Pacific Insects Vol. 22, no. 3–4: 347–360 17 December 1980

APHROPHORINAE OF POLYNESIA (RHYNCHOTA: HOMOPTERA: CERCOPIDAE)[1,2]

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Abstract. The Aphrophorinae of Polynesia are represented by the single genus *Lallemandana.* Eleven new species and one new subspecies are described. The 30 recognized species are placed in 2 subgenera, *Lallemandana,* s.s. and *Platyptyelus,* n. subgen. (type-species: *L. tylata,* n. sp.). Keys are provided to the species of *Lallemandana* and to the faunas of Tahiti and Raiatea islands.

The endemic fauna of boldly patterned Cercopidae inhabiting the islands of Polynesia has attracted considerable attention. Lallemand (1928a) and Van Duzee (1937) described several species from the Austral Is; Lallemand (1928b) produced a guide to the Cercopidae of Samoa; and China (1933) reviewed the species of the Society Is. Species have also been recorded from various islands in the Tuamotu group (Distant 1913; Lallemand 1944), the Cook Is (Dumbleton 1950), and the Tonga chain (Jacobi 1921). Many additional specimens have been collected and deposited in the Bishop Museum, Hawaii. This paper attempts to summarize the information on the most complex group, the subfamily Aphrophorinae.

All types are deposited in the Bishop Museum, Honolulu, Hawaii (BISHOP), except for some paratypes in the Canadian National Collection, Ottawa (CNC), as noted.

FAUNAL ELEMENTS

Cercopidae of the subfamily Aphrophorinae occur in the Samoan Is, Tonga Is, Society Is, Austral Is, and in a few isolated islands in the Cook Is and the Tuamotu island group. All the Aphrophorinae examined in this study belong to the genus *Lallemandana* China & Myers, 1934,[4] which is represented outside Polynesia only by a primitive representative in the Solomon Is. This is a new species, to be described in a subsequent paper. Other species of "*Lallemandana*" from outside Polynesia properly belong to other genera. The aphrophorine fauna of Polynesia, therefore, is an endemic Pacific group that has rapidly evolved as it spread from the Solomon Is into Polynesia (FIG. 19). The greatest number of species are generally found on the highest islands (FIG. 19).

Samoan Is. The most primitive species of *Lallemandana* outside the Solomon Is

1. Based on material in the Bishop Museum, Honolulu, Hawaii. A revision of the genera of the Aphrophorinae and illustrations of the male genitalia of some of the species described here will be published in a Memoir of the Entomological Society of Canada.
2. Material examined partially resulted from fieldwork supported by a grant to the Bishop Museum from the U.S. National Science Foundation (G-10734).
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4. For a possible exception, see remarks under *Samoan Is.*

inhabit the Samoan group. All 7 species belong to the *oceanica* species group. The male terminalia are known for only 3 species (*navigans* Jacobi, *juddi* Lallemand, *biformis* Lallemand), and in these 3 no useful specific characters were found in the genitalic apparatus. Identification of the species thus rests on the distinctive color patterns and body proportions, which Lallemand (1928b) splendidly illustrated. These species are distinguished in couplets 27–34 of the key to Polynesian species below.

There is a single unconfirmed record of "*Perinoia caput ranae* (sic) Le Guillou" from Samoa (Jacobi 1921). It may refer to another species of this genus, or (more probably) a species of *Liorhina* Stål, or it may represent a mislabeled specimen. Since *caputranae* is authoritatively recorded from New Guinea and adjacent islands, but not further east than this, the Samoan record is probably incorrect.

Tonga Is. Two distinctive species of *Lallemandana* are known from the Tongas: *oceanica* Jbi. (blackish, except for pale borders of the tegmina, a pale apex of the head, and a small pale spot at the apex of the clavus), and *picturata,* n. sp. (black, boldly patterned with yellow on head, pronotum, scutellum and tegmina). The male genitalia of members of the former are identical to those of members of the Samoan species; the male genitalia of members of the latter are unique (FIG. 18).

Fabricius (1787) described *Cicada flavipes* from "Rotterdam Island," which has been identified by Metcalf (1962) as Nomuka I in the Tonga chain. The original description and the subsequent description of the type by Stål (1869) agree well with *oceanica* Jbi. from the Tongas. On the other hand, China (1933) identifies Rotterdam I as an island off the coast of Borneo; I cannot find any evidence to support Metcalf's identification of the island, which may be only a lapsus calamni in his catalogue. If China is right, *flavipes* may prove to belong to another genus, or else it must be considered as a mislabeled specimen. In any case, should *flavipes* prove to be a senior synonym of *oceanica,* it should probably be treated as a nomen oblitum (ICZN 1964: Article 23b).

Cook Is. A single distinctive species, *Lallemandana rarotongae* Dum. (FIG. 12) occurs on Rarotonga I. Its only close relative (*insignis pallida* Lall.) is in Tahiti.

Tuamotu island group. Three species of *Lallemandana* occur in 3 of the Tuamotu islands: *insignis insignis* (Dist.) on Henderson I, *gambierana* Lall. on Gambier I, and *mooreana* (Ch.) on Makatea I. All three species are also represented in Tahiti, and their presence in the Tuamotus probably represents separate introductions from Tahiti. Of these 3 species, only *insignis* has become subspecifically distinct.

Austral Is. Five species of *Lallemandana* occur on 4 of the Austral Is: *australis,* n. sp. on Rurutu I, *tubuaii,* n. sp. on Tubuai I, *clavata,* n. sp. and *crockeri* (Van D.) on Raivavae I, and *insignis rapana* (Lall.) on Rapa I. Adults of the 2 species on Raivavae I can be distinguished by the characters cited under *clavata* (below).

All 5 species have their closest relatives in Tahiti. It is therefore likely that they represent separate introductions to the Australs from Tahiti (FIG. 19).

Society Is. The greatest number of species of *Lallemandana* occur in the Society Is,

and most of them inhabit either Tahiti or Raiatea I. Curiously, despite the relatively short distance between these islands and the relatively great distance over which certain species have spread (FIG. 19), only 1 species inhabits both Tahiti and Raiatea I. Adjacent islands may have a single endemic species (*huahinensis,* n. sp. on Huahine I) or endemic subspecies (*interrupta interrupta* Lall. on Bora Bora), or the same faunal elements as Tahiti (*mooreana* Ch. on Moorea and Makatea); but Raiatea has 5 endemic species representing both subgenera, and Tahiti has 9, also representing both subgenera. Adults of the species on Raiatea and Tahiti may be distinguished by the following keys.

KEY TO THE TAHITIAN SPECIES OF *Lallemandana*

1. Costal margins of tegmina brown or blackish brown (FIG. 17) 10
   Costal margins of tegmina whitish (FIG. 1–16) 2
2. Head and pronotum with parallel-margined yellow median stripe (FIG. 1) 9
   Head and pronotum with irregular yellow median markings, or pronotum entirely black (FIG. 13–16) 3
3. Scutellum black or blackish brown (FIG. 11A–B) ..... **pararapana, n. sp.**
   Scutellum yellow (FIG. 16A–D) 4
4. Crown of head mostly dark (FIG. 8) 8
   Crown of head mostly yellow (FIG. 3A–D) 5
5. Commissure of tegmina broadly yellow (FIG. 3A–D) ..... **mooreana**
   Commissure of tegmina mostly dark (FIG. 16A–C); if yellow, narrowly so, and with claval sutures pale (FIG. 13D) 6
6. Dark markings of crown forming patches or oblique stripes next to inner margins of eyes (FIG. 16A–C) ..... **tahitiensis**
   Dark markings of crown forming transverse band between eyes, sometimes interrupted at meson (FIG. 13B–D) 7
7. Costa of tegmen entirely pale (FIG. 13B–D) ..... **insignis pallida**
   Costa of tegmen with 2 pale areas separated by black streak (as in FIG. 2C) ..... **fenestrata**
8. Scutellum brown ..... **cheesmanae**
   Scutellum yellow ..... **gambierana**
9. Commissure of tegmina broadly yellow (as in FIG. 3C) ..... **sociabilis**
   Commissure of tegmina dark ..... **adamsoni**
10. Tegmina setose; apical veins of tegmina carinate ..... **mumfordi**
    Tegmina bare; all veins of tegmina obscure ..... **gressitti, n. sp.**

KEY TO THE RAIATEAN SPECIES OF *Lallemandana*

1. Scutellum brown or black, at most with narrow yellow median line (FIG. 6A) 5
   Scutellum almost entirely yellow (FIG. 1–5) 2
2. Head and pronotum with parallel-margined yellow median stripe (FIG. 1) 4
   Head and pronotum with irregular yellow median markings (FIG. 2A–B, 9A–B) or pronotum entirely black (FIG. 2C) 3
3. Length of ♂ less than 7.5 mm, of ♀ less than 8.5 mm ..... **interrupta cryptica, n. subsp.**
   Length of ♂ more than 8.0 mm, of ♀ more than 9.0 mm ..... **insulata, n. sp.**
4. Commissure of tegmina with broad yellow streak extending to apex of scutellum ..... **sociabilis**
   Commissure of tegmina marked with pale area near apex of clavus (FIG. 1) ..... **conjuncta, n. sp.**
5. Brown without pale markings ..... **tylata, n. sp.**
   Black with yellow apex of crown, yellow venter and pale costal areas (FIG. 6A–B) ..... **pseudorapana, n. sp.**

SYSTEMATICS

The genus *Lallemandana* is characterized by adults having an enlarged anteapical cell of the tegmen (China 1933: Fig. 1b, 1c), which is bounded on the anterior margin by the 1st longitudinal vein (R_1, R_{2+3} or S_1 of authors) that is connected to the costa by 2–4 veins. The number of these connecting veins is significant; in species of *Lallemandana* sensu stricto there are 2, or rarely, 1; in the new subgenus *Platyptyelus* there are at least 3. In the related Melanesian genus *Nesaphrestes* Kldy. the 1st longitudinal vein unites with the costa at the level of the anteapical cells; thus there are no veins connecting the outer anteapical cell to the costa.

The subgenus *Lallemandana* can be further segregated into 3 species groups based on lengths of the lateral pronotal margins of adults: very short in the *oceanica* species group, moderately long in the *fenestrata* species group, and very long in the *cheesmanae* species group. The first of these has a derived genitalic feature (lateral processes of the penis shaft) and so represents a natural group. The *cheesmanae* species group may be more a "convenience group" than a natural entity, as 2 different subgroups are evident from the form of the male terminalia (see *clavata,* n. sp. below).

The taxonomy of the species of *Lallemandana* (*Platyptyelus*) and of the *oceanica* and *cheesmanae* species groups of *L.* (*Lallemandana*) is relatively simple. There are few species in each, and their adults are readily distinguished by color and structural features. The bulk of the species fall in the difficult *fenestrata* species group, in which differences of structure are much more minimal and color pattern overlaps considerably (Fig. 1–17).

The complexities of the taxonomic problems in the *fenestrata* species group are exacerbated by insular varieties. In previous works, most taxa in this group have been considered as subspecies of *fenestrata* (Fabr.). Many of these, however, have distinctive adult structural differences of male terminalia, head proportions, or size, and many again are sympatric. I have therefore reduced the number of subspecies to 3: *rapana* (Lall.) and *pallida* (Lall.) are here placed as subspecies of *insignis* (Dist.), and a new subspecies of *interrupta* is described. Further subspecies may be warranted for the different island races of the widespread species *mooreana* (Ch.), *gambierana* Lall. and *sociabilis* (Lall.), but failing to find any significant differences in the material before me, I cannot definitely state that these do not represent recent introductions into neighboring islands by man.

For normal sorting and routine identifications, the keys already given to the separate island faunas will suffice. It must be emphasized, however, that species of *Lallemandana* (particularly in the *fenestrata* species-group) should be checked by analysis of their genitalic characters wherever possible, using the graphic key (Fig. 18) and the illustrations in China (1933). Furthermore, to remain aware of the possibility of additional species occurring in more than 1 island, the following key to adults of Polynesian Aphrophorinae should be consulted regularly.

Key to the Aphrophorinae of Polynesia

1. Crown of head with 4 or more alternating yellow and dark transverse bands; outer anteapical cell of tegmen of similar width to central anteapical cell ... (Samoa?) ..... **Liorhina** or **Perinoia**

Crown of head dark at base, pale apically, *or* unicolorous, or longitudinally striped (Fig. 1–17); outer anteapical cell of tegmen wider than central anteapical cell ....*Lallemandana* ... 2

2 (1). Tegmina bare; 4 or more veins connect 1st longitudinal vein of tegmen to costa; tegminal veins not carinate ..... *L.* (*Platyptyelus*), n. subg. ... 35

Tegmina setose; 2 or 3 veins connect 1st longitudinal vein of tegmen to costa; tegminal veins carinate apically ..... *L.* (*Lallemandana*) ... 3

3 (2). Lateral margins of pronotum $^2/_5$ or less (0.3–0.4) length of eye ..... (*oceanica* species group) ... 27

Lateral margins of pronotum nearly ½ (0.45) or more length of eye 4

4 (3). Lateral margins of pronotum $^2/_3$ length of eye or longer (0.67–0.80) ..... (*cheesmanae* species group) ... 24

Lateral margins of pronotum approximately ½ length of eye (0.45–0.60) ..... (*fenestrata* species group) ... 5

5 (4). Scutellum brown or black, at most with a narrow yellow median line (Fig. 6A–B, 11A–B, 13E–G 21

Scutellum yellow, with black areas (if present) confined to lateral margins (Fig. 7–10, 13A–D) 6

6 (5). Crown of head largely dark, with narrow yellow edge (Fig. 8) ... (Gambier Is, Tahiti) ..... **gambierana**

Crown of head largely or completely yellow or tawny, at least on meson (Fig. 1–7) 7

7 (6). Commissure of tegmen yellow at least as far as tip of scutellum (Fig. 7, 14) 20

Commissure of tegmen dark, *or* if partly yellow, then yellow patch or stripe not reaching tip of scutellum (Fig. 1–6) 8

8 (7). Pronotum divided by nearly straight median yellow stripe (Fig. 1, 12) 19

Pronotum entirely dark, *or* with ovoid (Fig. 16A), diamond-shaped (Fig. 5B) or irregular (Fig. 2A–B, 4A–B, 9A–B) yellow patch that is more or less constricted near anterior margin 9

9 (8). Dark markings of crown consisting of a transverse band across hind margin of head, touching or surrounding ocelli, *or* of 2 transverse bands nearly meeting at meson just behind ocelli (Fig. 3A–B, 5A–C, 10A–B; see also China 1933: Fig. 2a, 2b, 2h) 16

Dark markings of crown at least as far apart as ocelli, usually forming patches near eyes, only touching or surrounding ocelli if extending before eyes (Fig. 2A–C, 4A–C, 9A–B; see also China 1933: Fig. 2c, 2d, 2g, 2i) 10

10 (9). Commissure of tegmen marked with pale stripe reaching almost to apex of scutellum (Fig. 3A–D, 13A) 15

Commissure of tegmen dark, *or* with short pale area not reaching beyond middle of commissure (Fig. 4A–C, 9A–B, 16B–C) 11

11 (10). Pronotum largely yellow, narrowly bordered on lateral and anterior margins with black, yellow color of scutellum continuous with yellow area of pronotum (Fig. 2A) ... (Bora Bora) ..... **interrupta interrupta**

Pronotum largely or wholly black, scutellum more or less separated from yellow area of pronotum by dark posterior borders of pronotum (Fig. 9–10) 12

12 (11). Length of ♂ (including tegmina) greater than 8.0 mm, of ♀ greater than 9.0 mm ... (Raiatea I) ..... **insulata, n. sp.**

Length of ♂ less than 8.0 mm, of ♀ less than 9.0 mm 13

13 (12). Penis shaft unarmed ... (Tahiti) ..... **tahitiensis**

Penis shaft with tooth on posterior margin 14

14 (13). Penis shaft with erect filiform processes set on truncate apex (FIG. 18) ... (Rurutu I) ..... **australis, n. sp.**
Penis shaft unarmed apically; apex rounded ... (Raiatea I) ..... **interrupta cryptica, n. subsp.**
15 (10). Costal margin of tegmen entirely pale (FIG. 13A) ... (Henderson I) ..... **insignis insignis**
Costal margin of tegmen with 2 pale areas separated by a dark streak (FIG. 3A–D) ... (Moorea I, Tahiti, Makatea I) ..... **mooreana**
16 (9). Costal margin of tegmen entirely pale (FIG. 13B–D) ... (Tahiti) ..... **insignis pallida**
Costal margin of tegmen with 2 pale areas separated by a dark streak (FIG. 5A–C, 10A–B) 17
17 (16). Crown of head not more than ¾ (0.75) as long as broad; tegmina with extensive pale areas near commissure (FIG. 10A–B) ... (Tubuai I) ..... **tubuaii, n. sp.**
Crown of head at least $^4/_5$ (0.8) as long as broad (FIG. 5); tegmina with at most small pale areas near commissure (as in FIG. 4) 18
18 (17). Penis shaft strongly angled at midlength; styles ventroapically rounded (FIG. 18) ... (Huahine I) ..... **huahinensis, n. sp.**
Penis shaft nearly straight (China 1935: Fig. 6c); styles ventroapically angled (FIG. 18) ... (Tahiti) ..... **fenestrata**
19 (8). Yellow stripe of pronotum parallel-margined (FIG. 1) ... (Raiatea I) ..... **conjuncta, n. sp.**
Yellow stripe of pronotum broadening anteriorly (FIG. 12) ... (Rarotonga I) ..... **rarotongae**
20 (7). Yellow markings on commissure of tegmina forming a broad patch (FIG. 7) ... (Tonga Is) ..... **picturata, n. sp.**
Yellow markings on commissure of tegmina forming a stripe (FIG. 14) ... (Raivavae I) ..... **clavata, n. sp.**
21 (5). Tegmina with brown margins (FIG. 17) ... (Tahiti) ..... **mumfordi**
Tegmina with contrastingly pale margins (FIG. 1–16) 22
22 (21). Costal margin of tegmen entirely pale (FIG. 13E–G) ... (Rapa I) ..... **insignis rapana**
Costal margin of tegmen with 2 pale areas separated by a dark streak (FIG. 6A–B, 11A–B) 23
23 (22). Dark markings of crown consisting of a transverse band across hind margin of head, not extending before eyes (FIG. 6A–B) ... (Raiatea I) ..... **pseudorapana, n. sp.**
Dark markings of crown consisting of oblique bands against inner margins of eyes (FIG. 11B), *or* of a broad transverse band extending well before eyes (FIG. 11A) ... (Tahiti) ..... **pararapana, n. sp.**
24 (4). Crown and pronotum uniformly dark ... (Tahiti) ..... **cheesmanae**
Crown and pronotum with broad yellow median stripe 25
25 (24). Costal margin of tegmen entirely pale; median stripe of pronotum widening posteriorly (FIG. 15A–B) ... (Raivavae I) ..... **crockeri**
Costal margin of tegmen with 2 pale areas; median stripe of pronotum parallel-margined (as in FIG. 1) 26
26 (25). Tegmina with broad yellow stripe on commissure ... (Tahiti, Raiatea) ..... **sociabilis**
Tegmina with dark commissure ... (Tahiti) ..... **adamsoni**
27 (3). Clavi black throughout (rarely, patterned in brown and black) 34
Clavi pale throughout, or patterned in yellow and black ... (Samoa) 28
28 (27). Clavi pale throughout 31
Clavi boldly patterned in black and yellow 29
29 (28). Body pale; tegmina pale, transversed with broad black band ..... **buxtoni**
Body mostly dark; tegmina dark, patterned with yellow 30
30 (29). Scutellum yellow; clavi dark at base, yellow apically ..... **juddi**
Scutellum black; clavi yellow at base, dark apically ..... **swezeyi**
31 (28). Tegmina boldly patterned in black and yellow ..... **navigans**
Tegmina pale except for slight infuscation on apical veins 32
32 (31). Median length of crown nearly equal to that of pronotum ..... **armstrongi**
Median length of crown much less than that of pronotum 33

33 (32). Tylus declivous; lateral margins of pronotum infuscated ..... **bryani**
Tylus horizontal; ♀ pronotum pale throughout; ♂ pronotum entirely infuscated .... **biformis**
34 (27). Costa of tegmen with preapical and basal areas pale ... (Tonga Is) ..... **oceanica oceanica**
Costa of tegmen with only preapical area pale ... (Samoa) ..... **oceanica samoensis**
35 (2). Head spatulate, scarcely tapering to broadly rounded apex; tylus very large, much longer than vertex at middle ... (Raiatea I) ..... **tylata, n. sp.**
Head tapered to bluntly pointed apex; tylus normal in size, as long as vertex at middle ... (Tahiti) ..... **gressitti, n. sp.**

Genus **Lallemandana** China & Myers, 1934

Platyptyelus Hamilton, **new subgenus**

Type-species: *Lallemandana tylata,* n. sp.

Head depressed, elongate; frons (=postclypeus of authors) very strongly inflated, subglobose; lateral pronotal margins nearly as long as eye (0.75–0.85); tegmina with venation obscure or weakly evident throughout, not carinate apically; tegmina bare, prominently punctate; 1st longitudinal vein of tegmen connected to costa by 3 or 4 veins.

Polynesian species. Two new species, described below.

Lallemandana (P.) tylata Hamilton, **new species**

♂, 11.5–11.7 mm; ♀, 12.8 mm. Chocolate brown, coxae paler, blackish brown on genae, posterior margin of crown and anterior margin of pronotum. Head very long, crown almost as long (0.90–0.93) as interocular width, tylus very large, rounded apically, ½ longer than median length of vertex, $^4/_5$ as wide as interocular width of crown. Lateral margins of pronotum very long, almost as long (0.85) as eye. Penis shaft strongly sinuate, sharply bent dorsad at midlength, abruptly curved ventrad at apex; style apex stout, abruptly bent dorsad.

Holotype ♂ (Bishop 11,752), SOCIETY IS: Raiatea: Temehani Plateau, 1500′ [500 m], 5.X.1934, E.C. Zimmerman. 2 paratypes: 1♀, same data as holotype; 1♂, same data except, 1300′ [400 m], D. Anderson.

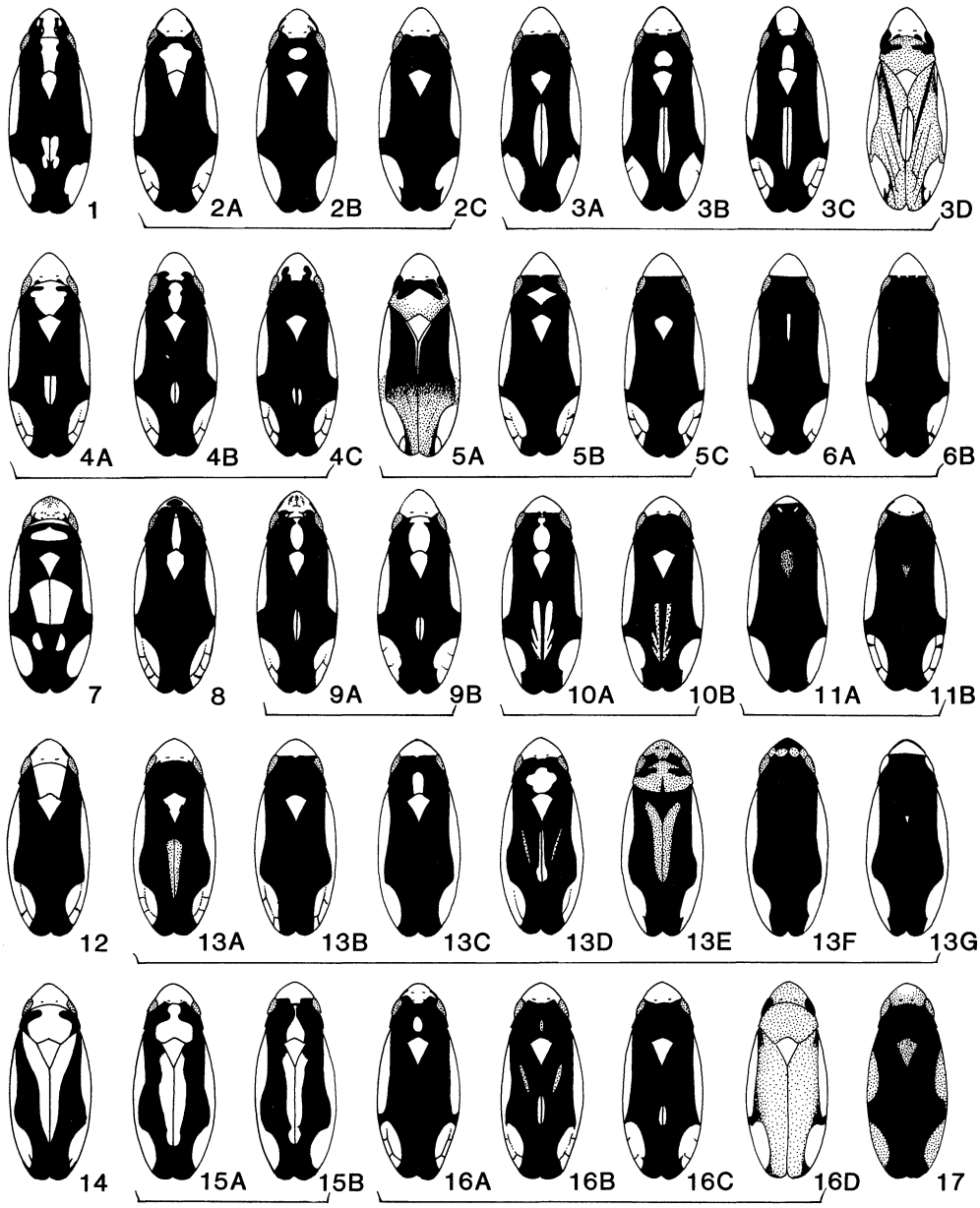
Remarks. Adults of this species are the largest in *Lallemandana* and are further distinguished by the remarkably large tylus and unique penis shaft. In other respects, however, they are plainly members of *Lallemandana.*

Lallemandana (P.) gressitti Hamilton, **new species**

♂, 9.6 mm; ♀ unknown. Dark brown, except for 2 pairs of paler spots near hind margin of crown and near anterior margin of pronotum. Head long, crown pointed, $^4/_5$ (0.8) as long as interocular width. Lateral margins of pronotum long, ¾ (0.75) length of eye. Penis shaft curved at midlength, parallel-margined, with short filiform processes at apex; style apex tapered, curved dorsad.

Holotype ♂ (Bishop 11,753), SOCIETY IS: Tahiti: Mt Aorai, 1400–1450 m, 9.VII.1961, on *Alstonia costata,* J.L. Gressitt.

Remarks. Superficially similar to *L. mumfordi* (Ch.), the adult male of *gressitti* is readily distinguished by its larger size, longer lateral pronotal margins, obscure venation, and by other characters cited under the subgeneric diagnosis.



Lallemandana

FIG. 1–17. Adult color pattern and variations (bracketed forms) in species of the *fenestrata* group of *Lallemandana*: **1,** *conjuncta*; **2A,** *interrupta interrupta*; **2B–C,** *interrupta cryptica*; **3,** *mooreana*; **4,** *australis*; **5,** *huahinensis*; **6,** *pseudorapana*; **7,** *picturata*; **8,** *gambierana*; **9,** *insulata*; **10,** *tubuaii*; **11,** *pararapana*; **12,** *rarotongae*; **13A,** *insignis insignis*; **13B–D,** *insignis pallida*; **13E–G,** *insignis rapana*; **14,** *clavata*; **15,** *crockeri*; **16,** *tahitiensis*; **17,** *mumfordi.*

Subgenus **Lallemandana** China & Myers

Lallemandia China, 1933: 39. Type-species by original designation: *Cicada fenestrata* Fabr., 1775.
Lallemandana China & Myers, 1934: 466, new name for *Lallemandia* China, 1933, nec Funkhouser, 1922.

Head weakly depressed, short to moderately elongate; frons weakly inflated; lateral pronotal margins short to long (0.3–0.75); tegmina with venation obscure, except at apex where veins are carinate; tegmina setose; 1st longitudinal vein of tegmen connected to costa by 1 or 2 veins.

Polynesian species. *Lallemandana adamsoni* (Ch.), *L. armstrongi* Lall., *L. biformis* (Lall.), *L. bryani* (Lall.), *L. cheesmanae* (Lall.), *L. crockeri* (Van D.), *L. fenestrata* (Fabr.), *L. gambierana* Lall., *L. insignis* (Dist.), *L. interrupta* (Lall.), *L. juddi* (Lall.), *L. mooreana* (Ch.), *L. mumfordi* (Ch.), *L. navigans* (Jbi.), *L. oceanica* (Jbi.), *L. rarotongae* Dum., *L. sociabilis* (Lall.), *L. swezeyi* (Lall.), *L. tahitiensis* (Ch.), and 9 new species and 1 new subspecies described below.

Lallemandana (L). australis Hamilton, **new species** FIG. 4, 18

♂, 7.5–7.6 mm; ♀, 7.9–8.8 mm. Head and thorax yellow, variously marked with black on dorsum (FIG. 4); legs yellow; abdomen black; tegmina brown to black, marked with 2 pale costal areas and a small pale spot at apex of clavus (in some specimens occupying up to ½ length of commissure). Head long, crown $^5/_6$ to almost as long (0.83–0.95) as interocular width. Lateral margins of pronotum about ½ (0.6) length of eye. Penis shaft curved dorsad, slender, parallel-margined up to obliquely truncate tip armed with long, erect, filiform processes (FIG. 18); style apex strongly narrowed, angled dorsad.

Holotype ♂ (BISHOP 11,754) (FIG. 4a), AUSTRAL IS: RURUTU: Upopepe Val, 100′ [30 m], 27.VIII.1934, E.C. Zimmerman. 9 paratypes: RURUTU: 2♂,1♀, same data as holotype; 2♀, 1 mi [1.7 km] N of Avera, 800′ [260 m], 24.VIII.1934, E.C. Zimmerman; 1♀, Moeri, 10′ [3 m], 26.VIII.1934, E.M. Cooke; 1♀, Mt Manureva, 1000′ [300 m], 28.VIII.1934, Zimmerman; 1♀, same data except, 1100′ [350 m], 30.VIII.1934; 1♀, Mt Teape, 700′ [200 m], 2.IX.1934, Zimmerman. 2 paratypes in CNC.

Remarks. The long crown and male genitalia of adults of *L. australis* are similar to those in *interrupta* and *pseudorapana,* n. sp. However, the shape of the apex of the penis shaft of *australis* is distinctive.

Lallemandana (L.) clavata Hamilton, **new species** FIG. 14, 18

♂, 7.4 mm; ♀, 7.5–8.1 mm. Yellow, marked with a black spot behind each eye, black lateral margins of the pronotum, and sinuous dark brown stripe down middle of each tegmen, entering clavus only near midlength (FIG. 14). Head short, crown pointed, ¾ (0.75) as long as interocular width. Lateral margins of pronotum about ½ (0.6) length of eye. Penis shaft strongly bent near middle, armed with small tooth on posterior margin and with short recurved filiform apical processes; style apex tapered, bent slightly caudodorsad (FIG. 18).

Holotype ♂ (BISHOP 11,755) (FIG. 14), AUSTRAL IS: RAIVAVAE: Motu Tehau, 5′ [1.5 m], 11.VIII.1934, swept from grasses and low herbage, E.C. Zimmerman. Paratypes: 3♀, same data as holotype.

Remarks. The male genitalia and color pattern suggest that *clavata* is related to the sympatric species *crockeri. L. crockeri* may not be a natural member of the *cheesmanae* species group despite its adults having long lateral pronotal margins, but rath-

er, it may be an aberrant relative of *clavata.* Adults of the latter can be distinguished from those of *crockeri* by their more extensive yellow pattern, shorter pronotal margins, and smaller size. Members of *L. clavata* are apparently seashore dwellers, while those of *crockeri* have been taken at elevations ranging from 150 m to 400 m.

Van Duzee (1937) apparently erred in stating that the crown of adults of *crockeri* is longer than broad; no known specimens of *Lallemandana* have such a crown. The specimens of *crockeri* in the Bishop Museum collection have the crown shape as in *clavata.*

Lallemandana (L.) conjuncta Hamilton, **new species** FIG. 1, 18

♂, 7.3 mm; ♀, 8.1 mm. Legs and venter of head and thorax yellow; legs yellow; abdomen and dorsum black, with broad parallel-sided median yellow band extending from apex of head across scutellum; tegmina black with 3 pale areas, 2 on costa, smaller 1 at apex of clavus (FIG. 1). Head moderately long, crown $^4/_5$ (0.82) as long as interocular width. Lateral margins of pronotum about ½ (0.6) length of eye. Penis shaft curved dorsad, broadened at middle, tapered to acute apex; style apex angled dorsad, style also armed with preapical lobe (FIG. 18).

Holotype ♂ (BISHOP 11,756) (FIG. 1), SOCIETY IS: RAIATEA: Marshi, 0–100 m, 29.III.1971, N.L.H. Krauss. Paratype: 1♀, same data as holotype.

Remarks. Though superficially similar to *adamsoni,* adults of *conjuncta* may be distinguished by their shorter pronotal margins, darker color and unique style.

Lallemandana (L.) huahinensis Hamilton, **new species** Fig. 5, 18

♂, 7.3–7.5 mm; ♀, 7.4–8.5 mm. Venter of body and legs yellow; dorsum black with 2 pale areas on costa of tegmen and yellow crown (except transverse black line at base), scutellum and sometimes also triangular or diamond-shaped spot on disc of pronotum (FIG. 5). Head long, crown almost as long (0.8–0.9) as interocular width. Lateral margins of pronotum about ½ (0.5–0.6) length of eye. Penis shaft angled dorsad near middle, unarmed, apically bifid, dorsal lobe membranous; style apex curved dorsad (FIG. 18).

Holotype ♂ (BISHOP 11,757) (FIG. 5c), SOCIETY IS: HUAHINE: Fare, 0–100 m, VIII.1969, N.L.H. Krauss. 8 paratypes: HUAHINE: 2♂,4♀, same data as holotype; 2♂, mt W of Mt Turi, 1500′ [500 m], 30.IX.1934, E.C. Zimmerman; 1♂, valley SE of Tahatea, 300–500′ [100–150 m], 2.X.1934, Zimmerman; 1♀, Haamene, 1–100 m, VIII.1969, N.L.H. Krauss. 2 paratypes in CNC.

Remarks. Though similar to *mooreana,* adults of *huahinensis* may be distinguished by the lack of a yellow commissural stripe, and by the distinctive style and penis apices.

Lallemandana (L.) insulata Hamilton, **new species** FIG. 9, 18

♂, 8.1–8.3 mm; ♀, 9.5 mm. Sordid ochre, infuscated on abdomen; tegmina, lateral margins of pronotum and patches near eyes brown or blackish brown, usually leaving irregular median pale stripe on dorsum (FIG. 9); tegmina with 2 pale costal spots and narrow pale streak at apex of clavus. Head moderately long, crown $^4/_5$ (0.78–0.82) as long as interocular width. Lateral margins of pronotum about ½ (0.5–0.55) length of eye. Penis shaft curved dorsad, broadened beyond middle, tapered to rounded apex (FIG. 18); style apex angled dorsad.

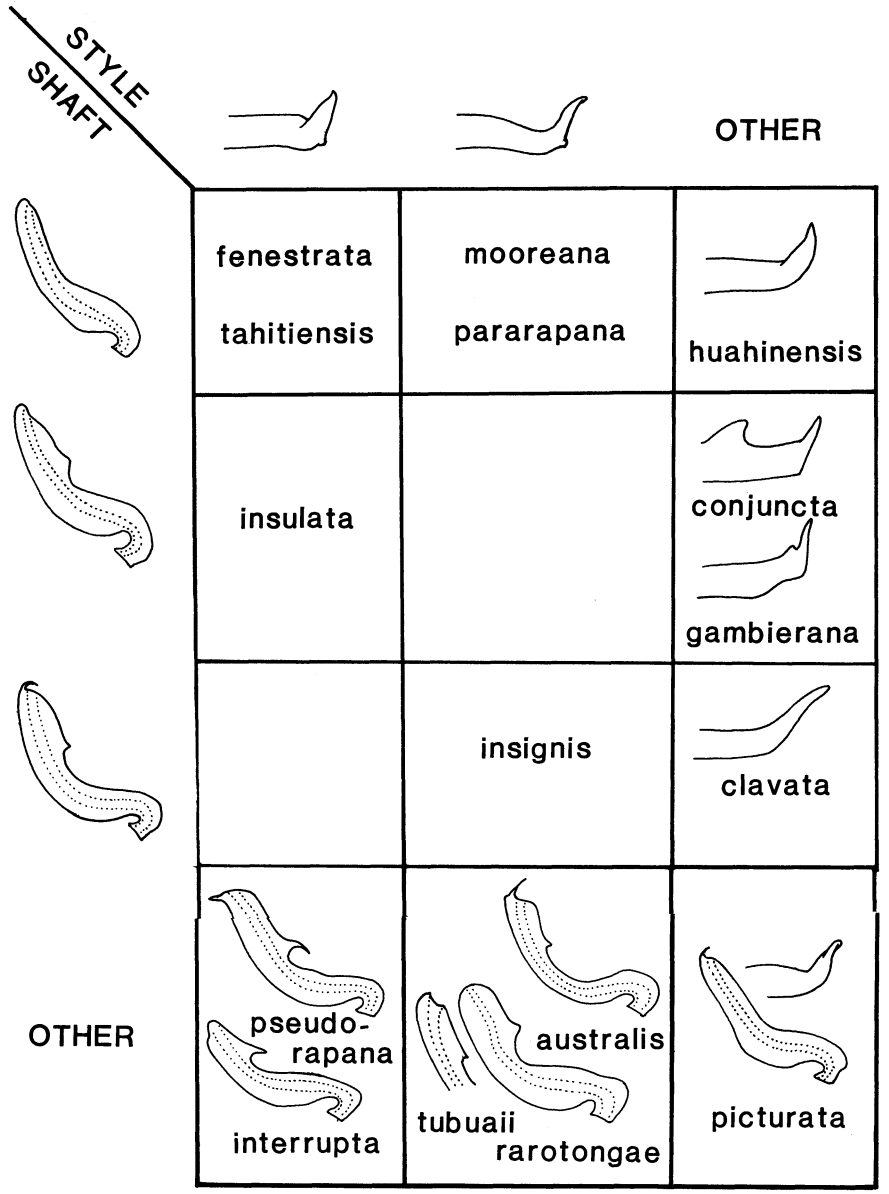


FIG. 18. Graphic key to the form of the ♂ genitalia of *Lallemandana* spp. of the *fenestrata* group, except *mumfordi* (♂ unknown). Adults of *fenestrata* and *mooreana* may be distinguished from those of *tahitiensis* and *pararapana* by their longer heads.

1. TAHITI (7352′) - 11 SPP.
2. SAVAII (6094′) - 4 SPP.
3. UPOLU (3608′) - 5 SPP.
4. RAIATEA (3389′) - 6 SPP.
5. MANUA (3056′) - 1 SP.
6. HUAHINE (2331′) - 1 SP.
7. TUTUILA (2142′) - 3 SPP.
8. RAROTONGA (2140′) - 1 SP.
9. GAMBIER (1447′) - 1 SP.
10. RAIVAVAE (1434′) - 2 SP.
11. TUBUAI (1309′) — 1 SP.
12. RURUTU -1 SP.
13. RAPA - 1 SP.
14. HENDERSON - 1 SP.
15. MAKATEA - 1 SP.
16. MOOREA - 1 SP.
17. BORA BORA - 1 SP.
18. EUA - 2 SPP.

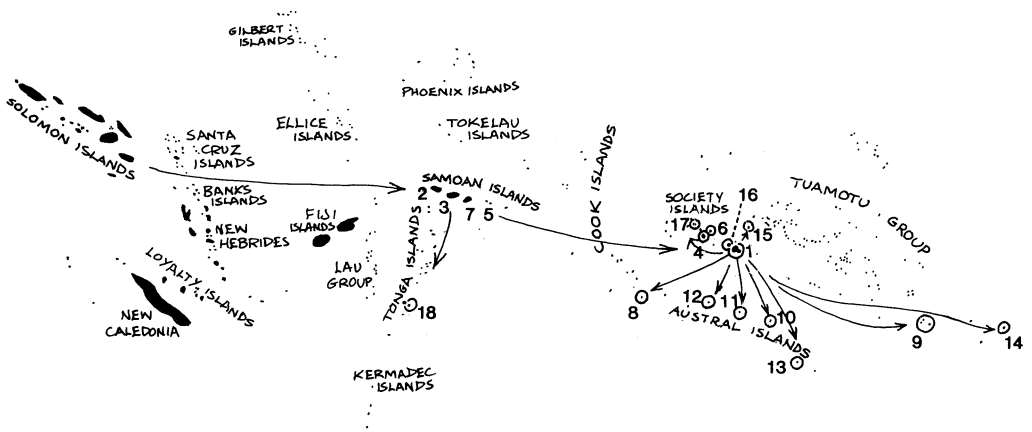


FIG. 19. Dispersal routes of *Lallemandana* and the number of species found on each island, ranked by highest elevation (elevations below 1000′ [300 m] not indicated).

Holotype ♂ (BISHOP 11,758) (FIG. 9b), SOCIETY IS: RAIATEA: XII.1926, J.W. Moore. Paratypes: 2♂,1♀, same data as holotype.

Remarks. Though similar to *conjuncta,* adults of *insulata* are distinguished by their large size and irregular pale median markings on the dorsum. They superficially resemble *australis* but have quite different genitalia.

Lallemandana (L.) interrupta cryptica Hamilton, **new subspecies** FIG. 2B–C

♂, 6.8–7.4 mm; ♀, 7.8–8.0 mm. Color as in *interrupta interrupta,* but yellow pronotal patch (when present) small, not reaching hind margin of pronotum (FIG. 2B), usually absent (FIG. 2C). Male genitalia as in *interrupta interrupta* (FIG. 18).

Holotype ♂ (BISHOP 11,759) (FIG. 2c), SOCIETY IS: RAIATEA: XII.1926, J.W. Moore. Paratypes: 8♂,7♀, same data as holotype. 2 paratypes in CNC.

Remarks. Superficially similar to *tahitiensis, cryptica* may be distinguished by its longer crown and distinctive male genitalia.

Lallemandana (L.) pararapana Hamilton, **new species** FIG. 11, 18

♂, 7.9 mm; ♀, 8.8 mm. Head of ♂ yellow; head of ♀, and venter and legs of both sexes sordid ochre; apex of crown same color as face; remainder of dorsum (except 2 pale costal areas) black, disc or tip of scutellum paler (FIG. 11). Head short, crown ¾ (0.75) as long as interocular width. Lateral margins of

pronotum about ½ (0.55) length of eye. Penis shaft angled at midlength, parallel-margined, unarmed (as in *tahitiensis*); style apex strongly tapered, angled dorsad (intermediate between that of *tahitiensis* and *mooreana,* FIG. 18).

Holotype ♂ (BISHOP 11,760) (FIG. 11b), SOCIETY IS: TAHITI: Mt Aorai, 1400–1450 m, 10.VII.1961, swept from ferns, J.L. Gressitt. Paratype: TAHITI: 1♂, Fare Rau Apa, III.1959, N.L.H. Krauss.

Remarks. Adults of *pararapana* are very similar to those of *mooreana,* differing in the striking adult color pattern and parallel-sided penis shaft. Members of *pararapana* superficially resemble those of *insignis rapana* (Lall.) and *pseudorapana,* n. sp. but differ in the unarmed penis shaft.

Lallemandana (L.) picturata Hamilton, **new species** FIG. 7, 18

♂, 6.2–6.5 mm; ♀, 7.7–8.1 mm. Head and legs orange, marked with black on crown near inner margins of eyes, and usually infuscated on frons; body with venter yellow, dorsum black with disc of pronotum and scutellum yellow; tegmina boldly patterned with broad yellow patches on black as in FIG. 7. Head short, crown about ¾ (0.72) as long as interocular width. Lateral margins of pronotum ½ (0.5) length of eye. Penis shaft angled dorsad at middle, tapered on apical ½, armed with short recurved filiform processes at apex; style apex tapered, curved dorsad, apically twisted (FIG. 18).

Holotype ♂ (BISHOP 11,761) (FIG. 7), TONGA IS: EAU I: Parker's Hill area, 200–300 m, III.1969, N.L.H. Krauss. 22 paratypes: EUA I: 6♂,4♀, same data as holotype; 1♂,3♀, Hafu, 150–200 m, III.1969, N.L.H. Krauss; 1♂,2♀, same data except, II.1972; 4♂,1♀, Ohonua, II.1956, Krauss. 2 paratypes in CNC.

Remarks. The short crown, bold yellow tegminal markings and male terminalia of adults of *picturata* are unique in the *fenestrata* species group.

Lallemandana (L.) pseudorapana Hamilton, **new species** FIG. 6, 18

♂, 7.1–7.6 mm; ♀, 7.9–8.7 mm. Legs and venter of head and thorax yellow; abdomen and dorsum black, except for crown yellow before eyes, 2 pale spots on costal margin of tegmen, and sometimes narrow yellow line on meson of scutellum (FIG. 6). Head moderately long, crown 4/5 (0.80–0.85) as long as interocular width. Lateral margins of pronotum about ½ (0.5–0.55) length of eye. Penis shaft curved dorsad, nearly parallel-sided to obliquely truncate tip, armed with hook-shaped posterior process beyond middle and short apical process directed cephalad (FIG. 18); style apex angled dorsad.

Holotype ♂ (BISHOP 11,762) (FIG. 6a), SOCIETY IS: RAIATEA: Uturoa, 1–100 m, VIII.1969, N.L.H. Krauss. 7 paratypes: RAIATEA: 1♂, same data as holotype, III.1971; 3♂,1♀, mts nr Uturoa, III.1955, N.L.H. Krauss; 2♀, hills above Pointe Marae, 200–300 m, 28.VIII.1969, Krauss. 2 paratypes in CNC.

Remarks. Superficially similar to adults of *insignis rapana* and of *pararapana,* those of *pseudorapana* may be distinguished by their longer head. The unique penis shaft separates the male of this species from those of all other *Lallemandana* species.

Lallemandana (L.) tubuaii Hamilton, **new species** FIG. 10, 18

♂, 7.3–7.5 mm; ♀, 8.2–8.8 mm. Venter yellow, with sclerites of abdomen discally infuscated; crown of head yellow with 2 narrow transverse black bars on hind margin; pronotum black, or with ovoid or

irregular yellow discal patch (FIG. 10); tegmina black with 2 pale costal areas and an extensive pale area transversed by black veins on apical ½ of clavus and adjacent parts of corium. Head short, crown ¾ (0.70–0.75) as long as interocular width. Lateral margins of pronotum about ½ (0.6) length of eye. Penis shaft strongly angled dorsad near middle, armed with small tooth on posterior margin, parallel-margined nearly to tip, which is rounded, except in region of gonopore, where it is shallowly emarginate (FIG. 18); style as in *australis*.

Holotype ♂ (BISHOP 11,763) (FIG. 10b), AUSTRAL IS: TUBUAI: Mt Taita, 1000′ [300 m], 15.VIII.1934, E.C. Zimmerman. 11 paratypes: TUBUAI: 5♀, Mt Taita, 1200′ [400 m], 20.VIII.1934, beaten from shrubs, E.C. Zimmerman; 1♂, same data except, 21.VIII.1934; 2♀, same data except, 23.VIII.1934; 3♂, Murivahi, 10′ [3 m], 16.VIII.1934, Zimmerman. 2 paratypes in CNC.

Remarks. Adults of *L. tubuaii* resemble those of *insulata,* n. sp. in genitalia and color pattern, but differ in size, in having the apex of the penis shaft more nearly parallel, and in having a more strongly narrowed style apex. The lack of filiform processes of the penis shaft distinguishes males of *tubuaii* from those of both *australis* and *insignis*.

Acknowledgments. I am indebted to G. M. Nishida and W. A. Steffan of the Bishop Museum, Honolulu, Hawaii for permission to examine the specimens in their collections.

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