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THE GENERA OF PARASITIC HYMENOPTERA IN THE PHILIPPINES, Part 1*

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INTRODUCTION

Students in biological control work in the Philippines need to know the parasitic groups of Hymenoptera found in this area. The keys to genera presented here are designed to help identify adult parasites encountered in the field or reared from various host insects.

This paper will be published in several parts containing five sections: I. Megalyridae, Stephanidae, Trigonalidae, Gasteruptiidae and Evaniidae, II. Braconidae, III. Ichneumonidae, IV. Chalcidoidea and V. Proctotrupoidea. Part 1 includes the first two sections; the other sections will follow in the order given above. In the Philippines the group with the largest number of genera is the family Ichneumonidae followed by the Chalcidoidea, Braconidae, and the Proctotrupoidea. The rest are small families and have only a few members.

The genera included are those reported in my catalogue of Philippine Hymenoptera (in press) and new records of genera discovered after studying Philippine specimens in various collections and museums like Baker's collection deposited in the United States National Museum, Washington, D. C.; Townes' collection in the University of Michigan, Ann Arbor; Chicago Museum of Natural History, Chicago; British Museum of Natural History, London; Hope Museum in Oxford University, Oxford; Naturhistoriska Riksmuseet, Stockholm; Museum National d'Histoire Naturelle, Paris; Museum d'Histoire Naturelle, Geneva; Bishop Museum, Honolulu; Bureau of Plant Industry, Manila; and collection of the College of Agriculture, University of the Philippines, Los Baños.

The grouping into superfamilies was based on the Hymenoptera Synoptic Catalog of the USDA, published as Monograph No. 2 (1951) by Muesebeck and others, and its supplement (1958) by Krombein and others. Richards (1956) differed in recognizing superfamilies Evanioidea and Trigonaloidea.

Synopsis of the Parasitic Hymenoptera in the Philippines

Superfamily Ichneumonoidea

Family Megalyridae..... The Megalyrids

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Family Stephanidae ..... The Stephanids
Family Braconidae ..... The Braconids
Family Ichneumonidae ..... The Ichneumon-flies

Superfamily Chalcidoidea ..... The Chalcid flies
Family Trichogrammatidae ..... The Trichogrammatids
Family Mymaridae ..... The Fairy-flies or Mymarids
Family Eulophidae ..... The Eulophids
Family Eupelmidae ..... The Eupelmids
Family Encyrtidae ..... The Encyrtids
Family Agaonidae ..... The Fig insects
Family Torymidae ..... The Torymids
Family Chalcididae ..... The Chalcidids
Family Eucharitidae ..... The Eucharitids
Family Pteromalidae ..... The Pteromalids
Family Eurytomidae ..... The Eurytomids
Family Perilampidae ..... The Perilampids

Superfamily Cynipoidea ..... The Gall-flies or Gall wasps
Family Liopteridae ..... The Liopterids
Family Cynipidae ..... The Cynipids

Superfamily Proctotrupoidea (=Serphoidea)
Family Evaniidae ..... The Ensign-flies
Family Gasteruptiidae ..... The Gasteruptiids
Family Proctotrupidae ..... The Proctotrupids
Family Ceraphronidae ..... The Ceraphronids
Family Diapriidae ..... The Diapriids
Family Scelionidae ..... The Scelionids
Family Platygasteridae ..... The Platygasterids

Superfamily Bethyloidea
Family Chrysididae ..... The Cuckoo wasps
Family Loboscelidiidae ..... The Loboscelidiids
Family Bethylidae ..... The Bethylids
Family Dryinidae ..... The Dryinids

Family Trigonalidae ..... The Trigonalids

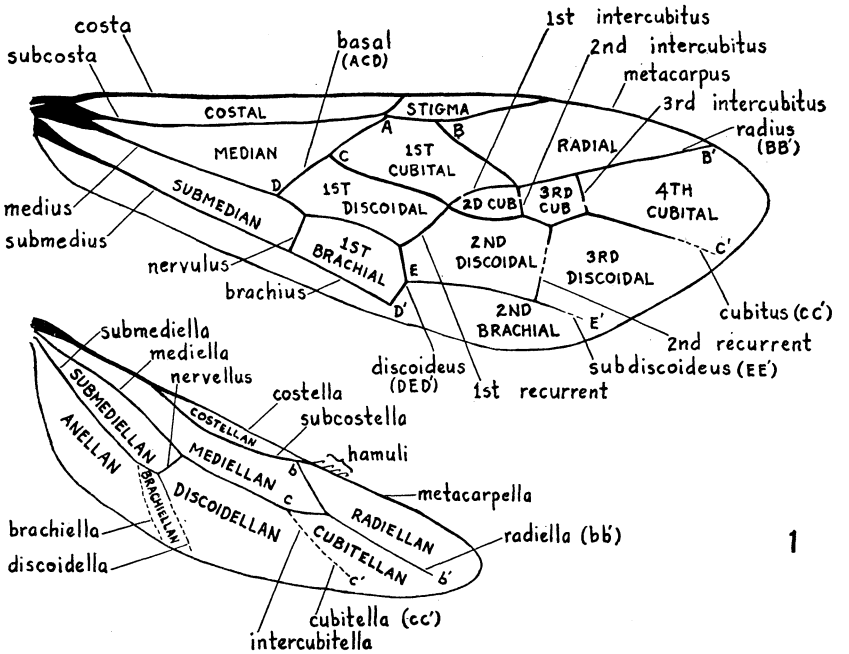
The Cynipoidea found in the Philippines has been incorporated in Weld's monograph of the Cynipoidea (1952), therefore it will not be discussed here.

A number of Hymenoptera which are classed by many authors as Aculeata are exclusively parasitic. The principal examples are the families listed under Bethyloidea. These and the scattered genera of parasitic Aculeata are not covered by this paper.

The genus *Loboscelidia* Westwood which was placed by Ashmead in the Cynipoidea and in the family Diapriidae (Proctotrupoidea) by Dalla Torre, Kieffer and Fouts is now removed to the superfamily Bethyloidea on account of the presence of an anal lobe in the hind wing. Being unique in the characters mentioned in the key, couplet 14, the family Loboscelidiidae was erected for the genus *Loboscelidia* by Maa and Yoshimoto (1961).

The following key was adopted from Brues, Melander and Carpenter's classification of

insects (1954, p. 626) and Townes' key to the families of the commoner Clistogastra appearing in Comstock's Introduction to Entomology (1948). This key starts out with the suborder Apocrita or Clistogastra, or Hymenoptera with the abdomen deeply constricted



Figs. 1–5. 1, wing venation of *Poecilogonalos* sp. (Trigonalidae) (Veins in dotted lines were added to indicate the position of the cubitellan and brachiellan cells.); 2, wings of *Brachymeria euploeae* Westwood (Chalcididae); 3, wings of *Saphonecrus areolatus* Weld (Cynipidae); 4, wings of *Aparamesisu microtomus* Kieffer (Diapriidae); 5, wings of bethylid (Bethylidae).

between the propodeum and the gaster. In this suborder cenchri are never present; fore tibia has only one apical spur; fore wing has no closed anal cell.

The system of wing venation used is that by Rohwer and Gahan (1916) but in the family Ichneumonidae "areolet" was substituted for the "second cubital cell." The wing illustrations are intended to show only venation without indicating infuscated areas or the arrangement of setae.

KEY TO SUPERFAMILIES AND FAMILIES OF PHILIPPINE PARASITIC HYMENOPTERA

1. Wings present 2
Wings absent 16

2 (1). Antenna with more than 13 segments or hind wing without closed cells (figs. 16–18); legs usually with 2 trochanters (fig. 6); ovipositor elongate or partly exposed and issuing before tip of abdomen (figs. 6–9); fore wing with or without costal cell. ..... Parasitic Hymenoptera or Terebrantia, 3
Antenna with 13 or fewer segments and hind wing with closed cells; legs each with a single trochanter; ovipositor (sting) entirely hidden and issuing from tip of abdomen; fore wing always with costal cell (fig. 1)..... ..... Stinging Hymenoptera or Aculeata

3 (2). Costal and subcostal veins (Sc & R) separated in fore wing, enclosing narrow costal cell (figs. 11–19); sternites sclerotized 4
Costal and subcostal veins confluent in fore wing, costal cell absent or very narrow (figs. 29–73); sternites membranous or sclerotized 8

4 (3). Mesoscutum with sharp median groove; abdomen elongate oval. (Outer orbit of eye encircled by carina (fig. 6); small species, 3–8 mm long excluding ovipositor, Genus *Ettchellsia*) ..... Family Megalyridae
Mesoscutum without median groove; abdomen variable 5

5 (4). Abdomen inserted near top of propodeum, far above hind coxae (figs. 8–10); antenna with 13 or 14 segments 6
Abdomen inserted normally, low down and close to hind coxae (fig. 7); antenna with 14–30 segments or more 7

6 (5). Hind wing with anal lobe (figs. 16–18); fore wing with radial cell short and ending before apex of wing or absent; prothorax short; abdomen orbicular, compressed, borne on pedicel (fig. 10) ..... Family Evaniidae
Hind wing without anal lobe; fore wing with radial cell reaching apex of wing (figs. 14 & 15); prothorax prolonged into a neck; abdomen elongate, gradually clavate (figs. 8 & 9) ..... Family Gasteruptiidae

7 (5). Fore wing with 2 or 3 closed cubital cells; hind wing with 2 closed cells (fig. 19); head large, quadrate; mandible broad, quadridentate (fig. 20); antenna with 14 segments to more than 20; mesopleurum with transverse suture ..... Family Trigonalidae
Fore wing with 1 closed cubital cell (figs. 11–13); hind wing without closed cell; head globose and tuberculate above (fig. 7); mandible not unusually large, bidentate; antenna setaceous, with 30 segments or more; hind femur swollen and toothed before apex ..... Family Stephanidae

8 (3). Antenna with 17 or more segments, rarely as few as 15; hind corner of pro-

notum reaching tegula (figs. 6 & 21); venter membranous and with longitudinal fold in dried specimen ..... Superfamily Ichneumonoidea, 9 (excl. Megalyridae & Stephanidae)

Antenna with 16 or fewer segments; hind corner of pronotum distant or not reaching tegula; venter sclerotized..... 10

9 (8). Fore wing with 2 recurrent veins (as in fig. 6); all abdominal segments freely movable, except in very rare cases..... Family Ichneumonidae

Fore wing with 1 or without any recurrent vein (figs. 29–73); abdominal segments 2 and 3 immovably united except in Aphidiinae ..... Family Braconidae

10 (8). Hind wing without anal lobe (figs. 2–4) 11

Hind wing with anal lobe (fig. 5)..... Superfamily Bethyloidea, 13

11 (10). Hind corner of pronotum reaching tegula (as in figs. 6 & 21); prepectus present; mid tibia with 1 apical spur, rarely absent; fore wing with single vein that is usually forked at apex (fig. 2); antenna elbowed..... ..... Superfamily Chalcidoidea

Hind corner of pronotum not reaching tegula; prepectus absent; mid tibia usually with 2 apical spurs; antenna usually not elbowed..... 12

12 (11). Abdomen compressed and usually with mid-dorsal keel, polished, covered mostly by single tergite; costal vein absent; marginal cell (2d R_1+R_2) large (fig. 3)..... Superfamily Cynipoidea

Abdomen cylindrical or depressed; costal vein present or marginal cell small or absent (fig. 4)..... .....Superfamily Proctotrupoidea (excl. Evaniidae & Gasteruptiidae)

13 (10). Body brilliantly metallic; abdomen usually with 3 exposed tergites, seldom 4; venter concave..... Family Chrysididae

Body usually black, not greenish or bluish; abdomen with more than 4 exposed tergites; venter convex..... 14

14 (13). Antennal ledge distinct; abdomen short; membranous lamina present on scape, neck region, femora and tibiae; dorsal cervical plate present behind ocellar area and touching front margin of pronotum.....Family Loboscelidiidae

Not as above 15

15 (14). Antenna 10-segmented; front tarsus of ♀ usually chelate..... Family Dryinidae

Antenna 12 to 13-segmented; front tarsus of ♀ simple..... Family Bethylidae

16 (1). Antenna elbowed; hind corner of pronotum not reaching tegula; prepectus present..... Superfamily Chalcidoidea

Antenna not elbowed; hind corner of pronotum reaching tegula; prepectus present or absent..... 17

17 (16). Sternites 2 and 3 membranous, with longitudinal fold in dried specimens; ovipositor exposed beyond tip of abdomen ..... Family Ichneumonidae

Sternites 2 and 3 sclerotized, without mid-longitudinal fold; ovipositor usually retracted into abdomen..... 18

18 (17). Front tarsus chelate; antenna 10-segmented ..... Family Dryinidae

Front tarsus normal 19

19 (18). Abdomen compressed and usually with mid-dorsal keel, covered mostly by single tergite..... Superfamily Cynipoidea

Abdomen depressed or cylindrical; head elongate with antenna inserted close

to anterior end ..... Family Bethylidae

I. MEGALYRIDAE, STEPHANIDAE, TRIGONALIDAE, GASTERUPTIIDAE and EVANIIDAE

The five families discussed here, although belonging in different superfamilies have something in common, that is, they have the costal and subcostal veins (Sc & R) in the fore wing separated thus enclosing a narrow costal cell (figs. 11–19); also the sternites are sclerotized. The rest of the parasitic genera have the costal and subcostal veins confluent so there is no costal cell or the costal cell is very narrow.

In Richard's key to families of British Hymenoptera (1956), the families Evaniidae, Aulacidae, and Gasteruptiidae were grouped to constitute the superfamily Evanioidea or those with the gaster attached near the top of the propodeum. The superfamily Trigonaloidea was erected for the family Trigonalidae.

Synopsis of Genera

(Those marked with an asterisk are new records for the Philippines)

Family Megalyridae:
1. *Ettchellsia* Cameron

Family Stephanidae:
1. *Megischus* Brullé
2. *Parastephanellus* Enderlein
3. *Foenatopus* Smith

Family Trigonalidae:
1. *Bakeronymus* Rohwer
2. *Trigonalys* Westwood
3. **Poecilogonalos* Schulz

Family Gasteruptiidae:
Subfamily Aulacinae
1. *Aulacus* Jurine
2. **Aulacostethus* Philippi

Subfamily Gasteruptiinae
1. *Gasteruption* Latreille
2. **Rhydinofoenus* Bradley

Family Evaniidae:
1. *Evania* Fabricius
2. *Prosevania* Kieffer
3. *Parevania* Kieffer
4. *Szepligetella* Bradley

Family MEGALYRIDAE Fig. 6.

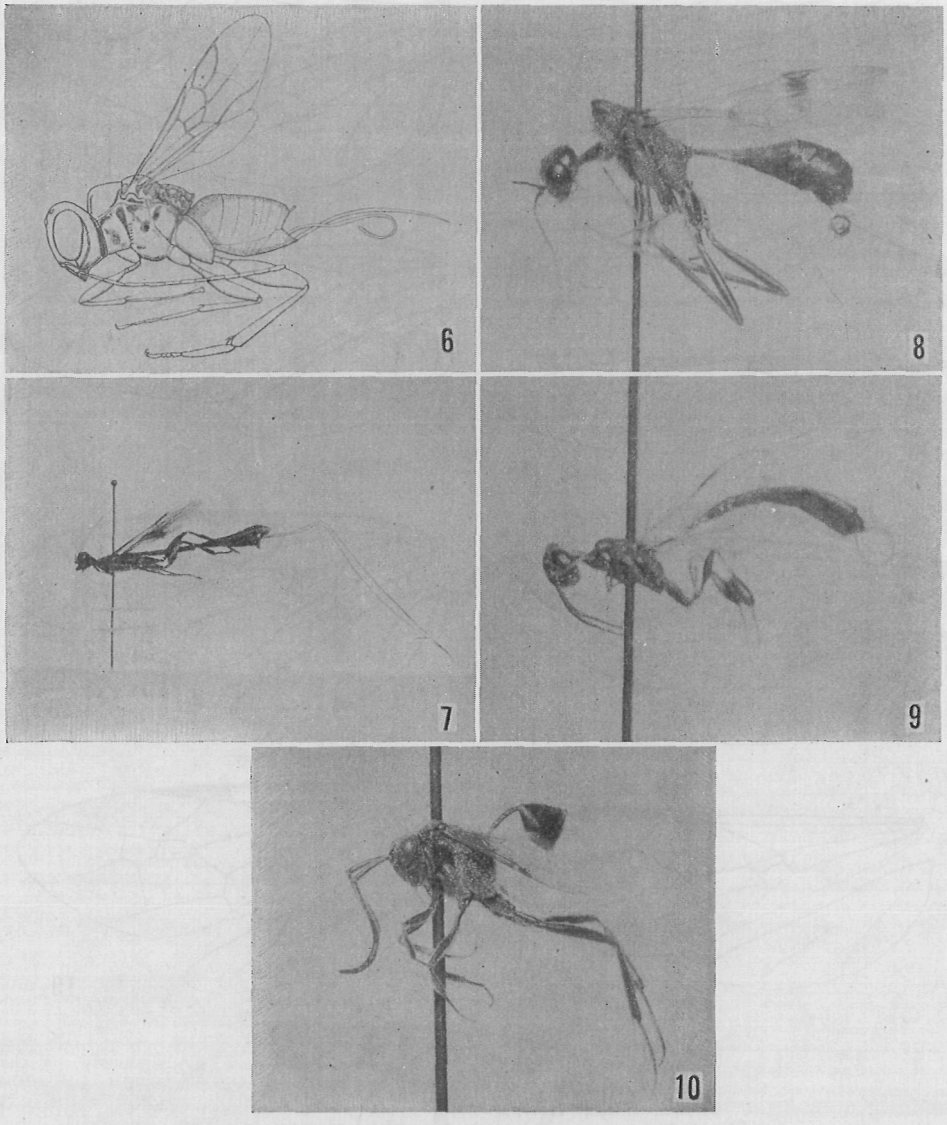
The family is mostly Indo-Australian in distribution and composed of large species with extremely long and prominent ovipositors. However, the species in the Philippines is small, measuring about 8 mm long including ovipositor. It belongs in the subfamily Dinapsinae. *Dinapsis* is reported from S. Africa.

The distinguishing characteristic of the family is the presence of a sharp median groove or linear furrow on the mesoscutum. The body is more or less cylindrical and the abdomen is elongate-oval.

In the Philippines, *Ettchellsia* is the only genus known in this family (Baltazar, 1962). The genus is distinct in having the outer orbit of the eye encircled by a carina (fig. 6).

Family STEPHANIDAE Figs. 7, 11, 12 & 13.

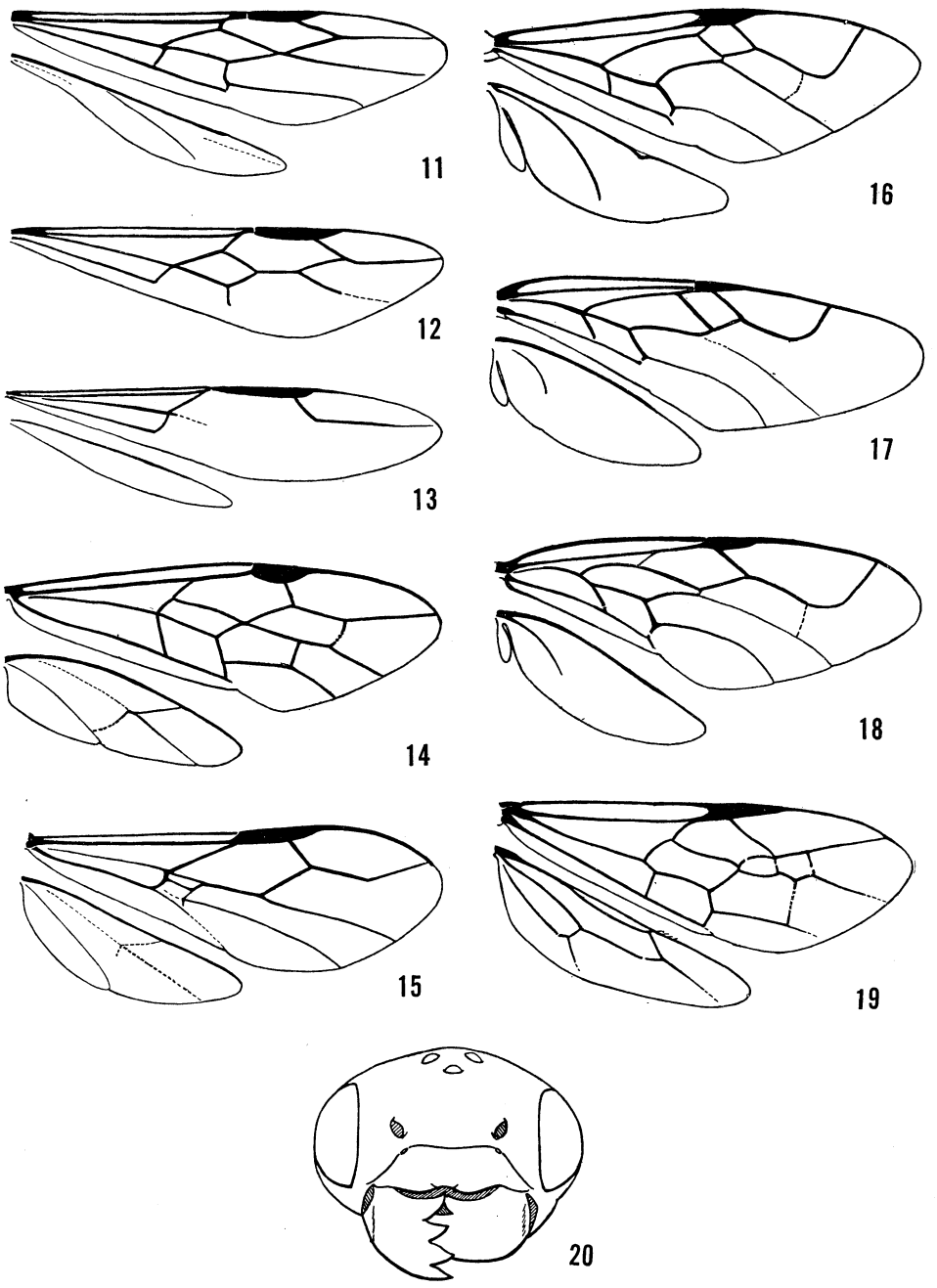
The stephanids are rather common in the tropics, often collected on dead tree trunks.



Figs. 6–10. 6, *Ettchellsia philippinensis* Baltazar (Megalyridae), side view; 7, *Megischus coronator* Fabricius (Stephanidae), side view; 8, *Aulacostethus* sp. (Gasteruptiidae), side view; 9, *Gasteruption* sp. (Gasteruptiidae), side view; 10, *Prosevania* sp. (Evaniidae), side view.

No host records are known in the family except for one record from *Agrilus kalshoveni* in Java parasitized by *Diastephanus leucosticus*. The species are presumed to be parasites of wood-boring coleopterous larvae or solitary bees or wasps nesting in wood.

The spherical head with a crown of teeth around the median ocellus is on a long neck. The antenna is setaceous, with 30 or more segments and arises just above the mouth. The abdomen is stalked, hind coxa elongate, hind femur swollen, and ovipositor long (fig.



Figs. 11–20. 11, *Megischus* sp. (Stephanidae), fore and hind wings; 12, *Parastephanellus* sp. (Stephanidae), fore wing; 13, *Foenatopus* sp. (Stephanidae), fore and hind wings; 14, *Aulacosthethus* sp. (Gasteruptiidae), fore and hind wings; 15, *Gasteruption* sp. (Gasteruptiidae), fore and hind wings; 16, *Evania appendigaster* L. (Evaniidae), fore and hind wings; 17, *Prosevania* sp. (Evaniidae), fore and hind wings; 18, *Parevania nitida* Kieffer (Evaniidae), fore and hind wings; 19, *Poecilogonalos* sp. (Trigonalidae), fore and hind wings; 20, same, front view of head.

7). The mandibles are bidentate.

KEY TO GENERA OF PHILIPPINE STEPHANIDAE

1. Fore wing with venation reduced, at most with 3 closed cells: median, submedian and radial (fig. 13) ..... **Foenatopus**
   Fore wing with venation more or less complete 2
2. Intercubital cell 3 and discoidal cell 1 separated by a stalk or cubitus vein with 3 abscissae; recurrent vein 1 not broken (fig. 12) ..... **Parastephanellus**
   Intercubital cell 3 and discoidal cell 1 adjacent to each other or cubitus vein with 2 abscissae; recurrent vein 1 broken (fig. 11) ..... **Megischus**

Family TRIGONALIDAE Figs. 19 & 20.

This is a small family, with only three genera recorded in the Philippines. No host records are known for the Philippine species but members of the family Trigonalidae are reported to be parasites, usually secondary parasites. Their hosts are likely to be the Vespidae, dipterous and hymenopterous parasites of caterpillars.

The taxonomic position of the trigonalids is uncertain. Townes (1956), in his paper on the nearctic species of trigonalid wasps, placed it with the Chrysidoidea (incl. the Bethyloidea) although he mentioned relationships to the Aculeata. He briefly distinguished the trigonalids from other families of Apocrita by the following: "Flagellum with 14 to more than 20 segments; costal cell of fore wing present; hind wing with distinct venation and two closed cells; anal lobe presented by a small vestige; and legs usually with two but sometimes with one trochanter each."

The mandibles are broad with four apical teeth on the right (fig. 20) and three on the left, mesopleurum with a transverse section, claws apically bifid, hind basitarsus equal to tarsal segments 2–5 united.

The occurrence of the genus *Poecilogonalos* in the Philippines is recorded here for the first time.

KEY TO GENERA OF PHILIPPINE TRIGONALIDAE

1. Fore wing with intercubitus 3 absent; clypeus narrow, inserted between antennae; frons and vertex with depression at middle; scutellum rugose; tergite 2 impunctate; abdomen depressed ..... **Bakeronymus**
   Fore wing with intercubitus 3 present (fig. 19); clypeus wide, immediately below antennae (fig. 20); frons and vertex without median depression; scutellum punctate or impunctate; tergite 2 punctate; abdomen convex 2
2. Scutellum finely punctate; sternite 3 of ♀ with strong median apical tooth; antenna of ♂ without tyloids ..... **Trigonalys**
   Scutellum impunctate; sternite 2 of ♀ with strong median apical tooth; antenna of ♂ with tyloids ..... **Poecilogonalos**

Family GASTERUPTIIDAE

The family is composed of two subfamilies, Aulacinae and Gasteruptiinae, although

some would treat these two groups as distinct families. Townes (1950) listed three characters that would readily separate the Gasteruptiidae from the other Hymenoptera: "1, abdomen attached to the thorax (alitrunk) high, far above the attachment of the hind coxae; 2, hind wing without closed cells or with a single closed cell; 3, first abdominal segment not set off from the rest of the abdomen by a conspicuous articulation. Of these, the first character is shared only with the Evaniidae and a few Braconidae and Ichneumonidae (most Labenini). The second character differentiates the Gasteruptiidae from the Braconidae and Ichneumonidae, and the third differentiates them from the Evaniidae."

KEY TO SUBFAMILIES OF GASTERUPTIIDAE

Fore wing with 2 recurrent veins and 2 closed cubital cells (fig. 14), wing not folded lengthwise when at rest; antenna inserted just above clypeus; hind tibia sublinear (fig. 8); hind coxa in ♀ usually with vertical or oblique groove on inner side... .....Subfamily Aulacinae

Fore wing with 1 or no recurrent vein and only 1 closed cubital cell (fig. 15), wing folded lengthwise when at rest; antenna inserted well above clypeus; hind tibia clavate or swollen apically (fig. 9); hind coxa in ♀ without groove oninner side ..... Subfamily Gasteruptiinae

Subfamily AULACINAE Figs. 8 & 14.

The Aulacinae are reported to be parasites of wood-boring Coleoptera and Symphyta. In the Philippines there are no host records known and specimens in this group are not often encountered in collections, in fact, the genus *Aulacostethus* is a new record for the Philippines. Two genera in the subfamily may be differentiated as follows:

KEY TO GENERA OF AULACINAE

Tarsal claws each with 2 or more teeth; occipital carina nearly always present; hind coxa of ♀ with vertical groove on inner side, situated beyond middle of coxa; mid tibia with sharp tooth at outer apical margin; median lobe of mesoscutum, in profile, with front face and top meeting at angle (fig. 8)..... **Aulacostethus**

Tarsal claws apparently simple, but each with single inconspicuous basal tooth; occipital carina absent; groove on inner hind coxa of ♀ without vertical groove on inner side, when present, either situated basad of middle or very oblique; mid tibia sometimes with tooth at outer apical margin; median lobe of mesoscutum, in profile, with front face and top meeting at angle or rounded curve that shows no angle ..... **Aulacus**

Subfamily GASTERUPTIINAE Figs. 9 & 15.

The gasteruptiines are parasitic on Sphecoidea and Apoidea nesting in wood or twigs, however, there are no host records in the Philippines. Some species may be caught around flowers. Two genera, *Gasteruption* and *Rhydinofoenus*, are differentiated in the following key. *Gasteruption* is mostly Holarctic in distribution unlike *Rhydinofoenus* which is a large genus and world-wide in distribution. The latter has not been reported from the Philippines before.

KEY TO GENERA OF GASTERUPTIINAE

Subgenital plate in ♀ with broadly V-shaped notch mid-apically; pronotum with blunt, weak or sometimes obsolete tooth on upper anterior margin; ovipositor sheath 0.3–0.5 as long as fore wing; hind tarsus very seldom marked with white..... ..... **Gasteruption**

Subgenital plate in ♀ with narrow slit notch mid-apically; pronotum with acute tooth projecting on upper anterior margin; ovipositor sheath 0.8–2.5 as long as fore wing; hind tarsus often marked with white ..... **Rhydinofoenus**

Family EVANIIDAE Figs. 10, 16, 17 & 18.

The evaniids commonly known as ensign-flies are parasitic in the egg capsules of Blattidae. This family has a large number of species in the tropics. Four genera are known in the Philippines.

The family is easily distinguished in having the gaster attached high or near the top of the propodeum by a cylindric and slightly arched petiole (fig. 10); the gaster is strongly compressed, circular, subcircular or subtriangular. The Evaniidae differs from other parasitic Hymenoptera in having a long anal lobe in the hind wing (figs. 16–18).

KEY TO GENERA OF PHILIPPINE EVANIIDAE

1. Hind coxa with submedian constricting groove at apex of metasternal fork short, not encircling base of coxa; distance between bases of mid hind coxa equal to 2× length of mid coxa; metasternum large and with midlongitudinal groove; shoulders of pronotum rounded, without sharp transverse carina; mediellan strong for about 0.9 distance to wing margin (fig. 16) ..... **Evania**

   Hind coxa with submedian constricting groove at apex of metasternal fork encircling coxa completely; distance between bases of mid and hind coxa equal to length of mid coxa and with midlongitudinal ridge; shoulders of pronotum with transverse carina; mediellan distinct for about 0.5 or less than distance to wing margin (figs. 17 & 18) 2

2. Frons bordered by longitudinal carina that encloses antennal sockets; hind coxa with longitudinal groove next to metasternal fork..... **Prosevania**

   Frons not bordered by longitudinal carina; hind coxa without longitudinal groove next to metasternal fork..... 3

3. Nervulus vertical; abscissa 2 of basal vein closely parallel to subcosta, joining subcosta near stigma, shorter than intercubitus 1; mesonotum coarsely punctate or rugose; inner claw shorter than outer claw ..... **Szepligetella**

   Nervulus oblique; abscissa 2 of basal vein confluent distally or closely parallel to subcosta, joining subcosta far anterior to stigma, as long as, or longer than intercubitus 1 (fig. 18); mesonotum finely punctate; inner and outer claws subequal in length ..... **Parevania**

II. BRACONIDAE Figs. 21–73.

The family Braconidae is one of the major groups of insect parasites and includes a

great number of species that are of considerable value in the biological control of insect pests. The family is almost entirely beneficial as primary parasites of Lepidoptera, Coleoptera, Diptera and Homoptera.

In the Philippines the braconid parasites and their corresponding hosts are listed in my catalogue of Philippine Hymenoptera (in press). Only 22 species have definite host records. Some common examples are *Apanteles* and *Chelonus* that are parasitic on many lepidopterous larvae, *Opius* on fruitfly maggots, and *Platyspathius* on powderpost beetle. Four parasites of the rice stem borers have been recorded, namely, *Bracon chinensis* (Szepligeti), *Tropobracon schoenobii* (Viereck), *Stenobracon nicevillei* (Bingham), and *Spathius fuscipennis* Ashmead. In 1955 attempts were made to introduce in the Philippines the polyembryonic parasite of the European corn borer, *Macrocentrus gifuensis* Ashmead from the United States, but were not successful. *Opius longicaudatus* Ashmead from the Philippines parasitizing *Dacus dorsalis* Hendel, was introduced to Hawaii and it successfully controls the fruitfly there. On the other hand *Opius fletcheri* Silvestri was introduced into the Philippines from Hawaii and it became established here and is successful against the cucurbit fruitfly, *Dacus cucurbitae* Coq.

The Braconidae is closely related to the Ichneumonidae and most species are easily distinguished from the latter by the absence of recurrent vein 2, the joint between abdominal segments 2 and 3 is inflexible except in Aphidiinae, and usually there is a vein crossing the large cell situated below the stigma.

At present the number of braconid species known in the Philippines is 197 in 63 genera. This paper includes 125 genera, 62 of which are considered new records for this area, with many more unidentified genera not included in the key.

I am indebted to Mr. C. F. W. Muesebeck of the U.S. National Museum, Washington, D. C., the foremost specialist in Braconidae, who checked the identifications of the specimens and made corrections on the manuscript. Many thanks are due Mr. G. E. J. Nixon of the British Museum of Natural History in London, who gave suggestions for the key; Dr. and Mrs. Townes who loaned their collections of the Philippine Braconidae for this study; and to the authorities of the U. S. National Museum who allowed me the use of the facilities in Washington, D. C., where most of this work was done.

Synoptic list of genera

(Those marked with an asterisk are new records for the Philippines)

Subfamily Aphidiinae:

1. **Ephedrus* Haliday
2. *Diaeretus* Foerster
3. **Monoctonus* Haliday
4. **Aphidius* Nees

Subfamily Euphorinae:

5. *Aridelus* Marshall
6. *Meteorus* Haliday
7. **Wesmaelia* Foerster
8. **Perilitus* Nees
9. **Euphoriana* Gahan
10. **Euphorus* Nees
11. **Steblocera* Westwood
12. **Microctonus* Wesmael
13. **Syntretus* Foerster

Subfamily Macrocentrinae:

14. *Macrocentrus* Curtis

Subfamily Helconinae*:

15. **Zele* Curtis
16. **Baeacis* Foerster
17. **Diospilus* Haliday

18. **Helcon* Nees
19. **Helconidea* Helcon
20. **Cenocoelius* Westwood

Subfamily Blacinae:

21. *Orgilus* Haliday
22. **Centistes* Haliday
23. **Eubadizon* Nees
24. **Blacus* Nees
25. *Stantonia* Ashmead
26. **Triaspis* Haliday
27. **Urosigalphus* Ashmead

Subfamily Agathidinae:

28. *Mesocoelus* Schulz
29. **Isoptronotum* Enderlein
30. *Cremnops* Foerster
31. *Disophrys* Foerster
32. **Zelomorpha* Ashmead
33. *Euagathis* Szepligeti
34. *Laccagathis* Watanabe
35. *Braunsia* Kriechbaumer
36. *Agathis* Latreille
37. **Camptothlipsis* Enderlein
38. **Baeognatha* Kokujev

Subfamily Microgasterinae:

39. **Mirax* Haliday
40. *Apanteles* Foerster
41. *Microplitis* Foerster
42. *Microgaster* Latreille
43. *Snellenius* Westwood
44. *Fornicia* Brullé

Subfamily Cardiochilinae:

45. *Cardiochiles* Nees
46. *Laminitarsus* Fullaway

Subfamily Cheloninae:

47. *Phanerotoma* Wesmael
48. *Phanerotomella* Szepligeti
49. *Ascogaster* Wesmael
50. *Megascogaster* Baker
51. *Cubochelonus* Baker
52. *Chelonus* (*Chelonus* Jurine)
    Chelonus (*Neochelonella* Hincks)

Subfamily Alysiinae:

53. **Synaldis* Foerster
54. **Dinotrema* Foerster
55. **Aspilota* Foerster
56. *Alysia* Latreille
57. **Idiasta* Foerster
58. **Anarcha* Foerster
59. **Cratospila* Foerster
60. **Acrobela* Foerster
61. **Phaenocarpa* Foerster
62. *Asobara* Foerster

Subfamily Dacnusinae*:

63. **Symphya* Foerster
64. **Dacnusa* Haliday
65. **Coelinius* Nees

Subfamily Opiinae:

66. *Opius* Wesmael

Subfamily Braconinae:

67. **Batotheca* Enderlein
68. *Spinaria* Brullé
69. **Spinariella* Szepligeti
70. **Gastrotheca* Guerin
71. *Aphrastobracon* Ashmead
72. *Chaoilta* Cameron
73. **Atanycolus* Foerster
74. *Stenobracon* Szepligeti
75. *Gronaulax* Cameron
    (=*Neuraulax* Roman)
76. *Euurobracon* Ashmead
77. **Vipio* Latreille
78. **Bathyaulax* Szepligeti
79. *Iphiaulax* Foerster
80. *Cratobracon* Cameron
81. *Sigalphogastra* Cameron
82. **Stirobracon* Cameron
83. *Tropobracon* Cameron
84. **Odontopygia* Enderlein
85. **Dioxybracon* Granger
86. **Myosoma* Brullé
87. *Odontogaster* Szepligeti
88. *Hemiglyptus* Ashmead
89. **Cratocnema* Szepligeti
90. **Philomacroploea* Cameron
91. *Campyloneurus* Szepligeti
92. *Bracon* Fabricius

Subfamily Spathiinae:

93. **Pseudospathius* Szepligeti

94. *Paraspathius* Nixon
95. *Spathius* Nees
96. *Platyspathius* Viereck

Subfamily Stephaniscinae*:

97. **Leptospathius* Szepligeti
98. **Halycaea* Cameron
99. **Doryctophasmus* Enderlein

Subfamily Rogadinae:

100. **Yelicones* Cameron
101. *Dedanima* Cameron (=*Colastomion* Baker)
102. *Macrostomion* Szepligeti (=*Macrostomionella* Baker)
103. *Megarhogas* Szepligeti
104. *Clinocentrus* Haliday
105. *Rogas* Nees
106. *Conspinaria* Schulz (=*Paragyroneuron* Baker)
107. *Gyroneuronella* Baker
108. *Hemigyroneuron* Baker
109. **Pelecystoma* Wesmael
110. *Rhogasella* Baker
111. *Pseudogyroneuron* Baker
112. *Aulosaphes* Muesebeck
113. **Acanthormius* Ashmead
114. **Pambolus* Haliday
115. *Hormius* Nees

Subfamily Doryctinae:

116. **Odontobracon* Cameron
117. *Euscelinus* Westwood
118. **Rhoptrocentrus* Marshall
119. *Heterospilus* Haliday
120. *Doryctes* Haliday
121. **Rhaconotus* Ruthe
122. *Rhyssalus* Haliday

Tribe Hecabolini:

123. **Aivalykus* Nixon
124. *Polystenus* Foerster
125. *Monolexis* Foerster

The subfamilies of Braconidae

There are 17 subfamilies of Braconidae represented in the Philippines. Of these, three are new records for this country: subfamilies Helconinae, Dacnusinae and Stephaniscinae. The key to determine the subfamilies and tribes has been incorporated in the key to the genera. Below is a brief diagnosis or characteristic of each subfamily with its corresponding host selection.

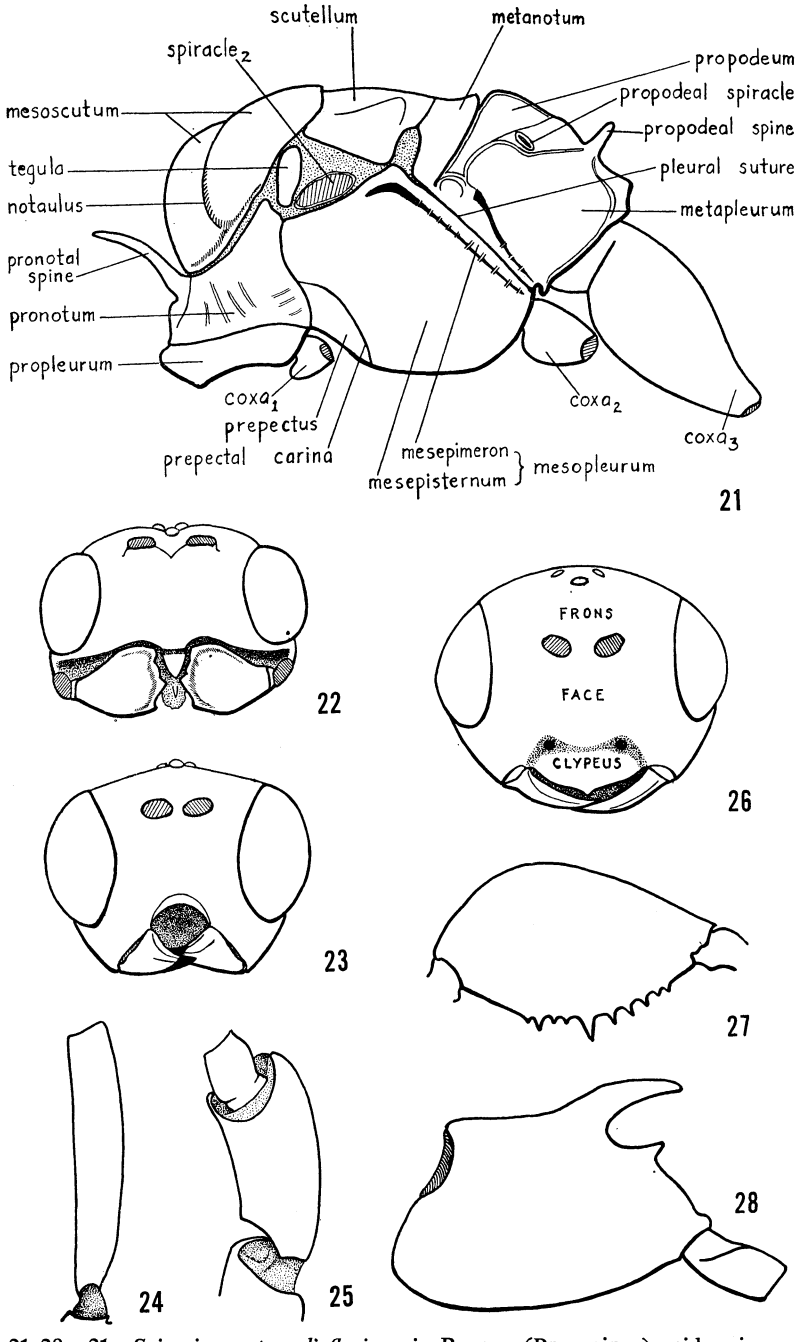
Aphidiinae (fig. 34). All species are internal parasites of aphids. Plant lice with braconid cocoons inside have an inflated appearance and brownish color, often referred to as mummified aphids.

The species are usually small, not exceeding 4 or 5 mm. This subfamily is different from the other subfamilies in having the joint between tergites 2 and 3 flexible so the abdomen can fold toward the underside. The venation is generally reduced (fig. 34).

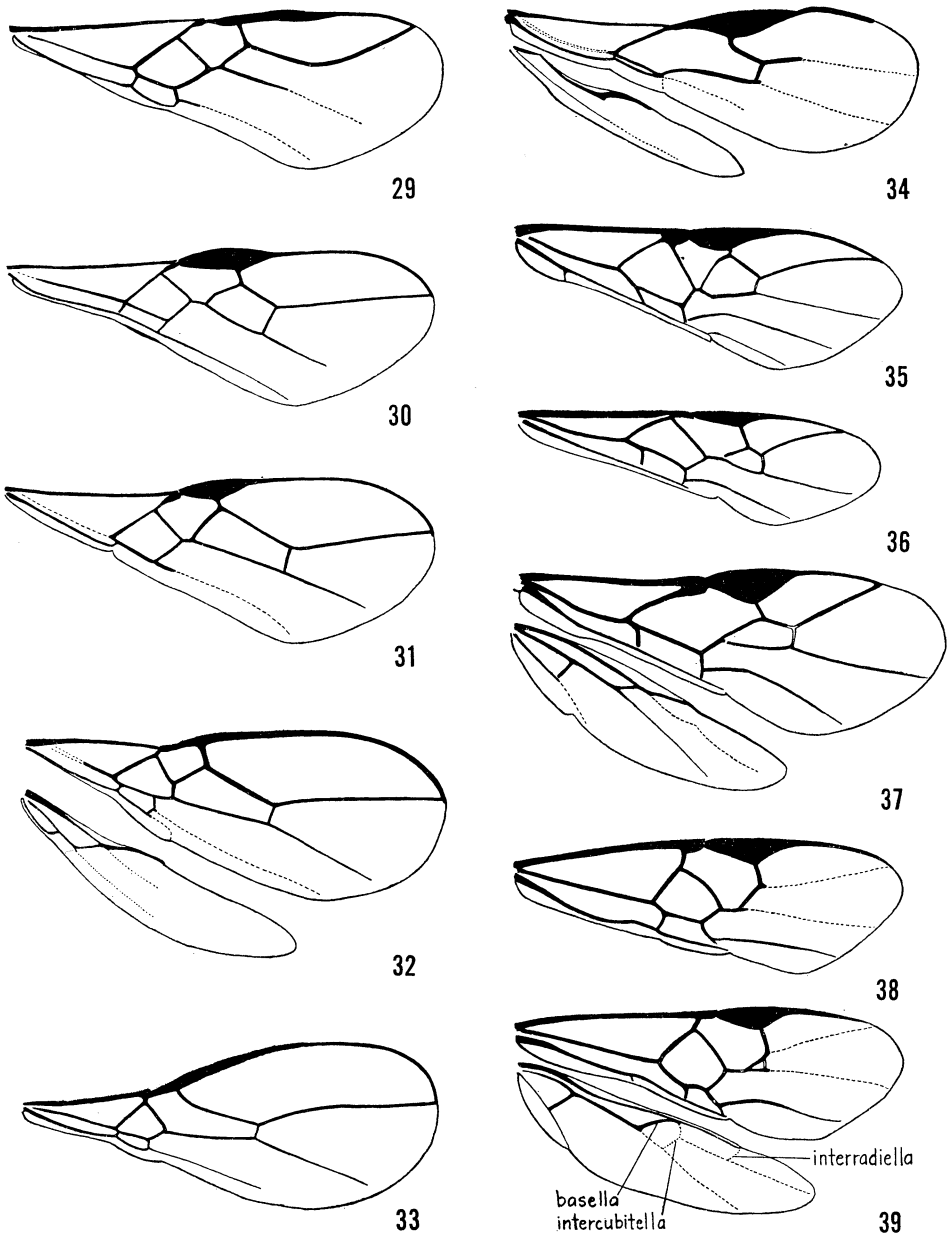
Euphorinae (figs. 24, 42–48). The great majority of species are internal parasites of adult Coleoptera. *Perilitus* is confined to Coccinellidae and Curculionidae whereas *Microctonus* attacks Curculionidae, Chrysomelidae and Tenebrionidae. According to Muesebeck (1936, 1951) *Aridelus* attacks nymphs and adults of Pentatomidae; *Euphorus* and *Euphoriana* are parasitic in Miridae. *Meteorus* is parasitic mostly on lepidopterous larvae and recorded also on wood-boring Coleoptera. No host records are known for the Philippine species.

The euphorine species are usually small and black. In Muesebeck's (1936) treatise of the subfamily he characterized the Euphorinae in detail as follows:

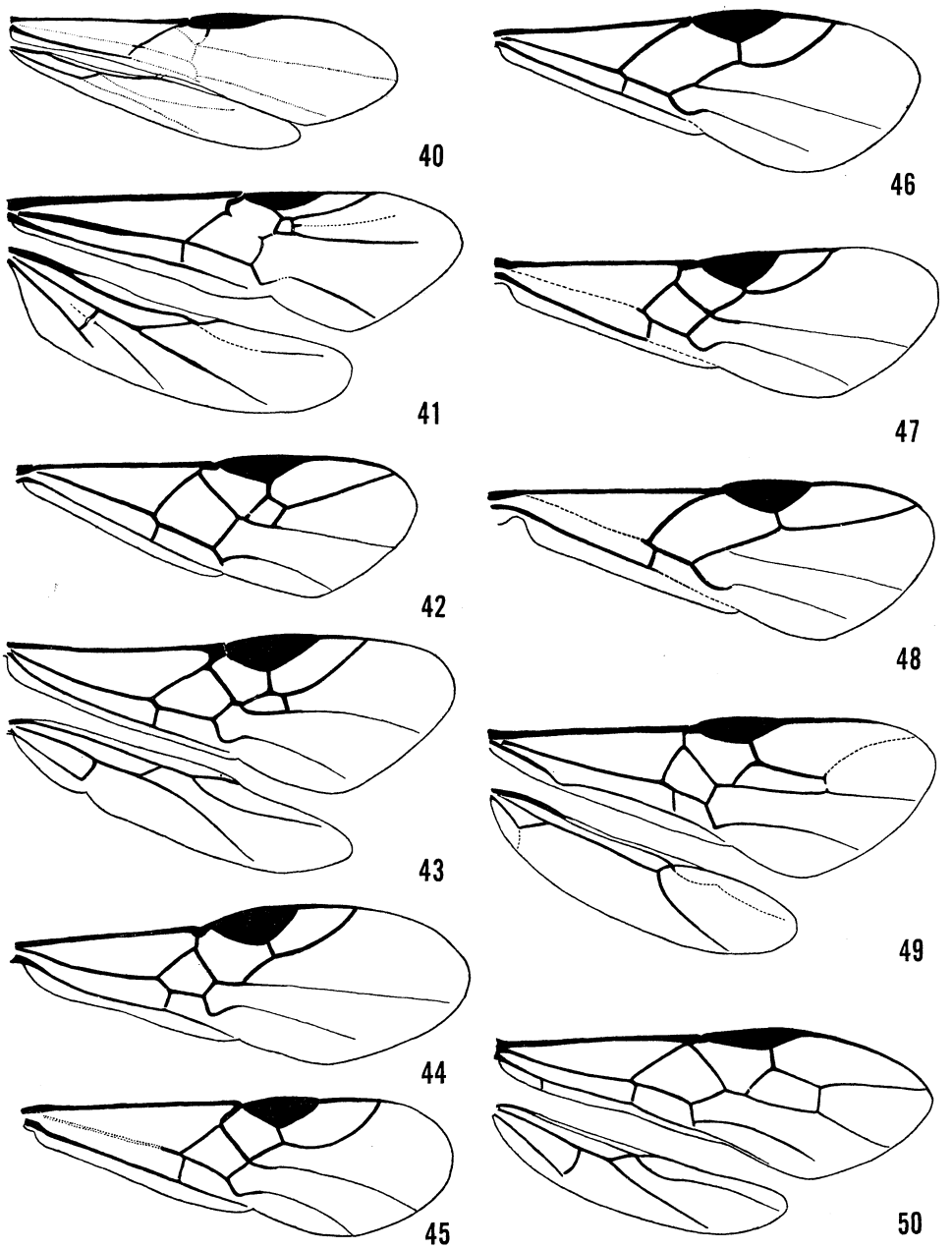
"Head transverse to quadrate; mandibles bidentate, crossing at apices and fitting against clypeus; clypeus separated from face by an impression; anterior margin of clypeus



Figs. 21–28. 21, *Spinaria westwoodi flavipennis* Roman (Braconinae), side view of thorax; 22, *Idiasta* sp. (Alysiinae), front view of head; 23, *Bracon chinensis* (Szepligeti) (Braconinae), front view of head; 24, *Streblocera* sp. (Euphorinae), scape; 25, *Chaoilta intrudens* Smith (Braconinae), scape; 26, *Baeacis* sp. (Helconinae), front view of head; 27, *Euscelinus sarawacus* Westwood (Doryctinae), hind femur; 28, *Odontobracon* sp. (Doryctinae), hind coxa.



Figs. 29–39. 29, *Dacnusa* sp. (Dacnusinae), fore wing; 30, *Cratospila* sp. (Alysiinae), fore wing; 31, *Asobara bactrocerae* Gahan (Alysiinae), fore wing; 32, *Aspilota* sp. (Alysiinae), fore and hind wings; 33, *Synaldis* sp. (Alysiinae), fore wing; 34, *Aphidius* sp. (Aphidiinae), fore and hind wings; 35, *Phanerotoma ferruginea* Baker (Cheloninae), fore wing; 36, *Ascogaster philippinensis* Baker (Cheloninae), fore wing; 37, *Chelonus* (*C.*) *semihyalinus* Ashmead (Cheloninae), fore and hind wings; 38, *Apanteles* sp. (Microgasterinae), fore wing; 39, *Microgaster apo* Wilkinson (Microgasterinae), fore and hind wings.



Figs. 40–50. 40, *Mesocoelus philippinensis* Muesebeck (Agathidinae), fore and hind wings; 41, *Disophrys insignis* Roman (Agathidinae), fore and hind wings; 42, *Meteorus browni* Ashmead (Euphorinae), fore wing; 43, *Aridelus fumipennis* Fouts (Euphorinae), fore and hind wings; 44, *Perilitus* sp. (Euphorinae), fore wing; 45, *Wesmaelia* sp. (Euphorinae), fore wing; 46, *Microctonus* sp. (Euphorinae), fore wing; 47, *Euphorus* sp. (Euphorinae), fore wing; 48, *Syntretus* sp. (Euphorinae), fore wing; 49, *Cardiochiles* sp. (Cardiochilinae), fore and hind wings; 50, *Macrocentrus philippinensis* Ashmead (Macrocentrinae) fore and hind wings.

subtruncate, more or less reflexed; maxillary palpi with 5 or 6 segments; labial palpi with 2, 3, or 4 segments; eyes prominent, usually bare or sparsely hairy, very rarely thickly hairy; temples and cheeks margined; occiput usually margined but with the carina often interrupted medially; transverse impression at base of scutellum broad and deep; prepectus margined; legs slender; calcaria of posterior tibia varying from very short to half as long as metatarsus; 2 or 3 cubital cells, very rarely only 1; radial cell ranging from very small and more or less lunate to very large, measured on wing margin in some specimens not more than one-fourth length of stigma, in others extending nearly to apex of wing; rarely, radial cell not defined, the radius lacking; first cubital and first discoidal cells either separated or confluent; recurrent vein very rarely absent; medius ranging from well developed to obsolete; first brachial cell open at apex; subdiscoideus not interstitial; submediellan cell large, rarely not defined. First abdominal tergite petiolate, the spiracles at or behind the middle; second and third tergites connate, large, usually but not always carinate at sides, usually overlapping on venter; apical margin of second tergite rarely distinct; ovipositor sheaths either concealed or prominent."

Macrocentrinae (fig. 50). These are internal parasites of lepidopterous larvae occurring in burrows or cavities in plant stems, fruit and seeds. The only known host record of *Macrocentrus* sp. in the Philippines was reported by Pierce (1928) on *Scirpophaga* sp. attacking sugar cane.

The species of *Macrocentrus* are yellowish brown or black, slender, with long legs and an ovipositor as long as the body. The subfamily is characterized by the absence of an occipital carina, the clypeus is convex, without an opening between clypeus and mandibles, cubital cell 2 is large and rectangular (fig. 50), and the spiracle on tergite 1 is before the middle.

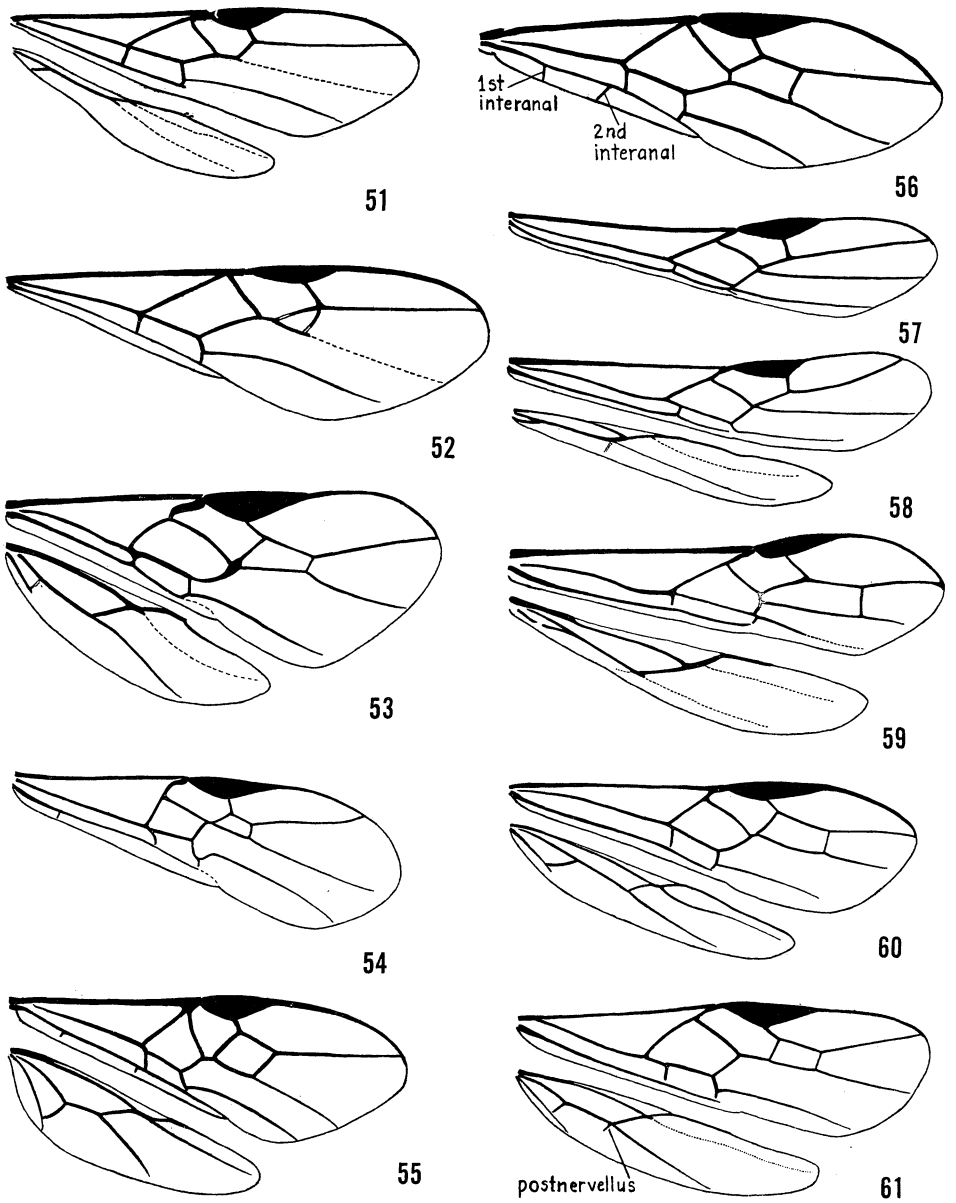
Helconinae (figs. 26, 54–56). These are parasites of wood-boring coleopterous larvae. No host records are known in the Philippines, in fact this is the first record of the occurrence of the subfamily here.

The Helconinae is composed of medium-sized species. The subfamily is characterized as follows: Clypeus convex with the space between clypeus and mandible narrow, occipital carina entire, fore wing with 3 cubital cells, anal cell of fore wing with 1 or 2 interanals, head usually conical or subcubical, and frontal depression more or less deep.

Blacinae (figs. 51 & 52). In this subfamily only two genera, *Triaspis* and *Urosigalphus*, are known to have host records. They are parasitic on coleopterous larvae of Bruchidae and occasionally Curculionidae. In the Philippines there are no host records for this subfamily. The 2 genera mentioned above are different from the rest of the Blacinae in that the abdomen is carapace-like, with only 2 sutures visible above as in the subfamily Cheloninae, but differ from the latter in having only 2 cubital cells instead of 3. Some authors place *Triaspis* and *Urosigalphus* in a separate family, Triaspinae.

The Blacinae has the clypeus convex, without an opening between the clypeus and mandibles, and the occipital carina is usually entire or dorsally interrupted as in *Orgilus*. The fore wing has 2 cubital cells except in *Stantonia* which has 3, and abscissa 2 of the radius is straight or almost straight and reaching the apex of wing.

Agathidinae (figs. 40 & 41). The hosts selected by the Agathidinae are lepidopterous larvae. So far as known there has been no host record in the Philippines. In Japan,



Figs. 51–61. 51, *Orgilus ashmeadi* Viereck (Blacinae), fore and hind wings; 52, *Stantonia flava* Ashmead (Blacinae), fore wing; 53, *Opius fletcheri* Silvestri (Opiinae), fore and hind wings; 54, *Cenocoelius* sp. (Helconinae), fore wing; 55, *Baeacis* sp. (Helconinae), fore and hind wings; 56, *Helcon* sp. (Helconinae), fore wing; 57, *Aivalykus ecclectus* Nixon (Hecabolini, Doryctinae), fore wing; 58, *Polystenus ruficeps* (Ashmead) (Hecabolini, Doryctinae), fore and hind wings; 59, *Spathius apicalis* Westwood (Spathiinae), fore and hind wings; 60, *Pseudogyroneuron* sp. (Rogadinae), fore and hind wings; 61, *Rogas bicolor* Baker (Rogadinae), fore and hind wings.

Mesocoelus philippinensis Muesebeck was recorded on *Acrocercops transecta* Meyrick by Yasumatsu and Kuroko (1957).

The subfamily may be recognized by the following set of characters: Clypeus convex, without an opening between clypeus and mandibles; cubital cell 2 very small; radial cell small, elongate and tapered toward apex of wing; radial vein strong; notaulus usually distinct; prepectal carina present; occipital carina absent, face sometimes much lengthened. *Mesocoelus* has the venation reduced, with only the nervulus, basal vein and abscissa 1 of radius distinct (fig. 40); hind coxa is elongate and as long as the hind femur.

Microgasterinae (figs. 38 & 39). The subfamily includes numerous species that are internal parasites of lepidopterous larvae. The genera of common occurrence are *Apanteles*, *Microgaster* and *Microplitis*.

The Microgasterinae has species with eyes usually hairy and the abdomen is very short so that it is surpassed by the hind femur. The distinguishing features are as follows: Cubital 2 small, triangular, and often confluent with cubital cell 3; radial cell large, radial vein weak or effaced towards apex of wing; notaulus absent; prepectal carina absent; clypeus not emarginate. *Snellenius* differs from the other Microgasterinae in having the notaulus deep and the prepectal carina present.

Cardiochilinae (fig. 49). Few host records are known for the subfamily but apparently they are parasites of lepidopterous larvae. No host records are known for the Philippine species in this subfamily.

The Cardiochilinae is easily distinguished by the strongly curved abscissa 3 of radius but the vein is usually weak. The legs are robust, the abdomen is sessile and short, and the ovipositor is curved.

Cheloninae (figs. 35–37). The species are predominantly solitary internal parasites of lepidopterous larvae. The parasite has the habit of ovipositing in the egg of the host and completing its larval development when the host larva is nearly mature.

The subfamily is easily recognized by the shape of the abdomen which is carapace-like or it looks like an inverted bath tub or a turtle shell. At most 2 sutures are visible on the abdomen dorsally. There are 3 cubital cells present on the fore wing, cell 2 being small and more or less triangular and definitely smaller than cell 3. As previously discussed in the subfamily Blacinae, *Triaspis* and *Urosigalphus* also have carapace-like abdomens but they possess only 2 cubital cells on the fore wing.

Alysiinae (figs. 22, 30–33) and *Dacnusinae* (fig. 29). These subfamilies have not been extensively studied. The common genera, like *Alysia* and *Dacnusa*, have been reported as internal parasites of fly maggots, Diptera. The only host record in the Philippines is *Asobara bactrocerae* Gahan on the nanka fruitfly, *Dacus umbrosa* Fabr.

This group of braconids is referred to as the Exodontes because of the peculiar mandibles (fig. 22) that have the teeth pointing outward instead of inward towards the mouth. The paddle-like mandibles are supposed to be used for digging in filth when searching for hosts.

Alysiinae has 3 cubital cells in the fore wing (except in *Synaldis*, fig. 33), cubital cell 1 being long because intercubitus 1 is lacking, and abscissa 1 of radius is about 4× as long as the intercubitus (figs. 30–32).

The Dacnusinae has 2 cubital cells in the fore wing, cubital cell 1 short since inter-

cubitus 1 is present, and abscissa 1 of the radius subequal in length to the intercubitus (fig. 29). The occurrence of this subfamily in the Philippines is recorded here for the first time.

Opiinae (fig. 53). These are parasites of Diptera. Several species of *Opius* in the Philippines have been reared from *Dacus* spp. and *Acidoxantha* sp.

The subfamily is composed of small insects, usually yellow or black. The members may be recognized as follows: Clypeus convex with opening between clypeus and mandible narrow, not a circular hole; occipital carina entire or interrupted dorsally; cell 2 is 4-sided; anal cell of fore wing without a cross-vein; head usually transverse, sometimes cubical. Some *Bracon* species may be mistaken for *Opius* or vice versa but the Braconinae have the opening between the clypeus and mandible circular and the clypeus hollowed out apically (fig. 23), also the occipital carina is wanting. There is a difference also in tergite 1, in that there is a V-shaped depression basally in *Bracon*, but not in *Opius*.

The 4 subfamilies discussed below belong to a group called Cyclostomi because of the circular opening formed between the concave clypeus and mandible. Members of the Cyclostomi usually parasitize lepidopterous larvae or beetle larvae living in tunnels or nests.

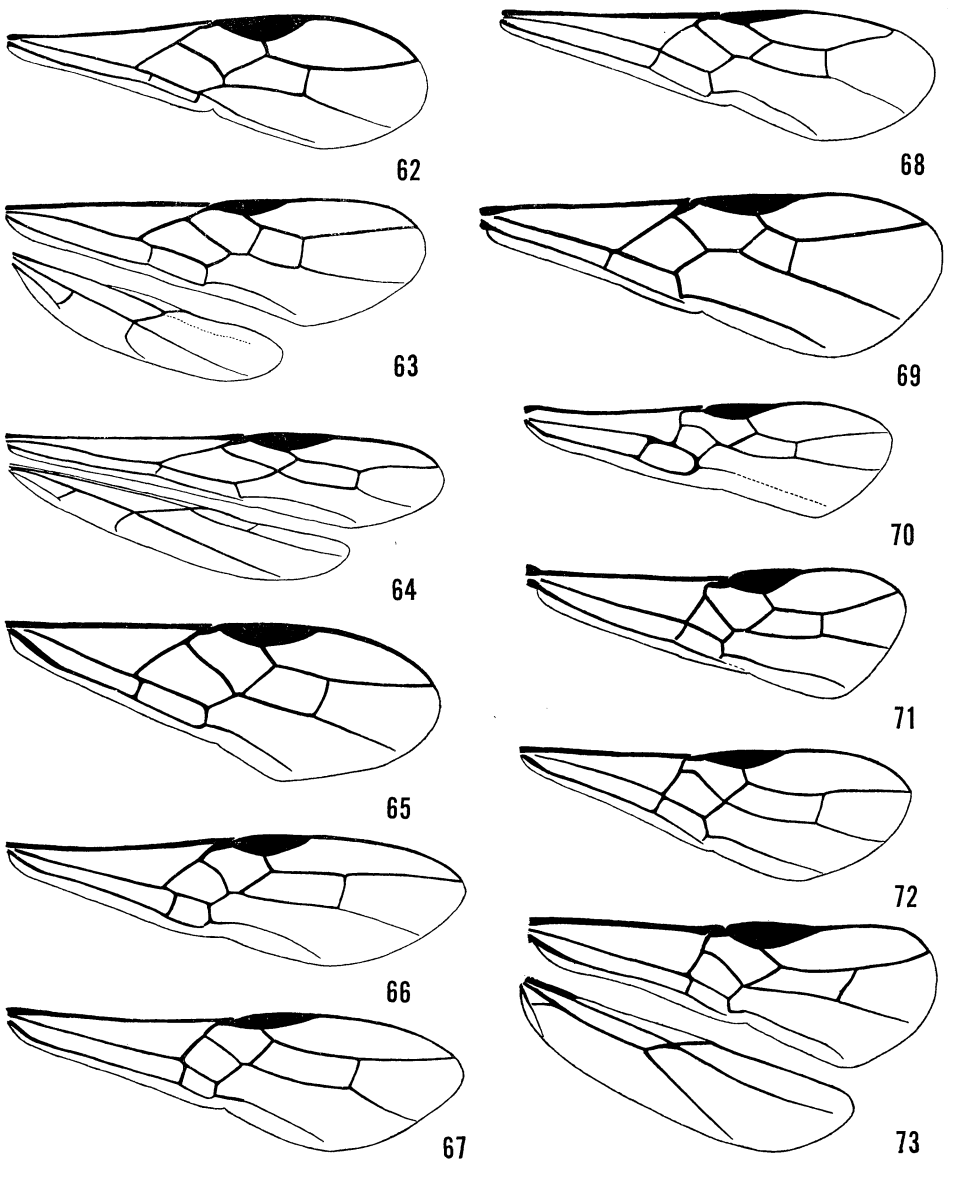
Braconinae (figs. 21, 23, 25, 65–73). The members of this subfamily are predominantly external parasites of caterpillars found in a cell, burrow or cocoon, some would attack coleopterous larvae, few are parasitic on sawflies and Cecidomyiidae. A species from the Philippines is predaceous rather than parasitic—Williams (1928) reported that *Bracon lendicivorus* (Cushman) develops at the expense of the cecidomyiid larvae, *Asphotrophia fici* Barnes, living in the fruit receptacles of *Ficus nota*. The common genus is *Bracon* (=*Microbracon*) which attacks a wide range of hosts. The first 3 parasites of rice stem borers mentioned in the introductory discussion of the family Braconidae belong in this subfamily.

This group is probably the largest in the subfamily and the most difficult to classify. The Braconinae is in bad need of revision. Among the Cyclostomi the Braconinae is different in having the occipital carina wanting, the head is usually transverse, the mesopleural furrow and prepectal carina are absent except in *Batotheca*, *Spinaria* and *Spinariella*, and the submediellan is small.

Spathiinae (fig. 59). Most of the species are external parasites of coleopterous borers, although a few are reported on lepidopterous borers. In the Philippines there are only 3 species with host records: *Platyspathius bisignatus* (Walker) and *P. dinoderi* (Gahan) parasitic on *Dinoderus minutus* F.; and *Spathius fuscipennis* Ashmead parasitic on *Chilo suppressalis* (Walker), one of the species of rice stem borers.

The Spathiinae is apparently differentiated from the other groups by a combination of characters: abdomen petiolate, tergite 1 not gradually widened apically except in *Platyspathius*; epipleura not reaching middle of tergite; dividing suture between tergites 2 and 3 absent or faintly impressed in the Philippine genera; occipital carina present; fore wing with 3 cubital cells. Nixon's (1943) revision of the Spathiinae of the Old World should be consulted for the identification of the species.

Stephaniscinae (fig. 64). It is presumed that the species here are external parasites of wood-boring beetles since no host records have been reported for this group. The distribution of the Stephaniscinae seems to be in the Old World. Its occurrence in the Philip-



Figs. 62–73. 62, *Euscelinus sarawacus* Westwood (Doryctinae), fore wing; 63, *Odontobracon* sp. (Doryctinae), fore and hind wings; 64, *Leptospathius* sp. (Stephaniscinae), fore and hind wings; 65, *Spinaria westwoodi flavipennis* Roman (Braconinae), fore wing; 66, *Euurobracon quadriceps apicalis* Roman (Braconinae), fore wing; 67, *Iphiaulax* sp. (Braconinae), fore wing; 68, *Stenobracon nicevillei* (Bingham) (Braconinae), fore wing; 69, *Tropobracon* sp. (Braconinae), fore wing; 70, *Aphrastobracon philippinensis* Ashmead (Braconinae), fore wing; 71, *Cratocnema* sp. (Braconinae), fore wing; 72, *Campyloneurus* sp. (Braconinae), fore wing; 73, *Bracon chinensis* (Szepligeti) (Braconinae), fore and hind wings.

pines is reported here for the first time with four genera.

In the key presented in this paper, this subfamily will key out to the same couplet as Doryctinae, but may be differentiated as follows: Tergite 1 subpetiolate, widened at apex and about 2.5 or more times as long as apical width; petiole coarsely punctate or transversely striate but not longitudinally striate. These are medium to large species with long ovipositor.

Rogadinae (figs. 60–61). This subfamily is composed of large or medium-sized species parasitic on lepidopterous larvae; however, no host record is known in the Philippines except for *Aulosaphes psychidivorous* Muesebeck on a psychid larva on cacao. The parasitic larva develops and makes its cocoon inside its host.

In the rogadines the occipital carina, the mesopleural furrow and prepectal carina are present. It may be differentiated from the Doryctinae as follows, but sometimes with difficulty: ovipositor short, not longer than the greatest depth of abdomen; head usually transverse; fore tibia never with a row of spines on inner side; pronotal collar not swollen. Like the Braconinae and Doryctinae this group needs revision badly.

Doryctinae (figs. 27, 28, 57, 58, 62 & 63). Most of the species are external parasites of coleopterous larvae, a few might attack lepidopterous larvae. In the Philippines, *Monolexis manilensis* Ashmead was bred from a scolytid.

The Doryctinae is hard to define and often confused with the Braconinae but the latter lacks the occipital carina. This subfamily differs from the Rogadinae as follows: Ovipositor long, longer than the greatest depth of abdomen; head usually cubical; fore tibia usually armed with a row of short spines on inner side; pronotal collar usually swollen. A small subfamily, Stephaniscinae, will key out to the same diagnosis mentioned above but the Doryctinae has tergite 1 sessile, and if petiole is elongate the rest of the tergites are longitudinally striate.

Key to genera of Philippine Braconidae

1. Mandibles widely separated, more or less flattened, teeth outward instead of inward, apices not touching nor overlapping when closed (fig. 22) 2
   Mandibles normal, apices touching or overlapping when closed (figs. 23 & 26)...14
2 (1). Fore wing with 2 cubital cells 3
   Fore wing with 3 cubital cells (except in *Synaldis*)..... Alysiinae, 6
3 (2). Cubital cell 1 long, intercubitus 1 wanting, abscissa 1 of radius about 4× as long as intercubitus (fig. 33)..... **Synaldis**
   Cubital cell 1 short, intercubitus 1 present, abscissa 1 of radius subequal in length to intercubitus (fig. 29) ..... Dacnusinae, 4

DACNUSINAE

4 (3). Abdomen carapace-like, only suture behind tergite 1 present..... **Symphya**
   Abdomen elongate, sutures between tergites present 5
5 (4). Tergite 1 coarsely rugose; radial cell long; stigma elongate, reaching or extending beyond 1/2 length of radial cell (fig. 29)..... **Dacnusa**
   Tergites 2 and 3 longitudinally striate or rugose; radial cell very short; stigma not exceptionally short, apex not reaching 1/2 length of radial cell ..... **Coelinius**

ALYSIINAE
(excl. *Synaldis*)

6 (2). Stigma linear, joining costal vein imperceptibly; abscissa 2 of radius longer than intercubitus 1; radial cell more than 1/2 length of fore wing; cubital cell 2 is 5-sided (fig. 32) 7
Stigma large, distinct from costal vein; abscissa 2 of radius variable in length in relation to intercubitus 1; radial cell less than or at most 1/2 length of fore wing; cubital cell 2 is 4-sided (figs. 30 & 31) 8

7 (6). Propodeal spiracle large and oval, rim somewhat raised ..... **Dinotrema**
Propodeal spiracle small, circular and puncture-like; propodeum carinate; sternaulus present ..... **Aspilota**

8 (6). Abscissa 2 of radius equal to or slightly shorter than intercubitus 1; radius arising beyond middle of stigma (fig. 30) 9
Abscissa 2 of radius longer than intercubitus 1; radius arising from or near middle of stigma (fig. 31) 12

9 (8). Propodeal spiracle very large, propodeum with midlongitudinal carina ..... **Alysia**
Propodeal spiracle small, circular or puncture-like 10

10 (9). Flagellar segment 1 shorter than 2; face wider than long ..... **Alysia**
Flagellar segment 1 longer than 2; face longer than wide 11

11 (10). Recurrent vein interstitial with intercubitus 1 ..... **Anarcha**
Recurrent vein antefurcal or entering cubital cell 1 (fig. 30) ..... **Cratospila**

12 (8). Flagellar segment 1 longer than 2; radius arising from the middle of stigma; postnervellus present ..... **Acrobela**
Flagellar segment 1 shorter than 2; radius usually arising beyond the middle of stigma; postnervellus present or absent 13

13 (12). Notaulus deeply impressed; postnervellus usually present ..... **Phaenocarpa**
Notaulus absent or impressed anteriorly; postnervellus absent (fig. 31) ..... **Asobara**

14 (1). Suture between tergites 2 and 3 membranous, thus abdomen can fold toward the underside; venation generally reduced (fig. 34); species small, not more than 4 or 5 mm ..... Aphidiinae, 15
Suture between tergites 2 and 3 rigid or erased; venation complete except in *Mesocoelus*; species small to large 18

APHIDIINAE

15 (14). Fore wing with 3 cubital cells ..... **Ephedrus**
Fore wing with less than 3 cubital cells 16

16 (15). Fore wing with recurrent, cubitus and intercubitus veins effaced ..... **Diaeretus**
Fore wing with discocubital cell complete, recurrent vein effaced, at least a stub of cubitus always present 17

17 (16). Abscissa 1 of radius nearly perpendicular to stigma; ovipositor and its sheaths curved downward ..... **Monoctonus**
Abscissa 1 of radius oblique (fig. 34); ovipositor and its sheaths straight or curved upward ..... **Aphidius**

18 (14). Clypeus convex, opening between clypeus and mandibles narrow or absent (fig. 26) 19
Clypeus hollowed out apically, opening between clypeus and mandibles large

and more or less round (fig. 23) 68

19 (18). Abdomen carapace-like, at most 2 sutures visible above..... 20
Abdomen normal, with more than 2 sutures visible above..... 29

20 (19). Fore wing with 2 cubital cells 21
Fore wing with 3 cubital cells..... Cheloninae, 23

21 (20). Notaulus absent; head small, narrower than thorax; eyes hairy; abscissa 2 of radius weak; sutures on abdomen deep; scutellum dentate apically... **Fornicia**
Notaulus deep; head large, almost as wide as thorax; eyes bare; abscissa 2 of radius distinct; abdomen with 2 weak transverse sutures present or absent; scutellum not dentate apically 22

22 (21). Abdomen flattish, with 2 transverse sutures present, apical margin notched and sometimes bidentate; antenna usually with more than 20 segments in ♂ ..... **Triaspis**
Abdomen strongly convex, without transverse sutures, apically pointed in the Philippine species at hand; antenna seldom with more than 20 segments in ♂ ..... **Urosigalphus**

CHELONINAE

23 (20). Abdominal sutures distinct, 3 tergites visible above..... 24
Abdominal sutures erased, tergites 1–3 forming a solid carapace..... 25

24 (23). Radial vein with 3 abscissae; cubital cell 2 is 4-sided, large, often as large or larger than cubital cell 1 (fig. 35); eyes round..... **Phanerotoma**
Radial vein with 2 abscissae; cubital cell 2 is 3-sided, small and elongate, smaller than cubital cell 1; eyes oblong ..... **Phanerotomella**

25 (23). Abscissa 1 of cubitus present, thus first cubital and first discoidal cells separate (fig. 36); eyes bare..... 26
Abscissa 1 of cubitus absent, thus first cubital and first discoidal cells confluent (fig. 37); eyes hairy 27

26 (25). Propodeal teeth present; abdomen rounded apically, or if pointed length at most 2.5 its greatest width; intercubitus 1 strongly arched toward stigma; abscissa 1 of radius equal to or longer than 2; nervulus far distad of basal vein (fig. 36)..... **Ascogaster**
Propodeal teeth absent; abdomen pointed apically, length about 3.25 its greatest width; intercubitus 1 straight; nervulus shortly distad of basal vein ..... **Megascogaster**

27 (25). Mesoscutum short, 0.7–0.8 as long as wide; head transverse from dorsal view; temple narrow; abdomen length less than 3× greatest width..... **Chelonus**, 28
Mesoscutum long, 1.0–1.2 as long as wide; head subcubical from dorsal view; temple broad; abdomen length more than 3× its greatest width... **Cubochelonus**

28 (27). Female carapace with 2 apical teeth, ♂ carapace more or less acute apically; head wider than thorax; ♀ antenna with 16 segments... Subgenus **Neochelonella**
Female carapace without teeth, ♂ carapace rounded apically; head as wide or narrower than thorax; ♀ antenna with 16 or more segments ..... Subgenus **Chelonus**

29 (19). Venation reduced, only nervulus, basal vein and abscissa 1 of radius distinct (fig. 40); hind coxa elongate, as long as hind femur..... **Mesocoelus**

Venation more or less complete; hind coxa shorter than hind femur (except in some species of *Microgaster*) 30

30 (29). Cubital cell 2 very small, triangular or squarish, sometimes open (figs. 38, 39 & 41); radial cell small, if large, radial vein weak towards wing apex; abdomen sessile 31

Cubital cell 2 large or medium, usually rectangular; radial cell large, if small, abdomen petiolate; abdomen petiolate or sessile 45

31 (30). Radial cell large, radial vein weak or effaced towards apex of wing (figs. 38 & 39); notaulus absent or slightly impressed (except in *Snellenius*); prepectal carina absent (except in *Snellenius*) ..... Microgasterinae, 32

Radial cell small, elongate and tapered towards apex of wing; radial vein strong; notaulus usually distinct (fig. 41); prepectal carina present ..... Agathidinae, 36

MICROGASTERINAE
(excl. *Fornicia*)

32 (31). Intercubitus 1 long, reaching stigma; radius not angled, obsolete except at extreme base; antenna with 14 segments ..... **Mirax**

Intercubitus 1 much shorter, not reaching stigma; radius with 2 abscissae, the first making an almost right angle with the second, the second usually indicated by a line of closely placed setae; antenna always with 18 segments.. 33

33 (32). Areolet open, intercubitus 2 lacking (fig. 38) ..... **Apanteles**

Areolet closed, intercubitus 2 present (fig. 39) 34

34 (33). Notaulus deep; mesoscutum raised and with midlongitudinal ridge; prepectal carina present ..... **Snellenius**

Notaulus absent or slightly impressed; mesoscutum evenly convex without median ridge; prepectal carina absent 35

35 (34). Inner spur of hind tibia shorter than 1/2 length of hind basitarsus; hind coxa short, less than 1/2 as long as thorax; mesopleurum with distinct crenulate furrow ..... **Microplitis**

Inner spur of hind tibia usually more than 1/2 length of hind basitarsus; hind coxa long, at least as long as thorax; mesopleurum rarely with crenulate furrow ..... **Microgaster**

AGATHIDINAE
(excl. *Mesocoelus*)

36 (31). Fore and middle claws bifid 37

Fore and middle claws simple, with or without a basal lobe 41

37 (36). Claws pectinate at base; ovipositor long, about as long as abdomen; face elongate 38

Claws with few long hairs at base; ovipositor short, not extending much beyond tip of abdomen; face shorter 39

38 (37). Notaulus absent; prepectal carina ending near top of mesopleurum; ovipositor sheath flat and wider than depth of ovipositor ..... **Isoptronotum**

Notaulus deep; prepectal carina ending at midheight of mesopleurum; ovipositor sheath not wider than depth of ovipositor ..... **Cremnops**

39 (37). Submediellan cell large, length reaching to about 1/2 of mediellan (fig. 41);

frontal carina bordering depression produced into a tooth near antennal base ..... **Disophrys**

Submediellan cell small, length at most reaching basal 1/3 of mediella; frontal carina absent, or if present not produced into a tooth near antennal base..... 40

40 (39). Frontal depression bordered by carina..... **Zelomorpha**

Frontal depression not bordered by carina ..... **Euagathis**

41 (36). Propodeum smooth; if carina present only a short midlongitudinal one and/or a basal transverse one; propodeal spiracle elongate and large 42

Propodeum rugose or mat; propodeal spiracle circular or oval, usually small... 43

42 (41). Frontal depression deep with a short medial carina above antennae; mesopleural furrow and notaulus absent..... **Laccagathis**

Frontal depression shallow or absent, frons without a median carina; mesopleural furrow present; notaulus present ..... **Braunsia**

43 (41). Areolet closed..... **Agathis**

Areolet open..... 44

44 (43). Propodeum and tergites 1 and 2 mat; clypeus about 2× as long as wide..... ..... **Camptothlipsis**

Propodeum rugose; tergites 1 and 2 shiny, tergite longitudinally striate; clypeus about 3× as long as wide..... **Baeognatha**

45 (30). Spiracle on tergite 1 at or behind middle (except in *Euphoriana*, but radius ends before apex of wing); abdomen petiolate or subpetiolate; radius usually ending before apex of wing (figs. 43–47) ..... Euphorinae, 46

Spiracle on tergite 1 definitely before middle; abdomen sessile; radius usually ending at or near apex of wing..... 54

EUPHORINAE

46 (45). Tergite 1 petiolate, slender and subcylindrical; tergite 2 laterally smooth and convex with dorsal part, its epipleura absent; ovipositor short..... 47

Tergite 1 subpetiolate, broadening strongly behind middle and depressed; tergite 2 with lateral edge sharp, epipleura present (except in *Syntretus*)..... 48

47 (46). Fore wing with 3 cubital cells; medius distinct in its entire length (fig. 43); frons with median carina; antenna always with 18 segments; face broad, about 2× as wide as high..... **Aridelus**

Fore wing with 2 cubital cells; medius basally weak (fig. 45); frons without median carina; antenna with more than 18 segments; face subquadrate..... ..... **Wesmaelia**

48 (46). Fore wing with 3 cubital cells (fig. 42) ..... **Meteorus**

Fore wing with 2 cubital cells, rarely 1 49

49 (48). First cubital and first discoidal cells separate..... 50

First cubital and first discoidal cells confluent 52

50 (49). Medius well developed in its entire length (fig. 44) ..... **Perilitus**

Medius obsolete or weak basally (fig. 47)..... 51

51 (50). Cubitus, intercubitus, discoideus and recurrent veins effaced..... **Euphoriana**

Cubitus distinct at least at base; first cubital and first discoidal cells distinctly separate; recurrent vein rarely absent (fig. 47)..... **Euphorus**

52 (49). Scape unusally long, at least 1/2 as long as height of head (fig. 24)... **Streblocera**
Scape very short, never more than 2× as long as thick 53
53 (52). Medius and nervellus well developed (fig. 46); tarsal claws simple ... **Microctonus**
Medius and nervellus weak or effaced (fig. 48); tarsal claws bidentate... **Syntretus**
54 (45). Abscissa 3 of radius strongly curved, usually weak (fig. 49); legs robust; abdomen sessile and short; ovipositor curved ..... Cardiochilinae, 55
Abscissa 3 of radius straight or slightly curved, always distinct (fig. 50)..... 56

CARDIOCHILINAE

55 (54). Hind basitarsus unusually broadened and lengthened; propodeum more or less triangular from dorsal view ..... **Laminitarsus**
Hind basitarsus normal, not as above; propodeum more or less semicircular from dorsal view..... **Cardiochiles**
56 (54). Occipital carina absent ..... Macrocentrinae, **Macrocentrus**
Occipital carina entire or dorsally interrupted 57
57 (56). Fore wing with 2 cubital cells..... Blacinae, 58
Fore wing with 3 cubital cells..... 61

BLACINAE
(excl. *Stantonia*, *Urosigalphus* and *Triaspis*)

58 (57). Occipital carina obsolescent dorsally; brachial cell closed (fig. 51) ..... **Orgilus**
Occipital carina entire; brachial cell open..... 59
59 (58). Ovipositor short and sickle-shaped; notaulus usually absent or weakly impressed..... **Centistes**
Ovipositor long and straight or slightly curved; medius well developed; notaulus deep 60
60 (59). Abscissa 1 of radius short; about 0.4 as long as intercubitus 1; abscissa 2 of radius curved and ending before apex of wing; ovipositor sheath long, about 0.6 as long as fore wing..... **Eubadizon**
Abscissa 1 of radius longer, about 0.8 as long as intercubitus 1; abscissa 2 of radius straight and ending at apex of wing; ovipositor sheath short, 0.3–0.4 as long as fore wing ..... **Blacus**
61 (57). Cubital cell 2 triangular; discoidal cell 1 trapezoidal, basal and first recurrent veins parallel (fig. 52)..... **Stantonia**
Cubital cell 2 is 4-sided; discoidal cell 1 of various shapes, basal and first recurrent veins not parallel 62
62 (61). Anal cell of fore wing without a cross-vein (fig. 53); head usually transverse, sometimes cubical; frons not or slightly depressed..... Opiinae, **Opius**
Anal cell of fore wing with 1 or 2 interanals (figs. 54–56); head usually conical or subcubical; frontal depression more or less deep ..... Helconinae, 63

HELCONINAE

63 (62). Hind tibial spurs long and unequal in length, inner spur about 1/2 as long as basitarsus; apex of tibia not notched where spurs are attached; ovipositor short; head transverse ..... **Zele**
Hind tibial spurs short and subequal in length; apex of tibia deeply notched where spurs are attached; ovipositor long; head subcubical or transverse..... 64
64 (63). Cubital cell 2 trapezoidal (figs. 54 & 56)..... 65

Cubital cell 2 rhombic (fig. 55) 67

65 (64). Abdomen attached high on propodeum, distant from hind coxa..... **Cenocoelius**
Abdomen attached low on propodeum, close to hind coxa..... 66

66 (65). Hind femur enlarged and with strong ventral tooth and or a row of blunt spines; interanella present..... **Helconidea**
Hind femur slender and without ventral spines; interanella absent..... **Helcon**

67 (64). Clypeus with median apical tooth (fig. 25); scape about 3× as long as wide; clypeal fovea nearer to the other fovea than to malar groove ..... **Baeacis**
Clypeus without median apical tooth; scape about 2× as long as wide; clypeal fovea equidistant to other fovea and malar groove ..... **Diospilus**

68 (18). Occipital carina present; mesopleural furrow and prepectal carina present; submediellan variable in size 69
Occipital carina absent; mesopleural furrow and prepectal carina absent excepting the genera included in couplets 110 and 111; submediellan small... 101

69 (68). Fore wing with 2 cubital cells (intercubitus 2 absent) (figs. 57 & 58) .....
..... Hecabolini, 70
Fore wing with 3 cubital cells (fig. 59) 72

HECABOLINI

70 (69). Submediellan cell absent; fore wing with discoidal cell 2 closed (fig. 57); tergite 1 longitudinally striate; ♂ and ♀ dimorphic, ♂ with tergites beyond the second unusually elongate and depressed, ♀ abdomen normal..... **Aivalykus**
Submediellan cell present; fore wing with discoidal cell 2 open (fig. 58); tergite 1 variable in sculpture; ♂ and ♀ similar 71

71 (70). Thorax and propodeum elongate and depressed; tergite 2 with a V-shaped groove or carina; scape about 2× as long as pedicel; medium-sized species
..... **Polystenus**
Thorax and propodeum normal, not unusually elongate nor depressed; tergite 2 without V-shaped groove or carina; scape subequal to pedicel; small species ..... **Monolexis**

72 (69). Abdomen petiolate, tergite 1 not gradually widened apically; epipleura not reaching middle of tergite; suture between tergites 2 and 3 absent (but faintly impressed in *Pseudospathius*) ..... True Spathiinae, 73
Abdomen subpetiolate or sessile; epipleura reaching middle of tergite; suture between tergites 2 and 3 present..... 75

SPATHIINAE

73 (72). Epipleura of abdominal segments 2 and 3 separated by a suture; species large, about 12 mm long excluding ovipositor; head and thorax yellowish, abdomen entirely black ..... **Pseudospathius**
Epipleura of abdominal segments 2 and 3 confluent; species less than 12 mm long; almost entirely black species 74

74 (73). Scape elongate and slender, about 2× as long as wide; hind coxa subequal in length to the swollen hind femur, the latter abruptly narrowed at base; species slender, gaster elongate..... **Paraspathius**
Scape short and cup-shaped, usually not more than 1.5× as long as wide, if somewhat longer, anterior face of mesoscutum perpendicular; hind coxa

usually shorter than hind femur, if not hind femur gradually narrowed at base; species with gaster ovate ..... **Spathius**

(Note: From here on the key is subject to revision. Further study is needed for the Rogadinae, Doryctinae and Braconinae.)

75 (72). Ovipositor short, not longer than greatest depth of abdomen; head usually transverse; fore tibia never with row of spines on inner side; hind coxa without basal spine on inner side; pronotal collar not swollen ... Rogadinae, 76

Ovipositor long, longer than greatest depth of abdomen; head usually cubical; fore tibia usually armed with row of short spines on inner side; hind coxa with or without basal spine on inner side; pronotal collar usually swollen ... 92

ROGADINAE

76 (75). Propodeum areolated, at least 1 closed area present; species small, about 2 mm long 77

Propodeum rugulose and without closed area; medium to large species 80

77 (76). Only tergites 1–3 visible above, longitudinally striate throughout; suture between tergites 2 and 3 deep 78

All tergites visible above, not longitudinally striate throughout or striate on petiole only 79

78 (77). Apical margin of tergite 3 transparent and notched at middle ..... **Aulosaphes**

Apical margin of tergite 3 with a strong tooth on each corner ..... **Acanthormius**

79 (77). Propodeum with 2 strong teeth; suture between tergites 2 and 3 absent; recurrent vein interstitial with intercubitus 1 ..... **Pambolus**

Propodeum without teeth; suture between tergites 2 and 3 present; recurrent vein antefurcal, arising from cubital cell 1 ..... **Hormius**

80 (76). Legs with last tarsal segment enlarged, tarsal segments 2, 3, and 4 short and wide; claws pectinate; femora short and thick ..... **Yelicones**

Legs with last tarsal segment not enlarged; tarsal segments 2, 3, and 4 long and slender; claws simple with or without a basal lobe; femora slender 81

81 (80). Mid and hind tibial spurs strongly curved, long and bare or hairy on basal 1/2 only; postnervellus absent 82

Mid and hind tibial spurs straight, short and hairy throughout; postnervellus present or absent 84

82 (81). Tarsal claws without basal lobe; propodeal spiracle small and circular; tergite 1 at most 2× as long as apical width; maxillary palpi of ♂ enlarged and flattened, of ♀ slender ..... **Dedanima**

Tarsal claws each with a basal lobe; propodeal spiracle usually elliptical; tergite 1 is 2–3× as long as apical width; maxillary palpi of ♂ not enlarged or flattened 83

83 (82). Intercubitus 1 and abscissa 2 of radius equal in thickness, intercubitus 1 straight and oblique; maxillary palpi of ♂ enlarged, in some species labial palpi enlarged also; in the Philippine species, tergite 1 is 2× as long as apical width ..... **Macrostomion**

Intercubitus 1 and abscissa 2 of radius thickened at the junction and together forming a curve; maxillary palpi of ♂ slender or unmodified except in 1 Philippine species (*Megarhogas stigmaticus* Baker, ♂ heretofore not known); tergite 1 is 2.5–3× as long as apical width ..... **Megarhogas**

84 (81). Postnervellus present (fig. 61) 85
Postnervellus absent (fig. 60) 86
85 (84). Tergites beyond third retracted underneath; hind tarsal spurs wide apart basally ..... **Clinocentrus**
Tergites all visible dorsally; hind tarsal spurs close together basally ..... A few species of **Rogas**
86 (84). Propodeal teeth present or with a slight suggestion; tarsal claws each with basal lobe 87
Propodeal teeth absent; tarsal claws without a basal lobe 88
87 (86). Tergite 1 sessile; propodeal teeth strong; middle lobe of mesoscutum prominently bulging and higher than lateral lobes ..... **Conspinaria**
Tergite 1 subpetiolate; propodeal teeth weak; middle lobe of mesoscutum not prominent, sloping anteriorly and not higher than lateral lobes... **Gyroneuronella**
88 (86). Notaulus weak ..... **Hemigyroneuron**
Notaulus deeply impressed 89
89 (88). Cubital cell 2 smaller than cubital cell 3, less than 1/2 size of 3; nervulus strongly postfurcal, distance from basal vein usually equal to or greater than its length; nervellus straight (fig. 61) ..... Most species of **Rogas**
Cubital cells 2 and 3 subequal in size; nervulus slightly postfurcal or interstitial, its distance from basal vein less than 1/2 its length; nervellus curved (fig. 60) 90
90 (89). Tergites 4–6 shorter than length of 2 and 3 united ..... **Pelecystoma**
Tergites 4–6 equal to length of 2 and 3 united 91
91 (90). Nervulus interstitial ..... **Rhogasella**
Nervulus slightly postfurcal (fig. 60) ..... **Pseudogyroneuron**
92 (75). Tergite 1 sessile, if petiole is elongate the rest of tergites longitudinally striate; petiole usually longitudinally striate ..... Doryctinae, 93
Tergite 1 subpetiolate, widened at apex, 2.5 or more times as long as apical width; petiole coarsely punctate or transversely striate but not longitudinally striate 98

DORYCTINAE

93 (92). Hind coxa with 1 or more dorsal spines (fig. 28); postnervellus curved outwards to apex of hind wing (fig. 63); tergite 2 with an enclosed median area ..... **Odontobracon**
Hind coxa without dorsal spine; postnervellus absent or if present slanted inwards to anal margin; tergite 2 with or without an enclosed area 94
94 (93). Tergite 1 rugoso-punctate finely or coarsely 95
Tergite 1 longitudinally striate 96
95 (94). Hind femur enlarged with ventral teeth (fig. 27); subdiscoideus issuing above middle of discoidal cell (fig. 62) ..... **Euscelinus**
Hind femur normal, without ventral teeth; subdiscoideus issuing at or below middle ..... **Rhoptrocentrus**
96 (94). Middle lobe of mesoscutum with a transverse carina on shoulder, anterior face of mesoscutum perpendicular to dorsal part ..... **Heterospilus**
Middle lobe of mesoscutum without a carina on shoulder, gradually convex in profile 97

97 (96). Tergites 1 and 2 longitudinally striate, beyond tergite 2 impunctate or microreticulate; femora without blister-like swelling near base..... **Doryctes**
Tergites longitudinally striate throughout, if not, at least on basal part of tergites; fore and mid femora usually with blister-like swelling near base; subdiscoideus interstitial ..... **Rhaconotus**

98 (92). Subdiscoideus issuing below middle of discoidal cell 2 (fig. 64); tergite 2 with a median triangular raised area near base.....True Stephaniscinae, 99
Subdiscoideus issuing above middle of discoidal cell 2; tergite 2 without a median triangular area..... 100

STEPHANISCINAE

99 (98). Postnervellus curved outwards (fig. 64); tergite 1 very long, about 6× as long as its apical width, with fine transverse aciculae..... **Leptospathius**
Postnervellus straight; tergite 1 long, about 3× as long as its apical width, rugoso-punctate..... **Halycaea**

100 (98). Fore wing speckled with fuscous and white; fore and mid femora with dorsal blister-like swelling near base; pronotal collar gradually sloping anteriorly, not swollen..... **Platyspathius**
Fore wing hyaline, in ♂ with brown elongate spot in the radial cell; fore and mid femora without a blister-like swelling; pronotal collar conspicuous, swollen ..... **Doryctophasmus**

BRACONINAE

101 (68). Prepectal carina (fig. 21) and mesopleural furrow present; nervulus postfurcal (fig. 65) 102
Prepectal carina and mesopleural furrow absent; nervulus variable in position, usually interstitial 104

102 (101). Pronotum without dorsal spine; tergite 5 with 4 apical spines; propodeum without teeth; tarsal claw without a basal lobe ..... **Batotheca**
Pronotum with a dorsal spine; tergite 5 with 1 median apical spine or none; propodeum with a pair of teeth; tarsal claw with a basal lobe..... 103

103 (102). Tergites 3–5 without spines; pronotal spine short and straight; hind femur with a preapical ventral tooth; propodeal teeth not distinct ..... **Spinariella**
Tergites 3–5 with spines; pronotal spines long and curved forward; hind femur without a tooth; propodeal teeth distinct (fig. 21)..... **Spinaria**

104 (101). Abdomen carapace-like with 2 apical spines..... **Gastrotheca**
Abdomen not as above 105

105 (104). Nervulus antefurcal; abscissa 1 of cubitus strongly curved (fig. 70); discoideus thickened; eyes large and deeply emarginate ..... **Aphrastobracon**
Nervulus interstitial or postfurcal; abscissa 1 of cubitus not as above; discoideus not thickened; eyes variable in size..... 106

106 (105). Scape excised basally (fig. 25) 107
Scape not excised basally.....108

107 (106). Notaulus absent; thorax, propodeum and tergites depressed; pronotum prolonged into a neck ..... **Chaoilta**
Notaulus present; thorax, propodeum and tergites normal; pronotum not prolonged into a neck..... **Atanycolus**

108 (106). Tergite 1 is 1.5–3.0× as long as its apical width; tergite 2 is 0.7–1.5 as long as its apical width; nervulus not forming straight line with basal vein, the latter slanting and forming a 45°–60° angle with subcosta (figs. 66–68); head usually cubical; mostly large species 109

Tergite 1 shorter than or at most as long as its apical width, or with a wide membrane on its side; tergite 2 short, 0.4–0.5 as long as its apical width; nervulus usually forming a straight line with basal vein, the latter forming a 75°–80° angle with subcosta (figs. 71–73); head usually transverse; mostly medium-sized to small species 117

109 (108). Notaulus deeply impressed on entire length of mesoscutum; tergite 2 long, 1.2–1.5 as long as its apical width; subgenital plate of ♀ pointed apically and extending beyond tip of last tergite 110

Notaulus shallow and impressed only on anterior 0.4 of mesoscutum; tergite 2 as long as or shorter than its apical width (excepting ♂♂ of *Euurobracon*); subgenital plate of ♀ variable in shape and length 111

110 (109). Radial vein ending before apex of wing (fig. 68); scape short, as long as its diameter; tergite 2 without a midbasal triangular area nor carinae; wings mottled with fuscous ..... **Stenobracon**

Radial vein ending at apex of wing; scape longer than its diameter; tergite 2 with a wrinkled midbasal triangular area and 2 apically convergent lateral carinae; wings banded yellow basally and black apically ..... **Gronaulax**

111 (109). Tergite 2 without midbasal triangular area; scape short, 1.0–1.5× as long as its diameter 112

Tergite 2 with midbasal triangular area; scape usually long, 2.0–3.0× as long as its diameter 115

112 (111). Recurrent vein strongly antefurcal, its distance from intercubitus 1 equals 0.5–1.0 the length of abscissa 1 of radius (fig. 66); tergite 3 without triangular area on each basal corner; nervulus postfurcal; tergite 1 with deep median groove on basal 0.3 ..... **Euurobracon**

Recurrent vein interstitial or slightly antefurcal (fig. 67); tergite 3 with triangular area on each basal corner; nervulus almost intestitial or postfurcal; tergite 1 without deep median groove basally 113

113 (112). Radius ending before apex of wing ..... **Vipio**

Radius ending at apex of wing 114

114 (113). Nervulus postfurcal; ovipositor long and auger-like, with 4 constrictions at apex ..... **Bathyaulax**

Nervulus interstitial; ovipositor short, thickened and curved downwards ..... **Iphiaulax**

115 (111). Tergite 2 without pair of convergent carinae, no tooth on each apical corner; scape short, 1.0–1.5 as long as its diameter ..... **Iphiaulax**

Tergite 2 with pair of convergent carinae apically and with small tooth on each apical corner; scape long, 2–3× as long as its diameter 116

116 (115). Tergite 1 with median carina; scape long, length about 3× diameter ..... **Cratobracon**

Tergite 1 without median carina; scape shorter, length about 2.0× diameter ..... **Sigalphogastra**

117 (108). Recurrent vein strongly antefurcal, its distance from intercubitus 1 is 0.5–1.2 as long as abscissa 1 of radius (fig. 69); tergite 2 without median triangular area basally 118
Recurrent vein interstitial or slightly antefurcal (figs. 72 & 73); tergite 2 with or without median triangular area basally 121
118 (117). Tarsal claws without basal lobe ..... **Stirobracon**
Tarsal claws each with basal lobe 119
119 (118). Middle lobe of mesoscutum without longitudinal grooves; tergite 2 with 2 grooves convergent apically; cubital cell 2 small (fig. 69); last tergite with apical margin convex ..... **Tropobracon**
Middle lobe of mesoscutum with 2 longitudinal grooves, tergite 2 without grooves; cubital cell 2 variable in size; last tergite with its apical margin notched medially or with apical spines 120
120 (119). Tergite 6 with 3 apical spines; cubital cell 2 small as in *Tropobracon* ..... **Odontopygia**
Tergite 6 with median apical notch; cubital cell 2 large ..... **Dioxybracon**
121 (117). Tergite 1 flat and long, about 3× as long as its apical width, with wide membrane laterally; all tergites smooth and shiny ..... **Myosoma**
Tergite 1 short, length equal to apical width or less, lateral membrane absent; tergites sculptured variably 122
122 (121). Apical margin of tergite 5 with numerous teeth ..... **Odontogaster**
Apical margin of tergite 5 without teeth 123
123 (122). Suture between tergites 2 and 3 deep and sinuate 124
Suture between tergites 2 and 3 straight or slightly sinuate 126
124 (123). Antennal socket raised and toothed dorsally; eyes bare ..... **Hemiglyptus**
Antennal socket not raised and without tooth; eyes with very short hairs... 125
125 (124). Hind tibia noticeably broadened and flattened; cubital cell 2 subequal to 3 in length; tergites 4–7 gradually becoming shorter, visible dorsally ..... **Cratocnema**
Hind tibia not as above; cubital cell 2 about 1/2 as long as 3; tergites 4–7 short and telescoped ..... **Philomacroploea**
126 (123). Abscissa 1 of cubitus curved at base (fig. 72); cubital cell 2 subequal to 3 in length; tergites 3–5 each with a transverse groove along apical margin, recurrent vein usually interstitial ..... **Campyloneurus**
Abscissa 1 of cubitus straight (fig. 73); cubital cell 2 equal to or shorter than 3; tergites 3–5 usually without transverse groove apically; recurrent vein antefurcal or interstitial ..... **Bracon**

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