

Descriptions of New Genera and Species of Hawaiian Encyrtidae (Hymenoptera), III.

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(Presented at the meeting of December 1, 1921.)

The present paper completes the consideration of Hawaiian Encyrtidae so far accumulated, except the endemic species of *Anagyrus*. The genera here treated all belong to the Mirini and the new species are apparently endemic. The types have been deposited in the collection of the Hawaiian Entomological Society.

Coelopencyrtus Timberlake.

The discovery of a fourth species of this interesting genus seems to indicate that our knowledge of its extent is far from complete. Of the described species three have been reared from *Odynerus nigripennis* (Holmgren) and only one from all the other species of *Odynerus*, although Dr. Perkins has recorded one or two probably undescribed species from the larvae of *Odynerus montanus* Smith and *O. oahuensis* Dalla Torre.* The preponderance of material reared from *nigripennis* is probably due to the fact that the nests of this species are much more frequently found than those of any other species of *Odynerus*, which are perhaps just as frequently parasitized.

The females of *Coelopencyrtus* are not easily distinguished as a rule, whereas the males show good characters in the structure of the head and antennae. The following table of the species may be found useful, although no characters have been discovered which will distinguish the females of *odyneri* and *swezeyi* in all cases. The distinctions given for these two species apply only to specimens from Oahu, as specimens of *swezeyi* from Hawaii have the characters, given for *odyneri*, except that the eyes are considerably more sparsely pubescent than in specimens of either species from Oahu.

FEMALES.

1. Head not greatly wider than long, if at all; the frontovertex nearly thrice as long as wide; the eyes distinctly pubescent..... 2

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* Fauna Hawaiiensis, Introduction, Vol. I, part 6, p. xvii, 1913.

- Head considerably wider than long; the frontovertex much wider or about twice as long as wide; the eyes bare.....*orbi* Timb.
2. Head about as long as wide; the clypeal margin produced medially; middle tibiae yellowish brown, except towards the base..... 3
Head somewhat wider than long, the clypeal margin roundly arcuate, not distinctly produced medially; middle tibiae wholly blackish; frontovertex narrowest in front of the anterior ocellus.
mauiensis n. sp.
3. Clypeal margin abruptly produced medially into a broadly rounded process; frontovertex narrowest at a point about halfway between the anterior and posterior ocelli, and strongly bluish in color.
odyneri Timb.
- Clypeal process less abruptly produced and somewhat subangulate at apex; frontovertex narrowest at the anterior ocellus and with a more or less greenish luster.....*swezeyi* Timb.

MALES.

1. Frontovertex either distinctly longer than wide or considerably produced in front of the eyes..... 3
Frontovertex no longer than wide and only slightly produced in front of the eyes..... 2
2. Frontovertex a little wider than long, the frons weakly protuberant; pedicel of antennae with a basal conical process above.
orbi Timb.
- Frontovertex as long as wide, the frons rather strongly protuberant; pedicel expanded on dorsal side at apex so that it is twice as wide at apex as at base.....*mauiensis* n. sp.
3. Anterior ocellus on a line with the anterior margin of eyes in dorsal view of head; pedicel no wider than long; the first funicle joint with a lamelliform process above at base.....*odyneri* Timb.
- Anterior ocellus in front of a line connecting the anterior corners of the eyes in dorsal view of head; pedicel considerably wider than long; the first funicle joint patelliform, produced above as a thin plate and as a short ramus on the outer side; the second funicle joint produced into a short ramus on the outer side.
swezeyi Timb.

Coelopencyrtus sp.

A single female reared from the mud cell of *Odynerus oahuensis* Dalla Torre, collected at Makua, Oahu, in 1900 by Messrs. Koebele and Perkins, seems to represent a new species, but in the absence of the male it would be inadvisable to formally name and describe it. In the above table of species it would run to *odyneri*, except that the frontovertex is proportionately wider, being hardly over twice as long as wide. The

head is somewhat thinner fronto-occipitally than in *odyneri*, a little wider than long, and the eyes appear to be somewhat more densely pubescent. The coloration agrees very well with *odyneri*.

Coelopencyrtus mauiensis n. sp. Figures 1-3.

Female. Similar to *odyneri*, but the head is somewhat thicker fronto-occipitally, and a little wider than long, with the clypeal margin subtruncate and rounding towards the sides, the medial process practically absent; frontovertex narrower, being narrowest at a point a little in front of the anterior ocellus, the inner orbits of the eyes, therefore, somewhat diverging posteriorly throughout a greater part of their length; ocelli in an equilateral triangle with the anterior ocellus somewhat behind the center of the frontovertex. (In specimens of *odyneri* of about the same size as the types of *mauiensis* the frontovertex is noticeably wider and the ocellar triangle is larger but still equilateral as the anterior ocellus is placed farther forward either at or before the center of the frontovertex, whereas in much larger specimens of *odyneri* the ocellar triangle is noticeably still more acute.) In other structural details and in sculpture and vestiture practically as in *odyneri*.

Coloration also about the same, except in regard to the legs and wings; the former are nearly wholly blackish, with the front and hind tarsi brownish, the middle tarsi and tibial spur brownish yellow, the middle tibiae also more or less brownish yellow, narrowly at apex on the under side; wings hyaline, with the smoky stain found in *odyneri* fainter,

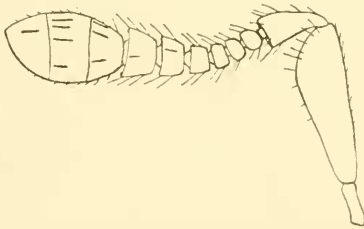


Fig. 1. *Coelopencyrtus mauiensis*. Antenna of female.

except across the disc opposite the apical third of the venation and abruptly terminating in a straight line parallel with the speculum and somewhat more basal, the base of the wing being perfectly clear except for a short, smoky streak near the posterior margin.

Length of body, (0.91 to) 1.21; length of head, 0.419; width of head, 0.466; width of vertex at posterior ocelli, 0.117; width of mesoscutum, 0.417; length of forewing, 1.00; width of forewing, 0.440 mm.

Male. Similar to *odyneri* in general characters, but the head is only twice as thick dorsally as at the oral margin, less distinctly longer than wide, and more rounded in frontal view but not so distinctly so as in

orbi; frontovertex as long as wide and only slightly produced in front of the eyes with the frons nevertheless rather strongly protuberant; ocelli in a right-angled triangle, the anterior ocellus placed just behind a line connecting the anterior corners of the eyes, the posterior pair situated about one-half more than their own diameter from the occipital margin. Scape as wide as in *odynerei* and shaped nearly as in *swezeyi* and *orbi*, with the dorsal margin even more deeply concave and the ventral margin evenly and strongly convex, the inner margin near the base provided with a minute nipple-like process; pedicel comparatively large, flattened



Fig. 2. *Coelopencyrtus mauriensis*. Antenna of male, lateral view.

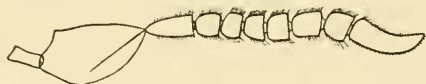


Fig. 3. *Coelopencyrtus mauriensis*. Antenna of male, dorsal view.

and produced above at apex so that in lateral view it is much wider at apex than at base and wider than either the scape or club; first and fifth funicle joints subequal in length and somewhat longer than the other joints, the second and third shortest; in lateral view of the funicle, all the joints more or less transverse, the first joint much wider at apex than at base and a little wider than the three following joints, but somewhat narrower than the fifth, the sixth distinctly smaller than the fifth, but appearing somewhat thicker in dorsal view; club somewhat shorter than the last three funicle joints combined, distinctly wider than the funicle and strongly obliquely inclined as in *odynerei*.

Face above antennae with a median carina, which reaches upward almost to the middle of the eyes; whole face above antennae shagreened or without smooth and polished areas found in the males of the other three species, being finely reticulate on the upper part between the eyes and rugulose-reticulate below, more roughly in the lower part of the scrobal impression or just above the strong transverse protuberance below and partly between the antennal sockets, considerably more smoothly in the deepest parts of the scrobal impressions opposite the upper half of the median carina; area of differentiated sculpture on either side of face between the antennal sockets and the eyes is very finely lineolate-reticulate and sharply defined below from the rugulose area of the middle of the face, but intergrading above next to the eyes with the reticulations of the upper part of the face, this area also much smaller than in *odynerei* or *swezeyi* and leaving a much wider median interspace; frontovertex duller or with the reticulations more rugulose than in *odynerei*.

Sculpture otherwise not differing materially from *odyneri*, and similar to the female.

The suberect pubescence on frontovertex and upper part of face rather dense and long, or about as in *odyneri*; the tuft of fine pubescence on the pedicel confined to the apex on the dorso-anterior margin; the short, erect pubescence of eyes rather dense as in *odyneri*.

Coloration as in the female except that the antennae are somewhat more brownish.

Length of body, (1.09 to) 1.19; length of head, 0.487; width of head, 0.471; width of vertex at posterior ocelli, 0.223; width of mesoscutum, 0.450; length of forewing, 0.992; width of forewing, 0.447 mm.

Described from 76 females, 7 males (holotype, allotype and paratypes), reared July 22, 1920, from a larva of *Odynerus nigripennis* (Holmgren), collected on the ditch trail near Keanae, Maui (O. H. Swezey).

Nesencyrtus kaalae (Ashmead). Figures 4, 5.

This species seems to have been unusually common in the fall of 1919 and following winter, as large series were reared at that time from the larvae or pupae of *Nesoprosopis fuscipennis* (Smith) and a small species which was probably *N. koae* Perkins, collected in the mountains back of Honolulu by Messrs. Bridwell and Williams.

From a pupa of what was probably *Nesoprosopis koae*, col-

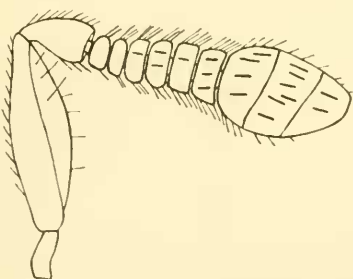


Fig. 4. *Nesencyrtus kaalae*. Antenna of female.

lected by Mr. J. C. Bridwell in a rotten stump at the base of the Thurston trail, Nuuanu Valley, Oahu, on October 19, 1919. 1 male and 17 females issued on November 1-2, and 5 living females were also taken in the debris of the same stump.

From three larvae of *Nesoprosopis* collected in a living condition by Mr. Bridwell from the same stump, and later exposed

by me to the parasites, there issued from the first, after it had pupated, 60 males and 25 females on November 15-16; from the second 1 male and 17 females on November 15-16; and

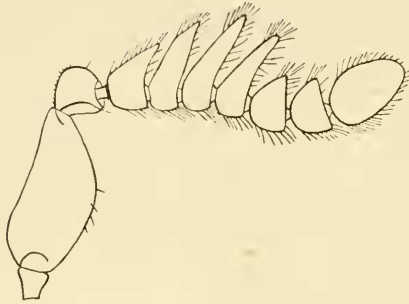


Fig. 5. *Nesyencyrtus kaalae*. Antenna of male.

from the third 1 male and 45 females about November 24. Presumably, these were already parasitized when exposed to the parasites from October 25 to November 7. The parasitized pupa above noted was so closely packed with the pupation cells of the parasite that even the front femora were utilized.

From a parasitized larva of *Nesoprosopis fuscipennis* collected by Dr. F. X. Williams December 14, 1919, on the Manoa Cliff trail, Oahu, there issued 62 females on December 26.

From the larva of a small *Nesoprosopis* sp. possibly *N. koae* Perkins, collected by Dr. Williams, January 4, 1920, on the waterfalls ridge, Manoa Valley, Oahu, at about 1600 feet elevation, and which did not show parasitism when found, there issued 16 males and 10 females on January 27-29.

The Oahu males, which had not been seen previously, proved to be identical with the males from Kilauea, Hawaii, described in these Proceedings, Vol. 4, p. 223. The Kilauea females, however, have the head somewhat thinner fronto-occipitally and the frontovertex proportionately wider or about one-half longer again than wide instead of about twice as long as wide as in the Oahu specimens. The frontovertex is also deeper blue, but the coloration does not differ materially otherwise.

***Nesyencyrtus* sp.**

One female collected at a steam crack near Kilauea, Hawaii,

3800 feet elevation, September 6, 1919 (W. M. Giffard), is apparently a new species, but it would be inadvisable to name it at this time as the males in this genus show better distinguishing characters than the females. It differs from *Kilauea* specimens of *kaalae* in having a slightly different shaped head and longer ovipositor and paler legs. The apex of the front and hind tibiae, the middle tibiae, and all the tarsi except the apical joint are brownish yellow, whereas only the tarsi and apical half of the middle tibiae are pale in *kaalae*.

Nesencyrtus sexramosus n. sp. Figure 6.

Male. Head somewhat thinner fronto-occipitally and of different shape than in the male of *kaalae*; as seen from above it is very strongly transverse or about three times wider than long, the anterior margin almost straight, the sides rounded, the occipital margin concave; as seen from the side it is only slightly thicker fronto-occipitally above than at the oral margin, the occipital margin appearing convex and the face concave above the antennal sockets; as seen from in front it is slightly wider than long and has roughly the shape of a keystone, being well rounded above, and with the sides converging from about the middle of the eyes nearly in a straight line to the broad oral margin; occiput somewhat concave; eyes small, very broadly ovate, only slightly longer than wide; frontovertex about a half wider again than long, its anterior

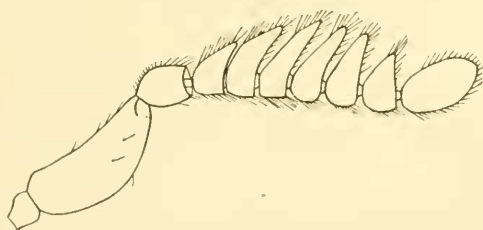


Fig. 6. *Nesencyrtus sexramosus*. Antenna of male.

margin not produced in front of the eyes; ocelli considerably smaller than in *kaalae* and arranged in an obtuse-angled triangle, the anterior ocellus about its own diameter from the anterior margin of the frons, the posterior pair about one-half their own diameter from the eye margins and three times as far from the occipital margin; cheeks longer than wide and somewhat longer than the eyes; face broad, convex below the antennal sockets and rather deeply concave above them to form a large serobal impression.

Antennae inserted far apart a short distance from the oral margin, of similar structure as in *kaalae*, but the scape is not twisted and in side view is rather strongly concave above and convex on the ventral margin,

and as seen from above considerably thickened at base; pedicel a little longer than wide, not produced on inner side as in *kaalae*; funicle joints all ramose on the inner side, the branches of the two middle joints longest, those of the first and sixth joints shortest, the sixth joint being similar to the fifth joint of *kaalae*; club a little longer and narrower than in *kaalae*.

Serobal impression finely lineolate-reticulate and somewhat more coarsely and evidently sculptured than the frontovertex, the fine lines more or less concentric around a pair of small triangular more deeply impressed smooth areas placed on either side of the short median carina on lower half of the impression, this carina not expanding above as in *kaalae*.

In other characters of form, sculpture and pubescence not materially different from *kaalae*.

General color moderately shiny black, the face below antennae and the frontovertex bluish black, the axillae and scutellum slightly bluish, the serobal impression and mesoscutum with a dark greenish luster; antennae blackish, the scape and pedicel shining, the flagellum dull and more brownish; legs black with a luster like that of the body, but all the tarsi and the spur of the middle tibiae brownish yellow, with the apical joint of the tarsi more or less infuscated; wings hyaline, the veins dark brown.

Length of body, 1.13; length of head, 0.438; width of head, 0.483; thickness of head, 0.221; width of vertex at posterior ocelli, 0.228; width of mesoscutum, 0.438; length of forewing, 1.11; width of forewing, 0.499 mm.

Described from one male (holotype) collected in the Kau desert, near Kilauea, Hawaii, at 3800 feet elevation, September 13, 1919 (W. M. Giffard).

Hypergonatopus n. g.

Female. Head subhemispherical, with the face moderately inflexed; eyes rather large and the frontovertex moderately to strongly narrow, ranging from about two and one-half to six times longer than wide, the vertex with a distinct small fovea in each posterior corner; the ocelli arranged in a more or less acute-angled triangle, the posterior pair close to the eye-margin and more or less removed from the occipital margin; face with a broadly ovate or subcircular shallow serobal impression, divided longitudinally by the broad, low protuberance between the antennae. Antennae inserted far apart close to the clypeal margin; the sockets more than twice their own length apart; scape slender, reaching considerably beyond the serobal impression; pedicel obconical, about as long as the first three funicle joints combined; flagellum moderately clavate, the funicle joints short, mostly about as long as wide or a little

transverse and increasing gradually in thickness distad; club three-jointed, rather large, about as long as the funicle and obliquely truncate at apex. Mandibles narrow at apex with three more or less unequal acute teeth, the inner tooth smallest and the middle longest, sometimes con-

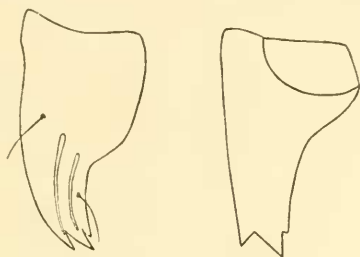


Fig. 7. *Hypergonatopus hawaiiensis*. Mandible of female, interior and dorso-anterior views.

siderably longer than the other two; base of mandible broad and expanded nearly in the same plane with apex. Palpi short, the maxillary pair four-jointed, the two middle joints about as long as thick, the basal joint one and one-half to two times as long, the apical joint about three times as long; labial pair with three nearly equal joints, each about as long as thick.

Thorax of about the usual size and robustness, the mesoseutum strongly transverse, twice or more wider than long; axillae short and transverse, meeting or nearly meeting at their inner tips; scutellum longer than wide, rounded at apex, and more or less longer than the scutum; propodeum short and declivous, but lengthening towards the sides, the spiracles minute and circular. Abdomen ovate, depressed or often more or less deeply sunken in behind the first tergite, nearly as wide at base as the thorax and about one-half to two-thirds as long; ovipositor not protruded and enclosed to the apex of the abdomen by the ventrites.

Legs normal, the middle tibiae enlarging towards apex, the middle tarsi stout at base but tapering towards apex, the spur as long as the first tarsal joint. Wings either of the hemipterous type or fully developed; in either case the marginal vein is elongate or usually about three or four times as long as the rather short stigmal vein, the post-marginal somewhat shorter than the stigmal or sometimes a little longer in the hemipterous wing.

Sculpture throughout is excessively fine or microscopic, the fronto-vertex having extremely fine, shallow, thimble-like punctures; the face and cheeks much smoother or hardly perceptibly shagreened under high magnification; the mesoscutum with very fine scale-like reticulations, the axillae and scutellum with similar sculpture but nevertheless duller, although not opaque; the mesopleura anteriorly with very fine reticulate shagreening, but becoming much smoother on the posterior half; the abdomen entirely smooth and polished.

Pubescence of head unusually sparse, the eyes being perfectly glabrous, but the frontovertex has an orbital row on each side of a few fine setae set in minute pin-punctures, and there is a row of very fine setae on each side of the face at the outer margin of the scrobal impression, each row encircling the antennal sockets and ascending on each side of the facial prominence to about opposite the upper end of the sockets; mesonotum including scutellum with more or less numerous reclinate setae of normal structure, which are scarcely seriatly arranged; abdomen with a row of fine setae on each side of the basal tergite and rather sparsely pubescent on the sides towards the apex; legs and antennae with the usual amount of pubescence; pubescence of the body dark-colored throughout, and not conspicuous.

Coloration of body usually bluish-black, with more or less purple luster on the head and abdomen; the mesoscutum and often the frontovertex, metallic green; wings typically more or less deeply infuscated at extreme base and on the apical two-thirds, but the cloud becomes gradually fainter towards the apex, and is interrupted by a hyaline area at the end of the stigmal vein and by another area on the opposite margin of the disc.

Male. Differs from the female mostly in the structure of the head and antennae. The head is much thinner fronto-occipitally, the eyes considerably smaller, the frontovertex much broader or hardly longer than wide; the face with a similar scrobal impression which reaches upward between the eyes. Antennae inserted just below a line connecting the lower corners of the eyes; the scape rather short but reaching beyond the scrobal impression; pedicel not over twice as long as thick at apex and much shorter than the first funicle joint; flagellum slender and cylindrical, clothed with long, scattered, semi-erect setae; the funicle joints all much longer than thick, the club elongate and about equal to the last two funicle joints combined. Sculpture, pubescence and coloration of the same type as in the female, but the wing pattern is much fainter, although usually apparent.

Genotype: *Echthrogonatopus hawaiiensis* Perkins.

This genus is closely allied to *Echthrogonatopus* Perkins, which in turn is similar to *Epiencyrtus* Ashmead, but *Echthrogonatopus* as represented by its genotype, *E. exitiosus* Perkins, has no foveae on the vertex, the eyes are slightly pubescent, the mandibles with the teeth nearly equal, the scutellum densely and opaquely sculptured, the mesoscutum with appressed, rather dense whitish pubescence, the middle tibiae less enlarged at apex, and the middle tarsi less thickened at base, the wings wholly hyaline, the disc ciliated throughout, the basal area being but little more sparsely pubescent, the speculum narrow and reaching from the stigmal vein obliquely nearly to the

opposite margin. In the male the scrobal impression is deeper and less rounded above, the antennae somewhat shorter, the pedicel longer, stouter and equal to the first funicle joint in length, the head much more coarsely sculptured.

To *Hypergonatopus* belong two species, hithertofore placed in *Echthrogonatopus*, viz. *E. hawaiiensis* Perkins and *Microterys molokaiensis* Ashmead. I am greatly indebted to Dr. James Waterston of the British Museum for carefully comparing specimens of *hawaiiensis* from the Hilo district of Hawaii with Oahu specimens, and for furnishing copious notes drawn up from the type of *molokaiensis*. It is hardly necessary to add that his assistance has greatly facilitated my work on the genus, which otherwise could not have been carried out as fully. Much more recently Dr. Perkins has returned the female type of *hawaiiensis* to the Islands, and I have thus had opportunity to study it personally.

The following synoptic tables may help in distinguishing the species.

FEMALES.

- | | |
|--|------------------------------|
| 1. Head unusually thick; the wings truncated at apex of the stigmal vein and reaching only to the middle of the abdomen; legs yellow | 6 |
| Head moderately thick; the wings fully developed; legs mostly blackish | 2 |
| 2. Wings comparatively broad, about 2.6 to 2.7 times longer than wide; frontovertex about two and one-half times longer than wide | 3 |
| Wings very narrow or about 2.9 times longer than wide; frontovertex about thrice as long as wide, marginal vein about thrice as long as the stigmal; apex of middle tibiae and middle tarsi brownish yellow, knee-joint of middle legs, apex of front and hind tibiae and corresponding tarsi brownish or sometimes somewhat yellowish | <i>hawaiiensis</i> (Perkins) |
| 3. Legs distinctly brownish, somewhat paler towards the tips of the tibiae and on the tarsi, the apical third of middle tibiae and the middle tarsi yellowish..... | 5 |
| Legs almost wholly blackish, except middle tarsi and tibial spur; the apex of middle tibiae only slightly yellowish..... | 4 |
| 4. Facial ridge between antennae not completely dividing the scrobal impression; scutellum abruptly declivous at apex, its disc more densely pubescent; marginal vein typically about twice as long as the stigmal vein, the latter nearly straight and not greatly enlarged at apex..... | <i>vulcanus</i> n. sp. |

- Facial ridge between antennae extending the whole length of the scrobal impression; scutellum more uniformly convex and gradually declivous at apex, its disc more sparsely pubescent and bare at the sides; marginal vein about three and a half times as long as the stigmal, the latter enlarged towards apex and curved towards costal margin.....*oahuensis* n. sp.
5. Wings with faint brownish markings, the discal setae in the basal area weak and colorless, excepting a row next to the submarginal vein; marginal vein about two and one-third times as long as the stigmal*brunneipes* n. sp.
6. First funicle joint somewhat longer than wide and subequal to either of the last two funicle joints in length; metallic luster of body brilliant, the antennae and legs wholly yellow.....*flavipes* n. sp.
- First funicle joint hardly longer than wide and distinctly shorter than the fifth or sixth funicle joint; metallic luster of body comparatively weak; antennae dark brown or fuscous, the scape somewhat yellowish except at base, the last two funicle joints dusky yellow; legs yellow, with the hind tibiae fuscous except at base and apex*hemipterus* n. sp.

MALES.

1. Antennal scape and legs largely black; scutellum duller than the mesoscutum 2
Antennal scape and legs, including coxae yellow; mesoscutum and scutellum metallic green with a brassy luster.....*flavipes* n. sp.
2. Wings about 2.5 to 2.6 times longer than wide..... 3
Wings narrower, about 2.7 to 2.9 times than wide; with faint markings and without a differentiated clear spot beyond apex of the stigmal vein; fifth funicle joint about 1.35 to 1.4 times longer than the first joint, the club hardly or not at all wider than the funicle and slightly longer than the first two funicle joints combined.
hawaiiensis (Perkins)
3. Wings without a differentiated clear spot beyond apex of the stigmal vein 4
Wings with a clear spot beyond apex of venation set with weaker hyaline setae; marginal vein about four times as long as the stigmal; fifth funicle joint about 1.5 times longer than the first, the club very slightly longer than the first two funicle joints combined.*
molokaiensis (Ashmead)
4. Wing pattern distinct, the area just beneath the marginal and stigmal veins deeply stained; medial setae of the basal area of disc strong and pigmented; fifth funicle joint about 1.33 times as long as the first, the club about one-fifteenth longer than the first two funicle joints combined.....*vulcanus* n. sp.
- Wing pattern faint and indistinct, except in a small area just be-

* These characters are based on Dr. Waterston's examination of the

neath the marginal and stigmal veins; medial setae of the basal area of disc weak and hyaline; fifth funicle joint about 1.55 times as long as the first, the club about one-ninth longer than the first two funicle joints combined.....*brunneipes* n. sp.

Hypergonatopus hawaiiensis (Perkins). Figures 7-10.

Echthrogonatopus hawaiiensis Perkins, 1912, Haw. Sugar Planters' Exp. Stat., Ent. Bull. 11, p. 17.

Female. Head nearly hemispherical in shape, as seen from above almost perfectly semi-circular in outline; as seen from in front the cheeks arcuately converge so that the greatest width is about opposite the middle of the eyes; as seen from the side the outline is subtriangular, with the dorsal side moderately rounded and slightly shorter than the facial side, the greatest thickness fronto-occipitally being opposite the lower corners of the eyes; occiput only slightly concave; eyes of moderate size, broadly and slightly obliquely ovate, widest anteriorly and just contiguous with the occipital margin behind; frontovertex about three times longer than wide, slightly widening at the posterior ocelli; the ocelli arranged in an acute-angled triangle, the distance between the posterior

pair about a fourth less than the distance from either to the anterior ocellus, the posterior pair about their own diameter from the eye-margin and nearly twice as far from the occipital margin; cheeks about as long as the width of the eyes; face with a rather large, nearly circular shallow scrobal impression reaching from the oral margin almost to the eyes, arcuately emarginated below by the mouth, and divided longitudinally by the broad low protuberance between the antennae, which usually reaches the upper margin of the impression.

Antennal scape moderately long, slender, and slightly widened at the middle, the ventral margin gently arcuate; pedicel as long as the first three funicle joints combined; first funicle joint a little longer than wide and somewhat longer than any of the three following joints, which are

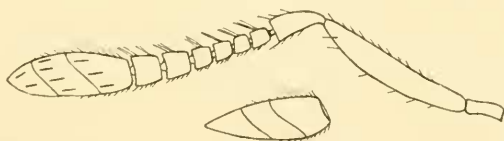


Fig. 8. *Hypergonatopus hawaiiensis*. Antenna of female, with insert of club showing usual shape of the latter.

subequal in length but increase slightly in thickness distad, so that the fourth is a little wider than long; last two funicle joints distinctly longer than those just preceding, but only slightly longer than the first, the sixth barely wider than long; club much wider at base than the preceding joints, and about equal to the last five funicle joints combined.

Thorax moderately convex above; the pronotum weakly arcuate, its

posterior margin subangulated medially; mesoscutum about twice as wide as long; axillae twice as wide as long and acutely meeting medially; disc of scutellum rather convex, the sides and apex strongly elevated and declivous; propodeum sloping backward, very short medially, and moder-



Fig. 9. *Hypergonatopus hawaiiensis*. Forewing of female.

ately long at the sides. Abdomen about one-half as long as the thorax, moderately convex below, and concave above behind the first tergite.

Wings long and narrow, about 2.9 times longer than wide; marginal vein elongate and about three times as long as the stigmal, the latter short and triangularly enlarged towards apex, the postmarginal rapidly tapering and somewhat shorter than the stigmal; speculum narrow and passing into the bare area at the middle of the disc nearly opposite to the end of the submarginal vein; this partly bare basal area with a short row of setae at the posterior margin of the disc, connecting with a group of scattered setae just below the submarginal vein; rest of the disc densely setose, but the setae become finer and hyaline in two areas, one just beyond the apex of the stigmal vein, the other on the opposite side of the disc.

Frontovertex with very fine, shallow, thimble-like puncturation which is slightly coarser and more evident than in *flavipes* or *hemipterus*, this sculpture becoming very delicate or hardly perceptible on the face, and absent on the cheeks, which are smooth and polished; frontovertex also with a row of fine pin-punctures along each orbit; mesonotum with fine, scaly reticulations, the mesoscutum being highly polished, the axillae and scutellum considerably duller, the reticulations on the scutellum becoming finer and at last obliterated towards the apex; both the scutum and scutellum with rather numerous fine, scattered pin-punctures which become somewhat thicker on the apical part of the scutellum; anterior part of mesopleura very delicately rugulose reticulate, the posterior half becoming smoother; propleura and prepectal plates with delicate reticulations somewhat coarser than the sculpture of the mesoscutum; abdomen smooth and highly polished.

Pubescence as described under the genus, the setae on the mesoscutum and scutellum moderately numerous, or considerably thicker than in *flavipes*, the basal tergite of abdomen with a row of only about four setae on each side.

General color bluish-black, the vertex, postorbital region, mesoscutum, lateral and apical margin of scutellum either metallic green or with a strong greenish luster; basal tergite of abdomen metallic greenish with a brassy and purple luster, the venter usually with a more or less evident brassy luster; other parts of the body with a purple luster, which is sometimes brilliant especially on the cheeks and posterior half of the mesopleura, but the axillae and scutellum considerably duller than the rest of the thorax; antennae and legs dark fuscous, the scape and femora nearly black, the apex of front and hind tibiae and corresponding tarsi somewhat brownish, the apical fourth of middle tibiae and the middle tarsi brownish yellow, middle trochanters and a narrow annulus near the base of the middle femora pale yellowish; wings with a small fuscous cloud at extreme base, and a transverse cloud beneath marginal vein extending to the opposite margin, medially produced towards the apex where it expands in the middle of the apical half of the disc, and gradually disappears towards the margins; the cloud being delimited by a clear area at the end of the stigmal vein and by another on the opposite side of the disc, the latter area somewhat fusiform in shape, extending parallel with the margin and basally produced into the transverse cloud beneath the marginal vein.

Length of body, (1.06 to 1.37) 1.33; length of head, 0.462; width of head, 0.487; thickness of head, 0.287; width of vertex at anterior ocellus, 0.120; width of mesoscutum, 0.478; length of forewing, 1.18; width of forewing, 0.407 mm.

Male. Head much thinner fronto-occipitally than in the female, the occiput more deeply concave; as seen from the side it is thickest above the middle, the facial outline meeting the plane of the frontovertex in an angle of somewhat more than 90 degrees; eyes much smaller, somewhat less broadly oval but otherwise about as in the female; frontovertex about a fourth longer than wide, the ocelli arranged in a nearly equi-

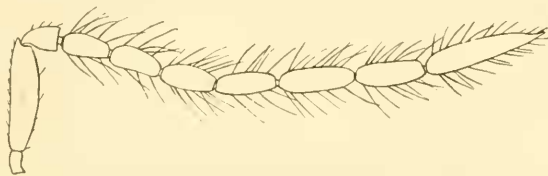


Fig. 10. *Hypergonatopus hawaiiensis*. Antenna of male.

lateral triangle, the anterior ocellus placed a little in front of the middle of the frontovertex; the posterior pair about one-half of their own diameter from the eye-margin, and nearly twice as far from the occipital margin; cheeks nearly twice as long as wide and nearly as long as the eyes; scrobal impression of face subcircular, somewhat longer than wide, reaching upward between the eyes, and divided in its lower two-thirds by the longitudinal low prominence between the antennal sockets. Antennae inserted just below the line connecting the anterior corners of the eyes,

and rather close together, the sockets just touching the ocular line and placed about their own length apart; scape much shorter than in the female and slightly expanded beneath, its length including radicle joint about equal to the pedicel and first two funicle joints combined, yet reaching well beyond the scrobal impression; pedicel about twice as long as thick and two-thirds as long as the first funicle joint; first three funicle joints about three times as long as thick, the following joints somewhat longer, the fifth a little longer than either the fourth or sixth; club slender, tapering to acute apex, about one-ninth longer than the first two funicle joints combined. Thorax and abdomen practically as in the female; the wings a little shorter and wider, about 2.7 to 2.75 times longer than wide, the discal setae about the same, except that there is no area of weaker, hyaline setae at the apex of the venation or on the opposite side of disc. Thimble-like punctures of frontovertex much coarser than in the female, being rather prominent but shallow; sculpture and pubescence otherwise very similar to that of female. Coloration agreeing closely with female, except that the wing-pattern is considerably reduced and much fainter, the extension of the cloud medially often being extremely faint.

Length of body, (0.83 to) 1.06; length of head, 0.370; width of head, 0.412; thickness of head, 0.119; width of vertex, 0.167; width of mesoscutum, 0.372; length of forewing, 1.10; width of forewing, 0.422 mm.

Redescribed from the following specimens all reared from Dryinid cocoons on sugar-cane collected by Mr. Swezey: 5 females, 1 male, Mountain View, Hawaii, August 26-30, 1916; 4 females, Papaikou, Hawaii, October 23, 1908; 3 females, 1 male, Hilo Sugar Company, near Hilo, Hawaii, February 27, 1919; 1 male, Waiakea, Hawaii, July 2, 1913; and 1 female, 1 male, Waiakea, Hawaii, April 13, 1916. The host of this series presumably is *Echthrodelpax fairchildii* Perkins, although there is a possibility that some of the specimens may have come from the cocoons of *Haplogonatopus vitiensis* Perkins.

The type of *hawaiiensis*, a female reared from the cocoon of *Pseudogonatopus perkinsi* (Ashmead), collected by Dr. Perkins in the mountains back of Honolulu, differs slightly from Hawaiian specimens as follows:

Head appears to the eye somewhat thicker fronto-occipitally, but there is hardly any difference by actual measurement; the frontovertex is slightly narrower, with the ocelli in a more acutely angled triangle, the distance between the posterior pair being slightly more than half the distance between either and the anterior ocellus; the facial prominence slightly more arched from end to end, and not quite reaching to the upper margin of the facial impression; eyes just barely separated from the

occipital margin; pedicel slightly longer than the first three funicle joints combined, the first funicle joint about a half longer again than the second; wings 2.92 times longer than wide, the marginal vein slightly over three times as long as the stigmal, pubescence of the mesoscutum and scutellum slightly sparser; coloration the same, except that the apex of the middle femora and the tips of the front and hind tibiae and corresponding tarsi are paler and more yellowish.

Length of body, 1.15; length of head, 0.408; width of head, 0.434; thickness of head, 0.264; width of vertex at anterior ocellus, 0.166; width of mesoscutum, 0.401; length of forewing, 0.990; width of forewing, 0.339 mm.

Dr. James Waterston also kindly compared a male from Oahu furnished by Dr. Perkins (a reared specimen from Tantalus, 1906, and presumably from the type series) with a male from Mountain View, Hawaii, and found the wing pattern slightly more distinct, the basal cloud being more extensive and the disc beyond the venation more deeply tinted medially; the marginal vein proportionately shorter; the club somewhat wider than the funicle and slightly longer than the first two funicle joints combined, the fifth funicle joint about 1.4 times as long as the first joint. This male, according to Dr. Waterston, was only about 0.95 mm. long, the forewing 0.86 mm. long and 0.30 mm. wide.

Hypergonatopus molokaiensis (Ashmead).

Microterys molokaiensis Ashmead, 1901, Fauna Hawaiiensis, 1, p. 322.

This species was described from a single male specimen taken in the mountains of Molokai at three thousand feet, by Dr. Perkins, in June, 1893.

Dr. Waterston's notes on this specimen are as follows:

"Wings hyaline, with the following clouding: veins brown; at the base of the wing a light brown triangular patch occupying the basal one-third of the submarginal cell and sloping to a point on the hind margin opposite the middle of the submarginal vein. It occupies the distal two-thirds of the oblique 'hairless line.' There is the usual clear space distally, parallel to the hind margin, extending in this case to a little beyond half. Beyond the level of the radial knob there is a faint small median cloud connected indistinctly with that behind the marginal.

Dimensions (of wing): Length, 1.15 mm; breadth, 0.44 mm.

Submarginal: marginal: radius: postmarginal:: 170: 60: 15: 15.

Chaetotaxy: On the marginal about ten bristles with twenty-five behind, the latter bristles much closer set than in *hawaiiensis*. Clear space beyond radius larger, with twenty to thirty hyaline bristles.

PROPORTIONS OF ANTENNAL JOINTS (FUNICLE AND CLUB).

	1	2	3	4	5	6	Club
Length	30	34	36	38	45	39	68
Breadth	15	15	16	16	17	17	20''

Hypergonatopus vulcanus n. sp.

Female. Similar to *hawaiiensis* but the eyes are slightly smaller and very narrowly separated behind from the occipital margin, their inner orbits more parallel; frontovertex wider or about two and one-half times longer than wide; ocelli arranged in a nearly equilateral triangle, the distance between the posterior pair hardly less than the distance from either to the anterior ocellus; scrobal impression of face slightly deeper; antennae similar, but the first funicle joint is proportionately a little longer, the sixth funicle joint more abruptly wider than the preceding joint; wings shorter and wider or about 2.6 to 2.7 times longer than wide, the marginal vein shorter or only slightly more than twice as long as the stigmal, the latter proportionately longer, nearly straight and more nearly of the same thickness throughout, the postmarginal also proportionately longer. Sculpture hardly distinguishably different from *hawaiiensis*, but apparently a little coarser.

Coloration as in *hawaiiensis*, but with somewhat weaker metallic luster, legs somewhat darker, the pale annulus at base of middle femora hardly apparent, the middle tibiae almost wholly dark, or only slightly brown or yellowish at extreme apex. Wings with a small, somewhat semi-circular darker cloud just beneath the marginal and stigmal veins, the pattern otherwise similar.

Length of body, (0.94 to) 1.05; length of head, 0.358; width of head, 0.407; thickness of head, 0.233; width of vertex at anterior ocellus, 0.120; width of mesoseutum, 0.370; length of forewing, 0.933; width of forewing, 0.356 mm.

Male. Similar to the male of *hawaiiensis*, differing principally in the shorter, wider wings, which are about 2.5 times longer than wide; the club somewhat wider than the funicle and proportionately shorter, or only about one-fifteenth longer again than the first two funicle joints combined. Coloration similar with differences as noted in case of the female, the wings, however, more deeply stained, a small spot beneath the marginal and stigmal veins being very deeply pigmented.

Length of body, 0.91; width of vertex, 0.162; width of mesoseutum, 0.353; length of forewing, 0.943; width of forewing, 0.379 mm. The head is slightly shrunken so that other measurements are not possible.

Described from four females, two males (holotype, allotype, and paratypes) reared from a Dryinid cocoon, probably of *Pseudogonatopus perkinsi* (Ashmead), Kilauea, Hawaii, February 8, 1917 (F. Muir), and from the following paratypes:

One female collected at twenty-nine miles, Kilauea, Hawaii,

January, 1917 (Giffard and Muir), with length of body, 1.22 mm. and marginal vein about 2.9 times longer than the stigmal.

One female collected at an old steam crack, four thousand feet, Kilauea, Hawaii, September 8, 1919 (W. M. Giffard), body 1.11 mm. long and marginal vein slightly less than three times longer than the stigmal.

One female dissected from a Dryinid cocoon, probably of *Pseudogonatopus perkinsi*, which in turn was reared from parasitized nymphs of *Ilburnia coprosmicola* Muir, collected on *Coprosma ernodioides* at twenty-seven miles, near Kilauea, Hawaii, July 30, 1918 (W. M. Giffard), has the body 1.19 mm. long and the marginal vein only slightly longer than the stigmal, the apex of scutellum, sides of propodeum and base of abdomen with a brilliant purple luster.

This series of *Hypergonatopus* from the Kilauea region, Hawaii, shows a remarkable degree of variation in the proportions of the marginal and stigmal veins, but as I cannot discover any other tangible differences between the extremes, it seems reasonable to suppose that they all belong to one species. The holotype shows an intermediate condition.

Hypergonatopus oahuensis n. sp.

Female. Very similar to *vulcanus* and differing in the same way that it does from *hawaiiensis*, but the facial prominence between the antennae extends the whole length of the scrobal impression, the head is thicker fronto-occipitally, the scutellum more uniformly convex, with the declivity at apex distinctly more gradual. Sculpture similar, but the reticulation of the scutellum is coarser and distinctly enlarging towards the sides, a condition which holds in a lesser degree for *vulcanus*; pubescence considerably sparser on the scutellum, the sides of which are entirely bare, and the median longitudinal rows of setae are made up of only about five or six bristles.

Similar to *vulcanus* in coloration, or bluish black with a green luster on frontovertex, mesoscutum, apex of scutellum and on the basal tergite of abdomen in some aspects; other parts of the body with a bluish luster which is weak except on the abdomen; antennae black and becoming slightly brownish on the flagellum; legs black, with front and hind tarsi brownish, the apex of middle tibiae and the middle tarsi brownish yellow.

Wings very similar to *vulcanus*, but the marginal vein is 3.5 times longer than the stigmal, the latter enlarged towards apex and curved towards the costal margin.

Length of body, 1.18; length of head, 0.398; width of head, 0.426;

thickness of head, 0.273; width of vertex at anterior ocellus, 0.120; width of mesoscutum, 0.393; length of forewing, 1.12; width of forewing, 0.422 mm.

Described from one female (holotype), collected on Mt. Kaala, Oahu, between 2500 and 3000 feet elevation, July 22, 1917 (Timberlake).

Hypergonatopus brunneipes n. sp.

Female. Very close to *vulcanus*, but having the head somewhat broader and slightly thinner fronto-occipitally; thorax more robust and wider, the scutellum wider across the base; sculpture of the mesonotum somewhat coarser, and the pubescence of the mesoscutum very much sparser; setae in the hyaline area near base of forewing greatly reduced in size and hyaline; marginal vein about 2.7 times longer than the stigmal, the latter enlarged at apex and curved towards the costal margin.

Coloration similar to *vulcanus*, the head with a rather weak bluish and purple luster on the frontovertex; the mesoscutum and apex of scutellum metallic green, the abdomen above and side of propodeum with a strong purple luster, changing to greenish in some aspects on the basal tergite, the venter with a greenish luster; mesopleura dark brown, shining but hardly metallic; antennae and legs dark brown, with apex and base of front tibiae, apex of middle femora, apical half of hind tibiae, and front and hind tarsi pale brown, the trochanters, annulus at base of femora, apical third of tibiae and the tarsi of middle legs yellowish. In one specimen (paratype) the pleura and legs are much paler brown. Wing markings similar to *vulcanus*, but much fainter.

Length of body (1.01 to 1.16), 1.14; length of head, 0.386; width of head, 0.473; thickness of head, 0.249; width of vertex at anterior ocellus, 0.120; width of mesoscutum, 0.412; length of forewing, 1.06; width of forewing, 0.403 mm. The head is slightly shrunken, but the measurements are believed to be tolerably accurate.

Male. Very similar to the male of *vulcanus*, but differing in the same way as the female in regard to the sculpture, pubescence and wing characters. Coloration similar to that of the female but the upper part of the face and the frons with a greenish luster, the lower part of the face, the cheeks and vertex with a purple luster, and the pleura, antennae and legs are rather pale brown. Wings almost hyaline, excepting a small spot beneath the marginal vein.

Length of body, 0.98; width of vertex, 0.174; width of mesoscutum, 0.396; length of forewing, 1.05; width of forewing, 0.417 mm. The head is so much shrunken that other measurements are not possible.

Described from three females, one male (holotype, allotype, and paratype), reared from a Dryinid cocoon, probably of *Pseudogonatopus perkinsi* (Ashmead), reared in turn from *Ilburnia koae* (Kirkaldy), Kilauea, Hawaii, January, 1915 (F. Muir).

Hypergonatopus flavipes n. sp.

Female. Head large and unusually thick fronto-occipitally, forming somewhat more than a hemisphere and distinctly wider than the thorax; dorsal surface very strongly and uniformly convex, the anterior outline forming a considerably larger arc than a semicircle; as seen from in front the outline is perfectly rounded above, but the cheeks converge slightly in a curve to the broad and truncate oral margin; as seen from the side the anterior outline is well rounded except that the face is slightly flattened at the scrobes; occiput only slightly concave; eyes very large and broadly oval, widest anteriorly and touching the occipital margin behind; frontovertex about six times longer than the least width, very narrow anteriorly and gradually widening behind so that the width is about one-half greater at the occipital margin; ocelli very minute and arranged in a very acute-angled triangle, the anterior ocellus at the center of the frontovertex, the posterior pair touching the eye-margin and far removed from the occipital margin; cheeks a little more than one-half as long as the eyes and very broad above; face only slightly inflexed, the scrobes in the form of a shallow, very broadly ovate impression about as wide as long and divided below by a broad, low ridge between the antennae, the impression of about the same size and depth as in *hawaiensis*, but less circular.

Antennal scape slender, curved, slightly wider at the middle, the ventral margin arcuate; pedicel as long as the first two funicle joints combined; first funicle joint somewhat longer than wide and about equal to either of the last two joints in length, but considerably narrower; next two joints about as wide as long, the fourth somewhat shorter and slightly wider than long, the last two joints distinctly longer than those preceding, the fifth about as wide as long, the sixth slightly wider than long; club missing except part of the basal joint, but presumably about as in *hemipterus*.

Thorax rather depressed above, the pronotum transverse, with its posterior margin only slightly arcuate; mesoseutum short and strongly transverse or about two and one-half times wider than long; axillae not greatly wider than long, and slightly separated medially; scutellum distinctly longer than wide, rather acute at apex, the disc depressed, the lateral margins and apex well elevated and declivous. Abdomen hardly longer than one-half of the thorax, the first tergite prominent, the following tergites deeply sunken in and telescoped within the first segment.

Wings of the hemipterous type or truncate at apex of the stigmal vein, the apical margin rounded, marginal vein between four and five times longer than thick and about three as long as the stigmal, the postmarginal slightly shorter than the stigmal vein; area of disc beneath the submarginal vein with about six or seven scattered, very minute hyaline setae; area beneath the marginal vein densely setose, the speculum distinct.

Frontovertex with excessively minute and delicate thimble-like sculp-

ture appearing smooth under low magnification, and with a row of sparse, minute, setiferous punctures at the orbits; mesoscutum polished and with very fine, scale-like reticulations, the axillae and scutellum slightly duller with similar reticulations, those of the scutellum somewhat coarser; mesonotum also with a few, extremely minute, scattered setiferous pin-punctures, those of the scutellum slightly larger and rather more numerous, and distributed sparsely over the disc from base to apex; mesopleura microscopically rugulose anteriorly, but becoming smooth on the posterior half, prepectal plates finely reticulate; propodeum smooth and polished, and with a median carina; abdomen smooth and highly polished.

Pubescence of the head about as in *hawaiiensis*; collar of pronotum with a row of fine setae somewhat coarser than those of the head, mesoscutum with sparse scattered setae like those of pronotum, the scutellum with slightly coarser, more numerous setae; sides and apex of abdomen with a few fine setae, the basal tergite with a row of about six fine setae on each side near the middle.

Head blue-black with a purple luster; mesoscutum bright metallic green, the axillae and scutellum duller green; pronotum, pleura and propodeum with a strong purple luster; basal tergite of abdomen bright metallic green, the remainder of abdomen brilliant metallic purple; antennae and legs entirely yellow, the coxae and base of femora paler, the general color approximating yellow ochre of Ridgway; apical fourth of wing beneath marginal vein and small area at extreme base fuscous, the marginal and stigmal veins dark brown, but submarginal except basal part nearly hyaline; pubescence of body dark and inconspicuous.

Length of body, 1.18; length of head, 0.476; width of head, 0.490; thickness of head, 0.332; least width of frontovertex, 0.073; width of mesoscutum, 0.424; length of forewing, 0.552; width of forewing, 0.216 mm.

Male. Differs from the female principally in the shape of the head, which is much thinner fronto-occipitally with the face distinctly inflexed; as seen from above the outline of the head is semicircular; as seen from in front the cheeks arcuately converge more strongly than in the female; as seen from the side the dorsal part is well rounded, but the face from the lower third of the eyes to just above the clypeal margin is strongly flattened and forms an obtuse angle with the plane of frontovertex; eyes hardly more than one-half as large as in the female, broadly oval and widest near the middle; frontovertex with parallel sides and about a half longer again than wide; ocelli large, arranged in a nearly equilateral triangle, the posterior pair only slightly farther apart than the distance from either one to the anterior ocellus, about one-half their diameter from the eye-margin and about one and one-half times their diameter from the occipital margin; cheeks longer than wide and slightly longer than the width of the eyes; face comparatively larger than in the female, the upper part surrounding the antennal sockets distinctly flattened and also continuous with the scrobal impression, which is semicircular and

reaches upward between the eyes. Antennae inserted close together on a level with the lower corners of the eyes, the sockets less than own length apart; scape somewhat shorter and straighter than in the female, but otherwise similar, the rest of antennae missing. Wings evidently not abbreviated as in the female, but they have been much mutilated by psocids, the apical half of each missing, but enough remains to show a fuscous cloud beneath the marginal vein, bounded by the speculum towards the base of the wing. Sculpture of the frontovertex more distinct than in the female, the reticulation of the mesoscutum somewhat coarser and distinctly enlarging along its anterior margin especially medially, the reticulation of scutellum about like that of the scutum. Pubescence as in the female, except that the fine setae on the lower part of the face are more scattered and arranged transversely near the clypeal margin. In other structural characters and in coloration agreeing closely with the female.

Length of body, 1.06; length of head, 0.391; width of head, 0.431; thickness of head, 0.231; width of frontovertex, 0.172; width of mesoscutum, 0.403 mm.

Described from three females, one male (holotype, allotype, and paratypes) reared from a Dryinid cocoon, presumably of *Pseudogonatopus perkinsi* (Ashmead), collected at Halawa, Oahu, September 12, 1909 (O. H. Swezey).

***Hypergonatopus hemipterus* n. sp.** Figure 11.

Female. Structurally nearly identical with *flavipes*, but the scape is a little narrower and widest just beyond the middle; the first funicle joint hardly longer than wide and distinctly shorter than either the fifth or sixth joint, the second to fourth joints subequal with the fourth, only a trifle shorter, the last two funicle joints as in *flavipes*; club considerably wider than the last funicle joint and as long as the five preceding joints combined, its apical joint obliquely truncate beneath. Wings



Fig. 11. *Hypergonatopus hemipterus*. Antenna of female.

abbreviated in the same manner, but more squarely truncate at apex; marginal vein shorter and stouter, but over three times longer than the stigmal, the postmarginal stout and a little longer than the stigmal. Sculpture and pubescence nearly the same as in *flavipes*, although the mesonotum is slightly more coarsely reticulate.

Coloration similar, but the metallic luster is much weaker and the antennae and hind tibiae are much darker; head shining black, with a very weak bluish luster, except the cheeks and postorbital region which have a rather strong purplish and dark green luster, mesonotum metallic

green, the axillae and scutellum not much duller than the mesosentum; pronotum and pleura darker than in *flavipes*, the purple luster on the latter rather strong, propodeum shining, metallic brownish as in *flavipes*; abdomen the same as in *flavipes* except that the metallic luster is greatly diminished; antennae dark brown or fuscous, the scape except at base suffused with yellowish, and the last two funicle joints dusky yellow; legs yellow as in *flavipes*, but the hind tibiae are fuscous except at base and apex; wing markings as in *flavipes*.

Length of body, 1.11; length of head, 0.426; width of head, 0.419; thickness of head, 0.273; least width of frontovertex, 0.064; width of mesosentum, 0.351; length of forewing, 0.469; width of forewing, 0.191 mm.

Described from two females (holotype and paratype), collected along the trail on Kaunuuohona, Oahu, January 7 and September 9, 1917 (Timberlake).

Aulonops n. g.

Closely allied to *Hypergonatopus* and differing chiefly in the shape of the head, and particularly of the face. Outline of the head as seen from above semi-circular, as seen from the side triangular with the dorsal and facial sides about equal, their planes meeting in a somewhat acute angle, the dorsal outline moderately convex and the facial side concave; as seen from in front, the head is considerably wider than long, the dorsal surface strongly rounded from side to side, the cheeks from a short distance below the eyes converging sharply to the broad and emarginate oral margin; occiput rather deeply concave; eyes moderately



Fig. 12. *Aulonops bifasciata*. Mandible of female, anterior view.

large, broadest anteriorly and almost touching the occipital margin behind; frontovertex about thrice as long as wide, and with a small fovea at each posterior corner; cheeks rather short and strongly narrowing towards the mouth.

Face considerably inflexed and with a deep transverse scrobal impression suggestive of the conditions found in *Chrysoplatycecus*, but here the angle between the face and the frons is well rounded off, and the angle between the anterior and posterior face of the impression is obtuse; as seen in frontal view of head the outline of the impression is nearly square except that the anterior corner of the square is strongly truncated by the mouth; posterior face of the impression is furthermore concave from side to side and has two narrow, shallow, longitudinal furrows near the middle to receive the scapes at rest; anterior face of the impression is much smaller and composed for the most part of the

broad, slightly convex space between the antennal sockets. Mandibles similar, but the two inner teeth are very short and subequal, and taken together they are deeply divided from the long, acute ventral tooth.

Scutellum distinctly longer than in *Hypergonatopus* and more pointed at apex. Middle tarsi nearly of the same thickness from base to apex. Abdomen of the same size and shape, but the ovipositor issues from near the base of the venter. Sculpture of the same type as in *Hypergonatopus*, but the reticulations of the mesoscutum are very faint, and the scutellum is nearly smooth and not duller than the scutum. In other respects similar to species of *Hypergonatopus*.

Genotype: *Aulonops bifasciata* n. sp.

***Aulonops bifasciata* n. sp.** Figures 12-14.

Female. Frontovertex narrowest in front of the ocelli and slightly widening towards the occipital margin; ocelli in an acute-angled triangle, the distance between the posterior pair about a third less than the distance from either to the anterior ocellus, the posterior pair about one-half their own diameter from the eye-margin and somewhat more than twice as far from the occipital margin. Scape slender, reaching beyond the scrobal impression, thickest at the middle, the ventral margin slightly arcuate; pedicel nearly three times as long as thick at apex and fully equal to the first three funicle joints combined; flagellum gradually increasing in thickness distad; funicle joints all wider than long, the first four nearly equal in length, the first one but slightly wider than long,

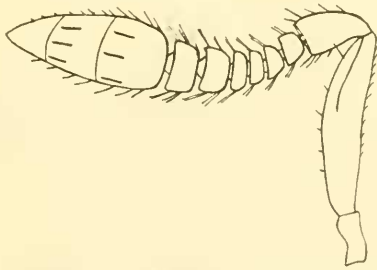


Fig. 13. *Aulonops bifasciata*. Antenna of female.

the fourth about twice as wide as long, last two funicle joints about twice longer than those preceding, each about one-half wider again than long; club rather elongate oval in shape, somewhat obliquely truncate and acute at apex, and about equal in length to the funicle and one-half of the pedicel combined.

Mesoscutum strongly transverse or nearly two and one-half times wider than long, its posterior margin straight; axillae about two and one-half times as wide as long, their inner tips very acute and nearly meeting; scutellum about one-half longer again than the scutum, rather strongly convex and declivous at the sides and apex. Forewing about 2.54 times longer than wide; the marginal vein elongate or about four times as

long as the stigmal, the latter rather short and capitate at apex, the postmarginal about one-half as long as the stigmal; setae of the disc arranged nearly as in *Hypergonatopus hawaiiensis*, except that there is a short, bare area extending entirely across the disc beneath the apical part of the submarginal vein.

Frontovertex with microscopic, shallow, thimble-like puncturation and with a row of fine pin-punctures at the margin of the eyes; face and lower part of the cheeks very finely and delicately reticulate, the cheeks becoming smooth and polished next to the eyes; mesoscutum microscopically reticulate and moderately shiny; the scutellum medially at base with a similar sculpture, which gradually becomes effaced towards the sides and apex, the disc also with a few scattered minute pin-punctures; mesopleura with very fine longitudinal lineolations on the anterior and ventral part, becoming smooth and polished posteriorly; abdomen entirely smooth and polished.

Pubescence, sparse, dark-colored and inconspicuous, the eyes glabrous, the mesoscutum and disc of scutellum with very fine scattered setae; the abdomen with a few very fine setae at the sides and apex.

Head and body shining, bluish black with a blue or purplish luster, the cheeks next to the eyes, the mesopleura, propodeum and abdomen with a brilliant purple luster; face metallic greenish, the frontovertex and mesoscutum with a slight greenish luster in some aspects, but bluish in others; antennae and legs dark fuscous or blackish, the front and hind tarsi, apex of middle femora and tibiae brownish, the middle tarsi,

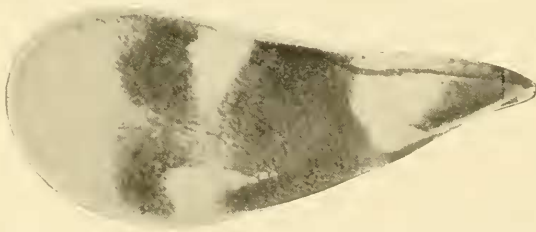


Fig. 14. *Aulonops bifasciata*. Forewing of female.

except the apical joint and the tibial spur, brownish yellow. Wings with a dark brown cloud except on the apical fourth, the cloud broken by three clear hyaline spots, a large triangular spot beneath the submarginal vein, an acutely angular spot suspended from the costal margin at apex of the stigmal vein, and a somewhat quadrate spot opposite which is narrowly extended basad on its inner side; the space between these two clear areas about as wide as one-third of the disc and less deeply pigmented, as is also the case with the middle portion of the clouded area just distad.

Length of body, 1.09; length of head, 0.375; width of head, 0.466;

thickness of head, 0.259; width of vertex at anterior ocellus, 0.118; width of mesoseutum, 0.429; length of forewing, 1.09; width of forewing, 0.427 mm.

Described from one female (holotype), collected in the Waianae Mountains between Kolekole Pass and Mt. Kaala, Oahu, March 9, 1911 (D. T. Fullaway).

Euchalcerinys n. g.

Female. Head moderately thick fronto-occipitally, the face strongly inflexed; as seen from above more strongly rounded on the sides than anteriorly; as seen from the side thickest considerably above the middle, the dorsal outline well rounded and somewhat shorter than the facial side; as seen from in front the outline is well rounded above, and slightly convergent on the sides towards the mouth, occiput moderately concave, its dorsal margin not strongly acute; eyes of medium size and nearly circular in outline, posteriorly just reaching to the occipital margin; frontovertex about three times as long as wide and without foveae at the posterior corners; ocelli arranged in an equilateral triangle, the posterior pair at the eye margins, and about three times their own diameter from the occipital margin; cheeks about as long as the diameter of the eyes, and without a genal suture; face with a shallow, semi-oval scrobal impression extending upward between the lower borders of the eyes and divided inferiorly by the facial prominence between the antennal sockets, which is short, not greatly longer than wide, and convex below.

Antennae inserted a moderate distance apart, rather close to the oral margin, the distance between the sockets about a third greater than the distance from either to the oral margin and about one-half the distance from either to the nearest point of the eye; scape slender, and rather

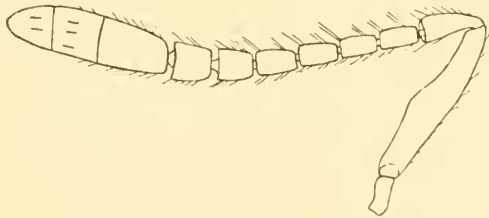


Fig. 15. *Euchalcerinys apicicornis*. Antenna of female.

long, reaching about to the plane of the frontovertex, and somewhat thicker at the middle; pedicel obconical, three times as long as thick at apex or nearly as long as the first two funicle joints combined; flagellum moderately clavate, the funicle joints all longer than wide, but distinctly increasing in thickness distad, the sixth joint about one-half wider again than the first; club three-jointed, large, oval, bluntly rounded at apex.

somewhat wider than the last funicle joint and as long as the four preceding joints combined.

Mandibles rather narrow at apex with three acute teeth, of which the two ventral are subequal and not deeply divided from each other, the inner or dorsal tooth considerably smaller; base of mandible moderately wide and expanded nearly in the same plane as the apex. Palpi short, the maxillary pair three-jointed, with the apical joint tapering and equal

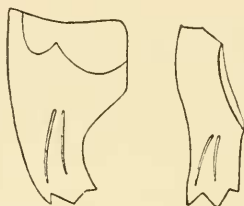


Fig. 16. *Euchalcerinys apicicornis*. Mandible of female, dorso-anterior and anterior views.

to the other two joints combined; labial palpi with three very short, equal joints, the two basal joints thickest at their union, the apical joint narrower and tapering.

Thorax of normal structure and robustness, the notum strongly convex; mesoseutum twice as wide as long, its posterior margin nearly straight, or only slightly produced medially; axillae over twice as wide as long, their inner tips very acute and meeting; scutellum about as long as the mesoseutum, or as long as its own width at the base, the disc strongly convex, the apex bluntly rounded; propodeum extremely short medially, but moderately long at the sides. Abdomen as wide as the thorax and nearly as long, triangular-ovate in shape and acute at apex; the basal tergite very prominent, longitudinally convex, and almost one-half as long as the whole abdomen; following tergites deeply sunken in and, excepting the apical one, mostly withdrawn beneath the first tergite; ovipositor barely exerted and not enclosed by the ventrites except basally.

Legs slender and rather longer than usual, the middle tarsi not much thickened at base and only slightly tapering, the spur of the middle tibiae slender and about two-thirds as long as the first tarsal joint. Wings large and broad, the venation much shorter than one-half the length of the disc; the submarginal vein close to the margin so that the costal cell is unusually narrow, marginal vein not much longer than wide and considerably shorter than the moderately long stigmal vein, the postmarginal vein very short and spur-like; speculum reaching nearly across the disc and widening below; disc beyond the speculum densely, uniformly pubescent, the setae in the basal area considerably sparser and larger, but becoming shorter and transparent towards the posterior margin.

Face, cheeks, most of pleura, the scutellum and abdomen smooth, the

abdomen being highly polished; frontovertex with microscopic, very shallow thimble-like puncturation, appearing smooth and shining under low magnification; mesoscutum very finely reticulate, the anterior end of the mesopleura very delicately lineolate.

Pubescence rather sparse and inconspicuously colored; the frontovertex with only a few fine setae, the eyes with rather sparse, very short, erect setae; mesonotum with sparse, subseriately arranged setae which are longer on the scutellum, the apex of the scutellum with a pair of still longer bristles; sides of propodeum and abdomen more thickly pubescent than other parts of the body.

Male. Head but little, if any, thinner than in the female; as seen from above, strongly rounded anteriorly, with the frons slightly protuberant and the occipital margin concave; as seen from the side, thickest just above the lower corners of the eyes, the dorsal side rather weakly rounded and much shorter than the facial side, the latter nearly straight except that the facial ridge between antennae is visible as a protuberance below; as seen from in front it is well rounded above, with the vertex slightly protuberant, but the cheeks converge below nearly straight to the moderately wide and somewhat emarginate oral margin; eyes somewhat smaller than in the female, nearly round with the posterior margin somewhat oblate; frontovertex about one-half longer again than wide; ocelli large, arranged in a little less than a right-angled triangle, the posterior pair slightly the farthest apart, about half their own diameter from the eye margin and twice as far from the occipital margin, the anterior ocellus placed at the middle of the frontovertex; cheeks nearly as long as the width of the eyes, the genal suture fine but distinct; face

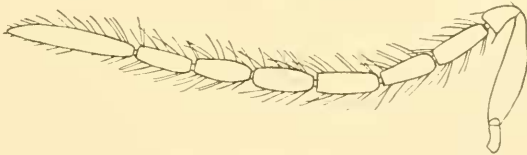


Fig. 17. *Eucharcerinus apicicornis*. Antenna of male.

with a rather deep, oval, longitudinal serbal impression, extending from the oral margin well upward between the eyes or the whole length of the face, nearly twice as long as wide, and divided on the lower half by a well elevated ridge between the antennae, which is slightly convex from end to end as seen from the side.

Antennae inserted rather close together far from the oral margin, the upper ends of the sockets about touching the ocular line, the distance between the sockets nearly equal to the distance from either to the nearest point of the eye, and about one-fourth less than the distance from the lower end of the sockets to the oral margin; scape moderately long, reaching well beyond the serbal impression, rather stout and fusiform in shape; pedicel somewhat longer than thick at apex and about equal to one-half of the first funicle joint; flagellum elongate, cylindrical,

rather densely clothed with long semi-erect hairs, which decrease in length on the club gradually towards the apex; funicle joints all about three times longer than thick, the club no thicker than the funicle, one-third as long and tapering to the acute apex.

Thorax, legs, and wings similar to the female, the abdomen much shorter, a little wider than long, rounded at apex, and about one-half as long as the thorax, the first tergite prominent, the following tergites, except the apical one, almost entirely concealed beneath the first, but not deeply sunken in.

Frontovertex with distinct but fine, thimble-like puncturation much more evident than in the female; face, except in the depths of the scrobal impression, and the inner margin of the cheeks very finely and mostly transversely lineolate; mesoseutum much more coarsely reticulate than in the female, the reticulations large anteriorly and gradually becoming much finer towards the posterior margin; shagreening of the mesopleura rather more evident and extensive than in the female; sculpture otherwise nearly as in the female.

Pubescence of head distinctly less sparse than in the female, there being fine setae scattered over the frontovertex, on the sides of the face and on the lower parts of the cheeks, and the setae of the mesoseutum are arranged much more distinctly in rows.

Genotype: *Euchalcerinys apicicornis* n. sp.

This genus is similar to both *Chalcerinys* and *Helegonotopus* of Perkins, but in each of those genera the head is thicker and the antennae are slenderer and inserted a little higher on the face. *Chalcerinys* besides has a much stronger, denser sculpture, a distinct genal suture, and the apical margin of the basal tergite distinctly emarginate; its male has the ridge between antennal sockets very prominent and extending towards the oral margin as a sublunate rostriform crest; the scape very stout, moderately long, of equal width throughout, and somewhat spirally twisted, the pedicel short and flattened; the funicle joints all flattened, unequal in size but all longer than wide, the first joint largest, it being both wider and longer than the following joints. *Helegonotopus* also is much more sculptured than *Euchalcerinys*, the scutellum being opaque and densely shagreened, the genal suture distinct, the maxillary palpi four-jointed, the marginal vein about twice as long as thick and subequal to the stigmal; while the male has the scape rather short and flattened, very wide at base and strongly narrowed to the apex; the pedicel short, the flagellum slender, elongate cylindrical, clothed with long hairs as in *Euchalcerinys*,

but the funicle has only five joints decreasing in length distad, the morphological sixth joint having become fused with the club; the latter is as long as the last two funicle joints combined and shows a faint indication of a suture at its middle.

Euchalcerinys apicicornis n. sp. Figures 15-17.

Female. General color metallic bluish black; the face, cheeks, scutellum, pleura, and abdomen, except the basal tergite, with a purple luster; frontovertex slightly greenish, the mesoscutum more evidently metallic greenish in some aspects, but in others bluish black, the luster in direct dorsal view iridescent; apex of scutellum and basal tergite of abdomen metallic green with a brilliant variable luster, chiefly golden or brassy and purple; antennae dark brown, the base of the scape and radicle joint paler brown, the club pale brownish yellow; legs including coxae yellow, the hind tibiae slightly brownish on the basal half, the apex of last joint of the tarsi dark brownish; wings very faintly and uniformly tinted with fuscous or almost hyaline, the veins pale yellowish; mandibles and protruded part of ovipositor brown.

Length of body, 0.98; length of head, 0.391; width of head, 0.412; thickness of head, 0.214; width of vertex at posterior ocelli, 0.113; width of mesoscutum, 0.382; length of forewing, 1.20; width of forewing, 0.499; length of protruded part of ovipositor, 0.045 mm.

Male. General color metallic bluish black, but the face, inner half of the cheeks, frontovertex, mesoscutum, apex of scutellum and basal tergite of abdomen metallic green, the luster of these parts much less variable than in the female, the frontovertex dullest; outer half of the cheeks and disc of scutellum with a brilliant purple luster, the pleura and remainder of the abdomen with a weaker luster; antennae dark brown, the base of the scape and apex of the pedicel pale brown; legs colored as in the female, but the hind tibiae, except at base and apex, more distinctly brownish, and the first three joints of the hind tarsi are slightly brownish; other parts as in the female.

Length of body, 0.84; length of head, 0.329; width of head, 0.353; thickness of head, 0.207; width of vertex at posterior ocelli, 0.141; width of mesoscutum, 0.346; length of forewing, 1.09; width of forewing, 0.447 mm.

Described from one female (holotype) collected at Waiahole, Oahu, March 28, 1915 (O. H. Swezey); one male (allotype) collected at Kalihiuka, Oahu, April 27, 1919 (J. C. Bridwell); and one male (paratype) collected on the Manoa Cliffs trail, Oahu, September 1, 1918 (Timberlake), the latter specimen with the head missing.

Anabrolepis extranea Timberlake.

A second specimen of this interesting species was taken by

Dr. F. X. Williams on *Metrosideros* in the upper part of Manoa Valley, Oahu, on July 25, 1920. It has a pair of long, filiform bristles at apex of the scutellum, which were broken off in the type.

A specimen of *Anabrolepis* recently received from Dr. R. J. Tillyard, who reared it from *Aphelinus mali* material on apple from the United States (the real host was probably one of the Diaspinae), is close to *A. zetterstedtii* (Westwood). It differs from *extranea* in having the last two funicle joints yellowish; the pubescence of the mesoscutum somewhat sparser and blackish (in *extranea* the pubescence of the mesoscutum is neither so sparse nor dark-colored as indicated in the original description, but pale brownish and moderately abundant): the wings distinctly wider in proportion to the length, the pattern of the same type but differing slightly in detail, the apical dark area being longer than wide, the subapical clear spot on anterior margin strongly narrowed inwardly or subtriangular in shape, with only its inner apex provided with dark-colored setae, the setae of the marginal vein dense, coarse and tapering, and apparently none of them spear-shaped.

A. zetterstedtii, according to Mercet (Fauna Iberica, Himen., Fam. Encirtidos, p. 678, 1921), is similar to the above specimen from North America, but the pubescence of the pronotum and mesoscutum is white, and the antennae seem to be somewhat slenderer, with the last two funicle joints slightly longer than thick.

Quaylea whittieri (Girault).

Quaylea aliena Timberlake, Proc. Haw. Ent. Soc. 4, p. 216, 1919.

There seems to be no reasonable doubt that *aliena* is a synonym of *whittieri*, as the receipt of a large series from California discloses numerous specimens that cannot be distinguished from *aliena*. The differences pointed out in the description of *aliena* seem to be correlated, for the most part, with the smaller size of the types compared with the larger California specimens which I then had at my disposal, which were reared mostly from *Scutellista*.

This species has become one of considerable importance in California, as it has greatly increased since the introduction

of *Aphycus lounsburyi* Howard, and now parasitizes a large percentage of this *Aphycus* in certain localities.

An account of the introduction of *Quaylea* into California is given by Alexander Craw in his Horticultural Quarantine Report for the months of December, 1900 to April, 1901 (Eighth Biennial Report, State Board Horticulture, California, for 1901-2, pp. 196, 197, 1902). Craw calls the species *Hemencyrtus crawii*, a manuscript name given by Ashmead. I have seen one of the original specimens at Sacramento, Cal., determined by Craw as *Hemencyrtus crawii*, so that there is not any doubt about the identity of *crawii* and *Quaylea whittieri*.

I have also recently received a few specimens of this species from Dr. R. J. Tillyard, which were reared from *Saissetia oleae* at Sydney, New South Wales, by Mr. Luke Gallard.

Notes on the Identity and Habits of *Blepyrus insularis* Cameron (Hymenoptera, Chalcidoidea).

BY P. H. TIMBERLAKE.

(Presented at the meeting of December 1, 1921.)

The Encyrtid chalcid-fly described by Cameron under the name of *Encyrtus insularis* has been a puzzle to everyone who has attempted to identify the insect from the description alone, and it has consequently been described several times and referred to several incorrect genera.

For assistance in working out the synonymy of this parasite, I am much indebted to Dr. James Waterston of the Imperial Bureau of Entomology, who compared Hawaiian specimens with the type of *insularis* in the British Museum, and to Dr. R. C. L. Perkins for transmitting an old specimen which had been collected by Blackburn and retained by him as identical with the one sent to Cameron and described as *insularis*. This specimen, which is perfectly preserved, bears the No. 87. The actual type in the British Museum has fared worse, as Dr. Waterston reports that the antennae and abdomen have been lost. In regard to the comparison, Dr. Waterston writes