A Review of the Hawaiian Braconidae (Hymenoptera)

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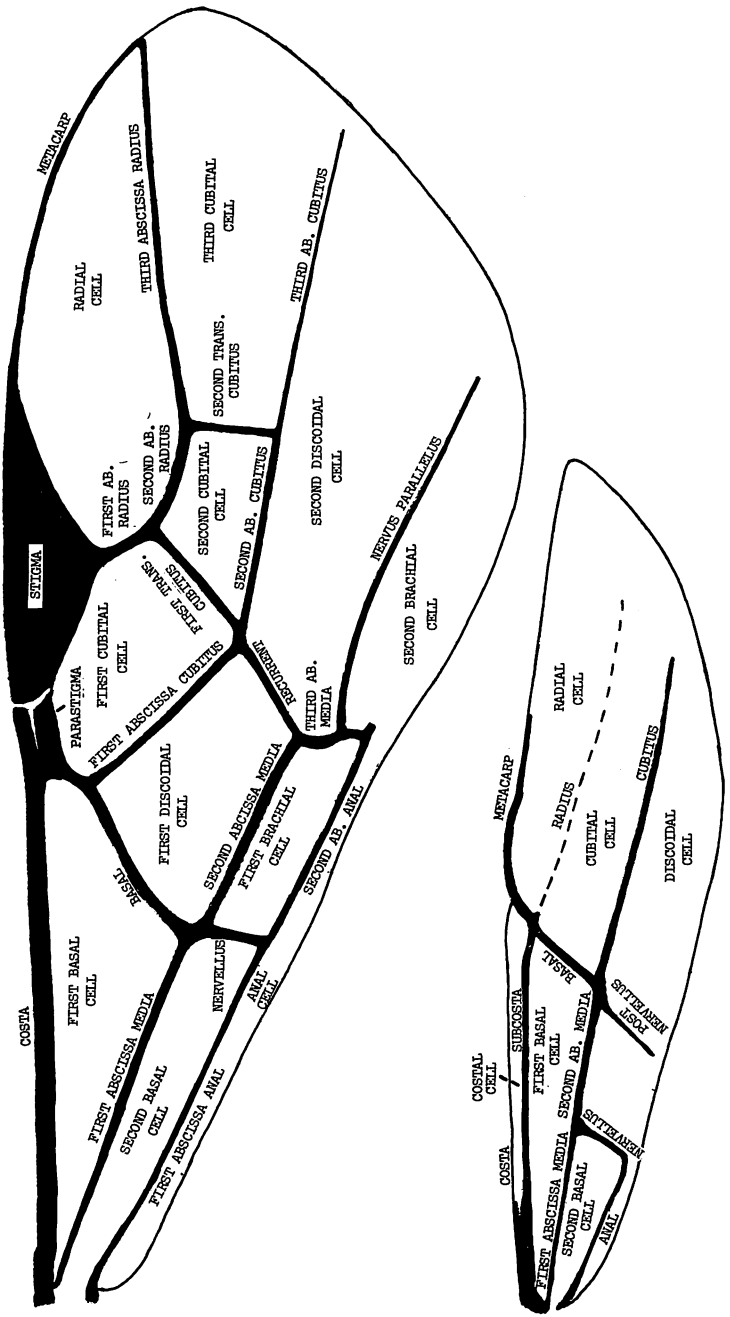
INTRODUCTION

The Braconidae comprise a large and economically important family of hymenopterous parasites. The Hawaiian braconid fauna is composed almost entirely of exotic elements either accidentally or purposely imported into the islands. Compared with complex continental faunae the Hawaiian braconids are relatively easy to treat as, with the exception of a few genera (e.g. *Opius*, *Apanteles*, *Bracon*), our fauna consists of a scattering of relatively unrelated forms.

Some of the species which have been imported as biological control agents have been of considerable benefit in combating economic pests such as fruit flies (Tephritidae), various lepidopterous larvae (armyworms, cutworms, etc.), and certain beetle larvae. At least two of our species must be classed as harmful. One, *Blacus cremastobombycia* Fullaway, is a parasite of a leaf-mining caterpillar imported to combat lantana; and the other, *Perilitus coccinellae* (Schrank), attacks certain coccinellid beetles which prey upon aphids. Others of our species may be beneficial in some circumstances and harmful in others, as are certain species of *Opius* which parasitize the larvae of harmful fruit-infesting species of tephritid flies as well as beneficial gall-forming species imported to combat weed pests such as *Lantana* and *Eupatorium*.

The primary purposes of this paper are to provide a workable key to the known Hawaiian Braconidae, and to present current information on the accepted names for our species. Additional information has been included on the origin, island distribution, and known hosts of the species treated. This information has been derived from the literature, primarily the PROCEEDINGS OF THE HAWAIIAN ENT. SOC., and from the labels of the specimens examined. These records are undoubtedly incomplete as the material available from islands other than Oahu is meager. Much additional biological work must be done to elucidate the host ranges of the species which occur here.

No attempt has been made to give complete synonymies for each species treated, but I have tried to include references to all names by which each species has been known in Hawaiian literature. The key is designed only to facilitate identification of the species now known to occur here, and will require revision as additional species become established in the Islands.


METACARP
RADIAL CELL
THIRD ABSCISSA RADIUS
THIRD CUBITAL CELL
THIRD AB. CUBITUS
SECOND TRANS. CUBITUS
SECOND DISCOIDAL CELL
SECOND AB. RADIUS
FIRST AB. RADIUS
SECOND CUBITAL CELL
SECOND AB. CUBITUS
NERVUS PARALLELUS
STIGMA
FIRST TRANS. CUBITUS
FIRST CUBITAL CELL
SECOND BRACHIAL CELL
PARASTIGMA
FIRST ABSCISSA CUBITUS
RECURRENT
THIRD AB. MEDIA
FIRST DISCOIDAL CELL
SECOND ABSCISSA MEDIA
FIRST BRACHIAL CELL
SECOND AB. ANAL
BASAL
COSTA
FIRST BASAL CELL
FIRST ABSCISSA MEDIA
SECOND BASAL CELL
NERVELLUS
ANAL CELL
FIRST ABSCISSA ANAL
METACARP
RADIAL CELL
RADIUS
CUBITAL CELL
CUBITUS
DISCOIDAL CELL
BASAL
COSTAL CELL
SUBCOSTA
FIRST BASAL CELL
SECOND AB. MEDIA
FIRST NERVELLUS
SECOND NERVELLUS
COSTA
FIRST ABSCISSA MEDIA
SECOND BASAL CELL
ANAL

In addition to the species treated, many other braconids have been introduced into Hawaii for biological control during the past seventy years or so. Most of these have never been recovered in the field, but a few (e.g. *Opius compensans* Silvestri) have been reported as recovered in our literature at least once. I have omitted from this treatment all such species for which no locally field collected or reared material was available for study.

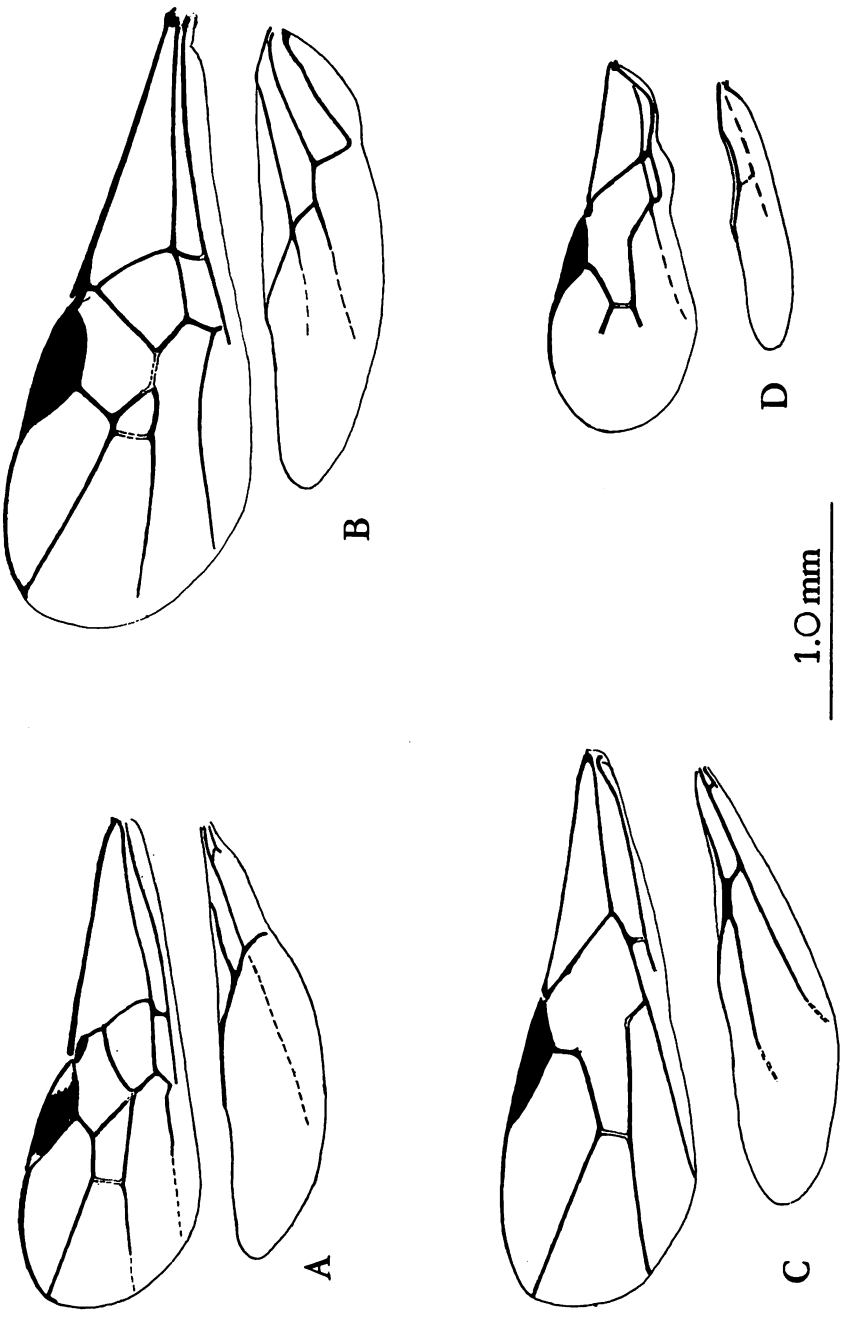
During the course of this study a number of species of braconids were discovered which had not been recorded in Hawaii previously. Some of these proved to be described forms known from other parts of the world, but several were found which could not be identified as known species. Where adequate material of such forms is at hand these have been described as new. Two unidentified species of *Apanteles* of which insufficient materal is available have not been named, although they are included in the key.

Several of the Hawaiian braconids described by earlier workers are still known only from these islands, although, with the exception of the presumably endemic *Ecphylopsis nigra* Ashmead, these are almost certainly immigrants. The Hawaiian records of several of the included species are based on single specimens. Such species are considered to be doubtfully established here, as there is always the possibility that these records may be based upon mislabeled specimens or fortuitous captures of imported species which failed to become permanently established in Hawaii.

The wing venation of the Hymenoptera has been interpreted in various ways by different authors, with the result that several different sets of terms have been applied to the veins and cells of the braconid wing. As there appears to be no general accord as to what should be accepted as a standard terminology, I have arbitrarily employed, with slight modification, that proposed by Wilkinson (1927). The system used is illustrated in figure 1. Although the terminology applied here would not be considered morphologically correct in the light of recent work on the comparative morphology of the hymenopterous wing, (see Riegel, 1948; Richards, 1956) it is hoped that it will at least provide a usable system for identification of our local braconids. For structures other than wing venation I have followed the terminology of Richards (1956).

I am indebted to Dr. C. F. W. Muesebeck of the U.S. National Museum, who kindly examined specimens of those species which constitute new records for Hawaii, and who has either identified or confirmed the identity of these. Also, I wish to thank Dr. L. D. Tuthill of the Department of Zoology and Entomology, University of Hawaii, under whose direction this work was undertaken. Dr. Tuthill has given generously of this time to study this manuscript and to make actual use of the key. He has contributed numerous helpful suggestions and criticisms of both the key and text.

FIG. 1. Wing venation of *Opius vandenboschi* Fullaway, labeled to illustrate system used in this paper.


A
B
C
D
1.0 mm

KEY TO BRACONIDAE KNOWN TO OCCUR IN HAWAII

1. Mandibles not meeting when closed, the tips curving outward instead of inward (Alysiinae) 2
   Mandibles meeting normally when closed, the tips not curving outward 3
2. Forewing with first abscissa of cubitus present, separating first cubital and first discoidal cells ..... **Aspilota konae** Ashmead
   Forewing with first abscissa of cubitus absent, first cubital and first discoidal cells confluent ..... **Aphaereta auripes** (Provancher)
3. Lower margin of clypeus semicircularly emarginate, forming with the closed mandibles a circular or eliptical opening 20
   Lower margin of clypeus not semicircularly emarginate, at most very broadly shallowly emarginate, forming no such circular or eliptical opening with closed mandibles 4
4. Hind wing with not more than one closed basal cell, frequently without any; small species, 3.0 mm. or less in length (Aphidinae) 5
   Hind wing with two closed basal cells; size frequently but not always larger 9
5. Forewing with first abscissa of cubitus present, separating first discoidal and first cubital cells, first and second transverse cubitus present ..... **Ephedrus incompletus** (Provancher)
   Forewing with first abscissa of cubitus absent, first discoidal and first cubital cells confluent, first transverse cubitus absent, second present or absent 6
6. Forewing with second transverse cubitus absent, discoidal-cubital cell open ..... **Diaeretiella rapae** (Ashmead)
   Forewing with second transverse cubitus present, forming a closed discoidal-cubital cell 7
7. Forewing with first abscissa of radius nearly perpendicular to stigma; stigma narrow and elongate, about 6 times as long as wide; ovipositor and ovipositor sheaths curved downward ..... **Monoctonus paulensis** (Ashmead)
   Forewing with first abscissa of radius not perpendicular to stigma; stigma wider, about 4 times as long as wide; ovipositor sheaths straight 8
8. Dorsum of propodeum smooth and shining, without carinae; recurrent vein of forewing evanescent ..... **Lysiphlebius testaceipes** (Cresson)
   Dorsum of propodeum carinate, carinae forming a small central areola; recurrent vein of forewing well defined (fig. 2, D) ..... *Aphidius* 8A

FIG. 2. Wing venation: A, *Doryctes immigrans* n. sp.; B, *Microtypus fullawayi* n. sp.; C, *Ecphylopsis swezeyi* n. sp.; D, *Aphidius gifuensis* Ashmead.

8A. Color almost entirely piceous, both sexes without yellowish or reddish areas on legs or body..... **Aphidius obscuripes** Ashmead

Color not uniform; head dark; legs mostly pale flavotestaceous to reddish; thorax and abdomen predominately pale or reddish, or dark marked with reddish areas.....8B

8B. Female antennae 16 or 17-segmented, male antennae 19 or 20-segmented; propodeum reddish or flavotestaceous..... **Aphidius gifuensis** Ashmead

Female antennae 19 or 20-segmented, male antennae 21 or 22-segmented; propodeum black..... **Aphidius smithi** Sharma & Rao

9. Gaster petiolate, first segment elongate and conspicuously narrowed basally (Euphorinae).....10

Gaster sessile or subsessile, if first segment rarely elongate, its lateral margins straight.....12

10. Forewing with first abscissa of cubitus absent, first cubital and first discoidal cells confluent; size small, about 2 mm. long..... **Microctonus vittatae** Muesebeck

Forewing with first abscissa of cubitus present, separating first discoidal and first cubital cells; larger species.....11

11. Forewing with two closed cubital cells, radial cell elongate, about twice as long as first cubital cell..... *Meteorus* 11A

Forewing with one closed cubital cell, radial cell shorter, only slightly longer than first cubital cell..... **Perilitus coccinellae** (Schrank)

11A. Prescutal sutures of mesonotum deeply impressed, distinctly setting off the lateral lobes of the mesonotum from the prescutum; first segment of gaster with a pair of small deep fossae dorsally just anterior to the middle of the segment..... **Meteorus humilis** (Cresson)

Prescutal sutures not noticeably impressed, lateral lobes of mesonotum not sharply set off; first segment of gaster without such a pair of fossae..... **Meteorus laphygmae** Viereck

12. Gaster with tergites not fused, with at least four distinct sutures.....15

Gaster with tergites fused to form a rigid dorsal shell or carapace, either entirely without sutures, or with not more than two transverse grooves..13

13. Forewing with one closed cubital cell (Triaspidinae)..... **Urosigalphus bruchi** Crawford

Forewing with two closed cubital cells (Cheloninae).....14

12. Predominately black species; dorsum of gaster without transverse grooves..... *Chelonus* 14A

Predominately testaceous species; dorsum of gaster with two transverse grooves..... *Phanerotoma* 14B

14A. Basal third of gaster covered by an uninterrupted pale band; parastigma of forewing small, pale..... **Chelonus blackburni** Cameron

Basal third of gaster without such an uninterrupted band, usually with a narrow, medially interrupted band, or lateral pale spots; parastigma of forewing large and dark..... **Chelonus texanus** (Cresson)

14B. First and second transverse cubitus veins of forewing confluent at juncture with radius, second cubital cell in form of a small right triangle..... **Phanerotoma hawaiiensis** Ashmead

First and second transverse cubitus veins intersecting radius at widely separated points, second cubital cell quadrangular..... ..... **Phanerotoma myeloisae** Fullaway

15. Distal abcissa of radius of forewing reaching costal margin well before apex, radial cell distinct, short and narrow, its length along the costal margin equal to or less than that of the stigma.....16

Distal abcissa of radius either not reaching margin of wing or extending to near the apex, radial cell either not defined or wider, its length along the costal margin greater then that of the stigma.....17

16. Radial cell of forewing very narrow, its length along costal margin less than that of stigma, distal abscissa of radius closely paralleling outer margin of stigma; second cubital cell closed, represented by a small triangular areola (Agathidinae)..... **Agathis hawaiicola** (Ashmead)

Radial cell wider, length along costal margin of wing about equal to that of stigma; second cubital cell open (Blacinae)..... ..... **Orgilus swezeyi** Fullaway

17. Forewing with two closed cubital cells, distal abscissa of radius well defined, extending to margin of wing near apex (fig. 1).....18

Forewing with but one closed cubital cell, distal abscissa of radius evanescent, usually represented by an unpigmented fold.....19

18. Second cubital cell of forewing small, its length along posterior margin about one-third maximum length of first cubital cell (fig. 2, B) (Blacinae)..... **Microtypus fullawayi**, n. sp.

Second cubital cell larger, length along posterior margin at least two-thirds maximum length of first cubital cell (fig. 1) (Opiinae).. *Opius* 18A

18A. Hind wing with postnervellus absent.....B

Hind wing with postnervellus present (fig. 1).....E

18B. First transverse cubitus of forewing intercepting cubitus basad of juncture of recurrent and cubitus so that first cubital cell appears stalked at its lower corner; color mostly dark brown or blackish, legs and dorsum of first two segments of gaster testaceous or flavotestaceous; ovipositor short, sheaths less than one-half as long as gaster ..... **Opius lantanae** Bridwell

First transverse cubitus intersecting cubitus at juncture of recurrent and cubitus; color predominately testaceous or flavotestaceous, abdomen sometimes darker; ovipositor sheaths three-fourths as long as gaster or longer.....C

18C. Forewing with a conspicuous thickening of cubitus along the posterior margin of the first cubital cell (fig. 3, A, B); ratio of first abscissa of radius to first transverse cubitus slightly less than 1:1 ..... D

Forewing without such a thickening of cubitus, ratio of first abscissa of radius to first transverse cubitus about 1:2 ..... **Opius humilis** Silvestri

18D. Thickened portion of cubitus of forewing shorter and wider, about twice as long as minimum width; recurrent vein strongly arcuate (fig. 3, A) ..... **Opius fletcheri** Silvestri

Thickened portion of cubitus longer and narrower, about 4 times as long as maximum width; recurrent vein only slightly arcuate (fig. 3, B) ..... **Opius incisi** Silvestri

18E. Prescutal sutures of mesonotum smooth; first transverse cubitus of forewing intercepting cubitus basad of juncture of recurrent and cubitus so that the first cubital cell appears stalked at its lower corner .... F

Prescutal sutures of mesonotum foveate; first transverse cubitus intersecting cubitus at juncture of recurrent and cubitus I

18F. Dorsum of first and second segments of gaster with numerous fine longitudinal striations ..... **Opius longicaudatus** (Ashmead) complex

Dorsum of first 2 segments of gaster without any such fine striations, although first segment may bear 2 or 3 conspicuous longitudinal carinae ..... G

18G. Dorsum of head and thorax distinctly punctate; second cubital cell of forewing slightly more than twice as long as maximum width (fig. 3, F) ..... **Opius fullawayi** (Silvestri)

Dorsum of head and thorax smooth and shining, punctures, where present, very minute; second cutital cell of forewing shorter, slightly less than twice as long as maximum width (fig. 3, E) ..... H

18H. Hind femora and tibiae, and dorsum of abdomen mostly dark brown or blackish ..... **Opius tryoni** Cameron

Hind femora and tibiae, and dorsum of abdomen testaceous or flavo-testaceous ..... **Opius kraussi** Fullaway

18I. Stigma of forewing slightly less than three times as long as maximum width (fig. 3, D); width of unseparated ovipositor sheaths about 0.07 mm.; head entirely reddish in both sexes .. **Opius oophilus** Fullaway

Stigma of forewing longer, slightly more than three times as long as maximum width (fig. 3, C); ovipositor broader, width of unseparated sheaths about 0.13 mm.; head reddish or darker, males always with at least the occiput dark ..... **Opius vandenboschi** Fullaway

19. Evanescent distal abcissa of radius arising at or very close to posterior apex of stigma; a small testaceous species (Blacinae) ..... **Blacus cremastobombyciae** Fullaway

Distal abcissa of radius arising near middle of outer margin of first cubital cell well below stigma; small dark species (Microgasterinae) ..... *Apanteles* 19A

19A. Forewing with two or three transverse infuscate bands, second abscissa of radius with a well defined pigmented stub basally (fig. 3, G)..... ..... **Apanteles trifasciatus** Muesebeck

Forewing hyaline, without infucsate bands, second abscissa of radius represented by an unpigmented fold, without a pigmented basal stub....B

19B. First tergite of gaster testaceous or ferrugineous, smooth and shiny, at most indistinctly punctate apically, apex conspicuously narrower than base.....C

First tergite of gaster usually black, apical portion rugose or coarsely punctate, apex sometimes as wide or wider than base.....D

19C. Propodeum mostly smooth except for a distinct median longitudinal carina; ovipositor sheaths slightly shorter than hind femora..... ..... **Apanteles dignus** Muesebeck

Propodeum without a median longitudinal carina, nearly smooth or faintly rugose medially; ovipositor longer, sheaths more than 1.5 times as long as hind femora..... **Apanteles** unidentified species no. 1

19D. Second tergite of gaster very finely reticulate or granulate.....E

Second tergite of gaster rugose or rugulose.....F

19E. Axillae of mesothorax mostly smooth and shining except for a relatively narrow basal concave rugose strip (fig. 4, D); ovipositor very long, the sheaths more than twice as long as hind femora..... ..... **Apanteles** unidentified species no. 2

Axillae of mesothorax each with a narrow arcuate smooth area along the posterior margin, the basal two-thirds rugose marginally (fig. 4, E); ovispositor shorter, sheaths about as long as hind femora... ..... **Apanteles scutellaris** Muesebeck

19F. Stigma of forewing relatively wide, almost exactly twice as long as maximum width (fig. 3, H); second tergite of gaster relatively short, median length less than one-half that of third tergite; ovipositor long, sheaths slightly longer than hind femora..... **Apanteles carpatus** (Say)

Stigma relatively narrow, definitely more than twice as long as wide (fig. 3, I); second tergite of gaster longer, median length two-thirds as long to longer than third tergite; ovipositor short, sheaths less than one-half as long as hind femora.....G

19G. Propodeum strongly rugose; ovipositor very short, sheaths about as long as third segment of hind tarsus, usually not visible from above..H

Propodeum weakly rugose at center, lateral portions nearly smooth; ovipositor longer, sheaths about twice as long as third segment of hind tarsus, usually visible from above.... **Apanteles bedelliae** Viereck

19H. First tergite of gaster smooth basally, slightly rugose apically; second tergite slightly shorter than third..... **Apanteles glomeratus** (L.)
First tergite of gaster strongly rugose to base; second tergite as long as or slightly longer than third..... **Apanteles marginiventris** (Cresson)

20. Head behind with a distinct marginal carina setting off the occipital area, always distinct on sides, although sometimes more or less obsolete above or below.....21
Head behind without such a carina setting off the occipital area (Braconinae)..... *Bracon* 20A

20A. Second cubital cell of forewing short, not more than about twice as long as wide..... **Bracon hebetor** Say
Second cubital cell longer, 2.5 to 3 times as long as wide.....B

20B. Propodeum rugose..... **Bracon swezeyi** Bridwell
Propodeum smooth and polished.....C

20C. Dorsum of gaster rugose, first tergite usually with a pair of subapical diagonal carinae which form a shallow, posteriorly directed "V".... ..... **Bracon mellitor** Say
Dorsum of abdomen with at least segments 3 to 6 polished or finely reticulate, first tergite without such a pair of carinae.....D

20D. First tergite of gaster very narrow, about 4 times as long as maximum width or longer, width at apex about one-fourth that of second tergite ..... **Bracon chinensis** Szepligeti
First tergite of gaster wider, not more than twice as long as wide, width at apex about one-half that of second tergite.....E

20E. Dorsum of thorax shining polished black, with only a few scattered hairs on the mesoscutum; ovipositor very long, sheaths five or six times as long as hind femora, longer than remainder of body..... ..... **Bracon terryi** (Bridwell)
Dorsum of thorax smooth but moderately densely clothed with hair, with at least the prescutal sutures testaceous; ovipositor short, sheaths about as long as hind femora..... **Bracon omidivorum** Terry

21. Gaster markedly petiolate, first segment about five times as long as median width, nearly as long as remainder of gaster (Spathiinae)... ..... **Spathius predebilis** Perkins
Gaster not markedly petiolate, first segment no more than twice as long as median width, conspicuously shorter than remainder of gaster.....22

22. Hind femora greatly enlarged, with irregular tooth-like projections along their anterior margins (Doryctinae)... **Euscelinus peregrinus** (Perkins)
Hind femora normal.....23

23. Winged.....24
Apterous (Pambolinae)..... *Ecphylopsis* 23A

23A. Dorsum of first tergite of gaster, propodeum, and mesoscutum rugose;

(both apterous and winged forms present). **Ecphylopsis swezeyi** n. sp.
Dorsum of first tergite of gaster, propodeum, and mesoscutum granulate; (apterous form only known)..... **Ecphylopsis nigra** Ashmead

24. Forewing with two closed cubital cells, first discoidal and first cubital cells separate.....26
Forewing with one closed cubital cell, or a confluent discoidal-cubital cell.....25

25. Forewing with first abscissa of cubitus absent, first discoidal and first cubital cells confluent (fig. 2, C) (Pambolinae)..... winged form of **Ecphylopsis swezeyi** n. sp.
Forewing with first abscissa of cubitus present, separating first discoidal and first cubital cells (Doryctinae)..... **Monolexis fuscicornis** Foerster

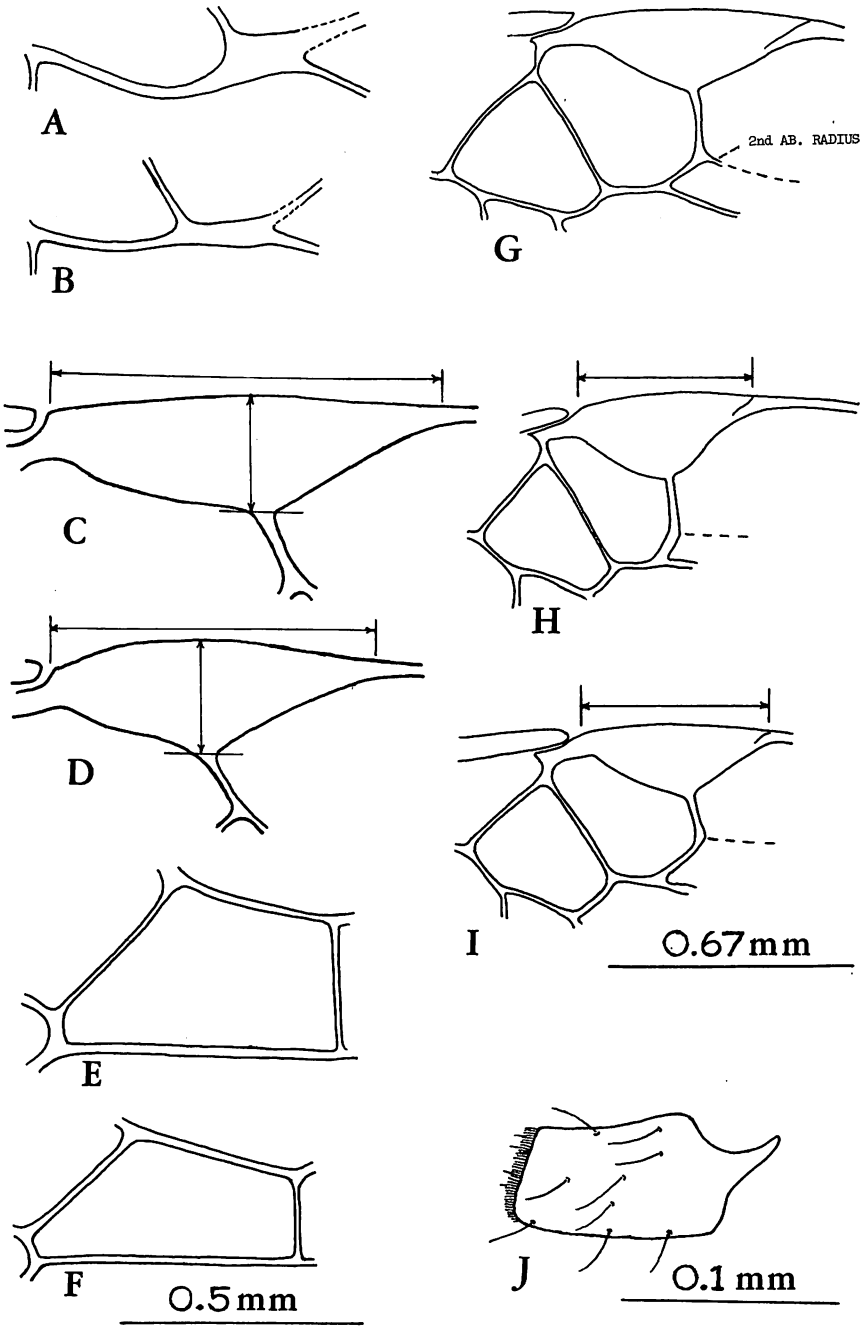
26. Nervus parallelus of forewing originating at anterior end of distal margin of first brachial cell, appearing as a continuation of the second abscissa of media; first brachial cell compeltely closed.....27
Nervus parallelus originating at or below center on distal margin of first brachial cell; first brachial cell sometimes open below origin of nervus parallelus (Doryctinae).....28

27. Mesonotum and scutellum smooth, shiny, hairless (Rogadinae)..... **Parahormius pallidipes** (Ashmead)
Mesonotum and scutellum granulate, moderately densely clothed with fine hair (Doryctinae)..... **Rhaconotus vagrans** (Bridwell)

28. First transverse cubitus of forewing incomplete, extending about two-thirds to three-quarters of the distance from radius to cubitus, so that the first and second cubital cells are incompletely separated posteriorly; hind wing of male with a conspicuous stigma-like thickening near the base of the costal margin..... **Heterospilus prosopidus** Viereck
First transverse cubitus complete, although sometimes becoming much paler just before intersecting cubitus; male without such a stigma-like thickening on costal margin of hind wing.....29

29. Dorsum of segments 4 to 6 of gaster finely granulate.....29A
Dorsum of segments 4 to 6 of gaster smooth, shiny, usually without conspicuous sculpture, occasionally with a very narrow transverse band of striation across segment 4.....29B

29A. Width of first tergite of gaster at apex equal to or only slightly greater than length; second tergite of gaster with a pair of well defined diagonal grooves on each side, forming a pair of X-shaped impressions (sometimes with the upper portions less strongly defined so that the impressions appear as inverted "V"s;) ovipositor long, sheaths about as long as thorax and abdomen combined..... **Glyptocolastes texanus** Ashmead


A
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0.1 mm

Width of first tergite of gaster at apex one and one-half times as great as length, or more; second tergite without such impressed grooves; ovipositor short, sheaths about one-half as long as gaster..... .....**Glyptocolastes bruchivorus** Crawford

29B. Dorsum of third tergite of gaster either striate over its entire surface, or with a narrow transverse band of striation; head concolorous, testaceous or flavotestaceous.....C

Dorsum of third tergite of gaster entirely smooth; head pale with a brownish patch behind each eye.....**Doryctes palliatus** (Cameron)

29C. Width of first tergite of gaster at apex slightly greater than length; head and legs testaceous, body usually darker. **Doryctes pallidiceps** (Perkins)

Width of first tergite of gaster at apex equal to or less than length; color uniformly testaceous.....D

29D. Anterior portion of propodeum with a pair of large areolae set off by a median longitudinal and lateral carinae; third tergite of gaster with a narrow transverse band of longitudinal striation; ovipositor short, sheaths shorter than gaster.....**Doryctes syagrii** (Fullaway)

Entire surface of propodeum rugose, without a median longitudinal carina (although lateral carinae set off an undivided median areola) (fig. 4, B); third tergite of gaster striate over almost entire length; ovipositor long, sheaths longer than gaster. .**Doryctes immigrans** n. sp.

Subfamily ALYSIINAE

Genus ASPILOTA Foerster 1862. NATURH. VER. RHEINLANDE VERH. 19:266.

Aspilota konae Ashmead.

Aspilota konae Ashmead 1901. FAUNA HAWAIIENSIS 1(3):359.

Distribution: Hawaii (Kauai, Oahu, Molokai, Hawaii).

Hosts: *Siphona irritans* (L.), *Ravinia lherminieri* (Robineau-Desvoidy) (Diptera: Muscidae and Sarcophagidae).

Genus APHAERETA Foerster 1862. NATURH. VER. RHEINLANDE VERH. 19:264.

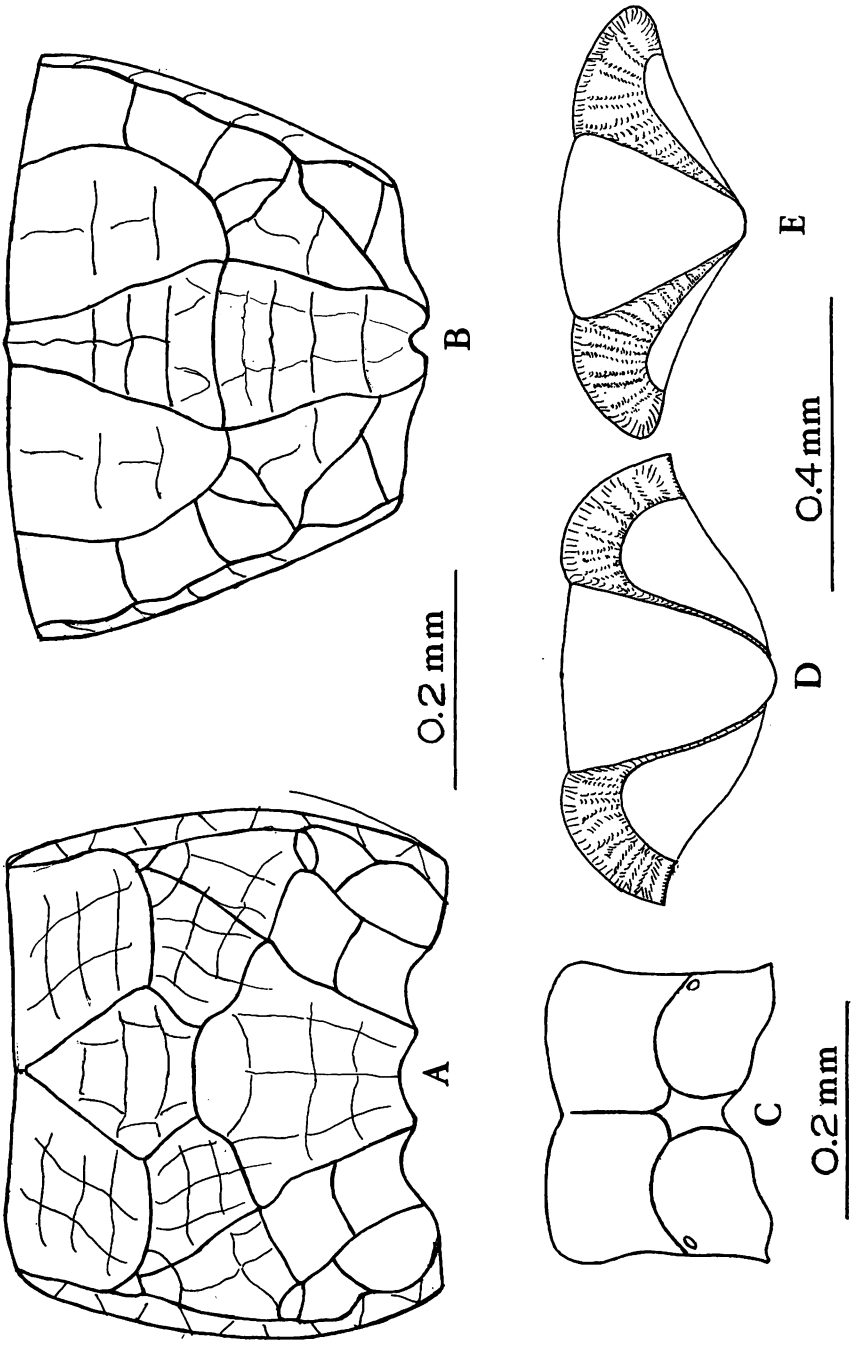
Aphaereta auripes (Provancher)

Trichesia auripes Provancher 1881. NAT. CANAD. 12:203.

Aphaereta muscae Ashmead 1889. PROC. U.S. NAT. MUS. 11:639.; 1901. FAUNA HAWAIIENSIS 1(3):358–359.

Aphaereta auripes (Provancher), Muesebeck et al, 1961. U.S.D.A. AGRIC. MONOGRAPH 2, p. 148.

FIG. 3. A, Cubitus vein of forewing of *Opius fletcheri* Silvestri, showing thickened portion; B, Same of *O. incisi* Silvestri; C, Stigma of forewing of *O. vandenboschi*, length and width measurements indicated; D, Same for *O. oophilus* Fullaway; E, Second cutibal cell of forewing of *O. tryoni* Cameron; F, Same for *O. fullawayi* (Silvestri); G, Portion of forewing of *Apanteles trifasciatus* Muesebeck; H, Same of *A. carpatus* (Say), length measurement indicated; I, Same for *A. marginiventris* (Cresson); J, Ovipositor sheath of *Aphidius gifuensis* Ashmead.


A
B
0.2 mm
C
D
E
0.4 mm
0.2 mm

Distribution: Continental U.S., Canada, Hawaii (Kauai, Oahu, Molokai, Maui, Hawaii).

Hosts: unidentified Sarcophagidae, *Dyscritomyia* sp. (Diptera).

Subfamily APHIDIINAE

Genus EPHEDRUS Haliday 1833. ENT. MAG. 1:261 & 485.

Ephedrus incompletus (Provancher)

Perilitus incompletus Provancher 1886. ADDIT. CORR. FAUNE ENT. CANADA HYMEN. p. 126 (male).

Ephedrus incompletus Provancher 1886. *Ibid*, p. 156 (female).

Ephedrus incompletus (Provancher), Muesebeck 1923. PROC. U.S. NAT. MUS. 63, art. 2, p. 42.

Distribution: Continental U.S., Canada, Hawaii (Oahu, Maui). First collected here in 1914.

Host: *Macrosiphum rosae* (L.) (Homoptera: Aphididae).

Genus MONOCTONUS Haliday 1833. ENT. MAG. 1:261 & 487.

Monoctonus paulensis (Ashmead).

Aphidius paulensis Ashmead 1902. PROC. WASH. ACAD. SCI. 4:246.

Monoctonus paulensis (Ashmead), Gahan 1911. MARYLAND AGRIC. EXPT. STA. BULL. 152, p. 160–161, fig. 5.

Distribution: Alaska, Oregon, California, Hawaii (Hawaii)?.

Host: Recorded as a parasite of the pea aphid, *Macrosiphum pisi* (Harris), on the North American continent.

This species has not been reported in our literature previously, and is included here on the basis of a single specimen collected at Kilauea, Hawaii, June 23, 1934, by O. H. Swezey. The only known host of this parasite, *Macrosiphum pisi*, has only recently been found established here ("PROCEEDINGS" 17(1):28, 1958), and is not yet known to occur on the island of Hawaii. However, since a number of introduced Temperate Zone insects not found elsewhere in the islands are known to occur in the Kilauea area, it would not be particularly surprising if both the pea aphid and its parasite were present there.

Genus APHIDIUS Nees 1818. NOV. ACT. ACAD. CAES. LEOP. CAR. 9:302.

Aphidius gifuensis Ashmead.

Aphidius gifuensis Ashmead 1906. PROC. U.S. NAT. MUS. 30:188.

Distribution: Japan, Hawaii (Oahu).

Host: *Myzus persicae* (Sulzer) (Homoptera: Aphididae).

FIG. 4. A, Propodeum of *Microtypus fullawayi* n. sp.; B, Same of *Doryctes immigrans* n. sp.; C, Same of *Aphidius gifuensis*; D, Dorsal aspect of scutellum and axillae of *Apanteles*, unidentified species number 2; E, Same of *A. scutellaris* Muesebeck.

This species has not been recorded previously from the Hawaiian Islands. About two dozen specimens were reared from *Myzus persicae* collected on *Malva rotundifolia* L. and *Ipomoea pentaphylla* Von Jacquin at Ewa, Oahu, on February 17, 1961 by E. I. Schlinger and J. W. Beardsley. Specimens from this lot were determined by C. F. W. Muesebeck. Also at hand are two specimens from Waimanalo, Oahu, March, 1956, M. Sherman collector, which seem to belong to this species. A series of five specimens reared by me from *Myzus* sp. on *Sonchus oleraceus* L. collected in Honolulu during April and May, 1957, although smaller and paler than specimens from Ewa, probably belong here.

Aphidius obscuripes Ashmead.

Aphidius obscuripes Ashmead 1889. PROC. U.S. NAT. MUS. 11:660.

Distribution: Continental U.S., Hawaii (Maui, Hawaii?).

Hosts: none recorded in Hawaii; has been reared from *Macrosiphum granarium* Kirby *M. pisi* (Harris), and *Rhopalosiphum prunifoliae* (Fitch) elsewhere. *M. granarium* and *M. pisi* are possible hosts here.

This species has not previously been recorded from the Hawaiian Islands, and is included here on the basis of a series of about 20 specimens collected at Paliku, Haleakala Crater, Maui, June 1952, by D. E. Hardy and M. Tamashiro, and determined for me by C. F. W. Muesebeck. Also at hand is a single mutilated specimen of what seems to be this species from Hualalai, Hawaii, 6,300 ft., Aug. 1, 1929, F. X. Williams, collector.

Aphidius smithi Sharma and Rao.

Aphidius smithi Sharma and Rao 1959. INDIAN JOUR. ENT. 20:183.

Distribution: India, California, Hawaii (Oahu).

Host: *Macrosiphum pisi* (Harris) (Homoptera: Aphididae) Introduced here from California in 1960 to combat the pea aphid, *M. pisi*, on alfalfa. Found established at Ewa, Oahu, in December 1960.

Genus LYSIPHLEBIUS Foerster 1862. NATURH. VER. RHEINLANDE VERH. 19:248 & 250.

Lysiphlebius testaceipes (Cresson)

Trioxys testaceipes Cresson 1880. U.S.D.A. ANN. REPT. FOR 1879, p. 208.

Lysiphlebus testaceipes (Cresson), Gahan 1910. PROC. ENT. SOC. WASH. 12:183.

Aphidius (*Lysiphlebus*) *testaceipes* (Cresson), Smith 1944. APHIDIINAE OF NO. AMERICA, p. 81.

Lysiphlebus testaceipes (Cresson), Starý 1960. CASOPIS CESKOSLOVENSKE SPOLECNOSTI ENT. 57(3):238.

Distribution: Continental U.S., Mexico, Hawaii (Kauai, Oahu, Molokai, Maui).

Purposely introduced from California in 1923; found established in January 1925.

Hosts: *Aphis gossypii* Glover, *A. maidis* Fitch, *A. medicaginis* Koch, *A. sacchari* Zehntner (Homoptera: Aphididae).

Genus DIAERETIELLA Starý 1960. CASOPIS CESKOSLOVENSKE SPOLECNOSTI ENT. 57(3):242.

Diaeretiella rapae (Curtis)

Aphidius rapae Curtis 1855. MACINTOSH'S BOOK OF THE GARDEN II, p. 194.

Diaeretus rapae (Curtis), Gahan 1910. PROC. ENT. SOC. WASH. 12:180.

Diaeretus chenopodiaphidis (Ashmead), Timberlake 1918. PROC. HAW. ENT. SOC. 3(5):401; Zimmerman 1948. INS. HAWAII 5:92 and 117; probably a misidentification.

Diaeretiella rapae (MACINTOSH), Starý 1960. CASOPIS CESKOSLOVENSKE SPOLECNOSTI ENT. 57(3):242.

Distribution: Continental U.S., Europe, North Africa, Australia, New Zealand, Hawaii (Oahu, Molokai, Hawaii).

Hosts: *Brevicoryne brassicae* (L.), *Myzus persicae* (Sulzer) (Homoptera: Aphididae).

The presence of this species in Hawaii was first reported by Fullaway in 1912 (PROC. HAW. ENT. SOC. 2(5):215, 1913). However, specimens in the Bishop Museum reared from cabbage aphids on Hawaii and in Honolulu by Perkins date back to 1902. Although Timberlake considered our species to be *Diaeretus chenopodiaphidis* (Ashmead), specimens from Oahu were recently (1957) determined as *D. rapae* by Muesebeck. These two species apparently are very close, and may actually be conspecific. Smith (1944, p. 99) has provided a key in which he separates these species on the basis of the number of antennal segments, sculpture of the first tergite of the gaster (petiole), etc. These characters are subject to some variation in specimens at hand, even in specimens reared from a single lot of host material. For the present and until such time as our material can be more thoroughly studied, I prefer to use the older name, *D. rapae*, for Hawaiian specimens. Apparently *D. chenopodiaphidis* is authentically known as a parasite of only one aphid, *Hyalopterus atriplicis* (L.), which is not known to occur in Hawaii.

Subfamily TRIASPIDINAE

Genus UROSIGALPHUS Ashmead 1889. PROC. U.S. NAT. MUS. 11:637.

Urosigalphus bruchi Crawford.

Urosigalphus bruchi Crawford 1907. JOUR. NEW YORK ENT. SOC. 15:181.

Distribution: Texas, Arizona, Panama, West Indies, Hawaii (Midway, Niihau, Kauai, Oahu, Molokai, Maui.)

Purposely introduced in 1921 from Texas; found established in 1922.

Hosts: *Mimosetes sallaei* (Sharp), *M. amicus* (Horn), *Algarobius prosopis*

(Leconte). *Callosobruchus chinensis* (L.) *Carydon gonagra* (Fabricius) (Coleoptera; Bruchidae).

Subfamily CHELONINAE

Genus CHELONUS Panzer 1806. KRIT. REVIS. INSEKTENF. DUETSCHLANDS 2:99
Subgenus *Chelonus* Panzer.

Chelonus (Chelonus) texanus Cresson.

Chelonus texanus Cresson 1872. TRANS. AMER. ENT. SOC. 4:179.

Distribution: Continental U.S., Hawaii (Oahu, Molokai, Hawaii).

Purposely introduced from Texas during 1942 and 1943; found established in 1946.

Hosts: *Agrotis ipsilon* (Hufnagel), *Peridroma porphyrea* (Denis and Schiffermueller) (= *P. margaritosa* (Haworth)) *Pseudaletia unipuncta* (Haworth), *Spodoptera exempta* (Walker), *Spodoptera mauritia acronyctoides* (Guenée) (Lepidoptera: Noctuidae).

Subgenus *Microchelonus* Szepligeti 1908. ANN. MUS. NAT. HUNGARICI 6:403.

Chelonus (Microchelonus) blackburni Cameron

Chelonus carinatus Cameron 1881. TRANS. ENT. SOC. LONDON 1881, p. 559, preoccupied.

Chelonus blackburni Cameron 1886. MEM. MANCHESTER LIT. AND PHIL. SOC. (3)10:242.

Chelonus cameroni Dalla Torre 1898. CAT. HYMEN. 4:200.

Distribution: Hawaii (Midway, Pearl and Hermes, Laysan, Niihau, Kauai, Oahu, Molokai, Lanai, Maui, Hawaii), Texas (?), Australia (?). The male of this species is apparently unknown.

Hosts: *Acrolepia assectella* (Zeller), *Genophantes leahi* Swezey, *Gnorimoschema operculella* (Zeller), *Hymenia recurvalis* (Fabricius), *Hellula undalis* (Fabricius), *Keiferia lycopersicella* (Busck), *Lineodes ochrea* (Walsingham), *Oebia dispecta* (Butler), *Omphisa anastomosalis* (Guenée), *Homoeosoma humeralis* (Butler), *Batrachedra cuniculator* Busck, *Pectinophora gossypiella* (Saunders), *Petrochroa dimorpha* Busck, *Plutella capparidis* (Swezey) (Lepidoptera: Pyralidae, Gelechiidae, Plutellidae, Tineidae, Cosmopterygidae).

Genus PHANEROTOMA Wesmael 1838. NOUV. MEM. ACAD. SCI. BRUXELLES 11: 165.

Phanerotoma hawaiiensis Ashmead

Phanerotoma hawaiiensis Ashmead 1901. FAUNA HAWAIIENSIS 1(3):360.

Distribution: Hawaii (Midway, Niihau, Kauai, Oahu, Maui).

Host: *Stoeberhinus testaceus* Butler (Lepidoptera: Gelechiidae).

Perkins (1910, 683) states that this species was probably introduced by Koebele, possibly from Japan.

Phanerotoma myeloisae Fullaway

Phanerotoma myeloisae Fullaway 1956. PROC. HAW. ENT. SOC. 16(1):42.

Phanerotoma sp., Swezey 1915. PROC. HAW. ENT. SOC. 3(2):108.

Distribution: Hawaii (Oahu).

Host: *Ectomyelois ceratoniae* (Zeller) (Lepidoptera: Pyralidae).

This species was first reported by Swezey in 1915, but a specimen in the Perkins collection at the Bishop Museum was collected in 1907.

Subfamily EUPHORINAE

Genus METEORUS Haliday, 1835. ENT. MAG. 3:24.

Meteorus humilis (Cresson):

Perilitus humilis Cresson 1872. CANAD. ENT. 4:84.

Meteorus humilis (Cresson), Cresson 1887. SYNOPSIS HYMENOPTERA No. AMERICA p. 228.

Distribution: Southeastern Canada and Northern U.S., Hawaii (Maui)?

Hosts: None reported here. A parasite of various lepidopterous larvae elsewhere.

Not previously reported from Hawaii. Included here on the basis of a single specimen collected at Haleau, West Maui, Sept. 7, 1932 by N. L. H. Krauss, and determined by C. F. W. Muesebeck.

Meteorus laphygmae Viereck

Meteorus laphygmae Viereck 1913. PROC. U.S. NAT. MUS. 44:560.

Distribution: Texas, Hawaii (Niihau, Kauai, Oahu, Molokai, Lanai, Maui, Hawaii). Purposely introduced from Texas in 1942, found established in 1944.

Hosts: *Heliothis zea* (Boddie), *Amyna natalis* (Walker), *Elaphria nucicolora* (Guenée) (?), *Agrotis ipsilon* (Hufnagel), *Peridroma porphyrea* (Denis and Schiffermuller) (= *P. margaritosa* (Haworth)), *Spodoptera exempta* (Walker), *Spodoptera exigua* (Huebner), *Spodoptera mauritia acronyctoides* (Guenée), *Hedelypta accepta* (Butler), *Oeobia stellata* (Butler); (Lepidoptera: Noctuidae, Pyralidae).

Genus PERILITUS Nees 1818. NOV. ACT. ACAD. CAES. LEOP. CAR. 9:302.

Perilitus coccinellae (Schrank)

Ichneumon coccinellae Schrank 1802. FAUNA BOICA 2:310.

Bracon terminatus Ness 1812. MAG. GESELL. NATURF. FREUNDE BERLIN 5:26.

Centistes americana Riley 1888. U.S.D.A., INSECT LIFE 1:103; Swezey, 1906. PROC. HAW. ENT. SOC. 1(1):17.

Dinocampus terminatus (Nees), Timberlake 1918. PROC. HAW. ENT. SOC. 3(5): 401.

Perilitis coccinellae (Schrank), Muesebeck et al 1950. U.S.D.A. AGRIC. MONOGR. 2, p. 101.

Distribution: cosmopolitan. Hawaii (Oahu, Hawaii).
Hosts: adult coccinellid beetles; reared from *Coelophora inaequalis* (Fabricius) in Hawaii.

Genus MICROCTONUS Wesmael 1835. NOUV. MEM. ACAD. SCI. BRUXELLES 9:54.

Microctonus vittatae Muesebeck
Microctonus vittatae Muesebeck 1936. U.S.D.A. MISC. PUB. 291, p. 19.
Microctonus sp., Fullaway 1956. PROC. HAW. ENT. SOC. 16(1):14.
Distribution: Japan, Eastern United States, Hawaii (Oahu). First collected here in 1955.
Hosts: none recorded in Hawaii; has been bred from the adults of chrysomelid beetles *Phyllotreta vittata* (Fabricius) and *P. zimmermani* (Crotch) elsewhere.

Subfamily BLACINAE

Genus ORGILUS Haliday 1833. ENT. MAG. 1:262.

Orgilus swezeyi Fullaway
Orgilus swezeyi Fullaway, 1956. PROC. HAW. ENT. SOC. 16(1):41.
Orgilus sp., Swezey 1935. PROC. HAW. ENT. SOC. 9(1):95.
Distribution: Hawaii (Oahu, Molokai, Maui, Hawaii). First reported in 1934, but the oldest specimen in local collections is dated 1907.
Hosts: *Opogona aurisguamosa* (Butler), *Stoeberhinus* sp. (Lepidoptera: Tineidae, Gelechiidae).

Genus BLACUS Nees 1818. NOV. ACT. ACAD. CAES. LEOP. CAR. 9:306.

Blacus cremastobombyciae Fullaway
Blacus cremastobombyciae Fullaway 1956. PROC. HAW. ENT. SOC. 16(1):40.
Distribution: Hawaii (Oahu). First found in 1955.
Host: *Cremastobombycia lantanella* Busck (Lepidoptera: Tineidae).

Genus MICROTYPUS Ratzeburg 1848. ICHNEU. D. FORSTINS. 2:47.

Microtypus fullawayi, new species (figs. 2, B; 4, A).

Female. Head shining; face vertex and genae smooth, sparsely setose, with barely discernible shallow setigerous punctation; supraclypeal folveae moderately deep, not noticeably punctate; anterior margin of clypeus rounded. Inner margins of compound eyes parallel; width of face between eyes about four-seventh transfacial width, (0.40 mm.: 0.70 mm. in type.). Antennae inserted high on face, near level of upper margin of compound eyes; head angulate below antennal sockets so that antennae appear to be inserted at anterior margin of dorsal part of head. Distance from apical margin of clypeus to lower margin of antennal sockets slightly more than interocular distance (0.42 mm. in type). Cheeks

smooth, shining, sparsely setose; in lateral aspect, length of genae behind compound eyes slightly less than length of eyes; dorsoventral width of compound eyes about 0.35 mm. in type. Vertex smooth and shining, area between antennal sockets and ocelli flat. Ocelli prominent, distance from lateral ocellus to margin of compound eye nearly twice distance between lateral ocelli, 1.1:0.6. Occiput smooth, shining; occipital carina interrupted medio-dorsally. Posterior region of head strongly concave so that the hind margin appears medially indented from above. Antennae 27 or 28-segmented in available specimens, slightly shorter than body (about 2.5 mm. long in type). Scape 0.19 mm. long by 0.11 mm. wide in type; pedicel small, about one-third as long as scape (0.075 mm. in type); first flagellar segment slightly longer than scape (0.22 mm. long by 0.088 mm. maximum width in type); outer flagellar segments progressively shorter, the 26th about 0.06 mm. long in type. Antennae moderately densely clothed with short, fine setae.

Thorax smooth, shining, faintly indistinctly punctate, sparsely setose. Prescutal sutures strongly developed, weakly foveate; prescutellar depression with a prominent median longitudinal carina, otherwise smooth and shining. Propodeum strongly rugose laterally, the medio-dorsal area conspicuously areolate; areas within the major areolae slightly rugose (fig. 4, A).

Wing venation as in figure 2, B. Forewing slightly shorter than body (2.9 mm. long in type); veins brown, membrane nearly hyaline, apical half very faintly infuscate. Prothoracic and mesothoracic legs of moderate length; metathoracci legs noticeably elongate, longer than body (about 4.3 mm. over-all length in type). Hind coxae slightly longer than wide, (0.54 mm. long by 0.48 mm. maximum width in type), hind femora about twice as long as coxae (1.0 mm. in type), hind tibae slightly longer (1.2 mm. in type).

Gaster about as long as thorax, (1.3 mm. long in type); basal tergite nearly twice as long as its maximum width (0.56 mm. long by 0.30 mm. maximum width at apex in type), with a pair of prominent sublateral longitudinal carinae extending from base three-fourths distance to apex, area between these carinae shining, with broad, smooth, shallow wrinkles. Posterior tergites very finely aciculate, sparsely setose; second tergite slightly more than one-half as long as basal tergite; third tergite somewhat shorter. Ovipositor slightly longer than gaster; sheaths extending about 1.7 mm. beyond apex of gaster in type.

Color mostly very dark brown or blackish-brown; face somewhat more ferrugineous; legs (except hind tibae), mouthparts, and palpi flavotestaceous; antennae and hind tibae (except for basal one-fourth) testaceous; bases of hind tibae pale.

Length: Holotype 3.0 mm.; paratypes 2.7 and 3.0 mm.

Male unknown.

Described from three female specimens. Holotype: Aina Haina, Honolulu, Oahu, Sept. 16, 1957, J. W. Beardsley collector, ex light trap. Paratypes: Waipio,

Oahu, Sept. 1958, J. W. Beardsley collector, ex light trap; and "Hon.", no date, R. C. L. Perkins collector. Holotype and one paratype in collection of Experiment Station, HSPA, Honolulu; one paratype in Bernice P. Bishop Museum, Honolulu.

Microtypus fullawayi differs in several respects from the description of *M. dioryctriae* Rower (PROC. U.S. NAT. MUS. 57:227, 1921) from California; the only other member of the genus recorded from the United States. The propodeum of *M. dioryctriae* is described as having a definite median carina, not present in *M. fullawayi*. The ovipositor of the former species is described as longer than the body, but is distinctly shorter in *M. fullawayi*. These two species apparently also differ in coloration.

It is a pleasure to name this species for Mr. D. T. Fullaway, long a student of the Braconidae and other parasitic Hymenoptera in Hawaii.

Distribution: Hawaii (Oahu). Presumably an immigrant species.

Hosts: Unknown.

Subfamily AGATHIDINAE

Genus AGATHIS Latreille 1804. NOV. DIST. HIST. NAT. 24:173.

Agathis hawaiicola (Ashmead), new combination.

Microdus hawaiicola Ashmead 1901. FAUNA HAWAIIENSIS 1(3):361.

Distribution: Hawaii (Oahu, Maui).

Hosts: *Pyroderces rileyi* (Walsingham), *Ereunetis minuscula* Walsingham, *E. simulans* Butler, *E. flavistriata* Walsingham, *Stoeberhinus testaceus* Butler, *Thyrocopa sapindiella* Swezey, *Aphthonetus* sp., *Hyposomcoma* sp., *Pectinophora gossypiella* (Saunders) (Lepidoptera: Tineidae, Gelechiidae, Hyponomeutidae, Xylorictidae).

Subfamily MICROGASTERINAE

Genus APANTELES Foester 1862. NATURH. VER. RHEINLANDE VERH. 19:245.

Apanteles bedelliae Viereck

Apanteles bedelliae Viereck 1911. PROC. U.S. NAT. MUS. 40:174.

Distribution: Continental U.S., Hawaii (Oahu, Molokai, Kauai). Purposely introduced from Kansas in 1945; found established in 1946.

Hosts: *Bedellia orchilella* Walsingham, *Parectopa hauicola* (Swezey). (Lepidoptera: Lyonitidae, Gracilariidae).

Apanteles carpatus (Say)

Microgaster carpata Say 1836. BOSTON JOUR. NAT. HIST. 1:263.

Protapanteles hawaiiensis Ashmead 1901. FAUNA HAWAIIENSIS 3(1):362.

Apanteles carpatus (Say), Viereck, 1916. CONN. GEOL. & NAT. HIST. SUR. BULL. 22, p. 200; Muesebeck 1921. PROC. U.S. NAT. MUS. 58:515.

Distribution: nearly cosmopolitan, Hawaii (Midway, Kauai, Oahu, Hawaii).

Hosts: *Tinea despecta* Meyrick, *Tineola uterella* (Walsingham) *Oecia maculata* Walsingham. (Lepidoptera: Tineidae, Hyposmocomidae).

Apanteles dignis Muesebeck

Apanteles dignis Muesebeck 1938. PROC. ENT. SOC. WASH. 40:203.

Distribution: Mexico, West Indies, California, Hawaii (Oahu, Molokai); first reported here in 1943; oldest Hawaiian specimen seen dated 1931.

Host: *Keiferia lycopersicella* (Busck) (Lepidoptera: Gelechiidae).

Apanteles glomeratus (L.)

Ichneumon glomeratus L. 1758. SYSTEM. NAT. 10th ed. 1:568.

Microgaster glomeratus (L.), Haliday 1834. ENT. MAG. 2:262; Swezey, 1931. *in* HANDBOOK OF INSECTS AND OTHER INVERTEBRATES OF HAWAIIAN SUGAR CANE FIELDS, by F. X. Williams, p. 376.

Apanteles glomeratus (L.), Marshall 1885. TRANS. ENT. SOC. LONDON for 1885, p. 176.

Distribution: Europe, continental U.S., Canada, Hawaii (Oahu, Molokai, Lanai, Maui, Hawaii). Reportedly introduced in 1898 and again in 1928. First reported established in 1934, but there are specimens in the Bishop Museum labeled as reared from *Pieris*, Honolulu, 1902, by Perkins.

Host: *Pieris rapae* (L.). (Lepidoptera: Pieridae).

Apanteles marginiventris (Cresson)

Microgaster marginiventris Cresson 1865. PROC. ENT. SOC. PHILA. 4:67.

Apanteles marginiventris (Cresson), Ashmead 1900. TRANS. ENT. SOC. LONDON for 1900, p. 277.

Distribution: Continental U.S., West Indies, Hawaii (Laysan, Niihau, Kauai, Oahu, Molokai, Lanai, Maui, Hawaii). Purposely introduced from Texas in 1942, found established 1943.

Hosts: *Scotorythra caryopis* Meyrick, *Spodoptera exempta* (Walker), *S. mauritia acronyctoides* (Guenée), *Pseudaletia unipuncta* (Haworth), *Hymenia recurvalis* (Fabricius), *Ethmia colonella* Walsingham (Lepidoptera: Geometridae, Noctuidae, Pyralidae, Ethmiidae).

Apanteles scutellaris Muesebeck

Apanteles scutellaris Muesebeck 1921. PROC. U.S. NAT. MUS. 58:533.

Distribution: Florida, California, Texas, Hawaii (Oahu). Introduced from California in 1933; found established in 1938.

Host: *Gnorimoschema operculella* (Zeller) (Lepidoptera: Gelechiidae).

Apanteles trifasciatus Muesebeck

Apanteles trifasciatus Muesebeck 1946. PROC. HAW. ENT. SOC. 12(3):615.

Apanteles sp., Swezey 1915. PROC. HAW. ENT. SOC. 3(2):108.

Distribution: Hawaii (Kauai, Oahu, Lanai, Maui, Hawaii). Oldest specimen seen was collected by Perkins in 1907.

Host: *Opogona aurisquamosa* (Butler) (Lepidoptera: Tineidae).

Apanteles, unidentified species no. 1.

Three specimens of this unidentified *Apanteles* are in the collection of the Experiment Station, HSPA. Two were reared from larvae of *Pyroderces rileyi* (Walsingham) by O. H. Swezey, during February, 1924; and the third was collected by Swezey in November, 1915. Dr. Muesebeck examined a specimen of this but was unable to match it with any described species. This and the following species are quite probably undescribed, but as each is represented by only three specimens, (hardly adequate material for species of this difficult group) they are not being named at this time.

Distribution: Hawaii (Oahu).

Host: *Pyroderces rileyi* (Walsingham) (Lepidoptera: Hyponomeutidae).

Apanteles, unidentified species no. 2.

This species appears to be a recent accidental immigrant. The first example was collected in a light trap at Waipio, Oahu, during May, 1956. Dr. Muesebeck examined this specimen but could not match it with any described form known to him. Two additional specimens are now at hand; one from Maunalani Heights, Honolulu, February 7, 1960, J. Ikemori collector; and the other from the light trap at Waipio, Oahu, February, 1961.

Distribution: Hawaii (Oahu).

Hosts: Unknown.

Subfamily OPIINAE

Genus OPIUS Wesmael 1835. NOUV. MEM. ACAD. SCI. BRUXELLES 9:115. (see Muesebeck *et al*, U.S.D.A. AGRIC. MONOGR. 2, 1951, p. 153 for complete synonymy).

Opius fletcheri Silvestri.

Opius fletcheri Silvestri 1916. BOLL. LAB. ZOO. GEN. E AG., PORTICI 11:163, fig. 2.

Distribution: India, Hawaii (Oahu, Hawaii). Introduced from India in 1916, oldest local specimen seen collected in 1921. (See Willard, 1920. JOUR. AGRIC. RES. 20(6):423–438.)

Host: *Dacus cucurbitae* Coquillett (Diptera: Tephritidae).

Opius fullawayi (Silvestri).

Diachasma fullawayi Silvestri 1914. TERR. HAWAII BOARD AGRIC. & FORESTRY BULL. 3, p. 108, fig. 42.

Opius fullawayi (Silvestri), Hagen 1953. PROC. HAW. ENT. SOC. 15(1):115.

Distribution: West Africa, Hawaii (Oahu, Hawaii), Introduced from Africa in 1914, oldest local specimen seen collected in 1916.

Host: *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae).

Opius humilis Silvestri

Opius humilis Silvestri 1914. TERR. HAWAII BOARD AGRIC. & FORESTRY BULL. 3, p. 103. fig. 36.

Distribution: South Africa, Hawaii (Oahu, Maui). Purposely introduced from South Africa in 1913, found established the same year.

Host: *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae).

Opius incisi Silvestri

Opius incisi Silvestri 1916. BOLL. LAB. ZOO. GEN. E AG., PORTICI 11:164, fig. 3.

Distribution: India, Malaya, Hawaii (Oahu, Maui, Hawaii). Introduced from India in 1916 (?), and again from Malaya about 1948. First reported established in 1950.

Hosts: *Ceratitis capitata* (Wiedemann) (?) *Dacus dorsalis* Hendel (Diptera: Tephritidae).

Opius kraussi Fullaway.

Opius kraussi Fullaway 1951. PROC. HAW. ENT. SOC. 14(2):249.

Distribution: Australia, Hawaii (Oahu, Hawaii). Introduced in 1949, recovered in 1951.

Hosts: *Ceratitis capitata* (Wiedemann), *Dacus dorsalis* Hendel.

This species appears to differ from *O. tryoni* Cameron only in coloration, and possibly is nothing more than a variety of the latter. Although it has been reported as established in our literature, there are very few specimens of local origin in collections here.

Opius lantanae Bridwell

Opius lantanae Bridwell 1919. PROC. HAW. ENT. SOC. 4(1):170.

Distribution: Hawaii (Kauai, Oahu, Maui, Hawaii). Bridwell reported that this species was first bred from material obtained by Swezey in 1913. The oldest specimens seen were collected by Perkins in 1906.

Host: *Ophiomyia lantanae* (Froggatt) (Diptera: Agromyzidae).

Opius longicaudatus (Ashmead).

Biosteres longicaudatus Ashmead 1905. PROC. U.S. NAT. MUS. 28:970.

Opius longicaudatus (Ashmead), Fullaway 1948. PROC. HAW. ENT. SOC. 13(2): 207.

Distribution: Malaya, Thailand, Philippine Islands, Formosa, New Caledonia, Hawaii (Oahu, Maui, Hawaii). Purposely introduced in 1947; first reported established in 1948.

Hosts: *Dacus dorsalis* Hendel, *Procecidochares utilis* Stone (Diptera: Tephritidae).

Fullaway (1953, PROC. ENT. SOC. WASH. 55(6):310–314) has described several

"varieties" of *longicaudatus* which are based primarily upon color differences. Three of these (i.e.: *O. l.* var *novocaledonicus*, var. *malaiaensis*, and var. *taiensis*) are reportedly established in Hawaii. *Opius formosanus* (Fullaway) is also reported to be established here, but it appears that Fullaway now considers this also to be a color variety of *O. longicaudatus* (1951, PROC. HAW. ENT. SOC. 14(2):245).

Although these forms may represent originally distinct races of *O. longicaudatus*, I can find no structural differences to separate them other than color, and can see no good reason for including these forms in the key. *Opius compensans* (Silvestri) has also been reported established here (1952, PROC. HAW. ENT. SOC. 14(3):373), but Fullaway (1951, PROC. HAW. ENT. SOC. 14(2):245) has stated that this too may be nothing more than a local variety of *O. longicaudatus*. As there are no Hawaiian specimens of this form at hand, it has also been omitted from the key.

Opius oophilus Fullaway

Opius oophilus Fullaway 1951. PROC. HAW. ENT. SOC. 14(2):248.

Distribution: Malaya (?) Hawaii (Oahu, Molokai, Lanai, Maui, Hawaii). Purposely introduced, probably from Malaya. First recognized in 1949.

Host: *Dacus dorsalis* Hendel (Diptera: Tephritidae).

The biologies of this species and the related *O. vandenboschi* Fullaway have been studied by van den Bosch and Haramoto (1951).

Opius tryoni Cameron

Opius tryoni Cameron 1911. PROC. LINN. SOC. N. S. WALES 36:343.

Diachasma tryoni (Cameron), Silvestri 1914. TERR. HAWAII BOARD AGRIC. & FORESTRY BULL. 3, p. 10.

Distribution: Australia, Hawaii (Oahu, Maui, Hawaii). Introduced in 1913, recovered the same year.

Hosts: *Ceratitis capitata* (Wiedemann), *Eutreta xanthochaeta* Aldrich, *Procecidochares utilis* Stone, *Dacus dorsalis* Hendel (Diptera: Tephritidae).

Opius vandenboschi Fullaway

Opius vandenboschi Fullaway 1952. PROC. HAW. ENT. SOC. 14(3):413.

Biosteres javanus Fullaway 1920. PROC. HAW. ENT. SOC. 4(2):260 (preoccupied).

Opius persulcatus of authors (PROC. HAW. ENT. SOC. 13(3):340, 1949, *et seq.*) not *O. persulcatus* (Silvestri), according to Fullaway (1952).

Opius sp., van den Bosch & Haramoto 1951. PROC. HAW. ENT. SOC. 14(2):251.

Distribution: Malaya, Java, Philippine Islands (?), Hawaii (Oahu, Lanai, Maui, Hawaii). Introduced from Malaya and the Philippines (?), 1948; recovered Nov. 1948.

Host: *Dacus dorsalis* Hendel (Diptera: Tephritidae).

Subfamily BRACONINAE

Genus BRACON Fabricius 1804. SYSTEMA PIEZATORUM, p. 102.

Bracon chinensis Szépligeti

Bracon chinensis Szepligeti 1902. TERMES FUZETEK 25:39.

Amysoma chilonis Viereck 1913. PROC. U.S. NAT. MUS. 44:640.

Bracon (Amysoma) chinensis Szepligeti, Watanabe 1932. TRANS. SAPPORO NAT. HIST. SOC. 12:65.

Distribution: China, Korea, Formosa, Japan, Okinawa, South India, Malaya, Thailand, Java, Philippine Islands, Hawaii (Kauai, Oahu). Purposely introduced from China in 1928; found established in 1937.

Host: *Chilo suppressalis* (Walker) (Lepidoptera: Pyralidae).

Bracon hebetor Say

Bracon hebetor Say 1836. BOSTON JOUR. NAT. HIST. 1:252.

Habrobracon sp. ?, Perkins 1910. FAUNA HAWAIIENSIS 2(6):684.

Habrobracon hebetor (Say), Bridwell 1919. PROC. HAW. ENT. SOC. 4(1):113.

Habrobracon juglandis (Ashmead), Swezey 1943. PROC. HAW. ENT. SOC. 9(3): 278; Zimmerman 1958. INSECTS OF HAWAII 9:390, 386.

Distribution: cosmopolitan, Hawaii (Oahu, Maui, Hawaii). The oldest specimens of local origin seen were collected in Honolulu, 1905, by Perkins.

Hosts: *Ephestia cautella* (Walker), *Plodia interpunctella* (Huebner) (Lepidoptera: Pyralidae).

Bracon mellitor Say.

Bracon mellitor Say 1836. BOSTON JOUR. NAT. HIST. 1:256.

Microbracon pembertoni Bridwell 1919. PROC. HAW. ENT. SOC. 4(1):115.

Microbracon mellitor (Say), Muesebeck 1925. PROC. U.S. NAT. MUS. 67, no. 2580, p. 65.; Willard 1926. PROC. HAW. ENT. SOC. 6(2):245.

Distribution: continental U.S., Mexico, Hawaii (Kauai, Oahu).

Hosts: *Ectomyelois ceratoniae* (Zeller), *Cryptophlebia illepida* (Butler), *Crocidosema lantana* Busck, *C. plebeiana* Zeller, *Pectinophora gossypiella* (Saunders) (Lepidoptera: Pyralidae, Tortricidae, Gelechiidae).

Bracon omiodivorum (Terry)

Macrodyctium omiodivorum Terry 1907. EXPT. STA. H.S.P.A. ENT. BULL. 5, p. 37; Perkins 1910. FAUNA HAWAIIENSIS 2(6):684.

Bracon omiodivorum (Terry), Perkins 1913. FAUNA HAWAIIENSIS 1:cxi.

Microbracon omiodivorum (Terry), Bridwell 1919. PROC. HAW. ENT. SOC. 4(1): 114.

Distribution: Japan, Fiji, Hawaii (Kauai, Oahu, Molokai, Lanai, Maui, Hawaii). Oldest specimens seen were collected by Perkins in 1903. Purposely introduced from the Orient by Koebele, in 1895.

Hosts: *Hedylepta accepta* (Butler), *H. blackburni* (Butler), *H. localis* (Butler), *Hymenia recurvalis* (Fabricius), *Archips postvittanus* (Walker), *Amorbia emigratella* Busck. (Lepidoptera: Pyralidae, Tortricidae).

Bracon swezeyi (Bridwell), new combination

Microbracon swezeyi Bridwell 1919. PROC. HAW. ENT. SOC. 4(1):116.

Bracon sp., and *Bracon* sp. ?, Swezey 1915. PROC. HAW. ENT. SOC. 3(1):109.

Distribution: Hawaii (Kauai, Oahu). The oldest specimen seen was collected by Perkins on Oahu, in 1906.

Hosts: *Bactra straminea* (Butler), *Batrachedra cuniculator* Busck (Lepidoptera: Tortricidae, Cosmopterygidae).

Bracon terryi (Bridwell)

Microbracon terryi Bridwell 1919. PROC. HAW. ENT. SOC. 4(1):169.

Bracon terry (Bridwell), Swezey 1952. PROC. HAW. ENT. SOC. 14(3):363.

Distribution: Hawaii (Oahu, Maui, Lanai, Hawaii). First collected by Perkins in 1906.

Hosts: *Tephritis crassipes* (Thomson), *Procecidochares utilis* Stone (Diptera: Tephritidae).

Subfamily SPATHIINAE

Genus SPATHIUS Nees 1818. NOV. ACAD. CAES. LEOP. CAR. 9:301.

Spathius perdebilis Perkins

Spathius perdebilis Perkins 1910. FAUNA HAWAIIENSIS 2(6):685.

Distribution: Hawaii (Oahu). There are specimens in the HSPA collection, determined as this by Bridwell, which were collected in 1914 and 1915, but it does not appear to have been collected in recent years.

Hosts: Probably wood boring coleopterous larvae. Perkins (1913) reported finding specimens flying around boards infested with *Dryopthorus* larvae.

Subfamily PAMBOLINAE

Genus ECPHYLOPSIS Ashmead 1900. PROC. U.S. NAT. MUS. 23:146.

Ecphylopsis nigra Ashmead

Ecphylopsis nigra Ashmead 1900. PROC. U.S. NAT. MUS. 23:146; 1901. FAUNA HAWAIIENSIS 1(3):363.

Distribution: Hawaii (Kauai, Oahu, Maui, Hawaii). This is an apparently endemic species.

Hosts: Unknown; a number of specimens are from koa, and Perkins (1913) states that it was bred from dead wood containing larvae of minute beetles such as *Proterhinus*.

Ecphylopsis swezeyi, new species (fig. 2, C).

Winged female. Head sparsely setose; upper face between antennal sockets and

ocelli rugulose, remainder of head granulose. Head globular, median length equal to about three-fourths distance from vertex to apical margin of clypeus (0.32 mm. : 0.43 mm. in type); width slightly less than width of thorax across tegulae (0.48 mm. : 0.50 mm. in type); maximum transfacial width slightly greater than distance from vertex to apical margin of clypeus (0.48 mm. : 0.43 mm. in type); interocular distance more than one-half maximum transfacial width (0.25 mm. : 0.48 mm. in type). Compound eyes small, oval, anterior-posterior length three-fourths the dorso-ventral width (0.12 mm. : 0.16 mm. in type); width of gena behind compound eye slightly less than twice length of compound eye (0.22 mm. : 0.12 mm. in type). Ocellar triangle small, distance between the two lateral ocelli about one-half distance of either from margin of compound eye (0.09 mm. : 0.18 mm. in type).

Antennae inserted near middle of face, about on a line through centers of compound eyes; 20-segmented in type, 18 to 20-segmented in paratypes; about as long as body (2.7 mm. in type). Scape about twice as long as pedicel (0.12 mm. : 0.06 mm. in type); flagellar segments elongate and slender, the first slightly longer than scape plus pedicel (0.20 mm. in type), second flagellar segment longer than first (0.27 mm. in type); outer flagellar segments progressively shorter toward apex, the penultimate less than one-half as long as first (0.11 mm. in type).

Dorsum of thorax mostly granulose to finely rugulose; mesonotum more coarsely rugulose. Prescutal sutures not discernibly developed. Dorsum of propodeum finely rugulose, with a few faint carinae extending a short distance anteriorly or antero-laterally from the apex; not discernibly areolate.

Wing venation as in figure 2, C. Forewing slightly shorter than body (2.7 mm. long in type), veins brownish, membrane hyaline; first abscissa of cubitus absent, the first discoidal and first cubital cells confluent; second transverse cubitus nearly transparent.

First tergite of gaster trapezoidal in shape, the width at apex slightly greater than length (0.38 mm. : 0.33 mm. in type), width at base less than one-half width at apex; surface rugulose, with a well-developed carina along each lateral margin. Second tergite shorter than first. Posterior tergites smooth, shining, each with a transverse row of long, fine setae near the anterior margin. Gaster about as long as head and thorax combined (1.4 mm. in type) widest across 4th segment, 0.50 mm. maximum width in type. Ovipositor of moderate length, length of sheaths beyond gaster equal to about one-half length of gaster (0.86 mm. in type).

Color brownish to testaceous.

Length: Holotype 2.7 mm.; paratype 2.6 mm.

Apterous female: Similar to winged female except as follows: ocelli reduced, barely discernible; thorax relatively narrower, head wider than thorax (0.40 mm. : 0.30 mm.); wings represented by tiny flaps. Length: 2.2 to 2.4 mm.

Male: Unknown.

Described from five specimens, 2 winged and 3 apterous. Holotype: Kumuwela, Kauai, August 1, 1925, O. H. Swezey, collector. Four paratypes (three apterous and one winged): Marsh Trail, Oahu, December 10, 1933, O. H. Swezey collector, ex *Straussia*. Types in collection of Experiment Station, HSPA, Honolulu.

This species appears to be closely allied to *Ecphylopis nigra* Ashmead, and the two constitute the only known braconids presumably endemic to the Hawaiian Islands. *E. swezeyi* may be separated from *E. nigra* by its larger size, usually lighter color, more strongly developed sculpture, and the presence of transverse rows of relatively long, fine setae on dorsum of abdomen. In addition, winged forms of *E. nigra* are as yet unknown.

This species is named for the collector, the late Dr. O. H. Swezey, who contributed so greatly to Hawaiian entomology.

Distribution: Hawaii (Kauai, Oahu) probably endemic.

Hosts: Unknown.

Subfamily DORYCTINAE

Genus EUSCELLINUS Westwood. 1882. TIJDSCHR. ENT. 25:25.

Euscelinus peregrinus (Perkins)

Hormius (?) *peregrinus* Perkins 1910. FAUNA HAWAIIENSIS 2(6):685.

Euscellinus peregrinus (Perkins), Bridwell 1920. PROC. HAW. ENT. SOC. 4(2):390.

Distribution: Fiji (Perkins, 1913) ?, Hawaii (Oahu). Oldest specimen seen collected by Perkins, 1906.

Hosts: Perkins (1913) states that this is a parasite of xylophagous bostrychid beetles, and a specimen at hand is labeled as reared from wood containing *Sinoxylon conigerum* Gerstaecker

Genus RHACONOTUS Ruthe 1854. STETTIN. ENT. ZTSCHR. 15:349.

Rhaconotus vagrans (Bridwell).

Hormiopterus vagrans Bridwell 1920. PROC. HAW. ENT. SOC. 4(2):390.

Rhaconotus vagrans (Bridwell), Swezey 1952. PROC. HAW. ENT. SOC. 14(3):363.

Distribution: Hawaii (Kauai, Oahu, Lanai, Maui, Hawaii). First collected here in 1914.

Hosts: Larvae of cerambycid beetles, including *Neoclytarlus chenopodii* Perkins.

Genus DORYCTES Haliday 1836. ENT. MAG. 4:40, 43.

Ischiogonus Wesmael 1838 is a synonym, according to Muesebeck *et al*, (1951).

Doryctes immigrans, new species (figs. 2, A; 4, B).

Female. Face dull, moderately densely setose. Interocular width about two-fifths total transfacial width (0.24 mm. : 0.59 mm. in type). Vertex shining, transversely corrugated, nearly devoid of setae. Head from dorsal aspect about 1.5 times as wide as long (0.40 mm. by 0.59 mm. in type) posterior region of head

slightly concave so that the dorsal margin appears slightly indented; lateral ocelli elliptical, distance between these a trifle less than distance of either from margin of compound eye. Occipital carina complete. Antennae slender, inserted near middle of face, 22 segmented in type, 17 or 18 segmented in smaller paratypes; slightly shorter than body (about 2.6 mm. long in type). Scape slightly shorter than first flagellar segment (0.13 mm. long by 0.06 mm. maximum width in type); pedicel about one-half length of scape (0.07 mm. in type); flagellum with first segment longest (0.16 mm. in type), outer segments progressively shorter, the penultimate about one-half as long as the first.

Thorax sparsely setose, dorsum mostly very finely aciculate or granulose; posterior one-third of prescutum rugose, appearing finely areolate; prescutal sutures strongly developed anteriorly; prescutellar depression divided into about six areolae by weak longitudinal carinae. Anterior fourth of prescutum strongly declivous, its plane perpendicular to that of posterior portion of prescutum. Wing venation as in figure 2, A. Forewing shorter than body, 2.4 mm. long in type, wing membrane hyaline, veins brownish; stigma dark brown medially, the anterior and posterior ends pale. Second transverse cubitus of forewing nearly transparent.

Propodeum rugose, the posterior portion with several more distinct carinae extending anterio-laterally from near the apex and forming a somewhat elongate posterio-median areola, smaller areolae laterally and anteriorly (fig. 4, B)

First three tergites of gaster with well-defined raised longitudinal striations these somewhat finer and closer together on the third tergite; first tergite about as long as maximum width at apex (0.5 mm. by 0.5 mm. in type); second tergite slightly shorter than first, wider than long (0.45 mm. by 0.60 mm. in type); third tergite about one-third as long as second (0.15 mm. in type); posterior tergites smooth, shining. Tergites 2 to 4 apparently fused into a single functional sclerite. Ovipositor elongate; sheaths nearly as long as body exclusive of antennae (2.8 mm. long in type).

Color brownish or ferruginous; dorsum of head and metascutum sometimes darker; legs pale flavotestaceous.

Length: Type 3.0 mm.; paratypes 2.0 to 3.0 mm.

Male: Unknown.

Described from nine specimens. Holotype: Waipio, Oahu, July, 1960, J. W. Beardsley collector, ex light trap. Paratypes: five, Waipio, Oahu, July 1958 to October, 1960 all ex light trap, J. W. Beardsley collector; three, Ewa, Oahu, June and September, 1960 ex light trap, J. W. Beardsley collector.

Holotype and five paratypes in collection of the Experiment Station, HSPA, Honolulu; three paratypes in Bernice P. Bishop Museum, Honolulu.

Distribution: Hawaii (Oahu), probably a recent accidental introduction.

Hosts: Unknown.

Doryctes pallidiceps (Perkins), new combination

Ischiogonus pallidiceps Perkins 1910. FAUNA HAWAIIENSIS 2(6):685.

Distribution: Fiji, New Zealand (?), Hawaii (Nihoa, Oahu, Molokai, Maui, Hawaii). Perkins (1910) states that this species first appeared here in 1900, and that he had seen apparently identical specimens from New Zealand.

Hosts: This species has been bred from, or found associated with, the larvae of several species of cerambycid beetles belonging to the genera *Plagithmysus* and *Neoclytarlus*.

Doryctes palliatus (Cameron), new combination.

Monolexis (?) *palliatus* Cameron 1881. TRANS. ENT. SOC. LONDON for 1881, p. 560.

Ischiogonus palliatus (Cameron), Ashmead 1901. FAUNA HAWAIIENSIS 1(3):362.

Distribution: Fiji (?) (Perkins, 1913), Hawaii (Kauai, Oahu, Molokai, Maui, Hawaii).

Hosts: larvae of cerambycid beetles including *Prosopus bankii* (Fabricius), and several species of *Neoclytarlus* and *Plagithmysus*.

Doryctes syagrii (Fullaway), new combination.

Ischiogonus syagrii Fullaway 1922. BULL. ENT. RES. 13:201.

Distribution: Australia (New S. Wales), Hawaii (Oahu, Maui, Hawaii). Purposely introduced in 1921 from Australia.

Host: *Syagrius fulvitarsis* Pascoe (Coleoptera: Curculionidae).

Genus MONOLEXIS Foerster 1862. NATURH. VER. RHEINLANDE VERH. 19:237.

Monolexis fuscicornis Foerster

Monolexis fuscicornis Foerster 1862. NATURH. VER. RHEINLANDE VERH. 19:273.

Distribution: cosmopolitan, Hawaii (Oahu). This species has not been recorded previously in our literature. There is a single specimen collected by Perkins (no date) near Mt. Tantalus, Oahu in the B. P. Bishop Museum; and a long series reared by E. C. Zimmerman from guava wood, Honolulu, May and Sept. 1940.

Host: larvae of *Lyctus* spp. (Coleoptera: Lyctidae). One of Zimmerman's specimens is labeled as having been reared from *Lyctus planicollis* Leconte.

Genus GLYPTOCOLASTES Ashmead 1900. PROC. U.S. NAT. MUS. 23:142.

Glyptocolastes bruchivorus Crawford

Glyptocolastes bruchivorus Crawford 1909. PROC. ENT. SOC. WASH. 11:203.

Distribution: Texas, Mexico, Hawaii (Oahu, Molokai, Lanai, Kahoolawe, Maui). Purposely introduced from Texas in 1921, found established in 1922.

Hosts: larvae of bruchid beetles; *Mimosestes sallaei* (Sharp), *M. amicus* (Horn), *Algarobius prosopis* (Leconte), *Callosobruchus chinensis* (L.), *Caryedon gonagra* (Fabricius).

Glyptocolastes texanus Ashmead

Glyptocolastes texanus Ashmead 1900. PROC. U.S. NAT. MUS. 23:142.

Russellia sp., Fullaway 1951. PROC. HAW. ENT. SOC. 14(2):208.

Distribution: Texas, Arizona, Hawaii (Oahu). First found here in August, 1947.

Hosts: Unknown. All the specimens so far collected here have been taken in light traps.

Genus HETEROSPILUS Haliday 1836. ENT. MAG. 4:40, 46.

Heterospilus prosopidis Viereck

Heterospilus prosopidis Viereck 1910. PROC. U.S. NAT. MUS. 38:381.

Distribution: Louisiana, Texas, Hawaii (Kauai, Oahu, Maui, Hawaii). Purposely introduced from Texas in 1910, found established in 1917.

Hosts: larvae of bruchid beetles; *Algarobius prosopis* (Leconte), *Bruchus phaseoli* Gyllenhal, *Stator pruininus* (Horn), *Callosobruchus chinensis* (L.), *Mimosestes sallaei* (Sharp).

Subfamily ROGADINAE

Genus PARAHORMIUS Nixon 1940. ANN. MAG. NAT. HIST. (11)5:473.

Parahormius pallidipes (Ashmead)

Hormius pallidipes Ashmead 1893. TRANS. AMER. ENT. SOC. 20:42; Fullaway 1944. PROC. HAW. ENT. SOC. 12(1):22.

Parahormius pallidipes (Ashmead), Nixon 1940. ANN. MAG. NAT. HIST. (11)5: 490.

Distribution: continental U.S., Hawaii (Oahu). Apparently an accidental immigrant, first reported by Fullaway in 1944; the oldest Hawaiian specimen seen was collected in 1937 by Swezey.

Hosts: *Gnorimoschema operculella* (Zeller), *Keiferia lycopersicella* (Busck) (Lepidoptera: Gelechiidae).

REFERENCES

ASHMEAD, W. H. 1900. Classification of the Ichneumon Flies, or the Superfamily Ichneumonoidea. PROC. U.S. NAT. MUS. 23:1–220.

———— 1901. Hymenoptera Parasitica. FAUNA HAWAIIENSIS 1(3):277–364, pls 8 & 9.

BRIDWELL, J. C. 1919. Descriptions of new species of hymenopterous parasites of muscoid Diptera with notes on their habits. PROC. HAW. ENT. SOC. 4(1):166–179.

———— 1920. Miscellaneous notes on Hymenoptera, 2nd paper, with descriptions of new species. PROC. HAW. ENT. SOC. 4(2):386–403.

FULLAWAY, D. T. 1951. Review of the Indo-Australasian parasites of the fruit flies (Tephritidae). PROC. HAW. ENT. SOC. 14(2):243–250.

———— 1952. New species of *Opius* (Hymenoptera: Braconidae). PROC. HAW. ENT. SOC. 14(3):411–413.

GAHAN, A. B. 1916. A revision of the North American ichneumon-flies of the Subfamily Opiinae. PROC. U.S. NAT. MUS. 49:63–96, Figs.

MUESEBECK, C. F. W. 1921. A revision of the North American species of ichneumon-flies belonging to the genus *Apanteles*. PROC. U.S. NAT. MUS. 58:483–576.

———— 1924. A revision of the North American icheumon-flies belonging to the genus *Meteorus* Haliday. PROC. U.S. NAT. MUS. 63, art. 2, 44 pp.

MUESEBECK, C. F. W. *et al.* 1951. Hymenoptera of America north of Mexico; synoptic catalog. U.S. DEPT. AGRIC. AGRICULTURAL MONOGRAPH n 2.

PERKINS, R. C. L. 1910. Supplement to Hymenoptera. FAUNA HAWAIIENSIS 2(6):600–686.

RIEGEL, G. T. 1948. The wings of Braconidae. ANN. ENT. SOC. AMERICA 41:439–449, Figs.

RICHARDS, O. W. 1956. Hymenoptera, Introduction and keys. HANDBOOK FOR THE IDENTIFICATION OF BRITISH INSECTS 6(1), 94 pp., Figs.

ROHWER, S. A. and A. B. GAHAN. 1916. Horisomology of the hymenopterous wing. PROC. ENT. SOC. WASHINGTON 18:20–76, Figs.

SILVESTRI, F. 1914. Report of an expedition to Africa in search of the natural enemies of fruit flies (Trypaneidae) with descriptions, observations and biological notes. TERR. OF HAWAII, BOARD OF AGRIC. AND FORESTRY, BULL. 3, 167 pp, pls.

———— 1916. Descrizione di alcuni imenotteri Braconidi parassiti di Ditteri Tripaneidi nell' India. BOLL. DEL LABORATORIA DI ZOOLOGIA GENERALE E AGRARIA-PORTICI 11::160–169.

SMITH, C. F. 1944. The Aphidiinae of North America (Braconidae: Hymenoptera). CONTRIBUTIONS IN ZOOLOGY AND ENTOMOLOGY No. 6, OHIO STATE UNIVERSITY, 154 pp., Figs.

STARÝ, PETR. 1960. The generic classification of the Family Aphididae (Hymenoptera). CASOPIS CESKOSLOVENSKE' SPOLENCNOSTI ENT. 57(3):238–252, Figs.

SWEZEY, O. H. 1915. A preliminary list of the hymenopterous parasites of Lepidoptera in Hawaii. PROC. HAW. ENT. SOC. 3(2):99–109.

———— 1931. Records of introduction of beneficial insects into the Hawaiian Islands. In Williams, F. X., THE INSECTS AND OTHER INVERTEBRATES OF HAWAIIAN SUGAR CANE FIELDS. Experiment Station, H.S.P.A., Honolulu. pp. 368–377.

VAN DEN BOSCH, R. and F. HARAMOTO. 1951. *Opius oophilus* Fullaway, an egg-larval parasite of the Oriental fruit fly discovered in Hawaii. PROC. HAW. ENT. SOC. 1(2):251–255.

WILKINSON, D. S. 1927. Eight new species of Braconidae. BULL. ENT. RES. 28:33–46, Figs.

WILLARD, H. F. 1920. *Opius fletcheri* as a parasite of the melon fly in Hawaii. JOUR. AGRIC. RES. 20:223–238.