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FULGOROIDEA FROM THE GALÁPAGOS  
ARCHIPELAGO

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**ABSTRACT:** The fulgoroid Homoptera of the Galápagos Archipelago are listed and 22 new species and one new subspecies are described in the families Cixiidae, Delphacidae, Tropiduchidae, and Issidae. The fauna is now largely made up of single-island endemic species that belong to genera known on the adjacent mainland. The origin of the ancestors of the present Alohine Delphacidae, however, is still obscure.

The material on which the present report is based consists of collections made severally in the islands of Floreana, Darwin, Isabela, Santa Cruz, San Cristobal, Santiago, Fernandina, Pinzon, and Wolf by P. D. Ashlock, D. C. Cavagnaro, G. Kuschel, R. O. Schuster, and R. L. Usinger in 1964. These collections were supplemented by the small earlier collections made in Floreana and Santiago by C. Darwin in 1835, in Genovesa and Santa Cruz by W. Beebe in 1923, in Isabela, Floreana, and Rabida by M. Willows in 1932, and in Isabela, Santa Cruz, and Genovesa by T. Crocker in 1935.

These collections belong to the California Academy of Sciences (referred to as "CAS" below), the Bernice P. Bishop Museum (Bishop Museum) and the British Museum (Natural History) (BM (NH) ). The writer's warmest thanks are tendered to the authorities of these museums, and particularly to Dr. P. H. Arnaud, Jr., Dr. E. H. Bryan, Jr., Dr. J. L. Gressitt, and Mr. J. P. Doncaster for the privilege of examining this material. He is also deeply indebted to Dr. H. C. Kjellander of the Naturhistoriska Riksmuseum, Stockholm, for the loan of the type series of specimens on which, in 1859, Stål based the species *Mycterodus productus*, the type species of his genus *Philatis*.



In this report the names currently applied to the islands are used. These occur on the labels of most of the specimens examined, but not on all. The alternative names of the islands concerned here are given in parentheses in the following list: Darwin (Culpepper), Fernandina (Narborough), Floreana (Santa Maria, Charles), Genovesa (Tower), Isabela (Albemarle), Marchena (Bindloe), Pinta (Abingdon), Pinzon (Duncan), Rabida (Jervis), San Cristobal (Chatham), Santiago (San Salvador, James), Santa Cruz (Indefatigable, Chaves), and Wolf (Wenman).

#### HISTORICAL RÉSUMÉ

In 1851, Walker described an issid (*Issus varius*) from Floreana and three species of Delphacidae (*Delphax substitua*, *Delphax vicaria*, and *Delphax simulans*) from Floreana and Santiago. In 1859, Stål described a further issid, *Mycterodus productus*, based jointly on specimens from Peru, Panama, and the Galápagos Islands, and three years later he made this species the type of a new genus, *Philatis*. In 1877, Butler described yet another issid, *Issus rostrifer*, from Floreana. No further additions were made until 1924, when Osborn described two new species of *Philatis* (*Philatis cinerea* and *Philatis major*) from Genovesa and Santa Cruz. Nine years later, Van Duzee added three further species to this genus, *Philatis breviceps* from Floreana, *Philatis serva* from Isabela, and *P. vicinus* from Rabida, and a new species of the cixiid *Oliarus* (*Oliarus galapagensis*) from Isabela, and in 1937 he described *Euthiscia crockeri* (Issidae) and recorded the presence in Isabela and Santa Cruz of the cixiid *Nymphocixia*, the Galápagos specimens of which he referred to *Nymphocixia unipunctata*, a species that in 1923 he had described from Espiritu Santo Island, in the Gulf of California.

#### GEOGRAPHICAL DISTRIBUTION

In the present collection 22 new species were discovered. The status and generic assignment of the known species has been revised. The fulgoroid fauna, as here recognised, and its distribution in the Archipelago and elsewhere, is listed in the synopsis below. This list is subjective in that records that the writer regards as erroneous, as having arisen from misidentifications by earlier workers, have not been included.

The entries in the list, and the number of specimens of each that have been secured, probably reflect the amount of time spent in collecting in each locality, as well as the comparative richness of the fulgoroid fauna of each island. From an inspection of the list it is possible to surmise where further collecting is likely to bring the existence of new species to light, but only a scrutiny of the collection data can reveal the fact that, even in the islands most visited, the higher uplands are still virtually unworked.

It has long been recognized that the fauna of this archipelago, is of American



DISTRIBUTIONAL LIST OF FULGOROIDEA OF THE GALÁPAGOS ARCHIPELAGO

	Darwin (Culpepper)	Wolf (Wenman)	Genovesa (Tower)	Santiago (San Salvador, James)	Rabida (Jervis)	Pinzon (Duncan)	North and South Seymour	Santa Cruz (Inde- fatigable, Chaves)	San Cristobal (Chatham)	Floreana (Santa Maria, Charles)	Fernandina (Narborough)	Isabela (Albemarle)
CIXIIDAE												
<i>Nymphocixia vanduzeei</i> Muir								+			+	+
<i>Oliarus galapagensis</i> Van Duzee												+
<i>O. remansor</i> *						+						
<i>O. albandus</i> *									+			
<i>O. agrippa</i> *								+				
<i>O. alastor</i> *										+		
DELPHACIDAE												
<i>Nesosydne brimo</i> *								+				
<i>N. simulans</i> (Walker)										+		
<i>N. iphis</i> *				+								
<i>N. alcmaeon</i> *								+				
<i>N. augur</i> *											+	
<i>N. olipor</i> *								+				
<i>N. seneca</i>											+	
<i>Peregrinus maidis</i> (Ashmead)								+				
<i>Sogatella kolophon</i> (Kirkaldy)								+	+			
<i>Syndelphax dissipatus</i> (Muir)								+				
<i>Caenodelphax teapae</i> (Fowler)								+				
<i>Pissonotus substitua</i> (Walker)										+		
TROPIDUCHIDAE												
<i>Colgorma menalcas</i> *										+		
ISSIDAE												
<i>Philatis vicinus</i> Van Duzee					+							
<i>P. servus</i> Van Duzee												+
<i>P. breviceps</i> Van Duzee										+		
<i>P. cinerea</i> Osborn			+									
<i>P. major</i> Osborn								+				
<i>P. varia</i> (Walker)				+								
<i>P. rostrifera</i> (Butler)										+		
<i>P. crockeri</i> (Van Duzee)								+				
<i>P. monaeses</i> *									+			
<i>P. lento</i> *										+		
<i>P. deucalion</i> *								+				
<i>P. delia</i> *								+				
<i>P. athamas</i> *	+											
<i>P. atrax</i> *								+				
<i>P. latobius</i> *		+										
<i>P. lycambes</i> *						+						
<i>P. daunus</i> *				+								
<i>P. auson</i> *						+						
<i>P. opheltes</i> *							+					

\* New species are denoted by an asterisk.



origin, and the present collection is in conformity with this finding in that most of the species belong to genera that are represented on the mainland. The Delphacidae comprise the most interesting element of the fauna, and include two tropicopolitan species, *Peregrinus maidis* (Ashmead,) and *Sogatella kolophon* (Kirkaldy), the tropical American *Caenodelphax teapae* (Fowler), and *Syndelphax dissipatus* (Muir), a species doubtfully referable to the American genus *Pissonotus*, and several species of Alohini that are referred to the broad concept of *Nesosydne*. *Syndelphax dissipatus* has been recorded in Brazil and Ecuador, the writer has taken it in Trinidad, West Indies, and has seen a series from Clipperton Island (Clipperton Rock, 20 August 1958 (C. L. Harbin) ).

The Alohini comprise a group of closely related species and a single isolated species: their nearest relatives are not known; they do not closely resemble any of the known Pacific or American species.

Family CIXIIDAE Spinola  
*Nymphocixia* Van Duzee

VAN DUZEE, 1923, p. 189. Haplotype, *Nymphocixia unipunctata* Van Duzee, 1923, p. 189.

Anal segment of male moderately long, apical margin in dorsal view acute, lateral margins rather deep, each produced ventrad at one-third from base in a small angular lobe. Pygofer in lateral view with posterior margin broadly and almost evenly convex, dorsolateral angles not distinct, a large triangular medio-ventral process present. Aedeagus with basal portion tubular, rather strongly produced ventrad in a vertical plate which is deepest near base; a rather long spinose process arising on right near apex, directed ventrocephalad, a second slender spinose process, subequal to first, arising below aedeagus at apex, and directed cephalad; a third slender spinose process, about as long as first, and weakly sinuate in its basal half, arising on left near apex, directed ventrocephalad; flagellum short and broad, membranous except for four short stout spinose processes, one, the largest, arising ventrally on left, directed ventrad then curving caudad, two arising on upper margin on left, and the fourth arising from a broad lobe on right. Genital styles slender, parallel-sided and almost straight, directed caudad, a slender finger-like process directed dorsad, arising dorsally a little before apex.

Two species have been described in *Nymphocixia*, the first *Nymphocixia unipunctata* Van Duzee from Espiritu Santo Island, in the Gulf of California, and *Nymphocixia vanduzeei* Muir from Cartagena, Colombia. The latter was stated to agree with the description of *N. unipunctata*, and was not differentiated from it by Muir. Through the courtesy of Dr. Paul Hurd the writer has been able to examine paratypes of *N. unipunctata* (fig. 1, H, K). He was also able to examine series from Panama, loaned from the U. S. National Museum.



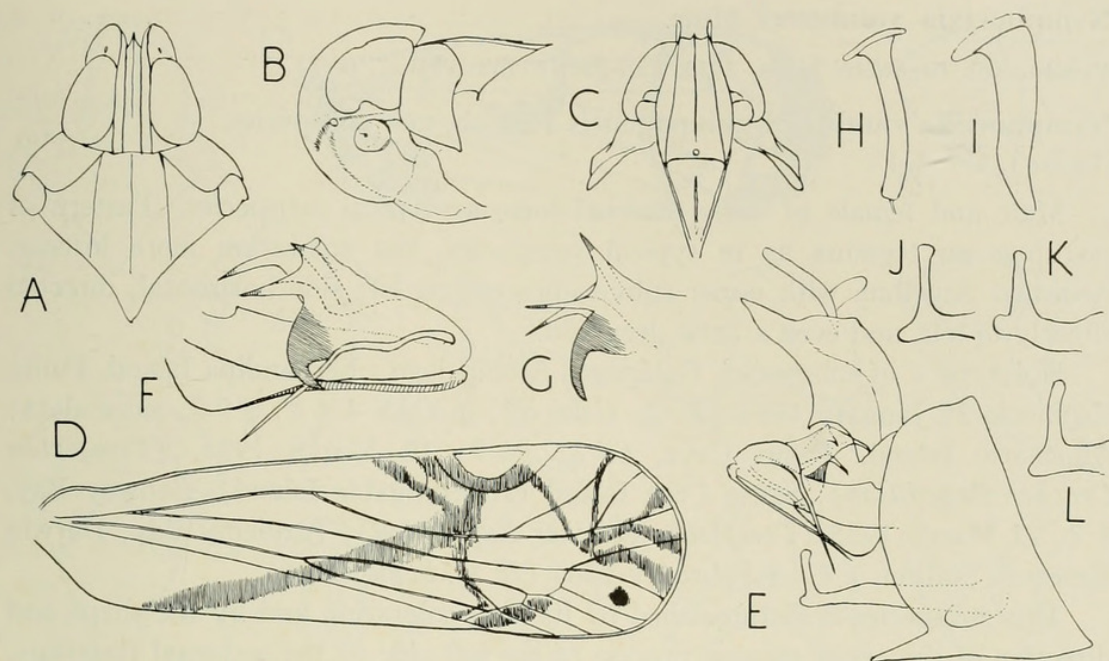


FIGURE 1. *Nymphocixia vanduzeei galapagensis*, new subspecies. A, Head, pronotum and mesonotum, dorsal view; B, the same, lateral view; C, frons, clypeus and lateral lobes of pronotum, antero-ventral view; D, tegmen; E, male genitalia, right side; F, apical portion of aedeagus, left side; I, strut between aedeagus and base of genital styles; J, apex of right genital style, viewed slightly posterolaterally. *Nymphocixia vanduzeei* Muir (Panama sample) G, apical portion of aedeagal flagellum, left side; L, apex of right genital style, viewed slightly posterolaterally. *Nymphocixia unipunctata* Van Duzee, H, strut between aedeagus and base of genital styles; K, apex of right genital style, viewed slightly posterolaterally.

On the basis of these collections, he is of the opinion that there are indeed two species present, but that they are very closely allied. They appear to be separable as follows:

Anterior margin of head, in profile, unevenly rounded, slightly less strongly convex in lower half, posterior end of sides of head above eyes rectangularly truncate; blemmata present, eyes with dorsal margin evenly rounded; tegmina with claval veins uniting slightly distad of  $Cu_1$  fork, and only a little basad of level of  $Sc + R$  fork; vertical strut between base of aedeagus and base of genital styles, straight, relatively slender, and of equal width throughout; dorsal process near apex of genital styles distinctly tapering from base to apex ..... *N. unipunctata* Van Duzee

Anterior margin of head, in profile, evenly rounded, as convex in lower half as in upper, posterior end of sides of head above eyes subacutely truncate; blemmata absent, eyes with dorsal margin feebly excavate at middle; tegmina with claval veins uniting level with  $Cu_1$  fork and strongly basad of level of  $Sc + R$  fork; vertical strut between base of aedeagus and base of genital styles straight or weakly sinuate, distinctly broad, broadest at junction with aedeagus and narrowing towards genital styles; dorsal process near apex of genital styles parallel-sided, even if slightly curved, not at all tapering distad ..... *N. vanduzeei* Muir



***Nymphocixia vanduzeei* Muir.**

*Nymphocixia vanduzeei* MUIR, 1930, Pan-Pacific Ent., vol. 7, p. 13.

***Nymphocixia vanduzeei galapagensis* Fennah, new subspecies.**

(Figure 1, A, F, I, J.)

Male and female of same external form as typical subspecies. Pattern of markings on tegmina as in typical subspecies, but coloration more intense. Aedeagal flagellum with upper spinose process on left side horizontal, directed slightly to left, and even a little decurved.

Holotype ♂ of subspecies, Galápagos Archipelago : Fernandina Island, Punta Espinosa, 29 January 1964 (*R. L. Usinger*), in CAS 4 ♂♂, 8 ♀♀, same data; Albemarle Island, Tagus Cove, 6 ♂♂, 5 ♀♀, 10 March 1935, (*Templeton Crocker Expedition*); Santa Cruz Island (Indefatigable Island), Conway Bay, 1 ♀, 22 March 1935 (*Templeton Crocker Expedition*); Academy Bay, Darwin Research Station, 1 ♂, 8 February 1964 (*R. O. Schuster*).

This subspecies is distinguished by its bold coloration and by the shape and direction of the upper spinose process of the left side of the aedeagal flagellum. In the typical subspecies (as interpreted from dissected males from Panama) this process is straight, and directed dorsocephalad (fig. 1, G-L).

The close similarity between the Galápagos population and that from the mainland of South America justifies the assumption that, in *Nymphocixia*, it was from western South America that the islands were colonized.

***Oliarus* Stål**

STÅL, 1862, p. 306. Logotype, *Cixius walkeri* Stål, 1859, p. 272.

***Oliarus galapagensis* Van Duzee.**

(Figures 2, A-D, I; 3, A-C.)

*Oliarus galapagensis* VAN DUZEE, 1933, p. 33.

Vertex longer at lateral margin than broad at level of anterior margin of eyes (♂, 2.3:1; ♀, 2.1:1).

Frons with median carina prominent, intercarinal areas fuscous-piceous, carinae tawny. Rostrum distinctly surpassing post-trochanters and attaining basal quarter of postfemora. Mesonotum with intermediate carinae prominent, curved outward basally. Post-tibiae with two spines laterally in basal half, the basal spine small, apically with six spines, one larger than the others, basal metatarsal segment and second metatarsal segment each with seven spines apically. Tegmina milky hyaline, veins fuscous, with darker granules; in female, with a diffuse fascia across base of clavus, a short diffuse curved fascia between *Sc* + *R* fork and *Cu*<sub>1</sub> fork, and a suffusion overlying all transverse veinlets, fuscous.

Anal segment of male in dorsal view subovate, longer than broad (1.4:1), apical margin short, slightly produced caudad, shallowly excavate, anal foramen



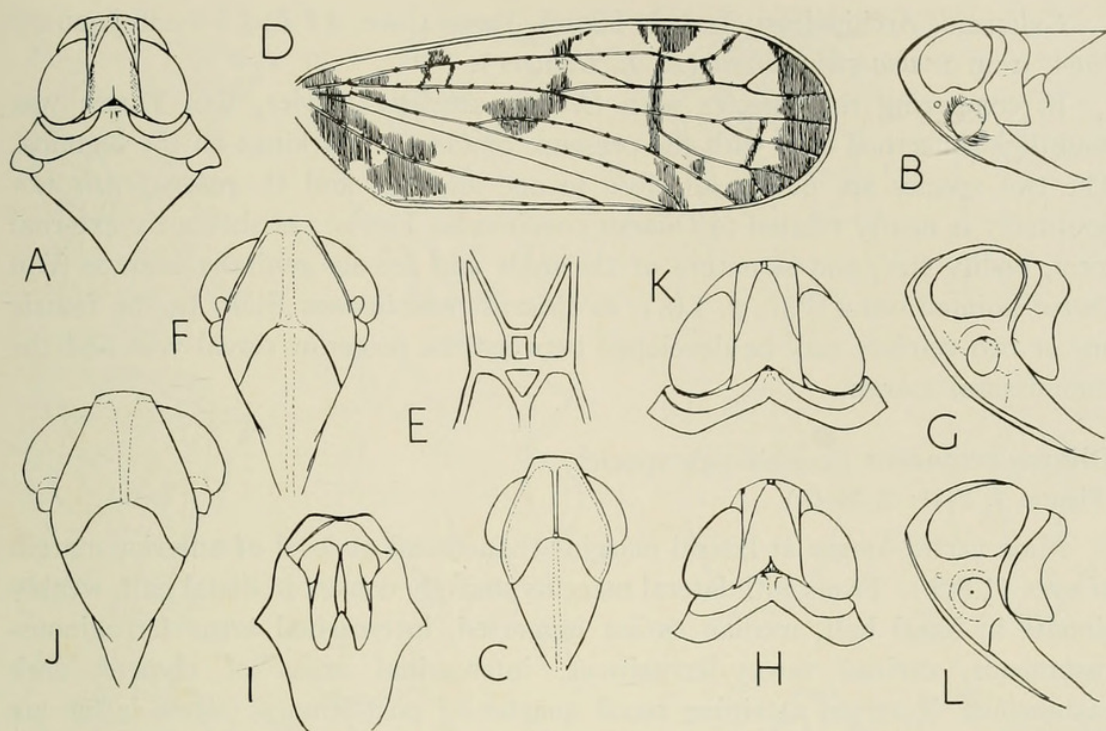


FIGURE 2. *Oliarus galapagensis* Van Duzee. A, Head, pronotum and mesonotum, dorsal view; B, the same, lateral view; C, frons and clypeus; D, tegmen; I, male genitalia, posterior view. *Oliarus alabandus*, new species. E, Carinae at apex of vertex and base of frons; J, frons and clypeus; K, head and pronotum, dorsal view; L, the same, lateral view. *Oliarus remansor*, new species. F, Frons and clypeus; G, head and pronotum, lateral view; H, the same, dorsal view.

situated in distal third, its lateral margins elevated and thickened. Pygofer short dorsally, long ventrally, lateral margins each produced caudad in a broadly rounded lobe, medioventral process approximately wedge-shaped, tapering distad, ornamented with five to six parallel rows of ridges. Aedeagus as figured: a moderately long stout sinuate spinose process on right directed caudad (1), a broad ventral plate giving off a short spinose process caudad (3), then narrowing obliquely towards right into a long spinose process that recurves to left beyond apex of main limb of aedeagus, a broad lobe on left at two-thirds from base, produced caudad in a narrow porrect lobe (2), flagellum comprising a stout limb at apex of aedeagus extending from right side to left, then curving cephalad and mesad, dividing into two branches, each tapering into a slender spinose process (4, 5). Genital styles rather short, narrow in basal two-thirds, expanding into a moderately broad lobe in distal third, curved dorsolaterad, weakly concave posteriorly, and rounded dorsally; a triangular lobe on inner face of style near middle.

Male length, 3.2 mm.; tegmen, 3.7 mm.

Female length, 3.5 mm.; tegmen, 3.9 mm.



Galápagos Archipelago: Isabela Island, Tagus Cove, 3 ♂♂, 2 ♀♀, 30 January 1964, from *Scalea gummifera* (R. L. Usinger).

In comparing this species with *Oliarus excelsus* Fowler, Van Duzee was doubtless concerned only with the presence of fuscous markings on the tegmina. The two species are not at all close to one another, and *O. galapagensis* undoubtedly is nearly related to *Oliarus concinnulus* Fowler, as shown by external form, bodily size, and structure of the male and female genitalia and, as Van Duzee pointed out (1937, p. 118), to *Oliarus franciscanus* Stål. In the female one or two veinlets may be developed between the posterior claval vein and the commissural margin.

***Oliarus remansor* Fennah, new species.**

(Figures 2, F-H; 3, M-O.)

Male vertex longer at lateral margins than broad at level of anterior margin of eyes (1.8:1). Frons with lateral margins strongly convex in distal half, weakly sinuate in basal half, median carina immersed, intercarinal areas ferruginous-castaneous, carinae tawny-ferruginous, intercarinal areas of clypeus dark castaneous. Rostrum attaining basal quarter of post-femora (when latter are directed caudad). Mesonotum almost smooth, all carinae being almost completely immersed. Post-tibiae and post-tarsi armed as in *O. galapagensis*. Tegmina milky-hyaline, veins concolorous with fuscous granules; corium with fuscous marking as in female of *O. galapagensis*. Anal segment of male in dorsal view subovate-rhomboidal, longer than broad (nearly 1.4:1), apical margin very short, convex, anal foramen situated in distal two-fifths. Pygofer short dorsally, long ventrally, lateral margins each produced caudad in a broadly rounded lobe, medioventral process approximately wedge-shaped, tapering distad, ornamented with five to six parallel rows of ridges. Aedeagus as figured; a long stout sinuate spinose process on right, directed caudad (1), a long, stout strongly sinuate spinose process on left at base directed caudad, then mesad, and finally ventrad (2), flagellum comprising a stout limb at apex of aedeagus, directed to left, then dividing into two branches that curve cephalad and each terminate in a stout spinose process, the more distad of these processes reaching almost to base of aedeagus. Genital styles rather short, almost straight in basal two-thirds, produced dorsad in a moderately broad lobe in distal third, and rounded apically, a triangular lobe on inner face of style near middle.

Male length, 2.8 mm.; tegmen, 3.0 mm.

*Holotype* ♂, Galápagos Archipelago: Isla Pinzon, summit and upper Caldera areas, 7 February 1964 (*D. Q. Cavagnaro*), in CAS.

This species differs from *O. galapagensis* in its smaller size, in the frontal median carina and mesonotal carina being immersed, and not or scarcely visible, except in coloration, in the form of the apical margin of the male anal segment, and in the armature of the aedeagus.



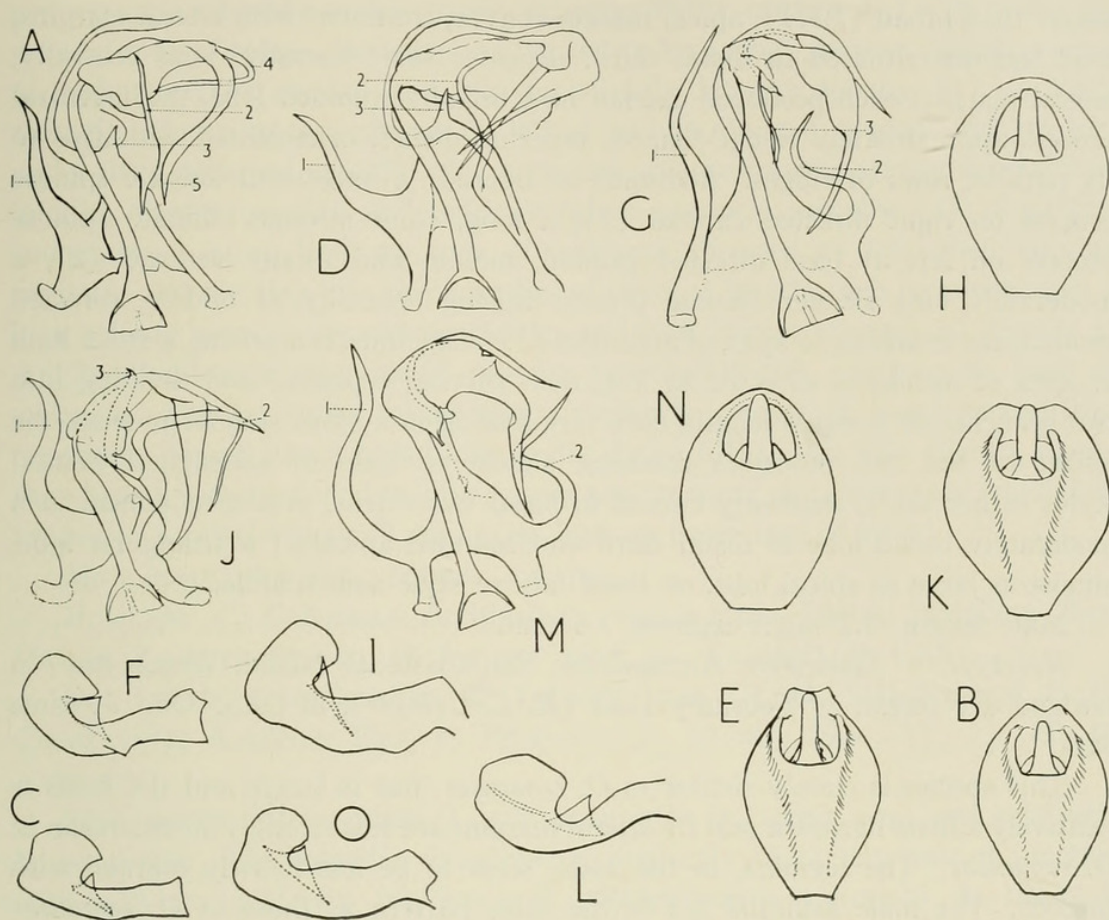


FIGURE 3. *Oliarus galapagensis* Van Duzee. A, Aedeagus, dorsal view; B, anal segment of male; C, right genital style. *Oliarus alastor*, new species. D, Aedeagus, dorsal view; E, anal segment of male; F, right genital style. *Oliarus alabandus* new species. G, Aedeagus, dorsal view; H, anal segment of male; I, right genital style. *Oliarus agrippa* new species. J, Aedeagus, dorsal view; K, anal segment of male; L, right genital style. *Oliarus remansor*, new species. M, Aedeagus, dorsal view; N, anal segment of male; O, right genital style.

***Oliarus alabandus* Fennah, new species.**

(Figures 2, E, J-L; 3, G-I.)

Male vertex longer at lateral margin than broad at level of anterior margin of eyes (1.9:1). Frons with lateral margins moderately convex in distal half, straight in basal half, median carina feeble, almost immersed, intercarinal areas dark ferruginous, carinae tawny-ferruginous, intercarinal areas of clypeus dark castaneous. Rostrum attaining basal quarter of post-femora. Mesonotum with lateral and median carinae weak but distinct, submedian carinae immersed, scarcely visible. Post-tibiae and post-tarsi armed as in *O. galapagensis*. Tegmina milky-hyaline, veins concolorous, granules fuscous; corium with a small spot at base of  $Cu_1$ , a small spot at middle of  $Sc + R$ , a short line at fork of  $Cu_1$ , stigma and transverse veinlets, fuscous. Anal segment of male in dorsal view ovate,



longer than broad (1.3:1), apical margin convex, confluent with lateral margins, anal foramen situated in distal third. Pygofer short dorsally, long ventrally, lateral margins each produced caudad in a broadly rounded lobe, medioventral process approximately wedge-shaped, tapering distad, ornamented with five to six parallel rows of ridges. Aedeagus as figured: a long stout sinuate spinose process on right directed caudad (1), a long, stout strongly sinuate spinose process on left at base directed caudad, mesad, and finally ventrad (2), a moderately long slender spinose process arising ventrally at middle, directed caudad, not reaching to apex of aedeagus (3); flagellum comprising a stout limb at apex of aedeagus, directed to left, then curving cephalad and dividing into two branches of unequal length, each terminating in a stout spinose process, the longer of the two processes reaching almost to base of aedeagus. Genital styles rather short, shallowly curved in basal two thirds, produced dorsad in a moderately broad lobe in distal third and rounded apically; a triangular lobe, almost as large as apical lobe, on inner face of style near middle.

Male length, 3.2 mm.; tegmen, 3.6 mm.

*Holotype* ♂, Galápagos Archipelago: San Cristobal Island, Wreck Bay, in lowland dry forest, 29 February 1964 (R. L. Usinger), in CAS. One ♂, same data.

This species is closely similar to *O. remansor*, but is larger and the frons is relatively a little narrower and its lateral margins are less strongly sinuate than in *O. remansor*. The tegmina, in the male, seem to be less heavily marked with fuscous. The male genitalia are of the same pattern as those of *O. remansor* but differ in having a well developed median process, directed caudad (3) in figure 3, G. In the genital styles, when viewed laterally, the dorsal margin is distinctly concave in its basal two-thirds, not straight as in *O. remansor*, and the ventral margin is more strongly sinuate. Moreover, the triangular lobe on the inner surface is relatively much larger in *Oliarus alabandus* than in *O. remansor*.

***Oliarus agrippa* Fennah, new species.**

(Figure 3, J-L.)

Male vertex longer at lateral margin than broad at level of anterior margin of eyes (2.4:1). Frons with median carina elevated and distinct, intercarinal areas polished, ferruginous, carinae tawny. Rostrum in male scarcely attaining basal quarter of post-femora. Mesonotum with carinae more or less distinct. Post-tibiae and post-tarsi armed as in *O. galapagensis*. Tegmina milky-hyaline, veins testaceous with fuscous granules, each bearing a golden seta; one to three veinlets between posterior claval vein and commissural margin.

Anal segment of male in dorsal view ovate, longer than broad (not quite 1.3:1), apical margin short, shallowly concave, anal foramen situated in distal two-fifths, its lateral margins elevated. Pygofer short dorsally, long ventrally, lateral margins each produced caudad in a broadly rounded lobe, medioventral



process approximately wedge-shaped, tapering distad, ornamented with five to six parallel rows of ridges. Aedeagus as figured: a long stout sinuate spinose process on right directed caudad and curving slightly laterad distally (1); a long, strongly sinuate spinose process on left at middle directed caudad, then to left, and a little decurved apically (2); a sinuate spinose process arising ventrally at middle, directed caudad and tapering rather abruptly apically (3); flagellum comprising a stout limb at apex of aedeagus directed to left, then curving cephalad and dividing into two branches of unequal length, each terminating in a long spinose process, the shorter slender and bent almost through 80 degrees at middle, the longer very broad basally, tapering distad, reaching to base of aedeagus. Genital styles rather short, shallowly sinuate in basal three-fifths, expanding dorsad into a broad lobe in distal two-fifths; this lobe slightly longer than broad, with its dorsal margin convex and its outer margin weakly angulately excavate; a relatively small triangular lobe on inner face of style.

Male length, 4.0 mm.; tegmen, 4.4 mm.

*Holotype* ♂, Galápagos Archipelago: Santa Cruz Island, Academy Bay, Darwin Research Station, 25 January 1964 (*G. Kuschel*), in CAS.

One female, same locality, 25 January 1964 (*R. O. Schuster* and *P. Q. Cavagnaro*); Academy Bay, 18 February, 23 January 1964, 1♂, 1♀ (*P. D. Ashlock*).

This species differs from *O. galapagensis* in its larger size, and relatively longer vertex. The posterior claval vein is distinctly angulately bent at junction with anterior claval vein, whereas in *O. galapagensis* it is straight. In the male genitalia the aedeagus differs markedly in the form of the processes, and, indeed, more closely resembles that of *O. alabandus*. All three species differ from one another in the shape of the genital styles and of their triangular processes, but the styles of *O. alastor* and *O. galapagensis* are more alike than those of *Oliarus agrippa* and *O. alabandus*.

The collection includes a single female specimen from Santa Cruz (Academy Bay, Darwin Research Station, 20 February 1964 (*R. O. Schuster*)) which has a body length of only 3.3 mm. and a tegminal length of 4.0 mm.; the vertex is 1.5 times longer than broad, the apex of the rostrum surpasses the middle of the post-femora when they are directed backwards, and the tegmina are marked as in females of *O. galapagensis*. As the differences between this female and the male of *O. agrippa* are greater than the differences between males and females of homogenous series of other species, its taxonomic status must remain uncertain until more material becomes available.

### ***Oliarus alastor* Fennah, new species.**

(Figure 3, D-F.)

Vertex longer at lateral margin than broad at level of anterior margin of eyes (♂, 2.2:1; ♀, 2.0:1). Frons with median carina elevated and distinct, inter-



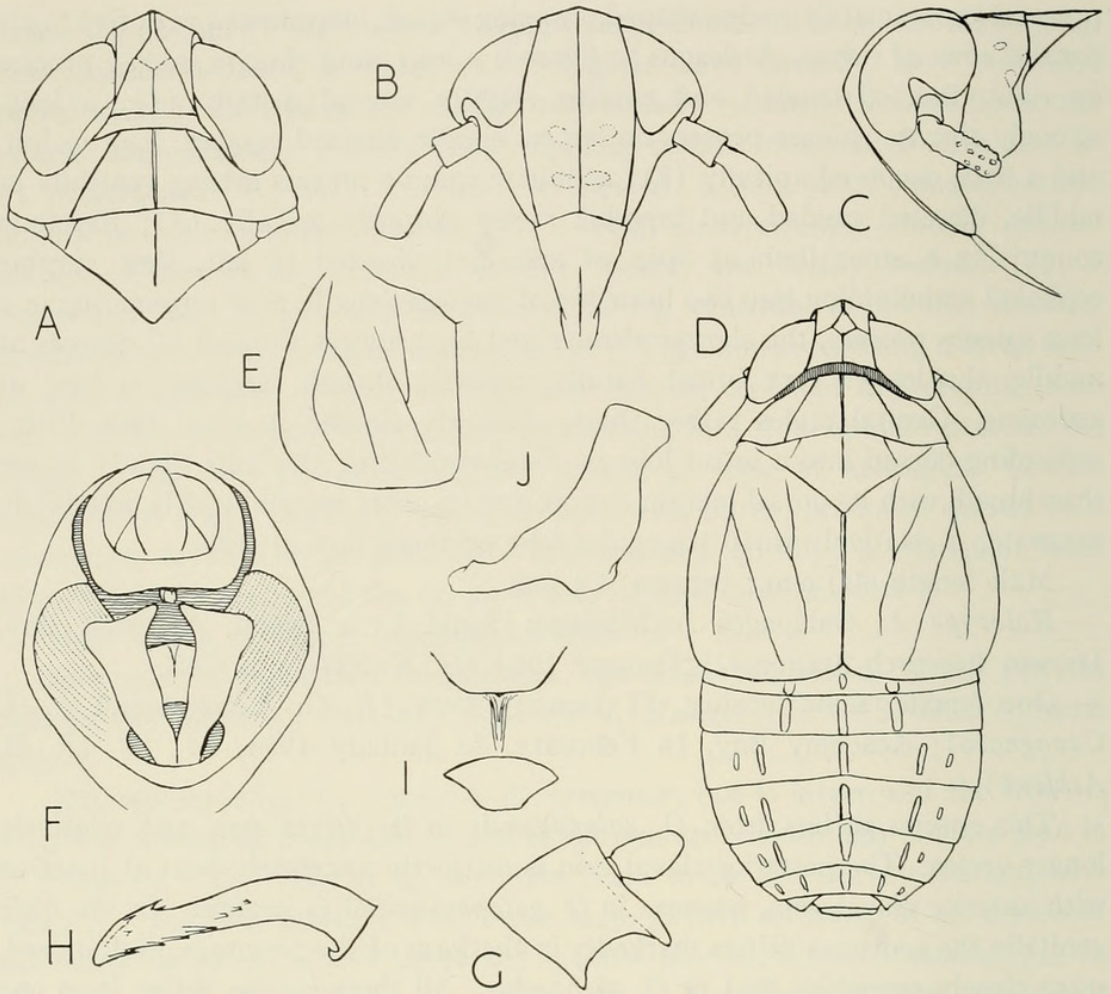


FIGURE 4. *Nesosydne brimo*, new species. A, Vertex, pronotum and mesonotum; B, frons and clypeus; C, head, pronotum and mesonotum, lateral view; D, dorsal surface of body; E, tegmen; F, male genitalia, posterior view; G, anal segment of male, left side; H, aedeagus, right side; I, median portion of diaphragm; J, genital style.

carinal areas dark, fuscous-castaneous, carinae tawny. Rostrum in male a little surpassing post-trochanters, in female just surpassing base of post-femora. Mesonotum with all carinae well developed, median and lateral carinae ferruginous, submedian carinae tawny. Post-tibiae and post-tarsi armed as in *O. galapagensis*. Tegmina milky-hyaline, veins fuscous with fuscous granules, a short line between *M* and fork of *Cu*<sub>1</sub> in corium, a suffusion over all transverse veinlets and inside apical margin, also in female, in clavus near base and over all veins of membrane, fuscous. Anal segment of male in dorsal view subovate, longer than broad (1.5:1), apical margin short, markedly produced caudad, distinctly excavate, anal foramen situated in distal third, its lateral margins strongly elevated and thickened. Pygofer short dorsally, long ventrally, lateral margins each produced caudad in a deeply rounded lobe, medioventral process approximately wedge-shaped, tapering distad, ornamented with five to six



parallel rows of ridges. Aedeagus as figured: a moderately long stout sinuate spinose process on right directed caudad (1); a rather short spinose process medially below aedeagus, directed caudad and slightly to left (3); a long spinose process arising at base of (3), extending to right, then caudad and finally curved to left, surpassing apex of aedeagus; a sinuate vertical ridge dorsally on left near middle produced caudad, then to left, in a rather slender curved spinose process (2); flagellum comprising a stout limb at apex of aedeagus extending from right side to left, then curving cephalad and dividing into two branches, each tapering distally into a long spinose process. Genital styles rather short, moderately narrow in basal two-thirds, expanding into a moderately broad lobe in distal third, curved dorsolaterad, almost straight posteriorly, and rounded dorsally, a triangular lobe on inner face.

Male length, 3.5 mm.; tegmen, 4.0 mm.

Female length, 4.3 mm.; tegmen, 4.7 mm.

*Holotype* ♂, Galápagos Archipelago: Floreana Island, Black Beach, 14 February 1964 (*R. L. Usinger*), in CAS. Three ♀♀, same data.

This species resembles *O. galapagensis* and is evidently very closely allied to it, but is distinctly larger. It differs in having the apical margin of the male anal segment more produced and in the male genitalia, in having process (2) curved, not straight; moreover the posterior margin of the genital styles is not at all excavate, whereas in *O. galapagensis* it is shallowly concave.

#### Family DELPHACIDAE Leach

##### *Nesosydne* Kirkaldy

KIRKALDY, 1907, p. 161. Orthotype, *Nesosydne koae* Kirkaldy, 1907, p. 161.

***Nesosydne brimo*** Fennah, new species.

(Figure 4, A-J.)

Vertex slightly longer medially than broad at base (1.1:1), subacutely rounding into frons, as wide at apex as at base, lateral margins feebly concave, apical margin convex with median carina moderately prominent, Y-shaped carina distinct, submedian carinae uniting before apex of vertex, basal compartment of vertex wider at hind margin than greatest length (1.7:1); and than median length (2:1), frons in middle line longer than wide at widest part (1.9:1), widest at four-fifths from base, lateral margins convex, median carina simple, clypeus at base distinctly wider than frons at apex, postclypeal disc about as long as broad at base, in profile weakly convex, anteclypeus in profile almost straight; entire clypeus in profile moderately convex; rostrum attaining post-trochanters, apical segment rather longer than subapical; antennae attaining level of frontoclypeal suture, basal segment cylindrical, longer than broad (1.4:1), second segment longer than first (2.1:1), ocelli minute, obscure. Pronotum with disc longer in middle line than broad at anterior margin (nearly 1.4:1), lateral carinae straight, attaining hind margin. Post-tibial spur two-thirds as long as



basal metatarsal segment, narrow, solid, with six teeth. Brachypterous tegmina posteriorly truncate. Penultimate (seventh) abdominal ventrite of male only a little longer in middle than at sides (1.3:1).

Fuscous-piceous; median carina of frons, vertex, carinae and subcarinal areas of pronotum and mesonotum light reddish brown or orange brown; intercarinal areas of basal two thirds of frons fuscous with diffuse paler spots; apical margin of frons narrowly, lateral carinae of post-clypeus, genae in posterior half, second antennal segment at apex, femora and tibiae apically, and tarsi except apically, metapleurites at margins, membrane of abdomen, and male genitalia, testaceous; abdomen dorsally in middle line, two rows of linear markings at lateral margin, a line on each side of middle on terga 3 and 4, and two lines sublaterally on terga 5 to 8, sordid orange yellow; mesoscutellum ivory white. Tegmina (brachypterous) subopaque, testaceous, darkening to fuscous in claval area. Anal segment of male short, cylindrical, lateroapical angles broadly rounded, not at all produced, apical margin unarmed, distinctly produced ventrad. Pygofer rather short, posterior opening shallow, longer than broad, dorsolateral angles not produced; diaphragm only slightly recessed below level of lateral margins, moderately broad in its middle portion, with dorsal surface shallowly concave, slightly produced caudad medially in a small lip, which is continued ventrad as a broad vertical carina; medioventral process absent. Aedeagus moderately long, tubular, sinuate, a row of seven teeth, becoming progressively smaller, across left side from apex ventrally to middle dorsally; orifice dorsal at apex, in side view oblique, with two small teeth on its basal edge on right side, and six small teeth along its margin on left side. Genital styles rather short and broad, flattened, inner margin concave in distal half, in posterior view with outer margin weakly sinuate, apical margin straight, oblique, with outer angle rounded, inner angle acute.

Male (brachypterous) length, 2.7 mm.

*Holotype* ♂, Galápagos Archipelago, Santa Cruz Island, Table Mountain, 440 m., 16 April 1964 (*D. J. Cavagnaro*), in CAS.

This species differs from all South American forms of *Alohini* in the shape of the head, form of the antennae and pattern of the male genitalia, and in the carination of the head and proportions of the antennae it agrees with *Nesosydne*, a weakly defined genus with many representatives in the eastern Pacific, and may broadly be compared with the Hawaiian *N. boehmeriae* *N. tetramolopii*, from which it differs in the form of the male genitalia. The writer has seen material of American alohine genera that have not yet been described, but the present species is not particularly close to any of them. Nevertheless, their existence suggests that there are others still undiscovered, and discourages the inference that the ancestor of *N. brimo* reached the Galápagos Archipelago from a source in the eastern Pacific.



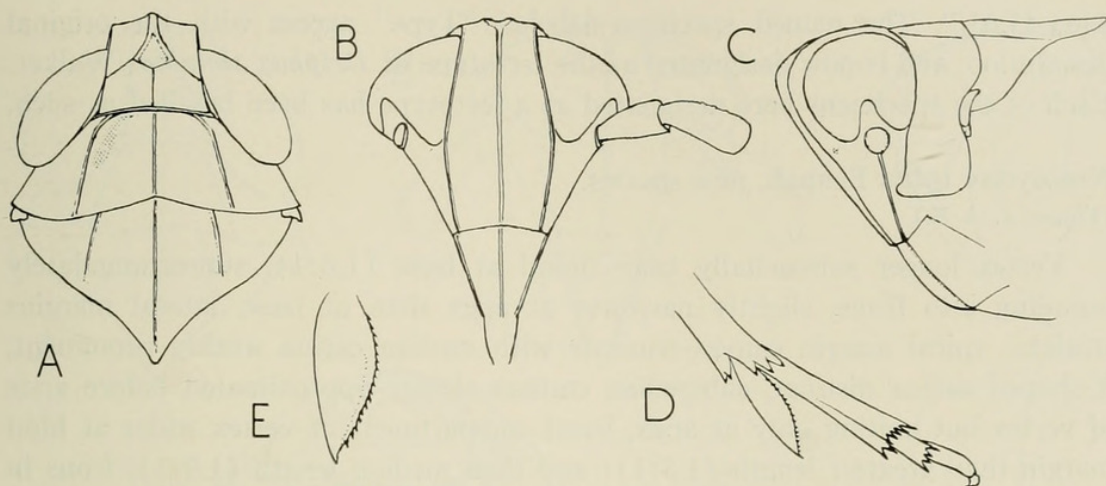


FIGURE 5. *Nesosydne simulans* (Walker). A, Vertex, pronotum and mesonotum; B, frons and clypeus; C, head, pronotum and mesonotum, lateral view; D, apex of post-tibia and post-tarsus; E, post-tibial spur.

***Nesosydne simulans* (Walker) new combination.**

*Delphax simulans* WALKER, 1851, p. 355, fig. 5, A-E.

Vertex as long medially as broad at base, broadly rounding into frons, very slightly narrower at apex than at base, lateral margins straight, apical margin subtruncate, shallowly convex, with median carina prominent, Y-shaped carina distinct, submedian carinae uniting before apex of vertex, basal compartment of vertex wider at hind margin than greatest length (2:1); and than median length (2.2:1), frons in middle line longer than wide at widest part (2.2:1), widest at middle, lateral margins shallowly convex, median carina simple, clypeus at base distinctly wider than frons at apex, postclypeal disc as long as broad at base, in profile weakly convex, anteclypeus in profile moderately convex, entire clypeus in profile moderately convex; antennae surpassing frontoclypeal suture, basal segment longer than broad (1.6:1), second segment longer than first (about 1.2:1), ocelli obsolete. Pronotum with disc as long in middle line as broad at anterior margin, lateral carinae convex, attaining hind margin. Post-tibial spur two-thirds of length of basal metatarsal segment, with 15 to 19 teeth.

Testaceous; carinae of head and pronotum lighter, disc of clypeus and lower surface of abdomen, castaneous-fuscous. Tegmina (brachypterous) hyaline, with faint yellowish tinge, a sublinear spot near junction of common claval vein with commissural margin, and a less distinct spot near base of commissural margin, dark fuscous.

The type material of *Delphax simulans* Walker includes a coelopterous female, gummed on card, accompanied by the labels "24. *Delphax simulans*. Galápagos. Charles Island. 3364.45.63. type." and one brachypterous male, one brachypterous female, one mutilated brachypterous specimen, one nymph, and a nymph of *Philatis*, each gummed on card and accompanied by labels "James Isld.



3365.45.63." The named specimen labeled "Type" agrees with the original description, and is now designated as the lectotype of *Delphax simulans* Walker. Each of the specimens here designated as a lectotype has been labelled as such.

**Nesosydne iphis** Fennah, new species.

(Figure 6, A-F.)

Vertex longer submedially than broad at base (1.6:1), subrectangulately rounding into frons, slightly narrower at apex than at base, lateral margins straight, apical margin convex-truncate with median carina weakly prominent, Y-shaped carina distinct, submedian carinae closely approximated before apex of vertex but uniting only at apex, basal compartment of vertex wider at hind margin than greatest length (1.5:1); and than median length (1.9:1), frons in middle line longer than wide at widest part (nearly 1.9:1); widest at middle, lateral margins distinctly convex, median carina simple, clypeus at base distinctly wider than frons at apex, postclypeal disc slightly longer than broad at base, in profile moderately convex, anteclypeus in profile moderately convex, entire clypeus in profile moderately convex, rostrum scarcely attaining level of post-trochanters, antennae just attaining level of frontoclypeal suture, basal segment longer than broad (2:1), second segment longer than first (1.9:1), ocelli minute, obscure, apparently obsolete. Pronotum with disc longer in middle line than broad at anterior margin (1.1:1), lateral carinae straight, attaining hind margin. Post-tibial spur with nine teeth.

Testaceous; genae, intercarinal areas of postclypeus, lateral lobes of pronotum, anterior border of mesonotum and sometimes disc in part, procoxae, mesopleura and metapleura, except at margins, castaneous. Tegmina (brachypterous) yellowish hyaline, a suffusion across base and a spot at claval apex, castaneous.

Anal segment of male very short, ring-like, lateroapical angles not prominent, rather closely approximated, each produced ventrad in a moderately long spinose process. Pygofer moderately long, posterior opening about as broad as long, dorsolateral angles each a little produced caudad in a broadly rounded lobe, diaphragm with dorsal margin rectangulately incised at middle; medioventral process longer than broad at its base, turbinate, deeply medially incised at apex. Aedeagus moderately long, tubular, narrowed and decurved in distal half, about three very minute teeth or papillae on left ventrally at point of flexure, orifice dorsal, near apex. Genital styles rather long, in posterior view broad in basal two-thirds, with convex margins, slightly twisted and much narrowed in distal third, with inner margin straight, outer margin concave, apex bluntly rounded.

Male (brachypterous) length, 2.1 mm.; tegmen, 1.4 mm.

Female (brachypterous) length, 2.5 mm.; tegmen, 1.5 mm.

*Holotype* ♂, Galápagos Archipelago: James Island, 3365.45.63. (collected by C. Darwin on the voyage of the *Beagle*), in BM (NH). Paratype 1 ♀, 1 muti-



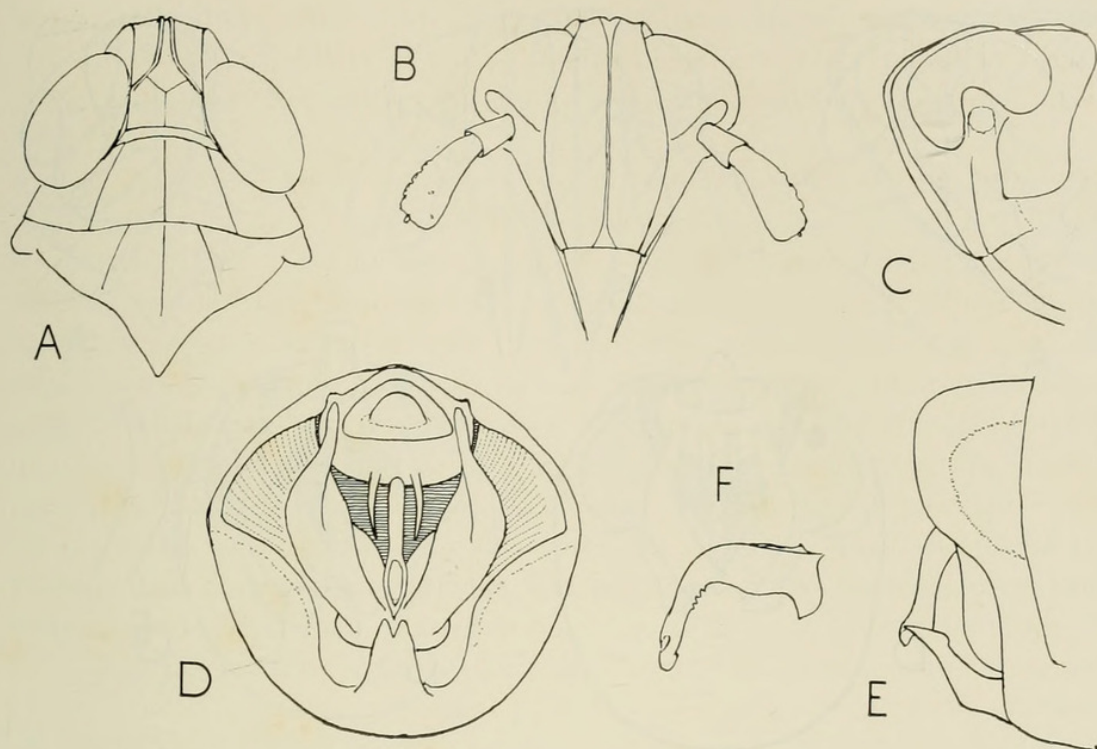


FIGURE 6. *Nesosydne iphis*, new species. A, Vertex, pronotum and mesonotum; B, frons and clypeus; C, head and pronotum, lateral view; D, male genitalia, posterior view; E, the same, right side; F, aedeagus, right side.

lated specimen, 1 nymph, same data. Four ♂♂, 7 ♀♀, Galápagos Archipelago. Santiago Island, NW Slope, 600 m., 30 May 1964 (*D. Q. Cavagnaro*).

This species differs from *N. simulans* in the more strongly convex frontal margins, the relatively longer vertex, and its subrectangular junction with the frons in profile, in the carinae of the vertex remaining apart, though only very narrowly so, as far as the apex of the vertex, and in the fewer teeth on the post-tibial spur.

***Nesosydne alcmaeon* Fennah, new species.**

(Figure 7, A-G.)

Vertex very slightly longer sub-medially than broad at base (1.1:1), broadly rounding into frons, as wide at apex as at base, lateral margins straight, apical margin transverse with median carina feebly prominent, Y-shaped carina distinct, submedian carinae uniting before apex of vertex, basal compartment of vertex wider at hind margin than greatest length (1.8:1); and than median length (2:1), frons in middle line longer than wide at widest part (2.1:1), widest at three-sevenths from base, lateral margins very shallowly convex, almost straight, median carina simple, clypeus at base distinctly wider than frons at apex, postclypeal disc as long as broad at base, in profile weakly convex, anteclypeus



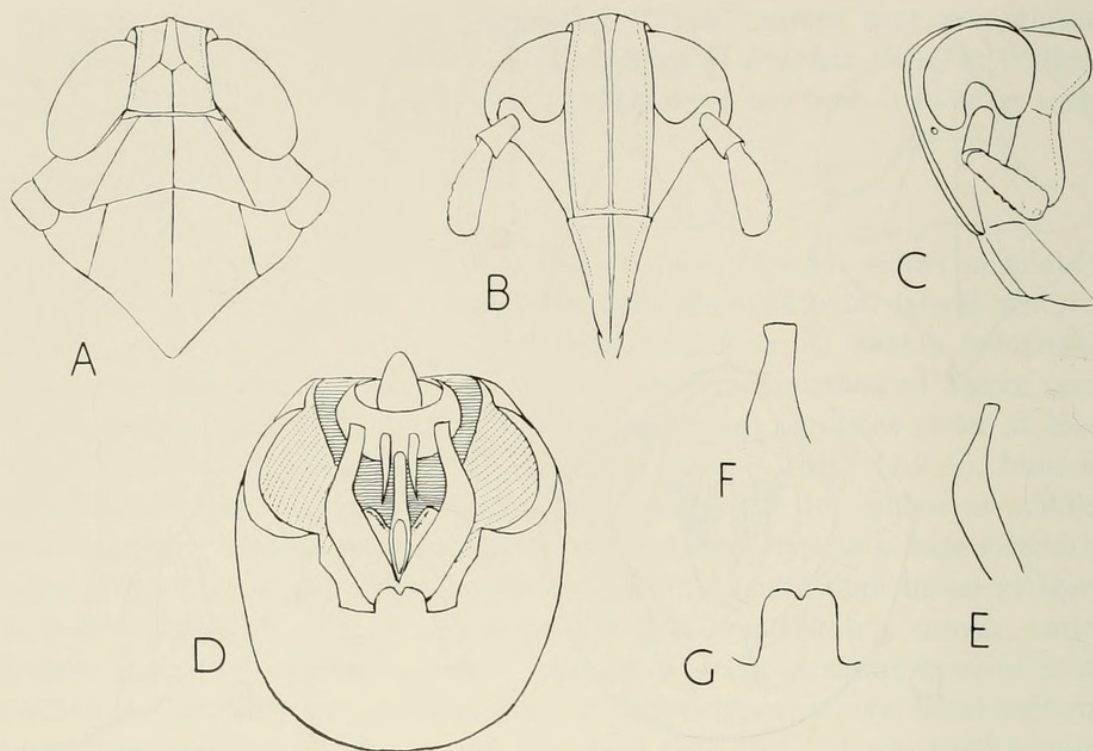


FIGURE 7. *Nesosydne alcmaeon*, new species. A, Vertex, pronotum and mesonotum; B, frons and clypeus; C, head and pronotum, lateral view; D, male genitalia, posterior view; E, genital style, posterior view; F, apex of genital style; G, medioventral process.

in profile moderately convex; entire clypeus in profile moderately convex; rostrum scarcely attaining level of post-trochanters; antennae surpassing level of frontoclypeal suture, basal segment longer than broad (1.7:1), second segment longer than first (2:1), ocelli small but quite distinct. Pronotum with disc a little shorter in middle line than broad at anterior margin (about 1:1.1), lateral carinae straight, attaining hind margin. Post-tibial spur two-thirds as long as basal metatarsal segment, with 12 to 13 teeth.

Fuscous-piceous; vertex, frons, genae, antennae (except at apex of first segment) rostrum, lateral fields of pronotum, tegulae, pleurites marginally, legs, except for a dilute fuscous suffusion on femora, testaceous; carinae of head and pronotum light testaceous; abdominal terga marginally, posterior margin of pygofer dorsally and diaphragm at sides, creamy white or white. Tegmina hyaline, a spot marginally near claval apex, fuscous; veins concolorous in corium, fuscous in membrane. Anal segment of male short, collar-like, lateroapical angles not prominent, rather close together, each produced ventrad in a moderately long spinose process. Pygofer moderately long, posterior opening about as broad as long; dorsolateral angles each distinctly produced caudad in a rounded lobe, diaphragm with dorsal margin deeply angulately excavate medially; medioventral process subquadrate, its posterior margin not or only very slightly notched



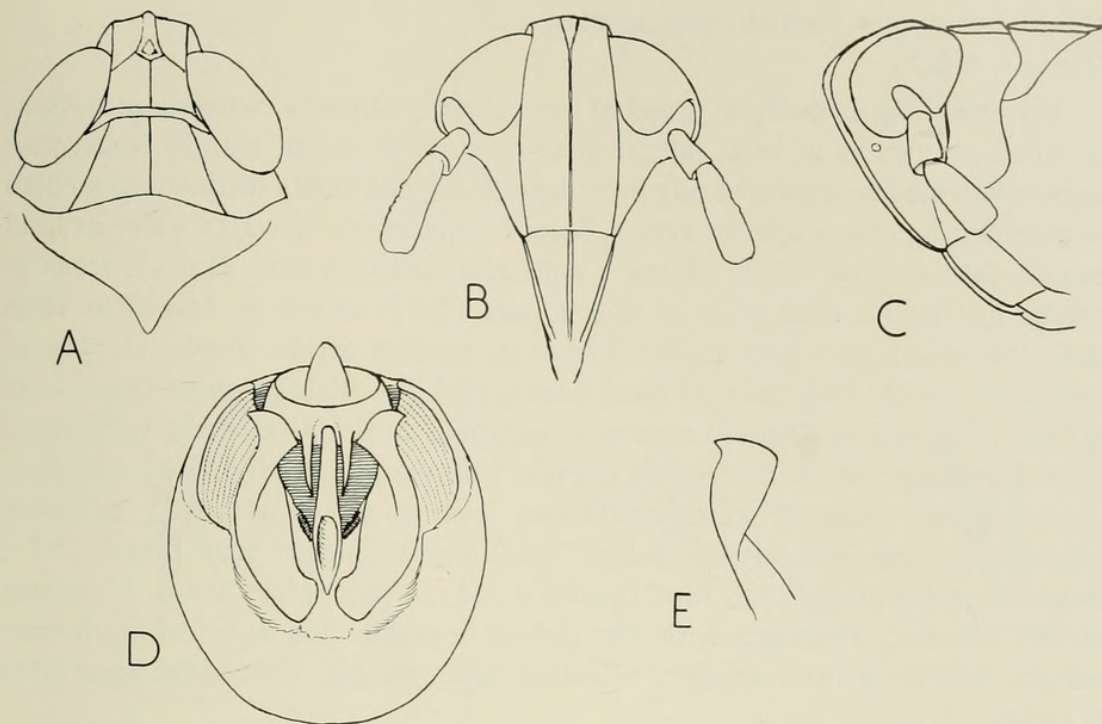


FIGURE 8. *Nesosydne augur*, new species. A, Vertex, pronotum and mesonotum; B, frons and clypeus; C, head, pronotum and mesonotum, lateral view; D, male genitalia, posterior view; E, apex of genital style.

medially. Aedeagus rather long, narrowly tubular, strongly deflexed in distal half, orifice long, dorsal, near apex. Genital styles rather long, moderately narrow, shallowly curving mesad throughout their length, tapering and moderately twisted in distal third, apical margin short, abruptly truncate, inner and outer angles sharply rectangulate.

Male length, 2.5 mm.; tegmen, 2.8 mm.

*Holotype* ♂, Galápagos Archipelago: Isla Santa Cruz, Academy Bay, Darwin Research Station, 9 February 1964 (*D. Q. Cavagnaro* and *R. O. Schuster*), in CAS.

Galápagos Archipelago, Isla Santa Cruz, Horneman Farm, 220 m. 1 ♂, 2 ♀♀, 5 March 1964 (*D. Q. Cavagnaro*); Academy Bay, Darwin Research Station, 1 ♂, 6 ♀♀, 5 February, 28 January 1964 (*R. O. Schuster*); grassland, 750 m., 2 ♀♀, 2 nymphs, 6 April 1964 (*D. Q. Cavagnaro*).

This species bears a close superficial resemblance to *N. simulans*, but differs in the proportions of the posterior compartment of the vertex, in the shape of the lateral margins of the frons, in the proportions of the antennae, and of the pronotal disc, and in the presence of distinct ocelli. From other species described in the present study it is distinguished by the shape of the genital styles.



**Nesosydne augur** Fennah, new species.

(Figure 8, A-E.)

Vertex as long medially as broad at base, slightly obtusely rounding into frons, as broad at apex as at base, lateral margins straight, apical margin transverse-convex with median carina weakly prominent, Y-shaped carina distinct, submedian carinae uniting before apex of vertex, basal compartment of vertex wider at hind margin than greatest length (1.5:1); and than median length (1.6:1), frons in middle line longer than wide at widest part (2:1), widest at two-fifths from base, lateral margins very shallowly convex, median carina simple, clypeus at base a little wider than frons at apex, postclypeal disc slightly longer than broad at base, in profile moderately convex, anteclypeus in profile moderately convex; entire clypeus in profile moderately convex, with margin weakly notched at apex of postclypeus; rostrum scarcely attaining level of post-trochanters; antennae amply surpassing frontoclypeal suture, basal segment longer than broad (2:1), second segment longer than first (nearly 1.7:1); ocelli rather small, blemmata present, obscure. Pronotum with disc as long in middle line as broad at anterior margin, lateral carinae straight, attaining hind margin. Post-tibial spur with 18 teeth.

Testaceous; abdomen dark fuscous, except at posterior margin of ventrites; carinae of head and thorax, anal segment of male and dorsal margin of pygofer, stramineous. Tegmina (brachypterous) yellowish-hyaline, a spot on commissural margin near claval apex, fuscous. Anal segment of male short, collar-like, lateroapical angles not prominent, rather closely approximate, each produced ventrad in a moderately long spinose process. Pygofer moderately long, posterior opening about as broad as long, dorsolateral angles subrectangulate, a little produced caudad and inflected; diaphragm with dorsal margin deeply incised at middle; medioventral process broad at base, apparently lobate. Aedeagus tubular, strongly decurved in distal half, with three or four minute teeth or papillae in a row on each side at point of curvature, orifice lenticular, dorsal, near apex. Genital styles rather long, stout, convex, strongly twisted and incurved in distal half, polished in apical quarter, apical margin convex-truncate, inner angle rounded, outer angle acute.

Male (brachypterous) length, 2.3 mm.; tegmen, 1.5 mm.

*Holotype* ♂, Galápagos Archipelago: Isla Fernandina; west side, 1100 feet, 5 February 1964 (*D. Q. Cavagnaro*), in CAS. Paratypes 3 ♀♀, same data, 5 February 1964 (*D. Q. Cavagnaro*).

This species differs from *N. simulans* in the proportions of the posterior compartment of the vertex, in the shape of the lateral margins of the frons and the proportions of the frons, and in the proportions of the antennal segments. From other species described in the present study it is distinguished by the shape of the genital styles.



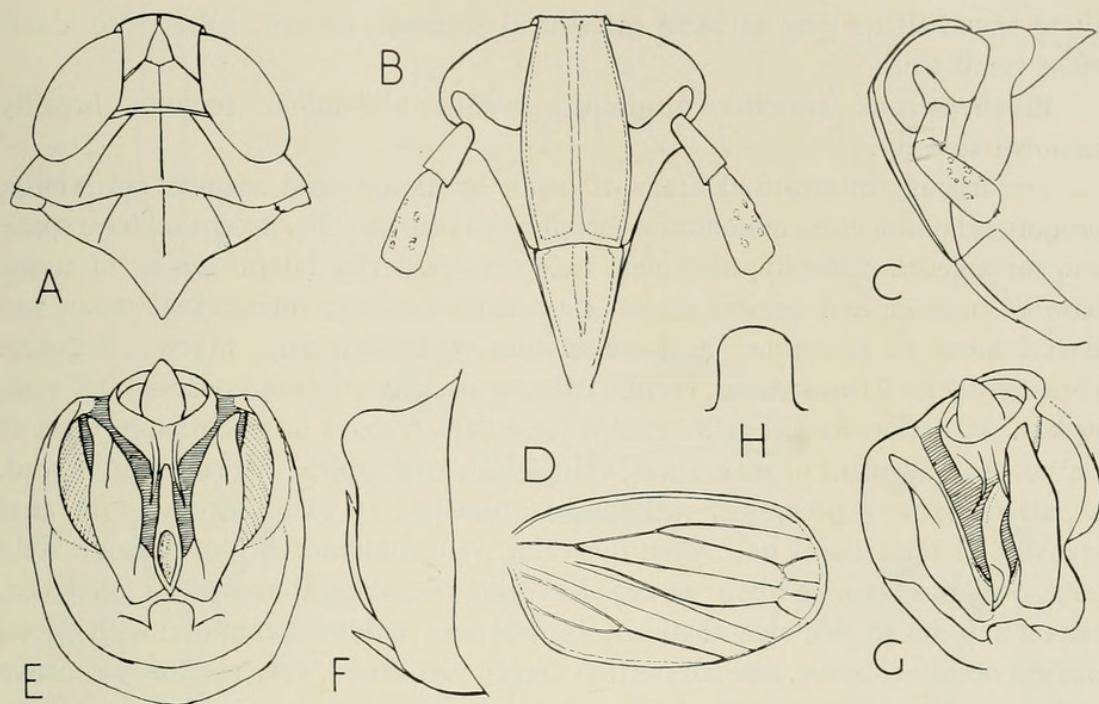


FIGURE 9. *Nesosydne olipor*, new species. A, Vertex, pronotum and mesonotum; B, frons and clypeus; C, head, pronotum and mesonotum, lateral view; D, tegmen; E, male genitalia, posterior view; F, the same, right side; G, the same, posterolateral view from right; H, medioventral process.

***Nesosydne olipor* Fennah, new species.**

(Figure 9, A-H.)

Vertex as long medially as broad at base, obtusely rounding into frons, about as wide at apex as at base, lateral margins straight, apical margin shallowly convex, with median carina only slightly prominent, Y-shaped carina distinct, submedian carinae apparently uniting before apex of vertex, but remaining closely apposed to base of frons, basal compartment of vertex wider at hind margin than greatest length (2.1:1), and than median length (2.6:1); frons in middle line longer than wide at widest part (2:1), widest at two-thirds from base, lateral margins convex, median carina apparently simple, but very narrowly forked at extreme base of frons; clypeus at base scarcely wider than frons at apex, postclypeal disc about as long as broad at base, in profile very shallowly convex, anteclypeus in profile moderately convex; entire clypeus in profile moderately convex; rostrum attaining post-trochanters, apical segment longer than subapical; antennae attaining level of frontoclypeal suture, basal segment longer than broad (about 1.4:1), second segment longer than first (2:1); ocelli minute, obscure. Pronotum with disc shorter in middle line than broad at anterior margin (1:1.1), lateral carinae straight, attaining hind margin. Post-



tibial spur half as long as basal metatarsal segment, narrow, solid, with about eight small teeth.

Brachypterous tegmina attaining seventh abdominal tergum, broadly rounded apically.

Testaceous; intercarinal areas of head, basal antennal segment anteriorly, pronotum behind eyes, mesonotum distally and near middle, procoxae, mesocoxae and metapleura diffusely, abdomen, except at posterior lateral angles of terga, base of pygofer and genital styles, castaneous-fuscos; intercarinal areas and lateral lobes of pronotum, and mesonotum posterolaterally, tawny. Tegmina (brachypterous) transparent, corium castaneous, clavus behind post-cubital vein, yellow. Posterior margin pallid except for a dark fuscous interruption at apex of clavus. Anal segment of male short, cylindrical, lateroapical angles not produced, a pair of spinose processes, rather close together at base, adpressed to anal segment in their basal half, then diverging ventrolaterad. Pygofer moderately long, posterior opening about as broad as long, dorsolateral angles not produced, lateral margins in side view shallowly convex near middle, diaphragm with dorsal margin deeply concave, median portion deeply pigmented, very shallowly concave and strongly produced caudad, medioventral process subquadrate, longer than broad. Aedeagus moderately long, tubular, slightly compressed laterally, decurved in distal half with upper half strongly compressed near point of flexure, orifice dorsal, near apex. Genital styles moderately long, in posterior view widening from base to middle then tapering and slightly twisting to short obliquely truncate apical margin.

Male (brachypterous) length, 2.0 mm.; tegmen, 1.3 mm.

*Holotype* ♂, Galápagos Archipelago, Isla Santa Cruz, Academy Bay, Darwin Research Station, 5 February 1964 (*R. O. Schuster*), in CAS.

This species differs from *P. alcmaeon* in having a frons that is proportionately broader and transversely is distinctly more convex. It differs also in the extremely obscure ocelli and the much narrower post-tibial spur, as well as in the number of teeth on the latter. In the male genitalia it differs in having the spinose processes of the anal segment adpressed to the ventral surface of the style for a greater length, and thereafter curving laterad more strongly, in the medioventral process of the pygofer having no medial notch on the distal margin, in the aedeagus being relatively shorter and less acuminate apically, and in the genital styles being devoid of the narrow distal prolongation found in *P. alcmaeon*.

***Nesosydne seneca*** Fennah, new species.

(Figure 10, A-H.)

Vertex longer medially than broad at base (nearly 1.5:1), subacutely rounding into frons, slightly narrower at apex than at base, lateral margins feebly concave, apical margin convex with median carina rather prominent, Y-shaped carina distinct, submedian carinae uniting at apex of vertex, basal compartment



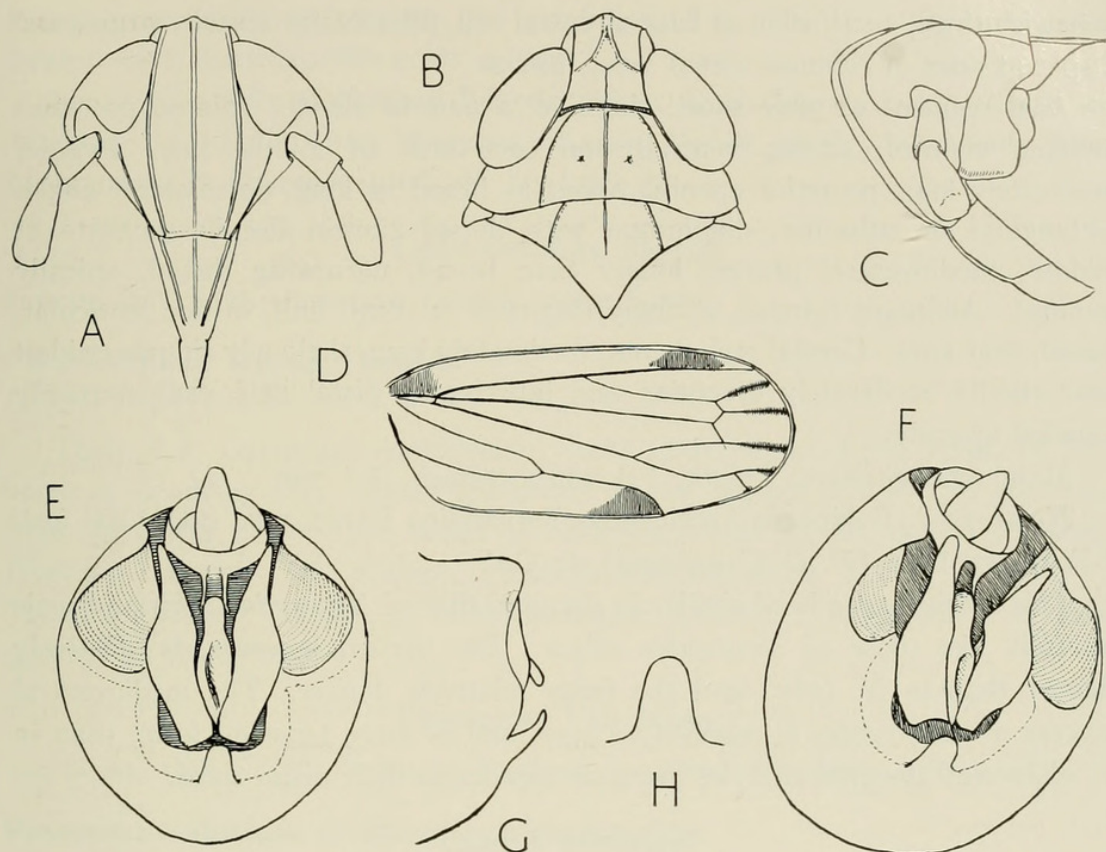


FIGURE 10. *Nesosydne seneca*, new species. A, Frons and clypeus; B, vertex, pronotum and mesonotum, dorsal view; C, head, pronotum and mesonotum, lateral view; D, tegmen; E, male genitalia, posterior view; F, the same, posterolateral view; G, the same, lateral view; H, medioventral process of pygofer.

of vertex wider at hind margin than greatest length (1.8:1), and than median length (2:1), frons in middle line longer than wide at widest part (2.1:1), widest at middle, lateral margins shallowly convex, median carina simple, clypeus at base slightly wider than frons at apex, postclypeal disc slightly longer than broad at base, in profile weakly convex, anteclypeus in profile moderately convex; entire clypeus in profile moderately convex; rostrum not attaining post-trochanters, apical segment about as long as subapical; antennae slightly surpassing level of frontoclypeal suture, basal segment longer than broad at apex (1.7:1), second segment longer than first (2:1); ocelli minute. Pronotum with disc longer in middle line than broad at anterior margin (about 1.2:1), lateral carinae distinctly convex, attaining hind margin. Total length of mesonotum greater than that of scutellum (about 1.8:1). Post-tibial spur with 11 teeth.

Sordid yellowish brown; frons, pronotum and mesonotum, reddish brown, carinae lighter; intercarinal areas of clypeus, coxae basally, abdomen, except at margins and medially on last two tergites, pygofer except in upper half of posterior margin, and genital styles, dark fuscous. Tegmina hyaline, with faint



yellowish tinge, a suffusion at base of costal cell, all veins at apical margin, and a spot at apex of common claval vein, fuscous.

Anal segment of male short, ring-like, a pair of slender spinose processes directed ventrad, arising ventrally on each side of middle line. Pygofer moderately long, posterior opening about as broad as long, dorsolateral angles rectangular or subacute, diaphragm with dorsal margin deeply excavate at middle; medioventral process longer than broad, narrowing distad, apically rounded. Aedeagus tubular, strongly decurved in distal half, orifice lenticular, dorsal, near apex. Genital styles stout, moderately long, shallowly sinuate, widest near middle, moderately diverging and tapering in distal half, each narrowly rounded apically.

Male (coelopterous) length, 2.0 mm.; tegmen, 1.5 mm.

*Holotype* ♂, Galápagos Archipelago, Fernandina Island, west side, 1100 feet, 5 February 1964 (*D. Q. Cavagnaro*), in CAS.

This species has a head similar in shape to that of *Nesosydne iphis* and male genitalia like those of *Nesosydne olipor*. The vertex, however, is relatively shorter than in *N. iphis*, and the frons relatively longer. The medioventral process of the pygofer is relatively longer, and of more tapering form, than in *N. olipor* and the genital styles are more slender in their distal third.

### **Sogatella Fennah**

FENNAH, 1956, Proc. Calif. Acad. Sci., 4th Ser., vol. 28, no. 13, p. 471. Orthotype, *Delphax furcifera* Horváth, 1899 : 372.

### **Sogatella kolophon (Kirkaldy).**

*Delphax kolophon* KIRKALDY, 1907, p. 157.

Galápagos Archipelago : San Cristobal Island, Progreso, 1 ♂, 23 February 1964 (*R. L. Usinger*). Santa Cruz Island, 8 km.–10 km. (Bella Vista) north of Academy Bay, 2 ♂♂, 24 January, 13 February 1964 (*P. D. Ashlock*).

### **Syndelphax Fennah**

FENNAH, 1963, Proc. Roy. Ent. Soc. Lond. Ser. B, vol. 32, p. 15. Orthotype, *Delphax matanitu* Kirkaldy, 1907d, p. 155.

### **Syndelphax dissipatus (Muir).**

*Delphacodes dissipata* MUIR, 1926b, p. 33.

Galápagos Archipelago: Santa Cruz Island, Horneman Farm, 220 m., 1 ♂, 2 April 1964 (*D. Q. Cavagnaro*); Academy Bay, Darwin Research Station, 1 ♂, 28 January 1964 (*R. O. Schuster*).

### **Peregrinus Kirkaldy**

KIRKALDY, 1904, p. 175. Orthotype, *Delphax maidis* Ashmead.



**Peregrinus maidis** (Ashmead).

*Delphax maidis* ASHMEAD, 1890, p. 323.

Six ♂♂, 6 ♀♀, Galápagos Islands, Santa Cruz Island, 8 km. north of Academy Bay, Bella Vista, Horneman Ranch, 10 km. north of Academy Bay, 23 January, 21 February 1964 (*P. D. Ashlock*).

**Caenodelphax Fennah**

FENNAH, 1965, p. 96. Orthotype, *Liburnia teapae* Fowler.

**Caenodelphax teapae** (Fowler).

*Liburnia teapae* FOWLER, 1905a, p. 135.

Three ♂♂, Galápagos Archipelago, Santa Cruz Island, Bella Vista, 10 km. north of Academy Bay. These specimens do not appear to differ in any way from specimens of the type series of *Liburnia teapae* in the British Museum (Natural History). One of these, a male bearing the labels "B.C.A. Homopt. I" "Teapa, Tabasco. H.H.S." "*Liburnia teapae* Fowler" "Type H.T." is here selected as the lectotype.

**Pissonotus Van Duzee**

VAN DUZEE, 1897, p. 236. Orthotype, *Pissonotus marginatus* Van Duzee, 1897, p. 227.

**Pissonotus substitua** (Walker) new combination.

*Delphax substitua* WALKER, 1851, p. 354.

*Delphax vicaria* Walker, 1851, p. 355., new synonymy.

The following description, based on the type of *P. substitua* (body and tegmen) and another specimen (head) is intended to supplement the original. The bodily measurements and coloration should permit the recognition of this species in the Galápagos Archipelago. Vertex longer medially than broad at base (1.3:1), subrectangulately rounding into frons, only very slightly narrower at apex than at base, lateral margins concave, apical margin shallowly convex, with median carina prominent, Y-shaped carina very distinct, submedian carinae not uniting before apex of vertex, basal compartment of vertex wider at hind margin than greatest length (1.8:1); and than median length (2.0:1), frons in middle line longer than wide at widest part (2.0:1), widest just basad of middle, lateral margins shallowly convex, median carina forked in basal eighth of its length, clypeus at base distinctly wider than frons at apex, postclypeal disc as long as broad at base, in profile weakly convex, anteclypeus in profile feebly convex; entire clypeus in profile moderately convex; antennae surpassing frontoclypeal suture, basal segment longer than broad (1.8:1), second segment longer than first (about 1.9:1); ocelli distinct. Pronotum with disc as long in middle line as broad at anterior margin, lateral carinae convex, attaining hind margin. Post-tibial spur two-thirds of length of basal metatarsal segment, with 19 teeth.



Fuscous or ochraceous-fuscous; head, except intercarinal areas of post-clypeus, lateral fields of pronotum, tegulae, margins of pleurites and legs (except femora), testaceous; carinae and hind margin of pronotum narrowly, lighter; abdominal terga at margins, anal segment of female and first valvifers, pallid or ivory white. Tegmina hyaline, a spot between common claval vein and commissural margin near their junction, and a faint cloud in membrane, *M* and *Cu*<sub>1</sub> from nodal line to apical margin, fuscous.

Galápagos Archipelago: Santa Cruz, Bella Vista, 10 km. north of Academy Bay, 1 ♀, 13 February 1964 (*P. D. Ashlock*).

The type material of *Delphax substitua* comprises a macropterous female, without head, gummed on card and accompanied by the labels "21. *Delphax substitua*. Type. Galapagos. Charles Isld. 45.63," and a mutilated brachypterous specimen gummed on card and labelled "James Isld. 3365.45.63." The named specimen labelled "Type" agrees with Walker's description, and is now designated as the lectotype of *Delphax substitua* Walker.

The trivial name *substitua* is one of Walker's quasilatin inventions, doubtless inspired by the participle *substitutus*. There appears to be no authority for regarding such arbitrary species names as Latin adjectives, and this name is accordingly here treated as a noun in apposition to the generic name.

The type material of *Delphax vicaria* Walker comprises part of a thorax (including a fragment of pronotum and most of the mesothorax and metathorax) and one brachypterous tegmen, gummed on card, and accompanied by the labels "23. *Delphax vicaria*. Type. Galapagos. Charles Isld. 3364.45.63," and a delphacid nymph, gummed on card, labelled "James Isld. 45.63." The tegmen and apparent bodily size (as calculated from that of the thorax) of the named specimen labelled "Type" agree with the original description, and this specimen is now designated as the lectotype of *Delphax vicaria* Walker.

#### Family TROPIDUCHIDAE Stål

##### *Colgorma* Kirkaldy

KIRKALDY, 1904, p. 279. Orthotype, *Achilus dilutus* Stål, 1859, p. 271.

The most evident character of this genus is the occurrence in combination of a very broad and short vertex with a broad shallow median frontal carina, but an unusual character of apparently generic value is to be found on the hind margin of the post-coxa: in many Tropicuchid genera this bears a spinose process, often submembranous distally, in *Colgorma* the corresponding structure takes the form of a flattened submembranous subtriangular lobe expanding distally, with its distal margin slightly obliquely truncate.

Two carinae are present at each lateral margin of the pronotum, the more dorsal weak and rather obscure, the lower strong. The post-tibiae have three spines laterally and five apically, and the basal metatarsal segment has five teeth apically.



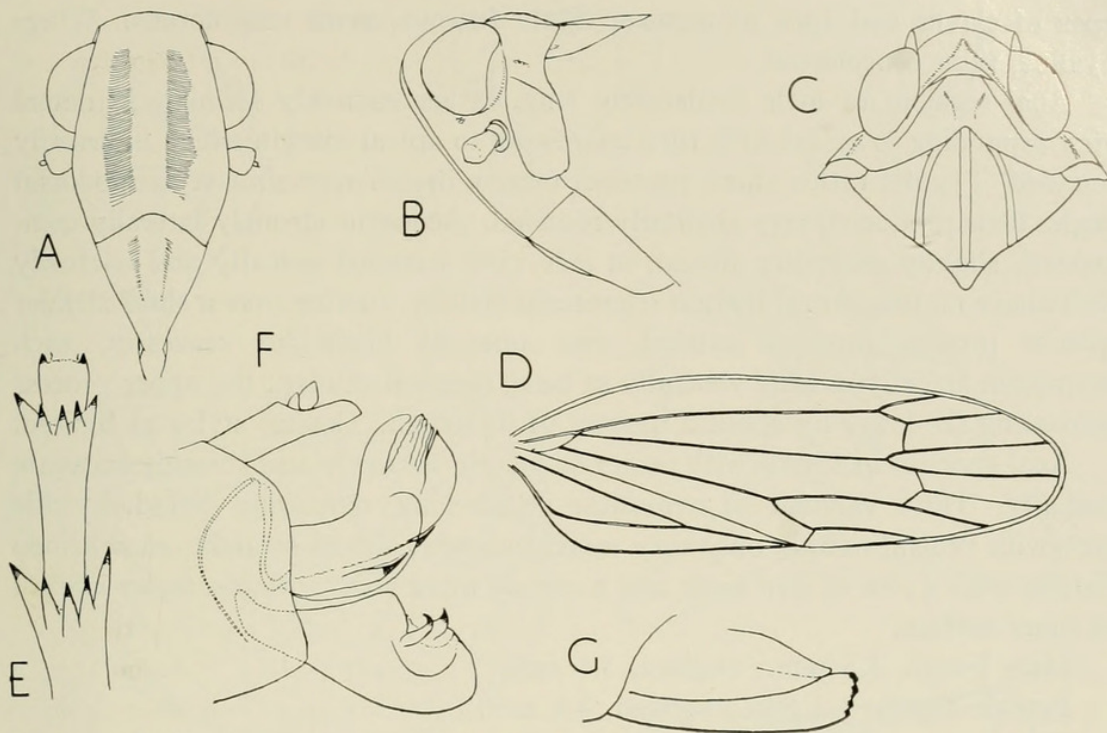


FIGURE 11. *Colgorma menalcas*, new species. A, Frons and clypeus; B, head, pronotum and mesonotum, lateral view; C, head, pronotum and mesonotum; D, tegmen; E, apex of post-tibia and basal two segments of post-tarsus; F, male genitalia, left side; G, ovipositor, left side.

***Colgorma menalcas* Fennah, new species.**

(Figure 11, A-G.)

Vertex broader at base of middle line than long in middle (2.4:1), depressed, median carina distinct in distal half, immersed in a broad triangular elevated area basally, head in profile subacutely (80 degrees) rounding into frons; frons longer in middle line than broad (about 1.3:1), widest at three-quarters from base, ocelli discernible, apparently non-functional, antennae with third segment as broad as long, slightly compressed, arista emerging in lower half of apical margin. Pronotum with median carina broad, simple, not forked basally; mesonotum broader between tegulae than long in middle (1.2:1).

Tegmina longer than broad, not much surpassing abdomen, widest near level of claval apex, *Sc + R* and *M* simple to nodal line, *Cu*<sub>1</sub> forked a little before level of claval apex, *Sc + R* with two branches reaching margin, *M* with two or three, *Cu*<sub>1a</sub> with two. Wings about three-quarters as long as tegmina.

Ochraceous-stramineous; vertex and frons a little tinged with orange brown, disc of pronotum inside lateral carinae basally, and lateral carinae of mesonotum, orange yellow. Tegmina ochraceous hyaline, a suffusion along margin between



apex of clavus and apex of tegmen, dilute fuscous, veins concolorous. Wings hyaline, veins concolorous.

Anal segment of male moderately long, rather narrowly tubular, in dorsal view expanding to apical fifth then narrowing to apical margin which is broadly rounded. Pygofer rather short, posterior margin in side view sinuate, laterodorsal angles little produced, very shallowly rounded. Aedeagus strongly laterally compressed, slightly ascending distad, in side view rounded apically and narrowly cleft above middle, dorsal margin sclerotized distally, roofing over a short slender spinose process directed caudad, two unequal blade-like processes, each acuminate apically, arising ventrally at base, directed caudad, the upper process surpassing the lower by about a quarter of its length. Genital styles as figured.

Anal segment of female with posterior margin narrowly and strongly excavate medially. Third valvulae of ovipositor rather long, narrowing distad, in side view with ventral margin only very weakly convex, almost straight, each armed distally with a row of five teeth and a row of three teeth towards upper margin on inner surface.

Male length, 3.5 mm.; tegmen, 3.6 mm.

Female length, 4.3 mm.; tegmen, 4.4 mm.

*Holotype* ♂, Galápagos Archipelago, Floreana Island, Wittmer's Farm, 15 February 1964 (*R. L. Usinger*), in CAS.

*Paratypes* 1 ♂, 2 ♀ ♀, same data.

The species of the genus, now 5 in number, may be separated as follows:

KEY TO SPECIES OF *Colgorma* Kirkaldy.

1. Frons more than 1.5 times as long in middle line as broad ..... 2  
Frons less than 1.5 times as long in middle line as broad ..... 3
2. Vertex not more than twice as broad as long in middle ..... *C. montana* Metcalf  
Vertex more than twice as broad as long in middle ..... *C. campestris* Metcalf
3. Ocelli bright and clear, apparently functional. Vertex not less than three times as broad at level of base of middle line than long in middle. Tegmina with a subapical row of cells. Third valvulae of ovipositor in side view with lower margin distinctly convex ..... 4  
Ocelli opaque, not functional. Vertex less than three times as broad as long. Tegmina without a subapical row of cells. Third valvulae in side view with lower margin almost straight ..... *C. menalca*s, new species
4. Apex of head in profile acutely rounded. Mesonotum as broad between lateral angles as long in middle to apex of scutellum. Tegmina with nodal line of transverse veinlets distad of middle; apical margin broadly rounded ..... *C. diluta* (Stål)  
Apex of head in profile subrectangularly rounded. Mesonotum broader between lateral angles than long in middle (nearly 1.2:1). Tegmina with nodal line of transverse veinlets at middle, apical margin deeply rounded ..... *C. rufimacula* (Walker)

Family ISSIDAE Spinola

*Philatis* Stål

*Philatis* STÅL, 1862, p. 68. Orthotype, *Mycterodus productus* Stål.



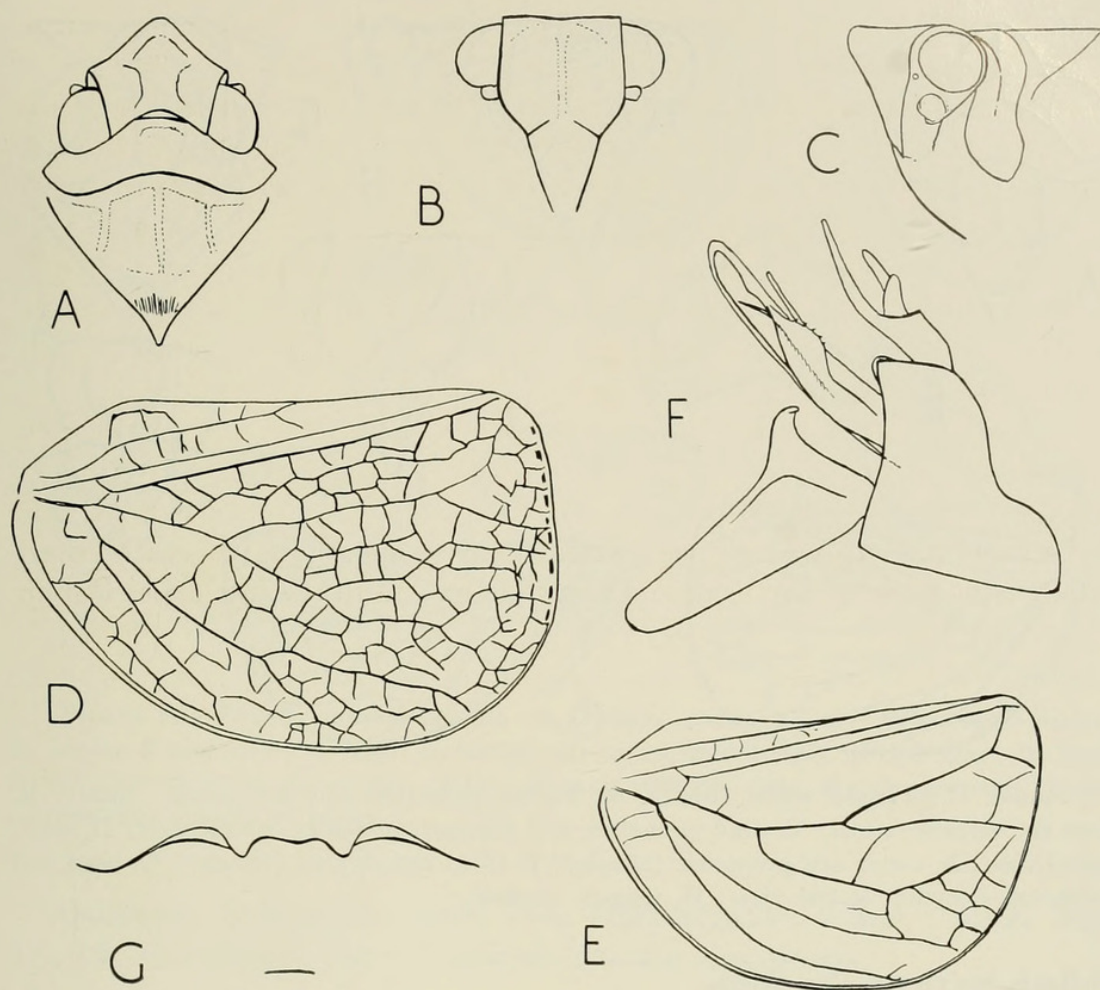


FIGURE 12. *Philatis productus* Stål. A, Vertex, pronotum and mesonotum (female); B, frons and clypeus (female); C, head, pronotum and mesonotum (female), lateral view; D, tegmen (female); E, tegmen (male); F, male genitalia, right side; G, posterior margin of pregenital sternite of female.

In the descriptions that follow, measurements are taken as indicated in figure 18, A: (a) width at level of anterior margin of eyes, (b) length in middle line, (c) length at lateral margin.

### ***Philatis productus* Stål.**

(Figure 12, A-G.)

*Mycterodus productus* STÅL, 1859, p. 278.

This species was originally based on material from the Galápagos Islands, Callao (Peru) and Panama. The writer now designates the specimen in the Naturhistoriska Riksmuseum labelled "Callao Kinb. Typus 463 66" as the lectotype of the species. The figures are of this specimen, which is a female.



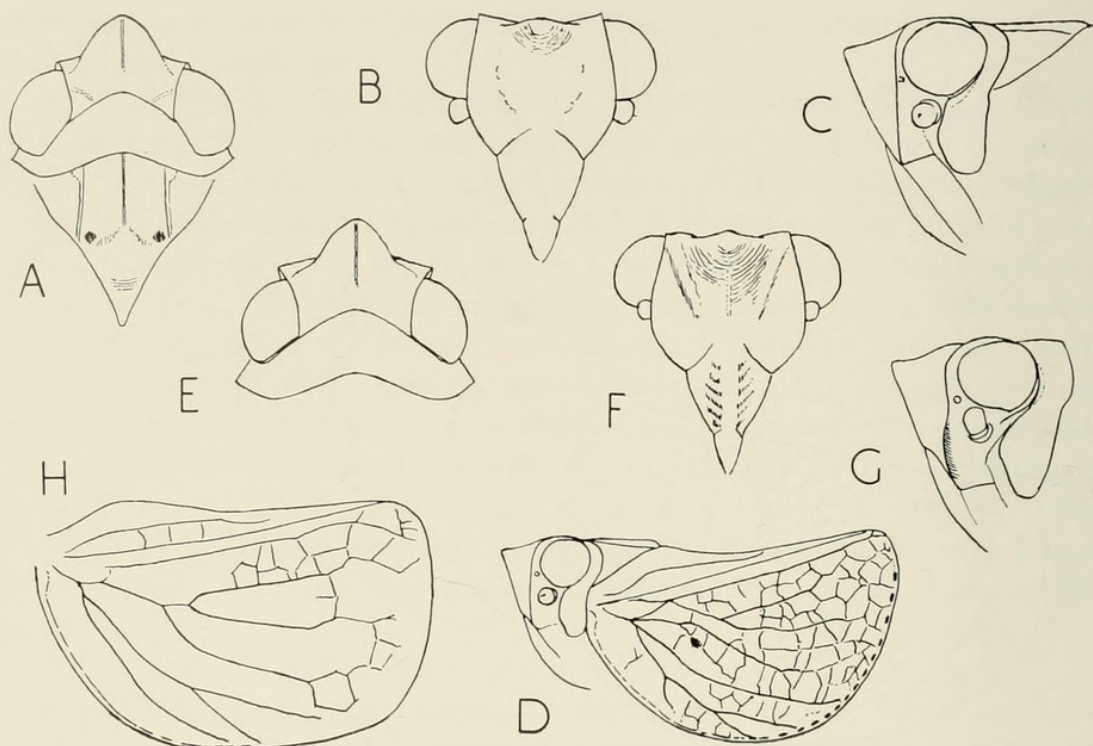


FIGURE 13. *Philatis major* Osborn. A, Vertex, pronotum and mesonotum (male); B, frons and clypeus (male); C, head, pronotum and mesonotum (male), lateral view; D, male, lateral view; E, vertex and pronotum (female); F, frons and clypeus (female); G, head and pronotum (female), lateral view; H, tegmen (female).

***Philatis breviceps* Van Duzee.**

*Philates breviceps* VAN DUZEE, 1933, p. 35.

Female vertex as long in middle line as at lateral margins, wider at level of anterior margin of eyes than long in middle (about 1.9:1), not carinate; frons medially carinate distally. Pronotum with a short fine impressed line medially in basal half.

Posterior margin of pregenital sternite broadly and shallowly excavate medially with basal margin of excavation very feebly sinuate.

Length, total, 3.5 mm. to 4.0 mm.; body, 3.2 mm. to 3.8 mm.; tegmen, 3.0 mm. to 3.5 mm.

Galápagos Archipelago, Floreana (Charles) Island, 2 ♀♀, 3363 77.2 (*C. Darwin*) in BM (NH).

This species is distinguishable by the proportions of the vertex and the shape of the posterior margin of the pregenital sternite.

***Philatis major* Osborn.**

(Figure 13, A-H.)

*Philatis major* OSBORN, 1924, p. 79.



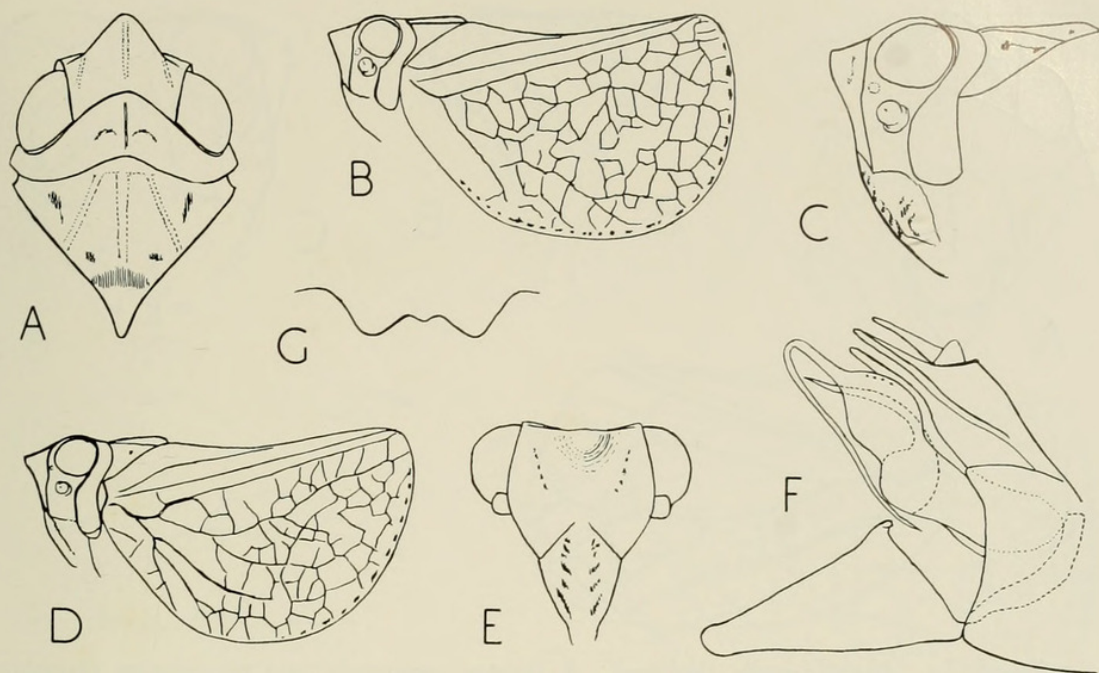


FIGURE 14. *Philatis cinerea* Osborn. A, Vertex, pronotum and mesonotum (male); B, female, lateral view; C, head, pronotum and mesonotum (male), lateral view; D, male, lateral view; E, frons and clypeus (male); F, male genitalia, right side; G, posterior margin of pregenital sternite of female.

Galápagos Archipelago: Santa Cruz (Indefatigable) Island, Conway Bay, 1♂, 1♀, 16 February 1935 (*Templeton Crocker Expedition*).

### ***Philatis cinerea* Osborn.**

(Figure 14, A-G.)

*Philatis cinerea* OSBORN, 1924, p. 78.

Male vertex longer in middle line than at lateral margins (1.3:1), wider at level of anterior margin of eyes than long (1.6:1), distinctly medially carinate, frons not medially carinate, or at most only obscurely. Tegmen longer than broad (1.6:1) and than length of claval suture (not quite 1.1:1). Pygofer with dorsolateral angles moderately produced, acutely rounded. Genital styles in lateral view longer than broad (nearly 1.5:1).

Female vertex longer in middle line than at lateral margins (nearly 1.4:1), wider at level of anterior margin of eyes than long (1.6:1), distinctly medially carinate; frons not medially carinate, or at most only obscurely. Pronotum with median line finely impressed. Tegmen longer than broad (1.6:1) and than length of claval suture (not quite 1.1:1).

Posterior margin of pregenital sternite deeply excavate on each side of middle; median lobe convex, indented at middle, not extending caudad to level of margins on each side.



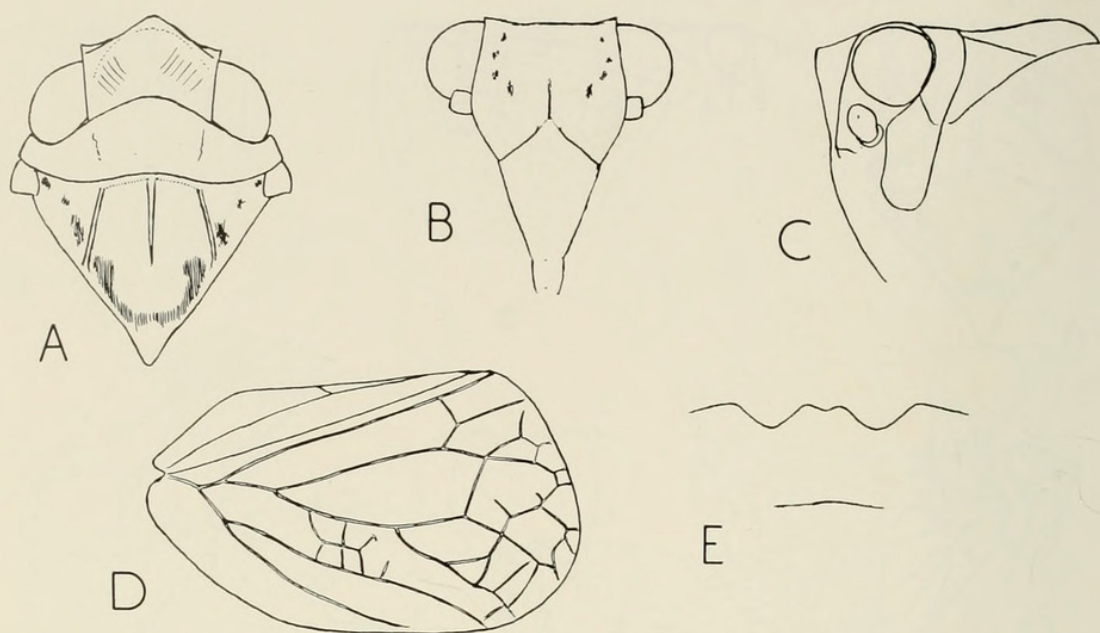


FIGURE 15. *Philatis varia* (Walker). A, Vertex, pronotum and mesonotum (female), dorsal view; B, frons and clypeus (female); C, head, pronotum and mesonotum (female), lateral view; D, tegmen; E, posterior margin of pregenital sternite of female.

Galápagos Archipelago: Tower Island, Darwin Bay, 2 ♂♂, 8 ♀♀, 25 March 1935 (*M. Willows Jr., Templeton Crocker Expedition*).

***Philatis varia* (Walker), new combination.**

(Figure 15, A-E.)

*Issus varius* WALKER, 1851, p. 372.

*Thionia varia* MELICHAR, 1906, p. 286.

*Galapagosana* (?) *varia* CHAMPION, 1924, p. 260.

Female vertex longer in middle line than at lateral margins (1.2:1), wider at level of anterior margin of eyes than long (1.9:1), not medially carinate, frons medially carinate distally. Tegmen longer than broad (1.7:1) and than length of claval suture (1.3:1).

Posterior margin of pregenital sternite strongly excavate on each side of middle, median lobe almost attaining level of lateral margins, distinctly excavate at middle.

Female length total, 5.8 mm.; body, 5.1 mm.; tegmen, 4.5 mm. Galápagos Archipelago: James Island 45.63. 3365. (*C. Darwin*) in BM (NH).

The above supplementary description is based on the type.

***Philatis vicinus* Van Duzee.**

(Figure 16, A-E.)

*Philates vicinus* VAN DUZEE, 1933, Proc. Calif. Acad. Sci., 4th ser., vol. 21, p. 34.



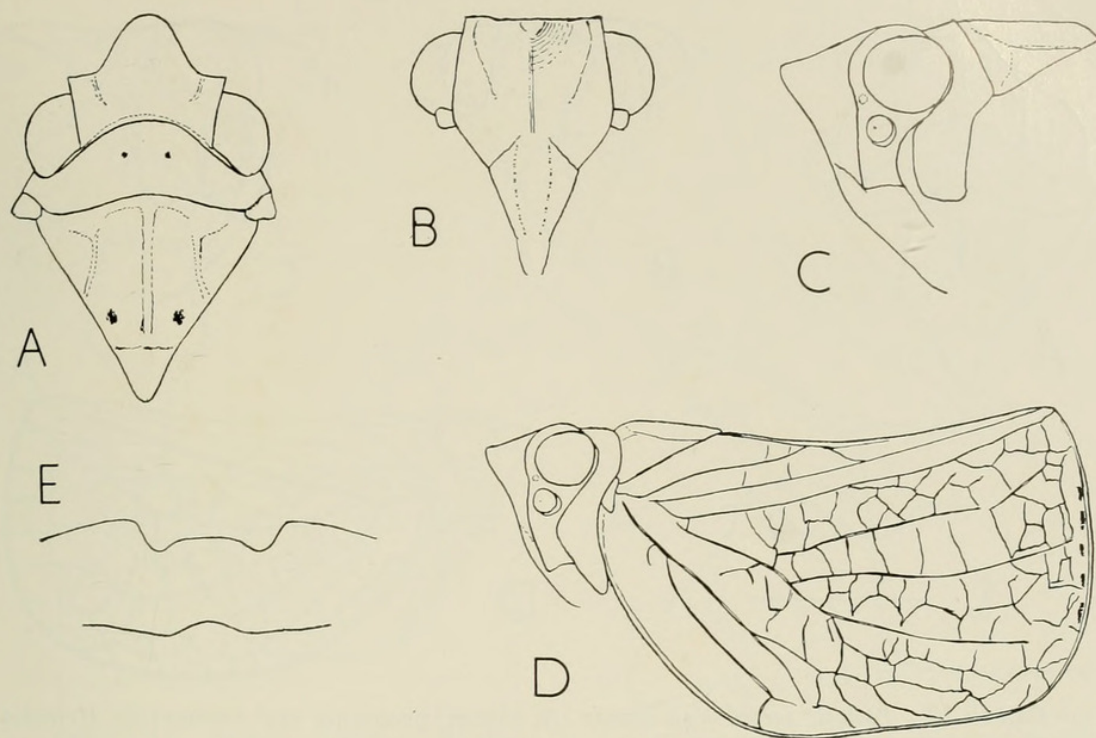


FIGURE 16. *Philatis vicinus* Van Duzee. A, Vertex, pronotum and mesonotum (female), dorsal view; B, frons and clypeus (female); C, head, pronotum and mesonotum (female), lateral view; D, female, lateral view; E, posterior margin of pregenital sternite.

The figures have been made from a paratype kindly loaned from the collection of the CAS. The type locality is Rabida Island.

***Philatis servus* Van Duzee.**

(Figure 17, A-E.)

*Philates servus* VAN DUZEE, 1933, Proc. Calif. Acad. Sci., 4th ser., vol. 21, p. 34.

The figures have been prepared from a paratype kindly loaned from the collection of the CAS. The type locality is Isabela Island.

***Philatis rostrifera* (Butler).**

(Figure 18, A-E.)

*Issus rostrifer* BUTLER, 1877, Proc. Zool. Soc. Lond. 1877, p. 90.

The figures have been made from the type in the collection of the BM (NH). The type locality is Floreana Island.

***Philatis crockeri* (Van Duzee).**

(Figure 19, A-E.)

*Euthiscia crockeri* VAN DUZEE, 1937, Proc. Calif. Acad. Sci., 4th ser., vol. 22, p. 119.

The figures have been made from the type in the collection of the CAS. The type locality is Santa Cruz Island.



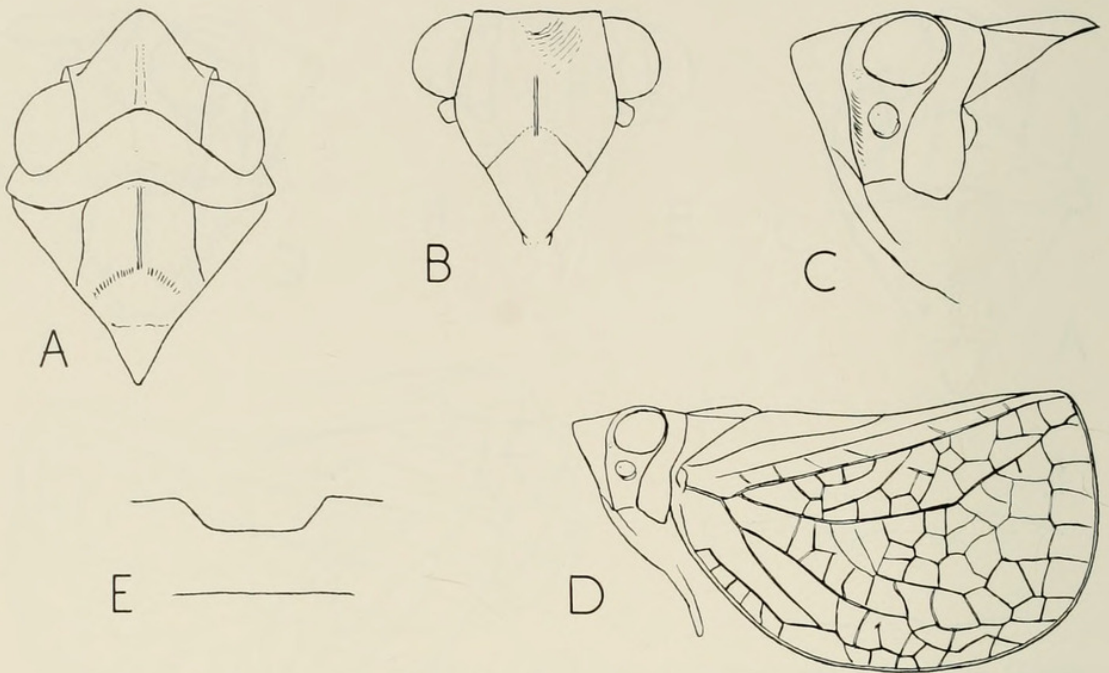


FIGURE 17. *Philatis servus* Van Duzee. A, Vertex, pronotum and mesonotum (female), dorsal view; B, frons and clypeus (female); C, head, pronotum and mesonotum (female), lateral view; D, female, lateral view; E, posterior margin of pregenital sternite.

***Philatis lento* Fennah, new species.**

(Figure 20, A-G.)

Male vertex as long in middle line as at lateral margins, wider at level of anterior margin of eyes than long (2.3:1), in side view declivous; frons in side view almost straight. Tegmen longer than broad (scarcely 1.6:1).

Anal segment in side view with ventral margin shallowly convex. Pygofer with dorsolateral angles moderately produced, slightly acute. Genital styles in lateral view longer than broad (about 1.6:1).

Female vertex as long in middle line as at lateral margins, wider at level of anterior margin of eyes than long (2.3:1), not carinate; frons medially carinate distally. Pronotum with median line finely impressed in basal half. Tegmen longer than broad (1.6:1), and than length of claval suture (1.2:1).

Posterior margin of pregenital sternite with margin entire medially, not excavate; a small excavation on each side at some distance from middle.

Male, female testaceous, heavily mottled with fuscous; mesonotal disc sometimes with a distinct fuscous spot at base of lateral carinae; sometimes vertex, pronotum and mesonotum castaneous-fuscous. Tegmina subopaque, yellowish-brown or grayish brown, an oblique vitta, or ovate spot, behind humeral eminence, creamy-white, deeply bordered distally with fuscous-piceous, the infuscation sometimes reaching anal angle; cell  $Cu_1$  sometimes pale, sometimes with pale veins; veins otherwise concolorous or a little paler than ground.



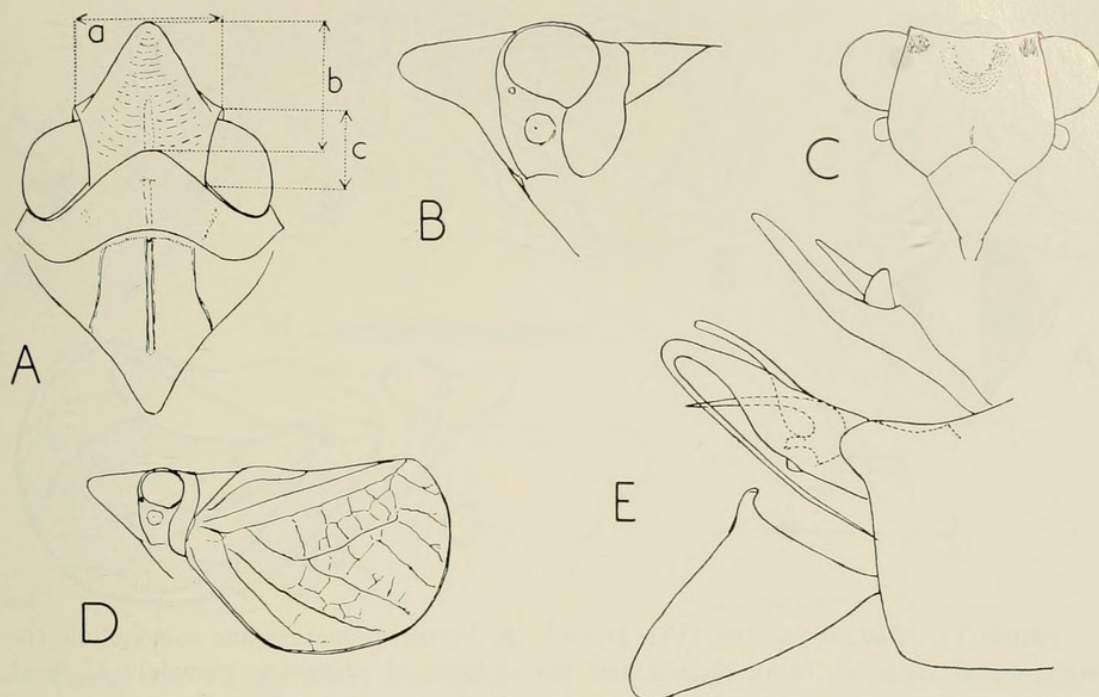


FIGURE 18. *Philatis rostrifera* (Butler). A, Vertex, pronotum and mesonotum (male), dorsal view (broken lines indicate points between which measurements are taken); B, frons, pronotum and mesonotum (male), lateral view; C, frons and clypeus (male); D, male, lateral view; E, male genitalia, right side.

Male length, total, 3.4 mm.; body, 3.0 mm.; tegmen, 2.8 mm.

Female length, total, 3.9 mm.; body, 3.5 mm.; tegmen, 3.3 mm.

*Holotype* ♂, Galápagos Archipelago: Floreana Island, Wittmer's Farm, 15 February 1964 (*R. L. Usinger*), in CAS.

*Paratypes*, 9 ♂♂, 3 ♀♀, same data.

In the short vertex and in coloration this species resembles the sympatric *P. breviceps*, but the apex of the head in profile is less produced than in *P. breviceps*, and the widest part of the tegmen is more basad than in *P. breviceps*. The two species differ markedly in the shape of the posterior margin of the pregenital sternite.

***Philatis deucalion*** Fennah, new species.

(Figure 21, A–G.)

Male vertex longer in middle line than at lateral margins (1.3:1), wider at level of anterior margin of eyes than long (1.8:1), in side view declivous; frons in side view almost straight. Tegmina longer than broad (1.6:1).

Anal segment rather elongate, in side view with ventral margin feebly sinuate. Pygofer with dorsolateral angles rather strongly produced, acute. Genital styles in lateral view longer than broad (2:1).



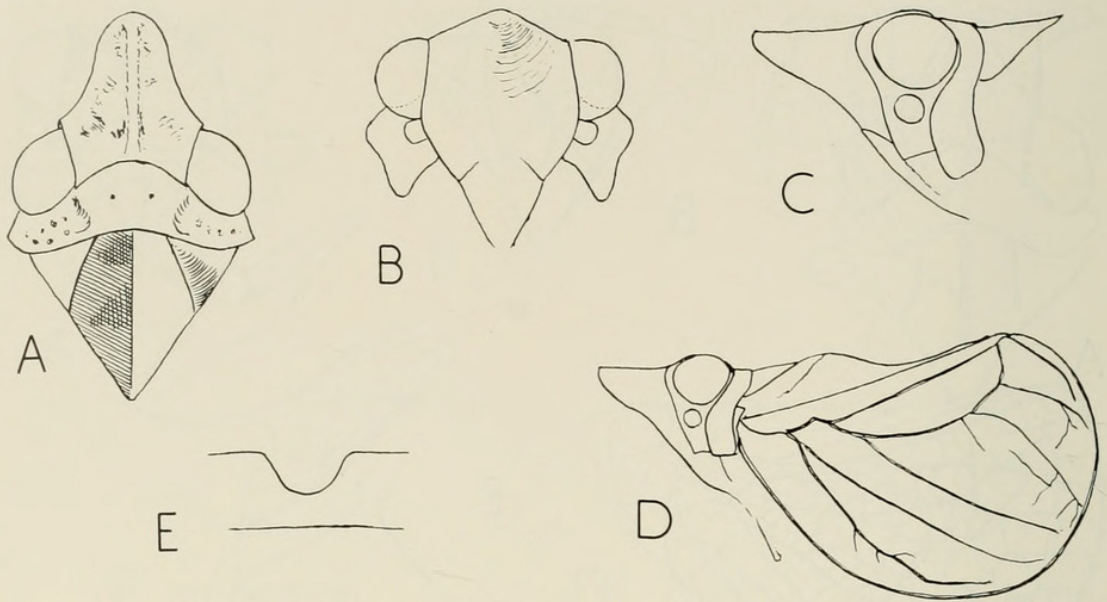


FIGURE 19. *Philatis crockeri* (Van Duzee). A, Vertex, pronotum and mesonotum (female), dorsal view; B, frons, clypeus and lateral lobes of pronotum (female); C, head, pronotum and mesonotum (female), lateral view; D, female, lateral view; E, middle part of posterior margin of pregenital sternite.

Female vertex longer in middle line than at lateral margins (nearly 1.4:1), wider at level of anterior margin of eyes than long (1.5:1), feebly medially carinate throughout; frons finely carinate medially. Pronotum ecarinate. Tegmina longer than broad (1.7:1), and than length of claval suture (not quite 1.2:1).

Posterior margin of pregenital sternite excavate medially and to an equal depth on each side.

Male, female testaceous, heavily mottled with fuscous; lateral fields of pronotum below level of eyes, a few irregular spots in lateral fields of mesonotum, and a spot on each side of mesonotal disc basally, fuscous-piceous. Tegmina subopaque, grayish ochraceous, an ill-defined ovate spot behind humeral eminence pale testaceous or stramineous, the area adjoining this distally, dark fuscous, this hue (in ♀) sometimes also lying over distal quarter of tegmen. Veins concolorous or a little paler than ground.

Male length, total, 4.3 mm.; body, 3.5 mm.; tegmen, 3.1 mm.

Female length, total, 4.5 mm.; body, 4.2 mm.; tegmen, 3.7 mm.

*Holotype* ♂, Galápagos Archipelago, Santa Cruz Island, Academy Bay, Darwin Research Station, 26 January 1964 (G. Kuschel), in CAS.

*Allotype* ♀, same locality, 7 February 1964 (R. O. Schuster).

This species is distinguishable from *P. breviceps* by the proportions of the vertex, and from *P. servus* Van Duzee and *P. vicinus* Van Duzee by the shape of the posterior margin of the pregenital sternite. In the latter character it is closest



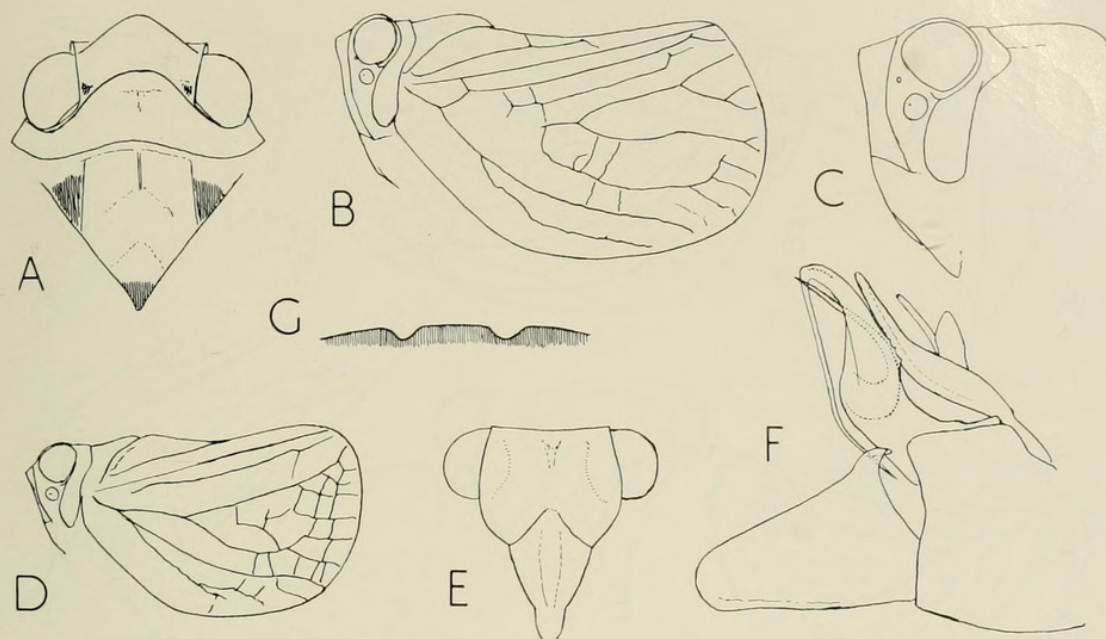


FIGURE 20. *Philatis lento*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, female, lateral view; C, head, pronotum and mesonotum (male), lateral view; D, male, lateral view; E, frons and clypeus (male); F, male genitalia, right side; G, posterior margin of pregenital sternite of female.

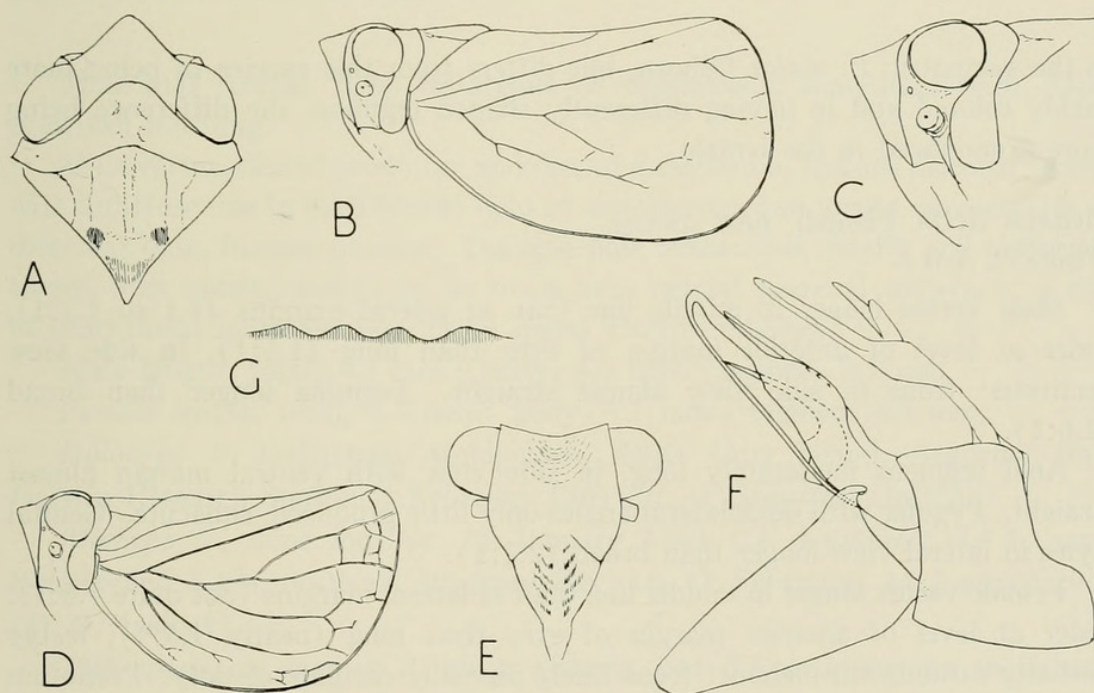


FIGURE 21. *Philatis deucalion*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, female, lateral view; C, head, pronotum and mesonotum (male), lateral view; D, male, lateral view; E, frons and clypeus (male); F, male genitalia, right side; G, posterior margin of pregenital sternite of female.



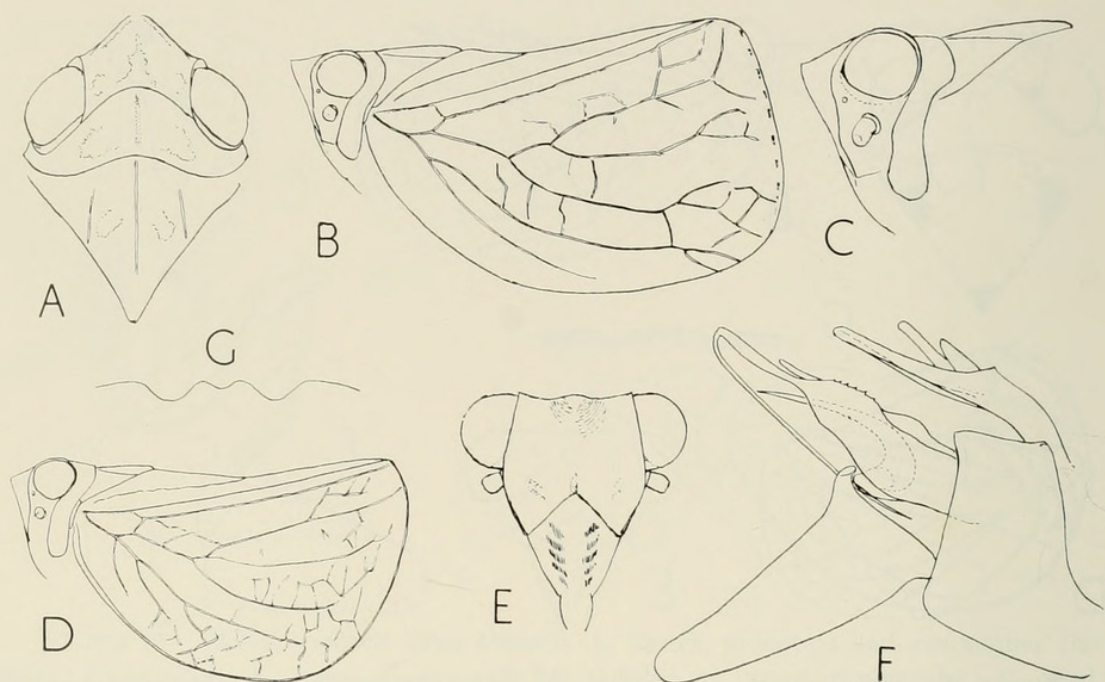


FIGURE 22. *Philatis delia*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, female, lateral view; C, head, pronotum and mesonotum (male), lateral view; D, male, left side; E, frons and clypeus (male); F, male genitalia, right side; G, posterior margin of pregenital sternite of female.

to the sympatric *P. major* Osborn, but differs from this species in being more darkly colored and in having differently shaped tegmina, the difference being more pronounced in the female.

***Philatis delia* Fennah, new species.**

(Figure 22, A-G.)

Male vertex longer in middle line than at lateral margins (1.1 to 1.2:1), wider at level of anterior margin of eyes than long (1.6:1), in side view declivous; frons in side view almost straight. Tegmina longer than broad (1.6:1).

Anal segment moderately long, in side view with ventral margin almost straight. Pygofer with dorsolateral angles only little produced, subacute. Genital styles in lateral view longer than broad (2.2:1).

Female vertex longer in middle line than at lateral margins (not quite 1.5:1), wider at level of anterior margin of eyes than long (nearly 1.5:1), feebly medially carinate throughout; frons finely medially carinate distally. Pronotum ecarinate. Tegmina longer than broad (nearly 1.7:1), and than length of claval suture (1.2:1).

Posterior margin of pregenital sternite slightly notched medially and sub-angulately excavate to a greater depth on each side.



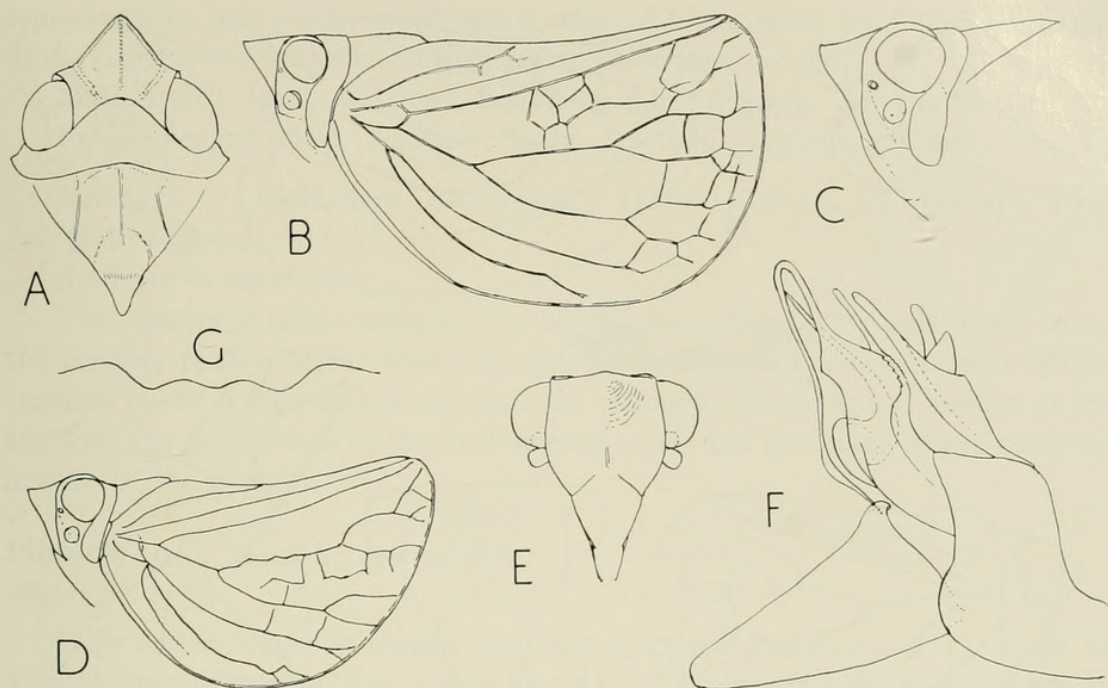


FIGURE 23. *Philatis athamas*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, female, lateral view; C, head, pronotum and mesonotum (male), lateral view; D, male, lateral view; E, frons and clypeus (male); F, male genitalia, right side; G, posterior margin of pregenital sternite of female.

Male and female, light testaceous or ochraceous, sometimes with dilute brownish mottling.

Male vertex, disc of pronotum and disc of mesonotum, fuscous piceous; female with a diffuse line in each lateral field of mesonotum, and a spot on each side of disc near base, fuscous-piceous. Tegmina pale ochraceous, faintly and uniformly tinged with fuscous except on an ovate area behind humeral eminence; a row of short linear markings just inside apical margin, fuscous.

Male length, total, 4.5 mm.; body, 4.0 mm.; tegmen, 3.5 mm.

Female length, total, 5.2 mm.; body, 4.1 mm.; tegmen, 4.5 mm.

*Holotype* ♂, Galápagos Archipelago, Santa Cruz Island, Academy Bay, Darwin Research Station, 3 February 1964 (*R. O. Schuster*), in CAS.

*Allotype* ♀, same locality, 25 January 1964 (*G. Kuschel*); 4♂♂, same locality and 8 km. north of Academy Bay, 16, 17 February, 24 January 1964 (*P. D. Ashlock*).

This species is near to *P. major* Osborn, but differs in having the lateral margins of the frons, in anterior view, more gradually rounding to the frontoclypeal suture. In the male the declivous and medially ecarinate vertex and the more bluntly rounded tegminal apex separate this species from *P. major*. In the female, the apical angle of the tegmina is more deeply rounded than in *P. major*,



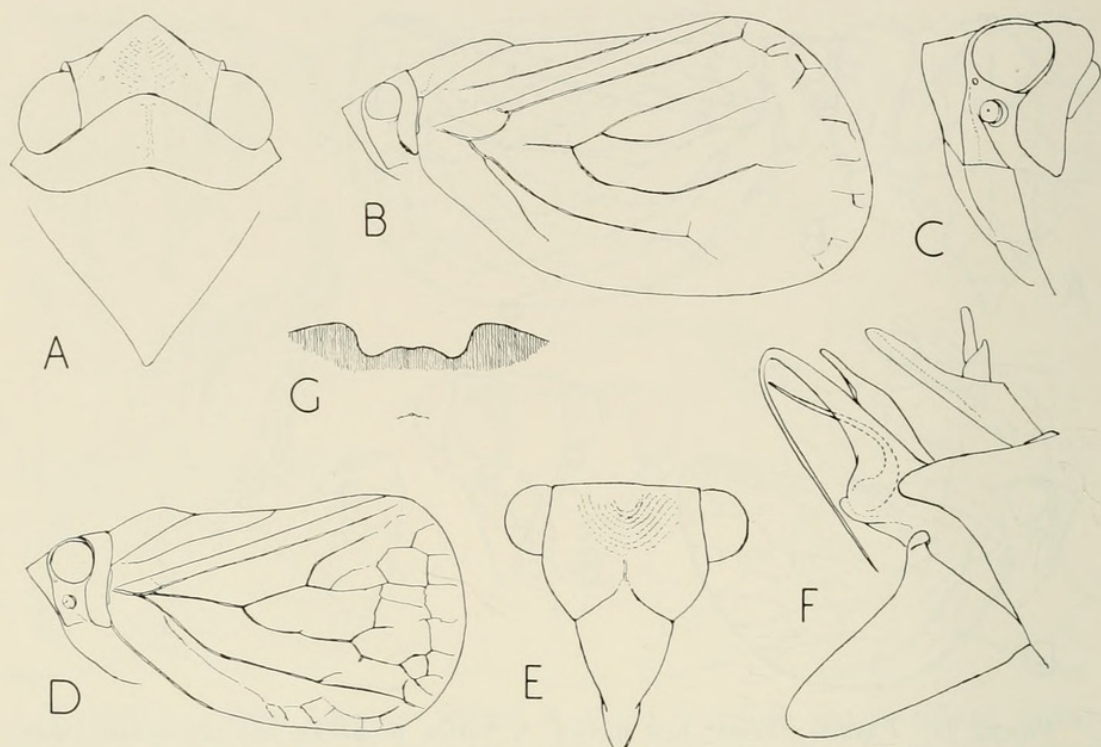


FIGURE 24. *Philatis atrax*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, female, lateral view; C, head and pronotum (male), lateral view; D, male, lateral view; E, frons and clypeus (male); F, male genitalia, right side; G, posterior margin of pregenital sternite of female.

and the anal segment is only 1.2 times as long as broad, whereas in *P. major* it is 1.6 times as long as broad.

***Philatis athamas* Fennah, new species.**

(Figure 23, A-G.)

Male vertex longer in middle line than at lateral margins (1.4:1), wider at level of anterior margin of eyes than long (1.4:1), in side view straight; frons in side view concave. Tegmina longer than broad (1.7:1).

Anal segment in side view with ventral margin sinuately convex. Pygofer with dorsolateral angles distinctly produced caudad, acute. Genital styles in side view longer than broad (nearly 1.9:1).

Female vertex longer in middle line than at lateral margins (not quite 1.5:1), wider at level of anterior margin of eyes than long (nearly 1.3:1), obscurely medially carinate, frons medially carinate distally. Pronotum ecarinate. Tegmina longer than broad (1.6:1) and than length of claval suture (not quite 1.2:1).

Posterior margin of pregenital sternite widely shallowly excavate in its middle portion, a further shallow emargination at middle.

Male, female. Pale green; vertex sometimes with a pale yellow tinge, eyes



red. Tegmina pale green, sometimes a series of linear spots inside apical margin dilute reddish brown; veins whitish green, paler than ground.

Male length, total, 4.8 mm.; body, 4.0 mm.; tegmen, 3.5 mm.

Female length, total, 5.5 mm.; body, 5.2 mm.; tegmen, 4.5 mm.

*Holotype* ♂, Galápagos Archipelago, Darwin Island, 29 January 1964 (*D. Q. Cavagnaro*), in CAS.

*Allotype* ♀, same data.

This species is distinguished from all the preceding by its pale green color, the concave profile of the frons, the almost acutely rounded anal angle of the tegmina in the female and in the male the strongly oblique apical margin of the tegmina, the proportions of the male genital styles and the shape of the posterior margin of the pygofer.

***Philatis atrax* Fennah, new species.**

(Figure 24, A-G.)

Male vertex longer in middle line than at lateral margins (1.1:1), wider at level of anterior margin of eyes than long (2:1), in side view horizontal or nearly so; frons in side view concave. Tegmina longer than broad (nearly 1.6:1).

Anal segment in side view with ventral margin straight. Pygofer with dorso-lateral angles distinctly produced caudad in a broadly rounded lobe. Genital styles in side view longer than broad (1.7:1).

Female vertex longer in middle line than at lateral margins (1.1 to 1.2:1), wider at level of anterior margin of eyes than long (2.2:1), ecarinate, frons medially carinate distally. Pronotum with a fine median groove. Tegmina longer than broad (nearly 1.7:1) and than length of claval suture (1.4:1).

Posterior margin of pregenital sternite rather deeply excavate in its middle portion, the base of the excavation very feebly convex caudad, and with a minute impression at middle.

Testaceous, so heavily irrorate with dark reddish brown as to appear wholly dark. Tegmina subopaque, testaceous or ferruginous, heavily mottled with dark reddish brown; a small obscure narrowly ovate spot behind humeral eminence, testaceous; veins concolorous.

Male length, total, 4.9 mm.; body, 4.2 mm.; tegmen, 4.0 mm.

Female length, total, 6.0 mm.; body, 5.8 mm.; tegmen, 5.0 mm.

*Holotype* ♂, Galápagos Archipelago, Santa Cruz Island, 750 m., in grassland, 6 April 1964, (*D. Q. Cavagnaro*), in CAS.

*Allotype* ♀, same data; North of Academy Bay, 540 m., grassland, under *Jaegiria hirta*, 19 February 1964, 5♂♂ 2♀♀ (*P. D. Ashlock*).

This species is well distinguished from all the preceding by its rather large size, and dark coloration. In the male, the apical and anal angles of the tegmina differ strongly from those in other species by being subequally rounded; in the



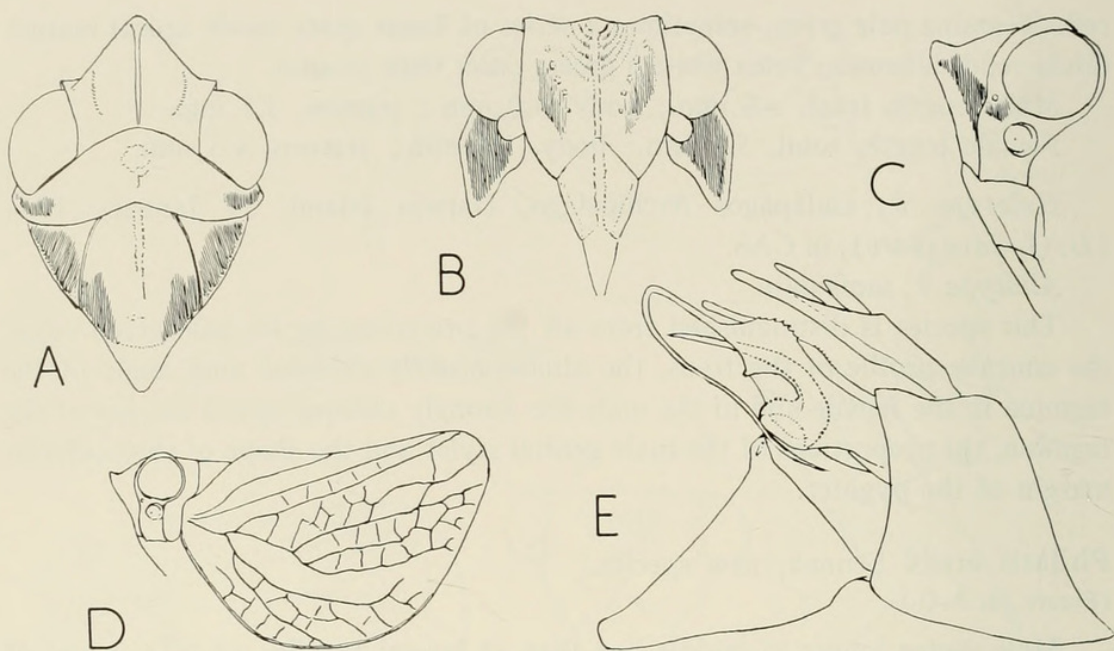


FIGURE 25. *Philatis latobius*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, frons, clypeus and lateral lobes of pronotum (male); C, head in profile (male); D, male, left side; E, male genitalia, left side.

female these angles are equally characteristic in that the apical angle is more deeply rounded than the anal angle.

***Philatis latobius* Fennah, new species.**

(Figure 25, A-E.)

Male vertex longer in middle line than at lateral margins (1.4:1), wider at level of anterior margin of eyes than long (slightly more than 1.3:1), in side view declivous; frons in side view straight. Tegmina longer than broad (1.6:1).

Anal segment in side view with ventral margin almost straight, very feebly sinuate in basal half. Pygofer with dorsolateral angles distinctly produced caudad in an acute lobe. Genital styles in side view longer than broad (1.5:1).

Stramineous or pale ochraceous; frons in basal half, lateral fields of pronotum, and lateral margins of mesonotum broadly, fuscous-piceous. Fore and middle legs sprinkled with dilute fuscous. Tegmina greenish-ochraceous, faintly mottled with fuscous in internal areas except in cell  $Cu_1$ . Vein  $Cu_1$  distally and posterior claval vein irregularly bordered with small fuscous spots; veins pale greenish-ochraceous.

Male length, total, 3.3 mm.; body, 3.0 mm.; tegmen, 3.0 mm.

*Holotype* ♂, Galápagos Archipelago, Wolf Island, 1 February 1964 (*D. Q. Cavagnaro*), in CAS.

The male of this species, in side view, bears some resemblance to the male



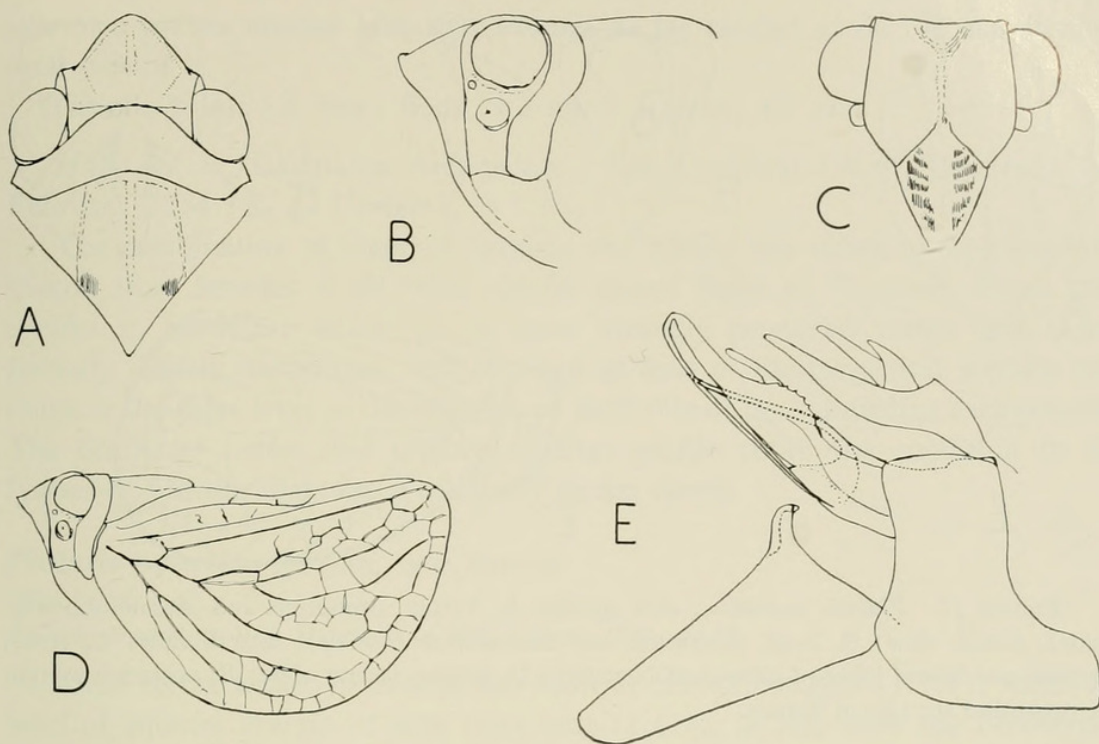


FIGURE 26. *Philatis lycambes*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, head, pronotum and upper margin of mesonotum (male), lateral view; C, frons and clypeus (male); D, male, lateral view; E, male genitalia, right side.

of *P. athamas*, but the vertex in dorsal view is distinctly more acute than in *P. athamas*. Moreover, in the latter species the apex of the tegmina is more acutely rounded than in *P. latobius*. The males of the two species also differ in the proportions of the anal segment and of the genital styles.

***Philatis lycambes* Fennah, new species.**

(Figure 26, A-E; fig. 30, H.)

Male vertex longer in middle line than at lateral margins (1.5:1), wider at level of anterior margin of eyes than long (1.5:1), in side view declivous; frons in side view concave. Tegmina longer than broad (slightly more than 1.6:1).

Anal segment in side view with ventral margin sinuately convex. Pygofer with dorsolateral angles only moderately produced caudad in a rounded sub-rectangulate lobe. Aedeagus in profile broadly obtuse-angulately rounded dorsally at base. Genital styles in side view longer than broad (2:1).

Ochraceous or pale testaceous; clypeus laterally, a fairly uniform sprinkling on frons in basal half, pronotum, mesonotum and legs, fuscous; a spot on each side of mesonotal disc basally, fuscous-piceous. Tegmina subopaque, greyish testaceous, all veins heavily margined with fuscous, an interrupted row of linear markings inside costal and apical margins, fuscous; veins grayish-ochraceous.



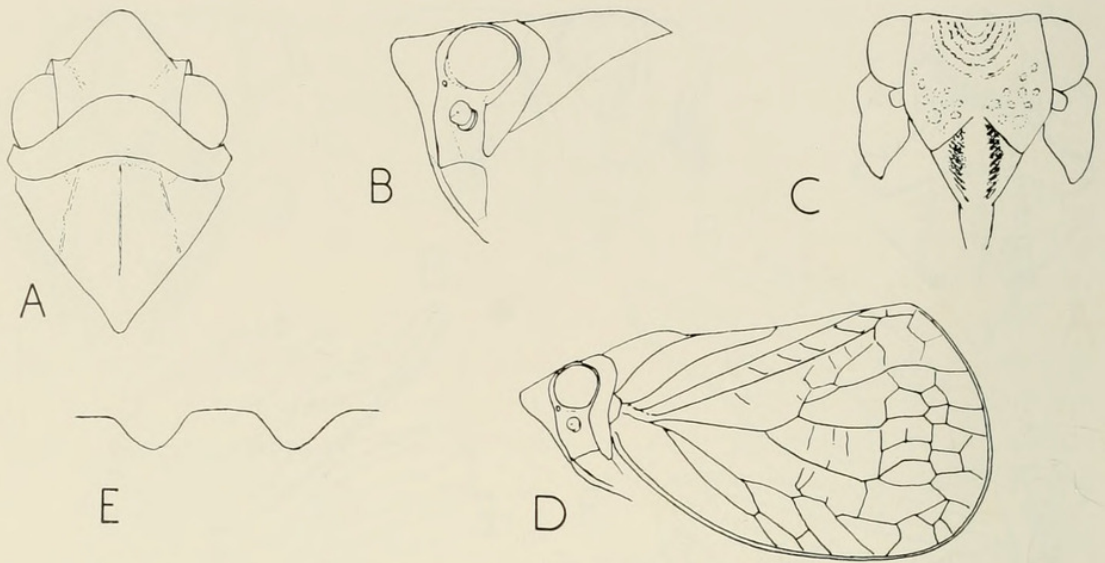


FIGURE 27. *Philatis monaeses*, new species. A, Vertex, pronotum and mesonotum (female), dorsal view; B, head, pronotum and mesonotum (female), lateral view; C, frons, clypeus and lateral lobes of pronotum (female); D, female, lateral view; E, posterior margin of pregenital sternite of female.

Male length, total, 4.2 mm.; body, 3.9 mm.; tegmen, 3.0 mm.

*Holotype* ♂, Galápagos Archipelago, Pinzon Island, summit and upper Caldera areas, 7 February 1964 (*D. Q. Cavagnaro*), in CAS.

This species, in the male, most closely resembles *P. athamas* and *P. latobius*. It is intermediate between them in size, and is of a quite different color. The apical margin of the tegmen is less oblique than in males of either of these species, and the vertex is relatively shorter.

***Philatis monaeses* Fennah, new species.**

(Figure 27, A-E.)

Female vertex longer in middle line than at sides (1.3:1), slightly declivous, wider at level of anterior margin of eyes than long (nearly 1.7:1), not medially carinate. Frons medially carinate distally. Pronotum obscurely grooved medially. Mesonotum with a small callus towards base of lateral carinae. Tegmen longer than broad (1.5:1) and than length of claval suture (1.3:1); apex anterior to junction of  $M_3$  with margin.

Testaceous, finely irrorate with fuscous. Tegmina grayish-testaceous densely and diffusely speckled with darker yellowish brown; an ovate area behind humeral eminence pale testaceous; a row of linear markings along costal and apical margins fuscous. Veins light testaceous, narrowly margined with fuscous except in pale ovate area.

Posterior margin of pregenital sternite with a rather deep notch on each



side of a convex median lobe that extends as far caudad as do the margins on each side of it.

Length, total, 5.6 mm.; body, 4.2 mm.; tegmen, 4.2 mm.

*Holotype* ♀, Galápagos Archipelago: San Cristobal Island, Progreso, 23 February 1964 (*R. L. Usinger*), in CAS.

The combination of shape of tegmina and bodily size serves to separate this species from females of all other species except those of *P. atrax*. From this species *P. monaeses* differs in its more strongly produced vertex and more strongly domed mesonotum, and the median lobe of the pregenital sternite extends to the same level as the margins on each side of the submedian excavations. The declivous vertex and concave frontal profile recall the condition in *P. lycambes*, but the latter has a relatively longer vertex.

***Philatis opheltes* Fennah, new species.**

(Figure 28, A-G.)

*Philatis productus* VAN DUZEE (not Stål), *pars.*, 1933, p. 34.

Male vertex longer in middle line than at lateral margins (1.3:1), wider at level of anterior margin of eyes than long (1.4:1), in side view not declivous; frons in side view shallowly concave. Tegmina longer than broad (1.5:1).

Anal segment in side view with ventral margin weakly convex. Pygofer with dorsolateral angles distinctly produced caudad in a subrectangulate lobe. Aedeagus with about five teeth submarginally on lobes of dorsolateral margin of phallobase. Genital styles in side view longer than broad (1.8:1), the basidorsal processes each directed mesodorsad, scarcely longer than broad at base.

Female vertex longer in middle line than at lateral margins (nearly 1.4:1), wider at level of anterior margin of eyes than long (1.3:1), carinate; frons carinate. Tegmina longer than broad (1.6:1) and than length of claval suture (1.2:1).

Posterior margin of pregenital sternite with margin moderately strongly incised on each side of middle, and very weakly excavate at middle.

Male and female, stramineous; in female, dilute yellowish-brown mottling on head and thorax, and on fore and middle legs. Tegmina stramineous, sometimes with yellowish-brown suffusion in cells, this suffusion sometimes dark; a minute spot at base and another at apex of basal cell, reddish-brown.

Male length, total, 5.0 mm.; body 4.1 mm.; tegmen, 4.3 mm.

Female length, total, 6.7 mm.; body, 5.8 mm.; tegmen, 5.6 mm.

*Holotype* ♂, Galápagos Archipelago: North Seymour Island, 12 June 1932 (*M. Willows, Jr., Templeton Crocker Expedition*), in CAS. One ♂, 3 ♀♀, same data.

This species most closely resembles *P. lycambes* and *P. athamas*. From the former it differs in appreciably greater bodily size and in the shape of the



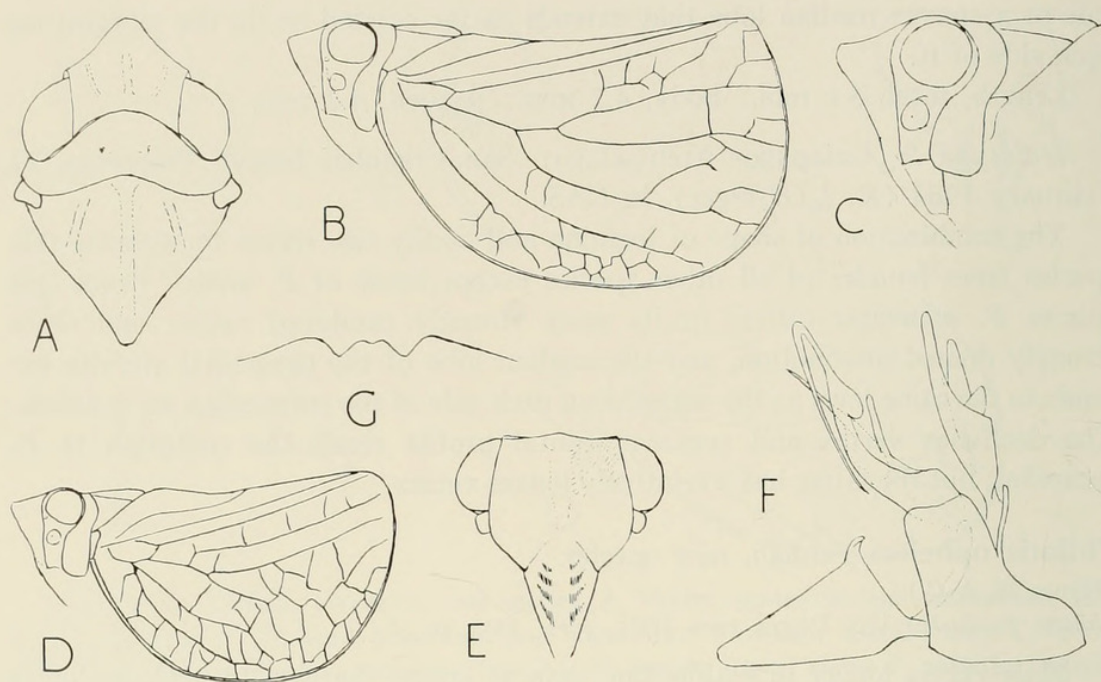


FIGURE 28. *Philatis opheltes*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, female, lateral view; C, head, pronotum and mesonotum (male), lateral view; D, male, lateral view; E, frons and clypeus (male); F, male genitalia, right side; G, posterior margin of pregenital sternite of female.

tegmina, and from the latter in the relatively shorter vertex in the female and more deeply rounded apical angle of the tegmina in the male.

A single male, broadly resembling and bearing the same data as males of the type series, but here excluded from it, is wholly pale green, has more acutely pointed tegmina, and, in the genitalia, has no teeth on the dorsal lobes of the phallobase, and straight, not incurved, basidorsal processes on the dorsal margin of the genital styles. An evaluation of its position must be deferred until further specimens are available.

***Philatis daunus* Fennah, new species.**

(Figure 29, A-F.)

Male vertex longer in middle line than at lateral margins (nearly 1.3:1), rounded-angulate at apex, wider at level of anterior margin of eyes than long (1.5:1), in side view slightly declivous; frons in side view very weakly concave, almost straight; ocelli small. Tegmina longer than broad (nearly 1.6:1), in side view with claval margin distinctly concave. Pale ochraceous; head, thorax, fore and middle legs faintly mottled with dilute yellowish-brown. Tegmina subopaque, grayish ochraceous, an ovate area near humeral eminence and cell  $Cu_1$ , ochraceous.



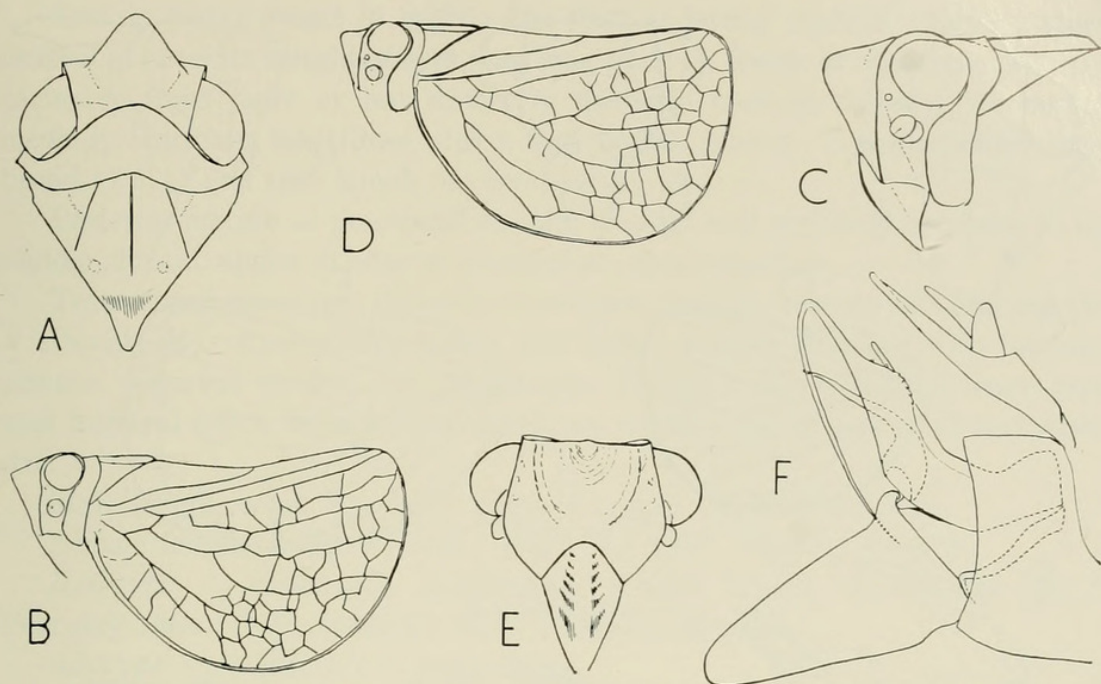


FIGURE 29. *Philatis daunus*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, male holotype, lateral view; C, head, pronotum and mesonotum (male), lateral view; D, male, lateral view; E, frons and clypeus (male); F, male genitalia, right side.

Anal segment in side view with ventral margin very shallowly convex. Pygofer with dorsolateral angles slightly produced caudad, abruptly angulate or subacutely rounded. Aedeagus with pair of reflexed processes long and slender, reaching near to base of genital styles. Genital styles in lateral view longer than broad (2:1). Length, total, 5.6 mm.; body, 4.6 mm.; tegmen, 4.8 mm.

*Holotype* ♂, Galápagos Archipelago: James Island, 4 June 1932. (*M. Willows, Jr., Templeton Crocker Expedition*) labelled *Philatis servus* Van Duzee, in the CAS.

One ♂, same data.

This species, in the male, is distinguished from all the preceding in the proportions of the vertex. In these it is most nearly approached by *P. opheltes*, but the latter has a distinctly concave frontal profile, and tegmina with the apical angle less deeply rounded.

The second male differs from the type in a few details that are worth recording. The apex of the vertex is abruptly angulate, not acutely rounded, the apical angle of the tegmina is slightly more deeply rounded than in the type, and the commissural margin is less concave, and is, indeed, almost straight. In the genitalia the dorsolateral angles of the pygofer are abruptly angulate, not merely strongly rounded, and the reflected aedeagal processes are relatively



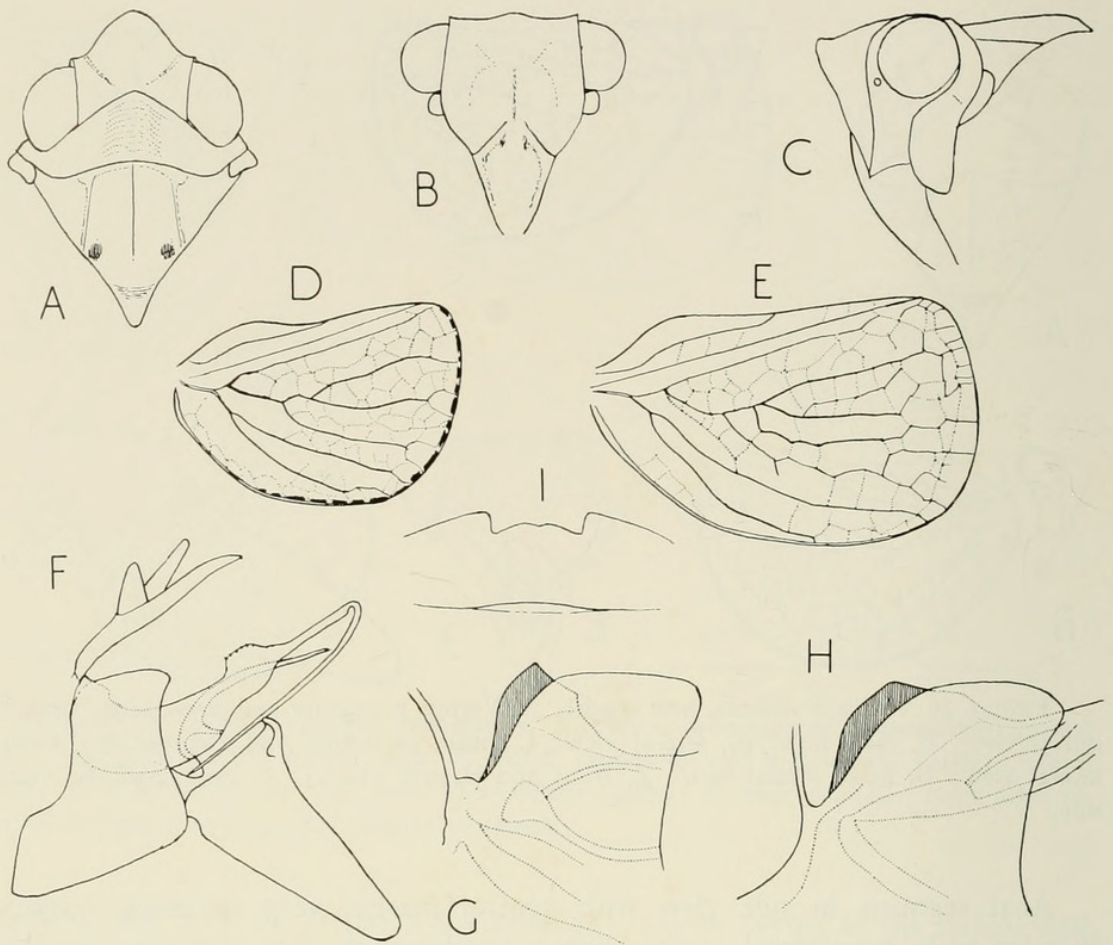


FIGURE 30. *Philatis auson*, new species. A, Vertex, pronotum and mesonotum (male), dorsal view; B, frons and clypeus (male); C, head, pronotum and mesonotum (male), lateral view; D, tegmen (male); E, tegmen (female); F, male genitalia, left side; G, dorsal margin of pygofer, with base of aedeagus visible by transparency; I, posterior margin of pregenital sternite of female. *P. lycambes*, new species. H, the same as in G.

slightly shorter than in the type. Further material is needed for the evaluation of these differences.

***Philatis auson* Fennah, new species.**

(Figure 30, A-I.)

Male vertex longer in middle line than at lateral margins (1.2:1), wider at level of anterior margin of eyes than long (1.5:1), in side view not, or only very slightly declivous, frons in side view weakly concave. Tegmina longer than broad (1.5:1).

Anal segment in side view with ventral margin straight or almost so. Pygofer with dorsolateral angles moderately produced caudad in a rounded lobe. Aedeagus dorsally at base in side view subrectangulately rounded truncate. Genital styles in side view longer than broad (2:1).



Female vertex longer in middle line than at lateral margins (1.3:1), wider at level of anterior margin of eyes than long (1.3:1), feebly or obscurely medially carinate; frons more or less distinctly medially carinate distally. Pronotum medially ecarinate, sometimes with a fine median groove. Tegmina longer than broad (1.6:1) and than length of claval suture (1.2:1).

Posterior margin of pregenital sternite broadly and shallowly excavate in its middle portion, angles at edge of excavation subrectangulate.

Testaceous; sometimes diffusely, sometimes heavily, irrorate with fuscous (in ♀ strongly so), or sometimes boldly and rather sparsely blotched with fuscous-piceous. Tegmina marked correspondingly; usually a pale or whitish ovate area near humeral callus, adjoined posteriorly by a dark fuscous spot of almost equal size.

Male length, total, 4.0 mm.; body, 3.5 mm.; tegmen, 3.3 mm.

Female length, total, 4.9 mm.; body, 4.1 mm.; tegmen, 4.0 mm.

*Holotype* ♂, Galápagos Archipelago, Pinzon Island, on *Scalesia* sp., 7 February 1964 (*P. D. Ashlock*), in B. P. Bishop Museum.

*Allotype* ♀, 6 ♂♂, 4 ♀♀, same data.

This species, in the male, resembles *P. lycambes*, but differs in the proportions of the head and in the shape of the apex of the tegmina. In the male genitalia there is one difference that is readily appreciable, this being the form of the base of the upper margin of the aedeagus. This is illustrated for the two species. In the female the species is distinguished from others by the proportions of the vertex in combination with the shape of the posterior margin of the pregenital sternite.

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