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VIII. Descriptions and Notes on Hawaiian Drosophilidae (Diptera).[1]

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Volume 12 of the *Insects of Hawaii* (Hardy, 1965) deals with 400 species of Drosophilidae from Hawaii. 18 of these are immigrant species and 382 are considered as endemic to the Hawaiian Islands. Since this book went to press intensive field work has been done in connection with a project on evolution and genetics of Hawaiian Drosophilidae which is now under way. This project has involved a number of field collectors and a wide assortment of collecting technics and during the summers of 1964 and 1965 approximately 100 additional new species have been collected. The species described here are those for which names are needed for the studies being reported on by some of the collaborators on the project. I am also giving notes on some apparent species aberrations; it is possible that these are actually sibling species and it appears likely that many siblings will be demonstrated when we have more detailed knowledge concerning the native fauna. It is now obvious that at least 600 species of Drosophilidae occur in the Hawaiian Islands. The work which is planned over the next five or more years will greatly increase our knowledge of this remarkable fauna.

I am indebted to the following colleagues for their valuable assistance in the field work: Drs. H. Carson, F. Clayton, W. B. Heed, H. Stalker, H. T. Spieth, L. H. Throckmorton, M. R. Wheeler, and Messrs. D. Gubler and K. Y. Kaneshiro.

The illustrations have been prepared by Misses Noreen Naughton and Aileen Matsuyama. I am very appreciative of this valuable assistance. The work was made possible by National Institute of Health Grant GM 10640.

Drosophila achlya, new species (Figs. 1a-d)

This species runs near *D. iki* Bryan and superficially resembles this species. It differs distinctly by having yellow antennae, a large brown basal wing spot, no brown marking on the *m* crossvein, and no rim on the labellum, as well as in other details.

MALE. *Head:* Mostly dark colored; the front is velvety black with a faint gray sheen as seen in some lights. The eye orbits are distinctly gray. The occiput is brown to black in ground color and covered with gray pollen. The face is brown, tinged with yellow to rufous, especially in the furrows. The median portion of the face is slightly raised. The lower margin of each gena, the clypeus and the palpi are black. The mentum is dark brown to black. The labella are pale yellow and fleshy, with no apparent ornamentation. A number of rather prominent black hairs are present along the outside margin of each palpus and no apical bristles are present. The palpus is shaped as in Figure 1a. The anterior reclinate bristles

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are about equal to the proclinates and are situated slightly above the latter. The antennae are pale yellow, contrasting from the remainder of the head. The aristae each have six dorsal and two ventral rays in addition to the apical fork. Two rather prominent bristles are situated at the upper portion of each vibrissal row. *Thorax:* Predominantly dark brown, covered with gray-brown pollen, and tinged with yellow to rufous in the ground color of the anterior portion of the mesonotum. The anterior dorsocentral bristles are two-thirds to three-fourths as long as the posteriors and situated about opposite the second pair of supraalars. Two strong humeral bristles are present. The sternopleural bristles are well developed, the anterior bristle is about three-fourths as long as the posterior, and a rather prominent black seta is situated half-way between the sternopleural bristles. The halteres are pale yellow. *Legs:* Mostly yellow; the coxae are yellow-brown, the middle femora are predominantly dark brown to black, tinged faintly with yellow to rufous; the bases of the middle tibiae are also brown to black and the hind

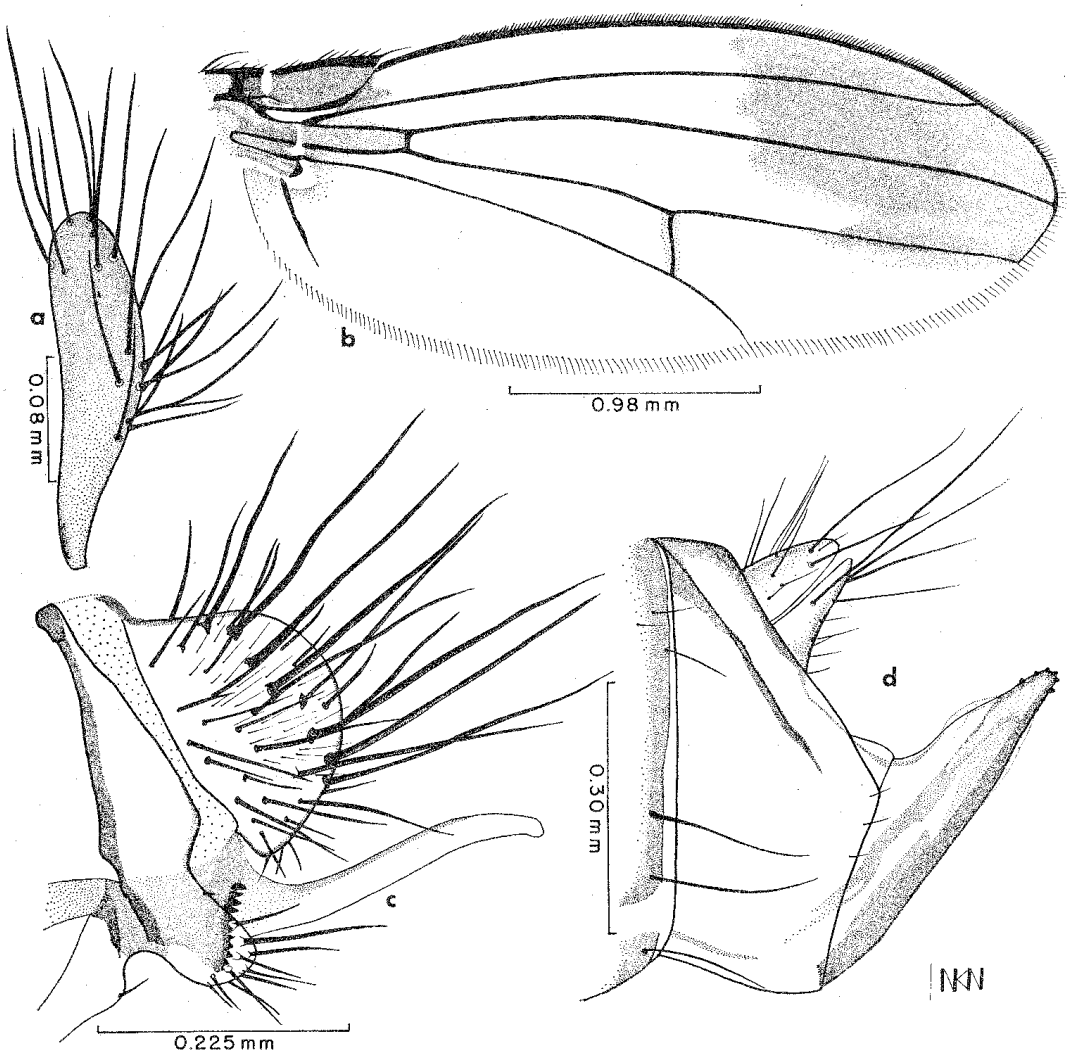

FIG. 1. *Drosophila achlya* n. sp. **a.** palpus; **b.** wing; **c.** male genitalia, lateral; **d.** female genitalia, lateral.

femora are yellow, tinged lightly with brown; the apical segments of the tarsi are dark brown. The front legs are not ornate. The tarsi lack ciliation; the basitarsus is rather slender, slightly more than half as long as the tibia, and two times longer than the second tarsal segment. *Wings:* Hyaline except for the brown bases and apices and except for a very faint tinge of brown on the *m* crossvein; the apical one-fourth of the wing is covered by a large brown marking (Fig. 1b). The third costal section is five times longer than the fourth and the costal fringe extends about two-fifths the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is 1.25 times longer than the penultimate section. The ninth tergum is greatly narrowed over the dorsal portion and shaped as in Figure 1c.

Length: Body, 2.75—3.0 mm.; Wings, 3.2—3.7 mm.

FEMALE. Similar to the male execpt that the apical brown mark on the wing is not quite so extensive, the third antennal segment is tinged with brown, and the bristles of the vibrissal row are stronger; the uppermost bristle is approximately equal in size to the ocellars. The oviposiiter blades extend slightly beyond the apices of the anal plates, are subacutely pointed and are armed with teeth around the apices (Fig. 1d).

Length: Body, 3.2 mm.; Wings, 3.9 mm.

Holotype male and allotype female from Waikamoi, Maui, 4,000′, Oct. 1, 1964 (H. T. Spieth). Twenty-one paratypes, 12 males and 9 females, same locality as type, collected July, August and October 1958 and 1964 (H. T. Spieth, D. E. Hardy, L. H. Throckmorton).

Type, allotype and some paratypes in the B. P. Bishop Museum. The remainder of the paratypes in the collections of the U.S. National Museum, British Museum (Natural History), and the University of Hawaii.

Drosophila amplilobus new species (Figs. 2a-f)

While doing a comparative study of the male genitalia of some of the Hawaiian *Drosophila* in the summer of 1964, Dr. Haruo Takada of Kushiro Women's College, Kushiro, Japan, discovered that the male genitalia of specimens determined as *D. crassifemur* Grimshaw from Kauai were distinctly different from those of this species which he had studied from other islands. I have now studied the genitalia of specimens from five of the main islands and it is obvious that a complex of species is present which fit the previous description of *crassifemur*. The species from Kauai is being successfully raised in culture and a name is needed for it at this time. Dr. Takada is publishing his detailed studies of the genitalia of the *crassifemur* complex elsewhere in this Bulletin. Specimens from Maui, Molokai, and Hawaii may possibly represent the same species (typical *crassifemur*) although some differences have been noted in the development of the structures surrounding the aedeagus, and other details of the genitalia. The significance of these differences is not yet understood and it will be necessary that these populations be established in cultures so that they can be more thoroughly studied.

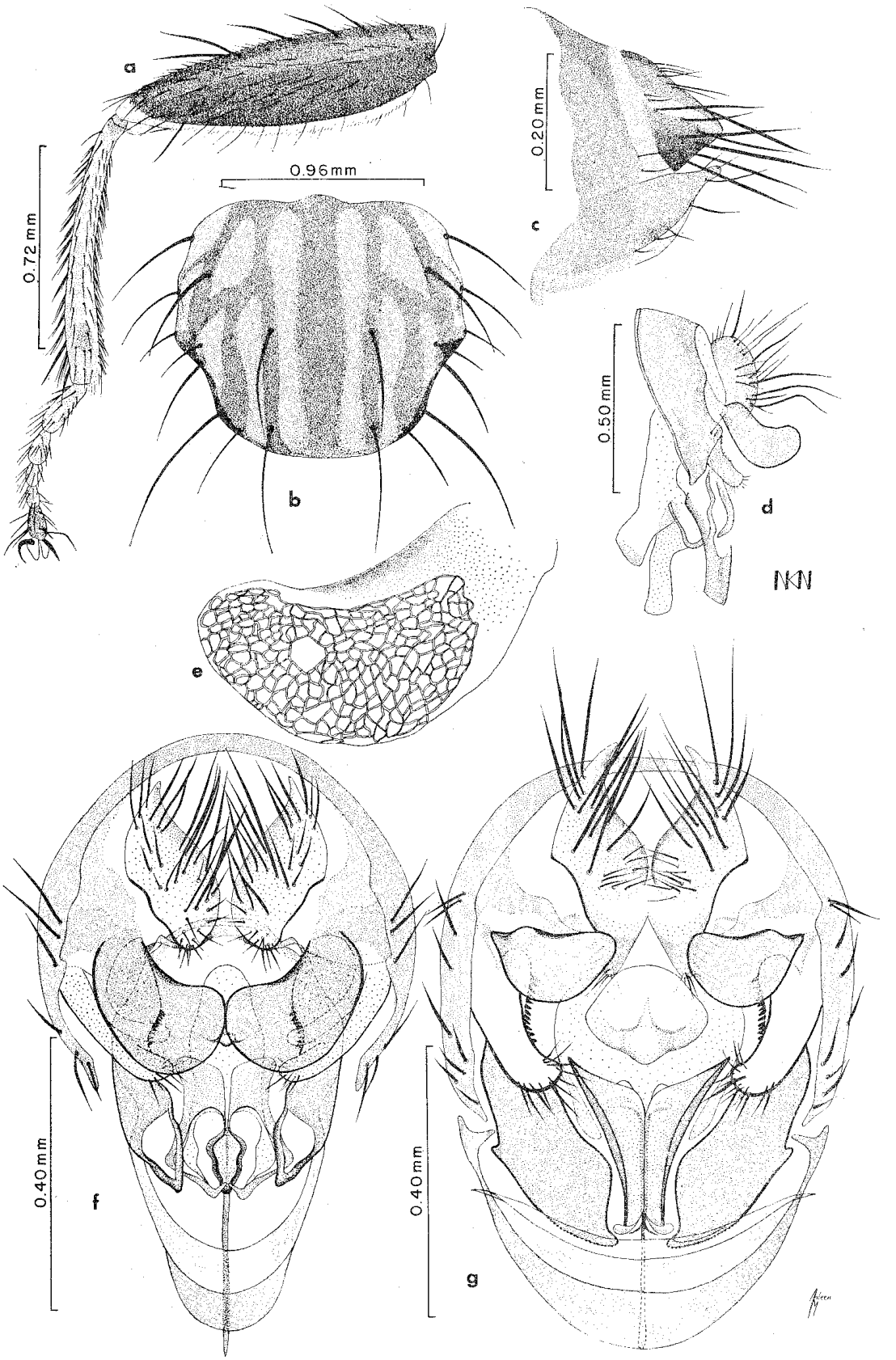

FIG. 2. *Drosophila amplilobus* n. sp. **a.** front leg of male, lateral; **b.** thorax dorsal view; **c.** female genitalia, lateral; **d.** male genitalia, lateral; **e.** lamella of ninth tergum of male; **f.** male genitalia, ventral. *D. crassifemur* Grimshaw. **g.** male genitalia, ventral.

Specimens from Oahu represent a distinct species. This is not being described until further collections can be made and until the species can be established in culture.

As pointed out in the papers being presented by Drs. Throckmorton and Spieth (this Bulletin), it appears evident that *crassifemur* and related species should be placed in the genus *Scaptomyza*; on the basis of internal morphology, egg characters, and mating behavior these seem to be *Scaptomyza* rather than *Drosophila*. On the basis of external morphology, they fit the present concept of the genus *Drosophila*. It is obvious that a revision of the generic concepts is needed but I feel that it is premature to make these rather drastic changes until more complete information is obtained concerning all of the species involved. The genitalia are unlike anything which I have seen in *Drosophila* or *Scaptomyza*. This complex of species is another striking example of the strange speciation trends exhibited by many of the Hawaiian drosophilids.

Externally, this species looks like typical *crassifemur*. I am unable to find any reliable characters which will separate these except those of the male genitalia. *In situ* the males of *amplilobus* can usually be differentiated by the greater size of the membranous lobe which extends from each margin of the ninth tergum; this almost completely obscures the clasper due to its large size. In relaxed or dissected specimens, marked differences can be seen in the claspers, the aedeagus, and surrounding structures. The most striking feature is the presence of a long, slender lobe arising from the base of each clasper and the lack of pointed projections on the parameres (compare Figs. 2d, 2f, and 2g).

MALE. Fitting the description of *crassifemur* so nearly that it would be repititious to describe the general features. The specimens are generally dark in color. The femora are black except for the yellow apices, and the yellow ventral portions of the first pair; the venter of each front femur is densely yellow pubescent as in *crassifemur*. The mesonotum typically has five black vittae extending the full length, except for the interruption of the lateral vittae just beyond the suture; these are set off by yellow-gray pollinose areas as in Figure 2b. The disc of the scutellum is dark brown to black, the margin is narrowly yellow. The humeri are clear yellow. The arista has five or six dorsal and one or two ventral rays in addition to the apical fork. Each palpus has three rather prominent bristles on the outside margin. The front leg is as in Figure 2a. The basitarsus is one-fourth as long as the tibia. The brown to black bands on the middle and hind tibiae are very prominent. The wings are pale brown. The third costal section is four times longer than the fourth and the costal fringe extends about three-fourths the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is about .5 longer than the penultimate section. The abdomen is typically dark brown to black with narrow gray margins on the apices of the terga. The genitalia are dark brown to black, except for the white lamellae arising from the ventral margins of the ninth tergum. These lamellae are sclerotized and brown to black along their anterior borders and the posterior and apical portions are expanded ventrally into a conspicuous paper-thin lobe which almost completely covers the clasper; this lobe is microscopically reticulated, when seen under high power (Fig. 2e). The other details of the genitalia are as in Figures 2d and 2f;

compare with figure of typical *crassifemur*, 2g. The aedeagus is large and fleshy and has a pointed projection on the dorsal surface (Fig. 2f).

Length: Body, 3.5–3.7 mm.; Wings, 3.9–4.2 mm.

FEMALE. The body coloring and markings are as in the male. The ventral portion of the front femur, however, is brown to black in ground color, densely covered with gray pubescence. The ovipositor blades are short and pointed, extending scarcely beyond the apices of the anal plates and shaped as in Figure 2c.

Length: Body, 4.0 mm.; Wings, 4.2 mm.

Field collected specimens of this species show considerable range in size, from the typical given above to approximately 2.5 mm. for the body and 2.7 mm. for the wings.

Holotype male, allotype female and 17 paratypes, 10 males, 7 females from laboratory culture WH47.1, March, 1965 (K. Kaneshiro). The original culture was collected at Halemanu Valley, Kauai, by Dr. Frances Clayton. Also about 50 paratypes, predominantly males, from the following localities in the Kokee area of Kauai: Kokee, 3600′ elevation, July, 1952, in banana-bait trap (D. E. Hardy); Mt. Waialeale Trail, 4500′, August, 1953 (D. E. Hardy); Halemanu Swamp, Aug., 1953 (D. E. Hardy); Halemanu Swamp, Aug., 1953 (D. E. Hardy); Kainamanu, 3800′, July, 1952 (D. E. Hardy); Nualolo Valley, July, 1952, 3400′ (D. E. Hardy); Poomau Valley, 3000′, July, 1952 (D. E. Hardy); and Waiakoali Stream, July 14, 1937, South Fork, 3500′ at light (E. C. Zimmerman).

Type, allotype and a series of paratypes in the B. P. Bishop Museum. Remainder of paratypes distributed among the following collections; U.S. National Museum, British Museum (Natural History), University of Texas Genetics Foundation, and the University of Hawaii.

Drosophila atroscutellata new species (Figs. 3a-h)

Because of the short, broad second segment of the front tarsus of the male and the dark markings in the apex of the wing, this species would run near *D. conformis* Hardy, from Hawaii. The two are apparently not related, however, and *atroscutellata* is readily differentiated by the predominantly yellow coloring of the thorax, with the brown contrasting scutellum; by the black apices of the middle tibiae; and by the differences in the front tarsi (Fig. 3c) and the wings (Fig. 3b). Superficially it closely resembles *kokeensis* n. sp., from Kauai. The leg characteristics and the wing venation, however, are very different in these two species (Figs. 3b, 3c, 7d and 7f).

MALE. *Head:* Predominantly yellow, except for the reddish brown compound eyes and black ocellar triangle. The vertex is brown to black, tinged with yellow, the upper eye orbits are brown to black with a faint yellowish tinge. The occiput is brown with yellow in the ground color. The mouthparts are black; the clypeus is light brown. A thin line of brown to black coloring extends down the inner margin of each gena. The antennae are pale yellow; each arista has six dorsal and two ventral rays in addition to the small apical fork. The anterior reclinate bristles are subequal to the proclinates and situated opposite the latter. The up-

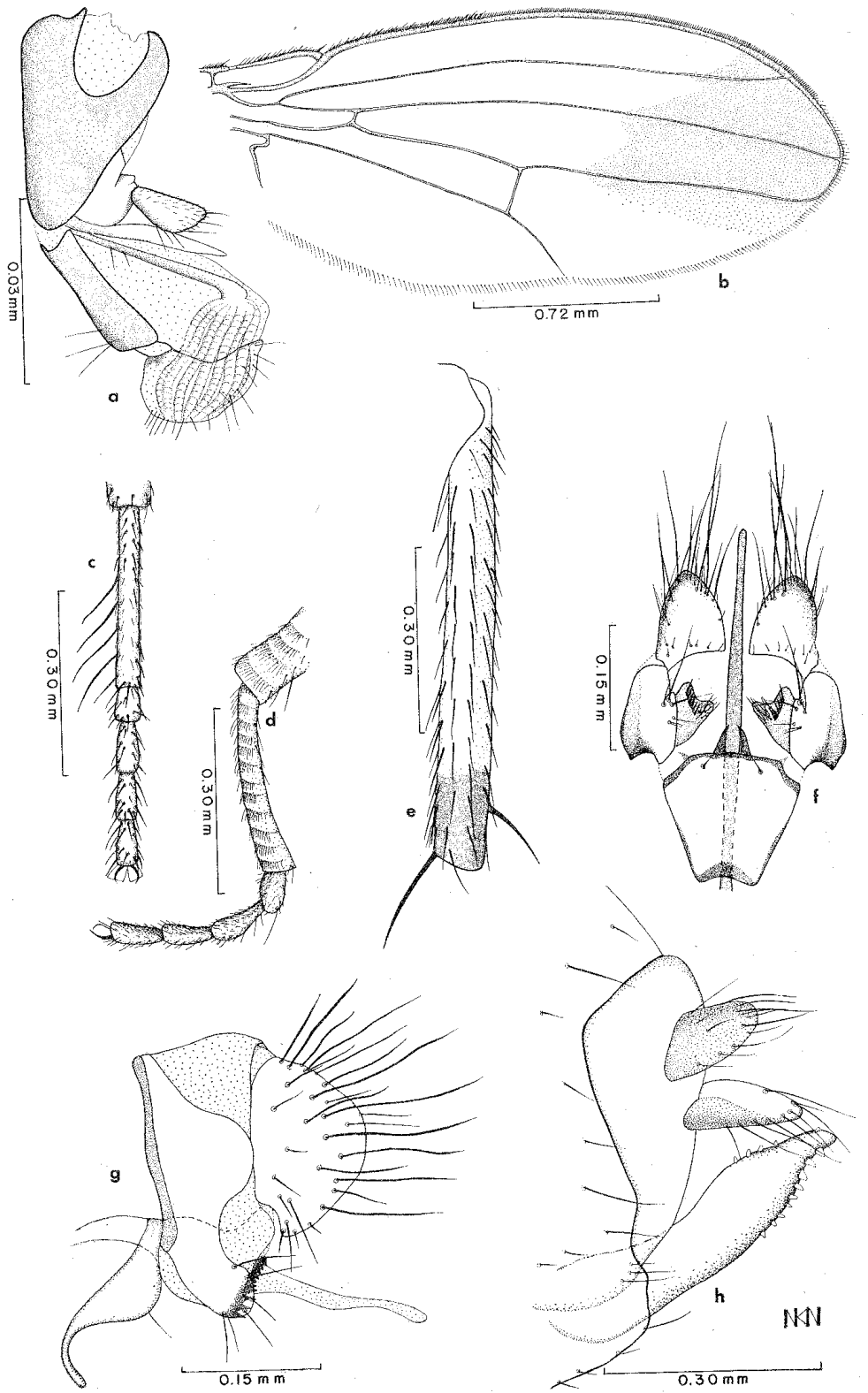

FIG. 3. *Drosophila atroscutellata* n. sp. **a.** mouthparts; **b.** wing; **c.** front tarsus of male, dorsal; **d.** front tarsus, lateral; **e.** middle tibia of male, lateral; **f.** male genitalia, ventral; **g.** male genitalia, lateral; **h.** female genitalia, lateral.

permost bristle of the vibrissal row is approximately equal in size to the anterior reclinates. Two or three rather prominent black setae are also developed in the vibrissal row. The face is white, tinged faintly with yellow. The median portion is slightly raised. The palpi are rather short and thick, only about two times longer than wide, lacking bristles but with black setae around the apical margin (Fig. 3a). The mentum is rectangular, about two times longer than wide. The labella are fleshy and prominent. In relaxed and cleared specimens the mouthparts are yellow-brown; *in situ* they appear black. *Thorax:* Entirely pale yellow except for the dark brown to black scutellum, a brown spot on the extreme anteromedian portion of the mesonotum, a tinge of brown behind each humerus, and the brownish yellow metanotum. A faint tinge of brown is also present on each humerus. Two prominent humeral bristles are present. Both sternopleural bristles are moderately strong; the anterior bristle is equal in size to the anterior dorsocentral bristle. The anterior dorsocentrals are approximately three-fourths as long as the posterior bristles and are situated slightly in front of a line drawn between the second pair of supraalars. *Legs:* Entirely pale yellow except for the conspicuously blackened apices of the middle tibiae (Fig. 3e); the middle tarsi are tinged with brown. The front tibiae are not ciliated. The front basitarsus is about two-fifths as long as the tibia, terminates in a prominent point at the dorsoapex, and has a row of about seven prominent, black, anterior setae extending from the apex two-thirds the distance to the base of the segment (Fig. 3c). The second tarsal segment is short and broad, flattened laterally, about as wide as long. *Wings:* Hyaline except for a prominent brown mark at the apex, filling the apical portions of cells *R3* and *R5* and the upper apical portion of cell *2nd M2* (Fig. 3b). Third costal section nearly five times longer than the fourth and the costal fringe extending two-fifths the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is 1.76 longer than the penultimate section. *Abdomen:* First segment entirely yellow, venter yellow; remainder of terga yellow on the side, brown down the median portions. The genitalia are yellow. The ninth tergum is greatly narrowed above, reduced to just a narrow line over the dorsal portion (Fig. 3g). The anal plates are acutely pointed ventrally. The claspers are plainly visible from a lateral view (Fig. 3g). The ventral aspects of the genitalia are as in Figure 3f; the claspers are densely setose on their inner margins.

Length: Body, 2.15 mm.; Wings, 2.5 mm.

FEMALE. Lacking the prominent brown marking in the wing, with the middle tibiae only faintly marked with brown at the apices, the mesonotum predominantly rufous, and the front and antennae brown. The uppermost bristle of the vibrissal row is almost equal in size to the upper reclinate bristles of the front. The first tergum and the bases of terga two to four are yellow to rufous; the apices of two to four are black. Terga five and six are yellow to rufous. The ovipositor blades are moderately slender, sharp pointed at the apex and with prominent teeth on the margin (Fig. 3h).

Holotype male and allotype female from Halemanu Valley, Kauai, 4,000′, August 28, 1964 (H. T. Spieth and L. H. Throckmorton). Fifty-six paratypes,

35 males and 21 females, same locality as type, March 5, 1964, to August 28, 1964 (F. Clayton, M. R. Wheeler, D. E. Hardy, and H. T. Spieth) and Kokee, Kauai, 3600′, March 5 to June 22, 1964 (H. L. Carson, F. Clayton, and M. R. Wheeler).

Type, allotype and a series of paratypes in the collection of the B. P. Bishop Museum. The remainder of the paratypes are in the collections of the U.S. National Museum, British Museum (Natural History), University of Texas Genetics Foundation, and the University of Hawaii.

Drosophila ceratostoma new species (Figs. 4a, c-f)

In my key to the Hawaiian *Drosophila*, this runs to couplet 68 near *asketostoma* Hardy and it appears to show some relationship to this species. *D. ceratostoma* differs by lacking vittae on the mesonotum; lacking long ciliation on the front tarsi; by the very different mouthparts (Fig. 4a); as well as by the smaller size and other details.

MALE. *Head:* The front is black except for the yellow anterior margin; the yellow marking extends almost to the proclinate bristles. The area between the ocellar triangle and the region occupied by the frontal bristles is velvety black. The orbits and ocellar triangle are black in ground color, covered with brownish-gray pollen. The face is yellow, except for a faint tinge of brown on the epistoma. A distinct carina extends down the median portion of the face. The upper two-thirds of the occiput is brown to black and densely covered with gray pollen; the lower portion is yellow. The clypeus is yellow-brown and the mouthparts are predominantly yellow. The labella are strangely ornate (Fig. 4a). The mouthparts seem to show some resemblance to *asketostoma* but the development of the spines and processes is quite different (refer to Fig. 4b of *asketostoma*). Each palpus has a number of short, black setae and one small bristle at the apex. The anterior reclinate bristles are about two-thirds to three-fourths as long as the proclinates and are situated opposite the latter. The antennae are yellow-brown; each arista has four dorsal and two ventral rays in addition to the apical fork. The oral vibrissae are poorly developed, consisting of short, black bristles which are slightly smaller than the bristles of the occipital row. The compound eyes are higher than long. The face is rather strongly narrowed above the epistoma; at the narrowest point it is scarcely over half as wide as at the upper portion of the face. *Thorax:* Predominantly brown to black in ground color covered with brownish gray pollen on the mesonotum, gray on the sides. The humeri are yellow, with a faint tinge of brown. The scutellum is brown to black on the disc, yellow on the margin and on the ventor. The pleura are brown to black, tinged with yellow; the margins of the sclerites are often yellow. Only one humeral bristle is present. The anterior sternopleural bristle is about two-thirds as long as the posterior bristle. The anterior dorsocentral bristles are about three-fifths as long as the posteriors and are situated almost opposite the second pair of supraalars. *Legs:* Yellow except for a tinge of brown on the apices of the tarsi. The legs are not ornate. The front tarsus has short, inconspicuous hairs along the dorsal surface (Fig. 4c). *Wings: F*aintly infuscated, with very pale brown marking at the apices of veins *R2+3*, *R4+5* and *M1+2*, and over the *m* crossvein. The third

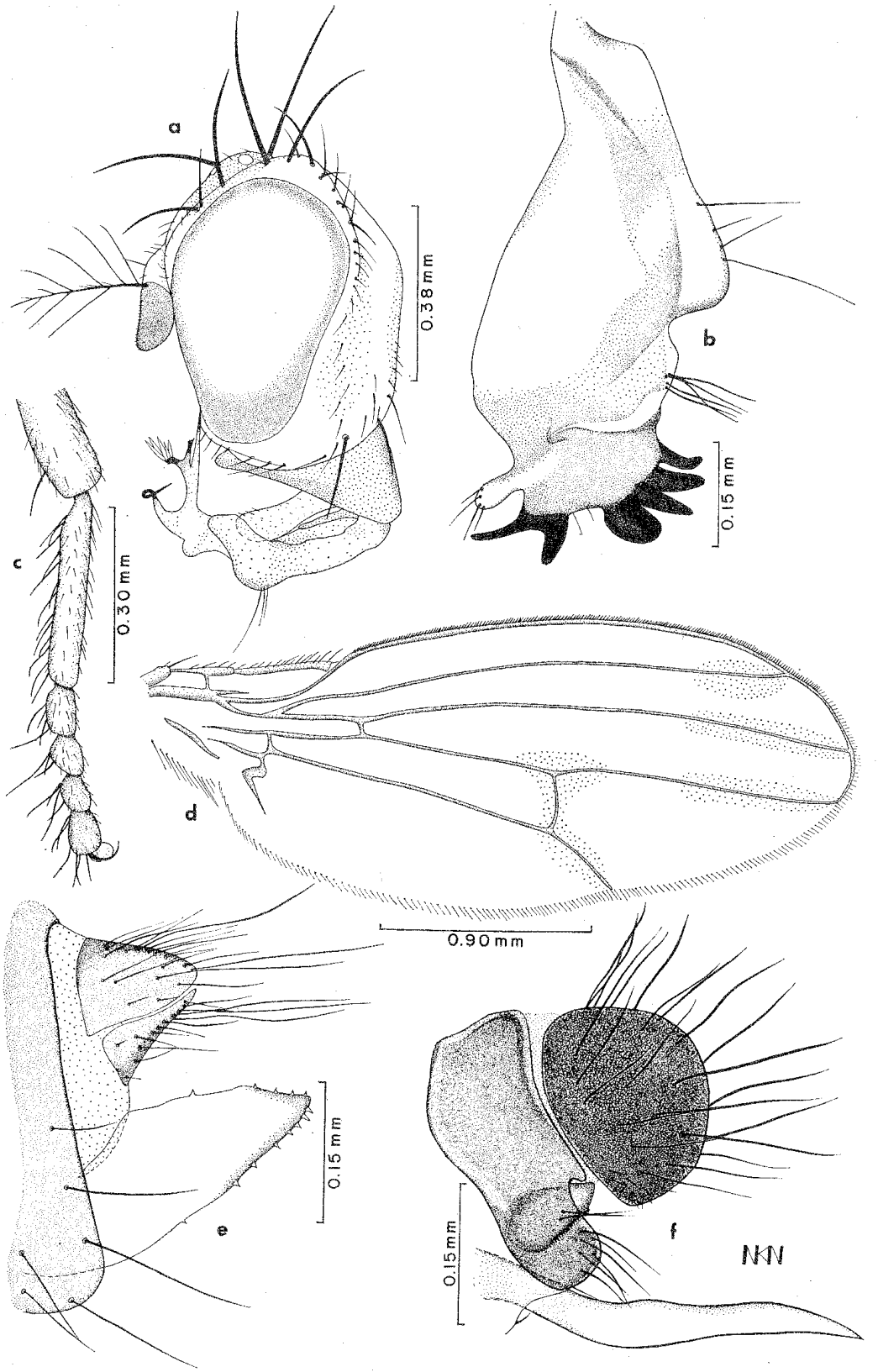

FIG. 4. *Drosophila ceratostoma* n. sp. **a.** head; **c.** front tarsus of male; **d.** wing; **e.** female genitalia; **f.** male genitalia, lateral. *D. asketostoma* Hardy, **b.** mouthparts of male.

costal section is about five times longer than the fourth and the costal fringe extends about one-third the distance between the apices of veins *R2+3* and *R4+5* (Fig. 4d). *Abdomen:* Dark brown to black on the dorsum, largely yellow on the ventor. The terga are thickly covered with short black setae. The cerci are dark brown to black, semi-circular in shape. The ninth tergum is almost parallel sided, blunt on the ventral margins (Fig. 4f).

Length: Body and Wings, 2.7–2.85 mm.

FEMALE. Fitting the description of the male except for sexual differences. The ovipositor blades are short and blunt, shaped as in Figure 4e.

Length: Body, 3.2 mm.; Wings, 3.6 mm.

Holotype male, allotype female and three paratypes, two males, one female, reared from bracket fungus at Kipuka Ki, Kilauea, Hawaii National Park, Hawaii, Sept. 12, 1964 (H. T. Spieth).

Type and allotype in the B. P. Bishop Museum. Paratypes in the collection of the U.S. National Museum and the University of Hawaii.

Drosophila conjectura Hardy, aberration or closely related species? (Fig. 5a)

Drosophila conjectura Hardy, 1965, Insects of Hawaii 12:223.

Seven specimens are on hand from Bird Park, Kilauea, Hawaii, December 5, 1963, (M. R. Wheeler) which appear to be typical *conjectura*. This is a new island record. Another series of sixteen specimens from the forest above Paauilo, Hawaii, 3000′, August 29, 1963, (L. H. Throckmorton, D. Gubler, and D. E. Hardy) seem to fit *conjectura* in all respects except that the pleura are brown rather than all yellow and the mesonotum and scutellum are darker brown to black. I see no structural differences in these. The mouthparts (Fig. 5a), ornamentation of the front tarsi, and other details appear to be identical. It will probably be necessary to do crossing experiments and to have more information concerning the biology and habits before the true position of this population can be decided.

Drosophila demipolita Hardy, aberration?

Drosophila demipolita Hardy, 1965, Insects of Hawaii 12:239.

A series of six specimens, one male, five females, reared from gill-type fungus at Kipuka Ki, Hawaii, Sept. 9–11, 1964 (H. T. Spieth) appears to fit *demipolita* except for the following differences found in the females: the apices of the wings and the *m* crossvein are distinctly tinged with brown, the sternopleura are all black, and the genae are comparatively broad, equal in width or slightly broader than the palpi. The male specimen which was bred with the series of females seems to fit *demipolita* but the wings are evenly tinged with brown. On the basis of the wing markings and the brown to black third antennal segment the females would fit near *haleakalae* Grimshaw, but differ by having two strong bristles present on each humerus (these are approximately equal in size) rather than having the secondary bristle tiny, and poorly developed as in *haleakalae*. They

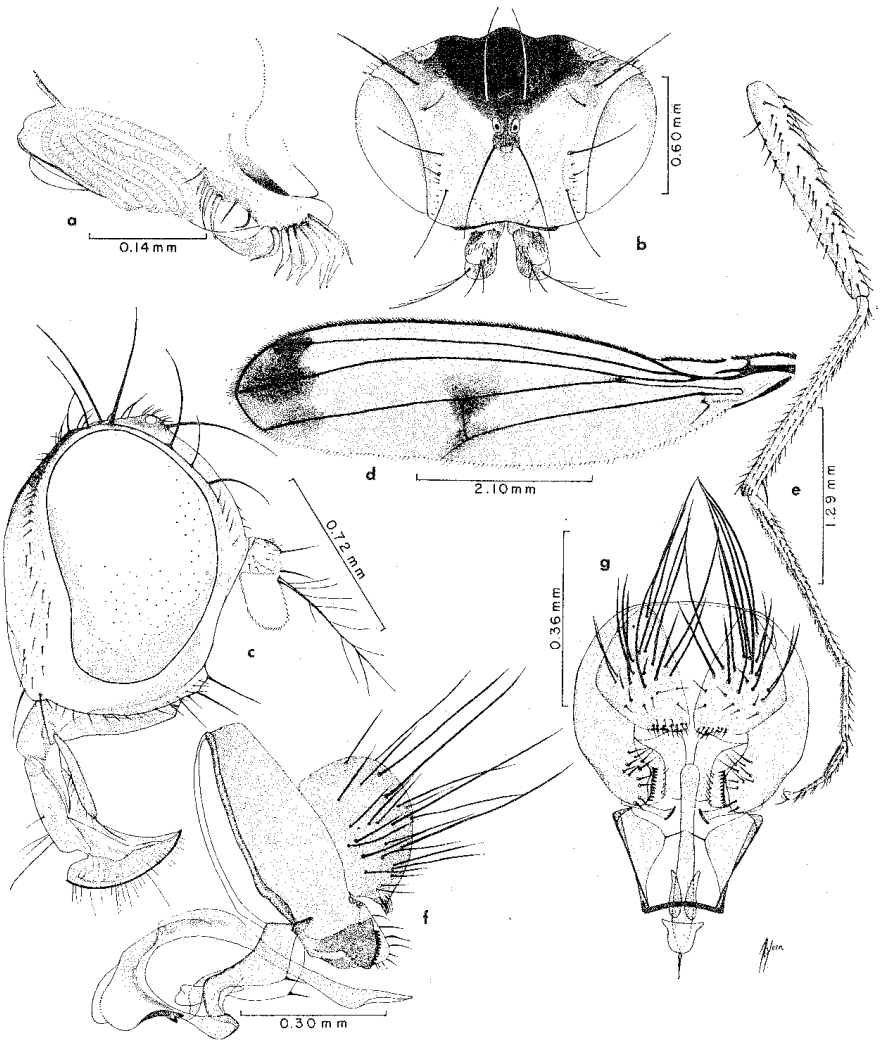

FIG. 5. *Drosophila conjectura* Hardy. **a.** mouthparts of male. *D. dolichotarsis* n. sp. **b.** head, front view; **c.** head, lateral; **d.** wing; **e.** front leg, lateral; **f.** male genitalia, lateral; **g.** male genitalia, ventral.

also differ by having the costal fringe extended almost one-half the distance between the apices of veins *R2+3* and *R4+5*, rather than scarcely over one-fourth this distance. The comparative lengths of the third and fourth costal sections and the last two sections of vein *M1+2* also differ in these two species. The specimens on hand may represent a new species but this cannot be decided until a larger series of specimens is studied.

Drosophila dolichotarsis new species (Figs. 5b-g)

This remarkable species would appear to fit near the *haleakalae-polita* complex of species because of the thickened black rim around the apex of each labellum and the yellow-white apex of the scutellum. It is strikingly different, however, from any *Drosophila* which has been described to date. On the basis of the associations we have seen of the species which have the thickened rim on the labellum,

it is probable that this may be a breeder in bracket-type or gill-type fungi. *D. dolichotarsis* fits near *D. venusta* Hardy, from Molokai, and is apparently related to that species. It is readily differentiated by the extremely long slender wings and differences in wing markings (Fig. 5d); by all yellow pleura, humeri and notopleural areas of the mesonotum; by the more elongate front basitarsus, equal in length to the tibia, as well as other details as brought out in the description below. *D. dolichotarsis* also shows close relationship to *stenoptera* Hardy, from Paliku, Haleakala, Maui. It is differentiated by the all yellow pleura, legs, and front, by the more slender front basitarsus (Fig. 5e) and wings (Fig. 5d) as well as differences in wing markings and other details.

MALE. *Head:* The eyes are oval, .54 higher than long and not noticeably narrowed ventrally (Fig. 5c). The genae are broad, measured from the vibrissal row to the eye margin; each is approximately equal in width to nine rows of eye facets. The occiput is also broad; at its widest point it is approximately one-half as wide as the compound eye. The head is predominantly yellow. The upper median portion of the occiput is polished black in ground color, covered with gray pubescence or microscopic scales. The ocellar triangle is rather narrowly marked in black as shown in Figure 5b. The sides and lower portions of the occiput as well as the remainder of the head, including the mouthparts, are yellow except for a faint tinge of brown in the ground color of the front, the clypeus, and on the lower margin of each gena. The front is about two times broader than the eyes as seen in direct dorsal view and is densely golden pubescent. The face is just slightly raised down the median portion. Each palpus has a moderately long apical bristle and numerous black setae around the posterior margin (Fig. 5c). Each labellum has a prominent black rim around the margin. Two prominent black bristles are present at the upper edge of each vibrissal row; these are approximately equal in size to the genal bristles. The anterior reclinate bristles are rather small, one-half to three-fifths as long as the proclinates and situated well above the latter, approximately one-half the distance between the proclinates and upper reclinates (Fig. 5c). The antennae are entirely yellow. Each arista has six dorsal and two ventral rays in addition to the apical fork. *Thorax:* Highly polished black over the mesonotum except for the yellow notopleural areas and a yellow margin just above each humerus. The scutellum is black in ground color with a prominent yellow-white apex and is rather densely covered with gray pollen. The humeri are yellow with a faint tinge of brown near the anterior margins. The pleura are pale yellow. The metanotum is polished black covered with gray pollen. Only one humeral bristle is present. Also, only one bristle is present on each sternopleuron; I see no evidence of the second sternopleural bristle. *Legs:* Lacking ornamentation but with the tarsi very long and slender. The front basitarsus is subequal to the tibia; the tibia is .1 longer than the basitarsus (Fig. 5e). The middle and hind tibiae are approximately .35 longer than the basitarsi of those segments. *Wings:* Approximately 4.3 times longer than wide, almost straight-sided. A dark brown spot extends over the apex of the wing and a broad brown spot extends over the *m* crossvein into the basal portion of cell *R5* and extends as a slightly less intense marking along the posterior margin of the wing to wing base. The *r-m* crossvein has a faint tinge of

brown. The entire wing is lightly tinged with brown. The basal cells are yellow. The third costal section is about seven times longer than the fourth and the costal fringe extends about half the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is .25 longer than the penultimate section. The last section of vein *M3+4* is about equal in length to the *m* crossvein. *Abdomen:* Predominantly polished black, gray pollinose over the first tergum, over the dorsal median portion of the second tergum and over the narrow basal portions of the remaining terga. The extreme lateral margins of the terga are light gray pollinose. The genitalia are dark brown to black. The cerci are subacutely pointed ventrally. The ninth tergum is almost straight sided, just slightly narrowed over the dorsal portion. The ventral margins of the tergum have short setae around the apices (Fig. 5f). The claspers are not visible from lateral view. These are very short, inconspicuous, and hidden beneath the lobes of the tergum. As seen from ventral view, the ventral margins of the cerci are densely setose. The claspers are two-three times longer than wide and each has a comb of black teeth along the hind margin (Fig. 5g). The aedeagus is flattened at the apex.

Length: Body, 6.0–6.2 mm.; Wings, 7.2 mm.

Holotype male and two male paratypes from Waikamoi, Maui, July 11–15, 1964 (H. L. Carson).

Type in the B. P. Bishop Museum, paratypes in the collections of the U.S National Museum and the University of Hawaii.

Drosophila gubleri new species (Figs. 6a-d)

A complex of small brownish yellow species which look superficially alike appear to live in similar or closely related habitats in the Koolau mountains of Oahu. The species at hand would run to couplet 116 in my key to the *Drosophila* and because of the brown marking in the anteroapical portion of the wing would run to *joycei* Hardy. These two are not related and the differences in wing markings, body coloration, development of the front tarsi and other characteristics will readily separate them. *D. gubleri* seems to fit closer to some of the species which lack wing markings. Except for the wings it would resemble *fastigata* Hardy but the anterior reclinate bristles are not strongly developed and the ornamentation of the front basitarsus is very different (Fig. 6d; *cf.* with Fig. 93a, Hardy, 1965:272). On the basis of the front tarsus it is similar to *unicula* Hardy, from Hawaii, but the basitarsus has two setae at the apex, not one, and the body coloring is very different.

MALE. *Head:* Yellow except for the reddish eyes and for the brown upper half of the occiput, the vertex, and upper portion of the front. The ocellar triangle is black. The median portion of the front is yellow to the ocellar triangle and the upper lateral portions have a golden brown to bronze sheen. A faint line of brown extends down each vibrissal row. The mouthparts, including the clypeus and the palpi, are yellow, faintly tinged with brown. The antennae are yellow with a slight tinge of brown on the third segments and over the dorsal surface of the second. The arista has five-seven dorsal rays and two ventral rays in addition to the apical fork. The palpi have several black setae around the apices but lack

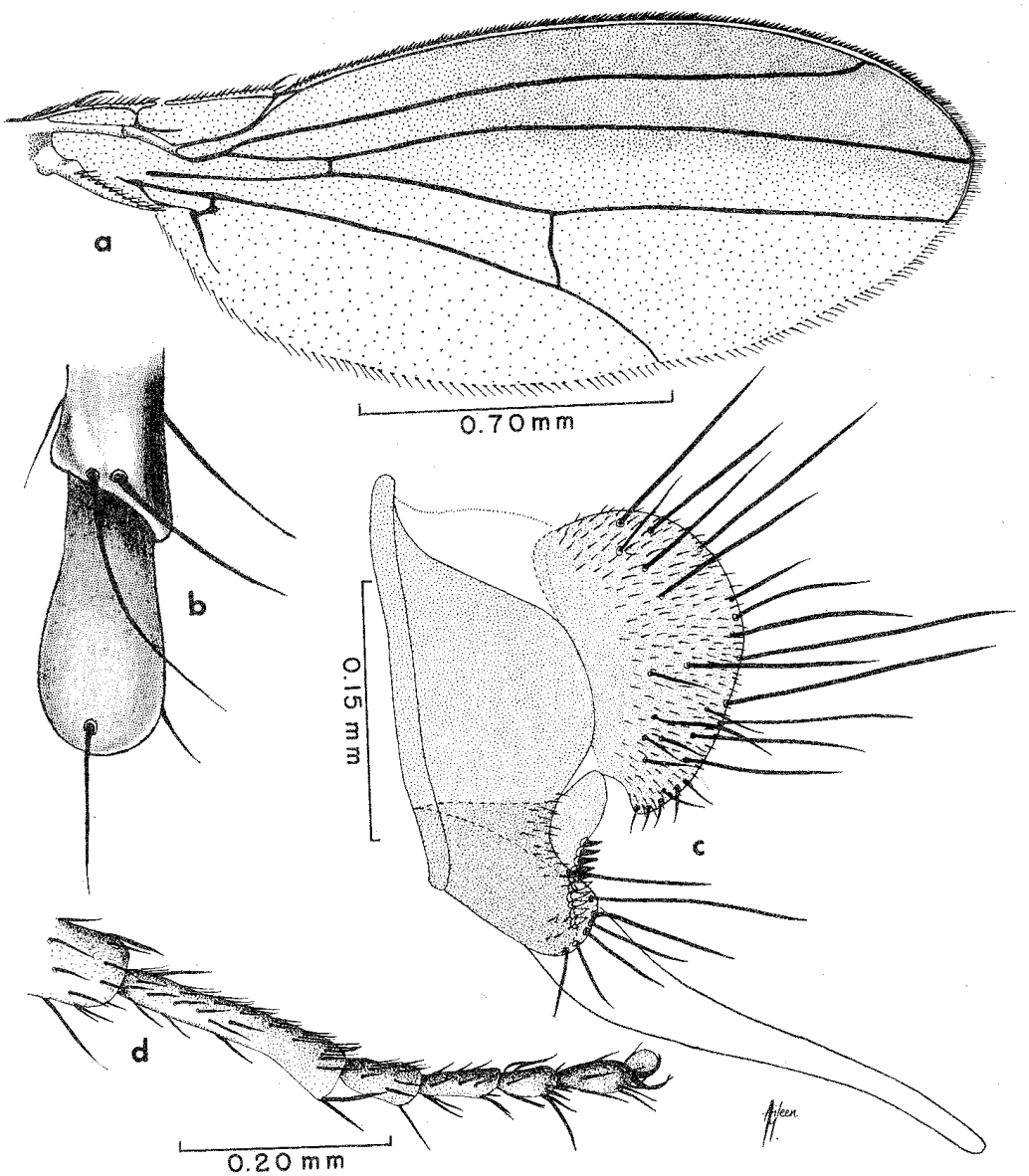

FIG. 6. *Drosophila gubleri* n. sp. **a.** wing; **b.** apex of front basitarsus of male, anterior view; **c.** male genitalia, lateral; **d.** front tarsus of male, lateral.

apical bristles. The anterior reclinate bristles are slightly smaller than the proclinates and are situated just above the latter. The uppermost bristle of each vibrissal row is almost equal in size to the proclinate bristles of the front. The face is slightly raised down the median portion. *Thorax:* Predominantly yellow, tinged with brown over the posterior portion of the mesonotum, and with the scutellum brown, faintly tinged with yellow on the disc, pale yellow below. Both pairs of humeral and sternopleural bristles are well-developed. The anterior dorsocentral bristles are approximately two-thirds as long as the posteriors and situated about half-way between the first and second supraalars. The pleura are pale yellow with a slight tinge of brown along the upper portions. The halteres are yellow. *Legs:* Yellow, tinged with brown at the apices of the tarsi. The front

legs are not ornate except for the development of the basitarsi. The basitarsus is rather slender, about two-thirds as long as the tibia, slightly enlarged on the upper apical portion and bearing two anteriorally directed black setae on this prominence (Fig. 6b). A few short erect anterior hairs are present on the apical half of the basitarsus (Fig. 6d). *Wing:* Subhyaline, with a pale brown marking extending over the anteroapical portion of the wing. This mark extends through the apices of cells *R1* and *R3* and through the upper portion of cell *R5* (Fig. 6a). The third section of the costa is 4.6 times longer than the fourth and the costal fringe extends about half the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is about .5 longer than the penultimate section. The last section of *M3+4* is slightly longer than the *m* crossvein. *Abdomen:* The first and fifth terga are yellow except for a faint tinge of brown on the apex of the fifth. The sides and anterolateral portions of the other terga are yellow, the median and posterior portions of terga two-four are brown. The sixth tergum is short, scarcely visible from dorsal view, and pale yellow in color. The genitalia are yellow. The anal plates (cerci) are subacutely pointed ventrally, the ninth tergum is strongly narrowed over the dorsal portion, and the claspers are plainly visible from a lateral view as shown in Figure 6c.

Length: Body and Wings, 2.3 mm.

FEMALE. The female has not been definitely associated with the male. A complex of species occur in this area in which the females are all apparently very similar and an allotype has not been designated. One specimen on hand which seems most nearly to fit with the male differs by lacking the brown marking in the wings and having the front more evenly discolored with brown, also the abdomen is all brown. The ovipositor plates are short, subacutely pointed.

Holotype Male, Pupukea Trail, Oahu; July 17, 1963, (D. Gubler). Four male paratypes collected in the Pupukea area, August, 1963, (D. Gubler, L. H. Throckmorton and D. E. Hardy).

Type in the B. P. Bishop Museum; paratypes in the collections of the U.S. National Museum, British Museum (Natural History), and the University of Hawaii.

It is a pleasure to name this species after Mr. Duane Gubler who has played an important part in the field studies of Hawaiian *Drosophila.*

Drosophila hirtitarsus Hardy, aberrations or possibly new species (Figs. 7a-b)

Two populations from the island of Hawaii would seem to be *hirtitarsus* except that the mouthparts appear to differ. The specimens from Maui and Molokai, typical *hirtitarsus,* have the labella distinctly narrowed, with the fleshy portion scarcely visible (Fig. 7a). The specimens from the island of Hawaii have the labella normal in development with the fleshy portion readily visible (Fig. 7b). These differences are easily seen *in situ.* I see no other differences which will separate these populations. These may represent sibling species or this may be just an aberration of the mouthparts. It will be necessary to have information concerning the biology and habits of these, and also do cross-mating experiments before a firm decision can be made. The series of about forty specimens from the

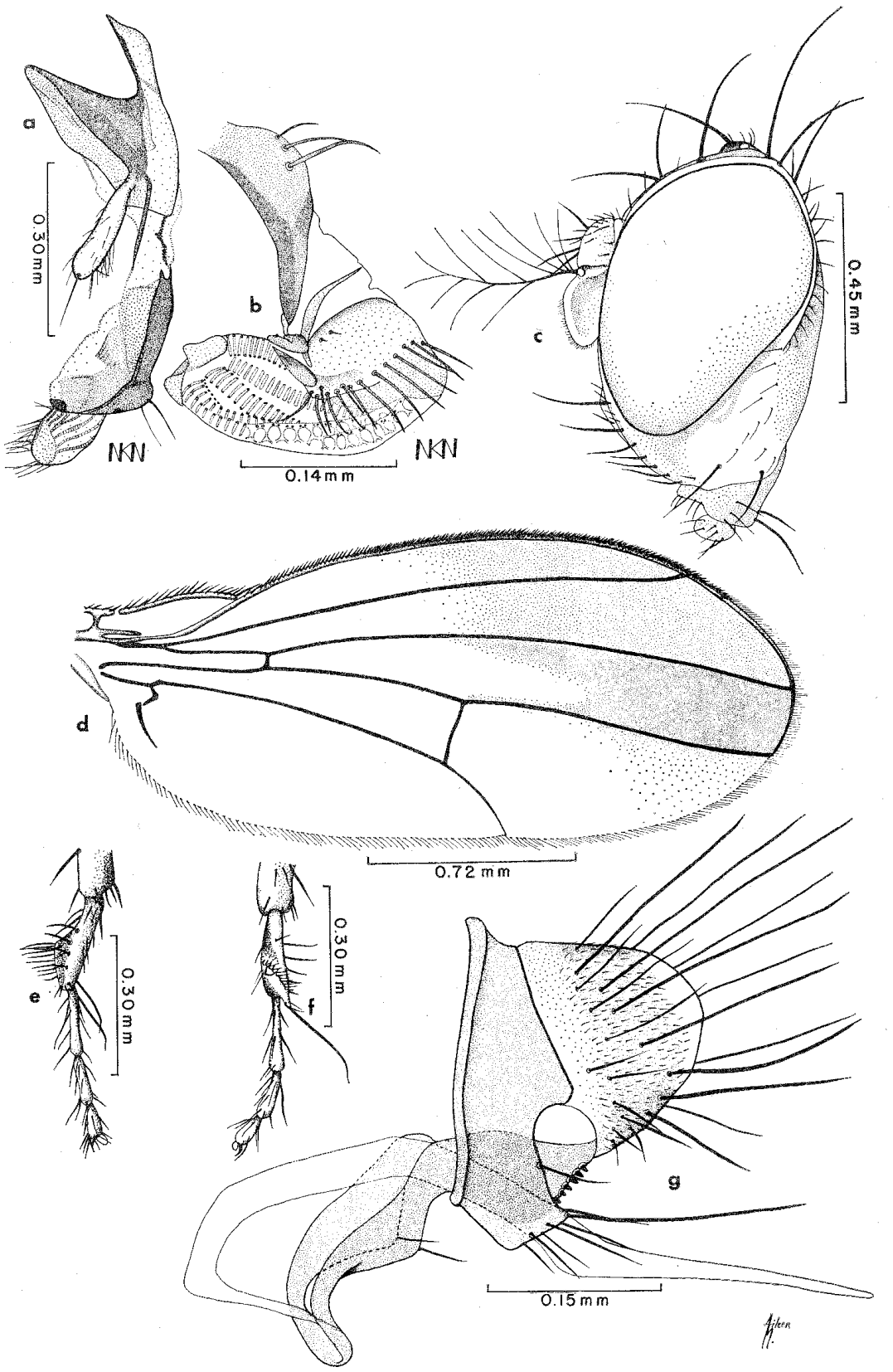

FIG. 7. *Drosophila hirtitarsus* Hardy. **a.** labellum of specimen from Maui; **b.** labellum of specimen from Hawaii. *D. kokeensis* n. sp. **c.** head; **d.** wing; **e.** front tarsus of male, posterolateral view; **f.** front tarsus of male, dorsal; **g.** male genitalia, lateral.

forest above Honokaa, Hawaii, 2000′, July 27, 1963 (D. Gubler and D. E. Hardy) differs from a series of sixty-seventy specimens from Kipuka Ki, Hawaii, some reared from gill-type fungi, others collected on gill-fungi, Sept. 9–12, 1964, (H. T. Spieth) by having the wings entirely clear, or evenly but faintly infuscated; the series from Kipuka Ki have the *m* crossvein faintly marked with brown.

Drosophila kokeensis new species (Figs. 7c-g)

This species very closely resembles *D. atroscutellata* n. sp. but the front tarsi are strikingly different in the two (Figs. 3d and 7e). These are apparently not related. In my key to the Hawaiian *Drosophila* this would run to couplet 112, but does not fit near any of the included species. The predominantly yellow color, with the contrasting dark brown scutellum, the development of the front basitarsus (Fig. 7e) and the wing markings (Fig. 7d) will differentiate this from any known *Drosophila.*

MALE. *Head:* The genae and lower portion of the occiput are broad compared to most *Drosophila* and the eyes are rather strongly narrowed on the lower portion (Fig. 7c). The head is predominantly yellow except for the reddish brown compound eyes, the black ocellar triangle and the brown tinged upper occiput, upper eye orbits, and lower lateral portions of the face. The antennae are pale yellow, the arista has six to eight dorsal rays and three ventral rays in addition to the apical fork. The anterior reclinate bristle is approximately equal to the proclinate and is situated opposite the latter. Two moderately strong bristles are present in each vibrissal row. The uppermost bristle is about equal in size to the proclinates. The mouthparts are yellow, tinged faintly with brown. The palpi lack conspicuous bristles but have black setae around the apices. *Thorax:* Yellow except for the brown scutellum, and for a brown tinge along the extreme anterior margin extending to the sides of the mesonotum above the humeri. Two prominent humeral bristles are present and both sternopleurals are well developed. The anterior dorsocentral bristle is two-thirds as long as the posterior and is situated in line with the second pair of supraalars. *Legs:* Entirely pale yellow. The front tibiae lack ornamentation. The preapical dorsal bristle is small, rather inconspicuous. Only four segments are visible in the front tarsus. The basitarsus is about one-half as long as the tibia, is produced into a short appendage on the apex, which bears two long apical cilia equal in length to the entire basitarsus. A closely set row of dorsal cilia extends over the apical half of the basitarsus. *Wings:* Hyaline except for a large brown spot over the anteroapical portion (Fig. 7d); this extends through the apex of cell *R5* anteriorly through the apical portion of cell *R1*. The third costal section is three times longer than the fourth and the costal fringe extends approximately one-third the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is about .5 times longer than the penultimate section. *Abdomen:* The first tergum is yellow; the other terga are yellow to rufous at their bases, brown to black, tinged with yellow apically. The genitalia are yellow. The ninth tergum is slender, shaped as in Figure 7g. The anal plates are approximately as high as long. The claspers are plainly visible from a lateral view.

Length: Body, 2.3 mm.; Wings, 2.7 mm.

FEMALE. Unknown; Holotype male and four paratypes from Kokee, Kauai, 3600′. Type collected July, 1963 (L. H. Throckmorton); Paratypes collected July, 1963 and November 8, 1963, (L. H. Throckmorton and M. R. Wheeler).

Type in the B. P. Bishop Museum; Paratypes in the collections of the U.S. National Museum, British Museum (Natural History), University of Texas Genetics Foundation, and the University of Hawaii.

Drosophila scitula new species (Figs. 8a-d)

This species runs near *melanosoma* Grimshaw in couplet 72 of my key to the *Drosophila* because of the shortened front basitarsi and the two are obviously closely related. *D. scitula* differs from *melanosoma* by having the apical two-fifths of the wing covered with a dark brown mark, by having abdominal terga one, five, and six yellow rather than black; by having the pleura nearly all yellow, rather than the upper half dark brown to black; and by being smaller and more slender bodied.

MALE. *Head:* The lower half of the front, the face, genae, mouthparts, lower one-third of the occiput, and the antennae are pale yellow. The upper front, vertex and occiput are brown. The ocellar triangle is dark brown to black. The lower half of each compound eye is densely and conspicuously yellow-white pubescent. The compound eyes are oblong to oval in shape, about one-third higher than long. The genae are rather narrow through the median portion; measured from the vibrissal row to the eye margin each gena would be equal in width to about three rows of eye facets. The anterior portion of the gena is produced into a subacute point bearing two rather prominent vibrissae. The other vibrissae are short, inconspicuous and pale. Each palpus has a long, slender, apical bristle equal in length to the proclinate bristles of the front. Each labellum has a prominent black rim (Fig. 8a). The anterior reclinate bristles are about three-fifths as long as the proclinates and situated well above the latter, approximately one-third the distance to the upper reclinate bristles (Fig. 8a). Each arista has seven dorsal and three ventral rays in addition to the apical fork. *Thorax:* The mesonotum is brown to black covered with gray-brown pollen. The scutellum is predominantly brown and the apex is yellow-white. The pleura are pale yellow except for a brown mark at the upper posterior corner of each mesopleuron and in the upper portion of each hypopleuron. The metanotum is yellow, tinged with brown. The humeri are yellow except for a brown tinge on the upper portions. The anterior dorsocentral bristles are two-thirds to three-fourths as long as the posteriors and are situated about opposite the first pair of supraalars. Two rather well developed humeral bristles are present but only one sternopleural bristle is present. The anterior sternopleural bristle is lacking or represented only by a minute seta. The posterior bristle is well-developed, equal in size to the posterior dorsocentral bristles. The halteres are pale yellow. *Legs:* Yellow except for a tinge of brown on the apices of the middle and hind femora and on the apical segments of the tarsi. The legs are not ornate and lack conspicuous ciliation. The front basitarsus is short and the second tarsal segment is one-half longer than the first

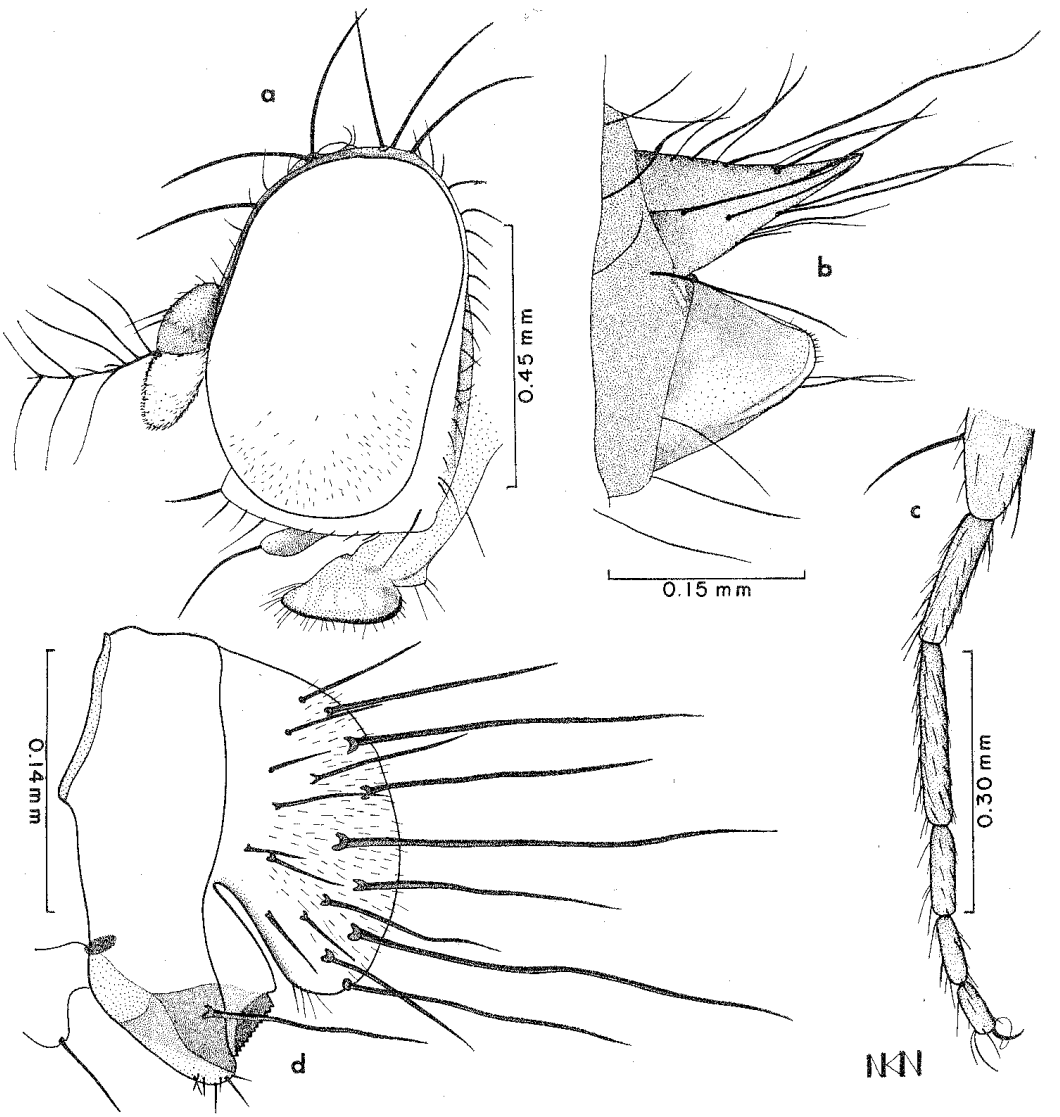

FIG. 8. *Drosophila scitula* n. sp. **a.** head; **b.** female genitalia, lateral; **c.** front tarsus of male; **d.** male genitalia, lateral.

(Fig. 8c). The preapical dorsal bristle on the front tibia is well developed. *Wing:* The apical two-fifths is dark brown; this marking extends almost to a level with the *m* crossvein. The third costal section is 3.65 times longer than the fourth and the costal fringe extends slightly beyond the middle of the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is .4 times longer than the penultimate section. The basal two-thirds of the wing is subhyaline. *Abdomen:* The first, fifth and sixth terga are yellow. The second tergum is yellow to rufous at the base, brown over the apical one-half to three-fourths. Terga three and four are dark brown. The genitalia are brown, tinged with yellow and shaped as in Figure 8d. The ninth tergum is rather broad over the dorsal portion. narrowed slightly on the sides, and with a prominent preapical bristle on each lateral lobe and a few short setae around the apex.

Length: Body, 2.5 mm.; Wings, 2.7 mm.

FEMALE. The female has not been definitely associated with the male; only one specimen is on hand which appears to fit here. It differs by having the wings clear, however, lacking the brown markings; also the upper half of each pleuron is dark brown to black and the palpi, clypeus, epistoma and third antennal segments are dark brown to black. Each palpus has a prominent apical bristle. The basitarsi of the front legs are short as in the male and the preapical dorsal bristle of the tibia is strong, about equal in length to the basitarsus. The brown apices of the middle and hind femora are more pronounced than in the male. The ovipositor and cerci are dark brown to black; the blades of the ovipositor are short, triangular, reaching scarcely to the apices of the cerci (Fig. 8b). The females differ from those of *melanosoma* by having the lower half of each pleuron pale yellow; by the brown apices of the middle and hind femora; and by having the lower reclinate bristles situated distinctly above the proclinates. The female is not being designated as an allotype.

Holotype male, Mohihi Stream, Kokee, Kauai; 3700′, July, 1963, (L. H. Throckmorton). Eleven male paratypes all from the Kokee area of Kauai, some with same data as type, June and July, 1963 and 1964; (M. R. Wheeler and D. E. Hardy); three from Kokee, 3600′, June 22, 1964, and Nov. 8, 1963; two from Halemanu Valley, 4,000′, June 25, 1964, (L. H. Throckmorton); and one taken near Waiakoali Stream, 3700′, June 26, 1964 (D. E. Hardy). The female specimen reported above was taken in Alakai Swamp, Kauai, 4000′, July 28, 1963 (D. E. Hardy).

Type and some of the paratypes in the B. P. Bishop Museum. The remainder of the paratypes are in the collections of the following: U. S. National Museum, British Museum (Natural History), University of Texas Genetics Foundation, and the University of Hawaii.

Drosophila spectabilis Hardy (Figs. 9a-g)
Drosophila spectabilis Hardy, 1965, Insects of Hawaii, Vol. 12: 470.

Description of male and new island records.

This species was described from a unique female from Puu Kolekole, Molokai. Ten additional specimens are now on hand, five males and five females; five same locality as type, June 10 and July 23, 1964 (D. E. Hardy and M. S. Carson); also five specimens from Waikamoi, Maui, August 14 and Oct. 1, 1964 (H. T. Spieth). The latter is a new island record. Typically the front is darker in color than on the type; on most specimens it is predominantly dark brown to black with a faint tinge of rufous in the ground color of the median portion. The lower one-third of the front is dark brown to black. The face is often discolored with brown to black especially through the median portion. In some specimens a pair of submedian, brownish yellow vittae extend down the mesonotum from the anterior margin to the anterior dorsocentral bristles. It was not mentioned in the original, but the vibrissae are arranged in two distinct rows (Fig. 9a). The male differs from the females by having the front basitarsus flattened laterally (Fig.

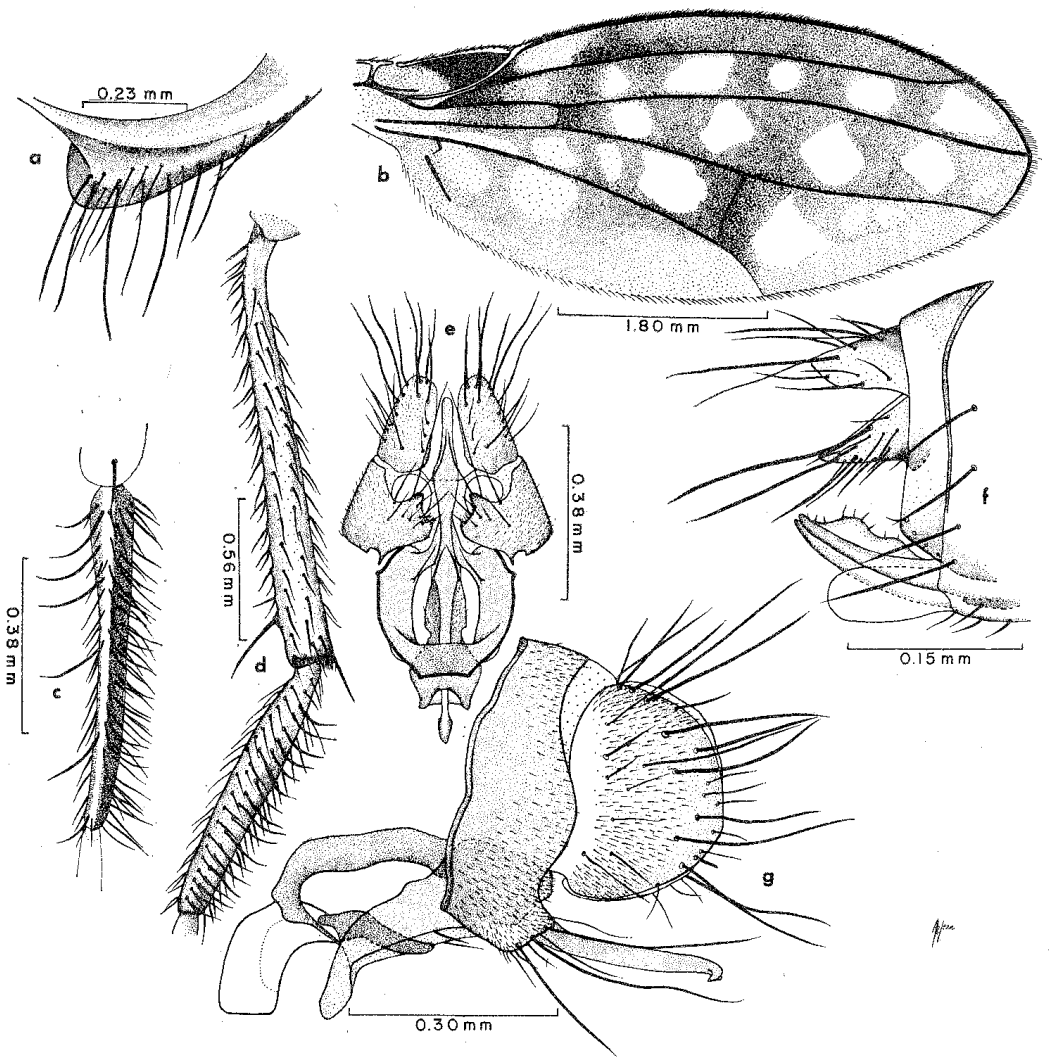

FIG. 9. *Drosophila spectabilis* Hardy. **a.** oral margin showing vibrissal row; **b.** wing; **c.** front basitarsus of male, dorsal; **d.** front tibia and basitarsus of male, lateral; **e.** male genitalia, ventral; **f.** female genitalia, lateral; **g.** male genitalia, lateral.

9d) similar to *adiastola*, densely covered with moderately long downcurved hairs on the posterior surface and with a row of about six curved anterior cilia extending almost the entire length the segment (Fig. 9c). The front basitarsus is three-fifths to two-thirds as long as the tibia and is nearly three times longer than the second tarsal segment. The front tibia is not ornate except for a rather prominent preapical ventral bristle (Fig. 9d). The wing markings are similar to those of the female except that the hyaline spots are smaller and the anterior margin of the wing is completely brown (Fig. 9b). The lateral aspects of the male genitalia are as in Figure 9g and the ventral aspects are as in Figure 9e. The size of the male is the same as that recorded for the female. The ovipositor plates are shown in Figure 9f.

Drosophila spiethi new species (Figs. 10a-e)

This belongs in the species group which is characterized by having a prominent appendage at the apex of the front basitarsus and by having only four tarsal segments developed. It appears to be related to *D. fundita* Hardy from Maui and Molokai, but differs in many respects. The front basitarsus of *spiethi* has a prominent, black, dorsal bristle at the base of the segment (Fig. 10e); this is absent in *fundita*; the appendage on the front basitarsus of *spiethi is* short, thick, and straight-sided (Fig. 10e), rather than slender, pointed, and curved as in *fundita*; the pleura are black in *spiethi*, all yellow in *fundita*; the lower half of the front is yellow in *spiethi*, the front is all brown in *fundita*; also the mesonotum of *spiethi* is black covered with gray pollen, rather than brown, tinged with rufous. This species is also rather closely related to *propiofacies* Hardy but differs by lacking the long, slender anterior reclinate bristles which are characteristic of that species; by the presence of the strong basal bristle on the basitarsus and by having the lower portion of the front yellow; as well as in other details.

MALE. *Head:* Higher than long, shaped much as in species of *Titanochaeta* (Fig. 10a). The front is predominantly yellow, the orbits are brown to black, covered with gray pollen to a level with the proclinate bristles, and the upper portion of the front is brown to black above a level with the lower point of the ocellar triangle, and is distinctly pollinose. The vertex is black in ground color, gray pollinose. The upper two-thirds of the occiput is brown, tinged with rufous in the ground color. The lower portion is yellow. The face, genae, and mouthparts are yellow, including the clypeus. Each palpus has several black setae around the apex but no prominent bristles. The mouthparts are not ornate. The antennae are pale yellow, the aristae each have six dorsal and two ventral rays in addition to the apical fork. The anterior reclinate bristles are approximately equal to the proclinates and are situated opposite the latter. One moderately strong bristle is present in each vibrissal row. This is approximately equal in size to the genal bristles. The face is only slightly raised down the median portion and the sides are slightly convergent. *Thorax:* Entirely dark colored except for the yellow apex on the scutellum and a tinge of yellow in the ground color of each humerus. The mesonotum is shining black covered with gray pollen and the pleura are dark brown, tinged faintly with rufous in the ground color. The halteres are pale yellow. The anterior dorsocentral bristles are small, poorly developed, scarcely over two times longer than the setae over the mesonotum and approximately one-third to two-fifths as long as the posterior dorsocentrals. Two moderately strong bristles are present on each humerus and both sternopleural bristles are well developed. *Legs:* Entirely yellow except for the brown apices of the tarsi. The legs are not ornate except for the modifications of the front tarsi. Only four segments are present in the front tarsus. The basitarsus has a prominent appendage at the apex; this is rather broad, not quite equal in length to the second tarsal segment, and is densely covered with black setae along the anterodorsal surface (Fig. 10e). A rather prominent, black, dorsal bristle is present near the base of the basitarsus and several black hairs extend in a line along the anterodorsal surface continuous with the line of hairs over the appendage (Fig. 10e). *Wings:* Almost

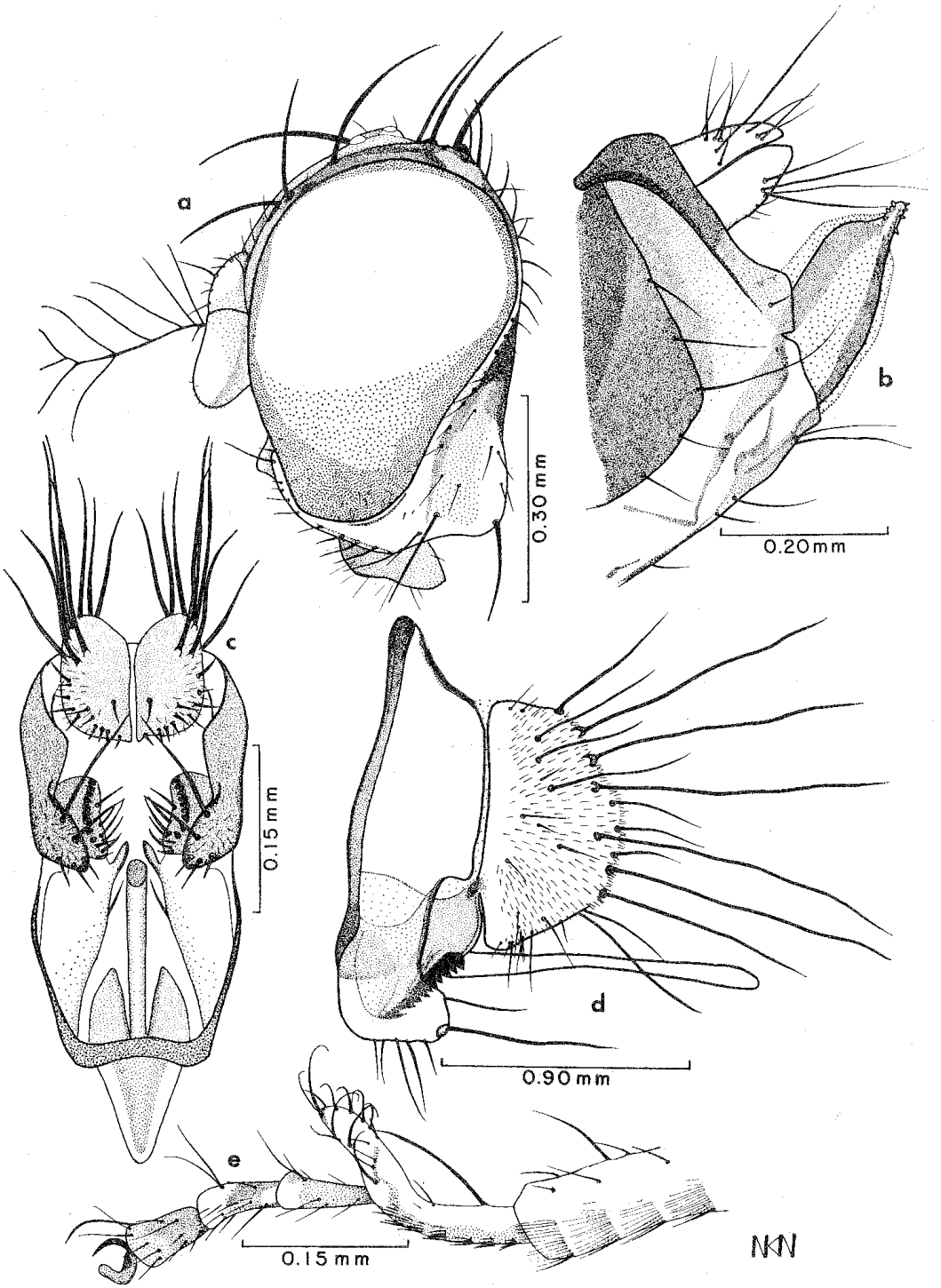

FIG. 10. *Drosophila spiethi* n. sp. **a.** head; **b.** female genitalia, lateral; **c.** male genitalia, ventral **d.** male genitalia, lateral; **e.** front tarsus of male, lateral.

hyaline, very faintly tinged with brown. The third costal section is 3.75 times longer than the fourth and the costal fringe extends slightly beyond one-third the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein

M1+2 is .7 times longer than the penultimate section. *Abdomen:* Brown covered with gray-brown pollen except for a tinge of yellow in the ground color of the basal segment and with segment six largely yellow, tinged with brown. The visible genitalia are yellow. The anal plates (cerci) are subacutely pointed ventrally. The ninth tergum is narrow, distinctly lobate ventrally and densely setose on the ventral margin (Fig. 10d). The claspers are hidden from a direct lateral view. The aedeagus is short and blunt; a prominent seta is present on each inside surface of the ninth sternum near the tip of the aedeagus (Fig. 10c). The parameres are short, just scarely visible from ventral view.

Length: Body, 2.3 mm., Wings, 2.5 mm.

FEMALE. Fitting the description of the male in most details. The arista has five dorsal and two ventral rays in addition to the apical fork. The uppermost bristle of the vibrissal row is stronger than in the male, approximately equal or slightly larger than the proclinate bristles of the front. The third seta of the vibrissal row is also rather well developed. The anterior dorsocentral bristles are strong, almost equal in length to the posteriors. The abdomen is entirely dark brown to black except for a tinge of yellow on the first tergum. The ovipositor blades are rather slender and pointed and are armed with teeth on both the dorsal and ventral surfaces just before the apex (Fig. 10b).

Length: Body, 2.5 mm.; Wings, 3.0 mm.

Holotype male, allotype female and 41 paratypes, 7 males, 34 females from Bird Park, Kilauea, Hawaii National Park, Hawaii, July 12, 1964 (H. T. Spieth). Also 2 males and 6 females collected same locality as type, July 17, 1964 (L. H. Throckmorton).

Type, allotype and some of the paratypes in the B. P. Bishop Museum. Remainder of the paratypes are being deposited in the collections of the U.S. National Museum, British Museum (Natural History), University of Texas Genetics Foundation, and the University of Hawaii.

It is a pleasure to dedicate this species to Dr. H. T. Spieth who is making intensive studies of the mating behavior of Hawaiian Drosophilidae.

Idiomyia clavisetae new species (Figs. 11a-f)

This remarkable species is distinctly different from any known *Idiomyia* and I am unable to relate it to any of the species which I have seen to date. The wing markings would somewhat resemble those of *I. grimshawi* Bryan but the two do not seem to be related. *I. clavisetae* is differentiated from other species in this genus by the capitate, or clavate, hairs on the posterior portion of the male abdomen and by having the extra crossvein in cell *R5* situated about half-way between the *r-m* and *m* crossveins (Fig. 11c).

MALE. *Head:* Predominantly yellow; the ocellar triangle and the posteromedian portion of the occiput are brown, the vertex is tinged with brown and a brown tinge extends along the orbits in the area occupied by the frontal bristles. The front is largely golden yellow, lightly tinged with brown or rufous. The

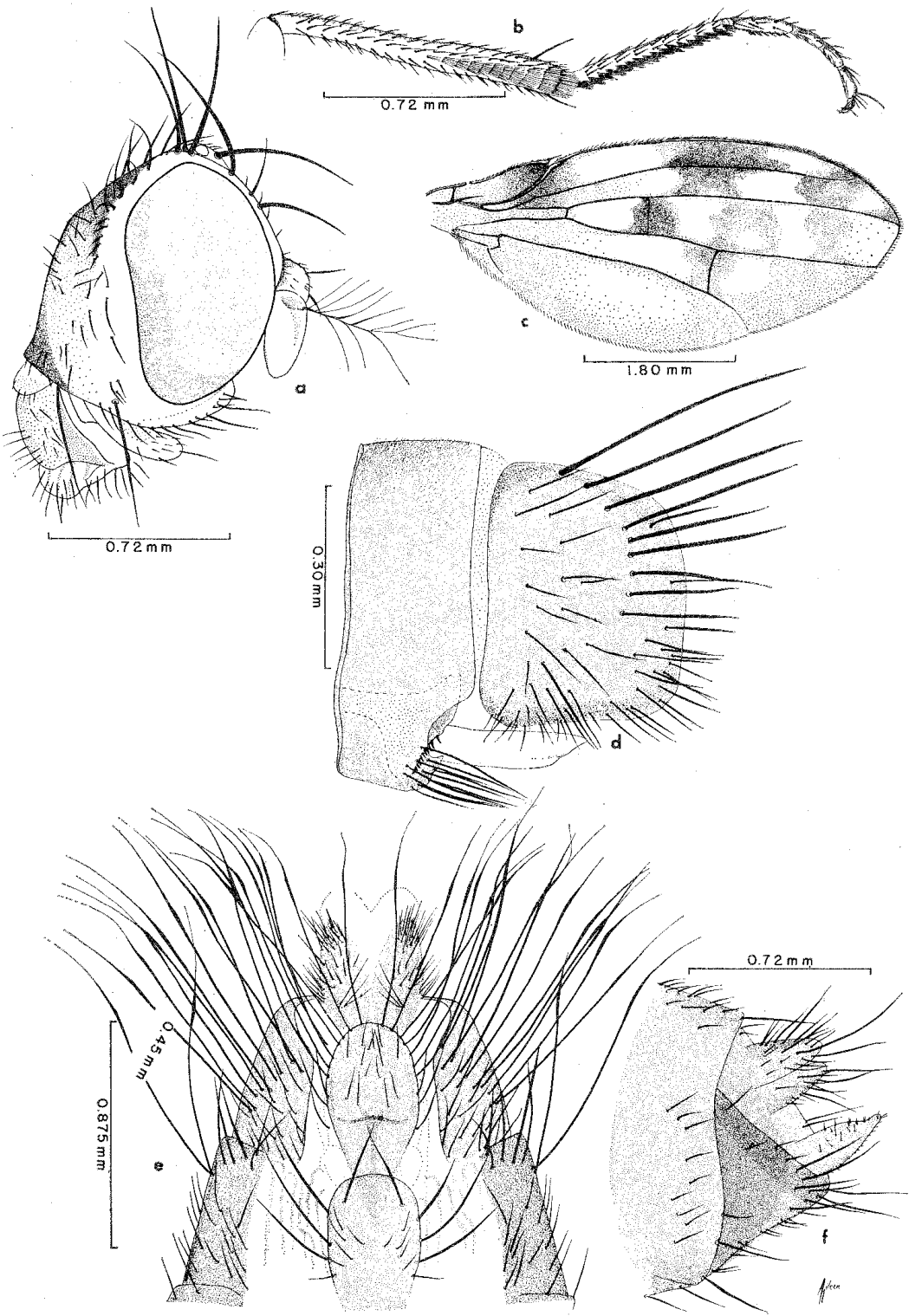

FIG. 11. *Idiomyia clavisetae* n. sp. **a.** head; **b.** front tibia and tarsus of male; **c.** wing; **d.** male genitalia, lateral; **e.** apex of male abdomen, ventral; **f.** female genitalia, lateral.

front is comparatively broad, two times wider than the compound eyes as seen from direct dorsal view. The interfrontal area is sparsely covered with short, black setae on the lower half. A line of short setae also extends down each side of the front just outside the frontal bristles. The anterior reclinate bristle is subequal to the proclinate and is situated distinctly above the latter, approximately one-third the distance from the proclinate to the upper reclinate. A dense patch of short, black setae occurs on each side of the mid-line of the posterior portion of the occiput. The antennae are entirely yellow; each arista has six dorsal and four ventral rays in addition to the apical fork (Fig. 11a). The face is clear yellow and has a prominent gibbosity in the median portion. The oral vibrissae are moderately developed; the three upper bristles are the strongest and are approximately two-thirds as long as the genal bristle. The mouthparts are entirely yellow except for a tinge of brown at apices of labella. The labella apparently lack teeth but are conspicuously covered with yellow to brown setae. The mentum is well developed and covered with prominent setae. The palpi lack prominent bristles but are covered with black setae on their apices. *Thorax:* Predominantly yellow, with brown markings on the upper half of each pleuron and on the mesonotum and scutellum. On the type the mesonotum has a broad brown median vitta which fades out slightly at the anterior end of the segment. On the two paratype males present, this vitta is lacking on the anterior third to one-half of the mesonotum. A narrow brown vitta extends on each side of the mesonotum from near the posterior border to about opposite the anterior supraalars; the area behind each humerus is also discolored with brown. The disc of the scutellum is pale brown, the sides are yellow. The upper two-thirds of each mesopleuron and the portion of each pteropleuron beneath the wing base are marked with brown. The anterior dorsocentral bristles are approximately two-third to three-fourths as long as the posterior pair, and are situated opposite the second supraalar bristles. Two strong bristles are present on each humerus. The sternopleural bristles are strong, the anterior bristle is three-fourths to four-fifths as long as the posterior. A line of fine black setae extends vertically over the median portion of each sternopleuron. The halteres are entirely yellow. *Legs:* Predominantly yellow, tinged faintly with brown on the apices of the femora and the tibiae. The tarsi are brown. The posteroventral and posterodorsal bristles are well developed on the femora. The front tibiae and tarsi are not ornate, the basitarsus is about three fifths as long as the tibia (Fig. 11b). *Wings:* Mostly infuscated with dark brown markings over the anterior portion and gray-brown over the posterior portion, leaving rather large hyaline spots in the cells (Fig. 11c). The wing base is yellow-brown to a level with the forking of the radial sector. The apical half of the costal cell is occupied by a brown spot which extends into the basal portion of cell *R1*. A large brown spot occupies the median portion of cell *R1* and extends through cell *R3* to vein *R4+5*. A brown spot is also present in the apex of cell *R1* extending transversely across the wing to cells *R3* and *R5* and blending with a pale brown marking at the apex of cell *2nd M2*. The third costal section is approximately five times longer than the fourth and the costal fringe extends about to the middle of the distance from the apices of vein *R2+3* and *R4+5*. The extra crossvein in cell *R5* is more basally placed than in any other known species of *Idiomyia*; it is sit-

uated halfway between the *r-m* and the *m* crossveins (Fig. 11c). *Abdomen:* Predominantly yellow; black on the sides of the first four terga and tinged with brown on the ventral margins of the fifth tergum. The posterior margins of terga two to four are narrowly brown. Except for one row on the postero-lateral margins of the fifth tergum, the peculiar capitate, or clavate, setae are confined to the sixth tergum and sternum (Fig. 11e). The cerci are prominent, semicircular in shape, and with rather conspicuous black setae around the apical margins. From lateral view the genitalia are shaped as in Figure 11d. The ninth tergum is not noticeably narrowed over the dorsal portion. The claspers are almost hidden from lateral view.

Length: Body and Wings, 5.7–6.0 mm.

FEMALE. Fitting the description of the male in most details. The third antennal segment in brown and the apices of the palpi are often tinged with brown. Each palpus has a small apical bristle. Also the front is rather uniformly brownish tinged in ground color. The abdomen is dark brown to black except for the yellow markings on the sides of the first segment. The ovipositor blades are rather short, extending about one-third longer than the cerci, and blunt at apices (Fig. 11f).

Length: Body 5.7 mm., Wings 6.0 mm.

Holotype male from Waikamoi, Maui, 4,000′; Oct. 1, 1964 (H. T. Spieth).

Allotype female, same locality and collector as type, dated Oct. 1–7, 1964. Seven paratypes, two males, five females, same locality as type, collected Oct. 1–7, 1964; July 8, 1964 (H. L. Carson) and one specimen collected on the Flume Trail at Waikamoi under *Clermontia arborescens* trees, Aug. 14, 1964 (D. E. Hardy).

Type and allotype in the B. P. Bishop Museum. Paratypes in the collections of the U.S. National Museum, British Museum (Natural History), and the University of Hawaii.

Idiomyia melanocephala new species (Figs. 12a-e)

Because of the strongly arched costa, the wing markings, and the nature of the antennae, this fits near *I. perkinsi* Grimshaw and the specimens at hand were taken in the same area as specimens of *perkinsi*. *I. melanocephala* differs from *perkinsi* by being predominantly black: the mesonotum all black, the scutellum black except for a narrow yellow apex and the pleura and legs nearly all black. In *perkinsi* the anterior portion and sides of the mesonotum, the disc of the scutellum and the posterior half of each pleuron are yellow; also the legs are almost completely yellow. *I. melanocephala* also differs by having the anterior reclinate bristle stronger, more conspicuous than in *perkinsi* and by having the *m* crossvein gently concave, not sinuate.

MALE. *Head:* Nearly quadrate as seen in direct lateral view; the front is not strongly produced and the face is gently concave as seen in lateral view. The eyes are slightly narrowed ventrally (Fig. 12a). The occiput is rather strongly swollen

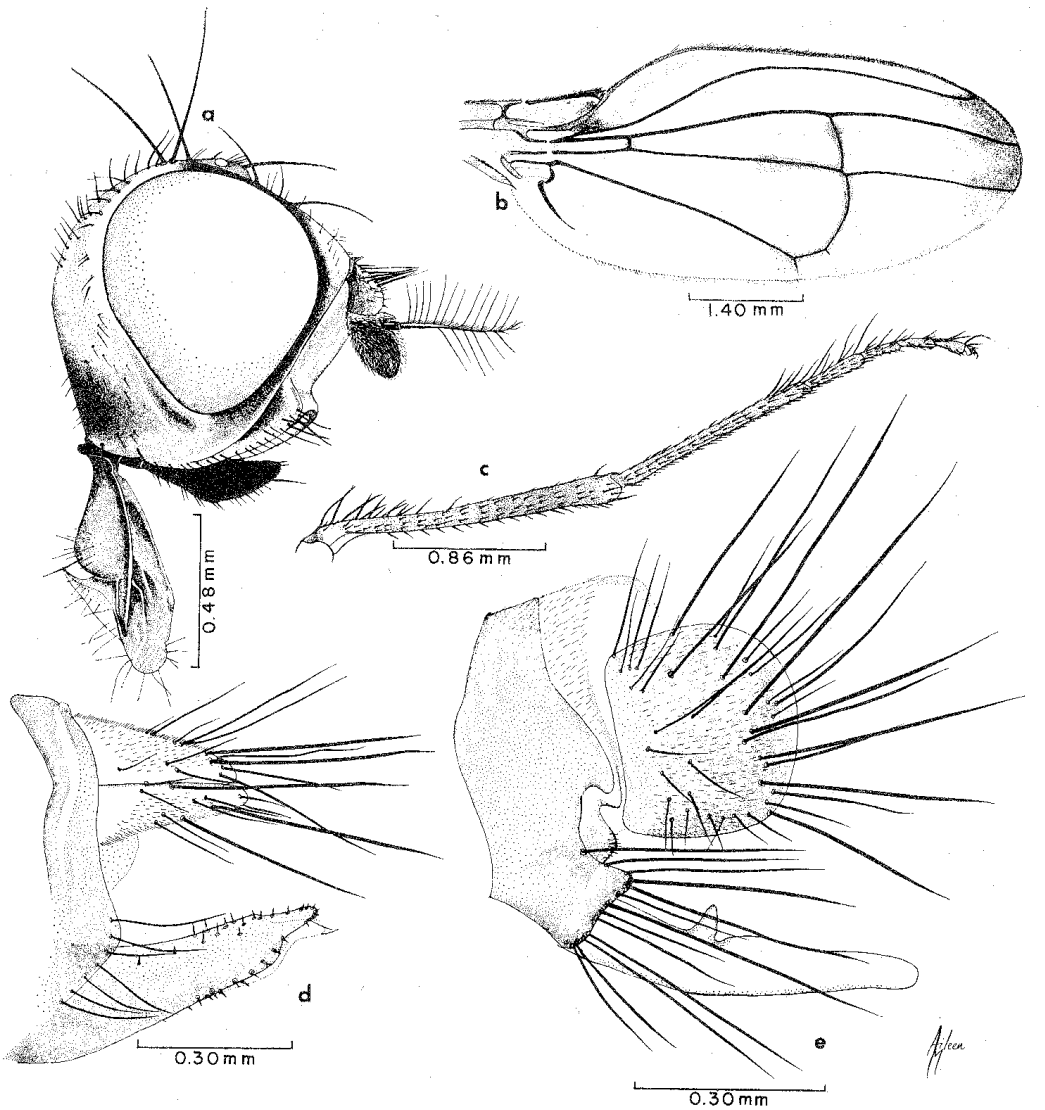

FIG. 12. *Idiomyia melanocephala* n. sp. **a.** head; **b.** wing; **c.** front tibia and tarsus of male; **d.** female genitalia, lateral; **e.** male genitalia, lateral.

and the median portion is approximately one-half as wide as the eye. The genae are also broad; measured from the eye margin to the vibrissal row each gena is equal to about six rows of eye facets. The head and appendages are predominantly black. The sides of the occiput are yellow, tinged faintly with brown and the front is mostly yellow, black along the orbits to just below the proclinate bristles. The eye orbits, ocellar triangle, vertex, and upper portion of occiput are densely gray-brown pollinose. The anterior reclinate bristle is moderately developed, about one-half to three-fifths as long as the proclinate and situated well above the latter, approximately two-fifths the distance between the proclinate and upper reclinate bristles (Fig. 12a). The oral vibrissae are arranged in two irregular rows and no unusually strong bristles are present in the vibrissal row; the upper three bristles are approximately equal in size to those on the genae. A

moderate bristle is present at the apex of each palpus; this is about equal in size to the anterior reclinate bristle. The mouthparts are not ornate. The aristae are rather short, scarcely more than one-fourth longer than the antennae. Each arista has eleven or twelve dorsal rays and five or six ventral rays in addition to the apical fork. The inner surface of the arista is densely covered with short villi. The second antennal segment has a dense patch of black setae on the dorsal surface. The antennae are rather widely spaced and a prominent carina extends between them; this extends onto the upper median portion of the face. *Thorax:* The mesonotum and scutellum are dark brown to black in ground color covered with gray-brown pollen. The area above each wing base is yellow; the yellow spot occurs on each anterior margin just inside the humerus and a tinge of yellow occurs in the area behind the humerus and in the notopleural area. The propleura, mesopleura and sternopleura are polished black. The pteropleura are black except for a yellow spot in the middle and beneath the wing base. The metapleura are yellow, tinged faintly with brown. The metanotum is dark brown to black, tinged with rufous in the ground color. The humeri are shining black with a faint tinge of yellow on the upper margins. The scutellum has a small yellow spot at the apex between the apical bristles. The lower humeral bristle is small, scarcely one-third as long as the upper. Two strong sternopleural bristles are present. The anterior dorsocentral bristles are about two-thirds as long as the posteriors and are situated approximately opposite the second pair of supraalars. *Legs:* Almost all black; yellow at the extreme apices of the femora and tibiae, and at the bases of the tibiae. The tarsi are mostly brown, faintly tinged with yellow. Each front tibia has a series of dorsal hairs at the base but no other conspicuous ciliation. The front basitarsus is approximately two-thirds as long as the tibia and has about four erect, anterodorsal hairs situated just before the apex of the segment. About four of these anterodorsal hairs are also found on the second tarsal segment (Fig. 12c). *Wings:* The costal margin is strongly arched, so that cell *R1* is very broad in the basal portion and narrowed apically. A dark brown spot extends over the apex of the wing. Brown markings are also present on the crossveins, along vein *M1+2* just before the crossvein, at the apices of the first and second costal cells, and near the base of cell *R1* just below the break in the costa (Fig. 12b). The extra crossvein in cell *R5* is situated just before the *m* crossvein. The *m* crossvein is gently concave and in some specimens has a small appendix on the outer edge as in Figure 12b. Vein *M3+4* is short, scarcely one-fifth as long as the *m* crossvein. The third costal section is 6.5 times longer than the fourth and the costal fringe extends three-fourths the distance between the apices of veins *R2+3* and *R4+5*. *Abdomen:* Polished black in ground color, covered with brown pollen. The genitalia are brown to black; the cerci are tinged with yellow and almost oval in shape. The ninth tergum is just slightly narrowed over the dorsal portion and is lobate ventrally (Fig. 12e). Only the upper edge of each clasper is visible from a dorsal view; the inner surface is armed with strong teeth. The aedeagus has a dorsal hook before the apex.

Length: Body, 6.4 mm.; Wings, 7.0 mm.

FEMALE. Fitting the description of the male in most respects. The median

portion of the face, however, is yellow, tinged faintly with brown. The ovipositor blades are rather well developed, extending beyond the apices of the anal plates; they are slightly attenuated apically, and armed with short setae around the margins (Fig. 12d).

Length: As in male.

Holotype male, allotype female and one male paratype from Waikamoi, Maui, July 10, 1964 (W. B. Heed).

Type and allotype in the B. P. Bishop Museum; paratype in the University of Hawaii collection.

Idiomyia planitibia new species (Figs. 13a-e)

This species is related to *I. hemipeza* Hardy, from Oahu, but the wing markings, body coloration and other details are quite different. The band on the anterior margin of the wing is less distinct, not so broad as in *hemipeza*, occupying only cell *R1*; the apical brown marking extends into the upper apex of cell *2nd M2* rather than ending at vein *M1+2*; the pleura are predominantly polished black, rather than having the lower portion brown and the upper portion yellow; the wings lack the transverse brown band through the middle which extends across the crossveins in *hemipeza*; and the male genitalia differ by having the anterior margin of the ninth tergum expanded (Fig. 13b).

MALE. *Head:* The head is distinctly pointed anteriorly, about one-third longer than wide with the face sharply slanting (Fig. 13a). The front is about as wide as long and approximately two times wider than the eyes. The front is almost entirely yellow except for a brown to black stripe down each side in the area occupied by the frontal bristles and for a sharp point extended part way down the middle from the ocellar triangle. The front is covered with golden pubescence. The ocellar triangle and the eye orbits are gray pubescent. The upper portion of the occiput is brown to black in ground color covered with gray pubescence. The lower portion of the occiput, the genae, except for a brown discoloration on the anterior portion, the lower margin of the face, epistoma, the labella and mentum are yellow. The upper four-fifths of the face, the anterior corners of the front, and the antennae are opaque black. The palpi are dark brown to black. Each palpus has a moderately strong apical bristle. The anterior reclinate bristles are small, scarcely over two times longer than the setae found on the lower part of the front and are situated almost half the distance between the proclinate and the upper reclinate bristles. The proclinate and upper reclinate bristles are approximately equal in size. The inner vertical bristles are slightly smaller than the outer and are about equal in size to the ocellar bristles. The compound eyes are almost bare with only scattered microscopic setae present. *Thorax:* The mesonotum is predominantly yellow covered with yellow pollen. A large black spot is present on each side just before the suture; this blends with a dark brown to black vitta which extends down each side almost the entire length of the mesonotum. A median brown to black vitta is also present, extending from the posterior margin approximately opposite the presutural bristles. The lower half

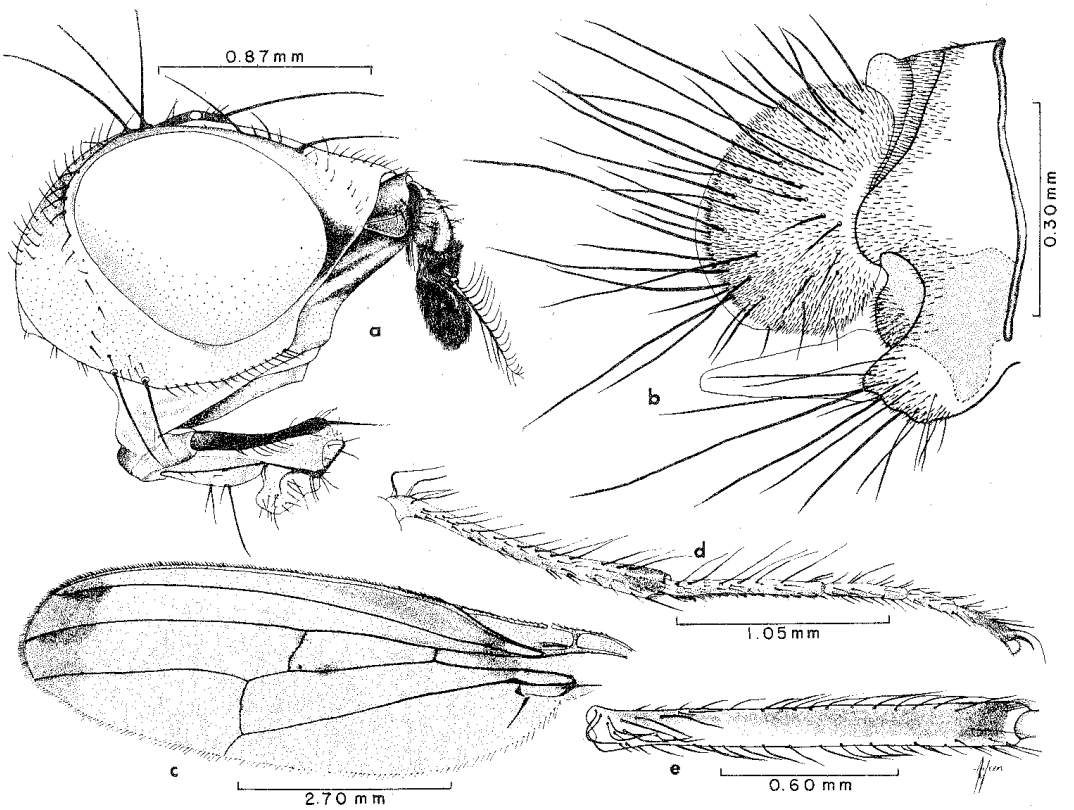

FIG. 13. *Idiomyia planitibia* n. sp. **a.** head; **b.** male genitalia, lateral; **c.** wing; **d.** front tibia and tarsus of male, lateral; **e.** front tibia of male, dorsal.

of each humerus is shining black, the upper portion pale yellow. The mesopleura, sternopleura, hypopleura and lower halves of the pteropleura are polished black; also a black spot is present in the upper portion of each pteropleuron just beneath the wing base. The metapleura are entirely yellow. The scutellum is brown on the disc, yellow on the margins and below. The metanotum is polished black covered with gray pubescence. The halteres are pale yellow. The anterior dorsocentral bristles are two-third to three-fourths as long as the posteriors and are situated slightly in front of a line drawn between the second supraalars. Two humeral bristles are present; the lower is one-half to three-fifths as long as the upper bristle. The anterior sternopleural bristle is two-thirds as long as the posterior bristle. *Legs:* Yellow except for the brown to black middle and hind coxae, the brown to black apices of the middle and hind femora and tibiae, a tinge of brown at the bases of the hind tibiae and at the apices of the front pair. Also the apical segments of the tarsi are brown to black. The legs are slender, the anterior femora lack posteroventral bristles except for two or three situated just before the apex of the segment. The front coxae are unusually long, approximately two-thirds as long as the femora. The front tibia is rather strongly flattened dorsally and the entire dorsal surface is smooth, free of setae except for a tiny poorly developed preapical dorsal seta. Six or eight rather long, curved hairs are situated on the dorsal surface at the extreme base of each tibia and a row of erect posterodorsal and a row of anterodorsal hairs extends down each side of the bare area (Figs.

13d-e) Rather long, erect hairs extend down the anterodorsal and posterodorsal surfaces of the front basitarsus. The front basitarsus is about three-fifths as long as the tibia. *Wings:* 3.2 times longer than wide, rather intensely tinged with yellow, with a dark brown spot covering the wing apex and a pale brown border extending along the anterior margin. A small brown spot is present near the upper edge of the extra crossvein in cell *R5* and another brown spot is present on vein *M1+2* just before the extra crossvein. The *r-m* crossvein is situated near the basal one-third of cell first *M2* and the extra crossvein is situated about its own length below the *m* crossvein (Fig. 13c). The last section of vein *M3+4* is short, scarcely over half as long as the *m* crossvein. The basal cells of the wing are intense yellow. *Abdomen:* The first tergum is entirely yellow. The other terga are black down the median portions, along the narrow posterior borders and on the sides, leaving a pair of large lateral spots on each tergum. The genitalia are brown to black, tinged with yellow. The cerci are broad, semicircular in shape, not produced ventrally. The ninth tergum is slightly narrowed over the dorsal portion and is expanded on the anterior median margin. The ventral portion of the tergum is lobate and bears strong bristles at the apex (Fig. 13b). The claspers are only partially visible from lateral view. The row of teeth is borne on the inner margin and is not visible except from ventral view.

Length: Body, 7.2 mm.; Wings, 8.3 mm. This species has a wing spread of approximately 18.6 mm.

FEMALE. Unknown.

Holotype male and four male paratypes from Waikamoi, Maui, July 11–15, 1964 (H. L. Carson, No. C 104. 45, and W. B. Heed).

The type is in the B. P. Bishop Museum, the paratypes in the collections of the U.S. National Museum, British Museum (Natural History), and the University of Hawaii.

Nudidrosophila aenicta new species (Figs. 14a, c, e, g-h)

This species runs near *eximia* Hardy, from Maui, but differs by having the pleura yellow, not dark brown, and by having the front legs of the male very differently ornamented. Except at the extreme base of the front tibia, the long hairs arranged down the segment are anterior and anteroventral in position rather than being dorsal and anterodorsal in position as in *eximia*; also the long hairs of the front basitarsus are arranged in two irregular rows on the anterior and anterodorsal surfaces (Fig. 14e) rather than being in a single row down the dorsal surface as in *eximia*. The female ovipositor of *aenicta* is more developed than in *eximia*, nearly twice as long (Fig. 14g). The females of this species show remarkable resemblance to *Drosophila hirtitibia* Hardy and based upon the females these would appear to be very closely related. In most characteristics, the two appear to be identical and the two species probably occupy the same or similar habitats. Most of the specimens of *aenicta* on hand were collected in the same habitat with a fairly large series of *Drosophila hirtitibia*. Besides the overall similarity of characters, the most striking resemblance is in the development of the ovipositors;

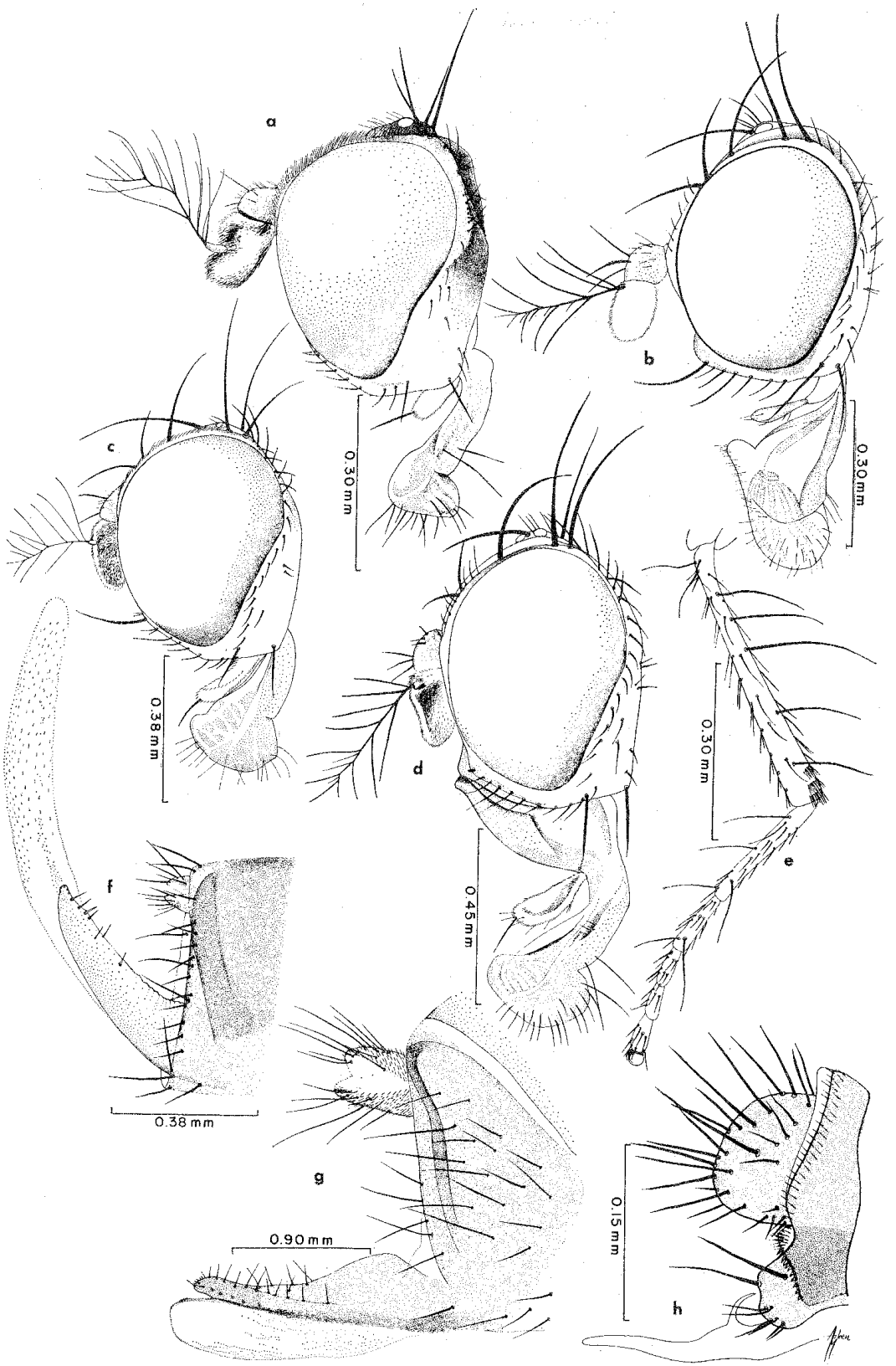

FIG. 14. *Nudidrosophila aenicta* n. sp. **a.** head of male, lateral; **c.** head of female, lateral; **e.** front tibia and tarsus of male, anterior lateral; **g.** female ovipositor; **h.** male genitalia, lateral. *Drosophila hirtitibia* Hardy. **b.** head of male, lateral; **d.** head of female, lateral; **f.** female ovipositor.

both have the same type of elongate blades which are equal to or longer than the combined lengths of abdominal segments five and six and which are directed vertically when in resting position (Fig. 14f). I believe it is evident that *Nudidrosophila* should not be retained as a genus but probably should be sunk as a direct synonym of *Drosophila* even though on the basis of the males there appear to be very striking differences and even though the male characters depart radically from the present concept of *Drosophila*; the characters they exhibit may not prove to be of generic importance in this case. I feel, however, that it is premature to set up this synonymy until this complex can be studied in more detail, and more information can be obtained concerning association with *hirtitibia* and possibly other *Drosophila*. Except for the head characters both sexes of *aenicta* show close resemblance to *D. hirtitibia*. The ciliation of the front tibiae and tarsi is also similar in the two, even the presence of several long, curved, dorsal hairs at the extreme base of each tibia. In the male of *D. hirtitibia* the head has the full complement of bristles, the front is not puffed on the sides, the eyes are broader in relation to the occiput (Fig. 14b) and the palpi lack strong bristles. The head of the male *Nudidrosophila* is as in Figure 14a. The females of *D. hirtitibia* differ from those of *aenicta* by having a row of prominent setae extending along each eye orbit from the anterior margin about half the length of the front and by having scattered interfrontal setae over the lower half of the front; these setae are well developed, conspicuous, approximately equal in size to the setae of the occipital row, and the sides of the front are not swollen (Fig. 14d). In *aenicta* the anterior lateral areas of the front are densely covered with minute setae and these areas are slightly puffed (Fig. 14c). Also the anterior reclinate bristles in *hirtitibia* are situated much closer to the eye margin than the proclinates and are fairly close to the latter. In *aenicta* the reclinates are situated almost in line with the proclinates and about one-third the distance to the upper reclinates. The eye is more oval in shape in *hirtitibia*, only slightly narrowed ventrally; the lower portion of the eye is nearly two times wider than the occiput, rather than being shaped as in Figure 14d and as described below. The wing venation is the same in the two although the costal fringe in *hirtitibia* is consistently shorter than in *aenicta*, extending about two-fifths the distance between the apices of veins *R2+3* and *R4+5*, rather than distinctly half or beyond. Also the postocellar bristles are much smaller in *hirtitibia*, being slightly smaller than the proclinate bristles. In *aenicta* these bristles are well developed, distinctly stronger and longer than the proclinates and nearly equal in size to the upper reclinate bristles.

MALE. *Head:* Almost quadrate in shape as seen from direct lateral view, with each eye rather strongly narrowed ventrally as in Figure 14a. The front is broad, almost two times wider than each compound eye as seen from direct dorsal view, dark brown to black on the upper two-thirds, yellow below, tinged with brown through the median portion. The anterolateral corners of the front are very densely covered with short, brownish yellow pubescence; these pubescent areas are slightly swollen. Yellow to yellow-brown setae are rather sparsely scattered in the median portion of the front and extend posterolaterally above the densely pubescent areas where they become longer, more prominent and about equal in size and development to the setae in the middle of the ocellar triangle. Long yellow laterally projected hairs are developed around the sides of the

ocellar triangle. The first two antennal segments are yellow, tinged with brown dorsally. The third segment is brown, tinged faintly with yellow to rufous in the ground color. Each arista has about six dorsal and two ventral rays in addition to the apical fork and has about six short rays along the anterior margin. The upper two-thirds of the occiput is brown, the lower portion yellow. The genae are yellow except for a line of brown along each vibrissal row. The oral vibrissae are represented by short setae; no bristles are present. The face is yellow, tinged faintly with brown on the lower portion; the median portion is slightly raised. The clypeus is yellow, tinged with brown. The mouthparts including the palpi are yellow. Each palpus has a broad, brown apical spine (Fig. 14a). The labella are not ornate. *Thorax:* Brown on the dorsum, yellow on the sides; the dorsal surface is lightly gray-brown pollinose. The lower margins of the humeri are yellow. Two strong humerals and two strong sternopleural bristles are present. The anterior dorsocentral bristles are approximately two-thirds as long as the posteriors and are situated almost in line with the second pair of supraalars. A moderately strong seta (small bristle) is situated on each side in line with the dorsocentrals and almost opposite the suture; this is approximately two times larger than the surrounding setae of the mesonotum. *Legs:* Entirely pale yellow. Each front tibia has about four long, black, curved, dorsal cilia situated at the base of the segment, also a row of about five or six slender, brown, anterior cilia extending most of the length of the segment and a row of five or six long, brown to black, anteroventral cilia extending along the segment (Fig. 14e). The preapical dorsal bristle is completely lacking on the tibia. The front tibia is 2.4 times longer than the basitarsus. The basitarsus has two prominent, black, anterior cilia, one located near the basal one-fourth and one located near the apical one-third; it also has three anterodorsal brown hairs rather evenly spaced along the segment (Fig. 14e). The second tarsal segment has one strong, black, anterior hair and one brown anterodorsal hair. *Wings:* Subhyaline, very faintly tinged with brown. The third costal section is 3.3 times longer than the fourth and the costal fringe extends slightly over halfway between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is .7 times longer than the penultimate section. *Abdomen:* Predominantly brown, tinged with yellow to rufous in the ground color, especially on the first and on the posterior segments. The genitalia are yellow. The ninth tergum is slightly narrowed over the dorsal portion, expanded ventrally as in Figure 14h. Only the upper portion of each clasper is clearly visible from a lateral view. The aedeagus has a strong dorsal hook near the base (Fig. 14h).

Length: Body, 1.75 mm.; Wings, 2.0 mm.

FEMALE. The female differs from the male by having the normal head bristles developed, by having a strong bristle present at the upper portion of each vibrissal row; this is approximately equal in size to the upper reclinate bristles of the front; the apical bristle on each palpus is not so broad and distinctly flattened as in the male and the front legs are not ciliated. The other characteristics of the female are as pointed out in the introduction above. The ovipositor is as in Figure 14g.

Length: Body, 2.2. mm.; Wings, 2.5 mm.

Holotype, male and allotype, female. Kawainui, Oahu; June 20, 1964 (M.R. Wheeler). Twenty paratypes: 3 males, 10 females, same data as type; 3 males, 4 females from Drum Drive, Oahu, June 20, 1964 (M. R. Wheeler).

Type and allotype in the B. P. Bishop Museum. Paratypes in the U.S. National Museum and the University of Hawaii.

Scaptomyza (Bunostoma) palmae Hardy, aberration? or new species

Specimens of dull black *Bunostoma* from the island of Oahu appear to agree in all respects with specimens of *palmae* Hardy, from Hawaii, except that the secondary rows of acrostichal setae are poorly developed. These are represented by one to four setae (usually two) situated on the posterior half of the mesonotum behind the suture. Typical *palmae* has the secondary rows of acrostichals well developed (four distinct rows present) and represented by 8–10 setae which extend anteriorly to a level about opposite the hind margins of the humeri. The male genitalia of these appear to be identical.

The *Bunostoma* are readily established in laboratory cultures, using the modified, high protein *Drosophila* medium and genetic studies have been made on the Hawaiian species by Drs. F. Clayton and H. Stalker. The two populations in question apparently behave as species in cultures although cross mating experiments have not been carried out. The cultures of *palmae* aberration? from Oahu have been designated by Dr. Stalker as "Dull type no. I" and I had previously identified this as "n. sp.? rel. to *anomala*." Subsequent studies indicate that morphologically this seems to be the same as *palmae* except for the more sparsely developed acrostichal setae. This alone seems too trivial to be used as a specific character. It is highly probable that this does represent a sibling species. I feel that this supposition should be supported by more detailed biosystematic data, however, before it is described as new.

Dr. F. Clayton has shown (this Bulletin) that the chromosome configurations are different in the population from Oahu than in the other species of *Bunostoma*.

Scaptomyza (Exalloscaptomyza) Hardy

Scaptomyza (Exalloscaptomyza) Hardy, 1965, Insects of Hawaii, Vol. 12: 604.

Drosophila mauiensis Grimshaw was erected as the type of *Scaptomyza (Exalloscaptomyza)* and at the time the manuscript for this book went to the printer, this was the only known species in the subgenus. When the field work for the project on evolution and genetics of the Hawaiian Drosophilidae began the summer of 1963, it was discovered quite early by Drs. H. L. Carson, L. H. Throckmorton, M. R. Wheeler, and others, that the *Exalloscaptomyza* are intimately associated with morning-glory flowers and that this actually represents a complex of species; the indications were that each major island in Hawaii had its distinctive species of *Exalloscaptomyza*. The subsequent comparative studies of the male genitalia of populations from the different islands have confirmed this. Two species apparently occur on the island of Hawaii and one each are found on

Kauai, Oahu, Molokai, and Maui. To date the island of Lanai has not been sampled for *Exalloscaptomyza.*

The development of the genitalia of both sexes is unusual. The ovipositor plates of the female are completely fused (Figs. 16c and 16f) and the homologies of the male structures are not yet thoroughly understood. I find no evidence of true claspers being developed and these structures may possibly be represented by the lobes which are developed from the inner margins of the ninth tergum. The aedeagus of the male is enlarged, and flattened at the apex (Fig. 16a) in all species except *molokaiensis.* Posterior parameres are developed on the hind margin of the ninth sternum and anterior parameres arise at the sides of the aedeagus. These structures vary considerably in the different species (Figs. 15a, 16d, and 17a).

All members of this subgenus breed in the flowers of morning-glories, in the semi-wet areas of the islands, usually at elevations of 1,000 to 3,000 ft. The species will breed in the laboratory in artificial media but the colonies are difficult to maintain; the females lay comparatively few eggs and to date it has not been possible to build up strong enough colonies to begin doing crossing experiments or genetic studies on these flies. Dr. L. H. Throckmorton has studied the internal morphology of this group (refer to paper by Throckmorton in this Bulletin).

Key to Species of *Scaptomyza (Exalloscaptomyza)*

1. Abdomen of male predominantly yellow, terga 4–6 entirely yellow. Legs yellow, tinged with brown; genitalia of both sexes as in Figures 15d, 15e, 16a and 16c 2
   Abdomen entirely subshining black. Legs predominantly black 3
2. Ninth tergum of male with a prominent, sharp pointed lobe on the antero-ventral margin; this bears two strong setae at the apex (Fig. 15d). North Kona, Hawaii ..... *deludens* n. sp.
   Lacking such a lobe on the ninth tergum. Male genitalia as in Figure 16a. Maui ..... *mauiensis* (Grimshaw)
3. Sixth sternum and the sides of the eighth tergum of male densely setose. Ninth tergum with a heavily sclerotized lobe developed from each inner margin; this is densely setose at its base (Fig. 16d). Female ovipositor elongate (Fig. 16e), expanded at apex and at base, hour-glass shaped (Fig. 16f). Molokai ..... *molokaiensis* n. sp.
   Not as above. Inner lobe on each side of tergum weakly sclerotized, not setose (Figs. 15a, 17a, and 17d). Female ovipositor wider than long to scarcely longer than wide (Figs. 15c, 17c, and 17f) 4
4. Posterior parameres, the lobes from the hind margin of the ninth sternum, sharp pointed and convergent at apices. Anterior parameres well-developed, pointed at apices (Fig. 15a). Female ovipositor slightly longer than wide as seen in ventral view (Fig. 15c). Hawaii ..... *caliginosa* n. sp.
   Posterior parameres rounded at tips, usually not convergent. Anterior parameres poorly developed, represented only by short, rounded lobes at sides of aedeagus (Fig. 17d). Female ovipositor as wide as long, shaped as in Figures 17c and 17f as seen in ventral view 5
5. Posterior parameres slender, evenly tapered on the outside margins and

separated by a very narrow space (Fig. 17d). Female ovipositor developed as a distinct, conspicuous lobe as seen in lateral view (Fig. 17e) and not tapered at apex, as seen from ventral view (Fig. 17f). Kauai ..... *throckmortoni* n. sp.

Posterior parameres rather broad, straight-sided and with a distinctly broader space between (Fig. 17a). Female ovipositor scarcely protruded as seen from a lateral view (Fig. 17b), and tapered at the apex as seen from a ventral view (Fig. 17c). Oahu ..... *oahuensis* n. sp.

Scaptomyza (Exalloscaptomyza) caliginosa new species (Figs. 15a-c)

The genitalia of both sexes show close relationship to typical *mauiensis* but *caliginosa* differs by having the abdomen and legs black except for the yellow tarsi and except for a tinge of yellow at the bases of the tibiae. The wings are faintly tinged with brown, whereas the wings of *mauiensis* are hyaline. The differences in the genitalia of both sexes are as in Figures 15a, 15b and 15c and as discussed under *mauiensis*.

MALE. An almost entirely black species with the body rather densely covered with brownish gray pollen. Fitting the description of the typical species except for the details of body and leg coloration, the faint tinge of brown in the wings, and the rather slight differences in the genitalia. The front is entirely black with a tinge of yellow on the anterolateral margins. The extension of the inner margin of each side of the ninth tergum of the male is developed into a prominent point

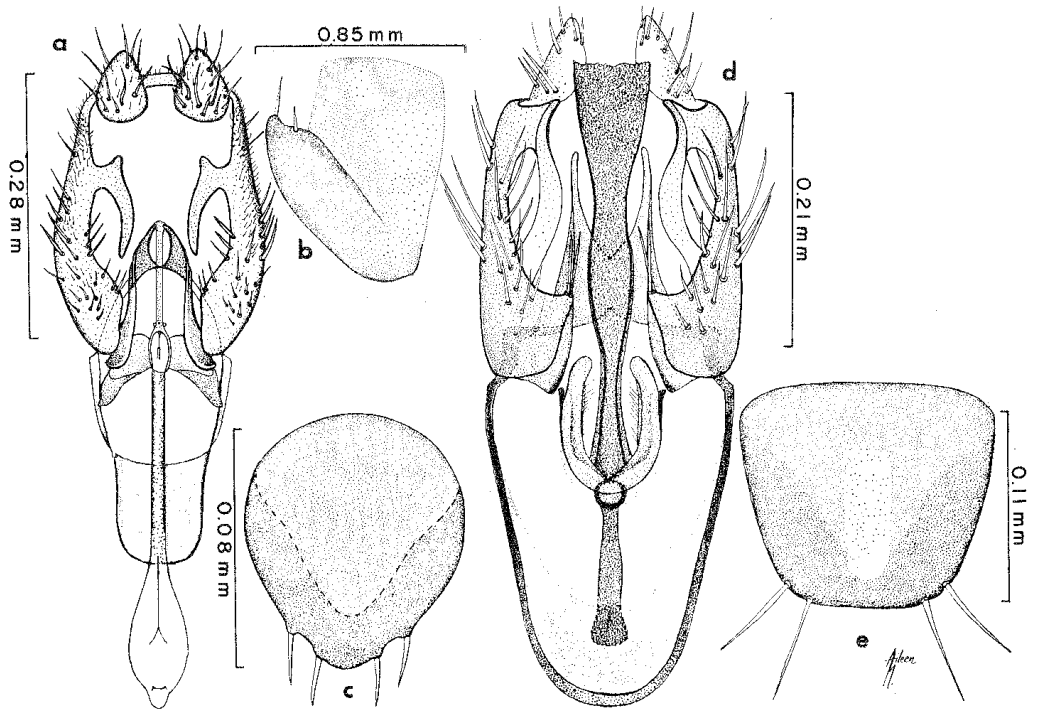

FIG. 15. *Scaptomyza (Exalloscaptomyza) caliginosa* n. sp. **a.** male genitalia, ventral; **b.** female ovipositor plate, lateral; **c.** female ovipositor plate, ventral. *S. (E.) deludens* n. sp. **d.** male genitalia, ventral; **e.** female ovipositor plate, ventral.

on the posterior margin and extends as a narrow piece which runs parallel to the edge of the ninth tergum. The posterior parameres, the lobes on the posterior margin of the ninth sterum, are pointed, converging at their apices (Fig. 15a). The anterior parameres are short, rather blunt at their apices. The other aspects of the genitalia are as in Figure 15a. The aedeagus is broad and flat at the apex. The female ovipositor is as in Figures 15b and 15c. The female agrees with the description of the male except for genital characters.

Length: Body and Wings, 1.7–2.0 mm.

This species is common in the flowers of morning-glory over most of the island of Hawaii at elevations of 1000 to 3000 ft.

Holotype male and allotype female, collected near Honokaa, Hamakua Coast, Hawaii, 1,000′ elevation, August 29, 1963, in morning-glory flowers (D. E. Hardy). About 250 paratypes from the following localities on Hawaii and collected in flowers of morning-glory: a large series same data as type; forest above Paauilo, University of Hawaii Branch Experiment Station, June 19, 1964, (D. E. Hardy); Mud Lane, Hamakua Forest, June 18, 1964, (D. E. Hardy); South Kona, 1,000′, June 17, 1964, (D. E. Hardy); and Kawaihae uka, June 26, 1963, (D. E. Hardy); Kamuela, Hawaii, June, 1963, (L. H. Throckmorton).

Type, allotype and a series of paratypes in the B. P. Bishop Museum. Paratypes are being deposited in the following collections: U.S. National Museum, British Museum (Natural History), University of Texas Genetics Foundation, and the University of Hawaii.

Scaptomyza (Exalloscaptomyza) deludens new species (Figs. 15d-e)

This species is colored exactly like *mauiensis* and the two are obviously closely related. The series of specimens on hand from north Kona, Hawaii, differ from specimens of *mauiensis* by having a prominent setose lobe developed on the anteroventral margin of each ninth tergum (Fig. 15d).

Fitting the description of *mauiensis*; the first three abdominal segments are brownish yellow and the posterior segments are entirely yellow. The coxae and femora are brownish yellow. The tibiae and tarsi are yellow. The wings are subhyaline, very faintly infuscated (the wings seem slightly more tinged than in *mauiensis* but I doubt that this is of any significance). The genitalia are as in Figure 15d; the lobe on the anteroventral portion of the ninth tergum is pointed and bears two prominent setae at the apex (Fig. 15d).

Size: as for *mauiensis* and *caliginosa*.

FEMALE. Fitting the description of *mauiensis*, with a slight tinge of yellow on the abdomen especially on the posterior portion and with the legs distinctly tinged with yellow: the front and middle tibiae and all of the tarsi are yellow. The ovipositor plate is very similar to that of *mauiensis* and is shown in Figure 15e.

Holotype male, allotype female, and 14 paratypes, 5 males, 9 females from Holualoa, North Kona, Hawaii, April 22, 1944, (N. L. H. Krauss).

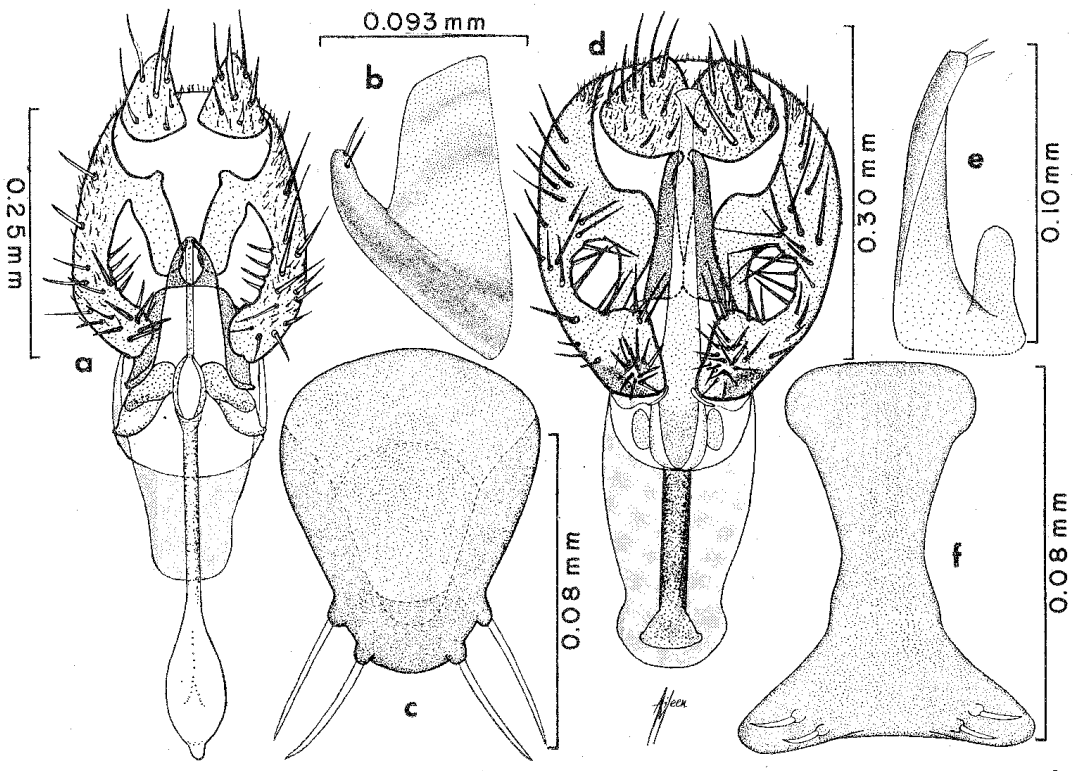

FIG. 16. *Scaptomyza (Exalloscaptomyza) mauiensis* (Grimshaw). **a.** male genitalia, ventral; **b.** female ovipositor plate, lateral; **c.** female ovipositor plate, ventral. *S. (E.) molokaiensis* n. sp. **d.** male genitalia, ventral; **e.** female ovipositor plate, lateral; **f.** female ovipositor plate, dorsal.

Type and allotype in the B. P. Bishop Museum; paratypes in the collections of the U.S. National Museum, British Museum (Natural History) and the University of Hawaii.

Scaptomyza (Exalloscaptomyza) mauiensis (Grimshaw) (Figs. 16a-c)

Drosophila mauiensis Grimshaw, 1901, Fauna Hawaiiensis 3 (1): 67.

Scaptomyza (Exalloscaptomyza) mauiensis (Grimshaw), Hardy, 1965, Insects of Hawaii 12: 604.

The typical species is readily recognized by having the posterior portion of the male abdomen pale yellow and the remainder of the abdomen brownish yellow; also by having the coxae of the legs predominantly yellow and the tibiae and femora brownish yellow. The genitalia are distinctive: the structures of both sexes are as in Figures 16a, 16b, and 16c. On the basis of the genital characters this species shows close relationship to *caliginosa* n. sp., from Hawaii, and is differentiated by the yellow abdomen and yellow markings on the legs of the male; and by having the wings hyaline, not tinged with brown. The inner extensions on the sides of the ninth tergum of the male are rather blunt on their posterior margins compared to those of *caliginosa* and the anterior parameres also are shorter (compare Figs. 15a and 16a). The female ovipositor plates also show some differences as shown in Figures 15c and 16c.

Refer to Hardy (1965: 604) for a detailed description of this species.

This species appears to be restricted to the semi-wet areas of Maui: the records on hand are from Iao Valley, West Maui; from the slopes of Mt. Haleakala, Makawao Forest Reserve; 3500′, and from Keanae, Maui. I have not been able to find it in the morning-glory flowers on the road to Haleakala. I have sampled flowers many times without success, from 1000 to 4000 ft. elevation and this slope may normally be too dry for these flies. The flies may be seasonal in this area, however, since one specimen on hand is labelled *ex.* morning-glory, 2,000′ elevation, Haleakala Road, March 17, 1964, (W. C. Mitchell).

Scaptomyza (Exalloscaptomyza) molokaiensis new species (Figs. 16d-f)

This species is readily differentiated from other known species of *Exalloscaptomyza* by the unusual genitalia of both sexes; refer to Figures 16d and 16f.

MALE and FEMALE. Predominantly shining black in ground color, covered with gray-brown pollen on the dorsum of the thorax, gray on the pleura and with gray pollen over the front. The antennae are brown to black, tinged with yellow on the second and on the base of the third segments. The palpi and mouthparts are yellow-brown. Fitting the description of *mauiensis* except that the abdomen is entirely shining black in ground color and the legs are predominantly black, also the genitalia of both sexes are strikingly different. *In situ* this species can be readily recognized by the densely setose ventral aspects of the posterior portion of the abdomen of the male, and by the comparatively elongate conspicuous ovipositor of the female (Figs. 16e and 16f). The sixth sternum, the ventral portions of the eighth tergum, and the ninth tergum of the male are densely setose. As seen from ventral view, the ninth tergum has a prominent lobe developed on each inner margin. This is rather heavily sclerotized, densely setose at its base, and curved downward at its apex as in Figure 16d. The aedeagus is short, not enlarged or flattened at apex as in other species of this complex. The other aspects of the male genitalia are as in Figure 16d. The female ovipositor is elongate compared to other species and is very differently developed, expanded at the apex and at the base, hour-glass shaped.

Length: Male. Body, 1.6 mm.; Wings, 1.8 mm.

Female. Body, 1.8–2.0 mm.; Wings, 2.0–2.2 mm.

Holotype male, allotype female and ten paratypes, six males, four females from Kaunakakai Ridge, Molokai, 2,000′, in morning-glory flowers, July, 1963, (D. E. Hardy and L. H. Throckmorton).

Type and allotype in the B. P. Bishop Museum. Paratypes in the collections of the U.S. National Museum, British Museum (Natural History) and the University of Hawaii.

Scaptomyza (Exalloscaptomyza) oahuensis new species (Figs. 17a-c)

A dark-bodied, clear-winged species which shows close relationship to *S. throckmortoni* n. sp., from Kauai, but is differentiated by having the posterior parameres, the lobes on the hind portion of the ninth sternum, comparatively broad, straight-sided and with a rather wide space separating the parameres as in Figure

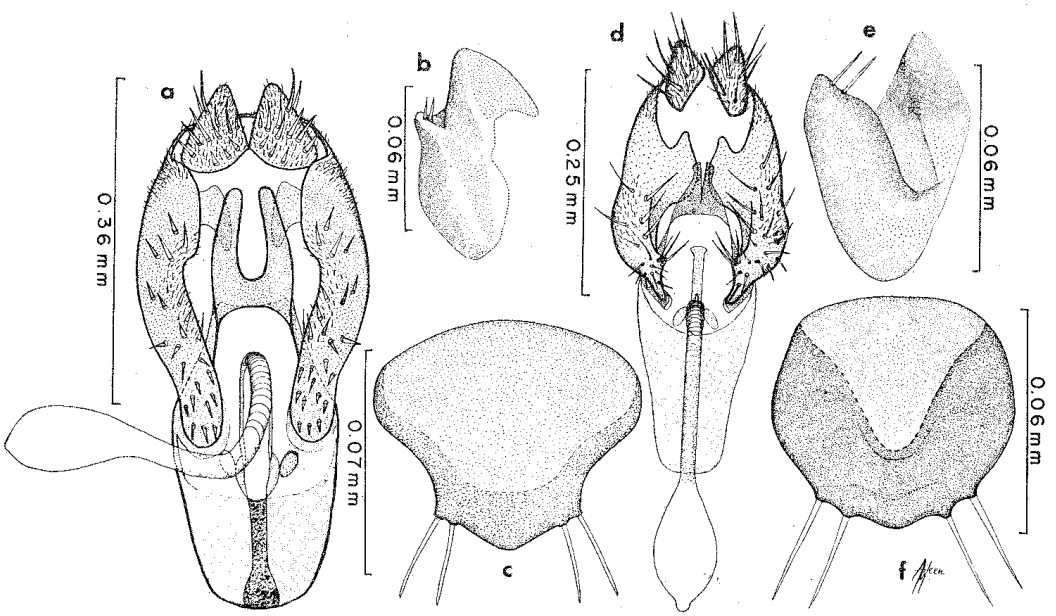

FIG. 17. *Scaptomyza (Exalloscaptomyza) oahuensis* n. sp. **a.** male genitalia, ventral; **b.** female ovipositor plate, lateral; **c.** ovipositor plate, ventral. *S. (E.) throckmortoni* n. sp. **d.** male genitalia, ventral; **e.** ovipositor plate, lateral; **f.** ovipositor plate, ventral.

17a. Also, the female ovipositor is just barely protruded as seen in direct lateral view, whereas in *throckmortoni* it is comparatively prominent (Fig. 17b), and in ventral or dorsal view the ovipositor of *oahuensis* is distinctly narrowed at the apical portion (compare Figs. 17c and 17f).

Length: Same as for *mauiensis*.

Holotype male and allotype female, Pupukea, Oahu, August, 1963, in morning-glory flowers (L. H. Throckmorton). Approximately 100 paratypes from the following localities on Oahu, taken mostly in morning-glory flowers: same as type; Honouliuli, March 12, 1964, (J. Y. Kim); Pali Highway, 500′, July, 1963, (L. H. Throckmorton); Mt. Tantalus, 1800′, May 9, 1965 (D. E. Hardy—M. Delfinado); also 3 specimens on hand collected in Kaimuki, March 6, 1910, (Lewis).

This species is found in the flowers at elevations from approximately 800′ to 2000′.

Type, allotype and some paratypes in the B. P. Bishop Museum. Other paratypes all being deposited in the collections of the U.S. National Museum, British Museum (Natural History), University of Texas Genetics Foundation and the University of Hawaii.

Scaptomyza (Exalloscaptomyza) throckmortoni new species (Figs. 17 d-f)

A predominantly dark-colored species appearing to be identical in external characteristics with the other species of this group which have the body and legs predominantly shining black covered with gray pollen. It shows close relationship

to *oahuensis* but is differentiated by having the posterior parameres slender, evently tapered on the outside margins and separated by a very narrow space (Fig. 17d). Also the female ovipositor is distinctly protruded as seen in lateral view and is not tapered at apex as seen in ventral or dorsal view (Fig. 17f). The other aspects of the genitalia are as shown in Figures 17d and 17e. The inner extensions from the ninth tergum are weakly sclerotized and form a rather broad lobe on each side. The anterior parameres are short, inconspicuous, consisting of small rounded lobes on each side of the aedeagus. The aedeagus is expanded and flat at the apex.

Length: same as for *mauiensis*.

This species occurs in morning-glory flowers on the Kokee Road, Kauai, at elevations from 2900 to 3600 ft. To date, it has not been taken at lower elevations.

Holotype male, allotype female, Kokee, Kauai, 3600′, July 29, 1963, (D. E. Hardy). Thirty-five paratypes, sexes about evenly distributed, same data as type, 2900–3600 ft. (D. E. Hardy and L. H. Throckmorton).

Type, allotype and some paratypes in the B. P. Bishop Museum; remainder of paratypes in the collections of the U.S. National Museum, British Museum (Natural History), and the University of Hawaii.

It is a pleasure to name this species after Dr. L. H. Throckmorton of the University of Chicago who was responsible for first pointing out the morphological differences in the *Exalloscaptomyza* populations.

Scaptomyza (Trogloscaptomyza) platyrhina new species (Figs. 18a-f)

Because of the peculiar development of the anal plates (cerci) of the male this species would somewhat resemble *diaphrocerca* Hardy, from Molokai, but the genitalia are very differently developed in these and the two species are obviously not related. *S. platyrhina* will best run in couplet 30 of my key to the *Scaptomyza* and should be keyed out at this point by having the femora of all legs enlarged, swollen (Fig. 18e) and the anal plates (cerci) developed into long, flattened ventral lobes (Fig. 18f). This species is readily differentiated from other known *Scaptomyza* in Hawaii by the enlarged femora and the distinctive genitalia.

MALE. *Head:* The head is almost quadrate as seen in direct lateral view (Fig. 18a). The front is yellow, tinged lightly with brown except for the brown to black orbits and the black ocellar triangle. The eye orbits, ocellar triangle and the occiput are densely gray pollinose. The ocellar triangle extends forward on the front to a point in line with the anterior reclinate bristles. The anterior reclinates are small, about two-thirds as long as the proclinates and situated distinctly above the latter. The oral vibrissae are strong, consisting of several prominent bristles. The face, genae, and mouthparts are yellow. The face is tinged with brown in the furrows and has a distinct carina down the middle. The antennae are yellow, tinged with brown. The arista has two dorsal rays in addition to the large apical fork (Fig. 18a). Each palpus has three short bristles at or near the apex and several short black setae along the outside surface. *Thorax:* Predominantly yellow, densely yellow pollinose. The mesonotum is discolored with brown on the postero-

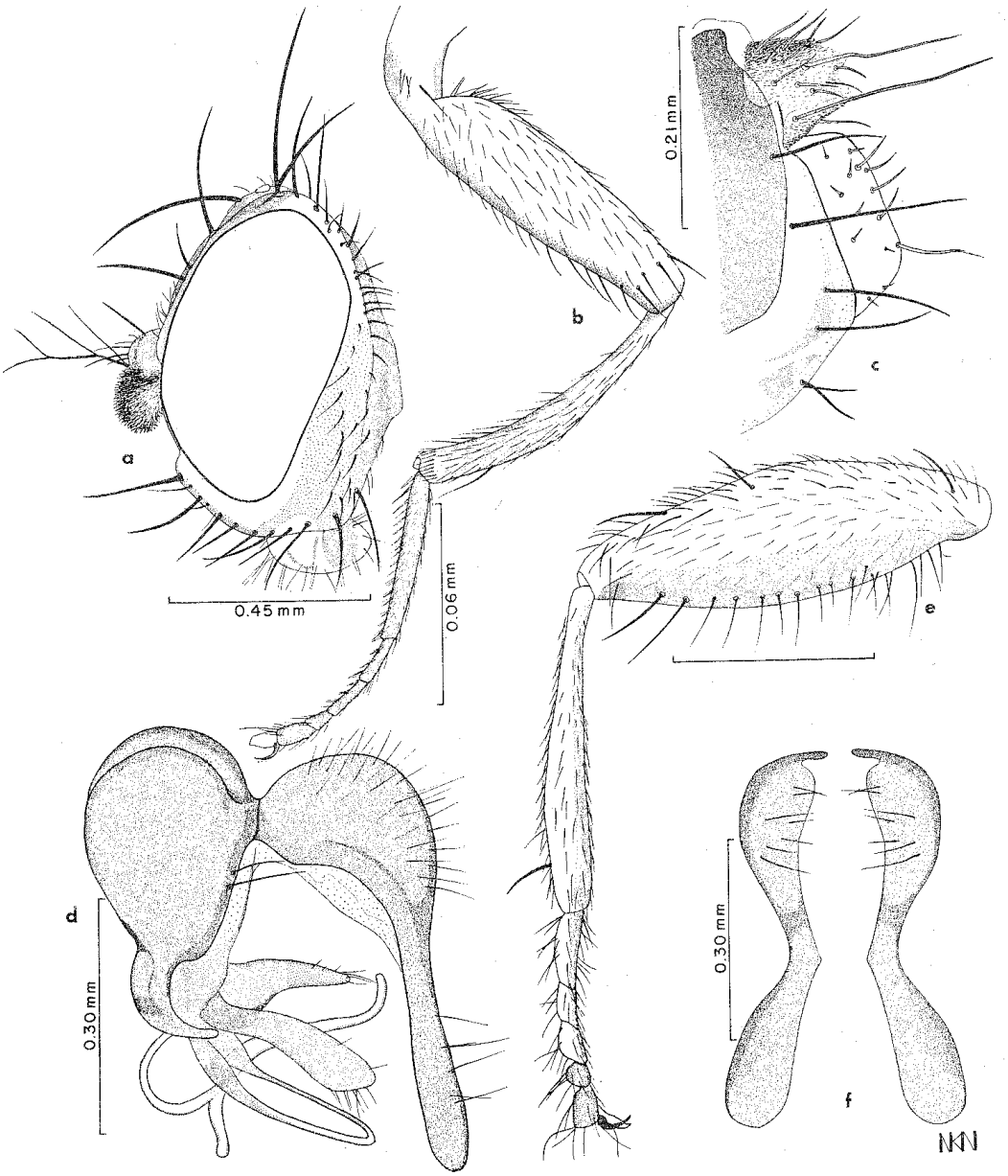

FIG. 18. *Scaptomyza (Trogloscaptomyza) platyrhina* n. sp. **a.** head, lateral; **b.** hind leg of male; **c.** female genitalia, lateral: **d.** male genitalia, lateral; **e.** front leg of male, lateral; **f.** anal plates of male, end view.

median portion, extending anteriorly almost opposite the suture and a slight tinge of brown is present in the ground color on each side in front of the suture. The scutellum is brown on the disc, yellow on the sides. The pleura are yellow, somewhat mottled with brown discolorations on the sternopleura, and with irregular markings of pale brown on the propleura, mesopleura and the upper portions of the pteropleura. The humeri and halteres are yellow. One strong humeral bristle is present. The anterior dorsocentral bristles are situated about opposite the first pair of supraalars. Six strong rows of acrostichal setae are present. The

anterior sternopleural bristle is approximately three-fourths as long as the posterior bristle. *Legs:* Entirely yellow except for the brown apical segments of the tarsi. The femora of all legs are rather strongly swollen, three times broader than the tibiae. The front legs are as in Figure 18e; the basitarsus is rather short, scarcely one-fourth as long as the tibia. The tibiae of the hind legs are slightly curved (Fig. 18b). *Wings:* Subhyaline, with the third costal section almost four times longer than the fourth and the costal fringe extending approximately half the distance between the apices of veins *R2+3* and *R4+5*. The last section of vein *M1+2* is .6 longer than the penultimate. *Abdomen:* Predominantly brown to black in the ground color, tinged with yellow on the basal portion and with the first four terga and the median portion of the fifth tergum dull gray pollinose. The lateral margins of the terga are marked with yellow. The sides of the fifth and the entire sixth tergum are polished black. The genitalia are black. The ninth tergum is polished and has a tumescence developed on each side of the dorsum; this is readily visible *in situ*. Each anal plate is developed into a long, flat lobe on the ventral part as in Figure 18f. The other aspects of the male genitalia are as in Figures 18d and 18f. The claspers are developed into two prominent lobes.

Length: Body and Wings, 2.5–2.7 mm.

FEMALE. Similar to the male in most respects; the femora are not strongly swollen however. The ovipositor is entirely membranous, covered with a few short setae as in Figure 18c.

Length: As in male.

Holotype male and allotype female, Alakai Swamp, Kauai, 4,000′, July 28, 1963, (H. L. Carson, No. C72.11). Twenty-seven paratypes, 17 males and 10 females, all same locality as type, some specimens reared from *Clermontia*, July 22, 1964 (W. H. Heed).

Type, allotype, some paratypes in the B. P. Bishop Museum. Other paratypes in the collections of the U.S. National Museum, British Museum (Natural History), and the University of Hawaii.

Titanochaeta contestata new species (Figs. 19a-g)

This species appears to fit in *Titanochaeta* although the arista has a ventral ray (Fig. 19a) and the female ovipositor blades are blunt, rounded at apices (Fig. 19d). Because of the ventral ray on the arista, this would run to *Drosophila* in the generic key; it obviously does not belong here, however, since it is definitely *Scaptomyza*-like in general facies as well as in genital characters of the male. The arista is also too sparsely plumed for *Drosophila*, having only two dorsal and one ventral ray in addition to the apical fork (Fig. 19a). This species shows very close resemblance to *T. chauliodon* Hardy, from Maui, and exhibits all of the *Titanochaeta* characters except the ones mentioned above. It should be noted however that several specimens of *chauliodon* and specimens of *T. bryani* Wirth are on hand which do have a ventral ray on the arista, (it has been noted that the branching of the arista is variable in the group); the ovipositor, however, is

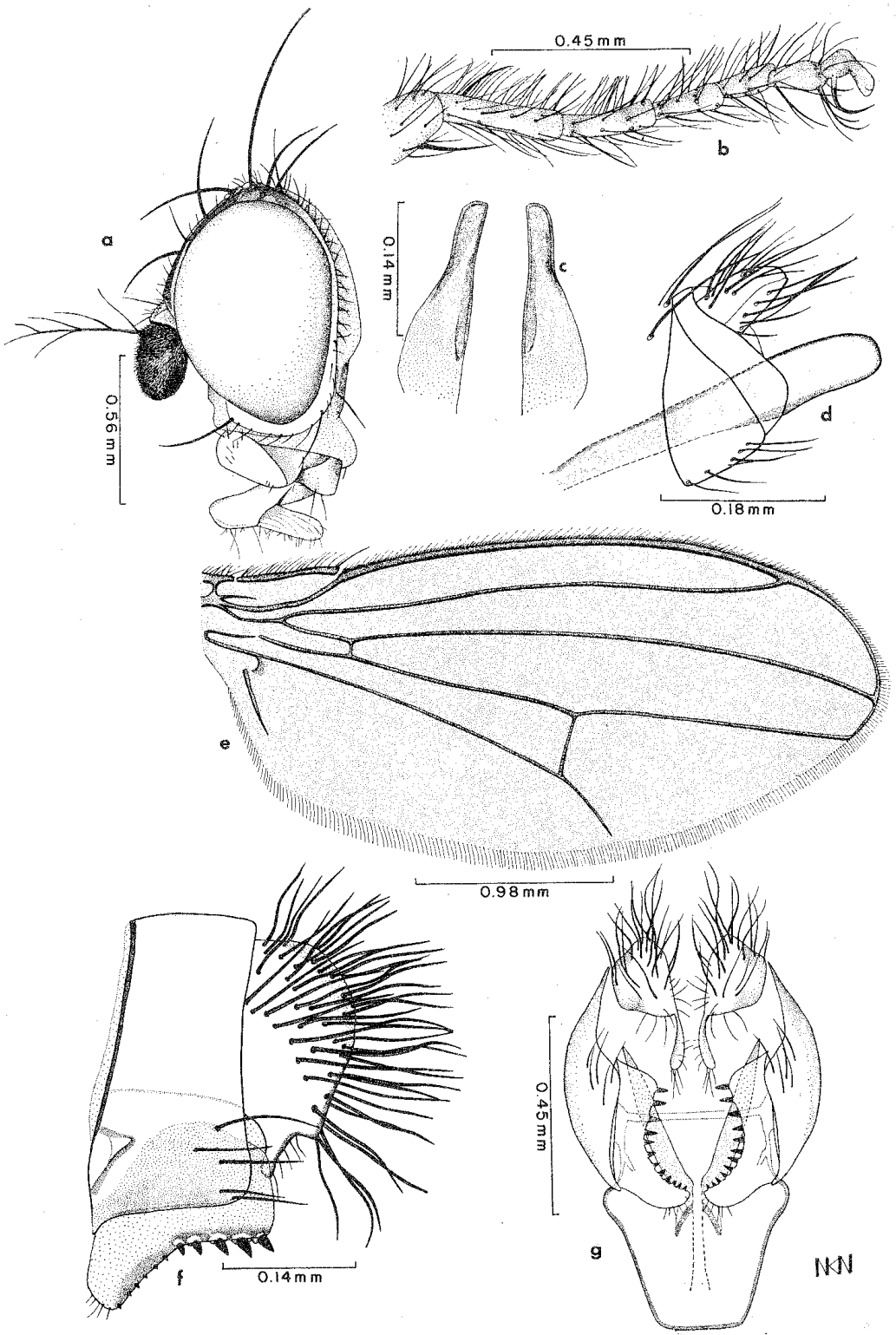

FIG. 19. *Titanochaeta contestata* n. sp. **a.** head, lateral; **b.** front tarsus of male; **c.** ovipositor plates, ventral; **d.** female genitalia, lateral; **e.** wing; **f.** male genitalia, lateral; **g.** male genitalia, ventral.

needle-shaped and typical of *Titanochaeta*. The exact status of *Titanochaeta* as well as the exact definition of this group cannot be clearly defined until further information is obtained concerning the habits and biologies of the species involved. The male genitalia of the presently included species are apparently of several different types and I find no characters in the genitalia which will typify the group. It may prove more logical to treat *Titanochaeta* as a subgenus of *Scaptomyza* but on the basis of the distinctive habits (predation on spider eggs) and the structural features which were discussed in my treatment of this group, I prefer to continue treating this as a genus until further information is available.

Both sexes are very similar to *chauliodon* and are best differentiated by the genital characters: the male genitalia as in Fig. 19f, having strong teeth along the inner edge of each clasper but lacking the distal spine and strong apical lobe which are characteristic of *chauliodon*; the female differing by having the ovipositor blades blunt and rounded rather than sharply pointed, needle-like. It should be noted that one paratype female from Mount Tantalus, Oahu, was recorded under the original description of *chauliodon*; this should be *T. contestata*.

MALE. *Head:* Distinctly higher than long, with the eye narrowed ventrally but the occiput not usually expanded. The sides of the face are not visible from direct lateral view and the gena are rather broad (Fig. 19a). Each gena, measured from the vibrissal row to the eye margin, is about equal in width to about four rows of eye facets. The head bristles are strongly developed. The anterior reclinate bristles are subequal to the proclinates and are situated slightly above the latter. The inner vertical bristles are equal in length to the height of the head. One strong bristle is present at the upper edge of each vibrissal row; this is approximately equal in size to the ocellar bristles. The front is about equal in width to about one eye and is predominantly brown, tinged with yellow in the ground color and covered with a golden-brown sheen in the areas between the ocellar triangle and the eye orbits. The ocellar triangle is shining black and a black vitta extends down the median portion of the front to the anterior margin. The anterior margin of the front is dark brown, the orbits are tinged with brown to black. The upper third of the occiput is brown to black on the sides, yellow, tinged lightly with brown in the median portions; the lower part is pale yellow as are the genae, face and mouthparts including the clypeus and the palpi. The face is slightly raised down the median portion. The palpi are large and conspicuous and lack apical bristles or setae. A series of prominent, black, dorsal setae are present on each palpus and a few short, black setae are also scattered over the median portion of the palpus and a few are located on the ventor at the base (Fig. 19a). The labella are slender, and covered with scattered black setae. The antennae are yellow, tinged with brown on the dorsal surfaces. Each arista has two or three dorsal rays and one ventral ray in addition to the apical fork. *Thorax:* The dorsum is largely brown; the humeri and lateral margins of the mesonotum, as well as the scutellum, are yellow. A rather indistinct brown-to-black vitta extends longitudinally down the middle portion of the mesonotum; the area on each side of this marking to the dorsocentral row is rufous, tinged lightly with brown. The median portion of the scutellum is brown. The pleura are entirely yellow. The metanotum is yellow-brown. The halteres are pale

yellow. The anterior dorsocentral bristles are strong, two-thirds to three-fourths as long as the posteriors and situated almost opposite the first pair of supraalars. Each humerus has two strong bristles plus one moderately developed bristle; the latter is two-thirds to three-fourths as long as the lower humeral bristle. Two strong sternopleural bristles are present and several prominent black setae are located in the area between the two bristles. *Legs:* Entirely yellow; the segments are densely black setose. The front tibia lacks long ciliation but several of the posteroventral setae on the apical third of the segment are equal in length to the preapical dorsal bristle. The front basitarsus is about one-fourth as long as the tibia. The entire tarsus is very thickly setose. The ventral portion of the basitarsus has thickened bristle-like setae (Fig. 19b). The tarsal claws are large and conspicuous, longer than the last tarsal segment; they are yellow to rufous on their bases, black apically. *Wings:* Subhyaline, very faintly tinged with brown. The third costal section is 3.65 times longer than the fourth and the costal fringe extends about one-third the distance between the apices of veins *R2+3* and *R4+5*. Cell *R5* is slightly expanded in the middle, directly above the *m* crossvein. The penultimate section of vein *M1+2* is subequal to the ultimate section. The last section of vein *M3+4* is about equal in length to the *m* crossvein (Fig. 19e). *Abdomen:* Predominantly brown on the dorsum, yellow on the sides, over the entire first tergum, the base and median portion of the second, and the entire margin of the sixth tergum. The genitalia are yellow, tinged faintly with brown. The cerci are pointed ventrally appearing rostrate as seen in direct lateral view. The ninth tergum is broad, not at all narrowed over the dorsal portion and with five or six small black setae near each posteroventral margin. The claspers are narrow, about four or five times longer than wide and strongly toothed along the inner margin, plainly visible from a lateral view (Fig. 19f). As seen from ventral view, each clasper has a clump of setae on the anterior end and six or more moderately long hairs on the inner margin. Each anal plate is developed into a slender, curved lobe visible from ventral view (Fig. 19g). The parameres are well developed and extend beyond the ends of the claspers.

Length: Body, 3.5–4.0 mm.; Wings, 3.5–4.2 mm.

FEMALE. Fitting the description of the male in most respects. The front basitarsi are not shortened, however, and the segments are not so conspicuously setose. The wing (Fig. 19e) is drawn from the allotype specimen. The mesonotum is more generally brown, the pale areas are much less distinct than in the male. The ovipositor blades are blunt, rounded at the apices, shaped as in Figs. 19c and 19d. The length is the same as for the male.

The internal morphology of this species is being discussed in the paper by Dr. Throckmorton.

Holotype male, Mt. Tantalus, Oahu; May 19, 1963 (M. R. Wheeler).

Allotype female, same locality as type; May, 1953 (D. E. Hardy). Five paratypes, 2 males and 3 females, from the following localities: same as type, Nov. 9, 1963, (M. R. Wheeler); Opaeula, Oahu, June 16, 1964, (M. R. Wheeler); Drum Drive, Oahu, June 20, 1964 (M. R. Wheeler and H. Carson); and Pupukea Trail, Oahu, June 14, 1964 (M. R. Wheeler).

Type and allotype in the B. P. Bishop Museum; paratypes in the collections of the U.S. National Museum and the University of Hawaii.

Changes of Names of Hawaiian Drosophila

Dr. Marshall Wheeler has pointed out to me that *Drosophila fungicola* Hardy, 1965, Insects of Hawaii 12: 282, is preoccupied by *fungicola* Villeneuve, 1921, Ann. Soc. Ent. Belgique 61: 158 and that *Drosophila intermedia* Hardy *op cit.*: 328 is preoccupied by *Drosophila (Scaptomyza) adusta* var. *intermedia* Duda, 1927, Arch. f. Naturgesch. 91A(11–12): 125 and 151. I am changing *fungicola* Hardy to *fungiperda*, and *intermedia* to *medialis*.