

CICADELLIDAE OF HAWAII

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Cicadellidae of Hawaii

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INTRODUCTION

The material upon which this report is based has all come to me through the late W. M. Giffard and the Entomological Division of the Experiment Station of the Hawaiian Sugar Planters' Association. It includes an extensive series of specimens, nearly 3,000, collected during the years 1916 and 1917, largely by Mr. Giffard, and is especially valuable on account of the unusually complete data with reference to food plants, localities, and altitude, which make it possible to give many details that must relate to local conditions under which the various species live. These were also accompanied by a few notes of value which have been incorporated as fully as possible.

There is also a large series from the Experiment Station of the Hawaiian Sugar Planters' Association collected by members of the staff, especially Messrs. Kirkaldy, Swezey, Timberlake, Pemberton, H. T. Osborn, and some by J. C. Bridwell.

A series from Bernice P. Bishop Museum including type and paratype material for a number of the species described by Mr. Kirkaldy and hence of special value in identifying his species has also been before me. There is also a small collection which I made during a short stay on the islands in 1924. There are included also a number of species which have been identified by Mr. Timberlake and H. T. Osborn.

The cicadellid fauna of Hawaii presents an exceedingly interesting biological problem, especially with reference to the affinities or derivation from fauna of the Asiatic or American region. It is remarkable in the proportion of species limited to the islands, and some of the species present quite striking local limitations, suggesting not only a marked isolation of the fauna for the islands as a whole, but also considerable restriction for individual islands or for different altitudes.

By far the largest number of species so far as known are included in one genus *Nesophrosyne*, established by Kirkaldy and limited to this region. This genus presents some striking resemblances to *Scaphoideus*, and possibly, had Kirkaldy been more familiar with this genus, he would have felt it less necessary to form a new genus. The agreements however are particularly in part of the venation and less conspicuously in head or other characters,

and the genus is probably warranted, especially if we consider its geographical isolation. I am informed that Nesophrosynes are found more particularly upon trees and shrubs or woody plants, and for the most part are rather few in number, although some species, judging from the quantities of specimens collected, must have been fairly abundant.

The species are almost all endemic, and the introduced species, except for three, are of doubtful origin.

Draeculacephala mollipes is evidently a recent introduction from the United States. The species of *Nesosteles*, which is hardly distinguishable from, if not identical with *Balclutha* or *Eugnathodus* of authors, may have had an American origin, but since there are several well-distinguished species, none of which can be referred to the American species, it would appear that the introduction has been much more remote and that there has been a separation of the forms since the introduction of the primitive stock which may have had a wide distribution in South Pacific regions. *Nesophrosyne* presents still another problem, as there has been such a wide separation of species within the genus that we must infer a long period of development for the group. Whereas there is a structural basis in the agreement of the neururation, there are several types of modification for the head which quite singularly seem to parallel the divergences that are to be noted in the various divisions of the subfamily Jassinae as represented in Europe and America. For example, there are species which, from neururation and general structure, must be considered as related, which have heads like members of the genus *Jassus*, some even approaching *Neocoelidia*; others resemble *Phlepsius* or *Thamnotettix* or *Eutettix* and some resemble *Euscelis*. Still others have much the appearance of *Deltocephalus*, *Platymetopius*, *Scaphoideus*, and *Mesamia*. Because all these have a venation which seems very closely related to *Scaphoideus* and some of the species have characters which are very similar to those of that genus, the primitive introduction for this group may have been a *Scaphoideus*-like insect, derived either from America or Asia, but at a very remote period, probably during the early history of life on the islands, with subsequent divergences of the different species, divergences, many of which appear to be still in progress. The fact that several forms, evidently very closely related, occupy different islands would argue for a common stock with an isolation resulting from the lack of communication or ready migration between the islands, as these forms have become established upon particular food plants. It may be remarked in this connection that most of the species appear to be limited to native plants and consequently must be considered as having had their development within the islands, quite probably along with the evolution of the modern flora. The fact that so many of these species present puzzling intergradations, and extremes of variation, may be in-

terpreted as showing that the process of speciation is still in progress. Kirkaldy has quite aptly remarked concerning this genus:

It is the most difficult of the Hemipterous genera in these islands to deal with specifically. It is impossible in some instances, from the material before me, to say whether certain forms are species or only local varieties. A much more adequate material, a knowledge of the range of variation, of the food plants, and of the nymphs, is necessary before the synonymy can be settled. The variation in some forms known to me is quite bewildering.

It is unfortunate considering this difficulty that Kirkaldy did not make his descriptions more complete and specific so that comparisons would be more satisfactory. Many descriptions he has confined to a few words, referring to some other species for comparison, and, without positive identification for his other species, the description is of course almost valueless. Kirkaldy of course made his descriptions from a small number of individuals, many from single specimens representing one sex, or with no evidence concerning the sexes belonging to the same species. Though I have had apparently a much larger amount of material, the line of separation between some species is still very difficult to determine; I have attempted to give sufficient detail so that the forms may be recognized, and with added knowledge concerning the host plants and the recognition of both sexes for each species it may be possible to determine something more of the relationships and lines of evolution presented in the group. It is certainly a very fascinating problem, but one which requires a large expenditure of time along with an abundance of material and particularly an opportunity to study in the field the limitation of food plants, distribution, and other factors associated with their development.

It may be remarked as of special interest that few members of the subfamilies Bythoscopinae and Typhlocybinae have been noted and apparently are not common in the Hawaiian fauna, also that the only species in the subfamily Cicadellinae is a North American species which has probably had a very recent introduction.

While in London in August 1932, I had the opportunity to examine the Kirkaldy specimens deposited in the South Kensington Natural History Museum and such species as are represented there must be recognized as typical, especially as many descriptions are stated to be based on one example.

If the present paper and the collection on which it is based shall serve as a better foundation for a study of the Hawaiian leaf hoppers of the family Cicadellidae, my purpose has been accomplished.

Type specimens of the species described as new are deposited in the collections of Bernice P. Bishop Museum and paratypes in my collection, deposited at Ohio State University. The main collection is deposited in

Hawaii in Bernice P. Bishop Museum in Honolulu and duplicate sets when available are retained in the Osborn collection at Ohio State University.

Drawings to illustrate certain of the species have been made by J. N. Knull and Mrs. Celeste Taft, and for dissections and drawings of internal genitalia I am indebted to Miss Dorothy M. Johnson. I wish also to acknowledge many helpful suggestions and the verification of botanic and locality names by Mr. Otto H. Swezey, and a grant toward cost of illustrations from Bernice P. Bishop Museum through the generosity of the Director, Dr. Herbert E. Gregory.

The host plants with species associated are found to be:

<i>Cynodon dactylon</i> — <i>Nesosteles hospes</i>	<i>Myoporum sandwicense</i> — <i>Nesophrosyne craterigena</i>
<i>Eragrostis variabilis</i> — <i>Nesosteles timberlakei</i>	<i>Bobea elatior</i> — <i>Nesophrosyne bobeeae</i>
<i>Sida cordifolia</i> — <i>Nesophrosyne perkinsi</i>	<i>Microlepidia strigosa</i> (?)— <i>Nesophrosyne umbratilis</i>
<i>Coprosma montana</i> — <i>Nesophrosyne cinerea</i>	<i>Dodonaea viscosa</i> — <i>Nesophrosyne nuenuue, maritima</i>
<i>Coprosma pubens</i> ?— <i>Macropsis hawaiiensis</i>	<i>Straussia hawaiiensis</i> — <i>Nesophrosyne silvicola, koleae. Nesorias oceanides</i>
<i>Coprosma rhynchocarpa</i> — <i>Nesophrosyne pluvialis</i>	<i>Antidesma platyphyllum</i> — <i>Nesorias eburneola</i>
<i>Gouldia</i> species— <i>Nesophrosyne gouldiae</i>	<i>Maba sandwicensis</i> — <i>Nesophrosyne mabae</i>
<i>Pipturus albidus</i> — <i>Nesophrosyne pipturi, ponapona, opalescens</i>	<i>Alyxia olivaeformis</i> — <i>Nesophrosyne signatula</i>
<i>Cyrtandra</i> species— <i>Nesophrosyne pipturi, pluvialis, opalescens</i>	<i>Metrosideros polymorpha, ohia lehua</i> — <i>Nesophrosyne cuprescens, koleae, silvicola, notatula</i>
<i>Cyrtandra cordifolia</i> — <i>Nesophrosyne gouldiae</i>	<i>Pelea</i> species— <i>Nesophrosyne peleae</i>
<i>Scaevola</i> — <i>Nesophrosyne perkinsi</i>	<i>Sesbania tomentosa</i> — <i>Nesophrosyne perkinsi</i>
<i>Euphorbia</i> species— <i>Kirkaldiella euphorbiae</i>	<i>Wikstroemia</i> species— <i>Nesophrosyne monticola</i>
<i>Euphorbia multiformis</i> — <i>Kirkaldiella ewana</i>	<i>Perrottetia sandwicensis</i> — <i>Nesophrosyne monticola</i>
<i>Touchardia latifolia</i> — <i>Nesophrosyne touchardii</i>	<i>Suttonia lessertiana</i> — <i>Nesophrosyne nimbicola, koleae, myrsines</i>
<i>Coprosma pubens</i> — <i>Nesophrosyne arcadiicola</i>	<i>Nothoecstrum breviflorum</i> — <i>Nesophrosyne giffardi</i>
<i>Kadua</i> species— <i>Nesophrosyne bicolorata</i>	

The distribution by islands is of special interest in connection with possible isolation and differentiation of species:

KAUAI	
Nesophryne filicicola	Nesophrosyne procellaris
Nesophryne microlepieae	Nesophrosyne perkinsi
Nesophryne kukanaroa	Nesosteles plutonis
Nesophryne kaiamamao	
Nesophrosyne umbratilis	LANAI
Nesophrosyne halemanu	Nesophrosyne lineata
Nesophrosyne koleae	Nesophrosyne perkinsi
Stirellus hospes	Nesophrosyne oneana
Nesosteles hospes	Nesophrosyne silvicola
	Nesophrosyne imbricola
	Nesophrosyne furculata
	Nesophrosyne nimbicola
	Nesophrosyne milu
	Nesophrosyne obliqua
	Nesophrosyne giffardi
	Nesoreias sanguinea
	HAWAII
OAHU	Macropsis hawaiiensis
Draeculacephala mollipes	Nesophrosyne affinis
Kirkaldiella ewana	Nesophrosyne touchardii
Nesophrosyne touchardii	Nesophrosyne ponapona
Nesophrosyne albicosta	Nesophrosyne perkinsi
Nesophrosyne palolo	Nesophrosyne ehu
Nesophrosyne pluvialis	Nesophrosyne pele
Nesophrosyne bicolorata	Nesophrosyne silvicola
Nesophrosyne gouldiae	Nesophrosyne montivaga
Nesophrosyne pipturi	Nesophrosyne montium
Nesophrosyne opalescens	Nesophrosyne imbricola
Nesophrosyne perkinsi	Nesophrosyne mabae
Nesophrosyne bobae	Nesophrosyne giffardi
Nesophrosyne caelicola	Nesophrosyne ulaula
Nesophrosyne ponapona	Nesophrosyne nimbigena
Nesophrosyne cuprescens	Nesophrosyne umbrigena
Nesophrosyne nimbicola	Nesophrosyne koleae
Nesophrosyne monticola	Nesophrosyne sinuata
Nesophrosyne signatula	Nesophrosyne nuenua
Nesophrosyne koleae	Nesophrosyne pluvialis
Nesophrosyne ulaula	Nesophrosyne arcadiicola
Nesophrosyne myrsines	Nesophrosyne nimbicola
Nesophrosyne peleae	Nesophrosyne craterigena
Nesophrosyne notatula	Nesophrosyne oreadis
Nesophrosyne maritima	Nesoreias oceanides
Stirellus hospes	Nesoreias insularis
Nesosteles peregrina	Nesoreias marginalis
Nesosteles hospes	Nesoreias comma
Nesosteles plutonis	Nesoreias eburneola
Nesosteles timberlakei	Nesosteles volcanicola
Opsius stactogalus	Nesosteles peregrina
Nesolina lineata	Nesosteles hospes
Empoasca solana	Nesosteles plutonis
	Cicadula kilaueae
	Nesolina lineata
MAUI	
Nesophrosyne angulifera	
Nesophrosyne cinerea	
Nesophrosyne haleakala	
Nesosteles hospes	
MOLOKAI	
Kirkaldiella euphorbiae	
Nesophrosyne palustris	

It may be noted that *Nesophryne* has been taken only on Kauai; that *Draeculacephala* has been taken only on Oahu;¹ that of *Nesophrosyne*, mostly feeders on shrubby plants or trees, species are restricted to a single island except *N. nimbicola* and *N. silvicola* credited to both Lanai and Hawaii. *Nesoreias* is found exclusively on Hawaii, except for *N. sanguinea* on Lanai. *Nesosteles*, however, with grass-feeding species, probably more readily carried from one island to another, has *N. hospes* on Kauai, Oahu, Maui, and Hawaii; *N. peregrina* on Oahu and Hawaii; and *N. plutonis* on Oahu, Hawaii and Molokai. *Cicadula* is found with only the species *kilaueae* on Hawaii.

We have then, so far as can be inferred from the records available, very distinct indication that there has been a high degree of isolation and that species have differentiated on the different islands and different food plants with very little migration between the islands.

SYSTEMATIC ARRANGEMENT

The Cicadellidae are commonly arranged in five subfamilies: Cicadellinae, Bythoscopinae, Gyponinae, Jassinae, and Typhlocybinae. Of these, almost all the Hawaiian species are included in the subfamily Jassinae, only one or two genera and two or three species in Bythoscopinae, one in Cicadellinae, none in Gyponinae, and one in Typhlocybinae.

In Jassinae nearly all the species are included in the genus *Nesophrosyne* established by Kirkaldy especially to include the Hawaiian species, this being in the tribe Jassini. The other prominent genus *Nesosteles* belongs to the tribe Cicadulini.

Key to Subfamilies

1. Elytral nervures forking on the disk and with crossveins forming discal cells..... 2
Elytral veins forking at the base and running without crossveins nearly to apex. Ocelli inconspicuous.....Typhlocybinae
2. Ocelli located on front below border of vertex.....Bythoscopinae
Ocelli located on disk or at border of vertex..... 3
3. Ocelli on disk of vertex..... 4
Ocelli on border between vertex and front.....Jassinae
4. Bodies not greatly depressed.....Cicadellinae
Bodies usually distinctly depressed.....Gyponinae

BYTHOSCOPIINAE

Genus NESOPHRYNE Kirkaldy

Nesophryne, Kirkaldy, Haw. Ent. Soc., Proc., vol. 1, p. 160, 1907.

This is a small genus with broad head, vertex margins nearly parallel, and the ocelli located on the rounded border between the vertex and front. Type: *Nesophryne filicicola* Kirkaldy.

¹ Specimens of *Nesophryne* have more recently been collected on Oahu and Maui, but the species remains undetermined and *Draeculacephala* has now spread to Kauai, Molokai and Maui since its first appearance on Oahu in 1912.—[O.H.S.]

Kirkaldy says: "Allied to *Eutettix*, but the habitus is quite different and the vertex much shorter and more declivous. Frons very wide, almost obliterating the fasciolae. . . . There is a well-defined appendix, four apical cells and a nodal cell. . . . The genus is confined to Kauai."

Kirkaldy doubtfully included also *N. kukanaroa* and *kaiamamao* from the same island but I have seen specimens of one only and include his descriptions for convenience of students who may not have access to the original descriptions.

Nesophryne filicicola Kirkaldy.

Nesophryne filicicola Kirkaldy: Haw. Ent. Soc., Proc., vol. 1, p. 160, 1907; Fauna Haw., vol. 2, Suppl., p. 556, 1910.

Head broad, scarcely wider than pronotum, short; vertex margins nearly parallel, rounded to front; front somewhat tumid, broad, abruptly narrowed to clypeus; clypeus elongate, somewhat rugose, widening to tip; lorae broad. Pronotum broad, short; hind border sinuate; scutellum very broad; base nearly twice as long as length; elytra broad, longer than abdomen. Genitalia: male, valve small, triangular; plates triangular, tips acute.

Color: yellowish tinged with red; anterior part of vertex and most of front black; ocelli reddish; clypeus, most of lorae, and upper part of cheek, blackish. Pronotum irrorate with yellowish and fuscous; scutellum with a transverse irregular line at middle; elytra milky, opaque, tinged with reddish; veins fuscous; lines of fuscous dots in claval and discal areoles.

Length: female, 6.5 mm; male, 5 mm.

Kauai: Puu Ka Pele, February 14, 1915, O. H. Swezey. Two nymphs bearing the same date and locality are evidently nymphs for this species. They are bright coral red with yellow markings along median line above, and the front is mostly ivory-yellow; from *Elaeocarpus bifidus*.

Nesophryne microlepieae Kirkaldy.

Nesophryne microlepieae Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 557, 1910.

Broad, robust; head short, transverse. Length: female, 5.5 mm, male, 5 mm.

Head scarcely as wide as pronotum, short; vertex about three times as wide as length, scarcely longer at middle than next the eye; front broad, narrowed abruptly from below antennae; clypeus rugose, nearly twice as long as wide; lorae broad, approaching margin of cheek; cheek margins sinuate below the eyes. Pronotum over twice as long as the vertex; hind border distinctly concave; elytra passing the abdomen.

Genitalia: female, last ventral segment one-third longer than preceding; hind border nearly truncate, very faintly sinuate with middle a little produced; male, valve nearly as long as preceding segment; hind border rounded, faintly subangulate; plates broad, short; tips blunt, extended nearly to tip of pygofer.

Color: dark fuscous; base of vertex and apex of front, dull yellowish-brown; ocelli red. Pronotum transversely on the middle with an area each side of median stripe dark yellowish; elytra coppery brown with the veins and most of the areoles, except the costa, suffused with dark fuscous; apex with appendix smoky; femora banded with fuscous. Abdomen blackish with the borders of the segments more or less pale.

Redescribed from male in Bernice P. Bishop Museum from same locality, and apparently from type material, Kalihiwai, Kauai, 400 feet, W. M. Giffard, October 7, 1906. Two specimens, one male and one female, collected by H. T. Osborn, Kokee, Kauai, the female June 10, 1919, the male June 9, 1919, Kauaikinana Stream.

Nesophryne kukanaroa (Kirkaldy).

Bythoscopus kukanaroa Kirkaldy: Fauna Haw., vol. 3, p. 114, 1902.

Nesophryne kukanaroa (Kirkaldy): Fauna Haw., vol. 2, Suppl., p. 557, 1910.

"Head, pronotum and scutellum pale luteo-flavous; frons transversely clouded with blackish-brown in the middle, clypeus as in *kaiamamao*, pronotum and scutellum obscurely spotted and dotted with dark brown, a reddish-brown spot near exterior angles of the latter. Pronotum spotted with black at the base. Propleura clouded with black. Elytra dilute olivaceous-brown (tending to a ruddy brownish tinge towards the lateral margins and the apex), closely and minutely irrorated with blackish-brown, except apically; a whitish obscure spot near the apex of the clavus, and one or two smaller ones on the corium. Nervures more or less reddish-brown, claval suture pale flavous; clavus apically black. Legs sordid flavous, spotted with black, tarsi more or less blackish. Head and eyes very slightly wider than pronotum. Eyes about $1/5$ wider than base of vertex. Vertex apically rounded. Anterior margin of pronotum widely roundly convex, lateral angles roundly obtuse-angled, lateral margins scarcely reflexed, postero-lateral margin a little longer than the antero-lateral. Scutellum much shorter than wide. Nervures well-marked, transverse nervures in clavus (these appear to be absent in some European forms).

"Long. nearly 6 mm, lat. $2 \frac{1}{6}$ mm.

"Hab. Kauai, Halemanu 4,000 feet (June) Perkins. A single specimen, without abdomen."

Nesophryne kaiamamao (Kirkaldy).

Bythoscopus kaiamamao Kirkaldy: Fauna Haw., vol. 3, p. 115, 1902.

Nesophryne kaiamamao (Kirkaldy): Fauna. Haw., vol. 2, Suppl., p. 557, 1910.

"Very similar to *B. kukanaroa*, but smaller, and the elytra without irrorations.

"Head, pronotum and scutellum coloured as in *kukanaroa*, but less maculate; a somewhat obscure horseshoe-shaped mark on scutellum, and a slender longitudinal line on vertex, brownish. Elytra dilute olivaceous, a little clouded with brownish-black here and there, nervures mostly dark brownish. Frons more or less ferruginous, clypeus obscure black, with a central and a lateral, slender, line, flavo-ferruginous. Propleura clouded with black. Legs sordid flavous, clouded and spotted with black; intermediate femora ringed widely near the apex with black. Beneath flavo-ferruginous. Head and eyes very slightly narrower than pronotum, vertex apically rounded. Pronotum, scutellum and nervures as in *kukanaroa*. Eyes about one-third wider than vertex at base.

"♀. Last abdominal segment, transverse, sinuately emarginate apically, the middle shortly minutely angularly emarginate,—without teeth. Genital segment very long.

"Long. $5\frac{1}{4}$ mm (to apex of elytra), lat. 2 mm.

"Hab. Kauai, high plateau (August), Perkins; one specimen only."

Specimens that are referred to this species from "Puu Ka Pele, Kauai, 2-14-15, Coll. O.H.S." include two nymphs that are pale yellow suffused

with red, "ex *Elaeocarpus*," also a female "Kalalau, Kauai, 8-20-21, Swezey Coll. *Elaeocarpus*."

Genus **MACROPSIS** Lewis

Macropsis Lewis, Ent. Soc. London, Trans., vol. 1, p. 49, 1835; Westwood, Int. Mod. Class. Ins., 2, 1840; Van Duzee, Cat. Hemiptera, 1917; Breakey, Ent. Soc. America, Ann., vol. 25, p. 789, 1932.

Pediopsis Burmeister, Gen. Ins., pl. 10, fig. 16, 1838.

Type: *Cicada virescens* (Gmelin).

Macropsis hawaiiensis, new species (fig. 1).

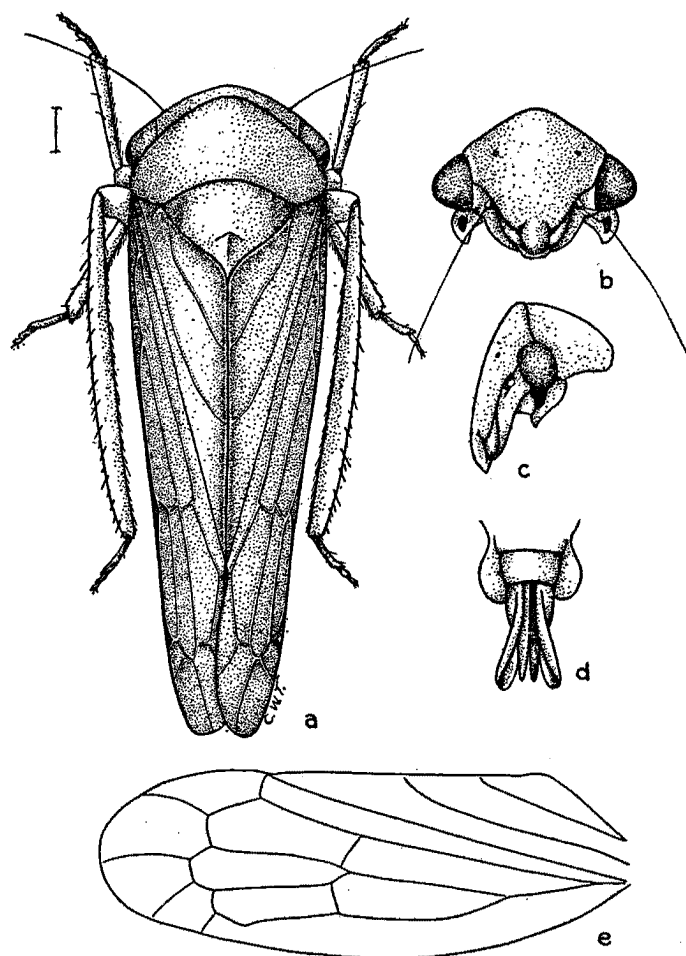


FIGURE 1.—*Macropsis hawaiiensis*: a, dorsal; b, face; c, profile; d, male genitalia; e, elytron.

Pale gray with a black spot on propleura. Length: male, 4.5 mm.

Head roundly angulate, vertex very narrow at middle widening a little at sides, ocelli wide apart, front slightly convex, clypeus short tumid with prominent raised margin at apex, lorae narrow with prominent inflation on inner disc and a raised margin, border of cheek deeply sinuate, pronotum rounded, subangulate before, lateral angle rounded, hind border with broad angular sinus. Scutellum smoothly faintly punctate anteriorly with rugae in front of the transverse impressed line and tumid areas and a central raised line on apical part. Elytra with four apical and three antepical areoles. Male plates long, slender, upcurved.

Color in dried specimen pale cinereous slightly tinged with fulvous or ochraceous, a black spot on the propleura and faintly dusky patch on basal angles of scutellum, tarsal claws smoky.

Described from a single male specimen (holotype) from Kilauea, 29 miles, 4,000 feet, Hawaii, no. 4, W. M. Giffard, 21-8-17 on "*Coprosma pubens?*".

Were it not for the very definite record given with this specimen I should think best to omit description as it would seem possibly a straggler or accidental immigrant. While approaching *M. pallida* and *M. cinerea* described by Breakey from United States and *M. thymele* Kirkaldy from Australia it does not agree with descriptions of either. It agrees with *M. fumipennis* variety *gleditschiae* in rugosity of apex of scutellum but differs in presence of black spot on propleura as also details of clypeus. I have compared it with the types of Breakey's species and it would seem possible that the species is an offshoot from American stock. If *Coprosma* is a leguminous plant it might have affinities with *M. fumipennis*.

Genus BYTHOSOPUS Germar

Bythoscopus robustus (Uhler).

Bythoscopus robustus (Uhler), Swezey, Haw. Ent. Soc., Proc., vol. 8, no. 3, pp. 381, 533, 544, 1934.

Of this species, which is apparently a recent introduction from North America, Mr. Swezey says: "It was first collected on Bermuda grass at Kawela Bay, Oahu, April 23, 1933. That is on the north coast of the island. This leafhopper has not been found yet in the vicinity of Honolulu. Specimens were identified by Mr. E. P. Van Duzee."

CICADELLINAE

Genus DRAECULACEPHALA Ball

Draeculacephala, Ball, Iowa Acad. Sci., Proc., vol. 8, p. 66, 1901.

Type: *Draeculacephala mollipes* (Say).

Draeculacephala mollipes (Say).

Tettigonia mollipes Say: Acad. Nat. Sci., Phila., Jour., vol. 6, p. 312, 1831; Compl. Writ., vol. 2, p. 386.

Draeculacephala mollipes, Ball, Iowa Acad. Sci., Proc., vol. 8, p. 66, 1901.

Head sharply angulate; vertex as long at middle as between the eyes; front flattened on the disc; clypeus slightly swollen on the base. Pronotum as long as vertex; hind border sinuate. Genitalia: female, last ventral segment half longer than preceding, obtusely, angularly produced on the middle; male, valve small, plates elongate, triangular, acute.

Color: vertex and anterior part of pronotum and scutellum yellowish; hinder part of pronotum and elytra grass-green; costa whitish; apex subhyaline, beneath testaceous, abdomen above black; below pale yellow. Males in some specimens black beneath.

Length: female, 7-8 mm; male, 6-7 mm.

Oahu: Kewalo, April 8, 1913, Swezey; Honolulu, November 1916, Bridwell; Honolulu, January 30, 1916, Swezey; "Wauana", August 13, 1916, Manoa Valley, April 2, 1916, Oahu Plantation, May 8, 1917, Honolulu, July 14, 1916, Timberlake.

All specimens noted are from the island of Oahu, where the species seems to have been introduced, probably from United States or possibly from Mexico.

Some males with the face and beneath black may represent a variety.

JASSINAE

This group includes the greater number of the Hawaiian Cicadellidae and most of the species have evidently been derived from a quite ancient migrant as there has been a pronounced differentiation into species especially in the dominant genus *Nesophrosyne*. The following artificial key will assist in separating the genera.

Key to Genera

- | | |
|---|---------------------|
| 1. With three anteapical areoles..... | 2 |
| With two anteapical areoles..... | 5 |
| 2. Vertex flattened, sharp edged, outer anteapical not stylate..... | Kirkaldiella |
| Vertex not greatly flattened, usually rounded to front..... | 3 |
| 3. Outer anteapical areole not stylate..... | 4 |
| Outer anteapical areole stylate..... | Nesophrosyne |
| 4. Vertex distinctly angulate..... | Stirellus |
| Vertex rounded..... | Opsius |
| 5. With two discal areoles..... | Nesoreias |
| With one discal areole..... | 6 |
| 6. Head rounded..... | 7 |
| Head angular vertex distinctly produced..... | Nesolina |
| 7. Sub costal vein not merged with outer sector..... | Cicadula |
| Sub costal merged with outer sector..... | Nesosteles |

Genus **KIRKALDIELLA**, new genus

Similar to *Mesamia* with depressed vertex especially back of apex, rather thin vertex margin, a transverse depressed line behind the apex; ocelli near the eye on the vertex border; the front broad, tapering from antennae to base of clypeus, slightly convex; clypeus narrow, widening perceptibly to

apex; pronotum short, strongly arched before, concave behind, lateral margin very short, scutellum wider than long. Elytra longer than abdomen, one cross nervure on corium, apical areoles short, four; antepical areoles three, the outer one shorter than the middle one and narrowed to each end and with a few (two to four) crossveins to costa. Female segment short and male plates short and rounded.

Genotype: *K. euphorbiae*, new species.

While somewhat resembling *Mesamia* Ball and especially *Megabyzus* of Distant the species included here seem to have good generic characters to separate them from any established genus. The single cross nervure relates them to *Eutettix* rather than *Mesamia* but structure of head and genitalia combine to exclude them from that genus. The two species included differ distinctly in characters of vertex and male genitalia.

***Kirkaldiella euphorbiae*, new species (fig. 2).**

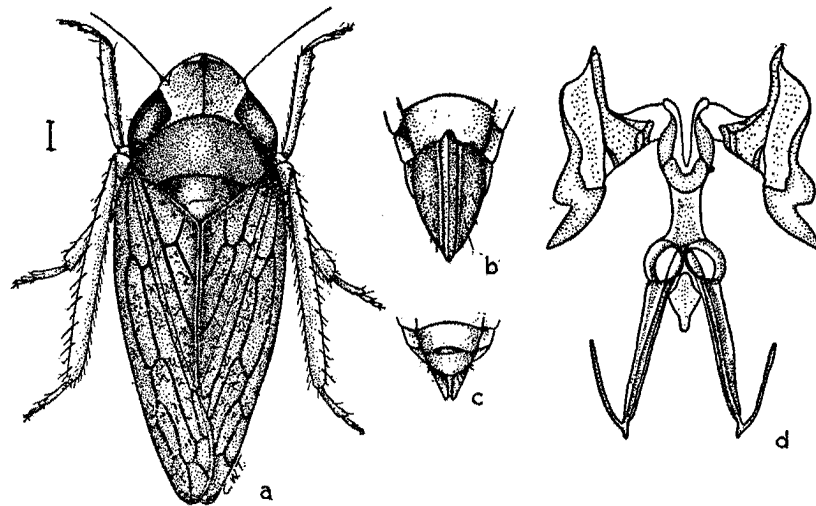


FIGURE 2.—*Kirkaldiella euphorbiae*: a, dorsal; b, female, c, male, d, internal, genitalia.

Resembling *Acucephalus* or *Mesamia*; head broad, flat; vertex margins elevated in front. Pronotum much shorter than vertex; scutellum short. Length: female, 3.5 mm; male, 3 mm.

Head wider than pronotum; eyes large; vertex produced, as long at middle as between the eyes, nearly twice as long as middle as at the eye; disc flattened or slightly depressed; anterior margins elevated, angled to front; front broad at base, tapering nearly uniformly to narrow clypeus. Pronotum three-fourths as long as vertex, rather deeply concave behind; side margin extremely short; scutellum nearly as long as pronotum, rather broad at base; elytra with outer antepical about half as long as middle with nodal veins varying from one to three, apparently one constant for fore part of outer antepical. Genitalia: female, last ventral segment short; hind border

sinuate at the sides and broadly, rather deeply notched at middle; male, valve short, rounded behind; plates short; outer border convex; tips blunt, with a short filamentous process. Internal genitalia: styles broad at base with sinuate outer margin and blunt tooth, connective short, widening to base of oedagus which is long with long apical barb, the separated basal parts showing a distinct channel, the two when appressed evidently forming a tube. (See fig. 2, d.)

Color: pale gray; three dots on margin of vertex; one each side next to eye in male, and numerous minute dots on elytra, light fuscous in female, dark fuscous in male; the nodal and outer apical vein blackish; a fulvous spot at basal angle of scutellum. Beneath pale testaceous in female, fuscous in male except tibiae and hind femora and male plates.

Molokai: Moomomi, on *Euphorbia* species, June, 1919, W. M. Giffard and Rock, a large series, more than 70 specimens (type, allotype, and paratypes). 1704, x

This species has much the aspect of a small *Acucephalus* or *Mesamia*.

Nymphs from the same plant and evidently belonging to this species have the head large, triangular; vertex margins somewhat elevated, represent at least two instars, the smaller ones with small wing pads, the larger with wing pads extending to second abdominal segments.

Kirkaldiella ewana, new species (fig. 3).

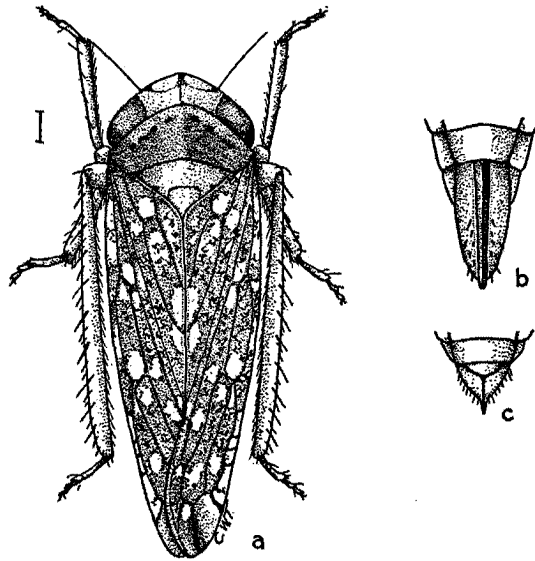


FIGURE 3.—*Kirkaldiella ewana*: a, dorsal; b, female, c, male, genitalia.

Similar to *euphorbiae* but with shorter vertex and more distinctly tinted with fulvous. Length: female, 4 mm, male, 3.25 mm.

Head wider than pronotum, rounded before, vertex slightly depressed with a distinct transverse impressed line back of apex and between ocelli. Ocelli one-third the distance

from eye to middle. Vertex margin slightly raised and somewhat thicker, front broad at base and tapering from antennae to clypeus, clypeus narrow, apex rounded, lorae large nearly touching border of cheek. Pronotum a little longer than vertex, arched before and slightly concave behind, scutellum small, a little wider than long. Elytra longer than abdomen, clavus with two veins connected by a crossvein near the base and with cross vein to margin and to claval suture. The outer anteapical is rather long and in some cases narrowed near the middle. Nodal cross veins three or four, the proximal one the stronger. Genitalia: female, last ventral segment with a broad triangular indentation; male valve small, hind margin rounded, plates short, about half as long as pygofer, outer border rounded, tips acuminate and bearing a slender appendage. Internal genitalia quite similar to those of *K. euphorbiae*.

Described from a series (holotype, allotype, paratypes) of 48 specimens from "Ewa, Nov. 27, '16, J. C. Bridwell collector". The following note accompanies these specimens: "This lot of 48 specimens taken all on (one) occasion off *Euphorbia multififormis* on a coral plain but little above sea level at Ewa, Oahu. Possibly a recent immigrant though the host plant is a native species." A specimen also from Barbers Point, Oahu, June 29, 1919, E. H. Bryan.

Compared with *K. euphorbiae* this species has a shorter vertex and the genitalia differ as shown in the figures. Occurring on differing islands and on different species of *Euphorbia*, it seems probable that the two species have come from a common stock, possibly introduced with a common host plant in the not very remote past. Their affinity is emphasized by the similarity of internal genitalia.

Genus NESOPHROSYNE Kirkaldy

Nesophrosyne Kirkaldy: Haw. Ent. Soc., Proc., vol. 1, p. 160, 1906; Fauna Haw., vol. 2, Suppl., p. 558, 1910.

Genotype: *N. perkinsi* Kirkaldy.

Nesophrosyne halemanu Kirkaldy.

Nesophrosyne halemanu Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 559, 1910.

Broad, short, head wider than pronotum, vertex flattened, rounded in front. Length: 4.25 mm.

Head faintly angulate; vertex nearly as long as width between the eyes, rounded, very faintly angulate in front, one-fourth longer at middle than next the eye; margin angulate; pronotum short, scarcely as long as vertex; hind border truncate; scutellum short, scarcely as long as pronotum, broadly triangular; elytra short, broad, apex blunt, almost obliquely concave.

Color: grayish, vertex with a median line, and a dot on the border, and another near the hind border, fuscous, face blackish. Pronotum gray, three rather faint fuscous dots; elytra pale subhyaline; nervures fuscous, line in the discal cells, outer apical cells fuscous; inner cells smoky.

Kauai: Halemanu, altitude 4,000 feet, 1 specimen, May 1895, Perkins. A specimen without abdomen from Bernice P. Bishop Museum. Kirkaldy states: "Male sternites more or less greyish black medianly, valve blackish, plates yellowish."

The type specimen is in the Natural History Museum, London, and in this specimen the elytra are tipped with black and there are three black dots on the costa.

This species and the following one seem to be somewhat intermediate between the species of *Kirkaldiella* and *Nesophrosyne* as the head is more flattened and the vertex margin sharper than in other species, but the outer anteapical approaches the form common to *Nesophrosyne*.

***Nesophrosyne haleakala* Kirkaldy.**

Nesophrosyne haleakala Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 567, 1910.

Broad, rather robust. Dull gray. Elytra short, scarcely as long as abdomen. Scutellum small. Length: 3.5 mm.

Head wider than pronotum, distinctly angulate; vertex produced, longer than width between the eyes, nearly twice as long at middle as next the eye, distinctly angulate; margin bluntly angulate; front broad, sides nearly parallel to below antennae, abruptly narrowed to clypeus; clypeus one-half longer than broad. Pronotum short, about two-thirds as long as vertex; side margins very short, hind margin truncate; scutellum small, shorter than pronotum, broadly triangular; elytra short, costa broad, three cross nervures at nodus, the outer one curved or reflexed; outer apical areole very small, pedicellate; inner apical areole very narrow, elongate, triangular; outer anteapical areole wanting; venation for two sides not strictly uniform. Genitalia: female, last ventral segment long; hind border faintly sinuate, scarcely produced at middle; ovipositor rather strongly curved, exceeding tip of pygofer, and almost passing tip of elytra.

Color: dull gray, faintly fulvous; vertex with a distinct fuscous spot at apex and a narrow spot each side near base, median line brown; front with fuscous on the disc and borders with distinct yellowish arcs; apex fuscous; clypeus mostly fuscous; cheeks and lorae with brownish fuscous spots. Pronotum and scutellum dull gray without markings; elytra whitish hyaline, veins mostly fuscous, the middle of the clavus and disk of corium with fuscous patches; costal veins blackish, and second apical areole mostly fuscous.

Redescribed from female labeled "Haleakala, Maui, 8,000 feet, Perkins, April, 1894", from Bernice P. Bishop Museum. Kirkaldy cites two females with the same locality and references, except that he gives 9,000 feet as the altitude. The specimen in hand however would appear to be from the type locality, perhaps representing part of type material, and the type specimen in the Natural History Museum in London has been examined. Also specimens from Haleakala, Maui, August 26, 1918; Kumuweia, Kauai, August 26, 1921; O. H. Swezey.

***Nesophrosyne umbratilis* Kirkaldy.**

Nesophrosyne umbratilis Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 558, 1910.

Black above, pale yellow below. A white stripe on the vertex and white subhyaline spots on clavus; costa broadly hyaline with milky suffusion. Length: 4 mm.

Head scarcely as wide as pronotum, subangulate, nearly half longer at middle than between the eyes; side margins divergent, one-third longer at middle than next the eye, broad at front; ocelli distinct from above; front rather narrow, tapering gradually to clypeus; clypeus broad at base, tapering slightly to rounded apex. Pronotum a little longer than vertex, hind border truncate; elytral veins obscure; nodal vein apparently wanting. Genitalia: male, valve rather large; hind border rounded; plates short, together nearly semicircular with delicate filamentous appendages which extend to tip of pygofer.

Color: vertex dull black with a median stripe which does not quite reach the anterior border; ocelli orange-red; face pale yellow; pronotum black, with a small yellowish spot at base; scutellum, disc yellowish; clavus with four elongate whitish spots; costa broadly hyaline white, somewhat suffused with milky white; membrane smoky with three or four dull whitish spots. Beneath, including legs, whitish; terminal segments of abdomen black beneath including valve; plates and filaments whitish.

Redescribed from type specimen, male, in Bernice P. Bishop Museum collection. Kalihiwai, 400 feet, Kauai, October 7, 1906 "on fern, probably (*Microlepia strigosa*)". Also specimens from Kilauea, Hawaii, January 28, 1916, Giffard.

This species has somewhat the appearance of *N. albicosta* but the vertex is shorter, the stripe wider and not reaching the white of the front, and differs in other details.

***Nesophrosyne touchardii*, new species (fig. 4).**

Small, pale; head sloping and produced; a fuscous patch at nodus and apex of elytra; face white, banded with black at base of front. Length: female, 3.75 mm; male, 3.5 mm.

Head scarcely as wide as pronotum, subconic; vertex convex, sloping, as long as width between the eyes, half longer at middle than next the eye; front broad, rather short, narrowed below antennae; clypeus narrowed near the base. Pronotum as long as vertex; hind margin slightly concave; claval veins joined near the base; outer anteapical about half as long as middle. Genitalia: female, last ventral segment half longer than preceding, faintly sinuate; male, valve small, obtusely angular; plates broad at base; lateral margins slightly concave; tips acute, appendage minute or absent.

Color: pale, dull yellowish; vertex with a transverse spot each side of the eyes; pronotum more or less suffused with fuscous at the sides; scutellum with a fuscous triangle and basal angles; clavus and part of the corium, opaque greenish-white or subhyaline; costa milky hyaline with a line before the middle; a large blackish patch at nodus extending on to base of outer anteapical, the tip beyond the first apical vein, part of nerves and tip of clavus, dark fuscous or blackish; a sharp point at tip of clavus and the cross-nervure on disk of corium, fuscous; veins in part fuscous; tips of apical veins whitish; face whitish except at base of front which is marked with one or two fuscous bands, and in some specimens a faint dusky line at apex of front. Beneath white, with black point on the hind tibiae; tarsal claws dusky; abdomen above blackish on the disc, whitish at the margins; beneath femora white; ovipositor black; male with a central dusky stripe and the valve and disk of plates dusky.

Oahu: Tantalus, 6 adults; Nuuanu, 2 adults and 2 nymphs; from *Touchardia*; Manoa, 1 adult and 3 nymphs; type and paratypes, O. H. Swezey.

Hawaii: Olaa, altitude 3,000 feet, paratypes; Glenwood, "*Touchardia latifolia*".

The nymphs accompanying these specimens are pale yellowish, with the outer borders of pronotum, two points on the hind margin, a point on the mesonotum each side, the wing pads, except tip, edge of metanotum, and first two abdominal segments at the sides, blackish.

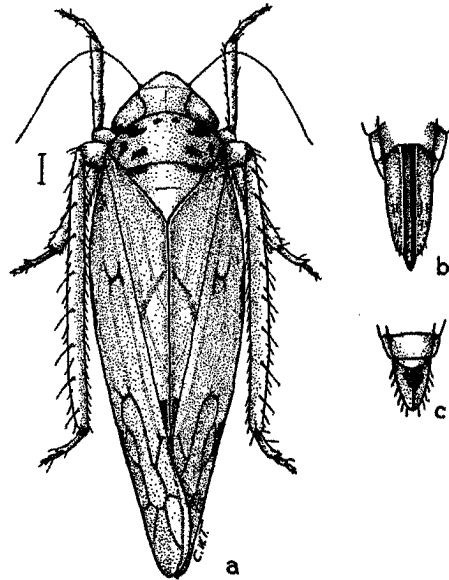


FIGURE 4.—*Nesophrosyne touchardii*: a, dorsal; b, female, c, male, genitalia.

The species is marked by the pale color and the conspicuous black patches.

A specimen similar to the above but with a continuous dark line on the costa and the male plates paler, from "Hauula, Oahu, 8-2-14, O. H. Swezey, collector."

***Nesophrosyne albicosta*, new species (fig. 5).**

Slender, head produced angulate, vertex and pronotum black, with a central whitish line, costa whitish hyaline in females, below white. Length: female, 4 mm.

Head as wide as pronotum, angulate, produced; vertex half longer at middle than between the eyes and next the eye; lateral borders divergent; margin to front bluntly angulate; front long, tapering nearly uniformly to clypeus; clypeus half longer than wide. Pronotum three fourths as long as vertex, hind border concave; elytra rather narrow; outer antepical minute with a single nodal vein, oblique to costa. Genitalia: female, last ventral segment half longer than preceding, roundly produced on the hind border and faintly notched at middle.

Color: beneath white, above blackish and olive brown; vertex black with a central line expanded toward apex, and two narrow oblique spots near tip yellowish-white; a central line and expanded patch on disk of pronotum dirty white; scutellum blackish;

disc paler, in some cases two discal pale dots; elytra olive brown, suffused with fuscous; the veins of clavus and inner part of corium, most of discal cells, apical membrane and oblique nodal vein, blackish; costa broadly whitish hyaline, widening to first apical vein; pygofer tinged with fuscous; ovipositor pale; margin tinged with brownish.

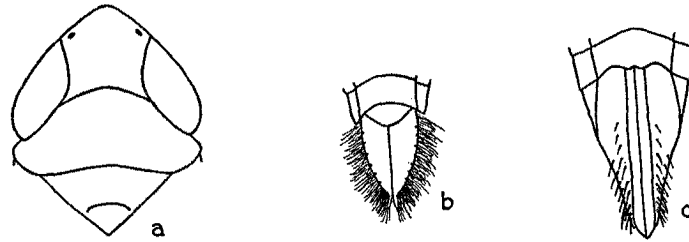


FIGURE 5.—*Nesophrosyne albicosta*: a, vertex; b, male, c, female, genitalia.

Oahu: Manoa Cliffs, 3 females, holotype and paratypes, W. M. Giffard; Nuuanu, 2; Tantalus, 1; Punaluu, 1; Mount Kaala, 3; Hillebrand Glen, November 17, 1912, 1; paratypes, O. H. Swezey. The Kaala specimens are a little larger and the elytra paler, but otherwise agree.

Nesophrosyne lineata, new species (fig. 6).

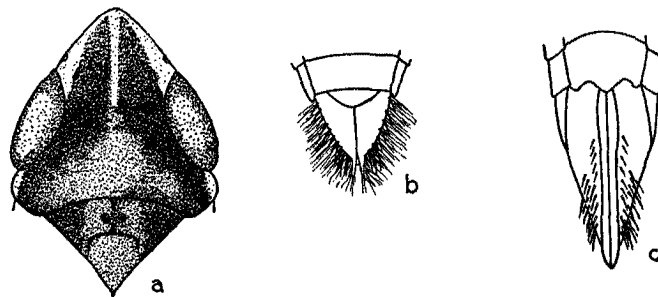


FIGURE 6.—*Nesophrosyne lineata*: a, vertex; b, male, c, female, genitalia.

Very similar to *N. albicosta*, but with costal area densely black. Abdomen beneath black, except terminal segments. Length: female, 4.25 mm; male, 3.75 mm.

Head as wide as pronotum, much produced; vertex about half longer than width between eyes, twice as long at middle as next the eye, distinctly angulate, blunt at tip; margin angled to front; front narrow, long, tapering nearly uniformly to clypeus; clypeus about half longer than width at base, widening toward tip; cheek rather deeply sinuate beneath the eye. Pronotum short, about two thirds as long as clypeus; side margin short; hind border concave; outer anteapical distinct, narrow, with cross vein at its base, and another, curved, first apical, at its tip. Genitalia: female, last ventral segment short, scarcely longer than preceding; hind border truncate or slightly concave; male, valve short, rounded behind; plates broad; outer margins rounded, abruptly narrowed to base of the upturned filamentous appendages which extend to tip of pygofer.

Color: black or dark fuscous above; vertex velvety black with margins and median line, white; pronotum black on anterior border, fuscous on the disk; extreme margin whitish, and a faint median streak on anterior part, sometimes obsolete, especially in the males. Pronotum black; elytra black; in males the clavus and inner part of corium black; in females clavus and inner part of corium dark fuscous; a few whitish dots in claval and first anteapical and two whitish hyaline spots in costa, the outer just inside the first apical vein; the apex smoky; face white; pectus black; legs white or slightly suffused toward tip with fuscous. Beneath, abdomen black with narrow margins of white; last ventral segment of female whitish; pygofer ferruginous, suffused with fuscous at base; male genitalia black, the filaments orange.

Lanai: altitude 1,900 to 3,400 feet, January, February, 1917, 7 females, § 77 a, 3 males, holotype, allotype, and paratypes, W. M. Giffard.

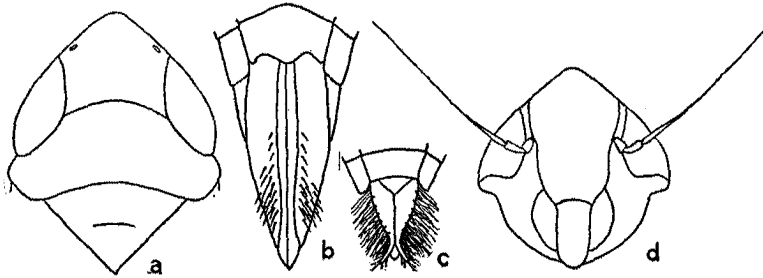


FIGURE 7.—*Nesophrosyne affinis*: a, vertex; b, female, c, male, genitalia; d, face.

***Nesophrosyne affinis*, new species (fig. 7).**

Very similar to *N. albicosta* and *N. lineata*, but with vertex a little shorter. The costa mostly black. Color beneath yellowish. Abdomen broadly banded with yellowish. Female segment produced. Length: female, 4 mm; male, 3.75 mm.

Head as wide as pronotum, produced, angulate; vertex one fourth longer at middle than between the eyes, hardly twice longer at the middle than next to the eye; tip rounded; margin to front bluntly angulate; front tapering to base of clypeus; clypeus broad at base, contracted a little at middle, half longer than width; cheeks broad, shallowly sinuate beneath the eye. Pronotum short, three fourths length of vertex. Genitalia: female, last ventral segment twice as long as preceding; distinctly produced and rounded behind; male, valve small, subangulate; plates short, nearly triangular to base of filaments; filaments upturned, extending nearly to tip of pygofer.

Color: blackish; vertex dark fuscous, with margins and median line expanded toward tip, whitish; pronotum with faint indications of median line; scutellum with disc brownish; two dots, transverse suture, median line and lateral angles, fuscous; elytra, clavus, and inner areoles of corium, fuscous, subhyaline; costa, except a white patch beyond the middle and a hyaline patch at the first apical nerve, black; membrane smoky in the female. In the male pronotum, scutellum and all of elytra, except the hyaline whitish spot next the apical vein, velvety black; face pale yellowish or dirty white; pectus pale in female, blackish in male; legs whitish, testaceous toward the tips. Abdomen black with broad yellowish or orange yellow bands; last ventral segment of female brown; pygofer ferruginous brown; male valve and plates black, except the tip; tip and filaments orange red.

Hawaii: Oloa, Crater Road, 27 miles, altitude 3,600 feet, July 30, 1918, holotype female, W. M. Giffard; Kilauea, altitude 3,800 feet, September 11, 1919, allotype male, W. M. Giffard.

These specimens differ considerably in intensity of color, but the pattern agrees so closely and the picture of the abdomen is so similar that it seems proper to place them together, especially as they are from the same island and practically the same altitude. These and *N. albicosta* and *N. lineata* are very evidently from common stock, but appear to have undergone divergences, due probably to isolation on separate islands.

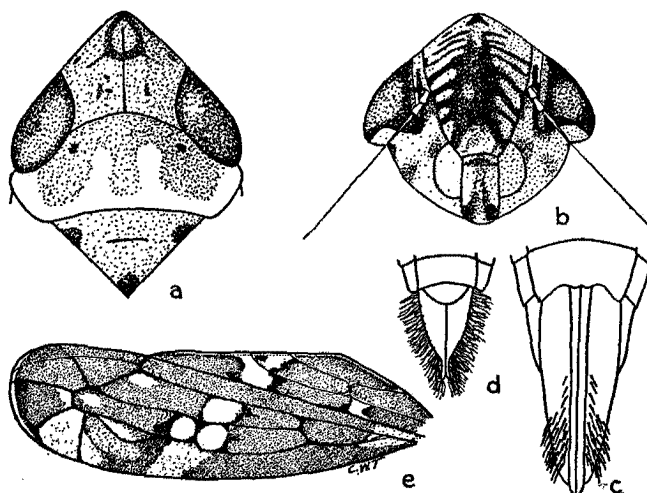


FIGURE 8.—*Nesophrosyne angulifera*: a, vertex; b, face; c, female; d, male, genitalia; e, elytron.

***Nesophrosyne angulifera*, new species (fig. 8).**

Head very distinctly angled; vertex with fuscous triangular tips; an oblique row of ivory white spots across elytra; a very large outer anteapical cell, with very short nodal veins. Length: female, 5 mm; male, 4.5 mm.

Head a little wider than pronotum; eyes large; vertex as long as width between the eyes, nearly twice as long at middle as next the eye, with a depressed arc before the middle; apex sharp; front broad at base, narrowing rapidly from below antennae; clypeus long, nearly twice as long as width at base, slightly widened toward apex; cheek borders sinuate. Pronotum short, scarcely as long as vertex; lateral borders very short, flaring; hind border concave; elytra broad; claval veins connected by a short nervure before the middle; outer anteapical cell nearly as long as the middle one; middle anteapical narrowed behind the middle, expanded at apex; nodal veins short, obscure. Genitalia: female, last ventral segment long, nearly twice as long as preceding; hind border faintly sinuate, slightly produced and minutely notched at middle; male, valve small, obtusely angulate; plates broad at base, narrowing to acute tip, with delicate filament.

Color: pale gray; vertex tinged with fulvous, two black spots near base; a median line and apical triangle fuscous; pronotum olive-gray with a black dot each side behind the eyes; hind border yellowish, extending on to disk each side of middle; scutellum with apex yellowish, tipped with black, and a black dot each side near the base; elytra olive-gray; a conspicuous oblique band of spots from middle of clavus to costa, broken into about three spots on the clavus, one of which is the apical part of vein; three discal spots, the hinder one in the end of the middle anteapical and a broad spot in costal

cell before the antepical—this band is bordered by fuscous and a broad fuscous spot in the outer antepical and covering the nodal veins; veins fuscous; apex margined with white, with submargin dark fuscous and a crossbar of lighter fuscous in the second and third apical areoles; the inner and antepical areoles and the areoles before and behind the first apical vein are whitish, subhyaline; face dull yellowish with fuscous arcs on the front and dots and lines on the clypeus; pectus blackish; pleurae lighter. Abdomen blackish with margins of segments light brown or dull yellowish; femora black; joints and tibiae and tarsi whitish with black dots and rings.

Maui: Olinda, altitude 4,200 feet, May 13, 1918, 2 females, holotype and paratype, and 1 male, allotype, Giffard and Fullaway.

This species is marked particularly by the sharp vertex, closely resembling some species of *Scaphoideus*, and by a very large outer antepical cell.

Nesophrosyne obliqua, new species (fig. 9).

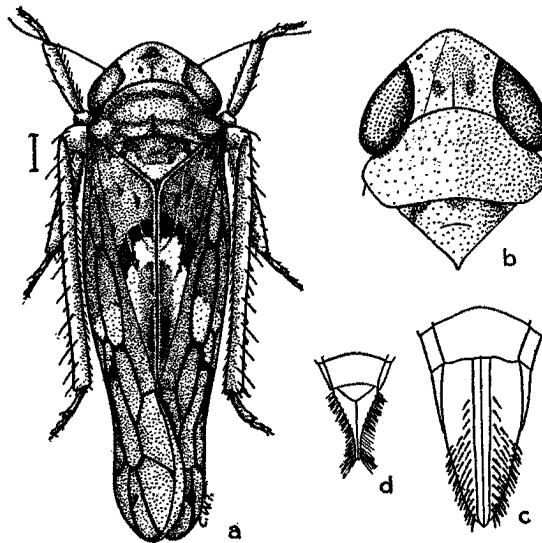


FIGURE 9.—*Nesophrosyne obliqua*: a, dorsal; b, vertex; c, female, d, male, genitalia.

Head as broad as pronotum, angulate; vertex produced; elytra with an oblique whitish band formed by four or five spots extending from middle of clavus to base of middle antepical areole, before which on clavus and beyond which on corium is a broad fuscous spot. Length: female, 4.5 mm; male, 4 mm.

Head as wide as pronotum, distinctly angular, rounded at tip; vertex as long as between the eyes, nearly twice as long at middle as next the eye; front broad at base, tapering nearly uniformly to tip; clypeus narrow, nearly twice as long as wide; cheek margin sinuate below the eye. Pronotum short, about as long as vertex; side margins very short; hind border slightly concave; claval veins fused before middle. Genitalia: female, last ventral segment half longer than preceding; hind border truncate; male, valve two thirds as long as preceding segment, subangulate; plate borders nearly straight, narrowing to blunt tip, which extends into a delicate upturned filamentous appendage, reaching tip of pygofer.

Color: olive-gray above, marked with yellow and fuscous; beneath mostly black;

vertex with two oval fuscous spots each side near base; median line merging with transverse line before the middle, brown or fuscous; apex blackish in the male; ocelli red; front at base brownish in female, mostly fuscous in male, faint pale arcs; apex fuscous; clypeus black; lorae and cheeks in female brown, in male black. Beneath black; legs mostly black; hind tibiae in female paler; abdomen black; borders of the segments narrowly yellowish; pygofers black; male valve and plates black, except extreme tip which is brown, filaments and cilia whitish.

Lanai: altitude 2,300 to 3,400 feet, December, January, and February, 1916, and 1917, 20 specimens, females and males, holotype, allotype, and paratypes.

This is a striking species, marked particularly by the oblique series of ivory spots on the elytra.

Nesophrosyne palolo, new species (fig. 10).

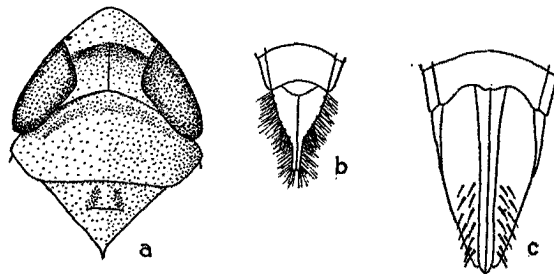


FIGURE 10.—*Nesophrosyne palolo*: a, vertex; b, male, c, female, genitalia.

Vertex flattened, margin subacute; outer anteapical pointed behind; postnodal cell triangular; nodal vein reflexed like *Deltocephalus reflexus*. Length: female, 4.5 mm; male, 4 mm.

Head scarcely as wide as pronotum, distinctly angulate; vertex longer than width between the eyes, two thirds longer at middle than next the eye; front margins nearly parallel, roundly narrowed below antennae; clypeus nearly twice as long as width. Pronotum scarcely as long as vertex; hind border slightly concave; middle anteapical constricted near tip; outer anteapical narrowed behind, nodal vein oblique. Genitalia. female, last ventral segment at sides scarcely longer than preceding; produced on the middle into broad obtuse tooth; male, valve minute, rounded behind; plates triangular, side margins nearly straight; tip subacute, reaching about three fourths the length of the pygofer.

Color: pale olive-yellow; vertex with a faint curved line between anterior border of eyes, obscure or wanting in the female; pronotum green olivaceous; scutellum tinged with yellowish; elytra at base pale olive; clavus in female mostly pale olive, in male with elongate patches of fuscous; corium with a broad fuscous patch, especially in males; a whitish hyaline patch at the end of costal and discal cells, and in the ends of anteapical cells, the post nodal cell and base of first apical areole, whitish hyaline; tip white with a submargin of fuscous. Beneath pale grayish in female, mostly blackish in the male; abdominal segments greenish yellow in the male; pygofer in female fulvous; male plates blackish tipped with brownish; face pale with fuscous arcs and tip of front; legs pale testaceous; hind tibiae dotted, and tarsi, ringed, with fuscous.

Oahu: Palolo Valley, female holotype, 2 males, allotype and paratype, O. H. Swezey.

Nesophrosyne bicolorata, new species (fig. 11).

Mostly black above, whitish below; head produced; costa beyond the middle and, except nodal and apical veins, clear hyaline. Length: female, 4 mm; male, 3.75 mm.

Head slightly wider than pronotum, subangulate, produced; vertex as long or longer than width between the eyes at base; lateral borders divergent, half longer at middle than next the eye, rounded or very bluntly angulate to front; front tapering uniformly to a rather broad apex; clypeus rather broad, about half longer than width. Pronotum as long as vertex; hind border faintly concave; elytra with tips blunt, subtruncate; nodal veins, usually two, or apparently fused; outer anteapical minute. Genitalia: female, last ventral segment half longer than preceding; hind border sinuate; middle slightly produced. Male, valve nearly as long as preceding segment, obtusely angular behind; plates broad at base, roundly narrowed to acute tips which bear slender upturned appendages which reach nearly to tip of pygofer.

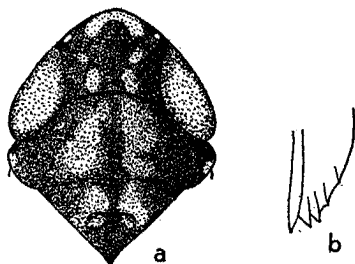


FIGURE 11.—*Nesophrosyne bicolorata*: a, vertex; b, female ovipositor.

Color: above black; vertex with faint yellowish elongate dots on the disk, traces of a transverse line at the middle, an angular submargined line, and ocelli, yellowish; pronotum black or with faint longitudinal lines on the disk; scutellum black with traces of yellowish dots at base; elytra black with faint hyaline whitish spots in the claval areoles and on the disc; corium with a broad hyaline whitish area behind the middle of costa, interrupted by a broad blackish spot on the nodal veins and terminated by the black apical nervure; tips of elytra smoky black. Beneath pale whitish, abdomen beneath suffused with blackish; pygofer testaceous; ovipositor black; male plates blackish with the apical appendages orange red.

Oahu: Punaluu, 7 specimens, males and females (holotype, allotype, and paratypes), from *Kadua*, O. H. Swezey.

Nesophrosyne peleae, new species (fig. 12).

Light yellow; face, except arcs, the tip of clavus, and corium, except a few whitish hyaline spots toward apex, black; a narrow fuscous or blackish line before the middle on the vertex. Length: female, 5 mm; male, 4.5 mm.

Head scarcely as wide as pronotum, distinctly angulate; vertex as long at middle as at base; sides divergent; nearly half longer at middle than next the eye; front margins roundly narrowed to clypeus; clypeus nearly twice as long as wide. Pronotum slightly longer than vertex; hind border slightly concave; outer anteapical small, narrowed behind; a single nodal vein from its anterior end. Genitalia: female, last ventral segment twice as long as preceding; hind border truncate, slightly produced at middle; male, valve short, rounded behind; plates narrowed to acute tips, with delicate filament.

Color: olive-yellowish; face in female, front, clypeus, and lorae, black; the arcs indicated at base, the cheeks yellowish in female; male, face entirely black; vertex

yellowish with a distinct transverse line between the fore borders of eyes, less distinct in the female; pronotum mostly black in the male; olive-yellow in the female with blackish discs; scutellum yellow; clavus olive-yellow, except tip which is black; corium entirely black in the male; veins mostly black in the female; nodus and apical veins, black; membrane black in male, subhyaline or smoky in female; beneath black; margins of abdominal segments yellowish; legs pale; hind tibiae lined and dotted with black; tarsi with fuscous rings.

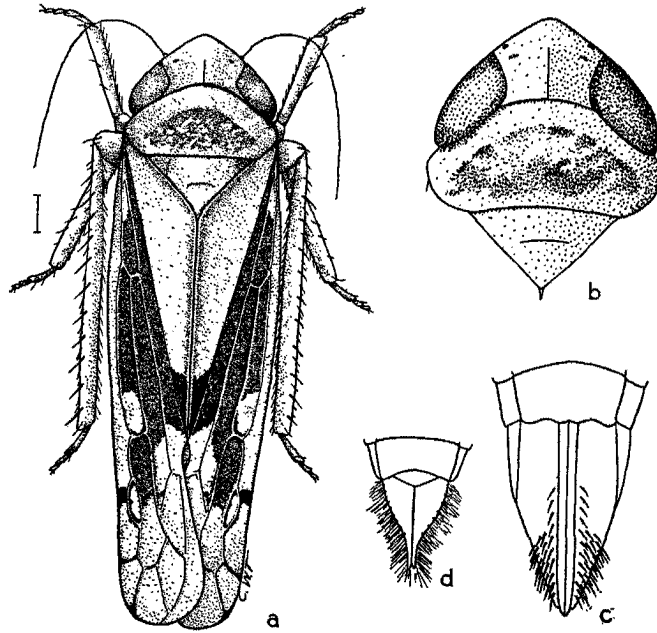


FIGURE 12.—*Nesophrosyne peleae*: a, dorsal; b, vertex; c, female, d, male, genitalia.

Oahu: Mount Kaala, on *Pelea*, 2 females (holotype and paratype), 1 allotype male; Palolo, 1 female (teneral) on *Pelea*, 2 males (paratypes); O. H. Swezey.

***Nesophrosyne cuprescens*, new species (fig. 13).**

Pale brownish; elytra hyaline with light coppery reflection. Length: female, 4.5 mm.

Head as wide as pronotum, angulate; vertex one third longer at middle than next the eye; front narrowed abruptly from antennal pits; clypeus long, nearly twice as long as wide; cheek border sinuate. Pronotum a little longer than vertex, concave behind; elytral veins scarcely visible. Genitalia: female, last ventral segment twice as long as preceding, lightly sinuate; the middle portion faintly produced, minutely notched at center.

Color: pale brownish or fulvous; disc of abdomen a little blackish; elytra brilliant coppery hyaline; beneath almost unicolorous; base of ovipositor blackish; tip brownish.

Oahu: "Palolo Hill", September 9, 1916, holotype female, on *ohia lehua*. A quite striking form, apparently undescribed.

Nesophrosyne pipturi Kirkaldy.

Nesophrosyne pipturi Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 560, 1910.

"Sexes almost monomorphic. Head and underside whitish, ocelli honey yellow. Eyes greyish black; a brownish black speck on the tempora. Pronotum and scutellum pale testaceous, the latter whitish posteriorly. Tegmina subhyaline, somewhat milky, pattern obscure, a faint St. Andrew's cross on the clavi when closed. Subcostal cell with two greyish brown suffused spots. Veins (except the colorless radial and claval veins) mostly yellowish fuscous, cells slightly suffused. Posterior tibiae with brown piliferous tubercles. Lora remote from apical margin of genae. Anal vein of clavus not hooked or strongly curved. Vertex obtuse, forming more or less of a curve with the eyes, a little produced.

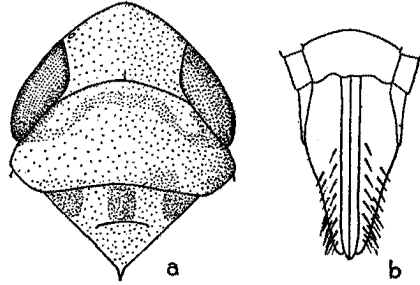


FIGURE 13.—*Nesophrosyne cuprescens*: a, vertex; b, female genitalia.

"♂. Genital segment pale. Valve short. Plates pointed apically, flaccid, lateral margins reflexed, about three fourths of the length of the mostly blackish pygophors which are bristly apically. Sternites sometimes more or less dark.

"♀. Hypopygium somewhat long, laterally rounded, gradually produced at the middle which is slightly notched. Pygophor elongate, not quite so long as the black ovipositor, apical half with scattered pale yellow bristles. Length: $4\frac{1}{2}$ mm.

"Hab. Oahu, Tantalus, 1300 ft. (Feb. - Apr., Kirkaldy, Terry, Giffard and Swezey), and Maunawili, 820 ft. (Feb., Giffard) on Mamake (*Pipturus albidus*). The type is a Tantalus specimen."

As redescribed from numerous specimens:

Head narrower than pronotum; obtusely angulate; color milky-whitish, somewhat spotted with brown or fuscous. Length: female, 4.25 mm; male, 3.75 mm.

Head obtusely angulate, vertex one third longer at middle than next the eye, obtusely rounded to front, ocelli about their own diameter distant from the eye. Front longer than broad, clypeus half longer than wide, cheek rounded, sinuate beneath the eye. Pronotum broad and short, lateral margin short not visibly carinate, posterior border slightly emarginate, claval veins very faint, approximate or apparently fused at center.

Color: uniformly milky-whitish except elytral markings of fuscous, usually two spots and apex of clavus, costal and discal spot on elytra and part of apical nerve fuscous. Female uniformly whitish except tarsi and tip of ovipositor blackish.

Genitalia: last ventral segment of female half longer than preceding slightly roundly produced at the middle; male, valve short, rounded behind; plates rather short, rounded at tips, disc brownish, lateral margin set with long white hairs. Apices with narrow filaments.

Oahu: Tantalus, altitude 1,500 feet, Maunawili, altitude 800 feet, "ex *Pipturus*", 3 specimens; "E. Koolau Mountains", 3 specimens; Tantalus,

June 20, 1917, Bridwell; Tantalus, December 22, 1918, on *Pipturus albidus*; August 27, 1918, on *Cyrtandra*. Lanai: Kaiholena, December 14, 1916; January 1917.

Nesophrosyne opalescens Kirkaldy.

Nesophrosyne opalescens Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 561, 1910.

"Allied to *N. pipturi*. Vertex, frons, antennae, pronotum, and scutellum pale, somewhat soiled, luteous. Clypeus, lora, and genae mauvish opalescent. Ocelli crimson-ringed. Tegmina brownish yellow, with fuscous markings much as in *N. pipturi*, the whole strongly mauvish opalescent. Wings strongly opalescent, veins dark. Abdomen black. Femora dark mauvish opalescent, tibiae pale.

"♂. Pygophor with crimson and white tufts. Length 4 mm.

"Hab. Oahu. Waianae (no elevation stated, April, Perkins.)"

I have not found any type. Specimens which agree with the description can be referred to *N. pipturi* by recognizing the opalescent character as variable.

Nesophrosyne gouldiae Kirkaldy.

Nesophrosyne gouldiae Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 560, 1910.

"♂. Whitish; claval veins (mostly) suffusedly, and two blotches on the apical third, inwardly, of the tegmen, dark brownish; wings hyaline. Sometimes the rest of the hopper is whitish, sometimes the base of the vertex and the disk of the pronotum irregularly, dark brownish, with a faint fuscous grill, scarcely apparent laterally. Sometimes the tegmina are more darkly suffused, but always only on the interior half. Vertex obtuse-angled in front of the eyes, scarcely longer than its basal width, somewhat flat.

"♀. Immaculate (practically) whitish; ovipositor sheath fuscous. Vertex more convex. Length, ♂ 4½, ♀ 5 mm."

Kirkaldy records the species from Oahu, Tantalus, and Palolo, on *Gouldia*.²

As redescribed from extensive series:

A distinctly variable species, some entirely unmarked, others with distinct blackish fuscous spots on vertex and elytra. Length: female, 5.5 mm; male, 4 mm.

Head narrower than pronotum, obtusely angulate in front, vertex narrow, nearly as long as width between eyes. One third longer at middle than next the eye. Ocelli near the eye; clypeus, sides nearly parallel half longer than width at base. Pronotum short, faintly carinate, on a very short lateral margin. Female, ventral segment truncate behind; male valve short rounded behind, plates elongate, triangular, acute at apex with delicate marginal hairs.

Color: uniformly whitish in one variety or milky whitish tinged with fulvous with two large black spots on vertex. Front border of pronotum, central border behind, margins of fulvous commissural spot, inner veins, an oblique cross band beyond the middle and an oblique line following veins from tip of clavus to antepical, blackish.

²The records from *Gouldia* are in error due to misidentification of the plant. *Cyrtandra cordifolia* is the correct host plant.—[O.H.S.]

Oahu: Tantalus, Punaluu, O. H. Swezey; March 1, 1910, D. T. Fullaway; also from Pacific Heights, Wahiawa, Punaluu (vertex rounded), Kuliouou, Mount Kaala, Nuuanu, Palolo.

Nesophrosyne furculata, new species (fig. 14).

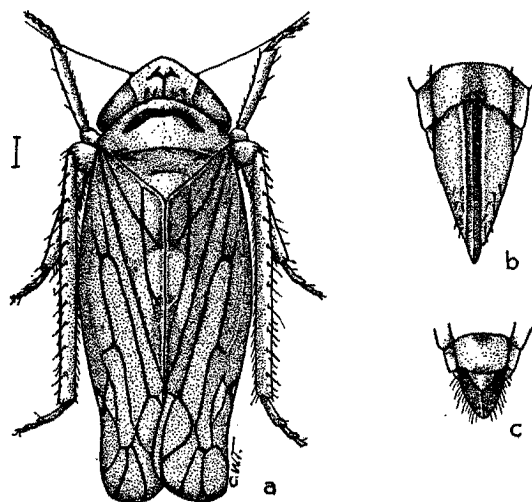


FIGURE 14.—*Nesophrosyne furculata*: a, dorsal; b, female, c, male, genitalia.

Pale yellowish with a prominent fork on the vertex, sometimes connected with a posterior black mark, sometimes reduced to two triangles on the anterior disk. Length: female, 3.75 mm; male, 3.5 mm.

Head as wide as pronotum, angulate; vertex produced, half longer at middle than next the eye; front tapering to clypeus; clypeus nearly twice as long as wide. Pronotum as long as vertex; hind border slightly concave; claval veins joined before the middle; outer anteapical conspicuous, narrowed posteriorly, connected by short nodal, sometimes two nodal veins with costa. Genitalia: female, last ventral segment more than half longer than preceding, produced medially into a broad rounded lobe or blunt tooth; male, valve short; hind border rounded; plates elevated on the disk; borders rather thick, slightly convex; tips blunt; margins densely ciliate.

Color: pale yellowish, tinged somewhat with fulvous; vertex pale yellow with an elongate spot each side on the median line, an expanded forked spot on the anterior part, sometimes, especially in the males, fused with the lateral spots, but as a rule presenting two sharp points directed forward. Pronotum with fuscous patch anteriorly, extending back behind the eyes; veins of clavus, inner part of corium and outer anteapical cell, nodus and apex, a deep fuscous or blackish; a broad whitish hyaline costal area extending back to the nodus; the absence of color gives a peculiar open appearance to the lower anterior part of middle anteapical. Beneath pale testaceous or dull yellowish; margins of the abdominal segments and plates, orange yellow.

Lanai: altitude 2,500 to 3,500 feet, December 1916, January, February 1917, 30 specimens (holotype, allotype, paratypes), W. M. Giffard. Host plant is not given.

Similar to *N. gouldiae* in neurulation; differs in picture on vertex.

Nesophrosyne perkinsi (Kirkaldy).

Eutettix perkinsi Kirkaldy: Entomologist, vol. 37, p. 178, 1904.

Nesophrosyne perkinsi (Kirkaldy): Haw. Ent. Soc., Proc., vol. 1, p. 160, 1907.

Light yellowish or whitish, rather faintly marked, head rounded in front, long commissural whitish spot occupying most of the clavus. Length: female, 4.5 mm; male, 3.5 mm.

Head slightly wider than pronotum, rounded in front, vertex short, about one fourth longer at middle than next to the eye, obtusely rounded to the front; front broad, ocelli close to the eye. Clypeus about twice as long as width at base; pronotum at lateral margin very short, without carina; hind border faintly concave, edge of clavus scarcely visible, bent toward each other before the middle. Genitalia: female, last ventral segment scarcely twice as long as preceding, distinctly produced at middle, the lateral angles rounded; male, valve very short, transverse, plates scarcely longer than width, obtusely rounded at apices, fringed with rather long delicate white hairs.

Color: milky whitish, scarcely any marking except a dark border to the clavus and the elytral veins of the inner half somewhat infuscate. The whitish commissural spot occupying most of the clavus is merely continuous with the whitish area of the pronotum and scutellum, and the costal half of the elytra is transparent, with the veins scarcely visible except beyond the nodus; beneath, entirely whitish, except borders of ovipositor.

Oahu: March 25, 1917; Kapahulu, July 1, 1906; Kaimuki, March 11, 1906; Diamond Head; O. H. Swezey. Lanai: November 21, 1916, W. M. Giffard. Molokai: Moomomi, W. M. Giffard. Hawaii: Kau, Honuapo, W. M. Giffard.

Evidently an abundant species. On *Sida cordifolia*: Haw. For. Agr., vol. 1, p. 183, 1904; Haw. Ent. Soc., Proc., vol. 1, p. 160, 1907; Fauna Haw., vol. 2, p. 559, 1910 (Kirkaldy).

Nesophrosyne ponapona Kirkaldy.

Nesophrosyne ponapona Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 561, 1910.

Greenish yellow with milky white spots on elytra, spots on vertex and some of the veins blackish. Length: female, 4 mm; male, 3.5 mm.

Head scarcely as wide as pronotum, roundly angulate in front, vertex wider than long, about one third longer at middle than next the eye. Ocelli close to the eyes; front longer than broad; clypeus longer than broad, apparently fused with front. Pronotum, lateral margin without carina, posterior border distinctly concave, claval veins approximate, apparently fused in front of middle. Genitalia: female, ventral segment about twice as long as preceding and slightly roundly produced; male, valve short, obtusely angulate behind, plates rather short, scarcely as long as united width at base, bluntly rounded at tips, margins with delicate whitish hairs.

Color: light yellowish or milky white, vertex with a faint transverse line, in front of the middle, with a narrow extension inside the ocelli, two dots on disc, fuscous; pronotum with dark dots arranged in six longitudinal lines, elytra with opalescent milky spots on clavus and inner half of corium, with fuscous patches toward base and apex, two fuscous spots on costa, costal cells milky hyaline; below whitish, the upper part of front, except faint arcs, a series of spots across clypeus and lorae and the median stripe on the venter blackish.

Oahu: Tantalus, altitude 1,500 feet, February 16, 1916; March, 1905; April 2, 1905; April 9, 1901; February 16, 1916; 4 specimens on *Pipturus*; Nuuanu, April 1, 1917; W. M. Giffard. Hawaii: Oloa, July 8, 1918, W. M. Giffard. Type specimen in the Natural History Museum, London.

Nesophrosyne ehu Kirkaldy.

Nesophrosyne ehu Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 569, 1910.

Small, similar to *N. ponapona*; elytra translucent, faintly maculate. Length: 4 mm. Head scarcely as wide as pronotum, angulate; vertex one half longer at middle than next the eye, obtusely angulate to front; front tapering to clypeus; clypeus long, nearly twice as long as width; sides nearly parallel. Pronotum about one fourth longer than vertex; elytra longer than abdomen. Genitalia: female, last ventral segment nearly twice as long as preceding; hind border faintly sinuate, slightly produced at the middle.

Color: pale fulvous; elytra with translucent, milky spots; veins mostly pale fulvous; wing veins dusky; beneath dull whitish; ovipositor sheath blackish.

A specimen collected at Hilo, April 3, 1906, by O. H. Swezey, is evidently the cotype referred to by Kirkaldy. No type was seen in the Natural History Museum in London.

Nesophrosyne maritima Kirkaldy.

Nesophrosyne maritima Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 560, 1910.

Uniformly dull yellowish with costal veins toward apex brownish. Length: female, 4 mm; male, 3.25 mm.

Head distinctly wider than pronotum, rounded in front, scarcely longer at middle than next the eye, little more than half as long as width between eyes. Front broad, ocelli near eyes, clypeus elongate, slightly widened toward tip; pronotum, short, margins scarcely carinate; posterior margin concave, claval veins very obscure, approximate at middle. Genitalia: female, ventral segment about half longer than preceding, nearly truncate, faintly notched at middle; male, valve short, rounded, plates elongate, slightly longer than united width at base, margins convex, tips acute, border rather scantily set with slender hairs.

Color: dull yellowish, nearly uniform above and below, the apical cross veins brownish, the membrane slightly clouded, ovipositor orange, tips of tarsi blackish, wing veins fuscous, the disc of the wings somewhat smoky.

Oahu: Makua, July 16, 1916, on *Dodonaea* species; Koko Crater, November 22, 1916, on *Dodonaea viscosa*; Timberlake.

Males, females, and nymphs, males more brilliant with more of a bright tawny or orange, black nervures on costa toward tip of elytra. The type specimen is in the Natural History Museum, London, and specimens compared with the type are in the H.S.P.A. Experiment Station Collection and author's collection.

Nesophrosyne giffardi Kirkaldy.

Nesophrosyne giffardi Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 563, 1910.

Dull yellowish, the clavus opaque, rest of elytra hyaline, with more or less infuscated nervures. Length: female, 4.5 mm; male, 4 mm.

Head wide or slightly wider than pronotum, roundly angulate in front, as long as width between eyes, rounding to front. Ocelli set close to eye. Front with distinct arcs, longer than broad. Clypeus nearly twice as long as broad, lorae broad, cheeks abruptly sinuate below the eye. Claval veins merged in front of middle. Genitalia: last ventral segment of female half longer than preceding; hind border sinuate; middle third roundly produced; male, valve narrow, short, faintly subangulate behind, plates uniformly narrowing to rather blunt apices, bordered with minute hairs.

Color: vertex, pronotum, scutellum, and clavus nearly uniform dull yellowish, the clavus with more hyaline area at base and apex, the latter more or less infuscated. Elytra milky hyaline, inner nervures and cross veins from outer antepical cell, blackish. Membrane with border of apex smoky. Beneath black, the front fulvous with fuscous arcs. Clypeus fulvous around basal center. Cheeks yellowish beneath eye. Legs yellowish; hind tibia and apex of tarsal joints blackish.

Lanai: altitude 2,500 feet, January 19, 1917, W. M. Giffard.

Hawaii: Kilauea, December 19, 1916, to January 1, 1917, dry forest; Kilauea, July 6, 1918; W. M. Giffard.

The type was seen in the Natural History Museum, London, and specimens compared with the type are in H.S.P.A. Experiment Station and author's collections.

Nesophrosyne giffardi variety *interrupta*, new variety.

Differs from the typical form in having the claval yellow area interrupted by an oblique fuscous band.

Hawaii: Kona, 4000 feet, April 29, 1916, type and paratypes, on *Myoporum*, C. E. Pemberton. M18 a

Nesophrosyne nuenuae Kirkaldy.

Nesophrosyne nuenuae Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 572, 1910.

Head scarcely as wide as pronotum, subangulate; vertex with a faint depression before the middle, one fourth longer at middle than next the eye; anterior border bluntly angulate; front narrowing uniformly to clypeus; clypeus long; sides nearly parallel; cheek broad, rounded, sinuate below the eyes. Pronotum short, scarcely one fourth longer than vertex; hind border distinctly concave. Genitalia: female, last ventral segment half longer than preceding; hind border nearly straight, faintly sinuate, minutely notched at middle; male, valve short, rounded behind; plates broad at base, roundly narrowed to acute tip, rather slender upturned filaments.

Color: pale yellowish or ivory; vertex with five black dots, two on the disc and three near the margin, a central one larger; pronotum grayish-yellow; elytra grayish-yellow with a black spot at middle of clavus and four or five black crossveins in the costa; apex of clavus somewhat infuscate; membrane smoky. Beneath, face pale yellowish; two distinct arcs at base of front, a dot each side of clypeus, two dots on border of eye, fuscous or black; legs pale, dotted with fuscous.

Length: female, 4 mm; male, 3.5 mm.

Kirkaldy records the species for Kilauea, Hawaii, and there are also numerous specimens from "A-a flows, Kau, Haw. 3,600 ft.", from *Dodonaea viscosa* variety, and from Crater Road, Kilauea, Hawaii, altitude 3,800 feet, August 2, 1918, "on gravel desert near Crater Proper," W. M. Giffard.

A cotype specimen in the H.S.P.A. Experiment Station collection is the only type representative seen. No examples were found in the Natural History Museum, London.

Nesophrosyne ulaula Kirkaldy.

Nesophrosyne ulaula Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 563, 1910.

Chestnut brown with dark marking on face and legs. Eyes brilliant red on the inner half, brownish behind. Length: female, 5 mm.

Head as wide as pronotum, vertex broad, rounding angulate in front, about one fourth longer at middle than next the eye, rounding to the front. Front longer than broad, ocelli near eye; clypeus nearly twice as long as wide, slightly widened toward tip. Pronotum with lateral margin about one third the short diameter of the eye, hind border distinctly concave. Claval veins united before the middle, elytral veins indistinct. Genitalia: female, ventral segment nearly twice as long as preceding, hind border slightly produced, minutely notched at center.

Color: rich brown, the vertex of the anterior border faintly marked with fuscous, the hind border yellowish; pronotum, scutellum, and elytra nearly uniform in color, the scutellum with basal angles a little darker with an ivory spot on each side; the clavus with a darker spot near the middle. Costal area with two slightly more hyaline areas. Face yellowish brown; basal part of front infuscated. Femora black except apex. Apex and tibia yellowish, the hinder ones and the tips of tarsal joints marked blackish.

Hawaii: Kilauea, January 17, 1917, W. M. Giffard.

Oahu: December 31, 1905; "Honolulu Mts." August, Perkins.

What appears to be a near variety of this species has a distinct yellowish commissural spot, and less of fuscous marking on the face.

Type specimen in Natural History Museum, London, examined and specimens compared with type.

Nesophrosyne procellaris Kirkaldy.

Nesophrosyne procellaris Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 565, 1910.

"Pale yellowish brown, or yellowish testaceous, the tegmina hyaline, brownish, testaceous, veins rather yellower (except the subcostal), the two claval veins rather widely so apically. Exterior subapical cell oval, remote from the subcostal vein, one nodal vein. Length $5\frac{1}{8}$ mm. Hab. Molokai, Kalae (Aug., 1893, No. 167)."

Specimens which best agree with this description are somewhat smaller, 4.5 mm:

Head wider than pronotum, obtusely angulate; vertex half longer at middle than next the eye, nearly as long at middle as width between the eyes; front tapering to clypeus; clypeus half longer than wide. Pronotum slightly longer than vertex; hind margin a little emarginate. Genitalia: female, last ventral segment half longer than preceding, truncate or slightly produced medially; male, valve small, rounded behind; plates broad at base, tapering to blunt tips, reaching three fourths the length of the pygofer.

Color: uniformly pale yellowish-brown; disc of abdomen above, fuscous. In one female and the male there is a smoky stripe running irregularly the length of the corium.

Molokai: Kamoku, July 15, 1910, 3 females, 1 male, D. T. Fullaway. The type specimen is in the Natural History Museum in London.

Nesophrosyne sinuata, new species (fig. 15).

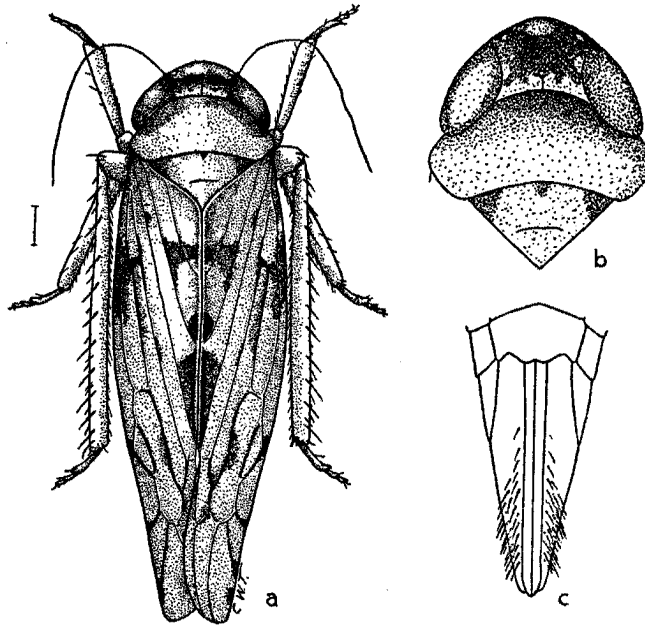


FIGURE 15.—*Nesophrosyne sinuata*: a, dorsal; b, vertex; c, female genitalia.

Vertex narrow; margin divergent; a single vein at nodus, covered by a dark patch; tips of apical veins suffused with blackish; lower part of face black. Length: 5 mm.

Head scarcely as wide as pronotum, subangulate; vertex about as long as width between the eyes; lateral margins distinctly divergent, about one fourth longer at middle than next the eye, rounded to front; front broad, narrowed rather sharply below antennae; clypeus nearly twice as long as wide. Pronotum about half longer than vertex, sides flaring; hind border rather deeply concave; elytra with a rather long outer anteapical and a single nodal vein near its anterior border. Genitalia: female, last ventral segment long, nearly twice as long as preceding; hind border rather deeply sinuate; the middle third produced and shallowly notched at middle.

Color: pale olive gray; front fulvous; clypeus, lorae, and cheeks, blackish; vertex fulvous, mostly suffused with fuscous. Pronotum with anterior border faintly fuscous; scutellum with lateral angles dusky; elytra pale olive gray, suffused with fuscous and fulvous; the claval veins whitish toward the tips; a large fuscous patch near base of corium; a small one on the middle anteapical; costal areole beyond the middle whitish, subhyaline; a blackish spot on the nodus and expanded black spots on the apical veins. Beneath blackish; abdominal segments margined with blackish; pygofer pale fulvous; legs pale yellowish; hind tibiae somewhat suffused with fuscous.

Hawaii: Oloa, 29 miles, altitude 3,800 feet, 4 specimens (holotype and paratypes), W. M. Giffard.

Nesophrosyne cinerea, new species (fig. 16).

Gray with vertex and scutellum paler; vertex with a distinct central line and a cross line between ocelli. Body black, outer anteapical large, nearly half as long as middle; nodal veins broadly fuscous. Length: female, 4.5 mm.

Head wider than pronotum, obtusely angulate; vertex three fourths as long as width between the eyes, one third longer at middle than next the eye, margin obtusely angulate; front broad, roundly narrowed below antennae; clypeus half longer than wide. Pronotum a little longer than vertex; hind border faintly concave; elytral veins distinct; claval veins connected by short crossveins; middle anteapical constricted; outer ante-apical long; sides nearly parallel, narrowed posteriorly. Genitalia: female, last ventral segment half longer than preceding, distinctly sinuate on the hind border, produced and distinctly notched at middle.

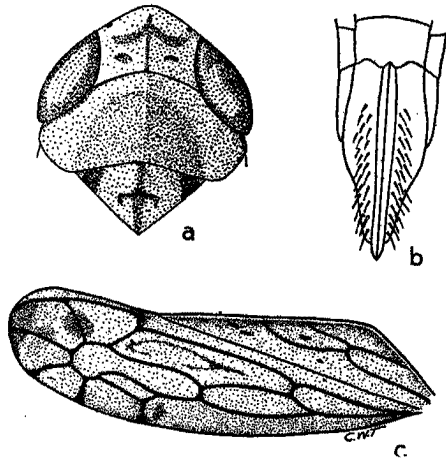


FIGURE 16.—*Nesophrosyne cinerea*: a, vertex; b, female genitalia; c, elytron.

Color: light gray; vertex tinged with yellowish, a fuscous dot each side near base, a black line on the middle, transverse bisinuate line before the middle, starting behind the ocelli each side; front with conspicuous fuscous arcs and middle line expanded toward tip; clypeus entirely and lorae partly, blackish; cheeks blackish beneath the eye; scutellum yellowish, with median line and transverse depression blackish; elytra gray; nerves dark fuscous or blackish; a large spot on the nodal veins and some faint fuscous dots on the discal areoles; thorax and abdomen, black; abdominal segments margined with tawny yellowish; pygofer black at base, tawny toward tips; legs dark gray suffused with fuscous.

Maui: Olinda, altitude 4,200 feet, on *Coprosma montana*, May 12 and 13, 1918, 2 females (holotype and paratype), Giffard and Fullaway, collectors. 887

This species has somewhat the appearance of *N. oneanea*, but is smaller and the elytral veins are much more distinct.

Nesophrosyne oneanea Kirkaldy.

Nesophrosyne oneanea Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 566, 1910.

Light olive with fuscous markings. Length: female, 5 mm; male, 4.5 mm.

Head scarcely wider than pronotum, broadly angular in front. Vertex about as wide as long, one third longer in middle than next the eye, rounded to front, two faint depressions on posterior disc and a narrow transverse furrow just behind ocelli; front slightly longer than broad, base of margins close to the eye; side margins nearly parallel, but narrowing to the rugged broad apex; clypeus rather broad, about one half longer than width at base; cheeks rounded, distinctly indented below the eye. Pronotum about as long as vertex, side margins short, faintly carinate; posterior border slightly concave. Claval veins united near base, outer anteapical narrow, nervures indistinct. Genitalia: female, ventral segment short, slightly sinuate behind; male, valve rounded behind, plates twice length of valve, outer margins convex, apex acute, together appearing rounded.

Color: head olive brown with an ivory triangular spot at apex and inclosing ocelli. "A transverse band back of ocelli and two spots near posterior border." ("The hind margin ivory white".) Pronotum nearly uniform olive brown with faint traces of fuscous near anterior border. Scutellum with fuscous spots and lateral angles; elytra bronzy olive. The central area of clavus and costal area mostly hyaline, a crossvein on elytra and disc with adjacent nervures fuscous. A fuscous spot on nodus and two apical nervures with more or less of apical membrane fuscous. Beneath, face brownish. The central area of front and all of clypeus and inner part of lorae black. Frontal arcs distinct.

Lanai: altitude 2,500 feet, December 19, 1916, female; altitude 3,000 feet, December 18, 1916, male, W. M. Giffard.

A type specimen is in the Natural History Museum in London and specimens were compared with the type in H.S.P.A. Experiment Station and the author's collections.

***Nesophrosyne silvicola* Kirkaldy.**

Nesophrosyne silvicola Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 570, 1910.

Head wider than pronotum, rounded, scarcely angulate; vertex nearly half longer at middle than next the eye; margin obtusely angulate; front broad, margins sinuate, apex abruptly narrowed to clypeus; clypeus broad; cheek broad, sinuate beneath the eyes. Pronotum short, half longer than vertex; hind border distinctly concave. Genitalia: female, last ventral segment half longer than preceding; hinder border slightly produced; male valve broad, short, obtusely angulate behind, plates rather broad, rounded to acute tips, reaching nearly to apex of pygofer.

Color: Pale olive; vertex with median line, a dot each side on disk, transverse line near the anterior margin and another at tip enclosing four yellowish spots; scutellum pale with three dark spots and a transverse line at suture, fuscous; elytra with veins fuscous and a dark spot at middle, another toward the tip and the apical cell fuscous; front pale with fuscous arcs, dark in the male; lower part of face fuscous in the male; clypeus with a fuscous spot in the female.

Length: female, 5.5 mm; male, 5 mm.

Lanai: altitudes 2,000, 2,500, 3,000 feet, December 14, 18, 19, 20, 26, 1916, January 19, 1917, W. M. Giffard.

Hawaii: South Kona Road, altitude 1,600 feet, August 26, 1917, on *Straussia hawaiiensis*, Kau, Kahuku, January 14, 1919, W. M. Giffard.

Lanai: December, January, February, 1916, 1917, 1919, numerous records.

A type specimen in the Natural History Museum, London, has no locality record except "Sandwich Ids." no. 656.

Nesophrosyne silvigena Kirkaldy.

Nesophrosyne silvigena Kirkaldy: Fauna Haw., vol. 2, suppl., p. 559, 1910.

Head scarcely wider than pronotum, obtusely angled, vertex rather narrow, nearly half longer at middle than at eye; front broad and ocelli near the eye; clypeus long, rather narrow; lorae short. Pronotum with very short lateral margins, scarcely carinate, posterior margin slightly concave; claval veins obscure, curved, approximate at center.

Color dull yellowish, vertex with a lighter patch anteriorly, transverse broken band between ocelli and two elongate spots posteriorly. Pronotum with two dots near posterior margin; scutellum with fulvous spots each side; clavus opaque with a rather obscure yellow saddle, the apical fourth fuscous, elytra smoky hyaline, veins distinctly fuscous, apical cells clouded. Face blackish, front with about eight light arcs; clypeus black; lorae and cheeks mostly blackish; venter blackish, hind border of segments and the pygofer yellowish; legs yellowish dotted with fuscous.

Genitalia: last ventral segment of female twice as long as preceding, faintly sinuate and slightly produced on median third.

Length, 4.5-5.5 mm.

Hawaii: Kilauea, 29 Miles, 4000 feet, August 29, 1917, February 1, 1917, W. M. Giffard.

No types have been seen and Kirkaldy's very short description is inadequate for positive identification but the above specimens seem properly referred here.

Nesophrosyne ignigena Kirkaldy.

Nesophrosyne ignigena Kirkaldy: Fauna Haw., vol. 2, p. 570, 1910.

I have not found any specimens to refer to this species and it seems probable that it should rank as a variety only, perhaps one of the many forms of *N. silvicola*, though smaller.

Nesophrosyne craterigena Kirkaldy.

Nesophrosyne craterigena Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 571, 1910.

Head broad, slightly wider than pronotum; vertex rounded, a little longer at middle than next the eye; front tapering below antennae; clypeus widening a little apically. Pronotum one third longer than vertex; hind border broadly concave; elytra narrowed toward tip; outer anteapical small, scarcely one third as long as middle anteapical; the nodal vein arising from its base. Genitalia: male, valve short, rounded behind; plates broad at base, roundly narrowed to acute tips.

Colors: golden yellow to orange. Pronotum somewhat olivaceous at base, faintly suffused with fuscous toward the anterior border; scutellum orange, faintly marked with blackish on the border; elytra greenish subhyaline on clavus and inner part of corium; milky hyaline spots on the disk; veins mostly fuscous, in part pale; tips of claval veins yellowish; three pairs of spots next to commissure, two spots in the inner discal cells, and the terminal third or half of apical areoles, fuscous; face pale with faint fuscous arcs, and in one specimen, the sutures lined with fuscous. Beneath, pale yellowish;

abdomen in one specimen orange, in the other blackish above with yellow borders to the segments; tip of male plates reddish orange.

Two males which differ quite a little in intensity of color, but which agree in the main color pattern and in structure, from Puuwaawaa, North Kona, Hawaii, 3,000 feet and 3,700 feet, from *Myoporum sandwicense*.

These specimens are slightly smaller, and do not fit in every detail with Kirkaldy's description, but they agree so closely that it seems proper to place them here, especially since they were collected from similar localities.

A male type is in the Natural History Museum in London.

***Nesophrosyne nimbigena* Kirkaldy.**

Nesophrosyne nimbigena Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 567, 1910.

A dull yellowish green, with black nervures and lines on vertex in front. Length: female, 5.25 mm.

Head as wide as pronotum, rounded, scarcely angulate in front, but slightly longer at middle than next the eye, rounding to the front; ocelli close to margin of eye; front longer than broad; side margins nearly parallel to near apex then abruptly narrowed to clypeus; clypeus nearly twice as long as basal width. Lorae rather long, approaching border of cheek. Cheeks rather narrow, faintly sinuate with eye. Pronotum, lateral margin short, faintly carinate; hind border distinctly concave, claval veins approximate before middle. Genitalia: last ventral segment of female slightly longer than preceding; hind border sinuate.

Color: dull greenish or light olive; vertex a yellowish or greenish yellow, a dark line between ocelli with arcs encircling ocelli at each end, a dark line on basal front paralleling the one above ocelli and a median line dark; pronotum, scutellum, and elytra nearly concolorous, with spots bordering the commissure and elytral nervures distinctly black. Beneath, the front with faintly indicated light arcs, the sutures and tip of clypeus and lorae, blackish. Legs a yellowish green, posterior femora lined blackish; ovipositor black.

Hawaii: Glenwood, altitude 1,800 feet, January 10, 1917; Kilauea, 29 miles; W. M. Giffard. The type was not seen. None was found in Natural History Museum in London and none indicated as typical in the material received from Honolulu.

***Nesophrosyne bobae* Kirkaldy.**

Nesophrosyne bobae Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 564, 1910.

Head as wide as pronotum, subangulate; vertex one fourth longer at middle than next the eye; front narrowed below antennae; clypeus half longer than wide. Pronotum nearly half longer than vertex, distinctly concave behind; nodal vein broad, outer ante-apical broad, but short. Genitalia: female, last ventral segment twice as long as preceding; produced on the hind border into a broad rounded tooth.

Color: pale olivaceous, with faint fuscous lines on apex; a distinct series of arcs on the front; clypeus, lorae, and lower part of cheeks infuscate; discs of lorae pale; pleural pieces with fuscous patches; spot on the costa before the middle, the nodal veins and the outer apicals, blackish; veins more or less infuscate; abdomen beneath a little suffused with blackish; pygofer fulvous toward the tip; ovipositor dusky, tipped with fulvous.

Oahu: Kaumuohona, Waiahole, Opaëula, Nuuanu; O. H. Swezey. Accompanying the specimens from Opaëula are two nymphs, March 30, 1913, which are uniformly pale yellowish. No type specimen was found in the Natural History Museum in London.

Nesophrosyne caelicola Kirkaldy.

Nesophrosyne caelicola Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 566, 1910.

Head scarcely as wide as pronotum, faintly subangulate; vertex one fourth longer at middle than next the eye; rounded to front; front tapering to clypeus; clypeus two thirds longer than wide. Pronotum half longer than vertex, broadly concave behind; nodal veins one, or fused; outer anteapical very short, less than one third as long as at middle. Genitalia: male valve small, hind border obtusely angulate; plates short, outer border rounded, tips subacute with a delicate filament extending nearly to tip of pygofer; female, last ventral segment a little longer than preceding, produced at middle into a broad obtuse tooth.

Color: pale olive, a faint fuscous line across the vertex, enclosing ocelli and united with crescentic line, bordering the vertex in front; two faint patches at the base of vertex; the nodal and apical veins with expanded blackish dots at the tips; face pale; ovipositor dusky.

Specimens from Punaluu, Oahu, collected by O. H. Swezey, seem to agree better with Kirkaldy's description than any specimens I have seen. Kirkaldy mentions the similarity of this species with *N. bobæae*, and it is possible that the two forms may merge with sufficient material. There seems to be, however, some difference in the process on the border of the female segment.

The type specimen, a male, is in the Natural History Museum in London and specimens compared with it are in the H.S.P.A. and author's collections.

Nesophrosyne palustris Kirkaldy.

Nesophrosyne palustris Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 564, 1910.

Pale brownish, suffused with rose-red. Length: 5 mm.

Head as wide as pronotum, rounded; vertex scarcely produced, a little more than half as long at middle as between the eyes, faintly depressed each side on disc. Pronotum nearly half longer than vertex, hind border concave. Genitalia: female, last ventral segment faintly sinuate, broadly rounded on middle half.

Color: head light brown; eyes red; pronotum distinctly suffused with red, except on the median line; scutellum with dusky triangle each side near base, faintly suffused with rose; elytra subhyaline, brownish, minutely flecked with rosy, with some of the veins lined with the same color; legs and femora, black, except at tip; tibiae pale testaceous.

One specimen, no. 886, from Bernice P. Bishop Museum, apparently corresponding with specimen referred to by Kirkaldy as "one rather mature specimen in bad condition". He gives the habitat as Molokai, Kahanui. Apparently closely related to *N. ulaula* and possibly a teneral specimen of that species.

No type for the species was found in the Natural History Museum in London.

Nesophrosyne myrsines Kirkaldy.

Nesophrosyne myrsines Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 568, 1910.

Head scarcely as wide as pronotum, subangulate; apex rounded; vertex as long at middle as between the eyes; the sides divergent, one third longer at middle than next the eye; front with sides nearly parallel, abruptly narrowed to clypeus; clypeus half longer than wide. Pronotum slightly longer than vertex; hind border broadly concave. Genitalia: male, last ventral segment obtusely angulate; plates, outer border rounded, tips acute, upturned, reaching tip of pygofer.

Color: fuscous or blackish; pronotum with a central line, narrow posterior border and space between ocelli, yellowish; front yellowish at base with fuscous arcs; rest of face deeply fuscous; pronotum with a median line expanded on hind border; scutellum, disc and apex, inner border of clavus expanded posteriorly and beyond the second nervure, pale yellowish; costa at base and beyond the middle, and posterior area, yellowish hyaline; a broad fuscous irregular stripe extending back from pronotum and angles of scutellum, touching the costa before the middle, apical part of clavus, and obliquely to nodal vein and first apical vein, deep fuscous; two or three light subhyaline spots in the anteapical area. Abdomen blackish; abdominal segments margined with yellow; venter black or fuscous; legs pale yellowish; hind tibiae and the tarsal joints marked with dusky.

Specimen referred to this species from Oahu, southeastern Koolau Range, June 1917, J. C. Bridwell.

This has somewhat the appearance of *N. umbratilis*, but differs distinctly in the color picture and male genitalia.

No type specimen was found in Natural History Museum, London. Type probably lost as there is no specimen in the collection so labeled as to distinguish it.

Nesophrosyne umbrigena Kirkaldy.

Nesophrosyne umbrigena Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 571, 1910.

Piceous blackish; elytra deep brown; tips of femora, fore and middle tibiae, pale testaceous; clavus with a yellow saddle, sometimes obscure. Length: male, 4.75 to 5 mm.

Head as wide as pronotum, subangulate; vertex a little longer at middle than next the eye, but little more than half as long as width between the eyes, rounded to front; front with sides nearly parallel, narrowing below antennae; clypeus nearly twice as long as width at base, widening a little toward apex. Pronotum twice as long as vertex, concave behind; outer anteapical small; nodal vein distinct. Genitalia: male, valve small, rounded behind; plates slightly rugose, narrowing to acute tips, bearing slender appendages which reach tip of pygofer.

Color: face, vertex, pronotum, and scutellum mostly piceous black; pronotum in some specimens more or less ivory yellow; ocelli yellow; tip of scutellum brown; elytra brown, with usually a broad yellow saddle bordered before with blackish; a patch on the disc infuscate; nodal vein and apical vein broadly suffused with blackish; the areoles smoky; post nodal faintly subhyaline, yellowish; femora black; apex and fore and middle tibiae blackish; hind tibiae spotted with dusky; tarsi ringed with fuscous.

A specimen which I take to be the female of this species is lighter colored than the males, the front pale brown, elytra yellowish brown, the nodal and apical veins with expanded fuscous patches at the costal vein. The female last ventral segment is nearly

twice as long as preceding, roundly produced on the hind border, mostly blackish. Pygofer smoky at base, dull yellowish; ovipositor blackish, yellowish at tip.

One specimen, no. 535, Bernice P. Bishop Museum, without locality, apparently agrees with "damaged example, the pronotum of which is largely whitish and the dark area of the clavus reduced" (Kirkaldy). One specimen from 29 miles, Oloa, Hawaii, 2,800 feet, June 19, 1918, W. M. Giffard, is a female, probably of this species.

Three specimens referred here from Kilauea, Hawaii, one from dry forest, altitude 4,000 feet, July 6, 1918; another January 11, 1917, W. M. Giffard; and one F. Muir. The dry forest specimen has the yellow saddle well developed; the other two specimens have a dark area on the clavus, including a yellowish patch near the center.

No type for this species was found in the collection of the Natural History Museum in London.

Nesophrosyne oreadis Kirkaldy.

Nesophrosyne oreadis Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 569, 1910.

Ferruginous brown. Clavus with a broad yellow spot forming dorsal saddle preceded by fuscous border. Femora black, whitish at the tips. Length: 5 mm.

Head narrower than pronotum, rounded, slightly angulate; vertex with a transverse depression anteriorly and a roundish depressed area on each side of the disc, one fourth longer at middle than next the eye; ocelli close to the eye margin; front with sides nearly parallel, roundly narrowed below antennae; clypeus long, widening toward tip, pronotum half longer than vertex, hind margin concave; elytra narrowed and slightly flaring toward tip. Genitalia: female, last ventral segment nearly half longer than preceding; hind border nearly truncate, faintly produced at middle; ovipositor extending beyond tip of pygofer.

Color: reddish brown or ferruginous brown; vertex with ivory yellow border at front and at base; front nearly uniformly brown; arcs scarcely visible; clypeus and cheek below the lorae, black. Pronotum paler on hind border; scutellum with a yellow dot on lateral margin; elytra brownish hyaline, a broad yellow spot on clavus extending from about the middle to include the tip of outer claval vein, a fuscous patch on its fore border and somewhat browner, more opaque apex; corium distinctly hyaline, brownish, with a fuscous patch over nodal veins. Beneath, pectus blackish; legs with coxae and most of femora black or dark fuscous; tips of femora, tibiae, and tarsi, except the apex of tarsal joints, light testaceous.

A specimen from Kilauea, Hawaii, altitude 4,000 feet, dry forest, collected by W. M. Giffard, July 6, 1918, agrees very perfectly with Kirkaldy's description except in position of the nodal veins which in this specimen are rather indistinct. However, these veins are somewhat variable in these species.

Location of the type if existing is not known.

Nesophrosyne montivaga Kirkaldy.

Nesophrosyne montivaga Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 569, 1910.

Head distinctly narrower than pronotum, subangulate; tip rounded; vertex one third longer at middle than next the eye; front with sides nearly straight, narrowed to clypeus;

clypeus slightly enlarged toward tip; lorae large, nearly reaching border of cheek; cheek border sinuate. Pronotum half longer than vertex, broadly concave behind; elytra with nodal veins near together. Genitalia: female, last ventral segment somewhat produced toward middle, obtusely angulate; male, valve broad, short, rounded behind; plates broad at base, triangular; outer borders slightly convex; tips subacute, with a short filament.

Color: dull yellowish; vertex with transverse line and two faint dots on the disc; pronotum with obscure tints of fuscous; elytra yellowish-gray; parts of areoles whitish subhyaline; costa orange; veins mostly deeply fuscous; a large spot at base of nodal cell; face mostly black; a black line at base of front, and the disk of front brownish.

Length: female, 5 mm; male, 3.75 mm.

Described from Hawaii, Kilauea and Hamakua, and specimens in hand are also from Kilauea, January 2, February 1, and March 25, 1917, W. M. Giffard. Also a paratype from Bernice P. Bishop Museum.

Type location not known but specimens probably from type material in H.S.P.A. collection.

Nesophrosyne montium Kirkaldy.

Nesophrosyne montium Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 569, 1910.

Similar to *N. montivaga*. Cheeks pale, clypeus and lorae black. Beneath black. Length: female, 4 mm; male, 3.5 mm.

Head narrower than pronotum, subangulate; vertex one third longer at middle than next the eye, obtusely angulate to front; front nearly uniformly narrowed to base of clypeus; clypeus long, widening a little toward tip. Pronotum one fourth longer than vertex; hind border deeply concave. Genitalia: female, last ventral segment half longer than preceding; hind border almost straight; male, valve nearly as long as preceding segment, obtusely angulate; plates broad at base, curved on the margin; tips blunt with minute processes and very short ciliae, about two thirds as long as pygofer.

Color: fulvous; vertex with a transverse broken band, and two small dots towards the apex and a dot on the disc near the border of the eye, the border of front, frontal arcs, fuscous; clypeus and lorae mostly dark fuscous or black; margins pale; border with faint brownish dots; scutellum with three faint basal dots; elytra subhyaline, yellowish, with a discal areole and middle apical areole mostly fuscous; clavus with a fuscous line and some fuscous suffused areas, especially across the central part and at apex. Abdomen black with margins of the segments whitish; pygofer ferruginous fuscous; ovipositor blackish.

Redescribed from specimen from Bernice P. Bishop Museum collected in Mountain View, Hawaii, March 31, 1906, by O. H. Swezey and marked "type". Probably a cotype.

A specimen in the Natural History Museum, London, presumably the type, is smaller than those in hand.

Nesophrosyne koleae Kirkaldy.

Nesophrosyne koleae Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 562, 1910.

Fulvous and dark brown, with a distinct fulvous, commissural saddle. Length: female, 4.5 mm.

Head wider than pronotum. Vertex long, about as long as width between eyes, obtusely angulate, rounding to the front; front broad, ocelli set close to eye; clypeus

nearly twice as long as width. Pronotum, lateral margins very short, not carinate; hind border slightly concave, claval veins approaching each other in front of the middle, becoming very obscure posteriorly. Genitalia: female, ventral segment truncate behind.

Color: fulvous, obscured with brown or fuscous; vertex fuscous with four fuscous points on hind quarter; face fulvous with very faint indication of arcs; pronotum with anterior border iridescent purplish; scutellum with a dark point each side of lateral margin; clavus with a rounded opaque fulvous spot forming a commissural saddle bordered by fuscous; the basal part subhyaline; disc of elytra, hyaline, suffused with fulvous, infuscated on the veins, a distinct spot on veins from base of outer anteapical cells; the membrane smoky; beneath, pleurae, iridescent, purplish.

Oahu: Tantalus, altitude 1,300 feet, April 9, 1915, January 29, 1905, October 11, 1915, no. 7, altitude 1,500 feet, on *Straussia*, February 20, 1915, altitude 1,500 feet, W. M. Giffard; Tantalus, 1,300 feet, on *ohia-ha*, February 20, 1916, male (Giffard collection); Kaumuohona, male, O. H. Swezey; Kalihi, altitude 1,500 feet, H. T. Osborn, on *Straussia*, male, female; Manoa, altitude 1,500 feet, female, O. H. Swezey; Waiawa, May 4, 1913, O. H. Swezey.

Hawaii: Kau, Kahuku, January 15, 1917; Kilauea, altitude 4,000 feet, dry forest; Crater Road, altitude 3,800 feet, W. M. Giffard.

Kauai: Summit Camp, April 23, 1922, O. H. Swezey.

No type specimen of this species was found in the Natural History Museum in London, and the first two specimens mentioned above may be the only types extant.

***Nesophrosyne pluvialis* Kirkaldy.**

Nesophrosyne pluvialis Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 568, 1910.

Head about as wide as pronotum, somewhat produced, subangulate; vertex nearly half longer at middle than next the eye; front with sides nearly parallel, narrowed below antennae; clypeus slightly widened at tip. Pronotum one fourth longer than vertex; hind border broadly concave. Genitalia: female, last ventral segment a little longer than preceding; hind border nearly straight, faintly sinuate; male, valve short, transverse; plates triangular; sides somewhat convex, apex acute.

Color: black; anterior border of vertex and two faint dots on the disc reddish yellow; posterior half of pronotum and a large saddle on clavus, pale yellow, a whitish patch beyond clavus; two large spots on outer half of costa whitish hyaline; membrane smoky; front mostly pale testaceous with faint fuscous arcs; clypeus, except for tip, the lorae and cheeks and body beneath, black; legs pale yellowish; tarsal joints dusky at tip. Length: female, 4.5 mm; male, 4 mm.

Hawaii: Olaa; Kilauea, 29 miles, August 1, 1917, Kilauea, altitude 4,000 feet, October 28, 1915, W. M. Giffard; Glenwood, March 2, 1919, O. H. Swezey.

Oahu: west side Mount Kaala, May 18, 1920; Olympus.

Host plants *Coprosma rhynchoarpa*, *Cyrtandra*.

Type seen in Natural History Museum, London, and specimens compared with type are in the Bernice P. Bishop Museum and Osborn collections.

Nesophrosyne paludicola Kirkaldy.

Nesophrosyne paludicola Kirkaldy: Fauna Haw., vol. 2, suppl., p. 564, 1910.

"♀ Blackish; a yellowish ferruginous grill on a purplish brown frons; a whitish spot on the pronotum near the lateral margins. Scutellum sordid whitish, more or less suffused (especially apically) with brownish. Tegmina whitish hyaline, claval veins suffused brown, apical angle brown; inner half of corium brownish except a narrow claval margin and one or two apical spots, whitish; exterior half whitish; apical cells mostly brownish. Abdomen mostly blackish brown, hind tibiae blackish brown, with white spines. Pygophor pale with pale hairs, ovipositor sheath blackish. Length 4½ mm.

"Hab. Molokai, 4000 ft. (June, Perkins, 1 ♀)".

This description from one female seems to agree well with *N. pluvialis*. No type has been seen.

Nesophrosyne arcadiicola Kirkaldy.

Nesophrosyne arcadiicola Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 571, 1910.

Head scarcely as wide as pronotum, subangulate; vertex one fourth longer at middle than next the eye, rounded to front; front broad, somewhat flattened on the disk, contracted toward tip; clypeus long, nearly twice as long as wide; lorae remote from border of cheek; cheeks broad, faintly sinuate. Pronotum short, side margins half longer than vertex; hind border deeply concave. Genitalia: female, last ventral segment nearly twice as long as preceding; hind border faintly produced, rounded; ovipositor extended beyond pygofer; male, valve short, obtusely angulate behind; plates short, robust, rounded to blunt tips, with a reddish appendix extending nearly to tip of pygofer.

Color: female, rich brown; fore and hind border of vertex and a small saddle at middle of clavus, orange yellow; disc of elytra and apical areoles yellowish-subhyaline; lateral borders of clypeus, tip of cheeks, basal half of the fore femora, all of middle femora, and most of hind femora black or dark fuscous; male, dark fuscous or blackish; posterior border of pronotum at the sides, narrow border of apex of scutellum, saddle in middle of clavus, a patch beyond middle of disc and a broken band across base of membrane, dull whitish. Beneath, mostly black; apex of fore femora and the tibiae, testaceous. Length: female, 5.25 mm; male, 4.75 mm.

A specimen bearing "type" label is in Bernice P. Museum from Hilo, Hawaii, April 3, 1906, O. H. Swezey.

Hawaii: Kilauea, January 20, 1917; August 29, 1916, on *Coprosma pubens*; 29 miles, January 20, 1917; August 21, 1917; W. M. Giffard; "Kulan Hill," August, 1918; dry forest, July 16, 1918; Shipman's, January 1, 1917; F. Muir.

Nesophrosyne nimbicola Kirkaldy.

Nesophrosyne nimbicola Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 565, 1910. (Male = *N. milu* Kirkaldy?)

Robust or rather broad. Head black. Pronotum and commissural spot ivory yellow. Most of scutellum and elytra chocolate brown. Length: 4.5 mm.

Head wider than pronotum. Eyes large, vertex narrow, broadly rounded in front, scarcely longer at middle than next the eye. Obtusely rounded to front. Front broad

at base narrowing from antennal pits. Clypeus less than twice as long as broad. Pronotum with lateral margins short, not carinate. Hind margin faintly concave. Claval veins united in front and middle. Elytral veins obscure. Genitalia: last ventral segment of female one third longer than preceding; hind border faintly sinuate.

Color: vertex black, eyes and anterior border of pronotum, brownish; pronotum and large commissural spot on clavus, yellow; scutellum orange brown blackened at base; elytra at base of clavus mostly chocolate brown, base and a discal spot, apex of clavus, most of membrane, blackish.

Lanai: altitude 2,000 feet, February 16, 1917, February 14, 1917, December 27, 1916, December 16, 1916, W. M. Giffard. Oahu: Kuliouou, January 25, 1916, W. M. Giffard. Hawaii: Kilauea, dry forest, altitude 4,000 feet, July 6, 1918, W. M. Giffard.

Type in Natural History Museum, London; Lanai, 2,400 feet, W. A. Bryan.

Host plant: *Suttonia lessertiana*.

Nesophrosyne umbricola Kirkaldy.

Nesophrosyne umbricola Kirkaldy: Fauna Haw., vol. 2, suppl., p. 565, 1910.

"Differs [from *N. nimbicola*] as follows: Frons with better developed pattern. Pronotum yellow. Scutellum sordid yellow. A fuscous smudge at the base of the tegmina in the middle, fourth and fifth (and a small part of third) apical cells smoky, first apical and apex of median cell hyaline. Wings pale yellowish, veins darker. Sternites pale ferruginous. Length $4\frac{1}{8}$ mm."

Kirkaldy based his description of this species on a single female, "Lanai 2000 ft. (Dec. Perkins 1 ♀)". I have not found any specimens that could be separated from *N. nimbicola* that would seem to fit this description and I have not seen any type.

Nesophrosyne milu Kirkaldy.

Nesophrosyne milu Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 565, 1910.

Robust; head wider than pronotum, short; vertex narrow, slightly longer at middle than next the eye. Pronotum twice as long as vertex; hind border truncate. Genitalia: male, valve small, triangular; plates tapering to blunt tips, without appendage.

Color: black; eyes dark brown; clavus with a broad yellow saddle; elytral disk with three hyaline spots at the middle of costa and a broken hyaline band beyond tip of clavus; fore tibiae whitish. Length: 4 mm.

Kirkaldy's record is Lanai, 3,000 feet; three specimens in hand also from Lanai, 3,400 feet, December 19, 1916, W. A. Bryan.

This species seems very probably to be the male of *N. nimbicola*; if so that name would prevail, since it appears first on the page where the species is described.

A male specimen ("type") is in the Natural History Museum, London.

Nesophrosyne imbricola Kirkaldy.

Nesophrosyne imbricola Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 566, 1910.

Brown or tawny with yellowish-white spots and a number of hyaline areas on the elytra. Length: female, 5 mm; male, 4.5 mm.

Head wider than pronotum. Vertex scarcely wider than long, broadly roundly angular in front; about one fourth longer at middle than next the eye, rounding to front. Front nearly parallel to below antennal pits, abruptly narrowed at apex; clypeus narrow, twice as long as broad; lorae broad, outer margin circular. Pronotum about one fourth longer than vertex, lateral margin short, not carinate. Posterior margin concave. Claval veins merged before the middle. Two distinct depressions on hinder part of vertex, including the minute elevation. Genitalia: last ventral segment of female nearly twice as long as preceding; posterior margin rounded, slightly produced; male valve small; posterior border broadly angulate; plates more than twice as long as valve, outer margins convex; apices together bluntly rounded with a short delicate filament (?).

The males differ somewhat from the females in having the face entirely black and a broad blackish zigzag area beginning before the middle of the elytra crossing to near the claval suture, running back to antepical cells where it forms a black band, the inner part extending backward and widening to a broad black spot on the membrane. This leaves two large conspicuous hyaline spots on the costal margin.

Lanai: altitude 2,500 feet, January 19, 1917, female, December 20, 1916, male, W. M. Giffard. Hawaii: January 12, 19, 1917, December 20, 26, 1916, W. M. Giffard.

A type specimen in the Natural History Museum, London, was examined for comparison.

Nesophrosyne monticola Kirkaldy.

Nesophrosyne monticola Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 562, 1910.

"Vertex whitish, with a blackish brown inverted short-handled trident; frons pale yellowish, narrowly whitish basally with a slightly curved narrow blackish transverse line just apical of the yellowish brown ocelli; then just apical of this, suffused with sanguineous; clypeus, lora, and genae mostly blackish. Pronotum yellow, anterior margin blackish ferruginous, continued in a narrow line down the middle. Scutellum yellow, more or less suffused with ferruginous. Tegmina ferruginous, a large yellowish white black-ringed spot on the middle of the clavi closed together; corium with a few small subopaque whitish spots interiorly, and the subcostal in part (apicalwards) hyaline; first and fifth subapical cells hyaline, veins dark ferruginous, sometimes verging on black, suffused.

"Hab. Oahu, Kaala, over 2,000 ft. (Dec., Perkins). Unfortunately only one ♂ of this pretty and distinct little hopper."

Specimens that fit Kirkaldy's description of the male are in hand, one male, Kuliouou, Oahu, June 25, 1916, on *Perrottetia sandwicensis* "Hom. Slide # 42" and genital segments gone, probably mounted; five males, "Kona-huanui, Oahu, October 15, 1916, on *Wikstroemia*, on Slide # 67". No females have been seen. The external genital parts of male in these specimens have

a broad valve with the hind border broadly rounded, the plates rather short triangular, narrowed to blunt, slightly divergent tips. Length: 4 mm. Nymphs which accompany these males and also from *Wikstroemia* of same locality and date are pale ivory with spots on the base of wing pads and a curved row of spots on the abdominal segments; a line on outer margin of tibiae and the tarsal claws, black. These may be last or next to the last instar. Length: 3 mm.

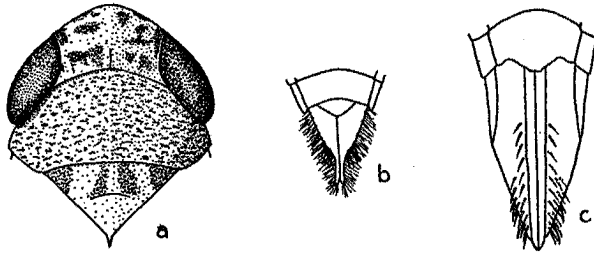


FIGURE 17.—*Nesophrosyne notatula*: a, vertex; b, male, c, female, genitalia.

***Nesophrosyne pele* Kirkaldy.**

Nesophrosyne pele Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 570, 1910.

Sordid yellowish with scattered elongate fuscous spots. Length: female, 4.5 mm; male, 4 mm.

Head wider than pronotum, rounded in front. Vertex narrow, slightly wider than long. About one fourth longer at middle than next the eye. Faint transverse depression in front of middle. Front longer than broad, narrowed slightly on sides and abruptly at apex. Clypeus nearly twice as long as broad, slightly widened toward apex. Pronotum about half longer than vertex, strongly arcuate between eyes. Lateral margin very short. Hind margin slightly concave. Claval veins approximate near the base. Genitalia: female, last ventral segment about twice as long as preceding, hind border truncate; male, valve small, plates broad, outer borders convex, apices rather bluntly rounded.

Color: above uniformly dull yellowish or creamy; vertex and scutellum slightly lighter than pronotum and elytra; vertex with a pair of transverse spots before the middle and a pair of longitudinal spots behind; pronotum with dark spots on disc and behind eyes; scutellum with median line and transverse suture, black; clavus with about seven elongate angular spots and corium with margins of veins, transverse spots on costa and apical nervures, blackish; face blackish, front lighter with distinct yellowish arcs.

Hawaii: Kilauea, O. H. Swezey; Kilauea, October 2, 1915; Kau Road, January 16, 1917; Kilauea, January 2, 1916; dry forest, January 9, 1919; W. M. Giffard.

Type in Natural History Museum, London.

***Nesophrosyne notatula*, new species (fig. 17).**

Minutely flecked with fuscous dots above. Length: female, 4.25 mm; male, 4 mm.

Head as wide as pronotum, subangulate; vertex one fourth longer at middle than next the eye, sloping, rounded to front; front broad, scarcely longer than width at base; side margins tapering into a broad apex; clypeus narrow, twice as long as wide. Pro-

notum half longer than vertex; hind border scarcely concave; elytra narrowed toward tip. Genitalia: female, last ventral segment twice as long as preceding, slightly produced, faintly sinuate; male, valve small, rounded behind; plates long, tapering uniformly to acute tips, reaching nearly to tip of pygofer.

Color: female, dull testaceous; vertex, pronotum, scutellum and elytra minutely flecked with fuscous, the vertex with dots arranged to form two rather indefinite transverse bands; base of front and margin of eye, dotted with fuscous; male darker; vertex yellowish; pronotum, scutellum, and elytra tinged with greenish-olive; apex of elytra smoky; face mostly black; margins of cheeks whitish; pectus and venter black; plates pale; legs pale with fuscous; the femora obscurely lined with fuscous.

Oahu: Mount Kaala, altitude 1,500 to 1,600 feet, May 4, 1917, female holotype, May 9, 1916, male allotype, from *ohia lehua*.

Two nymphs, also, minutely flecked, are associated with these specimens, from Mount Kaala, July 4, 1916, but are recorded as from *Metrosideros polymorpha*, another name for the same plant.

The male and female while differing much in color have the same characteristic flecking, and being taken from the same plant it seems probable that they should be associated.

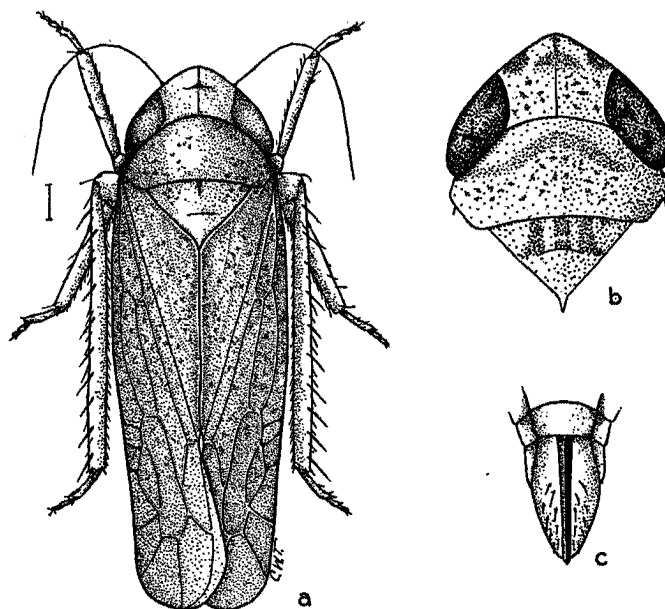


FIGURE 18.—*Nesophrosyne signatula*: a, dorsal; b, vertex; c, female genitalia.

***Nesophrosyne signatula*, new species (fig. 18).**

Pronotum, scutellum, and elytra minutely flecked with fuscous; nodal and apical veins, blackish; vertex with a blackish spot before the middle. Length: female, 4.5 mm.

Head as wide as pronotum, angular; vertex produced, nearly as long as wide at middle, half longer at middle than next the eye; margin angled; front longer than broad; margins roundly narrowed below antennae; clypeus two thirds longer than

width. Pronotum slightly longer than vertex; hind margin broadly concave; elytra long, scarcely narrowed toward tip; apex blunt; outer anteapical short, oval, a little more than one third as long as middle anteapical which is distinctly constricted; one nodal from base of middle anteapical, one from the middle of outer anteapical, two apical veins the costa of which are expanded and suffused with black like the nodals. Genitalia: female, last ventral segment one half longer than preceding; the middle part roundly produced.

Color: pale gray; vertex, anterior border of pronotum, scutellum, lower part of face and legs, paler; vertex with the broken series of lines running back from the ocellus; a distinct spot before the middle, and the median line, fuscous, pronotum rather faintly irrorate and minutely flecked; scutellum faintly flecked; elytra densely and minutely flecked to base of apical cells; tip of middle anteapical and the nodal areoles more distinctly hyaline; the extreme tip whitish with the submargin blackish; the second and third apical areoles smoky; beneath dirty white, pectus and disc of abdomen blackish; tergum blackish; pygofer yellowish; ovipositor fuscous.

Oahu: Mount Kaala, altitude 2,000 feet, July 9, 1916, from *Alyxia olivaeformis*, holotype and paratype.

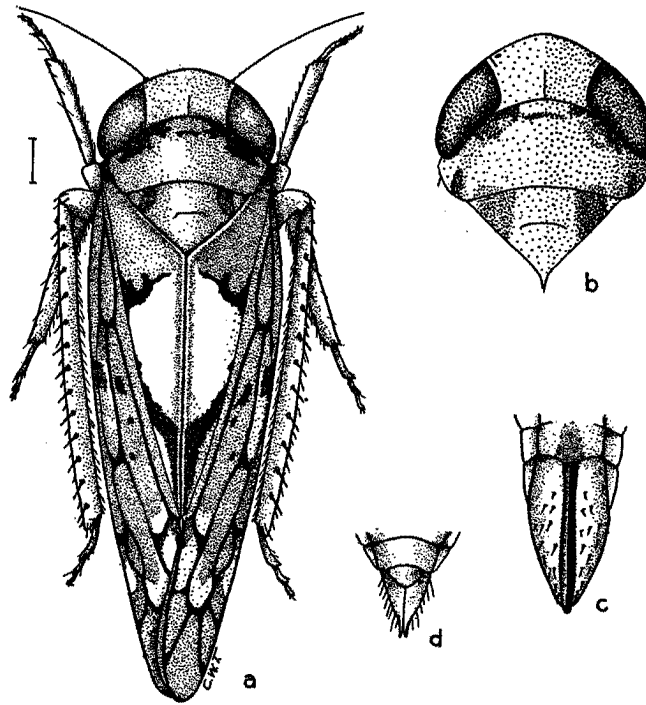


FIGURE 19.—*Nesophrosyne mabae*: a, dorsal; b, vertex; c, female, d, male, genitalia.

***Nesophrosyne mabae*, new species (fig. 19).**

Head yellow; a large yellow spot on the clavus; elytra subhyaline with a few milky spots; outer anteapical short, broad; nodal vein oblique. Length: female, 4.5 mm; male, 4.25 mm.

Head wider than pronotum, rounded; vertex a little longer at middle than next the eye, rounded to front; front broad at base, narrowing below antenna; clypeus nearly twice as long as wide. Pronotum one third longer than vertex; hind border broadly concave; outer antepical short, a little more than one third as long as middle antepical, broad; nodal vein arising near its anterior border. Genitalia: female, last ventral segment nearly twice as long as preceding; hind border sinuate, distinctly produced and minutely notched at middle; male, valve short, obtusely angulate; plates elongate, tapering to narrow tips, reaching tip of pygofer.

Color: vertex and face pale yellow; pronotum pale gray, faintly infuscate; scutellum yellowish, the angles a little dusky; clavus subhyaline at base; a large yellow opaque spot widening behind; apex fuscous; corium grayish hyaline with nervures mostly fuscous, the areoles on the disc somewhat splashed with fuscous; antepical areoles and base of third and fourth apicals milky hyaline; apex smoky. Abdomen above blackish; beneath pale yellowish; a central stripe on the last ventral segment of the female and the ovipositor blackish; male beneath entirely yellowish.

Hawaii: South Kona Road, altitude 1,900 feet, August 22, 1917, from *Maba sandwicensis*, holotype female, allotype male, W. M. Giffard; Kau, Kahuku, January 15, 1917, 2 females, paratypes, W. M. Giffard, F. Muir.

This is a handsome little species with somewhat the aspect of *N. koleae* but vertex is shorter, more bluntly rounded, and the yellow spot of clavus is larger, not bordered with blackish before, and the genitalia are different, which, with the different food plant, warrants a separate description.

Subgenus NESOREIAS

In this group, ranked as a subgenus by Kirkaldy, the outer antepical cell is nearly or quite obsolete, quite evidently by coalescence of the outer branch of ulnar vein with the inner. Type: *Nesoreias insularis* Kirkaldy.

Key to Species

- | | |
|---|-------------------|
| 1. Clavus without saddle spot..... | 2 |
| Clavus, base with saddle spot..... | 3 |
| 2. Clavus, base and spot black, face yellow..... | <i>oceanides</i> |
| Clavus ochreous, spot black, face dark with pale spots..... | <i>insularis</i> |
| 3. Saddle in shape of comma..... | <i>comma</i> |
| Saddle bordered with black..... | <i>marginalis</i> |
| Saddle covering most of clavus, ivory white or yellowish..... | 4 |
| 4. Veins fulvous..... | <i>eburneola</i> |
| Veins blood red..... | <i>sanguinea</i> |

Nesophrosyne (*Nesoreias*) *oceanides* Kirkaldy.

Nesophrosyne (*Nesoreias*) *oceanides* Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 573, 1910.

Head large, nearly as wide as pronotum, subangular; vertex produced, rounded to front, half longer at middle than next the eye; front broad at base, narrowed to clypeus; clypeus half longer than width; sides parallel; apex rounded. Pronotum short, as long as vertex; side margin very short; hind border concave. Genitalia: female, last ventral

segment long, nearly twice as long as preceding; hind border truncate; male, plates broad, narrowed to blunt tips, nearly as long as pygofer.

Color: light fulvous; pronotum paler; lateral margins fuscous; clavus, except base and apex yellow; base and apex of clavus, disc of corium, blackish; two large subhyaline spots beyond middle; the apical areoles subhyaline; veins fuscous; beneath, face fulvous; pectus, venter, black; pygofer yellow; legs pale fulvous; hind tibiae lined with black; male (?) darker; face and beneath, except borders of abdomen and the legs, black; legs pale fulvous; vertex at sides, base of scutellum, tip of clavus, disc and apex of elytra, blackish. Length: 4.5 mm.

Hawaii: South Kona Road, altitude 1,600 feet, August 26, 1917, on *Straussia hawaiiensis*, W. M. Giffard; Kilauea, dry forest, F. Muir.

The type not located, but example apparently typical in H.S.P.A. collection.

Nesophrosyne (*Nesoreias*) *insularis* Kirkaldy.

Nesophrosyne (*Nesoreias*) *insularis* Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 573, 1910.

Head about as wide as pronotum, strongly angulate, rounded at tip; vertex narrow, but little wider between eyes than length at middle, half longer at middle than next the eye; front sloping uniformly to clypeus; clypeus half longer than wide; apex subtruncate. Pronotum somewhat produced between the eyes, nearly half longer than vertex; side margins very short; hind border concave. Genitalia: female, last ventral segment but little longer than the preceding; hind border truncate; male, valve half as long as width; hind border obtusely angulate; plates tapering to blunt tips, nearly as long as pygofer.

Color: pale yellow; face, vertex, pronotum, and scutellum tinged with fulvous; clavus ochreous; apex fuscous; elytra yellowish-hyaline tinged with fulvous; veins on the disc concolorous, toward tip infuscate; apex in male black; face with a fuscous band below the eyes, covering most of lorae and apical half in female, all of clypeus in male; beneath pale yellowish; last ventral segment and ovipositor in female, valve and plates, infuscate. Length: female, 4 mm; male, 3.75 mm.

Hawaii: Niulii, May 22, 1917, O. H. Swezey; Kilauea, O. H. Swezey.

Specimens apparently typical but without type labels are in H.S.P.A. collection.

***Nesophrosyne* (*Nesoreias*) *marginalis*, new species (fig. 20).**

Size and form of *N. insularis*, but with a different picture. Apical part of clavus infuscate and the marginal border fuscous, but fore margin with yellow saddle and the costa, fuscous. Length: female, 4 mm; male, 4 mm.

Head as wide as pronotum, subangulate; vertex narrow, slightly wider than length at middle, half longer at middle than next to eye, rounded to front; front with sides parallel to below antennae, tapering gradually to clypeus; clypeus about half longer than width. Pronotum half longer than vertex; hind border distinctly concave; nodal vein very small, faint. Genitalia: male, valve small, obtusely angular behind; plates narrow, short, borders rounded; apex subacute.

Color: dull yellowish suffused with orange; vertex and lower part of face suffused with fuscous; ocelli orange; pronotum yellowish, with two triangular fuscous patches extending forward from the base; elytra pale yellowish, suffused with orange; a yellowish saddle, margined before with fuscous and followed behind with elongate triangular

patches in the apex; the costal vein and most of discal veins fuscous; apical areoles suffused with blackish; beneath yellowish; tips of tarsal joints dusky; last ventral segment, valve and plates, blackish; the latter tipped with orange.

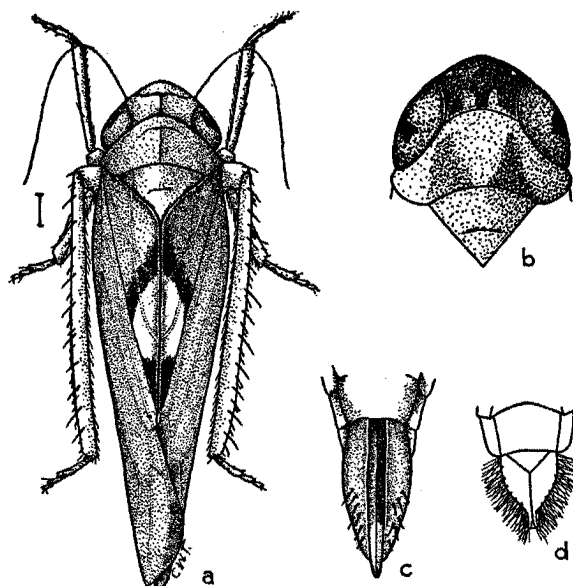


FIGURE 20.—*Nesophrosyne (Nesoreias) marginalis*: a, dorsal; b, vertex; c, female, d, male, genitalia.

Hawaii: Kilauea, dry forest, altitude 4,000 feet, 2 males, holotype and paratype, July 6, 1918, W. M. Giffard; Kilauea, altitude 4,000 feet, January 11, 1917, W. M. Giffard, F. Muir. 811

***Nesophrosyne (Nesoreias) comma*, new species (fig. 21).**

Head dull yellow; clypeus and lorae infuscate. Pronotum blackish, with yellowish patch each side; elytra blackish internally; outer border whitish hyaline; a large comma-shaped yellow spot on the middle of clavus. Length: female, 4 mm; male, 3.5 mm.

Head as wide as pronotum, obtusely angulate; vertex one fourth longer at middle than next the eye, rounded to front; front broad, narrowed below antennae; clypeus narrow, nearly twice as long as width, rounded at tip. Pronotum one third longer than vertex, distinctly concave behind; claval veins joined before the middle; a single nodal vein. Genitalia: female, last ventral segment short, scarcely longer than preceding; hind border truncate; male, valve small, obtusely angular behind; plates tapering to acute tips with slender upturned filaments.

Color: blackish; vertex and front, dull yellowish; clypeus and lorae fuscous; middle line on clavus and the cheeks, yellowish; pronotum blackish with a yellowish band on the posterior part approaching the middle in the male; scutellum black; the apical borders yellowish; clavus with three areoles at base dull whitish; a large comma-shaped yellowish spot at the middle; corium blackish with subhyaline spots in the areoles and a broad whitish hyaline costal border; membrane smoky; nodal and first apical vein distinctly blackish. Beneath mostly blackish; legs pale yellow or whitish; hind tibiae infuscate; tips of tarsal joints and clavi dusky; pygofer in female yellowish; ovipositor blackish; yellowish at tip; male plates with tip and filaments, brownish.

Hawaii: Kilauea, January 11, 1917, female holotype, male allotype, W. M. Giffard. Two paratype females, altitude 4,000 feet, dry forest, W. M. Giffard, are slightly larger, 4.5 mm, and the comma on the clavus is a little deeper orange yellow in color.

Resembles *N. koleae*.

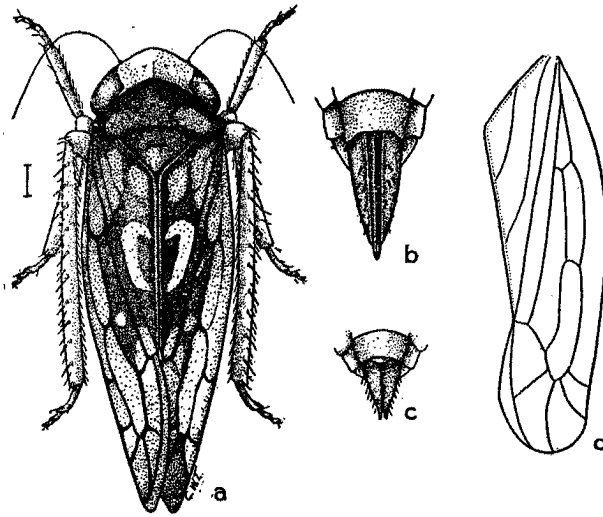


FIGURE 21.—*Nesophrosyne (Nesoreias) comma*: a, dorsal; b, female, c, male, genitalia; d, elytron.

***Nesophrosyne (Nesoreias) sanguinea*, new species (fig. 22).**

Small, angular, vertex produced. Pronotum, except anterior border, and a large yellow saddle on clavus, ivory yellow; veins and costa blood red. Lower part of face and abdomen black. Length: female, 4 mm; male, 3.75 mm.

Head barely as wide as pronotum, angular; vertex produced, nearly as long at middle as between the eyes, half longer at middle than at eye; front broad, narrowing abruptly below antennae; clypeus faintly carinate, widened toward tip. Pronotum as long as vertex; hind border concave; elytra with a single nodal cell on basal third of inner anteapical; three apical areoles. Genitalia: female, last ventral segment half longer than preceding; hind border slightly produced at middle; male, valve short, half as long as preceding segment, obtusely angular; plates broad at base; outer margin slightly convex, narrowing to acute apex, with a short upturned appendage.

Color: vertex, anterior border of pronotum, margins of scutellum, a patch before and behind the claval saddle, a patch on the basal part of costa, nodal vein in male and most of membrane, dark fuscous; apex of vertex, most of pronotum, and a broad claval saddle, ivory yellow or whitish, somewhat tinged with fulvous in the female; veins all blood red in female; subcosta somewhat fused with fuscous in male; face reddish brown in female; clypeus, lorae, and lower part of cheek, black; in male black with sides of the front and transverse arcs brownish. Beneath black; legs pale; tips of tibiae and tarsal joints, especially in the male, dusky; female pygofer brown; male plates black, with red tips.

Lanai: altitude 2,200, 2,500 feet, 1900; July 14, December 14, 1916; January 19, 1917, 2 females, holotype and paratype, 1 male allotype, W. M. Giffard.

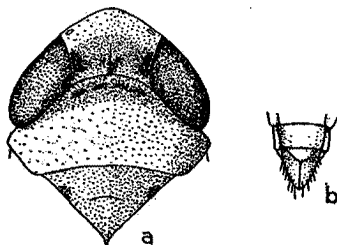


FIGURE 22.—*Nesophrosyne (Nesoreias) sanguinea*: a, vertex; b, male genitalia.

***Nesophrosyne (Nesoreias) eburneola*, new species (fig. 23).**

Small, similar to *N. sanguinea*, but paler. Pronotum, except narrow anterior border and a large elongate saddle covering most of clavus, shiny ivory white, tinged on the commissure with fulvous. Length: female, 3.5 mm.

Head as wide as pronotum, angular; vertex produced, nearly as long at middle as between eyes, half longer at middle than next the eye; front broad, toward the apex abruptly narrowed; clypeus half longer than wide. Pronotum short, as long as vertex; single nodal vein near basal third of anteapical. Genitalia: female, last ventral segment twice as long as preceding; hind border produced, rounded; apical part thin and hyaline; male, valve small, half as long as preceding segments; hind border rounded; plates broad at base; side margins rounded to blunt apex, extending into slender upturned filaments.

Color: pale fulvous; vertex at base darker; between the eyes black; tip of clavus fuscous; pronotum and the large claval saddle polished ivory; scutellum, base of clavus and elytra fulvous; elytra subhyaline with the veins dark fulvous inclining to reddish; narrow tip dusky; front fulvous, except extreme tip; clypeus, lorae and cheeks, black. Beneath, legs whitish; abdomen tinged with fulvous. Male, front except sides at base suffused with blackish; costa reddish.

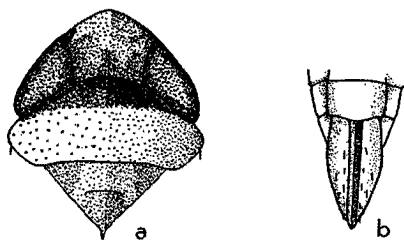


FIGURE 23.—*Nesophrosyne (Nesoreias) eburneola*: a, vertex; b, female genitalia.

Hawaii: Glenwood, Olaa, altitude 2,300 feet, August 27, September 3, 1916, 3 females, holotype and paratypes; Kau, near Kahuku, altitude 1,800 feet, January 14, 1919, from *Antidesma platyphyllum*; W. M. Giffard.

The males placed here are somewhat darker and the coloration more intense than for the females, but otherwise are so similar that it seems safe to associate them.

Genus STIRELLUS Osborn and Ball

Athysanus subgenus *Stirellus* Osborn and Ball: Ohio Naturalist, vol. 2, p. 250, 1902.

Euscelis subgenus *Stirellus*, Van Duzee: Cat. Hemiptera, p. 660, 1917.

Stirellus, Slesman: Entomologica Americana, vol. 10, p. 124, 1929.

Type of genus: *S. bicolor* (Van Duzee).

***Stirellus hospes* (Kirkaldy).**

Deltocephalus hospes Kirkaldy: Entom., vol. 37, p. 177, 1904.

Phrynomorphus hospes, Kirkaldy: Haw. Sugar Plant. Assoc., Ent. Bull., no. 3, p. 60, 1907; Fauna Haw., vol. 2, Suppl., p. 576, 1910.

Head slightly wider than pronotum, angulate; vertex produced, nearly twice as long at middle as next the eyes; front narrowing uniformly to base of clypeus; clypeus narrowing to tip, one fourth longer than width at base. Pronotum as long as vertex; hind border nearly truncate; claval veins not connected; outer anteapical cell narrow. Genitalia: female, last ventral segment a little longer at middle than preceding segment, truncate or slightly concave; male, valve short, rounded behind; plates rounded on the margin, acutely angled at tip, reaching nearly to tip of pygofer.

Color: pale gray; two oblique spots at apex of head, usually a second spot half way to the eye, and a dot at middle of clavus, another at base of middle anteapical, fuscous; the apical areoles with smoky borders to the veins.

Numerous specimens on Bermuda grass, Manoa Valley, Oahu, April 1916. Other specimens from Honolulu, June 29, and July 11, 1916, Timberlake det.; Tantalus, elevation 1,300 feet, January 21, 1906, W. M. Giffard; and one specimen Kealia, Kauai, May 15, 1906, O. H. Swezey det. This is a small species, supposed to have been introduced from Australia and Fiji, and according to Kirkaldy, feeds on *Cynodon dactylon*.

Genus CICADULA Zetterstedt

Cicadula Zetterstedt: Ins. Lapp. Col., p. 296, 1840.

Macrosteles Fieber: Verh. zool. bot. Ges. Wein, vol. 16, 1866.

Type: *Cicadula sexnotata* Fallen.

***Cicadula kilaueae* (Kirkaldy).**

Macrosteles kilaueae Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 575, 1910.

"Bright yellow, legs, etc., paler. Eyes greenish grey. Apical cells of tegmina hyaline, with yellow veins. Wings hyaline, veins white, sometimes partly fuscous. There is no appreciable sculpture, except microscopic. Vertex wider between the eyes than its length, and wider than the eyes together, lateral margins slightly divergent; rounded obtusely anteriorly, somewhat convex, roundly obtuse in profile; frons somewhat convex. Pronotum wider than the head and a trifle longer, lateral margins short, not keeled, hind margin slightly obtuse-angulately emarginate. Tegminal venation not very unlike that of *M. punctifrons*, but the first apical vein is sublongitudinal, not subtransverse, and the fourth vein is also longer and more longitudinal. ♀ Sheath blackish

brown. Length 4.5 mm. Hab. Hawaii, Kilauea. I have seen only one carded ♀, in Dr. Perkins' collection."

I have not seen the type, which is probably in the British Museum, but there are specimens that agree very closely with Kirkaldy's description: one specimen agrees for length but has the ovipositor sheath pale instead of blackish brown. I presume the species is somewhat variable in size and coloration and until sufficient material is available to make studies of the male genitalia it seems best to include these specimens under the one species.

Genus OPSIUS Fieber

Opsius Fieber: Vehr. Zool. bot. Ges. Wien, vol. 16, p. 505, 1866.

Opsius stactogalus (Amyot).

Athysanus (?) *stactogalus* Amyot: Meth. Mon., p. 413, 1848. In Fauna Fr. Ent. Soc. Fr., p. 468, 1847.

Jassus (*Thamnotettix*) *tamaraci* Kirschbaum (*stactogala*? footnote): Cicadinen Weisbaden und Frankfurt, p. 90, 1868.

Athysanus stactogalus Lethierry et Puton: Ent. Soc. France, Ann., ser. 5, vol. 6, p. 51, 1876.

Eutettix osborni Ball: Dav. Acad. Sci., Proc., vol. 17, p. 39, 1907.

Opsius stactogalus, Slesman: Ent. Am., vol. 10, p. 95, 1930.

This is a small light green species with faint whitish dots on the elytra. Probably a recent introduction in Hawaii as no specimens were included in the material sent me. It was first reported by R. H. Van Zwaluwenburg³. It is a tamarix-infesting species common to Europe and America, perhaps the latter by introduction. "It is reported that *Euscelis stactogalus* attacks all trees of the genus".⁴

Genus NESOSTELES Kirkaldy

Nesosteles Kirkaldy: Hawaiian Sugar Plant. Assoc., Div. Ent., Bull. 1, p. 343, 1906; Fauna Haw., vol. 2, Suppl., p. 573, 1910.

Eugnathodus Baker: Invertebrata Pacific, vol. 1, p. 1, 1903.

Agellus DeLong and Davidson: Ohio Jour. Sci., vol. 33, p. 210, 1933.

This genus founded by Kirkaldy to include a group of small species has for its type *Nesosteles hebe* described from Fiji, and Kirkaldy referred to this species one described as *hospes* which, later, Timberlake on examination of genitalia decided to be different. It is closely related to *Balclutha* from which it is separated by the width of the head, this exceeding the width of the pronotum. The first sector of the elytra fuses with the second near the

³ Van Zwaluwenburg, R.H., Hawaiian Ent. Soc., Proc., vol. 7, p. 224, 1929. Identified as *Euscelis stactogalus* by W. L. McAtee.

⁴ Biol. Abstracts, p. 1253, April, 1931.

fork. The reason for considering *Eugnathodus* and *Agellus* as synonyms has been presented in a previous paper on the Cicadellidae of the Marquesas Islands.⁵

Key to Hawaiian Species

1. Vertex short, broadly rounded, length at middle and at eye equal.....**hospes**
Vertex longer at middle than at eye, more or less angulate..... 2
2. Larger species, 3.5 to 4 mm; olive brown or green.....**plutonis**
Smaller species, 2 to 3 mm; green or yellowish..... 3
3. Vertex obtusely angulate, slightly longer at middle than at eye.....**volcanicola**
Vertex distinctly angulate, one third or more longer at middle than at eye..... 4
4. Slender, sides parallel, vertex one third longer at middle than at eye.....**peregrinus**
Broader, sides curved, vertex longer.....**timberlakei**

Nesosteles hospes Kirkaldy (fig. 24, a-b).

Nesosteles hebe variety *hospes* Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 574, 1910.

Nesosteles hospes, Timberlake: Haw. Ent. Soc., Proc., vol. 3, p. 381, 1918.

Head very short, wider than pronotum; color dull olive, body black. Length: female, 3 mm; male, 2.5 mm.

Head wider than pronotum, broad, blunt; vertex short, as long at middle as next the eye; front convex, but not strongly tumid; clypeus long, slightly widened toward the tip. Pronotum broad, nearly twice as wide as long, and three times as long as vertex; hind border slightly concave; elytra long, narrow. Genitalia: female, last ventral segment scarcely longer than preceding, truncate; lateral angles rounded; male, valve large, triangular; plates short, broad; tips divergent, blunt. Internal genitalia: styles with broad base and acute hook, oedagus elongate, curved, with basal expansion armed with four sharp teeth.

Color: pale gray; vertex with faint median line. Pronotum and elytra with touches of fuscous; front tinged with fuscous, sutures between front and clypeus dark. Beneath black; abdomen black above; legs pale brownish.

Hawaii: Kilauea, dry forest; Pahala; Kona; Naalehu.

Oahu: Honouliuli; coarse grass Manoa Valley, April 2, 1916; coarse grass, Cooke Trail, August 27, 1916; Honolulu, March 30, 1917; November, 1916; Kaumuohona, September 9, 1917; Olympus, Kuliouou, June 25, 1916; Waiawa, August 13, 1916; Manoa, December 4, 1916.

Maui: Lahaina, September 27, 1905.

Kauai: Eleele; Kekaha; Mana, September 21, 1907.

Timberlake has indicated the separation of *N. hospes* from *N. hebe* which was described from Fiji and of which Kirkaldy has considered *hospes* a variety.

Nesosteles plutonis Kirkaldy (fig. 24, d).

Nesosteles plutonis Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 574, 1910.

Head scarcely wider than pronotum, distinctly subangulate. Color pale green, more or less tinged with brown; abdomen mostly black. Length: 4 mm.

Head scarcely wider than pronotum, rounding, subangulate; vertex one third longer

⁵ Osborn, Herbert, Cicadellidae of the Marquesas Islands: B. P. Bishop Mus., Bull. 114, pp. 263-264, 1934.

at middle than next the eye; front moderately tumid; clypeus long, widened toward tip. Pronotum produced anteriorly, nearly passing the front border of eye, nearly three times as long as vertex. Genitalia: female, last ventral segment equal to preceding; hind border truncate; male, valve short, rounded behind; plates broad at base, rounded to acute tips which are about one half the length of pygofer. Internal genitalia similar to *N. hospes* but without toothed base to oedagus and the oedagus longer and more slender.

Color: light brown or greenish brown; head tinged with fulvous; elytra dull green, some specimens nearly hyaline.

Hawaii: Kilauea, F. Muir and O. H. Swezey; Kona, H. T. Osborn. Molokai: Kamoku, D. T. Fullaway. Oahu: Kaala Mountains, O. H. Swezey; Manoa, E. M. Ehrhorn.

The accompanying figures (fig. 24) illustrate the details of the internal genitalia more clearly than verbal descriptions.

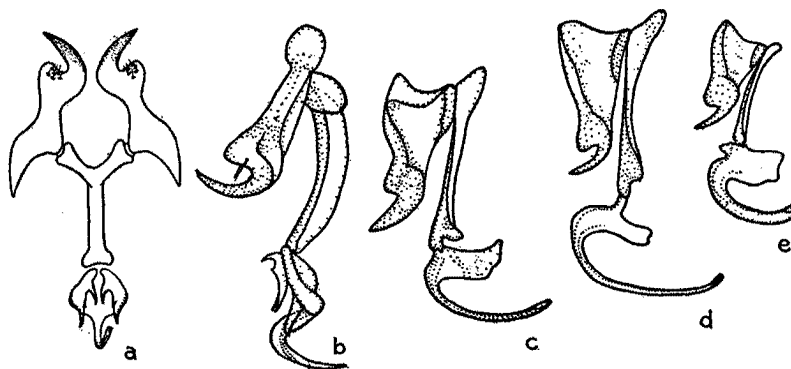


FIGURE 24.—*Nesosteles*, genitalia: a, b, *hospes*, b, side view; c, *peregrinus*; d, *plutonius*; e, *volcanicola*.

***Nesosteles volcanicola* Kirkaldy (fig. 24, e).**

Nesosteles volcanicola Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 574, 1910.

Head angulate, wider than pronotum. Color light greenish with reddish fuscous lines on vertex and pronotum. Length: female, 2.5 mm; male, 2.25 mm.

Head subangulate, rounded, wider than pronotum; vertex half longer at middle than next to eye, distinctly rounded to front, front tumid; clypeus long; margins parallel; tip rounded. Pronotum twice as long as vertex, concave behind. Genitalia: female, last ventral segment as long as preceding, truncate; male, valve small, triangular; plates broad at base, rounded to tip and extended into a narrow upturned appendix. Internal male genitalia, style very similar to *N. plutonis*, connective longer, oedagus thicker and shorter.

Color: yellowish, somewhat tinged with fulvous above; vertex with a median and apical transverse line and a spot each side, tawny and light fuscous; ocelli black. Pronotum with median line, two indefinite transverse bands, brownish; elytra yellowish hyaline. Abdomen above blackish dorsally, pale at the margins; beneath with bases of segments fuscous. In the males the sutures of the face are somewhat infuscate, as also the arcs of the front.

Hawaii: Kilauea, Kohala Mountains, May 24, 1907, O. H. Swezey; Kilauea, F. Muir.

Nesosteles peregrina Kirkaldy (fig. 24, c).

Nesosteles peregrina Kirkaldy: Fauna Haw., vol. 2, Suppl., p. 575, 1910.

Rather broad; head strongly angulate, rounded in front. Length: female, 2.5 mm; male, 2.25 mm.

Head slightly wider than pronotum, strongly arched and subangulate; vertex nearly half longer at middle than next to eye, rounded to front; front tumid; clypeus elongate; sides nearly parallel; tip rounded. Pronotum produced, rounding, subangulate, the apex farther forward than the anterior border of eye; hind border nearly straight. Genitalia: female, last ventral segment longer than preceding, narrow, truncate behind; male, valve short, rounded behind; plates narrowed abruptly to beyond the middle, continued as narrow, blunt tips, two-thirds as long as the pygofer. Internal genitalia: styles short, broad at base narrowed to rather blunt curved tooth; oedagus with inflated base and rather slender curved apical part.

Color: pale green, tinged with fulvous, unmarked; apex of elytra hyaline.

Hawaii: Kilauea, F. Muir, O. H. Swezey; Kohala Mountains, O. H. Swezey.

Oahu: Kaumuohona, O. H. Swezey; Kuliouou, Popouwela, Olympus, Nuuanu.

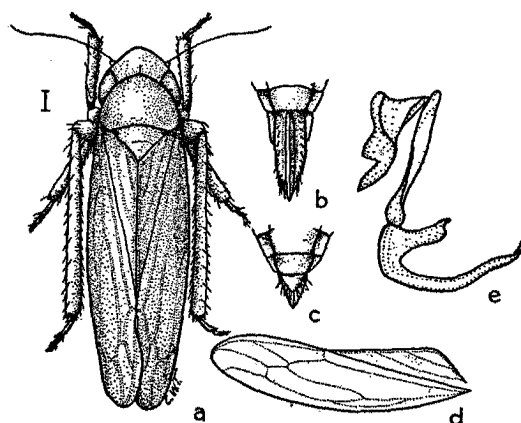


FIGURE 25.—*Nesosteles timberlakei*: a, dorsal; b, female, c, male, e, internal, genitalia; d, elytron.

Nesosteles timberlakei, new species (fig. 25).

Small, slender, costa curved, pale yellowish with no traces of infuscation on elytra. Length: female, 2.5 mm; male, 2.25 mm.

Head distinctly broader than pronotum, angulate before vertex, half longer at middle than at eyes; pronotum nearly twice as long as vertex, arched before, slightly concave behind; elytra long and narrow but with the costa distinctly convex. Female, ventral segment truncate, nearly twice as long as preceding; male, last segment long, rounded, valve small, hind border rounded, plates elongate triangular, tapering to acute tips as long as pygofer, the margins scantily set with fine bristles. Internal genitalia: styles small, similar to *N. volcanicola*; oedagus with slightly inflated base and a long strong sinuous apical part, thicker basally, ending in an upcurved tip.

Described from a long series, about 100 (holotype, allotype, and paratypes) from *Eragrostis variabilis*, Palolo Valley, Oahu, July 29, 1916, and other specimens. 895

This species was indicated by Timberlake as new and I take pleasure in naming it in his honor. It differs quite distinctly from the other species in shape of vertex and while the genitalia are quite similar to either *N. volcanicola* or *N. plutonis*, it is certainly distinct from either.

Genus NESOLINA, new genus

Similar to *Cicadula* in venation but with the head more deltocephaloid. Vertex produced, angular; front flattened, tapering to clypeus which is narrow, nearly twice as long as wide; elytra narrow, two anteapical, four apical areoles. Genotype: *Nesolina lineata*, new species.

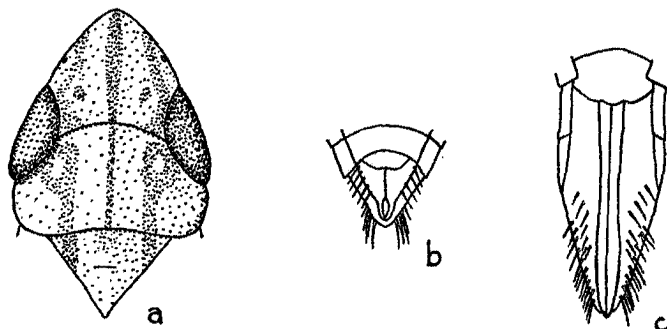


FIGURE 26.—*Nesolina lineata*: a, vertex; b, male; c, female, genitalia.

Nesolina lineata, new species (fig. 26).

A small, slender, light gray species with a distinct median line on vertex, pronotum, and scutellum. The males with dark stripes on the elytra, faint in female. Border of face fuscous. Length: female, 2.75 mm; male, 2.25 to 2.50 mm.

Head produced, a little wider than pronotum; vertex subangulate, as long at middle as between the eyes, more than twice as long at middle as at the eye; front flattened, tapering below the antennae, to base of clypeus; clypeus small, nearly twice as long as width. Pronotum as long as vertex, distinctly concave behind; lateral borders short; elytra narrow, nearly parallel; two anteapical, four apical cells. Genitalia: female, last ventral segment scarcely longer than preceding, truncate behind; male, valve rounded behind; plates very short, transverse, narrowed to middle and apically produced into delicate upturned filaments, reaching nearly to tip of the short pygofer.

Color: pale gray; a dark line from the tip of vertex across pronotum and scutellum; a broad fuscous stripe beginning with dark point on margin of vertex and bordering the eye, across the pronotum and outer angle of scutellum, touching two stripes on the clavus; a broad stripe on the corium divided before the anteapical cell, and included in the entire length of the anteapical; the apical cells smoky. Beneath pale; the borders of front, a stripe across the cheek under the eye, and the under side of the abdomen, suffused with blackish; females are uniformly paler.

Oahu: Diamond Head, from *Eragrostis*, W. M. Giffard; March 25, 1917, 896, 9
 from *Eragrostis variabilis*, W. M. Giffard.

Hawaii: Kau, Halfway House, altitude 1,500 feet, on bunch grass, August 27, 1919.

This is a striking little species, possibly an introduced form, but as records occur for Hawaii and Oahu, it would appear to be well established in the islands and quite possibly an indigenous species.

TYPHLOCYBINAE

The only species so far noted for this group is a species of *Empoasca* and this would appear to be a recent introduction.

Genus EMPOASCA Walsh

Mostly light green species with the elytral veins not forked but running to crossveins and the wings with a submarginal vein and one apical cell.

Genotype: *Tettigonia fabae* Harris (= *Empoasca virescens* Walsh).

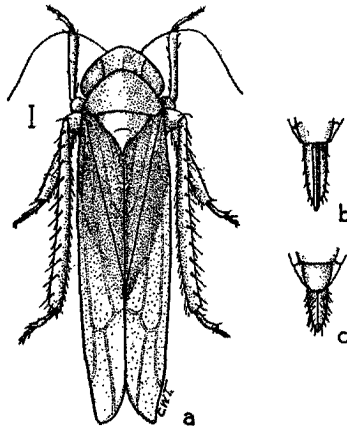


FIGURE 27.—*Empoasca solana*: a, dorsal; b, female, c, male, genitalia.

*Empoasca solana** DeLong (fig. 27).

Empoasca solana DeLong: Tech. Bull. 231, U. S. Dept. Agr., p. 50, 1931.

DeLong informs me that he has identified this species from specimens sent to him by Mr. D. T. Fullaway. A small series of specimens collected on the island of Oahu was included among those sent me from the H.S.P.A. Experiment Station. The species closely resembles *T. fabae* but differs in the internal genitalia. It is light green, the vertex distinctly longer at the middle than at the eye and rounded anteriorly.

* First observed in Honolulu in 1918, on spiny amaranth. Since then it has spread to the other islands, and has been found on a wide range of plants, including melons, beans, and several kinds of weeds.—[O.H.S.]

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