

The parasites of cereal stem borers (Lepidoptera: Cossidae, Crambidae, Noctuidae, Pyralidae) in Africa, belonging to the family Braconidae (Hymenoptera: Ichneumonoidea)

C. van Achterberg & A. Polaszek

Achterberg, C. van & A. Polaszek. The parasites of cereal stem borers (Lepidoptera: Cossidae, Crambidae, Noctuidae, Pyralidae) in Africa, belonging to the family Braconidae (Hymenoptera: Ichneumonoidea).

Zool. Verh. Leiden 304, 23.xii.1996: 1-123, figs 1-369.— ISSN 0024-1652/ISBN 90-73239-46-X.

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Key words: Braconidae; Cossidae; Crambidae; Noctuidae; Pyralidae; parasites; parasitoids; cereal stem borers; *Amicrocentrum*; *Bassus*; *Amyosoma*; *Bracon*; *Digonogastra*; *Iphiaulax*; *Mesobraconoides*; *Stenobracon*; *Euvipio*; *Tropobracon*; *Chelonus*; *Phanerotoma*; *Parallorhogas*; *Rhaconotus*; *Meteorus*; *Macrocentrus*; *Cotesia*; *Dolichogenidea*; *Glyptapanteles*; *Orgilus*; Afrotropical; Oriental; Australian; East Palaearctic; Nearctic; distribution; keys; biology.

A review is given of the parasites (parasitoids) of the African cereal stem borers (including introduced species) belonging to the family Braconidae (Hymenoptera); 38 species belonging to 19 genera are keyed and treated. Three new species are described: *Macrocentrus sesamivorus* spec. nov. from Kenya, Somalia, and Zaïre (Macrocentrinae), *Iphiaulax pilisoma* spec. nov. from Senegal, and *Amyosoma flavistigma* spec. nov. from Australia (Braconinae). New synonyms are: *Euglyptobracon* Telenga, 1936, with *Pseudovipio* Szépligeti, 1896; *Lorenzoa* de Stefani-Perez, 1909, *Kulczynskia* Niezabitowski, 1910, and *Chivinia* Shestakov, 1932, with *Bracon* Fabricius, 1804; *Euvipio* Szépligeti, 1904, with *Stenobracon* Szépligeti, 1901; *Glyptomorpha baetica* var. *mauretanic*a Szépligeti, 1906, *Euvipio fascialis* Szépligeti, 1913, *E. maculiceps* Szépligeti, 1914, and *Vipio maculicepsida* Shenefelt, 1978, with *Stenobracon unifasciatus* (Brullé, 1846); *Elphea lutea* Cameron, 1903, with *Stenobracon oculatus* Szépligeti, 1901; *Phanerotoma ocularis* Kohl, 1906, *P. rjabovi* Vojnovskaja-Krieger, 1929, *P. media* Shestakov, 1930, *P. ornatulopsis* De Saeger, 1948, *P. hispanica* var. *desertorum* Hedwig, 1957, and *P. flavitestacea* Fischer, 1959, with *P. leucobasis* Kriechbaumer, 1894. New combinations are: *Amyosoma chinense* (Szépligeti, 1902), *A. nyanzaense* (Quicke & Wharton, 1989), *A. yanoi* (Watanabe, 1960), *Bathyaulax nigripennis* (Szépligeti, 1914), and *Stenobracon rufus* (Szépligeti, 1904). Lectotypes are designated for *Camptothlipsis sublevis* Granger, 1949, *Bracon testaceorufatus* Granger, 1949, and *B. sesamiae* Cameron, 1906. *Bracon lautus* Szépligeti, 1901, is designated type species for *Lucobracon* Fahringer, 1927.

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Introduction

Recently, there has been a renewal of interest in biological control of African cereal stem borers, using either indigenous or introduced natural enemies. Indigenous natural enemies of several borer species have been surveyed recently, e.g. in Malawi (Phiri, 1995), Nigeria (Bosque-Pérez et al, 1995) and South Africa (Kfir, 1995). Exotic species have been introduced into Kenya (Omwega et al., 1995), and are being considered for introduction into other parts of Africa.

The natural enemy complexes associated with several borer species are often large (> 20 species), and species may be extremely difficult to distinguish (Polaszek et al., 1993, 1994; Setamou & Schulthess, 1995). For these reasons, any assessment of either the economic impact of indigenous natural enemies, or the success of introduced enemies, needs a firm basis in accurate systematics, with means of identification. Existing accounts are available for several groups of natural enemies, based either on taxonomic or behavioural attributes. For example, scelionid egg parasites were treated by Polaszek & Kimani (1990) and Polaszek et al. (1993); those belonging to the Braconidae: Microgastrinae by Walker (1994) and one genus of Braconidae: Braconinae, exclusively parasitizing lepidopterous stem borers in Gramineae, *Tropo-*

Table 1. List of lepidopterous stem borers of cereals in Africa of which Braconidae have been examined.

Family	Name
NOCTUIDAE	<i>Busseola fusca</i> (Fuller, 1901) <i>Sesamia calamistis</i> Hampson, 1910 <i>Sesamia cretica</i> Lederer, 1857 <i>Sesamia nonagrioides</i> Lefebvre, 1827 (= <i>Sesamia vuteria</i> auct.)
CRAMBIDAE	<i>Chilo agamemnon</i> Bleszynski, 1962 <i>Chilo diffusilineus</i> (J. de Joannis, 1922) <i>Chilo partellus</i> (Swinhoe, 1885) <i>Chilo zacconius</i> Bleszynski, 1970 (= <i>Parerupa</i> (or <i>Proceras</i>) <i>africana</i> auct.) <i>Coniesta ignefusalis</i> (Hampson, 1919) (= <i>Chilo pyrocaustalis</i> Hampson, 1919; = <i>Acigona</i> , <i>Donacoscaptes</i> , or <i>Haimbachia ignefusalis</i>) <i>Scirpophaga melanoclista</i> Meyrick, 1935 <i>Scirpophaga subumbrosa</i> Meyrick, 1933 <i>Scirpophaga</i> spp. (= <i>Schoenobius</i> , <i>Thopeutis</i> , or <i>Tryporyza</i> spp.)
PYRALIDAE	<i>Eldana saccharina</i> (Walker, 1865) <i>Maliarpha separatella</i> Ragonot, 1888
COSSIDAE	<i>Phragmataecia boisduvalii</i> (Herrich-Schäffer, 1854)

bracon Cameron, 1905, by van Achterberg (1993a); all secondary (hyper-)parasites by Polaszek & LaSalle (1995), and a review of the natural enemy complex of *Maliarpha separatella* Ragonot (Pyralidae) on rice was given by Polaszek et al. (1994), including eight species of Braconidae. However, large gaps are still present in our knowledge of the natural enemies of African stem borers, for example dipterous parasites and Ichneumonidae, which will be addressed in a forthcoming publication by Harris (in prep.) and Zwart (in prep.), respectively.

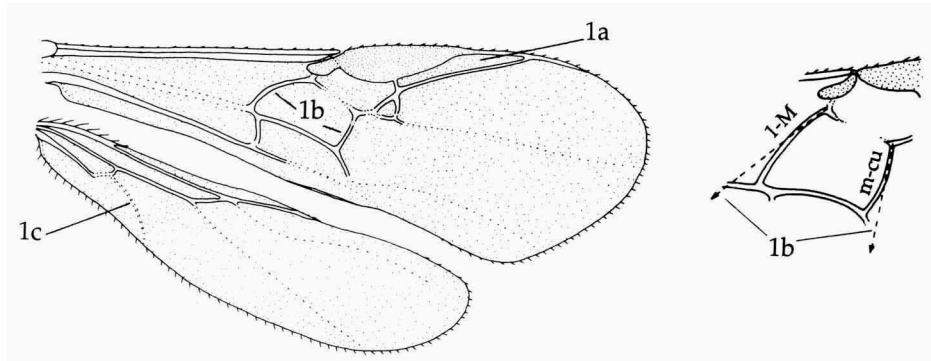
The purpose of this paper is to treat the taxonomy of the remaining Braconidae and to give a complete overview of the Braconidae, which constitute by far the most numerous and common natural enemies associated with African cereal stem borers. Stem borers may cause extensive damage; e.g., in rice fields 7-98% of the harvest may be lost in the Afrotropical and Oriental regions (Bess, 1972).

For the morphological terminology used in this paper, see van Achterberg (1988, 1993b). For the recognition of the family Braconidae, see Goulet & Huber (1993).

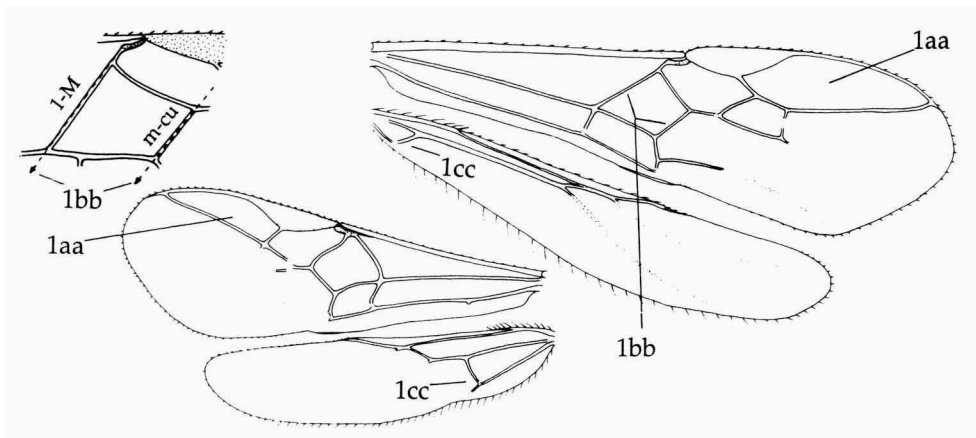
All taxonomic changes and the descriptions of new species are to be credited to the first author.

Key to the subfamilies and genera of Braconidae parasitizing African cereal stem borers

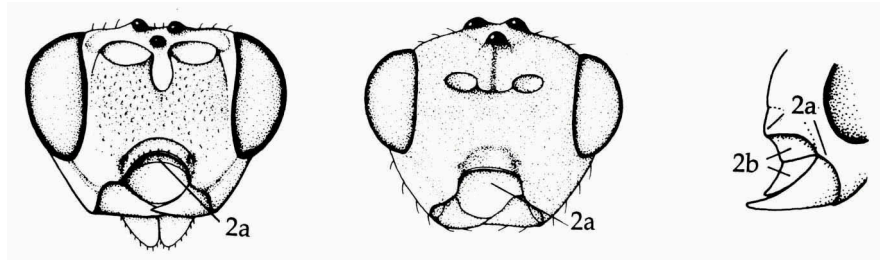
1. Marginal cell of fore wing extremely narrow and rather long (fig. 1a); trace of vein 2-CU of hind wing usually present (fig. 1b). Subfamily **Bassinae** (= **Agathidinae**) *Bassus* Fabricius
Note.— The genus *Braunsia* Kriechbaumer, 1894, has been listed, probably erroneously, as a parasite of stem borers in cereals; it can be recognized by the costate sculpture of the second and third metasomal tergites and banded or nearly completely dark brown wings.



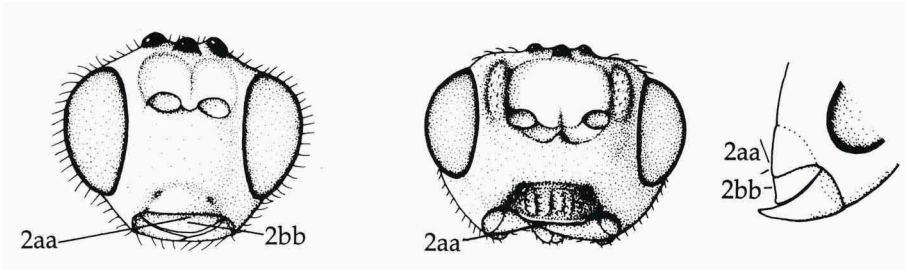
- Marginal cell of fore wing of different shape, wider (fig. 1aa); vein 2-CU of hind wing absent (fig. 1bb) 2



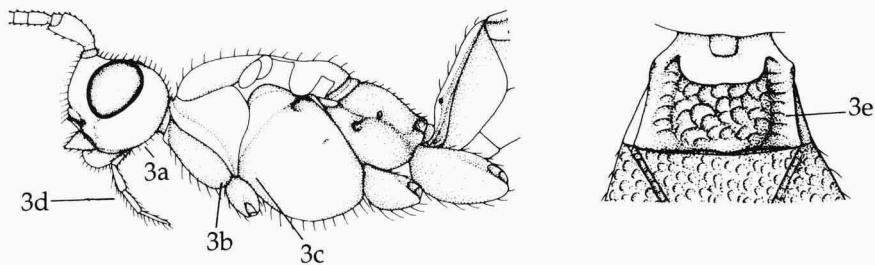
- 2. Hypoclypeal depression deep and wide, and middle of apparent ventral margin of clypeus distinctly above upper level of mandibular bases (fig. 2a); bottom of hypoclypeal depression consists of the concave labrum and a depressed part of clypeus (fig. 2b: "cyclostome braconids") 3



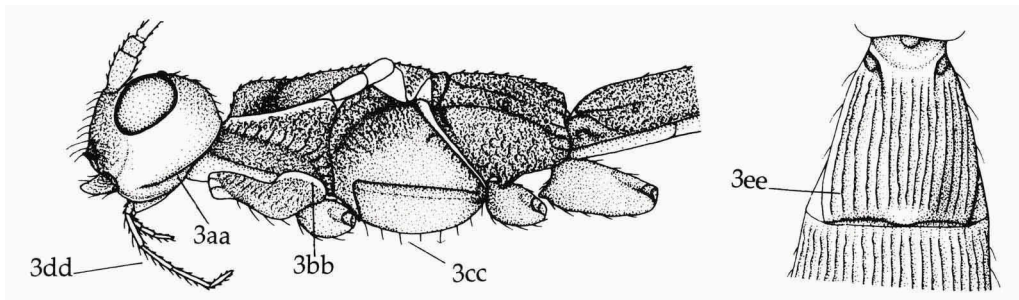
- Hypoclypeal depression absent, medio-ventral margin of clypeus close to upper level of mandibular bases (fig. 2aa); labrum flat and ventral part of clypeus not part of a hypoclypeal depression (fig. 2bb: "non-cyclostome braconids") 12



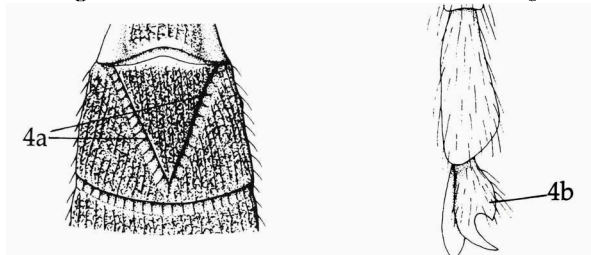
3. Occipital carina absent (fig. 3a); posterior flange of propleuron (fig. 3b) and prepectal carina of mesopleuron (fig. 3c) absent; maxillary palp with 5 segments (fig. 3d); first metasomal tergite with lateral parts flattened (fig. 3e). Subfamily **Braconinae** 4



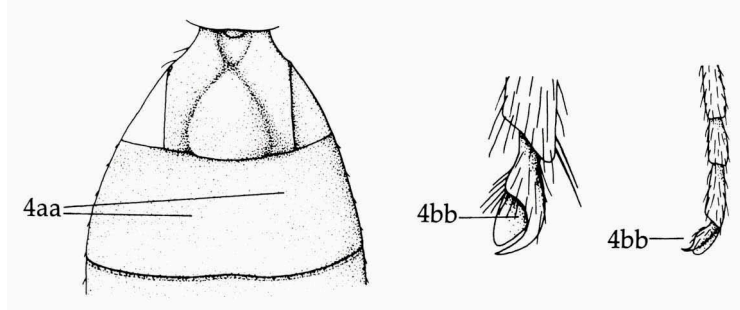
- Occipital carina present (fig. 3aa); posterior flange of propleuron (fig. 3bb) and prepectal carina (fig. 3cc) present; maxillary palp with 6 segments (fig. 3dd); first tergite with convex lateral parts (fig. 3ee). Subfamily **Doryctinae** 11



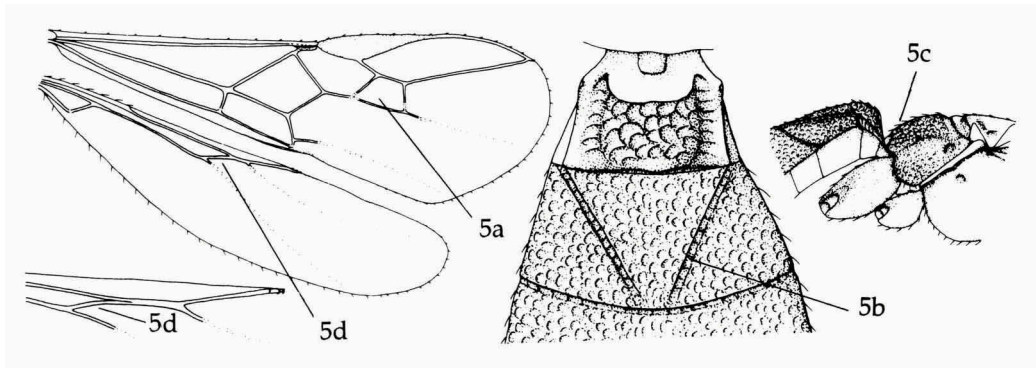
4. Second metasomal tergite with pair of converging grooves, and tergite completely sculptured (fig. 4a); tarsal claws with subbasal lobe (fig. 4b) 5



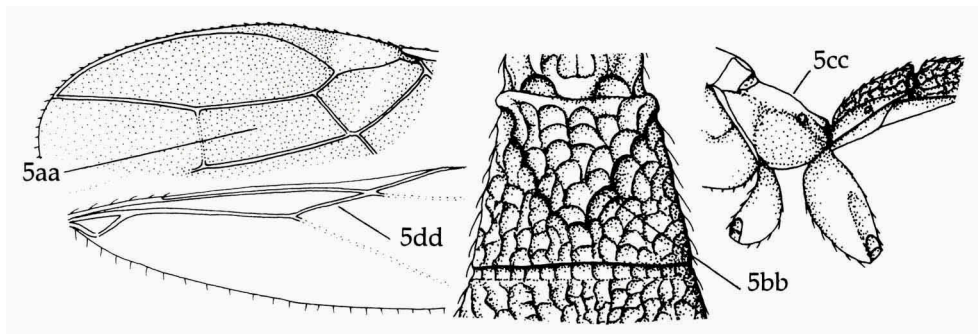
- Second tergite without pair of converging grooves, and no extensive sculpture of tergite (fig. 4aa); tarsal claws simple, without lobe (fig. 4bb) 6



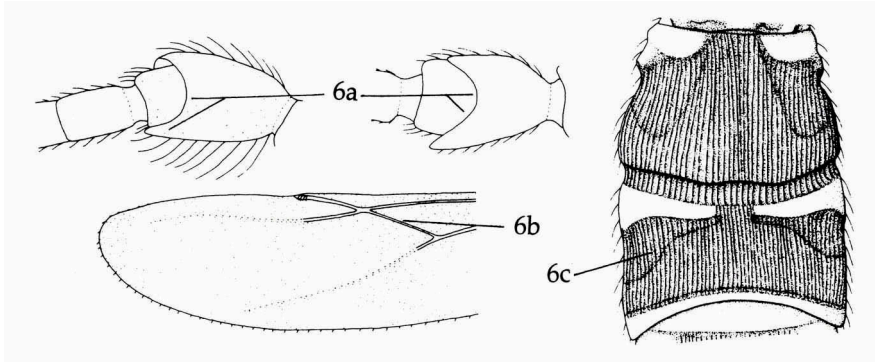
5. Second submarginal cell of fore wing slightly longer than high (fig. 5a); grooves of second metasomal tergite narrow (fig. 5b); at least posterior half of propodeum distinctly sculptured (fig. 5c); vein 1r-m of hind wing short (fig. 5d) *Tropobracon* Cameron



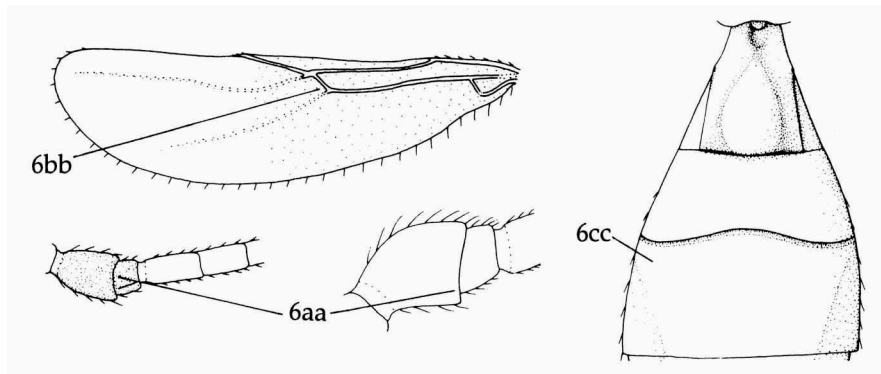
- Second submarginal cell of fore wing much longer than high (fig. 5aa); grooves of second metasomal tergite wide (fig. 5bb); propodeum completely smooth (fig. 5cc); vein 1r-m of hind wing comparatively long (fig. 5dd) *Mesobraconoides* Sarhan & Quicke



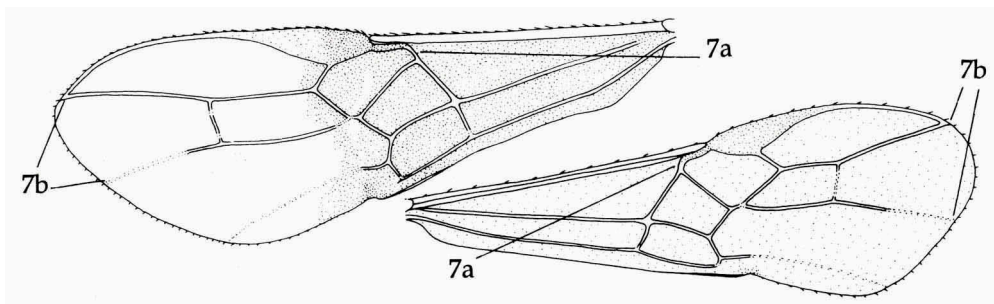
6. Scapus distinctly concave apically, ventrally longer than dorsally in lateral view (fig. 6a); vein 1r-m of hind wing comparatively long (fig. 6b); third metasomal tergite with antero-lateral grooves (fig. 6c) 7



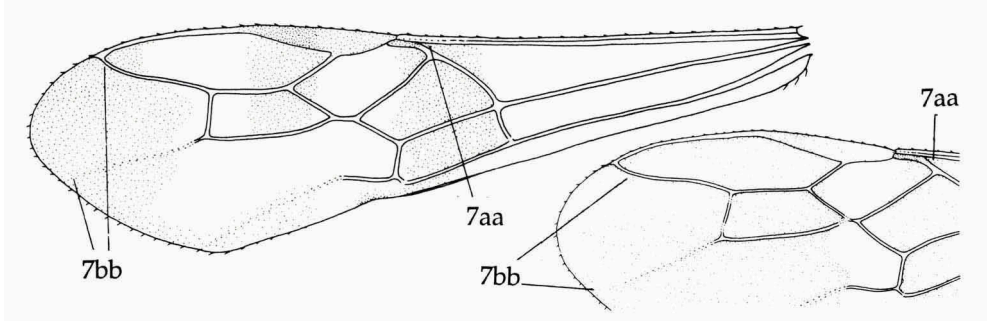
- Scapus truncate apically, in lateral view about as long ventrally as dorsally or shorter (fig. 6aa); vein 1r-m of hind wing short (fig. 6bb); third metasomal tergite without antero-lateral grooves (fig. 6cc) 9



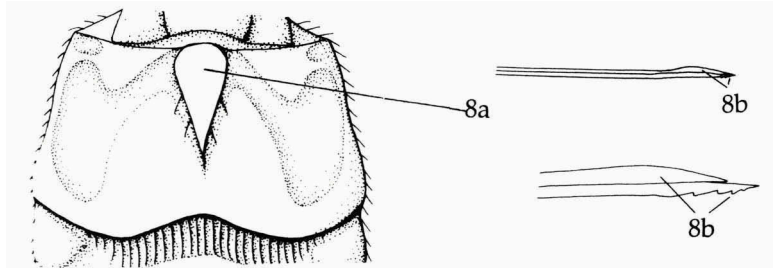
- 7. Vein 1-SR of fore wing distinctly angled with parastigma, because angle between veins 1-SR and C+SC+R is 60°-80° (fig. 7a); vein 3-M of fore wing terminating at about same level as vein SR1 or more basally (fig. 7b) 8



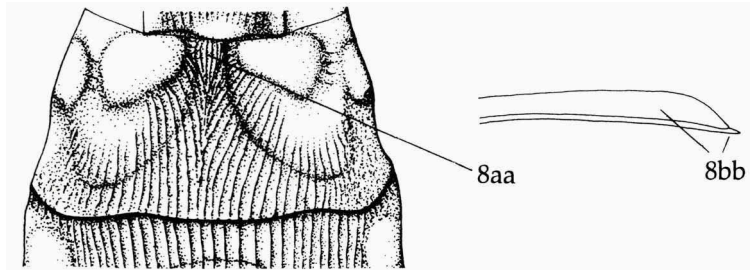
- Vein 1-SR of fore wing gradually merging into parastigma, because angle between veins 1-SR and C+SC+R is about 30° (fig. 7aa); vein 3-M of fore wing usually terminating distinctly more distad than vein SR1 (fig. 7bb) *Stenobracon* Szépligeti



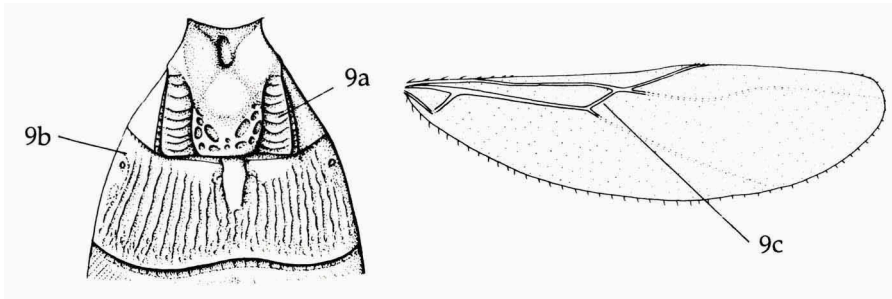
8. Second metasomal tergite with distinctly differentiated medio-basal area (fig. 8a); ovipositor normal, its upper valve not enlarged, and ventrally with some minute teeth (fig. 8b); second tergite (largely) smooth *Digonogastra* Viereck



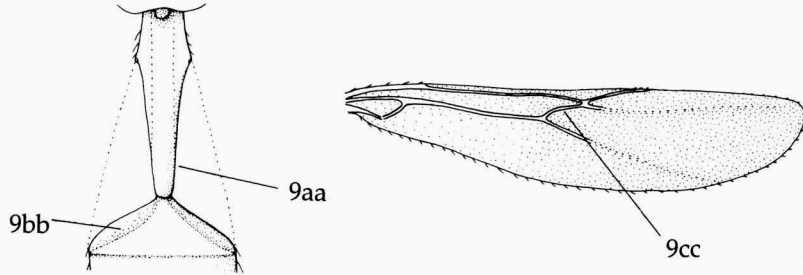
- Second metasomal tergite without medio-basal area (fig. 8aa); ovipositor aberrant, its upper valve enlarged, and ventrally without teeth (fig. 8bb); second tergite at least partly sculptured *Iphiaulax* Foerster



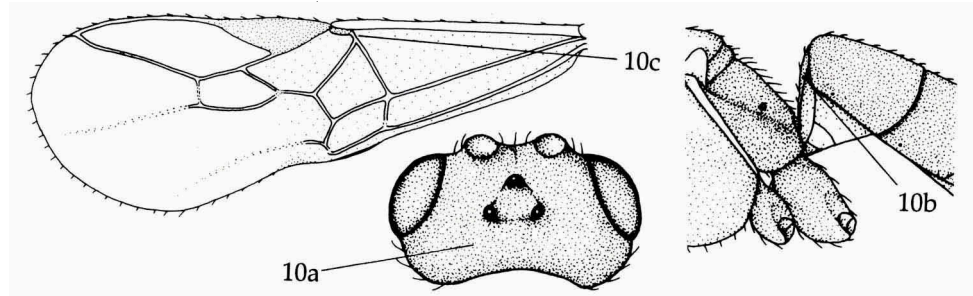
9. First tergite parallel-sided behind spiracles or diverging posteriorly, with distinct flat lateral areas (fig. 9a); antero-lateral corners of second tergite equally sclerotized as middle of tergite (not depressed in dried specimens, fig. 9b); vein 1r-m of hind wing straight (fig. 9c) 10



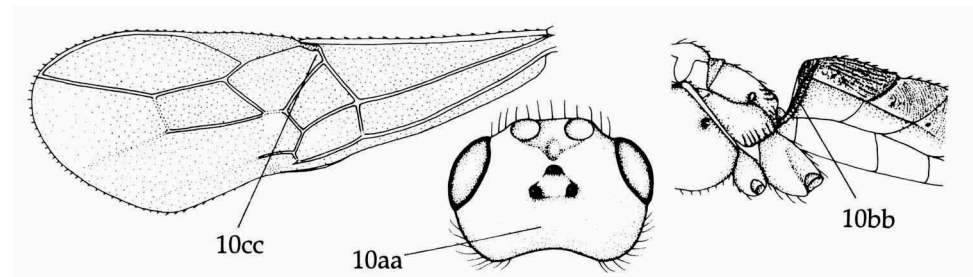
- First metasomal tergite more or less narrowed behind spiracles, without distinct flat lateral areas (fig. 9aa); antero-lateral corners of second tergite membranous, almost unsclerotized (depressed in dried specimens, fig. 9bb); vein 1r-m of hind wing more or less curved (fig. 9cc) *Amyosoma* Viereck



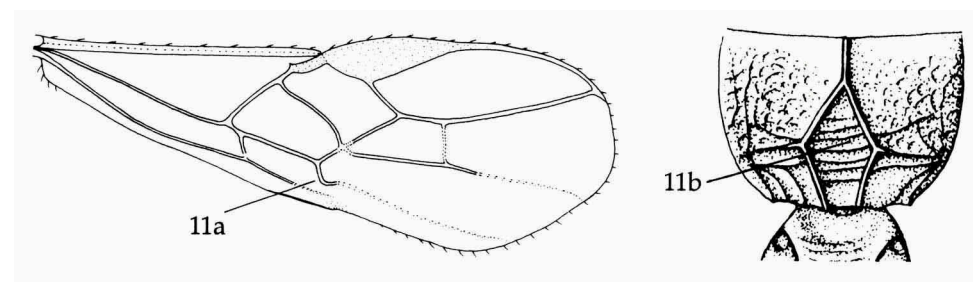
- 10. Vertex coriaceous (fig. 10a), dull and dorso-lateral carinae of first metasomal tergite absent (fig. 10b); vein 1-SR of fore wing very short or absent (fig. 10c) *Bracon* (subgenus *Habrobracon* Ashmead)



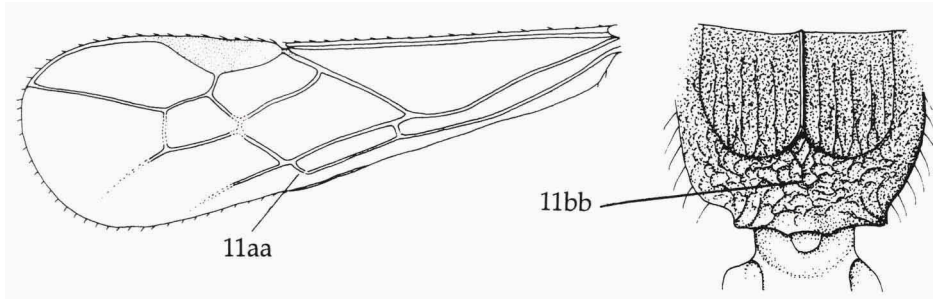
- Vertex largely smooth (fig. 10aa), shiny; if coriaceous then dorso-lateral carinae of first metasomal tergite present (fig. 10bb); vein 1-SR of fore wing medium-sized (fig. 10cc) *Bracon* (subgenus *Bracon* Fabricius)



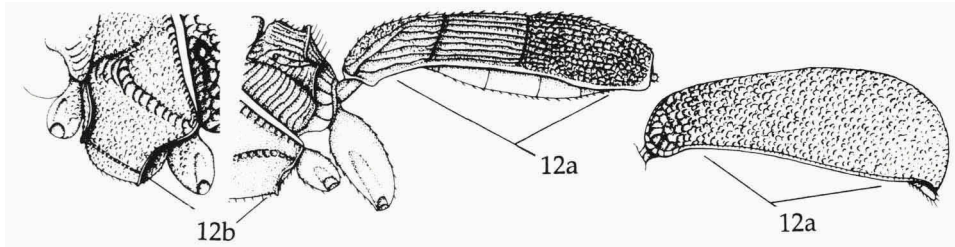
- 11. Third and fourth metasomal tergites smooth; first subdiscal cell of fore wing open distally and less slender (fig. 11a); propodeum distinctly areolate (fig. 11b); mesoscutal lobes largely smooth *Parallorhogas* Marsh



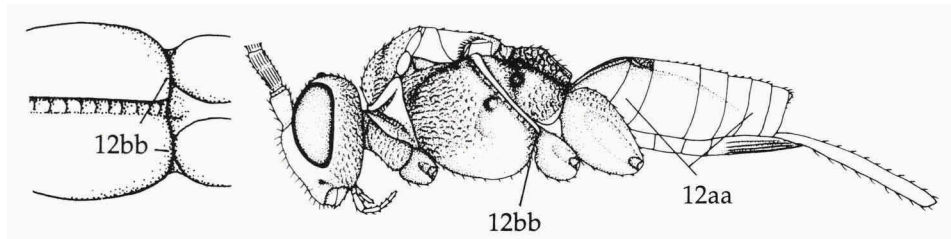
- Third and fourth tergites sculptured; first subdiscal cell of fore wing closed distally and slender (fig. 11aa); propodeum without distinct areolation (fig. 11bb); mesoscutal lobes granulate *Rhaconotus* Ruthe



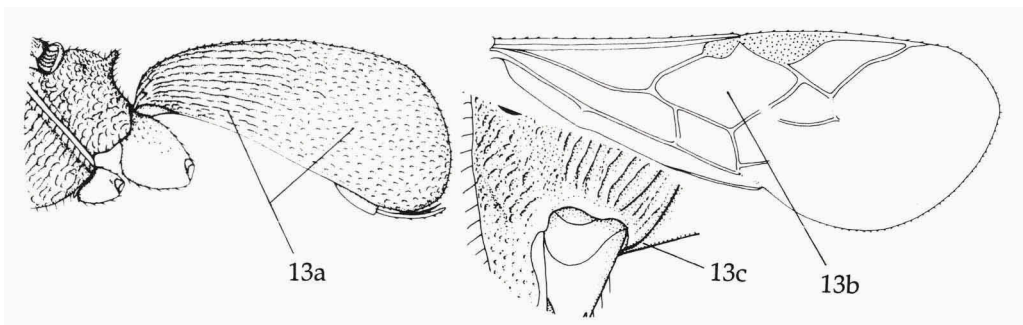
- 12. Metasoma with a carapace (fig. 12a); postpectal carina complete in front of middle coxae ventrally (fig. 12b). Subfamily *Cheloninae* 13



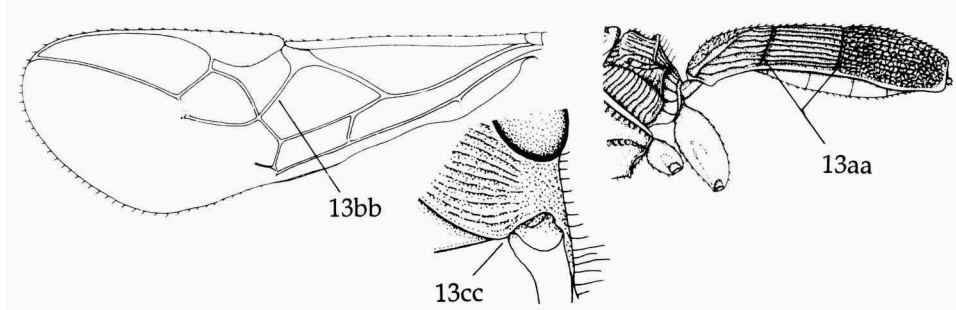
- Metasoma without a carapace (fig. 12aa); postpectal carina absent (fig. 12bb) ... 14



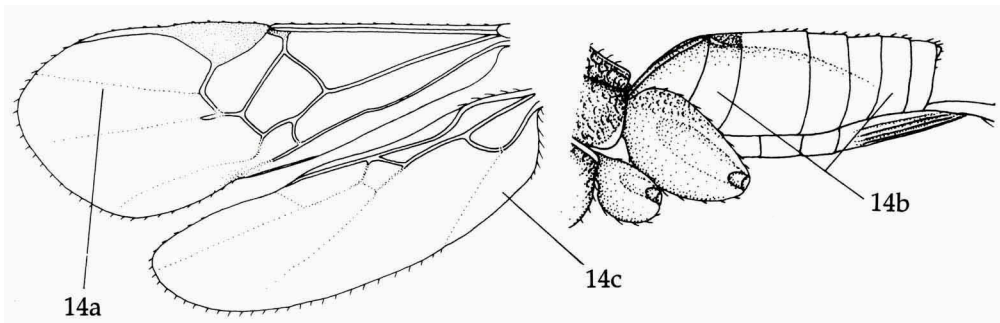
- 13. Metasomal carapace without transverse grooves (fig. 13a); vein 1-SR+M of fore wing absent (fig. 13b); occipital carina remains separated from hypostomal carina (fig. 13c) *Chelonus* Panzer



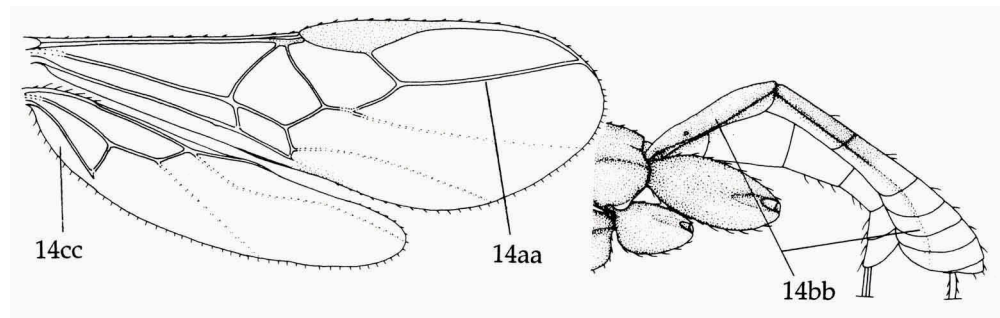
- Metasomal carapace with two transverse grooves (fig. 13aa); vein 1-SR+M of fore wing present (fig. 13bb); occipital carina just meeting hypostomal carina ventrally (fig. 13cc) *Phanerotoma* Wesmael



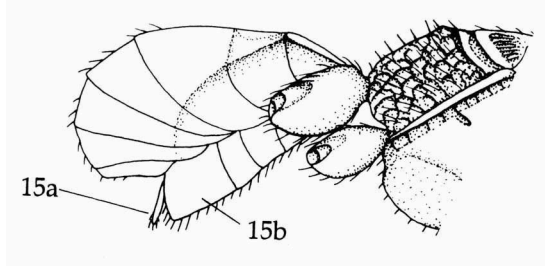
- 14. Vein SR1 of fore wing partly or completely unsclerotized, resulting in a distally open marginal cell distally (fig. 14a); metasoma often short (fig. 14b); plical lobe of hind wing may be large (fig. 14c). Subfamily Microgastrinae 15



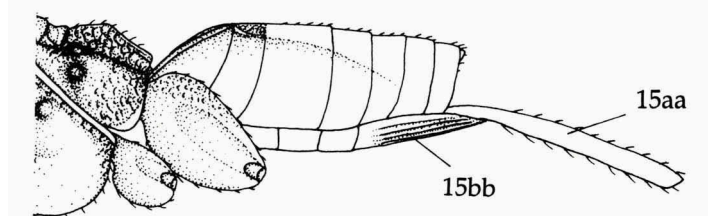
- Vein SR1 of fore wing completely sclerotized, tubular, reaching margin of wing, resulting in a closed marginal cell distally (fig. 14aa); metasoma usually elongate (fig. 14bb); plical lobe of hind wing usually medium-sized or small (fig. 14cc) 17



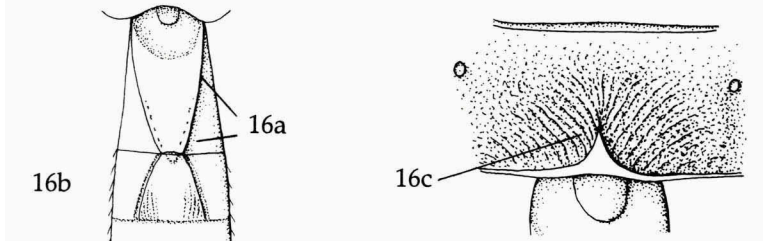
- 15. Ovipositor usually short, hardly protruding beyond apex of metasoma (shorter than basitarsus of hind leg; fig. 15a) and its sheath only apically setose; basal half of hypopygium of ♀ evenly sclerotized, and at most regularly curved (fig. 15b; *Cotesia* group) 16



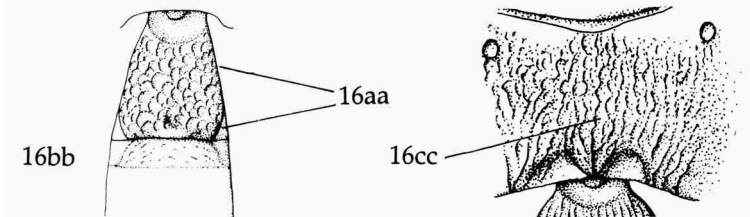
- Ovipositor usually medium-sized to long, distinctly protruding beyond apex of metasoma, at least as long as basitarsus, and more setose (fig. 15aa); basal half of hypopygium of ♀ usually folded, V-shaped at least, and often membranous medially (and creased in dead specimens; fig. 15bb) *Dolichogenidea* Viereck



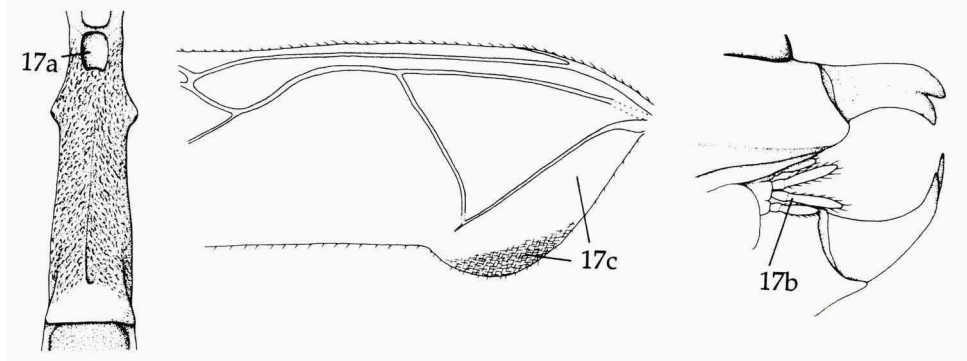
- 16. First metasomal tergite comparatively slender and gradually narrowed apically (fig. 16a); width of second tergite more than 1.5 times apical width of first tergite (fig. 16b); propodeum largely smooth, but may be reticulate posteriorly or largely rugulose-punctate (fig. 16c) *Glyptapanteles* Ashmead



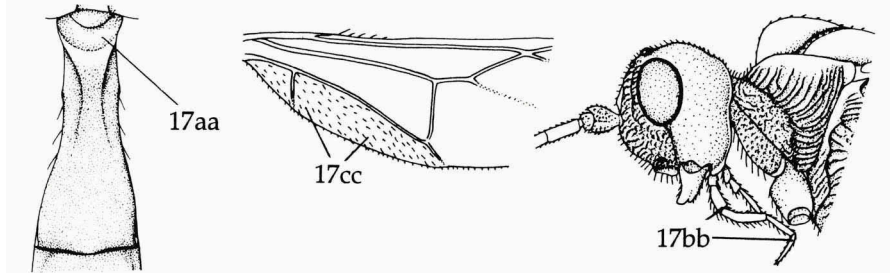
- First tergite robust, parallel-sided or widened apically, at most subapically narrowed (fig. 16aa); width of second tergite 1.5 times apical width of first tergite or less (fig. 16bb); propodeum (except anteriorly) largely coarsely rugose (fig. 16cc) .
..... *Cotesia* Cameron



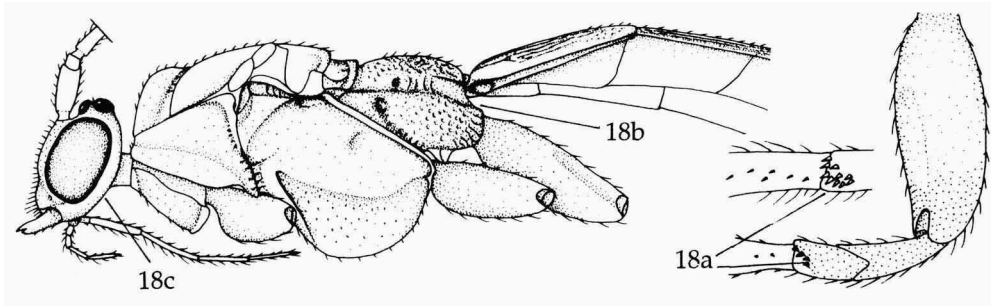
- 17. First metasomal tergite with a deep medio-basal hole behind its medio-basal depression (fig. 17a); maxillary palp consists of one segment (fig. 17b); plical lobe of hind wing large and reticulate setose (fig. 17c). Subfamily *Amicrocentrinae*
..... *Amicrocentrum* Schulz



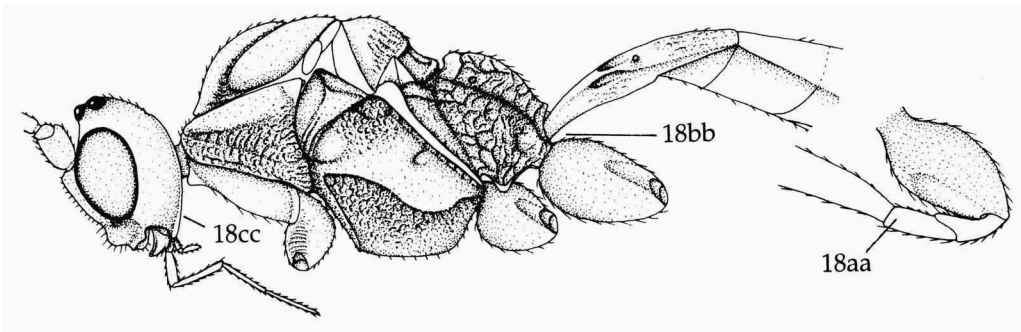
- First metasomal tergite without medio-basal hole behind its medio-basal depression (fig. 17aa); maxillary palp consists of 6 segments (fig. 17bb); plical lobe of hind wing at most medium-sized and unidirectional setose (fig. 17cc) 18



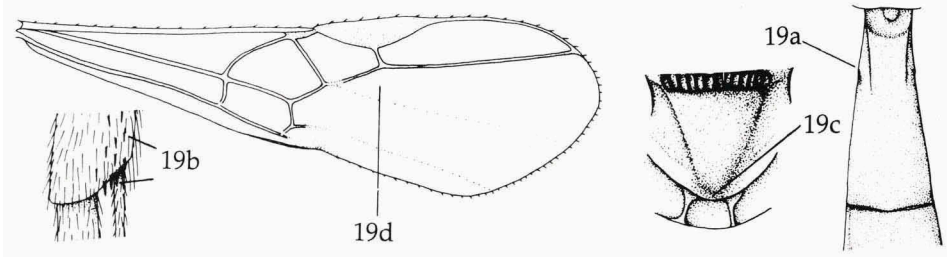
- 18. Anterior side of trochantelli with (sub)apical comb of short pegs (fig. 18a); metasoma connected to propodeum somewhat above hind coxae (fig. 18b); occipital carina absent (fig. 18c). Subfamily **Macrocentrinae** *Macrocentrus* Curtis



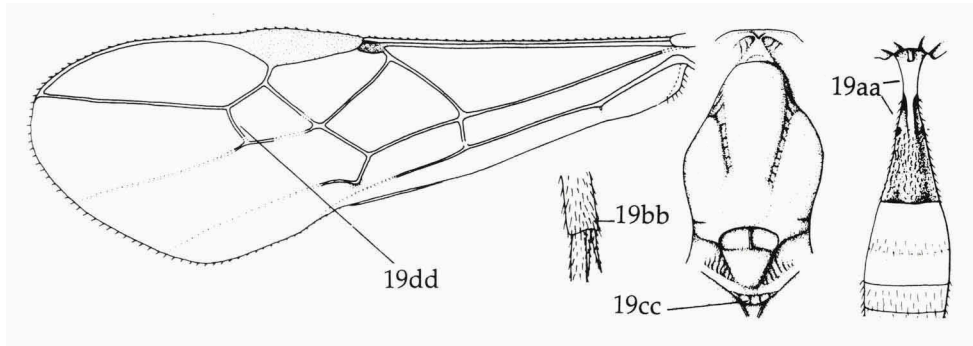
- Trochantelli without pegs (fig. 18aa); metasoma inserted near hind coxae (fig. 18bb); occipital carina present laterally (fig. 18cc) 19



19. First metasomal tergite sessile (fig. 19a); hind tibia with pegs near base of spurs (fig. 19b); scutellum without crenulate depression medio-posteriorly (fig. 19c); vein r-m of fore wing absent (fig. 19d). Subfamily *Orgilinae* *Orgilus* Haliday



- First tergite petiolate (fig. 19aa); hind tibia without pegs near base of spurs (fig. 19bb); scutellum with transverse crenulate depression medio-posteriorly (fig. 19cc); vein r-m of fore wing present (fig. 19dd). Subfamily *Euphorinae*
 *Meteorus* Haliday



Subfamily Amicrocentrinae van Achterberg, 1979

Genus *Amicrocentrum* Schulz, 1911
 (figs 20-31)

Megacentrus Szépligeti, 1904: 145 (not *Megacentrus* Heer, 1852). Type species (by monotypy): *Megacentrus concolor* Szépligeti, 1904.

Amicrocentrum Schulz, 1911: 88 (replacement name); Shenefelt, 1969: 141. Type species: *Megacentrus concolor* Szépligeti, 1904.

Amicrocentrum (subgenus *Amicrocentrum*); van Achterberg, 1979: 13.

Eiolo Cameron, 1912: 370. Type species (by monotypy): *Eiolo curvinervis* Cameron, 1912.

Diagnosis.— Length of body 9-27 mm, of fore wing 7-21 mm; notauli present; plical lobe of hind wing reticulate-setose (fig. 20); vein 1-M of hind wing strongly sinuate (fig. 20); first metasomal tergite with deep depression subbasally (fig. 31); third and following tergites normally setose.

Biology.— Endoparasites of concealed lepidopterous larvae. Rarely collected, usually at light.

Distribution.— Four species are known, one restricted to Madagascar and three to continental Africa. For a taxonomic revision, see van Achterberg (1979).

Amicrocentrum curvinervis (Cameron, 1912)
(figs 20-31)

Eiolo curvinervis Cameron, 1912: 372.

Amicrocentrum curvinervis; Shenefelt, 1969: 141.

Amicrocentrum (*Amicrocentrum*) *curvinervis*; van Achterberg, 1979: 14-15, figs 30-41 (redescription).

Diagnosis.— Length of body 16-24 mm, of fore wing 10-18 mm; antennal segments 51-59; clypeus distinctly convex and densely punctate; pterostigma less slender than those of other species (fig. 20); postero-dorsal corner of pronotum more or less punctate; length of first tergite 3.1-4.4 times its apical width (exceptionally in males 2.8 times; sides of second metasomal tergite parallel (fig. 31); length of second tergite 2.0-2.8 times its width (fig. 31), exceptionally 1.8 times; fourth tergite yellowish, not contrasting with other segments; metasoma of ♀ strongly compressed apicad; length of ovipositor sheath 1.6-2.0 times fore wing, usually 1.8-1.9 times. For the redescription, see van Achterberg (1979).

Biology.— Reported as a parasite of the noctuid stem borer *Busseola fusca*. Seems to be restricted to (originally) forested areas (van Achterberg, 1979).

Distribution.— Benin, Uganda, Zaire.

Remarks.— This species is included here on the basis of a single host record from Uganda (van Achterberg, 1979: 15). Further observations are necessary to confirm the accuracy of this record.

Subfamily Bassinae Nees, 1812 (= Agathidinae Nees, 1814)

Genus *Bassus* Fabricius, 1804
(figs 32-52)

Bassus Fabricius, 1804: ix, 93; Shenefelt, 1970: 312 (synonym of *Agathis* Latreille, 1804); van Achterberg, 1982a: 133; Chou & Sharkey, 1989: 151; Simbolotti & van Achterberg, 1992: 6-7. Type species (designated by Curtis, 1825): *Ichneumon calculator* Fabricius, 1798.

Microdus Nees, 1814: 184; Shenefelt, 1970: 313 (synonym of *Agathis* Latreille, 1804); Tobias, 1976: 212-214; van Achterberg, 1982a: 133; Nixon, 1986: 215; Tobias, 1986: 286; Chou & Sharkey, 1989: 151. Type species (designated by Haliday, 1840): *Ichneumon calculator* Fabricius, 1798.

Diplozon Haliday, 1833: 263; Shenefelt, 1970: 312 (synonym of *Agathis* Latreille, 1804). Type species (by monotypy): *Ichneumon calculator* Fabricius, 1798.

Therophilus Wesmael, 1837: 15; Shenefelt, 1970: 313; Chou & Sharkey, 1989: 151. Type species (designated by Viereck, 1914): *Microdus* (*Therophilus*) *conspicius* Wesmael, 1837.

Eumicrodus Foerster, 1862: 247. Invalid emendation of *Microdus*.

Lytopylus Viereck, 1905: 267 nec Foerster, 1862; Shenefelt, 1970: 313; Chou & Sharkey, 1989: 151. Type species (by monotypy): *Lytopylus azygos* Viereck, 1905.

Ioxia Enderlein, 1920: 119; Shenefelt, 1970: 312; Chou & Sharkey, 1989: 151. Type species (by monotypy): *Ioxia faceta* Enderlein, 1920.

Camptothlipsis Enderlein, 1920: 166; Shenefelt, 1970: 378; Tobias, 1986: 289 (as synonym of *Baeognatha* Kokujev, 1903); Nixon, 1986: 229 (id.); Simbolotti & van Achterberg, 1992: 6-7 (synonymized with *Bassus*). Type species (by original designation): *Camptothlipsis costalis* Enderlein, 1920 [examined].

Hormagathis Brues, 1926: 287; Shenefelt, 1970: 309 (synonym of *Aerophilus* Szépligeti, 1902); Simbolotti & van Achterberg, 1992: 6-7 (synonymized with *Bassus*). Type species (by monotypy): *Hormagathis mellea* Brues, 1926 [examined].

Obesomicrodus Papp, 1971: 338; Simbolotti & van Achterberg, 1992: 6-7 (synonymized with *Bassus*). Type species (by monotypy): *Obesomicrodus nigra* Papp, 1971 [examined], = *Bassus niger* (Papp, 1971 not Telenga, 1955; = *B. nigrisoma* Simbolotti & van Achterberg, 1992).

Diagnosis.— Head slightly or not elongated ventrally, only gradually narrowed ventrally, in frontal view trapezoid (fig. 38); area between antennal sockets triangular to nearly flat, or with a shallow or deep median groove; antenna shorter than body and with 23-39 segments, its apex without apical spine (fig. 35); clypeus at least partly flattened (fig. 38), transverse or quadrate (figs 38, 50), truncate or concave ventrally; labio-maxillary complex not or hardly protruding (fig. 43) and its galea not longer than wide; area behind antennal sockets slightly to moderately depressed (fig. 37); frons without lateral carinae (fig. 37); frons usually without strong median ridge; depression in front of anterior ocellus usually absent, but may be shallowly impressed; malar space distinctly longer than basal width of mandible (fig. 43); lateral pronope (= subpronope) rather shallow or absent; precoxal sulcus at least partly present, narrow and crenulate (fig. 43); middle lobe of mesoscutum without pair of longitudinal depressions anteriorly (fig. 39); notauli present (but may be reduced posteriorly) and usually narrow (fig. 39); propodeum granulate, reticulate, rugose or punctate, and without extensive areolation but an elongate medial areola may be present; vein r-m of fore wing present (in typical *Bassus*), obsolescent (fig. 52) or absent (figs 32, 45, "*Camptothlipsis/Baeognatha* auct."), its presence may be infraspecifically variable); second submarginal cell without ramellus; vein 1-SR+M of fore wing at least medially absent (fig. 45); vein r of fore wing issued near middle of pterostigma (figs 45, 52); vein 1r-m of hind wing shorter than vein SC+R1; tarsal claws not bifurcate, medium-sized and usually with a lobe (fig. 36); fore tibial spur normal (fig. 40), 0.4-0.5 times as long as fore basitarsus; length of inner spur of middle tibia 0.4-0.6 times middle basitarsus; apical half of middle tibia with peg(s) present above subapical cluster of pegs (fig. 34); hind trochantellus with its lower edges rounded; hind coxa shiny, punctulate or punctate, or rather mat and granulate; length of inner spur of hind tibia 0.4-0.6 times hind basitarsus; propodeal foramen usually distinctly removed from metasternal hind coxal cavities and separated by a sclerotized bridge; first metasomal tergite sessile and robust, its length 0.9-1.4 times its apical width and latero-epo present (fig. 43); first-third tergites smooth, partly or completely sculptured; second suture distinctly impressed, but sometimes shallow; second and third tergites frequently with a transverse depression ovipositor medium-sized to long and straight; ovipositor sheath subparallel-sided and subtruncate apically, its length 0.6-2.0 times fore wing.

Distribution.— Cosmopolitan. The only key to African species is given by Granger (1949) for Madagascan species, under *Camptothlipsis* and *Microdus*.

Biology.— Endoparasites of concealed larvae of Tortricidae, Gelechiidae, Pyralidae, Crambidae, Scytrididae, Tineidae, Coleophoridae and Blastobasidae.

Key to species of the genus *Bassus* parasitizing African cereal stem borers

1. Second metasomal tergite elongate and granulate (fig. 49); second submarginal cell of fore wing absent (fig. 45); vein SR1 of fore wing straight or nearly so (fig. 45); propodeum without areolation *Bassus sublevis* (Granger)
- Second tergite short, transverse and completely smooth (fig. 51); minute second submarginal cell of fore wing present (fig. 52); vein SR1 of fore wing distinctly sinuate (fig. 52); propodeum more or less areolate *Bassus* spec. A

Bassus sublevis (Granger, 1949) comb. nov.
(figs 45-50)

Agathis sp.; Carnegie, 1991: 6; Conlong, 1993: 9.

Camptothlipsis sublevis Granger, 1949: 305.

Material.— Lectotype (here designated), ♀ (MNHN), "Madagascar, Bekily, Rég[ion] sud de l'île", "viii.", "Muséum Paris, A. Seyrig", "39 [= antennal segments]", "Type"; 2 ♀♀ + 3 ♂♂ (BMNH, RMNH), "South Africa: Natal, Inanda, Tongaat Wewe Sugar Estate, 23.iv.1986, SEx 712, D. Conlong/*Agathis* sp. ♀, emerged from second instar [of] *Eldana* *saccharina* larva collected from *C. papyrus* umbel", but 2 ♂♂, 15.v.1986, ex L3; 1 ♂ 23.iv.1986, and ex L4; 1 ♀ (BMNH), "S.A. [= South Africa], Grooms F[a]rm, Mtunzini, 31.vii.[19]92"; 1 ♀ (PPRI), "South Africa: Ntl, Mkuze Game Res., 16.v.1984", "ex larva of *Eldana* on *Cyperus fastigiatus*"; 2 ♀♀ (BMNH, RMNH), "South Africa: Natal, Mtunzini, S.A.S.A. Field Station, 26.viii.1985, SEx 712.1, D. Conlong/emerged from third instar [of] *E. saccharina* collected from sugarcane in field 103 on 24.vii.[19]85"; 1 ♀ "RMNH", "South Africa: ?Natal, SASA, SEx 712.17, ex *Eldana*"; 1 ♀ + 1 ♂ (BMNH), "South Africa: Natal, Mtunzini, Grooms Sugar Est., 25.ix.1983", "SASA SEx 712.9, ex *Eldana* L3 on *Cyperus dives* umbel", but ♂: 4.vi.1991, L3; 1 ♀ (PPRI), "South Africa: Ntl, Shakaskraal, 29°26'S, 31°14'E, 26.vi.1985, D. Conlong", "ex *Eldana saccharina*"; 2 ♂♂ (BMNH, RMNH), "South Africa: Natal, Lower Tugela, Darnall Bethesda Sugar Estate, 7.iv.1986, SEx 712.2, D. Conlong/*Agathis* sp. ? emerged from third instar [of] *E. saccharina* collected from sugarcane stalk, died 12.v.[19]86, longevity 35 d[ays]"; 1 ♂ (BMNH), "South Africa: Natal, Amatikulu Reilly Sugar Estate, 26.ix.1983", "EPS 792 B collected from *C. immensis* flower on Reilly farm field (a) 25.xi.1983"; 1 ♂ (BMNH), "South Africa: Natal, Mkuze, Mkuze Game Res., 16.v.1984", SASA SEx 712.13, ex *Eldana* L3 [on] *Cyperus fastigiatus* rhizome"; 1 ♂ (BMNH), "South Africa: Natal, Ginginhlovu, Ibati River, 25.vi.1983". "SASA SEx 712.12, ex *Eldana* L3 on *Cyperus dives* umbel"; 1 ♂ (ICIPE), "Kenya: Kilifi, 27.xi.[19]91, ICIPE coll. 47-4945", "[ex] *C. partellus* larva on maize, R.C. Odhiambo".

Diagnosis.— Length of fore wing 4-5 mm; face 1.8-1.9 times wider than high (fig. 50); length of malar space 1.8-2.0 times basal width of mandible; frons with median carina more or less developed; notauli complete; precoxal sulcus finely crenulate anteriorly; median carina of propodeum weak; sculpture of remaining part of mesopleuron varies from absent (lectotype) to distinctly micro-sculptured; vein 1-R1 of fore wing somewhat longer than half length of pterostigma (fig. 45); first and second metasomal tergites finely granulate, of second tergite superficially so; first tergite distinctly widened posteriorly, about 1.5 times as long as wide apically; length of second tergite about equal to its basal width (fig. 49); length of ovipositor sheath about 1.5 times fore wing; body (except metanotum) completely yellowish-brown; antenna and pterostigma dark brown, pterostigma darker anteriorly than posteriorly; wing membrane evenly subhyaline; hind tarsus, and sometimes metanotum and scutellum narrowly posteriorly, infusate. Males frequently have metanotum, propodeum, hind tibia, and more or less first tergite, dark brown and wing membrane evenly infusate.

Biology.— Solitary endoparasite of pyralid and crambid stem borers: *Eldana saccharina* and *Chilo partellus*.

Distribution.— Afrotropical: South Africa, Madagascar, Kenya.

Notes.— The specimen selected (but not published) by Granger as "type" is designated lectotype, despite it having the metanotum infusate.

The series of *Camptothlipsis sublevis* Granger is mixed; as indicated by Granger (1949) sometimes a dark brown patch behind the eyes dorsally is present; the examined specimen with this character seems to belong to another species because it also has a dark brown frons medially, combined with having a pair of patches on the lat-

eral lobes of mesoscutum, the pterostigma pale brown posteriorly, the propodeum with a coarse median carina, the face less transverse, the first metasomal tergite largely smooth and less widened posteriorly, the apical half of fore wing slightly darker than its basal half; the precoxal sulcus coarser sculptured anteriorly, and the second tergite completely smooth, without fine granulation.

Bassus spec. A
(figs 51, 52)

Material.— 1 ♂ (BMNH), "Mozambique: Maputo Province, Homoine, Inhambane, 2.iii.[19]96, Z1D, D. Cugala, ex pupa *Chilo partellus*".

Diagnosis.— Because of lack of material we refrain from diagnosing this species.

Biology.— Solitary endoparasite of crambid stem borer: *Chilo partellus*.

Distribution.— Afrotropical: Mozambique.

Subfamily Braconinae Nees, 1812

Genus *Amyosoma* Viereck, 1913 stat. nov.
(figs 53-74)

Amyosoma Viereck, 1913: 640; Shenefelt, 1978: 1555 (as synonym of *Bracon* Fabricius, 1804); Mason, 1978: 723 (as synonym of *Myosoma* Brullé, 1846); Quicke, 1987: 122 (id.). Type species (by original designation): *Amyosoma chilonis* Viereck, 1913 (= *Bracon chinensis* Szépligeti, 1902).

Myosoma auct. p.p.

Diagnosis.— Length of fore wing 2.5-5.5 mm; scapus truncate apically, ovoid; vein 1r-m of hind wing short (fig. 63) to medium-sized (fig. 67)); angle between veins 1-SR and C+SC+R of fore wing about 80° (figs 63, 67); first discal cell of fore wing comparatively transverse (figs 53, 67); hind femur and tibia compressed; hind femur, tibia and tarsus rather sparsely and whitish or pale yellowish setose; first metasomal tergite narrowed behind spiracles medially, 1.8-2.7 times longer than apically wide, without or with narrow flattened areas laterally (figs 60, 68, 71); unsclerotized parts of second tergite triangular or nearly so (figs 73, 74); second metasomal sulcus rather deep, straight or nearly so (figs 68, 73); metasoma smooth.

Biology.— Ectoparasites of lepidopterous stem borers.

Distribution.— Palaeotropical, Southeast Palaeartic. The only known African species is described by Quicke & Wharton (1989), a second species has been introduced from the Oriental region.

Notes.— This genus is closely related to *Bracon*, and species have often been misplaced in that genus or in the closely related New World genus *Myosoma* Brullé, 1846. The genus *Amyosoma* shares with *Myosoma* the narrowed first metasomal tergite and to some degree the compressed hind femur and tibia, but it lacks the peculiar dense setosity of the legs, especially of the hind femur and tibia, and the colour of the setae is pale yellowish or whitish instead of black, it has the notauli complete (but shallow posteriorly), and the vein 1r-m of hind wing straight (but in *A. nyanzaense* frequently weakly curved). As pointed out by Mason (1978) the setosity of some Nearctic species of *Myosoma* (as well as of some Neotropical species) may be less developed, but still it remains much denser than in *Amyosoma*, and the setae are black.

The Afrotropical *Myosoma lutea* Szépligeti, 1913, is referred to the genus *Cratocnema* Szépligeti, 1914, by Quicke (1991), who examined the lectotype in the Budapest Museum.

Key to species of the genus *Amyosoma* Viereck

1. Apical half of fore wing largely subhyaline, distinctly paler than its dark brown basal half (fig. 67); antennal segments of ♀ 28-31, of ♂ about 24; lateral areas of notum of first metasomal tergite distinctly developed along whole length of tergite, length of tergite 1.8-2.1 times its apical width (fig. 68); hind leg (usually except infusate apex of hind tibia and tarsus) and metasomal tergites of ♀ orange-brown (but frequently fourth and fifth tergites dark brown); Afrotropical .
..... *A. nyanzaense* (Quicke & Wharton)
- Fore wing unicoloured or nearly so, or apical half of fore wing darker than basal half of wing; antennal segments of ♀ 33-37, of ♂ 30-35 (unknown of *A. rufescens*); lateral areas of notum of posterior half of first metasomal tergite largely absent or narrow (except posteriorly), length of tergite 1.9-2.5 times its apical width (figs 71, 73, 74); colour of hind leg and of metasoma of ♀ variable; Indo-Australian, Southeast Palaearctic, one species introduced in Afrotropical Pacific regions 2
2. Length of ovipositor sheath about 0.55 times fore wing and about twice length of hind tibia; pterostigma yellow (except small basal spot); sixth and seventh tergites yellowish-brown; basal half of fore wing mainly yellowish, and its apical half largely infusate; Australian *A. flavistigma* van Achterberg, spec. nov.
- Length of ovipositor sheath 0.25-0.45 times fore wing and 1.7 times length of hind tibia or less; pterostigma dark brown; sixth and seventh tergites mainly black or dark brown; wing membrane dark brown or subhyaline 3
3. First-fifth tergites bright orange; length of ovipositor sheath 0.25 times fore wing and shorter than hind tibia; face black; Australian
..... *A. rufescens* (Quicke & Ingram)
- First-fifth tergites mainly dark brown or black; length of ovipositor sheath 0.35-0.45 times fore wing and 1.0-1.7 times as long as hind tibia; colour of face variable; Oriental, Southeast Palaearctic, one species introduced in Afrotropical region 4
4. Wing membrane subhyaline; length of ovipositor sheath about 3 times length of first metasomal tergite and 1.7-2.0 times as long as hind tibia; face dark brown; third-fifth antennal segments of ♀ robust (fig. 70); parasite of coffee stem borer
..... *A. leuzerae* Rohwer
- Wing membrane evenly dark brown; length of ovipositor sheath 2.2-2.7 times length of first tergite and 1.0-1.3 times as long as hind tibia; face yellowish or black; third antennal segment of ♀ less robust (fig. 72) 5
5. Face yellowish; length of ovipositor sheath about as long as hind tibia, 2.2-2.5 times length of first tergite; third-sixth tergites pale yellowish postero-laterally; parasite of stem borers in Gramineae *A. chinense* (Szépligeti)
- Face black; length of ovipositor sheath about as long as hind tibia and hind basitarsus combined, about 2.7 times length of first tergite; third-sixth tergites black postero-laterally; parasite of stem borers in trees and shrubs
..... *A. yanoi* (Watanabe)

Amyosoma chinense (Szépligeti, 1902) comb. nov.
(figs 72-74)

Bracon chinensis Szépligeti, 1902: 39; Shenefelt, 1978: 1561; Quicke, 1991: 171 (holotype examined).

Myosoma chinensis; Mason, 1978: 723; Quicke & Wharton, 1989: 1.

Bracon albolineatus Cameron, [March] 1910b: 278; Shenefelt, 1978: 1561-1562 (not *Bracon albolineatus* Cameron, [May] 1910).

Amyosoma chilonis Viereck, 1913: 640; Shenefelt, 1978: 1562.

Agathis noiratum Ishida, 1915: 100; Shenefelt, 1978: 1562.

Microbracon chilocida Ramakrishna Ayyar, 1928: 49; Shenefelt, 1978: 1562.

Microbracon chilocida var. *nigrocephala* Ramakrishna Ayyar, 1928: 49; Shenefelt, 1978: 1562.

Material.— 1 ♀ + 1 ♂ (RMNH), "PRC [= China], Pingyang in Zhejiang, 2.viii.1965, He Junhua", "Host: *Tryporyza incertulas* (Walker)"; 3 ♀♀ + 12 ♂♂ (BMNH, RMNH), "Oman: Ghul., 29°09'N 57°12'E, swept from sorghum heavily attacked by *Sesamia cretica*, cultivation under date palms, 2.xi.1990, M.D. Gallagher & J.C. Deeming"; 1 ♀ (RMNH), "[Indonesia, Sumatra, Lampung], Gng Tanggamoës, degiesting, viii.1935"; 2 ♀♀ + 2 ♂♂ (BMNH, RMNH), "Indes, Bangalore, ex *Chilo partelus* [sic!] Swinhoe".

Diagnosis.— Length of fore wing 2.8-4.0 mm, and of body 2.9-3.9 mm; antennal segments of ♀ 33-36, of ♂ 30-35; third antennal segment of ♀ moderately robust (fig.); face largely granulate and yellowish; lateral areas of notum of posterior half of first metasomal tergite largely absent, length of tergite 2.1-2.5 times its apical width (fig3 73, 74); length of ovipositor sheath 0.32-0.40 times fore wing, 2.2-2.5 times length of first tergite, and about as long as hind tibia; wing membrane evenly dark brown; head (including face) and mesosoma largely yellowish-brown; metasoma mainly dark brown or black; third-sixth tergites pale yellowish postero-laterally; fore leg yellowish (but femur may be partly dark brown); middle and hind legs blackish or dark brown; head of female usually largely yellowish-brown, but may be largely dark brown dorsally; palpi and tegulae yellowish. Head of male dorsally, propodeum and metasoma (but unsclerotized parts of first and second tergites and posterior margins of following tergites whitish) of male dark brown or blackish.

Biology.— Gregarious ectoparasite of a variety of pyralid, crambid and noctuid stem borers in Gramineae.

Distribution.— Oriental, South Palaearctic, introduced in Afrotropical and Pacific regions. *A. chinense* was used extensively in biological control attempts against sugarcane stem borers earlier this century, and was introduced into Madagascar and Mauritius (Appert, 1973; Moutia & Mamet, 1946), though probably without establishing. During the present study it was found to occur in Oman, and its distribution may eventually be found to overlap that of *A. nyanzaense*.

Note.— The Indian specimens examined possess a differently shaped first metasomal tergite (figs 73, 74) and might be not conspecific.

Amyosoma flavistigma van Achterberg, spec. nov.
(figs 53-66)

Material.— Holotype, ♀ (ANIC), "Australia: N.T., Kakadu N.P., Border store, Manngara walk, 29.iii.1991, C. v. Achterberg, RMNH'91".

Diagnosis.— Length of fore wing about 5 mm, of body about 5.5 mm; number of antennal segments of ♀ more than 36; length of ovipositor sheath about 0.55 times

fore wing and about twice as long as hind tibia; pterostigma yellow (except small basal spot); basal half of fore wing mainly yellowish, and its apical half largely infusate; head (including face) mainly black; mesosoma and metasoma completely yellowish-brown.

Biology.— Unknown.

Distribution.— Australian: Australia.

Description.— Length of fore wing 5.1 mm, of body 5.4 mm.

Head.— Antenna incomplete, remaining antennal segments 36, third-fifth antennal segments moderately robust (figs 54, 56), length of third segment 1.3 times fourth segment, length of third and fourth segments 1.5 and 1.2 times their width, respectively; vertex smooth and largely glabrous; temples directly narrowed behind eyes (fig. 58); frons broadly glabrous medially, laterally densely setose, smooth, its median groove indistinct; length of eye in dorsal view 2.0 times temple; OOL:diameter of posterior ocellus:POL = 9:5:6; clypeus flat, hardly separated from face; face and clypeus superficially granulate and face with some punctulation; face medially glabrous, laterally setose, setae mainly directed downwards; width of hypoclypeal depression 0.5 times width of face; length of malar space 0.5 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.3 times its height; mesopleuron and mesoscutum (except near notauli) largely glabrous; notauli narrow anteriorly and superficial posteriorly, smooth; scutellar sulcus narrow, smooth; axillae conspicuously long and densely setose (fig. 62); scutellum largely setose; propodeum smooth, flattened medially.

Wings.— Fore wing: r:3-SR:SR1 = 10:34:40; cu-a subinterstitial (fig. 53); 2-SR:3-SR:r-m = 16:34:19. Hind wing: marginal cell narrowed apically; M+CU:1-M = 15:65.

Legs.— Length of femur, tibia and basitarsus of hind leg 3.2, 7.2 and 4.5 times their width, respectively (fig. 64); setae of hind femur and tibia black and rather long; hind femur curved in dorsal view (fig. 65); length of hind tibial spurs 0.4 and 0.5 times hind basitarsus.

Metasoma.— Length of first tergite 2.2 times its apical width, its surface smooth, polished, lateral areas of notum of apical half of tergite indistinct, except posteriorly (fig. 60); length of ovipositor sheath 0.56 times fore wing (figs 53, 55), 2.0 times length of hind tibia and 3.7 times length of first tergite.

Colour.— Yellowish-brown; antenna (except partly yellowish pedicellus), head (but clypeus, malar space widely and orbits dorsally partly yellowish-brown), and ovipositor sheath black; palpi, unsclerotized parts of first and second tergites, metasoma ventrally, latero-ventral parts of third-seventh tergites and posterior margin of eighth tergite pale yellowish; humeral plate, eighth tergite (except apically), parastigma, apex of vein C+SC+R of fore wing and basal patch of their veins (except yellowish veins r and 3-SR) largely infusate, remainder of wings and veins largely yellowish.

Amyosoma leuzerae Rohwer, 1918 stat. nov.
(figs 70, 71)

Amyosoma leuzerae Rohwer, 1918: 567-568.
Bracon chinensis var. *leuzerae*; Shenefelt, 1978: 1562.

Material.— 1 ♀ (RMNH), paratype, “[Indonesia], C. Java, Ambarawa, viii.1913, K.W. Dammerman”, “reared from larvae of *Zeuzera coffeae*”, “389, parasite on *Zeuzera coffeae* Nn., Ambarawa, viii.1913”; 2 ♀ ♀ (RMNH), “[Indonesia, Java], Sidoredjo, [ex] *Zeuzera*, 11.ix.[19]12, W. Roepke”.

Diagnosis.— Length of fore wing 3.5-4.3 mm, of body 3.0-4.3 mm; antennal segments of ♀ about 34; third-fifth antennal segments of ♀ robust (fig. 70); lateral areas of notum of posterior half of first metasomal tergite largely absent or narrow (except posteriorly; fig. 71); length of ovipositor sheath 0.47-0.51 times fore wing, 2.9-3.0 times first tergite, and 1.7-2.0 times hind tibia; wing membrane subhyaline; face and posterior margin of third and following metasomal tergites dark brown; further similarly coloured as *A. chinense*.

Biology.— Ectoparasite of cossid stem borers in trees and shrubs; the type series was reared from *Zeuzera coffeae* Nietner, 1861.

Distribution.— Oriental: Indonesia (Java).

Amyosoma nyanzaense (Quicke & Wharton, 1989) comb. nov.
(figs 67-69)

Myosoma nyanzaensis Quicke & Wharton, 1989: 2-4, figs 1-5.

Material.— 2 ♀ ♀ (ICIPE), “Kenya, Mtwapa, Kilifi, Distr. Coastal Res. Stn., 1.viii.1991, W. Overholt”, “on *Chilo partellus* on maize (ICIPE)”; 3 ♀ ♀ (BMNH, RMNH), “Kenya, Lambwe, vi.1991”, “ex *Busseola fusca*”, “on *Sorghum*, M.J. Chacko, SI no. 10, IIE 21939”; 1 ♀ (BMNH), “Kenya, Lambwe, 1.viii.[19]91, M.J. Chacko”, “ex larva *Chilo partellus* on *Sorghum* 2”; 2 ♂ ♂ (BMNH), “Kenya, Lambwe Valley”, “1.i.[19]89, M. Mohamed, no. 163 fm”; 1 ♀ + 1 ♂ (BMNH, RMNH), “Kenya, Kisumu, 22.x.[19]91, M.J. Chacko”, “ex *Chilo partellus* on *Sorghum* 1”; 1 ♂ (RMNH), “Kenya, Mombasa, 13.viii.[19]94, ex *Chilo partellus* on maize, A. Polaszek”; 1 ♂ (ICIPE), “Kenya: Mtwapa, Mombasa, 3.x.[19]91”, “ex *Chilo partellus* on maize, M. Okono, IB-76-143, ICIPE”; 2 ♂ ♂ (BMNH), “Kenya: Mtwapa, v.1966, ex *C. argyrolepis*, F.C. Mathez”; 1 ♂ (BMNH), “Kenya, Oyugis, B. Nyambo”, “no. 169 fm, *Sorghum*, IIE 21938”; 1 ♂ (BMNH), “Kenya, Oyugis, 10.i.[19]89, B.T. Nyambo”; 1 ♀ (KPCRS), “Ug[anda], Kwapa, Bukedi, [ex *Chilo partellus*?], 116, Stp-p11. JEDM[ilner].”; 2 ♀ ♀ (BMNH), id., but “S 40-p11, ex *Chilo partellus*, CIE 487”; 2 ♂ ♂ (CIRAD), “G[ran]de Comore, Inané, 25.i.1982, D. Bordat, 2387”, “ex L3 [of] *Chilo partellus* [on] maïs”.

Diagnosis.— Length of fore wing 2.4-4.1 mm, and of body 2.3-4.0 mm; antennal segments of ♀ 28-31, of ♂ about 24; third-fifth antennal segments comparatively slender (fig. 69); face finely superficially granulate, but medio-dorsally smooth; lateral areas of notum of first metasomal tergite distinctly developed along whole length of tergite, its length 1.8-2.1 times its apical width (fig. 68); length of ovipositor sheath 0.33-0.40 times fore wing, twice as long as first tergite and 1.0-1.3 times as long as hind tibia; apical 0.4-0.5 of fore wing subhyaline, distinctly paler than dark brown remaining part of wing; head mainly black, but orbits, clypeus and malar space yellowish; hind leg (except usually infuscate parts of hind tibia and of tarsus), mesosoma mainly and metasomal tergites (but sometimes apical tergites dark brown) of ♀ orange-brown; pterostigma and veins dark brown; colour of fourth-fifth tergites and mesosoma varies from mainly dark brown or black to completely yellowish-brown; hind leg may be completely yellowish, except its dark brown telotarsus. Males are usually darker than females, having only second and third tergite laterally and entire first tergite of metasoma yellowish-brown.

Biology.— Gregarious ectoparasite of Crambidae (*Chilo partellus*), and of Noctuidae (*Busseola fusca*).

Distribution.— Afrotropical: Kenya, Uganda, Comoro Islands.

Amyosoma rufescens (Quicke & Ingram, 1993) comb. nov.

Amyosoma rufescens Quicke & Ingram, 1993: 317, fig. 2.

Diagnosis.— Length of fore wing and of body about 5.5 mm; number of antennal segments unknown; length of ovipositor sheath about 0.25 times fore wing and shorter than hind tibia; pterostigma dark brown; wing membrane dark brown; head (including face), sixth and seventh tergites mainly black or dark brown; mesosoma and first-fifth metasomal tergites bright orange.

Biology.— Unknown.

Distribution.— Australian: Australia.

Amyosoma yanoi (Watanabe, 1960) comb. nov.

Bracon yanoi Watanabe, 1960: 6; Shenefelt, 1978: 1551.

Myosoma yanoi; Maetô, 1992: 714; Quicke & Ingram, 1993: 317.

Diagnosis.— Length of body of ♀ 5.0-5.5 mm, of ♂ 3.5-4.0 mm. According to the original description very similar to *A. chinense*, but differs by having the face black, the length of the ovipositor sheath about as long as hind tibia and hind basitarsus combined, and about 2.7 times as long as first tergite, and the third-sixth tergites of metasoma entirely black.

Biology.— Parasite of the sesiid vine stem borer *Paranthrene regale* Butler.

Distribution.— Palaearctic: Japan.

Genus *Bracon* Fabricius, 1804

(figs 75-112, 358, 360)

Bracon Fabricius, 1804: 102; Shenefelt, 1978: 1459-1461; Tobias, 1986: 114, 122; Quicke, 1987: 104. Type species (designated by ICZN, Opinion 162 (1945)): *Ichneumon minutor* Fabricius, 1798.

Braco Wesmael, 1838: 7 (invalid emendation).

Brachon Agassiz, 1846: 50 (invalid emendation).

Brazon Schulz, 1911: 60 (invalid emendation).

Habrobracon Ashmead (in Johnson), 1895: 324; Shenefelt, 1978: 1589; Tobias, 1986: 115 (as subgenus of *Bracon*); Quicke, 1987: 115 (as separate genus); Quicke & Sharkey, 1989: 349 (as separate genus). Type species (designated by Viereck, 1914): *Bracon gelechia* Ashmead, 1889.

Microbracon Ashmead, 1890: 15; Shenefelt, 1978: 1461. Type species (by monotypy): *Microbracon sulcifrons* Ashmead, 1890 (not *Bracon sulcifrons* Brullé, 1846; = *Bracon sulcifronsior* Shenefelt, 1978).

Amicoplidea Ashmead, 1900a: 118; Shenefelt, 1978: 1461. Type species (by original designation): *Phylax palliventris* Provancher, 1880.

Tropidobracon Ashmead, 1900a: 118; Shenefelt, 1978: 1461. Type species (by original designation): *Braxcon gastroidae* Ashmead, 1889.

Macrodyctium Ashmead, 1900: 138; Shenefelt, 1978: 1461. Type species (by original designation): *Bracon eurae* Ashmead, 1889 (= *Bracon angelesius* Provancher, 1888).

Liobracon Nason, 1905: 298; Shenefelt, 1978: 1461 (not *Liobracon* Szépliget, 1901). Type species (designated by Viereck, 1914): *Bracon nuperus* Cresson, 1872.

Seliodus Brèthes, 1909: 32; Shenefelt, 1978: 1721; Quicke & Sharkey, 1989: 346. Type species (by original designation): *Seliodus testaceus* Brèthes, 1909.

Lorenzoo de Stefani-Perez, 1909: 15-16; Pagliano & Scaramozzino, 1990: 117. Type species (by mono-

- typy): *Lorenzoo solani* de Stefani-Perez, 1909 (type (from Eritrea) probably lost; synonymy based on original description only). **Syn. nov.**
- Kulczynskia* Niezabitowski, 1910: 65; Shenefelt, 1978: 1690-1691; Tobias, 1986: 114 (as valid genus). Type species (by monotypy): *Kulczynskia aciculata* Niezabitowski, 1910. **Syn. nov.**
- Striobracon* Fahringer, 1927: 232; Shenefelt, 1978: 1461. Type species (designated by Tobias, 1959): *Ichneumon minutator* Fabricius, 1798.
- Glabrobracon* Fahringer, 1927: 281; Shenefelt, 1978: 1555; Tobias, 1986: 130 (as subgenus of *Bracon*). Type species (designated by Tobias, 1959): *Bracon variator* Nees, 1812.
- Orthobracon* Fahringer, 1927: 232; Shenefelt, 1978: 1628 (as synonym of subgenus *Bracon*). Type species (designated by Tobias, 1959): *Bracon exhilarator* Nees, 1834.
- Lucobracon* Fahringer, 1927: 232, 248; Shenefelt, 1978: 1615; Tobias, 1986: 137 (as subgenus of *Bracon*). Type species (here designated): *Bracon lautus* Szépligeti, 1901; existing designation of *Bracon suchorukovi* Telenga, 1936, is invalid because it was not included by Fahringer.
- Chivinia* Shestakov, 1932: 258; Shenefelt, 1978: 1733; Tobias, 1986: 113 (as valid genus). Type species (by monotypy): *Chivinia zimini* Shestakov, 1932 (the type specimen has vein r-m of fore wing lost, which accidentally occurs in the genus *Bracon*). **Syn. nov.**
- Cyanopterobracon* Tobias, 1957: 480; Shenefelt, 1978: 1552; Tobias, 1986: 121 (as subgenus of *Bracon*). Type species (designated by Tobias, 1959): *Bracon sabulosus* Szépligeti, 1896.
- Asiabracon* Tobias, 1957: 481; Shenefelt, 1978: 1552; Tobias, 1986: 119 (as subgenus of *Bracon*). Type species (by monotypy): *Bracon quadrimaculatus* Telenga, 1936.
- Sculptobracon* Tobias, 1961: 660; Shenefelt, 1978: 1654; Tobias, 1986: 119 (as subgenus of *Bracon*). Type species (by original designation): *Bracon burjaticus* Tobias, 1961.
- Pilibracon* Tobias, 1961: 662; Shenefelt, 1978: 1650; Tobias, 1986: 119 (as subgenus of *Bracon*). Type species (by original designation): *Bracon disparilis* Tobias, 1961.

Diagnosis.— Small to medium-sized species; scapus not modified, distinctly longer than pedicellus, its inner apex simple, its outer apex truncate (figs 78, 91, 102); face and clypeus differentiated, without reticulate sculpture or carinae and more or less convex; mesoscutum usually partly glabrous; vein r of fore wing shorter than vein 2-SR (figs 75, 94, 100); vein 1r-m of hind wing short (figs 82, 100); first discal cell of fore wing comparatively high; vein CU1a of fore wing far below level of vein 2-CU1; veins 1- and 2-CU1 of fore wing straight; vein 1-R1 of fore wing (metacarp) longer than pterostigma (fig. 100), exceptionally about as long or shorter; vein CU1b of fore wing slender; angle between veins 1-SR and C+SC+R of fore wing 75°-90° (figs 75, 94, 100); tarsal claws simple (fig. 90) or with lobe (fig. 107); propodeum with or without median carina; first metasomal tergite movably joined to second tergite, its length less than 1.7 times its apical width, and without strong constriction behind spiracles (figs 76, 87, 108); second tergite without distinct V-shaped area or grooves medio-anteriorly (figs 76, 108); basal width of third tergite usually less than 2.7 times its median length; third tergite without antero-lateral grooves (figs 86, 103); upper valve of ovipositor normal and its lower valve with minute teeth.

Biology.— The genus *Bracon* contains (partly gregarious) idiobiont ectoparasites of larvae with a more or less hidden way of life, belonging to Lepidoptera (Crambidae, Pyralidae, Tortricidae, Gelechiidae, Sesiidae, Coleophoridae, Gracillariidae and Cochylidae), Coleoptera (Curculionidae, Anobiidae and Bruchidae), Diptera (Cecidomyiidae, Lonchaeidae, Chloropidae, Tephritidae, Anthomyiidae, Agromyzidae and Scatophagidae), and less commonly also Hymenoptera (Cephidae, Tenthredinidae, Eurytomidae and Cynipidae). Four species of *Bracon* are known to be parasites of cereal stem borers in Africa, two belong to the subgenus *Habrobracon*, having a wide range of hosts (including several pyralid hosts of the genera *Ephestia* Guenée, 1845, *Plodia* Guenée, 1845 and *Galleria* Fabricius, 1798, in stored products) and the status of one of the two as a distinct species is questioned by Tobias (1986), but is considered to

be a valid species and in this paper additional characters (see below) are given. Both other species belong to *Bracon* s.s. and are found to be definitely parasites of cereal stem borers: *B. sesamiae* Cameron and *B. testaceorufatus* Granger.

Distribution.— Cosmopolitan and common. *Bracon* is one of the largest known genera of Braconidae currently containing about 1700 described species. No revision or compilation of the Afrotropical species of the genus *Bracon* is available, but Granger (1949) treated the Madagascan species.

Notes.— The genus *Habrobracon* is sometimes regarded as distinct from the related genus *Bracon* but even a combination of characters proved to be insufficient to come to a satisfiable separation. Therefore, in this paper we prefer to include it as a subgenus into the genus *Bracon* s.l. as was done before by Tobias (1986; transl. 1995).

We have seen a female from Ghana (CIE/BMNH, "Ghana, Subinso (Juaso), c. 6.ix.[19]72, Scheibelreiter", "ex maize borer sp.?, cocoons on maize") which will run in the key to spec. A. It has the mesoscutum very robust; antenna with 37 segments, the first metasomal tergite with complete dorsal carinae on the medial elevation, and apical half of the hind tibia and the hind tarsus dark brown. The robust body suggests that this species most probably is not a parasite of a stem borer and therefore it is excluded.

Key to species of the genus *Bracon* parasitizing African cereal stem borers

1. Antenna of ♀ with 14-18 segments, short, not (or slightly) longer than length of head and mesosoma combined (figs 78, 98); first metasomal tergite completely smooth (figs 76, 87); second submarginal cell of fore wing comparatively short (figs 75, 94); vertex coriaceous (fig. 84), dull and dorso-lateral carinae of first metasomal tergite absent (fig. 86); vein 1-SR of fore wing usually short or absent (figs 75, 94); subgenus *Habrobracon* Ashmead 2
- Antenna of ♀ with 26-36 segments, distinctly longer than length of head and mesosoma combined (figs 102, 103, 112); first tergite distinctly sculptured medio-posteriorly (fig. 108); second submarginal cell of fore wing comparatively long (fig. 100); vertex largely smooth, shiny; if coriaceous (fig. 105) then dorso-lateral carinae of first metasomal tergite present (figs 103, 108); vein 1-SR of fore wing medium-sized (fig. 100); subgenus *Bracon* Fabricius 3
2. Antennal segments of ♀ 13-14, antenna shorter than length of head and mesosoma combined or of equal length (fig. 78); setae of vertex erect, reaching above upper level of posterior ocellus (fig. 79); vein 3-SR of fore wing 0.9-1.2 times vein r, rarely up to 1.4 times (fig. 75); antennal segments of ♂ 20-23 (fig. 93) *B. hebetor* Say
- Antennal segments of ♀ 15-18, antenna slightly longer than length of head and mesosoma combined (fig. 98); setae of vertex more adpressed, mostly not reaching above upper level of posterior ocellus (fig. 99); vein 3-SR of fore wing 1.2-1.8 times vein r (fig. 94); antennal segments of ♂ 22-27 (fig. 96) *B. brevicornis* (Wesmael)
3. Fourth and fifth metasomal tergites (except posterior margin) distinctly granulate; pterostigma of ♀ dark brown or brown medially (fig. 100); hind tibia dorsally and laterally similarly coloured; rugae and striae of propodeum and of second tergite medio-dorsally fine and regular (fig. 108) or absent; mesoscutum antero-

- medially usually similarly coloured as lateral lobes anteriorly; Afrotropical (excluding Madagascar) 4
- Fourth and fifth tergites usually smooth or superficially granulate; pterostigma of ♀ pale yellowish medially (fig. 110); hind tibia dorsally (except subbasally) usually darker than laterally, sometimes only basally dark brown; rugae and striae of propodeum and of second tergite medio-dorsally coarse and more or less vermiculate (figs 358, 360); mesoscutum antero-medially usually darker than lateral lobes anteriorly; Afrotropical (including Madagascar) *B. testaceorufatus* Granger
4. Lateral lobes of mesoscutum largely setose (fig. 103); posterior third of notauli area more or less coriaceous, rather mat; base of hind tibia pale yellowish, distinctly contrasting with darker middle part of tibia; propodeum and second tergite medially with some fine striae or rugae (fig. 108); apical half of hind tibia and hind tarsus mainly dark brown; notaulic area of mesoscutum broadly yellowish posteriorly (but in ♂ this area frequently largely black) *B. sesamiae* Cameron
- Lateral lobes of mesoscutum largely glabrous; posterior third of notauli area smooth, shiny; base of hind tibia brownish-yellow, similar to colour of middle part of tibia; propodeum and second tergite medially only granulate; apical half of hind tibia and hind tarsus (except telotarsus) yellowish-brown; notaulic area of mesoscutum narrowly yellowish or black posteriorly *B. spec. A*

Bracon (Habrobracon) brevicornis (Wesmael, 1838)
(figs 94-99)

Bracon brevicornis Wesmael, 1838: 23.

Bracon brevicornis; Shenefelt, 1978: 1590-1593; Temerak, 1983: 364; Temerak et al., 1984: 213; Tobias, 1986: 117 (as synonym of *H. hebetor*) (transl.: 1995: 199).

Habrobracon brevicornis; Genieys, 1925: 143; Risbec, 1960: 642.

Material.— 7 ♀♀ + 3 ♂♂ (PPRI, RMNH), "South Africa, Delmas, Tvl [= Transvaal], vi.1987(2), v.1989(4) or 22.x.1989(4), R. Kfir", "ex larvae of *Busseola fusca* on maize"; 1 ♀ + 1 ♂ (BMNH), "M.S.I.R.I., Mauritius, *Bracon hebetor* from India, i.1978"; 1 ♀ + 3 ♂♂ (BMNH, RMNH), "Niger, Zinder, ex foreur tige sorgho, xi.[19]92, G. Sama"; 3 ♀♀ + 2 ♂♂ (RMNH), "E. Syria, Dier Sez Zov, ix.1978, A. Khatib", "ex *Earias insulana* on cotton (Noct.)"; 4 ♀♀ + 5 ♂♂ (RMNH), "France, Nice, ex *Ectomyelois ceratoniae* (Pyril.), viii.1995, G. Driessen"; 1 ♀ + 1 ♂ (RMNH), "Tchad, Chari-Baguir, Gawi, 11.i.1996, ex *Plutella xylostella* on *Hellulo undalis* sur chou, B.A. Verhoek"; 3 ♀♀ + 2 ♂♂ (RMNH), "Netherlands: L., Vaals, zaadgaard SSB, ex cones of *Larix decidua*, coll. 10.ix.1991, em. 16.ix.1991, P. Grijpma, RMNH'91. Unreared additional material examined from Spain, France, Bulgaria and Greece.

Diagnosis.— Length of fore wing 1.9-2.6 mm, of body 1.8-2.6 mm; antennal segments of ♀ 15-18, antenna slightly longer than length of head and mesosoma combined (fig. 98), its segments submoniliform (fig. 98); antennal segments of ♂ 22-27 (fig. 96); setae of vertex comparatively adpressed, mostly not reaching above upper level of posterior ocellus (fig. 99); clypeus nearly flat to convex (fig. 97); clypeus, face and frons finely granulate; setae of face rather short (fig. 97); vertex mainly smooth; mesoscutum largely setose, shiny, smooth; scutellar sulcus narrow and distinctly crenulate; vein 3-SR of fore wing 1.2-1.8 times vein r (fig. 94); veins 1-SR and 3-SR short, but 1-SR may be rather long (fig. 94); marginal cell of fore wing medium-sized ending distinctly removed from apex of wing (fig. 94); tarsal claws with small acute

lobe (cf. fig. 80); propodeum superficially granulate; length of first tergite about 0.8 times its apical width, its surface smooth; dorso-lateral carinae of first tergite absent; second tergite without medio-basal area; second metasomal suture rather deep, nearly straight, and finely crenulate; second-seventh segments superficially granulate, shiny; length of ovipositor sheath 0.20-0.29 times fore wing and about twice length of first tergite. Colour is very variable: pterostigma rather dark brown, with sometimes a (faint) pale basal spot; body nearly completely yellowish-brown to largely dark brown or black, with frons, orbits, vertex anteriorly, face laterally, pronotum dorsally, notaulic area, scutellum (except usually medio-anteriorly), first tergite (except medio-posteriorly) and following tergites laterally pale yellowish; basal two thirds of wings more or less infusate, remainder of wings subhyaline, but sometimes infusate apically.

Biology.— An extremely polyphagous ectoparasite, attacking Crambidae and Pyralidae in stored products and in the field; in the field also other lepidopterous families may be attacked.

Distribution.— Cosmopolitan.

Bracon (Habrobracon) hebetor Say, 1836
(figs 75-82)

Bracon hebetor Say, 1836: 252; Rao, 1972: 15; Brenière, 1977: 13; Clausen & Oatman, 1978: 177; Shenefelt, 1978: 1597-1606; Tobias, 1986: 117 (transl. 1995: 198-199).

Habrobracon hebetor; Risbec, 1950: 324; Kotlyarova, 1986: 31; Conlong, 1993: 10.

Bracon dorsator Say, 1836: 253; Shenefelt, 1978: 1601.

Bracon juglandis Ashmead, 1889: 621; Shenefelt, 1978: 1601.

Habrobracon brunnea Szépligeti, 1901a: 181; Shenefelt, 1978: 1600.

Habrobracon vernalis Szépligeti, 1901a: 182; Shenefelt, 1978: 1605.

Habrobracon beneficentior Viereck, 1911: 182; Shenefelt, 1978: 1600.

Habrobracon plotnicovi Bogoljubov, 1914: 280; Shenefelt, 1978: 1605.

Bracon brevantennatus de Stefani-Perez, 1919: 44; Shenefelt, 1978: 1600.

Habrobracon hebetor tortricidarum Goidanich, 1934: 255; Shenefelt, 1978: 1606.

Habrobracon pectinophorae Watanabe, 1935: 44; Shenefelt, 1978: 1605.

Habrobracon turkestanicus Telenga, 1936: 131, 342; Shenefelt, 1978: 1605.

Habrobracon flavus Telenga, 1936: 343; Shenefelt, 1978: 1601.

Habrobracon simonovi f. *lozinskii* Bogachev, 1939: 136; Shenefelt, 1978: 1605.

Habrobracon hebetor var. *asiatica* Telenga, 1936: 132-133; Shenefelt, 1978: 1606.

Material.— 4 ♂♂ (BMNH), "Nigeria: N.E., Ngala, i.1992, O. Ajayi", "ex *[Sesamia] poephaga* [on] *Sorghum* A."; 1 ♀ + 1 ♂ (RMNH), "Turquie, Dere Mahallesi, Isparta, 1150 m, 30.vi.1995, F. Gärbüz", "s/*Yponomeuta malinellus* no. 2"; 2 ♀♀ (RMNH), "Saudi-Arabia, Al Khar, ex grapes, 20.ix.1974, Talhouk"; 1 ♀ (RMNH), "Netherlands, Berkel & Rodenrijs, 26.iii.[19]93, [ex] *Ephestia kuehniella*, J.B. Douma"; 1 ♀ + 7 ♂♂ (RMNH), "[Netherlands], Berkel en Rodenrijs, Koppert B.V., 14.x.1986, ex *Ephestia kuehniella*, leg. P.D. te Wageningen"; 1 ♂ (RMNH), "U.S.A., Georgia, Savannah, J. Press", "*Bracon hebetor* Say ex *Ephestia cautella*"; 33 ♀♀ + 17 ♂♂ (RMNH), "Brazil: S.P., Penapolis, v.1986, ex *Diatraea saccharalis* in sugarcane, W.R.T. Novoretti, RMNH'86". Unreared additional material examined from U.S.A., China, Spain (including Canary Islands), France, Belgium, Malta and Greece.

Diagnosis.— Length of fore wing 1.7-2.6 mm, of body 1.3-2.7 mm; antennal segments of ♀ 13-14, submoniliform (figs 77, 78), antenna shorter than length of head and mesosoma combined or of equal length (fig. 78); antennal segments of ♂ 20-23 (fig. 93); setae of vertex erect, partly reaching above upper level of posterior ocellus (fig. 81); clypeus nearly flat to convex (fig. 81); clypeus, face and frons finely granu-

late; face with some long setae (figs 78, 81); vertex mainly smooth; mesoscutum largely setose, shiny, smooth; scutellar sulcus narrow and distinctly crenulate; vein 3-SR of fore wing 0.9-1.2 times vein r, rarely up to 1.4 times (fig. 75); veins 1-SR and 3-SR short (fig. 75); marginal cell of fore wing medium-sized ending distinctly removed from apex of wing (fig. 75); tarsal claws with small acute lobe (fig. 80); propodeum superficially granulate or smooth; length of first tergite about 0.8 times its apical width, its surface smooth; dorso-lateral carinae of first tergite absent (fig. 76); second tergite without medio-basal area; second metasomal suture shallow to rather deep, nearly straight, and usually smooth (fig. 76); second-seventh segments superficially granulate to (mainly) smooth, shiny; length of ovipositor sheath 0.21-0.30 times fore wing and about twice length of first tergite. Colour: very variable and similar to that of *B. brevicornis*: pterostigma rather dark brown, with sometimes a large pale basal spot; body nearly completely yellowish-brown to largely dark brown or black.

Biology.— An extremely polyphagous ectoparasite, like *B. brevicornis*; attacking Crambidae and Pyralidae in stored products and in the field also other lepidopterous families (Noctuidae, Tortricidae, Gelechiidae) may be attacked.

Distribution.— Cosmopolitan.

Bracon sesamiae Cameron, 1906
(figs 100-109)

Bracon sesamiae Cameron, 1906a: 334; Shenefelt, 1978: 1537-1538.

Bracon quadrinotatus [sic!] var. *sesamiae* Risbec, 1956b: 156; Shenefelt, 1978: 1530. **Syn. nov.**

Bracon quadrinotatus [sic!] var.; Descamps, 1956: 740; Shenefelt, 1978: 1530.

Material.— Lectotype of *Bracon sesamiae* Cameron here designated, ♀ (SAMC) "[South Africa], Grahamstown, Cape Colony, 14.xii.[19]03, G 33" (cocoon attached, but host [= *Busseola fusca*] not indicated on label), "*Bracon sesamiae* Cam."; paralectotype of *B. sesamiae* Cameron, 1 ♀ (SAMC), same labels, but no cocoon [+ one other unexamined paralectotype with same labels in SAMC]; 1 ♀ holotype of *B. q. sesamiae* Risbec (MNHN), "Museum Paris, *B. quadrinotatus* Gr.", "Museum Paris, variété *sesamiae* R.", "Museum Paris, ex coll. Risbec", "Museum Paris, cf. larve → etiquette", "Holotype"; 1 ♂ paratype of *B. q. sesamiae* Risbec (MNHN), "Allotype", "Museum Paris, *B. q. v. sesamiae* Risbec?"; 2 ♀♀ (PPRI, RMNH), "South Africa, Cedara, Natal, 17.iv.1990, R. Kfir", "ex *Busseola fusca*"; 2 ♀♀ (PPRI), id., but i.1990; 3 ♀♀ (PPRI, RMNH), id., but vii.1918, E.S. Logan, "ex larva of *Busseola fusca* on maize"; 2 ♀♀ (PPRI), "South Africa, Delmas, Tvl, 27.iv.1989, R. Kfir", "ex larva of *Busseola fusca* on Sorghum"; 1 ♀ + 5 ♂♂ (PPRI), id., but 16.iii.1988, ex *B. fusca* on maize; 1 ♀ (PPRI), id., but iii.1991; 4 ♀♀ + 1 ♂ (PPRI), id., but 7.i.1988; 1 ♀ (PPRI), "South Africa, Vereeniging, Tvl, iii.1977, H. van Hamburg", "ex larva of *Busseola fusca*"; 4 ♀♀ (PPRI, RMNH), "RSA, Potchefstroom, xii.1973, J.L. Louw", "with larve of *Busseola fusca* in maize stem"; 2 ♀♀ (PPRI, RMNH), "South Africa, Bapsfontein, Tvl, i.1977, H. v. Hamburg", "ex larva of *Busseola fusca*"; 1 ♂ (BMNH), "[Zimbabwe], Salisbury, ex *Busseola fusca* on maize, v.1956, C.N. Smithers"; 1 ♀ (BMNH), "Rhodesia, Salisbury, Gwevi, 5.iv.1974, ex *Busseola fusca*, no 1484 6, CIE A 7846; 2 ♀♀ + 6 ♂♂ (BMNH, RMNH), "Malawi, Makoka, 25.vi.1992", "ex *Chilo partellus* larvae in maize"; 2 ♀♀ + 1 ♂ (BMNH), "Tanzania: Lushoto, Lushoto, ex *B. fusca*, JEDM[ilner], xi.[19]65, 280-20(2)"; 3 ♀♀ + 4 ♂♂ (BMNH, RMNH), "Uganda, W. Nile, 23.xii.[19]70, ex *Sesamia* larva from wheat, Z.M. Nyiira"; 1 ♀ (BMNH), "Uganda, Kigezi, Gasovu, ex *Chilo*, iii.1965, J.E. Milner, S 29038"; 3 ♀♀ (BMNH), id., but ex *B. fusca*, 529-3p; 4 ♀♀ (BMNH), ex *Chilo*, S 29-3p, 115; 4 ♀♀ (BMNH), "Uganda: Kwapa, Budeki, S 40-p11 116, "ex *Chilo partellus* CIE 487", "ex coll. Kawanda Res. Stn, Uganda"; 3 ♀♀ (BMNH, RMNH), "Ethiopia, Awasa, 1720 m, ex [larva] *Busseola fusca*, 31.viii.[19]89", "Assefa, G.A. Coll., c. 507a, CIE A 15636", "*Bracon sesamiae* Austin det."; 1 ♀ + 1 ♂ (BMNH), "Ethiopia: Harargha, Alemaya, 7.i.1991, K. Yitafuru, 1001".

Diagnosis.— Length of fore wing 2.8-3.7 mm, of body 3.2-4.1 mm; antennal segments of ♀♂ 26-36 (of lectotype 29), antenna distinctly longer than length of head and mesosoma combined, moderately slender (figs 102, 103); frons granulate, rather

mat, and with longitudinal groove (fig. 101); vertex smooth, shiny; clypeus narrow (fig. 105); face granulate; mesoscutum largely setose, especially near notauli densely so; posterior third of notaulic area more or less coriaceous, and rather mat; mesoscutum and scutellum punctulate; notauli narrow, shallow, indistinct posteriorly; scutellar sulcus deep and distinctly crenulate (fig. 109); veins 1-SR and 3-SR medium-sized (fig. 100); marginal cell of fore wing elongate (fig. 100); tarsal claws with large acute lobe (fig. 107); propodeum with short median carina posteriorly and with fine curved rugae in front of it (fig. 109), flattened medio-basally; dorso-lateral carinae of first tergite strong (figs 103, 108); length of first tergite about 0.9 times its apical width, its surface distinctly rugose posteriorly and without distinct lateral carinae (fig. 108); second-sixth tergites (except posterior margin) mainly coriaceous, second tergite also with some comparatively fine longitudinal rugae and no medio-basal area (fig. 108); second metasomal suture deep, sinuate, and finely crenulate (fig. 108); length of ovipositor sheath 0.35-0.39 times fore wing and about 2.5 times length of first tergite. Colour of lectotype of *B. sesamiae* Cameron: head and mesosoma mainly dark brown; palpi, pedicellus, orbits (except for interruption medio-posteriorly), clypeus, malar space, notaulic area, scutellum, pronotum dorsally, tegulae, fore and middle legs (except middle tarsus), hind trochanter and trochantellus, hind femur, base of hind tibia, most of veins, metanotum, propodeum antero-medially and laterally narrowly, and metasoma brownish-yellow; mesopleuron, and metapleuron largely rather pale brown; pterostigma brown; hind femur often partly or largely dark brown, Males have metasoma dark brown apically. The holotype of *B. sesamiae* Risbec is much paler: head with only pair of patches on frons and on occiput, and stemmaticum dark brown, base of antenna mainly brown, and basal half of hind tibia pale yellowish; hind coxa brownish-yellow, and pterostigma dark brown. Third and following tergites of male-paratype more or less dark brown. One female from Tanzania (Lushoto) has vein r-m of fore wing absent.

Biology.— Ectoparasite of noctuid stem borers: *Busseola fusca*; *Sesamia* spec. and of the crambid stem borer *Chilo partellus*.

Distribution.— Cameroon, Ethiopia, Senegal, South Africa (type locality), Tanzania, Uganda, Zimbabwe.

Notes.— Risbec (1956b) described his *B. sesamiae* originally as a subspecies of *B. quadratinotatus* Granger. However, *B. quadratinotatus* is an unrelated species, and *B. sesamiae* Risbec is conspecific with *B. sesamiae* Cameron. *B. quadratinotatus* can be separated from both species of *Bracon* s.s. to be known to parasitize cereal stem borers as follows:

1. Mesoscutum (largely) densely setose; fourth and fifth metasomal tergites distinctly granulate *B. sesamiae* Cameron
- Mesoscutum largely glabrous; fourth and fifth tergites usually smooth or superficially granulate 2
2. First metasomal tergite with lamelliform dorsal carinae laterally; pterostigma dark brown medially; second tergite with only few rugae medio-dorsally; mesoscutum granulate medio-posteriorly; anterior half of propodeum with tree-like sculpture (i.e. median carina with branches); antenna very robust; hind tibia completely yellowish [holotype examined] *B. quadratinotatus* Granger
- Dorsal carinae of first tergite not lamelliform, at most like rugae (fig. 360); pterostigma pale brown or yellowish medially, contrasting with dark lateral

parts; second tergite distinctly (vermiculate) rugose medio-dorsally (fig. 360); mesoscutum smooth medio-posteriorly (fig. 358); anterior half of propodeum vermiculate-rugose medially or with some rugae, at least basally not tree-like (fig. 358); antenna moderately slender (fig. 112); hind tibia with dorsal dark brown streak, rarely indistinct *B. testaceorufatus* Granger

Bracon testaceorufatus Granger, 1949

(figs 110-112, 358, 360)

Bracon testaceorufatus Granger, 1949: 71-72, figs 71, 81; Shenefelt, 1978: 1546; Brenière et al., 1962: 223; Appert, 1973: 84, 87; Polaszek et al., 1994: 77-78, figs 18, 19.

Bracon quadratinotatus; Bordat, 1979: 14 (misidentification).

Braconidae [spec. indet.] Tran, 1977: 39.

Material.— Lectotype, here designated (according to Polaszek et al. (1994) there is a holotype, but Granger had 2 ♀♀ and did not indicate in the original description which one was the holotype), ♀ (MNHN) "Madagascar, Bekily, Reg. Sud de l'île", "Muséum Paris, vii.[19]36, A. Seyrig", "Type", "33"; 2 ♀♀ + 2 ♂♂ (CIRAD), "Madagascar, Lac Alaotra, Str. Cala, 12.ii.[19]88", "ex *Maliarpha separata* LB 4-2"; 1 ♀ (BMNH), "Madagascar, Marovoay, 26.v.1992, tige riz, ex *M. separata* [sic!], P. Bousses" (aberrant by widened wing veins); 5 ♀♀ + 2 ♂♂ (BMNH), "Tanzania, Zanzibar, Ungoja, Mwesa, 11.1986, H.R. Feijen/no. 76, *Maliarpha* parasitoids"; 1 ♀ + 4 ♂♂ (BMNH), id., but 12.v.1983, ex larve *Maliarpha separata* on rice no 44; 4 ♀♀ + 1 ♂ (BMNH, RMNH), id., but 27.iv.1983, no 42; 1 ♀ + 1 ♂ (BMNH), id., but 2.vi.1983, no 46; 7 ♂♂ (BMNH), id., but Mtwango, 4.vi.1983, no 56; 3 ♀♀ + 3 ♂♂ (BMNH, RMNH), "Tanzania, Zanzibar, i.1986, H.R. Feijen, ex [larve] *Maliarpha separata* on rice"; 4 ♀♀ (BMNH, RMNH), "Tanzania: Morogoro region, Mkindo, G. Bianchi, i.1991/5", "ex *Maliarpha separata* in rice"; 1 ♀ + 1 ♂ (BMNH), "Mozambique, Gaza, Liono, ex stemborer in rice, 5.v.1987, v.d. Oever/Segeren"; 1 ♀ (BMNH), "Uganda: Tirinyi, ex *Chilo* sp. indet, Jedm. [= J.E.D. Miller], X12, vi.[19]66"; 1 ♀ + 1 ♂ (BMNH), "Nigeria, Ibadan, 3.vi.1978, no. 1", "ex larva, E.A. Alemoda, CIE Coll. A 10564"; 5 ♀♀ + 3 ♂♂ (BMNH), "Kenya: Ahero irrigation scheme, nr Kisumu, 350 km W Nairobi, G. Bianchi, i.1991/2", "ex *Maliarpha*"; 1 ♀ (BMNH), "Ghana, Dawhenya, em. 30.vii.1972, Scheibelreiter, "Braconid ex *Tryporyza* larva on rice"; 26 ♀♀ + 15 ♂♂ (BMNH, RMNH), "Cameron: nr Santchou, Pleine de Mbo (250 km N Douala), G. Bianchi, i.1991/9", "ex *Maliarpha separata* [sic!] in rice"; 1 ♀ (BMNH), "R.C.I. [= Ivory Coast], Bouaké, Faume de la Riguies, 1976, P. Cochereau", "[ex] *Chilo diffusilineus*, para 23.v."; 2 ♀♀ (BMNH, RMNH), "R.C.I. [= Ivory Coast], Bouaké, tiges de riz, 25.x.1979, Bordat, 1229"; 1 ♀ (BMNH), id., but 23.v.1977; 1 ♀ + 2 ♂♂ (BMNH), id., but ex *Chilo diffusilineus*, vii.1977, 10R 885; 3 ♀♀ + 5 ♂♂ (CIRAD), "R.C.I. [= Ivory Coast], Kotiessou, ex larva *Maliarpha separata*, 552 [543, or 556]", "A. Pollet rec., coll. no. 459, sur riz"; 3 ♀♀ + 3 ♂♂ (CIRAD), id., but 24.i.1981, ex larve *Maliarpha*; 1 ♀ (CIRAD), "Côte d'Ivoire, Gagnoa, larva de *Maliarpha*, 024811, 2552", "à comparez à *B. quadratinotatus* Gr., ssp. *sesamiae* Risbec, B. de Miré, det. 1982"; 2 ♀♀ + 1 ♂ (BMNH), "Sénégal, Ziguinchor, Djibélor, sur riz, 23.xi.[19]81, J. Etienne", "SP 303 serie de microns-bracons, ectoparasite de *Chilo* sur riz"; 1 ♀ (BMNH), id., but Kandjalang, 12.xi.1981; 2 ♂♂ (BMNH), id., but 7.vi.1971, 339, ex *Chilo zacconius* CZ 98, Roudeillac; 2 ♀♀ + 4 ♂♂ (BMNH), id., but 15.xii.1990, ex *Chilo* on rice, SP 202; 2 ♀♀ + 1 ♂ (BMNH), "Lower Senegal Valley, Richard Toll, ix.1957, A. Wane, in rice plot", "ex larva of *Procera*", "CIE Coll. no. 15707"; 2 ♀♀ (BMNH), id., but 18.ix.1957; 3 ♀♀ + 2 ♂♂ (BMNH, RMNH), id., but "ex pupa of *Procera africana* on rice twig", 23.x.1958; 2 ♂♂ (CIRAD), id., but from *Maliarpha* on rice; 1 ♂ (CIRAD), "Mopti, Mali, 13.i.1979, ex *Chilo zacconius*, Demble no. 1 1286", "Under *Bracon sesamiae* Cameron in Montpellier"; 2 ♀♀ + 1 ♂ (BMNH), "Mauritania, Kged, 17.ix.[19]86, Belinabe, ex *Chilo*."

Diagnosis.— Length of fore wing 1.5-3.5 mm, of body 2.0-4.5 mm; antenna with 26-38 segments, distinctly longer than length of head and mesosoma combined, rather slender (fig. 112); clypeus smooth, flat, shiny, narrow, dorsal carina present or absent; frons and face finely granulate; vertex smooth; mesoscutum largely glabrous, shiny, smooth, including posterior half of notaulic area; scutellar sulcus comparatively wide and distinctly crenulate; veins 1-SR and 3-SR medium-sized (fig. 110);

marginal cell of fore wing elongate (fig. 110); tarsal claws with small truncate lobe (fig. 111); propodeum coarsely vermiculate-rugose (fig. 358) or at least with some rugae; length of first tergite about 0.9 times its apical width, no distinct dorsal carinae and its surface coarsely rugose medio-posteriorly (fig. 360); dorso-lateral carinae of first tergite coarse, not lamelliform; second tergite coarsely (vermiculate-)rugose medio-dorsally (fig. 360) and remainder distinctly granulate; second metasomal suture rather deep, nearly straight, and finely crenulate; third and fourth segments superficially granulate, shiny, following tergites smooth or nearly so; length of ovipositor sheath 0.35-0.42 times fore wing and 2.5-2.9 times length of first tergite; pterostigma pale yellowish(-brown) medially, contrasting with darker lateral parts; hind tibia with dorsal dark brown streak (interrupted by subbasal whitish band), rarely indistinct; body mainly orange-brown; antenna, stemmaticum, most of veins, ovipositor sheath, telotarsi, mesoscutum medially, (laterally variable, may be orange-brown to dark brown), propodeum, first tergite, second tergite medially, and sometimes third and fourth tergites largely, and ovipositor sheath dark brown or black. Males have the pterostigma largely dark brown, and some have apical half of metasoma largely dark brown.

Biology.— A gregarious idiobiont ectoparasite of larvae of crambid (*Chilo diffusilineus*, *C. zacconius*, *C. spec.* and *Scirpophaga spec.*), and pyralid (*Maliarpha separatella*) stem borers in rice. With 6-14 specimens living on one host caterpillar, an average fecundity of 25 eggs and a developmental time of 12 days (Polaszek et al., 1994). The larva pupate within the rice stem, a few millimetres below the host's remains. Emergent adults leave the stem via the aperture made by the host larva. In Madagascar, at least part of the population undergoes larval diapause whereas the remainder is active throughout the year (Bianchi et al., 1991).

Distribution.— Cameroon, Ghana, Ivory Coast, Kenya, Madagascar, Mali, Mauritania, Mozambique, Nigeria, Senegal, Tanzania, Uganda.

Note.— In areas of Madagascar where this species was common, it had no important rôle in regulating populations of *Maliarpha separatella* (Appert, 1967).

Bracon spec. A.

Material.— 2 ♂♂ (BMNH), "Uganda, Nyarusiza: Kigezi, ex *B. fusca*, 3/65, JEDM[ilner]. 525-P3", C.I.E.C.E.A. no. 279", "C.I.E. Coll. no a 1129"; 1 ♀ (BMNH), id., 6/66, Muyumbu, ex *B. fusca*; 2 ♀♀ (BMNH, RMNH), Tanzania, Biharamulo, ex *B. fusca*, 5/66, JEDM[ilner], S100-5".

Diagnosis.— Because of lack of material and because this species is very similar to *B. sesamiae*, we refrain from diagnosing this species. In addition to the differences given in the key it has the wings slightly darker than in *B. sesamiae*.

Biology.— Ectoparasite of noctuid stem borer: *Busseola fusca*.

Distribution.— Afrotropical: Tanzania, Uganda.

Genus *Digonogastra* Viereck, 1912

(figs 113-119)

Digonogastra Viereck, 1912: 621; Shenefelt, 1978: 1749 (as synonym of *Iphiaulax* Foerster, 1862); Quicke, 1988: 196-198; Quicke & Sharkey, 1989: 348; Quicke & Marsh, 1992: 559. Type species (by original designation): *Bracon epicus* Cresson, 1872.

Monogonogastra Viereck, 1912: 625; Shenefelt, 1978: 1749 (as synonym of *Iphiaulax* Foerster, 1862); Quicke, 1988: 196. Type species (by original designation): *Bracon atripectus* Ashmead, 1889.

Diagnosis.— Length of fore wing 3-16 mm; scapus distinctly concave apically, ventrally longer than dorsally in lateral view, and medium-sized (fig. 115); second (= pedicellus), third and fourth antennal segments normal, cylindrical (fig. 115); face without protuberances, and without reticulate sculpture, usually largely smooth or coriaceous; frons usually densely setose antero-laterally; vein 1-SR distinctly angled with parastigma, angle between veins 1-SR and C+SC+R 60°-80° (fig. 116)); vein 1-SR+M of fore wing nearly straight to distinctly angled basally; vein 3-M of fore wing terminating at about same level as vein SR1 or more basally (fig. 118); vein 1r-m of hind wing comparatively long and angle with vein 1-SC+R very sharp (fig. 118); fore basitarsus normal, hardly compressed, subcylindrical; tarsal claws simple, without acute lobe (fig. 19); second metasomal tergite (largely) smooth, without converging grooves, its medio-basal area distinctly differentiated and usually posteriorly connected to a median carina (fig. 117); third tergite with antero-lateral grooves (fig. 117); third-fifth tergites without transverse groove posteriorly (but present in *D. ornatus* (Provancher)); upper valve of ovipositor normal, not enlarged, straight, and its lower valve with some minute teeth (fig. 114); rarely upper valve of ovipositor widened and without pre-apical nodus and ventral tooth reduced; ovipositor sheath usually about as long as metasoma or longer, but as short as 0.25 times length of metasoma occurs.

Distribution.— Large genus, with a New World distribution; one species has been introduced in Africa to control crambid and pyralid stem borers. The genus has never been revised.

Biology.— Solitary or gregarious idiobiont ectoparasites of concealed larvae of Coleoptera (Cerambycidae) and of Lepidoptera (Crambidae, Pyralidae, Psychidae).

Notes.— May be confused with the Old World genus *Iphiaulax*, but differs by the very sharp angle between vein 1-SC+R and 1r-m of hind wing (fig. 118 versus figs 122, 123), the more or less developed medio-basal area of second tergite (usually connected to a median carina posteriorly; fig. 117 versus fig. 131) and the normal upper valve of the ovipositor (fig. 114 versus fig. 132). If rarely the upper valve is enlarged then the frons is densely setose antero-laterally and the fourth and fifth tergites lack the transverse posterior grooves. In *Iphiaulax* the upper frons is sparsely setose antero-laterally and the fourth and fifth tergites possess transverse grooves posteriorly (fig. 126). The males of *Digonogastra* have the digitus with 3-4 tooth-like processes, but males of *Iphiaulax* have only one such process (Quicke, 1988).

The East Palaearctic genus *Bracomorpha* Papp, 1971, is very similar to *Digonogastra*, but differs by having a pair of elongate, well differentiated lateral areas of second tergite, the median carina of second tergite absent, the medio-basal area of second tergite long ovoid, the first tergite distinctly sculptured, the vein 1r-m of hind wing comparatively short, and vein 1-SR+M of fore wing straight.

Quicke (in Quicke & Marsh, 1992) described *D. zaglyptogastra* from Argentina with a highly modified ovipositor. It possesses two distinct arch like apical parts, but the ventral valve is normal in having distinct minute teeth. It is an extreme member of an aberrant species group of *Digonogastra* with enlarged and smooth upper valve of the ovipositor, similar to the condition found in *Iphiaulax*.

Digonogastra kimballi Kirkland, 1989
(figs 113-119)

Iphiaulax kimballi Kirkland, 1982: 129; Lee & Chippendale, 1985: 509. Nomen nudum.

Digonogastra kimballi Kirkland (in Wharton et al.), 1989: 402-408, figs 1-6, 8-9, 12, 14-15, 17-19 (formal description, biology).

Material.— 1 ♀ (RMNH), "USA: Texas, College Station (Texas A & M Univ.), 29.vii.1985, J.W. Smith Jr", "ex *Eldana saccharina* on sugarcane", "lab culture, Mt Edgecombe".

Diagnosis.— Length of fore wing 3.3-7.5 mm, of body 3.7-9.0 mm; antenna with 39-61 segments (♀ ♂); face nearly smooth to rugulose-punctate; clypeus with distinct curved ventral carina, and its dorsal carina absent; head strongly narrowed posteriorly; frons silvery setose and largely smooth; propodeum densely (partly long) silvery setose; metasoma largely smooth; median carina of second tergite absent or nearly so (fig. 117); second metasomal suture wide, sinuate, smooth or more or less crenulate (fig. 117); length of ovipositor 1.0-1.2 times length of metasoma, and about 0.7 times fore wing; head completely black (rarely with red patch near eye ventrally); mesoscutum reddish, remainder of mesosoma more or less dark brown, propodeum usually with a pale median streak; metasoma of ♀ completely reddish, of ♂ marked with black apically; pterostigma, parastigma and wing membrane dark brown (fig. 118).

Biology.— Gregarious ectoparasite of Crambidae: *Diatraea grandiosella* Dyar, *D. lineolata* (Walker), *D. magnifactella* Dyar, *D. saccharalis* (Fabricius), and of *D. considerata* Heinrich. Reared from the pyralid *Eldana saccharina* only in the laboratorium (South Africa; see Smith et al., 1992). The essentially identical *D. solitaria* Wharton & Quicke, 1989, differs mainly from *D. kimballi* by its biology. It is a solitary parasite of the crambid *Eoreuma loftini* (Dyar) and two *Diatraea* species in southern Texas and north-eastern Mexico (Wharton et al., 1989). Its males have the apex of the metasoma red rather than black.

Distribution.— Nearctic: Mexico, and U.S.A., and introduced in Afrotropical region: South Africa.

Note.— *D. kimballi* was introduced into South Africa against the pyralid *Eldana saccharina* in 1985. Apparently, the species did not establish, but it is included here should it ever do so.

Genus *Iphiaulax* Foerster, 1862
(figs 120-134, 229, 230)

Iphiaulax Foerster, 1862: 235; Shenefelt, 1978: 1748-1804; Quicke, 1987: 117. Type species (by monotypy): *Ichneumon impostor* Scopoli, 1763.

Iphiaulacidea Fahringer, 1926: 156; Shenefelt, 1978: 1749. Type species (designated by Muesebeck & Walkley, 1951): *Ichneumon impostor* Scopoli, 1763.

Diagnosis.— Length of fore wing 4-14 mm; scapus distinctly concave apically, ventrally longer than dorsally in lateral view, short ovoid (fig. 124), inner apex simple or partly double margined; second (= pedicellus), third and fourth antennal segments normal, cylindrical; apex of antenna setose and acute; inner side of eyes notched (fig. 128); face without protuberances, and without reticulate sculpture, usu-

ally largely smooth, punctulate, or coriaceous (fig. 128); frons mainly glabrous; clypeus bordered dorsally by a carina composed of three more or less straight segments (fig. 120) or carina evenly curved (fig. 128); vein 1-SR distinctly angled with parastigma, angle between veins 1-SR and C+SC+R about 80° (figs 122, 123); first discal cell of fore wing subrectangular (fig. 122); vein 3-M of fore wing terminating at about same level as vein SR1 or more basally (figs 122, 123); vein 1r-m of hind wing comparatively long and angle with vein 1-SC+R moderately sharp (figs 122, 123); tarsal claws simple, without lobe (fig. 129); second metasomal tergite (largely) smooth, without converging grooves, and no medio-basal area differentiated and no strong median carina (fig. 131); third-fifth tergites with distinct antero-lateral grooves (fig. 126); sixth tergite largely retracted and smooth (fig. 126); upper valve of ovipositor enlarged, much wider than lower valve, and its lower valve without teeth (fig. 132); ovipositor sheath about as long as metasoma or shorter.

Distribution.— Rather large genus with an Old World distribution (mainly restricted to the subtropical and tropical parts), with several species in the Afrotropical region. The report from the Nearctic region by Quicke (1987) is due to confusion with *Digonogastra*. The genus has never been revised, Fahringer (1935: 505-551) gives a compiled key to the Afrotropical species, mixed up with many non-*Iphiaulax* species.

Biology.— Solitary idiobiont ectoparasites of concealed larvae of Coleoptera (Cerambycidae, Buprestidae) and of Lepidoptera (Crambidae, Pyralidae).

Notes.— Both species reared from stem borers in Africa belong to the group with the vein C+SC+R of fore wing and the pterostigma conspicuously red, the occiput and the mesosoma completely reddish-yellow, the third tergite distinctly striate, the fourth and fifth tergites without strongly bulging medial part, and the fifth metasomal tergite smooth.

The genus *Euglyptobracon* Telenga, 1936, is listed provisionally under *Iphiaulax* by Quicke (1987), but it is a junior synonym of *Pseudovipio* Szépligeti, 1896, **syn. nov.**

Key to species of the genus *Iphiaulax* parasitizing African cereal stem borers

1. Wing membrane nearly completely dark brown (fig. 123); mesoscutum and temples with conspicuous long blackish setae (fig. 126); vein r of fore wing dark brown; dorsal carina of clypeus evenly curved (fig. 128); mesoscutum comparatively slender (fig. 134); fifth metasomal tergite nearly flat (fig. 229) *I. pilisoma* spec. nov.
- Wing membrane largely pale yellowish, only broad apical band and band below parastigma (and including a darker stigmal spot) dark brown (fig. 122); mesoscutum with medium-sized brownish setae, setae of temples somewhat shorter; vein r of fore wing yellow; dorsal carina of clypeus angled (fig. 120); mesoscutum robust to moderately slender (fig. 121); fifth tergite distinctly convex near transverse groove (fig. 230) *I. dubiotus* Shenefelt

Iphiaulax dubiotus Shenefelt, 1978
(figs 120-122, 230)

Iphiaulax dubiosus Szépligeti, 1914a: 173 (not *I. dubiosus* Szépligeti, 1904).

Iphiaulax dubius; Fahringer, 1935: 562. Invalid emendation.

Iphiaulax dubiotus; Shenefelt, 1978: 1760. Replacement name.

Material.— 1 ♀ (? holotype, see note below) (MNHN), "Afr. Or. Angl. (Lac Victoria), Baie de Kavirondo, Alluaud & Jeannel, xii., 1911-1112° St. 23", "*Iphiaulax 27 dubiosus* [in Szépligeti's handwriting]"; 1 ♀ (MNHN), "Museum Paris, Bassin du Moyen-Niger, Niafunké, R. Chudeau, [ix.] 1909"; 1 ♂ (CIRAD), "Senegal, Djibelor, 4.vi.[19]70, IRAT", "Ex *Chilo zacconius*/ [sur] riz, legs Pham Van Sam"; 1 ♀ (PPRI), "South Africa, Ntl, Mtunzini, S.A.S.A., 28°56'S 31°42'E 36, x.[19]93, Conlong & Appanna", "Host plant: sugarcane"; 1 ♂ (PPRI), id. but from *Cyperus dives*; 2 ♀♀ (BMNH, RMNH), "South Africa, Natal, KwaDlangezwa, Empangeni", "12.ix.1991, SASA SEx 709(d), ex *Eldana* on *Papyrus umbel*"; 1 ♀ (BMNH), "S[outh]A[fri]ca, Grooms F[a]rm, i.[19]92, D. Conlong"; 1 ♂ (RMNH), "South Africa, Natal, Sasex, Mtunzini, 27.ix.1985", "SASA SEx 709(e), ex *Eldana* on sugarcane"; 1 ♀ (BMNH), "South Africa, Natal, Mtunzini, Sasex Field Stn, Fld 103", "27.ix.1985, SASA SEx 712.8, ex ?*Eldana* on sugarcane"; 1 ♀ (RMNH), "South Africa, Natal, Mtuzini, Obanjani Sugar Estate, 26.ii.1986, SEx 709(a), D. Conlong/*Iphiaulax* sp. ♀, emerged from third instar *E[ldana] saccharina* larva collected from mature sugarcane"; 1 ♀ (PPRI), "South Africa, Natal, Hlabisa, Mtubatuba, Palm Ridge Sugar farm, 25.vi.1985, SEx 709(c), D. Conlong/emerged from third instar *Eldana saccharina* larva collected from *C. papyrus umbel*"; 1 ♀ (BMNH), "South Africa, Natal, Lower Tugela, Darnall Bethesda Estate, 27.iii.1985, SEx 709(b), D. Conlong/*Iphiaulax* sp. ♀, emerged from third instar *E[ldana] saccharina* larva collected in sugarcane (mature). Died 18.v.1986, longevity 52 days".

Diagnosis.— Length of body 5-8.5 mm, and of fore wing 4-7.5 mm; inner apex of scapus slightly double margined; antennal segments 56-68, antenna 1.2-1.3 times as long as fore wing; face sparsely punctate laterally, remainder superficially granulate (but sometimes nearly whole face granulate), rather dull; ♂ has face narrower than ♀ and completely coriaceous-granulate; dorsal carina of clypeus angled (fig. 120) or nearly so; pronotum medio-posteriorly sparsely punctate laterally; mesoscutum with medium-sized brownish setae, and setae of temples somewhat shorter than of *I. pili-soma*; mesoscutum robust to moderately slender (fig. 121); third tergite distinctly striate; fourth and fifth tergites distinctly convex medially, weakly bulging near subposterior groove (fig. 230), of ♀ finely aciculate anteriorly, remainder usually smooth, of ♂ largely finely and densely sculptured; length of ovipositor sheath 0.35-0.40 times fore wing; stemmaticum and sometimes immediate surroundings of it, antenna (except radix) and ovipositor sheath black; head (including occiput and frons), mesosoma and metasoma completely reddish-yellow; veins C+SC+R of fore and of hind wings, and more or less M+CU1 of fore wing and M+CU of hind wing, and pterostigma conspicuously red; wing membrane largely pale yellowish, only broad apical band and band below parastigma (latter including a darker stigmal spot) dark brown (fig. 122); vein r of fore wing yellow, more or less reddish basally.

Biology.— Parasite of crambid (*Chilo zacconius*) and pyralid (*Eldana saccharina*) stem borers.

Distribution.— Afrotropical: South Africa, Tanzania, Senegal, Niger.

Note.— The specimen in MNHN from Kavirondo Bay agrees well with the (short) original description, comes from the type locality (or nearby) and bears a handwritten label by Szépligeti. However, the date should be "Oct. 1903", the additional locality Kisumu is not on the label, and as collector only Alluaud is listed. The type was not found among the Szépligeti types in the Budapest Museum (Quicke, 1991). In case the holotype is not found in MNHN and the above listed specimen is considered not to be the holotype then the specimen from Kavirondo Bay should be selected neotype.

Iphiaulax pilisoma van Achterberg, spec. nov.
(figs 123-134, 229)

Material.— Holotype, ♀ (MNHN), "[Senegal], Bambey, de champ en face *Pennisetum*, s/*Sesamia*, 8.x. [19]68".

Diagnosis.— Length of body about 8 mm, and of fore wing about 7.5 mm; inner apex of scapus slightly double margined; face mainly finely punctate, shiny, only near antennal sockets somewhat granulate (fig. 128); mesoscutum and temples with conspicuous long blackish setae (fig. 130); dorsal carina of clypeus evenly curved (fig. 128); pronotum medio-posteriorly sparsely punctulate laterally; mesoscutum slender (fig. 134); third tergite distinctly striate (fig. 126); medial part in front of sub-posterior transverse groove of fourth and fifth tergites slightly convex (fig. 229); fifth metasomal tergite smooth; length of ovipositor sheath about 0.3 times fore wing; head (including occiput, but stemmaticum and area around it black), mesosoma, and metasoma completely reddish-yellow; radix of antenna mainly yellowish; vein C+SC+R of fore wing and pterostigma conspicuously red; vein r of fore wing dark brown; wing membrane nearly completely dark brown (fig. 123).

Description.— Holotype, ♀, length of body 8.1 mm, of fore wing 7.5 mm.

Head.— Antennal segments short and very shortly setose, incomplete, with 59 segments remaining, length of third segment 1.3 times fourth segment, length of third, and fourth segments 1.6, and 1.2 times their width, respectively (figs 124, 125); middle segments of antenna 0.9 times as long as wide; length of antenna at least 1.2 times as long as fore wing; antennal sockets rather protruding laterally (fig. 130); length of maxillary palp 1.2 times height of head; length of eye in dorsal view 1.7 times temple (fig. 130); temples gradually narrowed posteriorly, long setose (fig. 130); OOL:diameter of posterior ocellus:POL = 20:9:9; frons slightly concave, with distinct median groove, smooth, glabrous; face rather convex, mainly finely punctate, near eyes more coarsely so, and near antennal sockets slightly granulate (fig. 128); clypeus flat, mainly smooth, dorsally and ventrally with an evenly curved carina (fig. 128) and evenly long setose ventrally; ventral margin of clypeus distinctly concave; length of malar space equal to basal width of mandible; malar suture weakly and broadly impressed, distinctly punctate; mandible moderately robust, strongly twisted apically, both teeth wide, second tooth about as long as first tooth, robust.

Mesosoma.— Length of mesosoma 1.6 times its height; side of pronotum except some punctulation antero-medially; mesopleuron and metapleuron mainly smooth, except for some sparse punctulation; scutellar sulcus narrow, indistinctly crenulate; mesoscutum slender (fig. 134), smooth, very long setose (fig. 126) except middle of lobes; notauli absent, except for indistinct anterior impressions; scutellum convex, distinctly protruding above mesoscutum; propodeum smooth, moderately long setose.

Wings.— Fore wing: 3-SR slightly curved (fig. 123); 1-SR+M slightly bent sub-basally (fig. 123); r:3-SR:SR1 = 9:37:60; cu-a straight, vertical and interstitial; 2-SR:3-SR:r-m = 20:37:20; m-cu slightly converging to 1-M posteriorly. Hind wing: 1r-m straight, slightly shorter than SC+R1 (fig. 123); with 3 hamuli and 4 basal bristles; marginal cell narrowed subapically and absent apically (fig. 123); M+CU:1-M = 11:37.

Legs.— Hind coxa sparsely punctulate; tarsal claws simple, slender, only setose,

and its apical tooth robust (fig. 129); length of fore tarsus 1.5 times fore tibia; length of fore spur 0.7 times fore basitarsus; length of femur, tibia and basitarsus of hind leg 3.6, 8.5 and 5.5 times their width, respectively; length of spurs of hind tibia 0.4 and 0.6 times hind basitarsus.

Metasoma.— Length of first tergite 1.1 times its apical width (fig. 131), laterally and basally smooth, its medial convexity longitudinally striate medially, and obliquely rugose laterally; second tergite with pair of wide, smooth antero-lateral areas, medially and posteriorly coarsely rugose-striate, but postero-laterally weakly rugose, with pair of wide triangular depressions below smooth areas (fig. 131); second suture wide and coarsely crenulate; third tergite coarsely striate, but posteriorly irregularly rugose; fourth tergite similarly but weaker sculptured; fifth tergite smooth except for wide crenulate transverse groove basally and narrow subposterior groove, and some indistinct sculpture anteriorly; remainder of metasoma smooth and mainly retracted; length of ovipositor sheath 0.29 times fore wing and about 0.6 times metasoma; apex of ovipositor acute, its upper valve distinctly enlarged compared to lower valve, and no nodus (fig. 132); ovipositor sheath widened (fig. 126).

Colour.— Red or reddish-yellow (including palpi, tegulae, pterostigma, vein C+SC+R of fore wing, except its apex); stematicum, patch around it, and medio-posterior part of frons, antenna (except small yellow patches at scapus dorsally and laterally, and mainly yellowish radix), and ovipositor sheath black; mandible, clypeus, and face medio-ventrally yellowish-brown; remainder of veins (including parastigma, and vein r of fore wing) dark brown, but veins M+CU1 of fore wing and SC+R of hind wing yellowish; wing membrane dark brown, but near pterostigma and basally of parastigma of fore wing and base of marginal cell of hind wing yellowish (fig. 123).

Biology.— Parasite of noctuid stem borer (*Sesamia* spec.).

Distribution.— Afrotropical: Senegal.

Note.— In Africa larger species (fore wing length about 13 mm) occur which are very similarly coloured. Besides the difference in size they differ from *I. pilisoma* by the shorter setae of the mesoscutum, the frons is more concave, the inner apex of the scapus has a distinctly double margin, the face is finely granulate between the punctures, the dorsal carina of the clypeus is angled (consisting of three straight parts), the radix of the antenna is completely black, the fifth tergite is distinctly sculptured medially, and the medial part of fourth and fifth tergites is distinctly bulging in front of transverse subposterior groove.

Genus *Mesobraconoides* Sarhan & Quicke, 1990

(figs 135-148)

Mesobraconoides Sarhan & Quicke, 1990: 217-221. Type species (by original designation): *Mesobracon psolopterus* Wilkinson, 1931.

Diagnosis.— Scapus short, robust, dorsally slightly longer than ventrally (fig. 145); second, third and fourth antennal segments normal, cylindrical; face without protuberances, and without reticulate-rugose sculpture, usually largely coriaceous (fig. 136); second submarginal cell of fore wing much longer than high (fig. 135);

angle between veins 1-SR and C+SC+R of fore wing about 40° (fig. 142); vein cu-a of fore wing distinctly postfurcal (fig. 135); vein 1r-m of hind wing rather long and slightly curved (fig. 135); propodeum completely smooth (fig. 137); tarsal claws with simple apical tooth and large submedial lobe (fig. 144); second metasomal tergite with wide converging grooves (fig. 147); first-sixth tergite coarsely reticulate-rugose, not serrate laterally and posteriorly, and with acute lateral crease (fig. 139); sixth tergite with truncate lamella posteriorly (fig. 139); upper valve of ovipositor normal, its lower valve with small teeth, and its sheath shorter than metasoma, about 0.3 times fore wing

Distribution.— Afrotropical: two species.

Biology.— Parasite of concealed lepidopterous and coleopterous larvae.

Mesobraconoides psolopterus (Wilkinson, 1931)
(figs 135-148)

Mesobracon psolopterus Wilkinson, 1931b: 394; Shenefelt, 1978: 1705.

Mesobraconoides psolopterus; Sarhan & Quicke, 1990: 221.

Material.— Holotype, ♀ (BMNH), "Type", "B.M. Type Hym. 3.c.533", "*Mesobracon psolopterus* Wilkinson, Type", "Sierra Leone, Njala, ex coffee branch borer, em. 4.xii.[19]20, E. Hargreaves".

Diagnosis.— Length of body 6-7.5 mm, of fore wing 7-8 mm; antennae with 57-62 segments, median segments considerably longer than wide; frons flattened, finely granulate and with shallow median groove (fig. 140); body yellowish-brown; antenna (but scapus and pedicellus brown), frons (except narrow rim near eyes) and vertex (id.) black; hind tarsus infusate; wings largely rather dark brown; pterostigma yellow to orange basally, dark brown apically, but sometimes largely yellowish.

Distribution.— Afrotropical: Nigeria, Sierra Leone.

Biology.— Probably an ectoparasite of stem and branch borers, attacking the final larval instar of the pyralid *Maliarpha separatella* (Sarhan & Quicke, 1990). The alternative host is a coleopteron: *Xyleborus* spec. (Scolytidae).

Note.— The inclusion of this species is based on two published records of it attacking *M. separatella* in Sierra Leone (Sarhan & Quicke, 1990). No material reared from *M. separatella* was examined. This record is considered questionable by Polaszek et al. (1994).

Genus *Stenobracon* Szépligeti, 1901
(figs 149-173)

Stenobracon Szépligeti, 1901b: 359; Shenefelt, 1978: 1724; Quicke, 1987: 132; Chishti & Quicke, 1996: 236-243 (revision of Indo-Australian species; key). Type species (by monotypy): *Stenobracon oculatus* Szépligeti, 1900.

Euvipio Szépligeti, 1904: 14; Shenefelt, 1978: 1839; Quicke, 1987: 112; Sarhan & Quicke, 1993: 329. Type species (by monotypy): *Euvipio rufa* Szépligeti, 1904. **Syn. nov.**

Elphea Cameron, 1903: 121; Shenefelt, 1978: 1724; Chishti & Quicke, 1996: 236. Type species (designated by Viereck, 1914): *Elphea lutea* Cameron, 1903 (= *Stenobracon oculatus* Szépligeti, 1910).

Phanaulax Cameron, 1910a: 43; Shenefelt, 1978: 1724; Chishti & Quicke, 1996: 236. Type species (by monotypy): *Phanaulax levituberculatus* Cameron, 1910 (= *Stenobracon nicevillei* (Bingham, 1901)).

Diagnosis.— Scapus ovoid, and protruding ventrally (fig. 154); second, third and fourth antennal segments normal, cylindrical; face without protuberances, and without reticulate sculpture, usually largely smooth or coriaceous (fig. 150); inner side of fore tibia with band of bristles or slender spines; angle between vein 1-M and vein C+SC+R of fore wing about 30° (fig. 149); fourth metasomal tergite with distinct antero-lateral grooves (its width is variable and intermediates occur; narrow especially in the subgenus *Stenobracon*; fig. 173, and usually much wider in the subgenus *Euvipio*; fig. 160); ovipositor sheath much longer than metasoma.

Distribution.— Afrotropical, Oriental, South Palaearctic: eight species recognized.

Note.— The holotype of *Euvipio nigripennis* Szépligeti, 1914 (MAC, "Musée du Congo, Kikondja, 28.ix.1911, Dr. Bequaert", "*Euvipio nigripennis* n. sp. Sz.", "*Euvipio nigripennis* Sz.", "Type, *E. nigripennis*") has been examined and proved to belong to the genus *Bathyaulax* Szépligeti, 1906, **comb. nov.** It is provisionally included because it has the outer side of fourth tarsal segments equally protruding apically as inner side, the median length of the second metasomal tergite about equal to its basal width, the first tergite strongly convex and its lateral areas very narrow, vein 3-SR of fore wing curved downwards, the face densely sculptured, and the ovipositor longer than the body.

Key to African species of the genus *Stenobracon* Szépligeti

1. Fourth tarsal segments truncate or nearly so apically (fig. 172); telotarsi in lateral view straight (figs 155, 168, 185); notauli complete or nearly so (figs 156, 169, 181); vein SR1 (slightly) sinuate (figs 149, 161, 174); face usually largely smooth (figs 162, 175)..... 2
 - Inner corner of fourth tarsal segments protruding apically (figs 198-200); telotarsi in lateral view curved (fig. 202); notauli absent posteriorly (fig. 193); vein SR1 (except apically) straight (fig. 187); sculpture of face variable, sometimes densely sculptured [*Bathyaulax* Szépligeti]
2. Vein cu-a of fore wing vertical, or posterior half curved to base of wing (figs 149, 161); antero-lateral grooves of second and third tergites distinct, usually deep (figs 160, 173); propodeum largely smooth; clypeus comparatively narrow (figs 150, 162); vein 1r-m of hind wing long (figs 149, 161).....3
 - Vein cu-a of fore wing straight and distinctly reclivous (fig. 174); antero-lateral grooves of second and third tergites absent or shallow (figs 178, 186); propodeum usually extensively sculptured; clypeus wide (fig. 175); vein 1r-m of hind wing comparatively short (fig. 174)..... [*Odesia* Cameron]
3. Second metasomal tergite without medio-basal area, or area indistinct (fig. 160); vein 3-SR of fore wing 1.8-2.7 times vein r (fig. 149), rarely up to 1.5 times; antero-lateral grooves of third tergite distinctly crenulate and rather wide (fig. 160); sixth tergite yellowish-brown; Afrotropical. Subgenus *Euvipio* Szépligeti 4
 - Second tergite with (minute) smooth medio-basal area, often weakly indicated and transverse (fig. 173); vein 3-SR of fore wing 1.2-1.8 times vein r, rarely up to 2.2 times (fig. 161); antero-lateral grooves of third tergite comparatively narrow or obsolescent, often weakly crenulate or smooth (fig. 173); sixth tergite frequently black; Oriental, South Palaearctic; introduced in Afrotropical region (Madagascar, Mascarenes, Mauritius, Réunion, Sudan). Subgenus *Stenobracon* Szépligeti 5

4. Fourth hind tarsal segment dark brown or black dorsally, similar to colour of telotarsus; setae on outer side of hind tibia dark brown or black; frons of ♀ with (large) black patch or wide black band posteriorly, enclosing stemmaticum, exceptionally completely yellowish or reddish; basal half of fore wing usually dark brown, except small area near base of wing *S. rufus* (Szépligeti)
- Fourth hind tarsal segment yellowish-brown dorsally and usually distinctly paler than telotarsus, if similarly coloured then setae on outer side of hind tibia pale yellowish; frons of ♀ yellowish or with a narrow black band, rarely broadly black posteriorly; basal half of fore wing usually partly yellowish *S. unifasciatus* (Brullé)
5. Vertex of ♀ (largely) yellowish; sixth tergite of ♀ yellowish; vein cu-a of fore wing may be far postfurcal; face of ♂ somewhat widened and head dorsally partly yellow; third tergite distinctly sculptured medially *S. deesae* (Cameron)
- Vertex of ♀ largely blackish or with black band; sixth (and fifth) tergite of ♀ blackish medially; vein cu-a of fore wing interstitial or just postfurcal by about width of vein (fig. 161); face of ♂ somewhat narrower and dorsally head completely blackish, except near antennal sockets; third tergite variable medially 6
6. Apical width of second metasomal tergite of ♀ 0.7-1.0 times its median length, of ♂ 0.9-1.2 times; third tergite of ♀ frequently smooth antero-medially, and usually antero-lateral grooves rather weak or absent (figs 163, 173) *S. oculatus* Szépligeti
- Apical width of second tergite of ♀ 1.1-1.5 times its median length, of ♂ 1.2-1.6 times; third tergite of ♀ usually rugose-striate antero-medially, and with distinct antero-lateral grooves *S. nicevillei* (Bingham)

Subgenus *Euvipio* Szépligeti, 1904 stat. nov.
(figs 149-160)

Euvipio Szépligeti, 1902: 39; Shenefelt, 1978: 1839 (as synonym of *Vipio* Latreille, 1804). Type species (by monotypy): *Euvipio rufa* Szépligeti, 1904.

Diagnosis.— Second submarginal cell of fore wing usually slightly widened distad (fig. 149); vein 3-SR of fore wing 1.8-2.7 times vein r (fig. 149), rarely 1.5 times; first tergite robust, distinctly widened posteriorly; second metasomal tergite without medio-basal area, or area indistinct (fig. 160); sixth tergite yellowish-brown.

Biology.— Solitary ectoparasites of Noctuidae, Crambidae, Pyralidae, and Cossidae.

Distribution.— Africa and Southwest Palaearctic.

Remarks.— Differs according to Quicke (1987) and Chishti & Quicke (1996) from *Stenobracon* s.s. by the shape of the antero-lateral grooves of the third metasomal tergite (distinctly widened posteriorly in *Euvipio* (fig. 160) and parallel-sided in *Stenobracon* (fig. 173)). Chishti & Quicke (1996) give as additional characters "more or less quadrate flagellomeres [of *Stenobracon* s.s.] compared with distinctly elongate ones found in *Euvipio*", and "*Stenobracon* [s.s.] species are typically brownish yellow in coloration compared with the more orange or reddish coloration of *Euvipio*". The differences between both species groups (here treated as subgenera) are few and intergrading, so at most *Euvipio* may be considered to be a subgenus, embracing the original Afrotropical and SW Palaearctic species. Many differences did not hold for the

series examined: the sculpture of metasoma, the colour of the stemmaticum, and of the wings are highly variable, and between the observed extremes many intermediates have been examined.

Stenobracon (Euvipio) rufus (Szepligeti, 1904) comb. nov.
(figs 149-160)

Euvipio rufa Szépligeti, 1904: 15; Jordan 1966: 4; Mohyuddin & Greathead, 1970: 254; Quicke, 1991: 174.

Vipio rufa; Shenefelt, 1978: 1858.

Vipio sp.; Badawy, 1967: 235.

?*Stenobracon* sp.; La Croix, 1967: 53.

Material.— 5 ♀♀ + 4 ♂♂ (PPRI, RMNH, Quicke Collection), "South Africa, Brits, TvL, 25°39'S, 27°46'E, 1990, R. Kfir", "Ex larvae of *Chilo partellus* on maize"; 1 ♀ (PPRI, id., but iii.1989, "Ex *Chilo partellus* on *Sorghum*"; 1 ♀ (PPRI), id., but xii.1988; 5 ♀♀ (PPRI, RMNH), "South Africa: Transvaal, Brits/Delmas/Warmbaths, ?1992-3", "ex *Chilo partellus* in maize, instar VI, R. Kfir"; 1 ♀ + 1 ♂ (PPRI), "South Africa, Warmbaths, TvL, iii.1972, N.J. v. Rensburg", "Ex *Chilo partellus* "; 1 ♀ (PPRI), "South Africa, Roodeplaat, 28.iv.[19]71, H. v. Hamburg", "on *Chilo partellus*"; 1 ♀ (BMNH), "Uganda, Kitamavu, 22.ii.[19]65, C.I.B.C., CIE A142, 073"; 1 ♀ (BMNH), "Uganda, Sekanyoni, 19.ii.[19]65, C.I.B.C., CIE A142, 076"; 1 ♀ (BMNH), "Uganda Prot., Buamba Forest, Semliki Forest, 2,300-2,800 ft.", "3-7.xi.1911, S.A. Neave"; 1 ♀ (BMNH), "Uganda Prot., between Kumi & N.E. shore L. Kioga, 3,400-3,600 ft.", "18-20.viii.1911, S.A. Neave"; 1 ♀ (BMNH), "Uganda Prot., Banks of Nile, near Kakindu, 3,400 ft.", "24-25.viii.1911, S.A. Neave"; 1 ♀ (BMNH), "Uganda Prot., Daro or Durro Forest, Toro, 4,000-4,500 ft., 25-29.x.1911, S.A. Neave"; 1 ♀ (BMNH), "Uganda Prot., Mbale, 3,800 ft., 6.viii.1911, S.A. Neave"; 1 ♀ (BMNH), "Uganda Prot., Entebbe, 1-11.ix.1911, S.A. Neave"; 1 ♀ (BMNH), "Uganda, Bweya, 17.v.1913, C.C. Gowley; 1 ♀ (Quicke Collection), "Uganda, Kampala, 4.xii.1918-12.i.1919, C.C. Gowley; 1 ♀ (RMNH), "Uganda, Bweya, 17.v.1913, C.C. Gowley"; 1 ♀ (KPCRS), "Uganda, ex coll. Res. Stn. Kawanda"; 2 ♀♀ (KPCRS), "[Uganda], Namulange, 20.xii.[19]67, larva in *Sorghum* stem, G.C 13.6, Mohyuddin"; 1 ♀ (BMNH), "Uganda, Mengo: Kawanda, ex *Chilo*, iii.1965, J.E. Milner, S30 P2"; 1 ♀ (KPCRS), "[Uganda], Kibale, 4.ix.[19]50, A.P.G.M."; 1 ♀ (BMNH), "Uganda, Entebbe, 19.viii.1913, C.C. Gowley"; 3 ♀♀ (BMNH, RMNH), "Uganda, Entebbe, x.1912 (or 12.vi.1913), C.C. Gowley"; 2 ♀♀ (MRAC, RMNH), "[Zaire], Nyangwe, 3.xii.1910, Dr. Bequaert", or 17.xi.1910; 1 ♀ (MRAC), "[Zaire], Cufulu, 4.xii.1910, Dr. Bequaert"; 1 ♂ (MRAC), "[Zaire], Uele: Dingila, vii.1933, J.V. Leroy"; 1 ♀ + 3 ♂♂ (MRAC), "[Zaire], Bambesa, 16.ii.1938, J. Vrijdagh" (1 ♀), or 25.viii.1933, J.V. Leroy (2 ♂♂) or xii.1933; 1 ♀ (MRAC), "[Zaire], Kayambo-Dikulwe, vi.[19]07, Dr. Sheffield Neave"; 1 ♀ (MRAC), "[Zaire], Bumbuli, 1915, R. Mayné"; 1 ♀ (BMNH), "Kenya, Mbita, ii.1990"; "S1 No 7, ex larva of *Chilo partellus* CIE A21111"; 2 ♀♀ (BMNH), "Kenya, Mbita Experimental plots", "17.ii.1988, sp. no. 62, ex pupa", "[ex] *Chilo partellus* CIE A19564; 1 ♂ (ICIPE), "Kenya: S. Nyanza Oyugis, 6.viii.[19]90, B.T. Nyambo", "ex *Busseola fusca* larva on *Sorghum* 203"; 1 ♀ + 3 ♂♂ (BMNH, RMNH), "Kenya, Mbita Pt. F. Stn., 8.iii.[19]84, R.M. Markham"; "ex *Eldana* [sp.] on *Sorghum*, C.I.E.A. 16068"; 4 ♀♀ + 6 ♂♂ (TAMU; Quicke Collection), "Kenya: western Province, Kisumu, Kibos Cotton Res. Sta., 8-18.i.1985, R. Murphy, ex: *Chilo partellus*"; 1 ♀ (BMNH), "Kenya: South Nyanza, Mbita Point, 21.x.[19]95, em. 8.i.[19]96, ex *Phragmataecia boisduvalii* (H-S) on *Phragmites* sp., A. Polaszek"; 2 ♀♀ (LUW), "Kenya, South Nyanza, Mbita point, 30.ix. (or 23.x.)1988, malaise trap, C.A. Groenendijk"; 2 ♀♀ (BMNH, RMNH), "Ethiopia, Kobo, 39°38'E, 12°09'N, alt. 1470 m, 11.xi.1976, Tadesse G.M. Coll., ex *Chilo* sp."; 1 ♀ (BMNH), "Nigeria, Ibadan, on rice leaves, B.A.O., 28.vii.[19]64; 2 ♀♀ + 2 ♂♂ (Quicke Collection), "Cameroon, Nkoemvon, 1980, D. Jackson"; 1 ♀ (MNHN), "Côte d'Ivoire, env. de Man, 1910, A. Chevalier"; 1 ♀ (RMNH), "Côte d'Ivoire, 30-35 km N de Korhogo, leg. J.W. Everts e.a."; 1 ♀ (CIRAD) "C. Ivoire, Gagnoa, parasite *Busseola fusca*, 22.viii.[19]86, P. Moyal"; 2 ♀♀ (MNHN), "R.C.I. [= Ivory Coast], Bouake, xi.1979, [ex] *Sesamia calamistis* [de] riz, Bordat A."; 2 ♀♀ (BMNH), "Ivory Coast, 1991", "ex *Sesamia* or *Eldana* IITA, K27, (Kouame /27)"; 1 ♀ (MNHN), "Côte d'Ivoire, 1988, ex *Sesamia* sp. on *Panicum maximum*, No 17 IITA, sample 2/3"; 1 ♀ (LUW), "Côte d'Ivoire, Katiola-Coton, 4.i.1981, malaise [trap], J.W. Everts c.s."; 1 ♀ (LUW), "Côte d'Ivoire, 30-35 km N. de Korhogo, 3.i.1980, malaise [trap], J.W. Everts, e.a."; 1 ♂ (BMNH), "Hte Volta, Bobo-Dioulasso, vi.1956, CIE. Coll. 15098"; 3 ♀♀ (TAMU, BMNH), "Niger: Niamey, Ndoma, xi.1986, O. Youm"; 1 ♀ (LUW), "Togo 25 à 50 km N. of Sokodé, Danalo, river valley, malaise trap, 3.vii.1986, P.E.T. Douben"; 1 ♀ (LUW), id., but Mòaval, 14.viii.1984; 2 ♀♀ (BMNH), "Benin, Abomey, Calavi, IITA, 10.x.1990, ex *Sesamia* sp. on *Sorghum*, No 19 IITA, sample 1/7".

Diagnosis.— Length of body of ♀ 10-13 mm (of ♂ 7-12 mm), and length of fore wing of ♀ 7.6-10.5 mm (of ♂ 5.7-9.1 mm), antennal segments of ♀ 83-100 (of ♂ 71-74); body reddish- or dark yellowish-brown; frons of ♀ with (large) black patch, or wide black band posteriorly, enclosing stemmaticum, exceptionally frons completely yellowish or reddish; antenna, ovipositor sheath and hind tarsus black(ish), but hind tarsus may be largely infuscate and only telotarsus dark brown; face of male pale yellow; fore tarsus and middle tarsus (dark) brown; wings with yellowish band below base of pterostigma, basal half of wings yellowish or dark brown (but frequently completely dark brown), apical 0.3-0.4 of pterostigma and remainder of wings largely dark brown except pale patch around veins 2-SR+M and r-m of fore wing; fourth hind tarsal segment dark brown or black dorsally, similar to colour of telotarsus; setae on outer side of hind tibia dark brown or black; mesosoma (including face of propodeum largely, at most some rugulosity postero-laterally) smooth; length of first tergite 1.0-1.3 times its apical width; first and second (largely, except antero-laterally), third and fourth tergites medially and largely posteriorly, longitudinally striate or rugulose; antero-lateral depressions of second and third tergites wide, deep, and of fourth tergite comparatively narrow; third and fourth tergites with deep, finely crenulate transverse grooves, and apices of tergites slightly concave; fifth-seventh tergites smooth, without grooves; length of ovipositor sheath 1.20-1.38 times fore wing.

Biology.— Parasite of stem boring Noctuidae: *Busseola fusca* (2), *Sesamia calamistis* (1); *S. spec.* (2), of Crambidae: *Chilo partellus* (8); *C. spec.* (1), of Cossidae: *Phragmataecia boisduvalii* (1), and of Pyralidae: *Eldana saccharina* (1).

Distribution.— Afrotropical (including Madagascar).

Remarks.— The specimens examined from Tanzania (Namavala), Ivory Coast (30-35 km N Korghogo) and Togo (25-50 km N Sokodé) are very similar to *S. rufus* but have the metasomal sculpture weak and irregular. A tiny female (from South Africa, Transvaal, Brits, reared from *C. partellus*) has 54 antennal segments, length of fore wing 4.1 mm, and length of body 5.0 mm, and length of ovipositor sheath 0.9 times fore wing.

Stenobracon (Euvipio) unifasciatus (Brullé, 1846) comb. nov.

Vipio unifasciatus Brullé, 1846: 447-448; Shenefelt, 1978: 1864. [examined].

Euvipio unifasciatus; Szépligeti, 1914b: 157.

Glyptomorpha baetica var. *mauritanica* Szépligeti, 1906: 548. **Syn. nov.**

Pseudovipio baeticus var. *mauretanicus*; Fahringer, 1926: 77.

Glabriolum baeticus var. *mauritanica*; Shenefelt, 1978: 1805.

Euvipio mauritanica; Quicke, 1991: 174.

Euvipio fascialis Szépligeti, 1913: 422; Risbec, 1960: 635; Quicke & Koch, 1990: 216 (lectotype designation). **Syn. nov.** [examined].

Vipio facialis; Shenefelt, 1978: 1848.

Euvipio maculiceps Szépligeti, 1914b: 157. **Syn. nov.** [examined].

Vipio maculicepsida Shenefelt, 1978: 1852 (new name for *Vipio maculiceps* (Szépligeti, 1914) nec Cameron, 1906). **Syn. nov.**

Glyptomorpha sp.; Harris, 1962: 153 (misidentification).

Material.— Holotype of *S. unifasciatus*, ♀ (MNHN), "Museum Paris, Sénégal, Guérin", "Senegal, Guérin" (old round label), "Type", "*Vipio unifasciatus* Br."; lectotype of *S. fascialis*, ♂ (ZMB), "Madagascar, Norris Bé, 2.xi.1895, Voeltzkov, S", "Type", "*Euvipio fascialis* n. sp.", "Lectotype of *Euvipio fas-*

cialis Szépl., ♂, Braconinae, det D. Quicke, 1988"; 1 ♂, paralectotype of *S. facialis* (ZMB), topotypic, but 1.xi.1895; holotype of *S. maculiceps* ♂ (ZMB), "Nyassa-See, Langenburg, 28.v.1899, Fülleborn S."; 4 ♀♀ (PPRI, RMNH), "S.A. [= South Africa], A. raynolda on cane, 7.x.[19]91, D. Conlong"; 1 ♀ (PPRI), "S.A. [= South Africa], Natal, 1992, D. Conlong"; 1 ♀ (PPRI), "South Africa, Natal, Darnall, Zinkwazi Park, 9.vi.1986", "SASA SEx 710, ex L5 *Sesamia* on sugarcane"; 1 ♀ (PPRI), "South Africa, Ntl, Shakaskraal, 29°26'S 31°14'E, 26.vi.1985, D. Conlong", "ex *Eldana saccharina*"; 1 ♂ (PPRI), "South Africa, Ntl, Salt Rock, 29°43'S 31°06'E, 19.vii.1985, D. Conlong", "ex *Sesamia calamistis*"; 1 ♂ (PPRI), "South Africa, Delmas, TvL, iii.1990, R. Kfir", "ex larva of *Busseola fusca* on Sorghum"; 1 ♂ (PPRI), "South Africa, Potchefstroom, Tul., ii.1974, J.L. Louw", "with larvae of *B. fusca* and *C. partellus*"; 1 ♀ (PPRI) id., but "ex pupa *Busseola fusca*"; 1 ♂ (PPRI), "South Africa, Natal, Mt Edgecombe, 24.vi.1991", "SASA DEx 710, ex ? on sugarcane"; 1 ♀ (PPRI), "South Africa, Ntl, Inanda, 29°37'S 31°03'E, 7.xi.1985, D. Conlong", "ex *Eldana saccharina*"; 1 ♀ (PPRI), "South Africa, Ntl, Hlabbisa, 28°08'S, 31°52'E, 29.vii.1985, D. Conlong", "ex *Eldana saccharina*"; 2 ♂♂ (PPRI), "South Africa, Ntl, Ubombo District, Mkuze Game Res., Ediza Campsite", "27°35,5463S 32° 17,9250E, vii.1993, Conlong & Appanne", "Host plant: *C. fastigiatus*"; 1 ♀ (BMNH), "[South Africa], Durban, F. Muir, 1902"; 1 ♀ (BMNH), "South Africa, Umhlanga Rocks, 15.xi.[19]54, G.C. Clark"; 1 ♀ (Quicke Collection), "[Namibia], Popa Falls, Okavango, 18°07'S, 21°33'E, 26-31.viii.1971"; 6 ♀♀ + 1 ♂ (BMNH, RMNH), "N.E. Rhodesia, Upper Luangwa R., 27.vii-13.viii.1910, S.A. Neave"; 3 ♀♀ (BMNH, Quicke Collection), "N.E. Rhodesia, Mid-Luangwa Vy, 14-16.viii.1900, 2,000 ft., S.A. Neave"; 1 ♀ (BMNH), "N.E. Rhodesia, Mid-Luangwa Vy, 23-31.viii.1910, 1,800 ft., S.A. Neave"; 2 ♀♀ (BMNH), "N.E. Rhodesia, Niamadzi R., nr Nawalia, 17-22.viii.1910, 2,000 ft., S.A. Neave"; 1 ♀ (BMNH), "[Zimbabwe], Central Angoniland, Lilongwe Dist., 4,000-5,000 ft., 28.v-3.vi.1910, S.A. Neave"; 1 ♀ (MNHN), "[Mozambique], Zambéze, Nova Choupanga, pres Chemba, v.1928, P. Lesne"; 1 ♂ (BMNH), "Malawi, Thyolo, 21.ix.1990", "ex larva in maize stem IIE 21 634"; 1 ♀ (BMNH), "Malawi, Mangochi, 22.x.1990, IIE 21 634"; 1 ♀ + 1 ♂ (BMNH), "Malawi, Makoka, 25.xi.1992, George Phiri, 6", "ex *Chilo partellus* larva in maize"; 1 ♀ (BMNH), "[Malawi], Nyasaland, cage no. 9, on maize, Chimwala, F[or]t Johnson, emerged 27.i.[19]60, A.L.M."; 1 ♀ (BMNH), "[Malawi], Nyasaland, W shore of L. Nyasa, btwn Domira Bay & Kotakota, 29.x-3.xi.1910, S.A. Neave"; 2 ♀♀ (BMNH, RMNH), "[Malawi], Nyasaland, Chiromo, R.C. Wood, 1917-34"; 1 ♂ (MRAC), "[Zaire], Uele: Dingila, 15.vii.1933, J.V. Leroy"; 1 ♀ (BMNH), "Tanzania-Kilombero distr., Namawala, 16.iv.1990, J.D. Charlwood"; 1 ♀ (BMNH), "Tanzania: Kilosa, Kilosa, ex *Chilo*, Z112-10, JEDM 3/66"; 1 ♀ (BMNH), "[Tanzania], S.W. Tanganyika, C. Rulura Valley, Kafokola pool, 24.viii.[19]52"; 1 ♀ (BMNH), "[Tanzania], Tanganyika, Morogoro, 2.v.1957, I.W.B. Nye"; 1 ♂ (BMNH), "[Tanzania], Tanganyika, Kwashaga, 21.viii.1958, I.W.B. Nye", "ex *Sorghum vulgare*"; 2 ♀♀ (RMNH), "Tanzania, Zanzibar, Unguja, Kisimbani, 8.vi.1987, coll. H.R. Feijen/from *Chilo*" on maize, 9.iv.1987; 1 ♂ (KPCRS), Uganda, Mengo: Kamsuki, ex *Chilo*, ii.1966, S16-23, J.E. Milner"; 2 ♀♀ + 2 ♂♂ (MNHN), "Madagascar, 1940, L.P. Regnard"; 1 ♀ + 1 ♂ (BMNH), "Madagascar, Ambilobe, 1968, s[ugar] cane field, CIE A2415 466"; 2 ♀♀ + 3 ♂♂ (MNHN, RMNH), "Madagascar, Bekily, Reg. Sud de l'Ile", "vii.[19]36, A. Seyrig" (1 ♀ + 1 ♂), viii.1936 (1 ♂), v.1934 (1 ♀), or iii.1933 (1 ♂); 1 ♀ (MNHN), "Madagascar, Rogez, forêt cote est", "i.[19]31, A. Seyrig"; 1 ♀ + 1 ♂ (MNHN), "Madagascar, Ransarafana", "x.[19]38, A. Seyrig"; 1 ♂ (BNHN), "Madagascar, Ambilobe, 1968, s/cane field, CIE A 2415, 465"; 1 ♀ (BMNH), "Malagasy Rep., Arivonimamo, 1970, I.R.A.T., C.I.E. A4354 563, ex *Sesamia calamistis*"; 1 ♂ (LUW), "Kenya, Mtwapa, near Mombasa, malaise trap (maize/sorghum), xi-xii.1992, Paul Lammers"; 1 ♀ (BMNH), "Kenya: Teita Hills, vii.1947, M. Steele"; 2 ♂♂ (RMNH, LUW), "Kenya: Central Province, Mwea, 16.ix.[19]92", "ex ?*Chilo partellus* on sorghum"; 2 ♀♀ (BMNH, RMNH), "[Kenya], Brit. E. Af., Voi, 1800 ft., 21-23.iii. 1911, S.A. Neave"; 1 ♀ (BMNH), "Nigeria, Samaru, Zaria, G.T. York", "em. end xii.1970, ex guinea corn stem, host poss. *Busseola fusca*"; 1 ♀ (BMNH), "Nigeria, Samaru, 21.x.[19]80, emerged from *B. fusca* larva, A.A. Adesiyun"; 1 ♀ + 2 ♂♂ (?BMNH), "N. Nigeria, Samaru, 22.ix.[19]59, ex larva *Coniesta ignefusalis*, Zaria"; 4 ♀♀ (BMNH, RMNH), "Mali, Mourdiah, 14°28'N 07°28'W, 30.ix.1985, Marcus Matthews", "ex *Acigona ignefusalis* (Pyralidae) in millet stems"; 1 ♀ (MNHN), "Mali, Kogoni, 5.xi.[19]86, iv, Hamadoun, 7077"; 1 ♂ (BMNH), "Mali, Makoka, 25.xi.1992, George Phiri, 5", "ex *Chilo partellus* in maize, larva"; 3 ♀♀ + 1 ♂ (BMNH, LUW), "Niger, Niamey, 25.viii.1992 (1 ♂; 11.ix.1990, or 2.x.1992: 2 ♀♀), ex *Coniesta ignefusalis*, Mil., S. Pennards"; 1 ? ♂ BMNH), "Niger, Sadore, 15.x.1992, ex *Coniesta ign.*, Mil., S. Pennards"; 1 ♀ (LUW), "Mkuzi Campsite, 25.vi.[19]93, *Euvipio fileno*. 22336"; 1 ♀ (BMNH), "Niger, Dabnou, *Acigona*-millet, 20.viii.[19]85, R.H. Markham"; 1 ♂ (BMNH), "Niger, Glami, *Acigona*-millet, 26.viii.[19]85, R.H. Markham"; 1 ♀ (Quicke Collection), "Niger, Malgoron, *Acigona*-millet, 6.ix.[19]85, R.H. Markham"; 2 ♂♂ (TAMU, BMNH), "Niger: Niamey, Ndonga, xi.1986, O. Youm"; 10 ♀♀ + 9 ♂♂ (TAMU, Quicke Collection), "Niger, 15-20 mi. E. Niamey, 4-17.viii.1983, F.E.

Gilstrap, lab cultured"; 1 ♀ (BMNH), "Niger, Niamey, 12.viii.[19]87, parasite *Sesamia* elevage labo, G. Sama"; 1 ♂ (BMNH), "Niger, Niamey, 8.viii.[19]80, elevage *Acigona*, G. Sama"; 1 ♀ (LUW), "Niger, Keita, Mil, parasite d' *Acigona*, 7.ix.1988, Y. Jongema"; 1 ♀ (Quicke Collection), "Niger, ICRISAT, centre Sahelien, nr "Niamey, x.1984, emerged 14.xi.1984, T 84080"; 1 ♂ (LUW), "Côte d'Ivoire, 30-35 km N. de Korhogo, 17.xii.1979, malaise [trap], J.W. Everts"; 1 ♂ (CIRAD), "R.C.I. [= Ivory Coast], Bouaké, cocon C5, riz, xi.1979, Bordat, 1230"; 1 ♀ (MNHN), "Sen[egal], Bambey, 21.xii.[19]49, W.A.", "ex chenille *Sesamia vuteria* Stoll, s/tige Mil."; 1 ♀ (BMNH), "[Senegal], Kandjalang, imago 9.vii.[19]81, 1 cocon de B[raconi]dae du *Sesamia*?, 15.xii.[19]80"; 1 ♀ + 2 ♂ (MNHN), "Senegal, Bambey, J. Risbec, s/millet", "ex *Chilo pyrocaustalis* Hmps. s/Mil."; 1 ♂ (CIRAD), "Senegal, Djibelor Oussouye, 28.iv.[19]69, B. Vercambre"; 1 ♀ (MNHN), "Senegal, Diourbel, xii.[19]51", "sur fleurs de *Sorghum guinensis*", "IFAN 1951, xii.[19]51, T. Leve"; 1 ♀ (BMNH), "Senegal, Zigvinchor, 10.v.[19]68", "host on rice"; 1 ♀ (LUW), "Senegal: Casamance, Ziguinchor, Banana, ex maize stem with remains of borer larva", "15.viii.[19]91, em. 31.viii.[19]91, A. Polaszek"; 1 ♂ (MNHN), "Senegal, Bambey, 22.xi.[19]46, J. Risbec, s/millet"; 1 ♀ (MNHN), "Senegal, Bambey, J. Risbec"; 1 ♀ (MNHN), "Senegal, Sebikotane, IFAN, 1951, 8.xi.[19]51, A. Villiers"; 1 ♀ (MNHN), "Algérie, Rocher-Blanc (Le Corso), v-vi.1912, J. Surcouf"; 1 ♀ (MNHN), "[Morocco], Tanger, H. Marmottan, 1914"; 1 ♀ (BMNH), "Brit. Somaliland, Burao Dist., El Humah, 18.x.1935, E. Peck"; 2 ♂ ♂ (BMNH), "Sudan Govt., Menagil, 14.iii.[19]30, among cotton, H.B. Johnston"; 1 ♀ (BMNH), "Sudan Govt., Khartoum, Abdul Hadi, 23.xi.[19]28 on dura"; 2 ♀ ♀ (BMNH), "Sudan, Tozi, x.1961, ex *Chilo zonellus* C.I.E. A2570"; 1 ♀ (BMNH), "[Sudan], Khartoum, xi.[19]63, ex larva *Chilo zonellus*, T.V.V."; 1 ♀ (BMNH), "[Sudan], Wad Medani, 16.i.1927, H.B. Johnston", "bred from larva of *Sesamia cretica* Led."; 1 ♀ (BMNH), "Sudan: Mai[u]rmo, 15 m[iles] South of Sennar, on green sorghum residue", "ex ?*Sesamia cretica*, A. Polaszek"; 1 ♀ (BMNH), "Saudi Arabia, A.S. Talhouk", "Riyadh, Arabia, 4.x.[19]77"; 1 ♂ (Quicke Collection), "Yemen, Wadi Zabid, iii.1970, leg. A. Szalay-Marzsö"; 2 ♀ ♀ (BMNH), "Yemen, xii.[19]87, trap in maize"; 1 ♀ (BMNH), "Yemen, Ta'izz, on road to Mocha, ca. 4,100 ft, 16.xii.1937", B.M. Exp. to S.W. Arabia, H. Scott & E.B. Britton, B.M. 1938-246"

Diagnosis.— Length of body of ♀ 9-14.5 mm (of ♂ 6.5-11.5 mm), and length of fore wing of ♀ 7.0-11.6 mm (of ♂ 5.2-8.6 mm), antennal segments of ♀ 72-96 (of ♂ 67-87); body reddish- or dark yellowish-brown; frons of ♀ yellowish or with a narrow black band, rarely broadly black posteriorly; basal half of fore wing usually partly yellowish and fore wing frequently with yellowish patch above vein r-m; pterostigma may be completely yellow; face of male pale yellow; fourth hind tarsal segment yellowish-brown dorsally and usually distinctly paler than telotarsus, if similarly coloured then setae on outer side of hind tibia pale yellowish; length of first metasomal tergite 1.0-1.2 times its apical width; length of ovipositor sheath 1.20-1.37 times fore wing. Further very similar to *S. rufus*.

Biology.— Parasite of Noctuidae: *Busseola fusca* (4); *Sesamia calamistis* (2); *S. cretica* (1); *S. nonagriodes* (1); *S. spec.* (1), of Crambidae: *Chilo partellus* (3); *C. zonellus* (2), *C. spec.* (3); *Coniesta ignefusalis* (5); *C. spec.* (5), and of Pyralidae: *Eldana saccharina* (4).

Distribution.— Afrotropical (including Madagascar) and Arabian Peninsula.

Remarks.— The male of *S. fascialis* has the entire head yellowish, the male of *S. maculiceps* has the vertex and frons dark.

Subgenus *Stenobracon* Szépligeti, 1901

Stenobracon Szépligeti, 1901b: 359; Shenefelt, 1978: 1724; Chishti & Quicke, 1996: 236-243 (revision). Type species (by monotypy): *Stenobracon oculatus* Szépligeti, 1901.

Stenobracon (Stenobracon) deesae (Cameron, 1902)

Bracon deesae Cameron, 1902: 433.

Stenobracon deesae; Narayanan, 1938: 215; Venkatraman & Subba Rao, 1954: 1; Narayanan & Chauduri, 1954: 647; Narayanan & Venkatraman, 1952: 12; Betbeder-Matibet, 1971: 332; Saxena, 1972: 145;

Rao, 1972: 12; Appert, 1973: 575; Etienne, 1977: 2; Shenefelt, 1978: 1725; Clausen & Oatman, 1978: 177; Smith et al., 1993: 64; Chishti & Quicke, 1996: 239-240.
Glyptomorpha deesae; Schmutterer, 1969: 156 (misidentification; certainly not introduction).
Vipio deesae; Bhalla & Venkatraman, 1963: 63; Schmutterer, 1969: 156 (misidentification; certainly not introduction).

Material.— 1 ♀ (BMNH), "CIE Coll., No. 16 738", "*Stenobracon* (= *Glyptomorpha*) *deesae* (Cam.), R.D. Eady det. 1959; 1 ♂ (BMNH), "Mauritius, from India, x.[19]58, M.S.I.R.I."; 1 ♀ (BMNH), "Oman, Rumais, 28.ii.1976, K. Guichard"; 1 ♀ + 1 ♂ (BMNH), "Madagascar, Tamatave, 1965, ex *Sesamia*/mais"; 1 ♀ (RMNH), India, Maharashtra, Sangli", "on wing jawar field", "8.ix.[19]88, K.S. Heble coll."

Biology.— Reported to be parasite of Crambidae: *Chilo partellus*; *C. sacchariphagus* (Bojer, 1856); *Corcyra cephalonica* Stainton, 1866, and of Noctuidae: *Sesamia* spec.

Distribution.— Oriental (India, China, Pakistan), South Palaearctic (Oman), and Afrotropical (introduced; Madagascar, Mauritius, Mascarenes, Sudan).

Stenobracon (*Stenobracon*) *nicevillei* (Bingham, 1901)

Bracon nicevillei Bingham, 1901: 555.
Glyptomorpha nicevillei; Ramakrishna Ayyar, 1924: 263
Stenobracon nicevillei; Ramakrishna Ayyar, 1928: 35; Cherian & Israel, 1938: 99; Betbeder-Matibet, 1971: 332; Saxena, 1972: 145; Rao, 1972: 12; Appert, 1973: 575; Chishti & Quicke, 1996: 241-242.
Phanaulax levituberculatus Cameron 1910a: 43; Chishti & Quicke, 1996: 241 (synonymy).
Stenobracon levituberculatus; Fahringer, 1928: 26; Quicke & Koch, 1990: 224.

Material.— 1 ♀ (BMNH), "Mauritius, from India, xi.[19]58, M.S.I.R.I."; 1 ♂ (BMNH), "Mauritius, from India, 14.ix.[19]59, M.S.I.R.I."; 1 ♀ (RMNH), "India, Sardar, Nagar", "5.x.[19]86, R.K. Tanwar, code Sng/4", "assoc. with sugarc[ane]?, CIEA19977"; 1 ♀ (BMNH), "India, Upperpally, 20.xi.1984, sp. 27", "sweep coll. on paddy, CIEA16944"; 1 ♀ (RMNH), "Sri Lanka, Peradeniya, G. Wijesehera", "10127, in sweepnet on rice, CIEA17786"; 1 ♀ (RMNH), "India, Hyderabad area, A.P.", "no. 11, ex p. of *Scirpophaga incertulas* on paddy, CIEA17474".

Biology.— Known to parasitize several Crambidae (*Chilo* and *Scirpophaga* species), and Noctuidae (*Sesamia* species).

Distribution.— India, Nepal, Sri Lanka. Introduced into Madagascar, and Reunion, but apparently without establishing. An aberrant female (BMNH: "Mozambique, F. Muir", "Sharp Coll., 1905-313") has the four basal metasomal tergites coarsely sculptured, the second-fourth tergites with a weak transverse impression, the seventh tergite black and the propodeum finely rugulose. It may belong to a new species near *S. nicevillei*.

Stenobracon (*Stenobracon*) *oculatus* Szépligeti, 1901
 (figs 161-173)

Stenobracon oculatus Szépligeti, 1901b: 360; Shenefelt, 1978: 1727; Chishti & Quicke, 1996: 242-243.
Elphea lutea Cameron, 1903: 122; Shenefelt, 1978: 1726; Chishti & Quicke, 1996: 242.
Stenobracon trifasciatus Szépligeti, 1908b: 214; Shenefelt, 1978: 1727 (as synonym of *S. nicevillei* (Bingham, 1901); Chishti & Quicke, 1996: 242.
Phanaulax fuscicornis Cameron, 1910d: 22; Shenefelt, 1978: 1726; Chishti & Quicke, 1996: 242.
Stenobracon maculata Matsumura, 1910: 50; Shenefelt, 1978: 1727 (as synonym of *S. nicevillei* (Bingham, 1901); Chishti & Quicke, 1996: 242.
Macrocentrus javanicus Ishida, 1915: 109; Shenefelt, 1978: 1727 (as synonym of *S. nicevillei* (Bingham, 1901); Chishti & Quicke, 1996: 242.
Hemibracon elegantulus Enderlein, 1920: 62; Shenefelt, 1978: 1727 (as synonym of *S. nicevillei* (Bingham, 1901); Chishti & Quicke, 1996: 242.

Material.— 3 ♀♀ (RMNH), paralectotypes of *S. trifasciatus*, “[Indonesia], Java, Semarang, E. Jacobson”, “Cotype”; 1 ♀ (RMNH), “[Indonesia], Java, Res. Rembang, 3.vi.1926, 40 m”, “Banglean, Fr. A.Th.H. Verbeek”; 1 ♂ (RMNH), “[Indonesia], Sandaran Agung, vi.1915, E. Jacobson”; 1 ♀ (RMNH), “[Indonesia], Java, Babakan (Banjoemas), iv.1911, E. Jacobson”; 1 ♀ (RMNH), “[Indonesia], Morotai, Bernstein”; 1 ♂ (RMNH), “[Indonesia], weps makan oelat *Schoen. trima*. dari serang, 26.i.[19]29” (aberrant male with sculptured third-fifth tergites); 1 ♀ (RMNH), “Formosa [=Taiwan], Hozan, H. Sauter, 1910”.

Biology.— Reported as parasite of Crambidae: *Chilo sacchariphagus*; *Chilo spec.*; *Scirpophaga spec.*; ?*S. excerptalis* (Walker, 1863) (= *S. nivella* auct.), and of Noctuidae: *Sesamia spec.*

Distribution.— Oriental (Indonesia, Malaysia, India, Philippines, Taiwan), South East Palaearctic (Japan), and Afrotropical (introduced; Madagascar, Mauritius).

Genus *Tropobracon* Cameron, 1905

(figs 203-228, 359, 361)

Tropobracon Cameron, 1905: 91; Shenefelt, 1978: 1730-1731; Quicke, 1987: 134; Sarhan & Quicke, 1993: 332; van Achterberg, 1993a: 50. Type-species (by monotypy): *Tropobracon luteus* Cameron, 1905 [type lost?].

Shirakia Viereck, 1913: 643; Shenefelt, 1978: 1730; van Achterberg, 1983: 74. Type-species (by original designation): *Shirakia schoenobii* Viereck, 1913.

Diagnosis.— Head granulate, but sculpture may be superficial or absent dorsally; scapus suboval, gradually narrowed basally, its apex slightly protruding dorsally (figs 205, 213), and its inner apical margin simple; apex of antenna normally setose, without spine (fig. 204); mesoscutum largely glabrous, only near notauli with some setae (fig. 359); notauli complete; antescutal depression present (fig. 206); side of scutellum with round depression (fig. 214); metapleural flange absent, except for a thickened rim; metanotum protruding medio-posteriorly and its median carina absent (fig. 214); propodeum granulate, reticulate or anteriorly largely smooth and shiny; propodeal spiracle round, just behind middle of propodeum and without lateral tubercles above it (fig. 205); angle between veins 1-SR and C+SC+R of fore wing 30-40° (figs 203, 215, 226); vein 1-SR short (figs 215, 223); vein 1-SR+M of fore wing straight; vein 3-SR of fore wing straight, about as long as vein 2-SR or shorter (figs 203, 215, 223); vein 1-R1 of fore wing somewhat longer than pterostigma, ending slightly basally of level of apex of vein 3-M (fig. 223); vein 3-CU1 of fore wing slender; vein 1r-m of hind wing short, straight or slightly curved (figs 203, 217, 225); tarsal claws with lobe (fig. 210), setose; tarsal segments normal, with medium-sized setae; first metasomal tergite movably joined to second tergite, flat basally, with curved area enclosed by dorsal carinae (fig. 212), in lateral view depressed basally (fig. 205), without median carina or differentiated medio-posterior area; second tergite with pair of converging narrow grooves (fig. 212; which usually meet posteriorly in males, figs 224, 228), and no medio-basal area; second and following tergites without antero-lateral grooves; second-sixth tergites with sharp lateral crease; ovipositor normal, with ventral teeth subapically, no nodus; hypopygium of female acute apically, not surpassing apex of metasoma (fig. 205); length of ovipositor sheath 0.3-0.4 times fore wing.

Distribution.— Afrotropical and Oriental: five described species.

Biology.— Gregarious ectoparasites of larvae of stemborers in Gramineae, belong-

ing to the Crambidae, Pyralidae and Noctuidae (Lepidoptera). The genus appears to be exclusively parasitic on cereal stem borers in the Old World tropics (van Achterberg, 1993a). Five described species are known, of which two (*T. antennatus* (Granger), and *T. comorensis* van Achterberg) are known to be parasites of cereal stem borers in Africa (van Achterberg, 1993a; Polaszek et al., 1994).

Key to Afrotropical species of the genus *Tropobracon* Cameron

1. Pterostigma yellowish; hind tibia pale yellowish; third-sixth tergites equally brownish-yellow or dark brown, exceptionally with pale median stripe; vein cu-a of fore wing subinterstitial (fig. 223), rarely antefurcal; free part of vein 1r-m of hind wing 0.4-0.6 times as long as vein 1-SC+R and combined part of vein 1r-m together (figs 219, 223); continental Africa, and Madagascar 2
- Pterostigma brown, medially paler than laterally; subbasal ring of hind tibia yellowish-brown; third-sixth tergites with pale yellowish median stripe or triangular area medially; vein cu-a of fore wing slightly postfurcal (fig. 226); free part of vein 1r-m of hind wing 0.6-0.7 times as long as vein 1-SC+R and combined part of vein 1r-m together (fig. 225); Comoro Islands *T. comorensis* van Achterberg
2. Mesoscutum distinctly granulate and rather dull (fig. 221); mesopleuron superficially granulate dorsally; scutellum with small pit medio-anteriorly and granulate (fig. 221); middle lobe of mesoscutum with shallow median groove medially (fig. 221); vein r of fore wing somewhat shorter compared to vein 3-SR (fig. 223); hind femur more robust (fig. 220) *T. antennatus* (Granger)
- Mesoscutum smooth and strongly shiny; mesopleuron smooth; scutellum without pit medio-anteriorly (or obsolescent) and only sparsely punctate; median groove of middle lobe of mesoscutum absent or nearly so; vein r of fore wing somewhat longer compared to vein 3-SR (fig. 215); hind femur usually more slender (fig. 218, but in holotype comparatively robust (fig. 216)) *T. persimilis* (Szépligeti)

Tropobracon antennatus (Granger, 1949)
(figs 217, 220-222, 359, 361)

Habrobracon triangularis Szépligeti, 1911: 405; Shenefelt, 1978: 1590.
Bracon antennatus Granger, 1949: 61 (replacement name for *Bracon triangularis* (Szépligeti, 1911) nec Nees, 1834); Shenefelt, 1978: 1590.
Tropobracon antennatus; Etienne, 1987: 51; van Achterberg, 1993a: 54, figs 15, 18-20, 23, 32; Polaszek et al., 1994: 78, figs 20-21.
Mesobracon spec. Ingram, 1958: 381; Saraiva, 1963: 367 (misidentification).
Habrobracon near *triangularis* Szepligeti: Risbec, 1950: 323.
Shirakia spec.; Badawy, 1967: 235; Jordan, 1966: 17.

Material.— See van Achterberg, 1993a.

Diagnosis.— Length of body 2.5-6.5 mm, of fore wing 2-6 mm, antenna with 50-65 segments; body yellowish(-orange), but antenna, and part of telotarsi dark brown; stemmaticum and second metasomal tergite brownish-yellow; mesoscutum distinctly granulate and rather dull middle lobe of mesoscutum with shallow median groove medially (fig. 221); scutellum with small pit medio-anteriorly and granulate (fig. 221);

mesopleuron superficially granulate dorsally; vein r of fore wing somewhat shorter compared to vein 3-SR (fig. 223); free part of vein 1r-m of hind wing about half as long as vein 1-SC+R and combined part of vein 1r-m (figs 222, 223); vein cu-a of fore wing subinterstitial (fig. 223), exceptionally antefurcal; pterostigma yellowish; hind femur more robust (fig. 220); hind tibia pale yellowish, without whitish subbasal ring; third-sixth tergites equally brownish-yellow or dark brown, exceptionally with pale median stripe. The male has second metasomal tergite much more slender than female, and consequently the triangular area is more slender and the triangle may be complete posteriorly (fig. 224). Also the grooves on the second tergite are often much wider.

Biology.— A gregarious (idiobiont) ectoparasite of lepidopterous stem borers, belonging to the Noctuidae (*Sesamia cretica*, *Sesamia* spec.), Crambidae (*Chilo zaccorius* (= *Proceras africana* auct.), *Coniesta ignefusalis*, and ?*Scirpophaga* spec.), and Pyralidae (*Maliarpha separatella*). Risbec (1956a) listed also a dipteran: ?*Diopsis curva* Bertolini (Diopsidae), but this record requires confirmation (Polaszek et al, 1994). In Malagasy, this species is uncommon on rice borers (P. Bousses, cited in Polaszek et al., 1994).

Distribution.— Cameroon, Ivory Coast, Kenya, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Togo, Uganda.

Remarks.— *Tropobracon antennatus* is largely similar to the Oriental *T. luteus* Cameron, 1905. It differs by the sculpture of the mesoscutum and propodeum, and by its colour, of which the yellowish pterostigma is the most easy character to use.

Tropobracon comorensis van Achterberg, 1993
(figs 225-228)

Tropobracon comorensis van Achterberg, 1993a: 55, figs 22, 25-27.

Material.— See van Achterberg, 1993a.

Diagnosis.— Length of body about 4.5 mm, free part of vein 1r-m of hind wing about 0.7 times as long as vein 1-SC+R and combined part of vein 1r-m together (figs 225, 226); vein cu-a of fore wing just postfurcal (fig. 226); third-sixth tergites with pale yellowish median stripe or triangular area medially; yellowish-brown (including stemmaticum and telotarsi); palpi and tegulae pale yellowish; whole hind tibia yellowish-brown, without (sub)basal ring; eighth and following antennal segments rather dark brown; wing membrane subhyaline; pterostigma and veins brown, but middle of pterostigma somewhat paler than its lateral parts.

Biology.— Parasite of crambid stem borers (*Chilo partellus*) on rice.

Distribution.— Afrotropical: Comoro Islands.

Note.— Very similar to *T. luteus*, but differs by the sculpture of the propodeum and the sculpture of the second metasomal tergite. The longer vein 1-SC+R of hind wing (figs 225, 226), the pit of scutellum, the yellowish-brown stemmaticum, and the slightly postfurcal vein cu-a of fore wing (fig. 220) indicate that it belongs to the Afrotropical group of species, despite having a slightly shorter vein 2-SC+R, a comparatively slender hind femur and dark pterostigma. Therefore, it is likely that the parental stock came from Madagascar or the African continent.

Tropobracon persimilis (Szépligeti, 1913)
(figs 215, 216, 218, 219)

Habrobracon persimilis Szépligeti, 1913: 599; Shenefelt, 1978: 1609.

Tropobracon persimilis; Quicke, 1991: 174; van Achterberg, 1993a: 60-61, figs 13-14, 16-17.

Material.— See van Achterberg, 1993a.

Diagnosis.— Length of fore wing 4-4.5 mm; antennal segments of ♀ 49-53; stemmaticum and second metasomal tergite brownish-yellow; mesoscutum smooth and strongly shiny; median groove of middle lobe of mesoscutum absent or nearly so; mesopleuron smooth; scutellum without pit medio-anteriorly (or obsolescent) and only sparsely punctate; vein r of fore wing somewhat longer compared to vein 3-SR (fig. 215); free part of vein 1r-m of hind wing about half as long as vein 1-SC+R and combined part of vein 1r-m together (figs 217, 219); vein cu-a of fore wing subinterstitial (cf. fig. 223), exceptionally antefurcal; pterostigma yellowish; hind tibia pale yellowish, without whitish subbasal ring; third-sixth tergites equally brownish-yellow or dark brown, exceptionally with pale median stripe; hind femur usually more slender (fig. 218, but in holotype comparatively robust (fig. 216).)

Biology.— Unknown, but included because it is probably a parasite of stem borers as are the other Afrotropical members of the genus.

Distribution.— Afrotropical: Malawi, Tanzania, Zambia.

Remarks.— Very similar to *T. antennatus*, but differs by the smooth and strongly shiny mesoscutum, the largely smooth scutellum without a medio-anterior pit and the median groove of mesoscutum absent or nearly so.

Subfamily Cheloninae Nees, 1816

Genus *Chelonus* Panzer, 1806
(figs 231-249, 263, 264)

Anomala von Block, 1799: 119-120, fig. 17; van Achterberg, 1982b: 185, 187, 1987b: 172-173 (requested suppression); Opinion 1546 (1989; name officially suppressed). Unavailable name.

Chelonus Jurine in Panzer, 1801: 164; Shenefelt, 1973: 838; van Achterberg, 1982b: 185; Zettel, 1990a: 191; Papp, 1995: 116, 125. Unavailable name by the suppression of the so-called "Erlangen-List" in Opinion 135 (1939).

Chelonus Panzer, 1806: 99; Shenefelt, 1973: 838-872; Tobias, 1986: 294; Zettel, 1990a: 191-194. Type species (designated by Curtis, 1837): *Ichmeumon oculator* Fabricius, 1775.

Davisania La Munyon, 1877: -; Shenefelt, 1973: 839; Zettel, 1990a: 191. Type species (designation by Viereck, 1914): *Davisania aughei* La Munyon, 1877. Syn. by Viereck, 1914.

Microchelonus Szépligeti, 1908a: 403; Shenefelt, 1973: 873-907; Tobias, 1986: 294 (as separate genus); Zettel, 1990a: 191 (as subgenus); Papp, 1995: 125 (as separate genus). Type species (by monotypy): *Microchelonus hungaricus* Szépligeti, 1908. Syn. by De Saeger, 1948.

Chelonella Szépligeti, 1908a: 403 (not Beneden & Hesse, 1863); Shenefelt, 1973: 873; Zettel, 1990a: 191. Type-species (designated by Viereck, 1914): *Chelonus basalis* Curtis, 1837. Syn. with *Microchelonus* by Muesebeck & Walkley, 1951.

Arichelonus Viereck, 1913: 641; Shenefelt, 1973: 839; Zettel, 1990a: 191. Type species (by original designation): *Chelonus aculeatus* Ashmead, 1890. Syn. by De Saeger, 1948.

Megachelonus Baker, 1926: 457; Shenefelt, 1973: 839; Zettel, 1990a: 191. Type species (original designation): *Megachelonus bidentatus* Baker, 1926. Syn. by De Saeger, 1948.

Cubochelonus Baker, 1926: 445; Shenefelt, 1973: 873; Zettel, 1990a: 194. Type species (by original designation): *Cubochelonus luzonicus* Baker, 1926.

Neochelonella Hincks, 1943: 98 (replacement name for *Chelonella* Szépliget, 1908, nec Beneden & Hesse, 1863); Shenefelt, 1973: 873-874; Zettel, 1990a: 191. Type-species (designated by Viereck, 1914 for *Chelonella* Szépliget): *Chelonus basalis* Curtis, 1837. Syn. with *Microchelonus* by Muesebeck & Walkley, 1951.

Stylochelonus Hellén, 1958b: 33; Shenefelt, 1973: 872; Zettel, 1990a: 194. Type species (by monotypy): *Chelonus pedator* Dahlbom, 1832. Described as subgenus of *Chelonus*.

Diagnosis.— Number of antennal segments (of both sexes) 17-44, but in females of one species-group ("*Microchelonus/Chelonella*") frequently fixed to 16; eyes setose; occipital carina remains separated from hypostomal carina, complete medio-dorsally; clypeus without medio-ventral teeth; propodeum with protruding carinae and more or less rugose; vein 1-SR+M of fore wing absent (fig. 236); vein r of fore wing usually rising near middle of pterostigma or somewhat behind middle; vein 2-R1 of fore wing absent, or as a short stub (fig. 232); vein CU1b present, resulting in a closed first subdiscal cell apico-posteriorly (fig. 236); vein r of hind wing absent (fig. 236); vein M+CU of hind wing about equal to vein 1-M or longer (fig. 236); metasomal carapace without transverse grooves (fig. 237), at most with one partial groove; carapace of male may have an apical opening (foramen: figs 263, 264); third metasomal tergite obtuse or elongate; fourth and following metasomal tergites largely retracted.

Traditionally, "*Microchelonus/Chelonella*" is separated from *Chelonus* by the following combination: the antenna of female consisting of 16 segments and the foramen of metasoma of males present (e.g. Tobias, 1986). Species which have 16 segments in the female and no foramen in the male metasoma apically are considered to belong to *Chelonus* s.s. according to Zettel (1990a). According to Papp (1995) *Microchelonus* Szépliget may be separated as a valid genus by the shape of the metasoma in lateral view, but this seems not to be correlated with any of the other characters e.g. number of antennal segments of female fixed to 16 or the presence of apical foramen of metasoma of males. According to Papp (1995) the length of the carapace in lateral view is 2.0-2.3 times its height in *Chelonus* and 2.7-3.5 times in *Microchelonus* but e.g. in his fig. 121 of *Chelonus canescens* Wesmael the length is 2.8 times its (maximum) height. In *C. curvimaculatus* (fig. 231) the female has the shape of the metasoma of typical *Chelonus* sensu Papp (1995) and its male has the shape of the metasoma of a "*Microchelonus*", and the carapace of *C. maudae* has the shape of a *Microchelonus* sensu Papp (1995) (fig. 234), but its male has no subapical metasomal foramen (fig. 234). Therefore, most likely the traditional recognition of *Microchelonus* will result in unnatural groupings. The separation based on the presence or absence of the metasomal foramen of the males as proposed by Zettel (1990a) may be valid, however, this makes the females unidentifiable to genus or subgenus in case the male is unknown or cannot be associated with the female with certainty.

Distribution.— Large cosmopolitan genus. About 450 species are known (Zettel, 1990a) and (especially in the moderate zones) very frequently collected, e.g. on flowers and in Malaise traps. Only two parts of the Afrotropical fauna of this genus has been monographed: for the species from Zaïre, see De Saeger (1946), and for the species from Madagascar, see Granger (1949).

Biology.— Solitary ovo-larval endoparasites of Lepidoptera. Milner (1967) recorded *C. curvimaculatus* on two occasions from pupae of *Busseola fusca*, presumably erroneously.

Key to species of the genus *Chelonus* parasitizing African cereal stem borers

1. Antennal segments 16(♀) or 25-27(♂); metasoma in lateral view distinctly widened apically (fig. 235); carapace of ♂ with wide slit-like foramen posteriorly (figs 263, 264); length of body 3-4.5 mm *C. curvimaculatus* Cameron
- Antennal segments 28-29(♀) or 31(♂); metasoma in lateral view less widened apically (fig. 231); carapace of ♂ without slit-like foramen posteriorly; length of body 6-8 mm *C. maudae* Huddleston

Chelonus curvimaculatus Cameron, 1906
(figs 235, 263, 264)

Chelonus curvimaculatus Cameron, 1906b: 34; Risbec 1950: 320; Milner, 1967: 59; Mohyuddin & Greathead, 1970: 252; Oatman, 1978: 188; Kfir, 1990: 406.

Microchelonus curvimaculatus; Shenefelt, 1973: 881-882.

Material.— 2 ♀♀ + 3 ♂♂ (PPRI, RMNH), "South Africa, Warmbaths, Tvl [= Transvaal], ii.1986, B. Kfir", "ex *Chilo partellus* on *Sorghum*"; 1 ♂ (ICIPE), "Kenya, Coast Province, Kwale district, location Mkgangani, sub-loc. ?, farm number ?", "ICIPE/WAU coll. # 28, date 28.v.[19]92, collector R.C. Q., host *S. calamistis*, ex maize"; 1 ♀ + 1 ♂ (BMNH, RMNH), "Zambia: Golden Valley, 19.v.[19]94, C.F. Mugoya", "ex *Chilo partellus* on maize"; 1 ♀ + 1 ♂ (MNHN), "Senegal: Richard Toll, 24.vii.1950, J. Risbec s/riz, 547", "Risbec det., MNHN remount from slide, Polaszek 95".

Diagnosis.— Length of body 3.0-4.5 mm, of fore wing 2.1-3.1 mm; antenna with 16 (♀) or 25-27 (♂) segments, antenna parallel-sided; eyes rather setose; face densely and finely rugose, with its setae directed downwards; clypeus densely and finely punctate; mesoscutum with coarse median carina, and its notaulic area coarsely scrobiculate sculptured, remainder of mesoscutum comparatively finely and densely punctate; scutellum mainly finely and densely punctate; ovipositor sheath about as long as apical height of metasoma (fig. 235, but largely retracted); postero-ventrally metasoma of ♀ not impressed medially; metasoma truncate and rather high posteriorly, distinctly widened apically (fig. 235), of ♂ less widened in lateral view, and with wide slit-like aperture or foramen (figs 263, 264); body black, but curved subbasal wide band of metasoma, parastigma (of ♀), palpi, middle and hind tarsi (except dark brown telotarsi, and hind tarsus may be largely dark brown except its basitarsus), spurs, basal half of hind tibia (except its dark brown base), middle tibia (except minute subbasal patch), and fore tibia ivory; coxae, middle femur largely, and tegulae dark brown or black; hind trochanter and trochantellus, remainder of fore leg (but tarsus largely infuscate) and basal third of antenna mainly yellowish-brown; remainder of antenna blackish; remainder of hind leg blackish; pterostigma, veins 1-R1, r, 2-SR, 3-SR, 2-M, 1-CU1, cu-a, and C+SC+R (except basally) of fore wing dark brown; wing membrane subhyaline; remainder of veins (including vein 1-M of fore wing) (pale) yellowish. Male has parastigma and most veins of fore wing dark brown.

Biology.— Parasite of Noctuidae (*Busseola fusca* and *Sesamia calamistis*), and of Crambidae (*Chilo partellus*, *C. zacconius*).

Distribution.— Afrotropical: Senegal, Sudan, Somalia, Kenya, Madagascar, Uganda, Tanzania, Congo, Mauritius, Zambia, Zimbabwe, South Africa.

Chelonus maudae Huddleston, 1994
(figs 231-234)

Chelonus maudae Huddleston (in Polaszek et al.), 1994: 78-79, figs 34-37.

Material.— See Polaszek et al. (1994). Figured specimens: 1 ♀ + 1 ♂ paratypes (BMNH), "Senegal: Djibelor, 15.x.1979, J. Etienne", "ex larva *Maliarpha separatella* on rice".

Diagnosis.— Length of body 6-8 mm, of fore wing 4-5 mm; antennal segments 28-29(♀) or 31(♂); metasoma in lateral view hardly widened and truncate apically (fig. 231); carapace of ♂ without slit-like foramen posteriorly (fig. 234); carapace of ♀ with rather narrow depression posteriorly (fig. 233). This species was treated in detail by Huddleston in Polaszek et al. (1994).

Biology.— So far only reared from the pyralid *Maliarpha separatella*.

Distribution.— Afrotropical: Senegal.

Genus *Phanerotoma* Wesmael, 1838
(figs 250-262, 265-280, 362, 363)

Phanerotoma Wesmael, 1838: 165; Shenefelt, 1973: 909-910; Tobias, 1986: 294; van Achterberg, 1990: 10 (list of synonyms); Zettel, 1990a: 179-180. Type species (designated by Haliday, 1840): *Chelonus dentatus* Panzer, 1805.

Diagnosis.— Number of antennal segments (of both sexes) fixed to 23, rarely up to 27; eyes glabrous; clypeus with more or less developed medio-ventral teeth (but often minute; fig. 256); occipital carina just meeting hypostomal carina ventrally, complete medio-dorsally; propodeum with protruding carinae (fig. 251) and more or less rugose; vein r of fore wing arising far behind middle of pterostigma (figs 250, 266, 270); vein 2-R1 of fore wing absent, or as a short stub (fig. 266); vein CU1b usually present, resulting in a closed first subdiscal cell apico-posteriorly (fig. 270); vein 1-SR+M of fore wing present (fig. 250); vein 1-SR of fore wing absent or nearly so (thus first discal cell sessile; fig. 250); vein cu-a of fore wing distinctly postfurcal (fig. 270); vein r of hind wing usually present (fig. 250); vein M+CU of hind wing equal to vein 1-M longer (figs 250, 270); metasomal carapace with two transverse grooves (fig. 251); third metasomal tergite about as long as second tergite or longer; fourth and following metasomal tergites largely retracted; carapace of male without an apical opening (foramen).

Distribution.— Large nearly cosmopolitan genus (except northern boreal areas; with nearly 200 species known). The Afrotropical fauna of this genus has never been monographed: De Saeger (1948) gives an incomplete compiled key, and Granger (1949) gives an incomplete key to the Madagascan species. Recently, Zettel (1990b) described two species from South Africa.

Biology.— Solitary ovo-larval endoparasites of larvae of Lepidoptera (Crambidae, Pyralidae, Noctuidae, Gelechiidae, Coleophoridae, Tortricidae). Frequently collected in light traps.

Key to species of the genus *Phanerotoma* parasitizing African cereal stem borers

1. Pterostigma entirely pale yellowish; vein 2-SR of fore wing straight (fig. 279); middle tibia without blister and completely yellowish-brown (fig. 280); hind tibia

- yellowish-brown, without dark brown parts; antenna (except scapus and pedicellus) dark brown; propodeum with transverse carina; length of fore wing 4-7 mm, of body 5.5-8 mm *P. saussurei* Kohl
- Pterostigma (except basally) dark brown; vein 2-SR of fore wing moderately to weakly curved (fig. 270); middle tibia with distinct blister and pale yellowish or whitish subbasally (fig. 267); apical third of hind tibia infuscate, more or less dark brown, remainder pale yellowish or whitish, except for weak infuscate ring near its basal 0.3; antenna largely yellowish-brown; propodeum without distinct transverse carina, at most weakly developed; length of fore wing 2-4 mm, of body 3.7-5.5 mm *P. leucobasis* Kriechbaumer

Phanerotoma leucobasis Kriechbaumer, 1894
(figs 267-273)

Phanerotoma leucobasis Kriechbaumer, 1894: 62; Shenefelt, 1973: 919 [type lost?].
Phanerotoma ocularis Kohl, 1906: 124-125, figs 10-16, 22; Shenefelt, 1973: 920-921; van Achterberg, 1990: 50-52, figs 303-322 (redescription) [examined]. **Syn. nov.**
Phanerotoma rjabovi Vojnovskaja-Krieger, 1929: 234, figs; Shenefelt, 1973: 925; van Achterberg, 1990: 50 (synonymy). **Syn. nov.**
Phanerotoma media Shestakov, 1930: 102; Shenefelt, 1973: 919; van Achterberg, 1990: 50 (synonymy) [examined]. **Syn. nov.**
Phanerotoma ornatulopsis De Saeger, 1948: 164, 186-188, figs 173, 184, 193-195; Shenefelt, 1973: 921 [examined]. **Syn. nov.**
Phanerotoma ornatulopsis race *tshegera* De Saeger, 1948: 164, 188-190, figs 175, 184, 196-199; Shenefelt, 1973: 921. Invalid name.
Phanerotoma hispanica var. *desertorum* Hedwig, 1957: 112; van Achterberg, 1990: 50 (synonymy) [examined]. **Syn. nov.**
Phanerotoma flavitestacea Fischer, 1959: 18, figs; Shenefelt, 1973: 915; van Achterberg, 1990: 50 (synonymy) [examined]. **Syn. nov.**

Material.— 1 ♀ + 1 ♂ (BMNH), “Kenya, Mbita, ex *Busseola fusca*, ICIPE.MPFS”, “R.C. Odhiambo, 9.iii.[19]83, no. 1-a-5 (other specimen no. 1-a-4)”; 1 ♀ (RMNH), “Kenya, Voi River Valley, Pipeline Roads, vi.1977, D. Quicke”; 2 ♀♀ (RMNH), “Benin: Calavi, IITA, ex *Maruca testulalis*, i.1995, D. Arodokoun”.

Diagnosis.— Length of body 3.7-5.5 mm, of fore wing 2-4 mm; face coarsely obliquely rugose; vein 2-SR of fore wing moderately to slightly curved (fig. 270); vein r of fore wing distinctly shorter than half length of vein 3-SR (fig. 270); middle tibia with distinct subbasal pale yellowish blister (fig. 267); metasoma of ♀ somewhat widened posteriorly in lateral view, and widely emarginate apically (fig. 269); metasoma slightly longer than mesosoma, and distinctly shorter than length of head and mesosoma combined; propodeum without distinct transverse carina, at most weakly developed, rugose and intermingled with finer sculpture; third tergite distinctly convex, but may be apically rather flat; body yellowish-brown, with first and second tergites (second tergite not laterally) pale yellow; stemmaticum black; antenna largely yellowish-brown; middle tibia pale yellowish or whitish subbasally; apical third of hind tibia more or less dark brown, remainder pale yellowish or whitish, except for weak infuscate ring near its basal 0.3; vein 1-M of fore wing, parastigma and pterostigma (except basally) dark brown.

Biology.— Parasite of the noctuid stem borer *Busseola fusca*, and the pyralid *Maruca testulalis* Geyer. According to De Saeger (1948; under *P. ornatulopsis*) also parasite of *E[ar]ias biplaga* Walker and of Pyralidae (*Edulicodes hylobatis* Ghesquière, and

Desmis horaria Meyrick). Reared in Europe from Pyralidae: *Paramyelois transitella* (Walker), *Ectomyelois ceratoniae* (Zeller), *Cadra calidella* (Guinée) and in laboratory from *Ephestia kuehniella* (Zeller). In Egypt from Gelechiidae: *Platyedra gossypiella* (Saunders) (van Achterberg, 1990).

Distribution.— Known from Afrotropical (Kenya, Cape Verde, Zaïre), Palaearctic (see van Achterberg, 1990) and Nearctic (introduced) regions.

Notes.— The differences between *P. leucobasis* (as *P. ocluaris*) and *P. ornatulopsis* as given by van Achterberg (1990) prove to be too variable to be useful in separation of both species and therefore *P. ornatulopsis* is synonymized. The possible synonymy with *P. bannensis* Masi, 1944 (Masi, 1951) is not accepted because in the original description Masi indicated that the propodeum is black, a feature never seen in *P. leucobasis*, and the infuscation of the hind tibia is not mentioned in the original description and therefore probably absent.

The lectotype (BMNH) of the Oriental *Phanerotoma hendecasisella* Cameron, 1905, has been examined because it is very similar to *P. leucobasis*, and Rao (1972) recorded a *Chilo* spec. in Sri Lanka as host of *P. hendecasisella*. It proved to be a different species separable from *P. leucobasis* by the completely flattened third metasomal tergite (fig. 265) and the strongly curved vein 2-SR of fore wing (fig. 266).

Phanerotoma saussurei Kohl, 1906
(figs 274-280, 362, 363)

Phanerotoma saussurei Kohl, 1906: 125; Shenefelt, 1973: 926; Polaszek et al., 1994: 79, figs 22, 23.

Phanerotoma major Brues, 1926: 266; Jordan, 1966: 4; Shenefelt, 1973: 919; Agyen-Sampong, 1980: 2; Agyen-Sampong & Fannah, 1987: 6; Polaszek et al., 1994: 79 (synonymy).

Phanerotoma spec.; Etienne, 1987: 51.

Material.— See Polaszek et al. (1994). Specimen figured: 1 ♂ (RMNH), "Madagascar, Lac Alaotra, Stn Cala, 18.ii.[19]88", "ex *Maliarpha separatella* LB1". Additional specimens: 1 ♀ + 1 ♂ (BMNH), "Benin, Malanville, 24.ix.1994, A. Polaszek, malaise trap [should be light trap; labelling mistake]/rice".

Diagnosis.— Length of body 5.5-8 mm, of fore wing 4-7 mm; face punctate-rugose; propodeum coarsely and densely reticulate, without distinct carinae dorsally; vein 2-SR of fore wing straight (fig. 279); vein r of fore wing distinctly shorter than half length of vein 3-SR (fig. 279); middle tibia without subbasal blister (fig. 280); metasoma depressed (fig. 275) and not emarginate posteriorly (fig. 276); metasoma distinctly longer than mesosoma, and nearly as long as head and mesosoma combined; body orange/yellowish-brown; legs entirely yellowish-brown; stematicum black; antenna (except scapus and pedicellus) and occasionally metasoma posteriorly, dark brown; vein 1-M of fore wing, parastigma and pterostigma pale yellowish-brown.

Biology.— Parasite of pyralid (*Maliarpha separatella*), and crambid (*Chilo zaccorius*, ?*Scirpophaga* spec.) rice stem borers. For more details, see Polaszek et al. (1994).

Distribution.— Afrotropical region: Benin, Mali, Senegal, Sierra Leone, Kenya, Tanzania, Madagascar.

Subfamily Doryctinae Foerster, 1862

Genus *Parallorhogas* Marsh, 1993
(figs 290-300)

Parallorhogas Marsh, 1993: 27-29. Type species (by original designation): *Allorhogas pyralophagus* Marsh, 1984.

Diagnosis.— Length of body 3-5 mm; antennal segments 22-32; frons flat; mesopleuron largely smooth (fig. 292); mesoscutal lobes largely smooth and glabrous, and mesoscutum with long medio-longitudinal carina (fig. 295); propodeum distinctly areolate (fig. 295); vein r arising between middle and base of pterostigma (fig. 290); first subdiscal cell of fore wing open distally and rather robust (fig. 290); vein m-cu of hind wing straight (fig. 290); outer hind tibial spur discernable at 80 × (fig. 297); outer aspect of hind tibia setose and striate (fig. 299); second suture of metasoma present, but may be obsolescent (fig. 298); second metasomal tergite without diverging grooves, distinctly striate; third and fourth metasomal tergites smooth; length of ovipositor sheath about half times fore wing.

Biology.— Ectoparasites of stem boring lepidopterous (Crambidae), or coleopterous (Bruchidae, Bostrichidae) larvae (Marsh, 1993).

Distribution.— Small genus, with all five species known from the Afrotropical region, but *P. pyralophagus* has been introduced into Africa (South Africa, Mauritius) from the Nearctic region (Mexico).

Parallorhogas pyralophagus (Marsh, 1984)
(figs 290-300)

Allorhogas sp.; Bennett et al., 1983: 9.

Allorhogas pyralophagus Marsh, 1984: 861-863, figs 1, 3, 8; Jayanth & Nagarkatti, 1985: 43; Melton & Browning, 1986: 402; Hawkins et al., 1987: 483; Smith et al., 1987: 477; Varma et al., 1987: 367; Castilho et al., 1989: 75; Varma & Saxena, 1989: 101; Varma & Nigam, 1990: 136.

Parallorhogas pyralophagus; Marsh, 1993: 29.

Material.— 2 ♀♀ + 2 ♂♂ (BMNH), "Origin: Mexico, ex *Eoreuma loftini*", "Trinidad [= in lab culture], Curepe, 2.iii.1984, F.D. Bennett"; 1 ♀ + 1 ♂ (RMNH), "USA: Texas [= lab culture from Mexico], vii.1988, J.W. Smith", "ex *Chilo partellus* on maize", "ex consignment from lab culture"; 4 ♀♀ (BMNH), "Mauritius, ex S. Africa against *C. sacchariphagus*", "A. Rajabalee, viii,[19]93, (MSIRI)".

Diagnosis.— Length of body 2.8-4.5 mm, of fore wing 2.1-3.5 mm; antennal segments 22-28; frons partly and vertex largely transversely aciculate (fig. 291); length of first metasomal tergite 0.7-0.8 times its apical width; first and second tergites mainly sublongitudinally striate, striae of second tergite distinctly converging medially; second suture straight and shallow; third tergite with weak transverse groove near basal 0.3 (fig. 298), third and following tergites smooth; length of ovipositor sheath 0.42-0.48 times fore wing; head, legs and metasoma largely brownish-yellow; mesosoma more or less yellowish-brown; outer side of scapus, apex of antenna, sometimes mesoscutum partly, precoxal sulcus and its surroundings, telotarsi, propodeum medially and metasoma medially dark brown or infuscate; pterostigma pale yellowish; veins brown; wing membrane subhyaline.

Biology.— Reported as ectoparasite of pyraloid stem borers: *Chilo auricilius* Dudgeon, *C. sacchariphagus* Bojer, *Diatraea grandiosella* Dyar, *Eldana saccharina*, *Eoreuma loftini* (Dyar), *Maruca vitrata* (Fabricius) and *Argyroploce schistace* Snellen.

Distribution.— Nearctic: Mexico. Introduced (probably unsuccessfully) into Afrotropical (Mauritius, South Africa) and Oriental (India, and Indonesia (Sumatra)) regions.

Genus *Rhaconotus* Ruthe, 1854

(figs 281-289, 354-357, 364-369)

Rhaconotus Ruthe, 1854: 349; Nixon, 1941: 473; Shenefelt & Marsh, 1976: 1334-1343; Belokobylskij & Tobias, 1986: 48-49 (transl., 1995: 75-78). Type species (by monotypy): *Rhaconotus aciculatus* Ruthe, 1854.

Hedysomus Foerster, 1862: 238; Shenefelt & Marsh, 1976: 1335. Type species (by original designation): *Hedysomus elegans* Foerster, 1862.

Hormiopterus Giraud, 1869: 478; Shenefelt & Marsh, 1976: 133.5. Type species (by monotypy): *Hormiopterus ollivieri* Giraud, 1869c.

Euryphrymnus Cameron, 1910c: 100; Shenefelt & Marsh, 1976: 1334. Type species (by monotypy): *Euryphrymnus testaceiceps* Cameron, 1910.

Diagnosis.— Length of fore wing 2-4 mm; mesoscutal lobes granulate, and mesoscutum without long medio-longitudinal groove (fig. 285); propodeum without distinct areolation (fig. 282); vein r arising near middle of pterostigma (fig. 281); first subdiscal cell of fore wing closed distally and slender (fig. 281); outer hind tibial spur distinctly discernable at 80 × (fig. 281); outer aspect of hind tibia moderately to long setose; second suture of metasoma complete (fig. 289); second metasomal tergite without diverging grooves (fig. 282), with or without distinct subposterior transverse groove; third and fourth metasomal tergites sculptured.

Biology.— Gregarious ectoparasites of stem boring lepidopterous, dipterous, or coleopterous larvae.

Distribution.— Medium-sized Old World genus (with more than 80 species known): mainly from the the Palaetropics, with some species occurring in the Palaearctic region. Both species keyed below lack a distinct more or less straight transverse subposterior groove of the second tergite in front of the curved second metasomal suture (figs 289, 368, 369).

Key to species of the genus *Rhaconotus* parasitizing African cereal stem borers

1. At least medial third of pterostigma largely dark brown (fig. 355); antennal segments of ♀ 26-33; head and mesosoma less densely setose (figs 357, 366, 367); second and third tergites more robust, widened posteriorly (fig. 369) *R. carinatus* Polaszek
- Pterostigma entirely pale yellowish (fig. 354); antennal segments of ♀ 39-45; head and mesosoma densely setose (figs 356, 364, 365); second and third tergites slender, parallel-sided posteriorly (fig. 368) *R. scirpophagae* Wilkinson

Rhaconotus carinatus Polaszek, 1994

(figs 355, 357, 366, 367, 369)

Rhaconotus carinatus Polaszek et al., 1994: 79-80, figs 17, 26, 30-32.

Diagnosis.— Length of body 3-5 mm, and of fore wing 2.0-3.5 mm; length of antenna 1.3-1.4 times fore wing; antennal segments of female 26-33; head and mesosoma comparatively sparsely setose (figs 357, 366, 367); mesosoma rather robust (fig. 366), and lobes largely glabrous; second metasomal suture distinctly curved (fig. 369); body dark reddish-brown; at least medial third of pterostigma dark brown (fig. 355); second and third tergites more robust, widened posteriorly (fig. 369); length of ovipositor sheath 0.5-0.6 times fore wing.

Biology.— Reported as gregarious ectoparasite of Pyralidae (*Maliarpha separatella*), and Crambidae (*Chilo zacconius*). For additional details, see Polaszek et al., 1994.

Distribution.— Afrotropical region: Cameroon, Togo, Ghana, Senegal, Sierra Leone, Nigeria, Tanzania and Madagascar.

Rhaconotus scirpophagae Wilkinson, 1927
(figs 354, 356, 364, 365, 368)

Rhaconotus scirpophagae Wilkinson, 1927: 34; Shenefelt & Marsh, 1976: 1341; Polaszek et al., 1994: 80, figs 16, 25, 27-29.

?*Hormiopterus caudatus* Szépligeti, 1914b: 202.

?*Rhaconotus caudatus*; Shenefelt & Marsh, 1976: 1336; Polaszek et al., 1994: 80 (possible senior synonym of *R. scirpophagae*).

Diagnosis.— Length of body 4-6 mm, and of fore wing 3-4 mm; length of antenna 1.7-1.9 times fore wing; antennal segments of female 39-45; head and mesosoma densely setose (figs 356, 364, 365); mesosoma slender (fig. 364), and lobes largely setose; second metasomal suture simple, and slightly curved; body dark brown; pterostigma uniformly yellowish; second and third tergites slender, parallel-sided posteriorly (fig. 368); length of ovipositor sheath 0.40-0.55 times fore wing.

Biology.— Reported as gregarious ectoparasite of Pyralidae (*Maliarpha separatella*), of Crambidae (*Chilo partellus*, *C. spec.*, *Scirpophaga ?excerptalis*, *S. nivella*, *S. spec.*) and Noctuidae (*Busseola fusca*).

Distribution.— Afrotropical (Ivory Coast, Ghana, Senegal, Sierra Leone, Nigeria, Kenya, Tanzania) and Oriental (Pakistan, India, and Indonesia (Java)) regions.

Subfamily Euphorinae Foerster, 1862 s.l.

Genus *Meteorus* Haliday, 1835

Meteorus spec. A

Meteorus sp. n.; Milner, 1967: 38.

Material.— 1 ♂ (KPCRS), "Kenya: Trans-Nzoia, Endebess, on *B. fusca*, Dedm, x.[19]65, 567-67", *Meteorus* sp., ♂, R.D. Eady det. 1966".

Diagnosis.— The small, dark brown and damaged male voucher specimen does not allow an identification and its biology is doubtful, therefore we refrain from giving a diagnosis.

Biology.— Reported as parasite of *Busseola fusca* (Noctuidae), but the record is doubtful.

Distribution.— Kenya.

Subfamily Macrocentrinae Foerster, 1862

Genus *Macrocentrus* Curtis, 1833
(figs 301-316)

Macrocentrus Curtis, 1833: 187; Shenefelt, 1969: 143-174; Haeselbarth, 1978: 25-32; Marsh, 1979: 186-190; Haeselbarth & van Achterberg, 1981: 157-160; van Achterberg & Haeselbarth, 1983: 38-52; Tobias, 1986: 250-263; van Achterberg & Belokobylskij, 1987: 244-261; van Achterberg, 1993c: 20 (list of synonyms). Type species (by monotypy): *Macrocentrus bicolor* Curtis, 1833.

Diagnosis.— Antenna often about as long as or somewhat longer than body (but sometimes distinctly shorter), with 24-61 segments; occipital carina absent; middle lobe of mesoscutum in lateral view usually distinctly protruding over lateral lobes (fig. 304), but in several species hardly or not protruding; vein 2-CU1 of fore wing straight or nearly so; subbasal cell of fore wing usually not or slightly widened apically, (but some Australian species have this cell distinctly widened distally), often with elongate yellowish or brownish patch (fig. 302); vein cu-a of fore wing vertical, usually slender (but may be widened basally or apically), and only exceptionally distinctly bent; vein r-m of fore wing sometimes absent (*Macrocentrus* is the only genus of the Macrocentrinae in which this condition occurs); vein CU1a of fore wing without a faint brownish spot; first subdiscal cell of fore wing elongate to robust and partly glabrous or setose; angle between veins 1-SR+M and 1-M about 90° (fig. 301); vein 3-M of fore wing normal, usually longer than twice vein 3-SR; marginal cell of hind wing narrow, subparallel-sided or somewhat widened apically (fig. 301); vein SR of hind wing at most weakly curved basally and unsclerotized; vein 1r-m of hind wing straight and short to medium-sized; vein 2-SC+R of hind wing horizontal (= longitudinal) and marginal cell slightly or not widened basally; vein SC+R1 of hind wing straight or evenly bent, exceptionally abruptly bent towards anterior wing margin; vein r of hind wing absent; vein R1 of hind wing slender; inner spur of hind tibia 0.3-0.5 times hind basitarsus; spur of fore tibia 0.2-0.6 times fore basitarsus; tarsal claws with (fig. 313) or without ventral lobe; inner hind claw similar to outer hind claw; hind coxa at most with a few transverse striae; all trochantelli with teeth; first metasomal tergite largely smooth or longitudinally striate or rugulose, exceptionally (some Afrotropical species) with transverse striation, its length 1.5-3.4 times its apical width, usually widened posteriorly; laterope of first tergite deep, distinctly differentiated from glymma; first tergite more or less shallowly concave medio-basally; length of ovipositor sheath 0.2-2.7 times fore wing; apex of ovipositor variable, with notch more or less developed subapically.

Distribution.— Cosmopolitan. Within the Macrocentrinae the dominant genus in the Holarctic and Palaeotropical regions, with nearly 100 species known.

Biology.— Solitary or gregarious endoparasites of Tortricidae, Gelechiidae, Oecophoridae, Pyralidae, Crambidae, Sesiidae, Noctuidae and Lycaenidae. Polyembryony (usually resulting in gregarious broods) frequently occurs in this genus.

Macrocentrus sesamivorus van Achterberg, spec. nov.
(figs 301-316)

Material.— Holotype, ♀ (NMK), "Kenya: Kwale D[i]str[ict], Musulwa, 26.v.[19]95, PL 17T1", "ex *Sesamia calamistis*, L3". Paratypes (4 ♀♀ + 1 ♂): 1 ♀, (ICIPE), "Kenya, Kwale, 23.xii.[19]94, ICIPE/WAU", "Host *C. partellus* [on] maize, no. 4020"; 1 ♀ (BMNH), "[Kenya], Kwale Dist., Musulwa, 10.v.[19]75, maize, PL 20, T3 c/3P/338"; 1 ♂ (RMNH), "Zaire, Lubumbashi, 8365, 18-19.ii.1972, A.B. Stam, at light"; 1 ♀ (RMNH), id. but 27-28.x.1971, no. 8274; 1 ♀ (RMNH), "Somalia, Mogadiscio, Afgoi, Shabelli Valley, Mal. trap, F. Bin".

Diagnosis.— Body and pterostigma completely yellowish; area between posterior ocellus and eye (= OOL) flat or largely so; clypeus nearly straight ventrally (fig. 309); temple compared to eye in dorsal view comparatively short (fig. 310); middle lobe of mesoscutum distinctly protruding above level of lateral lobes; metapleuron densely punctate-rugose ventrally, partly mingled with micro-sculpture and dorsally

mainly punctate (fig. 304); precoxal sulcus densely punctate, mingled with granulate micro-sculpture; vein 3-SR of fore wing 2.0-2.3 times vein 2-SR; vein cu-a of fore wing distinctly postfurcal, vertical; vein SC+R1 of hind wing slightly curved (fig. 307); subbasal cell of fore wing partly glabrous distally (fig. 302); vein 1-CU1 of fore wing nearly always distinctly widened; marginal cell of hind wing more or less widened apically (fig. 301); hind coxa granulate dorsally; length of fore wing less than 7 mm; length of ovipositor sheath 1.5-1.9 times fore wing.

Description.— Holotype, ♀, length of body 9.3 mm, of fore wing 6.3 mm.

Head.— Antenna rather long and densely bristly setose, with 62 segments, length of third segment 1.4 times fourth segment, length of third, fourth and penultimate segments 8.1, 5.8, and 3.2 times their width, respectively (figs 303, 306); length of antenna about twice as long as fore wing; length of maxillary palp 2.0 times height of head; length of eye in dorsal view 8.0 times temple (fig. 310); temples directly narrowed posteriorly (fig. 310); antennal sockets almost touching eyes (fig. 309); OOL:diameter of posterior ocellus:POL = 5.5:7; frons flat, narrow, anterior ocellus nearly reaching level of antennal sockets; face rather convex, mainly smooth, shiny, sparsely punctate; clypeus distinctly convex, sparsely punctate and long setose; ventral margin of clypeus slightly concave (fig. 309); length of malar space 0.9 times basal width of mandible; mandible normal, distinctly twisted apically, its second tooth wide, about half as long as first tooth and its first tooth robust, acute and long (fig. 312).

Mesosoma.— Length of mesosoma 1.4 times its height; side of pronotum largely smooth, sparsely punctate and posteriorly with some rugae; prepectal carina only laterally narrowly developed, ventrally absent; middle mesoscutal lobe steep anteriorly, strongly convex; only anteriorly precoxal sulcus densely punctate, interspaces mostly equal to diameter of punctures and superficially micro-sculptured; remainder of mesopleuron distinctly punctate, but much more sparsely so; metapleuron rugose, but dorsally mainly punctate, posteriorly densely rugulose (fig. 304); metapleural flange large, wide, obtuse apically; mesoscutal lobes smooth, setose except medially; scutellum flat; side of scutellum largely smooth, with one ruga and some punctures (fig. 315); surface of propodeum densely vermiculate-rugose, without median carina antero-medially.

Wings.— Fore wing: subbasal cell with glabrous patch distally, with elongate yellowish patch (fig. 302); r:3-SR:SR1 = 6:13:30; 1-CU1:2-CU1 = 8:32; 1-CU1 distinctly widened (fig. 302); cu-a straight, vertical and slightly diverging from 3-CU1 posteriorly (fig. 301); 2-SR:3-SR:r-m = 8:13:4; 2A indistinct, basal area sparsely setose. Hind wing: SC+R1 slightly curved (fig. 307); with 3 hamuli; marginal cell widened apically (fig. 301); 1-M twice times 1r-m.

Legs.— Hind coxa finely granulate dorsally, mingled with punctures, without striae (fig. 315); tarsal claws with medium-sized ventral lobe, setose, apical tooth robust (fig. 313); fore femur very slender and distinctly curved (fig. 308); length of fore spur 0.2 times fore basitarsus; length of femur, tibia and basitarsus of hind leg 7.7 16.8 and 10.6 times their width, respectively; length of spurs of hind tibia 0.3 and 0.4 times hind basitarsus; fore, middle and hind trochantelli with 9, 5, and 6 teeth, respectively (figs 308, 311); outer side of all femora with small teeth (figs 308, 311, 314).

Metasoma.— Length of first tergite 2.5 times its apical width (fig. 316), its surface finely and mostly longitudinally striate, apico-laterally obliquely striate (fig. 316), medio-basally distinctly concave and sculptured; dorsal carinae of first tergite short;

second tergite and basal two thirds of third tergite finely and mainly longitudinally striate; remainder of metasoma smooth; length of ovipositor sheath 1.88 times fore wing; apex of ovipositor rather robust, without distinct notch.

Colour.— Brownish-yellow; stemmaticum black; antenna (except scapus and pedicellus), tibiae, tarsi, metasoma (except baso-ventrally), and propodeum dorsally yellowish-brown; veins (except vein 1-R1 of fore wing) brown; vein 1-R1 of fore wing and pterostigma yellow; ovipositor sheath dark brown; wing membrane subhyaline.

Variation.— Length of fore wing 5.2-6.3 mm, of body 7.1-9.3 mm; antennal segments of ♀ 52(1), 60(1) or 62(2); length of eye in dorsal view 8.0-10.5 times temple; first tergite flattened medio-posteriorly, more or less depressed, its length 2.5-2.8 times its apical width.

Biology.— Parasite of noctuid (*Sesamia calamistis*) and crambid (*Chilo partellus*) stem borers.

Distribution.— Afrotropical: Kenya, Somalia, Zaïre.

Notes.— The new species is similar to the Palaearctic *M. flavus* Snellen van Vollenhoven, 1878, a parasite of pyralid larvae on trees. However, it differs by having the metapleuron densely punctate-rug(ul)ose, partly mingled with micro-sculpture (sparsely punctate only in *M. flavus*), vein 3-SR of fore wing 2.0-2.3 times vein 2-SR (about 1.5 times), the precoxal sulcus densely punctate, mingled with granulate micro-sculpture (sparsely punctate), the second metasomal tergite completely sculptured (partly smooth: fig. 155 in van Achterberg, 1993c), the temple compared to eye in dorsal view slightly shorter (slightly longer), vein 1-CU1 of fore wing nearly always distinctly widened (slender), and the marginal cell of hind wing more or less widened apically (parallel-sided).

Subfamily Microgastrinae Nees, 1814

Note.— Walker (1994) lists three genera of Microgastrinae so far known from African cereal stem borers: *Cotesia*, *Dolichogenidea* and *Glyptapanteles*. These three genera belong to a group traditionally regarded as "*Apanteles*" sensu lato (i.e., in the broadest sense as used before the publication of Mason's 1981 paper). Actually, *Dolichogenidea* is not always well separable from the genus *Apanteles* Foerster, 1862, because intermediates occur and it may be at most a subgenus of the genus *Apanteles* and also the recognition of both other genera may be problematical, especially of males.

Genus *Cotesia* Cameron, 1891

(figs 317-334)

Cotesia Cameron, 1891: 185; Shenefelt, 1972: 430 (as synonym of *Apanteles* Foerster, 1862); Mason, 1981: 110-113 (as separate genus); Tobias, 1986: 370 (included in *Apanteles* s.l.); Papp, 1988: 153-155 (as separate genus); Austin & Dangerfield, 1992: 21 (id.); Maetô, 1996: 42 (id.). Type species (by monotypy): *Cotesia flavipes* Cameron, 1891.

Protapanteles Ashmead, 1898: 166; Shenefelt, 1972: 430 (as synonym of *Apanteles* Foerster, 1862); Mason, 1981: 107-108 (as separate genus); Tobias, 1986: 370 (included in *Apanteles* s.l.); Papp, 1988: 152-161 (as separate genus). Type species (designated by Viereck, 1914): *Protapanteles ephyræ* Ashmead, 1898 (= *Apanteles paleacritæ* Riley, 1881).

Cryptapanteles Viereck, 1910: 209; Shenefelt, 1972: 430 (as synonym of *Apanteles* Foerster, 1862); Mason, 1981: 110 (as synonym of *Cotesia*). Type species (by original designation): *Cryptapanteles rileyanus* Viereck, 1910 (= *Apanteles scitulus* Riley, 1881).

Stenopleura Viereck, 1911: 187; Shenefelt, 1972: 430 (as synonym of *Apanteles* Foerster, 1862); Mason, 1981: 110 (as synonym of *Cotesia*). Type species (by original designation): *Apanteles sesamiae* Cameron, 1906.

One of the largest genera of the Microgastrinae with more than 2500 species; occurring world-wide and often common. The Afrotropical species are not monographed except for those from Zaïre (De Saeger, 1944) and Madagascar (Granger, 1949), both under *Apanteles*.

Biology.— More than half the species are gregarious; mostly parasitizing a wide variety of larvae of "Macrolepidoptera".

Key to species of the genus *Cotesia* parasitizing African cereal stem borers

1. Mesosoma distinctly flattened in lateral view, 1.7-1.8 times as long as high (fig. 319); antennal segments of ♀ robust (figs 319, 328); mesoscutum comparatively sparsely punctate, interspaces wider than diameter of punctures (fig. 326); sculpture of second tergite covering only part of notum of tergite (fig. 326); mesosternum and hind coxa largely smooth (fig. 319), but hind coxa may be coarsely punctate dorsally 2
- Mesosoma normal, in lateral view 1.3-1.4 times as long as high; antennal segments of ♀ slender (fig. 327); mesoscutum densely punctate, interspaces less than diameter of punctures; sculpture of second tergite covering entire notum of tergite; mesosternum and hind coxa densely punctate *C. ruficrus* (Haliday)
2. Aedeagus of male rounded at apex (fig. 332); hind coxa usually largely light brown, dark brown or black; face less convex, and antennal sockets at level of middle of eye in lateral view (fig. 328); antenna usually completely dark brown, with pedicellus yellow, and considerably paler than scapus; outer hind spur distinctly shorter than inner spur (fig. 329) *C. sesamiae* (Cameron)
- Aedeagus of male truncate at apex (fig. 333); hind coxa usually largely yellowish; face more convex, and antennal sockets below level of middle of eye in lateral view (fig. 319); basal half of antenna usually completely (yellowish-)brown, with pedicellus (partly) darker than scapus; outer hind spur slightly shorter than inner spur (fig. 331) *C. flavipes* Cameron

Cotesia flavipes Cameron, 1891
(figs 317-326, 331, 333, 334)

Cotesia flavipes Cameron, 1891: 185; Potting, 1996: 5-121 (life history, ecology, biological control, introductions, ethology, geographic variation).

Apanteles flavipes; Shenefelt, 1972: 509-510.

Apantels flavatus Ishida, 1915: 97; Shenefelt, 1972: 509.

Apanteles nonagriæ Olliff, 1893: 3817; Shenefelt, 1972: 509.

Apanteles nonagriæ Viereck, 1913: 645 (not Olliff, 1893); Shenefelt, 1972: 510.

Apanteles simplicis Viereck, 1913: 645; Shenefelt, 1972: 510.

Material.— 1 ♀ (BMNH), "Sri Lanka, Savangala, 26.ii.1994", "ex larva of *Chilo sacchariphagus* on sugarcane, sp. ENT/1/94/01 IIE 23093"; 1 ♂ (BMNH), "India, Kapurthala (Phagwarta), Punjab", "I. Singh, sp. no. 14", "ex larvae of *Chilo auricilius*, IIE 22636".

Diagnosis.— Length of fore wing about 1.5 mm; antenna robust (♀) or slender (♂), about 0.7 times (♀) or 1.3 times (♂) as long as body, both penultimate segments

1.3-1.5 times (♀) or about 3 times (♂) longer than wide; face more convex than in *C. sesamiae*, and antennal sockets below level of middle of eye in lateral view (fig. 319); mesosoma depressed, 1.7-1.8 times as long as high; mesoscutum and scutellum sparsely punctate; mesosternum largely smooth; sculpture of second tergite covering only part of notum of tergite (fig. 326); hind coxa shiny and nearly smooth; outer hind spur slightly shorter than inner spur (fig. 331); aedeagus of male truncate at apex (fig. 333); body black or dark brown; second and third metasomal tergites only laterally with yellow markings; basal half of antenna usually completely yellowish-brown, except for more or less darkened pedicellus, which is (partly) darker than scapus; legs brownish-yellow, hind tarsus more or less infusate; pterostigma brown; antenna of ♂ yellowish-brown. For additional description, see Walker (1994).

Biology.— Polyphagous on noctuid, crambid, and pyralid stemborers. Used as biological control agent; for a review, see Walker (1994) and Potting (1996).

Distribution.— Oriental (South and Southeast Asia); introduced and apparently established in Kenya, Madagascar, Mauritius, and parts of the Neotropics.

Cotesia ruficrus (Haliday, 1834)
(fig. 327)

Microgaster ruficrus Haliday, 1834: 253.

Apanteles ruficrus; Shenefelt, 1972: 617-618; Nixon, 1974: 494-495; Papp, 1986: 228, 241.

Cotesia ruficrus; Papp, 1990: 197-198; Polaszek et al., 1994: 80.

Apanteles antipoda Asmead, 1900b: 355; Shenefelt, 1972: 618.

Apanteles manilae Ashmead, 1904b: 19; Shenefelt, 1972: 618.

Apanteles sydneyensis Cameron, 1911b: 342; Shenefelt, 1972: 619

Apanteles (Protapanteles) narangae Viereck, 1913: 642; Shenefelt, 1972: 618-619.

Material.— 1 ♂ + 2 ♀ (CIRAD), "Côte d'Ivoire, Kotiessou, ex *Maliarpha separatella*, A. Pollet"; 2 ♀ (RMNH), "Iraq, coll. Zaykov", "Samarra, em. 6.xi.1976, M.S. Abdul-Rassoul", "ex *Leucania loreyi* (Dup.) on *Zea mays*"; 1 ♀ (RMNH), "Iraq, coll. Zaykov", "Karrada, Bagh., em. 10.ii.1978, M.S. Abdul-Rassoul", "ex *Trichoplusia ni* (Hubn. ex *Lactuca sativa*) on *Zea mays*".

Diagnosis.— Length of fore wing 2.0-2.5 mm; antenna slender, about as long as body, the two penultimate segments each about 1.7 times longer than wide (fig. 327); mesosoma normal, 1.3-1.4 times as long as high; mesoscutum and scutellum coarsely punctate; hind coxa dull and rugose-punctate; body black; combined second and third metasomal tergites distally to basal area with yellow markings; legs bright reddish or yellowish, hind femur darkened apically.; sculpture of second tergite covering entire notum of tergite; mesosternum and hind coxa densely punctate.

Biology.— A gregarious and extremely polyphagous endoparasite; e.g. of Pyralidae: *Maliarpha separatella*, of Crambidae: *Chilo zacconius*, of Gelechiidae: *Pectinophora gossypiella* (Saunders), and of Noctuidae: *Sesamia nonagrioides*, *S. calamistis*, *Mythimna loreyi* (Duponchel), *Chrysodeixis chalcites* (Esper) and *Agrotis ipsilon* (Hufnagel) (Polaszek et al., 1994; Walker, 1994). *C. ruficrus* accepts hosts feeding both internally and externally on plants.

Distribution.— Cosmopolitan: in the Afrotropical region known from Sudan, Somalia, Senegal, Nigeria, Ivory Coast, Cameroon, Uganda, Zimbabwe, South Africa, Madagascar and Mauritius (Walker, 1994).

Cotesia sesamiae (Cameron, 1906)
(figs 328-330, 332)

Apanteles sesamiae Cameron, 1906a: 335; Shenefelt, 1972: 617-618.

Cotesia sesamiae; Walker, 1994: 430.

Material.— Figured specimens: 1 ♀ (BMNH), “Kenya, Rusinga, 4.ix.[19]89”, “Sp. 13 ex larva of *Busseola fusca* on *Sorghum*, CIE A20694”; 1 ♂ (BMNH), “Kenya, Webhye, vi.1991, ”, “ex *Busseola fusca* on maize”, “M.J. Chacko, coll. SI no. 4, IIE 291 39”.

Diagnosis.— Length of fore wing about 1.8 mm; antenna robust (♀) or slender (♂), about 0.6 times (♀) or 1.4 times (♂) as long as body, both penultimate segments about 1.2 times (♀) or about 3.2 times (♂) longer than wide; face less convex than in *C. flavipes*, and antennal sockets below level of middle of eye in lateral view (fig. 328); mesosoma depressed, 1.7-1.8 times as long as high; mesoscutum and scutellum sparsely punctate; mesosternum largely smooth; hind coxa shiny and coarsely punctate dorsally; outer hind spur slightly shorter than inner spur (fig. 329); sculpture of second tergite covering only part of notum of tergite; aedeagus of male rounded at apex (fig. 332); body black or dark brown; second and third metasomal tergites largely brown; basal half of antenna usually completely yellowish-brown, except for more or less darkened pedicellus, which is (partly) darker than scapus; legs yellowish, only hind coxa blackish basally and usually largely yellowish; pterostigma dark brown. For additional description, see Walker (1994).

Biology.— Polyphagous on crambid, noctuid and pyralid stemborers. Used as biological control agent; for a review, see Walker (1994).

Distribution.— Afrotropical region, including Madagascar, Réunion, and Mauritius. The East Palaearctic and Oriental *Cotesia chilonis* (Matsumura, 1912) from Japan (and introduced in Java) is very similar to *C. sesamiae* (Polaszek & Walker, 1992; Walker, 1994).

Genus *Dolichogenidea* Viereck, 1911
(figs 335-344)

Dolichogenidea Viereck, 1911: 173; Shenefelt, 1972: 430 (as synonym of *Apanteles* Foerster, 1862); Mason, 1981: 34-37 (as separate genus); Papp, 1988: 146-148 (id.); Austin & Dangerfield, 1992: 27-29 (id.); Maetô, 1996: 39 (id.). Type species (by original designation): *Apanteles (Dolichogenidea) banksi* Viereck, 1911.

Very large genus with more than 1000 species; differs mainly from the genus *Cotesia* by their rather long ovipositors used to reach more or less concealed living hosts and the more or less modified hypopygium of the female. In this respect very similar to *Apanteles* Foerster, 1862, but the latter differs by the shape of the plical (or anal) lobe of the hind wing lacking partly a fringe of setae. The Afrotropical species are not revised except for those from Zaïre (De Saeger, 1944) and Madagascar (Granger, 1949).

Biology.— Mostly solitary parasites of larvae of small moths, partly leafminers, but occasionally gregarious and sometimes parasitizing Macrolepidoptera.

Distribution.— Cosmopolitan.

Key to species of the genus *Dolichogenidea* parasitizing African cereal stem borers

1. First metasomal tergite coarsely sculptured and very robust, with a distinct tubercle antero-medially (fig. 335); second tergite completely rugose (fig. 335); third tergite yellowish *D. oryzae* Walker
- First tergite largely smooth or finely sculptured and less robust, without or with weak tubercle antero-medially (figs 337, 338); second tergite (largely) smooth (figs 337, 339); third tergite black(ish) 2
2. Pterostigma pale yellow or whitish, sometimes almost hyaline; ovipositor sheath longer than metasoma, 1.5-1.8 times length of hind tibia (fig. 336) *D. polaszeki* Walker
- Pterostigma (light) brown, exceptionally partly yellowish; ovipositor sheath distinctly shorter than metasoma, about as long as hind tibia or shorter (figs 342, 343) 3
3. Ovipositor sheath about as long as hind tibia; first tergite comparatively slender (fig. 338) *D. fuscivora* Walker
- Ovipositor sheath less than half the length of hind tibia; first tergite comparatively robust (figs 339, 344) 4
4. Propodeum indistinctly sculptured, mainly smooth and without costulae; length of fore wing 1.6-1.8 mm *D. cameroonensis* Walker
- Propodeum partly sculptured, and usually costulae present, but frequently only weakly developed; length of fore wing 2.0-2.3 mm *D. aethiopica* (Wilkinson)

Dolichogenidea aethiopica (Wilkinson, 1931)
(figs 340, 341, 343, 344)

Apanteles aethiopicus Wilkinson, 1931a: 81; Shenefelt, 1972: 435.

Dolichogenidea aethiopica; Walker, 1994: 422-423, figs 10, 11, 13; Peigler, 1996: 44.

Apanteles procerae Risbec, 1951: 454; Walker, 1994: 422 (syn. with *D. aethiopica*).

Material.— See Walker (1994). Figured specimen: ♀ paratype of *D. aethiopica* (RMNH), "Uganda, Kampala, 2.vii.1929, per G.L.R. Hancock, ex ?Lasiocampid with Tachinids".

Diagnosis.— Length of fore wing 2.0-2.3 mm; mesoscutum densely and coarsely punctate; scutellum flat and smooth medially, punctate laterally; vein r of fore wing distinctly angled and vein 2-SR rather slender (fig. 340); propodeum with costulae more or less developed, largely smooth posteriorly, partly rugose dorsally; first and second metasomal tergites smooth, only some superficial sculpture on first tergite; length of first tergite about equal to its apical width, and largely parallel-sided and without distinct tubercle antero-medially (fig. 344); second tergite with diverging grooves shallow or virtually absent (fig. 344); second metasomal suture distinct, shallow (fig. 344); ovipositor sheath moderately wide and acute apically (fig. 343), sparsely setose; length of ovipositor sheath about 0.15 times fore wing and about 0.5 times hind tibia; hypopygium of ♀ acute apically (fig. 343); body blackish or dark brown; fore leg (except basal half of femur and coxa), basal half of middle tibia, middle tarsus (except telotarsus) and basal third of hind tibia pale brownish; remainder of legs dark brown; pterostigma light brown. For additional details, see Walker (1994).

Biology.— Reported (Walker, 1994) to parasitize external feeding hosts belonging to Arctiidae, Noctuidae, Saturniidae, and Zygaenidae, and one internal feeding crambid host: *Chilo zacconius*.

Distribution.— Afrotropical, widespread: Sierra Leone, Ivory Coast, Sudan, Somalia, Kenya, Tanzania, Uganda and South Africa (Walker, 1994).

Dolichogenidea cameroonensis Walker, 1994
(figs 339, 342)

Dolichogenidea cameroonensis Walker, 1994: 424-425, figs 9, 12, 14.

Material.— See Walker (1994). Figured specimen: ♀ paratype (BMNH), “[Cameroon], Garoua, viii.[19]54, M. Deschamps”, “*Apanteles procerae* Risb., 4, de chenille s/riz”.

Diagnosis.— Length of fore wing 1.6-1.8 mm; mesoscutum densely and rather coarsely punctate; scutellum flat and smooth; vein r of fore wing distinctly angled and vein 2-SR rather robust; propodeum without costulae, smooth or nearly so and at most partly micro-sculptured, first and second metasomal tergites smooth, at most with some punctures on first tergite (fig. 339); length of first tergite 1.0-1.1 times its apical width, and largely parallel-sided and without distinct tubercle antero-medially (fig. 342); second tergite with shallow diverging grooves; second metasomal suture absent or nearly so; ovipositor sheath moderately wide and acute apically (fig. 342), sparsely setose; length of ovipositor sheath about 0.15 times fore wing and about 0.5 times hind tibia; hypopygium of ♀ acute apically (fig. 342) or nearly so; body (dark) brown; fore leg (except basal half of femur), basal half of middle tibia and basal third of hind tibia, tarsus (except telotarsus) yellowish; remainder of legs dark brown; pterostigma light brown. For additional details, see Walker (1994).

Biology.— Unknown, reported to be collected from a caterpillar on rice (Walker, 1994).

Distribution.— Afrotropical: only known from Cameroon (Walker, 1994).

Note.— With the key characters given by Walker (1994) paratypes of *D. cameroonensis* cannot be separated from paratypes of *D. aethiopica*. Therefore, it is not unlikely that *D. cameroonensis* is a junior synonym of *D. aethiopica*; the reduced size of the specimens is probably connected with the reduction of sculpture, and size itself is not a very reliable character to separate a species.

Dolichogenidea fuscivora Walker, 1994
(fig. 338)

Dolichogenidea fuscivora Walker, 1994: 426, figs 15, 22.

Material.— See Walker (1994). Figured specimen: ♀ paratype (BMNH), “Ethiopia: Hararghe, Alemaya, 18.xii.1990, K. Yitafaru 1000”, “ex larva *Busseola fusca*”.

Diagnosis.— Length of fore wing about 2 mm; mesoscutum rather coarsely punctate, but sparsely so posteriorly; scutellum flat and smooth; vein r of fore wing distinctly angled, and vein 2-SR rather wide; propodeum without costulae, largely smooth, sparsely punctate, and no complete areola; first tergite finely longitudinally rugose; length of first tergite about 1.5 times its apical width, tergite largely parallel-

sided and without weak tubercle antero-medially (fig. 338); second tergite smooth, with only shallow diverging grooves anteriorly; second metasomal suture absent; ovipositor sheath moderately wide and acute apically; length of ovipositor sheath about as long as hind tibia; body, hind coxa and antenna black; middle coxa, dorsal face of all femora, hind tibia (except basally), all tarsi, and mandible light brown; for femur ventrally, fore tibia, middle tibia ventrally, tegulae and palpi yellow; pterostigma brown. For additional details, see Walker (1994).

Biology.— Reported by Walker (1994) to parasitize the internally feeding noctuid host: *Busseola fusca*.

Distribution.— Afrotropical: only known from Ethiopia.

Dolichogenidea oryzae Walker, 1994
(fig. 335)

Dolichogenidea oryzae Walker, 1994: 426, figs 16, 28.

Material.— See Walker (1994). Figured specimen: paratype ♀ (CIRAD), "R.C.I. [= Ivory Coast], Korhogo, tiges de riz, P.O.CIDT, xi.1979, Bordat, 1219".

Diagnosis.— Length of fore wing 2.5-3.1 mm; mesoscutum rather coarsely and densely punctate; scutellum flat and sparsely punctate; vein r of fore wing distinctly angled; propodeum with distinct costulae, and more or less complete areola and coarsely rugose-punctate; first and second metasomal tergites coarsely and densely reticulate-rugose; length of first tergite 0.7-0.9 times its apical width, widened apically and with tubercle medio-anteriorly (fig. 335); second tergite completely sculptured, without diverging grooves; second metasomal suture distinct, crenulate (fig. 335); ovipositor sheath wide and truncate apically densely setose; length of ovipositor sheath 0.5 times fore wing and 1.2 times hind tibia; head, mesosoma, first and second (and sometimes third) tergites black; fore and middle legs, apex of hind coxa, hind femur and basal two thirds of hind tibia yellow; third usually and sometimes fourth, tergites (largely) yellow; antenna, remaining tergites, apical third of hind tibia and tarsus, and base of hind coxa (dark) brown; pterostigma brown. For additional details, see Walker (1994).

Biology.— A solitary parasite of crambid stemborers in rice: *Chilo diffusilineus*, *C. zacconius*, and *C. spp.* (Walker, 1994).

Distribution.— Afrotropical: West Africa (Senegal, Niger, Ivory Coast; Walker, 1994).

Dolichogenidea polaszeki Walker, 1994
(figs 336, 337)

Dolichogenidea polaszeki Walker, 1994: 426-427, figs 17, 23, 25.

Material.— See Walker (1994). Figured specimen: ♀ paratype (BMNH), "Nigeria: Iresaakpa, 105 km N. Ibadan, J.A. Ubeku", "ex larvae *E. saccharina*, coll. 22.x.1991, em. 1-4.xi.1991".

Diagnosis.— Length of fore wing 2.9-3.3 mm; mesoscutum rather coarsely and densely punctate; scutellum flat and sparsely punctate; propodeum without distinct costulae, coarsely punctate, and partly rugose posteriorly; vein r of fore wing hardly

angled, forming an even curve with vein 2-SR and vein 2-SR slender; first tergite punctate-rugulose, parallel-sided (fig. 337); length of first tergite about 1.3 times its apical width, parallel-sided and with indistinct tubercle medio-anteriorly (fig. 337); second tergite smooth, transverse, with short curved grooves anteriorly (fig. 337); second metasomal suture shallow, smooth; ovipositor sheath moderately wide and acute apically, densely setose (fig. 336); length of of ovipositor sheath 0.5 times fore wing and 1.5-1.8 times hind tibia; body black, except basal sternites laterally; sternites laterally (often with brown markings), legs (except brown fore and middle coxae, and black hind coxa), and tegulae yellow; antenna brown, sometimes apical segments paler; pterostigma pale yellow or whitish, sometimes almost hyaline. For additional details, see Walker (1994).

Biology.— A solitary parasite, known from the following stem borer hosts: Noctuidae: *Poconoma* spec., *Sesamia calamistis*, *S. botanephaga* Tams & Bowden, 1953, *S. spec.*; Crambidae: *Chilo partellus*; Pyralidae: *Eldana saccharina* (Walker, 1994), *Busseola fusca* (previously unpublished record).

Distribution.— Afrotropical: Nigeria, Ghana, Benin, Uganda, Malawi (Walker, 1994), Kenya, Zambia (previously unpublished records).

Genus *Glyptapanteles* Ashmead, 1904
(figs 345-351)

Glyptapanteles Ashmead, 1904a: 147; Shenefelt, 1972: 430 (as synonym of *Apanteles* Foerster, 1862); Mason, 1981: 105-107 (as separate genus); Papp, 1988: 152 (id.); Austin & Dangerfield, 1992: 32-33 (id.); Maetô, 1996: 43 (id.). Type species (by monotypy): *Glyptapanteles manilae* Ashmead, 1904 [not *Apanteles manilae* Ashmead, 1904; = *A. ashmeadi* Wilkinson, 1928].

Very large genus with about 1000 species; differs mainly from the genus *Cotesia* by the shape of the first and second tergites. The Afrotropical species are not revised except for those from Zaïre (De Saeger, 1944) and from Madagascar (Granger, 1949).

Biology.— Mostly gregarious parasites of larvae of especially Macrolepidoptera.
Distribution.— Cosmopolitan.

Key to Afrotropical species of *Glyptapanteles* parasitic on cereal stem borers

1. Vein r of fore wing distinctly angled with vein 2-SR of fore wing and vein 2-SR more robust (fig. 349); ovipositor sheath thick and rounded apically (fig. 345); hind femur completely yellow; first tergite gradually narrowed apically (fig. 346) *G. maculitarsis* (Cameron)
- Vein r of fore wing hardly angled, more or less forming with vein 2-SR of fore wing a weak, even curve and vein 2-SR slender (fig. 351); ovipositor sheath thin and acute apically (fig. 348); hind femur at least partly (dark) brown; first tergite only apically narrowed (fig. 350) *G. africanus* (Cameron)

Glyptapanteles africanus (Cameron, 1911)
(figs 348, 350, 351)

Apanteles africanus Cameron, Jan. 1911a: 206-207 (not Viereck, April 1911); Shenefelt, 1972: 436.

Glyptapanteles africanus; Walker, 1994: 428, figs 5, 4, 18.

Apanteles beneficus Viereck, 1911: 175; Shenefelt, 1972: 436.

Apanteles cameroni Brues, 1924: 145; Shenefelt, 1972: 436.

Material.— See Walker (1994). Figured specimen: ♀ (BMNH), “Mali, Santolo, 17.x.1978, ex larve *Acigona ignefusalis*, Doumbia, no. 3”.

Diagnosis.— Length of fore wing about 2 mm; mesoscutum finely punctate; scutellum flat and smooth; vein r of fore wing hardly angled, more or less forming with vein 2-SR of fore wing a weak, even curve and vein 2-SR slender (fig. 351); propodeum, first and second metasomal tergites smooth; length of first tergite about 2.2 times its apical width, and only apically narrowed (fig. 350); second tergite with shallow diverging grooves (fig. 350); second metasomal suture indistinct; ovipositor sheath thin and acute apically (fig. 350); length of ovipositor sheath 0.1 times fore wing and 0.2 times hind tibia; body, coxae and antenna black; hind femur, tibia, tarsi, and basal half of middle femur usually dark brown; hind femur and apical half of hind tibia sometimes yellow; pterostigma brown. For additional details, see Walker (1994).

Biology.— Reported by Walker (1994) to parasitize the stem borer hosts *Chilo partellus* and *Coniesta ignefusalis* (Crambidae), and several external feeding hosts belonging to the Lymantriidae, and Notodontidae.

Distribution.— Widespread species, occurring in the Afrotropical (Nigeria, Ghana, Mali, Uganda, Kenya, Zimbabwe, Mali, Mozambique and South Africa) and Oriental regions (India, Pakistan).

Glyptapanteles maculitarsis (Cameron, 1904)
(figs 345-347, 349)

Apanteles maculitarsis Cameron, 1904: 173; Shenefelt, 1972: 563-564.

Glyptapanteles maculitarsis [sic!]; Walker, 1994: 428-429, figs 3, 6, 19, 24.

Glyptapanteles maculitarsis; Peigler, 1996: 43.

Apanteles capensis Cameron, 1907: 203; Shenefelt, 1972: 563.

Apanteles testaceioventris Cameron, Jan. 1911a: 208; Shenefelt, 1972: 563.

Apanteles testaceolineatus Cameron, Jan. 1911a: 208; Shenefelt, 1972: 563.

Apantels africanus Viereck, April 1911: 174; Shenefelt, 1972: 563.

Material.— See Walker (1994). Figured specimen: ♀ (PPRI), “South Africa, Delmas, TvL [= Transvaal], 26.ii.1987, R. Kfir”, “ex larve of *Busseola fusca* on maize”.

Diagnosis.— Length of fore wing 2.7-2.9 mm; mesoscutum finely punctate; scutellum convex and smooth; vein r of fore wing distinctly angled and vein 2-SR rather robust (fig. 349); propodeum mainly rugulose; apical half of first metasomal tergite mainly punctate-rugulose, remainder smooth; length of first tergite about 2.5 times its apical width, and gradually narrowed (fig. 346); second tergite with distinct diverging grooves and punctate-rugulose near grooves (fig. 346); second metasomal suture distinct; ovipositor sheath thick and rounded apically (fig. 346); length of ovipositor sheath 0.1 times fore wing and 0.2 times hind tibia; body, hind coxa and antenna black; fore and middle legs, hind femur, hind tibia (except apex), tegulae, lateral compressed areas of three basal sternites yellow; apex of hind tibia, apical half of hind basitarsus, and remaining of tarsus light brown; sometimes membranous lateral areas of first and second tergites yellow; pterostigma light brown. For additional details, see Walker (1994)..

Biology.— Reported by Walker (1994) and Peigler (1996) to parasitize the internal feeding noctuid host *Busseola fusca* and several external feeding hosts belonging to

the Lasiocampidae, Noctuidae, and several species of Saturniidae.

Distribution.— Afrotropical (widespread): Sierra Leone, Nigeria, Kenya, Tanzania, Uganda and South Africa.

Subfamily Orgilinae Foerster, 1862

Genus *Orgilus* Haliday, 1833

(figs 352, 353)

- Orgilus* Haliday, 1833: 262; Shenefelt, 1970: 252-263; van Achterberg, 1987a: 55 (key to (sub)genera), 1994: 180 (key to genera). Type species (by monotypy): *Microdus obscurator* Nees, 1814.
- Ischius* Wesmael, 1837: 20; Shenefelt, 1970: 253. Type species (by monotypy): *Microdus obscurator* Nees, 1814.
- Macropalpus* Ratzeburg, 1844: 56; Shenefelt, 1970: 253. Type species (by monotypy): *Eubadizon leptcephalus* Hartig, 1838.
- Oresimus* Ashmead, 1900a: 123; Shenefelt, 1970: 253. Type species (by original designation): *Eubadizon maculiventris* Cresson, 1872.
- Orgilomorpha* Ashmead, 1900a: 123; Shenefelt, 1970: 253. Type species (by original designation): *Ganychorus gelechiae* Ashmead, 1889.
- Ischiolus* Hellén, 1958a: 34, 36; Shenefelt, 1970: 252; van Achterberg, 1987a: 55-56 (as subgenus of *Orgilus*). Type species (by monotypy): *Microgaster rugosus* Nees, 1834.
- Afrorgilus* van Achterberg, 1987a: 57-58 (as subgenus of *Orgilus*). Type species (by original designation): *Orgilus caudatus* Granger, 1949.
- Anakogilus* van Achterberg, 1987a: 63-64 (as subgenus of *Orgilus*). Type species (by original designation): *Orgilus tenuis* Muesebeck, 1970.
- Aporgilus* van Achterberg, 1987a: 67 (as subgenus of *Orgilus*). Type species (by original designation): *Orgilus gauldi* van Achterberg, 1987.

Diagnosis.— Length of fore wing less than 10 mm; scapus robust, apically subtruncate; clypeus without tubercles, apically straight; malar suture absent or only as a shallow depression; propleuron convex ventrally; scutellum without medio-posterior depression; vein 1-SR of fore wing absent; vein 1-M of fore wing more or less curved (fig. 352); vein r-m of fore wing absent, at most with a minute remnant; posterior margin of hind wing convex or nearly straight subbasally (fig. 352); vein cu-a of hind wing vertical or weakly reclivous; vein M+CU of hind wing subequal to vein 1-M or longer (fig. 352); basal cell of hind wing medium-sized to large (fig. 352); first metasomal tergite sessile or subsessile (fig. 353); second tergite usually sculptured and without depressions.

Biology.— Endoparasites of lepidopterous larvae: Pyralidae, Coleophoridae, Gelechiidae, Oecophoridae, Psychidae, Gracillariidae and Tortricidae.

Distribution.— Cosmopolitan.

Orgilus bifasciatus Turner, 1922

(figs 352, 353)

Orgilus bifasciatus Turner, 1922: 276; Shenefelt, 1970: 254; Carnegie, 1991: 6; Conlong, 1990: 111, 113, 114, 1993: 10.

Material.— 1 ♀ (PPRI), "South Africa, Richards Bay, Natal, xi.1982, D. Conlong", "ex pupa [sic!] of *Eldana saccharina* on *Papyrus*", "*Orgilus bifasciatus* Turner, det. T. Huddleston, 1983"; 3 ♀♀ + 1 ♂ (PPRI, RMNH) "He 1"; 3 ♀♀ + 1 ♂ (PPRI, BMNH) "S[outh]. A[frica]., Natal, i.1992, D. Conlong"; 1 ♂ (PPRI), "South Africa, Natal, Umvoti River on *Papyrus*, 26.ix.1991, Sasex 794, D. Conlong"; 1 ♀ + 1 ♂ (PPRI, RMNH) "South Africa: Natal, SASA SEx 709a, ex *Eldana* L3 on sugarcane".

Diagnosis.— Length of body 4-5 mm, and of fore wing about 3 mm; antennal segments about 34, length of antenna about 1.4 times fore wing; mesoscutum rather coarsely and densely punctate; scutellum strongly convex, rather sparsely punctate; propodeum densely and finely rugulose; length of first tergite 1.1-1.2 times its apical width; first and second metasomal tergites densely rugulose, second tergite coarser sculptured than first one; second tergite 0.7 times longer than basally wide; second and third tergites with shallow transverse depression submedially, especially laterally (fig. 353); third and fourth tergites finely and densely aciculate, except posteriorly (fig. 353), fourth tergite finer sculptured than third one; second-fourth tergites with lateral crease; fifth and following tergites largely smooth; length of ovipositor 1.15-1.20 times fore wing, somewhat shorter than body; black, with apical 0.4 of first tergite, base of middle and hind tibiae, and hind spurs ivory; hind wing subhyaline; fore wing of ♀ fasciate, membrane dark brown interrupted by a pale band below parastigma and base of pterostigma (fig. 352), fore wing of ♂ mainly subhyaline; basal half of antenna dark brown or brown, and its apical third blackish or dark brown, and antenna of ♀ with narrow or wide yellowish submedial band. Males have second tergite partly ivory, antenna without yellowish band and wings mainly subhyaline

Biology.— Endoparasite of pyralid stemborers: *Eldana saccharina* (according to Conlong, 1990).

Distribution.— Afrotropical: South Africa.

Acknowledgements and abbreviations

We wish to thank Dr O. Ajayi (Kano), Prof. Dr B. Bassa and Dr V. Caleca (Palermo), Drs J. Casewitz-Weulersse, M. LaChaise and C. Villemant (Paris), Mrs M.A. Cochrane (Cape Town), Dr D. Conlong (Mount Edgecombe), Dr E. De Coninck (Tervuren), Mr D. Cugala (Maputo), Dr J. Deeming (Cardiff), Dr. G. Delvare (Montpellier), Mr S. Djiba (Ziguinchor), Dr E. Haeselbarth and Mr E. Diller (München), Mr T. Huddleston and Ms A.K. Walker (London), Dr S. Wangari-Kimani-Njogu (Nairobi), Dr F. Koch and Mrs A. Kleine-Möllhoff (Berlin), Dr K. Maetô (Ibaraki), Dr P.M. Marsh (Washington), Dr W.A. Overholt (Nairobi), Dr J. Papp (Budapest), Dr G. Phiri (Makoka), Dr D.J.L. Quicke (London), Mrs G. Simbolotti (L'Aquila), Dr R.A. Wharton (College Station), and Mr K.W.R. Zwart (Wageningen) for the loan of the specimens or providing information. The research was partly financed by the Directorate General for International Cooperation of the Netherlands Government (DGIS) of the Ministry of Foreign Affairs under the project "Cereal stem borers and their parasitoids in Africa".

Material has been examined from the following collections (abbreviations used in text are in brackets): The Natural History Museum, London, U.K. (BMNH); Centre de Coopération Internationale en Recherche Agronomique pour le Développement, Montpellier, France (CIRAD); International Centre of Insect Physiology and Ecology, Nairobi, Kenya (ICIPE); International Crops Research Institute for the Semi-Arid Tropics, Kano, Nigeria (ICRISAT); International Institute of Tropical Agriculture, Cotonou, Benin (IITA); Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (IRSNB); Kawanda Perennial Crops Research Station, Uganda (KPCRS); Laboratorium voor Entomologie, Landbouuniversiteit, Wageningen, The Nether-

lands (LUW); Muséum National d'Histoire Naturelle, Paris (MNHN); Musée Royal de l'Afrique Centrale, Tervuren, Belgium (MRAC); Makoka Research Station, Malawi (MRSM); National Cereals Research Institute, Moor Plantation substation, Nigeria (NCRI/MP); National Museums of Kenya, Nairobi (NMK); Plant Protection Research Institute, Pretoria, South Africa (PPRI); Nationaal Natuurhistorisch Museum, Leiden, The Netherlands (RMNH); South African Sugar Association Experiment Station, Mount Edgecombe, South Africa (SASA).

References

- Achterberg, C. van, 1979. A revision of the Amicrocentrinae, a new subfamily (Hymenoptera, Braconidae), with the description of the final larval instar *Amicrocentrum curvoineirois* by J.R.T. Short.— Tijdschr. Ent. 122: 1-28, figs 1-68.
- Achterberg, C. van, 1982a. Notes on some type-species described by Fabricius of the subfamilies Braconinae, Rogadinae, Microgastrinae and Agathidinae (Hymenoptera, Braconidae).— Ent. Ber., Amst. 42: 133-139, figs. 1-9.
- Achterberg, C. van, 1982b. Revisionary notes on *Chelonus* Jurine and *Anomala* von Block (Hymenoptera, Braconidae, Cheloninae).— Ent. Ber., Amst. 42: 185-190, figs. 1-37.
- Achterberg, C. van, 1983. Three new Palaearctic genera of Braconinae (Hymenoptera, Braconidae).— Ent. scand. 14: 69-76, figs. 1-37.
- Achterberg, C. van & E. Haeselbarth, 1983. Revisionary notes on the European species of *Macrocentrus* Curtis sensu stricto (Hymenoptera, Braconidae).— Entomofauna 4: 37-59, figs 1-55.
- Achterberg, C. van, 1987a. Revisionary notes on the subfamily Orgilinae (Hymenoptera, Braconidae).— Zool. Verh. Leiden 242: 1-111, figs 1-246, table 1.
- Achterberg, C. van, 1987b. *Chelonus* Panzer, 1806 (Insecta, Hymenoptera) and *Anomala* Samouelle, 1819 (Insecta, Coleoptera): proposed conservation.— Bull. zool. Nom. 44(3): 172-173.
- Achterberg, C. van & S.A. Belokobylskij, 1987. Revisionary notes on the Macrocentrinae from the Far East USSR (Hymenoptera, Braconidae).— Zool. Med. Leiden 61: 243-262, figs 1-100.
- Achterberg, C. van, 1988. Revision of the subfamily Blacinae Foerster (Hymenoptera, Braconidae).— Zool. Verh. Leiden 249: 1-324, figs 1-1250.
- Achterberg, C. van, 1990. Revision of the Western Palaearctic Phanerotomini (Hymenoptera: Braconidae).— Zool. Verh. 255: 1-106, figs 1-360.
- Achterberg, C. van, 1993a. Revision of the genus *Tropobracon* Cameron (Hymenoptera: Braconidae).— Zool. Med. Leiden 67 (4): 49-62, figs 1-32.
- Achterberg, C. van, 1993b. Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea).— Zool. Verh. 283: 1-189, figs 1-66, photos 1-140, plates 1-102.
- Achterberg, C. van, 1993c. Revision of the subfamily Macrocentrinae Foerster (Hymenoptera: Braconidae) from the Palaearctic region.— Zool. Verh., Leiden 286: 1-110, figs 1-494.
- Achterberg, C. van, 1994. Two new genera of the tribe Orgilini Ashmead (Hymenoptera: Braconidae: Orgilinae).— Zool. Med. Leiden 68: 173-190, figs 1-88.
- Agassiz, L.J.R., 1846. Nomenclator Zoologicus Index Universalis, ...II. Nomina Systematica Generum Hymenopterorum: i-viii, 1-36.— Recognoverunt.
- Agyen-Sampong, M., 1980. Parasites of rice pests of mangrove swamps of northern Sierra Leone.— WARDA/ADRAO Technical Newsletter 2, 1-3.
- Agyen-Sampong, M. & Fannah, S.J., 1987. Seasonality of the white rice borer *Maliarpha separata* Rag. (Lepidoptera: Pyralidae) in the mangrove swamp rice ecology of Northwest Sierra Leone. WARDA/ADRAO Technical Newsletter 7(1): 4-7.
- Appert, J., 1967. Les insectes nuisibles aux cultures de Madagascar (notes techniques).— Bull. Agron. 22: 1-177.
- Appert, J., 1973. Entomofaune parasitaire des foreurs des graminées a Madagascar.— Entomophaga 18: 77-94.
- Ashmead, W.H., 1889. Descriptions of new Braconidae in the collection of the U. S. National Museum.— Proc. U. S. nat. Mus. 11: 611-671.
- Ashmead, W.H., 1890. On the Hymenoptera of Colorado.— Bull. Colo. biol. Ass. 1: 1-47.
- Ashmead, W.H., 1898. Notes on parasitic Hymenoptera [by G. Dimmock]. Part 2. Descriptions of new parasitic Hymenoptera.— Proc. ent. Soc. Wash. 4(1897): 155-171.

- Ashmead, W.H., 1900a. Classification of the Ichneumon flies, or the superfamily Ichneumonoidea.— Proc. U. S. natn. Mus. 23: 1-220.
- Ashmead, W.H., 1900b. Notes on some New Zealand and Australian parasitic Hymenoptera, with description of new genera and new species.— Proc. Linn. Soc. N.S.W. 25: 327-360.
- Ashmead, W.H., 1904a. Descriptions of new genera and species of Hymenoptera from the Philippine Islands.— Proc. U. S. nat. Mus. 28: 127-158.
- Ashmead, W.H., 1904b. A list of the Hymenoptera of the Philippine Islands, with descriptions of new species.— J. N. Y. ent. Soc. 12: 1-22.
- Austin, A.D. & P.C. Dangerfield, 1992. Synopsis of Austrasian Microgastrinae (Hymenoptera: Braconidae), with a key to genera and description of new taxa.— Invertebr. Taxon. 6: 1-76, figs 1-113.
- Badawy, A., 1967. Dura stem borers and their parasites in the Sudan.— Bull. Soc. Ent. Egypte 51: 233-241.
- Baker, C.F., 1926. Braconidae-Cheloninae of the Philippines, Malaya, and Australia. 1. Chelonini (except *Chelonus*).— Philipp. J. Sci. 31: 451-489.
- Belokobylskij, S.A. & V.I. Tobias, 1986. Doryctinae: 21-72. In: Medvedev, G.S. (ed.). Opredelitel nasekomykh Evropeiskoi tchasti SSSR 3, Perepontchatokrylye 4.— Opr. Faune SSSR 145: 1-501, figs 1-263. Translation 1995: 28-117.— Lebanon, U.S.A.
- Bennett, F.D., Cock, M.J.W. & Diaz, F.A., 1983. *Allorhogas* sp. n. (braconids) a potential biological control agent for graminaceous stem borers from Mexico.— Entomology Newsletter, Int. Soc. Sugar-cane Technologists 14: 9-12.
- Bess, H.A., 1972. Lepidopterous stem borers in different rice growing areas.— Mushi 46: 65-80.
- Betbeder-Matibet, M., 1971. La lutte biologique contre *Chilo sacchariphagus* le "borer ponctué" de la canne à sucre à Madagascar.— Agron. Tropicale 26(3): 332-336.
- Bianchi, G., J., V. Delucchi, P. Bousses & N. Rahalivavololona, 1991. La lutte biologique contre le borer blanc Africain du riz *Maliarpha separatella* Rag. à Madagascar. Etude de faisabilité.— Unpublished report: 1-71.
- Bingham, C.T., 1901. Description of two new species of *Bracon* from Bengal.— Ann. Mag. nat. Hist. 8: 555-557.
- Bhalla, O.P. & Venkatraman, T.V. 1963. Ecological studies on *Vipio deesae* (Cam.) (Braconidae: Hymenoptera), a parasite of maize and jowar stalk borer, *Chilo zonellus* (Swinh.).— Indian J. Ent. 25: 36-47.
- Block, L.H. von, 1799. Verzeichnis der merkwürdigsten Insekten. In: W.G. Becker. Der Plauische Grund bei Dresden, mit Hinsicht auf Naturgeschichte und schöne Gartenkunst: 95-120.— Nürnberg.
- Bogachev, A.V., 1939. Investigations on the fauna in the Kirovabad area.— Izv. azerbaidzh. Fil. Akad. Nauk S.S.S.R 3: 135-137.
- Bogoljubov, S., 1914. Eine neue Schlupfwespenart (*Habrobracon* sp.). Parasit der Raupe von *Heliothis armigera* Hb.; ihre Biologie und Bedeutung für die Landwirtschaft.— Turkest. sel. Khoz. 9: 281-291.
- Bordat, D., 1979. Sonages effectués en Côte d'Ivoire concernant les foreurs du riz et leurs parasites.— Unpublished report (IRAT, Montpellier): 1-40.
- Bosque-Pérez, N.A., J.A. Ubeku & A. Polaszek, 1995. Survey for parasites of *Sesamia calamistis* (Lepidoptera: Noctuidae) and *Eldana saccharina* (Lepidoptera: Pyralidae) in southwestern Nigeria.— Entomophaga 39 (1994): 367-376.
- Brenière, J., Rodriguez, H. & Ranaisova, H., 1962. Un ennemi de riz à Madagascar, *Maliarpha separatella* Rag. ou borer blanc.— Agron. Tropicale 17: 223-302.
- Brenière, J., 1977. Etude des possibilités de concertation en matière de lutte biologique et intégrée. Réunion sur les foreurs desgraminées. Bouaké, Côte d'Ivoire, 8-11 Novembre.— Annexe III, 13 pp.
- Brêthes, J., 1909. Himenópteros nuevos de las Republicas del Plata y del Brazil.— An. Mus. nac. Hist. nat. B. Aires 19: 49-60.
- Brues, C.T., 1924. Some South African parasitic Hymenoptera of the families Evaniidae, Braconidae, Alysiidae, and Plumariidae in the South African Museum with a catalogue of the known species.— Ann. S. Afr. Mus. 19: 1-150.
- Brues, C.T., 1926. Studies on Ethiopian Braconidae, with a catalogue of the African species.— Proc. Am. Acad. Arts Sci. 61: 205-436.
- Brullé, A., 1846. Hyménoptères. In: Lepeletier de St. Fargeau, A.L.M., 1846. Histoire naturelle des insectes 4: 1-689.— Paris.
- Cameron, P., 1891. Hymenopterological notices.— Mem. Manchr lit. phil. Soc. 4: 182-194.
- Cameron, P., 1902. Descriptions of new genera and species of Hymenoptera collected by Major C.S.

- Nurse at Deesa, Simla and Ferozepore.— J. Bombay nat. Hist. Soc. 14: 267-293 + 419-449.
- Cameron, P., 1903. Descriptions of new genera and species of Hymenoptera taken by Mr. Robert Shelford at Sarawak, Borneo.— J. Straits Brch Asiat. Soc. 39: 89-181.
- Cameron, P., 1904. On the Hymenoptera of the Albany Museum, Grahamstown, South Africa.— Rec. Albany Mus. 1: 161-175.
- Cameron, P., 1905. On the phytophagous and parasitic Hymenoptera collected by Mr. E. Ernest Green in Ceylon.— Spolia zeylan. 3: 67-97.
- Cameron, P., 1906a. On the hymenopterous parasites of the mealie stalk borer (*Sesamia fusca*, Hampson).— Trans. S. Afr. phil. Soc. 16: 334-336.
- Cameron, P., 1906b. Descriptions of new species of parasitic Hymenoptera chiefly in the collection of the South African Museum, Cape Town.— Ann. S. Afr. Mus. 5: 17-186.
- Cameron, P., 1907. Descriptions of species of parasitic Hymenoptera, chiefly in the collection of the South African Museum, Cape Town.— Ann. S. Afr. Mus. 5: 203-225.
- Cameron, P., 1910a. On some Asiatic species of the subfamilies Exothecinae, Spathiinae, Hormioinae, Cheloninae and Macrocentrinae in the Royal Berlin Zoological Museum.— Tijdschr. Ent. 53: 41-55.
- Cameron, P., 1910b. Ueber einige asiatische Arten der Schlupfwespengattung *Bracon* F. im Kgl. Zoologischen Museum zu Berlin.— Int. ent. Z. 3: 277-278 + 281-282.
- Cameron, P., 1910c. On some Asiatic species of the subfamilies Spathiinae, Doryctinae, Rhogadinae, Cardiochilinae and Macrocentrinae in the Royal Berlin Zoological Museum.— Wien. ent. Ztg. 29: 93-100.
- Cameron, P., 1910d. On some Asiatic species of the subfamilies Braconinae and Exothecinae in the Royal Berlin Museum.— Societas ent. 25: 11, 12, 14-16, 19, 20, 22, 23, 25, 26.
- Cameron, P., 1911a. On the parasitic Hymenoptera collected by Mr. A.J.T. Janse, Transvaal.— Ann. Transv. Mus. 2: 173-217.
- Cameron, P., 1911b. On a collection of parasitic Hymenoptera (chiefly bred) made by Mr. W.W. Froggatt, F.L.S., in New South Wales, with descriptions of new genera and species.— Proc. Linn. Soc. N. S. W. 36: 333-345.
- Cameron, P., 1912. On the Hymenoptera from Belgian Congo in the Congo Museum, Tervueren.— Anns Soc. ent. Belg. 56: 357-401.
- Carnegie, A.J.M., 1991. Cane borers in Africa and recent work on *Eldana saccharina*.— Discussion document, International Society of sugarcane Technologists' Workshop, West Palm Beach, Florida, 11-15 March, 1991, 11 pp.
- Castilho, H.J., P.S.M. Botelho, N. Macedo & J.R. de Araujo, 1989. Avaliacao de *Allorhogas pyralophagus* (Marsh, 1984) (Hymenoptera: Braconidae) como ectoparasitoide de broca de cana-de-acucar, *Diatraea saccharalis* (Fabricius, 1794) (Lepidoptera: Pyralidae).— An. Soc. Ent. Bras. 18: 75-89.
- Cherian, M.C. & Israel, P., 1938. *Stenobracon nicevillei* Bingh. [Hym. Brac.], a natural enemy of sugarcane white moth borer [*Scirpophaga*].— Bull. ent. Res. 29: 99-102.
- Chishti, M.J.K. & D.L.J. Quicke, 1996. A revision of the Indo-Australian species of *Stenobracon* (Hymenoptera: Braconidae) parasitoids of lepidopterous stem borers of graminaceous crops.— Bull. ent. Res. 86: 227-245, figs 1-38.
- Chou, L-Y. & M.J. Sharkey, 1989. The Braconidae (Hymenoptera) of Taiwan. I. Agathidinae.— J. Taiwan Mus. 42: 147-233, figs 1-309.
- Clausen, C.P. & Oatman, E.R., 1978. Crambidae: 176-183 In: Clausen, C.P. (ed.). Introduced parasites and predators of arthropod pests and weeds: a world review.— Agriculture Handb. agric. Res. Serv. 480: 1-545.
- Conlong, D.E., 1990. A study of pest-parasitoid relationships in natural habitats: an aid towards the biological control of *Eldana saccharina* Walker (Lepidoptera: Pyralidae) in sugarcane.— Proc. South African Sugar Technologists' Association 64: 111-115.
- Conlong, D., 1993. Directory of South African insect rearers.— S.A. Sugar Assoc., Natal: 1-19.
- Curtis, J., 1833. British Entomology, 5. Hymenoptera.— London.
- Descamps, M., 1956. Insectes nuisibles au riz dans le Nord Cameroun.— Agron. Trop. 11: 732-755.
- Enderlein, G., 1920. Zur Kenntnis aussereuropäischer Braconiden.— Arch. Naturgesch. (A)84: 51-224, figs 1-11.
- Étienne, J., 1977. Lutte contre les foreurs des graminées à la Réunion. IRAT Réunion, Annexe VI: 1-4.— Réunion sur les foreurs des graminées. Bouaké, Côte d'Ivoire, 8-11 Novembre.
- Étienne, J., 1987. Les problèmes entomologiques actuels en riziculture casamançaise.— Agron. Tropicale 42: 47-60.

- Fabricius, J.C., 1804. *Systema Piezatorum*: 1-439.— Brunsvigae.
- Fahringer, J., 1926. *Opuscula braconologica*. 1. Palaearktischen Region 2-3: 61-220.
- Fahringer, J., 1927. *Opuscula braconologica*. 1. Palaearktischen Region 4-6: 221-432.
- Fahringer, J., 1928. Braconiden-Studien (Hym.).— *Ent. Mitt.* 17: 21-29.
- Fahringer, J., 1935. *Opuscula braconologica*. 2. Aethiopische Region 6-8: 385-635.
- Fischer, M., 1959. Neue und wenig bekannte Braconiden aus Jugoslawien (Hymenoptera).— *Acta Mus. maced. Sci. nat.* 6: 1-25.
- Foerster, A., 1862. Synopsis der Familien und Gattungen der Braconen.— *Verh. naturh. Ver. preus. Rheinl.* 19: 225-288.
- Gahan, A.B., 1928. Some reared parasitic Hymenoptera from Sudan.— *Bull. ent. Res.* 19: 255-257.
- Genieys, P., 1925. *Habrobracon brevicornis* Wesm.— *Anns ent. Soc. Am.* 18: 143-202.
- Giraud, J., 1869. Observations hyménoptérologiques. III. Des galles d'un Lépidoptère sur le *Limoniastrum guyonianum*, et des parasites qui les habitent.— *Anns Soc. ent. Fr.* (4)9: 469-488.
- Goidanich, A., 1934. Materiali per lo studio degli Imenotteri Braconidi. II, III.— *Boll. Ist. Ent. Univ. Bologna* 6: 209-230, 246-261.
- Goulet, H. & J.T. Huber, 1993. Hymenoptera of the world: an identification guide to families: i-vii + 1-668, figs 1-231.— Ottawa.
- Granger, C., 1949. Braconides de Madagascar.— *Mém. Inst. scient. Madagascar. Sér. A (II)*: 1-428, figs 1-426.
- Haeselbarth, E., 1978. Notizen zur Gattung *Macrocentrus* Curtis (Hymenoptera: Braconidae). II. Zur Trennung von *M. bicolor* Curtis, *M. thoracicus* (Nees) und einiger verwandter Arten.— *Nachr. Bl. bayer. Ent.* 27: 25-32, figs 1-10.
- Haeselbarth, E. & C. van Achterberg, 1981. *Macrocentrus rossemi* sp. n., eine neue Art der *thoracicus*-Gruppe (Hymenoptera, Braconidae).— *Ent. Ber., Amst.* 41: 157-160, figs 1-12.
- Haliday, A.H., 1833. An essay on the classification of the parasitic Hymenoptera of Britain, which correspond with the Ichneumonones minuti of Linnaeus.— *Ent. Mag.* 1: 259-276.
- Haliday, A.H., 1834. Essay on parasitic Hymenoptera.— *Ent. Mag.* 2: 225-259.
- Harris, K.M., 1962. Lepidopterous stem borers of cereals in Nigeria.— *Bull. Ent. Res.* 53: 139-171.
- Harris, K.M., (in prep.). Diptera. In: Polaszek, A. (ed.). Cereal stem borers in Africa: economic importance, taxonomy, natural enemies and control.
- Hawkins, B.A., Browning, H.W. & Smith, J.W. Jr., 1987. Field evaluation of *Allorhogas pyralophagus* (Hym.: Braconidae), imported into Texas for biological control of the stalk borer *Eoreuma loftini* (Lepidoptera: Pyralidae) in sugarcane.— *Entomophaga* 32: 483-491.
- Hedwig, K., 1957. Ichneumoniden und Braconiden aus Iran 1954 (Hymenoptera).— *Jh. Ver. vaterl. Naturk. Württemb.* 112: 104-117.
- Hellén, W., 1958a. Zur Kenntnis der Braconiden (Hym.) Finnlands. II. Subfamilie Helconinae (part).— *Fauna Fenn.* 4: 3-37.
- Hellén, W., 1958b. Die *Chelonus*-Arten Finnlands (Hym., Brac.).— *Notul. ent.* 38: 25-36.
- Hincks, W.D., 1943. Nomenclature notes on Braconidae and Aphidiidae (Hym.).— *Entomologist* 76: 97-104.
- Huddleston, T., 1994. See Polaszek et al., 1994.
- Ingram, W.R., 1958. The Lepidopterous stalk borers associated with Graminae in Uganda.— *Bull. Ent. Res.* 49: 367-383.
- Ishida, M., 1915. Sugar cane borers in Formosa.— *Kansho Meichu Chosa Hokakū* 1: 97-109.
- Jayanth, K.P. & Nagarkatti, S., 1985. Mass rearing technique for a Mexican parasite, *Allorhogas* sp. (Hymenoptera: Braconidae) introduced for trials against graminaceous borers in India. *Entomon* 1: 43-46.
- Johnson, W.G., 1895. A new parasite of the Mediterranean flour moth *Ephestia kurhuela* [sic!] Zell.— *Ent. News* 6: 324-325.
- Jordan, F.J., 1966. Report on an investigation into the presence and prevalence of rice stem-borers and their parasites in Sierra Leone, 1964-1965.— *West African Rice Research Station, Rokupr, Sierra Leone & International Rice Research Institute, Los Baños, Philippines*, 47 pp. (cyclostyled report).
- Jurine, L., 1801. See Panzer, 1801.
- Kfir, R., 1990. Parasites of the spotted stalk borer, *Chilo partellus* (Lepidoptera: Pyralidae) in South Africa.— *Entomophaga* 35: 403-410.
- Kfir, R., 1995. Parasitoids of the African stem borer *Busseola fusca* (Fuller) (Lepidoptera: Noctuidae), in South Africa.— *Bull. ent. Res.* 85: 369-377.
- Kirkland, R.L., 1982. Biology of *Iphiaulax kimballi* (Hym.: Braconidae), a parasite of *Diatraea grandiosella* (Lep.: Pyralidae).— *Entomophaga* 27: 129-134.

- Kirkland, R.L., 1989. See Wharton et al., 1989.
- Kohl, F.F., 1906. Hymenopteren Südarabiens: 1-133, pls 1-11.
- Kotlyarova, L.A., 1986. Preservation of the beneficial fauna in rice crops. — Zashchita-Rastenii 6: 31.
- Kriechbaumer, J., 1894. Hymenoptera ichneumonidea a medico Dr. Joh. Brauns in itinere ad oras Africae occidentalis lecta.— Berl. ent. Z. 39: 43-68.
- La Croix, E.A.S., 1967. Maize stalk borers in the coast province of Kenya.— East Africa agric. For. J. 33: 49-54.
- La Munyon, I.W., 1877. New Hymenoptera. New Orthoptera.— Proc. Nebraska Ass. Adv. Sci. -.
- Lee, H.J. & Chippendale, G.M., 1985. Development of *Iphiaulax kimballi* (Hymenoptera: Braconidae), an ectoparasite of the southwestern corn borer, *Diatraea grandiosella* (Lepidoptera: Pyralidae).— J. Kansas ent. Soc. 58: 509-516.
- Maetô, K., 1992. Japanese species of the *Myosoma* generic group (Hymenoptera, Braconidae).— Jap. J. Ent. 60: 714.
- Maetô, K., 1996. Inter-generic variation in the external male genitalia of the subfamily Microgastrinae (Hymenoptera, Braconidae), with a reassessment of Mason's tribal system.— J. Hym. Res. 5: 38-52, figs 1-56.
- Marsh, P.M., 1979. Braconidae: 144-295. In: Krombein, K.V., P.D. Hurd, D.R. Smith & B.D. Burks (eds). Catalog of Hymenoptera in America north of Mexico (3 vols): 1-2735.— Washington.
- Marsh, P.M., 1984. A new species of Braconidae (Hymenoptera) from Mexico introduced into Texas to control a sugarcane borer, *Eoreuma loftini* (Lepidoptera: Pyralidae).— Proc. ent. Soc. Wash. 86: 861-863.
- Marsh, P.M., 1993. Descriptions of new western hemisphere genera of the subfamily Doryctinae (Hymenoptera: Braconidae).— Contr. Am. ent. Inst. 28: 1-58, figs 1-73.
- Masi, L., 1951. Missione biologica Sagan-Omo diretta dal Prof. Edoardo Zavattari (1939), Hymenoptera: Braconidae.— Annali Mus. civ. Stor. nat. Giacomo Doria 64: 310-326.
- Mason, W.R.M., 1978. A synopsis of the Nearctic Braconini with revisions of the Nearctic species of *Coeloides* and *Myosoma* (Hymenoptera: Braconidae).— Can. Ent. 110: 721-768, figs 1-95.
- Mason, W.R.M., 1981. The polyphyletic nature of *Apanteles* Foerster (Hymenoptera: Braconidae): a phylogeny and reclassification of Microgastrinae.— Mem. ent. Soc. Canada 115: 1-147, figs 1-110.
- Matsumura, S., 1910. Die schädlichen und nützlichen Insekten von Zuckerrohr Pflanzen Formosas. — Z. Morph. Ökol. Tiere 6: 136-139.
- Melton, C.W. & H.W. Browning, 1986. Life history and reproductive biology of *Allorhogas pyralophagus* (Hymenoptera: Braconidae), a parasite imported for release against *Eoreuma loftini* (Lepidoptera: Pyralidae).— Annls ent. Soc. Am. 79: 402-406.
- Milner, J.E.D., 1967. Final report on a survey of the parasites of graminaceous stem-borers in East Africa.— Commonwealth Institute of Biological Control (cyclostyled report).
- Mohyuddin, A.I. & D.J. Greathead, 1970. An annotated list of the parasites of graminaceous stem borers in East Africa, with a discussion of their potential in biological control.— Entomophaga 15: 241-274.
- Moutia, L.A. & Mamet, R., 1946. A review of twenty-five years of economic entomology in the island of Mauritius.— Bull. ent. Res. 36: 453-457.
- Narayanan, E.S., 1938. A note on *Stenobracon deesae* (Cam.). A new parasite of the root-borer of sugarcane.— Indian J. Agric. Science 8: 215-216.
- Narayanan, E.S. & K.P. Chaudhuri, 1954. Studies on *Stenobracon deesae* (Cam.), a parasite of certain Lepidopterous borers of graminaceous crops in India.— Bull. Ent. Res. 45: 647-659.
- Narayanan, E.S. & T.V. Venkatraman, 1952. Technique of mass multiplication of *Stenobracon deesae* (Cam.) Hymenoptera: Braconidae for use against sugarcane and maize borers.— Proc. Indian Acad. Sciences (B) 36: 12-18.
- Nason, W.A., 1905. Parasitic Hymenoptera of Algonquin, Illinois. II.— Ent. News 16: 293-298.
- Nees von Esenbeck, C.G., 1814. Ichneumonides adsciti, in genera et familias divisi.— Mag. Ges. Naturf. Fr. Berlin 6 [1812]: 183-221.
- Niezabitowski, E.L., 1910. Materyaly do fauny Brakonidów Polski 1.— Spraw. Kom. fizyogr. Krajow. 44: 47-106.
- Nixon, G.E.J., 1941. The Indian and African species of *Rhaconotus* Ruthe (Hym., Braconidae).— Ann. Mag. nat. Hist. (11) 7: 473-503.
- Nixon, G.E.J., 1974. A revision of the north-western European species of the *glomeratus*-group of *Apanteles* (Hymenoptera, Braconidae).— Bull. ent. Res. 64: 453-524, figs 1-76.
- Nixon, G.E.J., 1986. A revision of the European Agathidinae (Hymenoptera: Braconidae).— Bull. Br.

- Mus. nat. Hist. (Ent.) 52: 183-242, figs 1-68.
- Oatman, E.R., 1978. Gelechiidae: 185-190. In: Clausen, C.P. (ed.). Introduced parasites and predators of arthropod pests and weeds: a world review.— Agriculture Handb. agric. Res. Serv. 480: 1-545.
- Olliff, A.S., 1893. Report on a visit to the Clarence River District for the purpose of ascertaining the nature and extent of insect ravages in the sugar-cane crop.— Agri. Gaz. N.S.W. 4: 373-386.
- Omwea, C.O., Kimani, S.W., Overholt, W.A. & Ogot, C.K.P.O., 1995. Evidence of the establishment of *Cotesia flavipes* (Hymenoptera: Braconidae) in continental Africa.— Bull. ent. Res. 85: 525-530.
- Opinion 135 (1939). The suppression of the so called "Erlangen-List" of 1801.— Opin. Decl. int. Commn zool Nom: 9-12.
- Opinion 1546 (1989). *Chelonus* Panzer, 1806 (Insecta, Hymenoptera) and *Anomala* Samouelle, 1819 (Insecta, Coleoptera): names conserved.— Bull. zool. Nom. 46: 149-150.
- Pagliano, G. & P. Scaramozzino, 1990. Elenco dei generi di Hymenoptera del mondo.— Boll. Soc. ent. ital. (Suppl.) 122: 1-210.
- Panzer, G.W.L., 1801. Nachricht von einem neuen entomologischen Werke des Hrn Prof. Jurine in Geneva.— Intelligenzblatt der Litteratur-Zeitung (Erlangen): 160-165.
- Panzer, G.W.L., 1806. Kritische Revision der Insektenfauna Deutschlands, nach dem System bearbeitet ... 2: 1-271.— Nürnberg.
- Papp, J., 1971. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei, 265. Braconidae (Hymenoptera) 3.— Annlis hist.-nat. Mus. natn. hung. 63: 307-363, figs 1-57.
- Papp, J., 1986. A survey of the European species of *Apanteles* Först. (Hymenoptera, Braconidae: Microgastrinae). IX. The *glomeratus*-group, 1.— Annlis hist.-nat. Mus., nat. hung. 78: 225-247.
- Papp, J., 1988. A survey of the European species of *Apanteles* Först. (Hymenoptera, Braconidae: Microgastrinae). XI. "Homologization" of the species-groups of *Apanteles* s.l. with Mason's generic taxa. Checklist of genera. Parasitoid/host list 1.— Annlis hist.-nat. Mus. natn. hung. 80: 145-175.
- Papp, J., 1990. A survey of the European species of *Apanteles* Först. (Hymenoptera, Braconidae: Microgastrinae).— XII. Supplement to the key of the *glomeratus*-group. Parasitoid/host list 2.— Annlis hist.-nat. Mus. nat. hung. 81: 159-203.
- Papp, J., 1995. Revision of *C. Wesmael's Chelonus* species (Hymenoptera Braconidae Cheloninae).— Bull. Inst. r. Sci. nat. Belg., Ent. 65: 115-134, figs 1-127.
- Peigler, R.S., 1996. Catalog of parasitoids of Saturniidae of the world.— J. Res. Lep. 33[1994]: 1-121, figs 1-7.
- Phiri, G.S.N., 1995. Interaction of the spotted stem borer *Chilo partellus* (Swinhoe) with some alternative hosts and its larval parasitoid *Cotesia sesamiae* (Cameron) in Malwai.— Unpublished PhD thesis, University of Reading: 1-347.
- Polaszek, A. & S.W. Kimani, 1990. *Telenomus* species (Hymenoptera: Scelionidae) attacking eggs of pyralid pests (Lepidoptera) in Africa: a review and guide to identification.— Bull. ent. Res. 80: 57-71.
- Polaszek, A. & A.K. Walker, 1992. The *Cotesia flavipes* species-complex; parasitoids of cereal stem borers in the tropics.— Redia 74 (Appendice [1991]): 335-341.
- Polaszek, A., J.A. Ubeku & N.A. Bosque-Perez, 1993. Taxonomy of the *Telenomus busseolae* species-complex (Hymenoptera: Scelionidae) egg parasitoids of cereal stem borers (Lepidoptera: Noctuidae, Pyralidae).— Bull. ent. Res. 83: 221-226.
- Polaszek, A., M.G. Fitton, G. Bianchi & T. Huddleston, 1994. The parasitoids of the African white rice borer, *Maliarpha separatella* Ragonot (Lepidoptera: Pyralidae).— Bull. ent. Res. 84: 65-90, figs 1-84.
- Polaszek, A. & J. LaSalle, 1995. The hyperparasitoids (Hymenoptera: Ceraphronidae, Encyrtidae, Eulophidae, Eurytomidae) of cereal stem borers in Africa (Lepidoptera: Noctuidae, Pyralidae).— Afr. Ent. 3: 131-146.
- Potting, R.P.J., 1996. Hunting for hiding hosts: the behavioral ecology of the stem borer parasitoid *Cotesia flavipes*: 1-125.— Thesis, Wageningen.
- Quicke, D.L.J., 1987. The Old World genera of braconine wasps (Hymenoptera: Braconidae).— J. Nat. Hist. 21: 43-157, figs 1-370.
- Quicke, D.L.J., 1988. *Digonogastra*: the correct name for Nearctic *Iphiaulax* of authors (Hymenoptera: Braconidae).— Proc. ent. Soc. Wash. 90: 196-200, figs 1-9.
- Quicke, D.L.J. & R.A. Wharton, 1989. *Myosoma nyanzaensis* sp. n. (Hymenoptera: Braconidae) parasitic on the stem-borer pest *Chilo partellus* (Swinhoe) (Lepidoptera: Pyralidae) in Kenya. — Bull. ent. Res. 79: 1-5.
- Quicke, D.L.J. & M.J. Sharkey, 1989. A key to and notes on the genera of Braconinae (Hymenoptera: Braconidae) from America north of Mexico with descriptions of two new genera and three new

- species.— Can. Ent. 121: 337-361, figs 1-9.
- Quicke, D.L.J. & F. Koch, 1990. Die Braconinae-Typen der beiden bedeutendsten Hymenoptersammlungen der DDR (Hymenoptera).— Dt. ent. Z. 37: 213-227.
- Quicke, D.L.J., 1991. The non-European Braconinae types of Szépliget housed in Budapest (Hymenoptera, Braconidae).— Annls hist.-nat. Mus. natn. hung. 83: 169-186.
- Quicke, D.L.J. & P.M. Marsh, 1992. Two new species of Neotropical parasitic wasps with highly modified ovipositors (Hymenoptera: Braconidae: Braconinae and Doryctinae).— Proc. ent. Soc. Wash. 94: 559-567, figs 1-21.
- Quicke, D.L.J. & S.N. Ingram, 1993. Braconine wasps of Australia.— Mem. Queensl. Mus. 33: 299-336, figs 1-138.
- Ramakrishna Ayyar, T.V., 1924. Short notes on some South Indian insects.— Proc. ent. Mtgs Pusa 5[1923]: 263-269.
- Ramakrishna Ayyar, T.V., 1928. A contribution to our knowledge of South Indian Braconidae. Part 1 - Vipioninae.— Mem. Dept. Agri. India, Ent. 10: 29-60.
- Rao, V.P., 1972. Rice stem borers and their natural enemies in India, Pakistan, Ceylon and Malaysia: 7-23. In: Rothschild, G.D.H. & D.F. Waterhouse (eds). Research on rice borers etc. Pacific Science Progress, Canberra, 19.08.1971. Fukuoka Entomological Society/Kyushu University, Fukuoka, Japan.— Mushi 45 (suppl.): 1-59.
- Ratzeburg, J.T.C., 1844. Die Ichneumoniden der Forstinsecten in forstlicher und entomologischer Beziehung 1: 1-224.— Berlin.
- Risbec, J., 1950. Etat actuel des recherches entomologiques agricoles dans la région correspondant au secteur soudanais de recherches agronomiques.— C. r. Ier Conf. int. Afric. Ouest 1: 317-375.
- Risbec, J., 1951. II. Les Microgasterinae d'A.O.F.— Mém. Inst. franç. Afr. noire 13: 411-473.
- Risbec, J., 1956a. Les parasites des insectes borers du riz au Cameroun.— Agron. Tropicale 11: 234-247.
- Risbec, J., 1956b. Hyménoptères parasites du Cameroun. 2e contribution.— Bull. Inst. fr. Afr. noire 18: 97-164.
- Risbec, J., 1960. Les parasites des insectes d'importance en Afrique tropicale et à Madagascar. — Agron. Tropicale 15: 624-656.
- Rohwer, S.A., 1918. Descriptions and notes on some ichneumon-flies from Java.— Proc. U.S. nat. Mus. 54: 563-570.
- Ruthe, J.F., 1854. Beiträge zur Kenntnis der Braconiden. (*Dimerus*, *Araphis*, *Trachyusa*, *Rhaconotus*, *Alysia*).— Stett. ent. Ztg 15: 343-355.
- Saeger, H. de, 1944. Microgasterinae (Hymenoptera Apocrita).— Explor. Parc. nat. Albert, Miss. de Witte 47: 1-342.
- Saeger, H. de, 1946. Euphorinae (Hymenoptera Apocrita), fam. Braconides.— Explor. Parc. nat. Albert, Miss. de Witte 50: 1-245.
- Saeger, H. de, 1948. Cardiochilinae et Sigalphinae (Hymenoptera, Apocrita). Fam. Braconidae.— Expl. Parc. nat. Albert, Miss. de Witte 53: 1-272, figs 1-306.
- Saraiva, A. Coutinho, 1963. A grande lagarta perfuradora das gramíneas - *Sesamia botanophaga* Tams & Bowden - no Arquipélago de Cabo Verde.— Garcia de Orto 11: 355-370.
- Sarhan, A.A. & D.L.J. Quicke, 1990. *Mesobraconoides psolopterus* (Hymenoptera: Braconidae), a larval parasitoid of the white rice borer, *Maliarpha separatella* (Lepidoptera: Pyralidae), in West Africa.— Bull. ent. Res. 80: 217-222.
- Sarhan, A.A. & D.L.J. Quicke, 1993. A key to the genera of Braconinae (Hymenoptera, Braconidae) occurring in Egypt and neighbouring countries.— Bull. Soc. ent. Egypt 68[1989]: 321-351.
- Say, T., 1836. Descriptions of new species of North American Hymenoptera, and observations on some already described.— Boston J. nat. Hist. 1: 209-305.
- Saxena, A.P., 1972. Studies on *Stenobracon deesae* Cam. and *Stenobracon nicevillei* Bing. (Hym.: Braconidae).— Z. angew. Ent. 71: 145-151.
- Schmutterer, G., 1969. Pests of crops in northeast and Central Africa, with particular reference to the Sudan: 1-296.— Stuttgart.
- Schulz, W.A., 1911. Zwei hundert alte Hymenopteren.— Zool. Annl. 4: 1-220.
- Setamou, M. & F. Schultness, 1995. The influence of egg parasitoids belonging to the *Telenomus busseolae* (Hymoptera: Scelionidae) species complex on *Sesamia calamistis* (Lepidoptera: Noctuidae) populations in maize fields in southern Benin.— Biocontrol Science & Technology 5: 69-81.
- Shenefelt, R.D., 1969. Braconidae, 1.— Hym. Cat. (nov. ed.) 4: 1-176.
- Shenefelt, R.D., 1970. Braconidae, 2.— Hym. Cat. (nov. ed.) 5: 177-306.
- Shenefelt, R.D., 1970. Braconidae, 3.— Hym. Cat. (nov. ed.) 6: 307-428.

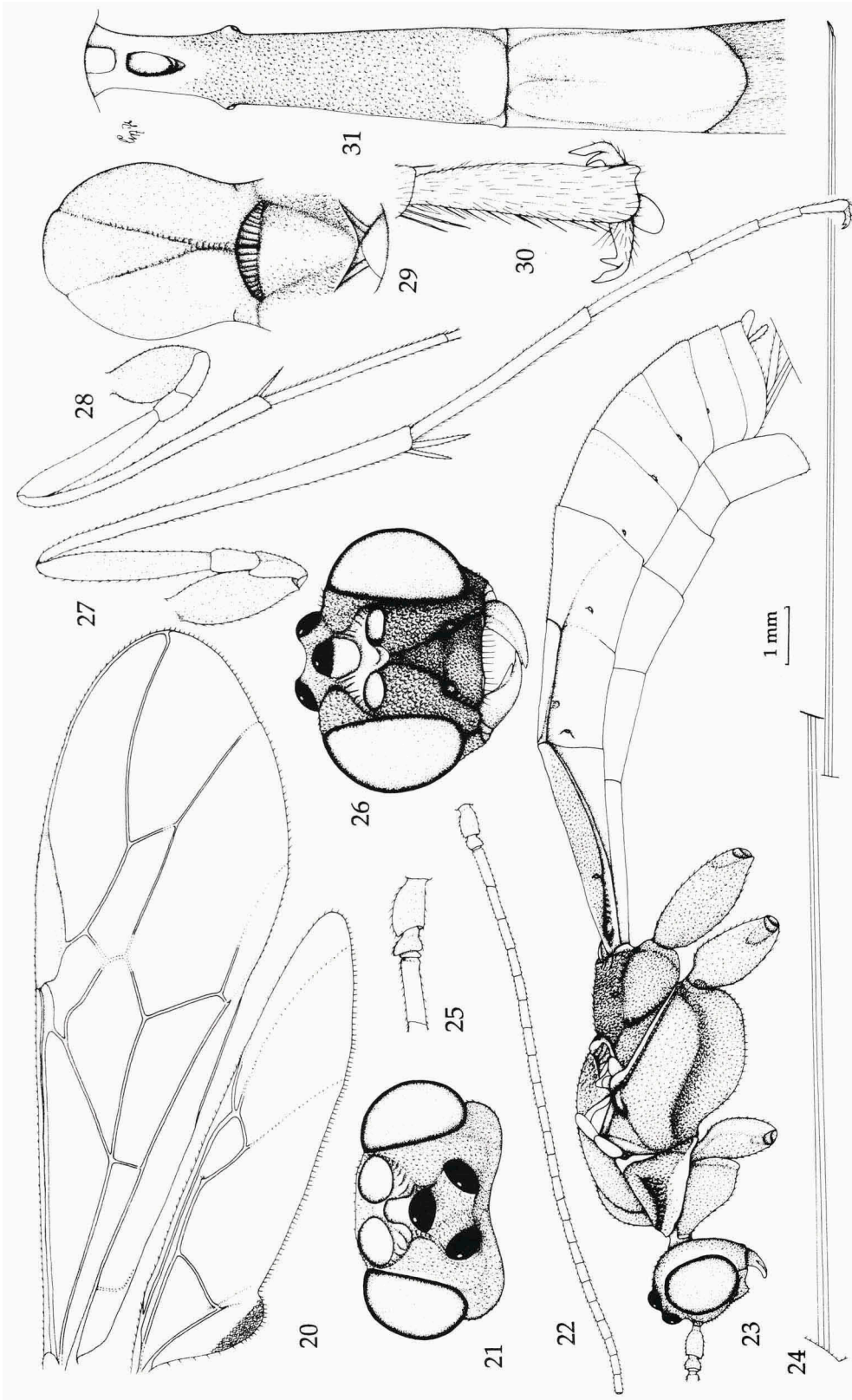
- Shenefelt, R.D., 1972. Braconidae, 4.—Hym. Cat. (nov. ed.) 7: 429-668.
- Shenefelt, R.D., 1973. Braconidae, 6.—Hym. Cat. (nov. ed.) 10: 813-936.
- Shenefelt, R.D. & P.M. Marsh, 1976. Braconidae, 9.—Hym. Cat. (nov. ed.) 13: 1263-1424.
- Shenefelt, R.D., 1978. Braconidae, 10.—Hym. Cat. (nov. ed.) 15: 1425-1872.
- Shestakov, A., 1930. Neue Braconidenarten aus den Gattungen *Phanerotomina*, gen. nov., und *Phanerotoma* Wesm.—Ent. Obozr. 24: 100-103.
- Shestakov, A., 1932. Zur Kenntnis der asiatischen Braconiden.—Zool. Anz. 99: 255-263.
- Simbolotti, G. & C. van Achterberg, 1992. Revision of the West Palaearctic species of the genus *Bassus* Fabricius (Hymenoptera: Braconidae).—Zool. Verh. Leiden 281: 1-80, figs 1-156.
- Smith, J.W. Jr, H.W. Browning & F.D. Bennett, 1987. *Allorhogas pyralophagus* (Hym.: Braconidae), a gregarious external parasite imported into Texas, USA for biological control of the stalkborer *Eoreuma loftini* (Lep.: Pyralidae) on sugarcane.—Entomophaga 32: 477-482.
- Smith, J.W. Jr, R.N. Wiedenmann & W.A. Overholt, 1992. Parasites of lepidopteran stemborers of tropical gramineous plants: 1-89. — Nairobi.
- Stefani-Perez, T. de, 1909. Altri zoocecidi dell'Eritrea.—Marcellia 8: 7-18.
- Stefani-Perez, T. de, 1919. Informazioni sui RR. Osservatori di Fitopatologia e intorno ad alcuni insetti dannosi alle derrate alimentari.—Min. Agr.-Dir. gen. Agr. (Serv. Fitopatologia), Palermo: 1-46, 2 tables.
- Szépligeti, G.V., 1901a. A palaearktibus Braconidák meghatározó táblázatai.—Term-Tud. Közl. 33: 174-184, 261-288.
- Szépligeti, G.V., 1901b. Tropischen Cenocoeliden und Braconiden aus der Sammlung des Ungarischen National-Museums.—Természetr. Füz. 24: 353-402.
- Szépligeti, G.V., 1902. Tropische Cenocoelioniden und Braconiden aus der Sammlung des Ungarischen National-Museums.—Természetr. Füz. 25: 39-84.
- Szépligeti, G.V., 1904. Hymenoptera. Fam. Braconidae.—Genera Insect. 22: 1-253, figs 1-32.
- Szépligeti, G., 1906. Braconiden aus der Sammlung des ungarischen National-Museums, 1.—Annls hist.-nat. Mus. natn. hung. 4: 547-618.
- Szépligeti, G., 1908a. Braconiden aus der Sammlung des ungarischen National-Museums, 2.—Annls hist.-nat. Mus. natn. hung. 6: 297-427.
- Szépligeti, G., 1908b. Jacobson'sche Hymenopteren aus Semarang (Java), Evaniiden, Braconidae und Ichneumoniden.—Notes Leyden Mus. 29: 209-260.
- Szépligeti, G., 1911. Braconidae der I. Zentral-Afrika-Expedition.—Wiss. Ergebn. dtsch. Zent. Afr. Exped.: 393-418.
- Szépligeti, G., 1913. Neue Afrikanische Braconiden aus der Sammlung des Ungarischen National-Museums.—Annls hist.-nat. Mus. natn. hung. 11: 592-608.
- Szépligeti, G., 1914a. Braconidae. In: Voyage de Ch. Alluaud et R. Jeannel en Afrique orientale 1911-1912.—Résultats scientifiques, Hymenoptera 4: 165-198.
- Szépligeti, G., 1914b. Afrikanische Braconiden des Königl. Zoologische Museums in Berlin.—Mitt. zool. Mus. Berl. 7: 153-230.
- Telenga, N.A., 1936. Hymenoptera 5(2). Fam. Braconidae 1.—Fauna Rossii (n. s.) 4: i-xvi + 1-403, figs 1-50.
- Temerak, S.A., 1983. Studies on certain factors affecting the the envenomation by the parasitoid, *Bracon brevicornis* Wesmael. 1. Ratios of females to host larva, ratios of host larvae to a female and size of host insect.—Z. angew. Ent. 96: 364-368.
- Temerak, S.A., M.A. Morsy & F.A. Abdel-Galil, 1984. Notes on relative impact of *Bracon brevicornis* Wesm. and its hyperparasitoid, *Pediobius bruchicida* (Randani) through populations of the hibernating larvae of the pink borer,....etc.—Bull. Soc. ent. Egypt 63: 213-218.
- Tobias, V.I., 1957. New subgenera and species of the genera *Bracon* F. and *Habrobracon* Ashm. (Hymenoptera, Braconidae) from the steppe and desert regions of the USSR.—Ent. Obozr. 36: 476-500.
- Tobias, V.I., 1961. New subgenera and species of the genera *Bracon* F. (Hymenoptera, Braconidae).—Ent. Obozr. 40: 659-688, figs 1-16.
- Tobias, V.I., 1976. Brakonidy Kavkaza (Hymenoptera, Braconidae).—Opred. Faune SSSR 110: 1-287, pls 1-67.
- Tobias, V.I., 1986. Agathidinae: 276-291. In: Medvedev, G.S. (ed.). Opredelitel nasekomykh Evropeiskoi tchasti SSSR 3, Perepontchatokrylye 4.—Opr. Faune SSSR 145: 1-501, figs 1-263. Translation 1995: 480-507.—Lebanon, U.S.A.
- Tran, V.L., 1977. Morphologie des pièces génitales et nervation ailaire des principales pyrales foreurs du riz en Côte d'Ivoire. Description de quelques Hymenoptères parasites.—Cahiers d'ORSTOM, Biologie 12: 29-45.

- Turner, R.E., 1922. New Evaniidae and Braconidae in the British Museum. — Ann. Mag. nat. Hist. (9) 10: 270-281.
- Varma, A., H. Nigam & K. Singh, 1987. Laboratory and field evaluations of an exotic parasite, *Allorhogas pyralophagus* Marsh (Hymenoptera: Braconidae) against sugarcane stalk borer, *Chilo auricilius* Ddgn. (Lepidoptera: Pyralidae).— Entomon 12: 367-372.
- Varma, A. & H. Saxena, 1989. Field recovery of an exotic parasite, *Allorhogas pyralophagus* Marsh (Hymenoptera: Braconidae) against sorghum borer, *Chilo partellus* Swinhoe.— Indian J. Plant Prot. 17: 101-102.
- Varma, A. & H. Nigam, 1990. Field releases and recoveries of an exotic parasite, *Allorhogas pyralophagus* Marsh against sugarcane stalk borer, *Chilo auricilius* Ddgn.— Indian J. Ent. 51: 136-138.
- Venkatraman, T.V. & B.R. Subba Rao, 1954. The mechanism of oviposition in *Stenobracon deesae* (Cam.) (Hymenoptera: Braconidae).—Proc. R. ent. Soc. Lond. (A) 29: 1-8.
- Viereck, H.L., 1905. Notes and descriptions of Hymenoptera from the western United States, in the collection of the University of Kansas.— Trans. Kans. Acad. Sci. 19: 264-326.
- Viereck, H. L., 1910. Hymenoptera for the New Jersey list of insects, and other Hymenoptera.— Proc. ent. Soc. Wash. 11(1909): 208-211.
- Viereck, H.L., 1911. Descriptions of six new genera and thirty-one new species of ichneumon flies.— Proc. U. S. nat. Mus. 40: 170-196.
- Viereck, H.L., 1912. Contributions to our knowledge of bees and ichneumon-flies, including the description of twenty-one new genera and fifty-seven new species of ichneumon-flies.— Proc. U.S. nat. Mus. 42: 613-648.
- Viereck, H.L., 1913. Descriptions of six new genera and twelve new species of Ichneumon-flies.— Proc. U. S. natn. Mus. 44: 639-648.
- Vojnovskaja-Krieger, T., 1929. Einige Worte über die Parasiten von *Oscinella frit* L.— Works appl. Ent., Leningrad 4: 185-188.
- Walker, A.K., 1994. Species of Microgastrinae (Hymenoptera: Braconidae) parasitizing lepidopterous cereal stem borers in Africa.— Bull. ent. Res. 84: 421-434.
- Watanabe, C., 1935. On some species of Braconidae from North China and Korea.— Insecta matsum. 10: 43-51.
- Watanabe, C., 1960. Three braconid parasites of Aegeriidae with description of a new species (Hymenoptera, Braconidae).— Mushi 33: 5-7, figs 1-2.
- Wesmael, C., 1837. Monographie des Braconides de Belgique.— Nouv. Mém. Acad. sci. R. Bruxelles 10: 5-68.
- Wesmael, C., 1838. Monographie des Braconides de Belgique, 4.— Nouv. Mém. Acad. sci. R. Bruxelles 11: 1-166.
- Wharton, R.A., J.W. Smith Jr, D.L.J. Quicke & H.W. Browning, 1989. Two new species of *Digonogastra* Viereck (Hymenoptera: Braconidae) parasitic on Neotropical pyralid borers (Lepidoptera) in maize, sorghum and sugarcane.— Bull. ent. Res. 79: 401-410, figs 1-19.
- Wilkinson, D.S., 1927. Eight new species of Braconidae.— Bull. ent. Res. 18: 33-46.
- Wilkinson, D.S., 1931a. Braconidae: notes and new species.— Bull. ent. Res. 22: 75-82.
- Wilkinson, D.S., 1931b. Four new species of Ichneumonoidea.— Bull. ent. Res. 22: 393-397.
- Zettel, H., 1990a. Eine Revision der Gattungen der Cheloninae (Hymenoptera, Braconidae) mit Beschreibungen neuer Gattungen und Arten.— Annln naturh. Mus. Wien 91B: 147-196, figs 1-130.
- Zettel, H., 1990b. Zwei neue *Phanerotoma*-Arten aus Südafrika (Hymenoptera, Braconidae: Cheloninae).— Linzer biol. Beitr. 22: 335-340.
- Zwart, K.W.R. (in prep.). Ichneumonidae. In: Polaszek, A. (ed.). Cereal stem borers in Africa: economic importance, taxonomy, natural enemies and control.

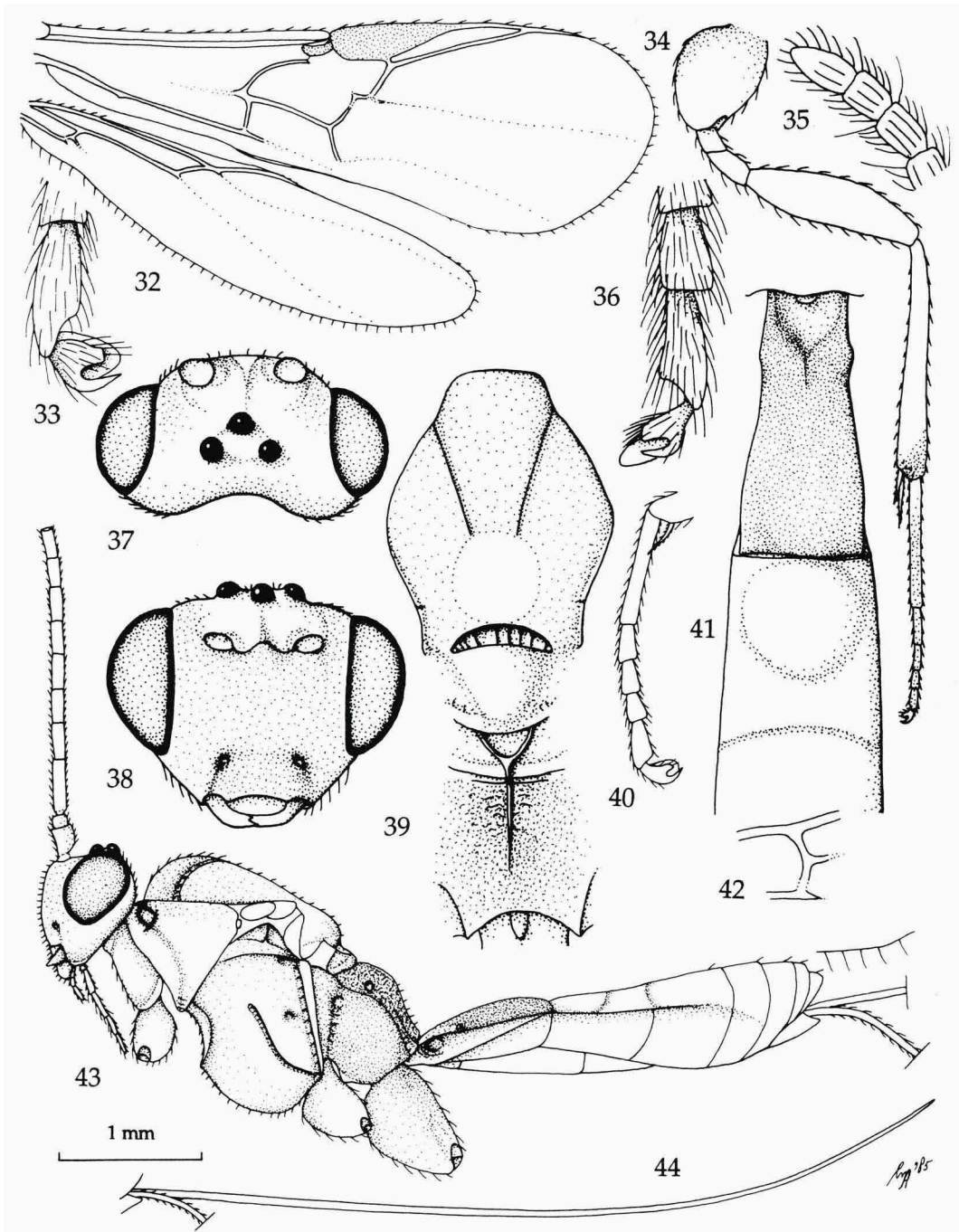
Received: 14.x.1996

Accepted: 28.x.1996

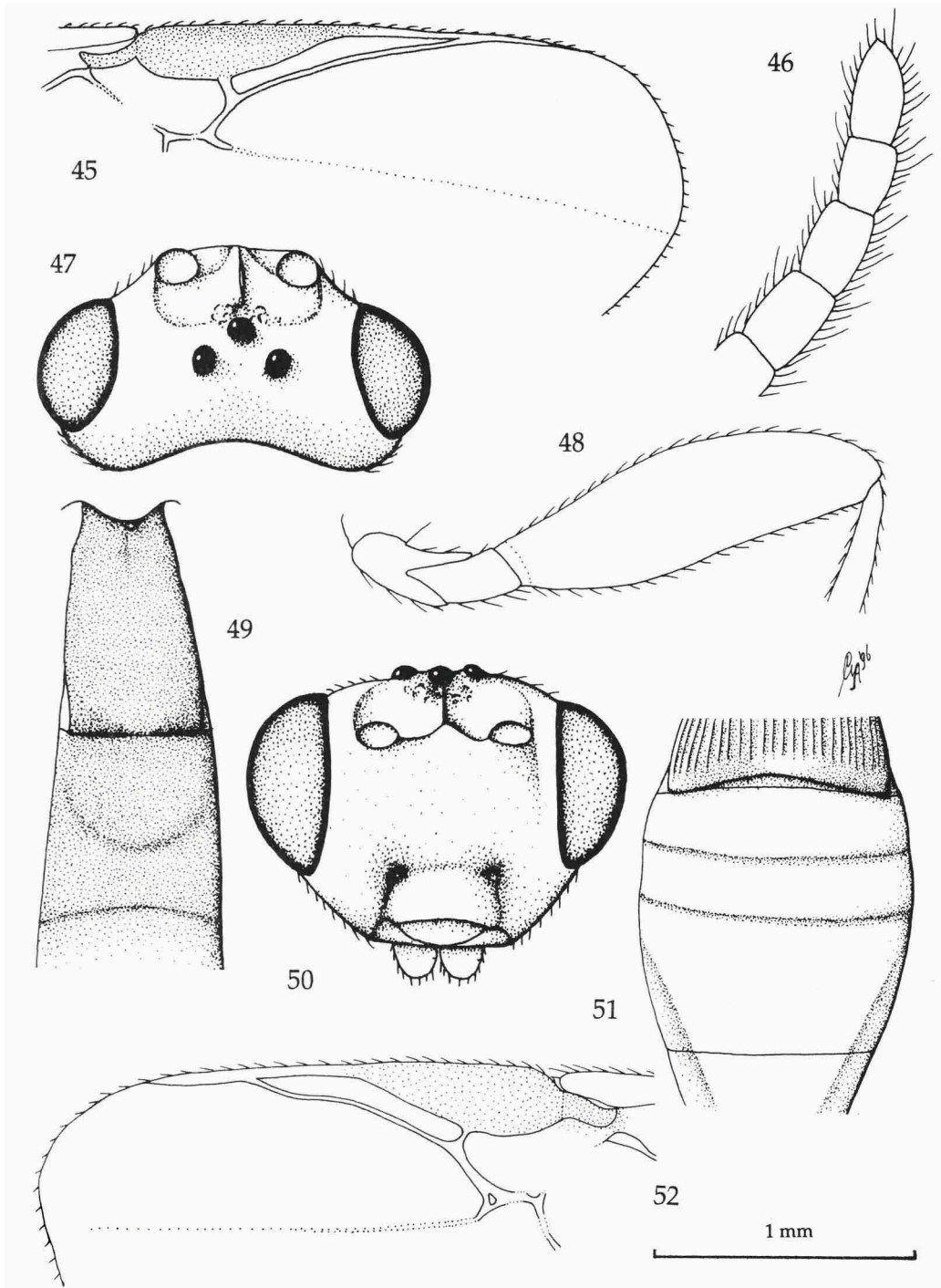
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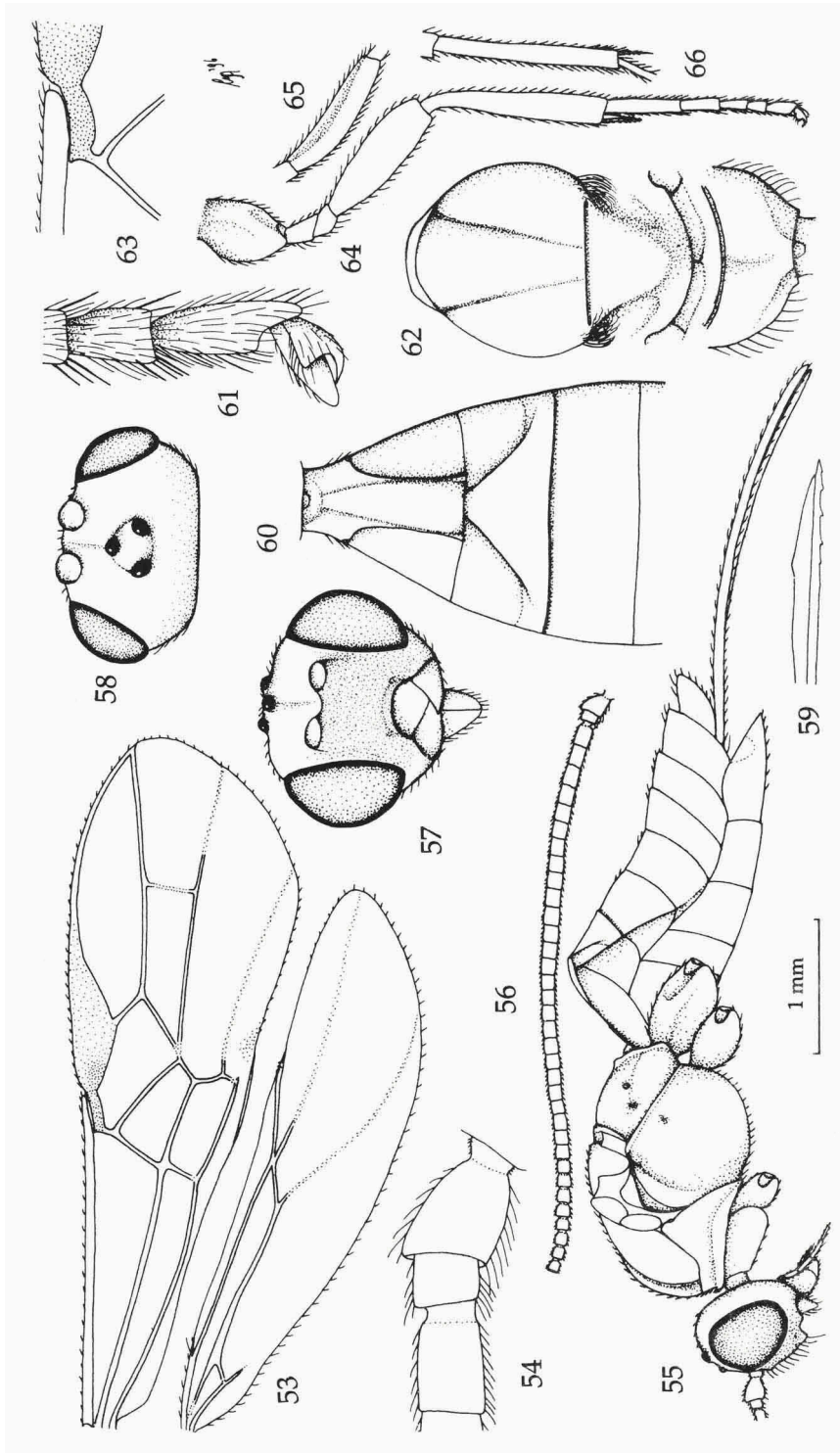
Figs 20-31. *Amicrocentrum curvineris* Cameron, ♀, holotype. 20, wings; 21, head, dorsal aspect; 22, antenna, dorsal aspect; 23, habitus, lateral aspect; 24, ovipositor; 25, base of antenna, lateral aspect; 26, head, frontal aspect; 27, hind leg, dorsal aspect; 28, middle leg, dorsal aspect; 29, thorax, dorsal aspect; 30, hind telotarsus, with full view of outer hind claw; 31, first and second metasomal tergites, dorsal aspect. 20, 22-24, 27, 28: 1.0 × scale-line; 21, 25, 26, 29, 31: 2.0 ×; 30: 5.0 ×.



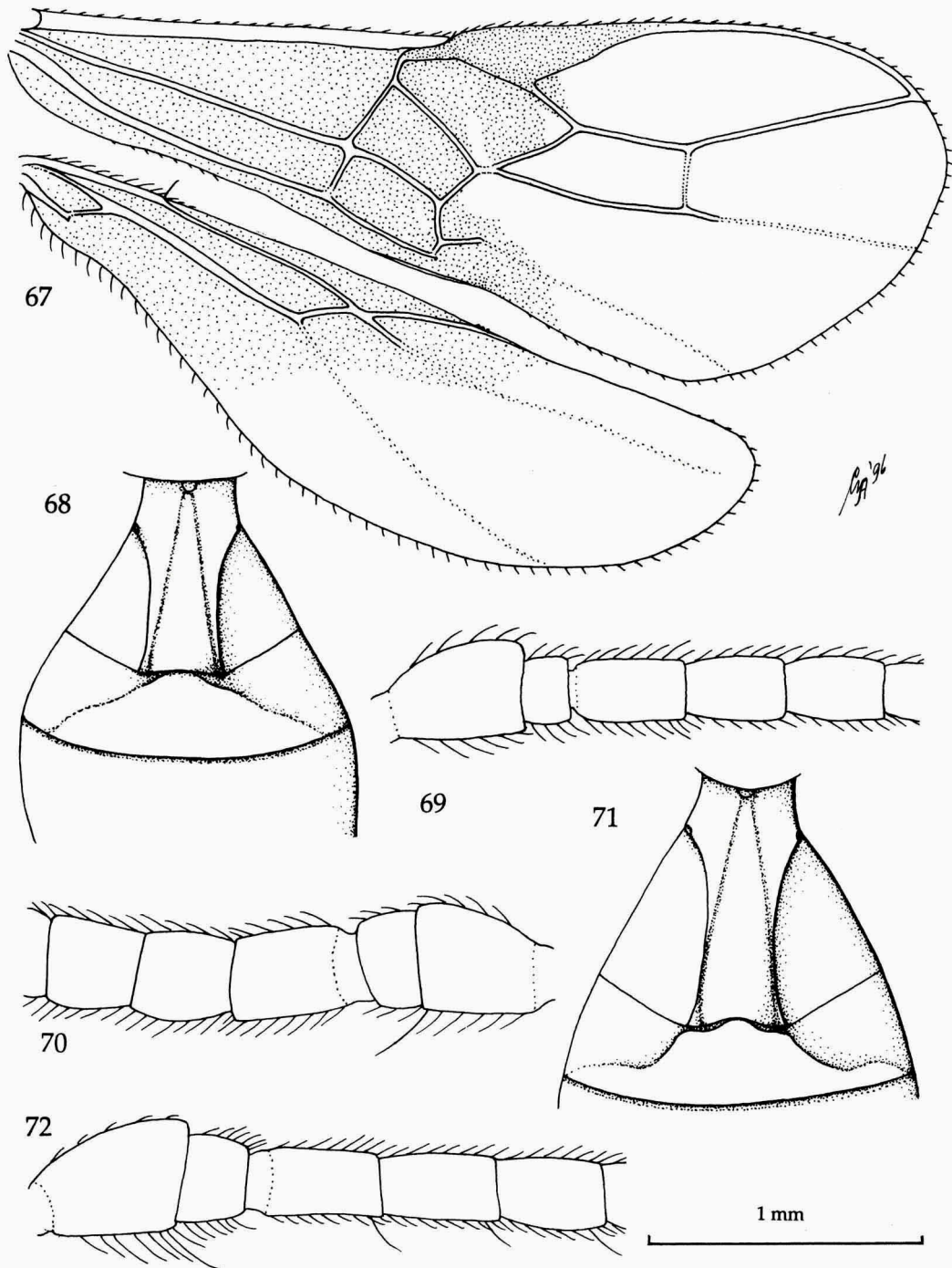
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Figs 53-66, *Amyosoma flavistigma* spec. nov., ♀, holotype. 53, wings; 54, base of antenna; 55, habitus, lateral aspect; 56, antenna; 57, head, frontal aspect; 58, head, dorsal aspect; 59, apex of ovipositor; 60, first-third metasomal tergites, dorsal aspect; 61, outer hind claw; 62, mesosoma, dorsal aspect; 63, detail of vein 1-SR of fore wing; 64, hind femur, dorsal aspect; 65, hind tibia, dorsal aspect; 66, hind leg. 53, 55, 56, 64-66: 1.0 x scale-line; 54: 5.0 x; 57, 58, 60, 62: 1.6 x; 59, 61: 5.4 x; 63: 2.0 x.



Figs 67-69, *Amyosoma nyanzaense* (Quicke & Wharton), ♀, Kenya, Kisumu; figs 70, 71, *A. leuzerae* Rohwer, ♀, Indonesia, Sidoredjo (Java); fig. 72, *A. chinense* (Szépligeti), ♀, India, Bangalore. 67, wings; 68, 71, first and second metasomal tergites, dorsal aspect; 69, 70, 72, base of antenna. 67: 1.0 × scale-line; 68: 1.5 ×; 69, 70, 72: 3.0 ×; 71: 1.3 ×.

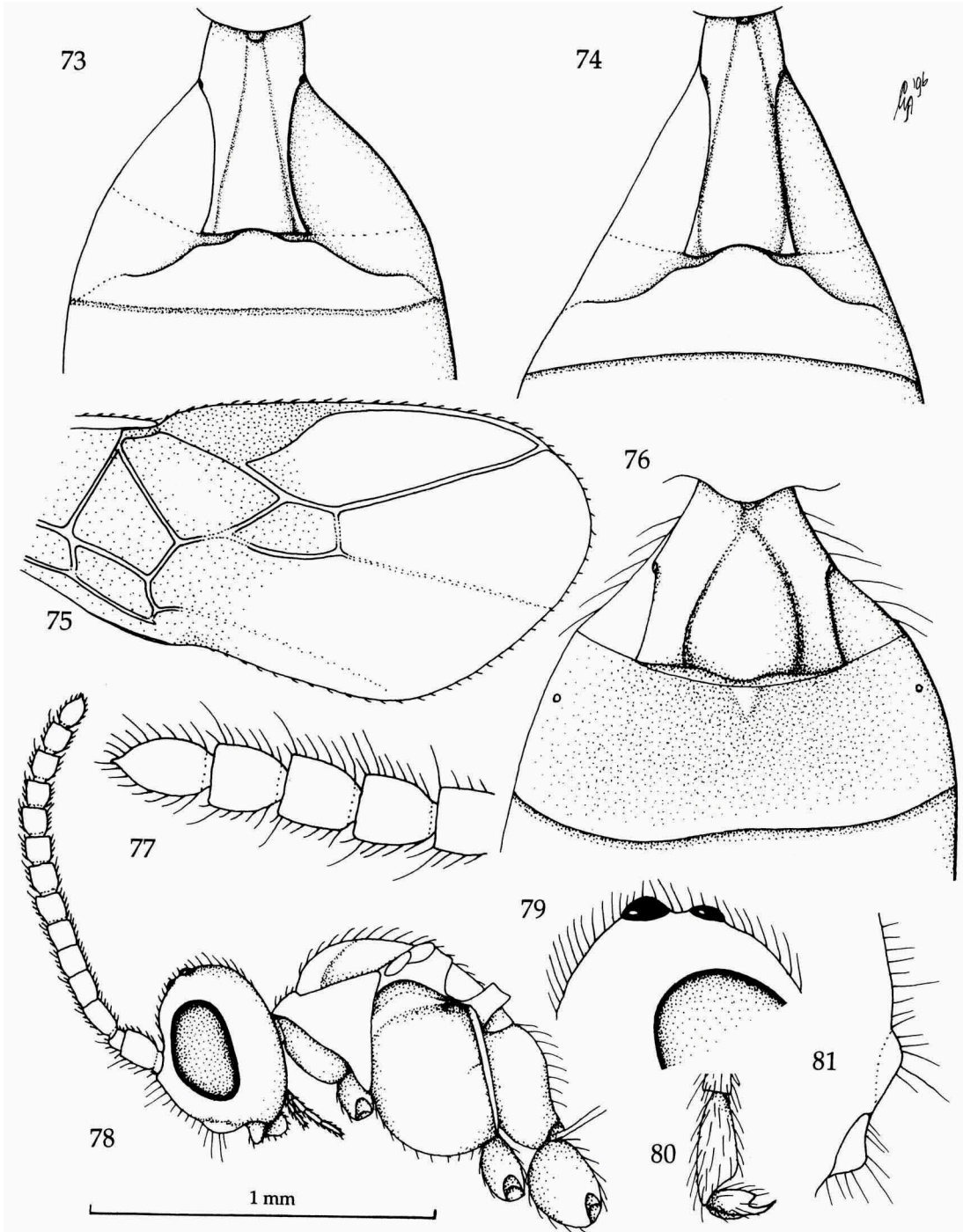
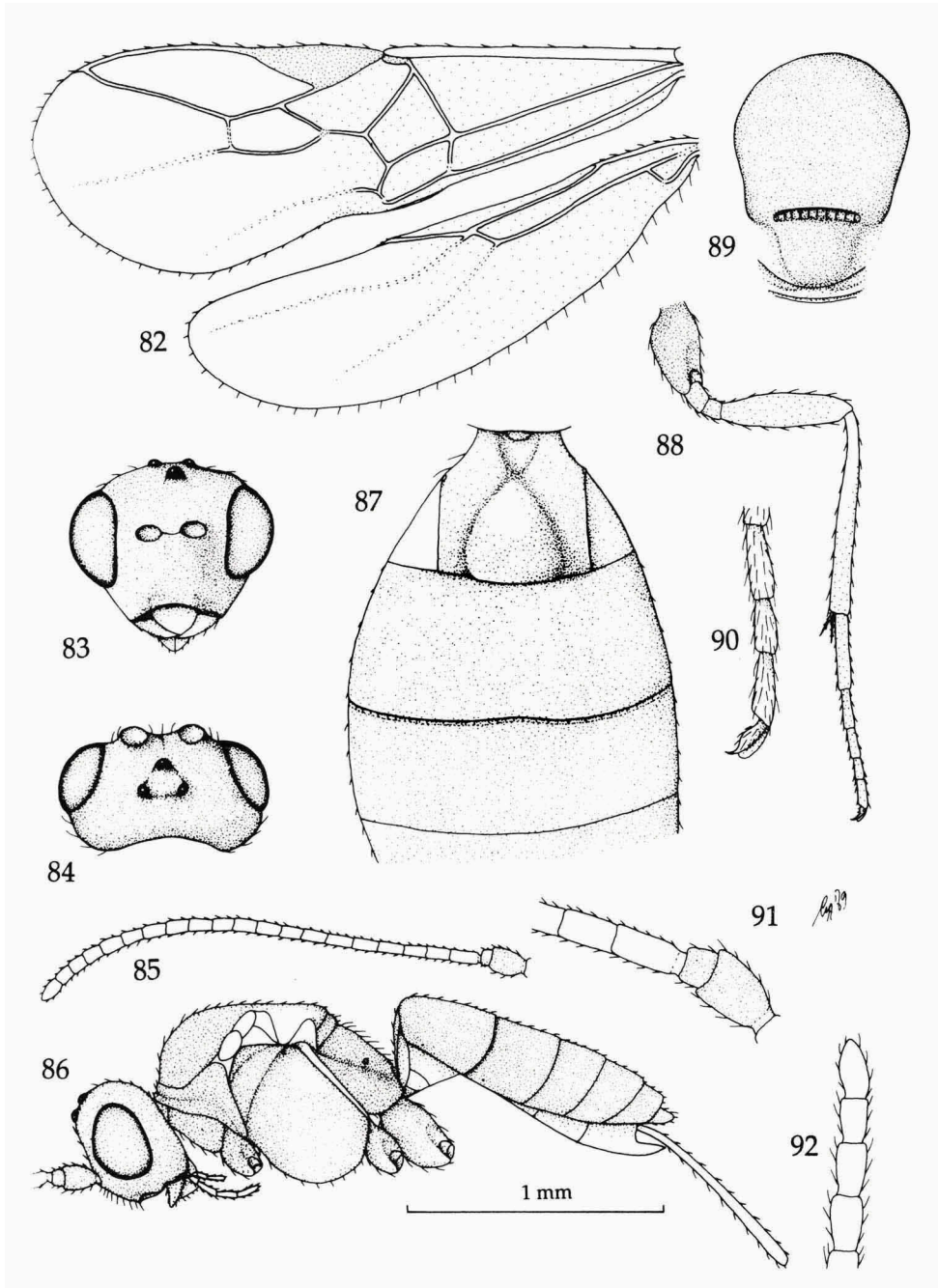


Fig. 73, *Amyosoma chinense* (Szépligeti), ♀, India, Bangalore; fig. 74, id., but ♀, China, Pingyang; figs 75-81, *Bracon (Habrobracon) hebetor* Say, ♀, Brazil, Penapelis. 73, 74, 76: first and second metasomal tergites, dorsal aspect; 75, apical half of fore wing; 76, head and mesosoma, lateral aspect; 77, apex of antenna; 79, vertex, lateral aspect; 80, outer hind claw; 81, clypeus, lateral aspect. 73-75, 78: 1.0 × scale-line; 76: 1.3 ×; 77, 79-81: 2.3 ×.



Figs 82-92, *Bracon (Habrobracon) gelechiaae* Ashmead, ♀, U.S.A., St. Albans (Maine), but 88-92 of ♀, U.S.A., Moreno (California). 82, wings; 83, head, frontal aspect; 84, head, dorsal aspect; 85, antenna; 86, habitus, lateral aspect; 87, first-third metasomal tergites, dorsal aspect; 88: hind leg; 89, thorax, dorsal aspect; 90, outer hind claw; 91, base of antenna; 92, apex of antenna. 82, 85, 86, 88: 1.0 × scale-line; 83, 84, 89: 1.2 ×; 87: 2.0 ×; 90-92: 2.5 ×.

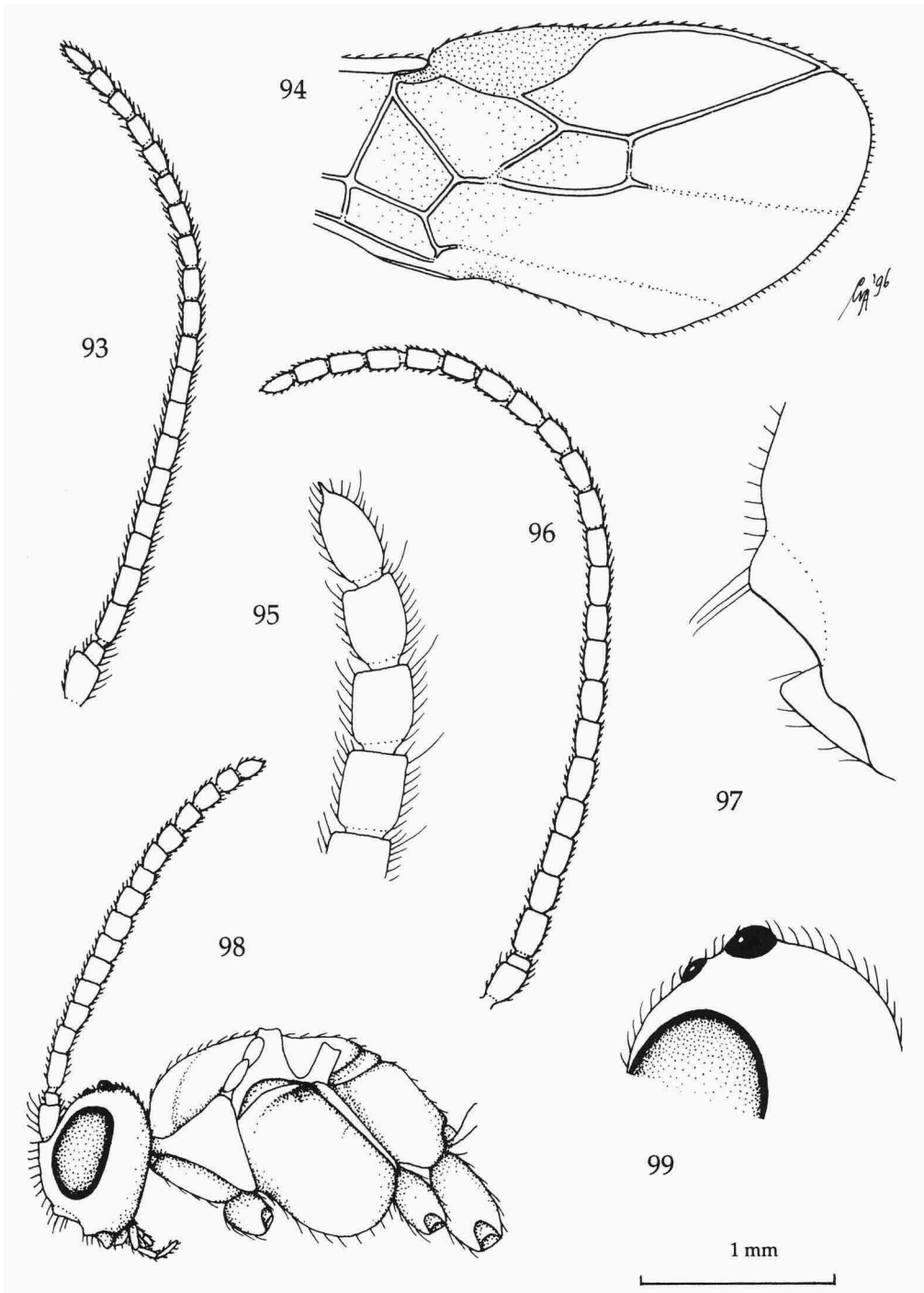
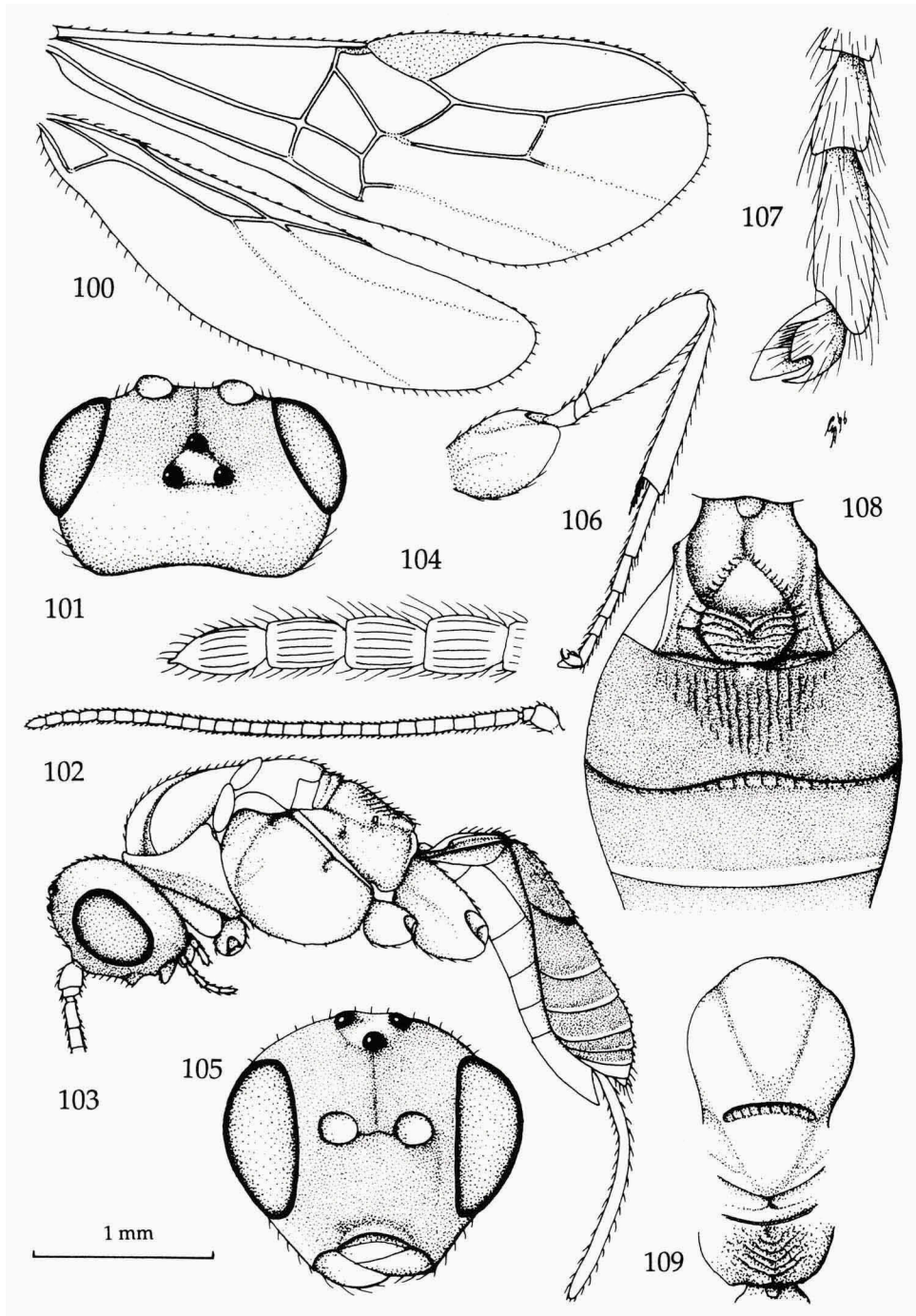
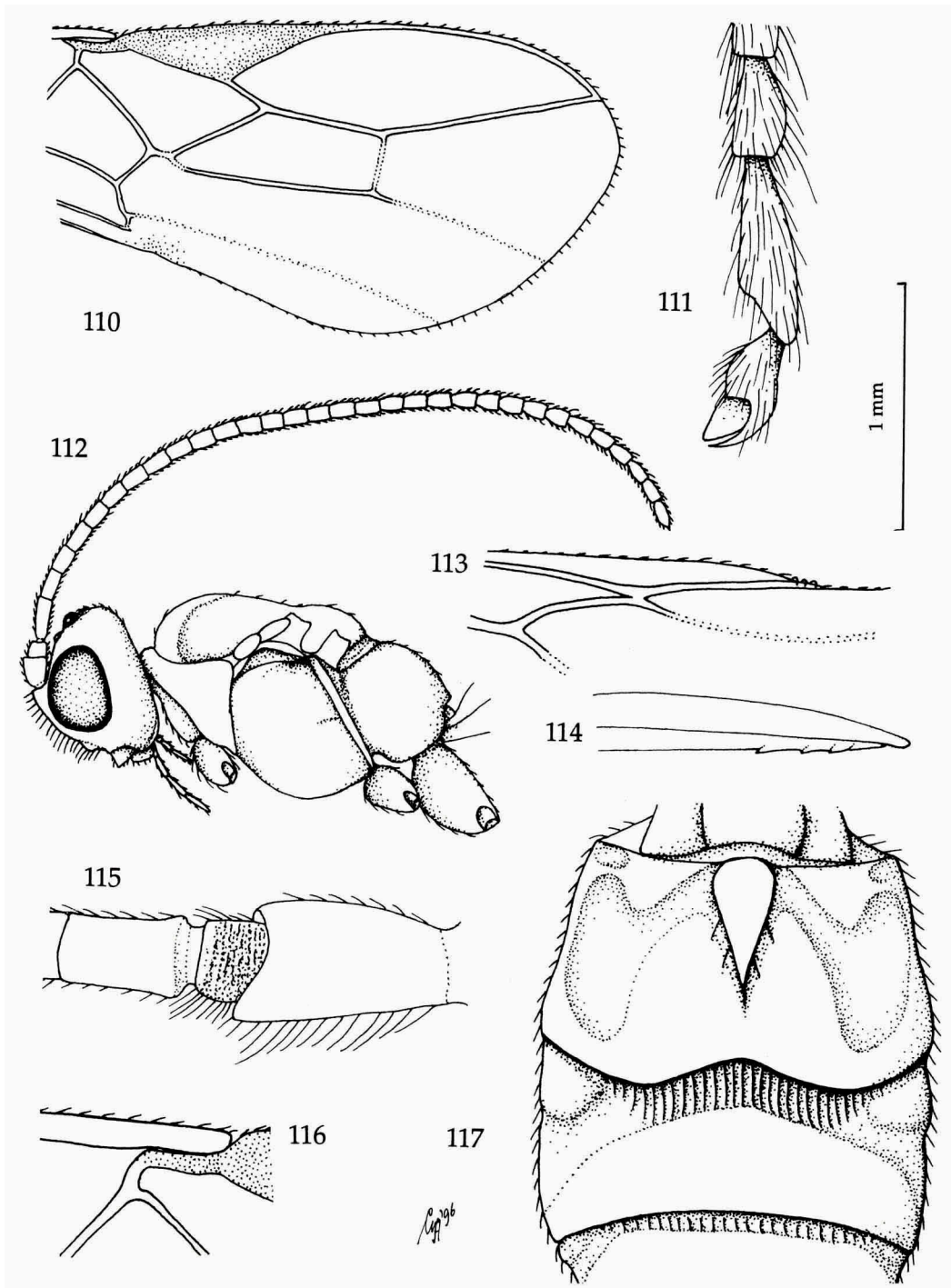


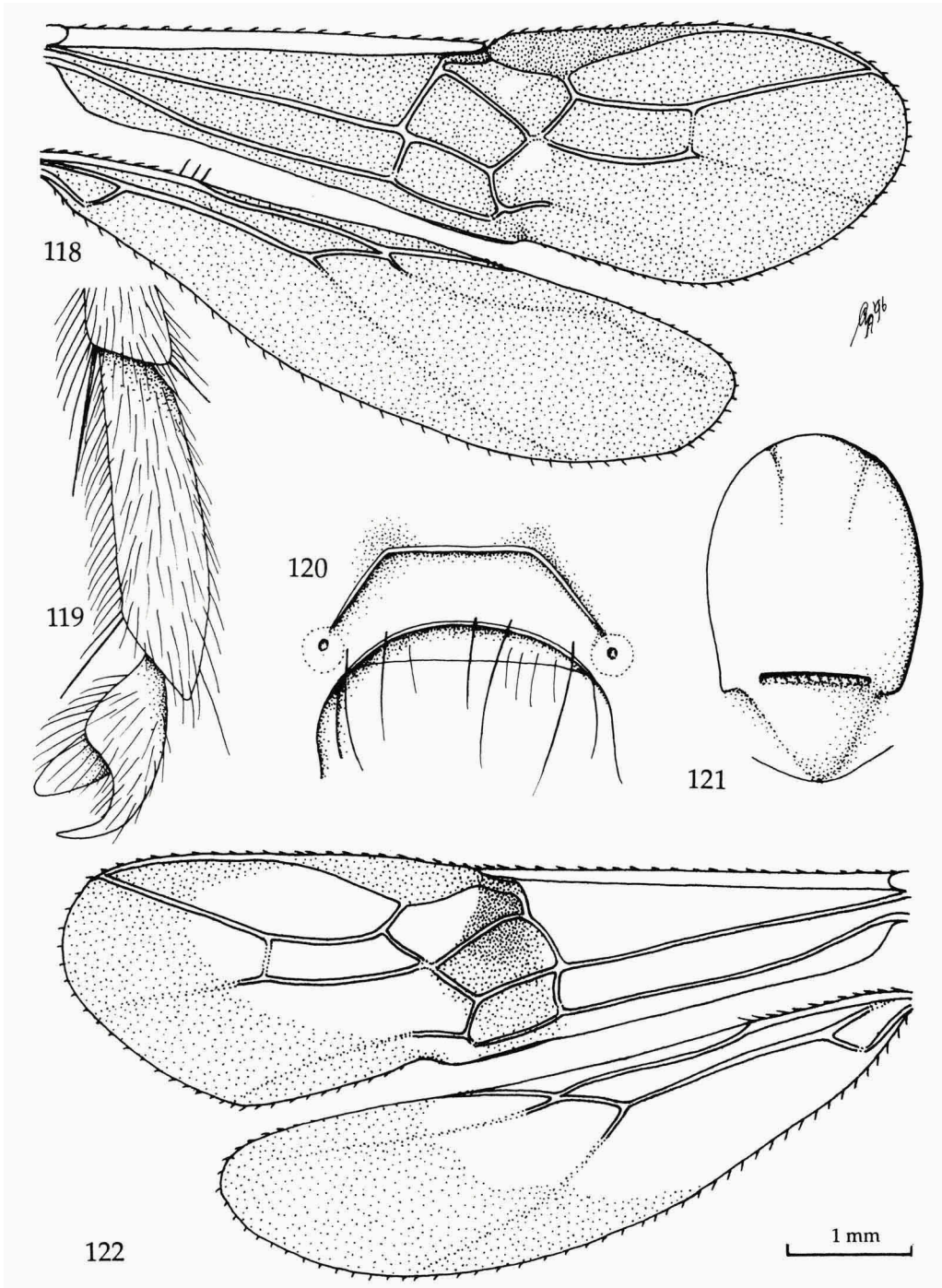
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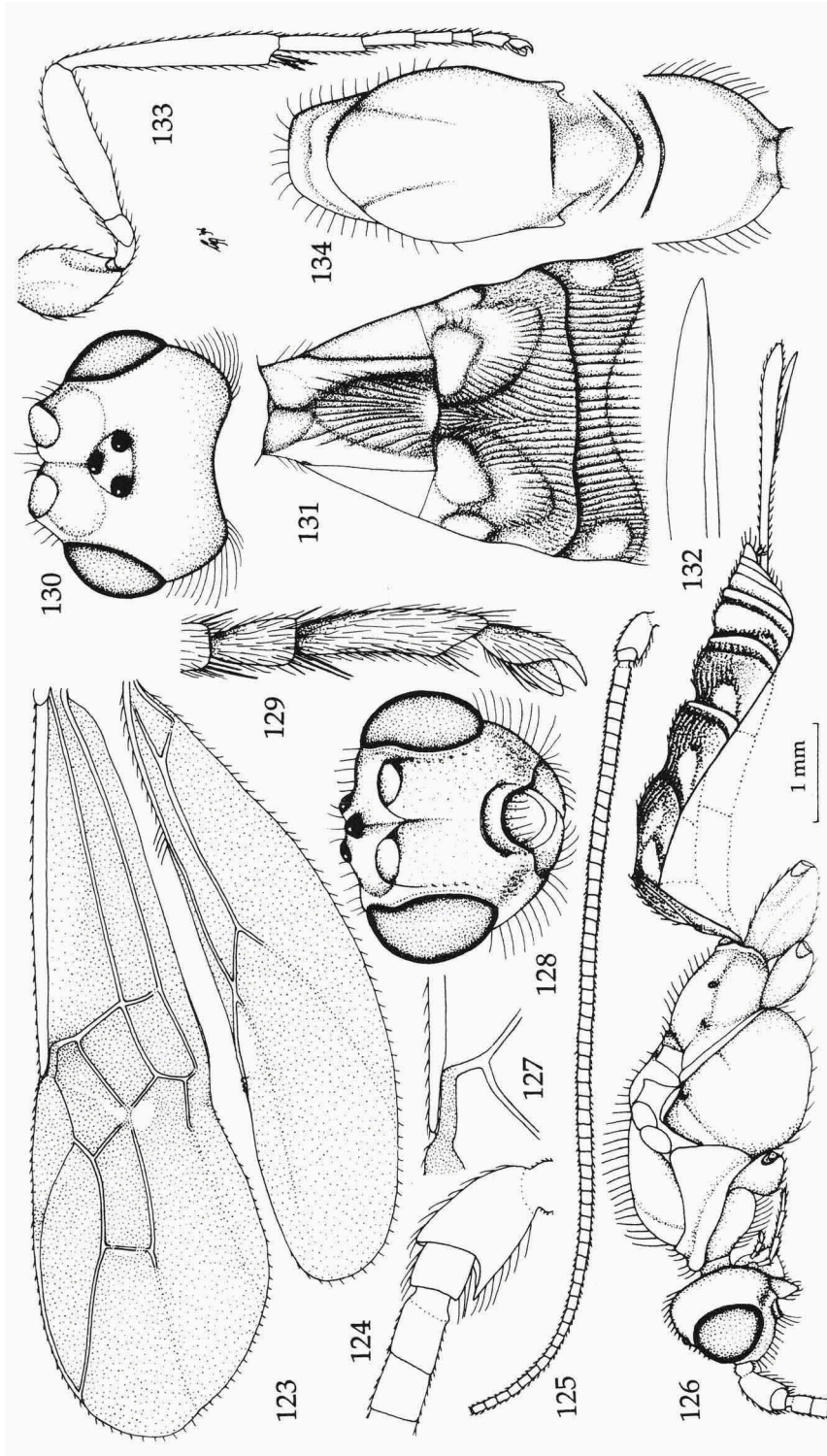
Figs 100-109, *Bracon (B.) sesamiae* Cameron, ♀, lectotype. 100, wings; 101, head, dorsal aspect; 102, antenna; 103, habitus, lateral aspect; 104, apex of antenna; 105, head, frontal aspect; 106, hind leg; 107, inner hind claw; 108, first-third metasomal tergites, dorsal aspect; 109, mesosoma, dorsal aspect. 100, 102, 103, 106: 1.0 × scale-line; 101, 105: 1.8 ×; 104, 107: 4.2 ×; 108: 1.5 ×; 109: 1.3 ×.



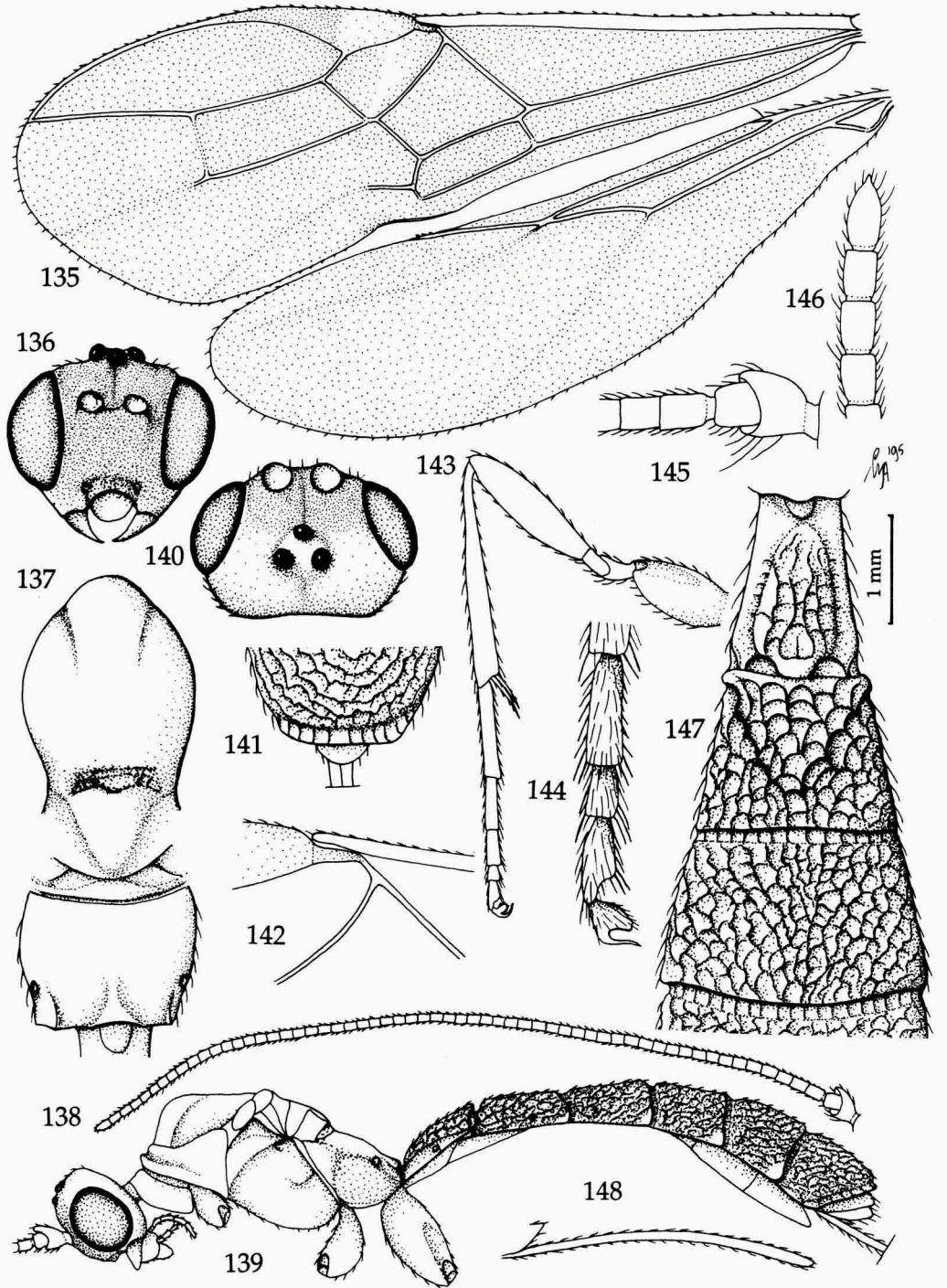
Figs 110-112, *Bracon (B.) testaceorufatus* Granger, ♀. Cameroon, Pleine de Mbo; figs 113-117, *Digonogastra kimballi* Kirkland, ♀, U.S.A., College Station (Texas). 110, apical half of fore wing; 111, outer hind claw; 112, head and mesosoma, lateral aspect; 113, detail of vein 1r-m of hind wing; 114, apex of ovipositor; 115, base of antenna, lateral aspect; 116, detail of vein 1-SR of fore wing; 117, second and third metasomal tergites, dorsal aspect. 110: 1.2 × scale-line; 111, 114: 3.3 ×; 112, 113, 116: 1.0 ×; 115: 2.2 ×; 117: 1.1 ×.



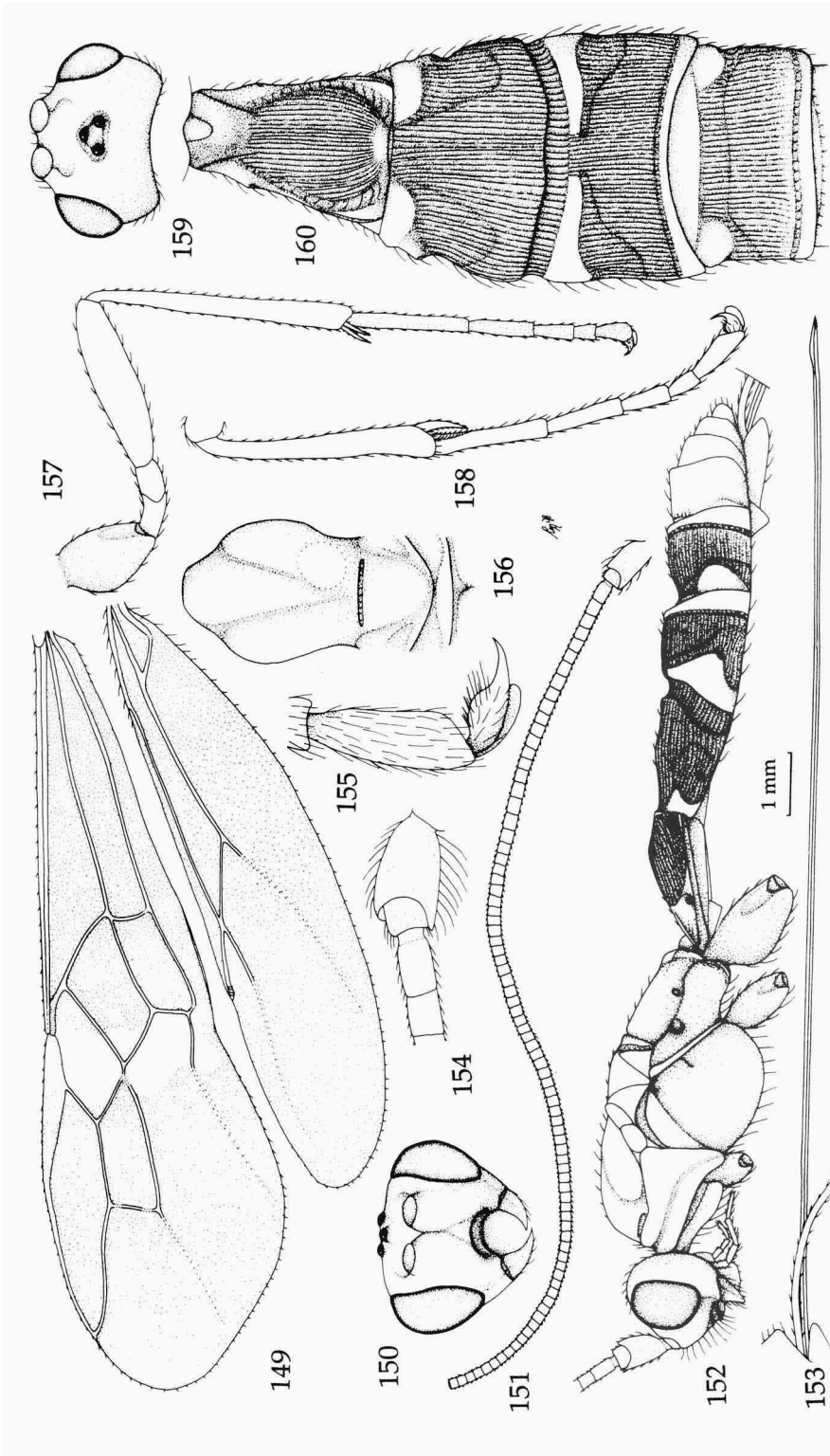
Figs 118, 119, *Digonogastra kimballi* Kirkland, ♀, U.S.A., College Station (Texas); figs 120-122, *Iphiaulax dubiotusus* Shenefelt, ♀, South Africa, Mt. Mtunzini. 118, 122, wings; 119, outer hind claw; 120, clypeus, frontal aspect; 121, mesonotum, dorsal aspect. 118, 122: 1.0 × scale-line; 119, 120: 6.7 ×; 121: 1.4 ×.



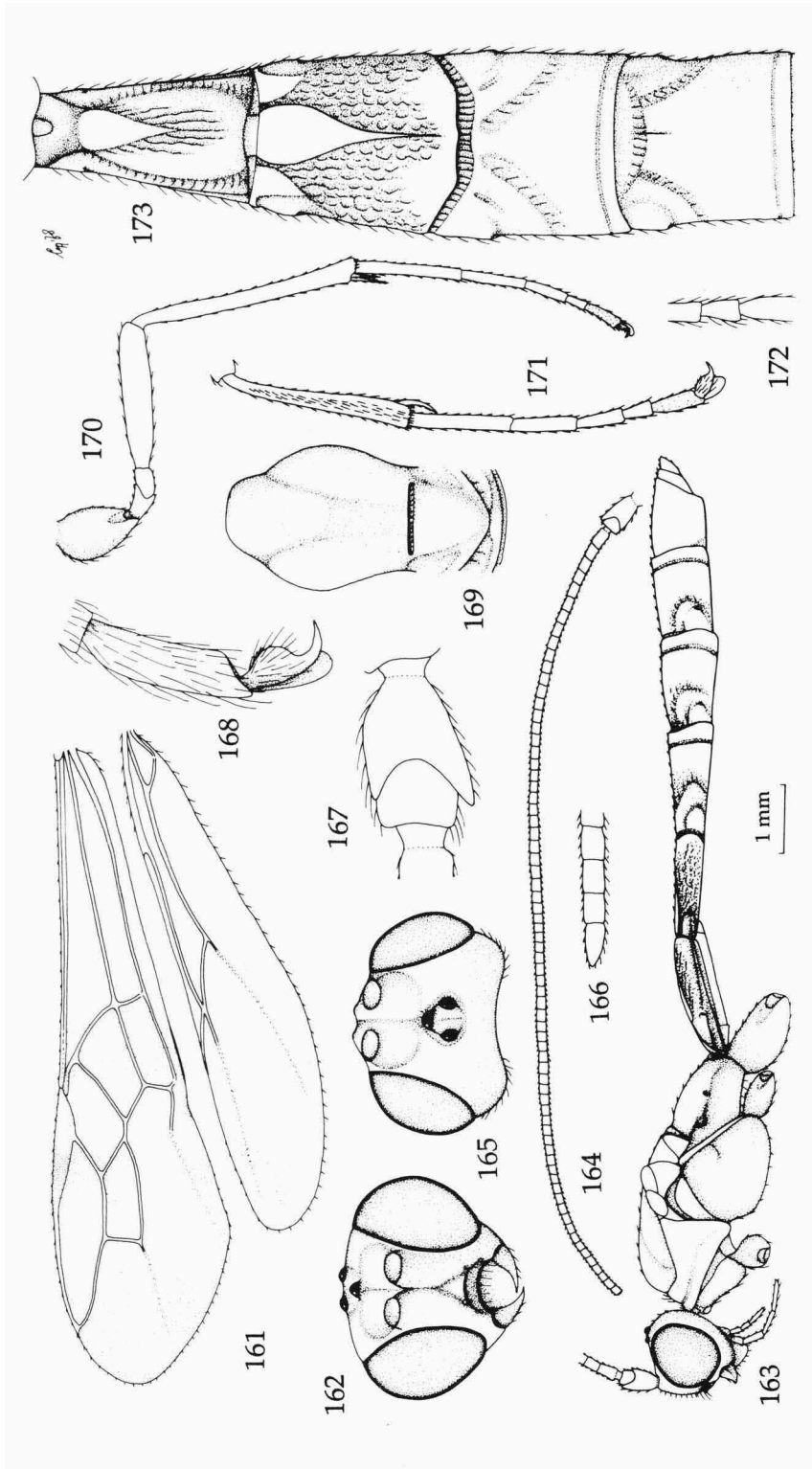
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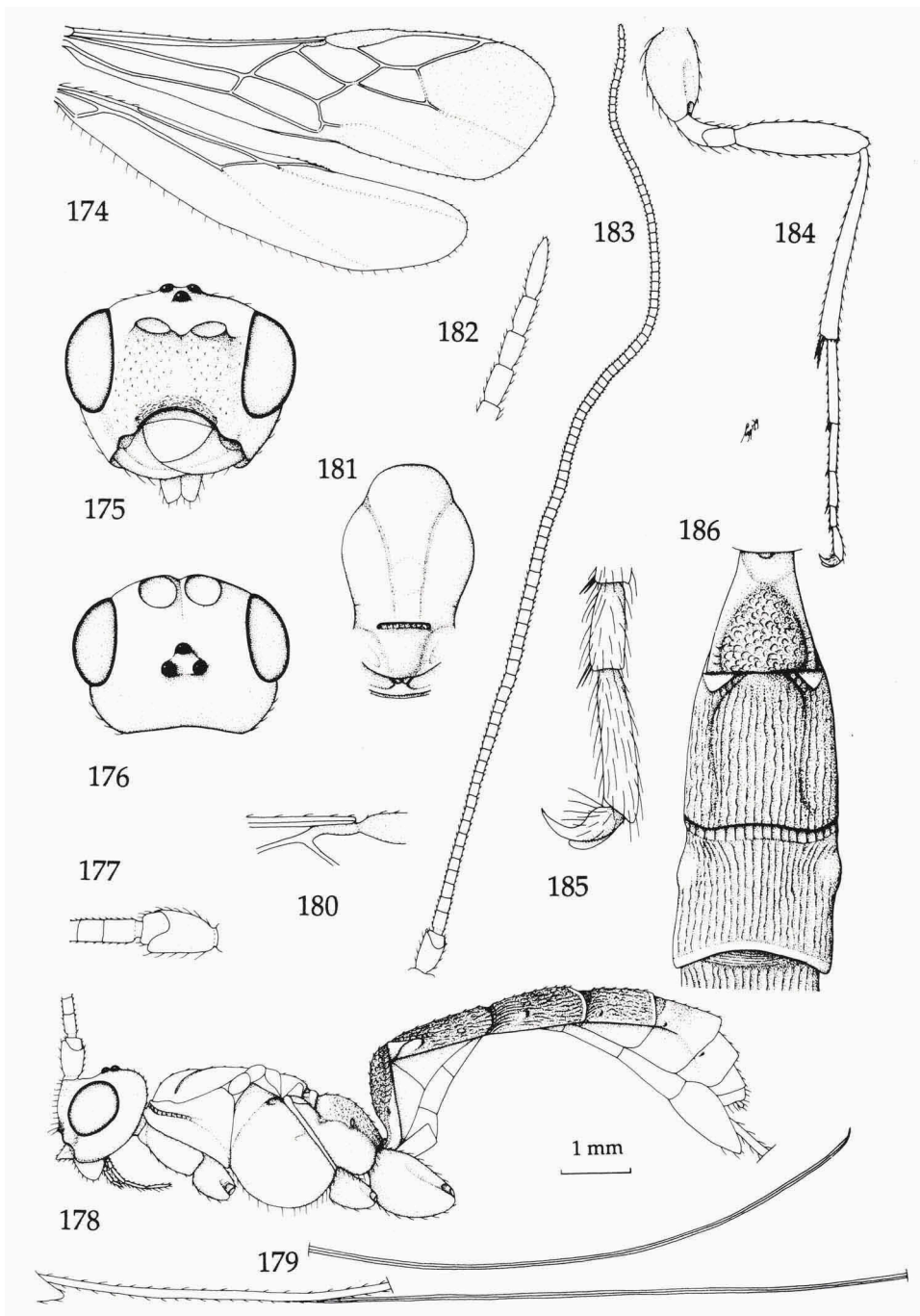
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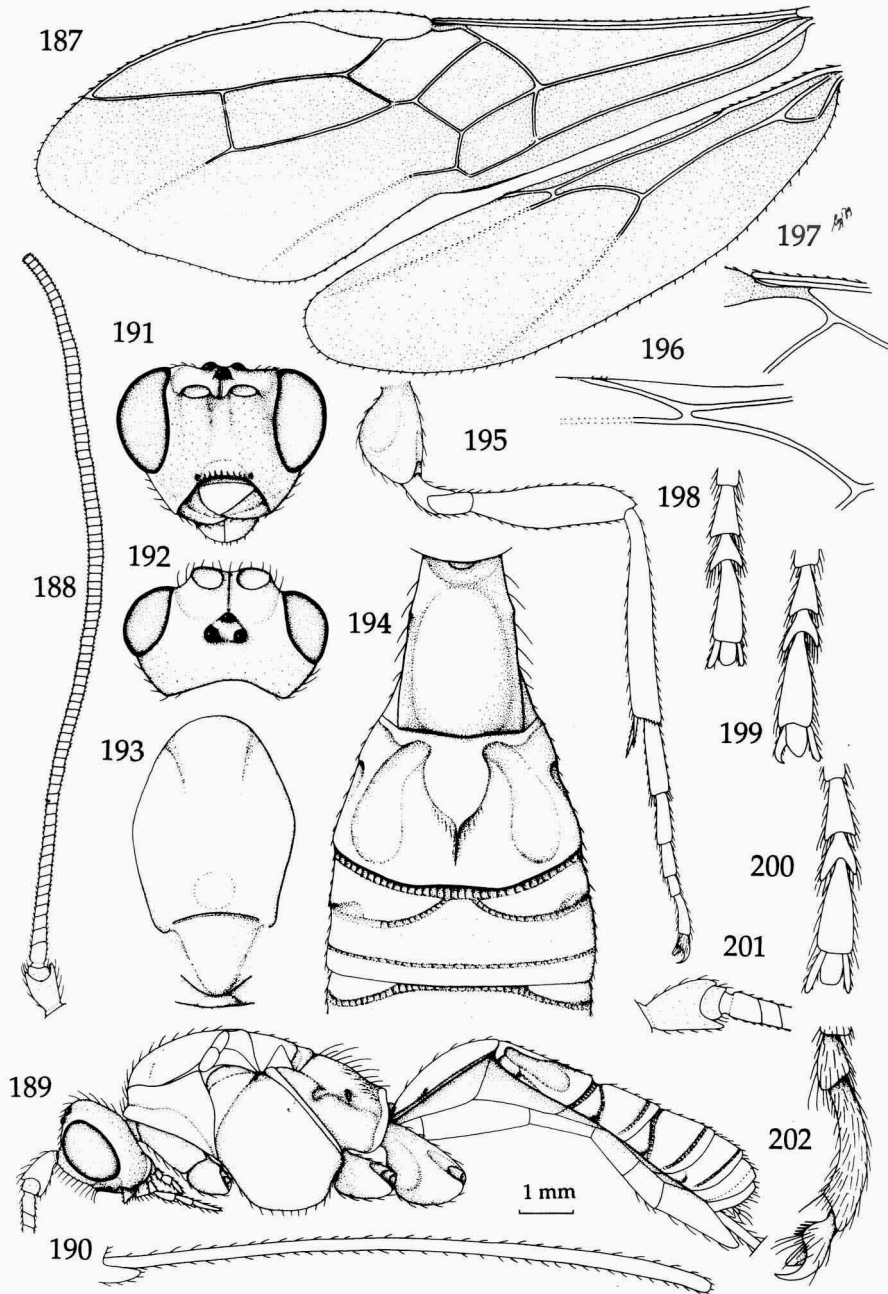
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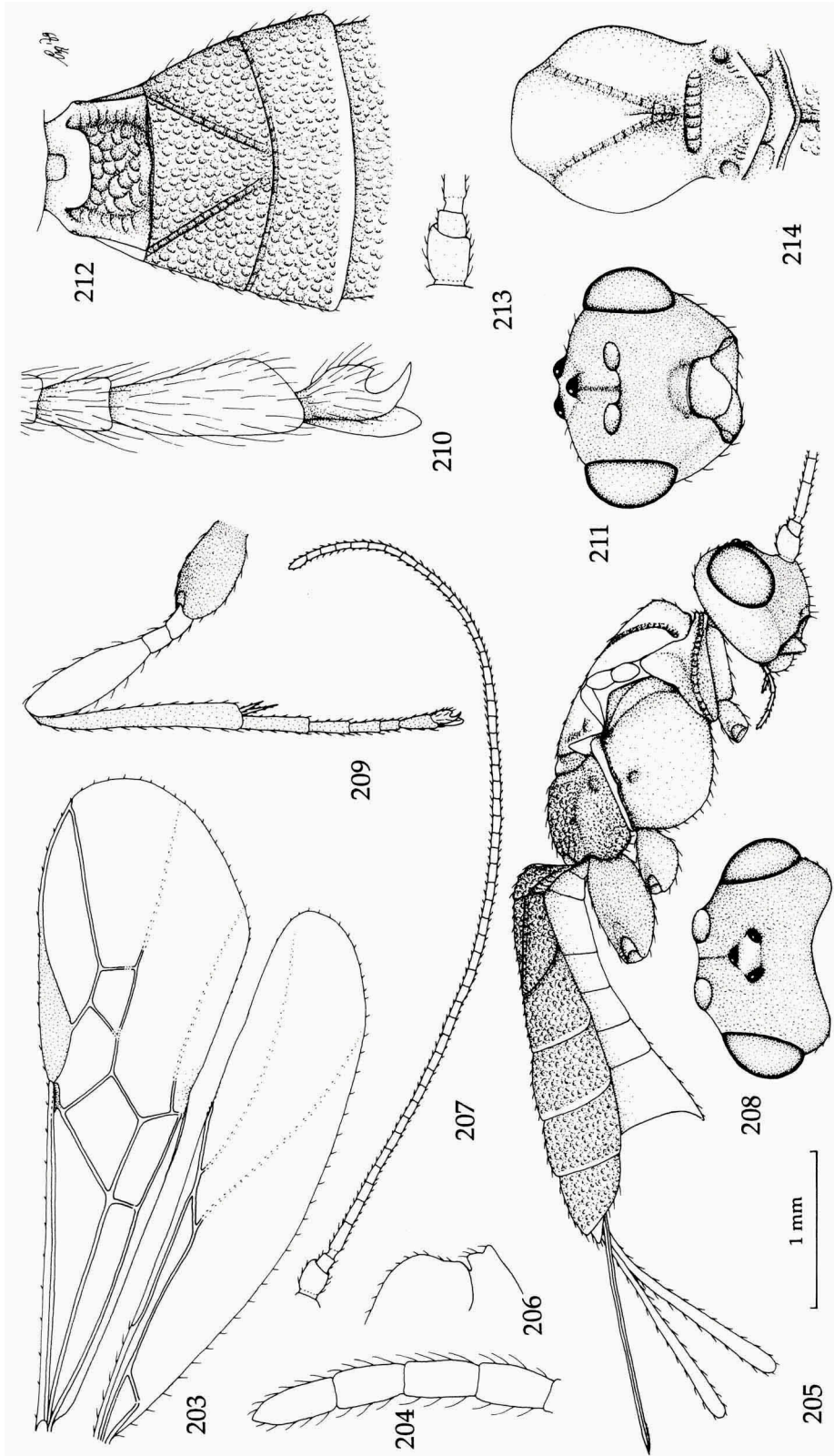
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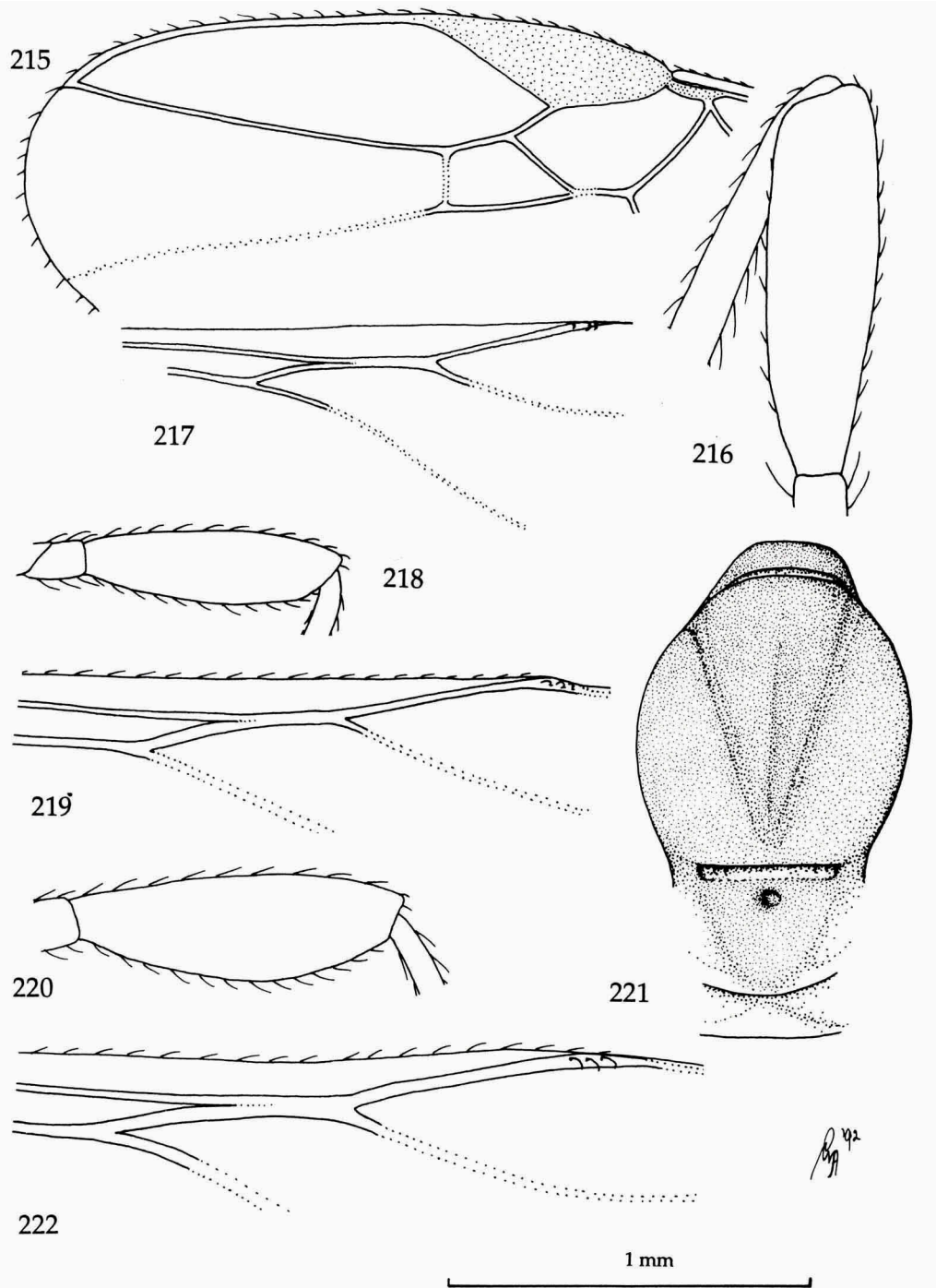
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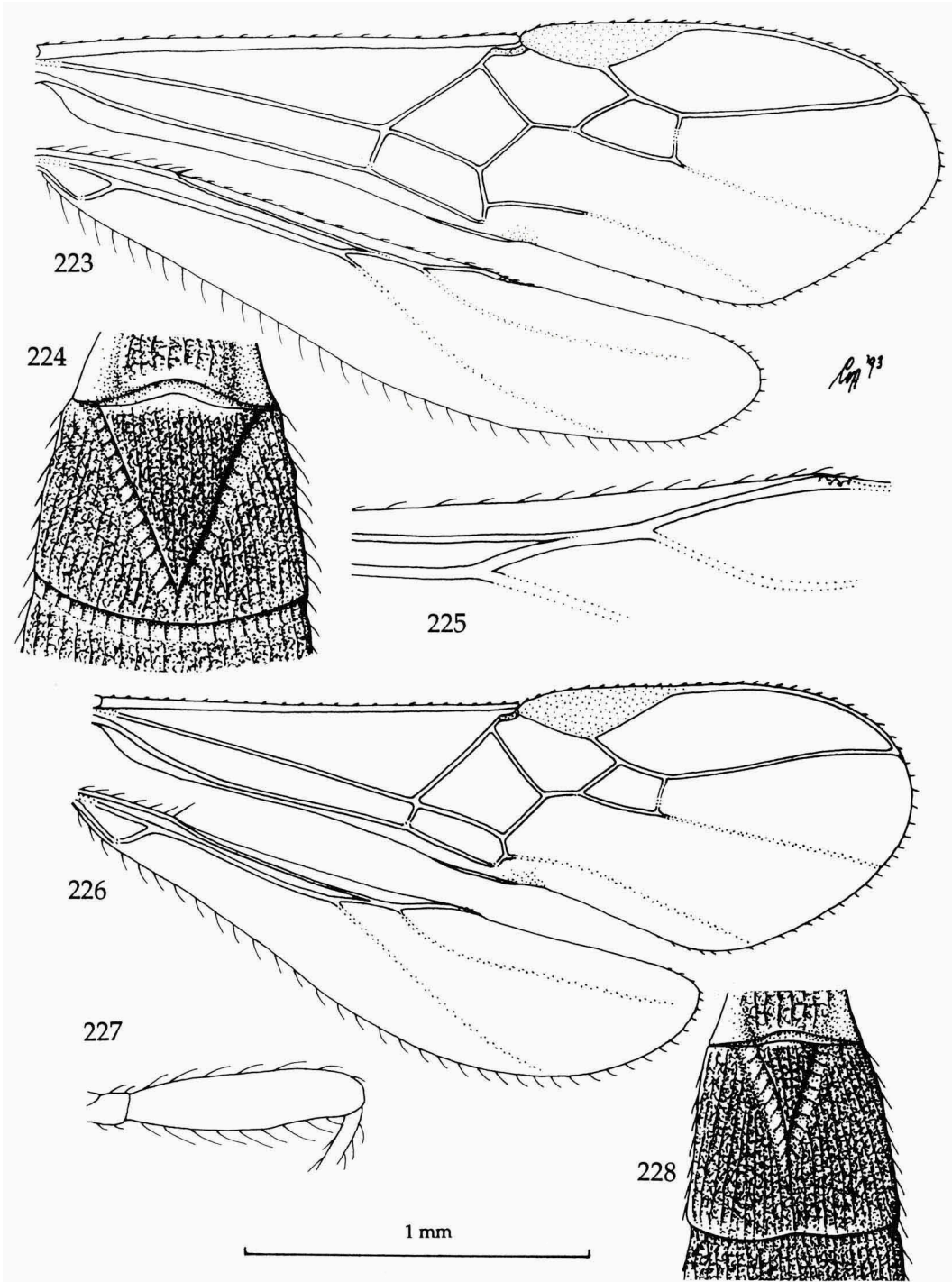
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Figs 203-214, *Tropobracon luteus* Cameron, ♀, holotype of *Shirakia schoenobii* Viereck. 203, wings; 204, apex of antenna; 205, habitus, lateral aspect; 206, mesoscutum and pronotum anteriorly, lateral aspect; 207, antenna; 208, head, dorsal aspect; 209, hind leg; 210, outer hind claw; 211, head, frontal aspect; 212, first-third metasomal tergites, dorsal aspect; 213, scapus, outer lateral aspect; 214, thorax, dorsal aspect. 203, 205, 207, 209: 1.0 × scale-line; 204, 210: 5.0 ×; 206, 213: 2.0 ×; 208, 211, 212, 214: 1.8 ×.



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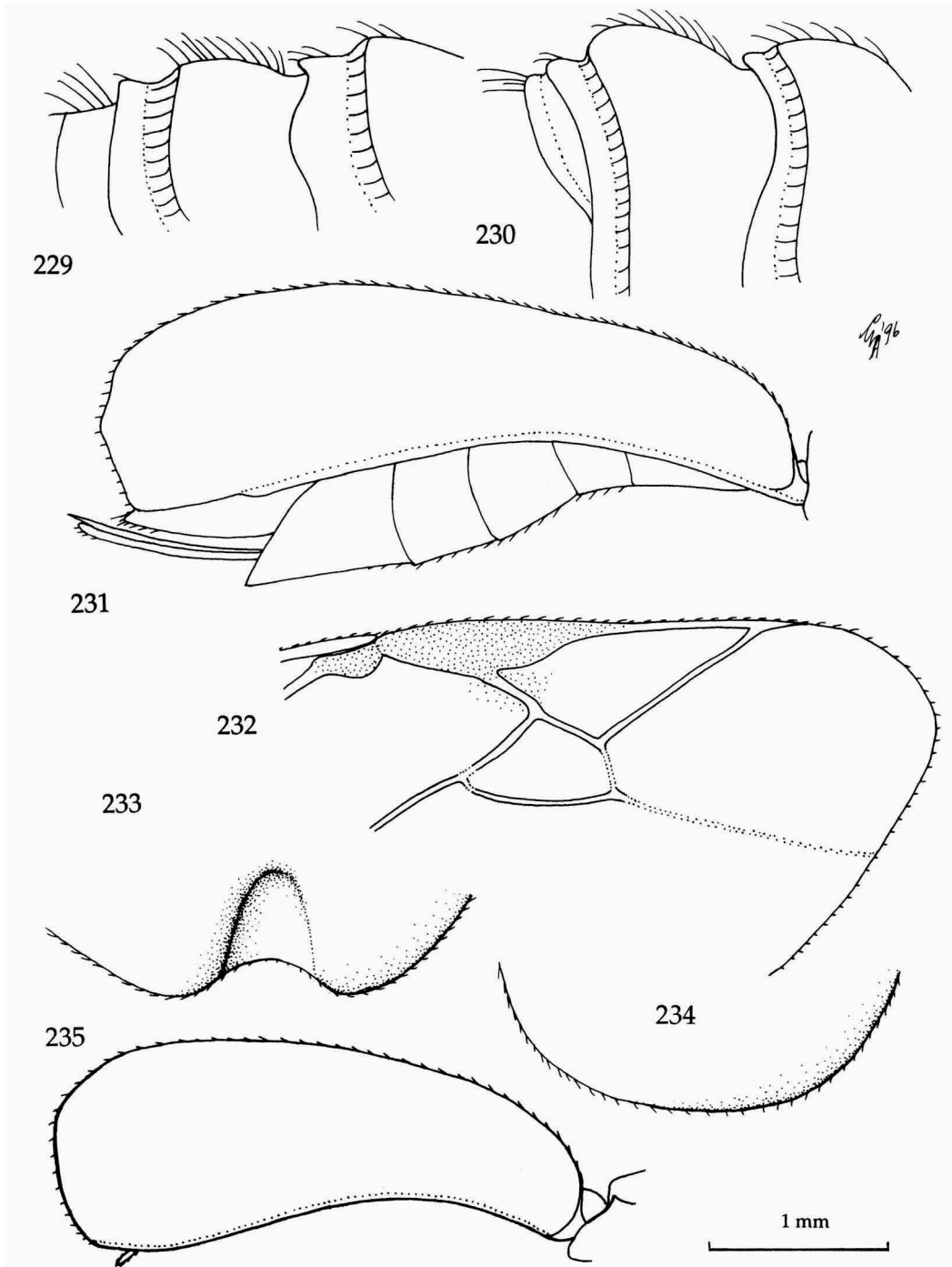
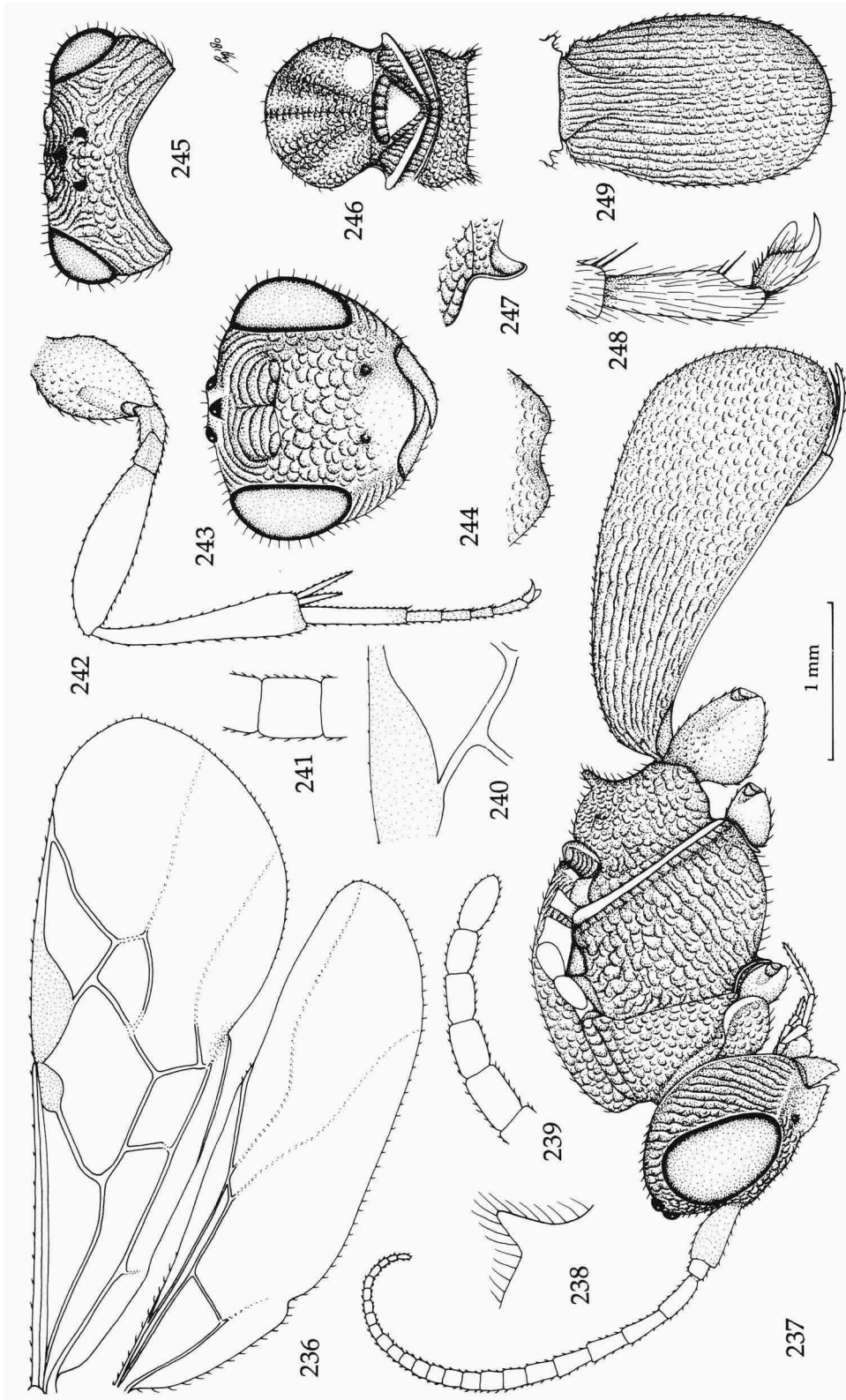
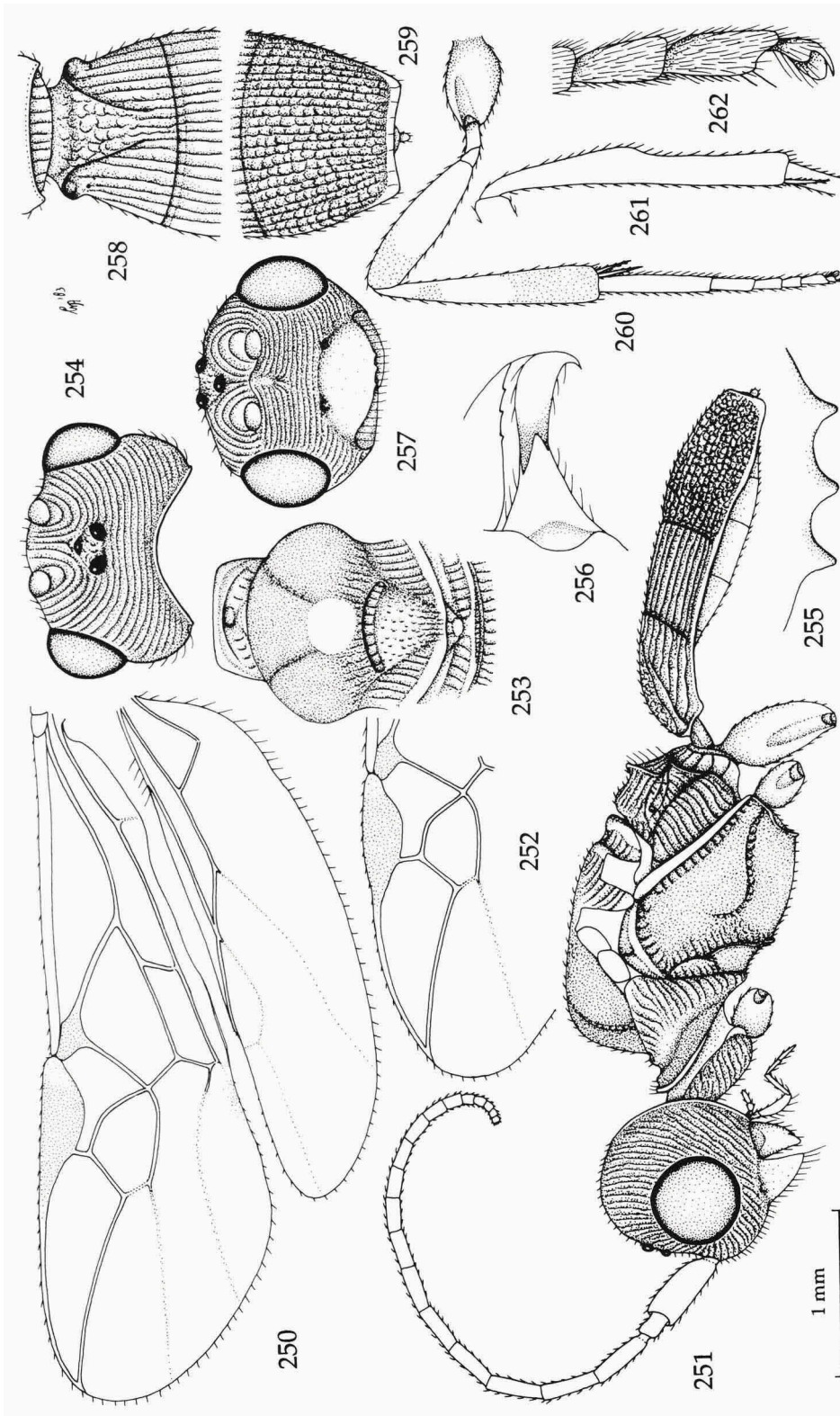


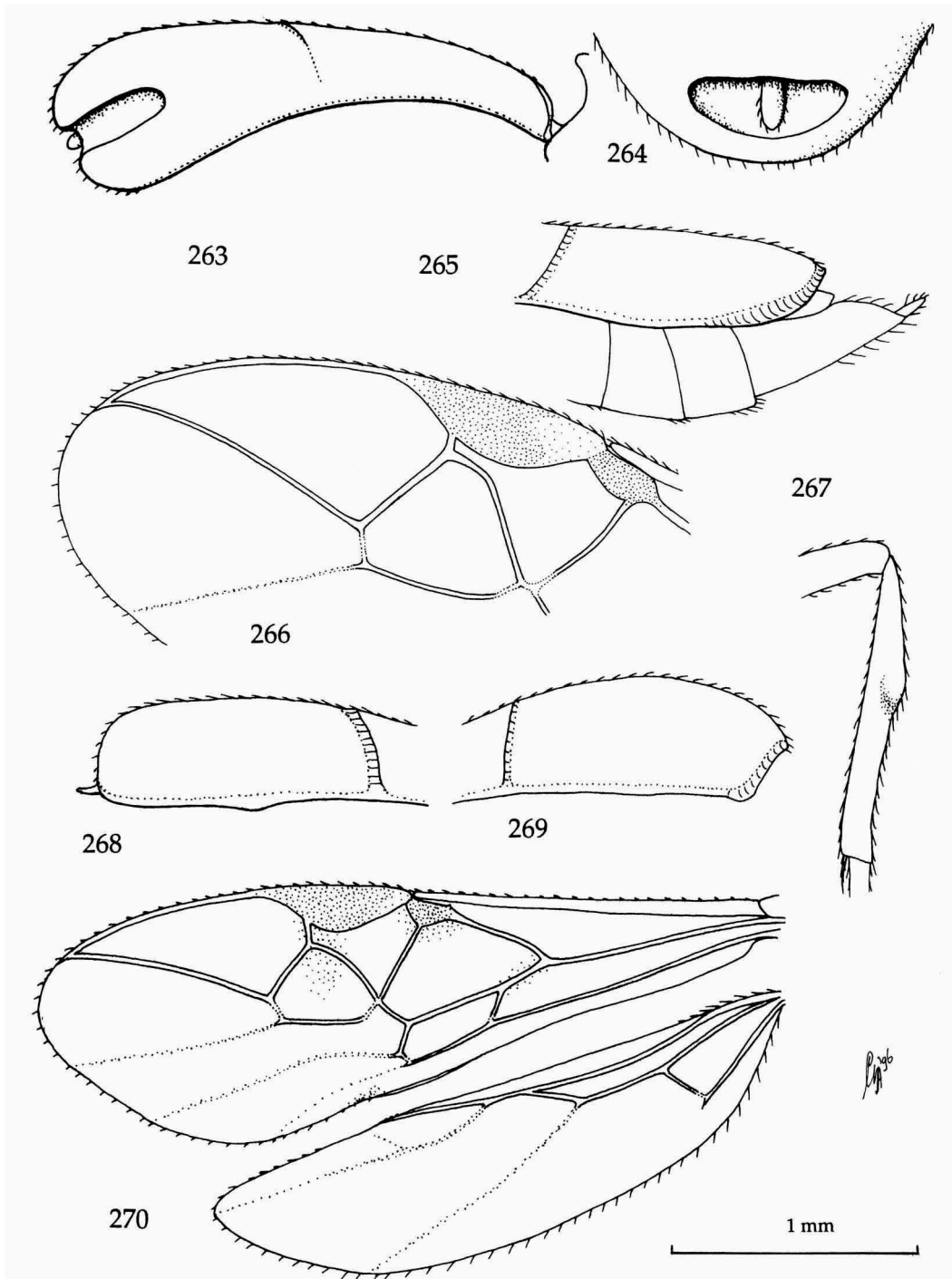
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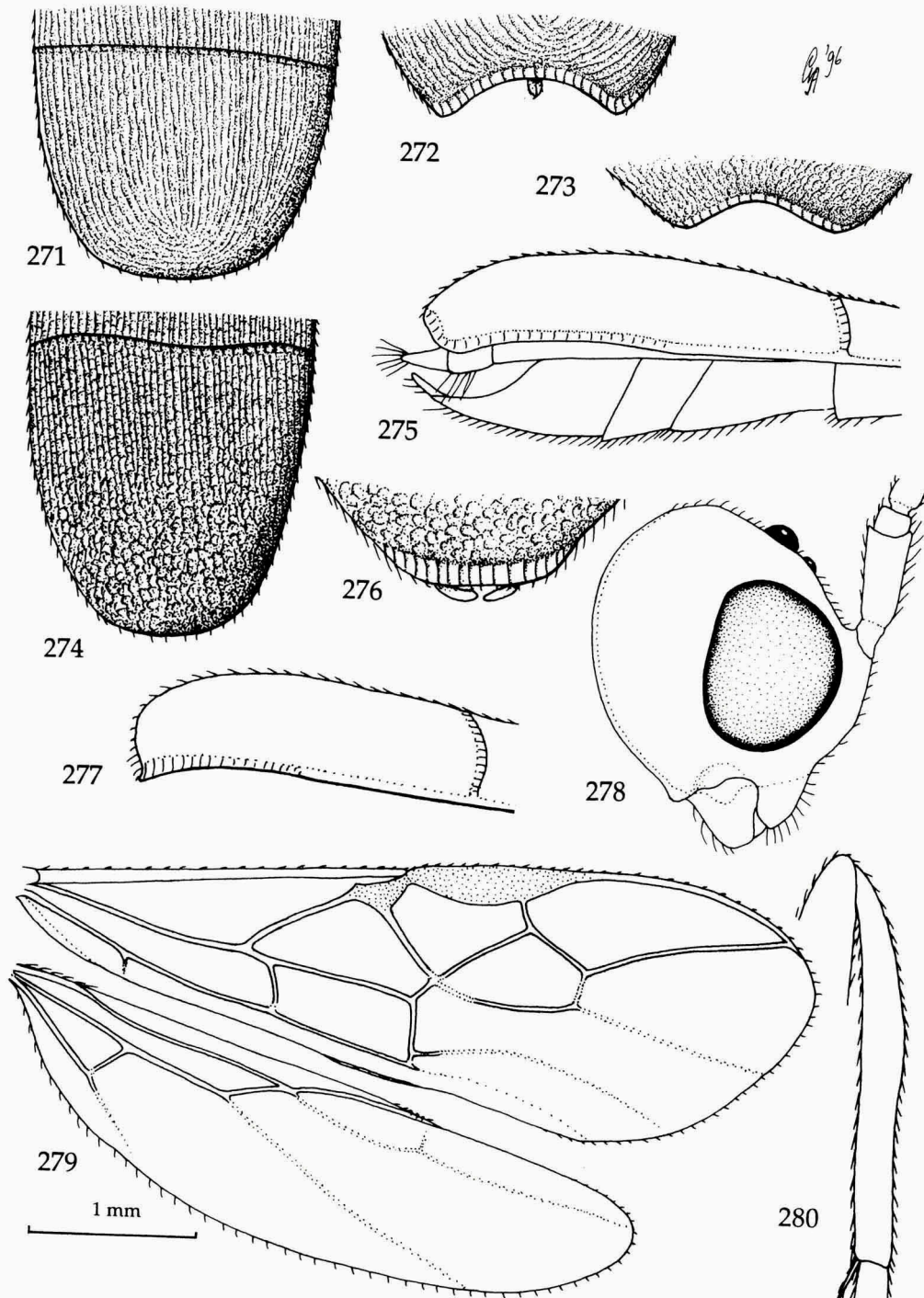
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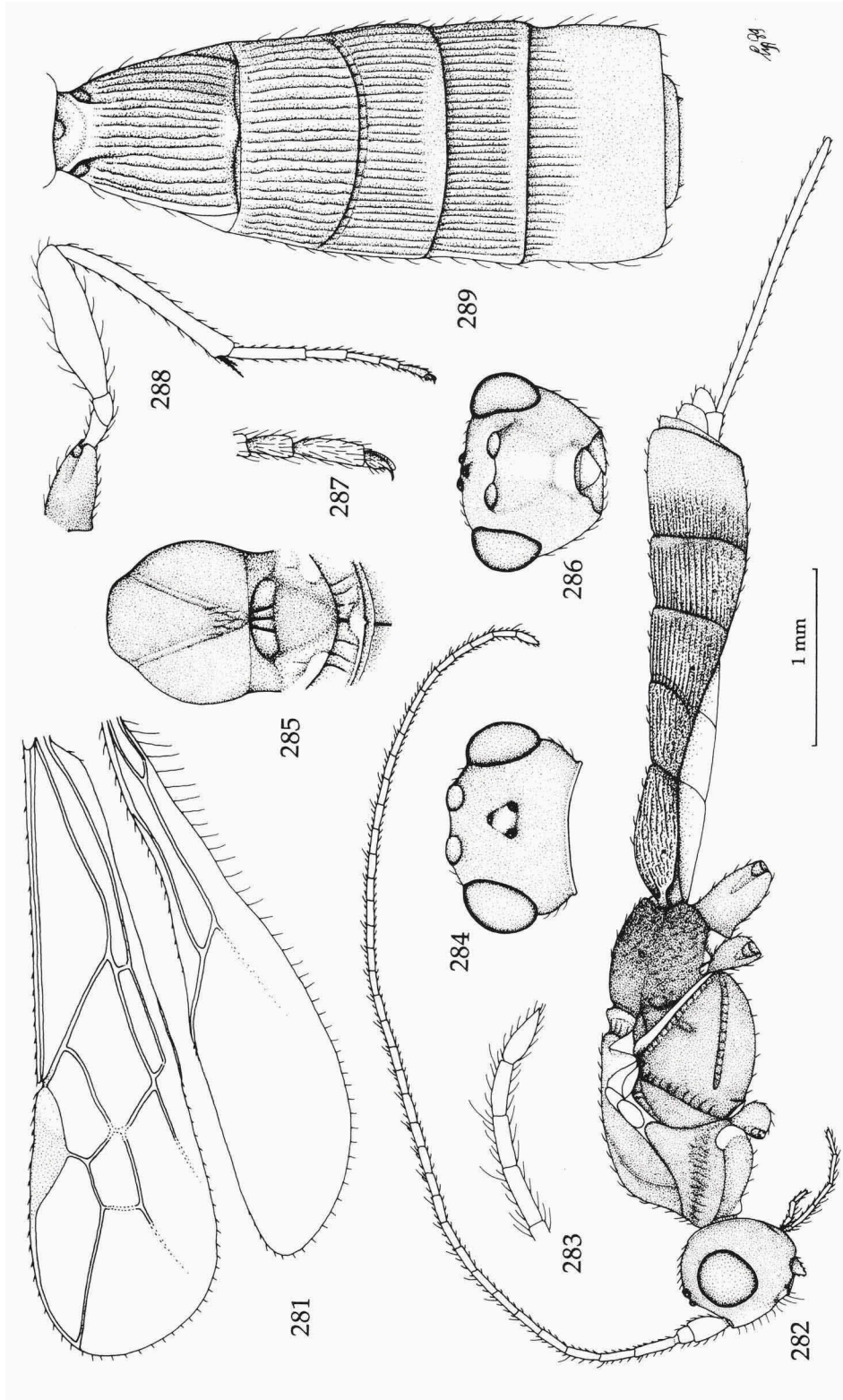
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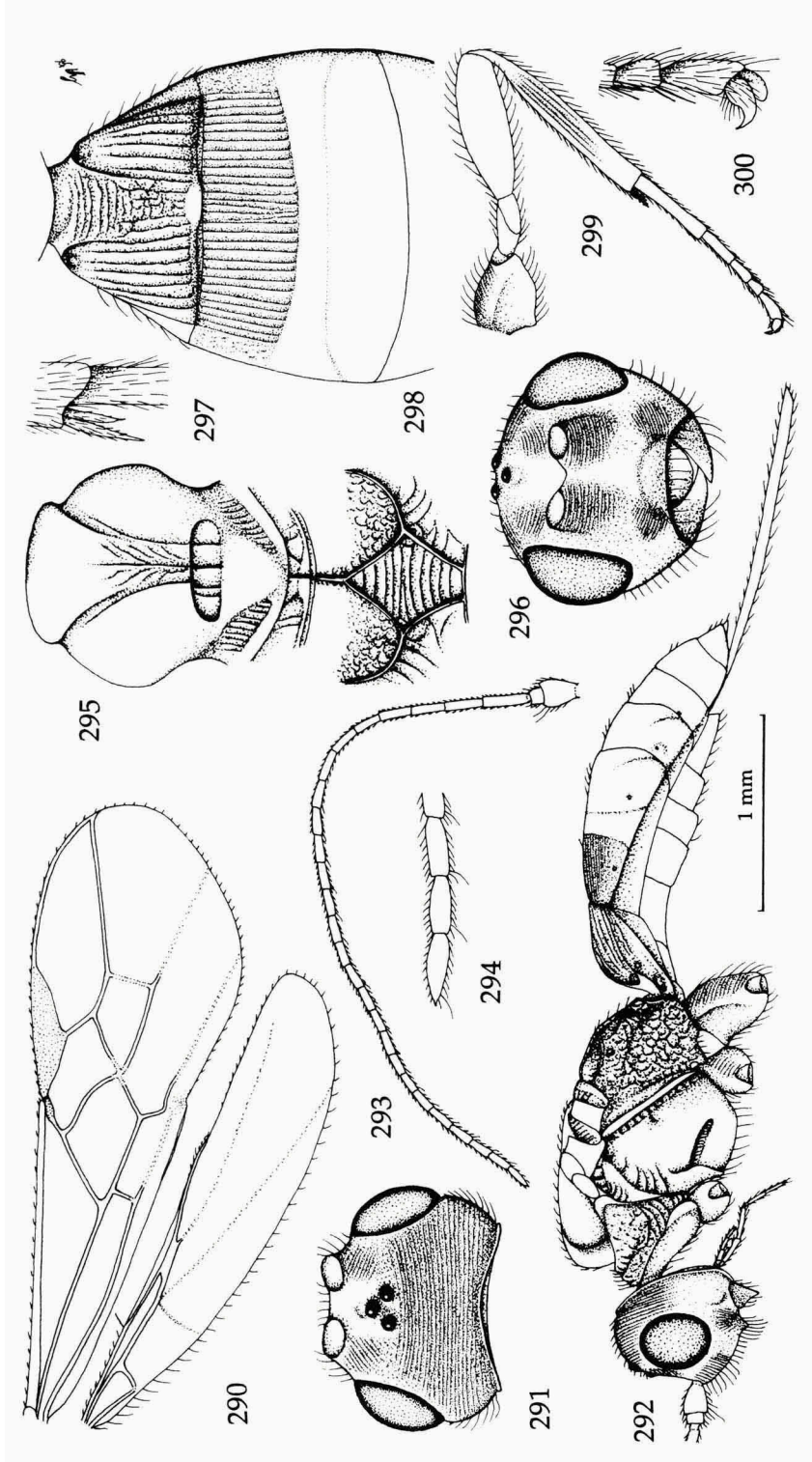
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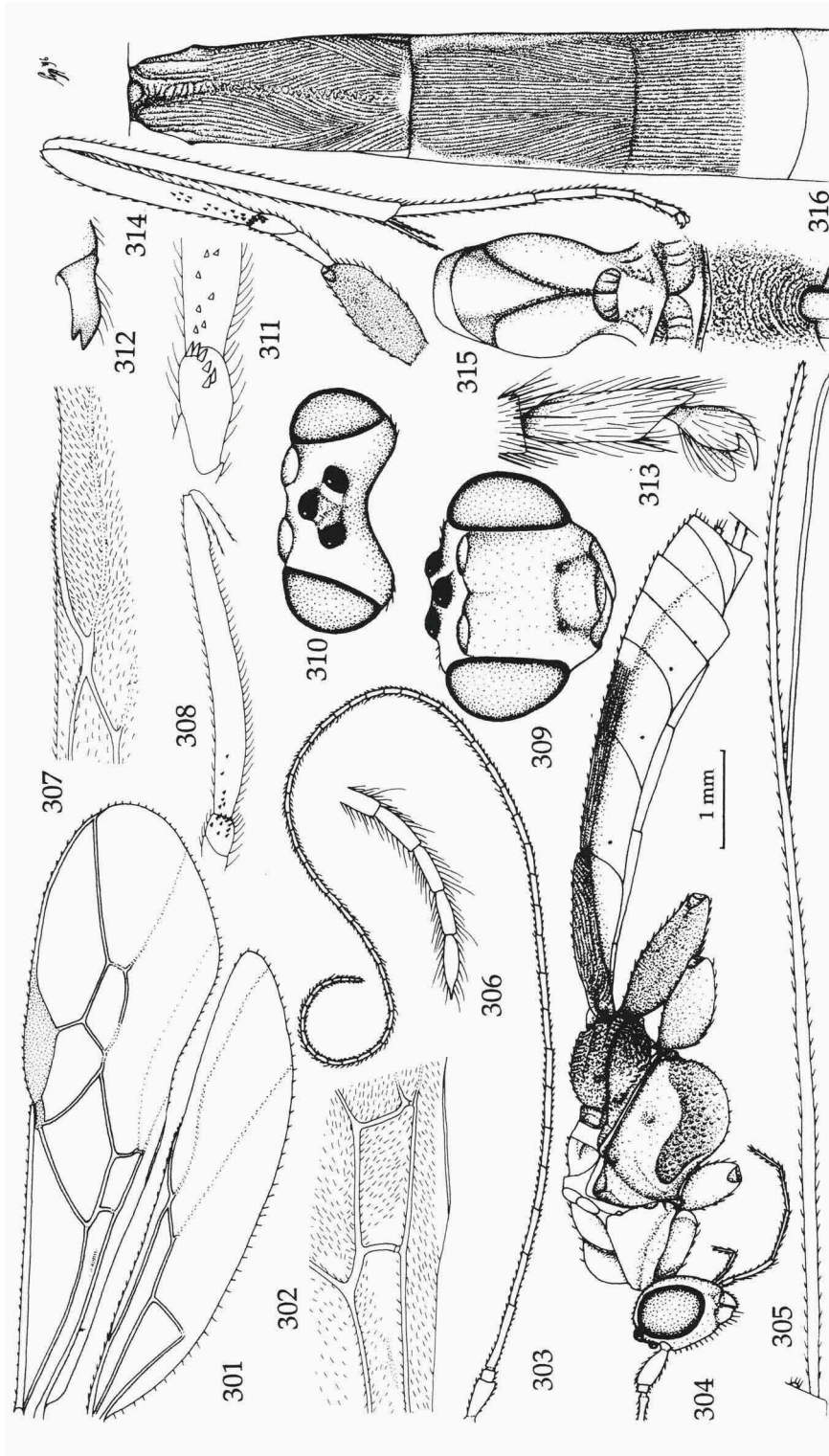
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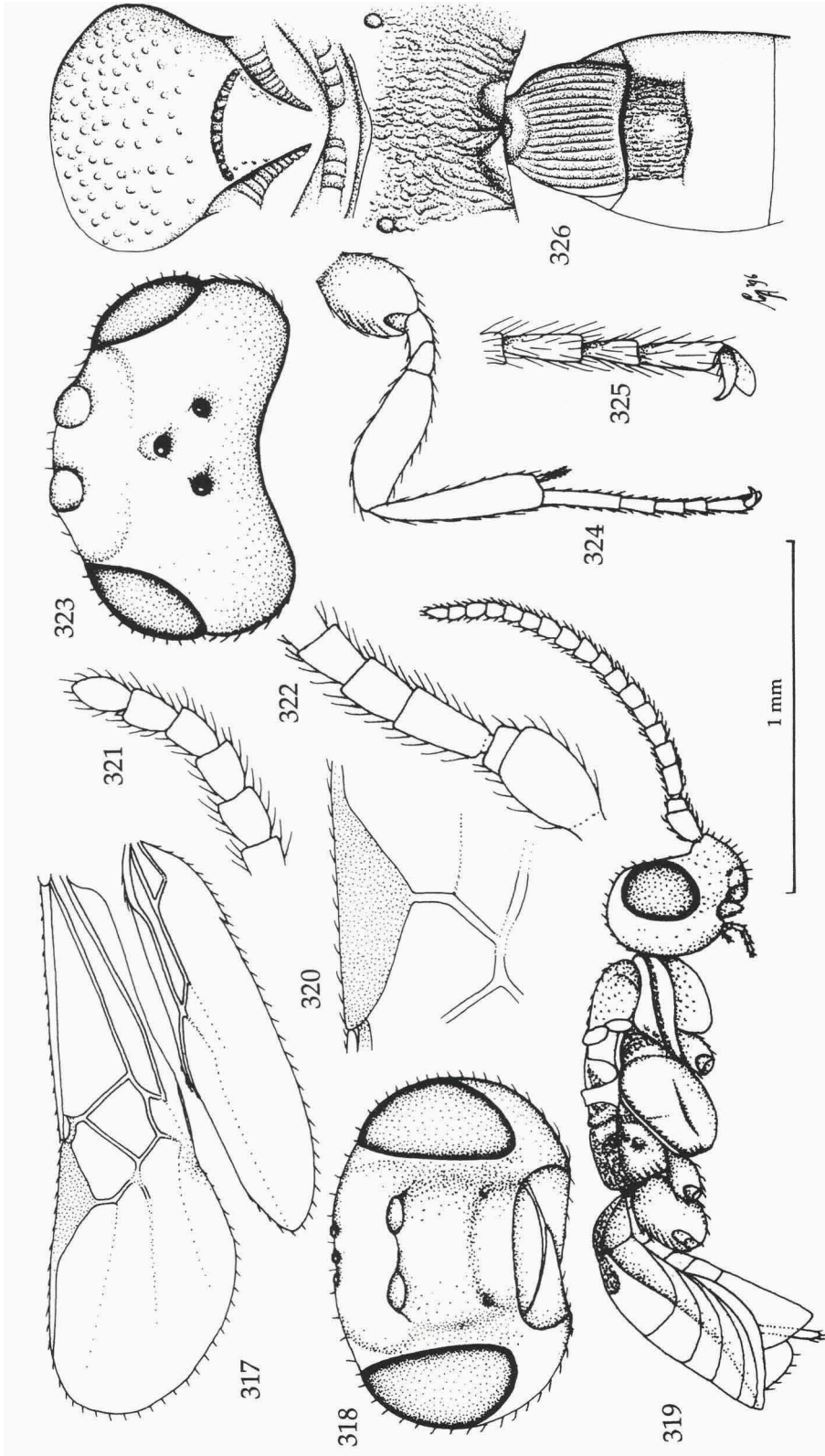
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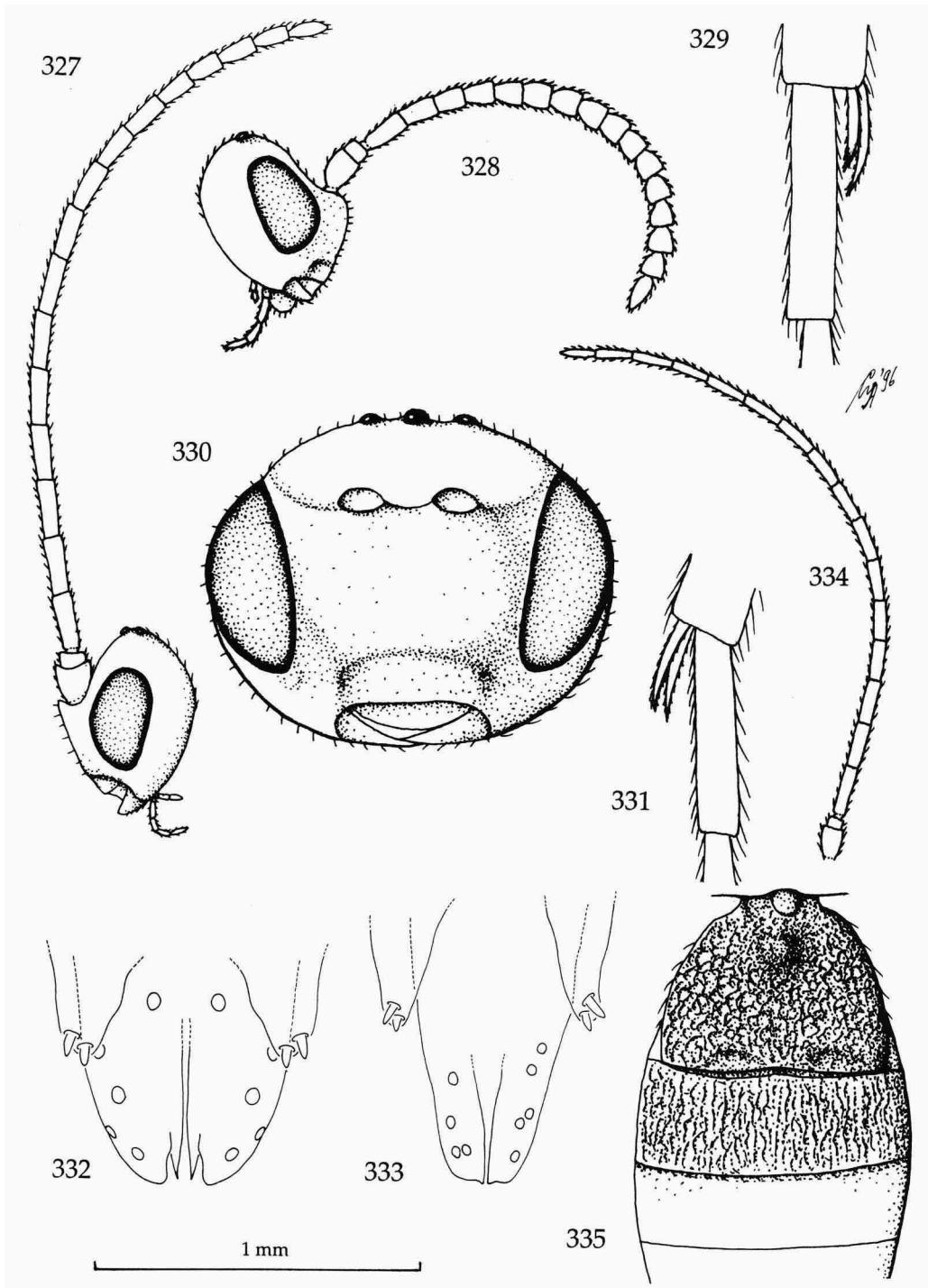
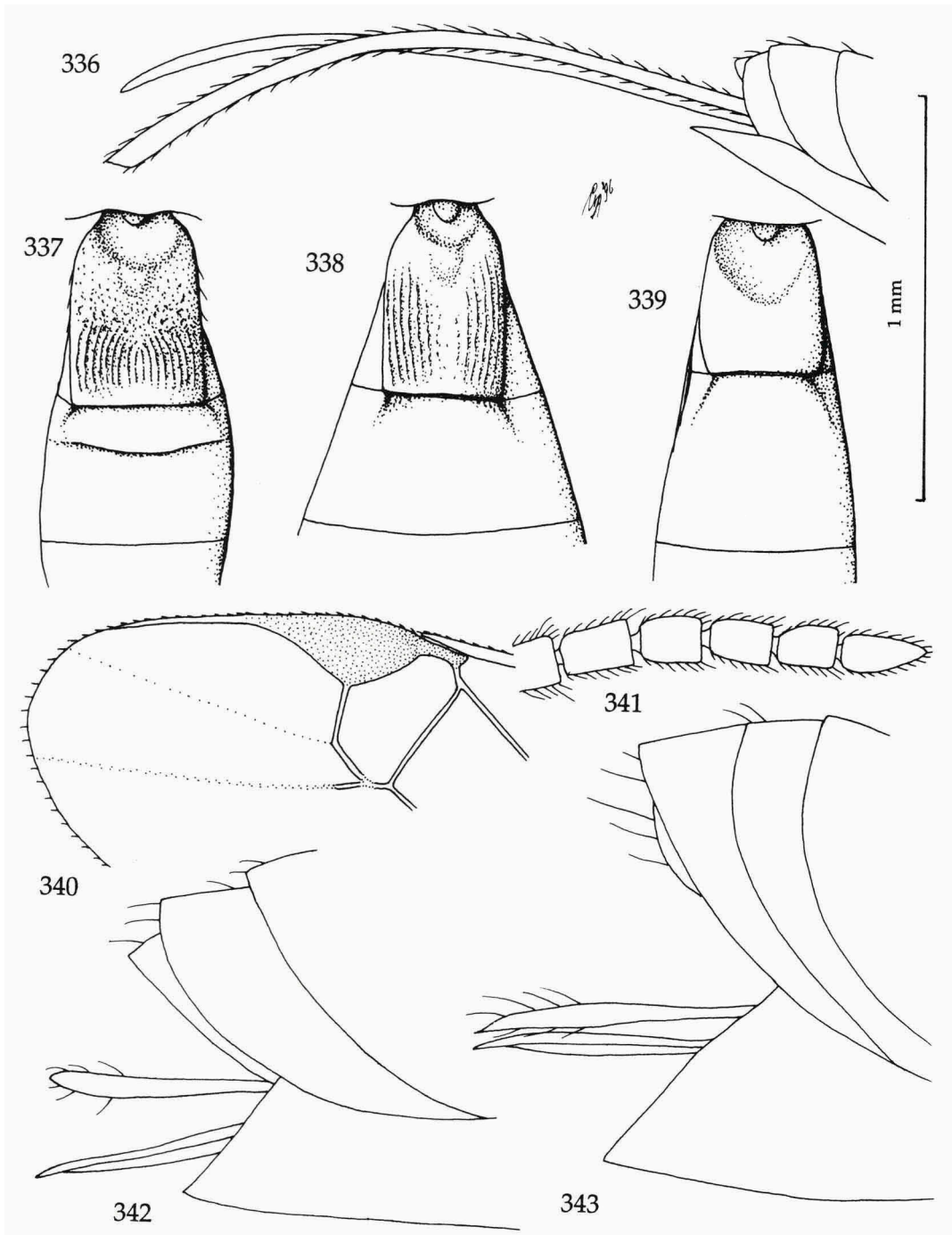


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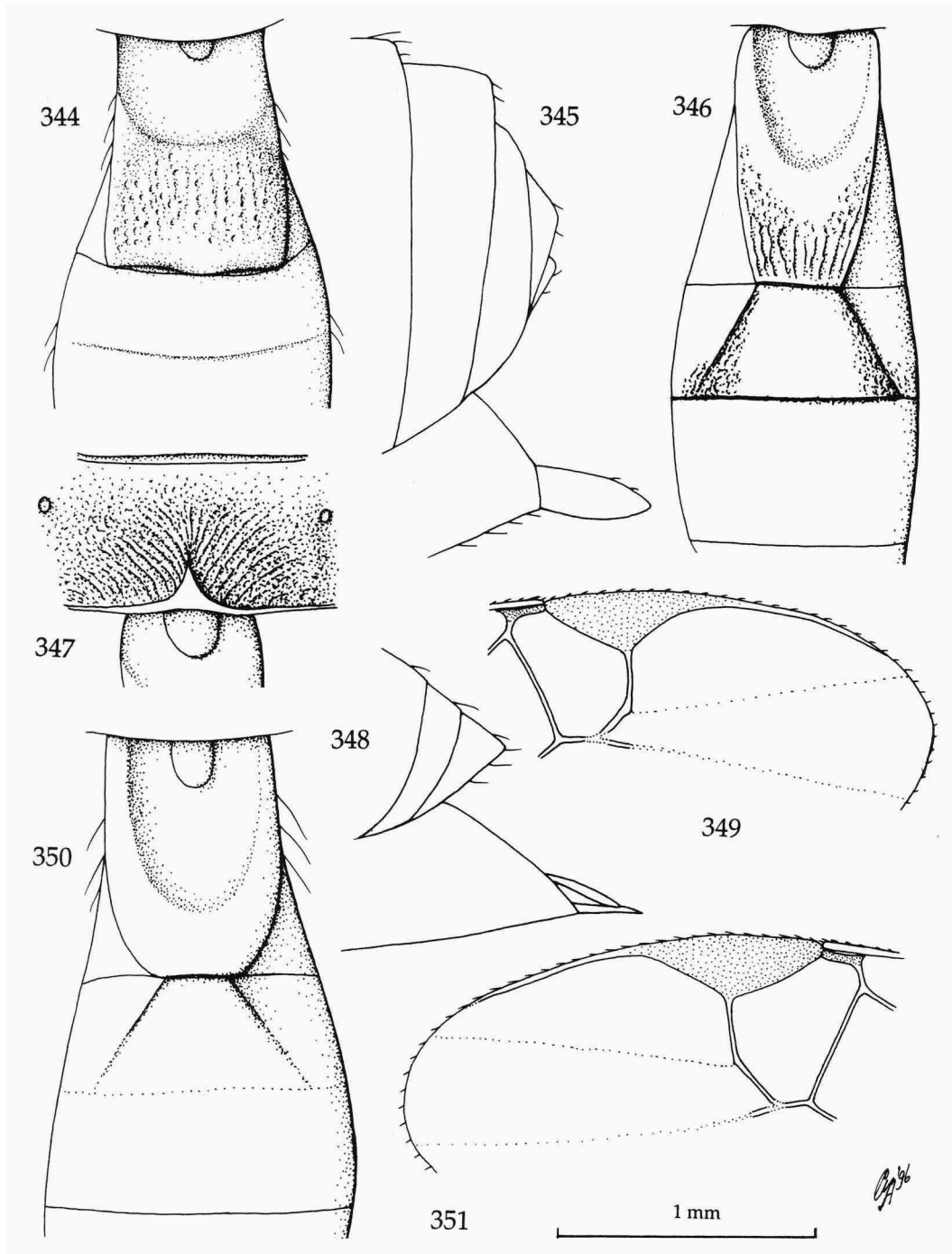
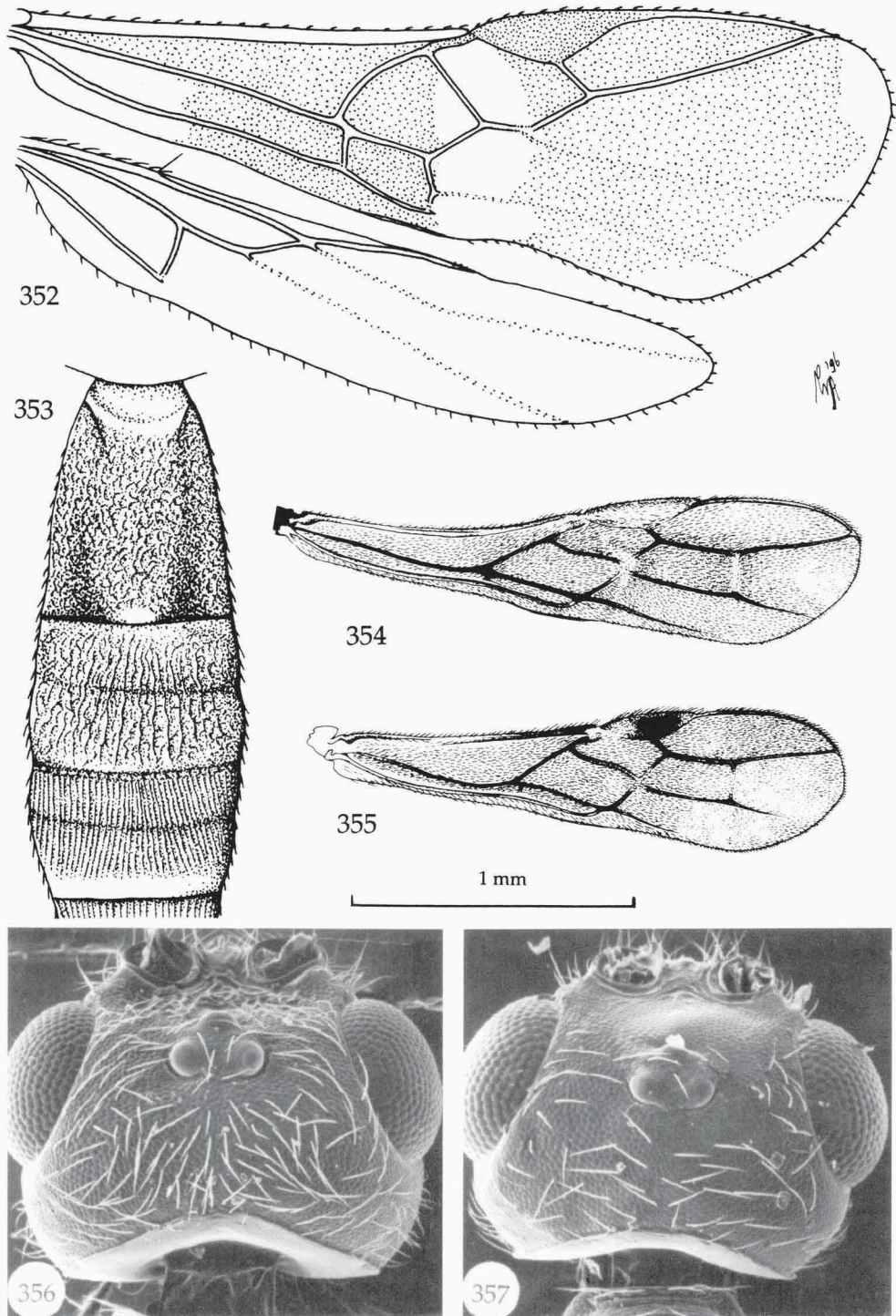
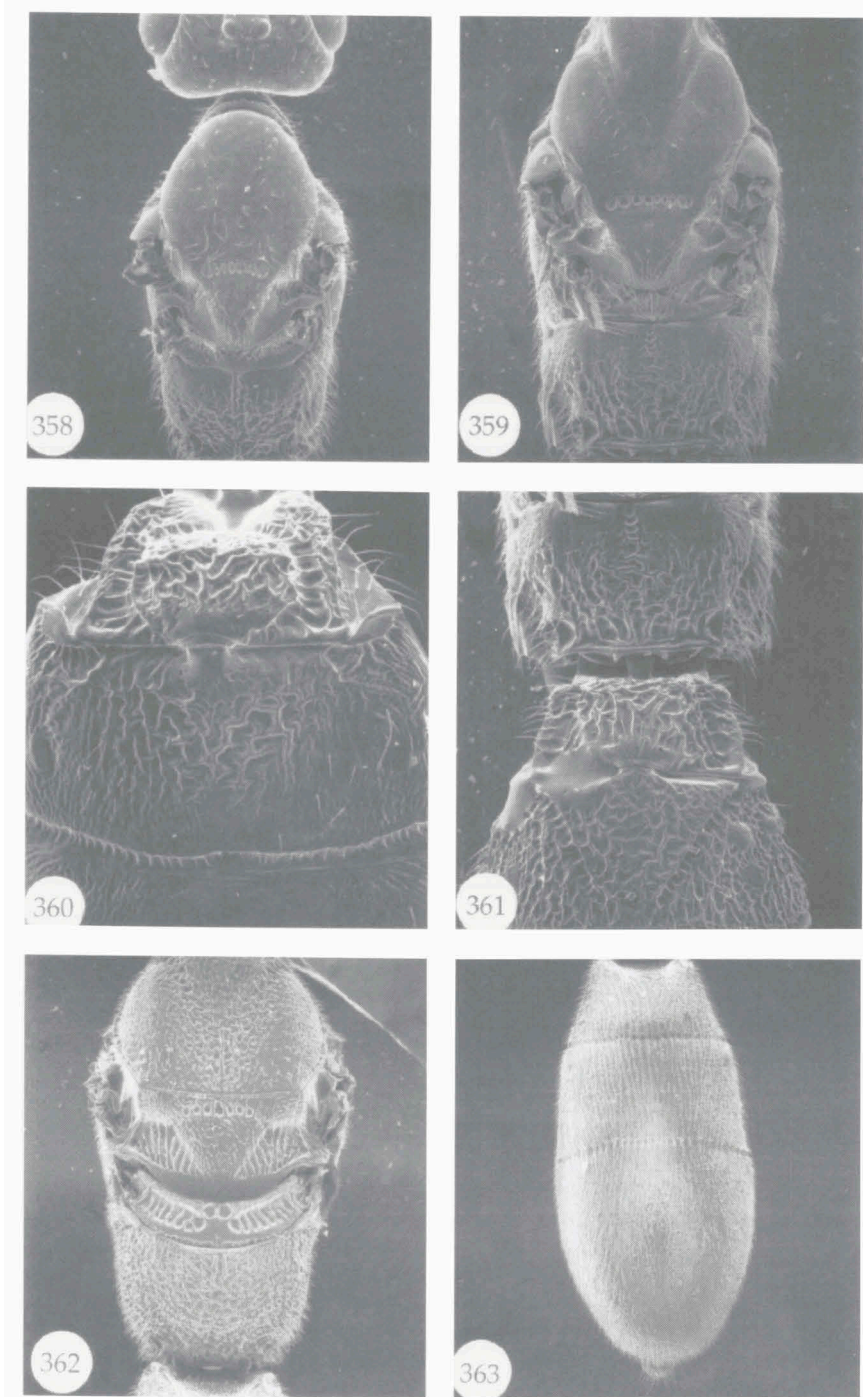


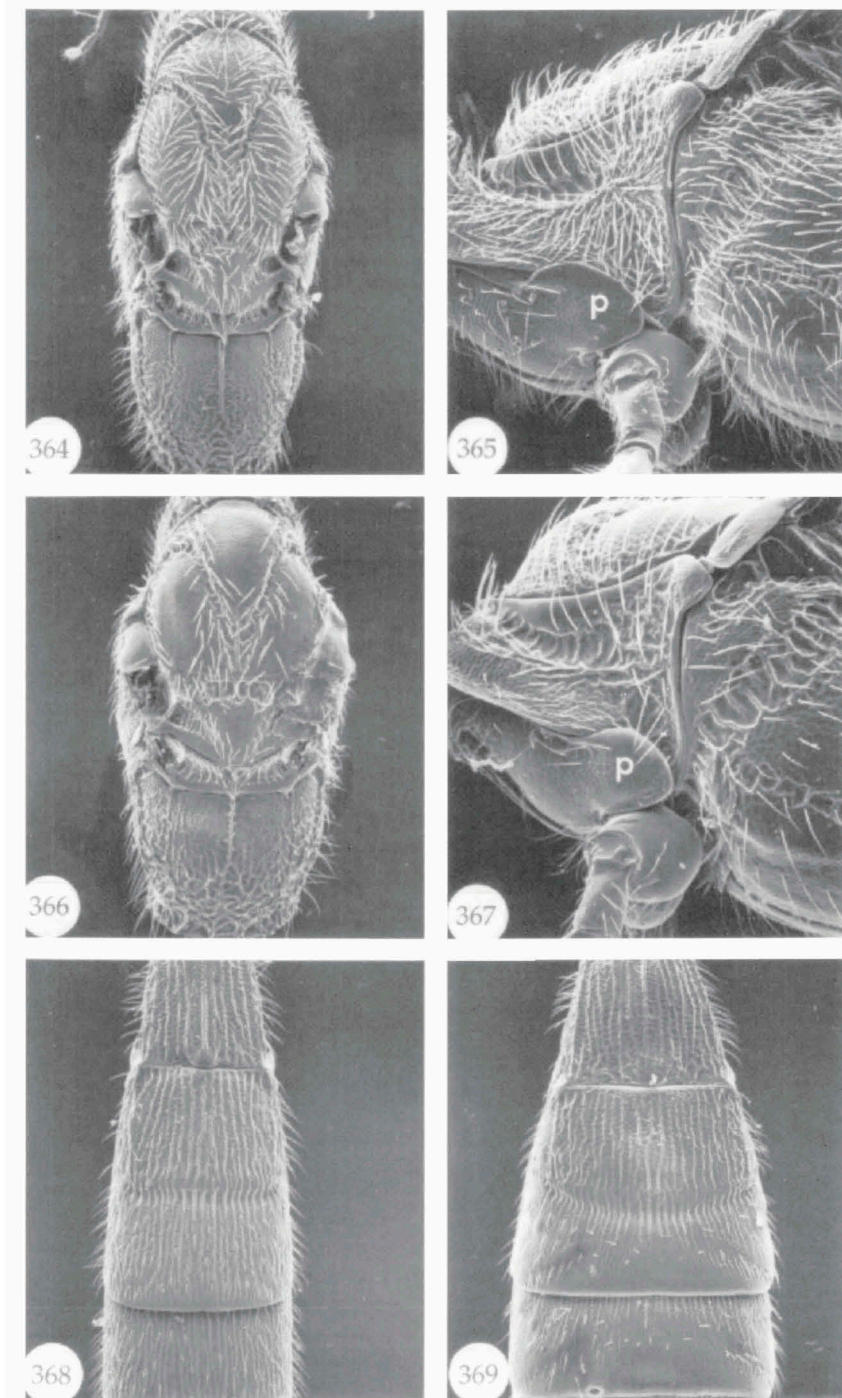
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<i>Eoreuma loftini</i>	35, 57	<i>grandiosella</i> (<i>Diatraea</i>)	35, 57
<i>Ephestia cautella</i>	29	<i>Habrobracon</i> Ashmead	11, 25, 26, 27
<i>Ephestia Guérin</i>	26	<i>Habrobracon beneficentor</i>	29
<i>Ephestia kuehniella</i>	29, 56	<i>Habrobracon brevicornis</i>	28
<i>ephyrae</i> (<i>Protapanteles</i>)	62	<i>Habrobracon brunnea</i>	29
<i>epicus</i> (<i>Bracon</i>)	33	<i>Habrobracon flavus</i>	29
<i>Eubadizon leptocephalus</i>	71	<i>Habrobracon hebetor</i>	29

<i>Habrobracon hebetor</i> var. <i>asiatica</i>	29	<i>kuehniella</i> (<i>Ephestia</i>)	29, 56
<i>Habrobracon hebetor tortricidarum</i>	29	<i>Kulczynskia aciculata</i>	26
<i>Habrobracon pectinophorae</i>	29	<i>Kulczynskia Niezabitowski</i>	26
<i>Habrobracon persimilis</i>	51	<i>lautus</i> (<i>Bracon</i>)	25
<i>Habrobracon plotnicovi</i>	29	<i>leptocephalus</i> (<i>Eubadizon</i>)	71
<i>Habrobracon simonovi</i> f. <i>lozinskii</i>	29	<i>Leucania loreyi</i>	64
<i>Habrobracon triangularis</i>	49	<i>leucobasis</i> (<i>Phanerotoma</i>)	55
<i>Habrobracon turkestanicus</i>	29	<i>leuzerae</i> (<i>Amyosoma</i>)	21, 23
<i>Habrobracon vernalis</i>	29	<i>levituberculatus</i> (<i>Phanaulax</i>)	41, 47
<i>Haimbachia ignefusalis</i>	4	<i>levituberculatus</i> (<i>Stenobracon</i>)	47
<i>hebetor</i> (<i>Bracon</i>)	29	<i>lineolata</i> (<i>Diatraea</i>)	35
<i>hebetor</i> (<i>Habrobracon</i>)	29	<i>Liobracon</i> Nason	25
<i>hebetor</i> var. <i>asiatica</i> (<i>Habrobracon</i>)	29	<i>loftini</i> (<i>Eoreuma</i>)	35, 57
<i>hebetor tortricidarum</i> (<i>Habrobracon</i>)	29	<i>Lorenzoo</i> de Stefani-Perez	25
<i>Hedysomus elegans</i>	58	<i>Lorenzoo solani</i>	26
<i>Hedysomus Foerster</i>	58	<i>loreyi</i> (<i>Leucania</i>)	64
<i>Hemibracon elegantulus</i>	47	<i>loreyi</i> (<i>Mythimna</i>)	64
<i>hendecasisella</i> (<i>Phanerotoma</i>)	56	<i>Lucobracon</i> Fahringer	26
<i>hispanica</i> var. <i>desertorum</i> (<i>Phanerotoma</i>)	55	<i>lutea</i> (<i>Elphea</i>)	40, 47
<i>horaria</i> (<i>Desmis</i>)	55	<i>lutea</i> (<i>Myosoma</i>)	21
<i>Hormagathis</i> Brues	17	<i>luteus</i> (<i>Tropobracon</i>)	48
<i>Hormagathis mellea</i>	17	<i>luzonicus</i> (<i>Cubochelonus</i>)	51
<i>Hormiopterus caudatus</i>	59	<i>Lytopylus azygos</i>	17
<i>Hormiopterus Giraud</i>	58	<i>Lytopylus</i> Viereck	17
<i>Hormiopterus ollivieri</i>	58	<i>Macrocentrus bicolor</i>	59
<i>hungaricus</i> (<i>Microchelonus</i>)	51	<i>Macrocentrus Curtis</i>	15, 59
<i>hylobatis</i> (<i>Edulicodes</i>)	55	<i>Macrocentrus flavus</i>	62
<i>Ichneumon calculator</i>	17	<i>Macrocentrus sesamivorus</i>	60
<i>Ichneumon impostor</i>	35	<i>Macrodyctium</i> Ashmead	25
<i>Ichneumon minutator</i>	25, 26	<i>Macropalpus</i> Ratzeburg	71
<i>Ichneumon oculator</i>	51	<i>maculata</i> (<i>Stenobracon</i>)	47
<i>ignefusalis</i> (<i>Acigona</i>)	4, 70	<i>maculiceps</i> (<i>Euvipio</i>)	44
<i>ignefusalis</i> (<i>Coniesta</i>)	4, 46, 50, 70	<i>maculiceps</i> (<i>Vipio</i>)	44
<i>ignefusalis</i> (<i>Donacoscaptes</i>)	4	<i>maculicepsida</i> (<i>Vipio</i>)	44
<i>ignefusalis</i> (<i>Haimbachia</i>)	4	<i>maculitarsis</i> (<i>Glyptapanteles</i>)	70
<i>impostor</i> (<i>Ichneumon</i>)	35	<i>maculitarsis</i> (<i>Apanteles</i>)	70
<i>incertulas</i> (<i>Tryporyza</i>)	22	<i>maculitarsis</i> (<i>Glyptapanteles</i>)	69, 70
<i>insulana</i> (<i>Earias</i>)	28	<i>maculiventris</i> (<i>Eubadizon</i>)	71
<i>loxia</i> Enderlein	17	<i>magnifactella</i> (<i>Diatraea</i>)	35
<i>loxia faceta</i>	17	<i>major</i> (<i>Phanerotoma</i>)	56
<i>Iphiaulacidea</i> Fahringer	35	<i>Maliarpha separatella</i>	4,
<i>Iphiaulax dubiosus</i>	36		5, 32, 33, 40, 50, 53, 54, 56, 59, 64
<i>Iphiaulax dubiotus</i>	36, 37	<i>malinellus</i> (<i>Yponomeuta</i>)	29
<i>Iphiaulax dubius</i>	37	<i>manilae</i> (<i>Apanteles</i>)	64, 69
<i>Iphiaulax Foerster</i>	10, 34, 35	<i>manilae</i> (<i>Glyptapanteles</i>)	69
<i>Iphiaulax kimballi</i>	35	<i>Maruca vitrata</i>	57
<i>Iphiaulax pilisoma</i>	36, 38	<i>Maruca testulalis</i>	55
<i>ipsilon</i> (<i>Agrotis</i>)	64	<i>maudae</i> (<i>Chelonus</i>)	52, 54
<i>Ischiolus</i> Hellén	71	<i>mauritanica</i> (<i>Euvipio</i>)	44
<i>Ischius</i> Wesmael	71	<i>mauritanica</i> (<i>Glabriolum baeticus</i> var.)	44
<i>javanicus</i> (<i>Macrocentrus</i>)	47	<i>mauritanica</i> (<i>Glyptomorpha baetica</i> var.)	44
<i>juglandis</i> (<i>Bracon</i>)	29	<i>mauritanicus</i> (<i>Pseudovipio baeticus</i> var.)	44
<i>kimballi</i> (<i>Digonogastra</i>)	35	<i>media</i> (<i>Phanerotoma</i>)	55
<i>kimballi</i> (<i>Iphiaulax</i>)	35	<i>Megacentrus concolor</i>	16

<i>Megacentrus Szépligeti</i>	16	<i>obscurator</i> (<i>Microdus</i>)	71
<i>Megachelonus Baker</i>	51	<i>ocularis</i> (<i>Phanerotoma</i>)	55, 56
<i>Megachelonus bidentatus</i>	51	<i>oculator</i> (<i>Ichneumon</i>)	51
<i>melanoclista</i> (<i>Scirpophaga</i>)	4	<i>oculatus</i> (<i>Stenobracon</i>)	40, 47
<i>mellea</i> (<i>Hormagathis</i>)	17	<i>Odesia Cameron</i>	41
<i>Mesobracon psolopterus</i>	39, 40	<i>ollivieri</i> (<i>Hormiopterus</i>)	58
<i>Mesobracon spec.</i>	49	<i>Oresimus Ashmead</i>	71
<i>Mesobraconoides psolopterus</i>	40	<i>Orgilomorpha Ashmead</i>	71
<i>Mesobraconoides Sarhan & Quicke</i>	8, 39	<i>Orgilus bifasciatus</i>	71
<i>Meteorus Haliday</i>	16, 59	<i>Orgilus caudatus</i>	71
<i>Meteorus spec. A.</i>	59	<i>Orgilus gauldi</i>	71
<i>Microbracon Ashmead</i>	25	<i>Orgilus Haliday</i>	15, 71
<i>Microbracon chilocida</i>	22	<i>Orgilus tenuis</i>	71
<i>Microbracon chilocida var. nigrocephala</i>	22	<i>ornatulopsis</i> (<i>Phanerotoma</i>)	55, 56
<i>Microbracon sulcifrons</i>	25	<i>ornatulopsis</i> race <i>tshegera</i> (<i>Phanerotoma</i>)	55
<i>Microchelonus curvimaculatus</i>	53	<i>ornatus</i> (<i>Digonogastra</i>)	34
<i>Microchelonus hungaricus</i>	51	<i>Orthobracon Fahringer</i>	26
<i>Microchelonus Szépligeti</i>	51, 53	<i>oryzae</i> (<i>Dolichogenidea</i>)	66, 68
<i>Microdus conspicuus</i>	17	<i>paleacritae</i> (<i>Apanteles</i>)	62
<i>Microdus Nees</i>	17	<i>palliventris</i> (<i>Phylax</i>)	25
<i>Microdus obscurator</i>	71	<i>Parallorhogas Marsh</i>	11, 56, 57
<i>Microgaster ruficrus</i>	64	<i>Parallorhogas pyralophagus</i>	57
<i>Microgaster rugosus</i>	71	<i>Paramyelois transitella</i>	55
<i>minutator</i> (<i>Ichneumon</i>)	25, 26	<i>Paranthrene regale</i>	25
<i>Monogonogastra Viereck</i>	34	<i>Parerupa africana</i>	4
<i>Myosoma auct.</i>	20	<i>partellus</i> (<i>Chilo</i>)	4, 19, 21, 24, 31, 44, 46, 47, 50, 53, 59, 62, 69, 70
<i>Myosoma Brullé</i>	20	<i>Pectinophora gossypiella</i>	64
<i>Myosoma chinensis</i>	22	<i>pectinophorae</i> (<i>Habrobracon</i>)	29
<i>Myosoma lutea</i>	21	<i>pedator</i> (<i>Chelonus</i>)	52
<i>Myosoma nyanzaensis</i>	24	<i>persimilis</i> (<i>Habrobracon</i>)	44
<i>Myosoma rufescens</i>	25	<i>persimilis</i> (<i>Tropobracon</i>)	51
<i>Myosoma yanoi</i>	25	<i>Phanaulax Cameron</i>	40
<i>Mythimna loreyi</i>	64	<i>Phanaulax levituberculatus</i>	40, 47
<i>narangae</i> (<i>Apanteles</i>)	64	<i>Phanerotoma bannensis</i>	56
<i>Neochelonella Hincks</i>	52	<i>Phanerotoma flavitestacea</i>	55
<i>ni</i> (<i>Trichoplusia</i>)	64	<i>Phanerotoma hendecasisella</i>	56
<i>nicevillei</i> (<i>Bracon</i>)	47	<i>Phanerotoma hispanica var. desertorum</i>	55
<i>nicevillei</i> (<i>Glyptomorpha</i>)	47	<i>Phanerotoma leucobasis</i>	56
<i>nicevillei</i> (<i>Stenobracon</i>)	41, 42, 47	<i>Phanerotoma major</i>	56
<i>niger</i> (<i>Bassus</i>)	17	<i>Phanerotoma media</i>	55
<i>nigra</i> (<i>Obesomicrodus</i>)	17	<i>Phanerotoma ocularis</i>	55, 56
<i>nigripennis</i> (<i>Bathyaulax</i>)	41	<i>Phanerotoma ornatulopsis</i>	55, 56
<i>nigripennis</i> (<i>Euviopio</i>)	41	<i>Phanerotoma ornatulopsis</i> race <i>tshegera</i>	55
<i>nigrisoma</i> (<i>Bassus</i>)	17	<i>Phanerotoma rjabovi</i>	55
<i>nigrocephala</i> (<i>Microbracon chilocida</i> var.)	22	<i>Phanerotoma saussurei</i>	55, 56
<i>nivella</i> (<i>Scirpophaga</i>)	48, 59	<i>Phanerotoma spec.</i>	56
<i>noiratum</i> (<i>Agathis</i>)	22	<i>Phanerotoma Wesmael</i>	12, 54
<i>nonagriae</i> (<i>Apanteles</i>)	63	<i>Phragmataecia boisduvalii</i>	43, 44
<i>nonagriodes</i> (<i>Sesamia</i>)	4, 44, 64	<i>Phylax palliventris</i>	25
<i>nuperus</i> (<i>Bracon</i>)	25	<i>Pilibracon Tobias</i>	26
<i>nyanzaense</i> (<i>Amyosoma</i>)	21, 24	<i>pilisoma</i> (<i>Iphiaulax</i>)	36, 38
<i>nyanzaensis</i> (<i>Myosoma</i>)	24	<i>Platyedra gossypiella</i>	56
<i>Obesomicrodus nigra</i>	17	<i>Plodia Guenée</i>	26
<i>Obesomicrodus Papp</i>	17		

<i>plotnicovi</i> (<i>Habrobracon</i>)	29	<i>Seliodus testaceus</i>	25
<i>Plutella xylostella</i>	28	<i>separatella</i> (<i>Maliarpha</i>)	4, 5,
<i>Poconoma</i> spec.	69	32, 33, 40, 50, 53, 54, 56, 59, 64	
<i>poephaga</i> (<i>Sesamia</i>)	29	<i>Sesamia botanephaga</i>	69
<i>polaszeki</i> (<i>Dolichogenidea</i>)	66, 68	<i>Sesamia calamistis</i>	4, 44, 46, 53, 62, 64, 69
<i>procerae</i> (<i>Apanteles</i>)	66	<i>Sesamia cretica</i>	4, 21, 46, 50
<i>Proceras africana</i>	4, 50	<i>Sesamia nonagrioides</i>	4, 46, 64
<i>Protapanteles</i> Ashmead	62	<i>Sesamia poephaga</i>	29
<i>Protapanteles ephyrae</i>	62	<i>Sesamia</i> spp.	31, 38, 39, 44, 46, 47, 50, 69
<i>Pseudovipio baeticus</i> var. <i>mauretanicus</i>	44	<i>Sesamia vuteria</i>	4
<i>Pseudovipio Szépligeti</i>	36	<i>sesamiae</i> (<i>Apanteles</i>)	63, 65
<i>psolopterus</i> (<i>Mesobracon</i>)	39, 40	<i>sesamiae</i> Cameron (<i>Bracon</i>)	27, 28, 30, 31
<i>psolopterus</i> (<i>Mesobraconoides</i>)	40	<i>sesamiae</i> Risbec (<i>Bracon</i>)	31
<i>pyralophagus</i> (<i>Allorhogas</i>)	56, 57	<i>sesamiae</i> (<i>Cotesia</i>)	63, 65
<i>pyralophagus</i> (<i>Parallorhogas</i>)	57	<i>sesamivorus</i> (<i>Macrocentrus</i>)	60
<i>pyrocaustalis</i> (<i>Chilo</i>)	46	<i>Shirakia schoenobii</i>	48
<i>quadrantotatus</i> var. <i>sesamiae</i> (<i>Bracon</i>)	31	<i>Shirakia</i> spec.	49
<i>quadratinotatus</i> (<i>Bracon</i>)	32	<i>Shirakia</i> Viereck	48
<i>quadrinotatus</i> (<i>Bracon</i>)	26	<i>simonovi</i> f. <i>lozinskii</i> (<i>Habrobracon</i>)	29
<i>quadrinotatus</i> (<i>Bracon</i>)	21	<i>simplicis</i> (<i>Apanteles</i>)	63
<i>regale</i> (<i>Paranthrene</i>)	25	<i>solani</i> (<i>Lorenzoa</i>)	26
<i>Rhaconotus aciculatus</i>	58	<i>solitaria</i> (<i>Digonogastra</i>)	35
<i>Rhaconotus carinatus</i>	58	<i>Stenobracon deesae</i>	42, 48
<i>Rhaconotus caudatus</i>	59	<i>Stenobracon levituberculatus</i>	47
<i>Rhaconotus Ruthé</i>	58	<i>Stenobracon maculata</i>	47
<i>Rhaconotus scirpophagae</i>	58, 59	<i>Stenobracon nicevillei</i>	40, 42, 47
<i>rileyanus</i> (<i>Cryptapanteles</i>)	62	<i>Stenobracon oculatus</i>	40, 47
<i>rjabovi</i> (<i>Phanerotoma</i>)	55	<i>Stenobracon rufus</i>	42, 43
<i>rufa</i> (<i>Euviopio</i>)	40, 41, 43	<i>Stenobracon Szépligeti</i>	9, 40, 42, 46
<i>rufa</i> (<i>Vipio</i>)	43	<i>Stenobracon trifasciatus</i>	47
<i>rufescens</i> (<i>Amyosoma</i>)	21, 25	<i>Stenobracon unifasciatus</i>	42, 44
<i>rufescens</i> (<i>Myosoma</i>)	25	<i>Stenopleura</i> Viereck	63
<i>ruficrus</i> (<i>Microgaster</i>)	64	<i>Striobracon</i> Fahringer	26
<i>ruficrus</i> (<i>Apanteles</i>)	64	<i>Stylochelonus</i> Hellén	52
<i>ruficrus</i> (<i>Cotesia</i>)	63, 64	<i>sublevis</i> (<i>Bassus</i>)	18, 19
<i>rufus</i> (<i>Stenobracon</i>)	42, 43	<i>sublevis</i> (<i>Camptothlipsis</i>)	19
<i>rugosus</i> (<i>Microgaster</i>)	71	<i>subumbrosa</i> (<i>Scirpophaga</i>)	4
<i>sabulosus</i> (<i>Bracon</i>)	26	<i>suchorukovi</i> (<i>Bracon</i>)	26
<i>saccharalis</i> (<i>Diatraea</i>)	29, 35	<i>sulcifrons</i> (<i>Microbracon</i>)	25
<i>saccharina</i> (<i>Eldana</i>) 4, 19, 35, 37, 43, 46, 57, 69, 72		<i>sulcifronsior</i> (<i>Bracon</i>)	25
<i>sacchariphagus</i> (<i>Chilo</i>)	47, 57, 63	<i>sydneyensis</i> (<i>Apanteles</i>)	64
<i>saussurei</i> (<i>Phanerotoma</i>)	55, 56	<i>tenuis</i> (<i>Orgilus</i>)	71
<i>schistace</i> (<i>Argyroploce</i>)	57	<i>testaceiceps</i> (<i>Euryphrymnus</i>)	58
<i>schoenobii</i> (<i>Shirakia</i>)	48	<i>testaceioventris</i> (<i>Apanteles</i>)	70
<i>Schoenobius</i> spp.	4	<i>testaceolineatus</i> (<i>Apanteles</i>)	70
<i>Scirpophaga excerptalis</i>	48, 59	<i>testaceorufatus</i> (<i>Bracon</i>)	26-28, 32
<i>Scirpophaga melanoclista</i>	4	<i>testaceus</i> (<i>Seliodus</i>)	25
<i>Scirpophaga nivella</i>	48, 59	<i>testulalis</i> (<i>Maruca</i>)	55
<i>Scirpophaga</i> spp.	4, 33, 47, 56, 59	<i>Therophilus</i> Wesmael	17
<i>Scirpophaga subumbrosa</i>	4	<i>Thopetis</i> spp.	4
<i>scirpophagae</i> (<i>Rhaconotus</i>)	58, 59	<i>tortricidarum</i> (<i>Habrobracon</i> 'hebetor')	29
<i>scitulus</i> (<i>Apanteles</i>)	62	<i>transitella</i> (<i>Paramyelois</i>)	55
<i>Sculptobracon</i> Tobias	26	<i>triangularis</i> (<i>Bracon</i>)	49
<i>Seliodus</i> Brèthes	25	<i>triangularis</i> (<i>Habrobracon</i>)	49

<i>Trichoplusia ni</i>	64	<i>Vipio</i> Latreille	42
<i>trifasciatus</i> (<i>Stenobracon</i>)	47	<i>Vipio maculiceps</i>	44
<i>Tropidobracon</i> Ashmead	25	<i>Vipio maculicepsida</i>	44
<i>Tropobracon antennatus</i>	49, 50	<i>Vipio rufa</i>	43
<i>Tropobracon</i> Cameron	8, 48	<i>Vipio unifasciatus</i>	44
<i>Tropobracon comorensis</i>	49, 50	<i>vitrata</i> (<i>Maruca</i>)	57
<i>Tropobracon luteus</i>	48	<i>vuteria</i> (<i>Sesamia</i>)	4
<i>Tropobracon persimilis</i>	49, 51	<i>Xyleborus</i> spec.	40
<i>Tryporyza incertulas</i>	22	<i>xylostella</i> (<i>Plutella</i>)	28
<i>Tryporyza</i> spp.	4	<i>yanoi</i> (<i>Amyosoma</i>)	21, 25
<i>tshegera</i> (<i>Phanerotoma ornatulopsis</i> race)	55	<i>yanoi</i> (<i>Bracon</i>)	25
<i>turkestanicus</i> (<i>Habrobracon</i>)	29	<i>yanoi</i> (<i>Myosoma</i>)	25
<i>unifasciatus</i> (<i>Stenobracon</i>)	44	<i>Yponomeuta malinellus</i>	29
<i>unifasciatus</i> (<i>Vipio</i>)	44	<i>zacconius</i> (<i>Chilo</i>)	4,
<i>unifasciatus</i> (<i>Euvipio</i>)	44	33, 37, 50, 53, 56, 59, 64, 67, 68	
<i>variator</i> (<i>Bracon</i>)	26	<i>zaglyptogastra</i> (<i>Digonogastra</i>)	34
<i>vernalis</i> (<i>Habrobracon</i>)	29	<i>Zeuzera coffeae</i>	24
<i>Vipio deesae</i>	47	<i>zimini</i> (<i>Chivinia</i>)	26
<i>Vipio facialis</i>	44	<i>zonellus</i> (<i>Chilo</i>)	46

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