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PHILOTARSIDAE (PSOCOPTERA) OF THE SOLOMON ARCHIPELAGO

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Abstract: Collecting in September, 1975, on 7 islands of the Solomon group, resulted in 4 species of philotarsids. On Bougainville are 2 species of *Haplophallus,* which are newly described. One, closely related to a species known from Manus Island in the Admiralties, is a member of the *bundoorensis* group, represented in Australia, New Guinea, the Bismarck Archipelago, New Caledonia and New Zealand. The other is related to a species from the Southern Marianas, and belongs to the *orientalis* species group, which has representatives in Africa, the Seychelles, the Oriental Region, New Guinea, Australia, the Bismarcks, and Micronesia, with a subgroup extending from Australia to Lord Howe and Norfolk Islands and New Caledonia, Fiji and Samoa. Of the latter subgroup, the species which occurs in New Caledonia, Fiji and Samoa, *H. trepticus,* was found to occur also on Guadalcanal. *Aaroniella trukensis,* a species known from Truk in the Carolines, was found on San Cristobal and on Guadalcanal.

There are no records of psocopterans from the Solomon Archipelago. The philotarsid faunas of Australia (Thornton & New 1977b), New Guinea (Thornton & Smithers 1977), the Bismarck Archipelago (Thornton & New 1977a), New Caledonia (Thornton & Smithers 1974), Norfolk Island (Smithers & Thornton 1974a), Lord Howe Island (Smithers & Thornton 1975) and New Zealand (Thornton et al. 1977) are now fairly well known, in connection with a long-term study of the psocopteran fauna of islands of the Melanesian Arcs (see Smithers & Thornton 1974b). Moreover, the Psocoptera of Micronesia have been studied from nonspecialist collections made mostly by staff of the Bishop Museum (Thornton et al. 1972). Thus, apart from the New Hebrides and Fiji archipelagos, the philotarsid fauna of Melanesia and adjacent areas is fairly well known.

We collected for psocopterans, by beating, in the Solomon Archipelago for a total of 39 man-days in the field in November 1975: 6 on Bougainville, 6 on New Georgia, 8 on Santa Ysabel, 4 on Malaita, 1 on Nggela, 8 on Guadalcanal, and 6 on San Cristobal. FIG. 1 shows our coverage of these islands. As on previous expeditions, wherever possible we attempted to sample native forest vegetation. We did not collect any philotarsids on New Georgia, Santa Ysabel, Nggela or Malaita. On Bougainville we collected 2 species of *Haplophallus* which are described below. On Guadalcanal we collected *Haplophallus trepticus* Thornton & Smithers, known previously from New Caledonia, Fiji and Samoa, and *Aaroniella trukensis,* Thornton, Lee & Chui, known from Truk in the Carolines. The latter species was also found on San Cristobal. No representatives of the *Zelandopsocus-Austropsocus* line of the family, which is so well represented in New Caledonia and has representatives also in the New Zealand sub-region, Australia and New Guinea, were found during our field collecting in the Solomons.

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The abbreviations used in this paper follow those used by Thornton & Smithers (1974). The ratio between interocular distance and eye diameter is that of Pearman (Ball 1943) and wing veins are named according to Badonnel (1951) except that "*rs*" is preferred to "*rr*". All measurements are in millimeters.

Types of the 2 new species described are deposited in Bishop Museum, Honolulu (BISHOP).

GENUS **Aaroniella** Mockford, 1951

This genus is represented in New Guinea by 6 species, 4 of which are unusual in having vein cu_2 of the fore wing setose. On Manus Island in the Admiralties occurs a typical member of the genus, *Aaroniella gressitti* Thornton, Lee & Chui, known also from Palau, Yap, Ponape and Kusaie in the Carolines. No species of the genus has yet been found on New Caledonia or Norfolk Island, although a somewhat aberrant species (but with fore wing vein cu_2 bare) occurs on Lord Howe Island.

Aaroniella trukensis Thornton, Lee & Chui, 1972

Aaroniella trukensis Thornton, Lee & Chui, 1972: 94-95, Fig. 13b, 14c, 15b, 16c, 16d.

MATERIAL EXAMINED. SOLOMON IS: Guadalcanal I: 1 ♀, Honiara, Botanical Gardens, 19.IX.1975; San Cristobal I: 1 ♀, N Coast, nr Kira Kira, 23.IX.1975.

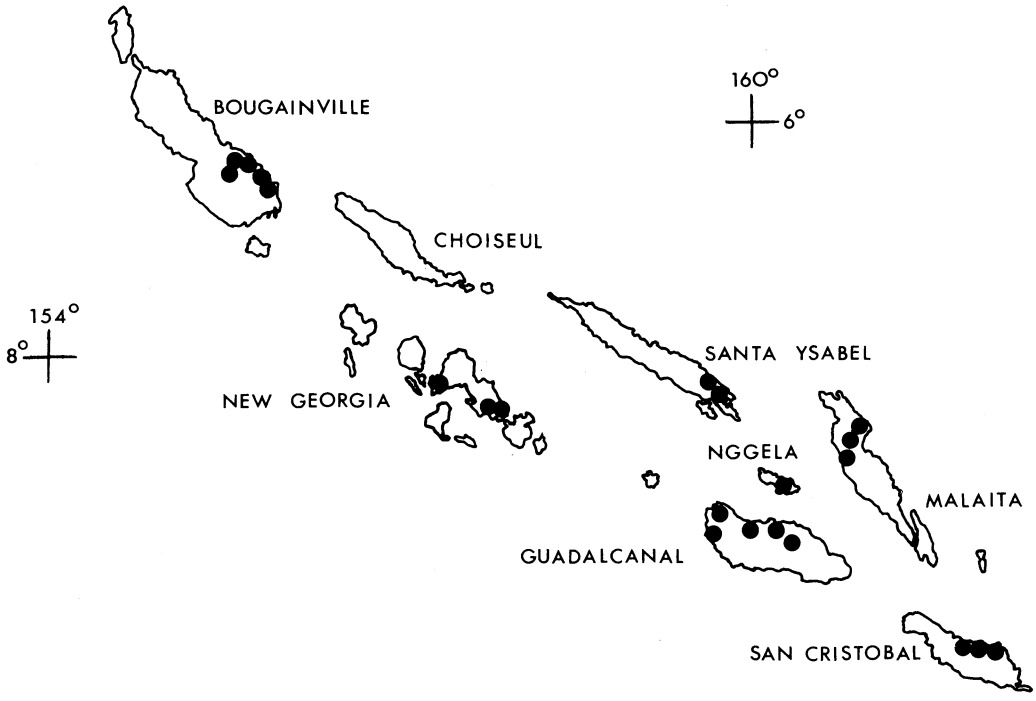

FIG. 1. The Solomon Archipelago showing collecting sites.

These specimens agree with the holotype in all respects, and differ from the closely related *A. gressitti* in head pattern, and shape and ciliation of the subgenital plate apical sclerite. This is the first record of the species outside Truk in the Carolines.

GENUS **Haplophallus** Thornton, 1959

This genus is represented in New Guinea by 5 species, 2 of which are members of the widely distributed *orientalis* group (Africa, the Seychelles, Oriental Region, Australia, New Guinea, Bismarck Archipelago and Micronesia) in which vein cu_2 of the fore wing is bare and the antennal apex lacks a stout apical seta. The *trepticus* group of 4 species (Australia, Lord Howe Island, Norfolk Island, and New Caledonia, Fiji and Samoa) may be regarded as a subgroup of the *orientalis* group. The remaining New Guinea species belong to the *bundoorensis* group, which is well represented in Australia, and occurs also in New Zealand, New Caledonia and the Bismarcks, and in which vein cu_2 of the fore wing is setose and the antennal apex bears a stout apical seta. In the Bismarck Archipelago are 2 species of each of the *orientalis* and *bundoorensis* groups, of which 1, *Haplophallus manus* Thornton & New (*bundoorensis* group), is closely similar to 1 of the Solomons species described below. The other Solomons species that is newly described below belongs to the *orientalis* group. A 3rd species, *H. trepticus,* also occurs in the Solomons, which thus have a single representative of each species group of *Haplophallus*.

Haplophallus trepticus Thornton & Smithers, 1974

Haplophallus trepticus Thornton & Smithers, 1974: 183, 184. Fig. 1-6.

MATERIAL EXAMINED. SOLOMON IS: Guadalcanal I: 1 ♀, Mt Austin, 300m, 7.IX.1975, beating introduced *Araucaria excelsa*.

This specimen differs from typical New Caledonian specimens in that the cream spot in the middle of the dark frons mark is absent, and the hyaline window in the pterostigma is less sharply defined. The species has also been recorded from Fiji and Samoa. Related species occur in Australia, Lord Howe Island, and Norfolk Island.

Haplophallus fuscipennis Thornton & Smithers, new species.

♀. *Coloration* (after 3 months in alcohol). Head buff with brown markings as in *H. fuscistigma* Thornton, Lee & Chui, 1972. Gena with an upper and lower brown band. Antenna brown, flagellar segments paler apically, except distal segment wholly dark brown. Thoracic terga brown, sutures prominently bordered cream, except scutella cream with very dark brown line along anterior sutures; pleura brown. Legs: coxa brown; femur with subapical and subbasal broad brown bands lined on dorsal surface by a broad brown longitudinal band; trochanter pale; tibia brown, dark narrow subbasal and wide subapical band on tibia of all legs; tarsal segments brown. Fore wing (FIG. 2) membrane light brown, slightly darker over apical cells, areola postica and pterostigma; small hyaline areas at base of areola postica and pterostigma and at anal angle and along vein cu_2. Veins darker brown. Hind wing uniformly light brown apart from a hyaline margin along vein cu_2. Abdomen cream with gray-brown granulations.

Morphology. I.O.:D=4.5:1. Apical segment of antenna not available. Claw with subapical tooth, pulvillus fine. Basal hind tarsal segment with 16 ctenidia. Pearman's organ with rasp and mirror. Fore wing: vein cu_2 bare, veins

with prominent dark setae in 2 ranks. Hind wing vein setae: $r_1 - 6$, $r_s - 0$, $r_{2+3} - 0$, $r_{4+5} - 16$, $m - 15$, $cu_1 - 8$. Subgenital plate (FIG. 3): apical lobe narrowing apically, bearing 7 apical setae. Gonapophyses (FIG. 4): ventral valve finely spiculate apically; dorsal valve long, parallel sided, with finely spiculate apical prominence; outer valve oval, setose, with 3 prominent longer setae. Epiproct almost square, setose apically. Paraproct with circular field of 19 trichobothria and 2 setae without basal rosettes.

Dimensions. B, 2.2; FW, 2.43; HW, 1.87; f_1, 0.27; f_2, 0.35; f_1/f_2, 0.79; F, 0.39; T, 0.76; t_1, 0.25; t_2, 0.05; t_3, 0.07; rt, 5.0:1:1.40.

♂. *Coloration* (after 3 months in alcohol). As ♀, except that pigment generally more extensive, frontal bands on head wider, and tibial bands merge so that tibiae are uniformly brown. Fore wing membrane within pterostigma somewhat darker than in ♀.

Morphology. I.O.:D=4.0:1. Flagellum thicker than in ♀, apical segment of antenna not available. Morphology of legs as ♀. Fore wing morphology as ♀, vein cu_2 bare. Hind wing vein setae: $r_1 - 7$, $r_s - 2$, $r_{2+3} - 0$, $r_{4+5} - 10$, $m - 13$, $cu_1 - 8$.

Hypandrium (FIG. 5) semicircular, simple, setose. Phallosome as in FIG. 6. Epiproct trapezoid, sclerotized laterally, setose posteriorly. Paraproct with a circular field of 17 trichrobothria and 2 setae without basal rosettes.

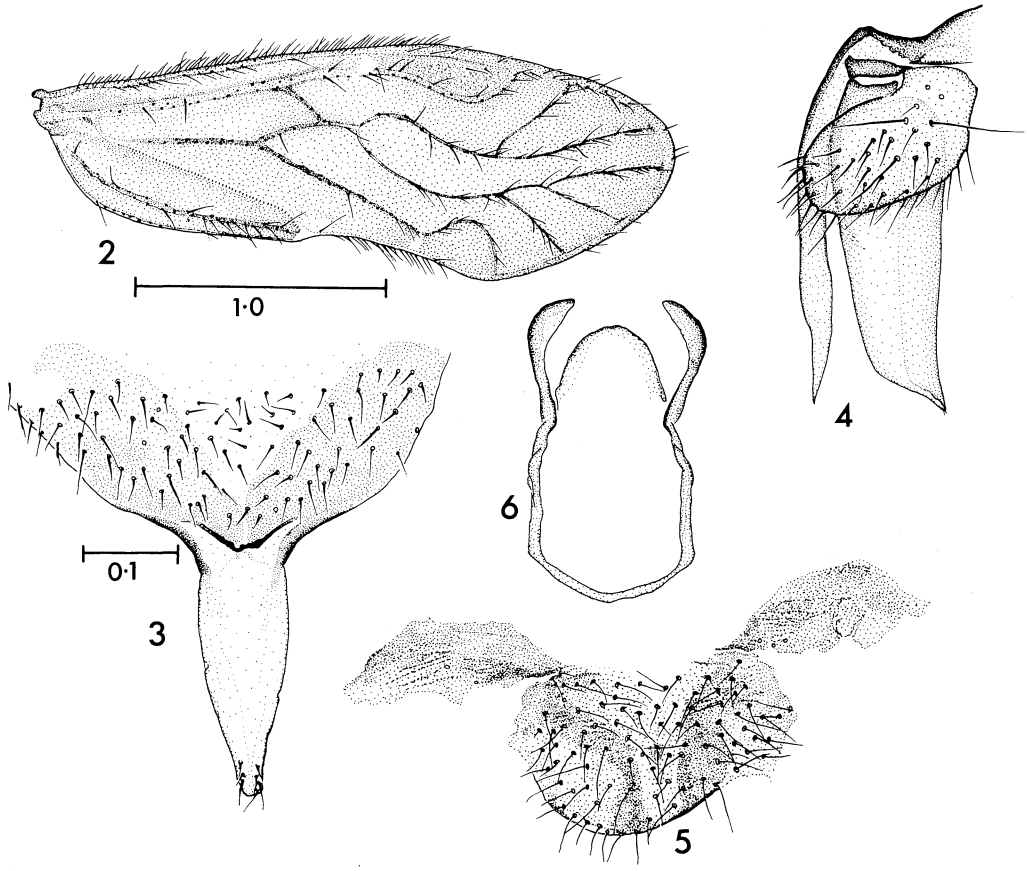

FIG. 2-6. *Haplophallus fuscipennis,* n. sp: 2-4, ♀: 2, fore wing; 3, subgenital plate; 4, gonapophyses; 5-6, ♂: 5, hypandrium; 6, phallosome. FIG. 3-6 to common scale.

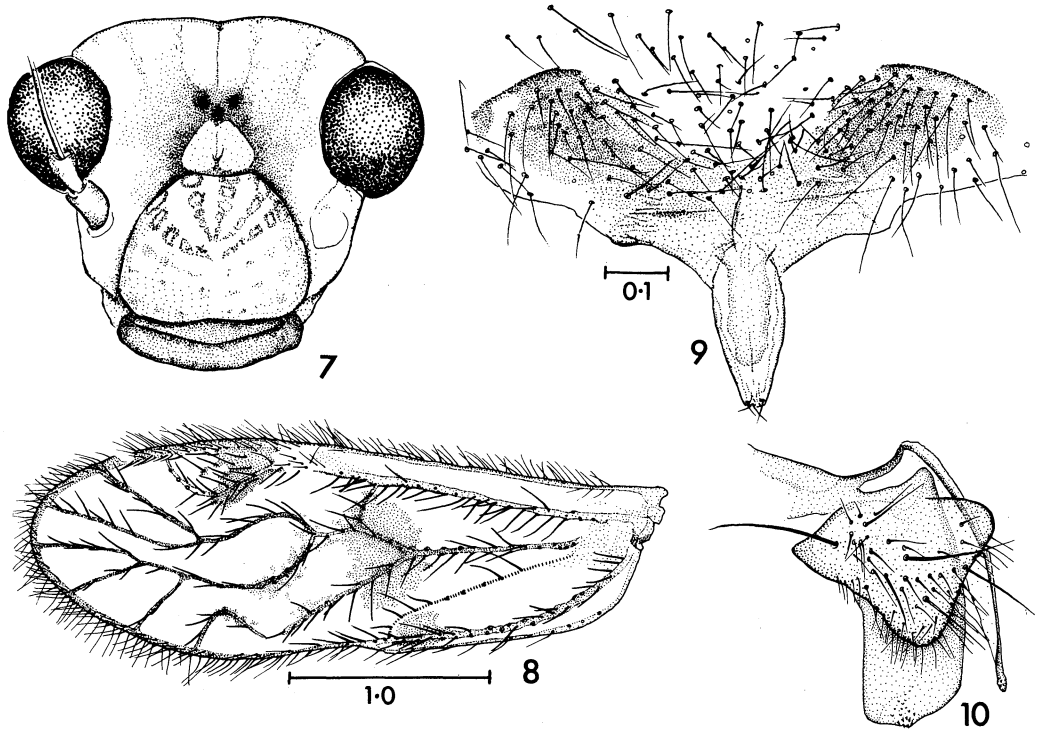

FIG. 7-10. *Haplophallus manoides* n. sp., ♀: 7, head (not to scale); 8, fore wing; 9, subgenital plate; 10, gonapophyses. FIG. 9-10 to common scale.

Dimensions. B, 1.9; FW, 2.17; HW, 1.68; f_1, 0.54; f_2, 0.28; f_1/f_2, 1.93; F, 0.33; T, 0.71; t_1, 0.22; t_2, 0.05; t_3, 0.06; rt, 4.40:1:1.20.

Holotype ♀ (BISHOP 10,758), allotype ♂ (BISHOP), PNG: SOLOMON IS: Bougainville: above Panguna, S side of saddle W of Mt Negrohead, 900 m, primary forest, 12.IX.1975.

This species, a member of the *orientalis* species group, is most similar in genitalic characters to *Haplophallus fuscistigma* from Saipan, in the Southern Marianas. It may be clearly distinguished from that species by coloration, notably the uniformly fuscous fore wing.

Haplophallus manoides Thornton & Smithers, new species

♀. *Coloration* (after 3 months in alcohol). Head generally buff. Eyes black. Vertex predominantly pale, with diffuse grayish brown markings dorsal to eyes and along median region. Ocellar protuberance dark brown. Genae pale. Median region of frons with distinctly shaped mark (FIG. 7). Postclypeus with brown honeycomb markings posteriorly, otherwise buff, striae very pale. Anteclypeus pale, labrum dark brown. Maxillary palp pale, apical segment dark brown. Scape and pedicel buff, flagellum grayish brown. Thoracic nota brown. Legs predominantly white, tarsi brown. Fore wing with brown markings as in FIG. 8. Abdomen buff, with traces of darker pigment dorsally.

Morphology. I.O.:D=3.25:1. Antennal apex attenuated, with single long apical seta. Tarsal claw with subapical tooth, pulvillus fine. Basal hind tarsal segment with 12 ctenidia. Rasp of Pearman's organ present. Fore wing (FIG. 8) cu_2 with 9 setae. Hind wing vein setae: $r_1 - 6$, $r_s - 0$, $r_{2+3} - 0$, $r_{4+5} - 12$, $m - 9$, $cu_1 - 0$.

Subgenital plate (FIG. 9), apically tripartite, apical lobe bearing 4 apical setae, subapical sclerite bare. Gonapophyses (FIG. 10): ventral valve with spiculate apex; dorsal valve rectangular with spiculate prominence; outer valve triangular with 5-6 very long setae and numerous shorter setae. Epiproct rectangular, setose. Paraproct with a field of 19 trichobothria and 2 setae lacking basal rosettes.

Dimensions. B, 2.5; FW, 2.98; HW, 2.42; f_1, 0.44; f_2, 0.27; f_1/f_2, 1.63; F, 0.74; T, 1.23; t_1, 0.33; t_2, 0.06; t_3, 0.08; rt, 5.50:1:1.33.

Holotype ♀ (BISHOP 10,759), PNG: SOLOMON IS: Bougainville: above Panguna, S side of saddle W of Mt Negrohead, 900 m, 12.IX.1975, primary forest.

This species is most similar to *Haplophallus manus* from Manus Island in the Admiralties group, and is a member of the *bundoorensis* group of species. There are differences in pigmentation of f_1; in head pattern; in the pigment pattern of the fore wing in the pterostigma, apical membrane coloration, and details of the central patch. The apical lobe of the subgenital plate bears 4 setae (2 in *H. manus*), and the distribution of stout setae on the outer valve differs in the 2 species. Clearly, however, the 2 species are very closely related and differ quite distinctly in fore wing pattern from all other members of the group.

DISCUSSION

The known philotarsid fauna of the Solomons appears to be an attenuation of the Bismarcks fauna with Micronesian influence.

Aaroniella trukensis has no close relations in New Guinea but is related to *Aaroniella gressitti,* which occurs in the Bismarcks. Both species are present in Micronesia, but apparently absent from New Guinea.

No representatives of *Zelandopsocus* or *Austropsocus,* which have species in Australia, New Zealand, New Caledonia and New Guinea, are known from either the Bismarcks or the Solomons, and evidently this line of the family has not colonized the "Outer Melanesian Arc."

Haplophallus manoides may be regarded as an extension of the New Guinea and Bismarcks fauna, being the only representative of the *bundoorensis* group in the Solomons, a group which is richly represented in Australia. *Haplophallus fuscipennis,* the representative of the typical *orientalis* group, appears to have Micronesian, rather than New Guinean affinities, and there are 2 related species in the Bismarcks. *Haplophallus trepticus* appears to be rather widespread in the SW Pacific, but was not collected on the Bismarcks or in New Guinea.

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