

PSOCOPTERA OF THE FIJI ISLANDS

By I. W. B. Thornton

PSOCOPTERA OF THE TONGAN ARCHIPELAGO

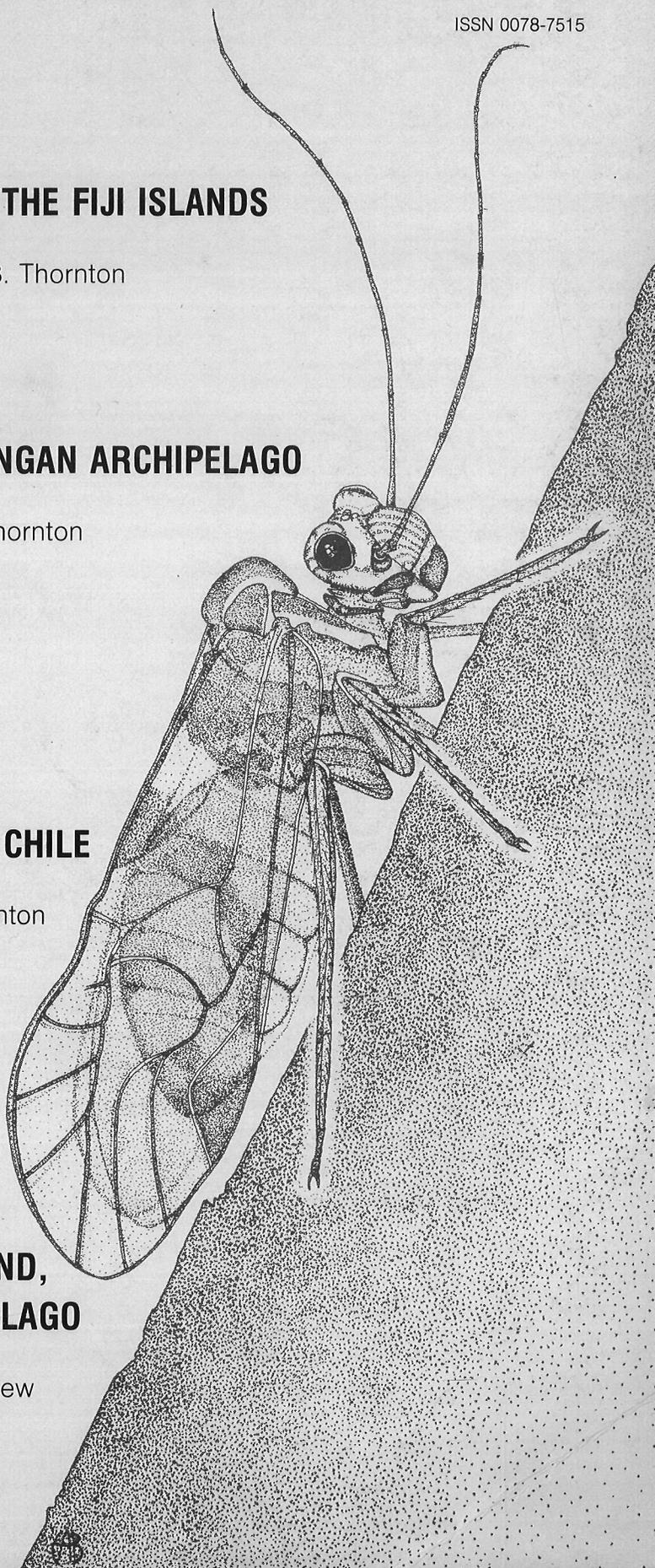
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**PSOCOPTERA FROM
CENTRAL AND SOUTHERN CHILE**

By T. R. New & I. W. B. Thornton

**PSOCOPTERA FROM
ROBINSON CRUSOE ISLAND,
JUAN FERNANDEZ ARCHIPELAGO**

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PSOCOPTERA OF THE FIJI ISLANDS

By I. W. B. Thornton 1

PSOCOPTERA OF THE TONGAN ARCHIPELAGO

By I. W. B. Thornton 106

PSOCOPTERA FROM CENTRAL AND SOUTHERN CHILE

By T. R. New & I. W. B. Thornton 136

**PSOCOPTERA FROM ROBINSON CRUSOE ISLAND,
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By I. W. B. Thornton & T. R. New 179

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PSOCOPTERA OF THE FIJI ISLANDS

By I. W. B. Thornton¹

Abstract. The psocopteran fauna of Fiji consists of 81 species (44 described as new) placed in 17 genera. Nine families are represented. Further descriptions are provided of *Aaroniella guttulata* and *Ptycta vitiensis*. There are few species in common with the Inner Melanesian Arc and none with Australia or New Zealand. Apart from 16 species of Pacific-wide distribution, the fauna appears to have an Oriental-Melanesian origin, with radiation in Fiji in the genera *Lepidopsocus*, *Heterocaecilius*, *Ptycta* and *Phlotodes*. The families Lepidopsocidae, Pseudocaeciliidae, Psocidae and Myopsocidae are thus very much better represented in Fiji than they are in New Zealand, whereas the Elipsocidae, with 10 species in New Zealand, is not known from Fiji, and the Philotarsidae (20 species in New Zealand) has but 2 species in Fiji.

This paper is part of a series on the distribution and relationships of psocopteran insects occurring on the Melanesian arcs of islands and archipelagos to the northeast and east of Australia (Smithers & Thornton 1974). The Fiji Archipelago is part of the Outer Melanesian Arc and, because of the considerable size and height of the islands of the western group, is an important archipelago biogeographically.

Although the islands lie on a piece of continental or quasi-continental crust (Chase 1971, Green & Cullen 1973), their geological history has been interpreted by Gill & Gorton (1973) and Packham (1973) as basically one of island-arc volcanism. It is believed that the islands were originally part of a long, continuous island arc that originated about the time that Australia began rifting from Antarctica and formed a volcanic ridge along a Pacific-Australia plate boundary with a west-dipping Pacific plate. Evidently the arc was predominantly submarine from its development in the Eocene to the Lower Miocene. During the Middle Miocene and/or Pliocene, when the resolution of stresses between the 2 great plates changed, the arc fractured, and the location of trenches in the northern section (Bismarcks, Solomons, New Hebrides) was reversed. At about the same time the composition of magma in Fiji changed to almost wholly olivine basalt, indicating the end of normal subduction volcanism about 6 million years ago, and the Fiji section of the arc was disrupted and rotated to its present position between the northern end of the Tonga arc and the southern end of the New Hebrides chain (Green & Cullen 1973). The Fiji archipelago was probably not a considerable area of dry land until the time of the volcanic events occurring around the Miocene-Pliocene boundary, about 5 million years ago. Assuming that the sea level in the southwest Pacific was -130 m during the last glacial period (Chappell 1976) then, on present bathymetry, the area of the archipelago would have been about doubled and Viti Levu and Vanua Levu separated by only a few kilometres of sea.

1. Department of Zoology, La Trobe University, Bundoora, Victoria, Australia 3083.

The first work treating the psocopteran fauna of Fiji was that of Karny (1926), who worked from dried specimens and thus provided no genitalic information. Karny recognized 7 species from Fiji, describing 4 as new (*Psocus vitiensis*, *Pseudocaecilius marshalli*, *Pse. veitchi* and *Pse. greenwoodi*), and recording *Lichenomima muscosa* (Enderlein) (known from Japan), *Caecilius novoguineensis* Enderlein (known from New Guinea), and *Ectopsocus myrmecophilus* Enderlein (known from India and New Britain).

From a study of the Bishop Museum collections made by Dr E. C. Zimmerman in the archipelago, Lee & Thornton (1967) described 5 more pseudocaeciliids (4 in *Heterocaecilius*, 1 in *Lobocaecilius*) and redescribed *Pse. greenwoodi* Karny and placed it in *Heterocaecilius*. Working with the same collection, Thornton & Wong (1968) recorded a newly discovered Micronesian species, *Peripsocus ferrugineus* Thornton & Wong, from Fiji, described 4 species of *Ectopsocus* found in the archipelago, and recorded *Ectopsocus fullawayi* Enderlein and *Ectopsocus perkinsi* Banks. Thus by 1968, 20 species were known from the archipelago.

The present paper is based on a further study of the Bishop Museum's Zimmerman collection (ECZ) and also on a collection that I made in the archipelago from October 1972 to January 1973 (IWBT). The known psocopteran fauna of the archipelago now stands at 81 species.

I worked on 3 islands, spending 36 days collecting in the field on Viti Levu, 16 on Vanua Levu, and 7 on Ovalau, a total of 59 collecting days. Care was taken to collect not only in lowland agricultural areas but also in the highland forests. FIG. 1 shows the localities at which psocopterans were collected, mainly by beating, on the archipelago.

Types are deposited in the Australian Museum, Sydney (AMS); Bishop Museum, Hawaii (BISHOP); Museum of Comparative Zoology, Harvard (MCZ); British Museum (Natural History) (BMNH). The following terms and abbreviations are used in this paper: I.O.:D—ratio of interocular distance to diameter of eye as measured by Baddonnel and described in Ball (1943); FW—fore wing length; HW—hind wing length; F—hind femur length; T—hind tibia length; t_1 —length of basal hind tarsal segment; t_2 —length of 2nd hind tarsal segment; t_3 —length of 3rd hind tarsal segment; rt —ratio of $t_1:t_2:t_3$, t_2 being unity; f_1 —length of basal flagellar segment; f_2 —length of 2nd flagellar segment. Lengths are in millimetres. Specimens collected by the author lack collector designation or are coded IWBT in the citations. Specimens collected by Dr E. C. Zimmerman are coded ECZ. Names of other collectors are written out.

KEY TO FAMILIES OF PSOCOPTERA IN FIJI

1. Body and wings with scales, antenna with more than 20 segments **Lepidopsocidae**
 Body and wings without scales, antenna with 13 segments or fewer 2
2. Fore wing without areola postica 3
 Fore wing with areola postica 4
3. In hind wing veins *rs* and *m* connected by a crossvein, claws without subapical tooth **Ectopsocidae**
 In hind wing veins *rs* and *m* fused for a length, claws with subapical tooth **Peripsocidae**
4. Fore wing with areola postica joined to media (discoidal cell closed) 5
 Fore wing with areola postica free (discoidal cell open) 6

16°S
177°W

16°S
179°E

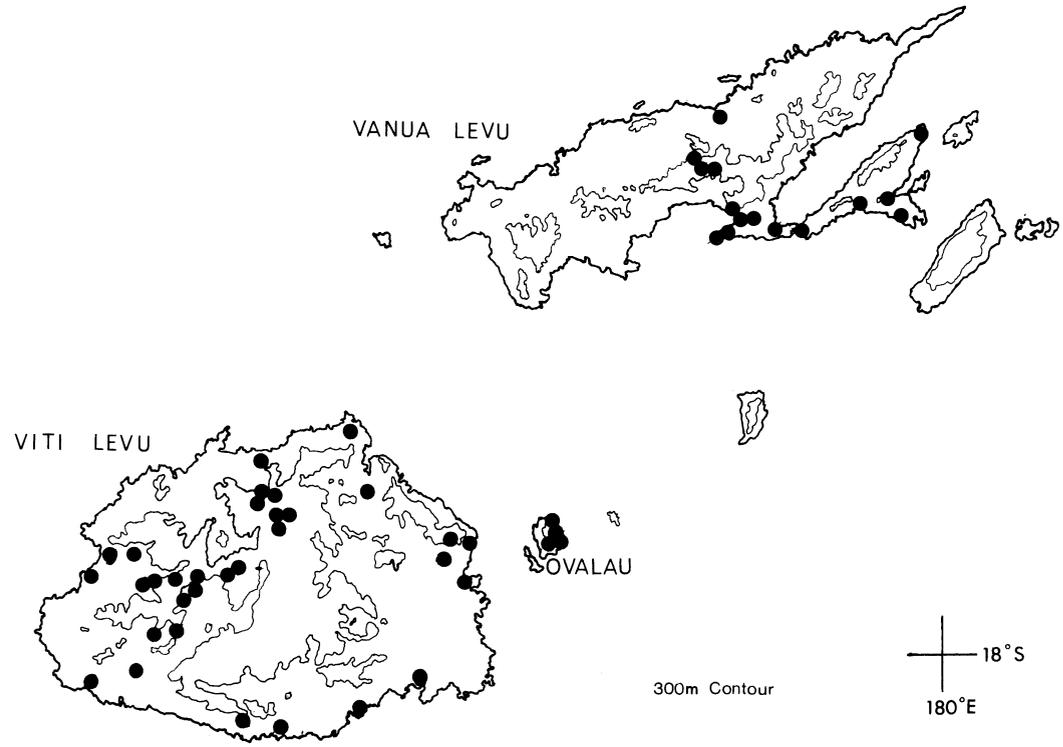


FIG. 1. Localities in Fiji at which psocoptera were collected during 1972-73. 300 m contour shown.

5. Tarsi 3-segmented; fore wing largely hyaline, with simple dark brown pigment pattern . . . **Psocidae**
 Tarsi 2-segmented; fore wing mottled with complex pattern of clouds and spots **Myopsocidae**
6. Tarsi 3-segmented 7
 Tarsi 2-segmented 8
7. Antenna with 15 or more segments; fore wing without nodulus **Pachyroctidae (Tapinella)**
 Antenna with 13 segments; fore wing with nodulus **Philotarsidae**
8. Female gonapophyses complete **Pseudocaeciliidae**
 Female gonapophyses without outer valve **Caeciliidae**

Family LEPIDOPSOCIDAE Pearman, 1936

KEY TO FIJIAN GENERA OF LEPIDOPSOCIDAE

1. Fore wing elytriform, veins hardly recognizable **Cyptophania**
 Fore wing not elytriform, veins distinct after removal of scales 2
2. Antenna with fewer than 30 segments, segments about 4× as long as thick; distinct closed cell in both fore and hind wing, that of hind wing narrow, basal **Nepticulomima**
 Antenna with 30 or more segments, segments about 2× as long as thick; distinct closed cell never present in both fore and hind wing 3
3. In fore wing veins r_3 and r_1 separate, or linked by a crossvein **Echmepteryx**
 In fore wing veins r_3 and r_1 fused for a distance **Lepidopsocus**

Genus **Cyptophania** Banks

Cyptophania Banks, 1931: 440. Type-species: *Cyptophania hirsuta* Banks. For synonymy see Thornton et al., 1972: 62.

Cyptophania hirsuta Banks

FIG. 2–3

Cyptophania hirsuta Banks, 1931: 440.—Zimmerman, 1948: 255.—Butler, 1961: 391 (distribution).

Specimens examined. OVALAU: 1♀, Levuka, Mission Hill, 100 m, dead banana leaves, 25.XI.1972.

I have examined the type of this Hawaiian species in MCZ. The fore wing membrane, after removal of scales, has a distinctive pigment pattern which is present in all specimens since collected in Hawaii (Thornton 1981b). This pattern and the fore wing venation are shown in FIG. 2 and 3. The Fiji specimen agrees exactly in these and other color characters. The hind wings are reduced to very small naked lobes. No males have yet been taken.

In Hawaii, *C. hirsuta* has also been collected from ephemeral habitats such as birds' nests, *Casuarina* litter, dead fern fronds and steles, dead leaves, and sugarcane trash. *C. hirsuta* differs from the other 3 described species, *C. bifurcata* (Karny) from Samoa, *C. alutaceum* (Enderlein) from the Seychelles, and *C. marginata* Thornton, Lee & Chui from the southern Marianas and Marshalls, in the fore wing pigmentation pattern.

Cyptophania marginata Thornton, Lee & Chui

Cyptophania marginata Thornton, Lee & Chui, 1972: 63–64.

Specimens examined. VANUA BALAVU: 1♀, Bavatu, ca 80 m, 16.VIII.1938, ECZ.

This species is also known from the southern Marianas and Marshalls, and I have seen it in collections from Samoa, Mangareva and Fanning. In Micronesia it has been

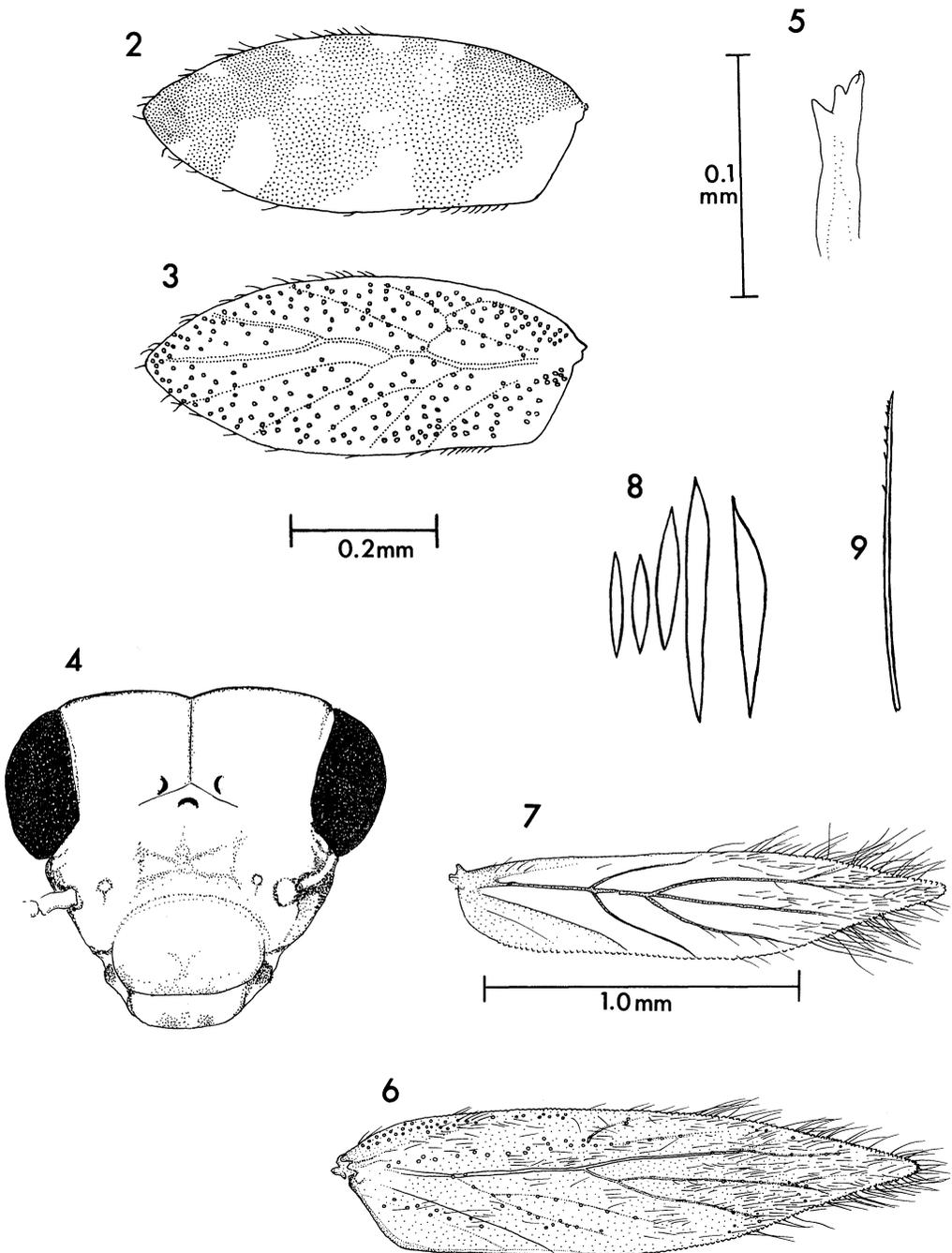


FIG. 2-9. 2-3. *Cyptophania hirsuta*, ♀: fore wing pattern (2) and venation (3). 4-9. *Echmepteryx vitiensis*, ♂: head (4), lacinial apex (5), fore wing (6), hind wing (7), fore wing scales (8,9). FIG. 2, 3, FIG. 6, 7, and FIG. 5, 8, 9 to common scales; FIG. 4 not to scale.

taken in berlesed material and from dying coconut fronds, decaying banana leaves and stems, a bird's nest, fungus, on breadfruit bark and under a stone. Like *C. hirsuta*, it is probably an opportunistic species, moving from one ephemeral habitat to another.

Genus **Echmepteryx** Aaron

Echmepteryx Aaron, 1886: 17. Type-species: *Amphientomum hageni* Packard.

Echmepteryx (Thylacopsis) lunulata Thornton, Lee & Chui

Echmepteryx (Thylacopsis) lunulata Thornton, Lee & Chui, 1972: 64–66.—Thornton & Woo, 1973: 6.

Specimens examined. VITI LEVU: 1N, Nausori Highlands, nr Nausori, 600 m, on *Pinus caribaea*, 21.X.1972; 3 ♀, Nausori Highlands, 2 km N of Magodro, nr Bukuya, 450 m, 7.XI.1972; 1 ♀, Burulevu, Sawakasi tikina, coast, on *Rhizophora mangle*, 23.XI.1972; 1 ♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973. OVALAU: 26 ♀, Levuka, Mission Hill, 100–200 m, dead banana leaves, 25.XI.1972; 1 ♀, Levuka, garden, 50 m, 26.XI.1972; 7 ♀, 1N, Lovoni Val, beating, 26.XI.1972; 3 ♀, above Levuka, 400 m, scrub, 27.XI.1972. VANUA LEVU: 3 ♀, Wakanilato, 2 km NW of Mt Delaikoro, on *Citrus*, 12.XII.1972; 1 ♀, Napuka, Dariqala Pt, Natewa Penin., sea level, on *Citrus*, 15.XII.1972; 2 ♀, nr Nakula, Savu Savu area, 320 m, 16.XII.1972; 1 ♀, Lesiacevu Pt, E end of Savu Savu Bay, sea level, on *Citrus*, 18.XII.1972; 1 ♀, isthmus 16 km E of Savu Savu, on *Pandanus*, 21.XII.1972; 3N, nr Faun Harbour, on *Citrus*, 22.XII.1972.

I have collected this species in the Hawaiian (Thornton 1981b), Tongan (Thornton 1981a) and Galapagos archipelagos. It also occurs on the Bonins, northern and southern Marianas, Carolines and Marshalls, and on Diego Garcia in the Indian Ocean. The species is very similar in head pattern to *E. pallida* Smithers from Australia (Queensland), *E. falco* Badonnel and *E. similis* Badonnel from Africa, and *E. acuminata* Turner from Jamaica, all of which differ from each other and from *E. lunulata* in fine details of the pattern. *E. falco* has a dark median stripe on the clypeus (absent in *E. lunulata*), *E. pallida* lacks dark bands across the anterior and posterior edges of the clypeus (present in *E. lunulata*), and *E. acuminata* has a broad brown band on the labrum (absent in *E. lunulata*). No males of this species have yet been taken. *E. lunulata* is most similar to *E. acuminata*.

Echmepteryx (Thylacopsis) madagascariensis (Kolbe)

Thylax madagascariensis Kolbe, 1885: 184.

Echmepteryx (Thylacopsis) albidus (Badonnel): Smithers, 1965: 74.

Echmepteryx albida (Badonnel): Turner, 1975: 537.

For additional synonymy see Thornton & Woo, 1973: 7.

Specimens examined. OVALAU: 30 ♀, Levuka, Mission Hill, 60–120 m, chiefly from dead banana leaves, 25, 26.XI.1972; 11 ♀, Cawaci, sea level, on palm, 28.XI.1972; 11 ♀, Draiba, sea level, on coconut fronds, 30.XI.1972. VANUA LEVU: 9 ♀, Wa-

kanilato, 3 km NW of Mt Delaikoro, on ti, 12.XII.1972; 3 ♀, isthmus 16 km E of Savu Savu, on *Pandanus*, 21.XII.1972.

This widespread tropicopolitan species occurs in West Africa, Madagascar, the Seychelles, Diego Garcia, Hong Kong, Micronesia (Bonins, N and S Marianas), Australia, the Kermadecs, Hawaiian Is, Galapagos, Chile and Jamaica. Moreover, Dr E. L. Mockford (in litt.) has stated, "I have what appears to be the same as the Hawaiian species from South Florida, eastern coastal areas of northeastern South America, and possibly some of the West Indies." The species is found predominantly in ephemeral habitats.

Figures of male and female genitalia of *Thylacopsis albidus* (W Africa) drawn by Badonnel (1949) agree with those of Hawaiian, Micronesian and Fijian specimens, as do the wing venation and markings. The type of *Thylax madagascariensis* (Madagascar and the Seychelles) is believed to be lost. However, the venation and fore wing scales drawn by Enderlein (1931) as well as descriptions of *T. albidus* by Badonnel (1949) and *T. madagascariensis* by Enderlein (1908b) agree completely with Hawaiian, Micronesian and Fijian specimens. The description of *Echmepteryx costalis* Banks from Hawaii (Banks 1931), which was figured as *Lepidopsocus costalis* by Zimmerman (1948), agrees with specimens I have collected later in Hawaii and with the Micronesian and Fijian specimens.

Echmepteryx vitiensis Thornton, new species

FIG. 4-11

♂. *Coloration* (after ca 3 years in alcohol). Generally buff. Head (FIG. 4) pale buff, somewhat darker as follows: either side of median epicranial suture, dorsal ridge of epicranium and mesad of orbit; narrow grayish stripe from orbit to antennal socket, wider grayish stripe over posterior ½ of gena; eyes black, ocelli with gray lunules; faint darker marking in "bow-tie" shape at anterior of frons; postclypeus with striae hardly distinguishable. Maxillary palp pale buff, apical segment darker distally. Thorax buff, mesothoracic nota paler, pleura with grayish granulation; legs pale buff, tibia and tarsus slightly darker. Fore wing (FIG. 6) fuscous, fading in apical ¼, hind wing hyaline. Abdomen covered with gray-brown granulations.

Morphology. I.O.:D = 3.51. Lacinia (FIG. 5, paratype) with 3 apical tines, distal one apparently divided towards apex. Antenna of holotype broken, at least 33 segments, segments 4× as long as broad. Thoracic terga waxy. Fore wing venation as FIG. 6. Fore wing scales of many types, illustrated in outline in FIG. 8; also towards apex of wing and particularly along margins very long narrow setose scales, slightly barbed on one side apically (FIG. 9); on membrane, carried on small bosses, smaller setoid scales; very large scale bosses confined to veins. Hind wing (FIG. 7) without closed basal cell; margin, except basal ⅓ of anterior margin, with large serrate scales as in fore wing. Rasp of Pearman's organ well developed, coxa of mesothoracic leg with interlocking organ. Basal hind tarsal segment with 15 ctenidia. Claw with stout subapical tooth and 4-5 small teeth, pulvillus narrow. Epiproct simple, setose. Paraproct with field of 6 trichobothria and 1 seta without a basal rosette; mesial spine slightly curved, sharp. Hypandrium simple, setose. Phallosome (FIG. 10, not squashed) with separate parameres divergent anteriorly, spatulate posteriorly and with elongate pores; 2 sets of sclerites within parameres, each apparently consisting of a stout slightly curved sclerite, a long narrow boomerang-shaped sclerite, and an ear-shaped sclerite; anterior arms of boomerang-shaped sclerites apparently support a median rugose radula.

Dimensions. B 1.5, FW 1.82, HW 1.56, F 0.56, T 0.83, t₁ 0.29, t₂ 0.06, t₃ 0.055, rt 4.8:1:0.9, f₁ 0.040, f₂ 0.037, f₁/f₂ 1.081.

♀. *Coloration* (after ca 3 years in alcohol). As ♂.

Morphology. As ♂. Flagellum with at least 37 segments. Basal hind tarsal segment with 12 ctenidia. Gonapophyses as FIG. 11.

Dimensions. B 1.5, FW 1.91, HW 1.64, F 0.60, T 0.83, t_1 0.30, t_2 0.058, t_3 0.062, rt 5.17:1:1.07, f_1 0.028, f_2 0.045, f_1/f_2 0.62.

Holotype ♂, VITI LEVU: Nadi, *Tamarindus indica*, 29.XII.1972, IWBT (BISHOP 11,456). Allotype ♀, same data as holotype (BISHOP). Paratypes, 1♂,2♀, same data as holotype (AMS).

Other specimens examined. VITI LEVU: 4♂,3♀, Nausori Highlands, nr Nausori, 600 m, 21.X.1972; 2♂,3♀,2N, 650 m, *Agathis* and *Dacrydium* forest, 27.X.1972; 2♂,5♀, Nadi, dead hurricane-blown tree, 29.X.1972; 1♂,1♀, Nadrau Plateau, nr Navai, 730 m, 31.X.1972; 2♂,9♀, Nadrau Plateau, Koro-O, 970 m, dead leaves and twigs, 2.XI.1972; 1N, Mt Victoria, 1000 m, W slope, 1.XI.1972; 1♂,9♀, Nadrau Plateau, Navai, 500 m, dead tree, 1.XI.1972; 2♂, Nadi, dead *Phoenix* fronds, 6.XI.1972; 2♂,14♀, 2 km E of Mt Magodro, nr Bukuya, 400 m, 7.XI.1972; 2♀, 2 km N of Mt Magodro, 750 m, dead leafy branches, 10.XI.1972; 1♂,19♀, Mt Magodro area, nr Nasivikoso, Namada stream, 450 m, dead branches, 10.XI.1972; 13♀, Sigatoka Val, nr Toga village, 70 m, dead breadfruit trees, 10.XI.1972; 4♂,1♀, 9 km NE of Nadrau, Nadrau Plateau, 600 m, 16.XI.1972; 1♂, 4 km S of Navai, 600 m, 16.XI.1972; 1♂, Burelevu village, Sawakasa tikina, coast, *Rhizophora mangle*, 23.XI.1972; 3♂,1♀, Nadi, 5.XII.1972; 2♂,8♀, Sabeto Val, Nadele area, 9.XII.1972; 2♂,3♀, Nadi, *Tamarindus indica*, 29.XII.1972; 1♂,7♀, Nausori Highlands, 730 m, *Pinus caribaea*, 1.I.1973. OVALAU: 1♂,1♀, Levuka, Mission Hill, 100 m, dead banana leaves, 25.XI.1972; 2♂,5♀, Levuka, Mission Hill, 100–200 m, 25.XI.1972; 1♂, Levuka, garden, 30 m, 26.XI.1972; 2♂,5♀, bush 300 m above Levuka, 27.XI.1972; 1♀, Lovoni crater, dead breadfruit leaves, 26.XII.1972; 1♂, Draiba, sea level, coconut fronds, 30.XI.1972. VANUA LEVU: 2♂,4♀,5N, Wakanilato, 3 km NW of Mt Delaikoro, dead leaves, 12.XII.1972; 1♀, nr Nakula, Savu Savu area, 120 m, 16.XII.1972; 1♀, 3 km SW of Savu Savu, sea level, *Citrus*, 18.XII.1972; 2♀, Savu Savu Bay, Balaga Beach, 23.XII.1972.

This common, somewhat undistinguished, pale-headed hairy species occurs from sea level to about 1000 m on both introduced and native trees and has been taken from both dead leaves and branches and healthy vegetation.

Genus *Lepidopsocus* Enderlein

Lepidopsocus Enderlein, 1903: 328. Type-species: *Lepidopsocus nepticulides* Enderlein.

KEY TO FIJIAN SPECIES OF *Lepidopsocus*

In this key the head and wing pigment patterns are referred to as they appear after removal of scales and as seen under a stereo microscope.

1. Medial area of vertex (posterior to ocelli) with a pair of distinct pigment patches 2
- Medial area of vertex (posterior to ocelli) without a pair of distinct patches 9
2. Pigment patches on medial area of vertex not continuing on to frons 3
- Pigmentation on medial area of vertex as longitudinal bands continuing on to frons .. **fasciatus**, n. sp.

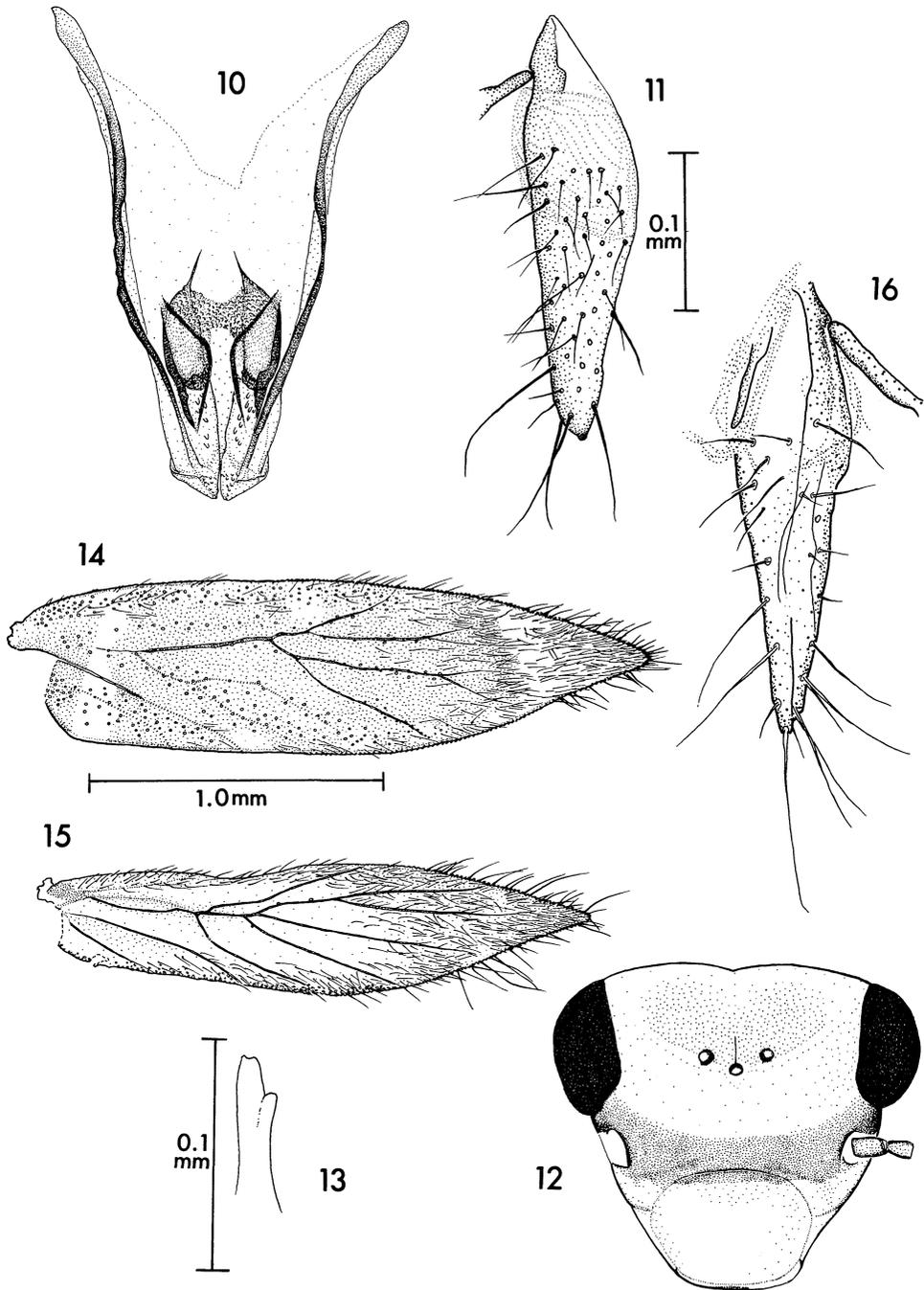


FIG. 10-16. 10-11. *Echmepteryx vitiensis*: ♂ phallosome (10); ♀ gonapophyses (11). 12-16. *Lepidopsocus cinctus*, ♀: head (12), lacinial apex (13), fore wing (14), hind wing (15), gonapophyses (16). FIG. 10, 11, 16 and FIG. 14, 15 to common scales; FIG. 12 not to scale.

3. Pigment patches in medial area of vertex wedge-shaped, point of wedge anterior 4
 Pigment patches in medial area of vertex broadly rounded or squarish, not pointed anteriorly 8
4. Frontal pigmentation pattern complex, including at least 3 pale areas surrounded by brown pigment 5
 Frontal pigmentation pattern as transverse bands or lacking "islands" of pale pigment surrounded by dark pigment 6
5. Frontal pigmentation pattern of 5 discrete paler areas surrounded by brown pigment .. **maculatus**
 Frontal pigmentation pattern of 3 paler areas surrounded by brown pigment **pseudomaculatus, n. sp.**
6. Frontal pigmentation pattern includes a pair of distinct transverse triangular patches **samus, n. sp.**
 Frontal pigmentation pattern consists of narrow pigmented bands 7
7. Frontal bands parallel, transverse; clypeus with narrow anterior band interrupted medially ... **delius, n. sp.**
 Frontal bands not parallel; clypeus with narrow brown band continuous **dindus, n. sp.**
8. Frons with 2 pairs of narrow transverse brown bars; fore wing membrane with broad alternating pale and brown transverse bands **ruptus, n. sp.**
 Frons with isolated pale areas separated by brown pigment, fore wing membrane with large distinct brown central patch **marmoratus**
9. Vertex pale medially, shading to dark brown adjacent to orbits, or with distinct lateral longitudinal marks extending almost to occiput 10
 Vertex uniform, or lateral marks faint, extending only halfway to occiput 13
10. Vertex pale medially, shading to dark brown adjacent to orbits 11
 Vertex with distinct lateral longitudinal marks 12
11. Frons without distinct pigment bands, no mark anterior to median ocellus **cuneatus, n. sp.**
 Frons distinctly marked with pigment bands from orbit to medial section of frons-clypeal suture, a pigment patch over and anterior to median ocellus **savuensis, n. sp.**
12. Median area of frons with small isolated pigment patch anterior to median ocellus, pigment band from lateral ocelli to vertex marks **pretiosus**
 No pigment patch anterior to median ocellus, no pigment band from lateral ocelli to vertex marks **major, n. sp.**
13. Median area of frons without brown pigment 14
 Median area of frons with some brown pigment 18
14. Fore wing membrane largely brown in basal $\frac{2}{3}$, apical $\frac{1}{3}$ hyaline, sharp straight line of demarcation between the two **pictus, n. sp.**
 Fore wing membrane without sharp straight line of demarcation between pigmented and hyaline areas 15
15. Legs unmarked apart from a single broad subbasal black band on hind tibia **tibialis, n. sp.**
 Legs not patterned as above 16
16. Head completely unpatterned; fore wing less than 1.75 mm long **torus, n. sp.**
 Head with at least a dark mark along posterior border of gena; fore wing more than 2 mm long 17
17. A longitudinal brown mark on each lateral $\frac{1}{4}$ of frons; genae dark brown; a cream band from orbit to antennal socket; fore wing membrane very pale brown **pelmus, n. sp.**
 Frons unmarked, cream; genae cream with dark mark along posterior edge; fore wing mottled in shades of brown and paler patches **fuscus, n. sp.**
18. Frons with a broad brown band transversely between antennal sockets **cinctus, n. sp.**
 Frons with interrupted pigment patches between antennal sockets 19
19. Frons with a pair of short narrow brown marks along frons-vertex suture and a pair of brown marks more anteriorly and medially **oweni, n. sp.**
 Frons with a narrow brown band all along frons-vertex suture, a large central light brown area surrounded by brown pigment contains 3 or 4 small isolated brown patches .. **nausoriensis, n. sp.**

Lepidopsocus cinctus Thornton, new species

FIG. 12-16

♀. *Coloration*. Head cream, a wide brown band transversely over frons (FIG. 12). Antenna brown, maxillary palps cream, posterior ½ of gena cream. Thorax light brown. Legs pale cream except brown as follows: distal ⅓ of femur, basal ¼ of tibia and basal ¼ of 1st tarsal segments. Fore wing membrane (FIG. 14) extensively marked with brown clouds; hind wing (FIG. 15) membrane hyaline. Abdomen pale brown.

Morphology. I.O.:D = 2.0:1. Lacinal apex unusual, lacking median tooth (FIG. 13). Flagella broken, with at least 36 segments, segments about 4× as long as broad. Thoracic terga waxy. Most of fore wing scales lost, barbed marginal setoid scales. Hind wing: (FIG. 15). Rasp of Pearman's organ present. Coxal interlocking device present (stud on right). Claw sharply bent, with minute subapical tooth. Basal hind tarsal segment with 18 ctenidia. Epiproct simple, setose. Paraproct with curved mesial spine, an oval field of 6 trichobothria and 1 seta without basal rosette. Gonapophyses as FIG. 16.

Dimensions. B 1.6, FW 2.15, HW 1.84, F 0.66, T 0.92, t₁ 0.36, t₂ 0.067, t₃ 0.045, rt 5.37:1:0.67, f₁ 0.042, f₂ 0.042, f₁/f₂ 1.

♂. Unknown.

Holotype ♀, OVALAU: bush above Levuka, 27.XI.1972, IWBT (BISHOP 11,457).

L. cinctus is described from a single female from Ovalau because of the very distinctive head pattern; a broad pigmented band across the base of the postclypeus is not found in any other Fijian lepidopsocid.

Lepidopsocus cuneatus Thornton, new species

FIG. 17-21

♀. *Coloration* (after ca 3 years in alcohol). Head with vague brown markings as FIG. 17, paler along each side of median epicranial suture and over central area of frons and postclypeus; frontal sutures black; genae brown; maxillary palps brown, apical segment darker. Thoracic terga brown, pleura brown. Legs: coxa brown; trochanter buff; femur brown, pale cream apically; tibia pale cream with 2 broad brown bands; basal segment of tarsus brown, basally fading to cream over apical ½, apical segment pale brown. Fore wing with distinct pattern of brown clouds as in FIG. 19. Hind wing hyaline apart from costal cell basally and anterior apex of wing with brown cloud. Abdomen brown.

Morphology. I.O.:D = 1.7:1. Lacinal apex as in FIG. 18. Antenna broken, at least 46 segments, segments 4× as long as broad. Thoracic terga waxy. Fore wing venation as in FIG. 19. Scales lanceolate, of varying widths, long marginal barbed setoid scales as in *Echmepteryx vitiensis*. Hind wing: FIG. 20. Claw without subapical tooth or serrations, pulvillus narrow. Basal hind tarsal segment with 16 ctenidia. Rasp of Pearman's organ present, also coxal interlocking device. Epiproct semicircular, setose. Paraproct with a field of 6 trichobothria and 1 without a basal rosette, mesial spine sharply pointed, slightly curved. Gonapophyses as in FIG. 21.

Dimensions. B 2.4, FW 2.58, F 0.77, T 1.17, HW 2.17, t₁ 0.47, t₂ 0.07, t₃ 0.05, rt 6.71:1:0.71.

♂. Unknown.

Holotype ♀, VITI LEVU: Nausori Highlands, 8 km E of Natawa, 850 m, Kauri forest, dead hurricane-blown tree, 28.X.1972, IWBT (BISHOP 11,458). Paratypes, 6♀, VITI LEVU: Nadrau Plateau, nr Navai, 800 m, dead hurricane-blown tree with lichen, 31.X.1972, IWBT (AMS).

Other specimens examined. VITI LEVU: 6♀N, Nadrau Plateau, Dromodromo, nr Navai, 780 m, 2.XI.1972; 1♀, 2 km E of Mt Magodro, nr Bukuya, Nakata, 400 m, 7.XI.1972; 5♀, 10 km NNE of Nadrau, 650 m, 16.XI.1972. VANUA LEVU: 1♀, Waikava Promontory, 170 m, *Citrus*, 22.XII.1972.

Superficially, the head pattern of this species is similar to that of *L. fasciatus*, n. sp. The pattern differs in being much less sharply defined and in the lateral pigmented

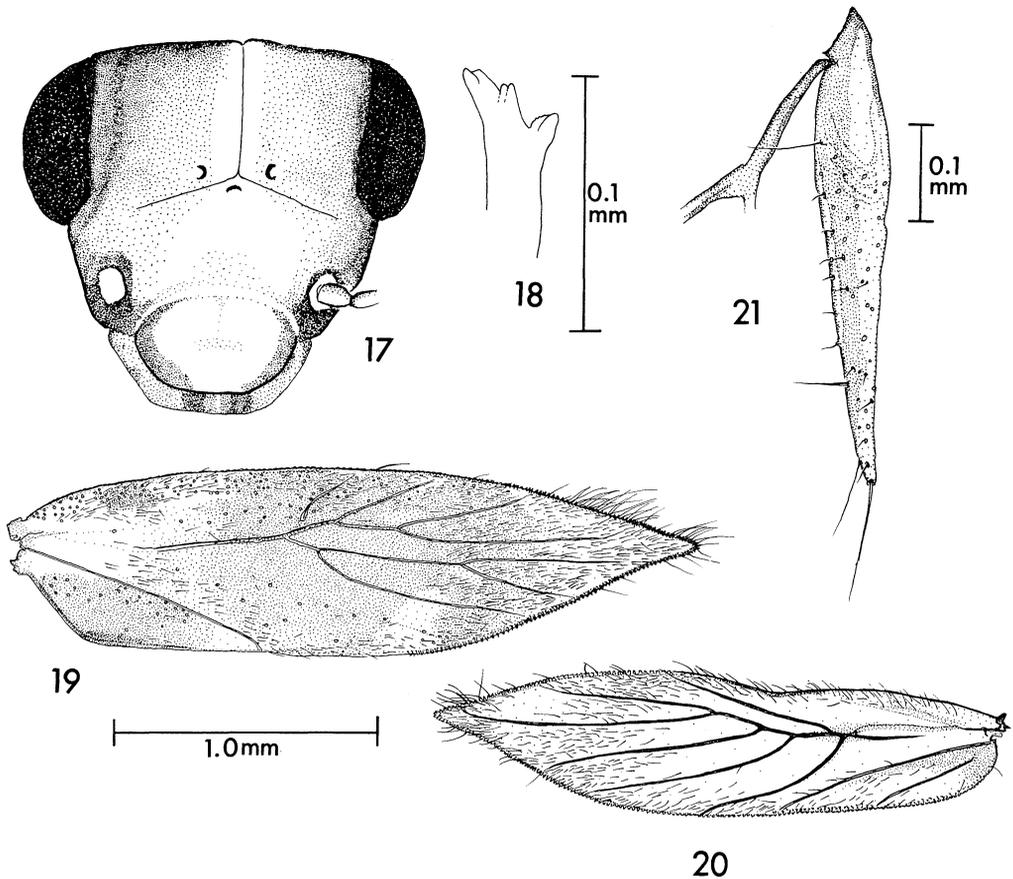


FIG. 17–21. *Lepidopsocus cuneatus*, ♀: head (17), lacinial apex (18), fore wing (19), hind wing (20), gonapophyses (21). FIG. 17 not to scale; FIG. 19, 20 to common scale.

areas, which extend to the orbits. This is probably an endemic species, having been collected predominantly in the highlands. No males have been collected.

Lepidopsocus delius Thornton, new species

FIG. 22–27

♀. *Coloration* (after ca 3 years in alcohol). Head cream, with brown pattern as in FIG. 22. Antenna and maxillary palp cream. Thoracic terga light brown, sutures darker; pleura cream with brown longitudinal band. Legs: coxa light brown; trochanter cream; femur cream, a brown mark apically on outer surface, a dark brown mark apically on inner surface; tibia cream with subbasal and subapical broad brown bands; basal tarsal segment dark brown over basal $\frac{1}{6}$, otherwise brown; apical tarsal segment brown. Wings pale brown. Abdomen brown.

Morphology. IO:D = 1.6:1. Lacinia as FIG. 23. Antenna with 52 flagellar segments; segments 2–4× as long as broad, the majority at least 3× as long as broad. Thoracic terga waxy. Fore wing with long marginal setoid scales as in *E. vitiensis*, also asymmetrical scales. Venation of fore and hind wings as in FIG. 24 and 25. Claw with single subapical tooth, no other serrations, pulvillus narrow. Basal hind tarsal segment with 20 ctenidia. Pearman's organ present, and coxal interlocking device. Epiproct (FIG. 26) simple, setose,

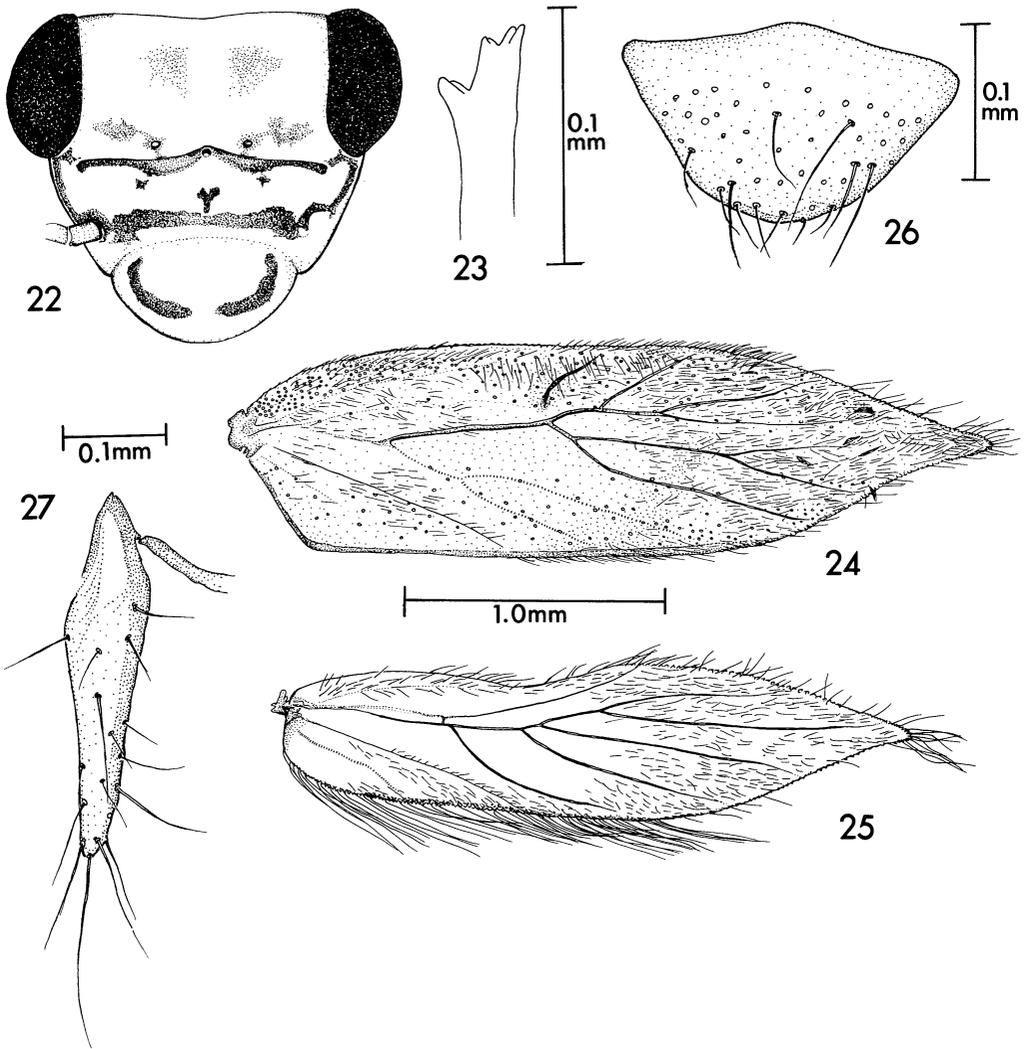


FIG. 22-27. *Lepidopsocus delius*, ♀: head (22), lacinial apex (23), fore wing (24), hind wing (25), epiproct (26), gonapophyses (27). FIG. 22 not to scale; FIG. 24, 25 to common scale.

large setal bosses on base of epiproct closer together than in *E. vitiensis*. Paraproct with a field of 6 trichobothria and 1 seta without a basal rosette, mesial spine slightly curved, sharp. Gonapophyses as FIG. 27.

Dimensions. B 2.6, FW 2.93, F 0.88, T 1.28, HW 2.46, t_1 0.59, t_2 0.09, t_3 0.07, rt 6.5:1:0.7, f_1 0.049, f_2 0.055, f_1/f_2 0.890.

♂. Unknown.

Holotype ♀, VANUA LEVU: summit Mt Delaikoro, ca 1000 m, 12.XII.1972, IWBT (BISHOP 11,459).

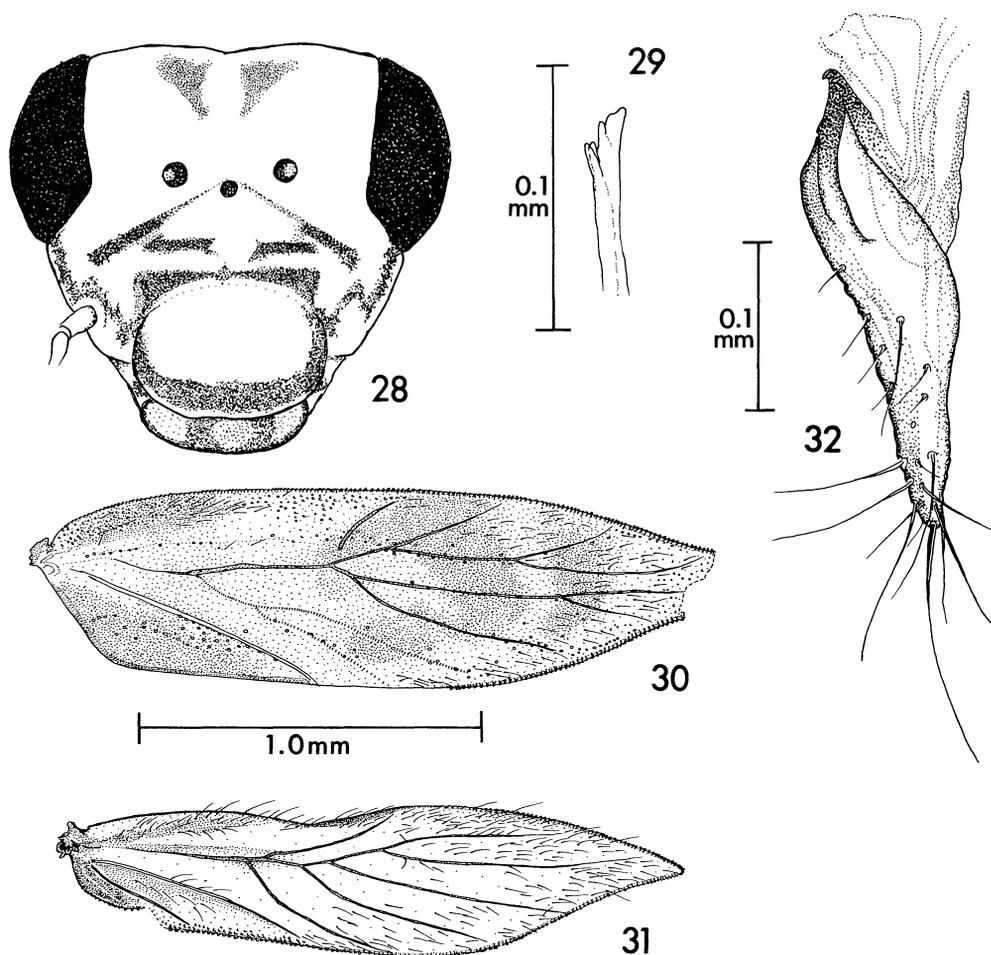


FIG. 28–32. *Lepidopsocus dindus*, ♀: head (28), lacinial apex (29), fore wing (30), hind wing (31), gonapophyses (32). FIG. 28 not to scale; FIG. 30, 31 to common scale.

This species is described from a single female because it has a distinctive head pattern and was collected from native vegetation high on Vanua Levu. It may thus be endemic.

***Lepidopsocus dindus* Thornton, new species**

FIG. 28–32

♀. *Coloration* (after ca 3 years in alcohol). Head cream, marked with brown as in FIG. 28; gena posteriorly cream; maxillary palps brown; antennae brown. Thorax golden brown. Legs cream, brown as follows: apical ½ of femur; subapical and subbasal band on tibia, base of basal tarsal segment. Fore wing extensively covered with brown clouds (FIG. 30). Hind wing as FIG. 31. Abdomen brown.

Morphology. I.O.:D = 1.5:1. Lacinial apex as in FIG. 29. Antennae lost. Fore wing scales lost. Rasp of Pearman's organ present. Coxal interlocking device present (stud on right). Claw with small subapical

tooth, pulvillus narrow. Basal hind tarsal segment with 18 ctenidia. Epiproct simple, setose. Paraproct with field of 6 trichobothria, and 1 seta without a basal rosette. Gonapophyses as FIG. 32.

Dimensions. B 1.9, FW 2.15, HW 1.79, F 0.61, T 0.93, t_1 0.33, t_2 0.053, t_3 0.050, rt 2.82:1:0.94.

♂. Unknown.

Holotype ♀, VANUA LEVU: Lesiaceva Point, *Citrus*, 19.XII.1972 (BISHOP 11,460). Paratypes: 3 ♀, TONGA: Vava'u, Neiafu Tahi, 6.I.1973, IWBT (AMS).

The head pattern of this species is distinctive.

Lepidopsocus fasciatus Thornton, new species

FIG. 33–40

♀. TYPICAL FORM. *Coloration* (after ca 3 years in alcohol). Head cream, brown markings, as in FIG. 33. Genae posteriorly cream. Maxillary palps cream, 2nd segment gray-brown apically. Scape and pedicel gray-brown, flagellum cream. Fore wing (FIG. 35), membrane pale buff. Hind wing (FIG. 36) hyaline. Thoracic terga pale buff. Legs buff apart from the following being brown: femur apically, subbasal and subapical bands of tibia, and a basal band on basal tarsal segment. Abdomen pale buff. DARK FORM. *Coloration.* As typical form with following exceptions: brown striae on head extend over genae as in FIG. 39, genae posteriorly cream. Fore wing membrane brown apart from hyaline apical $1/5$ (FIG. 40). Legs as typical form except coxa and femur brown. Abdomen gray-brown dorsally, buff ventrally.

Morphology. I.O.:D = 1.6:1. Lacinal apex (FIG. 34, from Wakanilato paratype). Antenna broken, flagellum with at least 31 segments, majority 4× as long as broad. Fore wing with asymmetrical scales on membrane, margin with narrow lanceolate scales, some serrate setoid scales on apical margin (FIG. 37). Claw with subapical tooth. Basal hind tarsal segment with 20 ctenidia. Rasp of Pearman's organ present. Coxal interlocking device present, with peg on right. Epiproct semicircular, setose. Paraproct with curved mesial spine, an oval field of 6 trichobothria and 1 seta without a basal rosette. Subgenital plate with 4 strong setae on posterior margin. Gonapophyses (FIG. 38) usual for genus, spermatheca opening into digitiform sac.

♂. Unknown.

Holotype ♀, VITI LEVU: Sigatoka-Ba divide, 3 km SW of Nanoko, 650 m, 13.XI.1972, IWBT (BISHOP 11,461). Paratypes (all typical form): VITI LEVU: 1 ♀, Nausori Highlands, nr Nausori, 600 m, 21.X.1972, IWBT; 3 ♀, 2 km E of Mt Magodro, nr Bukuya, Nakata, 400 m, 7.XI.1972, IWBT; 1 ♀, Mt Magodro area, nr Nasivikoso, Namada stream, 400 m, 10.XI.1972, IWBT (all in AMS); OVALAU: 2 ♀, Cawaci, sea level, 28.XI.1972, IWBT (AMS); VANUA LEVU: 1 ♀, Wakanilato, 4 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972, IWBT; 1 ♀, Natewa Penin., Darigala Pt, Napuka, sea level, *Citrus*, 15.XII.1972, IWBT; 1 ♀, Savu Savu Bay, cocoa, 17.XII.1972, IWBT; 2 ♀, 4 km SW of Savu Savu, sea level, *Citrus*, 18.XII.1972, IWBT; 1 ♀, isthmus 16 km E of Savu Savu, *Pandanus*, 21.XII.1972, IWBT; 2 ♀, nr Faun Harbour, *Citrus*, 22.XII.1972, IWBT; 1 ♀, Valaga Beach, Savu Savu Bay, 23.XII.1972, IWBT (all in AMS).

Specimens examined of dark form. VITI LEVU: 1 ♀, Sawakasa tikina, Burelevu village, on *Rhizophora mangle*, 23.XI.1972. OVALAU: 1 ♀, scrub 300 m above Levuka, 27.XI.1972; 2 ♀, Cawaci, sea level, 28.XI.1972. VANUA LEVU: 1 ♀, Savu Savu Beach, *Citrus* and *Barringtonia asiatica*, 17.XII.1972; 3 ♀, 4 km SW of Savu Savu, sea level, *Citrus*, 18.XII.1972; 3 ♀, E end of Savu Savu Bay, Lesiaceva Pt, on *Citrus*, 18, 19.XII.1972; 1 ♀, isthmus 16 km E of Savu Savu, *Pandanus*, 21.XII.1972; 5 ♀, nr Faun Harbour, on *Citrus*, 22.XII.1972; 1 ♀, Urata, Savu Savu Bay, 23.XII.1972; 1 ♀, Valaga Beach, Savu Savu Bay, 23.XII.1972.

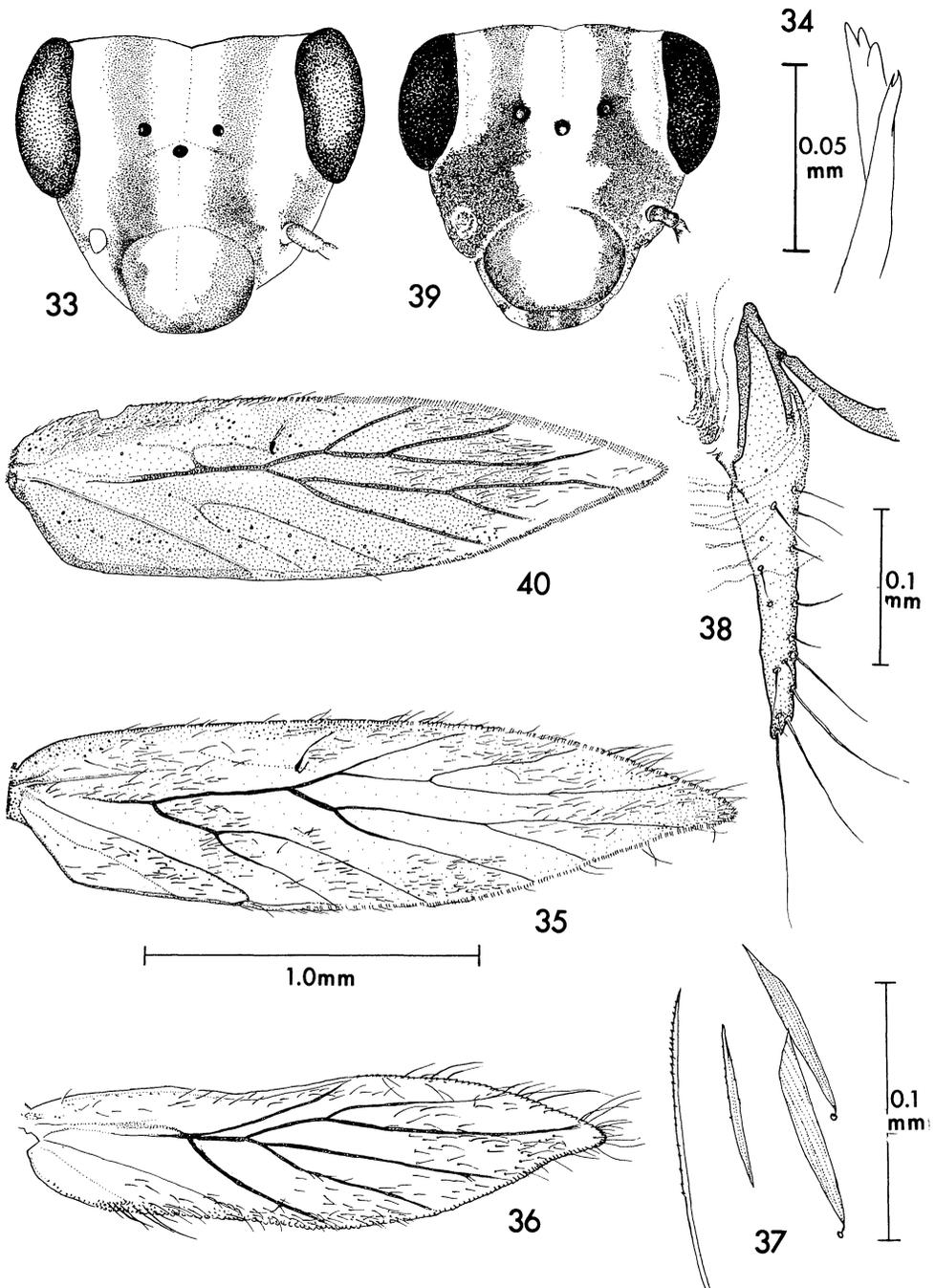


FIG. 33-40. *Lepidopsocus fasciatus*, typical form ♀: head (33), lacinial apex (34), fore wing (35), hind wing (36), fore wing scales (37), gonapophyses (38); dark form ♀: head (39), fore wing (40). FIG. 33, 39 not to scale; FIG. 35, 36, 40 to common scale.

The typical and dark forms have been collected together on Ovalau on 1 occasion and on Vanua Levu on 3 occasions. All nymphs collected had a color pattern as in the typical form, even on 2 occasions (Lesiacevu Pt, Vanua Levu, and Levuka, Ovalau) when only the dark form adults were collected with nymphs.

In Hawaii, where this species also occurs (Thornton 1981b), both forms are again present, and all nymphs collected have the head pattern of the typical form. Very few intermediates were found, and both forms were collected together on the same trees.

No males have been collected.

The situation with respect to this species is somewhat similar to that of *L. maculatus* and *L. pseudomaculatus*, in which one species differs from the other in head pattern as a result of a greater extent of the pigment pattern. However, in the case of *maculatus* and *pseudomaculatus* the pattern differences could be associated with morphological differences in the male genitalia, and the 2 species were never collected together. The case for 2 separate species is thus much stronger than it is for the forms of *L. fasciatus*. It is nevertheless possible that 2 species exist in this case, possibly with identical nymphs, but in the absence of corroborating differences in male genitalia, I prefer for the present to regard *L. fasciatus* as 1 dimorphic species.

Lepidopsocus fuscus Thornton, new species

FIG. 41-45

♀. *Coloration.* Head (FIG. 41) cream, a dark mark along posterior border of gena. Maxillary palp light brown, apical segment darker. Thoracic terga light brown, sterna and pleura darker gray-brown. Legs: coxa brown; trochanter pale; femur brown; tibia cream with 2 brown bands; basal tarsal segment brown basally, otherwise cream, apical segments brown. Fore wing (FIG. 43) heavily mottled with shades of brown and paler patches. Hind wing (FIG. 44) hyaline apart from basal cells pale brown. Abdomen brown.

Morphology. I.O.:D = 1.6:1. Lacinial apex: (FIG. 42). Flagellum broken. Thoracic terga shiny. Head shiny, vertex concave when viewed from front. Remaining fore wing scales narrow lanceolate. Rasp of Pearman's organ present, coxal interlocking device present (stud on right). Claw sharply bent, a sharp subapical tooth and slight serrations basally. Basal hind tarsal segment with 20 ctenidia. Epiproct simple, setose. Paraproct with a curved mesial spine, field of 6 trichobothria and 1 seta without a basal rosette. Subgenital plate simple, setose. Gonapophyses as FIG. 45.

Dimensions. B 2.3, FW 2.54, HW 2.13, F 0.73, T 1.09, t_1 0.45, t_2 0.07, t_3 0.06, rt 6.43:1:0.86.

♂. Unknown.

Holotype ♀, VANUA LEVU: nr Nakula, Savu Savu area, 130 m, 16.XII.1972, IWBT (BISHOP 11,462). Paratypes: 6 ♀, same data as holotype (AMS).

This plain species was taken at only 1 locality on Vanua Levu.

Lepidopsocus maculatus Thornton, Lee & Chui

FIG. 46-48

Lepidopsocus maculatus Thornton, Lee & Chui, 1972: 68-70.—Thornton & Woo, 1973: 8-9.

This species, known also from Micronesia (S Marianas), Hawaii and the Galapagos, is closely similar to *L. pseudomaculatus*, known only from Fiji.

The differences involve the head pattern (which was not figured by Thornton et al.), leg pattern, and male genitalia. The male genitalia of *L. maculatus* have not previously been described.

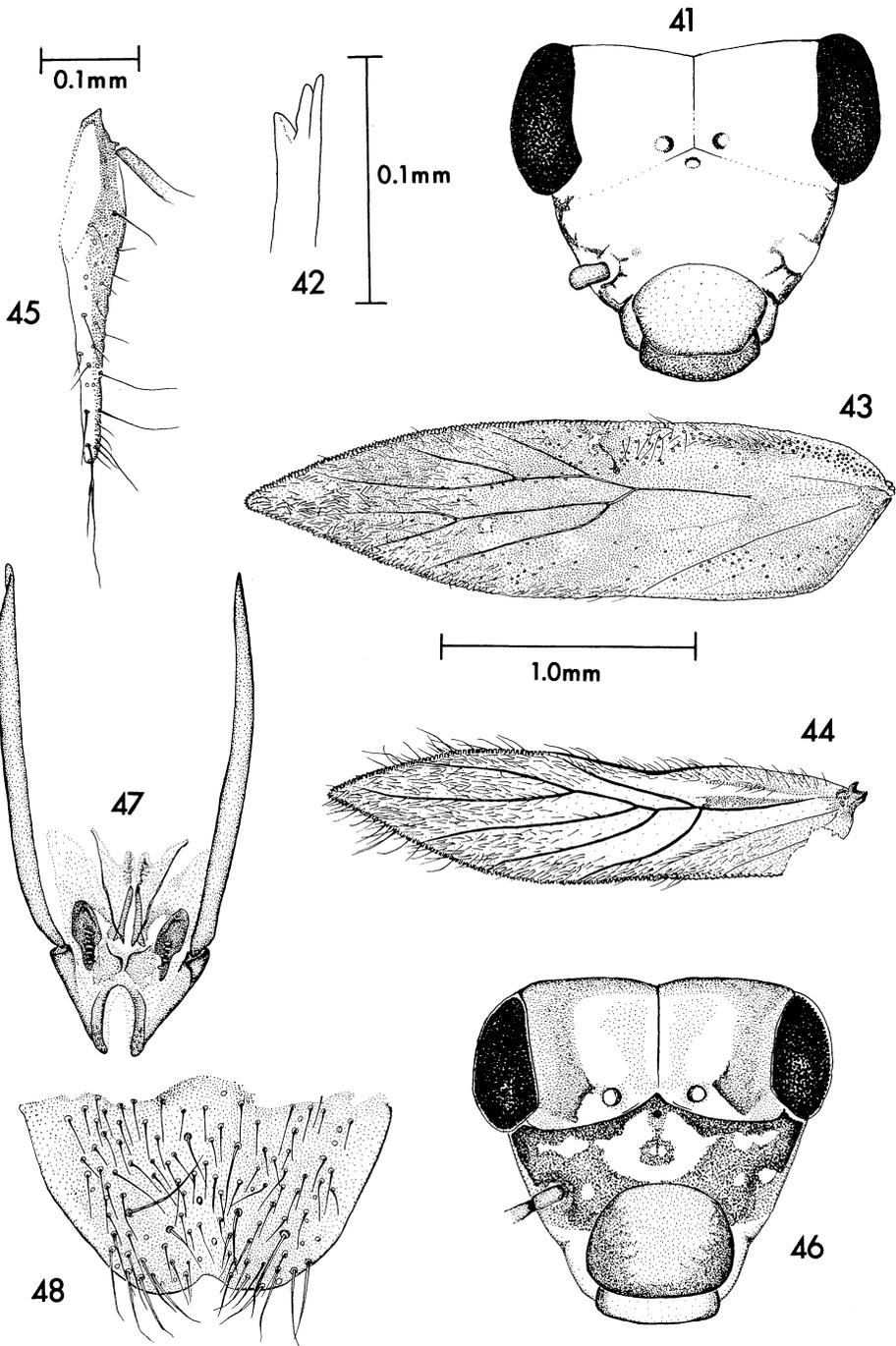


FIG. 41-48. 41-45. *Lepidopsocus fuscus*, ♀: head (41), lacinial apex (42), fore wing (43), hind wing (44), gonapophyses (45). 46-48. *Lepidopsocus maculatus*: ♀: head (46); ♂: phallosome (47), hypandrium (48). FIG. 41, 46 not to scale; FIG. 43, 44, and FIG. 45, 47, 48 to common scales.

Additional description

♀. *Coloration.* Head with gray-brown markings as in FIG. 46, vertex marks as seen from rear of head appear as 2 small wedges of pigment.

♂. *Coloration.* As ♀.

Morphology. I.O.:D = 1.5:1. As ♀ apart from genitalia. Phallosome (FIG. 47), with pair of oval sclerites each bearing 5-7 bluntly-pointed small pegs. Hypandrium as FIG. 48.

Specimens on which additional description based. VITI LEVU: 1 ♀, nr Navai, 750 m, dead fallen tree with lichen, 31.XI.1972; 1 ♂, Dromo Dromo, Nadrau Plateau, 800 m, 2.XI.1972.

Other specimens examined. VITI LEVU: 2 ♂, 5 ♀, 10N, Nausori Highlands, nr Nausori, 550 m, *Pinus caribaea*, 21.X.1972; 1 ♂, 4 ♀, Nadi, dead vegetation after hurricane, 29.X.1972; 1 ♂, nr Navai, 750 m, dead fallen tree with lichen, 31.X.1972; 1 ♀, Koro-O, Nadrau Plateau, dead twigs, 1000 m, 2.XI.1972; 2 ♂, 3 ♀, Dromo Dromo, Nadrau Plateau, 800 m, 2.XI.1972; 1 ♀, 1N, Mt Magodro area, nr Nasivikoso, Namada stream, dead branches, 100 m, 10.XI.1972; 4 ♀, 5N, Sigatoka-Ba divide, 3 km SW of Nanoka, 13.XI.1972; 30 ♀, Nausori Highlands, *Pinus caribaea*, 800 m, 1.I.1973. OVALAU: 1 ♀, Cawaci, sea level, 28.XI.1972. VANUA LEVU: 1 ♀, Savu Savu area, nr Nakula, 150 m, 16.XII.1972; 2 ♀, isthmus 16 km E of Savu Savu, *Pandanus*, 21.XII.1972; 1 ♀, Savu Savu Bay, Balaya Beach, 23.XII.1972.

Details of differences from *L. pseudomaculatus*, n. sp. are given under that species. There is an error in the key given in Thornton et al (1972: 68). Under couplet 3 the vertex characters should be transposed: *L. marmoratus* has rounded vertex patches and a broad transverse fore wing band; *L. maculatus* has wedge-shaped patches with most of the fore wing fuscous.

Lepidopsocus major Thornton, new species

FIG. 49-54

♂. *Coloration* (after ca 3 years in alcohol). Head cream, marked with brown as in FIG. 49; epicranial and frontal sutures pale, genae posteriorly cream. Maxillary palp cream, apical segment pale brown. Antenna brown. Thoracic terga brown, pleura darker gray-brown. Legs: coxa brown, trochanter cream, femur cream with a brown patch subapically on lower surface, tibia cream with 2 brown bands, basal tarsal segment brown basally otherwise cream, apical tarsal segment brown. Fore wing membrane pale brown with darker brown clouds as in FIG. 51; hind wing membrane almost hyaline. Abdomen granulated gray-brown.

Morphology. I.O.:D = 3.5:1. Lacinial apex as in FIG. 50. Flagellar segments at least 4× as long as broad. Thoracic terga shiny. Fore wing (FIG. 51), scales of various types; marginal setoid scales long, barbs minute. Hind wing as FIG. 52. Pearman's organ present, coxal interlocking organ present. Claw sharply bent with a single small subapical tooth, pulvillus expanded. Basal hind tarsal segment with 22 ctenidia. Epiproct semicircular, setose. Paraproct with a long curved spine and a field of 6 trichobothria and 1 without a basal rosette. Hypandrium large, squarish, setose. Phallosome; parameres bow-shaped, fused preapically, with curved apical lobes bearing hyaline pores; phallosome sclerites as in FIG. 53, the most prominent pair bearing 5 small sclerotized pegs.

Dimensions. B 2.4, FW 3.08, HW 2.55, F 0.95, T 1.14, t_1 0.56, t_2 0.08, t_3 0.07, rt 7.1:1:0.88.

♀. *Coloration.* As ♂, but brown clouds in fore wing less extensive.

Morphology. I.O.:D = 3.5:1. As ♂. Flagellum broken, but at least 41 segments, segments 4× as long as broad. Basal hind tarsal segment with 20 ctenidia. Gonapophyses as FIG. 54.

Dimensions. B 2.7, FW 2.82, HW 3.13, F 0.92, T 1.32, t_1 0.57, t_2 0.09, t_3 0.06, rt 6.33:1:0.66, f_1 0.044, f_2 0.061, f_1/f_2 0.721.

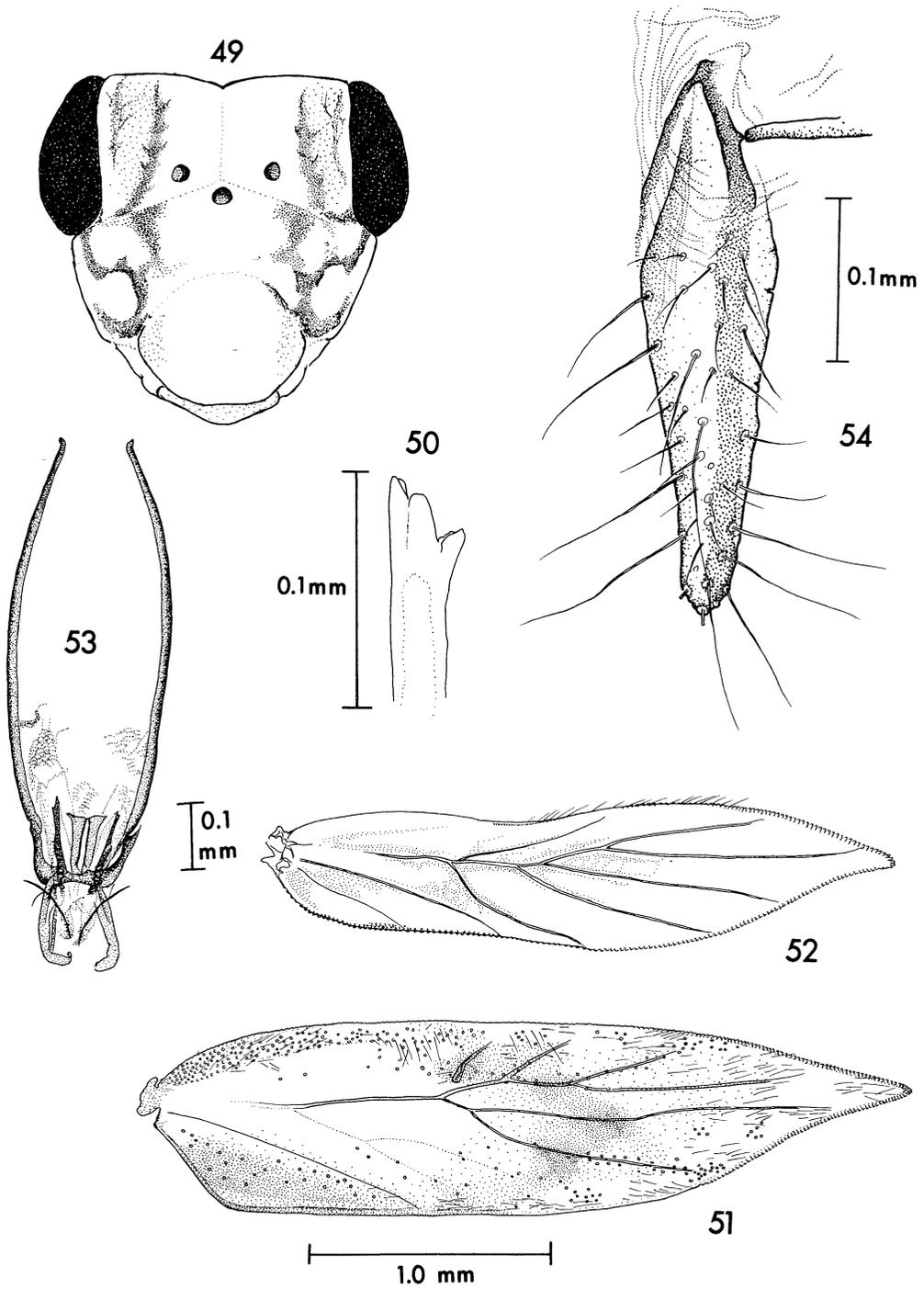


FIG. 49-54. *Lepidopsocus major*: ♂: head (49), lacinial apex (50), fore wing (51), hind wing (52), phallosome (53); ♀: gonapophyses (54). FIG. 49 not to scale; FIG. 51, 52 to common scale.

Holotype ♂, VANUA LEVU: nr Nakula, Savu Savu area, 150 m, 16.XII.1972, IWBT (BISHOP 11,463). Allotype ♀ (BISHOP), 6♂,7♀ paratypes (AMS), same data as holotype. 1♀ paratype, VANUA LEVU: Waikara Promontory, 150 m above Dakuniba, 22.XII.1972 (AMS).

Other specimens examined. VANUA LEVU: 2♂,2♀, Doguru village, N of Mt Delaikoro, 180 m, *Citrus*, 12.XII.1972; 1♀, Savu Savu, 30 m, *Citrus*, 18.XII.1972; 2♀,1N, Lesiaceva Point, sea level, *Citrus*, 19.XII.1972; 1♂,2♀, Waikava Promontory, 150 m above Dakuniba, 22.XII.1972; 6♂,5♀,4N, Savu Savu Bay, Valaga Beach and Urata, 23.XII.1972.

L. major is a large species with distinctive fore wing markings. It is closely similar to an undescribed Hawaiian species.

Lepidopsocus marmoratus (Banks)

FIG. 55–57

Echmepteryx marmorata Banks, 1931: 439.

For full synonymy see Thornton et al., 1972: 70.

Specimens examined. VITI LEVU: 7♀,12N, Nausori Highlands, nr Nausori, 600 m, on *Pinus caribaea*, 21.X.1972; 5♀,2N, Nadi, general beating, 23.X.1972; 3N, Nausori Highlands, 8 km SE of Natawa, 870 m, on ti and *Freycinetia*, 28.X.1972; 1♀, Nadi, dead hurricane devastated vegetation, 29.X.1972; 1♀, 2 km E of Mt Magodro, nr Bukuya, Nakata, 400 m, 7.XI.1972; 1♀,1N, Mt Magodro area, nr Nasivikoso, Namada stream, 100 m, dead branches, 10.XI.1972; 4♀,5N, Sigatoka-Ba Divide, 700 m, 5 km SW of Nanoko, general beating, 13.XI.1972; 1N, Burelevu village, Sawasaka tikina, on *Rhizophora mangle*, 23.XI.1972; 4N, Nadi, on *Citrus*, 5.XII.1972; 50♀, Nausori Highlands, 800 m, on *Pinus caribaea*, 1.I.1973. OVALAU: 1N, Levuka, about 300 m above town, 27.XI.1972; 6♀,1N, Cawaci, sea level, 28.XI.1972; 1N, Nasinu, general beating, 30.XI.1972. VANUA LEVU: 1♀, nr Natula, Savu Savu area, 120 m, 16.XII.1972; 1N, Lovoniquai village, head of Natewa Bay, beating *Agathis vitiensis*, 21.XII.1972; 2♀, isthmus 16 km E of Savu Savu, on *Pandanus*, 21.XII.1972.

L. marmoratus also occurs in Hawaii and the southern Marianas.

I have examined the type specimen of this species in the Harvard Museum of Comparative Zoology. It was labelled as follows: *Echmepteryx marmorata* Banks, Kualoa 1.25 McEldowney ex Albizzia TYPE 16907. The dry insect with scales satisfied Banks' description. On removal of the scales from the head and fore wing, pigment patterns were revealed which did not correspond to those produced by the vestment of scales and hairs. The fore wing membrane carries a distinct large brown mark over the middle 1/3, and the head pattern is also distinctive; these features enable specific identification of alcohol-stored specimens. I provide illustrations of these patterns (FIG. 55, 56) from a Fijian specimen. The Fijian, Hawaiian and Micronesian specimens are clearly conspecific on these criteria. The female genitalia are shown in FIG. 57.

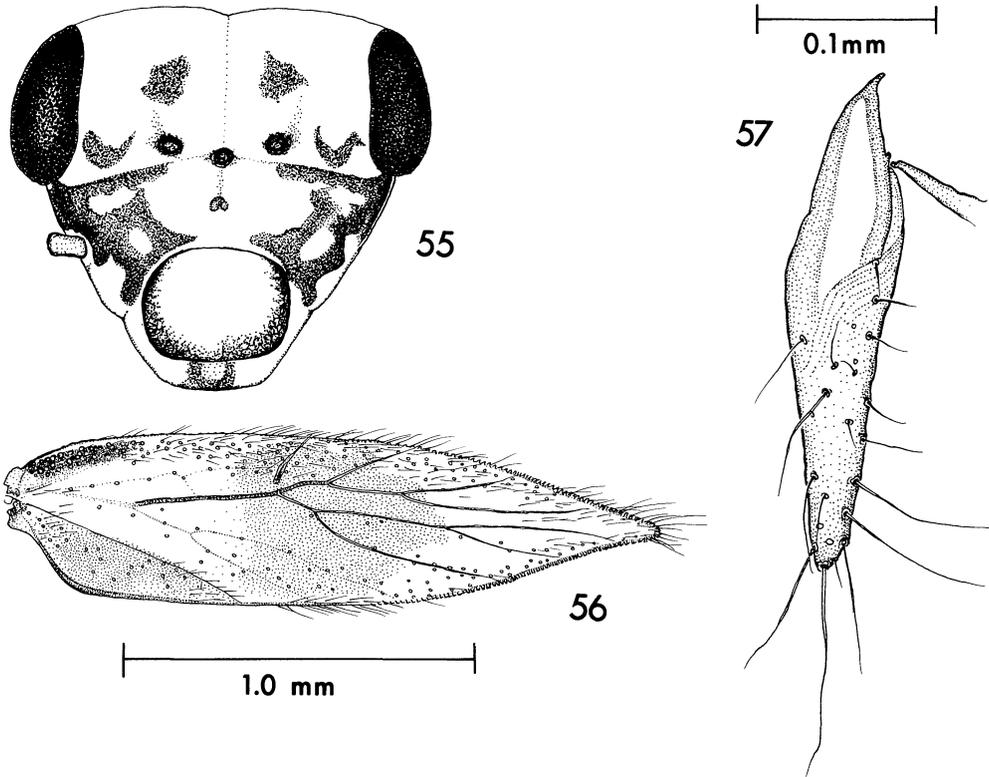


FIG. 55–57. *Lepidopsocus marmoratus*, ♀: head (55), fore wing (56), gonapophyses (57). FIG. 55 not to scale.

Lepidopsocus nausoriensis Thornton, new species

FIG. 58–62

♀. *Coloration* (after ca 3 years in alcohol). Head light brown, marked with brown as in FIG. 58; genae cream with 1 brown spot in center of gena; antenna light brown; maxillary palp light brown, subapical segment darker. Thorax brown. Legs: coxa and trochanter pale brown; femur pale brown, a brown mark subapically on lower surface; tibia pale brown with a subapical and a subbasal brown band; tarsal segments light brown, basal segment brown basally. Fore wing (FIG. 60) membrane suffused with light brown, paler towards apex. Hind wing (FIG. 61) membrane hyaline. Abdomen brown.

Morphology. I.O.:D = 2.0:1. Lacinial apex as FIG. 59. Flagella broken, with at least 45 segments, the majority 4× as long as broad. Thoracic nota shiny. Most fore wing scales lost, some lanceolate scales present, long marginal setae serrate. Hind wing (FIG. 61). Rasp of Pearman's organ present, coxal interlocking device present (stud on left). Claw fairly straight with subapical tooth, pulvillus expanded. Basal hind tarsal segment with 20 ctenidia. Epiproct simple, semicircular, setose. Paraproct with long slightly curved spine, field of 6 trichobothria and 1 seta without basal rosette. Gonapophyses as FIG. 62.

Dimensions. B 2.00, FW 2.72, HW 2.34, F 0.7, T 1.22, t_1 0.5, t_2 0.065, t_3 0.07, rt 7.69:1:1.08, f_1 0.074, f_2 0.049, f_1/f_2 1.51.

♂. Unknown.

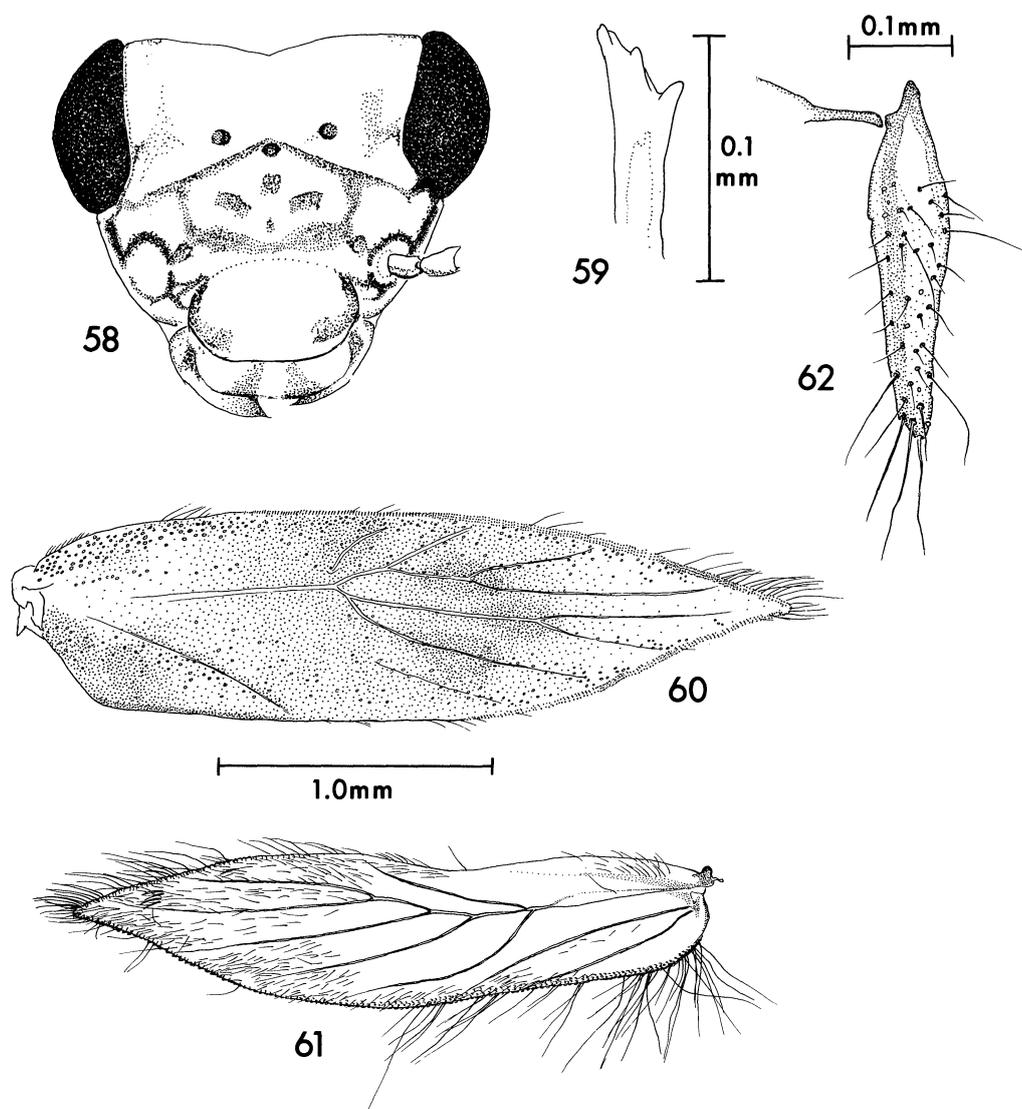


FIG. 58–62. *Lepidopsocus nausoriensis*, ♀: head (58), lacinial apex (59), fore wing (60), hind wing (61), gonapophyses (62). FIG. 58 not to scale; FIG. 60, 61 to common scale.

Holotype ♀, VITI LEVU: Nausori Highlands, 8 km SE of Natawa, 900 m, ti and *Freycinetia*, 28.X.1972, IWBT (BISHOP 11,464). Paratypes: 2 ♀, same locality as holotype, dead hurricane-blown vegetation, 28.X.1972, IWBT (AMS).

This species is only known from native plants at one locality in the Nausori Highlands. The head pattern is distinctive.

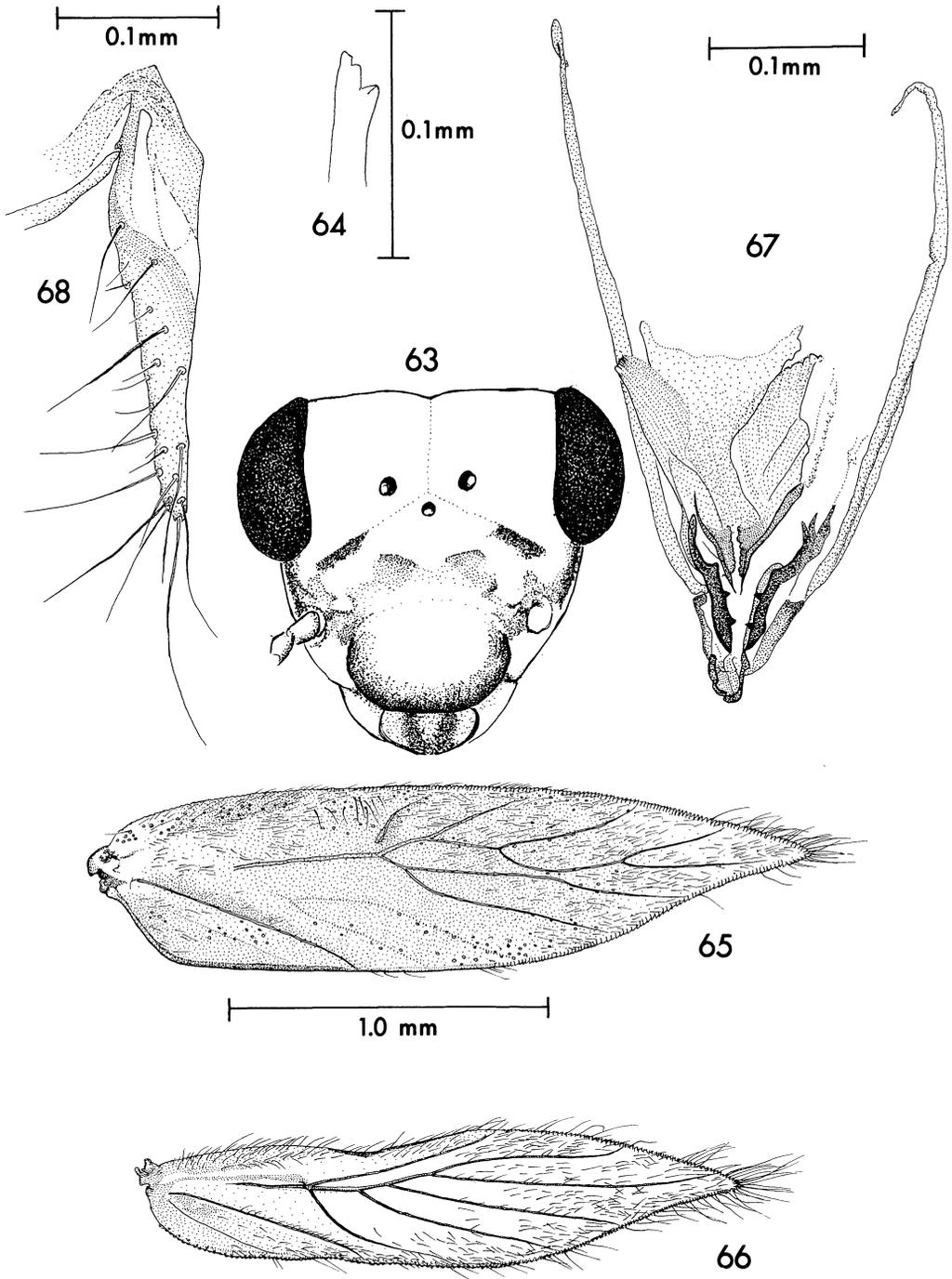


FIG. 63-68. *Lepidopsocus oweni*: ♂: head (63), lacinial apex (64), fore wing (65), hind wing (66), phallosome (67); ♀: gonapophyses (68). FIG. 63 not to scale; FIG. 65, 66 and FIG. 67, 68 to common scales.

Lepidopsocus oweni Thornton, new species

FIG. 63–68

♂. *Coloration*. Head pale brown, with brown markings as in FIG. 63. Maxillary palps pale brown, antennae brown. Thoracic terga brown, pleura grayish brown. Legs: pro and meso coxa cream, meta coxa brown; trochanter pale brown; femur cream over basal ½, brown over dorsal ½; tibia cream with 2 broad brown bands; tarsus pale brown. Fore wing membrane brown, fading towards apex (FIG. 65). Hind wing hyaline, veins brown with some cells pale brown (FIG. 66). Abdomen pale brown.

Morphology. I.O.:D = 1.7:1. Lacinia as FIG. 64. Flagellum broken, with at least 34 segments, most 4× as long as broad. Fore wing with marginal setoid serrate scales, membrane clothed with setae, membrane scales missing. Hind wing as FIG. 66. Rasp of Pearman's organ present, coxal interlocking device present (peg on right). Claw sharply bent with very small subapical tooth, no serrations, pulvillus narrow. Basal hind tarsal segment with 18 ctenidia. Epiproct simple, setose. Paraproct with a field of 6 trichobothria and 1 seta without a basal rosette; mesial spine long, pointed. Hypandrium simple, setose. Phallosome (FIG. 67): parameres slender, with hyaline pores apically, each member of principal pair of phallosome sclerites with 2 pointed pegs.

Dimensions. B 1.6, FW 2.08, HW 1.69, F 0.58, T 0.88, t_1 0.34, t_2 0.06, t_3 0.05, rt 5.67:1:0.83, f_1 0.05, f_2 0.035, f_1/f_2 1.4.

♀. *Coloration*. As ♂, head pattern rather more pronounced.

Morphology. I.O.:D = 2.2:1. Coxal interlocking device with peg on left. Gonapophyses as FIG. 68.

Dimensions. B 1.9, FW 2.23, HW 1.87, F 0.63, T 0.88, t_1 0.32, t_2 0.06, t_3 0.04, rt, 5.3:1:0.7, f_1 0.03, f_2 0.036, f_1/f_2 0.83.

Holotype ♂, OVALAU: bush 300 m above Levuka, 27.XI.1972, IWBT (BISHOP 11,465). Paratypes: 1♂, 2♀, same data as holotype (AMS).

This species resembles *L. ruptus*; differences are discussed below.

Lepidopsocus pelmus Thornton, new species

FIG. 69–74

♀. *Coloration*. Head cream, marked with brown as in FIG. 69, frontal sutures pale, genae dark brown, a cream band from orbit to antennal socket. Antenna and maxillary palp brown. Thoracic terga pale brown, pleura dark brown. Legs: coxa brown; trochanter pale cream; femur pale, dark brown pigment apically on lower surface; tibia pale, 2 broad brown bands, basal tarsal segment brown in basal ½, pale brown apical ½; apical tarsal segment brown. Wing membrane uniform very pale brown. Abdomen light brown.

Morphology. I.O.:D = 3.5:1. Lacinial apex as FIG. 70. Flagellum broken, with at least 37 segments, segments at least 4× as long as broad. Thoracic terga waxy. Hind legs missing. Fore wing (FIG. 71): scales (FIG. 73) spear-shaped; broad lanceolate; asymmetrical. Hind wing as FIG. 72. Claw with single small subapical tooth. Basal hind tarsal segment (paratype) with 18 ctenidia. Pearman's organ present, also coxal interlocking device. Epiproct semicircular, setose. Paraproct with 5 or 6 trichobothria and 1 seta not in rosette socket, 3 long fine setae and 1 tapering finely pointed spine. Gonapophyses as FIG. 74.

Dimensions. B 1.8, FW 2.52, HW 2.07, no hind leg, f_1 0.04, f_2 0.052, f_1/f_2 0.76.

♂. Unknown.

Holotype ♀, VANUA LEVU: nr Nakula, Savu Savu area, 120 m, 16.XII.1972, IWBT (BISHOP 11,466). Paratypes: 1♀, VANUA LEVU: Waikava Promontory, 150 m, *Citrus*, 22.XII.1972, IWBT (AMS); 1♀, VITI LEVU: Nadrau Plateau, Nadarivatu, 900 m, lichen-covered twigs, 31.XI.1972, IWBT (AMS).

This species was collected together with *Lepidopsocus savuensis*. The head patterns are quite distinctive.

Lepidopsocus pictus Thornton, new species

FIG. 75–78

♀. *Coloration*. Head pale brown, ocelli colorless, maxillary palps and antennae pale brown. Thorax and legs pale brown; fore wing very pale brown with well-marked brown pattern over basal ⅓ of membrane

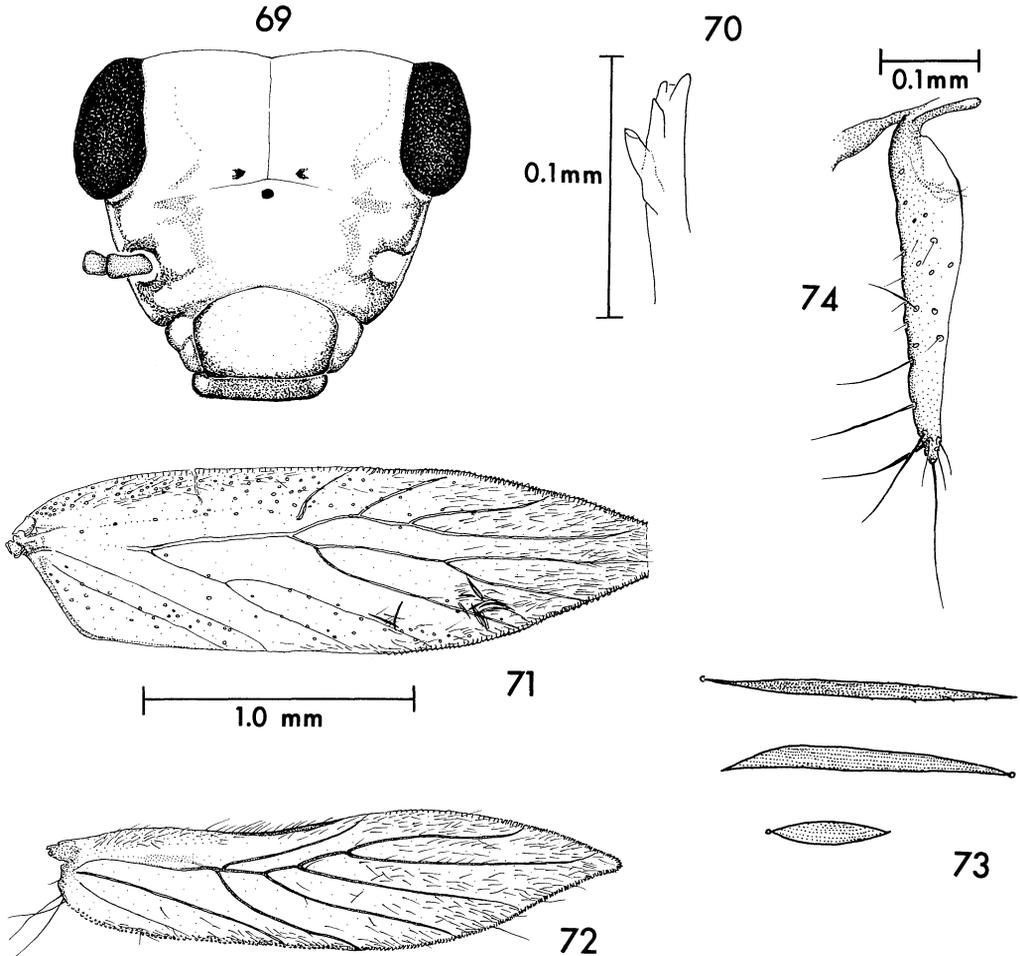


FIG. 69-74. *Lepidopsocus pelmus*, ♀: head (69), lacinial apex (70), fore wing (71), hind wing (72), fore wing scales (73), gonapophyses (74). FIG. 69 not to scale; FIG. 71, 72 to common scale.

(FIG. 75), vestment of apical $\frac{1}{3}$ brown in a narrow band $\frac{1}{8}$ length of wing from apex; hind wing hyaline, veins pale basally and distally, otherwise brown. Abdomen pale brown.

Morphology. I.O.:D = 4.25:1. Lacinial apex as FIG. 77. Flagellum broken, with at least 26 segments, segments about 4× as long as broad. Fore wing (FIG. 75), scales with large sockets lost, marginal setoid scales serrate, remaining scales very narrow lanceolate. Hind wing as FIG. 76. Rasp of Pearman's organ present. Middle legs lost. Claw bent, with minute subapical tooth, pulvillus narrow. Basal hind tarsal segment with 15 ctenidia. Epiproct semicircular, setose. Paraproct with usual mesial spine, a field of 6 trichobothria and 1 seta not in rosette. Gonapophyses as FIG. 78, fleshy remnant of outer valve obvious.

Dimensions. B 2.00, FW 2.00, HW 1.73, F 0.61, T 0.865, t_1 0.34, t_2 0.07, t_3 0.05, rt 4.9:1:0.7, f_1 0.038, f_2 0.040, f_1/f_2 0.95.

♂. Unknown.

Holotype ♀, VITI LEVU: Mt Victoria, W ridge, 1300 m, 15.XI.1972, IWBT (BISHOP 11,467).

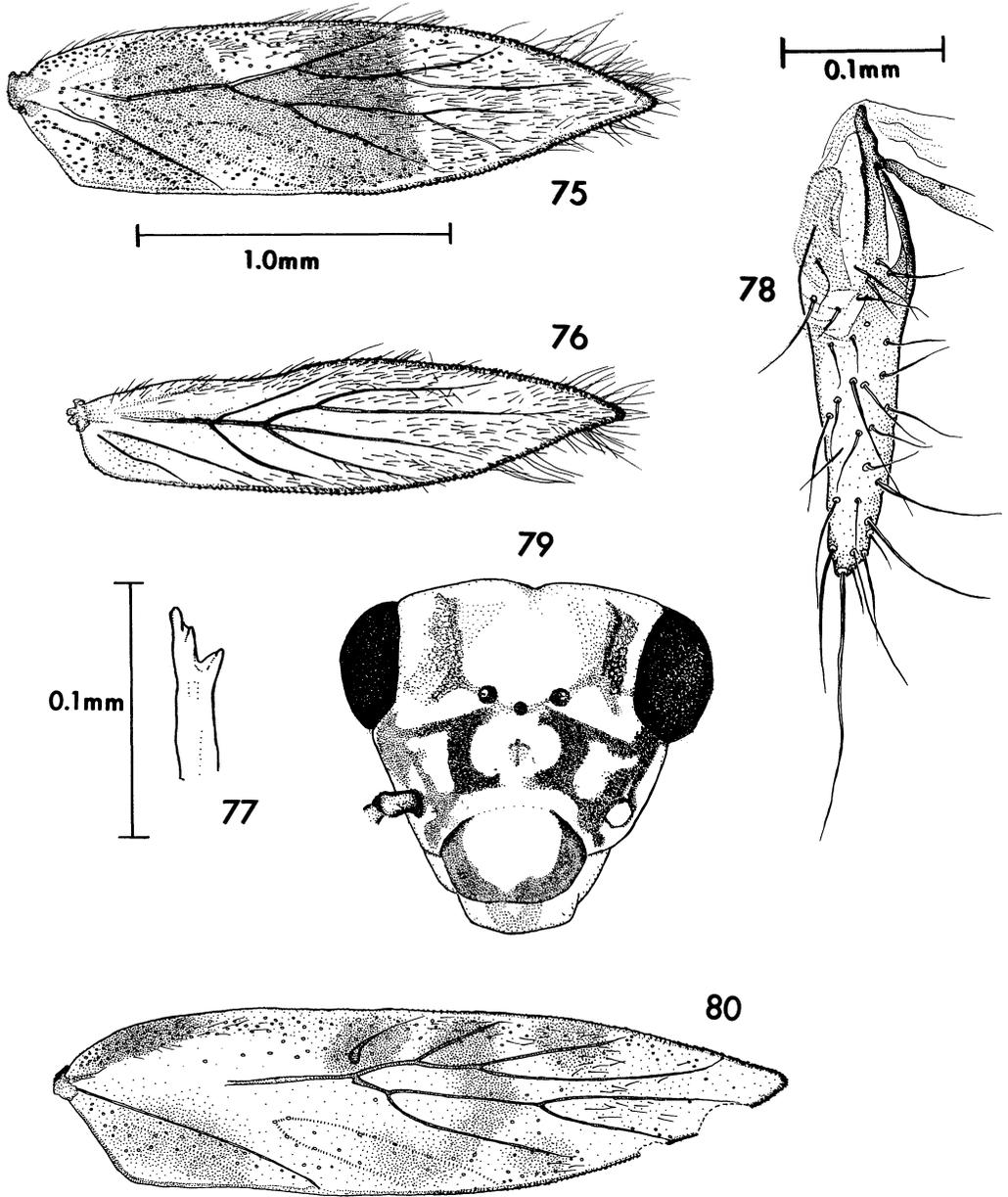


FIG. 75-80. 75-78. *Lepidopsocus pictus*, ♀: fore wing (75), hind wing (76), lacinial apex (77), gonapophyses (78). 79-80. *Lepidopsocus pretiosus*, ♀: head (79), fore wing (80). FIG. 79 not to scale; FIG. 75, 76, 80 to common scale.

This species is represented by a single specimen, collected near the summit of Fiji's highest mountain. The pigmented area of the fore wing is distinctive among Fijian lepidopsocids.

Lepidopsocus pretiosus (Banks)

FIG. 79–80

Echmepteryx pretiosa Banks, 1942: 28.

Lepidopsocus pretiosus (Banks): Thornton et al., 1972: 70, 71, Fig. 3a–c.

Specimens examined. OVALAU: 1 ♀, scrub 350 m above Levuka, 27.XI.1972; 3 ♀, 1N, Draiba, coast, general beating, 30.XI.1972. VANUA LEVU: 1 ♀, 2N, Labasa, *Citrus*, 11.XII.1972; 1 ♀, 2 km SW of Savu Savu, sea level, *Citrus*, 18.XII.1972.

This species, described from Guam and widespread in Micronesia, was further figured by Thornton et al. (1972). The 2 circular spots on the clypeus of the plesiotype are absent from the Harvard paratype, from many Micronesian specimens, and from all the Fijian specimens (FIG. 79). It may be that these patches were an artifact. *L. pretiosus* may be identified by the simple frons and vertex pattern and that of the fore wing membrane (FIG. 80). The species appears to be confined to the lowlands in Fiji.

Lepidopsocus pseudomaculatus Thornton, new species

FIG. 81–84

♂. *Coloration* (after ca 3 years in alcohol). Head buff with brown markings as in FIG. 81. Genae posteriorly buff. Maxillary palps buff, apical segment light brown, antennae brown. Thoracic sclerites brown. Legs: coxa trochanter and femur brown; tibia buff with broad subbasal and subapical brown bands, in prothoracic legs these uniting; basal tarsal segment brown basally, remainder of tarsus buff. Fore wing membrane paler in apical $\frac{1}{5}$ than remainder (FIG. 82). Hind wing almost hyaline. Abdomen buff.

Morphology. I.O.:D = 1.9:1. Lacinia 3-tined. Antenna broken, flagellum with at least 38 segments, 4× as long as broad, except in middle region where they are about 2× as long as broad. Thoracic terga waxy. Fore wing (FIG. 82) membrane scales of 4 types: broad asymmetrical, setoid, narrow lanceolate, large bosses bear long narrow parallel-sided scales most numerous on costal margin; marginal scales slightly serrated apically. Hind wing also with long serrated marginal scales, membrane lacking scales with large bosses, evidently only 1 type of scale, setoid. Pearman's organ present; coxal interlocking device with socket on left, peg on right. Claw sharply bent without subapical tooth but with very slight serrations; pulvillus narrow, expanded apically. Basal hind tarsal segment with 20 ctenidia. Epiproct semicircular, setose. Paraproct with a long curved spine on mesial face and with a field of 6 trichobothria and 1 seta without a basal rosette. Hypandrium (FIG. 83) fairly densely setose posteriorly. Phallosome (FIG. 84) without sclerotized pegs on any sclerites and with subapical pairs of sclerites differing in shape from those of *L. maculatus*.

Dimensions. B 2.1, FW 2.17, HW 1.83, F 0.69, T 0.98, t_1 0.39, t_2 0.07, t_3 0.06, rt 5.57:1:1.17, f_1 0.038, f_2 0.030, f_1/f_2 1.27.

♀. *Coloration.* As ♂.

Morphology. I.O.:D = 2.0:1. Most of fore wing and hind wing scales lost. Epiproct and paraproct as ♂. Gonapophyses usual for genus. Subgenital plate simple, bearing 4 very long stout setae.

Dimensions. B 2.0, FW 2.12, HW 1.79, F 0.64, T 0.85, t_1 0.35, t_2 0.06, t_3 0.05, rt 5.83:1:1.2, f_1 0.041, f_2 0.038, f_1/f_2 1.68.

Holotype ♂, VITI LEVU: Nausori Highlands, 850 m, 31.XII.1972, IWBT (BISHOP 11,468). Allotype ♀, same locality as holotype, 800 m, *Pinus caribaea*, 1.I.1973, IWBT (BISHOP). Paratypes: 5 ♂, 16 ♀, same data as allotype (AMS).

Other specimens examined. VITI LEVU: 2 ♂, 3 ♀, Nausori Highlands, 8 km SE of Natawa, Kauri forest, 28.X.1972; 1 ♀, same locality, ex ti and *Freycinetia*, 28.X.1972;

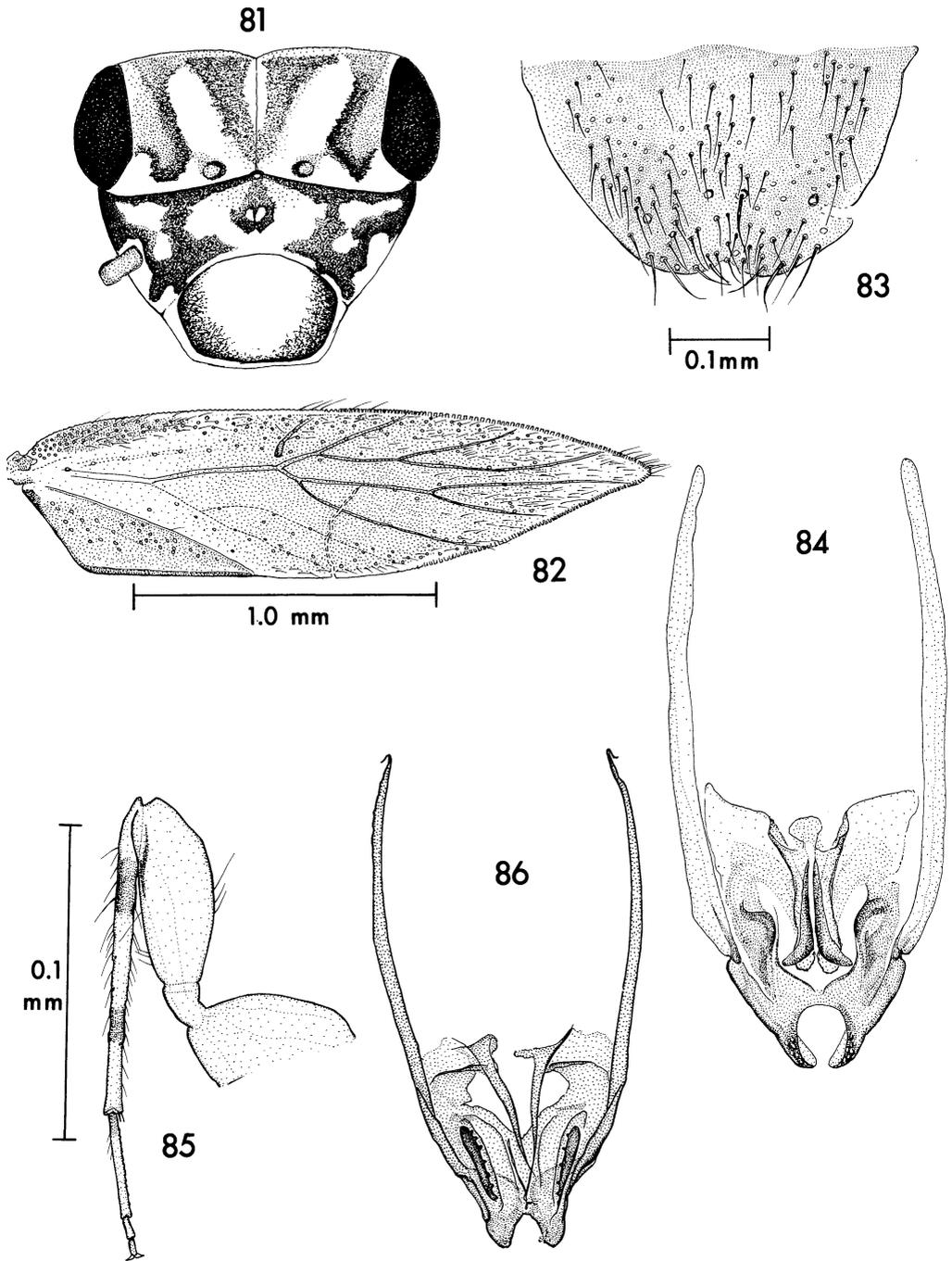


FIG. 81-86. 81-84. *Lepidopsocus pseudomaculatus*, ♂: head (81), fore wing (82), hypandrium (83), phallosome (84). 85-86. *Lepidopsocus ruptus*, ♂: hind leg (85), phallosome (86). FIG. 81 not to scale; FIG. 83, 84, 86 to common scale.

1N, Nadrau Plateau, nr Navai, 800 m, 31.X.1972; 2♀, Nadrau Plateau, Nadarivatu, lichen covered twigs, 900 m, 3.XI.1972; 1♀, 2 km E of Mt Magodro, nr Bukuya, Nakata, 400 m, 7.XI.1972.

This species, so similar to *L. maculatus*, appears to be confined to the highlands of Viti Levu and has not been taken in the same collections as *L. maculatus*.

Males can readily be distinguished on dissection: phallosome in *L. maculatus* possesses pegs on a pair of oval sclerites; *L. pseudomaculatus* lacks pegs and subapical sclerites differ in shape from those of *L. maculatus*. Correlated with these differences are the following differences in color pattern: *L. maculatus* frons with light circular mark mesial to antennal socket completely surrounded by pigment and vertex marks visible as small distinct wedges from rear; *L. pseudomaculatus* frons with light mark mesial to antennal socket connecting to a larger more posterior mark and no separate distinct marks visible on vertex from rear. Ground color of the femur in *L. maculatus* is lighter than the tibial stripes; ground color of femur in *L. pseudomaculatus* is as dark as the tibial stripes.

Males distinguished on these superficial characters all proved on dissection to be also distinguishable on phallosome characters.

Lepidopsocus ruptus Thornton, new species

FIG. 85–94

♂. *Coloration*. Head cream, marked with brown as in FIG. 87. Scape and pedicel brown, flagellum cream basally, pale brown distally. Maxillary palp cream. Thorax cream, a brown suffusion over anterior of mesonotum: fore wing membrane very pale brown with darker areas just distinguishable (FIG. 88), hind wing (FIG. 89) veins brown, membrane hyaline. Legs cream, apart from brown marks as in FIG. 85. Abdomen cream.

Morphology. I.O.:D = 1.8:1. Lacinial apex as FIG. 90. Flagellum broken, with at least 26 segments, segments 4× as long as broad. Thoracic terga waxy. Fore wing scales lost. Rasp of Pearman's organ present. Coxal interlocking device present (peg on right). Basal hind tarsal segment with 16 ctenidia. Epiproct semicircular, setose. Paraproct with curved mesial spine, field of 6 trichobothria, and 1 seta not in rosette socket. Hypandrium simple, rounded, setose. Phallosome (FIG. 86), with several pairs of subapical sclerites, members of 1 pair bearing 6 and 7 distinct short pointed pegs.

Dimensions. B 1.4, FW 2.02, HW 1.64, F 0.60, T 0.83, t₁ 0.29, t₂ 0.06, t₃ 0.04, rt 4.83:1:0.67, f₁ 0.04, f₂ 0.045, f₁/f₂ 0.89.

♀. *Coloration*. As ♂. Pigment pattern on head slightly more distinct (FIG. 91). Faint brown pattern visible on fore wing (FIG. 92).

Morphology. I.O.:D = 2.5:1. As ♂. Most of scales lost, 1 remaining scale as in FIG. 93. Coxal interlocking device present (stud on left). Claw (FIG. 93) sharply bent, lacking subapical tooth. Basal hind tarsal segment with 15 ctenidia. Gonapophyses as FIG. 94.

Dimensions. B 1.5, FW 2.03, HW 1.77, F 0.51, T 0.89, t₁ 0.31, t₂ 0.05, t₃ 0.04, rt 6.2:1:0.8, f₁ 0.03, f₂ 0.032, f₁/f₂ 0.94.

Holotype ♂, VITI LEVU: Nadi, 23.X.1972, IWBT (BISHOP 11,469). Allotype ♀, same data as holotype (BISHOP). Paratypes: 4♂, 5N, VANUA LEVU: Waikanilato, 3 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972, IWBT (AMS).

Other specimens examined. VANUA LEVU: 1♂, 2♀, Doguru village, 2 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972; 1♀, 1N, Savu Savu, sea level, *Barringtonia asiatica*, 17.XII.1972; 3♂, Savu Savu Bay, cocoa, 17.XII.1972; 2♂, 1N, Lovoniqai village, Na-

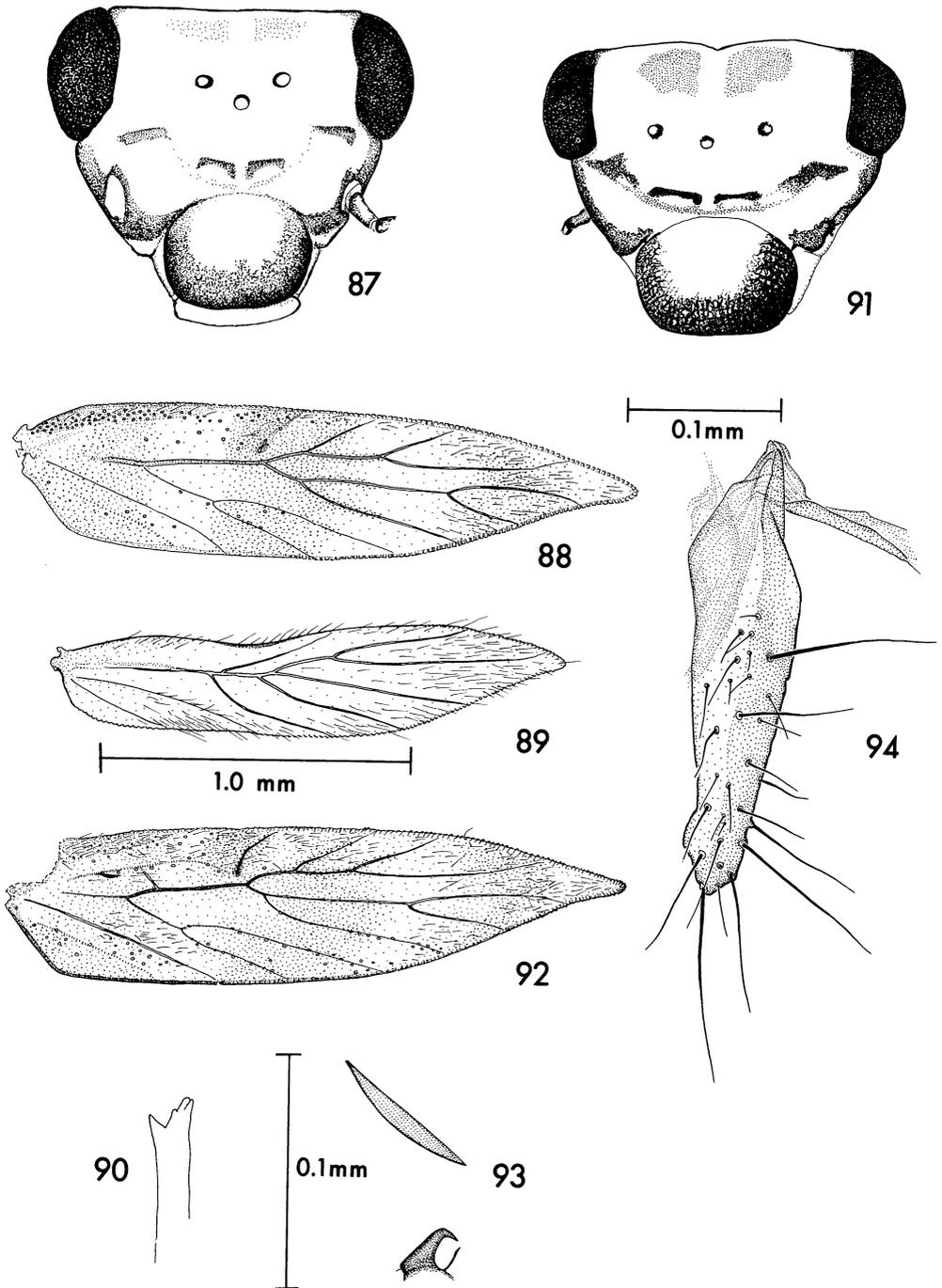


FIG. 87-94. *Lepidopsocus ruptus*: ♂: head (87), fore wing (88), hind wing (89); ♀: lacinial apex (90), head (91), fore wing (92), fore wing scale and claw (93), gonapophyses (94). FIG. 87 and 91 not to scale; FIG. 88, 89, 92 and FIG. 90, 93 to common scales.

tewa Bay, *Agathis vitiensis*, 21.XII.1972; 1 ♀, Waikava Promontory, 170 m above Dakuniba, 22.XII.1972; 2 ♂, 2 ♀, 1N, Savu Savu Bay, Urata and Balaga Beach, 23.XII.1972.

In general head pattern, *L. ruptus* is similar to *Echmepteryx lunulata* except that the narrow band over the frons is usually interrupted. This band is also interrupted in *L. oweni*, which superficially resembles *L. ruptus*. *L. ruptus* differs from *L. oweni* as follows: it is a smaller species, with relatively smaller eyes; the vertex is marked with a pair of brown patches (absent in *L. oweni*) and a smaller dark mark at each corner of the vertex adjacent to the orbit (absent in *L. oweni*); the lateral brown bars on the frons are not directed towards the ocelli as they are in *L. oweni*; one pair of phallosome sclerites bears 6 to 7 pegs in *L. ruptus* (only 2 in *oweni*).

The species was collected on Viti Levu and quite frequently on Vanua Levu at elevations up to 200 m, on both native and introduced plants.

Lepidopsocus samus Thornton, new species

FIG. 95–99

♀. *Coloration*. Head cream with gray-brown markings as in FIG. 95, genae posteriorly cream; antenna scape and pedicel gray-brown. Maxillary palp cream, 2 subapical segments gray-brown distally, apical segment gray-brown. Thorax golden brown. Legs: coxa and trochanter cream; femur cream basal ½, apical ½ brown; tibia cream with subbasal and subapical brown bands (except protibia no subbasal band); tarsi cream except basal segment brown basally. Fore wing (FIG. 97), membrane golden brown except hyaline over apical ⅓. Hind wing (FIG. 98) hyaline, veins brown. Abdomen golden brown.

Morphology. I.O.:D = 1.6:1. Lacinial apex (FIG. 96) not expanded, tines long. Flagella broken, with at least 28 segments, segments 4× as long as broad. Fore wing (FIG. 97) scales largely lost; a few lanceolate scales with serrate margins remaining on posterior margin of wing. Rasp of Pearman's organ present, coxal interlocking device present (stud on left). Claw straight, with subapical tooth. Basal hind tarsal segment with 16 ctenidia. Epiproct simple, setose. Paraproct with field of 6 trichobothria, 1 seta without basal rosette, mesial spine slightly curved, sharply pointed. Gonapophyses as FIG. 99.

Dimensions. B 1.7, FW 2.17, HW 1.79, F 0.84, T 0.58, t₁ 0.32, t₂ 0.06, t₃ 0.05, rt 5.3:1:0.8, f₁ 0.044, f₂ 0.039, f₁/f₂ 1.13.

♂. *Coloration*. As ♀, but fore wing pigment lacking.

Morphology. I.O.:D = 2.8:1. As ♀. Epiproct and paraproct as ♀. Phallosome (damaged in preparation) with complex subapical sclerites, none of which apparently bears pegs.

Dimensions. B 1.4, FW 1.90, HW 1.61, F 0.62, T 0.92, t₁ 0.31, t₂ 0.05, t₃ 0.045, rt 6.2:1:0.9, f₁ 0.034, f₂ 0.03, f₁/f₂ 1.13.

Holotype ♀, VANUA LEVU: nr Nakula, Savu Savu area, 150 m, 16.XII.1972, IWBT (БИШОР 11,470). Allotype ♂, same data as holotype (БИШОР). Paratypes: 4 ♀, same data as holotype (AMS).

Other specimens examined. VITI LEVU: 1 ♀, Nadrau Plateau, nr Navai, 800 m, 31.X.1972; 3 ♀, 1N, Navai, dead tree, 1.XI.1972; 1 ♀, Dromodromo, nr Navai, 820 m, 2.XI.1972. VANUA LEVU: 1 ♀, 1N, Wakanilato, 4 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972; 4 ♀, 1N, Waikava Promontory, 180 m, *Citrus*, 22.XII.1972.

L. samus is similar to *L. fasciatus* but the head pattern is distinctive. Probably a native species, it has been collected from 150 m to 800 m in altitude, on introduced and native vegetation.

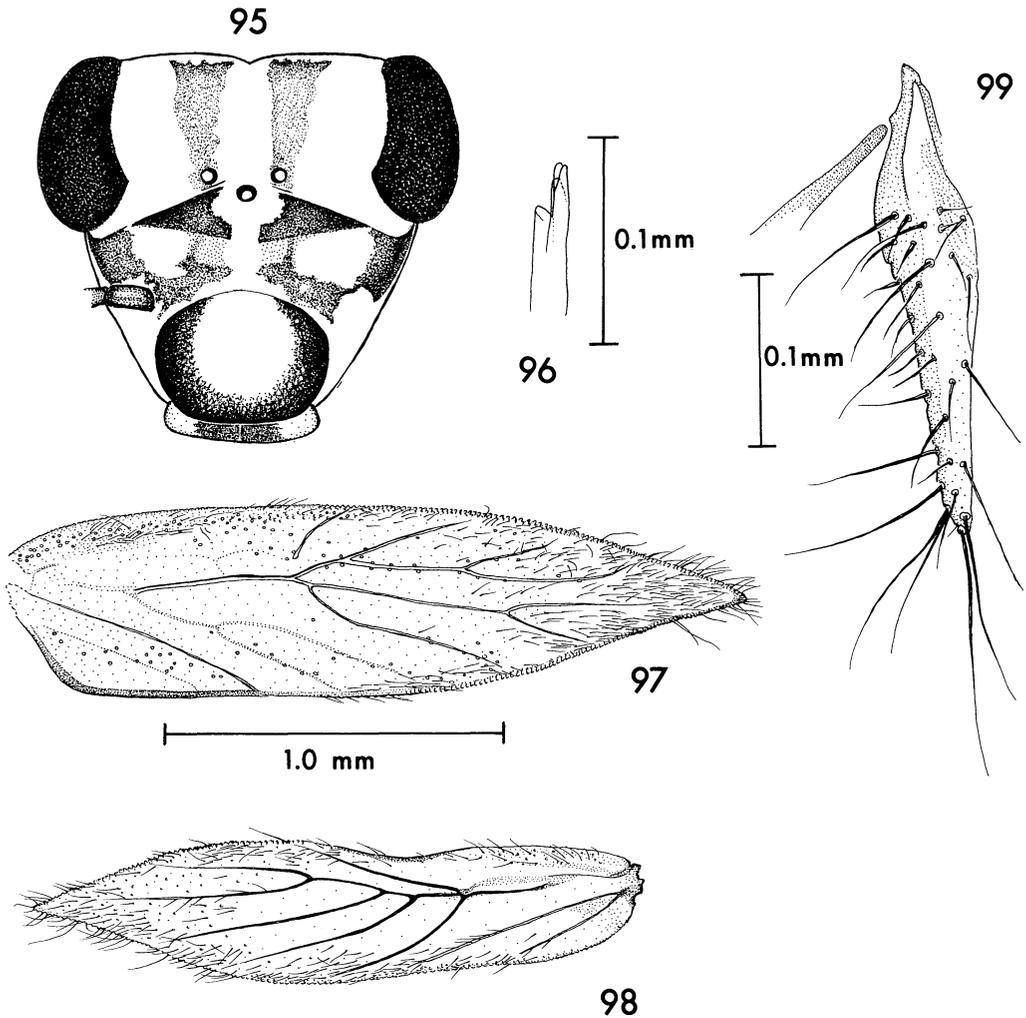


FIG. 95–99. *Lepidopsocus samus*, ♀: head (95), lacinial apex (96), fore wing (97), hind wing (98), gonapophyses (99). FIG. 95 not to scale; FIG. 97, 98 to common scale.

***Lepidopsocus savuensis* Thornton, new species**

FIG. 100–104

♂. *Coloration* (after ca 3 years in alcohol). Head cream, brown markings as in FIG. 100. A broad pale band below eye separates largely brown gena from wedge-shaped brown marks on frons, maxillary palps brown. Thoracic terga cream, pleura brown, sterna cream. Legs cream, small brown spot near apex of femur, tibia with a single very wide band, basal tarsal segment brown towards base. Fore wing and hind wing membranes hyaline. Abdomen cream.

Morphology. I.O.:D = 3.5:1. Lacinial apex (FIG. 101) truncate, middle tine short and sharp. Antennae broken, flagellum with at least 39 segments, the majority 4× as long as broad. Thoracic terga waxy. Fore wing short, bluntly pointed (FIG. 102), lanceolate and asymmetrical scales on membrane, apical margin

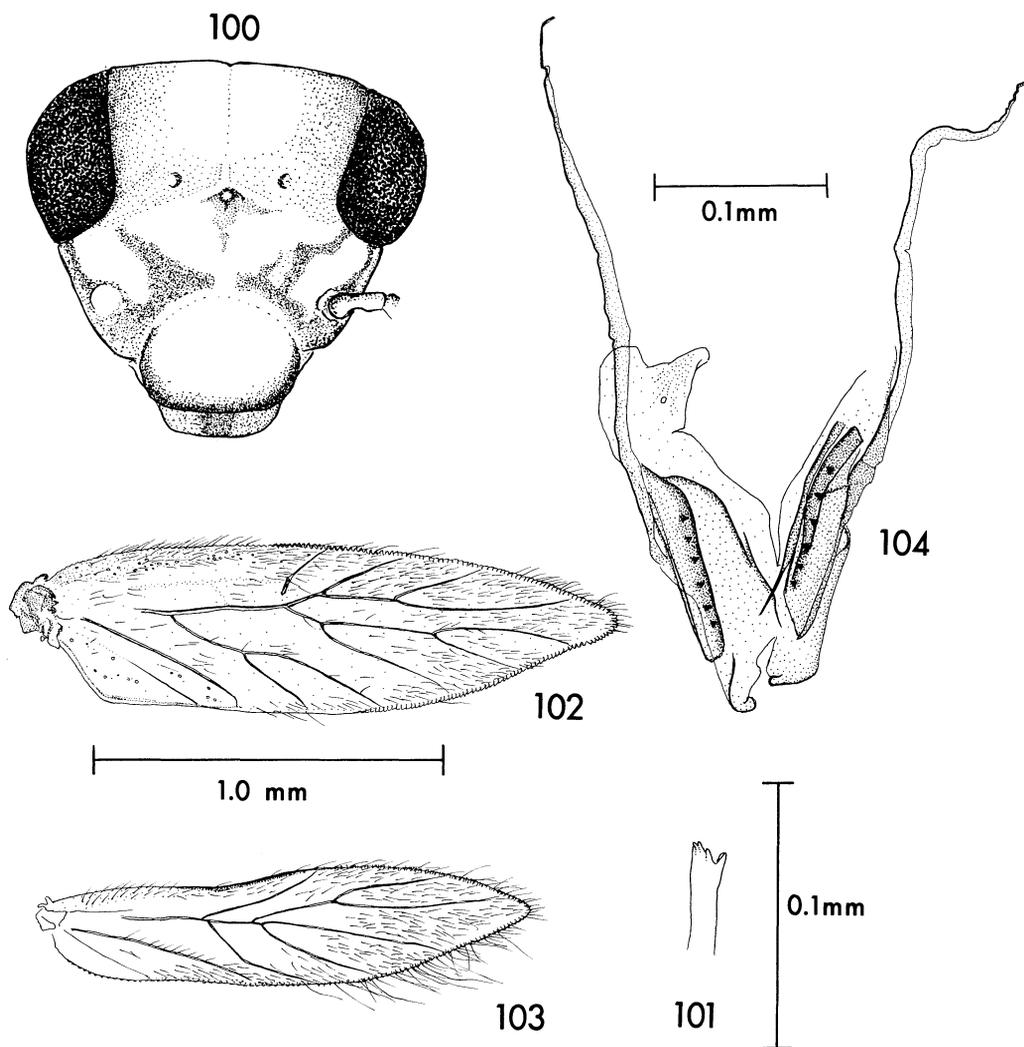


FIG. 100–104. *Lepidopsocus savuensis*, ♂: head (100), lacinial apex (101), fore wing (102), hind wing (103), phallosome (104). FIG. 100 not to scale; FIG. 102, 103 to common scale.

with serrate setoid scales, apical $\frac{1}{3}$ of membrane densely clothed with fine setae. Hind wing membrane (FIG. 103) setose over apical $\frac{1}{3}$. Claw without subapical tooth or serrations, apical tooth sharply bent, pulvillus narrow. Basal hind tarsal segment with 17 ctenidia. Rasp of Pearman's organ and coxal interlocking device present. Epiproct semicircular, setose. Paraproct with curved tapering sharp spine, oval field of 6 trichobothria and 1 seta without a basal rosette. Hypandrium simple. Phallosome (FIG. 104) with slender parameres diverging anteriorly and apically spoon-shaped without obvious elongate pores; several pairs of sclerites subapically, 1 pair of narrow sclerites bearing a line of 6 widely spaced low pointed pegs.

Dimensions. B 2.00, FW 1.66, HW 1.40, F 0.57, T 0.80, t_1 0.277, t_2 0.07, t_3 0.04, rt 3.9:1:0.5, f_1 0.032, f_2 0.029, f_1/f_2 1.1.

♀. Unknown.

Holotype ♂, VANUA LEVU: nr Nakula, Savu Savu area, 120 m, 16.XII.1972, IWBT (BISHOP 11,471).

This species is described from a unique male, since its head pattern is quite distinctive.

Lepidopsocus tibialis Thornton, new species

FIG. 105–109

♀. *Coloration*. Cream, including sutures, apart from eyes black, and single subbasal black band on hind tibia only (FIG. 105).

Morphology. I.O.:D = 1.8:1. Lacinial apex as FIG. 106. Flagella missing. Thoracic terga waxy. Fore wing (FIG. 107) scales lost. Hind wing as FIG. 108. Rasp of Pearman's organ present, interlocking device on meso-coxae present (stud on left). Claw sharply bent, no subapical tooth. Basal hind tarsal segment with 18 ctenidia. Epiproct simple, setose. Paraproct with fairly straight sharp mesial spine, field of 6 trichobothria and 1 seta without a basal rosette. Gonapophyses (FIG. 109) with fleshy outer valve.

Dimensions. B 1.9, FW 2.14, HW 1.77, F 0.66, T 0.96, t_1 0.34, t_2 0.06, t_3 0.05, rt 5.67:1:0.83, f_1 0.035, f_2 0.042, f_1/f_2 0.83.

♂. Unknown.

Holotype ♀, VANUA LEVU: Savu Savu Bay, Urata, 23.XII.1972, IWBT (BISHOP 11,472). Paratypes: 2 ♀, TONGA: Tongatapu, Nukualofa area, 15.I.1973, IWBT (AMS).

This pale plain species is nevertheless distinctive in having a well-marked single band on the tibia.

Lepidopsocus torus Thornton, new species

FIG. 110–113

♀. *Coloration* (after ca 3 years in alcohol). Head uniform pale brown, apart from eyes black. Thorax pale brown. Fore wing membrane pale brown, gradually darkening towards apex, but apical $1/5$ hyaline (FIG. 110). Hind wing membrane hyaline, veins dark brown (FIG. 111). Abdomen pale brown. Insect thus uniformly pale brown without any distinct pattern or markings.

Morphology. I.O.:D = 2.2:1. Lacinial apex as FIG. 112. Flagella broken, with at least 25 segments, segments 4× as long as broad. Most of fore wing scales lost, long marginal serrated setae present. Rasp of Pearman's organ present. Coxal interlocking device present (stud on right). Claw with subapical tooth, slight serrations basally, pulvillus expanded. Basal hind tarsal segment with 15 ctenidia. Epiproct simple, setose. Paraproct with a field of 6 trichobothria and 1 without a basal rosette. Gonapophyses as FIG. 113.

Dimensions. B 1.5, FW 1.68, HW 1.5, F 0.51, T 0.74, t_1 0.274, t_2 0.058, t_3 0.050, rt 4.7:1:0.9, flagellar segments not measurable.

♂. Unknown.

Holotype ♀, VITI LEVU: Nausori Highlands, beating *Agathis* and *Dacrydium*, 27.X.1972, IWBT (BISHOP 11,473). Paratypes: 1 ♀, VITI LEVU: Nadrau Plateau, Dromodromo, nr Navai, 800 m, 2.XI.1972; 1 ♀, 4 km S of Navai, 700 m, 16.XI.1972, IWBT (AMS).

This uniformly pale brown species, without head or leg markings, has only been taken in the highlands of Viti Levu in Fiji, but occurs also in Tonga (Thornton 1980).

Genus Nepticulomima Enderlein

Nepticulomima Enderlein, 1906: 95. Type-species: *Nepticulomima sakuntala* Enderlein.

Nepticulomima lusiae Thornton, new species

FIG. 114–119

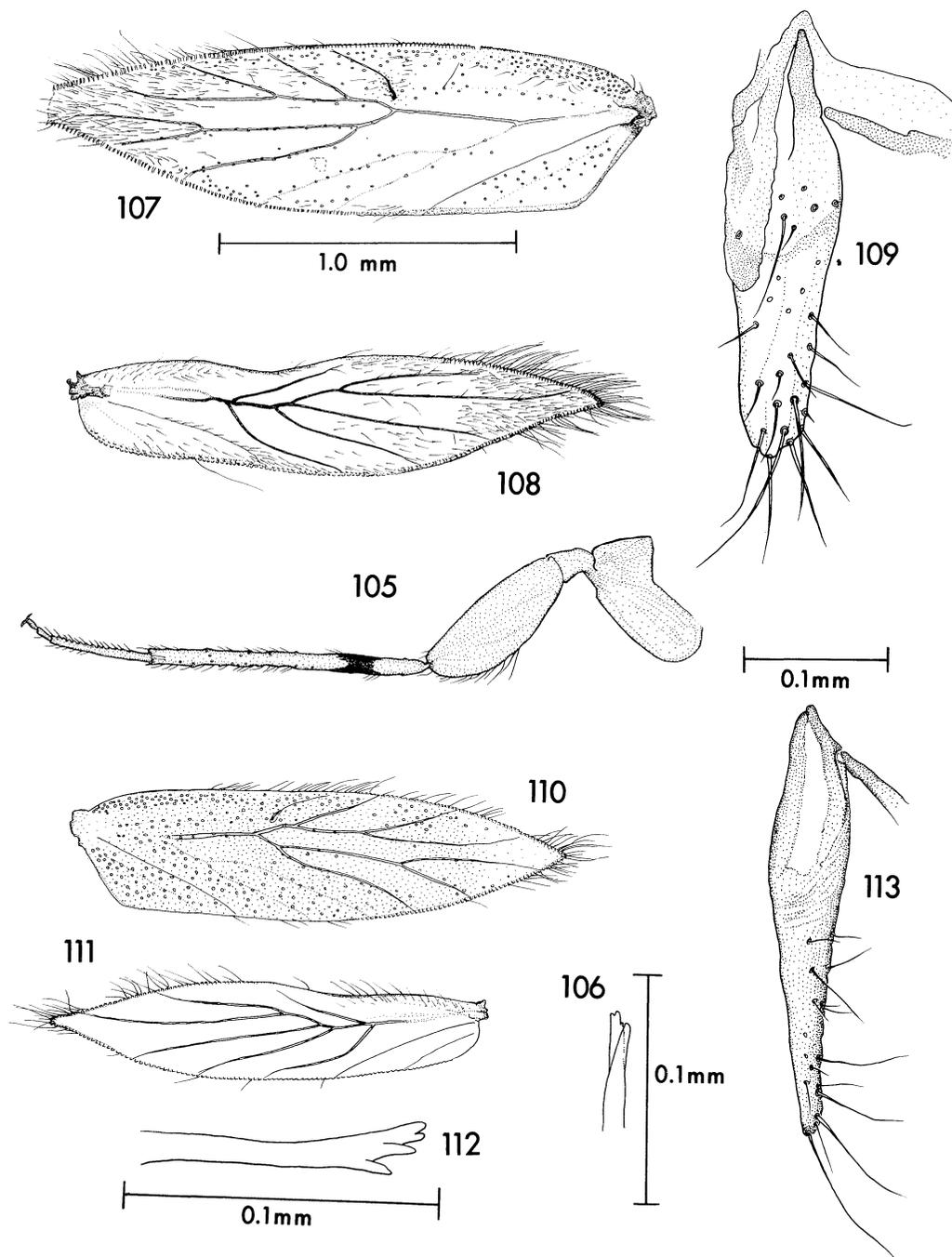


FIG. 105-113. **105-109.** *Lepidopsocus tibialis*, ♀: hind leg (105), lacinial apex (106), fore wing (107), hind wing (108), gonapophyses (109). **110-113.** *Lepidopsocus torus*, ♀: fore wing (110), hind wing (111), lacinial apex (112), gonapophyses (113). FIG. 105, 107, 108, 110, 111 and FIG. 109, 113 to common scales.

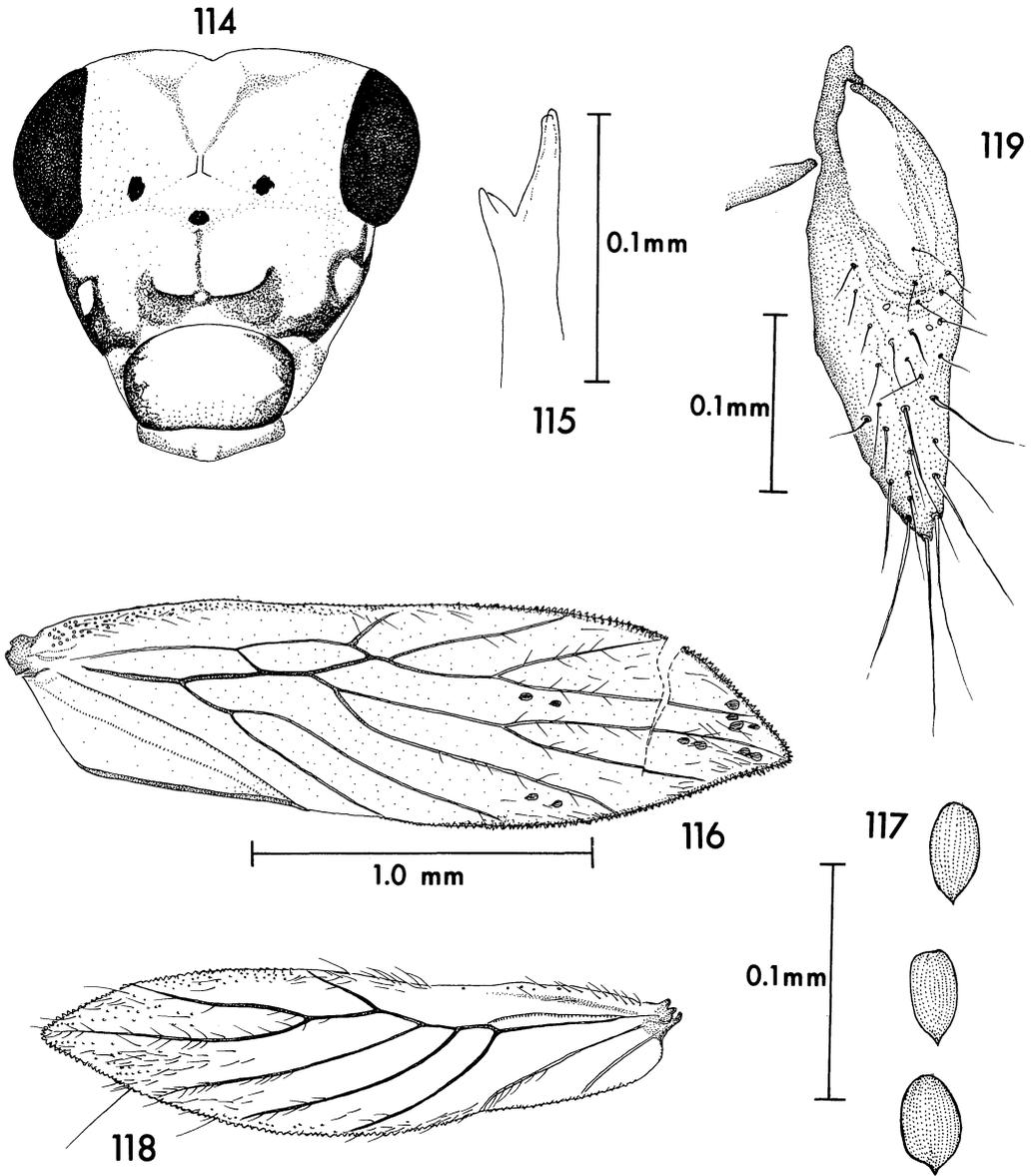


FIG. 114–119. *Nepticulomima lusiae*, ♀: head (114), lacinial apex (115), fore wing (116), fore wing scales (117), hind wing (118), gonapophyses (119). FIG. 114 not to scale; FIG. 116, 118 to common scale.

♀. *Coloration* (after ca 3 years in alcohol). Head cream, brown markings as in FIG. 114. Gena with dark brown bands parallel to lower edge of orbit; ocelli black; maxillary palps cream, dark brown along mesial surface. Thorax cream, a broad dark brown longitudinal band across pleura. Legs: coxa cream basally, dark brown apically; trochanter cream; femur cream, a broad brown subbasal band and a narrower brown subapical band; tibia with 2 brown bands, the subbasal ½ as wide as the subapical; tarsal segments brown,

except apical $\frac{1}{2}$ of basal segment cream. Fore wing membrane light brown, fading to hyaline distally. Hind wing membrane hyaline. Abdomen dorsally light brown with gray-brown granulations laterally and ventrally.

Morphology. I.O.:D = 1.7:1. Lacinia as FIG. 115. Flagellum broken, segments more than $4\times$ as long as broad. Thoracic terga waxy. Fore wing venation as in FIG. 116, membrane evenly covered with squat scales (FIG. 117) some of marginal scales more elongate, setoid scales on membrane and margin serrate. Hind wing as FIG. 118. Claw with apical tooth sharply bent, 2 prominent subapical teeth, pulvillus narrow. Rasp of Pearman's organ present and coxal interlocking device present (peg on left). Basal hind tarsal segment with 22 ctenidia. Epiproct semicircular, setose. Paraproct with elongate field of 6 trichobothria and 1 seta without a basal rosette; mesial spine slightly curved, sharply pointed. Gonapophyses as FIG. 119.

Dimensions. B 1.6, FW 2.27, HW 1.83, F 0.67, T 1.05, t_1 0.40, t_2 0.06, t_3 0.06, rt 6.6:1:1.0, f_1 0.115, f_2 0.105, f_1/f_2 1.09.

δ . Unknown.

Holotype ♀, VANUA LEVU: Lovoniquai, Natewa Bay, *Agathis vitiensis*, 21.XII.1972, IWBT (BISHOP 11,474). Paratype, 1♀, OVALAU: Levuka, Mission Hill, 150 m, 25.XI.1972, IWBT (AMS).

This is the only species of *Nepticulomima* so far discovered in Fiji. It is named after Mrs Lusi Niumataiwalu, whose hospitality on Viti Levu was much appreciated. Karny (1932) has recorded *Nepticulomima biroiana* (Enderlein) known from Java, New Guinea, and the Bismarcks, from Samoa. *N. lusiae* differs from *N. biroiana* in fore wing venation in that the small closed cell is convex anteriorly and has an indistinct spur-vein from its anterior border towards the wing margin.

Family PACHYTROCTIDAE Pearman, 1936 Genus **Tapinella** Enderlein

Tapinella Enderlein, 1908a: 772. Type-species: *Tapinella formosana* Enderlein.

Tapinella levuka Thornton, new species

FIG. 120–122

♀. *Coloration.* Head, thorax including legs, and abdomen brown, except antennae paler. Ocelli pale, eyes black, fore wing light brown, veins darker; hind wing very faint brown, veins rather darker.

Morphology. I.O.:D = 3.0:1. Body length 1.1 mm. Median epicranial suture and clypeal suture distinct, dark. Claw with single subapical tooth. Pearman's organ absent. Fore wing as FIG. 120. Hind wing lacking vein r_1 . Gonapophyses as FIG. 121. Epiproct trapezoid, setose, a single long seta in middle of posterior margin. Paraprocts without trichobothria. Subgenital plate as FIG. 122.

Holotype ♀, OVALAU: Cawaci, sea level, 28.XI.1972, IWBT (Bishop 11,475). Paratype, 1♀, same data as holotype, IWBT (AMS).

This uniformly brown species can be distinguished from other dark species with unpatterned fore wings by the lack of either darker bands or spots on the abdomen, lack of darker pleural stripes on the thorax, and lack of head pattern.

Tapinella tuila Thornton, new species

FIG. 123–125

♀. *Coloration.* Head pale buff apart from brown band from orbit to antennal socket; eyes black, ocelli pale. Thorax and abdomen buff with single lateral brown stripe on each side. Wings uniformly very pale brown.

Morphology. I.O.:D = 3.5:1. Body length 1.0 mm. Median epicranial suture faint, clypeal suture distinct,

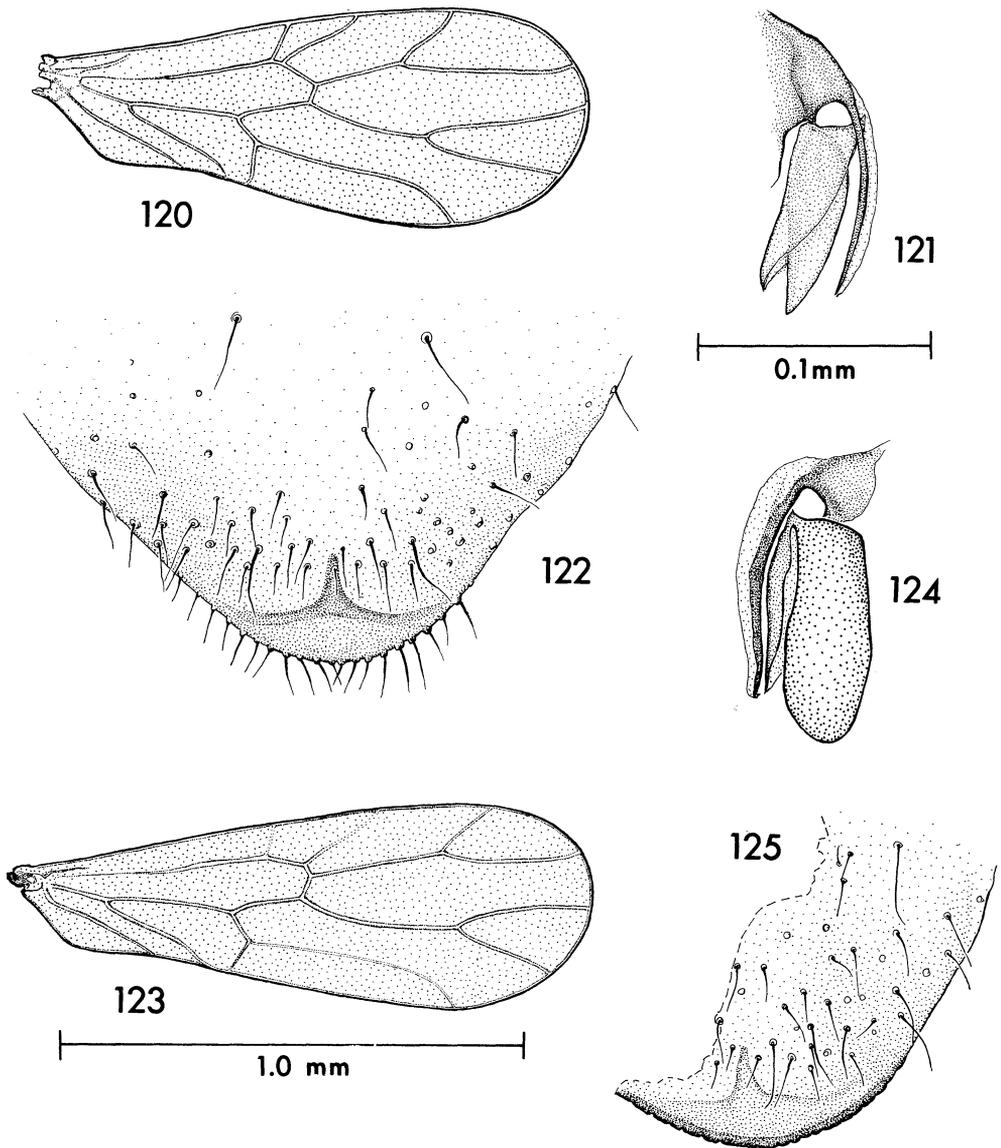


FIG. 120–125. **120–122.** *Tapinella levuka*, ♀: fore wing (120), gonapophyses (121), subgenital plate (122). **123–125.** *Tapinella tuila*, ♀: fore wing (123), gonapophyses (124), subgenital plate (125). FIG. 120, 123 and FIG. 121, 122, 124, 125 to common scales.

dark. Claw with subapical tooth. Pearman's organ absent. Fore wing as FIG. 123. Hind wing with vein r_1 absent. Gonapophyses (FIG. 124) as usual in the genus. Paraprocts damaged. Epiproct squarish, hind margin with median group of 4 fairly long setae, and 1 longer seta more laterally. Subgenital plate (FIG. 125) with sclerotized crenulate hind margin, T-sclerite with very broad lateral arms.

Holotype ♀, VITI LEVU: Nausori Highlands, nr Nausori, 600 m, *Pinus caribaea*, 21.X.1972, IWBT (BISHOP 11,476).

This is the only known species of *Tapinella* with a single lateral dark stripe along the thorax and abdomen. It is closely similar to *Tapinella mariana*, Thornton, Lee & Chui from Micronesia, which, however, has a double lateral stripe on the abdomen, and *T. unicolorata* Turner, from Jamaica, in which the single lateral stripe is faint.

Family CAECILIIDAE Pearman, 1936

Genus **Caecilius** Curtis

Caecilius Curtis, 1837: 648 (see Mockford 1965). Type-species: *Psocus fuscopterus* Latreille.

Caecilius annus Thornton, new species

FIG. 126–128

♀. *Coloration* (freshly killed, in alcohol). Head brown, eyes black; ocelli pale on dark brown protuberance, median epicranial suture dark brown, antenna light brown, maxillary palp light brown with darker apical segment. Thoracic nota brown, scutella bordered dark brown; pleura very dark brown; legs very pale brown with tibia and tarsal segments slightly darker. Fore wing (FIG. 126) veins brown, bordered hyaline; membrane with brown clouds and hyaline patches. Hind wing pale brown with brown veins except costal cell brown, basal angle hyaline and margin darker apically. Abdomen dorsally brown, epiproct lighter; ventrally with blackish brown granulated pigment.

Morphology. I.O.:D = 3.5:1. Body length 1.5 mm. Head and thoracic sclerites shining. Vein cu_2 in fore wing bare. Paraproct with field of 14 trichobothria. Subgenital plate (FIG. 127) emarginate medially, with a pair of curved horns posteriorly. Gonapophyses as FIG. 128. Sperm sac sclerotized.

Holotype ♀, VITI LEVU: Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973, IWBT (BISHOP 11,477).

This dark species with a distinctively marked fore wing and unusual subgenital plate is known from the holotype only. The gonapophyses are not unusual for the genus.

Caecilius casarum Badonnel

Caecilius casarum Badonnel, 1931: 234.

Caecilius palmarum Mockford & Gurney, 1956: 361.

Specimens examined. VITI LEVU: 2♀, Nadi, banana, 28.XII.1972; 1♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973. OVALAU: 4♀, 1N, Draiba, sea level, coconut fronds, 30.XI.1972. VANUA LEVU: 1♀, Labasa, *Citrus*, 11.XII.1972.

This species, found only on introduced plants from sea level to 800 m, is a distinctive widespread tropicopolitan species, occurring in Mozambique, Hong Kong, New Guinea, Micronesia, Samoa, Hawaii, Easter I, the southern United States, and coastal areas of the new world tropics and subtropics. It also occurs in Tonga (Thornton 1981a).

Caecilius niunatus Thornton, new species

FIG. 129–133

♀. *Coloration* (after ca 3 years in alcohol). Head including maxillary palps, scape, pedicel and basal flagellar segment cream, remainder of flagellum brown; eyes black. Thorax and legs cream except nota pale brown; fore wing (FIG. 129) uniform very pale brown; hind wing paler, almost hyaline. Abdomen cream.

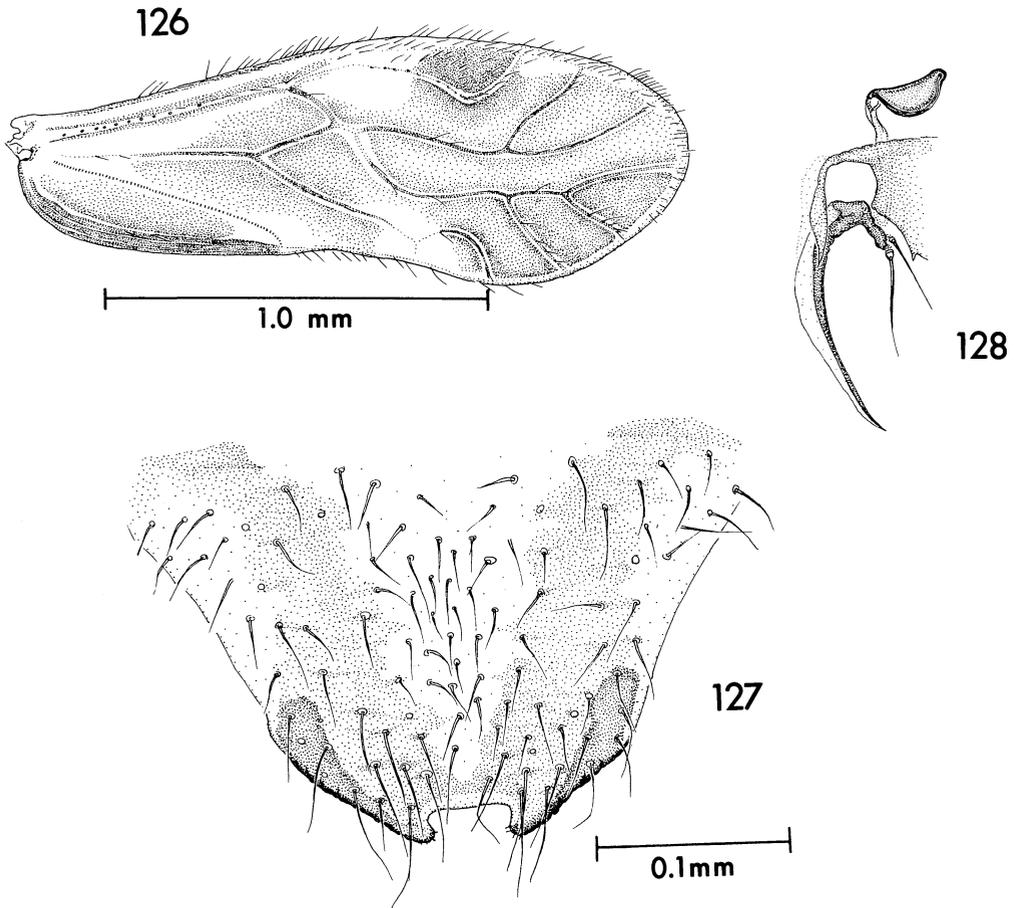


FIG. 126–128. *Caecilius annus*, ♀: fore wing (126), subgenital plate (127), gonapophyses (128). FIG. 127, 128 to common scale.

Morphology. I.O.:D = 2.5:1. Body length 2.1 mm. Vein cu_2 in fore wing bare. Paraproct with oval field of 9–10 trichobothria. Subgenital plate (FIG. 130) semicircular, setose. Gonapophyses evidently reduced to 1 very small valve bearing a single long seta (FIG. 131).

♂. *Coloration* (after ca 3 years in alcohol). As ♀.

Morphology. I.O.:D = 0.8:1. Body length 1.5 mm. Antennal flagellum 2× as thick as that of ♀. Vein cu_2 in fore wing setose (3–6 setae). Paraprocts with field of 17 trichobothria. Hypandrium (FIG. 132) shallow, unsclerotized in middle portion. Penis frame (FIG. 133) angular.

Holotype ♀, VANUA LEVU: Lovoniqai village, Natewa Bay, *Agathis vitiensis*, 21.XII.1972, IWBT (BISHOP 11,478). Allotype ♂, same data as holotype (BISHOP). Paratypes: 6♂, 9♀, same data as holotype, IWBT (AMS).

Other specimens examined. VITI LEVU: 1♀, Nausori Highlands, 8 km SE of Natawa, 870 m, Kauri forest, dead hurricane-blown tree, 28.X.1972; 3♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973. OVALAU: 1♂, Levuka, Mission Hill, 70 m,

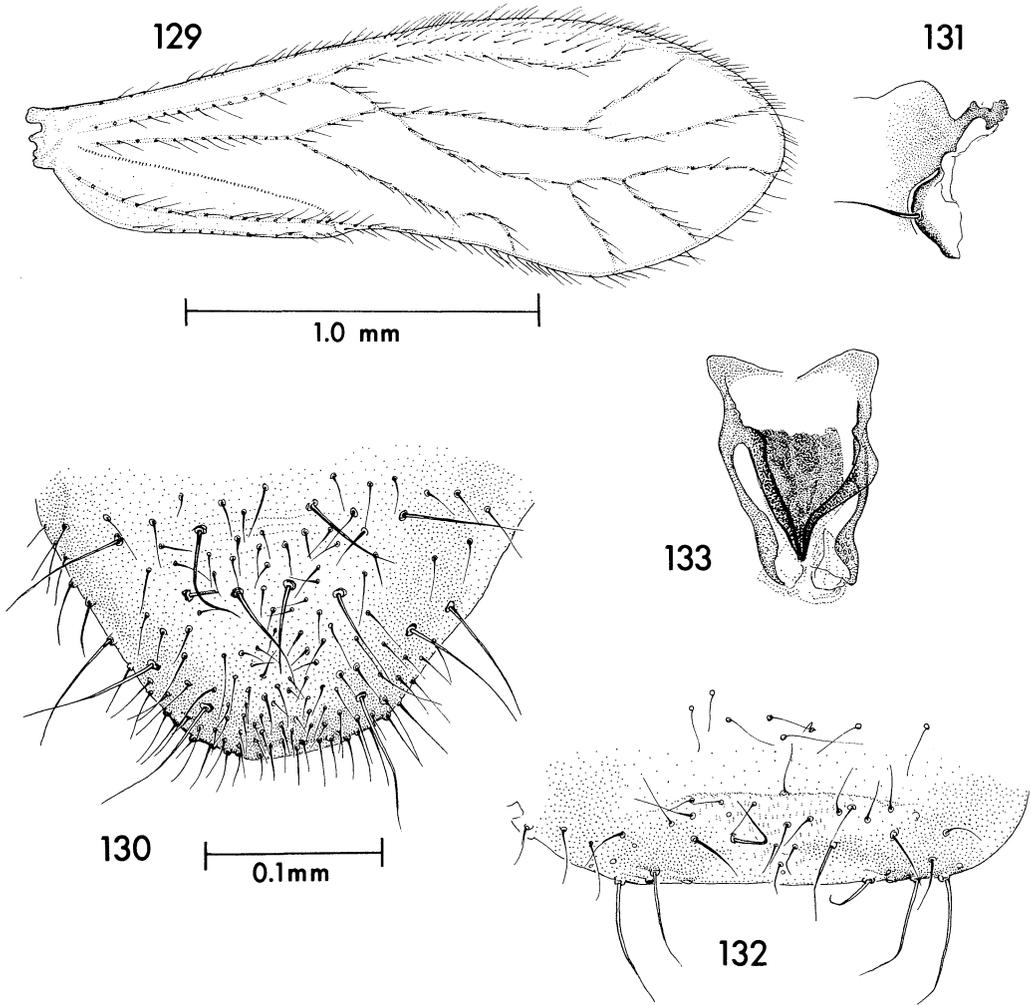


FIG. 129–133. *Caecilius nimatus*: ♀: fore wing (129), subgenital plate (130), gonapophyses (131); ♂: hypandrium (132), phallosome (133). FIG. 130–133 to common scale.

25.XI.1972; 1♂, Lovoni Crater, 26.X.1972. VANUA LEVU: 2♂,6♀, Wakanilato, 4 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972; 1♂,1♀, nr Nakula, Savu Savu area, 130 m, 16.XII.1972; 1♂,2♀, Savu Savu Bay, cocoa, 17.XII.1972; 3♂,3♀, Savu Savu, 30 m, *Citrus*, 18.XII.1972; 13♂,13♀, Lesiaceva Pt, *Citrus*, 19.XII.1972; 1♀, isthmus 16 km E of Savu Savu, *Citrus*, 21.XII.1972; 1♀, Faun Harbour, *Citrus*, 22.XII.1972; 2♂,4♀, Savu Savu Bay, Urata, 23.XII.1972.

This cream species with brown flagella is easily distinguished from other Fijian caeciliids in coloration. The ciliation of the fore wing is variable; vein cu_2 may be bare

or carrying up to 10 setae, and the ciliation is not correlated with sex. The species is found predominantly in the lowlands.

In the form of the female gonapophyses and the venation of the fore wing, *C. niunatus* is close to species of *Paracaecilius* (Badonnel 1931, 1967, 1969), a genus known from Africa. However, the eyes are not unusually large, as they are in that genus, nor is the phallosome open anteriorly.

Caecilius novoguineensis Enderlein

Caecilius novoguineensis Enderlein, 1903: 276.—Karny, 1926: 290.

Karny identified this New Guinean species, collected on Vanua Levu (Labasa) by R. Veitch in IX.1922, by Enderlein's description. It has a uniformly pale fore wing and an extremely small areola postica; it was not collected in 1972/1973.

Family ECTOPSOCIDAE Roesler, 1952

Genus **Ectopsocus** McLachlan

Ectopsocus McLachlan, 1899: 277. Type-species: *Ectopsocus briggsi* McLachlan.
For synonymy see Thornton et al., 1972: 101.

Ectopsocus denervus Thornton & Wong

Ectopsocus denervus Thornton & Wong, 1968: 95–98.—Thornton et al., 1972: 104.

Specimens examined. VITI LEVU: 1 ♂, Sigatoka Val, nr Toga, 60 m, dead breadfruit trees, 10.XI.1972; 1 ♂, Nadi, *Tamarindus indica*, 28.XII.1972. OVALAU: 1 ♂, 2 ♀, Levuka, 30 m, 26.XI.1972. VANUA LEVU: 2 ♀, Savu Savu Bay, sea level, cocoa, 17.XII.1972.

This species, previously known from Micronesia, Samoa and the Philippines, also occurs on Tonga (Thornton 1981a). In all Fijian specimens, as in those known from elsewhere, vein r_{2+3} of the hind wing is absent.

Ectopsocus fullawayi Enderlein

Ectopsocus fullawayi Enderlein, 1913: 356.
For further synonymy see Thornton et al., 1972: 102.

Specimens examined. VITI LEVU: 2 ♂, Nausori Highlands, 600 m, *Pinus caribaea*, 21.X.1972; 4 ♀, Nadrau Plateau, nr Navai, 800 m, 31.X.1972; 4 ♂, 4 ♀, Nausori Highlands, 7 km E of Nausori, 850 m, dead trees, 7.XI.1972; 3 ♀, Nausori Highlands, 2 km E of Mt Magodro, nr Bukuya, 400 m, 7.XI.1972; 1 ♂, 1 ♀, Mt Magodro area, nr Nasivikosa, Namada stream, 450 m, lichen-covered *Citrus*, 10.XI.1972; 1 ♀, Sigatoka-Ba divide, 4 km SW of Nanoka, 650 m, dead leaves, 13.XI.1972; 1 ♀, Dorovau (Tailevu), Verata tikina, lichen-covered *Citrus*, 23.XI.1972; 5 ♂, 17 ♀, 2N, Burelevu, Sawakasi tikina, coast, *Rhizophora mangle*, 23.XI.1972; 2 ♂, 8 ♀, Nadi, 5.XII.1972; 1 ♀, Sabeto Val, Nadele area, 9.XII.1972; 1 ♂, 1 ♀, Nadi, *Tamarindus indica*, 28.XII.1972; 1 ♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973. OVALAU: 5 ♂, 9 ♀, Levuka, Mis-

sion Hill, ca 100 m, dead banana leaves, 25.XI.1972; 2♂,5♀, Levuka, garden, 30 m, 26.XI.1972; 4♂,6♀,1N, Lovoni Crater, dead breadfruit trees, 26.XI.1972; 3♂,6♀, bush 300 m above Levuka, 27.XI.1972; 1♀, Draiba, sea level, coconut fronds, 30.XI.1972. VANUA LEVU: 2♂, Wakanilato, 4 km NW of Mt Delaikoro, 12.XII.1972; 1♂, Savu Savu Beach, *Barringtonia asiatica*, 17.XII.1972; 14♂,10♀, Lesiaceva Pt, *Citrus*, 18,19.XII.1972; 5♂, Savu Savu, *Citrus*, 18.XII.1972; 2♀, Savu Savu Bay, Balaga Beach, 23.XII.1972. LAU GROUP: 2♀,2N, Vanua Balavu, Mvana, 9.VIII.1938, ECZ; 1♀, Vanua Balavu, Loma Loma, 5.VIII.1938; Moala Group: 1♀, Moala, Vanuka, 30 m, 23.VIII.1938, ECZ; 1♀, Moala, 1.5 km W of Naroi, 200 m, 25.VIII.1938, ECZ.

This species is common in Fiji, occurring both on the high islands of the western group and on the Lau Group. It is a widespread central Pacific form, occurring also on Wake, Samoa, Tonga, Hawaiian Is, Tubuai, Rapa, Tuamotu Archipelago, Marquesas, Pitcairn, Oeno, Mangareva, Henderson and Easter I, but has not been collected on the Bonins, Marianas, Carolines, Marshall or Gilberts. The record from Guam in Mockford 1972 is in error (Mockford, pers. commun.).

Ectopsocus furcatus Thornton & Wong

Ectopsocus furcatus Thornton & Wong, 1968: 115–116.

Specimens examined. LAU GROUP: 1♀, Vanua Balavu, Loma Loma, 7.VIII.1938, ECZ.

E. furcatus is known only from the female. I did not take it in 1972/73. It also occurs on the Malay Peninsula.

Ectopsocus myrmecophilus Enderlein

Ectopsocus myrmecophilus Enderlein, 1903: 298.—Karny, 1926: 290.

Fiji records. VITI LEVU: Lautoka, from jar containing *Jatropha curcas* fruits, 10.VII.1922, W. Greenwood. VANUA LEVU: Labasa, 31.VIII.1922, Greenwood.

Karny identified this species without genitalic information. However, the fore wing has some pattern, and the species does not appear to be represented in the collections before me.

Ectopsocus ornatoides Thornton & Wong

Ectopsocus ornatoides Thornton & Wong, 1968: 103–106.—Thornton et al., 1972: 105.

Specimens examined. VITI LEVU: 1♂, Mt Victoria, 900–1200 m, 13.XI.1938, E.C.Z.

I did not collect the species in 1972/73. It occurs also in Samoa, Hawaii, and Micronesia (Bonins, Volcanos, Marianas, Carolines and Marshalls).

Ectopsocus perkinsi Banks

Ectopsocus perkinsi Banks, 1931: 438.—Zimmerman, 1948: 235.—Thornton & Wong, 1968: 118–120.

Specimens examined. VITI LEVU: 2♀, Nadarivatu, 1300 m, 5.IX.1938; 3♀, Navai Hill, Tholo North, 800 m, 17.IX.1938, ECZ; 1♂,4♀, Nadrau Plateau, Dromodromo,

nr Navai, 800 m, 31.X.1972; 1 ♀, Korovou (Tailevu), Verata tikina, lichen on *Citrus*, 23.XI.1972; 1 ♀, Sabeto Val, Nadele area, 9.XII.1972; 1 ♂, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973. VANUA LEVU: 1 ♀, Doguru, 2 km NW of Mt Delaikoro, 170 m, *Citrus*, 12.XII.1972. LAU GROUP: 1 ♀, Oneata, Dakuiloe, 21.IX.1938, ECZ; 1 ♀, Vanua Balavu, Loma Loma, 7.VIII.1938, ECZ.

Superficially similar to *E. fullawayi*, this species is evidently less common but has been taken from sea level to 1300 m elevation on the higher western islands and also occurs on the Lau Group. Its known Pacific range is more restricted than that of *E. fullawayi* [it has been recorded from Hawaii, Tubuai and Samoa and I have taken it on Tonga (Thornton 1981a)], but this may be a reflection of its relative rarity.

Ectopsocus spilotus Thornton & Wong

Ectopsocus spilotus Thornton & Wong, 1968: 107.

Specimens examined. VITI LEVU: 1 ♀, Mt Victoria, 1300 m, 13.IX.1938, ECZ; 1 ♂, 3 ♀, Nadi, *Citrus*, 22, 23.X.1972; 1 ♀, Nadi, dead hurricane-blown vegetation, 29.X.1972; 1 ♂, 2 ♀, Nadi, dead *Phoenix dactylifera* fronds, 6.XI.1972; 5 ♀, 2N, Nadi, 5.XII.1972; 2 ♀, Nadi, *Tamarindus indica*, 28, 29.XII.1972; 3 ♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973. OVALAU: 30 ♂, 50 ♀, Levuka, Mission Hill, 30–150 m, *Citrus*, dead banana leaves, 25, 26.XI.1972; 1 ♀, Lovoni Crater, dead breadfruit leaves, 26.XI.1972; 2 ♂, 5 ♀, bush 300 m above Levuka, 27.XI.1972; 10 ♂, 10 ♀, Cawaci, sea level, 28.XI.1972; 1 ♀, Nasova, sea level, *Phaleria disperma*, 30.XI.1972; 10 ♂, 10 ♀, Draiba, sea level, coconut fronds, 30.XI.1972; 7 ♀, Nasinu, 30.XI.1972. VANUA LEVU: 4 ♂, 15 ♀, Labasa, *Citrus*, 11.XII.1972; 1 ♂, Wakanilato, 3 km NW of Mt Delaikoro, 12.XII.1972; 1 ♀, Savu Savu Beach, *Barringtonia asiatica*, 17.XII.1972; 7 ♂, 4 ♀, Savu Savu, 30 m, *Citrus*, 18.XII.1972; 2 ♂, 6 ♀, Lesiaceva Pt, sea level, *Citrus*, 19.XII.1972. LAU GROUP: 1 ♀, Mago I, 2 km S of Marona, ca 100 m, 14.VIII.1938; 1 ♀, Munia, 300 m, 3.VIII.1938, ECZ.

A common species, taken mainly in the lowlands on introduced vegetation and occurring on the Lau Group as well as the high islands, *E. spilotus* was nevertheless collected at 1300 m on Mt Victoria, Viti Levu, by Zimmerman. The species' range includes the Marshalls and Gilberts, Hawaii and Samoa, and I have also collected it on Tonga (Thornton 1981a).

Ectopsocus uncinatus Thornton & Wong

Ectopsocus uncinatus Thornton & Wong, 1968: 116–118.

Specimens examined. VITI LEVU: 1 ♀, Mt Victoria, 1100 m, 5.IX.1938, ECZ; 1 ♀, Nadarivatu, 1150 m, 5.IX.1938, ECZ; 1 ♂, 3 ♀, ridge W of Nadarivatu, 830 m, 9.IX.1938, ECZ; 1 ♀, Nausori Highlands, nr Nausori, 600 m, 21.X.1972; 3 ♂, 4 ♀, Nausori Highlands, 700 m, *Agathis* and *Dacrydium*, 27.X.1972; 1 ♀, Nausori Highlands, 8 km SE of Natawa, 800 m, dead tree, 28.X.1972; 1 ♂, 1 ♀, Nadrau Plateau, nr Navai, 800 m, 31.X.1972; 3 ♂, 7 ♀, same locality, dead tree, 1.XI.1972; Nadi, dead *Phoenix dactylifera* fronds, 6.XI.1972; 2 ♂, 2 ♀, Nausori Highlands, 7 km E of Nausori,

830 m, dead trees, 7.XI.1972; 3 ♀, 2 km E of Mt Magodro, nr Bukuya, Nakata, 430 m, 7.XI.1972; 1 ♀, Mt Magodro area, nr Nasivikoso, Namada stream, 430 m, 10.XI.1972; 1 ♂, 1 ♀, 10 km NNE of Nadrau, 680 m, 16.XI.1972; 2 ♀, Sigatoka-Ba divide, 660 m, 4 km SW of Nanoka, dead leaves, 13.XI.1972; 1 ♀, 3 km S of Navai, 650 m, 16.XI.1972; 2 ♀, Korovou (Tailevu), Verata tikina, 23.XI.1972; Sabeto Val, Nadele area, 9.XII.1972; 1 ♂, 1 ♀, Nausori Highlands, 870 m, *Agathis* and *Dacrydium*, 31.XII.1972; 2 ♂, 3 ♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973. LAU GROUP: 1 ♀, Vanua Balavu, Mvana, 70 m, 9.VIII.1938, ECZ.

E. uncinatus is only known from Fiji; it has been collected largely from native plants in the mountains but also occurs on the Lau group.

Family PERIPSOCIDAE Pearman, 1936

Genus **Peripsocus** Hagen

Peripsocus Hagen, 1866: 203. Type-species: *Psocus phaeopterus* Stephens.

Peripsocopsis Tillyard, 1923: 193.

Peripsocus ferrugineus Thornton & Wong

Peripsocus ferrugineus Thornton & Wong, 1968: 91–93.—Thornton et al., 1972: 107.

Specimens examined. VITI LEVU: 7 ♂, 14 ♀, Nausori Highlands, 850 m, on *Pinus caribaea*, 1.I.1973. VANUA LEVU: 2 ♀, Labasa, on *Citrus*, 11.X.1972; 1 ♂, 10 ♀, Lesiaceva Pt, Savu Savu Bay, on *Citrus*, 18, 19.XII.1972; 1 ♂, 4 ♀, nr Nakula, Savu Savu area, 120 m, 16.XII.1972; 2 ♂, 11 ♀, Savu Savu, *Citrus*, 30 m, 18.XII.1972. LAU GROUP: 1 ♂, Vanua Balavu, Bavatu, 60–75 m, 16.VIII.1938, ECZ.

P. ferrugineus has been recorded from the southern Marianas, the Carolines (including Caroline atolls), and Samoa, and I have also collected it in Hawaii (Thornton 1981b). The reddish-brown patch in the apical 1/3 of the pterostigma and the similarly pigmented stigmasac are distinctive among Fijian peripsocids. The male is unusual in lacking an apical beak to the penis frame and in the spatulalike shape of the median aedeagal sclerite; both features can be seen without dissection. It is most similar to *Peripsocus maoricus* (Tillyard) from New Zealand in wing pattern, but lacks the cloudy area in the center of the wing.

Peripsocus pauliani Badonnel

Peripsocus pauliani Badonnel, 1949: 42.—Thornton & Wong, 1968: 20–22.—Thornton et al., 1972: 107–108.—Thornton & Woo, 1973: 32–33.

Specimens examined. VITI LEVU: 1 ♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973; 1 ♀, Sabeto Val, Nadele area, 9.XII.1972.

Described from a single female from the Ivory Coast, Africa, the species has also been recorded from Hong Kong, Malaya, Philippines, Volcanos, southern Marianas, Carolines, Marshalls, and the Galapagos Is. I have collected it also in Tonga. Males are unknown; the species is probably parthenogenetic.

Peripsocus similis Enderlein

Peripsocus similis Enderlein, 1903: 290 (nec Badonnel, 1955).

For full synonymy see Thornton & Wong, 1968: 22.

Specimens examined. VITI LEVU: 1 ♀, Nadi, dead bamboo, 6.XI.1972; 4 ♀, Nausori Highlands, 800 m, *Pinus caribaea*, 2.I.1973. VANUA LEVU: 1 ♀, Labasa, *Citrus*, 11.XII.1972. OVALAU: 3 ♀, Levuka, Mission Hill, 70 m, general beating, 25.XI.1972.

This species has been recorded from Singapore and Hong Kong, and I have collected it also in Hawaii (Thornton 1981b) and Tonga (Thornton 1981a). Males are unknown; the species may be parthenogenetic.

Family PSEUDOCAECILIIDAE Pearman, 1936

KEY TO FIJIAN SPECIES OF PSEUDOCAECILIIDAE

1. In fore wing media 2-branched **Pseudoscottiella loma, n. sp.**
In fore wing media 3-branched 2
2. In fore wing r_5 less than $\frac{1}{2}$ as long as r_{4+5} 3
In fore wing r_5 longer than r_{4+5} 4
3. Apical lobe of subgenital plate deeply emarginate **Lobocaecilius nigrens**
Apical lobe of subgenital plate only slightly emarginate, lobe as long in midline as laterally
..... **Lobocaecilius vanuensis, n. sp.**
4. Fore wing uniformly hyaline or pale brown 5
Fore wing with brown pigmented areas and lighter or hyaline areas 7
5. Male fore wing with sensory papillae in anal cell; apical lobe of ♀ subgenital plate deeply indented, lobes appearing as a pair of triangles 6
Male fore wing without sensory papillae in anal cell; apical lobe of ♀ subgenital plate not deeply indented **Heterocaecilius dardanus**
6. Anal cell of ♂ fore wing entirely covered with sense papillae; distal branches of veins no darker than basal veins **Heterocaecilius simplex**
In ♂ fore wing papillae confined to basal angle of cell Cu_2 ; distal branches of veins decidedly darker than basal sections **Heterocaecilius apicalis, n. sp.**
7. Fore wing with costal cell hyaline, cell R_s pigmented, general pigment pattern of fore wing longitudinal 8
Fore wing with costal cell and cell R_s equally pigmented or hyaline, general pigment pattern of fore wing not longitudinal 10
8. In fore wing cell R_s largely hyaline, cell An darker than rest of membrane
..... **Heterocaecilius pictus, n. sp.**
In fore wing cell R_s pigmented, cell An no darker than rest of membrane 9
9. Abdomen dorsally chocolate brown, ventrally cream; no dark mark between orbit and antennal socket **Heterocaecilius albicus, n. sp.**
Abdomen cream; dark brown band between orbit and antennal socket
..... **Heterocaecilius tectus, n. sp.**
10. Pigmented areas of fore wing restricted to regions of areola postica, apical $\frac{1}{2}$ of pterostigma, distal angles of cells Cu_2 and Cu_1 , and along basal section of vein r_5 .. **Pseudocaecilius criniger**
Fore wing much more extensively pigmented than above 11
11. Fore wing almost uniform brown, no distinct paler or hyaline areas in medial cell
..... **Heterocaecilius veitchi**
Fore wing with distinct paler or hyaline areas in medial cell 12

12. Distinct hyaline or paler areas of fore wing extensive, including part of cell R_s and apical portion of cell R_1 **Heterocaecilius greenwoodi**
 Hyaline or paler areas of fore wing limited to narrow posterior bands or indistinct over anterior $\frac{1}{2}$ of wing 13
13. Apex of subgenital plate emarginate in shape of inverted V; areola postica more than $\frac{1}{2}$ as high as long **Heterocaecilius volatus**
 Apex of ♀ subgenital plate shallowly emarginate, not forming an inverted V; areola postica about $\frac{1}{3}$ as high as long **Heterocaecilius panicus**
- Note: *Heterocaecilius marshalli* is insufficiently known to be included in this key.

Genus **Pseudocaecilius** Enderlein

Pseudocaecilius Enderlein, 1903: 260.—Lee & Thornton, 1967: 9–10. Type-species: *Pseudocaecilius elutus* Enderlein.

Pseudocaecilius criniger (Perkins)

Elipsocus criniger Perkins, 1899: 85.

For synonymy see Thornton & Woo, 1973: 34.

Specimens examined. VITI LEVU: 12 ♀, Nadi, general beating, 23.X.1972; 6 ♀, Nadi, *Citrus*, 22.XI.1972; 1 ♀, Nadi, general beating, 5.XII.1972. VANUA LEVU: 4 ♀, Labasa, *Citrus*, 11.XII.1972; 2 ♀, Wakanilato, 3 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972.

This species, the type-species of the genus, has a wide distribution including tropical Africa, Mozambique, Madagascar, India, the Malay Peninsula, S China, Taiwan, Java, the Philippines, the Bonin Is, Marianas and Caroline Is, the Hawaiian Is, and the Galapagos Is, possibly also extending to the southern United States and Puerto Rico. Its occurrence in the Fiji lowlands on introduced plants is thus not surprising. I have also found it in Tonga (Thornton 1981a).

Pseudocaecilius marshalli Karny

Pseudocaecilius marshalli Karny, 1926: 289.—Thornton, 1961: 149.—Lee & Thornton, 1967: 86, 106.

Specimens examined. VITI LEVU: Lautoka, young cotton, 2.VI.1923, R. Veitch.

This yellowish species with hyaline wings has a long radial sector, and is probably a member of the *greenwoodi* group of *Heterocaecilius*. The description rests solely on color and venation, and without genitalic information it is not possible to identify the species with certainty. The holotype has no abdomen. The species may be synonymous with *H. dardanus* or *H. simplex*, both of which have hyaline wings with yellowish veins, and a yellowish body and legs. It was recorded from Guam by Karny, but otherwise has not been collected outside Fiji.

Genus **Lobocaecilius** Lee & Thornton

Lobocaecilius Lee & Thornton, 1967: 12–13. Type-species: *Lobocaecilius cynara* Lee & Thornton.

Lobocaecilius nigrens Lee & Thornton

Lobocaecilius nigrens Lee & Thornton, 1967: 100–103.

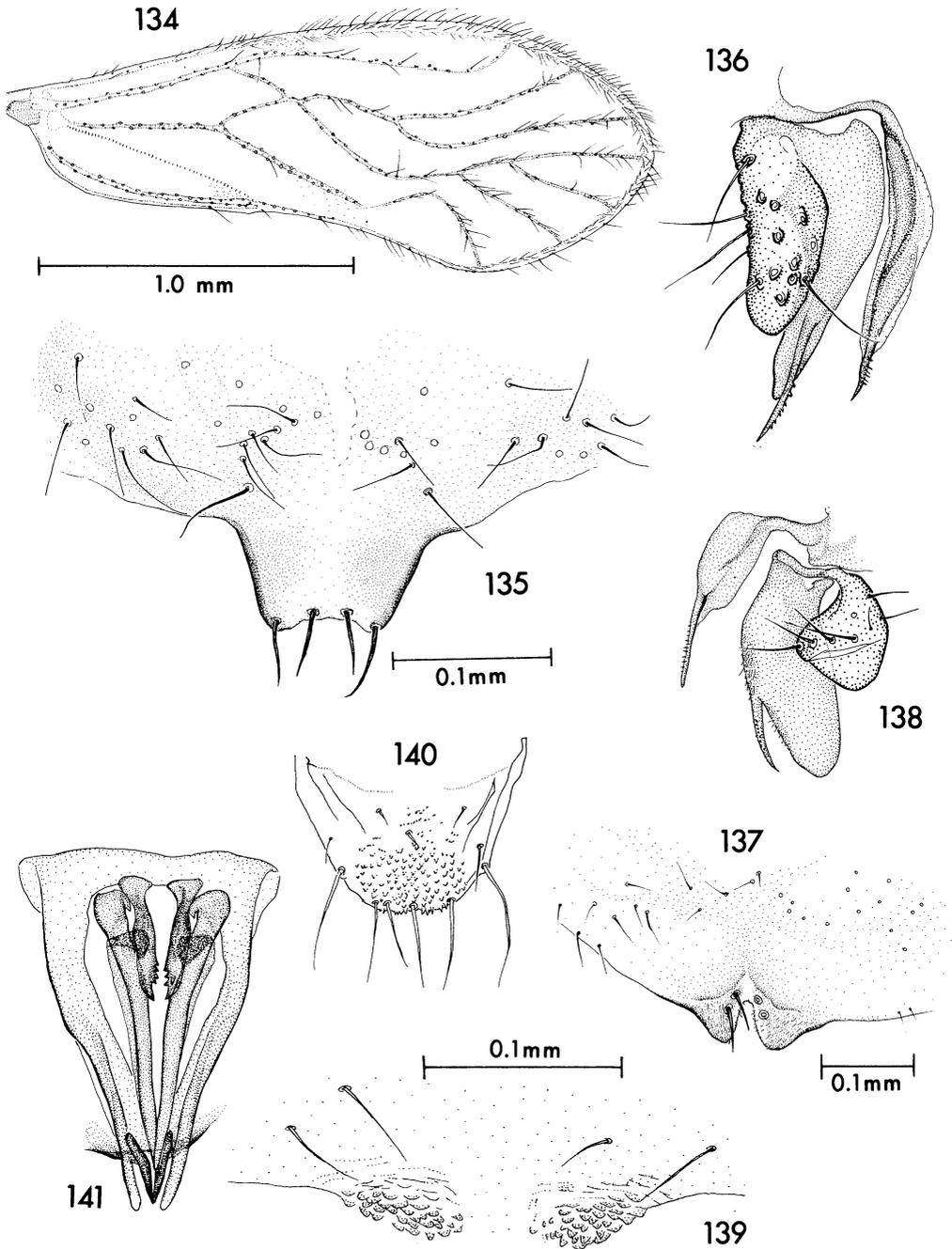


FIG. 134-141. 134-136. *Lobocaecilius vanuensis*, ♀: fore wing (134), subgenital plate (135), gonapophyses (136). 137-141. *Heterocaecilius albicus*: ♀: subgenital plate (137), gonapophyses (138); ♂: 9th tergite ornamentation (139), epiproct (140), phallosome (141). FIG. 135, 136, 140, 141 and FIG. 137, 138 to common scales.

Specimens examined. VITI LEVU: 2♂, 1♀, 2 km E of Mt Magadro, nr Bukuya, 400 m, 7.XI.1972; 1♂, Sabeto Val, Nadele area, 9.XII.1972. VANUA LEVU: 1♂, Labasa, *Citrus*, 11.XII.1972; 1♀, Wakanilato, 3 km NW of Mt Delaikoro, 12.XII.1972; 1♀, Lesiacevu Pt, *Citrus*, 19.XII.1972; 1♀, Lovoniqai village, head of Natewa Bay, *Agathis vitiensis*, 21.XII.1972. OVALAU: 1♀, Levuka, Mission Hill, 150 m, 25.XI.1972; 2♀, Draiba, coconut fronds, sea level, 30.XI.1972. LAU GROUP: 1♀, Mago, Ima, S Marona, 70 m, 14.VIII.1948; 1♂, Vanua Balavu, Mvana, 61 m, 9.VIII.1938.

In fresh specimens there is a distinct pattern on the postclypeus consisting of 2 wide longitudinal parallel brown bands leaving a wide cream median band. In one of the male specimens (from Labasa) there are sense-papillae at the base of vein *r* in the fore wing, similar to those found in *Lobocaecilius fennecus* Lee & Thornton, from Micronesia. The junction of veins *rs* and *m* in the fore wing is variable in this species: in 3 specimens they are joined by a short crossvein, in 1 there is a point junction, and in the remaining specimens there is fusion of the veins for a short distance.

This is 1 of only 2 species of *Lobocaecilius* represented in Fiji and is closely similar to *L. cynara* Lee & Thornton and *L. fennecus* from Micronesia, and *L. carinifex* Lee & Thornton from Rapa and Tahiti (see Lee & Thornton 1967: 107). The species also occurs in Tonga (Thornton 1981a).

***Lobocaecilius vanuensis* Thornton, new species**

FIG. 134–136

♀. *Coloration* (after ca 3 years in alcohol). General color of whole insect pale cream, unpatterned. Fore wing hyaline, veins more distinctly pigmented at apices where there is suggestion of brown clouds.

Morphology. I.O.:D = 2.5:1. Body length 1.9 mm. Fore wing as FIG. 134. Number of ctenidiobothria on proximal tarsal segment of hind leg: 15; no subapical tooth on claw. Subgenital plate (FIG. 135) with apical lobe sclerotized on lateral margins. Gonapophyses (FIG. 136) with outer valve elongate, setose. Tergite 9 with 2 fields of fine papillae on posterior margin. Paraprocts with field of 10 trichobothria and 1 seta not in rosette socket.

Holotype ♀, VANUA LEVU: Labasa, *Citrus*, 11.XII.1972, IWB (BISHOP 11,479). Paratypes: 6♀, same data as holotype, IWB (AMS).

In fore wing pattern this species is similar to *L. cynara* and *L. fennecus* (Micronesia), *L. carinifex* (Tahiti and Rapa) and *L. nigrens* (Fiji). *L. carinifex* differs markedly in the structure of the subgenital plate and dorsal valve; *L. cynara* and *L. fennecus* may be distinguished from *L. vanuensis* on head pattern as well as subgenital plate structure. The Fijian species *L. nigrens*, which is similar to *L. vanuensis* in color, differs in that the apical lobe of the subgenital plate is distinctly bilobed.

Genus *Heterocaecilius* Lee & Thornton

Heterocaecilius Lee & Thornton, 1967: 13. Type-species: none designated (Article 42c, International Code Zool. Nomencl.).

This genus was erected as a “holding genus” for a heterogeneous assemblage of species, but it was pointed out (Lee & Thornton 1967) that a group of 5 Fijian species can be grouped separately from the others on a combination of 6 character states. This group will be referred to as the *greenwoodi* group; 3 additional species described below and 1 species further described are included in it, making 9 species in all.

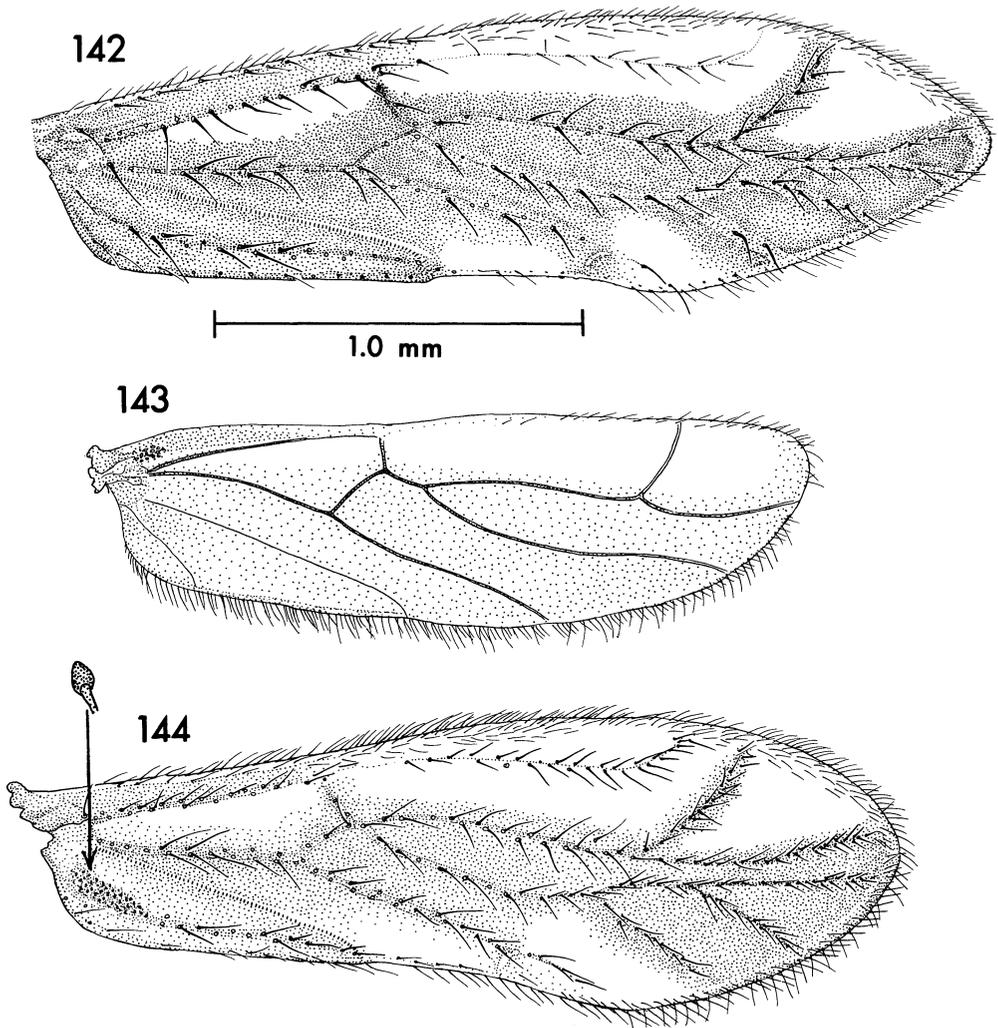


FIG. 142–144. *Heterocaecilius albicus*: ♀ fore wing (142), ♀ hind wing (143), ♂ fore wing and (inset) sense papilla (144). Common scale.

***Heterocaecilius albicus* Thornton, new species**

FIG. 137–146

♀. *Coloration* (after ca 3 years in alcohol). Head dark brown, no darker mark between orbit and antennal socket, antennae very pale buff. Thoracic terga dark brown, pleura brown, legs white. Fore wing (FIG. 142) with distinctive brown pattern, hind wing (FIG. 143) posteriorly pale brown. Terga of abdominal segments 3–7 very dark chocolate brown, segments 2 cream, 8 gray, 9 brown; abdomen ventrally white.

Morphology. I.O.:D = 3.0:1. Body length 2.1 mm. Head and thoracic sclerites waxy. Fore wing spear-shaped apically, without basal field of papillae. Epiproct rounded apically, setose; paraprocts with field of 9–10 trichobothria. Subgenital plate (FIG. 137) with apical lobes rounded, each with a pair of setae on mesial face near base. Gonapophyses (FIG. 138): outer valve with short bare lobe, dorsal valve subapical spine not reaching apex of valve, mesial face of valve finely setose basal and apical to spine, ventral valve broad basally.

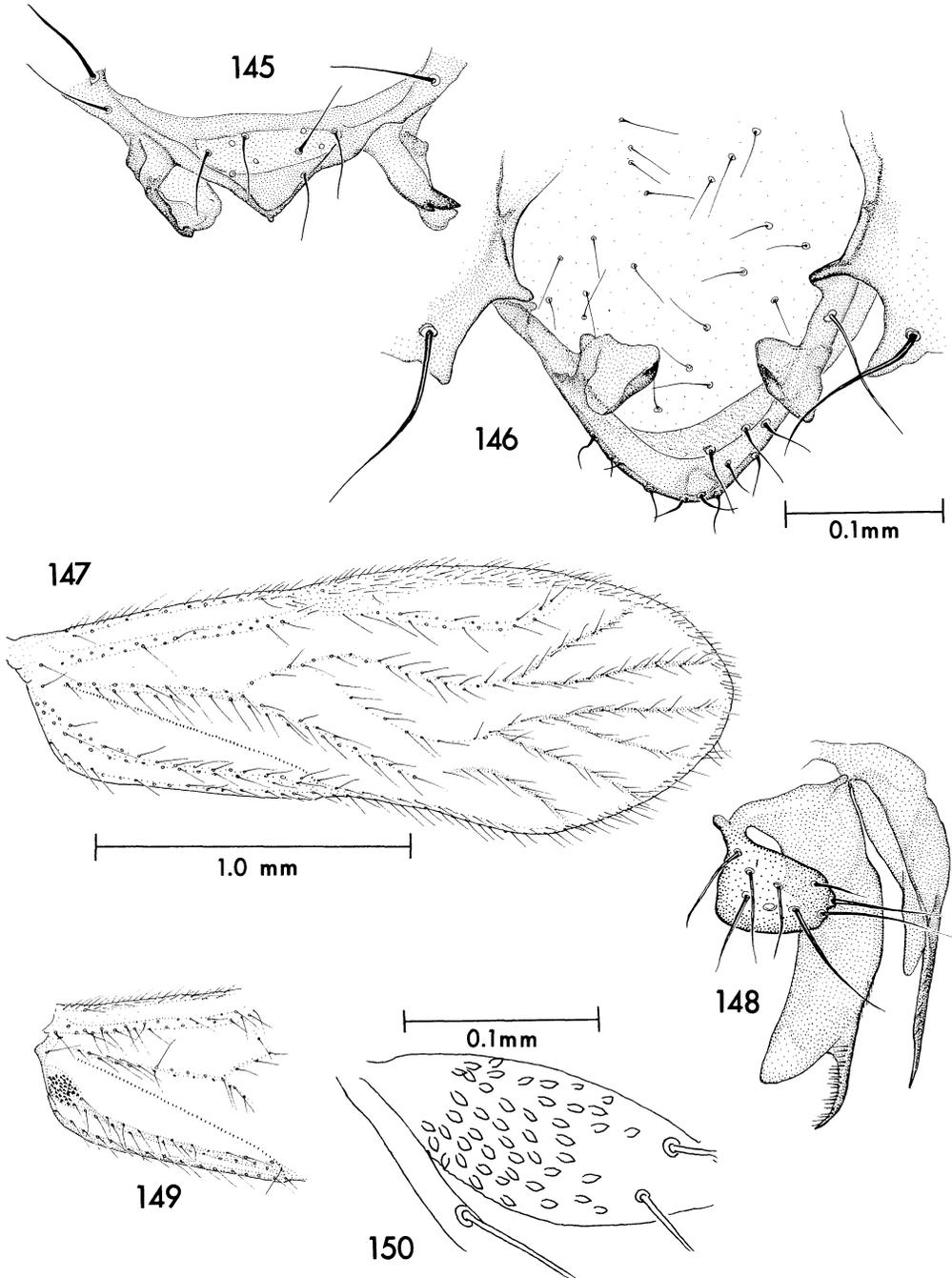


FIG. 145–150. 145–146. *Heterocaecilius albicus* ♂ hypandrium: holotype (145), paratype (146). 147–150. *Heterocaecilius apicalis*: ♀: fore wing (147), gonapophyses (148); ♂: basal $\frac{1}{3}$ of fore wing (149), basal sense field of fore wing (150). FIG. 145, 146, 148 and FIG. 147, 149 to common scales.

♂. *Coloration* (after ca 3 years in alcohol). As ♀, but thoracic terga brown.

Morphology. I.O.:D = 1.1:1. Body length 1.9 mm. Head and thoracic sclerites waxy. Fore wing with fairly diffuse field of sense-papillae in basal angle (FIG. 144 and inset). Ninth tergite with pair of low posterior rugose projections (FIG. 139, from paratype), epiproct with broad median rugose field (FIG. 140). Penis frame (FIG. 141) with prominent sclerites, short pair serrate apically. Hypandrium fairly simple; a pair of prominent rounded lobes (FIG. 145, 146), each lobe with short pointed spine (FIG. 146, paratype).

Holotype ♀, VANUA LEVU: isthmus 16 km E of Savu Savu, *Citrus*, 21.XII.1972, IWBT (BISHOP 11,480). Allotype ♂, same data as holotype (BISHOP). Paratypes: 1♂, 1♀, same data as holotype, IWBT (AMS).

Other specimens examined. VITI LEVU: 1♀, 2 km N of Mt Magodro, 830 m, lichen-covered dead tree, 10.XI.1972. VANUA LEVU: 1♂, 1♀, Lovoniqai, head of Natewa Bay, *Agathis vitiensis*, 21.XII.1972; 1♂, Waikava Promontory, 180 m above Dakuniba, 22.XII.1972; 1♂, 2♀, Savu Savu Bay, Urata, 23.XII.1972.

In male genitalia *H. albicrus* is almost identical to *H. apicalis*, n. sp. However, it may be readily distinguished by the prominent fore wing and body patterns. The species is unusual in that there is a slight but distinct sexual dimorphism in wing shape. It is a member of the *greenwoodi* group.

Heterocaecilius apicalis Thornton, new species

FIG. 147–155

♀. *Coloration* (after ca 3 years in alcohol). Head pale cream, eyes black. Antenna with scape and pedicel brown, f_1 pale brown basally, pale buff apically, remainder of flagellum pale buff, a fine dark brown line at apices of f_1 , f_2 and f_3 . Thoracic terga brown, pleura and legs very pale buff. Fore wing (FIG. 147) uniformly suffused very faint brown, veins brown in apical $\frac{1}{4}$. Hind wing hyaline. Abdomen pale cream.

Morphology. I.O.:D = 3.5:1. Body length 1.9 mm. In fore wing rs long, no basal field of papillae. Epiproct semicircular, setose; paraprocts with a field of 10 trichobothria. Subgenital plate (FIG. 151) with a pair of triangular lobes, each somewhat sclerotized on its outside face and bearing a subapical and subbasal seta on its mesial face. Gonapophyses (FIG. 148): outer valve with very short bare lobe, dorsal valve lobed, spine projecting beyond valve, mesial face of valve finely setose basal to spine.

♂. *Coloration*. As ♀.

Morphology. I.O.:D = 1.0:1. Body length 1.7 mm. Fore wing with discrete field of papillae at basal angle (FIG. 149, 150), rs long. Ninth tergite (FIG. 152) produced posteriorly, with a pair of rugose fields; epiproct with broad median rugose field (FIG. 153). Penis frame (FIG. 154) enclosing prominent sclerotized rods. Hypandrium (FIG. 155) fairly simple, with a large pair of earlike lobes, each with a fingernail-shaped sclerite. Paraprocts with a field of 9 and 10 trichobothria.

Holotype ♀, VANUA LEVU: Savu Savu, *Citrus*, 40 m, 18.XII.1972, IWBT (BISHOP 11,481). Allotype ♂, same data as holotype (BISHOP).

Other specimens examined. VITI LEVU: 4♂, 6♀, 4N, Nausori Highlands, nr Nausori, *Pinus caribaea*, 600 m, 21.X.1972; 1♂, Nadi, *Citrus*, 22.X.1972; 1♀, 1N, Nadi, general beating, 23.X.1972; 4♂, 11♀, Nausori Highlands, *Pinus caribaea*, 800 m, 1.I.1973. VANUA LEVU: 1♂, 5♀, Labasa, *Citrus*, 11.XII.1972; 1♂, 1♀, Wakanilato, 1 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972; 1♂, Savu Savu Beach, *Barringtonia asiatica*, 17.XII.1972; 6♂, 8♀, A Savu Savu, *Citrus*, 40 m, 18.XII.1972; 2♀, Lesiaceva Pt, *Citrus*, 19.XII.1972; 2♂, 2♀, Lovoniqai village, head of Natewa Bay, *Agathis vitiensis*, 21.XII.1972; 1♂, 1♀, isthmus 16 km E of Savu Savu, *Citrus*, 21.XII.1972; 1♂, 1♀, Savu Savu Bay, Balaga, 23.XII.1972. OVALAU: 7♀, Levuka, Mission Hill, 70 m,

25.XI.1972; 2♂, Levuka, 30 m, 26.XI.1972; 1♂, Levuka, *Citrus*, 70 m, 27.XI.1972; 1♂, 1♀, Draiba, coconut fronds, sea level, 30.XI.1972.

In male genitalia this species is very similar indeed to *H. albicrus*. The 2 species are nevertheless readily distinguished by the well-marked fore wing and body patterns of *H. albicrus*, and the lack of these in *H. apicalis*. The papillar field in the male fore wing is much more localized than in *H. albicrus*, and the papillae more dense. This species is also a member of the *greenwoodi* group of species, and occurs from sea level to 800 m on both introduced and native trees. It also occurs in Tonga (Thornton 1981a).

***Heterocaecilius dardanus* Lee & Thornton**

Heterocaecilius dardanus Lee & Thornton, 1967: 90–93.

Specimens examined. VITI LEVU: 1♂, Mt Victoria, W slope, 900 m, 16.IX.1938, ECZ; 1♀, Navai Hill, Tholo North, 758 m, 17.IX.1938, ECZ.

This member of the *greenwoodi* group, which may be a high mountain form, is similar to *Heterocaecilius veitchi*, n. comb. in genitalic characters. However, the wing of *H. dardanus* is yellowish hyaline (brown in *H. veitchi*), the hypandrium possesses an additional short pair of prongs, and the outer valve of the female gonapophyses is more than ½ the length of the outer valve (less than ½ in *H. veitchi*). *H. dardanus* was not collected by me in 1972/73.

***Heterocaecilius greenwoodi* (Karny)**

Pseudocaecilius greenwoodi Karny, 1926: 290.—Thornton, 1961: 149.

Heterocaecilius greenwoodi (Karny): Lee & Thornton, 1967: 103–106.

Specimens examined. VITI LEVU: 1♀, Mt Victoria, W slope, 909 m, 16.IX.1938, ECZ.

This species, which has distinctive wing markings, was not collected by me in 1972/73.

***Heterocaecilius panicus* Lee & Thornton**

Heterocaecilius panicus Lee & Thornton, 1967: 97.

The type ♀ collected on Viti Levu, 17.IX.1938, by E. C. Zimmerman, is still the only known specimen of this species of the *greenwoodi* group.

***Heterocaecilius pictus* Thornton, new species**

FIG. 156–159

♀. *Coloration* (after ca 3 years in alcohol). Head cream with following exceptions: postclypeus from antennal sockets anteriorly brown (FIG. 156), scape and pedicel brown, basal 3 flagellar segments with narrow dark brown line of pigment at apical extremities, no brown band between orbit and antennal socket. Thoracic terga brown, pleura light brown; coxa of meso- and meta-thoracic legs light brown, legs otherwise cream; fore wing with brown pigment as in FIG. 157. Hind wing hyaline. Abdomen cream, 9th tergite brown.

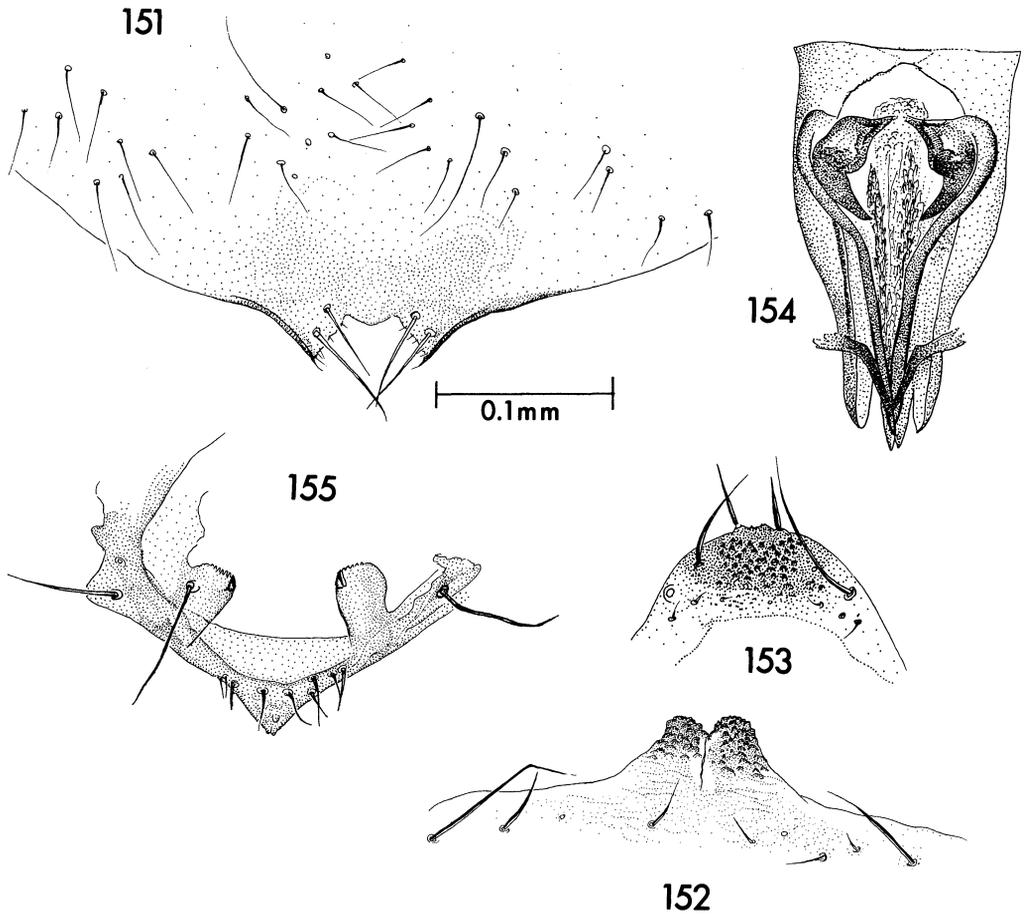


FIG. 151–155. *Heterocaecilius apicalis*: ♀: subgenital plate (151); ♂: 9th tergite ornamentation (152), epiproct (153), phallosome (154), hypandrium (155). Common scale.

Morphology. I.O.:D = 2.0:1. Body length 2.4 mm. Ocelli lacking. In fore wing vein r_s $2\times$ length of r_{2+3} . Subgenital plate (FIG. 158) with 2 triangular lobes with rounded apices, each bearing a pair of setae. Gonapophyses (FIG. 159): dorsal valve with lobe as long as spine, outer valve with posterior lobe without setae.

♂. Unknown.

Holotype ♀, VANUA LEVU: Doguru village, 1.5 km N of Mt Delaikoro, *Citrus*, 180 m, 12.XII.1972, IWBT (BISHOP 11,482). Paratype: 1 ♀, same data as holotype (AMS).

H. pictus is distinctive in fore wing pigmentation, head pattern, and lack of ocelli, and is another member of the *greenwoodi* group of *Heterocaecilius*. The subgenital plate is similar to that of *H. campanula* Lee & Thornton, which, however, lacks the posterior lobe of the outer valve typical of the members of the *greenwoodi* group.

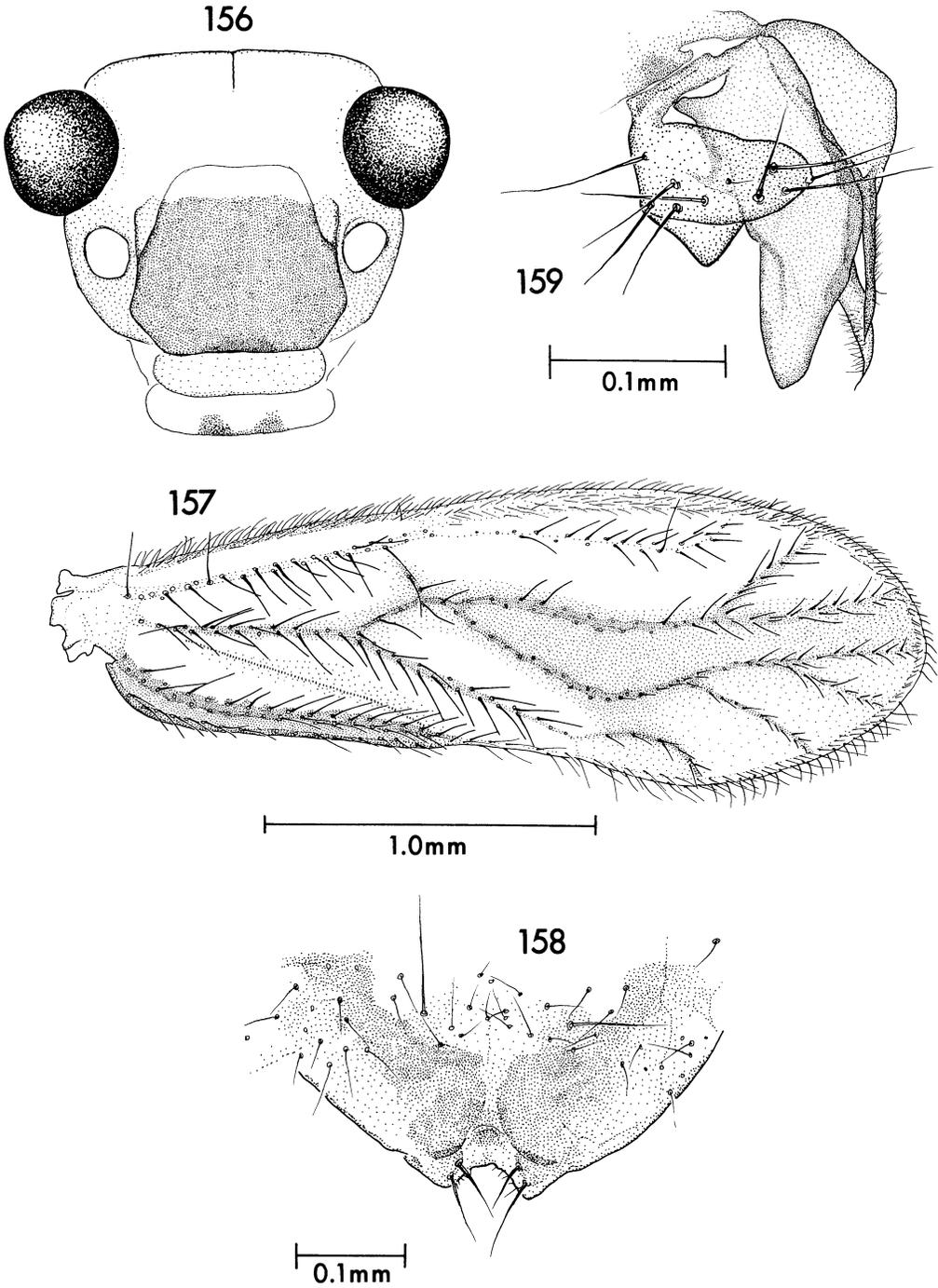


FIG. 156–159. *Heterocaecilus pictus*, ♀: head (156), fore wing (157), subgenital plate (158), gonapophyses (159). FIG. 156 not to scale; FIG. 158, 159 to common scale.

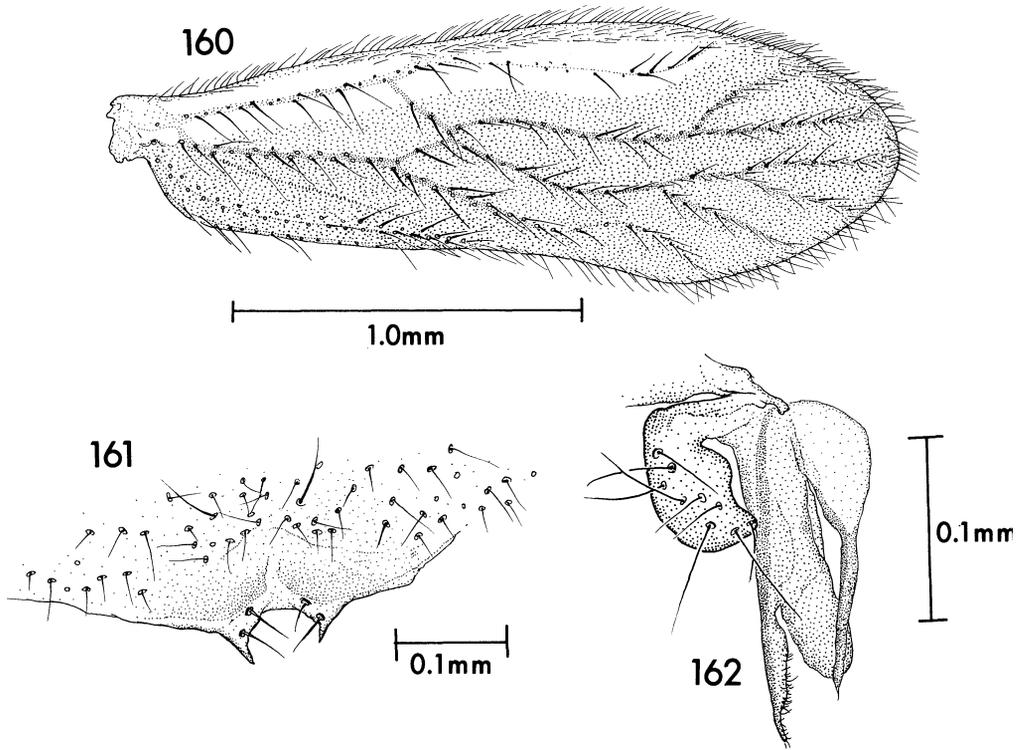


FIG. 160-162. *Heterocaecilius tectus*, ♀: fore wing (160), subgenital plate (161), gonapophyses (162).

***Heterocaecilius simplex* Lee & Thornton**

Heterocaecilius simplex Lee & Thornton, 1967: 93-97.

Specimens examined. VITI LEVU: 1♂, Nadarivatu, Navai Hill, 818 m, 7.IX.1938, ECZ; 1♂, 3♀, Navai Hill, Tholo North, 758 m, 16.IX.1938, ECZ; 1♀, Nadarivatu, Navai Hill, 848 m, 11.IX.1938, ECZ; 4♀, Nausori Highlands, 8 km S of Natawa, 850 m, dead hurricane-blown tree, Kauri forest, 28.X.1972; 3♂, 1♀, Nausori Highlands, 860 m, foliage, Kauri and *Dacrydium* forest, 27.X.1972.

This species is easily recognized by the field of sense-papillae covering the anal angle of the male fore wing. Evidently like most other members of the *greenwoodi* group, it is a mountain species.

***Heterocaecilius tectus* Thornton, new species**

FIG. 160-162

♀. *Coloration* (freshly killed, in alcohol). Head cream, pale brown markings on vertex at edge of orbit and each side of median epicranial suture, ocelli pale with dark brown lunules, dark brown band from orbit to antennal socket, postclypeus anterior of antennal sockets brown. Scape and pedicel brown, flagellum pale brown, apices of f_1 , f_2 and f_3 with fine dark brown line. Bristles on frons and vertex dark

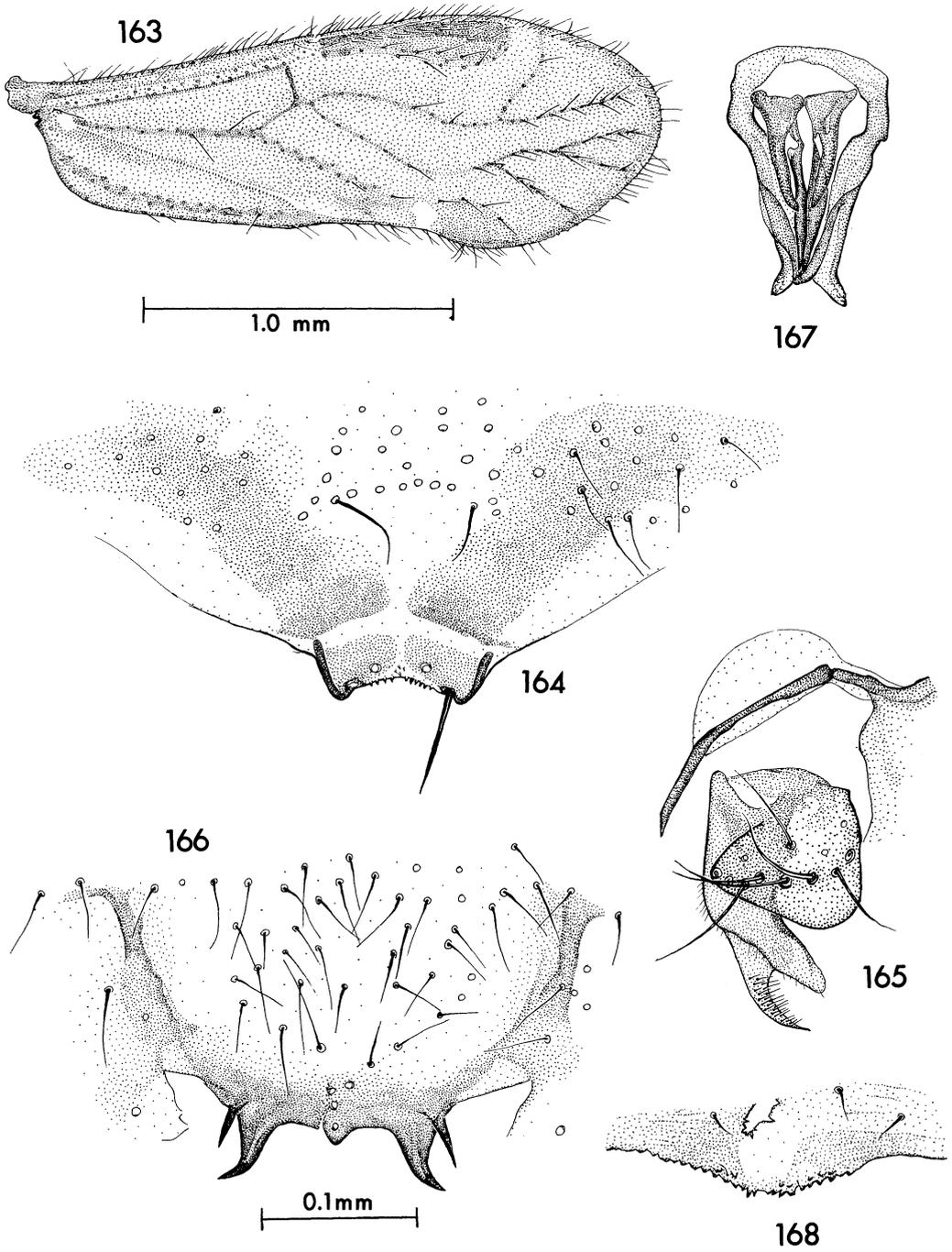


FIG. 163-168. *Heterocaecilius veitchi*: ♀: fore wing (163), subgenital plate (164), gonapophyses (165); ♂: hypandrium (166), phallosome (167), apical margin of 9th tergite (168). All but wing to common scale.

brown. Thoracic terga brown, legs light brown. Fore wing (FIG. 160) with anterior $\frac{1}{3}$ hyaline, rest evenly suffused with brown pigment; hind wing pattern similar but paler. Abdomen cream, 9th tergite brown.

Morphology. I.O.:D = 2.5:1. Body length 2.00 mm. In fore wing *rs* and *m* connected by short crossvein, *rs* 2 \times length of *r*₂₊₃. Subgenital plate lobes very sharply pointed, each bearing 2 setae (FIG. 161), margin medially with very small fine setae. Gonapophyses (FIG. 162): dorsal valve lobe not extending to apex of spine, outer valve without bare posterior lobe.

δ . Unknown.

Holotype ♀, VANUA LEVU: isthmus E of Savu Savu, *Citrus*, 21.XII.1972, IWBT (BISHOP 11,483).

Described from a single female because of its distinctive wing markings, *H. tectus* resembles in subgenital plate *H. adamsi* Lee & Thornton from Ponape. It is not a member of the *greenwoodi* group of species. The dark clypeus resembles that of *H. pictus*, which, however, may be clearly distinguished on wing pattern and on genitalic characteristics.

***Heterocaecilius veitchi* (Karny), new combination**

FIG. 163–168

Pseudocaecilius veitchi Karny, 1926: 289.—Thornton, 1961: 149.

Karny provided no genitalic information on this species, which he described from a single specimen of unknown sex. The type has no abdomen. Specimens collected in 1972 were referred to *veitchi* on the very distinctive dark brown color of the wings, becoming paler basally, which was adequately illustrated by Karny. Dissection of the genitalia of both sexes shows the species to be a member of the *greenwoodi* group of *Heterocaecilius*; it is accordingly transferred and a further description provided.

Additional description

♀. Apical lobe of subgenital plate (FIG. 164) shallowly emarginate, a strong seta near each corner and a pair closer to midline, apical margin of lobe slightly serrated. Outer valve of gonapophyses (FIG. 165) with a transverse row of stout long setae, apical part of valve bare; dorsal valve with distinct subapical lobe. Epiproct semicircular, setose, paraproct with field of 9 trichobothria and 2 setae not in rosette sockets.

♂. Hypandrium (FIG. 166) with 2 pairs of sharp prongs on apical margin, prongs with fingernail-like sclerites apically, each of the larger prongs bent laterally. Penis frame (FIG. 167) stout, angular, with 2 pairs of strong sclerites. Epiproct semicircular, setose; paraproct with field of 11 trichobothria. Apical margin of 9th tergite (FIG. 168) slightly produced medially, margin beset with pointed tubercles in medial region.

Specimens on which additional description based. VANUA LEVU: 1 ♀, nr Nakula, Savu Savu area, 120 m, 16.XII.1972; 1 ♂, Lesiaceva Pt, sea level, *Citrus*, 19.XII.1972.

Other specimens examined. VANUA LEVU: ♀ holotype, Labasa, VII.1922, R. Veitch; 1 ♀, Doguru village, 1 km NW of Mt Delaikoro, *Citrus*, 150 m, 12.XII.1972; 1 ♂, 2 ♀, nr Nakula, Savu Savu area, 100 m, 16.XII.1972; 1 ♀, Savu Savu Bay, cocoa, 17.XII.1972; 1 ♂, 1 ♀, Lesiaceva Pt, *Citrus*, sea level, 18,19.XII.1972; 1 ♀, Waikava Promontory, *Citrus*, 150 m, 22.XII.1972; 1 ♀, Savu Savu Bay, Balaga Beach, 23.XII.1972. VITI LEVU: 1 ♀, Nausori Highlands, 700 m, *Agathis* and *Dacrydium* forest, 27.X.1972; 2 ♀, Nausori Highlands, forest 8 km SE of Natawa, *Freyinetia*, 850 m, 28.X.1972; 1 ♀, Nadrau Plateau, nr Navai, hurricane-blown tree with lichen, 800 m, 31.X.1972; 1 ♂, 1 ♀, Nadrau Plateau, Navai, general beating, 750 m, 1.XI.1972; 1 ♂, 1 ♀, 2 km E of Mt Magodro, nr Bukuya, 400 m, 7.XI.1972; 1 ♀, Nadrau Plateau,

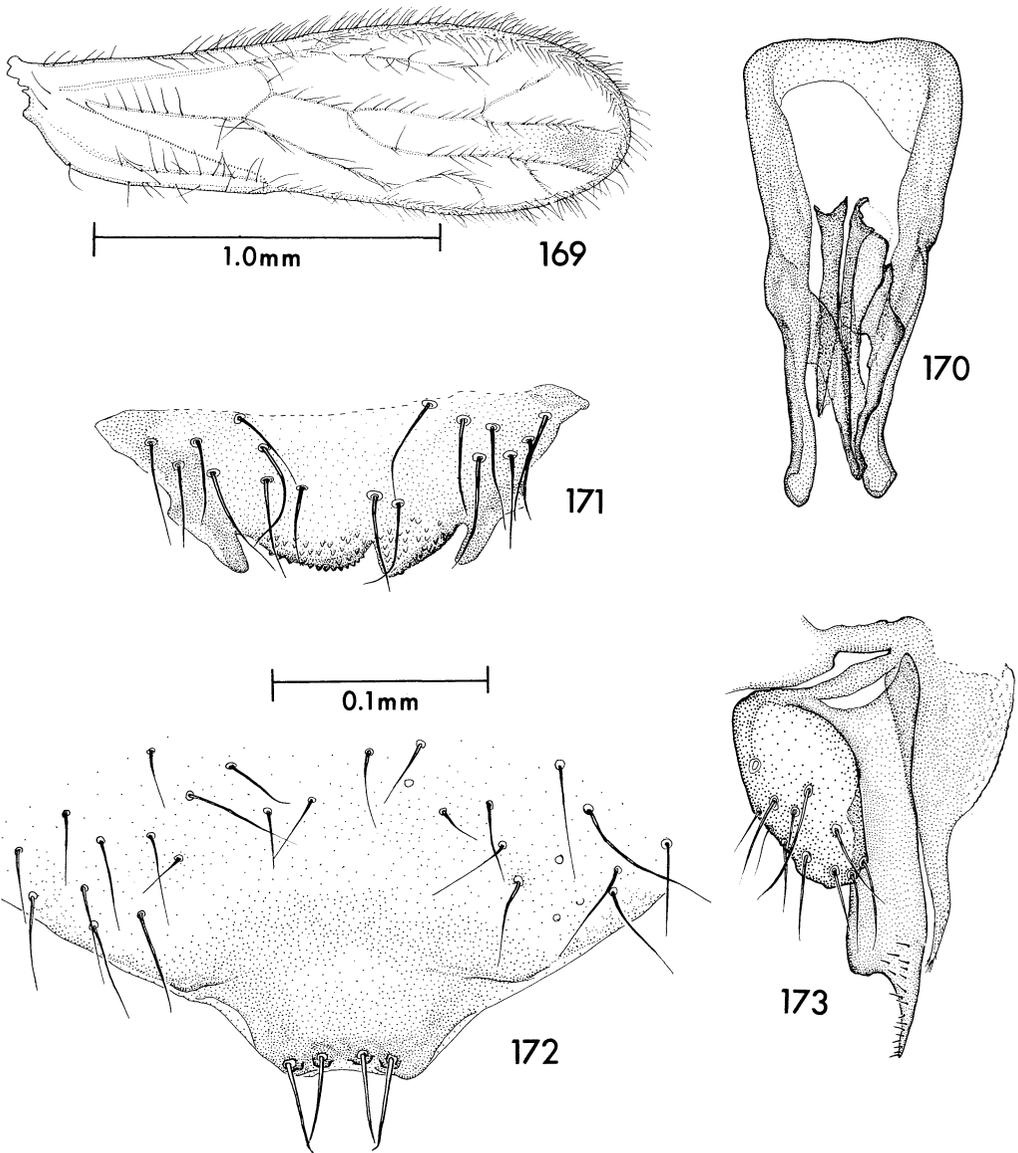


FIG. 169-173. *Pseudoscottiella loma*: ♂: fore wing (169), phallosome (170), hypandrium (171); ♀: subgenital plate (172), gonapophyses (173). All but wing to common scale.

9 km NNE of Nadrau, 650 m, 16.XI.1972; 1♂, 1♀, Nausori Highlands, Kauri and *Dacrydium* forest, foliage, 870 m, 31.XII.1972. OVALAU: 1♀, bush 350 m, above Levuka, 27.XI.1972.

The range of this species evidently extends from sea level to the highlands, and it occurs on both native and introduced vegetation.

In male and female genitalia *H. veitchi* is similar to *H. dardanus*; however, the hypandrium of *H. veitchi* bears an additional pair of short prongs and the outer valve of the female gonapophyses is relatively shorter. Karny remarked upon the fact that the branches of the radial fork in the fore wing are "strongly diverging"; this character appears to be constant, being found in all specimens (FIG. 163).

Heterocaecilius volatus Lee & Thornton

Heterocaecilius volatus Lee & Thornton, 1967: 97–100.

Specimens examined. VITI LEVU: 1♀, Nadarivatu, 900–1200 m, 3.IX.1938, ECZ; 1♀, same data but 115 m, 5.IX.1938, ECZ.

The 2 females collected by Zimmerman have distinctive hyaline areas in the fore wing. This species is also a member of the *greenwoodi* group.

Genus **Pseudoscottiella** Badonnel

Pseudoscottiella Badonnel, 1946: 170. Type-species: *Pseudoscottiella megops* Badonnel.

Pseudoscottiella loma Thornton, new species

FIG. 169–173

♂. *Coloration* (after ca 3 years in alcohol). Head cream, unmarked; eyes black. Thoracic terga pale brown, rest of thorax and legs cream. Fore wing hyaline with obvious subapical brown spot (FIG. 169). Hind wing hyaline, faint brown cloud round apex of vein *m*. Abdomen cream.

Morphology. I.O.:D = 0.5:1. Body length 1.6 mm. Ninth tergite with a pair of sclerified ridges overlapping epiproct which bears a line of 4 strong setae on posterior margin. Penis frame (FIG. 170) angular basally, with a pair of aedeagal rods. Hypandrium (FIG. 171) simple, a pair of prominent lateral sclerified processes; medial margin rugose.

♀. *Coloration.* As ♂.

Morphology. I.O.:D = 4.0:1. Body length 1.7 mm. Subgenital plate (FIG. 172) with single apical lobe bearing 4 setae. Gonapophyses (FIG. 173): dorsal valve with incipient lobe, outer valve unlobed.

Holotype ♂, VANUA LEVU: Doguru village, 1.5 km NW of Mt Delaikoro, *Citrus*, 180 m, 12.XII.1972, IWBT (BISHOP 11,484). Allotype ♀, VANUA LEVU: Wakani-lato, 3 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972, IWBT (BISHOP).

Nineteen species of this genus have been described: 6 from Africa (Badonnel 1969), 9 from Micronesia (Thornton et al. 1972), 1 from the Kermadecs (Smithers 1973) and 3 from Australia (New 1974). The 6 African species appear to be relatively distinct from the Pacific forms, in which the male penis frame lacks radula rods and the female subgenital plate bears a well-developed apical lobe. This Fijian species agrees with the other Pacific species in these features, and is quite clearly distinguishable from them on fore wing pattern.

Family PHILOTARSIDAE Pearman, 1936

Genus **Aaroniella** Mockford

Aaroniella Mockford, 1951: 102. Type-species: *Elipsocus maculosus* Aaron.

I have previously (Thornton 1959, 1962) suggested that *Caecilius guttulatus* Banks (Philippines) is an *Aaroniella*; I have now examined the type, from Luzon, and transfer *guttulatus* to *Aaroniella*, giving a further description of the holotype.

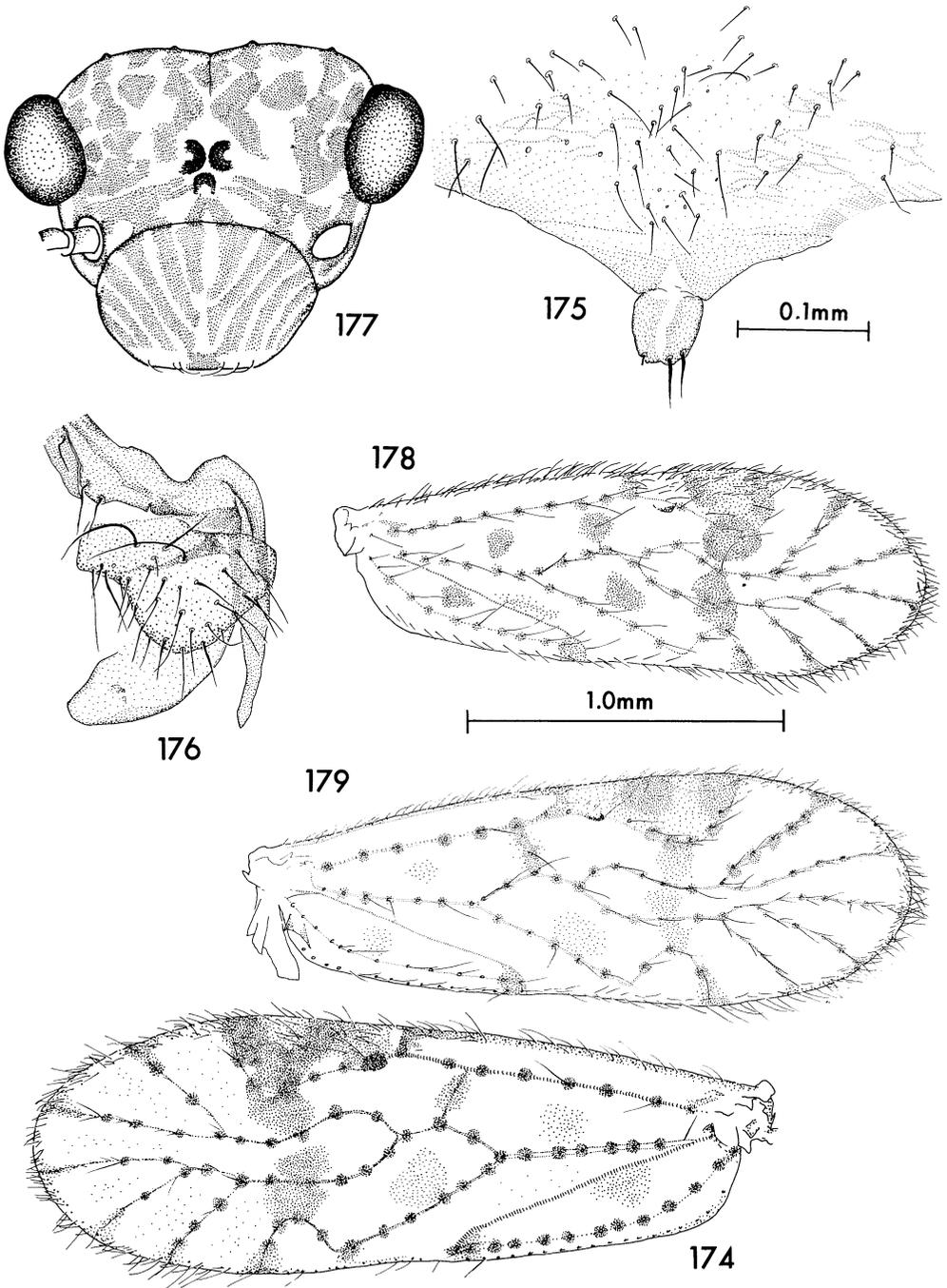


FIG. 174–179. **174–176.** *Aroniella guttulata*, ♀ holotype: fore wing (174), subgenital plate (175), gonapophyses (176); *Aroniella pterosoma*, ♀: head (177), fore wings [178 (holotype), 179]. FIG. 175, 176 and FIG. 174, 178, 179 to common scales. Head not to scale.

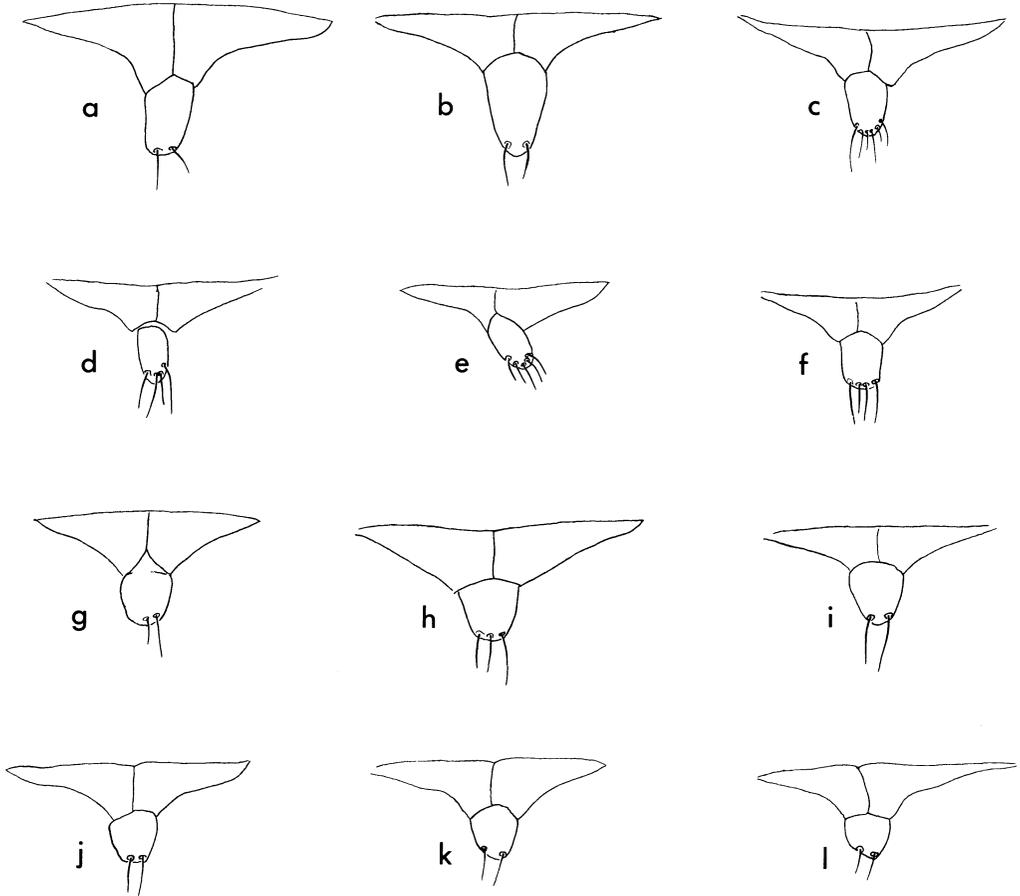


FIG. 180. Subgenital plate apices. **a–b**, *Aaroniella trukensis*: **a**, Truk; **b**, Solomons (Guadalcanal). **c–f**, *Aaroniella gressitti*: **c**, Ponape; **d**, Palaus; **e**, Yap; **f**, Manus. **g**, *Aaroniella guttulata*, Philippines (holotype). **h–l**, *Aaroniella pterosoma*: **h**, New Hebrides (Tanna); **i**, New Hebrides (Erromango); **j**, Fiji (Viti Levu); **k**, Fiji [Ovalau (holotype)]; **l**, Tonga. All to same scale.

Aaroniella guttulata (Banks), new combination

FIG. 174–176, 180 g

Caecilius guttulatus Banks, 1916: 202, Plate II, Fig. 12.—Thornton 1959: 344; 1962: 241.

Additional description of holotype ♀ (MCZ)

Morphology. I.O.:D = 2.6:1. Antennal apex absent. Basal hind tarsal segment with 13 ctenidia. Claw with distinct subapical tooth, Pearman's organ present. Vein cu_2 in fore wing (FIG. 174) bare. Ciliation of hind wing veins: r_1 11, rs 3, r_{2+3} 6, r_{4+5} 14, m 10, cu_1 0. Subgenital plate apex (FIG. 175) with apical sclerite as broad as long, 3 apical setae. Gonapophyses as FIG. 176, paraproct with field of 17 trichobothria and 1 seta without a rosette.

Fijian specimens of *Aaroniella* are similar to *A. guttulata* in genitalic characters, but differ in details of wing pattern and in leg pattern. They are described below as a separate species.

Aaroniella pterosoma Thornton, new species

FIG. 177–179, 180 h–i

♀. *Coloration*. Head generally buff with brown markings as in FIG. 177, similar to those of *Aaroniella gressitti*. Genae buff, brown around antennal socket, broad brown band along ventral and posterior borders. Eyes black; ocelli pale, bordered black along inner margins. Antenna light brown, flagellar segments ringed with white apically. Thorax and legs wholly brown. Fore wing (FIG. 178) with a broken transverse brown band from pterostigma to aerola postica, this sometimes faint and narrow (FIG. 179). Patches of brown in pterostigma and in basal ½ of wing, apical veins with small brown clouds apically, setae on veins sited on small brown spots. Hind wing hyaline. Abdomen buff.

Morphology. I.O.:D = 2.2:1. B = 1.5 mm. Antennal apex attenuated, with single apical seta. Basal hind tarsal segment with 13 ctenidia. Claw with subapical tooth, Pearman's organ present. Vein cu_2 of fore wing bare (FIG. 178). Ciliation of hind wing veins: r_1 9, rs 4, r_{2+3} 3, r_{4+5} 15, m 8, cu_1 0. Subgenital plate as *A. guttulata*, but with 2 apical setae. Gonapophyses as *A. guttulata*, but dorsal valve incipiently bifid at apex. Praeproct with field of 13–15 trichobothria.

♂. Unknown.

Holotype ♀, OVALAU: Nasinu, 30.XI.1972, IWBT (BISHOP 11,485). Paratypes: VITI LEVU: 1 ♀, Nadrau Plateau, nr Navai, 800 m, 31.X.1972; 1 ♀, 1.5 km E of Mt Magodro, nr Bukuya, 400 m, 7.XI.1972 (FIG. 179); 1 ♀, Nadrau Plateau, 10 km NNE of Nadrau, 700 m, 16.XI.1972 (AMS).

Other specimens examined are from Tonga (Thornton 1981a) and the New Hebrides.

This species, so similar to *A. guttulata*, is also very similar in head pattern to *Aaroniella gressitti* Thornton, Lee & Chui, 1972, known from Palau, Ponape, Yap and Kusaie in the Caroline Is and from Manus I in the Bismarck Archipelago. In fore wing pattern, however, it resembles more *Aaroniella trukensis* Thornton, Lee & Chui, 1972, which occurs on Truk in the Carolines and also in the Solomons.

A. pterosoma can be distinguished from females of both *A. gressitti* and *A. trukensis* on subgenital plate structure, but the distinction from *A. guttulata* is much less clear. In *A. gressitti* the apical sclerite bears 4 or more apical setae and is at least 1.5× as long as wide; that of *A. trukensis* bears only a pair of apical setae and is at least 1.5× as long as wide, widest basally and slightly pointed apically. These characters are invariable in all specimens from the Carolines and Manus (*gressitti*) and Truk and the Solomons (*trukensis*). The apical sclerite of the subgenital plate of *A. guttulata* bears 3 apical setae and is as wide as long, being widest basally, narrowing apically, as is that of *A. pterosoma* on which only 2 setae occur. A comparison of these features is made in FIG. 180.

A. pterosoma can be distinguished from *A. guttulata* and *A. trukensis* on color pattern of the tibia. The whole leg is brown in *A. pterosoma*, as it is in *A. gressitti*. The tibia of *A. guttulata* is pale buff with a broad brown subapical band; in *A. trukensis* it is also pale, but with a narrow proximal brown band as well as the broad subapical one.

Karny (1932) described *Philotarsus samoanus* from a Samoan male. I have examined the type of this species, and the species is clearly an *Aaroniella*. The fore wing pattern is similar to *A. pterosoma*, *A. gressitti*, *A. trukensis*, *A. guttulata* and in extent of pigmentation is closer to *A. gressitti*; although the tibia is brown, the femur is banded; the penis frame and hypandrium are *gressitti*-like rather than *trukensis*-like. A possible

synonymy of *A. gressitti* with *A. samoanus* must, however, await the collection of females in Samoa, and/or the description of the male of *A. guttulata*.

The presence of 3 closely related forms along the Outer Melanesian Arc—*A. gressitti* in the Bismarcks, also occurring in the Carolines; *A. trukensis* in the Solomons, also occurring on Truk; and *A. pterosoma* in the New Hebrides, Fiji and Tonga—suggests that New Guinea has not been a source area for this genus in Melanesia. None of the New Guinea forms has been collected from the outer arc, and evidently no species of the genus occurs in New Caledonia. Apparently the colonization of the outer arc by *Aaroniella* was from the North, rather than from New Guinea.

Genus **Haplophallus** Thornton

Haplophallus Thornton, 1959: 336. Type-species: *Haplophallus orientalis* Thornton.

Haplophallus trepticus Thornton & Smithers

Haplophallus trepticus Thornton & Smithers, 1974: 183–184.

Specimens examined. VITI LEVU: 2 ♀, Nadarivatu, 1100 m, 1,2.IX.1938, ECZ; 1 ♂, same data, 6.IX.1938; 2 ♂, 3 ♀, Navai Hill, Tholo North, 800 m, 15,16.IX.1938, ECZ; 4 ♀, Nausori Highlands, nr Nausori, *Pinus caribaea*, 600 m, 21.X.1972; 1 ♀, Koro-o, Nadrau Plateau, 1000 m, dead leaves and twigs, 2.XI.1972; 3 ♂, 2 ♀, Nausori Highlands, *Agathis* and *Dacrydium* foliage, 850 m, 31.XII.1972; 11 ♂, 24 ♀, 2N, Nausori Highlands, *Pinus caribaea*, 800 m, 1.I.1973. VANUA LEVU: 1 ♀, Napuka, Dariqala Pt, Natewa Penin., *Citrus*, sea level, 15.XII.1972; 8 ♂, 5 ♀, Lesiaceva Pt, Savu Savu Bay, *Citrus*, sea level, 18.XII.1972; 5 ♂, 7 ♀, Savu Savu, *Citrus*, 40 m, 18.XII.1972; 10 ♂, 27 ♀, Lesiacevu Pt, *Citrus*, sea level, 19.XII.1972; 1 ♀, Balaga Beach, Savu Savu Bay, 23.XII.1972. OVALAU: 1 ♀, Levuka, Mission Hill, 60 m, 25.XI.1972. LAU GROUP: 1 ♀, Vanua Balavu, Buthalevu, 100 m, 10.VIII.1938, ECZ.

This New Caledonian species is evidently widespread in Fiji, occurring from sea level to 1100 m. I have also collected it in Tonga (Thornton 1981a), the Solomons and the New Hebrides and have seen it in collections from Samoa.

Family PSOCIDAE Stephens, 1829

The record of *Metylophorus* given in Smithers (1972) is in error. Karny (1926) included *Psocus nebulosus* Stephens, which is a *Metylophorus*, in his paper, which dealt predominantly with Fijian psocoptera, but the record was from Nigeria.

Genus **Ptycta** Enderlein

Ptycta Enderlein, 1925: 102. Type-species: *Psocus haleakalae* Perkins.

KEY TO FIJIAN SPECIES OF *Ptycta*

1. Fore wing less than 2.3 mm long, veins *rs* and *m* fused for a distance **bebea, n. sp.**
- Fore wing more than 2.5 mm long, veins *rs* and *m* connected by a crossvein 2
2. Female fore wing with a distinct transverse brown fascia, teeth on hypandrial tongue of ♂ asymmetrical 3

- Female fore wing without distinct transverse brown fascia, teeth on hypandrial tongue of ♂ symmetrical 4
3. Apical lobe of subgenital plate more than 2× as long as broad; dorsal valve of gonapophyses fleshy; clypeus without distinct dark markings **tora, n. sp.**
- Apical lobe of subgenital plate less than 2× as long as broad; dorsal valve of gonapophyses not fleshy; clypeus with large distinct diamond-shaped or oval dark patch 5
4. Female fore wing with several small distinct dark patches in basal cells; penis frame tine finely serrate for whole length, not knobbed **dispersa, n. sp.**
- Female fore wing with at most 1 or 2 continuous dark patches; penis frame serrate only at apex or not at all 6
5. Clypeus with diamond-shaped brown mark; hypandrial tongue with 2 large asymmetrical prominent teeth **mara, n. sp.**
- Clypeus with large oval dark brown mark; hypandrial tongue asymmetrical in spacing, shape and size of teeth **vitiensis**
6. Brown pigment on ♀ fore wing runs in direction of length of fore wing, towards pterostigma; tine of penis frame not finely spinose **sitivana, n. sp.**
- Brown pigment on ♀ fore wing confined to angle of cells Rs + M, Cu₂ and pterostigma, not continuous; tine of penis frame finely spinose apically 7
7. Tine of penis frame distinctly knobbed apically; marginal teeth of hypandrial tongue uniform in size and shape; pterostigma of ♀ fore wing pigmented over at least apical 1/3 ... **marostica, n. sp.**
- Tine of penis frame not distinctly knobbed apically; marginal teeth of hypandrial tongue larger basally; ♀ unknown or pterostigma with pigment only in distal 1/4 8
8. Clypeus with dark brown T-shaped mark; basal teeth of hypandrial tongue all of similar size **collina, n. sp.**
- Clypeus with faint striae; basal teeth of hypandrial tongue include a pair of very large spines **natewa, n. sp.**

Ptycta bebea Thornton, new species

FIG. 181–187

♀. *Coloration* (after ca 3 years in alcohol). Head buff, marked with brown (FIG. 181). Thoracic terga brown, pleura brown, legs buff apart from a broad brown band on femur subapically and tarsal segments dark brown. Fore wing marked with brown as FIG. 182, hind wing hyaline. Abdomen with gray-brown granulations.

Morphology. I.O.:D = 2.0:1. Body length 2.0 mm. Fore wing with veins *rs* and *m* fused for a distance. Number of ctenidiobothria on basal hind tarsal segment: 21. Subgenital plate (FIG. 183) with square apical lobe. Gonapophyses (FIG. 184) small, ventral valve short. Epiproct setose, squarish; paraproct with field of 20 trichobothria.

♂. *Coloration*. As ♀.

Morphology. I.O.:D = 1.5:1. Body length 1.7 mm. Venation of fore wing as ♀. Number of ctenidia on basal hind tarsal segment: 20. Epiproct setose, a shallow broad lobe (FIG. 185) on hind margin bears minute spines; paraproct with field of 21 trichobothria, and bearing a stout sharply pointed prong, bent apically. Hypandrium (FIG. 186) small, apical tongue bearing short sclerotized teeth on margins. Penis frame (FIG. 187) simple.

Holotype ♀, VANUA LEVU: ~~Savu Savu Beach~~, 30 m, 18.XII.1972, IWBT (BISHOP 11,486). Allotype ♂, same data as holotype (BISHOP). Paratypes: 2♂, 3♀, same data as holotype, IWBT (AMS).

Other specimens examined. VITI LEVU: 1♂, Nadi, on *Tamarindus indica*, 28.XII.1972. VANUA LEVU: 10♂, 25♀, Labasa, *Citrus*, 11.XII.1972; 1♂, 1♀, Savu Savu Beach, *Barringtonia asiatica*, 17.XII.1972; 1♂, Lesiaceva Pt, *Citrus*, 18.XII.1972; 4♂, 4♀, Savu Savu, *Citrus*, 30 m, 18.XII.1972; 1♂, 3♀, Lesiaceva Pt, 19.XII.1972; 1♀, Waikava Promontory, 170 m, 22.XII.1972. OVALAU: 6♂, 7♀, Levuka, Mission Hill, 170 m, 25.XI.1972; 1♂, 1♀, Cawaci, sea level, 28.XI.1972; 1♀, Nasinu, 30.XI.1972.

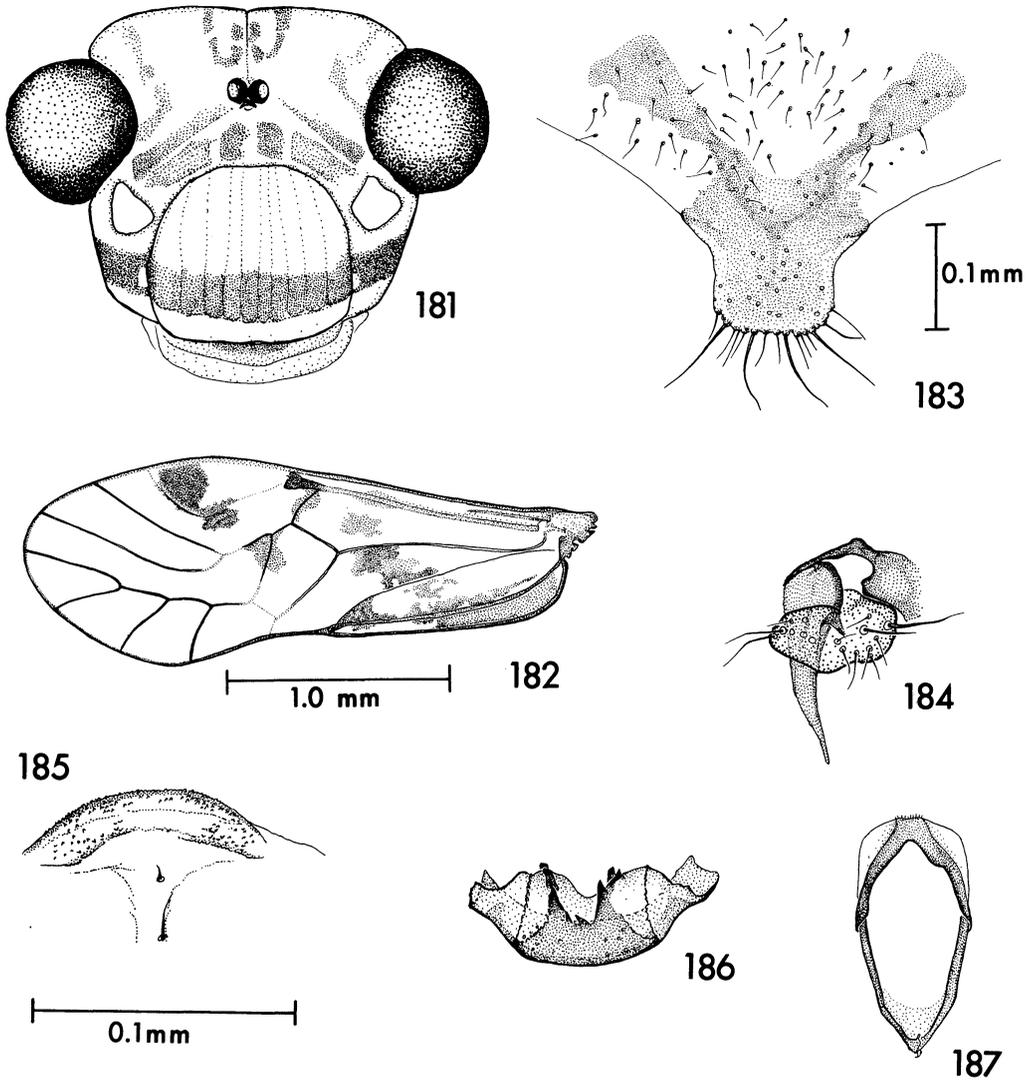


FIG. 181–187. *Ptycta bebea*: ♀: head (181), fore wing (182), subgenital plate (183), gonapophyses (184); ♂: posterior border of epiproct (185), hyandrium (186), phallosome (187). FIG. 181 not to scale; FIG. 183, 184, 186, 187 to common scale.

P. bebea, a somewhat small species, is characterized by the narrow transverse band across the clypeus anteriorly, and the numerous fairly small patches of pigment on the fore wings. It is an unusual Fijian species of the family in that veins *rs* and *m* in the fore wing are united for a short distance rather than connected by a crossvein. This character is invariable in the 70 specimens examined. I have also collected this species in Tonga (Thornton 1981a).

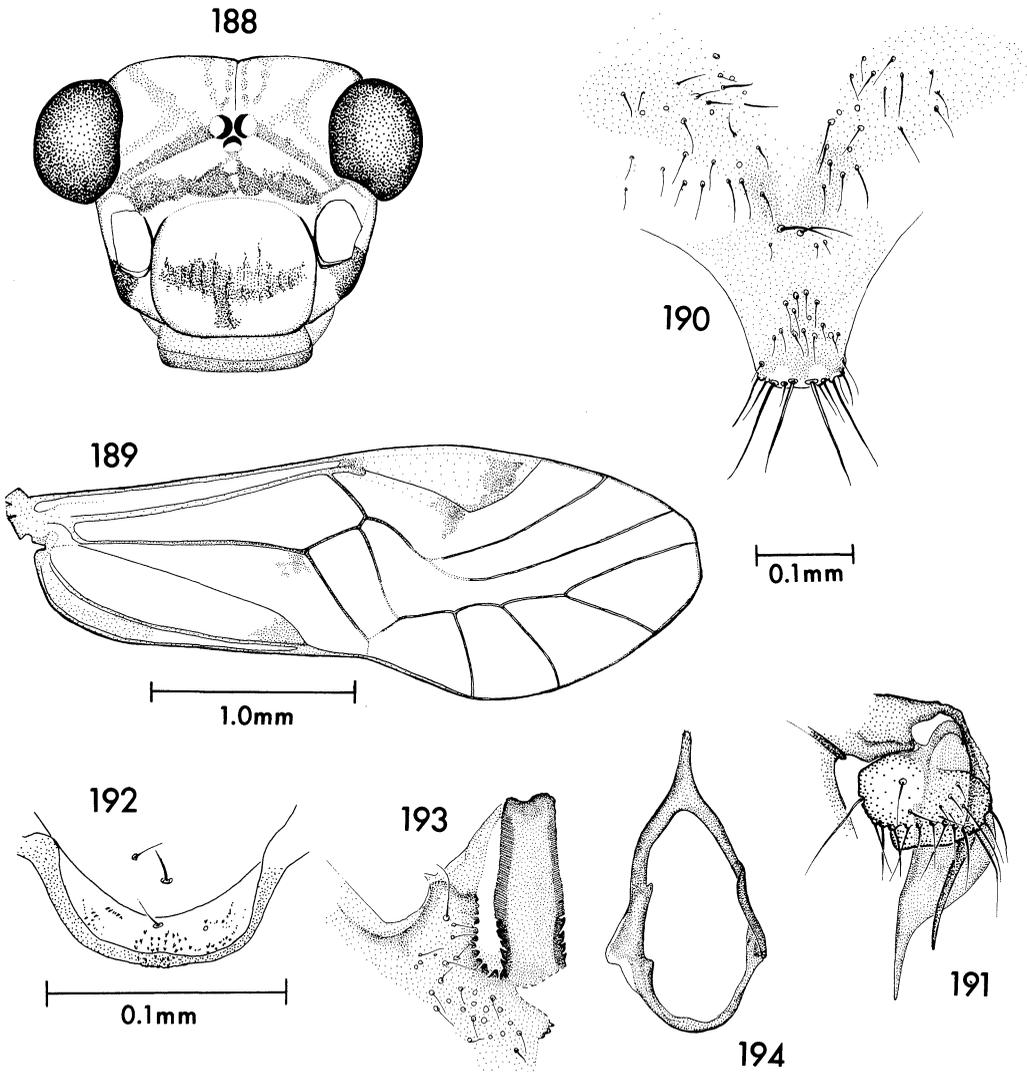


FIG. 188-194. *Ptycta collina*: ♀: head (188), fore wing (189), subgenital plate (190), gonapophyses (191); ♂: basal lobe of epiproct (192), hypandrium (193), phallosome (194). FIG. 188 not to scale; FIG. 190, 191, 193, 194 to common scale.

In head pattern and male and female genitalia, *P. bebea* is very similar to *Ptycta angulata* Thornton, Lee & Chui, 1972 from the southern Marianas and the eastern Carolines and Marshalls. It differs in wing pattern and slightly in the shape of the penis frame and structure of the hypandrium, but the 2 species are clearly closely related.

Ptycta collina Thornton, new species

FIG. 188–194

♀. *Coloration* (after ca 3 years in alcohol). Head light buff, marked with brown as in FIG. 188. Fore wing (FIG. 189) without a transverse brown fascia. Maxillary palp light buff, darker at extreme apex. Genae light buff, a narrow brown band along lower margin. Scape and pedicel light buff, flagellum brown. Thoracic terga light brown, legs cream except tarsal segments on prothoracic legs and apical tarsal segment of other legs brown. Abdomen creamy-buff.

Morphology. I.O.:D = 1.8:1. Body length 2.3 mm. Fore wing with veins *rs* and *m* connected by a crossvein. Basal hind tarsal segment with 20 ctenidia. Epiproct (lost) trapezoid, with 4 very long stout setae near apex, paraproct with field of 21–22 trichobothria. Subgenital plate (FIG. 190) apical lobe not sharply marked off from main disc. Gonapophyses as in FIG. 191.

♂. *Coloration*. As ♀.

Morphology. I.O.:D = 0.75:1. Body length 2.2 mm. Fore wing venation as ♀. Basal hind tarsal segment with 21 ctenidia. Epiproct broader than long, basal lobe (FIG. 192) sclerotized with very minute spines on edge only in medial position, basal lobe fairly deep. Paraproct with field of 26 trichobothria. Hypandrial tongue (FIG. 193) marginal teeth on apical $\frac{2}{3}$ fine, closely set, basal teeth larger, pointed, distinct. Penis frame (FIG. 194) apical tine lacking apical swelling.

Holotype ♀, VITI LEVU: Nausori Highlands, 870 m, *Agathis* and *Dacrydium*, 31.XII.1972, IWBT (BISHOP 11,487). Allotype ♂, same data as holotype (BISHOP). Paratypes: 1♂, 1♀, same data as holotype, IWBT (AMS).

Other specimens examined. VITI LEVU: 10♂, 10♀, Nausori Highlands, 8 km SE of Natewa, 860 m, dead hurricane-blown tree, 28.X.1972; 3♂, 7♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973.

This species, collected only in the Nausori Highlands of Viti Levu, is rather similar to *P. marostica*, n. sp. It may be distinguished by having a very small pigment patch near the end of vein *m* + *cu* in the fore wing, and in the male by having hypandrial marginal teeth of distinctly 2 kinds, those near the base being larger and more sharply pointed than those towards the apex. The penis frame lacks the slight distal enlargement of the apical tine that occurs in *P. marostica*, n. sp.

Ptycta dispersa Thornton, new species

FIG. 195–201

♀. *Coloration* (after ca 3 years in alcohol). Head pale buff, marked with brown as in FIG. 195, markings less extensive than most Fijian species. Maxillary palp and antenna pale buff. Thoracic terga cream, brown posteriorly; pleura light brown; legs pale buff, apical tarsal segment slightly darker. Fore wing membrane posteriorly very pale brown, paler near veins, otherwise hyaline; small dispersed brown patches of pigment in basal $\frac{1}{2}$ of wing (FIG. 196). Abdomen cream, a lateral line of small brown patches.

Morphology. I.O.:D = 1.5:1. Body length 2.5 mm. In fore wing veins *rs* and *m* connected by a crossvein. Basal hind tarsal segment with 19 ctenidia. Epiproct trapezoid with 4 very long stout setae near apex; paraproct with field of 21–23 trichobothria. Subgenital plate (FIG. 197) with short squat apical lobe. Gonapophyses as in FIG. 198.

♂. *Coloration*. As ♀, except brown patches in fore wing fewer and smaller, abdomen wholly cream.

Morphology. I.O.:D = 1.0:1. Body length 2.2 mm. Fore wing venation as ♀. Basal hind tarsal segment with 24 ctenidia. Epiproct squarish, lacking very long stout setae, bearing a long shallow basal lobe (FIG. 199) which is finely spinous and overlaps 9th tergite; paraproct with 22–25 trichobothria. Hypandrial tongue (FIG. 200) symmetrical, with very narrow close-set teeth on margins. Penis frame (FIG. 201) with finely toothed apical tine.

Holotype ♀, VITI LEVU: Nausori Highlands, *Pinus caribaea*, 800 m, 1.I.1973,

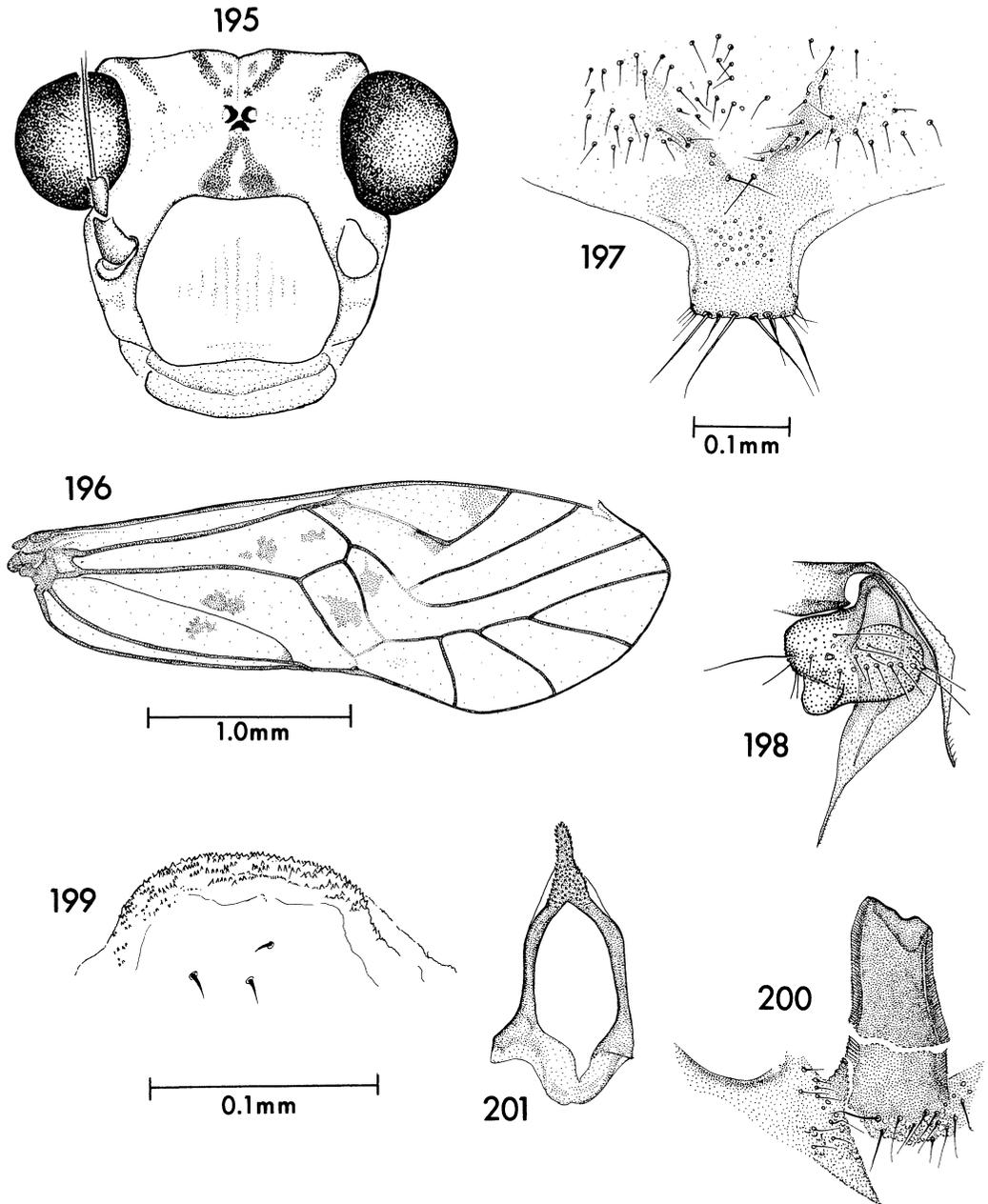


FIG. 195–201. *Ptycta dispersa*: ♀: head (195), fore wing (196), subgenital plate (197), gonapophyses (198); ♂: basal lobe of epiproct (199), hyandrium (200), phallosome (201). FIG. 195 not to scale; FIG. 197, 198, 200, 201 to common scale.

IWBT (BISHOP 11,488). Allotype ♂, same data as holotype (BISHOP). Paratypes: 12♂, 22♀, same data as holotype, IWBT (AMS).

Other specimens examined. VITI LEVU: 1♀, Nadarivatu, 2.IX.1938, ECZ; 2♂, Nausori Highlands, foliage in Kauri and *Dacrydium* forest, 870 m, 31.XII.1972. VANUA LEVU: 1♀, Savu Savu, *Citrus*, 30 m, 18.XII.1972. OVALAU: 1♀, Nasova, *Phaleria disperma*, sea level, 30.XI.1972.

This species, found from sea level to 870 m, is quite different from any other Fijian psocid on fore wing pattern. Veins *rs* and *m* are connected by a crossvein in all specimens.

***Ptycta mara* Thornton, new species**

FIG. 202–208

♀. *Coloration* (after ca 3 years in alcohol). Head light buff, marked with brown as FIG. 202. Scape, pedicel and basal flagellar segment light buff, remainder of flagellum brown. Maxillary palp brown. Thoracic terga brown. Legs cream apart from coxa, apex of tibia, and tarsal segments brown. Fore wing patterned with brown as FIG. 203, hind wing hyaline. Abdomen with brown granulations.

Morphology. I.O.:D = 1.5:1. Body length 3.2 mm. Basal hind tarsal segment with 24 ctenidia. In fore wing veins *rs* and *m* joined by a crossvein. Epiproct square, sclerotized laterally, with 7 long setae; paraproct with field of 32 trichobothria. Gonapophyses as FIG. 204. Subgenital plate (FIG. 205) apical lobe not sharply marked off from rest of plate.

♂. *Coloration.* As ♀.

Morphology. I.O.:D = 0.5:1. Body length 2.8 mm. Basal hind tarsal segment with 26 ctenidia. Fore wing venation as ♀. Epiproct trapezoid, with shallow broad posterior lobe (FIG. 206) bearing low denticles. Paraproct with field of 28–32 trichobothria, a long apical pointed stout spine, curved at apex, and a shorter stout blunt peg subbasally. Hypandriae apical lobe (FIG. 207) asymmetrically toothed. Penis frame (FIG. 208) simple, apical tine blunt.

Holotype ♀, VANUA LEVU: Lesiaceva Pt, sea level, *Citrus*, 19.XII.1972, IWBT (BISHOP 11,489). Allotype ♂, same data as holotype (BISHOP).

Other specimens examined. VITI LEVU: 1♂, 1♀, Nadarivatu, 2.IX.1938, ECZ; 1♀, Mau, 32 km SW of Suva, 100 m, 20.X.1972; 1♂, Nadi, general beating, 23.X.1972; 2♂, Nausori Highlands, 8 km SW of Natawa, dead hurricane-blown tree, Kauri forest, 850 m, 28.X.1972; 3♀, Korovou (Tailevu), Verata tikina, *Citrus* with lichen, 23.XI.1972; 9♂, 14♀, 1N, Nausori Highlands, *Pinus caribaea*, 800 m, 1.I.1973. VANUA LEVU: 1♂, 1♀, 1N, Labasa, garden, 11.XII.1972; 2♂, 6♀, Savu Savu Beach, *Barringtonia asiatica*, 17.XII.1972; 4♂, 6♀, 3 km SW of Savu Savu, sea level, 18.XII.1972; 2♂, 6♀, Lesiaceva Pt, *Citrus*, sea level, 18.XII.1972; 2♂, 9♀, Savu Savu, *Citrus*, 30 m, 18.XII.1972; 7♂, 28♀, 1N, Lesiaceva Pt, sea level, 19.XII.1972; 1♂, 4N, Lovoniqai village, head of Natewa Bay, *Agathis vitiensis*, 21.XII.1972; 1♀, Waikava Promontory, 170 m above Dakuniba village, 22.XII.1972; 3♂, 1N, Savu Savu Bay, Balaga Beach, 23.XII.1972. OVALAU: 1♂, Lovoni valley, 26.XI.1972; 1♀, Cawaci, sea level, 28.XI.1972; 1♂, Nasova, *Phaleria disperma*, 30.XI.1972. MOALA GROUP: 1♂, Moala, 2 km W Naroi, 200 m, 25.VIII.1938, ECZ. LAU GROUP: 1♂, Munia, 300 m, 3.VIII.1938, ECZ.

Of 232 fore wings, veins *rs* and *m* are fused for a short distance in 1, they meet at a point in 6, and they are joined by a crossvein in 225.

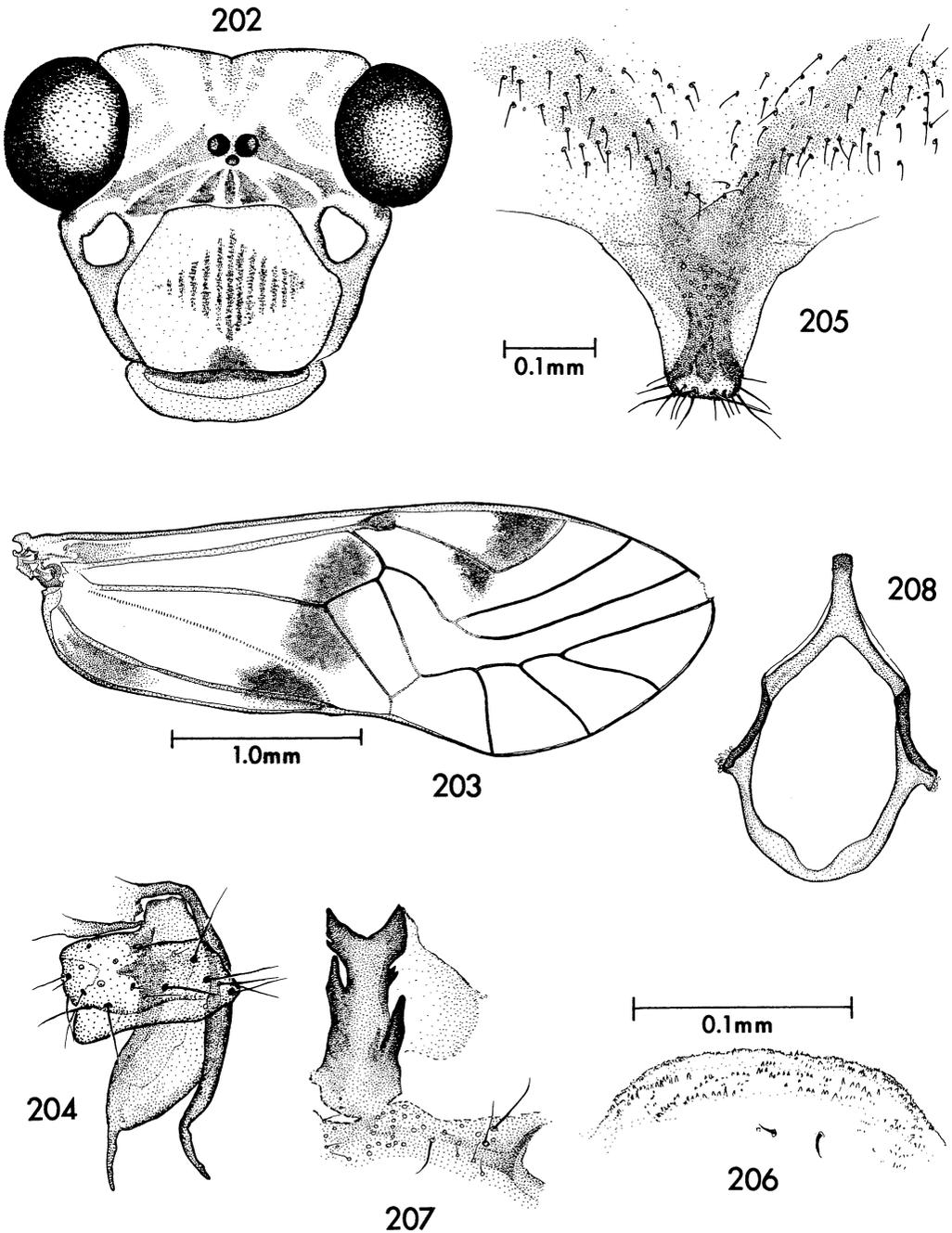


FIG. 202-208. *Ptycta mara*: ♀: head (202), fore wing (203), gonapophyses (204), subgenital plate (205); ♂: basal lobe of epiproct (206), hyandrium (207), phallosome (208). FIG. 202 not to scale; FIG. 204, 205, 207, 208 to common scale.

P. mara was collected in numbers in the lowlands, and also at 800 m on introduced pines. It occurs in the Moala and Lau groups, as well as on the main islands. The wing fascia is sometimes broken and incomplete and, in such cases, the species resembles *P. marostica*, n. sp., which has a similar head pattern. The 2 species are easily distinguished upon dissection; the hypandrium of *P. mara* is quite unlike that of any other Fijian psocid, and the dorsal valve of the female gonapophyses differs from that of *P. marostica*, n. sp. in narrowing abruptly at the base of the terminal spine.

***Ptycta marostica* Thornton, new species**

FIG. 209–215

♀. *Coloration* (after ca 3 years in alcohol). Head buff marked with brown as FIG. 209, maxillary palps buff, apical segment brown; antennae brown. Thoracic terga brown, cream adjacent to median sutures; pleura brown. Legs buff except coxa brown, apex of tibia and tarsal segments very dark brown. Fore wing as in FIG. 210. Abdomen cream with 3 longitudinal gray-brown lines dorsally and a broad lateral gray-brown line each side.

Morphology. I.O.:D = 1.9:1. Body length 2.6 mm. Fore wing veins *rs* and *m* connected by crossvein. Basal hind tarsal segment with 24 ctenidia. Epiproct trapezoid bearing 2 very long stout setae near apex; paraproct with 19 trichobothria. Subgenital plate as FIG. 211; gonapophyses as FIG. 212.

♂. *Coloration*. As ♀, but tibia brown and fore wing lacks brown patch in cell M + Cu.

Morphology. I.O.:D = 1.6:1. Body length 1.9 mm. Fore wing venation as ♀. Basal hind tarsal segment with 24 ctenidia. Epiproct broader than long with triangular lateral wings, shallow broad basal sclerotized lobe (FIG. 213) very finely spinous; paraproct with field of 17–19 trichobothria. Hypandrial tongue (FIG. 214) symmetrical, with fine, close-set marginal teeth. Penis frame (FIG. 215) with finely serrate knob at apex of tine.

Holotype ♀, VANUA LEVU: 3 km SW of Savu Savu, *Citrus*, sea level, 18.XII.1972, IWB (BISHOP 11,490). Allotype ♂, same data as holotype (BISHOP). Paratypes: 2♂, 5♀, same data as holotype (AMS).

Other specimens examined. VITI LEVU: 1♀, Mt Magodro area, nr Nasivikoso, Namada stream, 400 m, 10.XI.1972. VANUA LEVU: 3♂, 13♀, 14N, Labasa, *Citrus*, sea level, 11.XII.1972; 3♀, 3N, Wakanilato, 3 km NW of Mt Delaikoro, 12.XII.1972; 1♀, Doguru village, 1.5 km NW of Mt Delaikoro, *Citrus*, 170 m, 12.XII.1972; 1♂, 4♀, Savu Savu area, nr Nakula, 130 m, 16.XII.1972; 1♂, Savu Savu Bay, cocoa, 17.XII.1972; 1♂, 2♀, Savu Savu, *Citrus*, 30 m, 18.XII.1972; 1♀, Waikava Promontory, 170 m above Dakuniba village, 22.XII.1972; 1♀, nr Faun Harbour, *Citrus*, 22.XII.1972; 1♀, Savu Savu Bay, Balaga Beach, 23.XII.1972. OVALAU: 1♀, Levuka, Mission Hill, 270 m, 25.XI.1972.

Of 60 fore wings examined, veins *rs* and *m* meet at a point in 1, and they are joined by a crossvein in 59. In no specimen do they fuse for a distance.

Ptycta marostica is evidently quite widespread in Fiji and occurs from sea level to 870 m, on both introduced plants and native vegetation. The species is distinguishable from other Fijian species by head pattern and by male hypandrium and phallosome structure.

***Ptycta natewa* Thornton, new species**

FIG. 216–220

♂. *Coloration* (after ca 3 years in alcohol). Head buff, patterned with brown as FIG. 216, clypeal striae faint. Fore wing (FIG. 217) pigment on angles of cells M + Cu and R very faint.

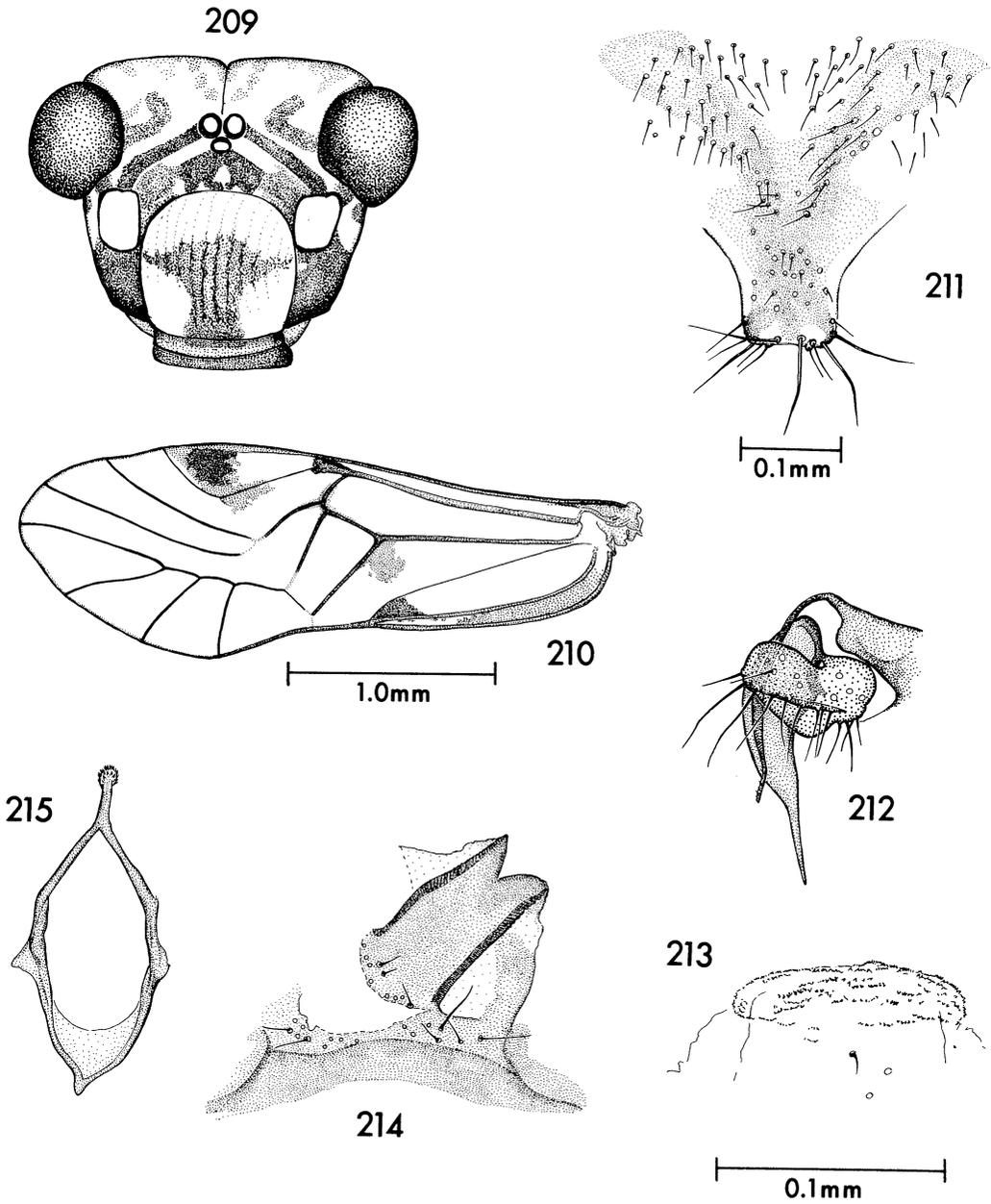


FIG. 209–215. *Ptycta marostica*: ♀: head (209), fore wing (210), subgenital plate (211), gonapophyses (212); ♂: basal lobe of epiproct (213), hyandrium (214), phallosome (215). FIG. 209 not to scale; FIG. 211, 212, 214, 215 to common scale.

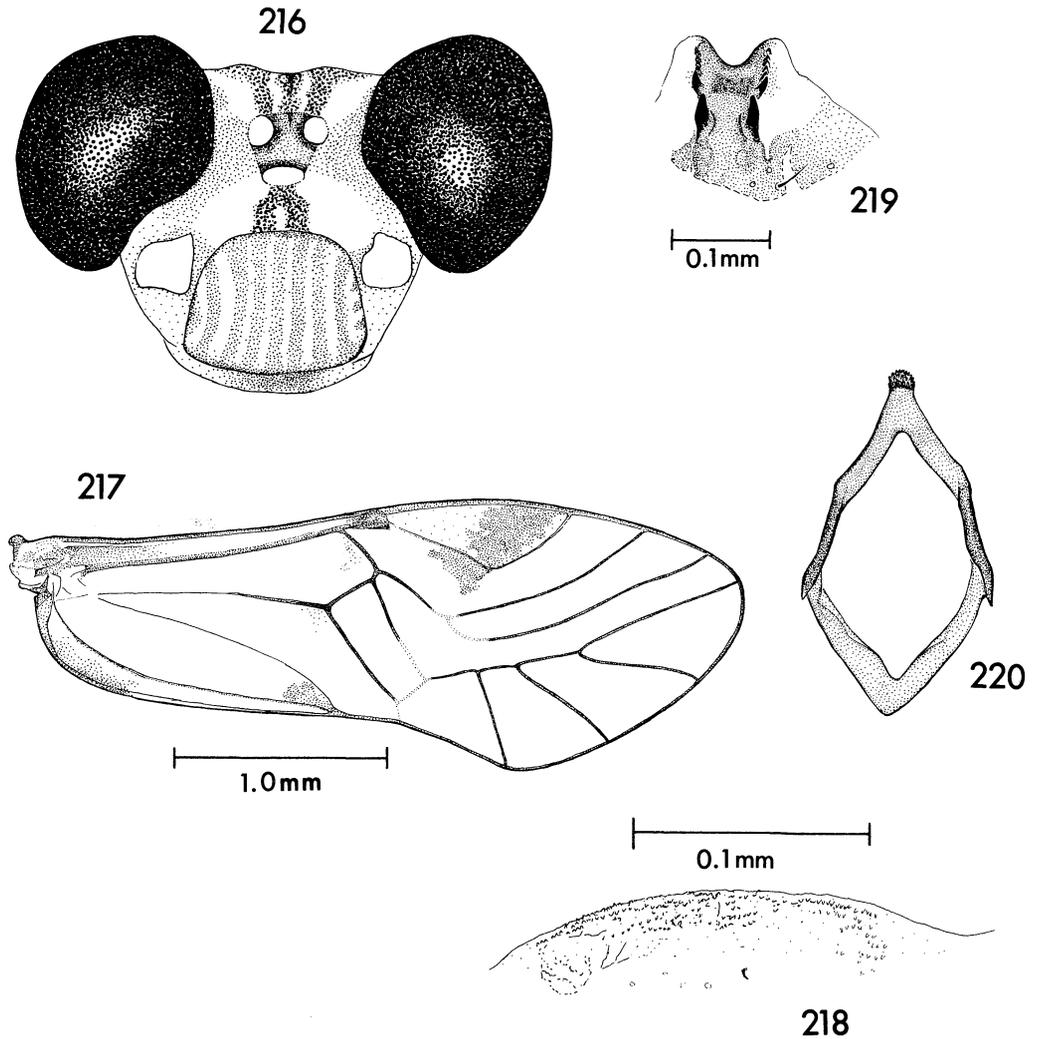


FIG. 216–220. *Ptycta natewa*, ♂: head (216), fore wing (217), basal lobe of epiproct (218), hypandrium (219), phallosome (220). FIG. 216 not to scale; FIG. 219, 220 to common scale.

Morphology. I.O.:D = 0.6:1. Body length 2.6 mm. In fore wing veins *rs* and *m* connected by crossvein. Basal hind tarsal segment with 22 ctenidia. Epiproct triangular, basal lobe (FIG. 218) wide, shallow, sclerotized, bearing fine teeth. Paraproct with field of 28 trichobothria. Hypandrial tongue (FIG. 219) symmetrical, margins with fine teeth towards apex, a large stout tooth basally. Penis frame (FIG. 220) apical tine finely spinose apically.

♀. Unknown.

Holotype ♂, VITI LEVU: Nausori Highlands, 8 km SE of Natawa, 870 m, dead

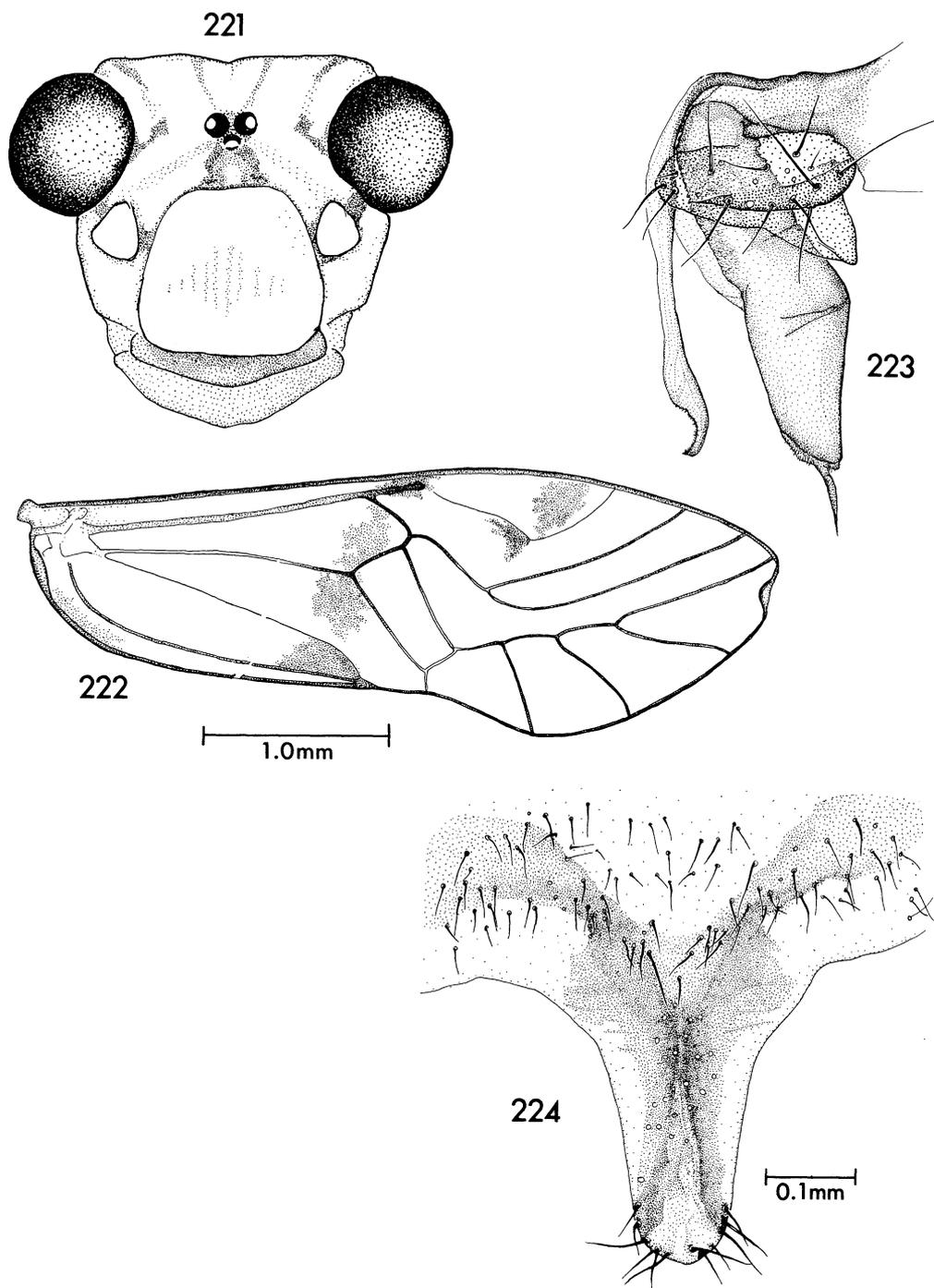


FIG. 221–224. *Ptycta tora*, ♀: head (221), fore wing (222), gonapophyses (223), subgenital plate (224). FIG. 221 not to scale; FIG. 223, 224 to common scale.

hurricane-blown tree, Kauri forest, 28.X.1972, IWB (BISHOP 11,491). Paratype ♂: same data as holotype (AMS).

Ptycta natewa is described from 2 males because of the distinctive hypandrium, which bears fine sharp teeth at the base of the apical tongue. It was collected together with both sexes of *P. marostica* and *P. collina*, males of *P. mara*, and a female of *P. tora*, n. sp. (known only from females). The head pattern, fore wing pattern, and hypandrium of males of *P. mara* distinguish that species from *P. natewa* and *P. collina* as do the head pattern and hypandrium of *P. marostica*. The possibility that *P. natewa* is the male of *P. tora*, n. sp. cannot be entirely discounted, although the well-marked fore wing fascia of *P. tora* females and the complete lack of any vestige of a fascia in *P. natewa* render this unlikely.

***Ptycta tora* Thornton, new species**

FIG. 221–224

♀. *Coloration* (after ca 3 years in alcohol). Head generally cream, marked with brown as in FIG. 221. Eyes black, ocelli with black centripetal margins. Basal segment of flagellum cream basally, darkening to brown apically, rest of flagellum brown. Apical segment of maxillary palp brown apically, palp otherwise cream. Thoracic terga brown. Legs cream, apart from coxa, apex of tibia, and tarsal segments brown. Fore wing with brown markings as in FIG. 222, hind wing hyaline. Abdomen cream.

Morphology. I.O.:D = 1.4:1. Body length 2.5 mm. In fore wing veins *rs* and *m* joined by a short crossvein. Number of ctenidiobothria on basal hind tarsal segment: 21. Epiproct square, sclerotized laterally, bearing 4 long setae; paraproct with field of 28–30 trichobothria. Gonapophyses (FIG. 223): dorsal valve fleshy, with apical spine; outer valve setose with apical lobe bare. Subgenital plate (FIG. 224) with long apical lobe bearing stout setae round apical margin.

♂. Unknown.

Holotype ♀, VITI LEVU: Nadrau Plateau, nr Navai, 800 m, 31.X.1972, IWB (BISHOP 11,492). Paratypes: 3 ♀, same data as holotype, IWB (AMS).

Other specimens examined. VITI LEVU: 1 ♀, Nausori Highlands, 8 km SE of Natawa, 870 m, dead hurricane-blown tree in Kauri forest, 28.X.1972; 3 ♀, Nausori Highlands, 800 m, *Pinus caribaea*, 1.I.1973.

This species, like the majority of Fijian species of this genus, has veins *rs* and *m* of the fore wing joined by a short crossvein in all specimens. It may be recognized without dissection by a combination of head pattern and the almost uninterrupted wing fascia. The long apical lobe of the subgenital plate and the fleshy dorsal valve are unique in Fijian species.

P. tora is evidently a mountain form and has been taken only on Viti Levu.

***Ptycta sitivana* Thornton, new species**

FIG. 225–231

♀. *Coloration* (after ca 3 years in alcohol). Head pale buff, marked with brown as in FIG. 225. Apical segment of maxillary palp brown, antenna light brown. Thoracic terga brown, pleura cream. Legs: coxa, trochanter and femur cream, tibia and tarsal segments brown. Fore wing marked with brown as in FIG. 226, hind wing hyaline. Abdomen cream with a longitudinal brown band each side extremely laterally.

Morphology. I.O.:D = 1.5:1. Body length 1.9 mm. Basal hind tarsal segment with 23 ctenidia. In fore wing veins *rs* and *m* joined by a crossvein. Epiproct squarish, with 7 long setae near margin, paraproct with field of 20 trichobothria. Subgenital plate (FIG. 227) with apical lobe broadening basally. Gonapophyses as FIG. 228.

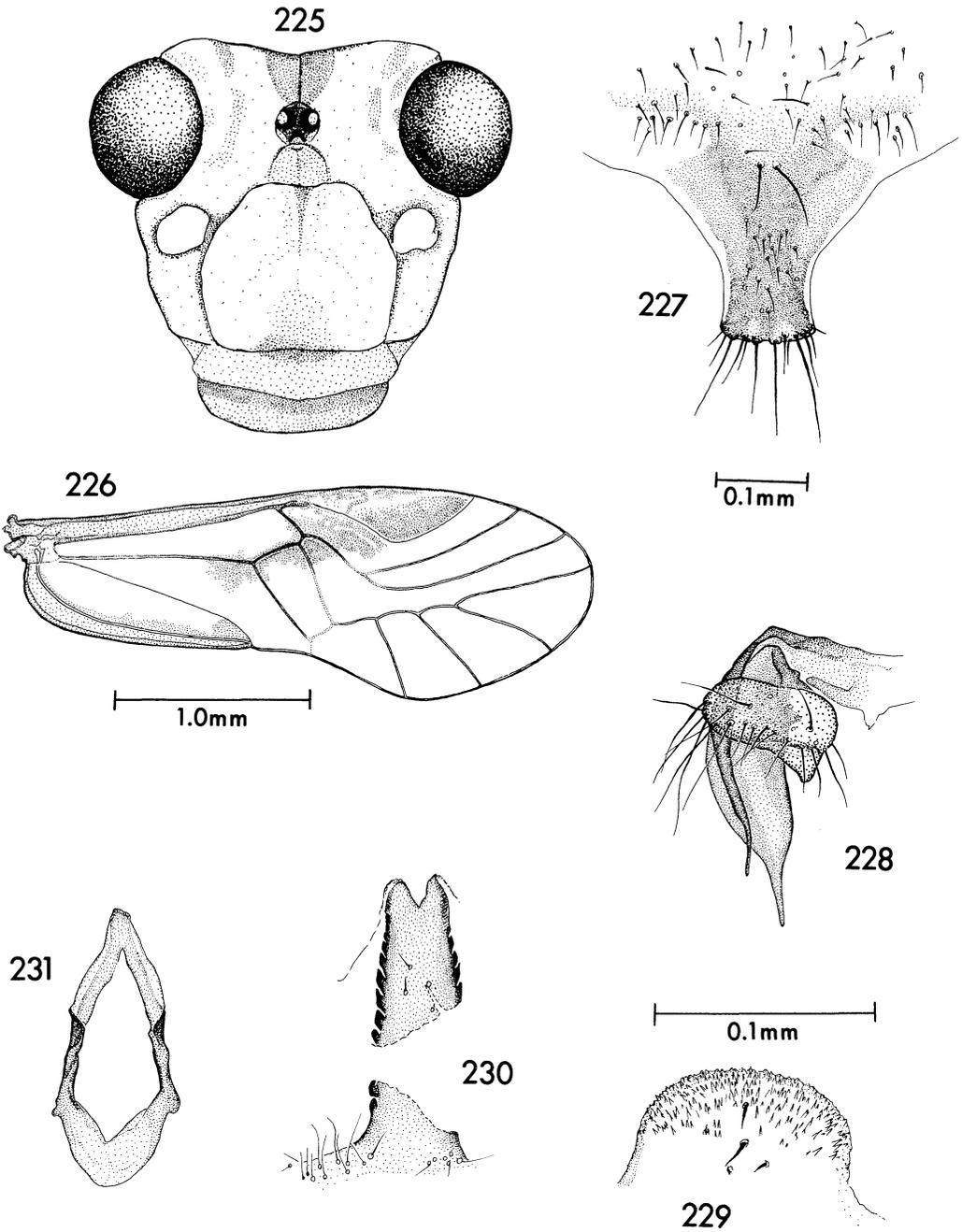


FIG. 225-231. *Ptycta sitivana*: ♀: head (225), fore wing (226), subgenital plate (227), gonapophyses (228); ♂: basal lobe of epiproct (229), hypandrium (tongue broken and reversed) (230), phallosome (231). FIG. 225 not to scale; FIG. 227, 228, 230, 231 to common scale.

♂. *Coloration.* As ♀.

Morphology. I.O.:D = 0.6:1. Body length 1.9 mm. Basal hind tarsal segment with 21 ctenidia. Fore wing venation as ♀. Epiproct with prominent posterior lobe (FIG. 229) finely toothed. Paraproct with 20–23 trichobothria, apical pointed spine, and basal peg. Hypandrium (FIG. 230) apical tongue toothed along margins, symmetrical. Penis frame (FIG. 231) stout.

Holotype ♀, VITI LEVU: Nausori Highlands, foliage of Kauri and *Dacrydium* forest, 870 m, 31.XII.1972, IWBT (BISHOP 11,493). Allotype ♂, same data as holotype (only genitalia, antenna, wings and hind leg) (BISHOP).

Other specimens examined. VITI LEVU: 1♀, same data as holotype; 1♀, Nausori Highlands, *Pinus caribaea*, 800 m, 1.I.1973.

In all specimens veins *rs* and *m* of the fore wing are connected by a crossvein. The species is easily distinguished from other Fijian psocids by the median dark band over the frons and clypeus and by the longitudinal brown mark in the middle of the fore wing. It has only been collected in the Nausori Highlands.

***Ptycta vitiensis* (Karny), new combination**

FIG. 232–240

Psocus vitiensis (Karny), 1926: 285, 286 [holotype ♂, Viti Levu: Nadi, 1916, R. Veitch (BMNH)].

Karny described this species without dissection and without a genitalic description. I have dissected the male type in the British Museum, and the hypandrium is quite distinctive. I provide below a description of the female and a further description of the male.

♀. *Coloration.* Head cream, marked with brown as in FIG. 232. Antennae brown. Thoracic sclerites dark brown. Fore wing patterned with brown as in FIG. 233. Legs buff, except coxa, basal 1/3 of femur brown, apex of tibia and tarsal segments dark brown. Abdomen granulated brown.

Morphology. I.O.:D = 1.3:1. Body length 3.0 mm. Basal hind tarsal segment with 23 ctenidia. In fore wing veins *rs* and *m* joined by a crossvein. Epiproct trapezoid, paraproct with field of 28 trichobothria. Gonapophyses (FIG. 234) fairly small, dorsal valve not fleshy. Subgenital plate (FIG. 235) apical lobe short, squarish.

♂. *Coloration.* As ♀ except transverse fascia in fore wing much less extensive (in type specimen lacking).

Morphology (of holotype): I.O.:D = 0.8:1. Body length 2.5 mm. Basal hind tarsal segment with 25 ctenidia (from recent specimen—holotype hind legs lost). Fore wing venation as ♀. Epiproct trapezoid, a shallow broad posterior lobe with minute denticles (FIG. 236, holotype). Paraproct with field of 27–31 trichobothria, an apical sharp spine and a basal blunt peg. Hypandrium (FIG. 237, holotype) apical lobe with blunt teeth on margins, these more widely spaced on one side than other; a stout peg each side at base of lobe. Penis frame (FIG. 238, holotype) simple, apical tine swollen apically.

♀ *specimen on which further description based.* VANUA LEVU: Savu Savu, *Citrus*, 30 m, 18.XII.1972.

Other specimens examined. VITI LEVU: 2♂, 1♀, Nausori Highlands, *Pinus caribaea*, 800 m, 1.I.1973. VANUA LEVU: 1♂, Savu Savu, *Citrus*, 30 m, 18.XII.1972; 19♂, 18♀, 4N, Savu Savu Beach, *Barringtonia asiatica*, 17.XII.1972; 2♂, 6♀, 1N, 1.5 km SW of Savu Savu, sea level, 18.XII.1972; 2♂, 1♀, Lesiaceva Pt, *Citrus*, 18.XII.1972; 16♂, 13♀, Savu Savu, *Citrus*, 30 m, 18.XII.1972; 15♂, 36♀, Lesiaceva Pt, *Citrus*, 19.XII.1972. OVALAU: 1♂, 1♀, 1N, Levuka, Mission Hill, 25.XI.1972; 2♂, 3♀, 7N, Nasova, *Phaleria disperma*, 30.XI.1972.

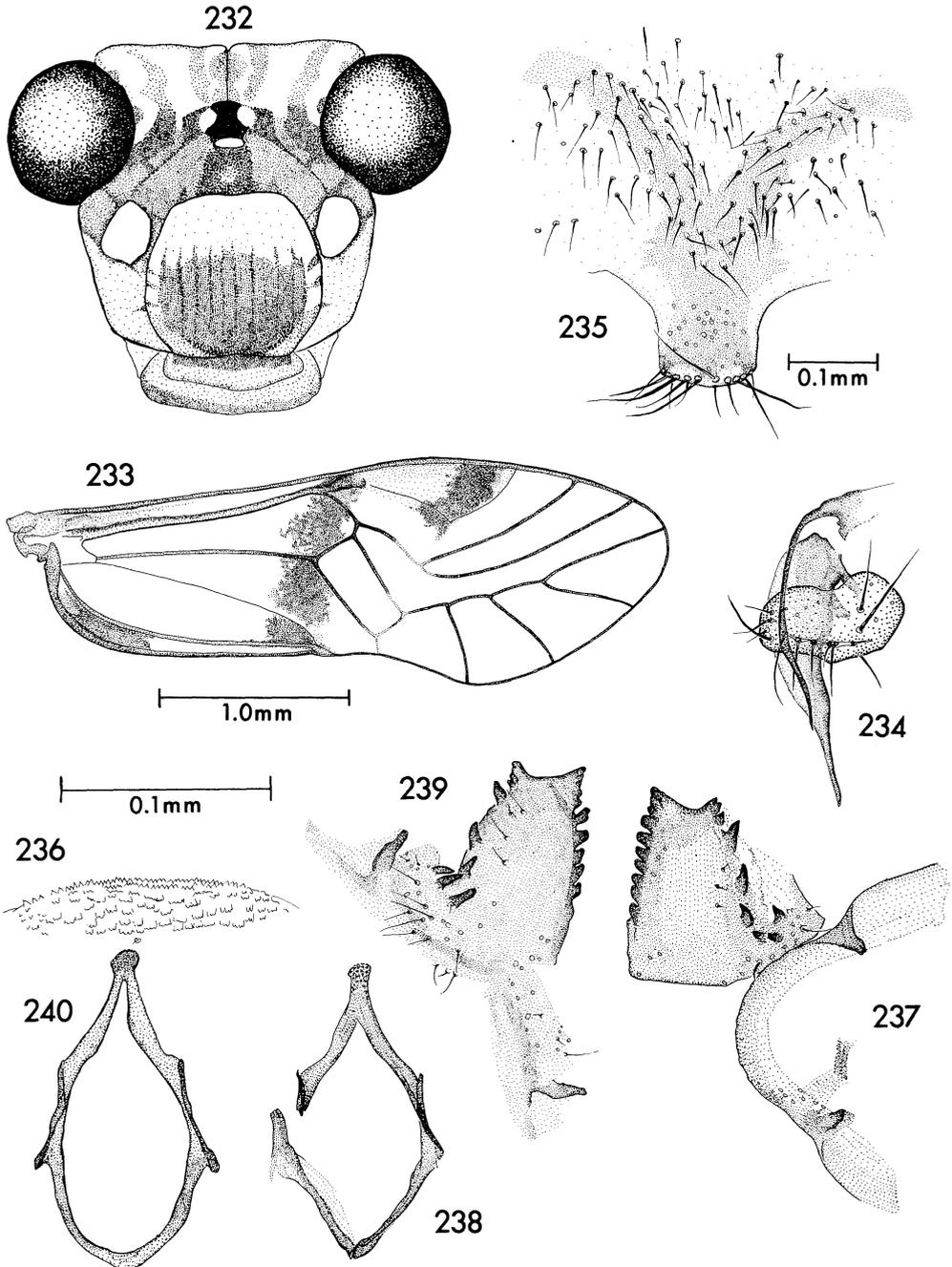


FIG. 232-240. *Ptycta vitiensis*: ♀: head (232), fore wing (233), gonapophyses (234), subgenital plate (235); ♂ (holotype): basal lobe of epiproct (236), hypandrium (237), phallosome (238); ♂ collected with ♀ above: hypandrium (239), phallosome (240). FIG. 232 not to scale; FIG. 234, 235, 237, 238, 239, 240 to common scale.

Of 264 fore wings examined, veins *rs* and *m* are fused for a short distance in 20, they meet at a point in 98, and they are joined by a crossvein in 146.

This species is common below 200 m and has not been collected in the highlands. The head pattern is sufficient to distinguish it, without dissection, from other Fijian species. It is similar to *P. bebea* in hypandrial structure but is distinct in details and in head and fore wing pattern.

The Fijian *Ptycta* species may be summarized as follows. *P. bebea*, which is the only *Ptycta* also occurring in Tonga, differs from all others in fore wing venation and general wing pattern; *P. tora* is unusual in gonapophyses and subgenital plate structure; the remaining species, *P. vitiensis*, *P. mara*, *P. sitivana*, *P. marostica*, *P. dispersa*, *P. natewa*, and *P. collina*, together with *P. tora*, are unusual in having veins *rs* and *m* in the fore wing predominantly connected by a crossvein rather than fused. This particular character is often of very low taxonomic reliability as measured by its correlation with other specific characters. In Fiji, however, it is a reliable character, shared by all the Fijian species of *Ptycta* except *bebea*, which is normal in this respect. It seems very likely that the 8 *Ptycta* species possessing this character represent an endemic complex, with *P. tora* being a somewhat aberrant member.

Family MYOPSOCIDAE Enderlein, 1903

KEY TO FIJIAN MYOPSOCIDAE²

1. In hind wing, veins *rs* and *m* joined by a crossvein **Myopsocus medialis, n. sp.**
In hind wing, veins *rs* and *m* fused for a distance (*Phlotodes*) 2
2. Fore wing with 2 concentric hyaline arcs over apical cells; apex of ♀ subgenital plate with 2 long and about 8 short setae **Phlotodes palauensis, n. comb.**
Fore wing pattern not as above; ♀ genital plate with apical setae of uniform length, or with less than 5 setae 3
3. Phallosome with external parameres distally widely separated, hypandrium extensively chitinized in a complex manner 4
Phallosome with external parameres appearing fused posteriorly, forming a ringlike phallic frame; hypandrium marginally chitinized, simple 6
4. External parameres of phallosome enlarged apically; fore wing with a distinct darker circular spot posterior to pterostigma and an arc of darker pigment in apical cells with a hyaline arc immediately basal 5
External parameres not enlarged apically; fore wing without distinctive circular spots or apical arcs **Phlotodes reptus, n. sp.**
5. Hypandrium with large lateral lobes heavily spinose, trapezoid apical tongue; fore wing with an isolated circular dark spot in cell M_3 **Phlotodes bipunctatus, n. sp.**
Hypandrial lateral lobes small and slightly spinose, median margin convex; fore wing without isolated circular dark spot in cell M_3 **Phlotodes ascoides, n. sp.**
6. Head pattern simple, with a broad median dark band over frons and clypeus; fore wing with cell M_2 almost completely hyaline and cell R_{4+5} almost completely pigmented .. **Phlotodes alticola, n. sp.**
Head pattern marking diffuse and/or complex, no distinct broad median band over frons and clypeus; fore wing with cell R_{4+5} not uniformly pigmented 7

2. *Myopsocus muscosa* is not included in the key, since I regard the record as doubtful and, in any case, there is no information on genitalic characters.

7. Fore wing has circular pigmented spots with hyaline margins over veins m_1 , m_2 , and m_3 ; ♀ subgenital plate with apical group of 5 or 6 setae of equal length . . . **Phlotodes punctatoides, n. sp.**
Fore wing without distinct circular pigmented spots on branches of media; female subgenital plate with a pair of setae or setae of markedly unequal length 8
8. Female subgenital plate with a pair of long apical setae and a pair of much shorter finer setae; clypeal spots in form of a Y **Phlotodes graptus, n. sp.**
Female subgenital plate with a pair of long apical setae only; clypeus with diffuse mottling over median area 9
9. Fore wing pigment generally consisting of extensive pigmented and hyaline areas, markedly darker small pigment patches within medial cell, at angle of cell R_{4+5} anterior to areola postica apex and in middle of radial cell **Phlotodes zimmermani, n. sp.**
Fore wing pattern as small pigmented areas giving a generally mottled appearance, no distinctively darker marks in medial or radial cells **Phlotodes napuka, n. sp.**

Genus **Myopsocus** Hagen

Myopsocus Hagen, 1866: 201. Type-species: *Psocus unduosus* Hagen.

Myopsocus medialis Thornton, new species

FIG. 241–243

♀. *Coloration* (after ca 3 years in alcohol). Head cream, patterned with fine brown markings, striae on clypeus fine, distinct. Maxillary palp and antenna cream. Thoracic terga with brown patches toward midline, those of mesothorax darker. Pronotum cream. Pleura cream with a fine longitudinal dark gray line above coxa and another near dorsal edge of pleura. Legs: cream apart from a subapical brown band on tibia, basal tarsal segment brown, rest of tarsus dark brown. Fore wing patterned with brown as in FIG. 241; hind wing hyaline. Abdomen buff.

Morphology. I.O.:D = 2.5:1. Body length 2.4 mm. Number of ctenidiobothria on basal hind tarsal segment: 35. Claw with subapical tooth. In fore wing vein m_3 arises from areola postica. Epiproct trapezoid, setose; paraproct with oval field of 21 trichobothria. Subgenital plate (FIG. 242) with apical group of 8 stout setae. Gonapophyses as in FIG. 243, outer valve setose.

Holotype ♀, VANUA LEVU: nr Nakula, Savu Savu area, 100 m, 16.XII.1972, IWBT (BISHOP 11,494). Paratype, 1 ♀, same data as holotype (AMS).

This *Myopsocus* species is remarkable in that vein m_3 of the fore wing arises directly from the areola postica.

Myopsocus muscosus Enderlein

Myopsocus muscosus Enderlein, 1906: 254, 255.

Lichenomima muscosa (Enderlein): Karny, 1926: 285.

Specimens examined. VANUA LEVU: Labasa, VII.1921, R. Veitch.

Identified before genitalic description was standard procedure, this record of a species described from Japan must be questionable. From Enderlein's figures, however, it is a *Myopsocus* and quite distinct from the previous species.

Genus **Phlotodes** Enderlein

Phlotodes Enderlein, 1910: 67. Type-species: *Myopsocus kolbei* Enderlein.

Phlotodes alticola Thornton, new species

FIG. 244–249

♀. *Coloration* (after ca 3 years in alcohol). Head buff, with striking brown pattern as FIG. 244. Fore wing heavily pigmented (FIG. 245) with cell M_2 largely hyaline; hind wing hyaline.

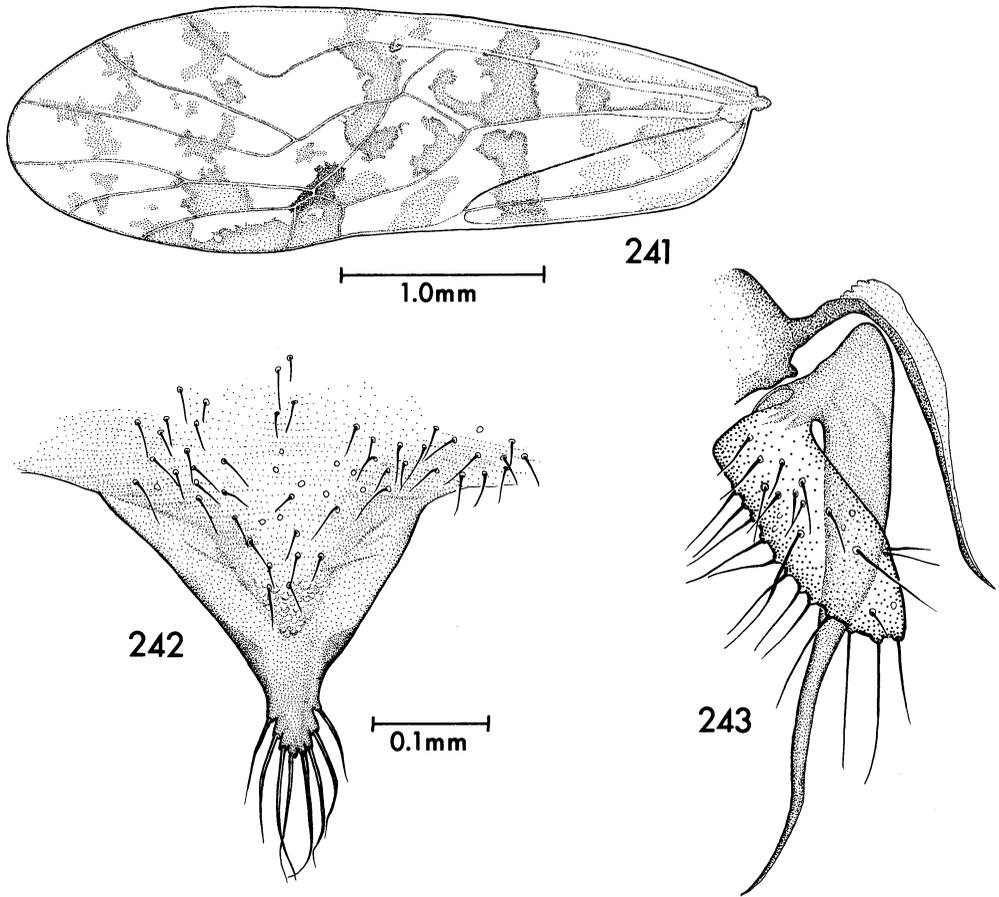


FIG. 241–243. *Myopsocus medialis*, ♀: fore wing (241), subgenital plate (242), gonapophyses (243). FIG. 242, 243 to common scale.

Morphology. I.O.:D = 1.5:1. Body length 3.6 mm. Number of ctenidia on basal hind tarsal segment: 30. Epiproct trapezoid, finely setose, with 4 setae much larger and stouter than rest; paraproct with field of 28 trichobothria. Subgenital plate (FIG. 246) with 2 or 3 very fine setae apically. Gonapophyses as FIG. 247.

♂. *Coloration.* As ♀.

Morphology. I.O.:D = 1.0:1. Body length 2.6 mm. Number of ctenidia on basal hind tarsal segment: 27. Epiproct trapezoid, lateral margins sclerotized, a field of low tubercles on apical margin and a low rounded sclerotized lobe subapically; paraproct with field of 26–28 trichobothria. Hypandrium (FIG. 249) simple, rim sclerotized. Penis frame (FIG. 248) a closed ring with median rod.

Holotype ♀, VITI LEVU: Nadrau Plateau, nr Navai, 800 m, 31.X.1972, IWBT (BISHOP 11,495). Allotype ♂, same data as holotype (BISHOP). Paratype, 1♂, same data as holotype (AMS).

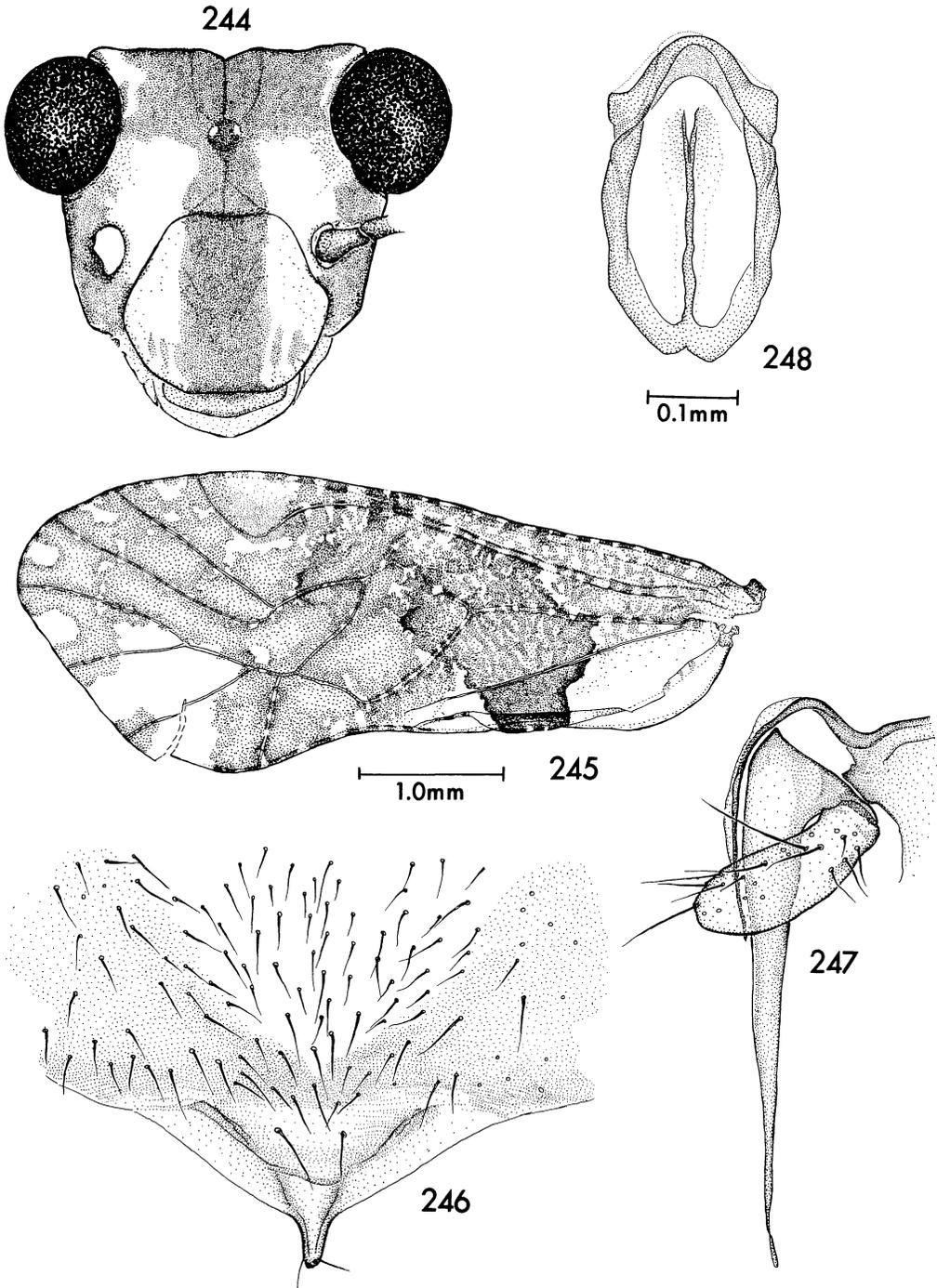


FIG. 244-248. *Phlotodes alticola*: ♀: head (244), fore wing (245), subgenital plate (246), gonapophyses (247); ♂: phallosome (248). FIG. 244 not to scale; FIG. 246-248 to common scale.

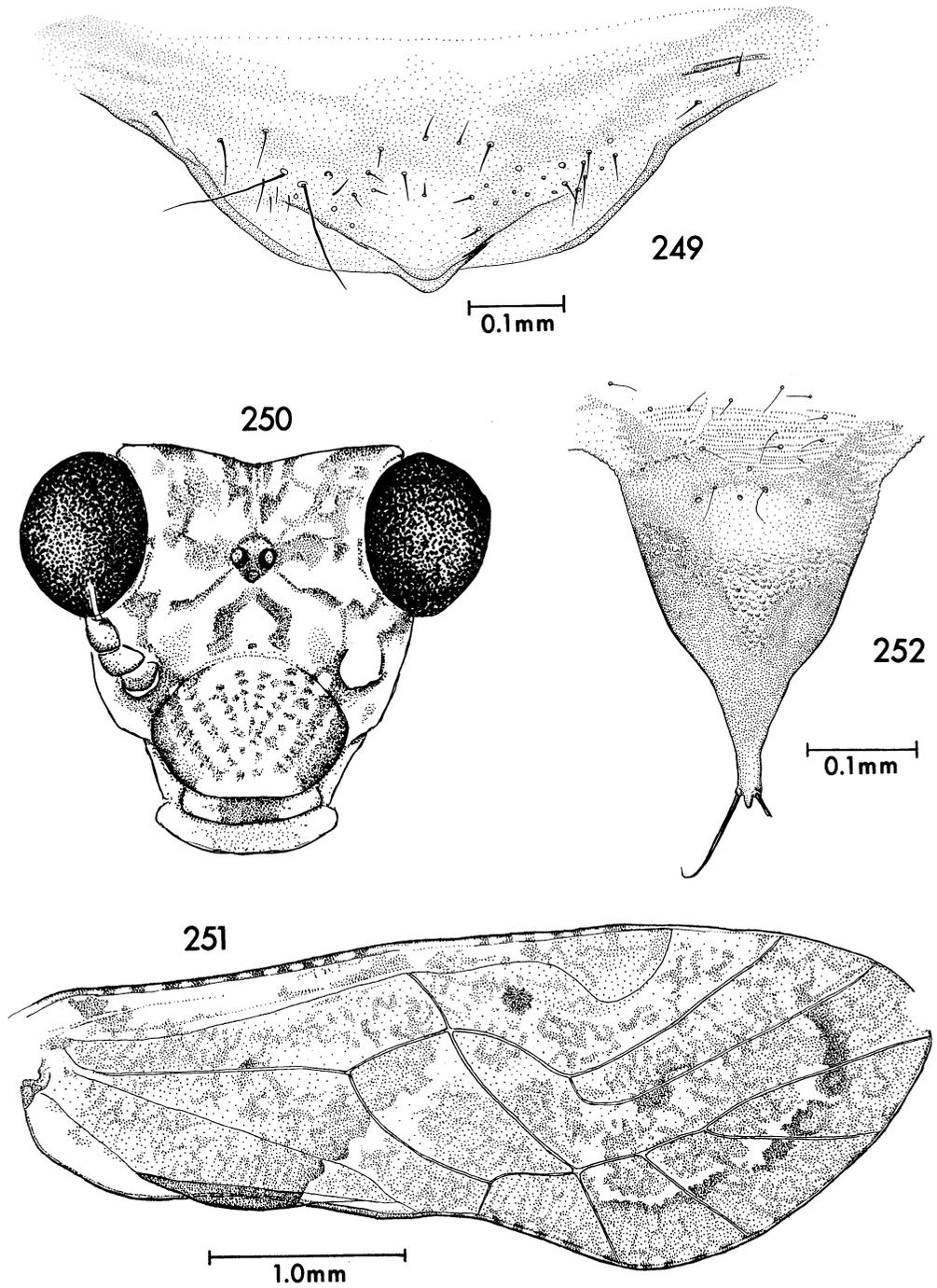


FIG. 249-252. 249. *Phlotodes alticola*, ♂: hypandrium. 250-252. *Phlotodes ascoides*, ♀: head (250), fore wing (251), subgenital plate (252). Head not to scale.

Other specimen examined. 1 ♀, VITI LEVU: Nadrau Plateau, 9 km NNE of Nadrau, 680 m, 16.XI.1972.

The head and wing patterns of *Ph. alticola* are quite distinctive. The species has only been collected on the Nadrau Plateau of Viti Levu.

Phlotodes ascoides Thornton, new species

FIG. 250–256

♀. *Coloration* (after ca 3 years in alcohol). Head buff, marked with brown as FIG. 250. Scape and pedicel brown, flagellum pale buff. Maxillary palps pale buff. Thoracic terga dark brown on posterior borders, otherwise buff. Pleura brown upper ½, buff lower ½. Legs cream except hind femur with 3 brown spots, apical tarsal segments brown. Fore wing patterned with brown (FIG. 251). Hind wing hyaline. Abdomen dark gray-brown dorsally, cream ventrally.

Morphology. I.O.:D = 2.0:1. Body length 3.4 mm. Number of ctenidia on basal hind tarsal segment: 25. Epiproct trapezoid, with 4 very long setae, several shorter ones; paraproct with field of 24 trichobothria. Subgenital plate (FIG. 252) bottle-shaped, a small distinct peninsula between the apical pair of setae. Gonapophyses as FIG. 253, outer valve ovoid.

♂. *Coloration.* As ♀, but very faded.

Morphology. I.O.:D = 0.7:1. Body length 3.5 mm. Number of ctenidia on basal hind tarsal segment: 26. Epiproct (FIG. 254) heavily sclerotized round edge, with 4 or 5 fine setae, 9th tergite with pair of low spinous lobes overlapping base of epiproct. Paraproct with field of 15–19 trichobothria. Outer parameres (FIG. 255) separate and broadened apically, a median sclerotized rod. Hypandrium (FIG. 256) with short lateral blunt projections.

Holotype ♀, VITI LEVU: Nausori Highlands, nr Nausori, 600 m, *Pinus caribaea*, 21.X.1972, IWB (BISHOP 11,496). Allotype ♂, VITI LEVU: Nadarivatu, Navai Hill, 830 m, 7.IX.1938, ECZ (BISHOP).

Other specimens examined. VITI LEVU: 1 ♂, 1 ♀, Nadarivatu, Navai Hill, 830 m, 7.IX.1938, ECZ; 1 ♂, Nadarivatu, ridge W of Vatucere, 900 m, 8.IX.1938, ECZ; 1 ♀, Nadarivatu, 850 m, 11.IX.1938, ECZ; 4 ♀, Nadarivatu, Tholo North, 760 m, 17.IX.1938, ECZ. VANUA LEVU: 1 ♀, Wakanilato, 4 km NW of Mt Delaikoro, *Citrus*, 12.XII.1972; 1 ♀, Doguru, 2 km NW of Mt Delaikoro, *Citrus*, 170 m, 12.XII.1972; 1 ♀, 2N, Savu Savu, *Citrus*, 30 m, 18.XII.1972.

The bottle-shaped subgenital plate, with 2 apical setae only and having a small apical projection between the setae, is a distinguishing characteristic of this species, in which it resembles *Rhaptoneura setosa* Smithers from Madagascar. Like *Ph. alticola*, it appears to be a highland form.

Phlotodes bipunctatus Thornton, new species

FIG. 257–262

♀. *Coloration* (after ca 3 years in alcohol). Head buff, patterned with brown as in FIG. 257, antennae buff, maxillary palps buff, brown at apex. Thorax brown dorsally, pleura cream. Legs cream, with fine gray stripes on coxa (2 or 3), irregular bars on femur (6–7) and fine stripes subapically on tibia (2); tarsus brown. Fore wing (FIG. 258) with distinctive wing spots at base of and below pterostigma and in cell M_3 ; cell R_{2+3} pale. Hind wing hyaline. Abdomen buff.

Morphology. I.O.:D = 1.5:1. Body length 2.5 mm. Number of ctenidia on basal hind tarsal segment 16. Epiproct setose. Paraproct with field of 22 trichobothria. Subgenital plate (FIG. 259) with a pair of apical setae. Gonapophyses with fairly short ventral valve, outer valve pointed (FIG. 260).

♂. *Coloration.* As ♀.

Morphology. I.O.:D = 0.8:1. Body length 1.9 mm. Number of ctenidia on basal hind tarsal segment: 28. Epiproct short, broad. Paraproct with field of 18–20 trichobothria. Hypandrium (FIG. 261) with trapezoid

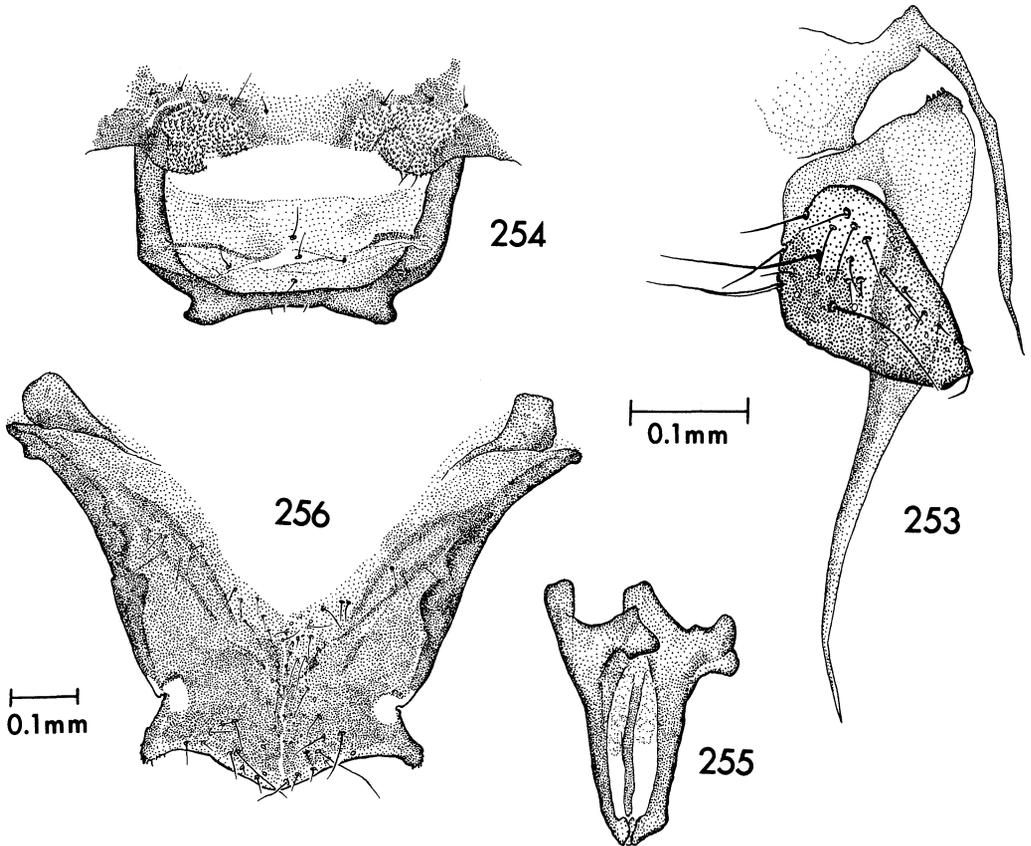


FIG. 253–256. *Phlotodes ascoides*: ♀: gonapophyses (253); ♂: epiproct and 9th tergite (254), phallosome (255), hypandrium (256). FIG. 254–256 to common scale.

median tongue and large tuberculate lateral lobes. Penis frame (FIG. 262) with outer parameres separated, apically broad and serrate, a median rod.

Holotype ♀, VANUA LEVU: nr Faun Harbour, *Citrus*, 22.XII.1972, IWB (BISHOP 11,497). Allotype ♂, VANUA LEVU: Natewa Penin., Darigala Pt, Napuka, sea level, 16.XII.1972, IWB (BISHOP).

The wing spots in the areola postica and near the base of the pterostigma easily distinguish this from other Fijian species. The hypandrium and phallosome are also distinctive.

***Phlotodes graptus* Thornton, new species**

FIG. 263–269

♀. *Coloration* (after ca 3 years in alcohol). Head light buff, marked with brown as in FIG. 263, genae, antennae, and maxillary palps pale buff. Thoracic sclerites light buff. Legs light brown except a subapical light buff band on femur and tibia, basal tarsal segment light buff. Fore wing marked with brown as in FIG. 264, hind wing hyaline. Abdomen buff.

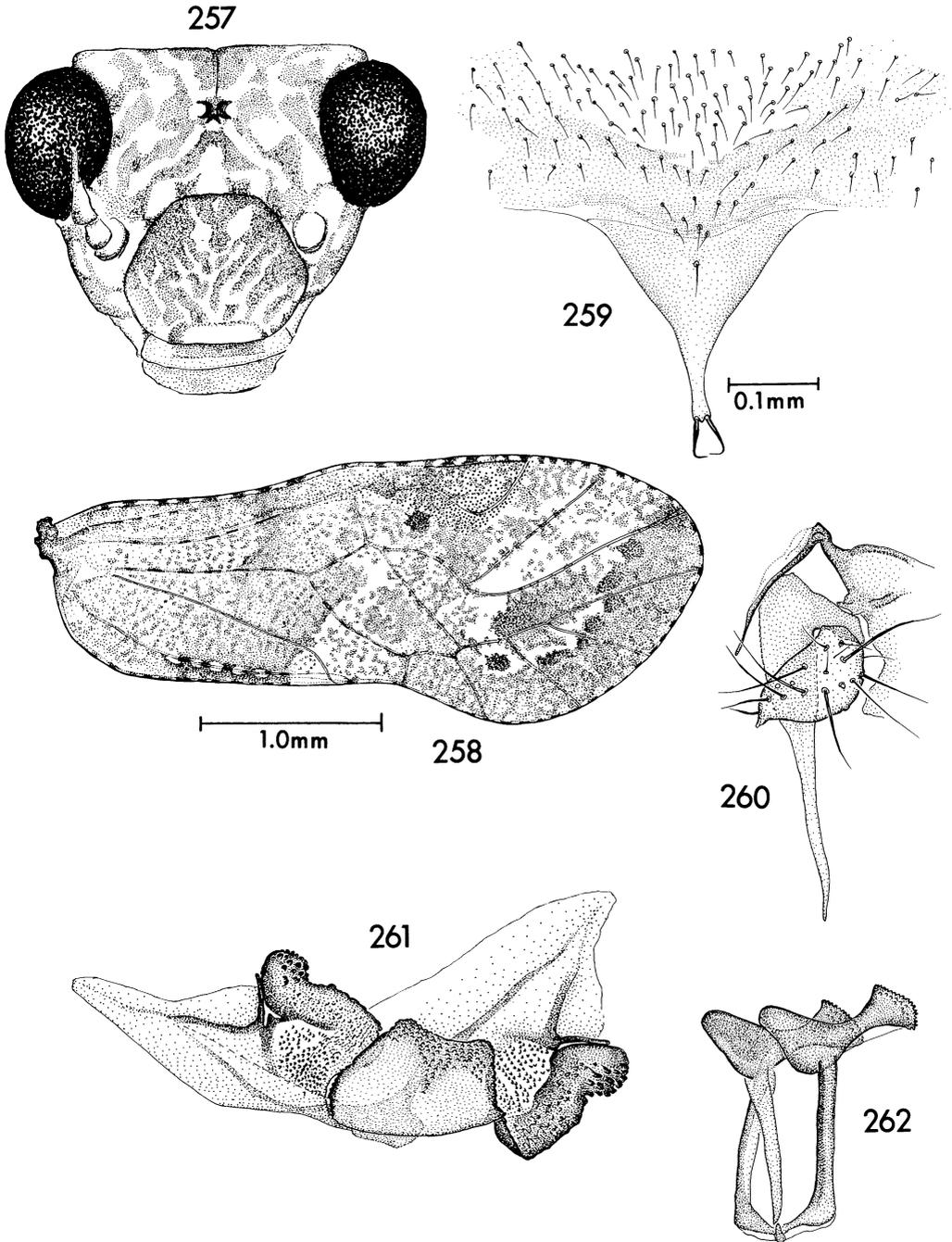


FIG. 257–262. *Phlotodes bipunctatus* ♀: head (257), fore wing (258), subgenital plate (259), gonapophyses (260); ♂: hypandrium (261), phallosome (262). FIG. 257 not to scale; FIG. 259–262 to common scale.

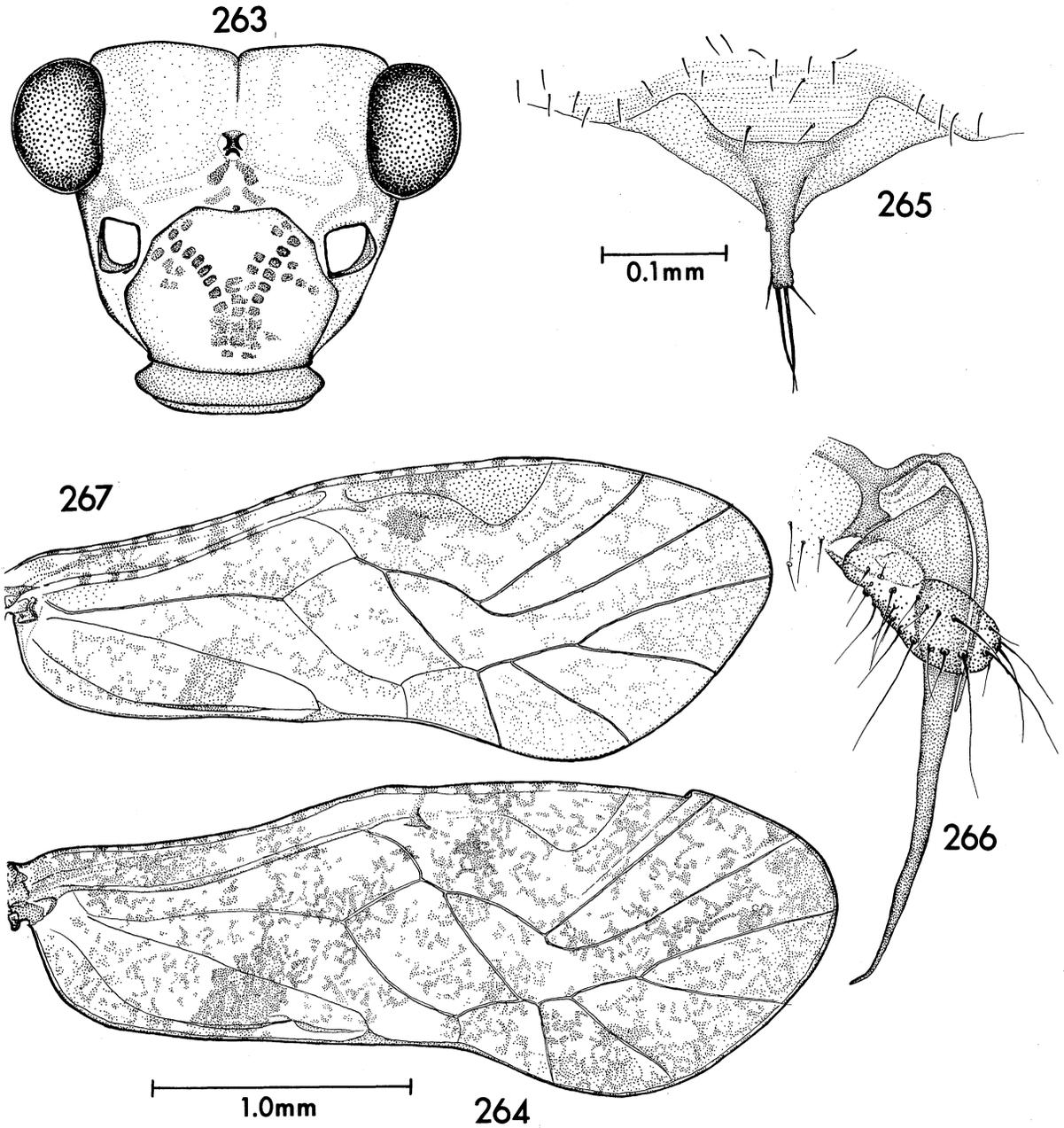


FIG. 263-267. *Phlotodes graptus*: ♀: head (263), fore wing (264), subgenital plate (265), gonapophyses (266); ♂: fore wing (267). FIG. 260 not to scale; FIG. 254, 267 and FIG. 265, 266 to common scales.

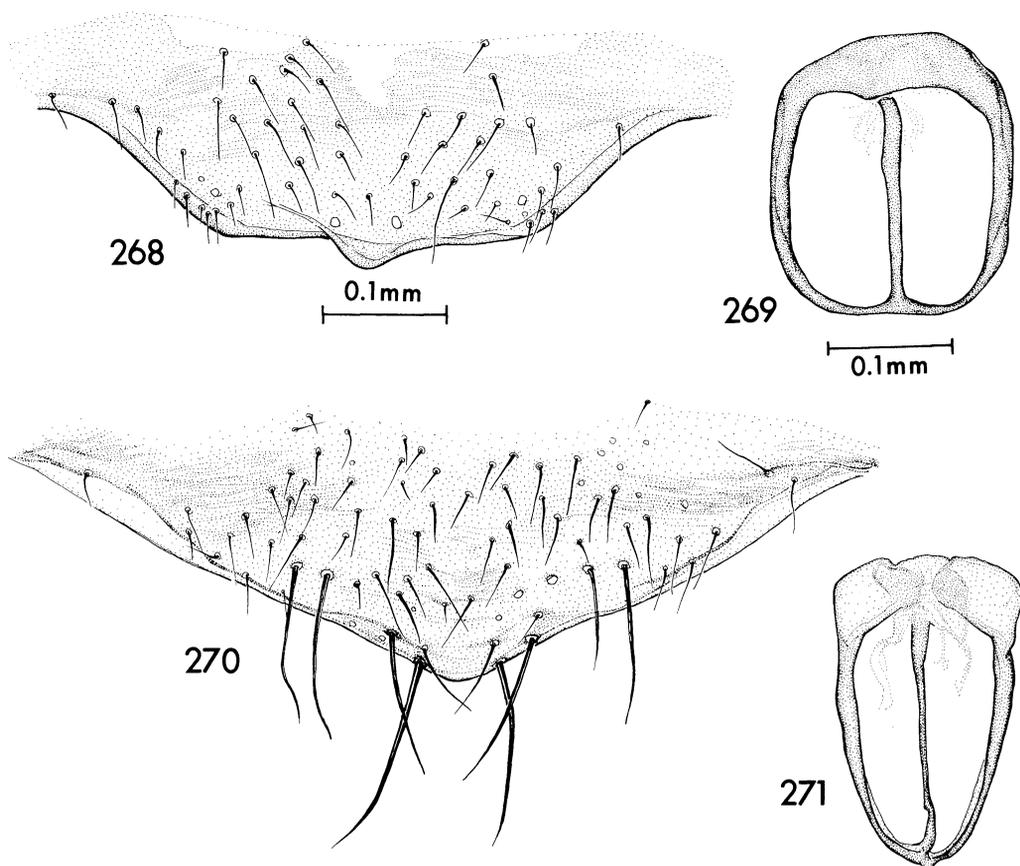


FIG. 268–271. 268–269. *Phlotodes graptus*, ♂: hypandrium (268), phallosome (269). 270–271. *Phlotodes napuka*, ♂: hypandrium (270), phallosome (271). Common scale.

Morphology. I.O.:D = 2.0:1. Body length 2.1 mm. Number of ctenidia on basal hind tarsal segment: 20. Epiproct with 4 long setae and several finer shorter ones; paraproct with field of 19–20 trichobothria. Subgenital plate (FIG. 265) apically with a pair of long and a pair of short setae. Gonapophyses (FIG. 266) with bluntly rounded outer valve.

♂. *Coloration.* As ♀, fore wing (FIG. 267) less heavily patterned.

Morphology. I.O.:D = 1.0:1. Body length 1.9 mm. Number of ctenidia on basal hind tarsal segment: 20. Epiproct trapezoid, setose; paraproct with field of 23 trichobothria. Hypandrium (FIG. 268) simple, with sclerified rim. Penis frame (FIG. 269) a closed ring with median rod.

Holotype ♀, VITI LEVU: Nadi, 23.X.1972, IWBT (BISHOP 11,498). Allotype ♂, VITI LEVU: Nausori Highlands, 8 km SE of Natawa, 870 m, ex ti and *Freycinitia*, 28.X.1972, IWBT (BISHOP).

In subgenital plate this species resembles *Ph. venusta* Smithers & Thornton from New Guinea; in phallosome it resembles *Ph. preclara* Smithers & Thornton, also from New Guinea. It may be distinguished from both these species, however, in wing pattern.

Phlotodes napuka Thornton, new species

FIG. 270–275

♀. *Coloration* (after ca 3 years in alcohol). Head pale buff, sparsely marked with brown as FIG. 272. Thoracic terga brown, pleura with a broad longitudinal gray-brown band. Legs cream apart from apical ½ of pro- and meso-femora brown, apices of tibia dark brown, 2 apical tarsal segments brown. Fore wing patterned with brown (FIG. 273). Hind wing hyaline. Abdomen gray-brown dorsally, cream ventrally.

Morphology. I.O.:D = 1.5:1. Body length 2.7 mm. Number of ctenidia on basal hind tarsal segment: 25. Epiproct trapezoid, setose; paraproct with field of 21–23 trichobothria. Subgenital plate (FIG. 274) with pair of stout apical setae without a projection between them. Gonapophyses (FIG. 285) with elongate setose outer valve.

♂. *Coloration*. As ♀.

Morphology. I.O.:D = 1.1:1. Body length 2.2 mm. Number of ctenidia on basal hind tarsal segment: 23. Epiproct semicircular, with a very shallow median rugose lobe on posterior border bearing 2 fine setae; paraproct with field of 22 trichobothria. Hypandrium (FIG. 270) simple, with 1 pair of very long stout setae, 3 pairs of lesser size, many other smaller setae. Penis frame (FIG. 271) with median rod, outer parameres not completely fused into a ring.

Holotype ♀, VANUA LEVU; 4 km SW of Savu Savu, sea level, *Citrus*, 18.XII.1972, IWBT (BISHOP 11,499). Allotype ♂, VANUA LEVU: Lovoniqai, head of Natewa Bay, *Agathis vitiensis*, 21.XII.1972, IWBT (BISHOP). Paratype, 1♂, VANUA LEVU: Natewa Penin., sea level, Napuka, Darigala Pt, *Citrus*, 15.XII.1972, IWBT (AMS).

In female wing pattern and subgenital plate this species resembles *Ph. bella* Smithers & Thornton from New Caledonia and *Ph. fenestrata* Smithers & Thornton from New Guinea. In male genitalia it resembles *Ph. pilipes* Smithers & Thornton from New Guinea, but the wing pattern is distinctive.

Phlotodes palauensis (Thornton, Lee & Chui), new combination

Myopsocus palauensis Thornton, Lee & Chui, 1972: 130.

Specimen examined. VITI LEVU: 1♂, Nadarivatu, 850 m, 11.IX.1938, ECZ.

Although the wings of this specimen are faded and the pattern is difficult to distinguish, on the basis of the male genitalia it is assigned to *palauensis*, which is here transferred to *Phlotodes* on the grounds of hind wing venation of the type specimen. The species is also known from the Palau group in the Caroline Is.

Phlotodes punctatoides Thornton, new species

FIG. 276–281

♀. *Coloration* (after ca 3 years in alcohol). Head buff, marked with brown as in FIG. 276, median vertex marks darkest, a narrow brown line from orbital margin to below antennal socket. Thoracic terga brown, pleura buff. Legs: coxa, trochanter and femur brown, femur with a subbasal buff band, remainder of legs buff. Fore wing patterned as in FIG. 277, hind wing hyaline. Abdomen buff.

Morphology. I.O.:D = 1.7:1. Body length 2.4 mm. Number of ctenidia on basal hind tarsal segment: 25. Epiproct trapezoid, lateral margins sclerotized, 4 long setae and several finer ones; paraproct with field of 23 trichobothria. Subgenital plate (FIG. 278) with about 6 apical setae of equal length and thickness. Gonapophyses as in FIG. 279.

♂. *Coloration*. As ♀.

Morphology. I.O.:D = 1.2:1. Body length 1.7 mm. Number of ctenidia on basal hind tarsal segment: 20. Epiproct trapezoid, a field of very fine spines subapically; paraproct with field of 22–25 trichobothria. Hypandrium (FIG. 281) simple, margin sclerotized. Penis frame (FIG. 280) a closed ring with median rod.

Holotype ♀, VITI LEVU: Sigatoka-Ba divide, 4 km SW of Nanoka, 650 m, 13.XI.1972, IWBT (BISHOP 11,500). Allotype ♂, VITI LEVU: Nadrau Plateau, nr

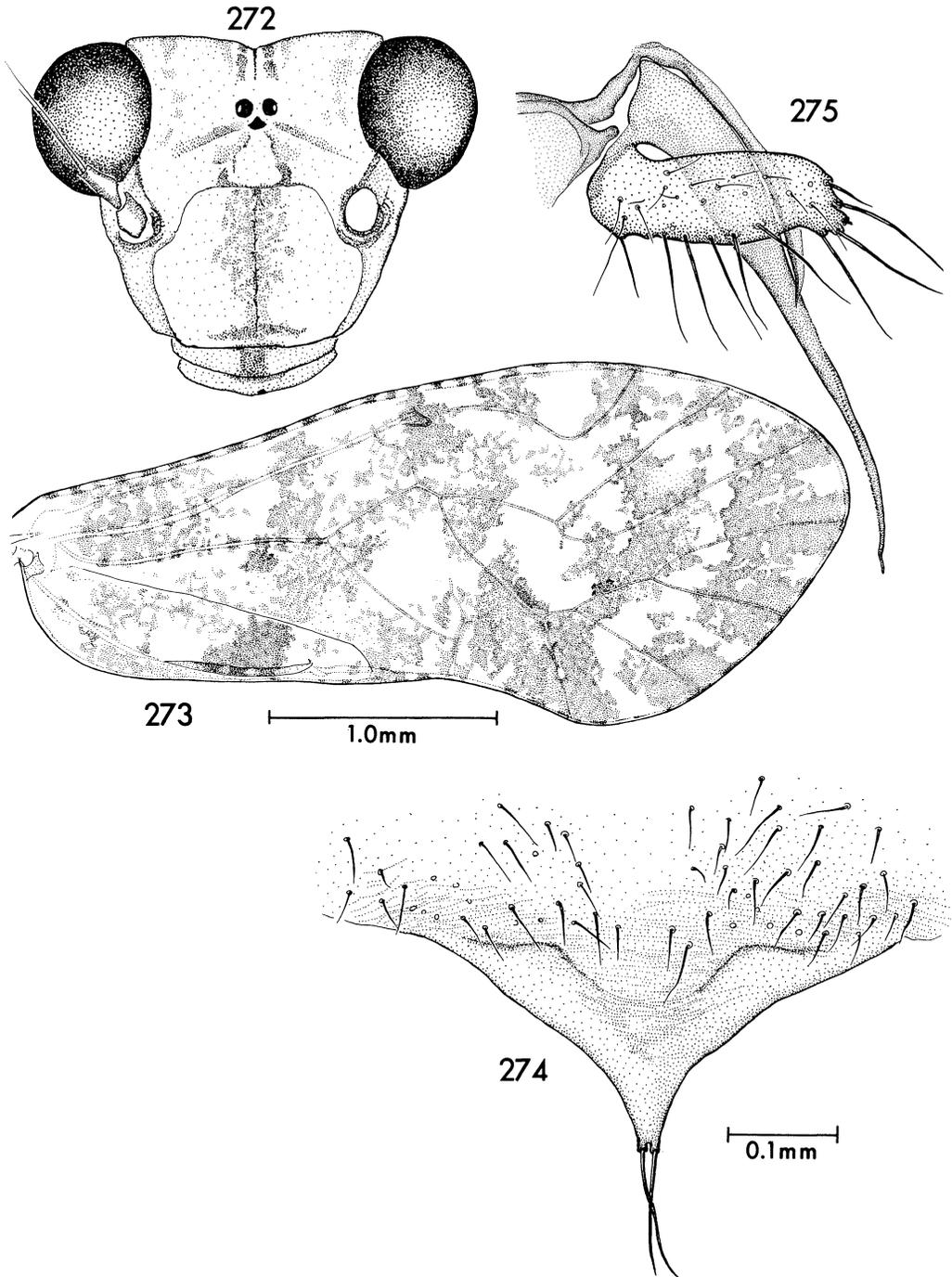


FIG. 272-275. *Phlotodes napuka*, ♀: head (272), fore wing (273), subgenital plate (274), gonapophyses (275). FIG. 272 not to scale; FIG. 274, 275 to common scale.

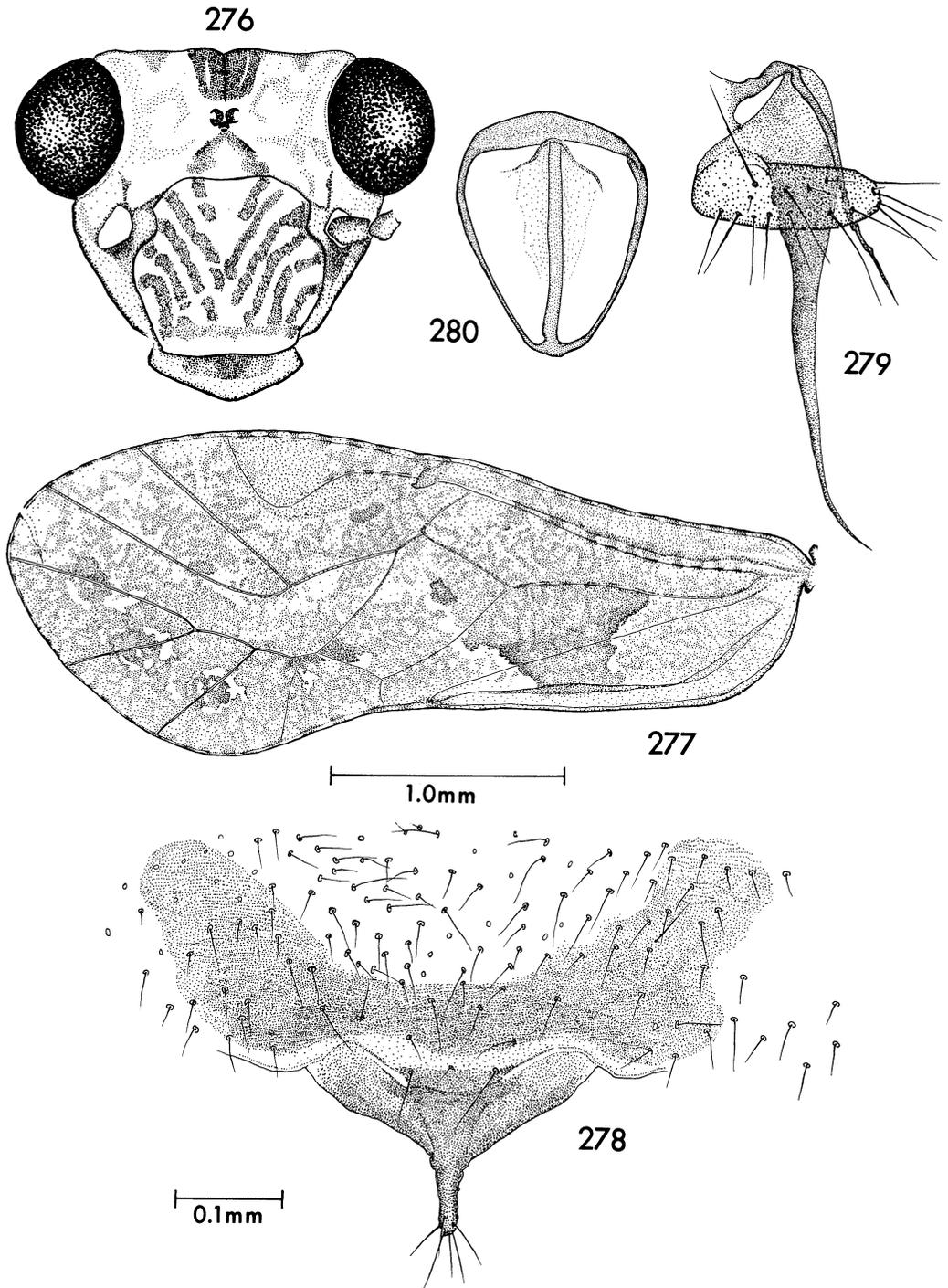


FIG. 276-280. *Phlotodes punctatoides*: ♀: head (276), fore wing (277), subgenital plate (278), gonapophyses (279); ♂: phallosome (280). FIG. 278-280 to common scale; FIG. 276 not to scale.

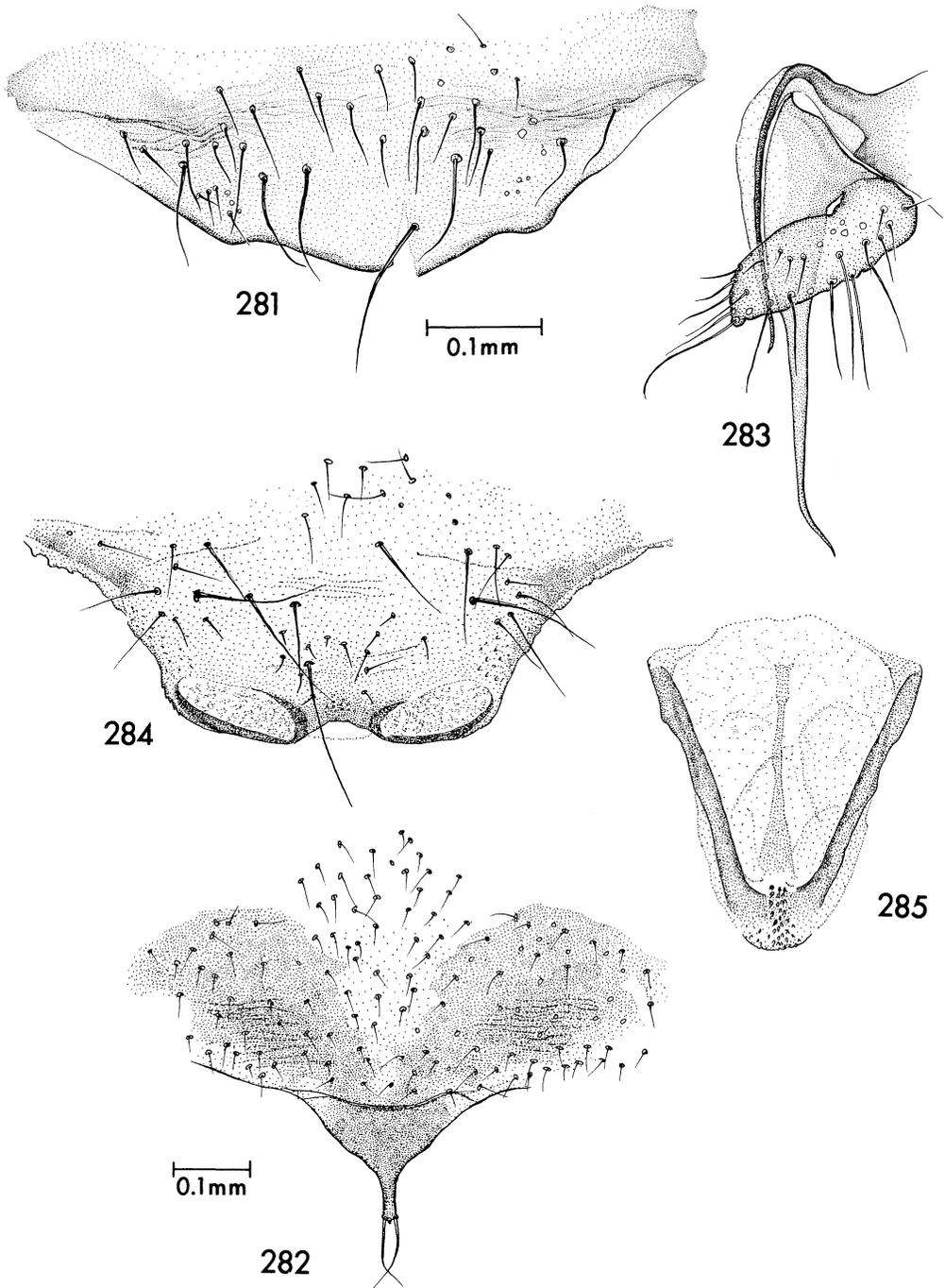


FIG. 281-285. 281. *Phlotodes punctatoides*, ♂: hypandrium. 282-285. *Phlotodes repletus*: ♀: subgenital plate (282), gonapophyses (283); ♂: hypandrium (284), phallosome (285). FIG. 281, 283, 284, 285 to common scale.

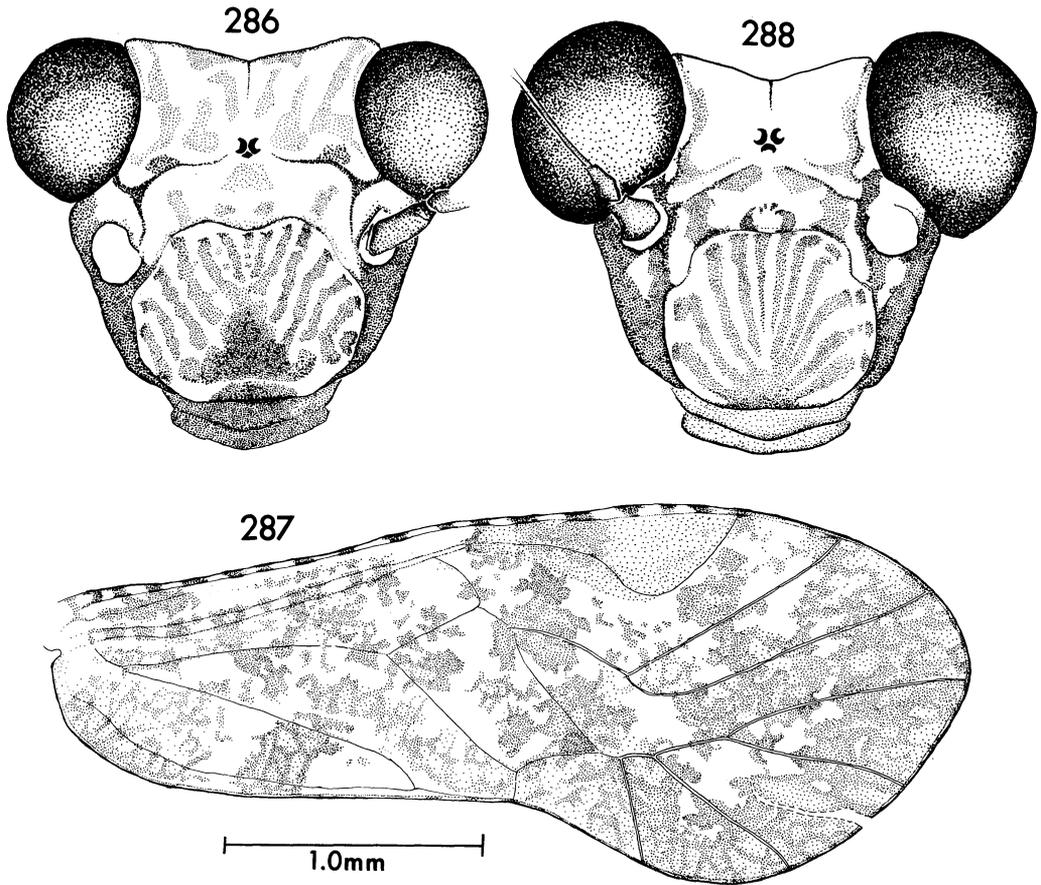


FIG. 286–288. *Phlotodes reptus*: ♀: head (286), fore wing (287); ♂: head (288). Heads not to scale.

Navai, 800 m, 31.XI.1972, IWBT (BISHOP). Paratypes: VANUA LEVU: 1♀, Savu Savu, *Citrus*, 30 m, 18.XII.1972, IWBT (AMS); LAU GROUP: 1♀, Mago I, Ima, S Marona, 70 m, 14.VII.1938, ECZ (AMS).

This species is very similar to *Phlotodes punctatus* Thornton, Lee & Chui, from Micronesia, which is here transferred to *Phlotodes* on the basis of the venation of the hind wing of the type specimen. *Ph. punctatoides* differs in details of the apical pattern of the fore wing. The species also occurs in Tonga (Thornton 1981a).

***Phlotodes reptus* Thornton, new species**

FIG. 282–288

♀. *Coloration* (after ca 3 years in alcohol). Head buff, marked with light brown as FIG. 286, genae brown, labrum brown, scape and pedicel brown. Flagellum pale brown, maxillary palps brown. Pronotum with brown spot, mesonota buff, metanota marked with brown; thoracic pleura cream with small dark brown marks. Pro- and meso-thoracic legs brown, apart from a subbasal cream band on tibia and basal tarsal segment cream. Fore wing (FIG. 287) patterned with brown; hind wing hyaline. Abdomen granulated gray-brown.

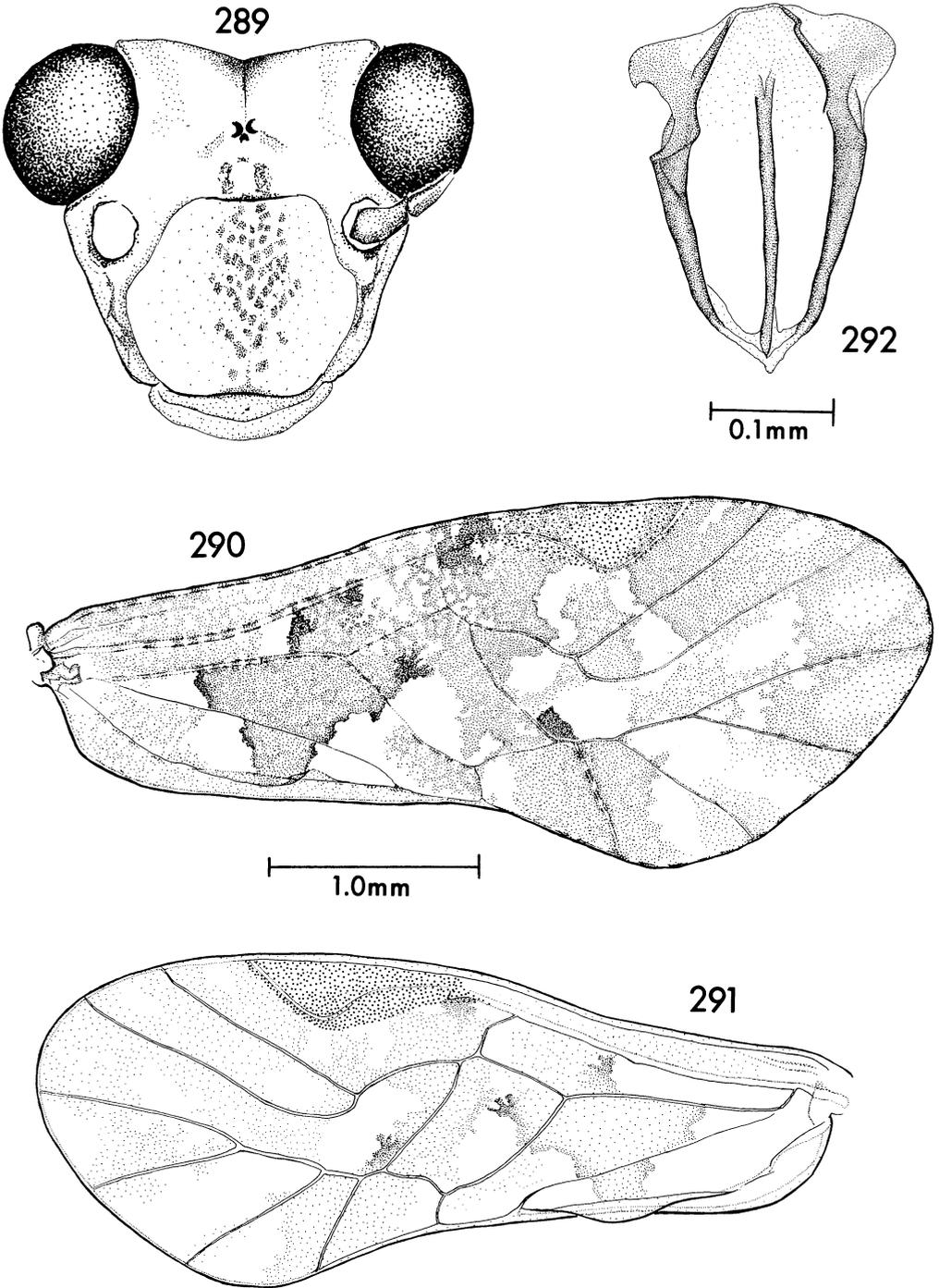


FIG. 289–292. *Phlotodes zimmermani*: ♀: head (289), fore wing (290); ♂: fore wing (291), phallosome (292). Head not to scale, wings to common scale.

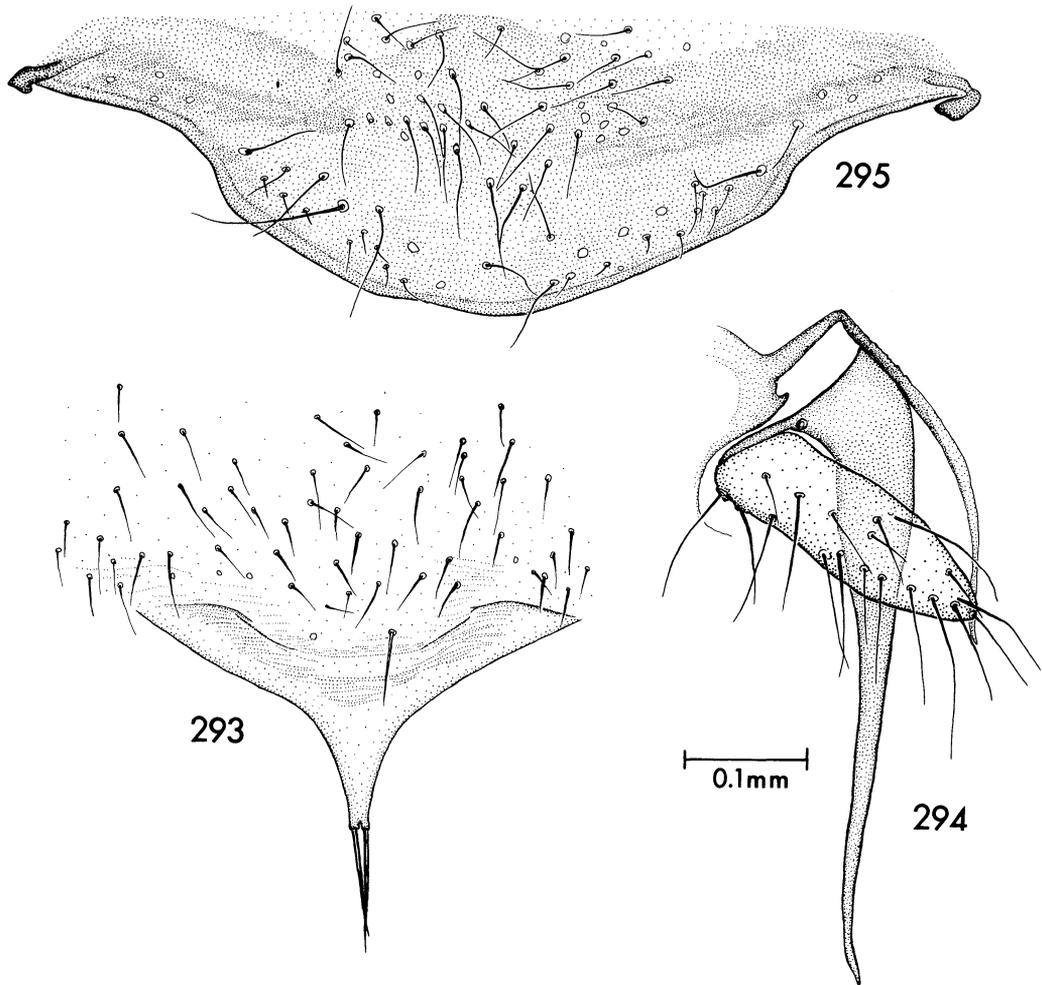


FIG. 293–295. *Phlotodes zimmermani*: ♀: subgenital plate (293), gonapophyses (294); ♂: hypandrium (295). Common scale.

Morphology. I.O.:D = 1.5:1. Body length 2.5 mm. Hind legs missing, claws of other legs with subapical tooth. Epiproct trapezoid with fine setae and 4 long stout setae, paraproct with field of 20 trichobothria. Subgenital plate (FIG. 282) with a pair of apical setae and with a very small median apical projection. Gonapophyses as FIG. 283.

♂. *Coloration.* As ♀, except that legs are light brown with apex of tibia and apical tarsal segments brown, and vertex of head (FIG. 288) unmarked medially.

Morphology. I.O.:D = 1.0:1. Body length 2.4 mm. Number of ctenidia on basal hind tarsal segment: 23. Epiproct trapezoid, finely setose, field of low tubercles round apical margin; paraproct with field of 20–21 trichobothria. Hypandrium (FIG. 284) complex, with paired posterior sclerified curved ridges. Penis frame (FIG. 285) with median field of spinelets, outer parameres separate.

Holotype ♀, VANUA LEVU: Savu Savu area, nr Nakula, 150 m, 16.XII.1972, IWBT (BISHOP 11,501). Allotype ♂, VANUA LEVU: E end Savu Savu Bay, Lesiaceva

Pt, sea level, *Citrus*, 18.XII.1972, IWBT (BISHOP). Paratype, 1♂, VITI LEVU: Nadrau Plateau, nr Navai, 800 m, hurricane-blown *Citrus* with lichen, 31.X.1972, IWBT (AMS).

Ph. reptus is rather similar to *Ph. bella* from New Caledonia, in general appearance. It differs, however, in details of fore wing pattern and in length of apical setae on the subgenital plate.

Phlotodes zimmermani Thornton, new species

FIG. 289–295

♀. *Coloration* (after ca 3 years in alcohol). Head (FIG. 289) cream, with faint brown markings apart from dark gray-brown band along midline of clypeus. Thorax cream, including legs, apart from broad gray-brown band along pleura above coxa. Fore wing patterned with shades of brown as in FIG. 290; hind wing hyaline. Abdomen cream.

Morphology. I.O.:D = 1.5:1. Body length 2.7 mm. Number of ctenidia on basal hind tarsal segment: 28. Epiproct trapezoid, 4 long setae and several smaller finer ones; paraproct with field of 25–26 trichobothria. Subgenital plate (FIG. 293) with a pair of long apical setae, no median prominence between them. Gonapophyses as in FIG. 294.

♂. *Coloration*. As ♀ but fore wing (FIG. 291) less heavily marked, although intensely pigmented areas still identifiable.

Morphology. I.O.:D = 1.0:1. Body length 2.3 mm. Hind leg broken. Epiproct semicircular, sclerotized round margin, setose; paraproct with field of 26–28 trichobothria. Hypandrium (FIG. 295) simple, with sclerotized rim. Penis frame (FIG. 292) a closed ring with median rod.

Holotype ♀, VITI LEVU: Sigatoka-Ba divide, 650 m, 5 km SW Nanoka, 13.XI.1972, IWBT (BISHOP 11,502). Allotype ♂, VITI LEVU: Navai Hill, Tholo North, 760 m, 17.IX.1938, ECZ (AMS).

Other specimens examined. VITI LEVU: 2♀, ridge W of Nadarivatu, 9.IX.1938, ECZ; 1♀, Nadarivatu, Navai Hill, 820 m, 7.IX.1938, ECZ; 1♀, Navai Hill, Tholo North, 800 m, 15.IX.1938, ECZ; 3♀, same data as allotype. VANUA LEVU: 1♀, Doquru, 2 km NW of Mt Delaikoro, 150 m, *Citrus*, 12.XII.1972.

The fore wing pattern of this species distinguishes it from any other *Phlotodes* species, although the female genitalia are remarkably similar to those of *Ph. natewa*. It appears to be a mountain species.

Phlotodes sp.

One male taken by E. C. Zimmerman on VITI LEVU, Navai Hill, Tholo North, at 830 m, on 13.IX.1938, is in the Bishop Museum collection. It is similar to *Ph. punctatoides*, but the penis frame is smaller and of a different shape. The wing pattern is too faded for description, and thus the species is not described.

Smithers & Thornton (1974) have previously established 4 tentative species groups of *Phlotodes* based on combinations of character states. New Guinea and Bismarck species fall into Groups I and II, New Caledonian species into Groups II and III, and Australian and New Zealand species into Group IV.

The following Fijian species fall into Group I, which has representatives also in Africa, Madagascar, Micronesia and New Guinea: *Ph. punctatus*, *Ph. graptus*, *Ph. alticola*, *Ph. palauensis*, *Ph. reptus* and *Phlotodes* sp. The following are in Group II, which has

TABLE 1. Comparison of psocopteran families in the New Zealand area (NZ) and the Fiji Archipelago (Fiji) by number of species.

FAMILY	NO. OF SPECIES	
	NZ	Fiji
Lepidopsocidae*	3	26
Pachytroctidae	0	2
Trogiidae	4	0
Psoquillidae	1	0
Psyllipsocidae	1	0
Liposcelidae	2	0
Caeciliidae	6	4
Ectopsocidae	5	8
Peripsocidae	4	3
Pseudocaeciliidae*	5	15
Elipsocidae*	10	0
Philotarsidae*	20	2
Trichopsocidae	1	0
Psocidae*	1	9
Myopsocidae*	1	12
Total	64	81
No. of families	14	9

* Families with contrasting representation.

representatives also in Madagascar, New Guinea and New Caledonia: *Ph. bipunctatus*, *Ph. ascoides*, *Ph. napuka*. Group III evidently has no representatives in Fiji, and Group IV, which so far as is known comprises species from Australia and New Zealand only, is also unrepresented in Fiji. It seems clear, therefore, that the Fijian myopsocids are related to those of New Guinea, the Bismarcks and New Caledonia rather than to those of Australia or New Zealand.

DISCUSSION

The Fijian psocopteran fauna, as now known, consists of 81 species in 19 genera, and 9 families are represented. Families that are well represented include the Lepidopsocidae (26 species), Ectopsocidae (8), Pseudocaeciliidae (15), Psocidae (9), and Myopsocidae (12), and those notable for their absence or poor representation are the Caeciliidae (4), Peripsocidae (3), Philotarsidae (2), Elipsocidae (0), Stenopsocidae (0), Calopsocidae (0), Mesopsocidae (0), and Hemipsocidae (0).

Of the well-represented families, radiation appears to have occurred in Fiji in the Lepidopsocidae (*Lepidopsocus*), which is also very well represented in New Caledonia, the Pseudocaeciliidae (the *greenwoodi* group of *Heterocaecilius*), the Psocidae (the *vi-ti-ensis* group of *Ptycta*), and the Myopsocidae (*Phlotodes*).

Although the distribution of the family Philotarsidae over the Melanesian arcs is now fairly well determined, the only important area of which the representation of the whole order Psocoptera is at all well known is the New Zealand area. Since Smi-

TABLE 2. Comparison of psocopteran faunas of New Zealand (NZ) and Fiji by number of genera and species. New Zealand fauna from Lee & Thornton (1967), Thornton & Wong (1968), Smithers (1969), and Wong (pers. commun.).

FAMILY/GENUS	NO. OF SPECIES	
	NZ	Fiji
Lepidopsocidae		
<i>Echmepteryx</i>	2	3
<i>Pteroxanium</i>	1	—
<i>Lepidopsocus</i>	—	20
<i>Nepticulomima</i>	—	1
<i>Cytophania</i>	—	2
	3	26
Pachytroctidae		
<i>Tapinella</i>	—	2
Trogiidae		
<i>Lepinotus</i>	3	—
<i>Trogium</i>	1	—
	4	0
Psoquillidae		
<i>Rhyopsocus</i>	1	—
Psyllipsocidae		
<i>Psyllipsocus</i>	1	—
Liposcelidae		
<i>Liposcelis</i>	2	?—
Caeciliidae		
<i>Caecilius</i>	5	4
<i>Enderleinella</i>	1	—
	6	4
Ectopsocidae		
<i>Ectopsocus</i>	5	8
Peripsocidae		
<i>Peripsocus</i>	4	3
Pseudocaeciliidae		
<i>Heterocaecilius</i>	2	10
<i>Pseudoscottiella</i>	3	1
<i>Pseudocaecilius</i>	—	2
<i>Lobocaecilius</i>	—	2
	5	15
Elipsocidae		
<i>Drymopsocus</i>	1	—
<i>Pentacladus</i>	1	—
<i>Propsocus</i>	1	—
<i>Spilopsocus</i>	4	—
<i>Paedomorpha</i>	1	—
<i>Sabulopsocus</i>	1	—
? genus	1	—
	10	0

TABLE 2. Continued.

FAMILY/GENUS	NO. OF SPECIES	
	NZ	Fiji
Philotarsidae		
<i>Haplophallus</i>	2	1
<i>Aaroniella</i>	3	1
<i>Bryopsocus</i>	2	—
<i>Zelandopsocus</i>	3	—
<i>Austropsocus</i>	10	—
	20	2
Trichopsocidae		
<i>Trichopsocus</i>	1	—
Psocidae		
<i>Blaste</i>	1	—
<i>Ptycta</i>	—	9
	1	9
Myopsocidae		
<i>Myopsocus</i>	1	2
<i>Phlotodes</i>	—	10
	1	12
Families	14	9
Genera	28	17
Species	64	81
Sp/genus	2.29	4.75

thers (1969), Dr S. K. Wong has discovered further species (pers. commun.), making some 64 species from the New Zealand area in all compared to some 81 species now known from the much smaller Fiji Archipelago. A comparison of the representation of families is made in TABLE 1 and of genera in TABLE 2. Obvious contrasts in the psocopteran faunal spectra can be seen in the representation of the families Lepidopsocidae, Pseudocaeciliidae, Elipsocidae, Philotarsidae, Psocidae and Myopsocidae. The Elipsocidae do not appear to be represented in Fiji, but have 10 species in New Zealand; the Psocidae and Myopsocidae, with only 1 representative of each family in New Zealand, have 9 and 12 species, respectively, in Fiji. The Pseudocaeciliidae has 3× the representation in Fiji that it has in New Zealand (15 and 5 species), and the Philotarsidae, with 20 species in the New Zealand area, has but 2 in Fiji. The great disparity in the Lepidopsocidae representation (26 in Fiji, including 20 species of *Lepidopsocus* of which possibly 17 are endemic; 3 in New Zealand) is not surprising, this being a family predominantly of the tropics and subtropics. The great diversity of *Lepidopsocus* in Fiji parallels the apparent speciation in this family in New Caledonia.

Looking at the psocopteran faunas as a whole, and paying particular attention to the major families, it seems clear that there is very little, if any, relationship between the 2 archipelagos of Fiji and New Zealand.

TABLE 3. Myopsocid representation (by species) in Australia (A), New Guinea (NG), New Caledonia (NC), and New Zealand (NZ), compared with that in Fiji (F).

GENUS	NO. OF SPECIES				
	A	NG	NC	NZ	F
<i>Myopsocus</i>	1*	1*	0	0	2?
<i>Phlotodes</i>	7	15	3	1	9
<i>Lophopterygella</i>	1	0	0	0	0

* Same species.

Insofar as the family Philotarsidae is concerned, the Fijian fauna (2 species) differs markedly in size from that of the New Zealand area (20 species) (Thornton et al. 1977) and New Caledonia (Thornton & Smithers 1974), particularly where the *Zelandopsocus-Austropsocus* line of the family is concerned, a line which is absent from Fiji but well represented in Australia, New Caledonia, and the New Zealand area. This line of the family, insofar as it is now known, has the following distribution: Australia (14 species), Norfolk (0), Lord Howe I (0), New Guinea (3), New Caledonia (34), the New Zealand area (15), Bismarck Archipelago (0), Fiji (0). Clearly this line of the family is confined to the older, Inner Melanesian Arc of islands, and has not reached the outer arc, which is a Tertiary structure.

The myopsocid faunas of Australia, New Guinea, New Caledonia and New Zealand are now fairly well known, and it is of interest to compare the myopsocid representation of Fiji with these areas (TABLE 3). *Myopsocus* is represented by a single species in New Guinea and Queensland (Australia) and by a separate species (possibly 2) in Fiji. The genus is not known from New Zealand. Smithers & Thornton (1974) tentatively established 4 species groups in *Phlotodes*. New Guinea and Bismarcks species are of Groups I and II, New Caledonian of Groups II and III, and Australian and New Zealand species make up Group IV. The *Phlotodes* species of Fiji fall into Groups I and II (TABLE 4), thus having Melanesian, largely New Guinean, relationships. Group IV remains an entirely Australia-New Zealand assemblage, and is not represented in Fiji. Quite clearly, the Fiji Archipelago is much more similar in its myopsocid

TABLE 4. *Phlotodes* species in Australia (A), New Guinea (NG), New Caledonia (NC), New Zealand (NZ) and Fiji (F), belonging to the species groups of Smithers & Thornton (1974).

GROUP	NO. OF SPECIES				
	A	NG	NC	NZ	F
I	0	3	0	0	6
II	0	5	1	0	3
III	0	0	1	0	0
IV	6	0	0	1	0
Not grouped	1	7	1	0	0
		(I or II)	(I or II)		

fauna to New Guinea and New Caledonia, particularly the former, than it is to New Zealand.

The *greenwoodi* group of *Heterocaecilius* (family Pseudocaeciliidae) consists of 9 known species, with the possible inclusion of the incompletely known *marshalli*. Members of the group share characteristics not found elsewhere in the family except, to some degree, in *Heterocaecilius fasciatus* Thornton & Lee from Palawan. The occurrence in *H. fasciatus* of some of the characteristics of the *greenwoodi* group may suggest an Oriental Region origin for this group.

A group of 8 species of the Psocidae is unusual and remarkably consistent in the small venational peculiarity of the fore wing—the connection of veins *rs* and *m* by a distinct crossvein. Outside this *vitiensis* group, this characteristic is usually variable and of limited incidence. The character is present also in species of *Amphigerontia* and *Sigmatoneura* (see Smithers 1976), which have quite different genitalic characteristics, and in *Ghesquierella*, which is much more similar. The latter genus is known only from Africa. *Ptycta* has speciated very extensively in Hawaii, and the *rs-m* crossvein is not present in any of the 40 or so endemic species of that archipelago.

Forty-nine of the 81 species now known have been recorded only from Fiji (60%), and although some of these may have reached Tonga, it appears likely that endemism may be on the order of 50%. Of the known species, 13 are known from elsewhere in the Pacific other than Melanesia, 3 are tropicopolitan species, 5 have an Oriental or Oriental-Pacific distribution, 1 occurs elsewhere only in New Guinea, and 6 are otherwise only known from Tonga. At the species level, Fiji has nothing in common with Australia or New Zealand. The proportion of species shared with other parts of the Melanesian arcs will be known when those areas have been fully reported upon.

Apart from the widespread Pacific species the fauna appears to have an Oriental-Melanesian origin but with limited radiation in certain groups, such as *Lepidopsocus*, the *greenwoodi* group of *Heterocaecilius*, the *vitiensis* group of *Ptycta*, and *Phlotodes*.

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