

Key to the Hawaiian Drosophilidae and Descriptions of New Species

BY EDWIN H. BRYAN, JR.

Curator of Collections, Bernice P. Bishop Museum.

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In 1933¹ the writer enumerated 58 species of flies of the family Drosophilidae which had been recorded from Hawaii, including five species and a variety which were at that time described as new. Since then one additional species has been recorded from Hawaii, one new genus and species is described and another recorded by Dr. J. R. Malloch in these Proceedings (page 53), and three new species are described below, bringing the total up to 64 described species. These represent seven or eight genera.

In 1923-1924, in connection with graduate work for an advanced degree at the University of Hawaii, the writer prepared keys to many of the families, genera, and species of Hawaiian Diptera. The great increase in the knowledge of this order in Hawaii has made the publication of this manuscript² seem inadvisable, without extensive revision. The portion of the keys which has to do with the family Drosophilidae has at this time been revised and is here presented, together with descriptive notes, with the hope that it may aid in the identification of this interesting group of flies. As Diptera nomenclature is somewhat specialized, a brief diagnosis of the characters of chief taxonomic importance, for this family, is given.

Drosophilidae are small acalypterate flies, rarely exceeding 5 or 6 mm. in length, many much smaller. Some members of the genus *Idiomyia* here reach a length of 7 mm. Many of the species found in Hawaii have strikingly pictured wings. All but one species have a plumose or pectinate arista on the third segment of the antenna. The face is nearly vertical in profile, with bristles, in a characteristic arrangement, on the upper half of the front. The typical venation of *Drosophila* is shown in figure 1. The costal vein is twice broken before the tip of the 1st longitudinal vein, which appears to continue as the costa. The auxiliary vein is rudimentary. In none of the species found in Hawaii is there a cross-vein separating the discal and second basal cells.

Some species are found about decaying vegetable matter, such as fermenting fruit, garbage, and the like. Other species occur in the native forest, attracted to exuding sap and rotting bark. Two of the introduced species in Hawaii are predators, one on spiders' eggs and one on mealybugs. The group is world wide in distribution; some are popularly known as "pomace flies"; and, because of

¹ Bryan, E. H. Jr., A review of the Hawaiian Diptera. Hawaiian Ent. Soc., Proceedings, vol. VIII, no. 3, July, 1934. (Drosophilidae, pp. 434-440, 456-457.)

² Bryan, E. H. Jr., Diptera of Hawaii. (Manuscript). 1924.

their short life cycle and large chromosomes, some have been used extensively in the study of inheritance.

EXTERNAL STRUCTURES OF TAXONOMIC VALUE

HEAD: On each side of the *front* (space between the eyes, from base of antennae to vertex, or top of head) is a row of 3 *fronto-orbital* bristles: in typical *Drosophila* the uppermost is directed toward the apex (reclinate), the middle one is smaller than the other two and also reclinate, and the lower one is directed toward the mouth cavity (proclinate) and is a little further from the eye-margin than are the other two. The *ocelli* are three small, simple eyes, one in front and two behind, situated at the top of the front, in a well-marked *ocellar triangle*. A single pair of *ocellar bristles* stand on the front, one just in front of each lateral ocellus, always directed outward (divergent). A single pair of *postvertical bristles* stand just behind and laterad to the lateral ocelli, directed toward each other (convergent). Two *vertical bristles* stand on each side, at the upper lateral corners of the front, the outer pair divergent, the inner pair convergent.

The antennae are each composed of 3 segments, the basal short, the second somewhat longer and crowned with hairs of short bristles, and the third as long or longer than the other two combined, bearing a slender *arista* or two-jointed, bristle-like appendage, which in most of the species is plumose, with dorsal, hair-like branches spaced along its entire length, and ventral branches on the outer portion only. The arista may also be pectinate (with branches, like a comb, on one side only), or minutely pubescent (in one species).

Below the antennae and above the oral margin is the *face*, which may have a central elevated ridge or keel (*carina*), running down from between the antennae. The *vibrissae* are a pair or row of bristles at the outer corners of the oral, buccal, or mouth cavity, and along its anterior (upper) edge.

The eyes may be bare or hairy; if hairy, with a minute hair at alternate angles of the hexagonal ommatidia, of which there may be several hundred. In *Chymomyza* there is an area of enlarged ommatidia in the lower anterior part of the eyes.

THORAX: The number and arrangement of bristles is of most taxonomic value. The *mesonotum* of *Drosophila* bears: 2 conspicuous pairs of *dorsocentral bristles*, on its median posterior part, directed backward toward the scutellum; between these are rows of *acrostical hairs*; a large and a small pair of *postalar bristles*, laterad from the posterior dorsocentrals, and above the middle of the wing base, the small one toward the scutellum from the large one; a large and a small pair of *supra-alar bristles*, laterad from the anterior dorsocentral, and above the anterior edge of the wing base, the smaller anterior to the larger; a single pair of *presutural bristles*,

above and behind the humeral angles; each humeral angle may bear from one to three bristles; behind the humeral angle, and laterad from the presuturals, are two *notopleural bristles* on each side, just above the notopleural suture. The margins of the scutellum may have one or two pairs of strong bristles.

LEGS: The coxae are much longer on the first pair of legs than on the other two. On the tibiae there may be prominent *apical* and *preapical bristles*, located on, or just before the outer end. In some species the male may have special hairs or bristles located upon the legs, especially the front pair, which are not found on the female, such as a comb-like row of about ten short, stiff, slightly curved, black bristles on the inner distal surface of the basal tarsal joint (metatarsus), found in *Drosophila melanogaster*, the common, small pomace fly. The male also may have the two basal joints of the front tarsi shorter and thicker than the corresponding joints of the other legs; while in the female corresponding tarsal segments are alike in size and shape.

WINGS: The nomenclature of the wing venation, as used in these keys and descriptions, is shown in figure 1. The following "index" relationships are used by taxonomists: The sections of the costa are numbered outward from the base,—that between the base and the tip of the 1st vein is the first section (A); between the tips of the 1st and 2nd veins, the second section (B); between the tips of the 2nd and 3rd veins, the third section (C), etc. The length of the second section divided by the length of the third section (B/C) is called the *costal index*. Sections of the other longitudinal veins are likewise numbered from the base, assuming all cross-veins to be present. The portion of the 4th vein lying between the anterior and posterior cross-veins is called its third section (E); the distal section of the 4th vein is called the fourth (F). The length of the fourth section of the 4th vein divided by the length of the third section (F/E) is called the *fourth-vein index*. The length of the third section of the costa divided by the length of the third section of the 4th vein (C/E) is called the *4 C index*. The length of the distal section of the 5th vein (G) divided by the length of the posterior cross-vein (X) is called the *5 X index* (G/X). The costa is edged with a row of short hairs, a double row on the first section, in which are situated the two "breaks," and a single row beyond. The surface of the wing may also be covered with pale hairs, so fine as to be visible only under some magnification.

ABDOMEN: The sexes may be most readily distinguished by examining the abdomen. The females have six or seven segments, the males five. Each of these segments is composed of a curved, chitinized *dorso-lateral plate*, connected by a parchment-like area, on each side, with a quadrilateral-shaped *ventral plate*. Of the latter there are six in the female and four in the male. Each plate overlaps the anterior portion of the one further out.

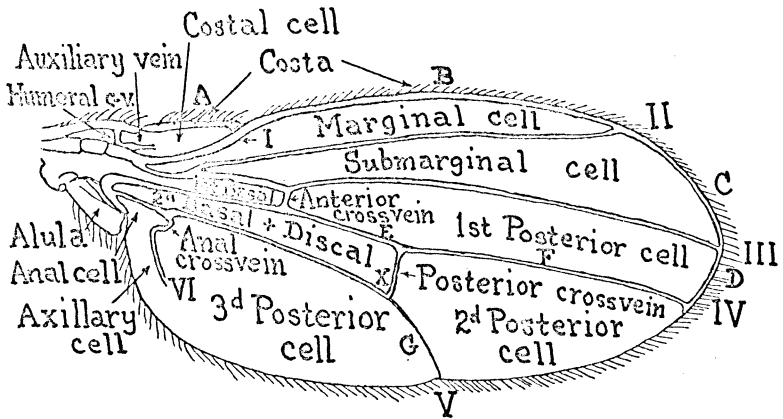


Fig. 1. Wing of *Drosophila melanogaster* (after Sturtevant), with the venation nomenclature used in these keys and descriptions. The following tabulation will help to correlate various systems of names for veins and cells:

| | | | |
|-------------|-------------------------|---|-------------------------|
| VEINS | | Comstock & Needham | |
| Costa, | Costal or Marginal Vein | C | Costa |
| Auxiliary, | Auxiliary Vein | Sc | Subcosta |
| I | 1st Longitudinal Vein | R ₁ | Radius 1 |
| II | 2nd Longitudinal Vein | R ₂₊₃ | Radius 2 plus 3 |
| III | 3rd Longitudinal Vein | R ₄₊₅ | Radius 4 plus 5 |
| IV | 4th Longitudinal Vein | M ₁₊₂ | Media 1 plus 2 |
| V | 5th Longitudinal Vein | M ₃ +Cu ₁ | Media 3 plus Cubitus 1 |
| VI | Anal Vein | Cu ₂ +1st A | Cubitus 2 plus 1st Anal |
| CROSS-VEINS | | | |
| | Humeral cross-vein | h | Humeral cross-vein |
| | Anterior cross-vein | r-m | Radio-medial cross-vein |
| X | Posterior cross-vein | m | Medial cross-vein |
| | Anal cross-vein | Cu ₂ | Cubitus 2 |
| CELLS | | | |
| | Costal Cell | 1st+2nd C (Two costal cells separated by h) | |
| | Marginal Cell | 1st R | |
| | Submarginal Cell | 3rd R | |
| | 1st Basal Cell | | |
| | 1st Posterior Cell | R ₅ | |
| | 2nd Basal + Discal Cell | M+1st M ₂ | |
| | 2nd Posterior Cell | 2nd M ₂ | |
| | 3rd Posterior Cell | Cu ₁ | |
| | Anal Cell | Cu | |
| | Axillary Cell | A | |
| | | | INDEXES |
| | | | $\frac{B}{C}$ |
| | | | $\frac{F}{E}$ |
| | | | $\frac{C}{E}$ |
| | | | $\frac{G}{X}$ |

In the female, behind the 7th (or 6th) dorso-lateral plate, is a papilla, composed of a long-haired dorsal and a smaller ventral chitinized plate, forming the anal opening. Below this is the ovipositor, which may have a variety of forms. In the male, behind the 5th dorso-lateral plate, is a small plate called the *genital arch*, connected with the 5th segment by an obscure plate. Below and behind these is a chitinized plate, called a *clasper*, bearing peg-like bristles. Above, on each side of the anus, is a hairy, upright *anal plate*, which lies vertically, instead of horizontally, as in the female. The form and manner of articulation of these various parts (together called the *hypopygium*) is characteristic in different species, and might be used in taxonomy, although often difficult to see. As they have been disregarded in past descriptions of Hawaiian species, and as so few of the native species are represented in local collections, they cannot be used in these keys.

KEY TO THE GENERA IN HAWAII

- | | | |
|------|---|--------------------------------------|
| 1. | Mesonotum with four series of fine acrostical hairs between the pairs of dorsocentral bristles, which are postsutural and two in number; length 1.5 mm..... | 2 |
| 1' | Mesonotum with six or more rows of acrostical hairs; length more than 1.5 mm..... | 3 |
| 2. | White-dusted broad vitta extends along dorsum from front to apex of scutellum; arista of antennae with four strong rays above and none below; wings grayish hyaline, clouded at the fork of 2nd and 3rd veins and over cross-veins, and with three dark spots equally spaced in marginal cell, along the costa and one on middle of last section of 4th vein..... | <i>Tantalia albovittata</i> Malloch* |
| 2' | Thorax shining black with two gray-dusted vittae on mesonotum, one on each side behind the suture, and two on each pleura; arista with six rays above and three below; legs black with yellow rings; wings dark with hyaline spots..... | <i>Dettopsomyia formosa</i> Lamb** |
| 3. | Arista minutely pubescent; front rather hairy..... | 4 |
| 3' | Arista plumose..... | 5 |
| 3''. | Arista short pectinate (branches on upper side only); eyes hairy; no prescutellar bristles, but other bristles large..... | <i>Titanochaeta</i> |
| 4. | Costa weak between tips of 3rd and 4th veins; wings clear; thorax and abdomen concolorous, cinereous, marked with brown..... | <i>Gitona</i> |
| 4' | Costa well developed to apex of 4th vein; wings with cloudy infuscation..... | <i>Pseudiasata</i> |
| 5. | An extra cross-vein between 3rd and 4th veins near posterior cross-vein..... | <i>Idiomyia</i> |
| 5' | Only one (the anterior) cross-vein between 3rd and 4th veins..... | 6 |
| 6. | Lower reclinate orbital bristle large, placed below the proclinate on the front; postvertical bristles small; eyes bare or nearly so, some ommatidia in the lower anterior part enlarged..... | <i>Chymomyza</i> |
| 6' | Lower reclinate orbital bristle small, placed above (or rarely a trifle below) the proclinate..... | 7 |

* Described by Dr. J. R. Malloch in these Proceedings, page 53.

** Redescribed by Dr. J. R. Malloch on page 54.

7. Lower angles of face with a conspicuous row of strong black bristles, which curve forward, extending back from the vibrissae; four supra-alar bristles *Hyponomyia*
 7. Face without such conspicuous black bristles below the vibrissae, along the oral margin only; two supra-alar bristles present..... *Drosophila*

TITANOCHAETA Knab, *Insector Inscitiae Menstruus*, II, p. 168, 1914.

Titanochaeta ichneumon Knab is a very small (2 mm. long), dark brown fly, with pale gray-pruinose dorsum and front, slender, pale yellow legs, and very long, black inner vertical bristles. The arista is short pectinate, as indicated in the key. It has been reared from spider's eggs. The wing indices are as follows: costal index, 2.1 to 2.6; 4th vein index, 2.0 to 2.1; 4 C index, 1; 5 X index, 2.8.

GITONA Meigen, *Systematische Beschreibung der bekannten europäischen zweiflügligen Insekten*. 6, 129, 215, 1830.
 (*Gitonides* Knab, *Insector Inscitiae Menstruus*, II, p. 165, 1914.)

Gitona perspicax (Knab) is a small (3.5 mm.) pale gray-pruinose fly, with red-brown blotches; abdomen banded red-brown and yellow; wings clear with pale brown veins; costal index, about 2.6; 4th vein index, 1.75 to 2.1; 4 C index, 1 to 1.1; 5 X index, .9 to 1.1. It is a parasite on mealybugs (*Pseudococcus* spp.), widely distributed in S. E. Asia and tropical Australia. In Hawaii it has been bred from mealybugs infesting sugar cane and other plants.

PSEUDIASTATA Coquillett, *Proceedings, Entomological Society of Washington*, vol. 9, p. 148, 1908.

Pseudiasata nebulosa Coquillett. Although this species is by some authorities placed in a separate family, Diastatidae, it is included in this key because of its close relationship. It is a robust little fly with a flattened, hemispherical head; the front, thorax and abdomen are uniformly light cinereous-brown, with bristles of the same color; the wings with one large and two smaller, cloudy infuscations; two conspicuous black bristles just before each costal break; costal index, 5.3; 4th vein index, 1.0; 4 C index, .38; 5 X index, .5. Several of these flies have been introduced from Panama, as parasites on the pineapple mealybug; but it is not known to be established in Hawaii.

IDIOMYIA Grimshaw, *Fauna Hawaiiensis*, III, p. 50, 1901.

This genus contains the largest of the Hawaiian *Drosophilidae*, some up to 7 mm. long. Its species are distinct from all other members of the family in having an additional cross-vein connecting the 3rd and 4th longitudinal veins, located near the posterior cross-vein. There are, in local collections, specimens of only three of the seven described species, but an attempt is made below to separate them in a key drawn up from descriptions.

1. Wings appearing brown, with numerous small hyaline spots in the cells.....*I. grimshawi* Bryan
- 1'. Wings with various fuscous marks, at tip, along cross-veins and parts of the 4th vein, and, in some species, in marginal cell and at base of wing2
2. Scutellum entirely dark on disc; front yellow to golden on the anterior part, black across the vertex, through the ocellar triangle.....3
- 2'. Scutellum with a light median stripe; front yellow or reddish-yellow, without a continuous black band across the vertex, although the ocellar triangle and upper half of the orbits may be black.....5
3. Mesonotum light on the anterior half, with two distinct medial brown lines, and a brown spot on each side; scutellum dark, bordered with yellow4
- 3'. Mesonotum light, with brownish infuscation lacking definite pattern; scutellum entirely dark, not bordered with yellow; abdomen black, paler at base; pleurae nearly black; proboscis and palpi yellow.....*I. silvestris* Perkins
4. Proboscis and palpi yellow; abdomen black with a series of yellow spots on the sides; two medial brown stripes cross anterior half of mesonotum, some yellow on posterior half; pleurae with 3 or 4 dark spots.....*I. heteroneura* Perkins
- 4'. Proboscis and palpi black; abdomen entirely shining black; posterior half of mesonotum dark brown, with two medial brown stripes extending a short way forward into its anterior half, which, like the pleurae, is dark cinereous-yellow.....*I. picta* Grimshaw
5. Face, antennae, and palpi black; front with a transverse brown band behind base of antennae; mesonotum black with yellow anterior edge or lines.....6
- 5'. Face and palpi yellow; antennae obscurely reddish-yellow, 3rd segment with brown pile; front yellow or dusky-yellow, without a transverse brown band behind the antennae; mesonotum reddish-yellow, with two dark brown stripes, which are hook-shaped, and broad posteriorly.....*I. oahuensis* Grimshaw
6. Mesonotum with a yellow median stripe; femora with only the bases and tips infuscated; costa strongly arched (only the ♂ is known).
.....*I. perkinsi* Grimshaw
- 6'. Mesonotum entirely black; femora black with yellow tips; costa nearly straight (only the ♀ is known).....*I. obscuripes* Grimshaw

Idiomyia grimshawi Bryan.

Two male specimens, which agree reasonably well with this species, were collected by Dr. F. X. Williams at Lulumahu Valley, Oahu, one at 1900 feet elevation, Sept. 27, 1936, and one on banana plants, May 2, 1937. These differ somewhat from the type, which was a female, in being darker, with browner wings, having a slightly different arrangement of hyaline spots. The central brown stripe of the mesonotum fades out at about its middle, being distinct only on the posterior half and across the scutellum. There is much variation in color, however, among specimens of these species; and until many more specimens are available for comparison, all of those with brown wings containing hyaline spots, will be considered as belonging to one species. The four wing indices of these two specimens, together with those of the type, are as follows:

| Specimen and wing | | Costal index | 4th vein index | 4 C index | 5 X index |
|-------------------|-------------|--------------|----------------|-----------|-----------|
| Type, ♀, | Left wing: | 5.6 | 1.04 | .36 | .96 |
| | Right wing: | 5.6 | 1.03 | .36 | .87 |
| Lulumahu, ♂, | Left wing: | 6.1 | .98 | .31 | .66 |
| | Right wing: | 6.4 | 1.00 | .31 | |
| Lulumahu, ♂, | Left wing: | 6.3 | .96 | .31 | .79 |
| | Right wing: | 6.4 | .96 | .29 | .79 |

Idiomyia oahuensis Grimshaw

Five specimens which were collected by Dr. F. X. Williams at Lulumahu Valley, Oahu, in a banana grove, 1800 to 1900 feet elevation, Sept. 19-27, 1936, and April 4 and 11, 1937, are assigned to this species. They differ from Grimshaw's description only in minor respects. The type was a female. Male specimens in this series have the costa arched, just beyond the juncture of the first vein. In describing *Idiomyia obscuripes*, based on two female specimens with straight costa, Grimshaw notes its close relation to *I. perkinsi*, described from a male specimen, which has a strongly curved costa, suggesting that it may be only the female of that species. The finding of this sexual difference in *I. oahuensis* strengthens this supposition, although they may still be opposite sexes of distinct species, as one came from Molokai Mts. and the other from Haleakala, Maui, and there are also minor differences, such as the color of the legs.

The indices of Dr. Williams' five specimens from Lulumahu, and also those of one female specimen, collected by O. H. Swezey on Mt. Olympus, Oahu, 10-20-1918, in nest of *Hylocrabro tumidoventris*, are as follows:

| Specimen and wing | | Costal index | 4th vein index | 4 C index | 5 X index |
|-----------------------------|-------------|--------------|----------------|-----------|-----------|
| Mt. Olympus, ♀, (Swezey) | Left wing, | 5.32 | 1.02 | .37 | .44 |
| | Right wing, | 5.14 | 1.04 | .39 | .55 |
| Lulumahu, ♀, Sept. 19, | Left wing, | 4.98 | 1.0 | .35 | .41 |
| | Right wing, | 4.19 | 1.0 | .45 | .40 |
| Lulumahu, ♀, Sept. 20, | Left wing, | 4.91 | .92 | .37 | .48 |
| | Right wing, | 4.73 | .95 | .40 | .42 |
| Lulumahu, ♀, Sept. 27, | Left wing, | 5.31 | 1.0 | .37 | .36 |
| | Right wing, | 5.48 | .96 | .37 | .36 |
| Lulumahu, ♂, Apr. 4, | Left wing, | 4.96 | .92 | .36 | .32 |
| | Right wing, | 4.93 | .89 | .37 | .33 |
| Lulumahu, ♂, Apr. 11, | Left wing, | 4.35 | .85 | .40 | .33 |
| | Right wing, | 4.81 | .85 | .36 | .35 |

In the female specimens the extra cross-vein between the 3rd and 4th veins is almost continuous with the posterior cross-vein. In the males these two are separated by about $1/6$ the length of the extra cross-vein or $1/13$ the length of the posterior cross-vein, the latter being toward the apex.

A single female specimen collected by O. H. Swezey on the Kaala Mts., Oahu, 9-7-1913, is related to this species, but is larger (7 mm. long, wing 8 mm.), the proboscis is lighter brown, the 2nd antennal segment has fewer brownish and blackish bristles and hairs, the mesonotum is darker, without definite edge to the dark stripes, and the scutellum is all dark, with only a faint trace of lighter medial line. The indices for its wings are as follows:

| | Costal index | 4th vein index | 4 C index | 5 X index |
|-------------------|-----------------|-------------------|--------------|--------------|
| Left wing: | 5.67 | 1.06 | .37 | .57 |
| Right wing: | 5.89 | 1.03 | .35 | .52 |

Idiomyia picta Grimshaw

An examination was made of a single female paratype specimen in B. P. Bishop Museum, collected on Haleakala, Maui, 5000 feet elevation, Oct., 1896, by Dr. R. C. L. Perkins. Its bright, golden-yellow front is bordered across the vertex by a black band, including the upper orbits and ocellar triangle, W-shaped, as viewed from behind. The extra posterior cross-vein is about .4 to .45 its own length beyond the posterior cross-vein. The wing is infuscated across both posterior cross-veins, the last section of the 5th vein, the adjacent portion of the penultimate section of the 4th vein, the tips of the 2nd, 3rd, and 4th veins, and across the apical portion of the costal cell to the 3rd vein, at the anterior cross-vein. The wing indices are:

| | Costal index | 4th vein index | 4 C index | 5 X index |
|-------------------|-----------------|-------------------|--------------|--------------|
| Left wing: | 5.0 | 1.25 | .43 | .69 |
| Right wing: | 5.33 | 1.3 | .40 | .69 |

CHYMOMYZA Czerny, Zeitschrift fur Hymenopterologie, Dip-terologie, 3, p. 199, 1903.

Chymomyza procnemis (Williston)

Specimens collected in pineapple fields at Kunia, Oahu, Nov. 10, 1936, by K. Ito, and Dec. 16, 1936, by Dr. Walter Carter, were identified as this species. They are small flies, about 2 mm. long. The front is golden yellow, the orbits smooth and dark brown. Thorax is chocolate brown; abdomen black. Legs light, except the front tibia, femora, and metatarsus, which are black and bristly; the hind metatarsi are also minutely bristly, but are yellow. Wings clear, costal vein strong and black, until just before its juncture with the 3rd vein, when it becomes white; other veins pale brown.

Costal index, 1.3 to 1.6; 4th vein index, 2.3 to 2.6; 4 C index, 1.5 to 1.6; 5 X index, 2.8 to 3.4.

HYPENOMYIA Grimshaw, Fauna Hawaiiensis, III, p. 53, 1901.

Sturtevant³ placed this genus as a "synonym of *Drosophila*, in the absence of a satisfactory description." There are no specimens in Hawaii of the single species, *H. varipennis* Grimshaw. The writer has no assurance that it is either a good genus or correctly diagnosed in the key to genera given above.

DROSOPHILA Fallen, Diptera Succiae Geomyzides, 2, 4, 1823.

This is the largest genus of Diptera in Hawaii. Dr. R. C. L. Perkins⁴ estimated that not less than 250 species would eventually be found. Sufficient collecting has not been done to adequately treat this group. Many of the 41 endemic species which Grimshaw described were based upon only one or two specimens. Representatives of but few of these species have been captured since, so that the group is very poorly represented in local collections. This, coupled with the meager descriptions and the extreme variability in the group, makes the identifying or characterizing of specimens very difficult and unsatisfactory. Four immigrant species are known to occur in Hawaii, which are much more abundant than the native species. There may be other species here which will be found elsewhere, on other Pacific islands, if not on the continents. The following key is based largely upon descriptions, and for that reason may be subject to revision when more specimens are procured.

KEY TO THE SPECIES OF *DROSOPHILA* IN HAWAII

- | | |
|--|--------------------------------|
| 1 . Wings with a dark pattern, including fuscous spots in the cells..... | 2 |
| 1' . Wings infuscated only at apex, in costal cell, or along the veins..... | 14 |
| 1" . Wings not infuscated (they may be uniformly dusky or tinged with yellow) | 30 |
| 2 . Thorax light colored, with a single broad, central dark stripe and conspicuous lateral spots | 3 |
| 2' . Thorax without such markings..... | 5 |
| 3 . Tibiae pale yellow, conspicuously banded with dark brown; antennae blackish, 3rd segment yellow on lower half and at apex; wings appearing brownish with numerous hyaline spots..... | <i>D. picticornis</i> Grimshaw |
| 3' . Tibiae not banded; antennae with 3rd segment entirely black..... | 4 |
| 4 . Antennae with upper edge of 2nd segment brownish; wings with 3 fuscous cross-bands and no detached spots in 2nd or 3rd posterior cells | <i>D. grimshawi</i> Oldenberg |
| 4' . Antennae with 2nd segment entirely yellow; wing pattern similar, but more broken up, with isolated fuscous spots in 2nd and 3rd posterior cells..... | <i>D. crucigera</i> Grimshaw |
| 5 . Wings with anterior and apical costal borders continuously infuscated | 6 |

³ Sturtevant, A. H., The North American species of *Drosophila*, Carnegie Institution of Washington, Pub. No. 301, p. 117, 1921.

⁴ Perkins, R. C. L., Fauna Hawaiiensis, Introduction, p. clxxxix, 1913.

- 5'. Wings without continuous fuscous anterior border.....8
6. Wings with a broad Z-shaped fuscous mark on disc, extending along 4th vein, between and including the anterior and posterior cross-veins.....*D. z-notata* Bryan
- 6'. Wings without such Z-shaped mark.....7
7. Wings broadly infuscated at base, along anterior margin, and most of veins; 1st posterior cell with a narrow fuscous line close to 3rd vein; thorax yellow with 3 black stripes, of which the middle one is the broadest.....*D. undulata* Grimshaw
- 7'. Wings not broadly infuscated at base; most of submarginal cell infuscated, basal portion clear; large fuscous blotch in 1st posterior cell, which rests upon 4th vein near posterior cross-vein; U-shaped hyaline spot in 2nd posterior cell.....*D. perkinsi* Grimshaw
8. Wings with 2 large, star-shaped fuscous patches on the disc; thorax brown with 2 cinereous stripes, continuing caudad from the light orbits of the front; scutellum yellow at tip.....*D. fuscoamoeba* Bryan
- 8'. Wings and thorax without such markings.....9
9. Central part of marginal cell infuscated, or a fuscous spot near the middle of the 2nd longitudinal vein, overlapping adjoining cells.....10
- 9'. Central part of marginal cell or middle of 2nd vein not infuscated; wing distinctly infuscated only on apical portion of longitudinal veins 2-4, over cross-veins, or in costal cell.....14
10. Third longitudinal vein with a fuscous spot opposite the posterior cross-vein.....11
- 10'. Third longitudinal vein without such fuscous spot.....12
11. Marginal cell infuscated for the greater part of its length, narrowly clear just beyond tip of 1st vein, and again beyond a point opposite the fuscous spot on the 3rd vein; thorax yellow-brown with 4 conspicuous black stripes; scutellum dark brown with only lateral corners yellow.....*D. conspicua* Grimshaw
- 11'. Fuscous spot in marginal cell no longer than width of wing, faint in some specimens; thorax with 3 dark stripes; pleurae with large dark spot beneath base of wing; legs entirely yellow.....*D. lanaiensis* Grimshaw
- 11''. Fuscous spot in marginal cell scarcely longer than infuscation on 4th vein at posterior cross-vein; this gives appearance of a nearly continuous fuscous band across wing at posterior cross-vein; another across tip of wing; "thorax yellow-cinereous, unstriped or with 2 obscure brown stripes" (4 paratype specimens have mesonotum and pleurae uniformly reddish-brown, scutellum a little lighter).....*D. hawaiiensis* Grimshaw
12. Dorsum of thorax ochraceous, with 4 distinct brown lines.....13
- 12'. Dorsum of thorax cinereous or reddish-yellow, with obscure brown markings; scutellum dark on disc; fuscous mark on posterior cross-vein is dumbbell-shaped; anterior cross-vein scarcely infuscated.....*D. pilimana* Grimshaw
- 12''. Mesonotum, pleurae, and scutellum entirely ochraceous, without distinct dark markings; "both cross-veins broadly infuscated" (paratype specimen lacks infuscation on anterior cross-vein).....*D. ochracea* Grimshaw
13. Scutellum brown on disc; wings with strong fuscous spots: around tip of wing; in apical half of 2nd posterior cell, across posterior cross-vein, extending into 1st and 3rd posterior cells; across anterior cross-vein and adjacent parts of 1st basal, submarginal, marginal, and costal cells; faint fuscous mark along middle of marginal and submarginal cells in ♀, reduced in ♂ to faint narrow line along middle of 2nd vein; length 5.5 mm.; abdomen black with yellow markings.....*D. lulunahu* Bryan

- 13'. Scutellum entirely ochraceous; wings with paler fuscous markings; length 4 mm.; abdomen brown, the anterior margins of segments darker.....*D. punalua* Bryan
14. Apex of wing, or tips of longitudinal veins 2 to 4, infuscated.....15
- 14'. Apex of wing clear, or no darker than the rest of the wing.....26
15. Legs yellow or brownish, with femora dark brown or black; dark species.....16
- 15'. Legs entirely yellow, or uniformly reddish-yellow.....18
16. Thorax and abdomen entirely shining black; apex of wing and posterior cross-vein infuscated.....17
- 16'. Thorax blackish-brown, with 2 broad darker lines on the dorsum, and yellow stripe on pleurae; abdomen black with posterior edges of segments lighter; infuscated over most of 2nd and tips of 3rd and 4th veins and posterior cross-vein.....*D. humeralis* Grimshaw
17. Length 6 mm.; front black with reddish cross-band above antennae; orbits and vertical triangle shining black; proboscis yellow; antennae black; legs yellow, fore coxae dull black, and all femora shining black.....*D. nigra* Grimshaw
- 17'. Length 4 mm.; front without reddish cross-band; orbits dull; proboscis dark; antennae dark reddish-brown; legs brownish, with femora shining black.....*D. nigra* var. *iki* Bryan
18. Posterior cross-vein forming a small Y where it joins the 4th vein, broadly infuscated from tip of 5th vein to 4th vein.....*D. deltaneuron* Bryan
- 18'. No Y-shaped fork in posterior cross-vein where it intersects 4th vein.....19
19. Posterior cross-vein distinctly and broadly infuscated, the fuscous spot extending onto 1st posterior cell.....20
- 19'. Posterior cross-vein faintly or not at all infuscated.....21
20. Thorax reddish-yellow with an obscure central brown stripe; antennae black; abdomen reddish-yellow with dorsal central line and hind margins of segments blackish; (males, only?) bases of front femora on inner side with brush of short, stiff, black hairs.....*D. anomalipes* Grimshaw
- 20'. Thorax yellow-brown, with obscure blackish patch in front of scutellum, which is reddish-brown; pleurae with brown markings; abdomen dark with small yellow spots at anterior angles of segments; antennae reddish-yellow. (Similar to *D. pilimana*, but lacks fuscous spot on middle of 2nd vein).....*D. paucipuncta* Grimshaw
- 20". Thorax and scutellum entirely yellow-ochraceous; or dorsum with obscure dark lines and scutellum light. (Several undescribed species, too poorly represented in collections to warrant descriptions as yet).....*Drosophila* spp.
21. Antennae and most of the front light yellow or ochraceous.....22
- 21'. Antennae and front more or less dark; legs yellow.....23
22. Thorax dark cinereous, pleurae shining blackish-brown; apical half of rather narrow wing slightly infuscated, last 2 sections of 4th vein nearly equal.....*D. flaviceps* Grimshaw
- 22'. Thorax ochraceous with 6 obscure dark lines; most of 2nd and apical portions of 3rd and 4th veins, and both cross-veins lightly infuscated; last section of 4th vein 1.9 times penultimate.....*D. sadleria* Bryan
23. Pleurae light or reddish-yellow; last 2 sections of 4th vein of nearly equal length (4th vein index, about 1).....24
- 23'. Pleurae dark brown; last section of 4th vein longer than penultimate (4th vein index greater than 1).....25

- 24 . Anterior and apical portions of wings infuscated; thorax reddish-yellow; abdomen shining brown, yellow at base.....
.....*D. infuscata* Grimshaw
- 24' . Tips of 2nd, 3rd, and 4th veins and posterior cross-vein infuscated; thorax and abdomen lighter..... *D. kaulu-ai* Bryan
- 25 . Thorax and scutellum reddish-yellow, pleurae dark brown; apex of 2nd and 3rd veins (and 4th lightly) infuscated, posterior cross-vein not infuscated.....*D. sordidapex* Grimshaw
- 25' . Thorax and scutellum shining blackish-cinereous, scutellum with yellow tip; front light yellow above antennae, blackish behind; antennae yellow with upper edges of 2nd and 3rd segments dark; posterior cross-vein and apex of wing slightly infuscated.....
.....*D. haleakalae* Grimshaw
- 26 . Wings with costal cells dark fuscous, and costal margin slightly infuscated; thorax and abdomen entirely shining black; legs yellow, those of ♂ with conspicuous hairs on fore tibiae and metatarsi; 4th vein index 1.5.....*D. setiger* Grimshaw
- 26' . Wings with costal cell and costal margin clear.....27
- 27 . Wings with one or both cross-veins clouded with fuscous, entire wing (except in *D. parva*) tinged with yellow or light brown.....28
- 27' . Wings without any distinct fuscous markings (although they may be uniformly tinged with yellow, pale brown, or gray).....30
- 28 . Last section of 4th vein twice as long as penultimate (4th vein index equals about 2); 2nd vein curved forward at tip; thorax dark cinereous, with 3 obscure dark lines; abdomen blackish-brown; length about 1.5 mm.....*D. parva* Grimshaw
- 28' . Last two sections of 4th vein nearly equal (4th vein index equals about 1); front brown with orbits and vertical triangle blackish...29
- 29 . Thorax and scutellum reddish-yellow to reddish-brown; legs yellow to reddish-yellow; abdomen yellow with dorsal median line and hind halves of segments blackish..... *D. sharpi* Grimshaw
- 29' . Thorax and abdomen blackish, segments of latter narrowly edged with yellow; legs with fore coxae and all femora blackish-brown, tibiae yellowish*D. olaae* Grimshaw
- (Wings without fuscous markings)
- 30 . Intermediate and hind tibiae yellow with dark rings; thorax yellow or orange-yellow, with 5 brown stripes; abdomen dark brown, segments with lighter edges; wings uniformly tinged with light brown or gray31
- 30' . Tibiae not ringed with black; dorsum of thorax without such stripes32
- 31 . Wing (4 mm.) longer than body (3.5 mm.); pleurae reddish-yellow, blotched with dark brown; fore legs with coxae reddish-yellow, femora shining dark brown, short and very much swollen, with long black hairs on upper and outer surfaces (only ♂ known), tibiae equal in length to femora and yellowish; middle and hind legs with normal femora, shining dark brown, tibiae yellow with 2 dark rings.....*D. crassifemur* Grimshaw
- 31' . Wings (4 mm.) shorter than body (4.25 mm.); pleurae dark brown, mesopleurae edged with yellow below; legs with fore coxae and all femora shining blackish-brown; tibiae yellowish, the fore pair with indistinct, other two with 2 distinct brown rings.....
.....*D. nasalis* Grimshaw
- 32 . Femora dark.....33
- 32' . Femora entirely light yellow.....36

33. Arista extremely short-haired; small, blackish species; thorax obscurely dark brown or blackish, abdomen blackish, lighter toward the tip, femora shining black; very small (2 mm.).....*D. mauiensis* Grimshaw
- 33'. Arista longer-haired; large species.....34
34. Thorax and abdomen entirely dark brown or blackish; 3rd segment of antennae reddish-yellow.....*D. molokaiensis* Grimshaw
- 34'. Thorax, abdomen and parts of the head gray with small reddish-brown spots, one at the base of each bristle or large hair, some fused together into blotches; abdomen with interrupted dark bands on the posterior margins, lateral margins pale; 3rd segment of antennae dark brown.....35
35. Front coxae dark reddish-brown below.....*D. repleta* Wollaston
- 35'. Front coxae pale below.....*D. mulleri* Sturtevant
36. Last 2 sections of 4th vein equal or nearly equal in length (4th vein index equals about 1).....37
- 36'. Last section of 4th vein at least half as long again as penultimate (4th vein index equals about 1.5).....41
- 36". Last section of 4th vein about 2 (or more) times penultimate (4th vein index equals 2 or more).....44
37. Thorax shining black or dark brown; wings of ♂ faintly infuscated; antennae and front of ♂ light yellow; front of ♀ varies from shining dark brown to reddish brown.....*D. melanosoma* Grimshaw
- 37'. Thorax, at least in part, yellow or brownish-yellow.....38
38. Thorax reddish-yellow, with 3 obscure dark stripes; pleurae reddish-yellow, a patch on mesopleurae and spot beneath wings blackish; antennae large, reddish-brown, with a long, tortuous, many-plumed arista.....*D. longiseta* Grimshaw
- 38'. Thorax, including pleurae, entirely yellow or reddish-yellow, mesonotum not distinctly striped.....39
39. Front dark ferruginous, with orbits and vertical triangle shining; antennae brown, 2nd segment dark brown above, reddish-yellow below; abdomen dark brown, basal angles of segments yellow; wings tinged with yellow.....*D. cognata* Grimshaw
- 39'. Front yellow; 2nd segment of antennae entirely yellow; abdomen yellow, hind margins darker.....40
40. Third segment of antennae yellow; mesonotum and scutellum dull brownish-yellow; pleurae and legs pale yellow; lower apical part of front femora with a row of short stout bristles; abdomen dull yellow, each of the 4 basal segments with an interrupted black band; wings may be clouded at tips of 1st and 2nd veins and over posterior cross-vein; length 2.5 mm., wing 2.7 mm. A very common, introduced species.....*D. immigrans* Sturtevant
- 40'. Third segment of antennae somewhat brownish; front femora without (?) such row of bristles; mesonotum, pleurae, and scutellum reddish-yellow; abdomen yellow with hind margins of segments brownish; length 3 mm., wing 3.5 mm.....*D. xanthosoma* Grimshaw
41. Thorax with mesonotum light (yellow or reddish-yellow).....42
- 41'. Mesonotum dark (shining black or blackish-brown), abdomen black, last segment shining.....43
42. Abdomen dark brown with obscure yellow spots at the basal angles of the segments; mesonotum with 3 brown stripes, scutellum dark brown; 2nd vein curved forward near apex; length 2 mm.....*D. inaequalis* Grimshaw
- 42'. Abdomen yellow with hind border of each segment dark brown; mesonotum unstriped, scutellum yellow or reddish-yellow; tip of 2nd vein nearly straight toward apex; length 2.5 to 3 mm.....*D. monticola* Grimshaw

- 43 . Front light yellow with orbits black ; antennae entirely reddish-yellow*D. verifrons* Grimshaw
- 43' . Front reddish-yellow in front, shining black above ; antennae reddish-yellow, 3rd segment brown.....*D. polita* Grimshaw
- 43". Front black, orbits lighter ; antennae dark brown, arista with 3 hairs above and none below.....*D. obscurifrons* Grimshaw
- 44 . Thorax yellow or reddish-yellow ; front and antennae yellow.....45
- 44' . Thorax darker (olive brown to black) ; front dark ; antennae dark, at least in part.....46
- 45 . Abdomen yellow, tip black ; arista with 3 hairs above and none below ; thorax and scutellum entirely yellow ; length 1.5 mm. (A variety has the 3rd segment of the antennae brown).....*D. pusilla* Grimshaw
- 45' . Abdomen dark on posterior portions of segments ; arista with 5 branches above and 3 below ; thorax and scutellum shining reddish-yellow ; length 2 mm. A very abundant, introduced species.....*D. melanogaster* Meigen
- 46 . Front black or dark brown.....47
- 46' . Front reddish-yellow ; thorax olive brown ; arista of antennae with at least 6 hairs above and 3 below ; legs light, femora yellow.....*D. plumosa* Grimshaw
- 47 . Front dark brown, the orbits cinereous ; antennae reddish-brown, the 3rd and upper part of 2nd segments brown ; face yellow-cinereous with a very conspicuous keel ; thorax obscure brownish-yellow, traces of 3 lighter stripes on the pleurae ; abdomen dark brown, lighter toward base ; legs yellow.....*D. carinata* Grimshaw
- 47' . Front black, orbits and vertical triangle shining, a little lighter ; antennae, thorax and abdomen uniform blackish-brown ; legs pitchy brown. Face dark brown or blackish, without keel. Pleurae a little lighter than mesonotum.....*D. obscuricornis* Grimshaw
- 47". Front black, reddish-yellow near base of antennae ; face blackish with slight keel ; antennae brown, 2nd segment reddish-yellow, arista with 3 hairs above and none below ; thorax blackish-brown, pleurae lighter, olive-brown ; abdomen blackish, last segment shining ; legs yellow.....*D. exigua* Grimshaw

Drosophila lulumahu new species.

General color ochraceous, with brownish markings. Mesonotum with 4 narrow brown stripes, the outer pair on posterior half only ; wings with 7 fuscous spots, some of which run together. Like *D. punahua*, but larger and darker.

Front golden brown, orbits and a narrow central line lighter. Ocelli clear yellow, at the corners of a black ocellar triangle. Usual arrangement of strong black bristles on the front and vertex ; a few small black hairs above base of antennae and between lower fronto-orbital bristles. Antennae brown, lighter on the sides of the two basal segments ; second segment with numerous small black bristles ; third segment with dark pile ; stout dorso-basal arista, curved midway, with about 15 branches above, more closely spaced toward the base, and 5 on the outer half below, with a few fine, short hairs between ; the base of the arista enlarged. Face light yellow-brown, like the orbits ; one pair of stout vibrissae, followed by a row of small black bristles on the sides of the oral cavity. Proboscis dark brown, like the antennae ; palpi broad, thin, medium brown, with black pubescence ; cheeks light, occiput dark in the center, light on the sides.

Mesothorax cinereous-brown, with dark brown markings as follows : 2 narrow median lines, extending from its anterior edge to just before the

scutellum; a narrow brown line on each side of these behind the transverse suture; on the disc of the scutellum; an interrupted spot across humerus to presutural bristle; a line forward from base of wing; and a spot directly below base of wing on the pteropleura. With higher magnification the following dark brown spots may also be seen: at the lower end of the propleura; at the juncture of sternum, hypopleura, and pteropleura; and enclosing the posterior spiracle. A normal *Drosophila* arrangement of thoracic bristles, fairly strong and black; the 2 pairs of dorsocentral bristles set well back, close together, just before the scutellum; scutellum with light colored sides, one pair of lateral and one pair of crossing, apical bristles. Halteres light yellow. Males have the pleurae darker than the females, with a prominent pair of bristles on the sides of the sternum.

Legs of the female light brown throughout; those of the male darker, with dark brown femora. In both sexes there is a row of 5 or 6 strong bristles above and 4 below, on the outer face of the front femora, and a comb of strong bristles on the antero-lateral aspect of the middle coxae. The male, in addition, has a number of long, fine hairs on the front tibia, especially a prominent group of 4 near its juncture with the femora.

Abdomen with the anterior portion of each segment light, the posterior half dark, in the female; more extensively dark in the male, only part of the basal segment yellow in some specimens.

Wings yellowish, with veins light and dark brown, and fuscous spots as follows: a small spot in the outer third of the costal cell, extending across the adjacent portions of the marginal, submarginal, and 1st basal cells, to the anterior cross-vein; spots at the tips of the 2nd, 3rd, and 4th longitudinal veins, which may run together; and a spot enclosing each end of the posterior cross-vein, which run together along that cross-vein, forming a dumbbell-shaped mark. The females in addition have a large spot across the middle of the marginal and submarginal cells, which is reduced in the males to a slight cloudiness on the middle of the 2nd longitudinal vein. Costal index 4 to 5; 4th vein index, 1.2 to 1.3; 4 C index, .45 to .55; 5 X index, .75 to 1.0.

Length: 5.5 mm.; wing, 6 mm.

Described from a series of 9 males and 8 females, all collected by F. X. Williams at Lulumahu Valley, Oahu, 1936 to 1937. Holotype male and allotype female, collected April 25, 1937, in a banana grove, No. 820 in B. P. Bishop Museum; paratypes in collection of H.S.P.A.

D. lulumahu and *D. punalua* are related to *D. pilimana* Grimshaw, specimens of which were collected by Dr. R. C. L. Perkins in the Waianae Mountains, Oahu. Although the description of *D. pilimana* is not definite and there is but a single female paratype specimen in local collections, the writer believes that the absence of definite stripes on the mesonotum and the smaller and more restricted fuscous spots on the wings, definitely distinguish *D. pilimana* from *D. punalua* and the present new species.

Drosophila deltaneuron new species.

General color of head and thorax brown, abdomen shining dark brown; mesonotum without distinct markings; tips of 2nd, 3rd, and 4th veins, and both cross-veins distinctly infuscated; other parts of the wing smoky, especially the costal and marginal cells; the posterior cross-vein forming a distinct Y where it intersects the 4th vein.

Front smoky brown, ocellar triangle darker, with crystal-white, bead-like ocelli. Face lighter (smoky-ochraceous), the keel and ocellar margins almost white. Margin of the oral cavity at the vibrissal angle black, with a row of black bristles, alternating short and long, gradually decreasing in length toward the lower angles, at which are placed two long and several short black bristles. Hind margin of eyes with a continuous row of black bristles, and an incomplete 2nd row. Vertical and ocellar bristles large. Antennae brown, almost unicolorous with the front, the 2nd segment with two long and several short bristles; arista located near the upper angle of the 3rd segment, with 7 rays above and 3 beneath, those beneath paired with the apical 3 above.

Mesonotum brown, almost the same shade as front and antennae. Two pairs of dorsocentral bristles, in front of which are a pair of hairs, only slightly larger than the surrounding acrostical hairs, of which there are 8 rows between the dorsocentrals. Arrangement of macrochaetae normal. A dark brown spot below the wings, and a dark stripe running forward from wing base. Scutellum only slightly darker brown than mesonotum, with 1 pair of lateral and 1 pair of apical bristles, all strong.

Legs uniformly brown, concolorous with the thorax. Front femur with a ventral row of 5 graduated bristles and 2 lateral preapical bristles; middle tibiae with strong apical and preapical bristles. All three coxae with combs of curved bristles. Claws black and distinct.

Wings with a normal venation, except for the Y-shaped fork in the posterior cross-vein where it meets the 4th longitudinal vein. Infuscated as described above. The entire surface of the wing in some specimens smoky. Costal vein edged with short bristles, a pair of larger ones at the tip of the 2nd break (before the tip of the 1st vein), and one bristle near the middle of the 1st section of the costa, near the base of the wing. A row of fine black bristles along the margin of the alula. The wing vein indexes are as follows:

| Index | Males | Females | Average |
|----------------|-----------------|-----------------|---------|
| Costal index. | 5.2 (4.6 -5.7) | 5.0 (4.4 -6.3) | 5.1 |
| 4th vein index | 1.38(1.27-1.48) | 1.42(1.26-1.5) | 1.4 |
| 4 C index | .48(.41- .52) | .54(.44- .48) | .51 |
| 5 X index | .73(.64- .79) | .72(.60- .82) | .72 |

Abdomen uniformly dark brown, shining, the surface with numerous small black bristles.

Length: 4 mm.; wing, 4 mm.

Described from a series of 5 males and 7 females, collected by F. X. Williams at Lulumahu Valley, Oahu: types (♂ and ♀) May 2, 1937, No. 818 in B. P. Bishop Museum, paratypes, September 27, 1936, to May 2, 1937, in collection of H.S.P.A. The specimens were collected in and near a banana grove.

This species differs from all other species of *Drosophila* hitherto described from Hawaii in the small, but distinct, triangular cell formed by a fork of the posterior cross-vein where it intersects the 4th vein.

Drosophila sadleria new species.

Ochraceous, the thorax with 6 pale brown lines on the dorsum; wings with both cross-veins and the tips of 2 to 4 and 5 faintly infuscated.

Front, face, antennae, proboscis and palpi ochraceous, the upper orbits on the front and the vertical triangle darker, a pale orange band across the

base of the antennae. Ocellar bristles strong, proclinate and parallel; vertical bristles strong. The type has a 4th fronto-orbital bristle on the left side, laterad to and on almost the same level as the lower; usual 3 fronto-orbital bristles on the right side. The second antennal segment is large and bears 2 or 3 medium size and several shorter bristles; arista pale brown, with 6 branches above and 2 below. Oral margin on each side, beneath the eye, with a row of small bristles, one or more of the middle ones strong; continued around the hind margins in a row of bristles as strong or stronger.

Thorax ochraceous, dorsum with 6 pale brown longitudinal stripes, the lateral one on each side extending forward only to the transverse suture; pleurae with 3 parallel horizontal, darker stripes, the middle one running forward from the base of the wing. Normal chaetotaxy, bristles strong, the 2 pairs of dorsocentrals set well back, before the scutellum. Scutellum unicolorous, with strong lateral and subapical pairs of bristles, the latter crossing.

Abdomen dark brown, the posterior edges of segments narrowly lighter, each segment with a row of small bristles along its lighter edge. Terminal segment with fine golden-brown hairs.

Legs ochraceous; coxae with strong bristles; front femora with 2 rows of moderately strong bristles, 4 each, curving outwardly; middle tibiae with 2 nearly apical bristles; front tarsi with double row of long, dark reddish-brown hairs.

Wings with both cross-veins, and the apical portions of veins 2 to 4 and last section of vein 5 (continuing from the posterior cross-vein) faintly infuscated. The central portion of the wing is faintly tinged with fuscous, especially along the 2nd vein. Costal index (left) 4.1, (right) 4.3; 4th vein index (left) 1.95, (right) 1.90; 4 C index (left) .78, (right) .74; 5 X index (both) 1.06.

Length: 3 mm.; wing, 4 mm.

Type, ♀, Ni'u, Oahu, December 11, 1910 (O. H. Swezey), ex rachis of Sadleria fern. Described from a single female, Type No. 819 in B. P. Bishop Museum.

Other pupa cases of *Drosophila* flies have been found by Mr. Swezey in Sadleria fern stems, at Kilauea, Hawaii, May, 1920. These are 4 to 5 mm. long, shining reddish-brown, impressed at the anterior end.