sunda area; *E. nigrisoma* differs mainly by the less sculptured mesoscutum, mesopleuron and metapleuron, the latter without rugae and with distinct smooth interspaces between the punctures, and the fore wing is more infusate apically.

8. Second segment of fore tarsus of ♀ very robust (fig. 82), hardly longer than wide **and** head (including stemmaticum) yellowish dorsally; outer side of temple straight (fig. 88); hind femur of ♀ very robust (fig. 84), of ♂ moderately so (fig. 85) *E. mayunae* spec. nov.
- Second segment of fore tarsus of ♀ slender to rather robust (fig. 104), distinctly longer than wide; if rather robust (fig. 126) then at least stemmaticum and its surroundings black and outer side of temple weakly concave (fig. 124); hind femur of ♀ less robust (figs 112, 133; unknown for *E. maculipennis*), of ♂ moderately slender (fig. 118) 9
9. Second metasomal suture comparatively widely impressed (figs 95, 103), distinct; first tergite of ♀ longitudinally depressed sublaterally near middle of tergite (figs 95, 103); costulae of propodeum absent or nearly so (figs 94, 102); laterally temples straight (figs 97, 106); second-fourth segments of middle tarsus of ♀ comparatively slender (fig. 105); vertex and frons (including setae) yellowish; length of fore wing 10-15 mm; length of ovipositor sheath 0.03-0.05 times fore wing 10
- Second metasomal suture absent (cf. fig. 11) or narrowly impressed (fig. 115); first tergite of ♀ without or with weak sublateral depressions (figs 115, 129, 130, 131); costulae of propodeum present (cf. fig. 57); laterally temples slightly concave (figs 120, 124); second-fourth segments of middle tarsus of ♀ robust (fig. 126); vertex and frons (including setae) black, rarely only medially so, but yellowish in *E. maculipennis*; length of fore wing 8.5-10.5 mm; length of ovipositor sheath about 0.08 times fore wing (but unknown for *E. maculipennis*) 11
10. First metasomal tergite distinctly widened apically (usually hardly longer than wide apically, but sometimes distinctly longer; fig. 95); anterior half of precoxal sulcus distinctly crenulate; middle lobe of mesoscutum posteriorly distinctly differentiated from rest of mesoscutum (fig. 94): second tergite largely yellowish-brown or blackish; apex of hind tibia less convex (fig. 96) *E. borneoensis* Szépligeti, 1902
- First tergite parallel-sided (and about twice as long as its apical width; fig. 103); anterior half of precoxal sulcus smooth; middle lobe of mesoscutum posteriorly weakly differentiated from rest of mesoscutum (fig. 102): second tergite ivory and medially dark brown; apex of hind tibia more convex (fig. 109) *E. parallela* spec. nov.
11. Second metasomal suture absent; vertex, frons and stemmaticum usually black, rarely frons only partly or only stemmaticum blackish; malar space and occipital flange comparatively large (fig. 123); colour of vein 1-R1 of fore wing (including its setae) variable; lateral lobes of mesoscutum of ♂ reddish or yellowish-brown; hind coxa black or yellowish brown 12
- Second metasomal suture finely impressed (fig. 115); vertex, frons and stemmaticum yellowish-brown; malar space and occipital flange smaller (fig. 119); vein 1-R1 of fore wing (including its setae) dark brown or brown; lateral lobes of mesoscutum of ♂ and hind coxa more or less infusate *E. maculipennis* (Brullé, 1846)



Figs 36-39, *Euagathis maxichora* spec. nov., ♀, holotype; figs 40-47, *E. robusta* spec. nov., ♀, holotype, but 44 of paratype. 36, 41, scutellum and propodeum, dorsal aspect; 37, 42, fore tarsus, dorsal aspect; 38, 43, middle tarsus, dorsal aspect; 39, 46, first metasomal tergite, dorsal aspect; 40, 44, detail of pterostigma and second submarginal cell of fore wing; 45, hind basitarsus, lateral aspect; 47, detail of veins M+CU and 1-M of hind wing. 36, 39-41, 44-47: 1.0 × scale-line; 37, 38: 1.7 ×; 42, 43: 2.1 ×.

12. Mesosoma (except reddish pronotum and mesoscutum), first and second metasomal tergites and hind leg black; first tergite more robust and with weak sublateral depressions; middle tarsus of ♀ less robust; vein 1-R1 of fore wing (including its setae) dark brown or brown [*E. ruficollis* (Cameron, 1899)]
 Note.— Not known from the area but included because it may occur in the eastern Himalayas. The wing membrane is yellowish subhyaline, with a distinct stigmal spot and apically wings brown.
- Mesosoma, first and second tergites and hind leg yellowish; first tergite less robust and without sublateral depressions (figs 129, 130, 131); middle tarsus of ♀ rather robust (fig. 126); vein 1-R1 of fore wing (including its setae) largely yellowish
 *E. chinensis* (Holmgren, 1868)
 Note. The pigmentation of the wing membrane is variable: normally with distinct infuscated bands, but the membrane may be nearly completely dark brown or mainly yellowish subhyaline with apical quarter slightly infuscated and with minute or obsolescent stigmal spot (fig. 132; = var. *melanocera* (Cameron, 1899)). If the first metasomal tergite is 1.7-2.6 times as long as wide apically, the frons yellowish, the middle tarsus of ♀ slender (cf. fig. 105), and the length of the ovipositor sheath 0.13-0.15 times fore wing, cf. *E. abbotti* (Ashmead, 1900) which occurs in southern Vietnam.

Descriptions

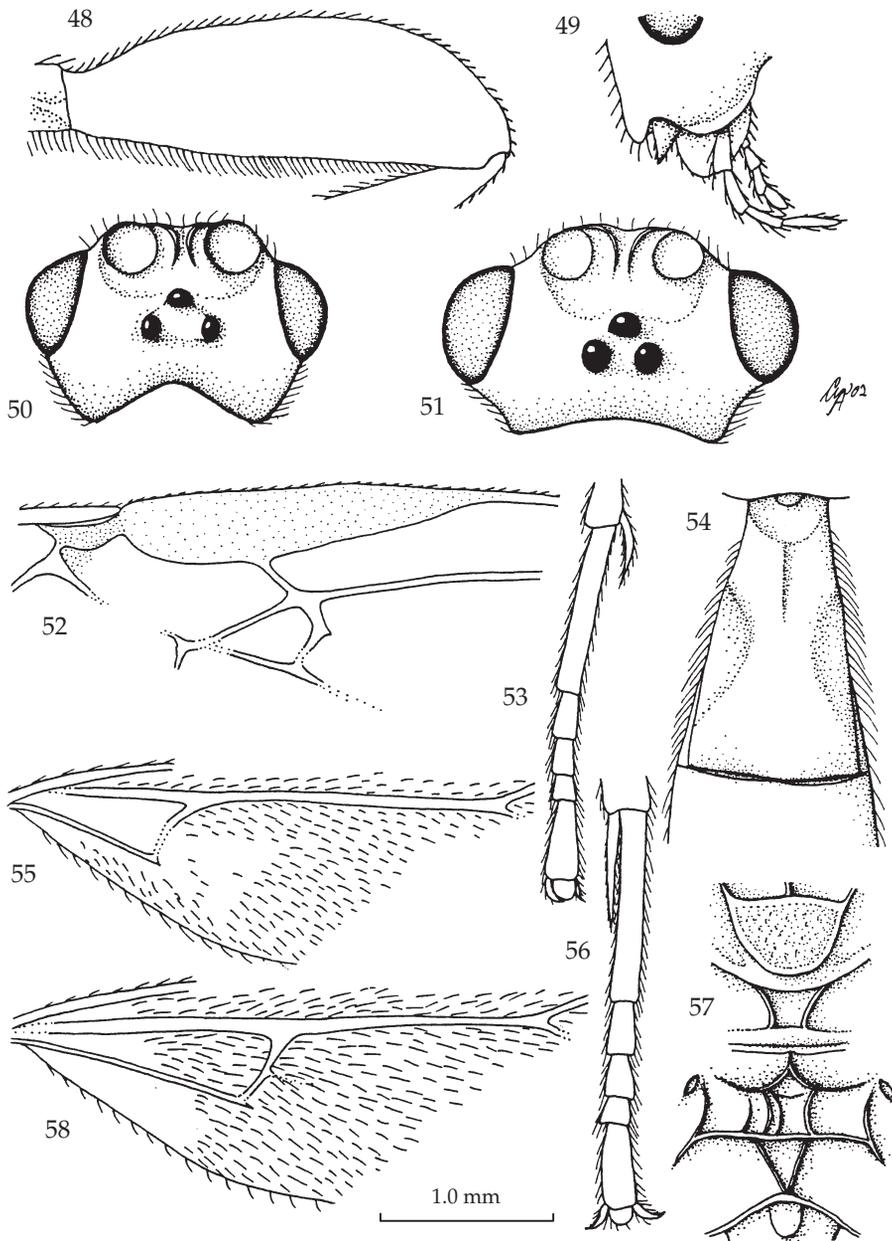
Euagathis argentosa spec. nov.
 (figs 51-57, 59-61)

Material.— Holotype, ♀ (CASB), “[China:] Yunnan, Xishuangbanna, 620-650 m”, “15.xi.1958, Zhay Yiran”. Paratypes (4 ♀♀, CASB, RMNH, ZUH), topotypic, but 2 ♀♀ collected by Pu Fuji and 1 ♀ collected 13 .vii.1958 by Li Zhanju.

Holotype, ♀, length of body 9.4 mm, of fore wing 10.6 mm.

Head.— Antenna incomplete, 24 segments remaining; length of third antennal segment 1.2 times fourth segment; length of third and fourth segments 3.0 and 2.5 times their width, respectively; length of maxillary palp 0.8 times height of head, palpi rather slender (fig. 60); length of eye in dorsal view 1.7 times temple; temples weakly concave laterally and distinctly narrowed (fig. 51); OOL:diameter of ocellus:POL = 13:5:5; face rather sparsely punctulate, and vertex finely punctate; crests between antennal sockets subparallel, strong; occipital flange large, wide, its ventral margin oblique.

Mesosoma.— Length of mesosoma 1.5 times its height; laterally pronotum smooth; subpronope deep, large; epomia single; mesoscutum largely smooth, sparsely punctulate, medio-posteriorly nearly flat and lateral lobes slightly convex, its middle lobe distinctly convex, without pair of shallow grooves anteriorly (but faintly indicated); notauli distinctly impressed, subanteriorly pit-like, absent near margin of mesoscutum and completely smooth; scutellum flat, sparsely and weakly rugose, steep anteriorly, saddle-shaped, with strong and complete lateral carina, subposteriorly curved, crest-like (fig. 57); mesopleuron below precoxal sulcus densely and moderately strongly punctate with interspaces mostly wider than diameter of punctures, this area with short pilosity, above sulcus nearly completely smooth except for some punctulation and ventro-posteriorly punctate-coriaceous; precoxal sulcus with very long and strong crenulae, rather deep (fig. 61); metapleuron finely punctate, but obscured by very dense silvery pilosity (as is hind coxa and somewhat less so also metasoma later-



Figs 48-50, *Euagathis robusta* spec. nov., ♀, holotype; figs 51-57, *E. argentosa* spec. nov., ♀, holotype; fig. 58, *E. gracilitarsis* spec. nov., ♀, holotype. 48, hind femur, lateral aspect; 49, malar space and palpi; 50, 51, head, dorsal aspect; 52, detail of pterostigma and second submarginal cell of fore wing; 53, fore tarsus, dorsal aspect; 54, first metasomal tergite, dorsal aspect; 55, 58, base of hind wing; 56, middle tarsus, dorsal aspect; 57, scutellum and propodeum, dorsal aspect. 48, 49: 0.8 ×; 50: 0.6 ×; 51-58: 1.0 × scale-line.

ally); propodeum coarsely areolate, areola narrow, with complete and strong costulae near middle of propodeum; spiracles medium-sized (fig. 57).

Wings.— Fore wing: second submarginal cell subtriangular, narrow anteriorly, without ramellus (fig. 52); $r:3-SR:SR1 = 5:2:58$; $2-SR:3-SR:r-m = 13:3:7$. Hind wing: $M+CU:1-M = 30:53$; surroundings of cu-a mainly glabrous (fig. 55).

Legs.— Length of hind femur, tibia and basitarsus 6.5, 10.6 and 8.5 times their width, respectively; hind femur rather densely pimply, with moderately long and dense whitish setosity, tibia and tarsus with shorter and more bristly dark brown setae; length of outer and inner spur of middle tibia 0.45 and 0.65 times their basitarsus, robust; length of outer and inner spur of hind tibia 0.35 and 0.55 times hind basitarsus, respectively, rather slender; middle tarsi rather slender (fig. 56).

Metasoma.— Rather slender, smooth; length of first tergite 1.7 times its apical width, convex sublaterally and with a weak median groove anteriorly (fig. 54); second metasomal suture shallow; length of ovipositor sheath 0.06 times fore wing, sheath rather wide.

Colour.— Yellowish-brown (including pedicellus); remainder of antenna (including most of scapus), mesopleuron posteriorly and propodeum dark brown; metapleuron (except anteriorly), metasoma and hind leg black; basal 0.7 of wing membrane yellow (including 1-M), with minute stigmal spot (fig. 52), and remainder of wing rather dark brown; vein C+SC+R apically, parastigma, and 1-R1 narrowly dark brown (as are setae), other veins yellowish; pterostigma completely yellowish.

Variation.— Paratypes are very similar to the holotype, length of fore wing 10.6–12.2 mm, and of body 9.4–10.5 mm, antennal segments 55 (1) or 56 (1), length of the hind femur 6.1–6.5 times its width (fig. 59); length of first tergite 1.6–1.9 times its apical width; propodeum dark brown or black; pilosity of metapleuron and hind coxa may have yellowish tinge; stigmal spot small or absent; hind coxa sometimes dark brown.

Distribution.— Oriental China (Yunnan: 620–650 m).

Euagathis borneoensis Szépligeti, 1902
(figs 94–101)

Euagathis borneoensis Szépligeti, 1902: 67; Shenefelt, 1970: 410; Bhat & Gupta, 1977: 195.

Balцемена borneoensis; Simbolotti & van Achterberg, 1995: 44–45.

Euagathis albiventris Enderlein, 1920: 178; Shenefelt, 1970: 409. **Syn. nov.**

Balцемена albiventris; Bhat & Gupta, 1977: 178–179.

Euagathis sikkimensis Enderlein, 1920: 177; Shenefelt, 1970: 415. **Syn. nov.**

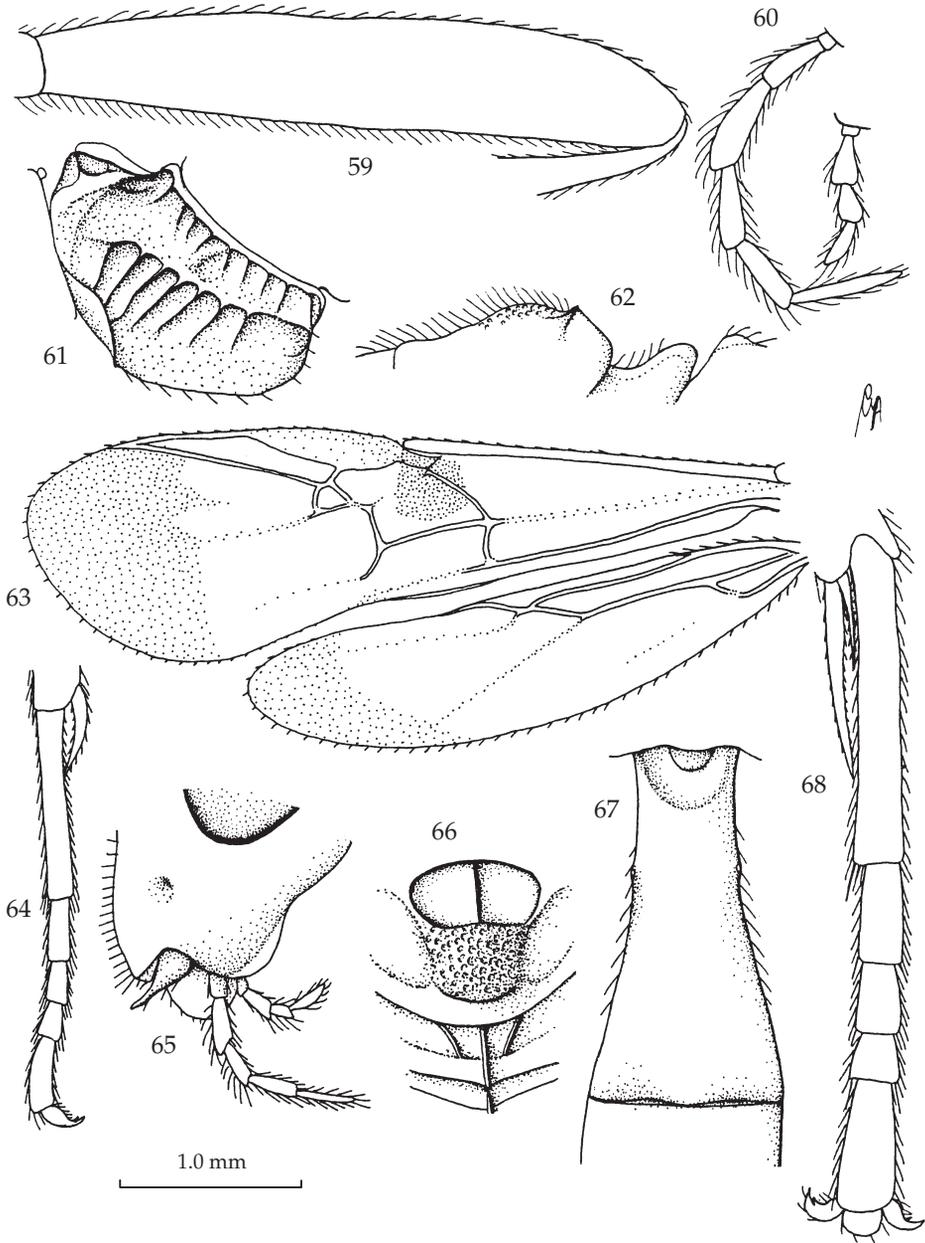
Balцемена sikkimensis; Bhat & Gupta, 1977: 176–177.

Balцемена chinensis Bhat & Gupta, 1977: 177–178, figs 24b, c, f. **Syn. nov.**

Material.— Lectotype, ♀ (TMA), “Borneo, leg. Xánthus”, “*borneoensis*, det. Szépligeti”, “Lectotypus ♀, *Euagathis borneoensis* Szépl., 1902 % des. Papp. J. 1967”, “Hym. Typ. No. 720, Mus. Budapest”. Additional material from Oriental China (ZUH, CASB, RMNH) from Yunnan (Xishuangbana, Canglan), Hunan (Tianping Mt., Yueyang), Fujian (Shaowa, Jiayang), Sichuan (Mt. Emei, Jiayang), Zhejiang (Suichang, Hangzhou, Qingyun, Fuyang) and Jiangsu (Nanjing) and Vietnam (CASB Tonkin (Hoa Binh)).

Lectotype, ♀, length of body 12.3 mm, of fore wing 11.9 mm.

Head.— Antenna incomplete, 17 segments remaining; length of third antennal seg-



Figs 59-61, *Euagathis argentosa* spec. nov., ♀, holotype, but 61 of paratype; figs 62-68, *E. forticarinata* (Cameron), ♂, lectotype of *E. nigratarsis* (Cameron), but 68 of ♀, India, Sikkim, Nam Nam. 59, hind femur, lateral aspect; 60, palpi; 61, mesopleuron; 62, scutellum, lateral aspect; 63, wings; 64, fore tarsus, lateral aspect; 65, malar space and palpi; 66, scutellum, dorsal aspect; 67, first metasomal tergite, dorsal aspect; 68, middle tarsus, dorsal aspect. 59: 1.0 × scale-line; 60: 1.8 ×; 61: 0.6 ×; 62, 64-67: 1.5 ×; 63: 0.5 ×; 68: 1.8 ×.

ment 1.2 times fourth segment; length of third and fourth segments 3.5 and 3.0 times their width, respectively; length of maxillary palp 0.7 times height of head; length of eye in dorsal view 1.5 times temple; temples straight laterally and distinctly narrowed (fig. 97); OOL:diameter of ocellus:POL = 12:5:6; face and vertex largely smooth, punctulate; crests between antennal sockets parallel, robust, rounded dorsally and with long setae; occipital flange rather large, moderately wide, its ventral margin oblique.

Mesosoma.— Length of mesosoma 1.5 times its height; laterally pronotum with curved rugae, remainder smooth, without posterior crenulation; subpronope deep, large; epomia single; mesoscutum smooth except for few fine punctures, medio-posteriorly flat, its middle lobe without a distinct pair of shallow grooves or a median carina anteriorly; notauli smooth and complete, distinctly impressed and almost meeting posteriorly (fig. 94); scutellum flat, smooth except for some punctures laterally, truncate and steep anteriorly (fig. 99), without lateral carina, subposterior crest curved, rather short, blunt and strong (fig. 94); mesopleuron below and above precoxal sulcus mainly smooth, finely punctate and with moderately long pilosity; precoxal sulcus narrow, deep and narrowly crenulate, but anteriorly widely crenulate; metapleuron mainly smooth medially, punctate laterally, with moderate pilosity; propodeum with strong, curved lateral carina, with areola coarse, rather narrow and costulae largely absent; spiracles large (fig. 94).

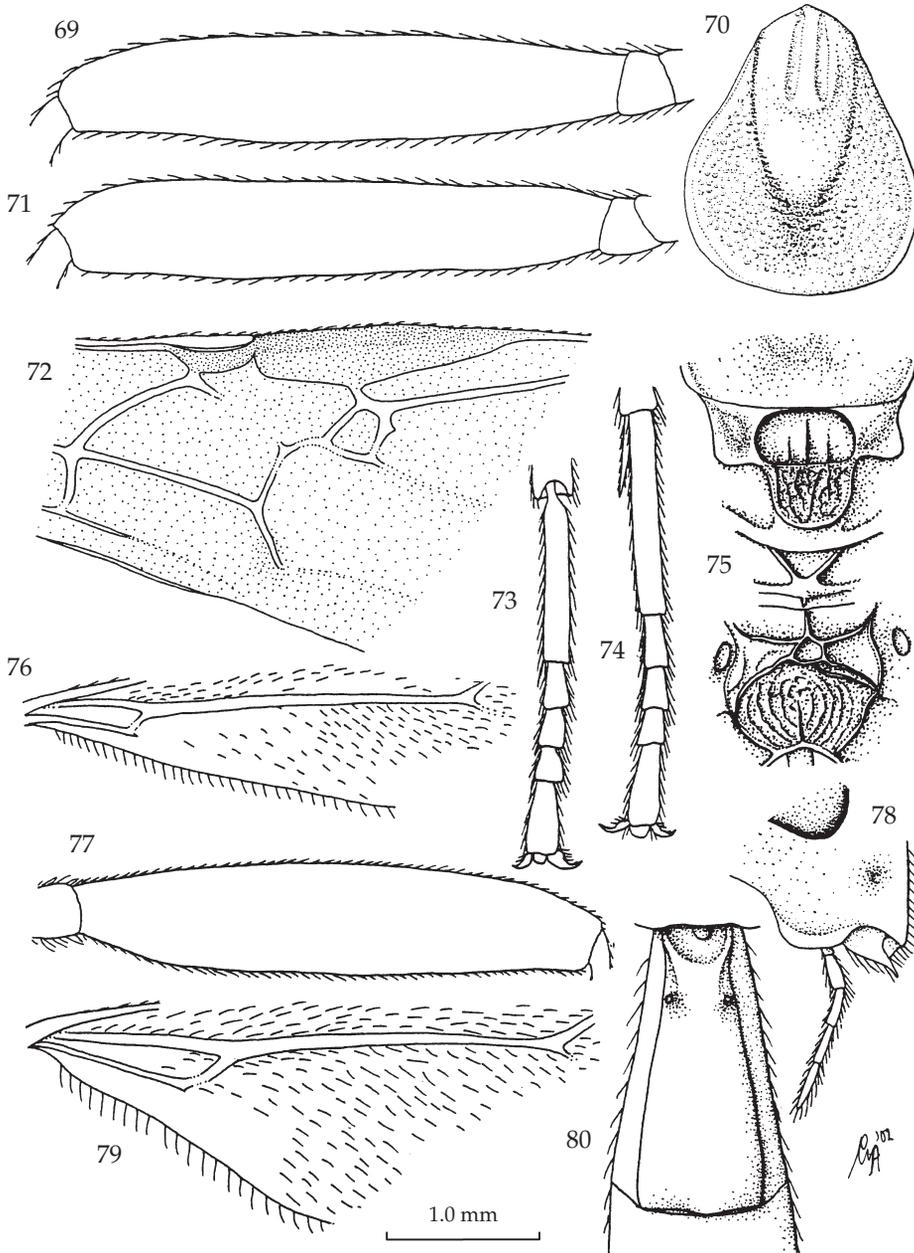
Wings.— Fore wing: second submarginal cell pentagonal, rather wide anteriorly, with short ramellus (fig. 100); r:3-SR:SR1 = 5:3:71; 2-SR:3-SR:r-m = 11:3:12. Hind wing: M+CU:1-M = 30:52 (fig. 101); surroundings of cu-a setose.

Legs.— Length of hind femur, tibia and basitarsus 5.38, 9.5 and 11.4 times their width, respectively; hind femur (as remainder of legs) with long and dense setosity; outer side of apex of hind tibia somewhat less convex than in *E. parallela* (fig. 96); length of outer and inner spur of middle tibia 0.3 and 0.5 times their basitarsus, respectively; length of outer and inner spur of hind tibia 0.25 and 0.40 times hind basitarsus, respectively; spurs, fore and middle tarsi slender (cf. figs 104, 105).

Metasoma.— First tergite strongly widened apicad (fig. 95), smooth; length of first tergite 1.1 times its apical width, with pair of moderate sublateral depressions behind spiracles and not widened near spiracles; second metasomal suture deep, wide, straight, complete (fig. 95); length of ovipositor sheath 0.05 times fore wing, sheath wide.

Colour.— Yellowish-brown; antenna (but inner side of scapus and partly dorsally yellowish), convex outer part of apex of hind tibia narrowly and hind tarsus black or dark brown; fore wing membrane yellow, but with large separate stigmal spot dark brown and apical band of fore wing brown; hind wing apically and posteriorly brown and remainder yellowish; vein C+SC+R apically and parastigma dark brown (as are setae), pterostigma and veins completely yellow.

Variation.— Length of first metasomal tergite of ♀ 1.0-1.4 times as long as apical width. The colour of the metasoma and of the hind leg is variable: from yellowish-brown (f. *borneoensis*) to dark brown or black (f. *chinensis*), but the metasoma is basoventrally more or less ivory or pale yellowish. Males are generally darker than the females. Rarely the apical infuscation of the fore wing reaches up to the middle level of the stigmal spot with the apical half of the pterostigma and vein 1-R1 (and its setae) dark brown (one ♀ from Vietnam (Tonkin)). This is the largest species of the genus in China and Vietnam.



Figs 69-71, 79, *Euagathis forticarinata* (Cameron), 69, ♀, India, Sikkim, Nam Nam; 70, ♀, holotype of *E. pallida* Fullaway; 71, ♂, India, Kalimpong; 79, ♀, Vietnam, Thuong Cuu; figs 72-78, 80, *E. dravida* Bhat & Gupta, ♀, paratype, but 76 from Vietnam, Thuong Cuu. 69, 71, 77, hind femur, lateral aspect; 70, mesoscutum, dorsal aspect; 72, detail of pterostigma and second submarginal cell of fore wing; 73, fore tarsus, dorsal aspect; 74, middle tarsus, dorsal aspect; 75, scutellum and propodeum, dorsal aspect; 76, 79, detail of base of hind wing; 78, malar space and maxillary palp; 80, first metasomal tergite, dorsal aspect. 69, 71: 1.0 × scale-line; 70: 2.4 ×; 72, 77: 1.2 ×; 73, 74, 80: 1.6 ×; 75, 76, 78, 79: 2.1 ×.

Distribution.— China (Oriental part), India (West Bengal (Sikkim)), Indonesia (Java, Sumatra, Borneo), Vietnam (Tonkin).

Notes.— The size of the propodeal spiracle is variable: *Balcmena chinensis* should have the propodeal spiracle 1.5-1.7 times longer than wide (but 2.2 times in fig. 24f in Bhat & Gupta, 1977; 1.7 times in lectotype of *E. borneoensis*) and it should be 2.5 times in *E. albiventris*. Also the other differences (the hind leg yellowish, brown or black and the precoxal sulcus moderately to strongly transversely crenulate) as indicated for *E. sikkimensis*, *E. chinensis* and *E. albiventris* by Bhat & Gupta (1977) fall within the limits of variation observed in this species.

If the notauli are crenulate, vein 1-R1 of the fore wing and the setae are dark brown, the middle tibial spurs are short, vein M+CU of the hind wing is only somewhat longer than vein 1-M, and the ramellus of the fore wing is rather long, cf. *E. maxichora* spec. nov.

Simbolotti & van Achterberg (1995) included this species in the genus *Balcmena* Cameron, 1903, because of the shape of the first tergite, the deep second metasomal suture, the larger second submarginal cell of the fore wing, the more robust head, and the largely smooth mesopleuron, but these differences do not hold after examination of the Chinese species of both groups.

Euagathis chinensis (Holmgren, 1868)
(figs 122-133)

Agathis chinensis Holmgren, 1868: 428.

Euagathis chinensis; Shenefelt, 1970: 410.

Agathis melanocerus Cameron, 1899: 91-92. **Syn. nov.**

Euagathis melanocera; Shenefelt, 1970: 413; van Achterberg & O'Toole, 1993: 25-26.

Euagathis japonica Szépligeti, 1902: 68; Shenefelt, 1970: 412; Simbolotti & van Achterberg, 1975: 30-32, figs 16, 71-81, 108, 109 (redescription); Sharkey, 1996: 22, 1998: 531. **Syn. nov.**

Euagathis semiflavus Szépligeti, 1908: 228. **Syn. nov.**

Euagathis semiflava; Shenefelt, 1970: 415; Bhat & Gupta, 1977: 199-201, figs 30b, 31; Chou & Sharkey, 1989: 186-187, figs 37, 71, 104, 137, 169, 201, 233, 269, 204.

Euagathis horniana Enderlein, 1920: 180; Shenefelt, 1970: 411; Bhat & Gupta, 1977: 199 (as synonym of *E. semiflava*); Chou & Sharkey, 1989: 186. **Syn. nov.**

Euagathis formosana Enderlein, 1920: 178-179; Shenefelt, 1970: 411; Bhat & Gupta, 1977: 199 (as synonym of *E. semiflava*); Chou & Sharkey, 1989: 186. **Syn. nov.**

Euagathis formosana var. *obscurior* Enderlein, 1920: 179; Bhat & Gupta, 1977: 199 (as synonym of *E. semiflava*); Chou & Sharkey, 1989: 186. **Syn. nov.**

Euagathis nigrifrons Enderlein, 1920: 180; Shenefelt, 1970: 413; Bhat & Gupta, 1977: 199 (as synonym of *E. semiflava* Szépligeti); Chou & Sharkey, 1989: 186. **Syn. nov.**

Euagathis tricarinata Enderlein, 1920: 178; Shenefelt, 1970: 415; Bhat & Gupta, 1977: 199 (as synonym of *E. semiflava* Szépligeti); Chou & Sharkey, 1989: 186. **Syn. nov.**

Material.— Holotype of *A. chinensis*, ♂ (NRS), "China", "Kinb.", "*Agathis chinensis*", holotype of *E. melanocera*, ♀ (OUM), "*Agathis melanocerus* Cam., Type, Khasia", "6770"; lectotype of *E. japonica* ♀ (TMA), "Japan, leg. Xanthus", "Japonia", "305, 12", "*japonicus* det. Szépligeti", "Lectotypus *Euagathis japonica* Szépli., 1902, ♀ % des. J. Papp, 1967", "Hym. Typ. No. 718, Mus. Budapest"; holotype of *E. semiflava*, ♀ (TMA), "Java, Semarang, 1905, E. Jacobson", "Holotypus *Euagathis semiflavus*, ♀, Szépl. 1908, det. Papp", "*Euagathis semiflavus*", "Hym. Typ. no. 722, Museum Budapest"; holotype of *E. nigrifrons*, ♀ (PAN), "Sumatra, Liangagas, Dohrn", "Type", "*Euagathis nigrifrons* Enderl., ♀, Type, Dr Enderlein, det. 1919 ♀"; lectotype of *E. tricarinata* (PAN), "Sikkim, Darjeeling, H.H. Rolle, Berlin,

SW11", "Co-Typus", "*Euagathis tricarinata* Enderl., ♀, Type, Dr Enderlein, det. 1919"; 1 ♀ paralectotype (PAN), topotypic, (fits the original description less accurately than the lectotype); lectotype of *Euagathis formosana*, ♀ (PAN) "Formosa, Takao, 2.xii.[19]07, H. Sauter, S.", "Type", "*Euagathis formosana* Enderl., ♀, Type, Dr Enderlein, det. 1919"; 2 ♀♀ (PAN), paralectotypes, one from Takao, and one from Korroton; 1 ♂, holotype of *Euagathis formosana* var. *obscurior* (PAN) "Formosa, Korroton, 8.ix.[19]07, H. Sauter, S.", "Type", "*Euagathis formosana* var. *obscurior* Enderl., ♂ Type, Dr Enderlein, det. 1919". Additional material from Oriental China (ZUH, CASB, RMNH, BMNH) from Hainan (Qinglan, Xinrong, Nodoo, Sama), Yunnan (Xishuangbanna, Lancang, Tonshi, Yinggen, Nanshuiman, Tingning), Guangxi (Nanning, Longsheng, Guilin), Guangdong (Fengkai, Guangzhou [= Canton], Yuenan, Yingde), Guizhou (Leishan, Jiangkou, Huangguoshu, Guiding, Pingtang), Hongkong, Hunan (Mt. Heng, Sili, Zhuzhou), Jiangxi (Ji'an), Fujian (Dehua, Chougan, Jianyang, Liancheng, Xiamen, Fuzhou), Sichuan (Mt. Emei, Wulong), Anhui (Mt. Huang), Zhejiang (Chusan, Mt. Jiang, Mt. Tianmu, Hangzhou, Longquan, Lishui, Wenzhou, Songyang, Shengxian, Quzhou, Putuo, Mt. Sinaing, Wencheng, Jinhua, Yuhang, Jingun, Fuyang), Jiangsu (Mt. Baohua, Nanjing), Qinghai (Guinan) and Taiwan (Arison), and Vietnam (CASB, RMNH, BMNH, IEBR) Tonkin (Hao Binh, Thuong Cuu near Than Son (350-400 m)). Unplaced in China: Yinggeng, Tongshi, Shuiman, Wanning.

Variation.— Antennal segments of ♀ 56-57, length of fore wing 8.5-10.5 mm; length of first metasomal tergite 1.2-1.7 times its apical width (of Indonesian specimens usually 1.2-1.3 times); length of inner spur of middle tibia 0.6-0.7 times middle basitarsus. The pigmentation of the head and the colour pattern of the fore wing is quite variable in this species: the extension of the blackish patch on the vertex varies from very small to quite large, including temples and about upper half of head; in one specimen the head is entirely yellowish-brown. The infuscated band departing from the pterostigma and connected to the apical infuscation may be narrow distally, it may be reduced up to almost a sort of isolated dark spot hardly separated from the remainder of the infuscation (specimens from West Malaysia and Burma). A specimen from Burma (Tenasserim) has the scutellum more oval-shaped, with a deeper subposterior depression and without a short transverse, medio-posterior carina. The lectotype of *E. formosana* has basal 0.4 of the marginal cell of fore wing yellowish, and the apical half of the pterostigma yellowish (but in one paralectotype the pterostigma is largely dark brown). The lectotype of *E. tricarinata* has the length of the first metasomal tergite 1.4 times its apical width, the scutellum wide, moderately (but sparsely) punctate, without lateral carinae, and the precoxal sulcus with most of its crenulae long. The holotype of *E. nigrifrons* has the length of the fore wing 10.7 mm, the length of the first tergite 1.4 times its apical width, the apex of the hind tibia dark brown and the second submarginal cell with a distinct ramellus. The lectotype of *E. japonica* has the length of the fore wing 11.1 mm, and the length of first metasomal tergite 1.5 times its apical width. *E. melanocera* has the stigmal spot almost absent, lacking most of the apical infuscation of the fore wing, vein r of the fore wing comparatively long (fig. 132) and the first metasomal tergite very robust (fig. 131).

Variation of specimens from China: the melanistic male from Ningbo (China) has the wing membrane nearly completely dark brown, but vein C+SC+R of the fore wing and basal 0.7 of the pterostigma are yellow. The pterostigma is often completely yellowish or has its apical quarter dark brown, rarely with the apical half dark brown; the notauli are smooth and shallow posteriorly or obsolescent; females may have most of (or rarely complete) hind tibia and tarsus dark brown, rarely males have the apical half of the metasoma black and the hind leg largely brown. The males have the first

tergite more slender than the females, up to 1.9 times as long as its apical width (♀: 1.2-1.7 times); the wing membrane may be nearly completely dark brown, but if so, still veins 1-M and cu-a of the fore wing are contrastingly yellow; vein cu-a of the fore wing is curved basad. Rarely only the stemmaticum is blackish or the frons is only partly black.

Distribution.— Indonesia (Java, Sumatra), West Malaysia, Thailand, Laos, Burma, Singapore, Sri Lanka, India, Pakistan, Nepal, and China (including Taiwan, see Chou & Sharkey, 1989). The type series of *E. japonica* is reported to originate from Japan but this conspicuous species has never been found after this report (Sharkey, 1996) and it may originate from Taiwan, which has been occupied by Japan in the past. A widely distributed and comparatively common species which seems to be absent from Borneo and the more eastern islands. In the north of its distribution it remains restricted to the Oriental part of Asia.

Biology.— Parasitoid of Lymantriidae.

Euagathis dravida Bhat & Gupta, 1977
(figs 72-78, 80)

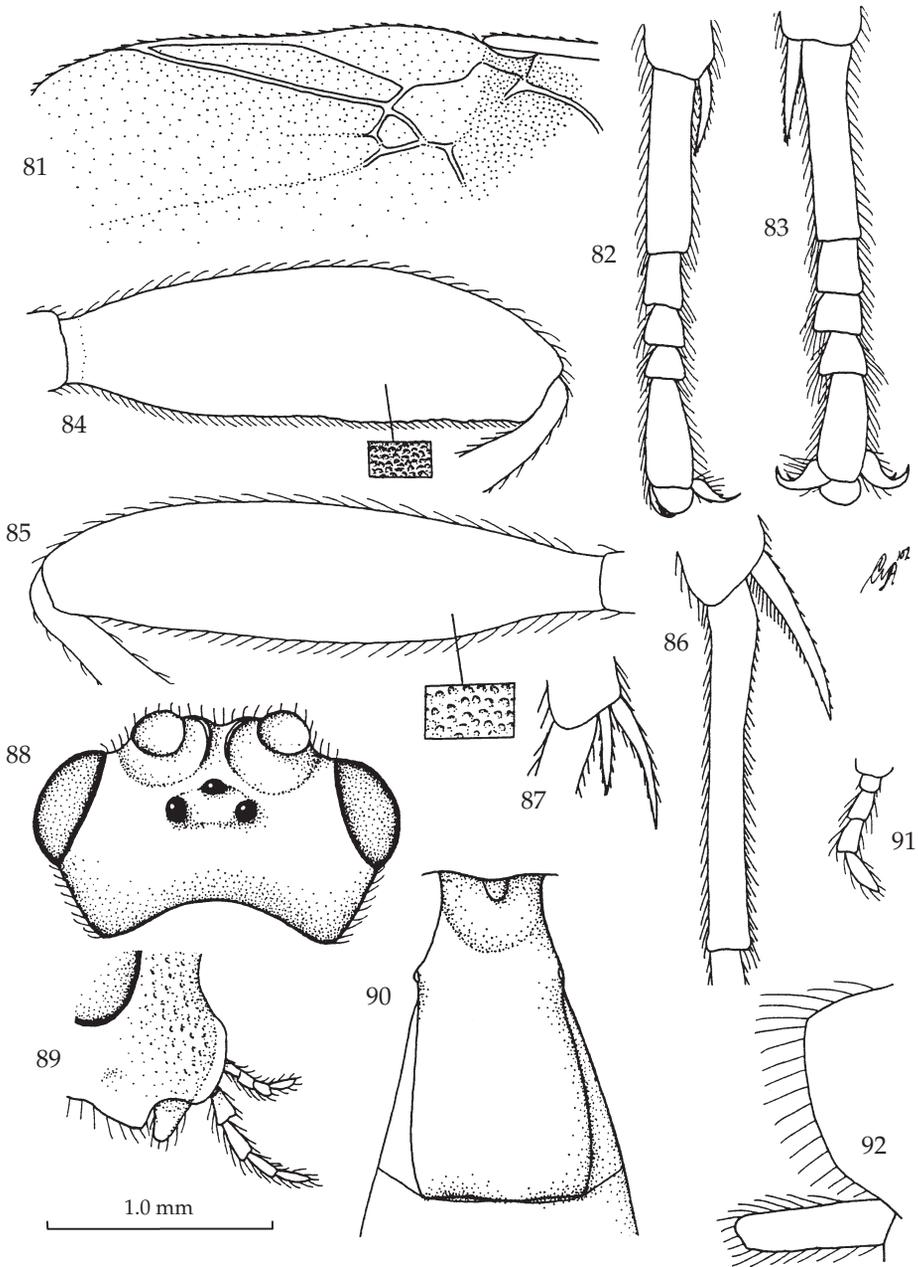
Euagathis dravida Bhat & Gupta, 1977: 212-213.

Material.— Paratype (topotypic with holotype), ♀ (CNC), "S. India, Nilgiri Hills, Devala, 3200'[ft], x.1960, P.S. Nathan", "*Euagathis dravida* Bhat & Gupta, 1975"; 1 ♀ (CNC), "S. India, Madras St[ate], Anamalai Hills, 3500'[ft], vi.1966, P.S. Nathan", "*Euagathis dravida* Bhat & Gupta, 1975". Additional material from northern Vietnam (RMNH) from Phuong Cuu, near Than Son (c 300 m, at light).

Paratype, ♀, length of body 6.8 mm, of fore wing 7.6 mm.

Head.— Antenna with 46 segments; length of third antennal segment 1.2 times fourth segment; length of third, fourth and penultimate segments 3.2, 2.7 and 1.6 times their width, respectively; length of maxillary palp 0.6 times height of head, palpi rather slender (fig. 78); length of eye in dorsal view 1.4 times temple; temples straight laterally and directly narrowed; OOL:diameter of ocellus:POL = 12:5:9; face laterally rather sparsely and finely punctulate, but more densely and coarsely punctate medially; vertex sparsely finely punctate, but mainly smooth near stemmaticum; crests between antennal sockets subparallel, robust, sculptured; occipital flange large, wide, its ventral margin subhorizontal.

Mesosoma.— Length of mesosoma 1.4 times its height; laterally pronotum mainly coarsely rugose-punctate ventrally, medially mostly smooth and with some weak crenulation and dorsally more sparsely and finer punctate, with posterior crenulation strongly developed; subpronope deep, wide triangular; epomia single; middle lobe of mesoscutum sparsely punctate with interspaces more than diameter of punctures, with pair of shallow grooves and without weak median crest anteriorly and rather flattened dorsally in lateral view, lateral lobes coarsely punctate and distinctly convex, medio-posteriorly distinctly depressed; notauli narrow, distinctly impressed, and finely crenulate but smooth posteriorly; scutellum flattened and medio-anteriorly somewhat depressed (fig. 75), coarsely rugose, anteriorly truncate, carinate, with complete lateral carina, subposterior crest transverse, slightly curved, long and strong (fig. 75); mesopleuron (as metapleuron) with dense whitish pilosity, area below precoxal sulcus very coarsely punctate with interspaces less than diameter of punctures and



Figs 81-92, *Euagathis mayunae* spec. nov., ♀, holotype, but 85 of ♂, paratype. 81, detail of pterostigma and second submarginal cell of fore wing; 82, fore tarsus, dorsal aspect; 83, middle tarsus, dorsal aspect; 84, 85, hind femur, lateral aspect; 86, hind basitarsus, lateral aspect; 87, middle tibial spurs; 88, head, dorsal aspect; 89, malar space and palpi; 90, first metasomal tergite, dorsal aspect; 91, detail of labial palp; 92, ovipositor sheath, lateral aspect. 81: 0.5 x; 82, 83, 86, 91: 1.5 x; 84, 85, 87-90, 92: 1.0 x scale-line.

anteriorly with coarse rugae, above sulcus coarsely and less densely punctate, especially posteriorly finer and more sparsely punctate; precoxal sulcus complete, narrow, distinct and its crenulae medium-sized, moderately robust; metapleuron coarsely and densely punctate, with some rugae ventrally; medially propodeum largely rugose and only anteriorly with small pentagonal areola and costulae (fig. 75), without areola or costulae near middle of propodeum, lateral carinae complete and strong, posteriorly rather protruding and conspicuously setose; spiracles large (fig. 75).

Wings.— Fore wing: second submarginal cell quadrangular, parallel-sided, rather narrow anteriorly, without ramellus (fig. 72); $r:3\text{-SR}:SR1 = 5:6:103$; SR1 straight or nearly so; $2\text{-SR}:3\text{-SR}:r\text{-m} = 17:6:14$. Hind wing: $M+CU:1\text{-M} = 30:81$; surroundings of cu-a glabrous (fig. 76).

Legs.— Length of hind femur, tibia and basitarsus 5.0, 8.8 and 7.8 times their width, respectively; hind femur slender (fig. 77) and with dense setosity (as remainder of leg), densely and coarsely punctate; length of outer and inner spur of middle tibia 0.45 and 0.70 times their basitarsus, respectively; length of outer and inner spur of hind tibia 0.4 and 0.6 times hind basitarsus, respectively; hind spurs, fore and middle tarsi slender (figs 73, 74), but middle spurs robust.

Metasoma.— Smooth; length of first tergite 2.4 times its apical width, tergite slightly widened apically, convex posteriorly; second metasomal suture obsolete; ovipositor sheath missing, but in ♀ from Vietnam length of ovipositor sheath 0.11 times fore wing, sheath rather slender.

Colour.— Black or blackish-brown (including antenna and hind leg); narrow streak behind eye, fore and middle legs, palpi and tegulae brownish-yellow; wing membrane rather weakly yellowish-brown, but antero-apical corner distinctly dark brown, without stigmal spot; veins and base of pterostigma brown, but anterior margin of fore wing dark brown.

Variation.— The female from Vietnam has the notauli completely crenulate and the lateral lobes of mesoscutum with oblique rugae; the length of the first tergite 2.0–2.5 times its apical width and the spiracles are sometimes distinctly protruding.

Distribution.— India (Tamil Nadu (Devala, approx. 975 m), Karnataka (S. Coorg, 945–1070 m)), and northern Vietnam (Vinh Phu, Phuong Cuu, approx. 300 m).

Biology.— Parasitoid of Arctiidae.

Euagathis forticarinata (Cameron, 1899)
(figs 62–71, 79)

Agathis forticarinata Cameron, 1899: 86–87; van Achterberg & O'Toole, 1993: 18 (lectotype designation).
Euagathis forticarinata; Shenefelt, 1970: 411; Bhat & Gupta, 1977: 216–218, figs 26c, 28c, 29e, 31g; Simbolotti & van Achterberg, 1990: 12–14, figs 73–76; 1995: 25–28, figs 31–35, 90–94 (redescription, synonymy).

Agathis nigratarsis Cameron, 1899: 87–88. **Syn. nov.**

Cremnops nigratarsis; Shenefelt, 1970: 387; Bhat & Gupta, 1977: 267.

Euagathis nigratarsis; van Achterberg & O'Toole, 1993: 27.

Agathis peronata Cameron, 1899: 89–91; van Achterberg & O'Toole, 1993: 31 (synonymy with *E. forticarinata*).

Euagathis peronata; Shenefelt, 1970: 413; Bhat & Gupta, 1977: 218–219.

Agathis lepcha Cameron, 1907: 113.

Euagathis lepcha; Shenefelt, 1970: 411; Dover, 1925: 40 (synonymy); Bhat & Gupta, 1977: 217.

- Euagathis pallida* Fullaway, 1919: 51; Baltazar, 1966: 218; Shenefelt, 1970: 413; Simbolotti & van Achterberg, 1990: 12 (synonymy with *E. forticarinata*).
- Euagathis variabilis* Enderlein, 1920: 175; Shenefelt, 1970: 415; Bhat & Gupta, 1977: 231-232, fig. 29f.
- Euagathis variabilis* var. *tibialis* Enderlein, 1920: 176; Shenefelt, 1970: 416.
- Euagathis variabilis* var. *melanogaster* Enderlein, 1920: 177; Shenefelt, 1970: 415.
- Euagathis variabilis* var. *melanopleura* Enderlein, 1920: 177; Shenefelt, 1970: 415.
- Euagathis variabilis* var. *tonkinensis* Enderlein, 1920: 176; Shenefelt, 1970: 416.
- Euagathis variabilis* var. *sucarandana* Enderlein, 1920: 176 (♂, not lectotype ♀); Shenefelt, 1970: 416.
- Euagathis bipunctata* Enderlein, 1920: 179-180; Shenefelt, 1970: 410.
- Euagathis hongkongensis* Fullaway, 1919: 52; Shenefelt, 1970: 411. **Syn. nov.**
- Euagathis varuni* Bhat & Gupta, 1977: 234-235, figs 30d, 31e. **Syn. nov.**
- Euagathis nigrithorax* Bhat & Gupta, 1977: 235-236, figs 30f, 31f. **Syn. nov.**
- Euagathis transcarinata* Bhat & Gupta, 1977: 236-238, figs 27a, 29h, 31a. **Syn. nov.**
- ? *Euagathis sentosus* Chen & Yang (in Chen et al.), 1995: 28-31, figs 1A-E.

Material.— Holotype of *E. forticarinata*, ♀ (OUM), “*Agathis forticarinata* Cam., Type, Khasia [India]”, “675”; lectotype of *E. nigratarsis*, ♂ (BMNH), “*Agathis nigratarsis* Cam., Type, Khasia”, “3.c.918”; holotype of *E. varuni*, ♀ (USNM), “India, Assam, Doom Dooma, 29.v.1943, D.E. Hardy”, “Holotype *Euagathis varuni* Bhat & Gupta, 1975”;), 1 ♂ (USNM), “Malaya, Selangor, Kepong”, “in forest”, “viii.1949, Army scrub Typhus Unit”, “Allotype *Euagathis varuni* Bhat & Gupta, 1975”. Additional material from Oriental China (ZUH, CASB, RMNH, BMNH) from Hainan (Wanning, Yinggen, Tongshi, Mt. Wuzhi, Sama, Jienfengling, Bawangling, Dan Xian), Yunnan (Mangshi, Lancang, Lingchuan, Xishuangbanna, Jingdong, Canglan), Guangxi (Guilin, Longzhou, Baise, Nanning), Guangdong (Guangzhou [= Canton], Fengkai), Guizhou (Guiyang, Luodian, Huishui, Guioling, Mt. Lei), Jiangxi (Guling), Fujian (Xiamen, Zhangzhou, Fuzhou), Sichuan (Jianyang), Zhejiang (Hangzhou, Mt. West Tianmu), and Vietnam (CASB, RMNH, IEBR, BMNH) Tonkin (Hoa Binh, Thuong Cuu near Than Son (350-400 m), Huong Bay) and Phong Dién National Park (approx. 100 m).

Variation.— This species is characterised by its sculpture, the slender hind femur, and the comparatively elongate head. The colour of the scapus varies from yellow to dark brown. Sculpture of mesoscutum and scutellum very variable, posteriorly mesoscutum may be smooth to strongly obliquely rugose, and the scutellum may be strongly punctate, with a lamelliform carina anteriorly, and the scutellum may be rather angulate anteriorly, but intermediates occur. The colouration of the body in *E. forticarinata* appears to be very variable; it ranges from predominantly yellowish-brown, yellow, dark reddish-brown to brown. Especially remarkable is the variability of the colour of the hind leg (and to a lesser degree of the metasoma): the brown (or dark brown) pigmentation may extend to half of the tibia and the tarsus to the entire tibia and tarsus or even the whole hind leg. Extremely melanistic males from West Malaysia have been examined which have also the scapus and the mesosoma nearly completely dark brown, with only the pronotum and the scutellar sulcus yellowish. The sculpture of the scutellum of males is also variable: the anterior carina may be entirely absent, partially present or entirely present. The colour pattern of the wings varies considerably. The lectotype of *E. variabilis* has 51 antennal segments, length of fore wing 6.6 mm, length of first metasomal tergite 1.9 times its apical width, the notaulic area smooth posteriorly, the apex of hind tibia, and the tarsus dark brown. The lectotype of *E. variabilis* var. *tibialis* has the pterostigma dark brown, the fore wing more extensively darkened and the scutellum comparatively strongly sculptured. The lectotype of *E. bipunctata* has the length of the first metasomal tergite 1.7 times its apical width and the stigmal spot is

rounded. The lectotypes of *E. variabilis* var. *melanopleura* and var. *melanogaster* concern melanistic males, the latter with apical 0.6 of the fore wing largely dark brown, including the pterostigma. The colour of scapus varies from yellow to dark brown and the hind femur is comparatively slender (figs 69, 71). Of *E. nigrithorax* and *E. transcarinata* are only males known. It concerns melanistic specimens of *E. forticarinata*, of which the meso-, and metapleura are more or less darkened and in *E. nigrithorax* the dark pattern extends to the mesoscutum and the scutellum.

In China specimens occur having the stigmal spot included in a dark band which often reaches the posterior margin of the wing, as in *E. indica* Enderlein, 1920, but intermediates to the normal isolated stigmal spot has been examined. However, *E. indica* has the first tergite distinctly widened, its length 1.3-1.8 times its apical width and the mesopleuron below the precoxal sulcus weakly punctate. It may concern *E. sentosa* Chen & Yang, 1995, which has also the typical somewhat elongate head of *E. forticarinata* according to the original description. The interpretation of *E. sentosa* is based on the figures and the original description in Chinese, the English summary does not give any relevant information and the types were not available for examination. According to the original description of *E. sentosa* in Chinese the length of the first metasomal tergite is 2.9 times its apical width, but in the figure it is 2.2 times, which is slightly higher than normal for *E. forticarinata*. The meso- and metapleura should be sparsely punctate, which disagrees with *E. forticarinata*. The types of *E. hongkongensis* were not examined, but the original description is sufficient informative; the type series consists of three males from China having the hind leg darkened, the first tergite twice as long as wide apically and the head and mesosoma coarsely punctate.

Distribution.— Oriental China (including Hongkong and Taiwan), India, Sri Lanka, Nepal, Burma, Thailand, Vietnam, Malaysia (West Malaysia) and Indonesia (Sumbawa, Java, Sumatra, Sulawesi). Not (yet) known from Borneo or the Papuan region. This species is the only *Euagathis* species known to be common near human settlements in secondary vegetation.

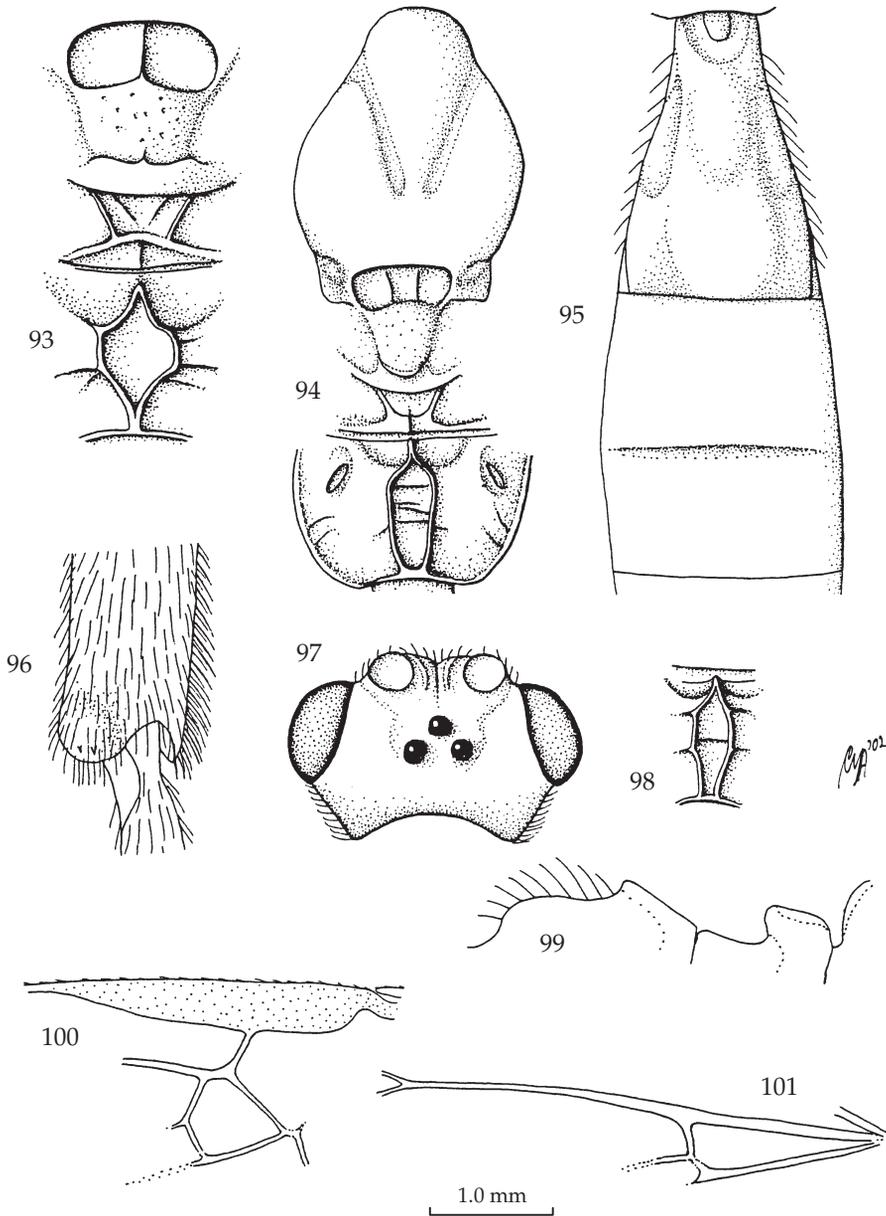
Euagathis gracilitarsis spec. nov.
(figs 25-32, 58)

Material.— Holotype, ♀ (CASB), “[China:] Yunnan, Xishuangbanna, 650 m, 5.vii.1958, Pu Fuji”. Paratypes: 4 ♀♀ + 1 ♂ (CASB, RMNH, ZUH), 4 ♀♀, topotypic, 620-950 m, 21.vi.1957 (1 ♀, Wang Shuyong), 14.iv.1958 (1 ♀, id.), 7.ix.1958 (1 ♀, id.), 4.vi.1958 (1 ♀, Pu Fuji) and 1 ♂ from Yunnan, but without precise locality data.

Holotype, ♀, length of body 11.5 mm, of fore wing 10.6 mm.

Head.— Antennal segments 55; length of third antennal segment 1.2 times fourth segment; length of third, fourth and penultimate segment 2.5, 2.1 and 1.4 times their width, respectively; length of maxillary palp 0.7 times height of head; length of eye in dorsal view 1.5 times temple; temples slightly concave laterally and weakly narrowed (fig. 26); OOL:diameter of ocellus:POL = 17:5:10; face finely punctate (medially densely so) and vertex sparsely punctulate; crests between antennal sockets subparallel, strong; occipital flange large, wide, its ventral margin oblique.

Mesosoma.— Length of mesosoma 1.5 times its height; laterally pronotum smooth, except for some short crenulation posteriorly; subpronope deep, large; epo-



Figs 93, *Euagathis mayunae* spec. nov., ♀, holotype; figs 94-101, *E. borneoensis* Szépligeti, ♀, lectotype, but 94, 95 and 101 from China, Yunnan, Xishangbanna. 93, scutellum and propodeum, dorsal aspect; 94, mesosoma, dorsal aspect; 95, first-third metasomal tergites, dorsal aspect; 96, apex of hind tibia, dorsal aspect; 97, head, dorsal aspect; 98, detail of propodeal areola; 99, scutellum and metanotum, lateral aspect; 100, detail of pterostigma and second submarginal cell of fore wing; 101, veins M+CU and 1-M of hind wing. 93: 1.8 x; 94, 95, 97, 98, 100, 101: 1.0 x scale-line; 96, 99: 2.6 x.

mia single; mesoscutum smooth (except for some fine punctures), medio-posteriorly depressed, its middle lobe with hardly indicated pair of shallow grooves medio-anteriorly; notauli complete, deep, coarsely crenulate posteriorly; scutellum flat, sparsely punctate, angulate anteriorly, saddle-shaped (fig. 31), without lateral carina, subposterior crest rather long and strong (fig. 31); mesopleuron below precoxal sulcus sparsely punctate and with moderate pilosity, above sulcus nearly completely smooth, except for some punctures; precoxal sulcus moderately wide, deep and distinct and its crenulae medium-sized, but very coarse anteriorly; metapleuron densely rather superficially punctate, with some rugae and with long setae; propodeum coarsely areolate, with areola comparatively narrow and costulae complete and near middle of propodeum; spiracles large (fig. 31).

Wings.— Fore wing: second submarginal cell large pentagonal, wide anteriorly, without distinct ramellus (fig. 25); r:3-SR:SR1 = 5:5:55; 2-SR:3-SR:r-m = 9:5:11. Hind wing: M+CU:1-M = 30:36; surroundings of cu-a with dense setosity (fig. 58).

Legs.— Length of hind femur, tibia and basitarsus 4.3, 6.8 and 8.8 times their width, respectively; length of outer and inner spur of middle tibia 0.40 and 0.45 times their basitarsus, respectively; length of outer and inner spur of hind tibia 0.4 and 0.5 times their basitarsus, respectively; hind femur rather robust (fig. 30); hind coxa and femur with rather long setosity; middle tibial spurs rather slender.

Metasoma.— Rather slender, smooth; length of first tergite 1.7 times its apical width (fig. 32); second metasomal suture fine, narrow, complete; length of ovipositor sheath 0.03 times fore wing, sheath rather wide.

Colour.— Yellowish-brown; antenna, metasoma behind basal half of first tergite and ovipositor sheath blackish; hind tarsus largely dark brown; basal half of wing membrane yellow, but with subhyaline patches in it; large stigmal spot being part of large dark brown band, below pterostigma with a rather large yellowish patch and a narrow yellowish patch below it (fig. 25), and remainder of wing dark brown; vein C+SC+R apically, parastigma, and apical half of pterostigma dark brown (as setae), veins in pale areas yellowish, remainder brown; remainder of pterostigma yellow.

Variation.— Paratypes are very similar to the holotype, length of the fore wing 10.3-12.2 mm, and of the body 9.4-11.2 mm, length of the ovipositor sheath 0.03-0.05 times the fore wing, length of the hind femur 4.2-4.4 times its width (fig. 30; ♀, of ♂ about 3.5 times); antenna with 55 segments (2 ♀♀) and dark brown or brown apically and the ramellus of the fore wing is comparatively long; POL 1.6-2.0 times diameter of the posterior ocellus; the metasoma and the hind tarsus completely or largely yellowish-brown or brown; the stigmal spot in all paratypes isolated and the marginal cell of the fore wing may be completely yellow.

Distribution.— Oriental China (Yunnan: 620-950 m).

Notes.— Easily to recognise because of the combination of crenulate notauli and slender tarsi.

Euagathis maculipennis (Brullé, 1846)
(figs 113-121)

Agathis maculipennis Brullé, 1846: 488; Shenefelt, 1970: 341.

Euagathis maculipennis; Simbolotti & van Achterberg, 1995: 7, 9, 10, 42, figs 88, 89.

Material.— Lectotype here designated, ♂ (MNHN), "Reynaud, 1829, Coll. Bes.", "*Agathis maculipennis* Br.", "Lectotype", and lectotype label by van Achterberg, 1995. Additional material from China (CASB, ZUH, RMNH) from Yunnan (Canglan, Jingdong).

Notes.— It is similar to *E. chinensis* but this species has the vertex and frons black, the fore wing with a distinct dark brown apical band and without distinct second metasomal suture. The interpretation of this species is problematical because only a few male specimens are known to us, and is therefore, provisional. The alternative is that this species is considered to be weakly pigmented submontane form of *E. chinensis* with vertex and stemmaticum yellowish. Known from Yunnan (China) and originally probably described from the Indian subcontinent (the precise locality is unknown). This species may occur in the foothills of the Himalayas between 1200-1400 m.

Euagathis maxichora spec. nov.
(figs 33-39)

Material.— Holotype, ♂ (ZUH), "China: Fujian, Meihua Mt., 1100-1400 m, 23-24.vii.1988, no. 886388/89, Pan Shen". Paratype: ♀ (ZUH), "China: Fujian, Fuzhou, 28.ix.1982, no. 853554, Lin Yulan".

Holotype, ♂, length of body 14.2 mm, of fore wing 15.3 mm.

Head.— Antennal segments 60; length of third antennal segment 1.3 times fourth segment; length of third, fourth and penultimate segment 2.6, 2.0 and 1.4 times their width, respectively; length of maxillary palp 0.8 times height of head; length of eye in dorsal view 1.4 times temple; temples straight laterally and weakly narrowed (fig. 35); OOL:diameter of ocellus:POL = 8:3:4; face finely punctate and vertex sparsely punctulate; crests between antennal sockets converging, strong; occipital flange large, wide, its ventral margin oblique.

Mesosoma.— Length of mesosoma 1.4 times its height; laterally pronotum smooth, with posterior crenulation short and weak; subpronope deep, large; epomia single; mesoscutum smooth (except for some fine punctures), medio-posteriorly depressed, its middle lobe without pair of shallow grooves or a median carina anteriorly; notauli complete, deep, crenulate posteriorly (fig. 36); scutellum flat, sparsely punctate, truncate anteriorly, saddle-shaped (fig. 36), without lateral carina, subposterior crest long and strong (fig. 36); mesopleuron below precoxal sulcus mainly smooth, punctulate and with long pilosity, above sulcus nearly completely smooth; precoxal sulcus moderately wide, deep and distinct and its crenulae medium-sized, robust, anteriorly short; metapleuron mainly smooth, punctulate, with moderate pilosity; propodeum coarsely areolate, with areola comparatively narrow and costulae complete and behind middle of propodeum; spiracles large (fig. 36).

Wings.— Fore wing: second submarginal cell large pentagonal, wide anteriorly, with medium-sized ramellus (fig. 33); r:3-SR:SR1 = 5:11:92; 2-SR:3-SR:r-m = 13:11:16. Hind wing: M+CU:1-M = 29:34; surroundings of cu-a with setosity.

Legs.— Length of hind femur, tibia and basitarsus 3.8, 6.4 and 10.2 times their width, respectively; length of outer and inner spur of middle tibia 0.4 and 0.5 times their basitarsus, respectively; length of outer and inner spur of hind tibia 0.35 and 0.50 times hind basitarsus, respectively; hind femur robust (fig. 34); tarsi and middle tibial spurs rather robust (figs 37, 38).

Metasoma.— Robust, smooth; length of first tergite equal to its apical width and without sublateral depressions (fig. 39); second metasomal suture fine, complete.

Colour.— Yellowish-brown; antenna (but scapus largely brown), first metasomal tergite medio-posteriorly, second-sixth tergites (except laterally), seventh tergite and ovipositor sheath blackish; hind tarsus largely dark brown; basal half of wing membrane yellow, but with large stigmal spot being part of large dark brown band, below pterostigma with yellowish patch and with yellowish patch near ramellus in dark brown area (fig. 33), and remainder of wing dark brown; vein C+SC+R apically, parastigma, and apical third of pterostigma dark brown (as setae), veins in pale areas yellowish, remainder brown; remainder of pterostigma yellowish.

Variation.— The paratype ♀ is dirty and moldy, very similar to holotype, it has the length of the fore wing 14.2 mm, and of the body 13.8 mm, length of the ovipositor sheath 0.02 times fore wing, the length of the hind femur 3.8 times its width; the middle; and the ramellus of the fore wing is comparatively long.

Distribution.— Oriental China: Fujian (between 1100-1400 m).

Notes.— Easily recognizable because of the combination of the crenulate notauli (fig. 36) and the normally robust hind femur (fig. 34).

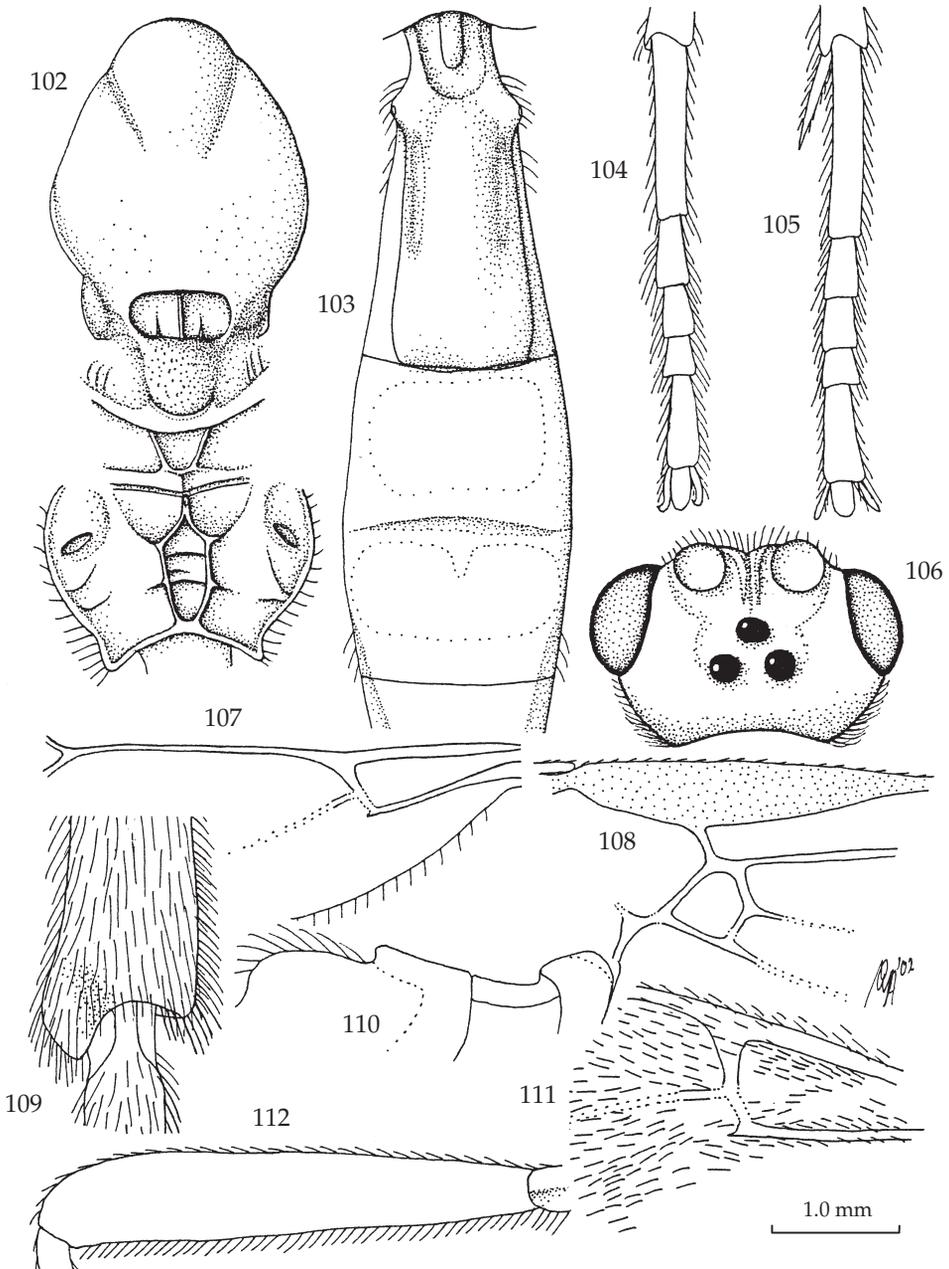
Euagathis mayunae spec. nov.
(figs 81-93)

Material.— Holotype, ♀ (ZUH), "China: Fujian, Caizhou, 5.vii.1982, no. 853550, Lin Yulan". Paratypes (1 ♀ + 1 ♂): ♂ (ZUH), "China: Fujian, Shanhang, 19-21.vii.1988, no. 885041, Ma Yun"; ♀ (ZUH), "[China:] Fujian, Laizhou, [1000-1500 m], 6.vii.1982, ex a larva of Lymantriidae, Lin Yulan, no. 853550".

Holotype, ♀, length of body 8.3 mm, of fore wing 8.3 mm.

Head.— Antenna incomplete, 45 segments remaining; length of third antennal segment 1.2 times fourth segment; length of third and fourth segments 2.7 and 2.3 times their width, respectively; length of maxillary palp 0.5 times height of head, palpi robust (fig. 89); length of eye in dorsal view 1.6 times temple; temples straight laterally and distinctly narrowed (fig. 88); OOL:diameter of ocellus:POL = 12:5:8; face rather sparsely and finely punctate, and vertex more densely so; crests between antennal sockets subparallel, rather weak; occipital flange large, wide, its ventral margin subhorizontal.

Mesosoma.— Length of mesosoma 1.3 times its height; laterally pronotum with curved rugae anteriorly, with posterior crenulation medium-sized and distinct; subpronope deep, large; epomia single; mesoscutum distinctly punctate with interspaces more than diameter of punctures, medio-posteriorly distinctly depressed and lobes distinctly convex, its middle lobe with pair of shallow grooves and a distinct median crest anteriorly; anterior half of notauli distinctly impressed, indistinct and smooth posteriorly; scutellum rather convex, coarsely and rather densely punctate, truncate and anteriorly, saddle-shaped (fig. 93), without lateral carina, subposterior crest curved, rather long and strong (fig. 93); mesopleuron below precoxal sulcus coarsely punctate with interspaces mostly equal to diameter of punctures and with short pilosity, above sulcus nearly completely smooth except for some punctures; precoxal sulcus moderately wide, deep and distinct and its crenulae medium-sized, robust, anteriorly rather long; meta-pleuron rather coarsely punctate, with several rugae ventrally, with moderate pilosity;



Figs 102-112, *Euagathis parallela* spec. nov., ♀, holotype. 102, mesosoma, dorsal aspect; 103, first-third metasomal tergites, dorsal aspect; 104, fore tarsus, dorsal aspect; 105, middle tarsus, dorsal aspect; 106, head, dorsal aspect; 107, veins M+CU and 1-M of hind wing; 108, detail of pterostigma and second submarginal cell of fore wing; 109, apex of hind tibia, dorsal aspect; 110, scutellum and metanotum, lateral aspect; 111, base of hind wing; 112, hind femur, lateral aspect. 102, 103, 106-108, 112: 1.0 x scale-line; 104, 105: 1.3 x; 109, 110: 2.6 x; 111: 2.0 x.

propodeum coarsely areolate, areola wide, with complete and strong costulae near middle of propodeum (fig. 93); spiracles medium-sized.

Wings.— Fore wing: second submarginal cell subparallel, narrow anteriorly, without distinct ramellus (fig. 81); $r:3\text{-SR:SR1} = 5.3:76$; $2\text{-SR}:3\text{-SR}:r\text{-m} = 14.3:12$. Hind wing: $M+CU:1\text{-M} = 30:70$; surroundings of cu-a with setosity.

Legs.— Length of hind femur, tibia and basitarsus 3.2, 6.2 and 6.8 times their width, respectively; hind femur robust (fig. 84) and with dense setosity (as remainder of legs), densely punctate; length of outer and inner spur of middle tibia 0.50 and 0.75 times their basitarsus, respectively; length of outer and inner spur of hind tibia 0.35 and 0.55 times hind basitarsus, respectively, robust; middle and hind tibial spurs, fore and middle tarsi robust (figs 82, 83).

Metasoma.— Robust, smooth; length of first tergite 1.8 times its apical width (fig. 90), convex sublaterally; second metasomal suture absent; length of ovipositor sheath 0.06 times fore wing, sheath rather wide (fig. 92).

Colour.— Yellowish-brown (including scapus and pedicellus); remainder of antenna (but apically paler), and hind tarsus rather dark brown; basal half of fore wing membrane yellow, but with large stigmal spot being part of large dark brown band up to posterior border of wing, below pterostigma with yellowish patch (fig. 81), and remainder of wing dark brown; vein C+SC+R apically, parastigma, and apex of pterostigma narrowly dark brown (as the setae), veins in pale areas yellowish, remainder brown; remainder of pterostigma yellowish.

Variation.— Paratype ♂ is very similar to holotype, length of the fore wing 9.3 mm, and of the body 8.4 mm, length of the hind femur 4.0 times its width (fig. 85); apical third of antenna pale brown, remainder black except scapus and pedicellus; hind coxa and lateral lobes of mesoscutum somewhat darkened; and the ramellus of the fore wing distinct and second submarginal cell of fore wing triangular; fore and middle tarsi, and tibial spurs rather slender. The ♀ paratype has the first tergite 1.3 times longer than its apical width and the hind basitarsus 7.6 times as long as width.

Distribution.— Oriental China (Fujian).

Biology.— Parasitoid of Lymantriidae.

Note.— It is a real pleasure to name this species after one of its collectors, Mrs Ma Yun (Hangzhou University), who has been collecting Braconidae for a long time and spent a lot of time on figuring and describing them in collaboration with Prof. He and the second author.

Euagathis ophippium (Cameron, 1899)
(figs 15-24)

Disophrys ophippium Cameron, 1899: 93.

Euagathis ophippium; Shenefelt, 1970: 413; van Achterberg & O'Toole, 1993: 29.

Euagathis chinensis Szépligeti, 1902: 68 (not *Agathis chinensis* Holmgren, 1868). **Syn. nov.**

Euagathis asiatica Fahringer, 1937: 417 (replacement name); Shenefelt, 1970: 409. **Syn. nov.**

Euagathis semenovi Shestakov, 1940: 13; Shenefelt, 1970: 415; Sharkey, 1998: 531. **Syn. nov.**

Euagathis seminovi; Sharkey, 1996: 22-23, figs 3c, 25d.

Euagathis relativia Bhat & Gupta, 1977: 211-212. **Syn. nov.**

Material.— Holotype of *E. ophippium*, ♀ (OUM), "*Disophrys ophippium* Cam., Type, Khasia", "793"; lec-

holotype of *E. chinensis* and of *E. asiatica*, ♂ (TAM), "China, leg. ?", "China", "*chinensis*, det. Szépligeti", "Lectotypus ♂ *Euagathis chinensis* Szépl., 1902 % des. Papp J., 1967", "Hym. Type No. 721, Mus. Budapest". Additional material from China (ZUH, CASB, RMNH) from Yunnan (Xishuangbanna), Guangxi (Congsheng), Guizhou (Mt. Lei, Guiyang, Guiding), Hunan (Zhuzhou, Linyan), Fujian (Mt. Longxi, Mt. Wuyi, Jianyang), Zhejiang (Mt. Tianmu, Hangzhou, Fuyang, Mt. Mugan), Jiangsu (Mt. Baohua), Shandong (Mt. Lao), Beijing (Badaling, Shanbao, Mt. Shangfong), Jilin (Dongliao, Kongian) and northern Vietnam (RMNH, EIBR) from Cuc Phuong National Park (approx. 225 m).

Redescribed after ♀ from Cuc Phuong National Park (Vietnam), length of body 8.3 mm, of fore wing 9.1 mm.

Head.— Antenna with segments 47; length of third antennal segment 1.2 times fourth segment; length of third, fourth and penultimate segments 2.8, 2.3 and 1.5 times their width, respectively; length of maxillary palp 0.6 times height of head, palpi robust; length of eye in dorsal view 1.4 times temple; temples weakly concave laterally and rather narrowed; OOL:diameter of ocellus:POL = 9:5:5; face laterally rather sparsely and finely punctate, but more dense and coarsely medially; vertex sparsely finely punctate; crests between antennal sockets subparallel, robust; occipital flange large, rather wide, its ventral margin subhorizontal (fig. 21).

Mesosoma.— Length of mesosoma 1.4 times its height; laterally pronotum with curved rugae antero-ventrally, with posterior crenulation medium-sized and distinct; subpronope deep, large; epomia single; middle lobe of mesoscutum distinctly punctate with interspaces more than diameter of punctures, without pair of shallow grooves and a weak median crest anteriorly and rather flattened dorsally in lateral view, lateral lobes punctate laterally and distinctly convex, medio-posteriorly distinctly depressed; notauli distinctly impressed, and distinctly crenulate but smooth posteriorly; scutellum strongly convex medio-anteriorly, tuberculate (fig. 17), coarsely and rather densely punctate, anteriorly truncate (fig. 16), without complete lateral carina, subposterior crest sinuate, long and strong (fig. 16); mesopleuron below precoxal sulcus very coarsely punctate with interspaces less than diameter of punctures and moderately pilose, above sulcus coarsely and less densely punctate; precoxal sulcus wide, and distinct and its crenulae long and moderately robust; metapleuron very coarsely vermiculate-rugose, with moderate pilosity; medially propodeum largely superficially rugose and only anteriorly with coarse carinae, medially forming a small triangle, without areola or costulae near middle of propodeum, lateral carinae complete and very strong, posteriorly lobe-shaped protruding and with conspicuous setosity; spiracles large.

Wings.— Fore wing: second submarginal cell pentagonal, rather wide anteriorly, without ramellus (fig. 15); r:3-SR:SR1 = 5:10:118; 2-SR:3-SR:r-m = 18:10:21. Hind wing: M+CU:1-M = 30:50; surroundings of cu-a glabrous.

Legs.— Length of hind femur, tibia and basitarsus 4.6, 7.7 and 8.8 times their width, respectively; hind femur comparatively slender (fig. 24) and with dense setosity (as remainder of legs), densely punctate; length of outer and inner spur of middle tibia 0.4 and 0.6 times their basitarsus, respectively; length of outer and inner spur of hind tibia 0.35 and 0.50 times hind basitarsus, respectively; middle tibial spurs, fore and middle tarsi rather robust (figs 18, 19).

Metasoma.— Slender, smooth; length of first tergite 2.2 times its apical width, tergite slightly widened apically (fig. 20), convex posteriorly; second metasomal suture absent; length of ovipositor sheath 0.06 times fore wing, sheath rather wide.

Colour.— Black or blackish-brown (including antenna and hind leg), pro- and mesothorax, metanotum, metapleuron anteriorly and propodeum anteriorly and medially orange-brown; palpi (but basally darkened), tegulae, fore and middle tarsi pale yellowish; remainder of fore leg, apex of middle femur and middle tibia pale yellowish-brown; wings rather dark brown, but basal half with yellowish tinge, without stigmal spot (fig. 15); veins and base of pterostigma dark brown, remainder of pterostigma brown.

Variation.— Males are dark winged with the pterostigma dark brown, rarely having the fore wing brownish with yellowish tinge and the pterostigma yellowish. Mesosoma dark reddish-brown to completely black, scapus nearly always black, and metasoma black. Hind leg in both sexes black or dark brown; basal half of antenna of ♀ yellowish but sometimes dark brown. Females have the wing membrane brownish with yellowish tinge, usually without stigmal spot (but sometimes present) and the scapus yellowish. The colour of the body varies from completely yellowish-brown to completely black, with all kinds of intermediates. Sometimes females have the whole metasoma and most of the hind leg rather dark reddish-brown. One female (CASB) has the whole head, mesosoma and legs yellowish-brown. Length of first metasomal tergite 1.8-2.2 times its apical width.

Notes.— This species is easily recognizable because of the coarse vermiculate-rugosity of the metapleuron, the tuberculate protruding scutellum and the flange-like tubercles of the propodeum and its the long setae. It is the only species of *Euagathis* that penetrates well in the East Palaearctic region.

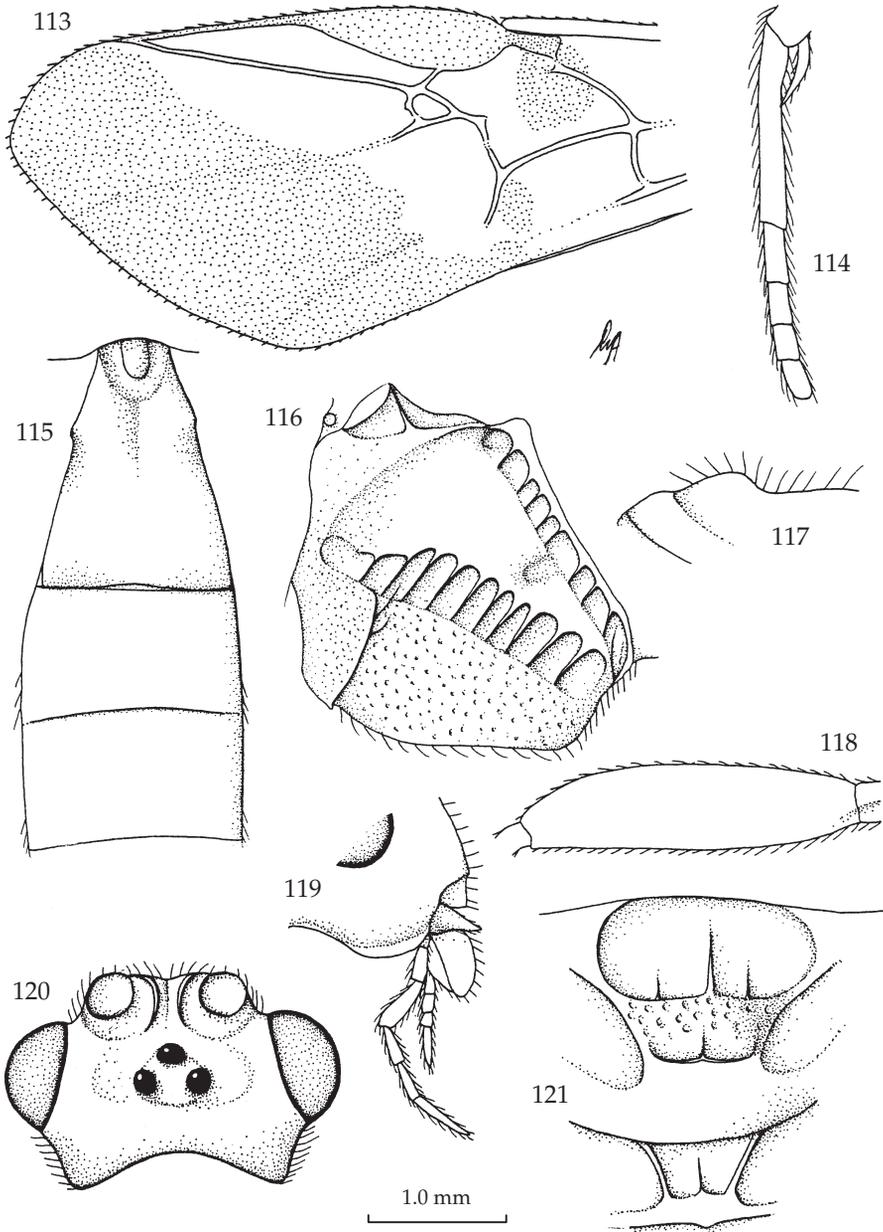
Euagathis relativa Bhat & Gupta, 1977, was described from two old faded males from China (Hangzhou) with brownish palpi (the colour of the palpi is very variable in this species) and should have a more robust metasoma, but the first tergite is 2.2 times as long as wide apically!

In the key by Simbolotti & van Achterberg, 1995, *E. ophippium* runs to *E. ruficollis* (Cameron, 1902 (not Cameron, 1899; = *E. rufonigra* Enderlein, 1920) from the Sunda area, but *E. rufonigra* differs by having the metapleuron punctate, the propodeum with a transverse carina after the middle of the propodeum, the precoxal sulcus with much shorter crenulae, the middle lobe of the mesosocutum more protruding, the length of fore wing 10-13 mm, and the middle tarsus less robust. *E. nigriceps* Enderlein, 1920, from West Malaysia agrees in having the protruding scutellum, the robust fore tarsi and the setose propodeal side but this species has the metapleuron punctate and the fore wing membrane subhyaline. *E. ophippium* differs from *E. aurea* Simbolotti & van Achterberg, 1995, from East and West Malaysia in the evenly and less convex scutellum (figs 124, 127 in Simbolotti & van Achterberg, 1995), the yellowish-brown hind basitarsus; the largely bright golden-yellow fore wing membrane and the less elongate first tergite (1.4-1.5 times longer than its apical width).

Distribution.— India (Meghalaya), Nepal, Vietnam, Oriental and Palaearctic China, North Korea, Japan, Far East Russia.

Euagathis parallela van Achterberg, spec. nov.
(figs 102-112)

Material.— Holotype, ♀ (RMNH), "NW Vietnam: Tonkin, Hoang Lien N.R., 15 km W Sa Pa, c 1900 m, 19.x.1999, C. v. Achterberg, RMNH'99".



Figs 113-121, *Euagathis maculipennis* (Brullé), ♂, lectotype, but 118 from China, Yunnan, Xishangbanna. 113, apex of fore wing; 114, fore tarsus, lateral aspect; 115, first-third metasomal tergites, dorsal aspect; 116, mesopleuron; 117, scutellum, lateral aspect; 118, hind femur, lateral aspect; 119, malar space and palpi; 120, head, dorsal aspect; 121, scutellum and metanotum, dorsal aspect. 113: 1.0 x scale-line; 114, 117: 1.5 x; 115, 121: 1.8 x; 116, 119, 120: 1.3 x; 118: 0.7 x.

Holotype, ♀, length of body 12.3 mm, of fore wing 12.9 mm.

Head.— Antennal segments 52; length of third antennal segment 1.3 times fourth segment; length of third, fourth and penultimate segment 3.3, 2.5 and 1.4 times their width, respectively; length of maxillary palp 0.7 times height of head; length of eye in dorsal view 1.4 times temple; temples straight laterally and distinctly narrowed (fig. 106); OOL:diameter of ocellus:POL = 12:5:6; face and vertex largely smooth, punctulate; crests between antennal sockets parallel, robust, rounded dorsally and with long setae; occipital flange rather large, moderately wide, its ventral margin oblique.

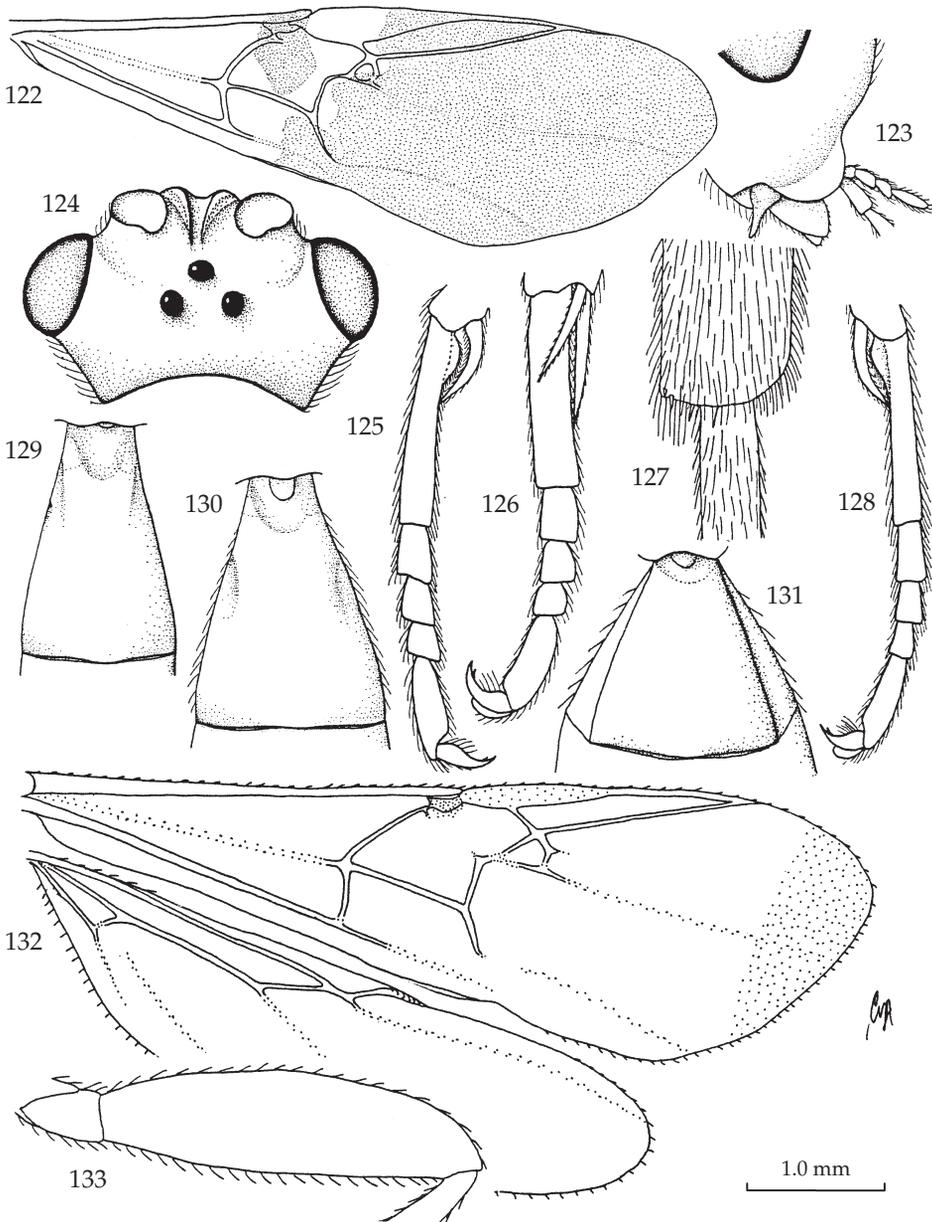
Mesosoma.— Length of mesosoma 1.5 times its height; laterally pronotum smooth, with posterior crenulation indistinct; subpronope rather deep, large; epomia single; mesoscutum smooth except some punctures, medio-posteriorly weakly depressed, its middle lobe with obsolescent pair of shallow grooves and a median carina anteriorly; notauli only anteriorly deep, smooth posteriorly (fig. 102); scutellum rather convex, moderately punctate, truncate anteriorly, rather rounded anteriorly (fig. 110), without lateral carina, subposterior crest curved, rather blunt and strong (fig. 102); mesopleuron below precoxal sulcus mainly smooth, finely punctate and with rather long pilosity, above sulcus smooth but anteriorly extensively punctate; precoxal sulcus narrow, its anterior half shallow and smooth, deep and narrowly crenulate; metapleuron mainly smooth dorsally, sparsely punctate anteriorly, and with crenulae ventrally, with moderate pilosity; propodeum with strong, curved lateral carina, with rather narrow coarse areola and costulae largely absent (fig. 102); spiracles large (fig. 102).

Wings.— Fore wing: second submarginal cell pentagonal, rather wide anteriorly, with short ramellus (fig. 108); $r:3\text{-SR:SR1} = 5:4:94$; $2\text{-SR}:3\text{-SR}:r\text{-m} = 13:7:13$. Hind wing: $M+CU:1\text{-M} = 30:49$; surroundings of cu-a with setosity, but less densely (fig. 111) than in *E. borneensis*.

Legs.— Length of hind femur, tibia and basitarsus 5.8, 8.3 and 8.7 times their width, respectively; hind femur slender (fig. 112), long and with dense setosity (as remainder of legs); outer side of apex of hind tibia convex (fig. 109); length of outer and inner spur of middle tibia 0.35 and 0.45 times their basitarsus, respectively; length of outer and inner spur of hind tibia 0.40 and 0.27 times hind basitarsus, respectively; middle tibial spurs, fore and middle tarsi slender (figs 104, 105).

Metasoma.— Smooth; first tergite subparallel-sided behind spiracles, rather slender (fig. 103), smooth; length of first tergite 2.3 times its apical width and twice its subapical width, with pair of moderate sublateral depressions behind spiracles and distinctly widened near spiracles; second metasomal suture wide, somewhat curved, nearly complete (fig. 103); length of ovipositor sheath 0.03 times fore wing, sheath wide.

Colour.— Yellowish-brown; antenna, basal 0.6 of first tergite, large patch on second and third tergites, third-fifth tergites partly laterally, hind coxa (except dorsally), apex of hind tibia narrowly and hind tarsus black or dark brown; metasoma (except hypopygium) more or less ivory; fore wing membrane yellow, but with large separate stigmal spot dark brown and apical band of fore wing brown; hind wing apically and posteriorly brown and remainder yellowish; vein C+SC+R apically and parastigma dark brown (as setae), pterostigma completely yellow; veins in pale areas yellowish,



Figs 122-133, *Euagathis chinensis* (Holmgren), ♀, lectotype of *E. japonica* Szépligeti, but 131-133 of holotype of *E. melanocera* (Cameron), 128 of ♂ from Indonesia, Sumatra, Medan and 130 of ♀ from Indonesia, Java, Pelawa. 122, fore wing; 123, malar space and palpi; 124, head, dorsal aspect; 125, 128, fore tarsus, lateral aspect; 126, middle tarsus, lateral aspect; 127, apex of hind tibia, dorsal aspect; 129-131, first metasomal tergite, dorsal aspect; 132, wings; 133, hind femur, lateral aspect. 122: 0.6 x; 123: 1.4 x; 124: 1.1 x; 125, 126, 128: 1.7 x; 127: 2.0 x; 129, 130: 1.0 x scale-line; 131, 133: 0.8 x; 132: 0.7 x.

remainder brown.

Distribution.— Vietnam (Tonkin: about 1900 m).

Note.— Very similar to *E. borneoensis*, but differs by the slender first tergite and a different colour pattern.

Euagathis robusta spec. nov.
(figs 40-50)

Material.— Holotype, ♀ (CASB), “[Vietnam:] Tonkin, Hoa-Binh, A. de Cooman”. Paratype: ♀ (CASB), “[China:] Yunnan, Xishuangbanna, 650 m”, “30.xi.1958, Zhang Yiran”.

Holotype, ♀, length of body 12.6 mm, of fore wing 13.2 mm.

Head.— Antennal segments 62; length of third antennal segment 1.4 times fourth segment; length of third, fourth and penultimate segment 2.4, 1.7 and 1.1 times their width, respectively; length of maxillary palp 0.7 times height of head; length of eye in dorsal view 1.5 times temple; temples straight laterally and moderately narrowed (fig. 50); OOL:diameter of ocellus:POL = 17:5:10; face and vertex finely punctate; crests between antennal sockets parallel and strong; occipital flange large, moderately wide, its ventral margin oblique (fig. 49).

Mesosoma.— Length of mesosoma 1.5 times its height; laterally pronotum smooth, with posterior crenulation short and weak; subpronope rather deep, large; epomia single; mesoscutum smooth, medio-posteriorly weakly depressed, its middle lobe without pair of shallow grooves or a median carina anteriorly; notauli complete, deep, crenulate posteriorly (fig. 41); scutellum flat, sparsely punctate, truncate anteriorly, saddle-shaped, steep anteriorly, without lateral carina, subposterior crest curved, rather long and strong (fig. 41); mesopleuron below precoxal sulcus mainly smooth, finely punctate and with long pilosity, above sulcus nearly completely smooth except for some punctures; precoxal sulcus moderately wide, deep and distinct and its crenulae medium-sized, robust, anteriorly rather short; metapleuron mainly smooth, punctulate, with moderate pilosity; propodeum coarsely areolate, with areola comparatively narrow and costulae complete, strong and behind middle of propodeum (fig. 41); spiracles large.

Wings.— Fore wing: second submarginal cell pentagonal, wide anteriorly, without distinct ramellus (fig. 40); r:3-SR:SR1 = 5:7:87; 2-SR:3-SR:r-m = 12:7:15. Hind wing: M+CU:1-M = 30:33 (fig. 47); surroundings of cu-a with setosity.

Legs.— Length of hind femur, tibia and basitarsus 3.2, 6.1 and 5.0 times their width, respectively; hind femur very robust (fig. 48), long and with dense setosity (as remainder of legs); length of outer and inner spur of middle tibia 0.50 and 0.55 times their basitarsus, respectively; length of outer and inner spur of hind tibia 0.45 and 0.60 times hind basitarsus, respectively; fore tarsus rather robust (fig. 42); middle tibial spurs and middle tarsus robust (fig. 43).

Metasoma.— Robust, smooth; length of first tergite 0.9 times its apical width, somewhat depressed sublaterally (fig. 46); second metasomal suture fine, somewhat curved, complete; length of ovipositor sheath 0.02 times fore wing, sheath wide.

Colour.— Yellowish-brown; antenna, head (except palpi) and largely hind tarsus black or dark brown; basal half of fore wing membrane yellow, but with large stigmal spot being part of large dark brown band up to posterior border of wing, below

pterostigma with yellowish patch and without yellowish patch in dark brown apical area (fig. 40), and remainder of wing dark brown; vein C+SC+R apically, parastigma, and apical 0.4 of pterostigma dark brown (as setae), veins in pale areas yellowish, remainder brown; remainder of pterostigma yellowish.

Variation.— Paratype ♀ is very similar to holotype, but has the face largely, the clypeus and the head dorsally yellowish; length of the fore wing 13.3 mm, and of the body 13.4 mm, length of the ovipositor sheath 0.02 times the fore wing; length of the hind femur 3.0 times its width; and the ramellus of the fore wing is medium-sized and the second submarginal cell of the fore wing somewhat larger (fig. 44).

Distribution.— Vietnam (Tonkin), Oriental China (Yunnan: about 650 m).

Euagathis ruficollis (Cameron, 1899)

Disophrys ruficollis Cameron, 1899: 98-99.

Euagathis ruficollis; Shenefelt, 1970: 414; Bhat & Gupta, 1977: 223.

Balcmema ruficollis; van Achterberg & O'Toole, 1993: 35.

Material.— Holotype, ?♀ (most of metasoma is missing; OUM), "*Disophrys ruficollis* Cam., Type, Khasia", "679".

Notes.— Not yet known from southern China or northern Vietnam, but included in the key because this species may occur in the eastern Himalayas since it was described from northern India (Meghalaya).

N.B. The valid name for *Euagathis ruficollis* (Cameron, 1902 not Cameron, 1899) becomes *E. rufonigra* Enderlein, 1920, because the genus *Balcmema* is included in the genus *Euagathis*.

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The other abbreviations of depositories are: IEBR for Institute of Ecology and Biological Resources, Vietnam National Center for Natural Sciences and Technology, Hanoi, RMNH for the Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden, and ZUH for Zhejiang University, Hangzhou.

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