

A Review of the Hawaiian Diptera, with Descriptions of New Species

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The order Diptera has probably been the most neglected major order of insects in Hawaii. The only general account of Hawaiian two-winged flies is that which appears in the *Fauna Hawaiiensis*, except for brief discussion of some of the groups by Williams (1931). A few excellent papers and numerous notes, dealing with individual families, genera, or species, have appeared, but no recent general summary of the whole order has been published. The *Fauna Hawaiiensis* recorded 135 endemic and 57 immigrant species; the former in 27 genera, the latter in 46. At present there are known to occur in these islands about 325 described species, belonging to 130 genera, and representing 42 families. (Compare Perkins, 1913, p. clxxx).

In 1919, at the suggestion of Professor D. L. Crawford, the writer began to compile a card catalog of the species of Diptera recorded from Hawaii and references to them. In 1924 a manuscript on the "Diptera of Hawaii" was submitted to the University of Hawaii as a thesis toward the degree of Master of Science. The present paper attempts to summarize the information which has been accumulated; to present a list of the species now known to occur in Hawaii, together with a bibliography and discussion of the principal references to them; and to describe new species, descriptions of which appear in the author's thesis and other unpublished manuscripts.

EARLY REFERENCES TO HAWAIIAN DIPTERA

The early references to Hawaiian entomology were discussed by J. F. Illingworth (1923). He cited several early accounts which indicate that domestic flies were troublesome at a very early date. David Malo (1903, p. 65), a native Hawaiian, writing about 1832, mentioned as native the common house fly or *nalo*, but included the mosquito (*makika*) among "the creatures recently imported

from foreign lands," as did Jarves (1843, p. 10). Charles Pickering, in the report of the U. S. Exploring Expedition (1848, p. 333) discussed the connection between house flies and man, stating that such flies are absent on uninhabited islands, but present where man has been. He also discussed the introduction of mosquitoes, as did Cheever (1850, p. 105).

The earliest systematic descriptions of Hawaiian Diptera were written by Thomson (1868), in working up the specimens collected on the voyage of the Swedish frigate "Eugenie," which visited Hawaii in August, 1852.

Rev. Thomas Blackburn, who came to Hawaii in 1877, made extensive collections which added much to the knowledge of most orders of insects in these islands. But apparently he did not care for flies, for he said little about them, except that there were "too many Diptera of the mosquito type," (1877, p. 227).

THE FAUNA HAWAIIENSIS

It was not until the arrival of R. C. L. Perkins in 1892 that Diptera were carefully collected. A rather large percent of the native flies known today were described, from Perkins' material, in the *Fauna Hawaiiensis*. Also, quite a number of the immigrant species were recorded in that monumental work. Grimshaw (1901 and 1902) recorded 185 species, 111 of which were described as new. Speiser (1902) described two new species and one new variety of Hippoboscid flies. And Perkins (1910) described six species and recorded five more which he had already described. In the "Introduction," Perkins (1913) gave a careful résumé of all the families of Diptera known in Hawaii at that time.

Just prior to the appearance of Grimshaw's first paper, L. O. Howard (1901) presented to the Entomological Society of Washington a list of the Diptera collected in Hawaii by H. W. Henshaw. This contained mention of 19 species, 5 of which were not specifically determined. The records were repeated by Grimshaw.

MORE RECENT CONTRIBUTIONS

More recent work on Hawaiian Diptera has been largely of an economic nature, although some taxonomic papers have been published. In 1906, F. W. Terry produced a preliminary account of

the Diptera of economic importance, in which he noted several injurious and beneficial species. Although Terry carried on extensive research and breeding, most of his work was lost at the time of his sudden death in November, 1911. In 1910 he presented as a presidential address before the Hawaiian Entomological Society a paper entitled "Biological Notes on Hawaiian Diptera," but only a few items and the description of a new genus and two new species of Chironomidae were published (1913).

The most serious dipterous pests are the two fruit flies: *Chaetodacus cucurbitae*, the melon fly, and *Ceratitis capitata*, the Mediterranean fruit fly. A large number of papers and notes have appeared concerning these. There are several references to Diptera attacking or annoying cattle, horses, and other live stock, especially one paper by Van Dine and Norgaard (1908) and one by Bridwell (1918). Several papers and notes have appeared on mosquitoes, and there are numerous references to beneficial Diptera, such as certain Syrphidae, Pipunculidae, Tachinidae, and Drosophilidae. The principal recent papers and most of the notes have appeared in the Proceedings of the Hawaiian Entomological Society, with a few in publications of the local experiment stations. Papers on individual families, genera, and species will be referred to in the discussion of these groups, given below.

ACKNOWLEDGMENTS

J. F. Illingworth has done much to obtain identifications of Diptera, especially muscoid flies. F. X. Williams gave an excellent, well-illustrated summary of numerous species found in sugar cane fields (1931), and has helped to advance the knowledge of flies associated with water. Otto H. Swezey and other entomologists have assisted greatly by collecting and breeding specimens, which have been made available to the writer by the experiment stations and institutions with which these entomologists were associated.

The writer is greatly indebted to J. M. Aldrich, Charles P. Alexander, E. T. Cresson, Jr., C. Howard Curran, O. A. Johannsen, J. R. Malloch, the late M. Bezzi, and others, for helpful assistance in obtaining correct identifications of numerous species.

The following species are described as new in this paper:

Calliphoridae: *Dyscritomyia terryi* n. sp.

Drosophilidae: *Idiomyia grimshawi* n. sp.

Drosophila z-notata n. sp.

Drosophila fuscoamoeba n. sp.

Drosophila punalua n. sp.

Drosophila nigra Grimshaw variety *iki*
n. var.

Drosophila kauluai n. sp.

RÉSUMÉ OF THE FAMILIES OF DIPTERA FOUND IN HAWAII

Family LIMONIIDAE (Limnobiidae)

Fifteen species of craneflies have been identified from Hawaii. These are now placed in four genera, and all belong to the subfamily Limoniinae.

Grimshaw (1901, pp. 6-7) described *Libnotes perkinsi*, six species of *Dicranomyia*, *Trimicra lateralis*, and *Styringomyia didyma*. Alexander found two of these species of *Dicranomyia* preoccupied (1911 and 1919). He renamed them and described two new species in 1919, one in 1923, and one in 1924 (see bibliography under these dates). Swezey (1915) described *D. foliocuniculator*, with leaf-mining larvae.

Perkins (1913, p. clxxxii) suspected that *S. didyma* was an immigrant species; and this was substantiated when Edwards (1911) synonymized *Idiophlebia pallida* of Grünberg (1903) with it, and noted a wide distribution in his revision of the genus (1914). Alexander (1919, p. 30) noted it as "apparently well distributed throughout parts of Australasia;" (see also Alexander, 1923, p. 251).

Edwards (1921) synonymized *Trimicra lateralis* with *Trimicra pilipes* (Fabricius); (see also Alexander, V: 251, 1923).

Alexander (1919) described *Gonomyia* (*Lipophleps*) *hawaiiensis*. In a check list (1932), he considered both *Libnotes* and *Dicranomyia* as subgenera of *Limonia*.

One of the most interesting features of Hawaiian craneflies is the leaf-mining habit of *L. foliocuniculator* and possibly other related species. The native species are found along streams in the

(VI: 276, 1926) as *Scatella warreni*. In this same paper Cresson (pp. 275-276) described *S. terryi* and *S. bryani*.

Family DIASTATIDAE

Pseudiatata nebulosa Coquillett was introduced from Panama several times between 1924 and 1932, as a predator on pineapple mealybugs (*Pseudococcus brevipes*), but it is not known if this species has become established in Hawaii. (See Reports of the Entomologist, Hawaii Board of Agriculture and Forestry, 1924 to 1930; colored plate (figure 4) opposite page 34 in Report for 1923-1924, 1925).

Family DROSOPHILIDAE

This family of flies, most of which are distinguished by the branched arista on the third segment of the antennae, is the largest family of flies in Hawaii, being represented by four immigrant species which are extremely abundant in the lowlands, and by a number of endemic species, some of which have strikingly pictured wings. To this family belong the little brownish flies, some with pink eyes, which swarm about decaying fruit and garbage pails. There are also species which parasitize spiders' eggs and prey on mealybugs. Five genera are represented by 58 named species, including those described as new below. According to Perkins (1913, p. clxxxix) there remain many more forms to be described, for he estimated that there are fully 250 different species in Hawaii, and (p. xxxvii) stated that "300 would be a moderate estimate" of the existing species in Hawaii. He also gave notes on habits and parasites.

Sturtevant (1921) in his monograph on the North American species, mentioned and briefly discussed many of the native and all of the immigrant species.

Gitonides perspicax, new genus and species, was described by Knab (1914, p. 166). (See Swezey, V: 185, 1923). After seeing the type, Sturtevant (1921, pp. 54, 131) considered *Gitonides* to be a synonym of *Gitona*. (See Bryan, V: 291, 1923). Timberlake (V: 4, 1922) recorded it from Queensland, Manila, Java, and Pusa, India. Fullaway (IV: 241, 1920 and V: 319, 1924) mentioned it as a predator on *Pseudococcus filamentosus* (Cockerell). Swezey (VII: 182, 1928) found it associated with *Trionymus*

(*Pseudococcus*) *insularis* (Ehrhorn) on *Panicum torridum*, and (VIII: 12, 1932) bred it from *Cenchrus* grass infested with this mealybug from Molokai. It seems to be a widespread predator on mealybugs.

Titanochaeta ichneumon was described by Knab (1914, p. 168) the genus also being described as new. (See Swezey, V: 185, 1923). Swezey (VII: 292, 1929) recorded it as having been reared from spider egg cases on Hawaii and Oahu, since 1908. Another drosophilid, as yet undetermined, was also reported from spider eggs.

The genus *Idiomyia*, described by Grimshaw (1901, p. 50) and briefly discussed by Sturtevant (1921, pp. 55, 116, 131) is distinct from all other known Drosophilidae in having an additional cross-vein connecting the third and fourth longitudinal veins, near the posterior cross-vein. Four species were described by Grimshaw (1901, pp. 51-53), two by Perkins (1910, pp. 699-700), and one is here described as new.

***Idiomyia grimshawi* new species.**

Shiny yellow-brown and dark brown fly; wings brown, with small hyaline spots, much resembling the pattern of *Drosophila picticornis* Grimshaw.

Front light reddish-brown, orbits lighter, and the area between the three amber, bead-like ocellae dark and shining; the usual frontal and vertical bristles, strong, with fine dark hairs on the orbits, external to the three fronto-orbital bristles. Oral margin yellow-brown, somewhat protruding; vibrissae, a row of five or six bristles, the second moderately large, those below diminishing in size. Proboscis and palpi light brown; Antennae light reddish brown, third segment a little darker; arista long plumose, with seven or eight hairs above and three or four below. Back of head below vertex with a broad brown stripe, distinctly lighter on the sides.

Thorax light brown, with a broad central dark brown stripe, which is broader behind, and with an interrupted lateral brown stripe on each side, laterally displaced at the suture; humeral angles yellowish; pleurae light brown with a narrow dark brown stripe extending cephalad from the base of the wing, and two spots between base of wing and middle coxa. Scutellum dark brown, sides lighter. Abdomen shining dark brown. Female ovipositor pointed, pick-shaped, clear yellow-brown.

Legs yellow-brown, parts of one specimen's obscurely darker; rather bare of large bristles except on front femora and apex of tibiae.

Wings marked with brown in such a way as to give one the impression that they are brown with hyaline spots. The spots differ somewhat in size and number, but are as follows: Five or seven in a row in the marginal cell, six or seven in the submarginal cell, two in the first posterior cell before the extra cross-vein and three distad from it, three in discal cell, two or

three in second posterior cell, and two in the distal half of the third posterior cell, the basal half of it being nearly clear. The extra cross-vein is about half its own length basad from the posterior cross-vein.

Length 6 mm.; wing, 5.5 mm.

Type (female), Punaluu, Oahu, 6-11-16 (O. H. Swezey). Type in Bishop Museum. Paratype (female), Mt. Kalena, Wai-anae Mts., Oahu, April 19, 1931 (F. X. Williams), in Experiment Station H.S.P.A. collection; paratype (female) Mt. Kaala, Oahu, July 4, 1916 (P. H. Timberlake), in Bishop Museum.

Grimshaw (1901, p. 53, pl. III: 5 and 6) described the new genus *Hyphenomyia*. Sturtevant (1921, p. 117) places this as "a synonym of *Drosophila*, in the absence of a satisfactory description." As there are no specimens in Hawaii of the single species which Grimshaw (1901, p. 54) described, we can but leave this record as it stands.

Of *Drosophila*, 40 native species were described by Grimshaw (1901, pp. 57-73; 1902, p. 86), many of them based upon one or two specimens. With such generalized descriptions, few identified specimens at hand for comparison, and the variable nature of so many of the species, these are difficult to positively determine. There are in local collections a number of specimens which cannot certainly be assigned to any species at present known to be present in Hawaii. The writer is here describing only the most distinctive of these as new.

Drosophila immigrans, *D. repleta*, *D. mulleri*, and *D. melanogaster* are regarded as the only immigrant species, although it may be possible that some of those described as native may be widespread. These four species were recorded from Hawaii by Sturtevant (1921, pp. 126, 127). Hadden (VI: 386, 1927) reported two of them eaten by the mantis *Paratenodera sinensis*. *D. melanogaster* (under the name *D. ampelophila*) was recorded on overripe fruit in lists of economic insects by Van Dine (1908, p. 44; 1909, p. 32). Illingworth (VII: 256, 1929) regarded *D. repleta* as a minor pest of ripening pineapples, because it helps to spread rot. (See also Bryan, V: 291, 1923). Bezzi (1928) recorded this species from Fiji. All four species are common in the lowlands and lower forests of all the main islands, with *D. immigrans* perhaps the most abundant, although other species may be locally dominant.

Of the native species, Grimshaw's *D. variegata* (1901, p. 57), being preoccupied by *D. variegata* Fallen, was renamed *Drosophila grimshawi* by Oldenberg (1914, p. 23). *D. piticornis* was bred from decayed bananas on Oahu by Terry (I: 126, 1908). *D. molo-kaiensis* was collected on Molokai by Swezey and Bryan (VII: p. 302, 1929). What may be *D. xanthosoma* was captured at Parker Ranch, Waimea, Hawaii, by Illingworth (V: 277, 1923). *D. crucigera* was bred by Swezey (October 5, 1933) from fruits of *Alectryon macrococcus*, on Oahu, September 17, 1933.

Species of *Drosophila* were reported by Bridwell (IV: 331, 1919) as being stored in *Crabro* nests. Undetermined species appear in various lists. Timberlake (V: 424, 1924) reported a puparium parasitized by *Pachycrepoideus dubius* Ashmead.

***Drosophila z-notata* new species.**

Dark reddish-brown, with lighter lines on the dorsum and sides of the thorax; wings with anterior and apical margins infuscated and a Z-shaped fuscous mark on the disc, from anterior to posterior cross-veins.

Front dark brown, orbits and narrow median line, lighter; face dark brown with a distinct keel, and the lower lateral ridges set with black bristles. Antennae dark brown, apical part of second segment lighter; arista dark brown, long plumose. Proboscis and palpi brown.

Thorax and scutellum dark reddish-brown; dorsum with three obscure lighter lines, which are broader in front, the median line ending at base of scutellum, the two lateral ones continuing onto its antero-lateral angles. Pleurae dark brown with a narrow yellow stripe cephalad from base of wing, and another horizontal yellow line above the bases of the coxae.

Abdomen dark reddish-brown, the posterior margins of the segments very narrowly yellowish.

Legs dark reddish-brown, the extreme tips of the femora lighter and shining. Coxae, especially the middle pair, with long curved black bristles on the anterior distal surface.

Wings dusky, with the marginal cell and second longitudinal vein broadly infuscated; apical part of second, third, and fourth longitudinal veins so broadly infuscated that only two small triangles remain uncolored at the tips of the submarginal and first posterior cells. Disc of wing with a broad Z-shaped fuscous mark, extending along the fourth longitudinal vein from anterior to posterior cross-veins, across the latter, and on the adjacent portions of the third and fifth veins.

Length: 4 mm.; wing, 4.5 mm.

Type and two paratypes from Waiahole, Oahu, March 28, 1915 (O. H. Swezey); two paratypes from Punaluu, Oahu, June 11, 1911, and August 9, 1914 (O. H. Swezey). Type in Bishop Museum.

***Drosophila fuscoamoeba* new species.**

Small, dark brown, with two lateral cinereous stripes on the dorsum; wings with two connected star-shaped fuscous patches, suggesting conventionalized amoeba, with pseudopodia extended.

Front dark brown, orbits broadly light cinereous, with a short, faint, narrow median light line; face yellow-ochraceous. Antennae, proboscis and palpi brown.

Thorax dark brown; dorsum with two lateral cinereous stripes, not reaching the posterior margin; pleurae light at base of wing, on propleura, and an obscure line cephalad from base of wing. Scutellum dark brown, tip lighter; metanotum and halteres brown.

Abdomen entirely dark brown. Legs yellow-brown, posterior femora darker in some specimens; coxae and anterior femora with bristles.

Wings hyaline, with two fuscous blotches: apical patch between 3rd and 4th longitudinal veins, with branches extending to the apex of each vein, to the costal and posterior wing margins, and to the basal patch, which lies between the 2nd and 5th longitudinal veins; this has two arms to the costal margin, one over the tip of the 5th longitudinal vein, and a broad, dividing branch toward the base of the wing. Second longitudinal vein short, entering the costa nearly opposite the posterior cross-vein. Last section of the 4th longitudinal vein 1.3 to 1.5 times the penultimate.

Length: 3 to 3.5 mm.; wing, 3.5 mm.

Type and one paratype, Tantalus, Oahu, September 8, 1907 (Terry); one paratype each: Palolo, Oahu, October 13, 1907 (Terry), Waiahole, Oahu, August 13, 1916 (Swezey), Waiawa, Oahu, August 13, 1916 (Timberlake), Mt. Olympus, Oahu, July 2, 1916 (Timberlake). Type in Bishop Museum.

***Drosophila punalua* new species.**

Ochraceous and brown, with four narrow dark stripes on the dorsum of the lighter thorax; wing with seven fuscous spots along the veins, including an H-shaped spot over the posterior cross-vein.

Front ochraceous, silvery white along the orbits, at bases of fronto-orbital bristles, and about ocellar triangle; face ochraceous with silvery pubescence, without a distinct keel; vertical and ocellar bristles large. Antennae light brown, arista long plumose; proboscis and palpi ochraceous.

Thorax ochraceous, with four narrow, somewhat darker brown stripes on the dorsum, the middle pair extending the entire length from behind head to scutellum, the lateral pair from suture to near posterior margin. Pleurae ochraceous, with obscure darker markings behind the humeri and near the base of the wing in one specimen. Scutellum, metanotum and halteres ochraceous. Sternopleural and two pairs of scutellar bristles, strong.

Abdomen brown, the anterior margins of segments a little darker. Legs ochraceous; the coxae, especially the middle pair, with long black bristles; front femora with two rows of about four black bristles each; middle tibiae with two apical bristles.

Wings hyaline, with rather pale fuscous spots as follows: on the apical part of the 1st longitudinal vein; middle and tip of 2nd longitudinal vein; tips of third and fourth longitudinal veins; anterior cross-vein; and a broad

H-shaped mark over the posterior cross-vein and adjacent portions of fourth and fifth longitudinal veins. Last section of fourth longitudinal vein a little longer than penultimate, slightly wavy.

Length: 4 mm.; wing, 4 mm.

Type and one paratype, Punaluu, Oahu, June 11, 1916, (Swezey); one paratype, unlabeled in Terry collection. Type in Bishop Museum.

***Drosophila nigra* Grimshaw, variety *iki* new variety.**

Shining black, wings tinged with brown, apex darker, and the posterior cross-vein infuscated.

Similar to *D. nigra*, but smaller; the front without a reddish cross-band; the orbits dull, not shining black; proboscis dark, not yellow; antennae dark reddish brown, not black; legs brownish, not yellow, but with femora shining black, as in *D. nigra*; the infuscation at the tip of the wing and over posterior cross-vein, variable in intensity, one specimen being cloudy, the other quite black. Thorax and abdomen uniform shining black.

Length: 4 mm.; wing, 4 mm.

Type, Kilauea, Hawaii, VI, '08, (W. M. Giffard); paratype, Kilauea, Hawaii, dry forest, 4000 feet, 9-1-19 (W. M. Giffard).

***Drosophila kauluai* new species.**

Moderate size, shining light brown; long, pale brownish wings, faintly infuscated on the posterior cross-vein and at the tips of the 2nd and 3rd longitudinal veins.

Front with purplish tinge, orbits and vertical triangle brown; face dark cinereous, with a distinct keel, the lateral depressions darker. Antennae light chocolate brown, third segment rather small, little longer than the second; arista long pubescent. Vibrissae present as a row of six short bristles along the large oral margin, a strong bristle at the lower angle, and a row along the cheek margin, continuing around the posterior orbits.

Thorax yellow-brown, shining; dorsum with numerous small black bristles, and last two dorsocentrals, 2 post-alars, supra-alars, presuteral, 2 humeral, and 2 notopleural bristles strong; pleurae concolorous, with 2 long, outward-pointing sternopleural and 2 hypopleural bristles. Scutellum concolorous, but dull; with 2 strong pairs of bristles, the apical pair crossing; halteres yellow-brown.

Abdomen smoky-brown, posterior margins and lateral edges lighter, thickly covered with black bristles, longest along the margins.

Legs yellow-brown, with numerous short black bristles; front femora with five or six bristles on the outer side; two apical bristles on the tibiae.

Wings long, somewhat cloudy, with iridescent reflections; the posterior cross-vein, and the tips of the 2nd and 3rd, and in some specimens, the 4th longitudinal veins indistinctly infuscated; the last two sections of the 4th longitudinal vein about equal.

Length: 3 to 3.5 mm.; wing, 4 mm.

Type and 12 paratypes, Pacific Heights, Oahu, March 3, 1912 (O. H. Swezey), bred from the fruit of *Sideroxylon* (native name, "kaulu," + "ai," to eat). Type in Bishop Museum.

Family ASTEIIDAE

Two species of *Asteia* were described by Grimshaw (1901, p. 73). Both are very rare.

Stenomicro angustata ? Coquillett was reported by Williams (VIII: 223, 1933) as sometimes to be seen in sugar cane fields. He described the larvae.

Bryania bipunctata (new genus and species) was described by Aldrich (VII: 395, 1931) for specimens from Nihoa Island. (See Bryan, VII: 336, 1931). The relationship of this new genus was noted by Malloch (1932).

Family CHLOROPIDAE (Oscinidae)

Malloch (1930 and 1932, p. 216) gives *Prohippelates pallidus* (Loew) as the latest name for the species which was recorded from Oahu and islands to the northwest of Kauai as *Hippelates nigricornis* (Bryan, 1926, p. 70, and VII: 235, 1929). It is the same as *Hippelates* sp., recorded from Palmyra Island by Swezey (III: 16, 1914), and is a species widespread in the Pacific.

Siphunculina signata was determined by Aldrich from specimens collected on Oahu and the islands to the northwest of Kauai (Bryan, VII: 335, 1931). Specimens were also collected on Kaula Islet (Bryan, VIII: 245, 1933). Bezzi (1928, p. 153) recorded it from Fiji and as almost cosmopolitan.

Family CARNIDAE

Illingworth (V: 277, 1923) and Bryan (V: 290-1, 1923) recorded two species of small, black, bristly flies, determined by Aldrich as *Rhodesiella elegantula* and *R. tarsalis*, collected by Illingworth at Waimea, Hawaii, in 1922. Both were also found to occur on Oahu, specimens of *R. tarsalis* having been caught as early as 1914 (see Bryan, V: 344, 347, 1924; Wilder, VII: 215, 1929). *R. elegantula* was reported as having been frequently caught in

Subfamily Napaeinae

Brachydeutera hebes Cresson
(*B. argentata*, locally)

General, in lowland water.

Subfamily Ephydrinae

Scatella hawaiiensis Grimshaw

Oahu, Hawaii; (probably general).

“ **sexnotata** Cresson

Oahu, Hawaii, Nihoa, Necker, Laysan, (probably general, frequently near sea).

“ **terryi** Cresson

Oahu.

“ **warreni** Cresson

Maui.

“ **bryani** Cresson

Kauai, Oahu.

Family DIASTATIDAE

Pseudiasata nebulosa Coquillett

Introduced from Panama, 1924-1932; established?

Family DROSOPHILIDAE

Gitona perspicax (Knab)
(*Gitonides*)

Oahu, Molokai.

Titanochaeta ichneumon Knab

Oahu, Hawaii.

Drosophila anomalipes Grimshaw

Kauai.

“ **carinata** Grimshaw

Hawaii.

“ **cognata** Grimshaw

Molokai, Hawaii.

“ **conspicua** Grimshaw

Hawaii.

“ **crassifemur** Grimshaw

Kauai, Maui.

“ **crucigera** Grimshaw

Oahu.

“ **exigua** Grimshaw

Hawaii.

“ **flaviceps** Grimshaw

Hawaii.

“ **fuscoamoeba** Bryan

Oahu.

“ **grimshawi** Oldenberg

Molokai, Lanai, Maui.

(*D. variegata* Grimshaw, not Fallen)

“ **haleakalae** Grimshaw

Maui.

“ **hawaiiensis** Grimshaw

Oahu, Hawaii.

“ **humeralis** Grimshaw

Kauai, Oahu?

“ **immigrans** Sturtevant

General, in lowlands.

“ **inaequalis** Grimshaw

Hawaii.

“ **infusata** Grimshaw

Hawaii.

“ **kaului** Bryan

Oahu.

“ **lanaiensis** Grimshaw

Lanai, Oahu?

“ **longiseta** Grimshaw

Molokai.

“ **mauiensis** Grimshaw

Maui.

“ **melanogaster** Meigen

General, in lowlands.

(*D. ampelophila* Loew)

(“Pomace fly.”)

“ **melanosoma** Grimshaw

Kauai

“ **molokaiensis** Grimshaw

Molokai.

“ **monticola** Grimshaw

Hawaii.

“ **mulleri** Sturtevant

General, in lowlands.

Family DROSOPHILIDAE (Continued)

<i>Drosophila nasalis</i> Grimshaw	Molokai.
" <i>nigra</i> Grimshaw	Maui.
" <i>nigra</i> var. <i>iki</i> Bryan	Hawaii.
" <i>obscuricornis</i> Grimshaw	Molokai.
" <i>obscurifrons</i> Grimshaw	Molokai.
" <i>ochracea</i> Grimshaw	Hawaii.
" <i>olaae</i> Grimshaw	Hawaii.
" <i>parva</i> Grimshaw	Hawaii.
" <i>paucipuncta</i> Grimshaw	Hawaii.
" <i>perkinsi</i> Grimshaw	Oahu, Maui, Hawaii.
" <i>picticornis</i> Grimshaw	Kauai, Oahu.
" <i>pillmana</i> Grimshaw	Kauai, Oahu, Molokai, Hawaii, (probably general).
" <i>plumosa</i> Grimshaw	Hawaii.
" <i>polita</i> Grimshaw	Lanai, Hawaii?
" <i>punalua</i> Bryan	Oahu.
" <i>pusilla</i> Grimshaw	Molokai, Maui.
" <i>repleta</i> Wollaston	General, in lowlands.
" <i>setiger</i> Grimshaw	Oahu, Molokai.
" <i>sharpi</i> Grimshaw	Kauai.
" <i>sordidapex</i> Grimshaw	Hawaii.
" <i>undulata</i> Grimshaw	Hawaii.
" <i>varifrons</i> Grimshaw	Oahu.
" <i>xanthosoma</i> Grimshaw	Hawaii.
" <i>z-notata</i> Bryan	Oahu.
<i>Hypenomyia varipennis</i> Grimshaw	Molokai.
<i>Idiomya grimshawi</i> Bryan	Oahu.
" <i>heteroneura</i> Perkins	Hawaii.
" <i>oahuensis</i> Grimshaw	Oahu.
" <i>obscuripes</i> Grimshaw	Maui.
" <i>perkinsi</i> Grimshaw	Molokai.
" <i>picta</i> Grimshaw	Maui.
" <i>silvestris</i> Perkins	Hawaii.

Family ASTEIIDAE

<i>Asteia apicalis</i> Grimshaw	Hawaii.
<i>Asteia hawaiiensis</i> Grimshaw	Hawaii.
<i>Stenomicro angustata</i> ? Coquillett	General, cane fields.
<i>Bryania bipunctata</i> Aldrich	Nihoa Island.

Family CHLOROPIDAE (OSCINIDAE)

<i>Prohippelates pallidus</i> (Loew)	Oahu, Kahoolawe, (perhaps general), Lisiansky, Midway, Cure, Wake.
(<i>Hippelates nigricornis</i> Thomson)	
<i>Siphunculina signata</i> Wollaston	Oahu, Kaula, Nihoa, French Frigates Shoal, Lisiansky.

Family CARNIDAE

<i>Rhodesiella elegantula</i> (Becker)	Oahu.
<i>Rhodesiella tarsalis</i> Adams	Oahu, Hawaii.