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THE PSYCHODIDAE OF THE RYUKYU ISLANDS
(Diptera)

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Abstract: Thirty-one species of Psychodidae are recorded from the Ryukyu Islands; all belong to the Psychodinae. Genera represented are *Pericoma* (2 species), *Brunettia* (1), *Telmatoscopus* (7), *Trichopsychoda* (1), *Philosepedon* (1), *Psychoda* (18) and 1 species unassigned to a genus; 12 species were undescribed previously. There is a strong relationship with Japan.

The Psychodidae upon which this paper is based were collected during expeditions to the Ryukyu Islands as a part of the U. S.-Japan Cooperative Scientific Program and financed by NSF Grant GF-58 to Bishop Museum. Nearly all the specimens were collected by C. M. Yoshimoto, J. C. Harrell, and G. A. Samuelson, Bishop Museum; and Y. Miyatake, Kyushu University. Illustrations were executed by Stella M. Quate.

The strongest apparent affinities of the Psychodidae of the Ryukyus are with Japan. Four species occur in both areas and the generic representation is similar. Other Ryukyu species are found also in the Philippines and Taiwan, but these are widespread members of the genus *Psychoda* and do not appear to be significant zoogeographically.

List of Ryukyu Islands Psychodidae

1. *Pericoma miyatakei*, n. sp.
2. *P. palopsis*, n. sp.
3. *Brunettia spinistoma* Tokunaga & Komyo
4. *Telmatoscopus albipunctatus* (Williston)
5. *T. illusorius*, n. sp.
6. *T. spinitibialis okinawanus* Tokunaga
7. *T. ishigakensis*, n. sp.
8. *T. obtusalus*, n. sp.
9. *T. lanceolatus* Tokunaga
10. *T. aquilus*, n. sp.
11. *Trichopsychoda arnaudi* Tokunaga
12. "*T.*" *okinawensis* Tokunaga
13. *Philosepedon memnonius*, n. sp.
14. *Psychoda contigua*, n. sp.
15. *P. umbratica* Quate
16. *P. innotabilis* Quate
17. *P. malleola* Tokunaga & Komyo
18. *P. formosana* Tokunaga
19. *P. alternata* Say
20. *P. acanthostyla* Tokunaga

21. *P. formosiensis* Tokunaga
22. *P. savaiiensis* Edwards
23. *P. quadrifilis* Edwards
24. *P. longiseta* Tokunaga & Komyo
25. *P. bifurcata* Tokunaga
26. *P. yama*, n. sp.
27. *P. seorsa*, n. sp.
28. *P. harrisi* Satchell
29. *P. itoco* Tokunaga & Komyo
30. *P. crenula* Quate
31. *P. allodapa* Quate

Key to genera of Ryukyu Islands Psychodidae

1. Vertex of head on midline much longer (or higher) than width of eye bridge; labellum bulbous apically, species often with color pattern in vestiture 2
   Vertex of head on midline shorter than width of eye bridge; labellum flattened apically and bearing 4-5 blunt teeth on apical margin as well as several preapical spines; antenna with 14-16 segments, those beyond 13 sharply reduced in size; small, yellowish or gray species usually unmarked ..... **Psychoda**
2. Wing membrane bare 3
   Wing membrane hairy (sockets visible in denuded, mounted specimens) 4
3. Flagellar segments of antenna barrel-shaped, not nodiform, ascoids short, simple rods; R_5 ending beyond rounded wing apex ..... **Pericoma**
   Flagellar segments nodiform (with basal, spherical node and slender, cylindrical internode); antennal ascoids multiple and usually branched; vein R_5 usually ending in wing apex ..... **Telmatoscopus**
4. Radial and medial forks complete, surstyles of ♂ genitalia not as below 5
   Radial and medial forks incomplete, *i. e.*, bases of R_3 and M_2 lacking and ending free without attaching to R_2 and M_1 respectively; surstyle of ♂ genitalia short, roughly quadrate, tenacula very long, thread-like with bell-shaped tips ... **Trichopsychoda**
5. Wing very broad, especially in ♂ and densely covered with dark scaly vestiture; forks on same level and near base, consequently R_{2+3} much shorter than R_2; antennal ascoids long, sinuous ..... **Brunettia**

Key to Pericoma species of Ryukyu Islands

Eye bridge with facets lacking at angle above antennal base; eyes narrowly separated in ♂ and by 2 facet diameters in ♀; ♀ subgenital plate with sides of apical part divergent; ♂ antenna peculiarly modified, segments 3, 7, 8 with large projections and 4-6 disc-like ..... 1. **miyatakei**
Eye bridge with facets complete; eyes widely separated by 4 facet diameters in ♀; ♀ subgenital plate rectangular with sides parallel; ♀ unknown ..... 2. **palopsis**

1. **Pericoma miyatakei** Quate, n. sp. Fig. 1 a-g.

Large, brown species with peculiarly modified antennae of ♂.

♂. Eyes narrowly separated by less than 1/2 facet, bridge rounded on median margin, much reduced and facets lacking at angle above antennal base; frons with rectangular patch of hairs with short median projection that does not extend to lower eye margin. Cibarium as figured. Ratio of palpal segments=9 : 13 : 15 : 23. Antenna with scape about

1.5× as long as pedicel; flagellum with basal segments highly modified, segment 3 (1st flagellar segment) hemispherical with thick, hairy projection, 4-6 disc-like, 7, 8 with long, slender projection, 9-13 truncated pyriform, terminal 3 smaller than preceding, ovoid; dense

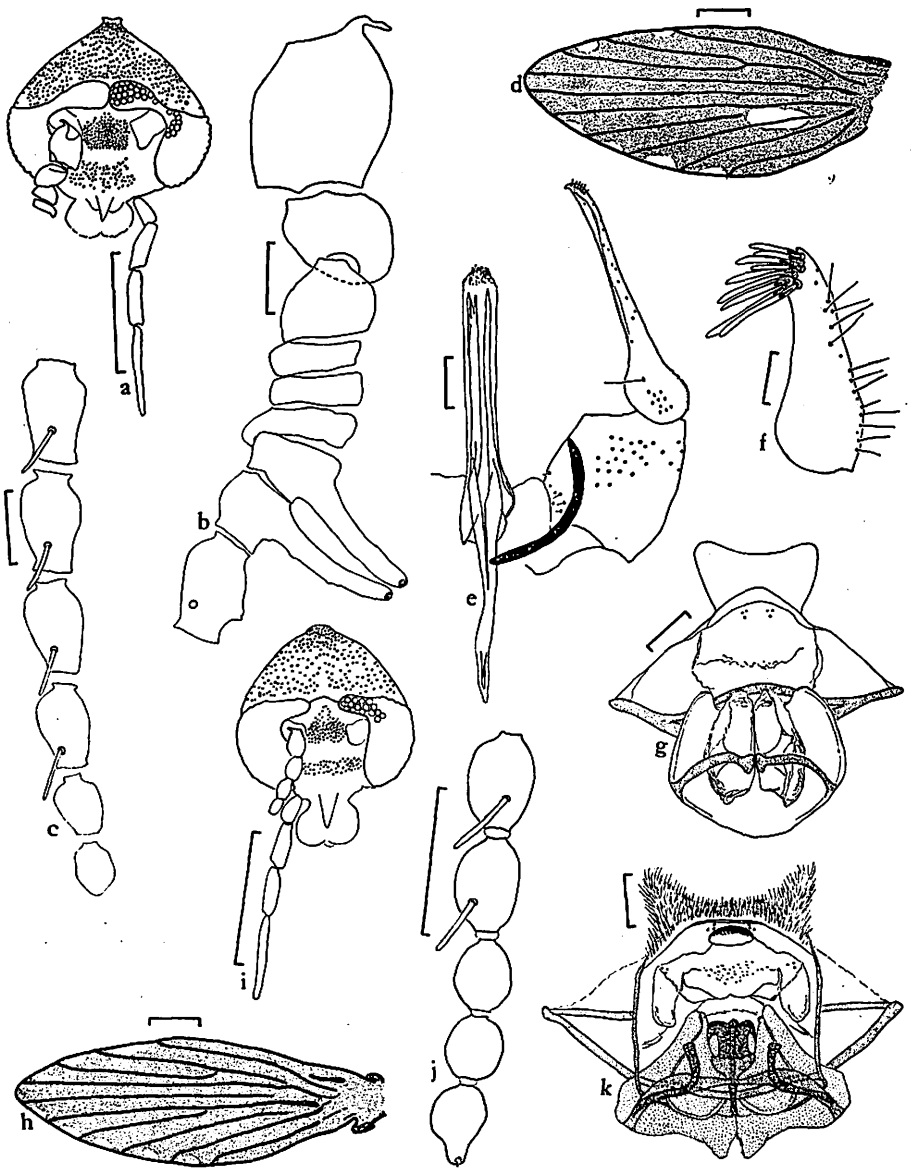

Fig. 1. a-g. *Pericoma miyatakei*: a, ♂ head; b, ♂ antennal segments 1-9; c, ♂ antennal segments 10-14; d, ♂ wing; e, ♂ genitalia, dorsal; f, ♂ surstyle; g, ♀ genitalia. h-k. *P. palopsis*: h, ♀ wing; i, ♀ head; j, ♀ antennal tip; k, ♀ genitalia. (Scale lines of wings & heads=0.3 mm, others=0.05 mm.)

covering of spatulate hairs on basal 11 segments; ascoids consist of a simple rod.

Thorax with 2 pairs (apparently) of large saccular patagia, about 2× size of coxa. Wing with rounded apex, vestiture with dark spots at vein tips and forks, membrane brown with pale areas between vein tips along posterior margin; radial and medial forks on same level a little basad of Cu apex, medial fork weakened or broken but without spur. Genitalia as figured; dististyle long and slender; aedeagus simple, tubular; surstyle with cluster of tenacula near apex.

Antenna 0.85 mm; wing length 2.40 mm, width 0.92 mm.

♀. Similar to ♂, but antenna unmodified and without spatulate hairs; eyes separated by about 2 facets, bridges connected by inverted V-shaped interocular suture; flagellar segments spherical or ovoid; genitalia as figured, apical part of subgenital plate with divergent sides and shallow apical concavity.

Antenna 0.56-0.66 mm; wing length 2.05-2.32 mm, width 0.72-0.87 mm.

Holotype ♂ (KU), Ushiku-mori, Iriomote I., 9. III. 1964, Miyatake; allotype ♀ (KU), Upper Nahara River, Iriomoto I., 12. III. 1964, Miyatake; paratopotype ♀ (BISHOP), same as holotype.

It is with pleasure that I dedicate this species to my friend, Mr Yorio Miyatake.

2. **Pericoma palopsis** Quate, n. sp. Fig. 1 h-k.

Species with rather slender, spotted wings.

♀. Eyes separated by distance equal to 4 facets, bridge rounded on median margin, interocular suture arcuate with posterior spur on midline, frons with triangular patch of hairs extending posteriorly to middle of eye bridge. Ratio of palpal segments=6 : 9 : 10 : 18. Antenna with scape and pedicel subequal; terminal 3 segments smaller than preceding; ascoids consist of simple rod.

Wing slender with round apex, vestiture with dark brown spots at tips of veins and at forks; membrane brown with clear spots along margin between vein tips; radial and medial forks on level of Cu apex, medial with small spur. Genitalia as figured; subgenital plate rectangular with broad, shallow apical concavity.

Antenna 0.52 mm; wing length 2.15 mm, width 0.77 mm.

♂. Unknown.

Holotype ♀ (KU), Upper Nahara River, Iriomote I., 12. III. 1964, Y. Miyatake.

3. **Brunettia spinistoma** Tokunaga and Komyo, 1955, Philip. J. Sci. **83**: 411.—Tokunaga, 1961, *Ibid.* **88**: 505. Fig. 2 a-c

Specimens studied agree with Tokunaga's descriptions and illustrations, except ♂ aedeagus does not extend to tip of lobe and clear area not as extensive along lateral margin of paramere as illustrated (1955: 506, fig. 83).

♂. Antenna 1.46±0.08 mm (1.32-1.62); wing length 2.34±0.1 mm (2.17-2.57), width 1.36±0.06 mm (1.25-1.50). 50 specimens.

♀. Antenna 1.03±0.06 mm (0.90-1.20); wing length 2.30±0.1 mm (2.02-2.57), width 1.05±0.08 mm (0.92-1.22). 50 specimens.

DISTRIBUTION: Japan.

RYUKYU IS. OKINO ERABU I.: Oyama, 30.VII.1963, Yoshimoto, ♂, 3 ♀♀. OKINAWA I.: Izumi-Goyayama, 22. III. 1964, Yoshimoto, 2♂♂; Shoshi, 23. III. 1964, Miyatake, 3♀♀; Mago, 21-23.III.1964, Yoshimoto & Harrell, ♂, ♀; Yona, 24-25.III.1964, 3♀♀; Hiji-gawa, 25.III.1964, Miyatake, ♀; Chizuka, Bohart & Harnage, ♀. ISHIGAKI I.: 20-30.XII.1952, G. E. Bohart, 12♀♀; Kara-yama, 14-18.III.1964, Malaise trap, Yoshimoto & Harrell, 74♂♂, 92 ♀♀; Toro-gawa, 17.III.1964, Miyatake, ♀; Omato-dake, 16.III.1964, Yoshimoto & Harrell, 4♂♂, 11♀♀. IRIOMOTE I.: 11-12. III. 1964, Malaise trap, Yoshimoto & Harrell, 87♂♂, 373 ♀♀; Shirahama—Hoshidate, 6-9. III. 1964, Yoshimoto, Harrell, Miyatake, Shirôzu, 27♂♂, 11 ♀♀; Ushiku-Mori, 11.III.1964, Miyatake, 16♂♂, 20♀♀; Up. Nahara-gawa, 12.III.1964, Miyatake, 3♂♂, 3♀♀; Shirahama, Sonai, 8.III.1964, Harrell, ♂.

Specimens of ***Brunettia*** are usually found in small numbers and collections often include several closely related, but distinct forms. Because of the possibility that they are variants of a single species which only appear distinct because the small samples do not include intermediates, I have often been reluctant to identify such collections. This is one of the few times I have had a chance to study a big series of a single species. The taxonomic features of this large sample are constant and I find little variation, either in structural details or size. Also, the specimens agree closely with the material described earlier by Tokunaga from Japan and the Ryukyus. Tentatively, we may conclude that the range of intraspecific variation is small and apparently minor, morphological differences in specimens of ***Brunettia*** may indicate different species, rather than individual variants.

KEY TO TELMATOSCOPUS SPECIES OF RYUKYU ISLANDS

1. Eyes separated on midline 2
   Eyes contiguous on midline in both sexes 6
2. Palpus 1 very short, 1/3 length of 2; wing broad with acute apex, R_1 ending in apex 3
   Palpus 1 at least 1/2 length of 2; wing slender 4
3. Radial fork little distad of medial; ♂ aedeagus racquet-shaped, consisting of an oblong loop attached to straight basal piece; ♀ subgenital plate simple, without conspicuous ornamentation on inner face, weakly bilobed or nearly truncate apically ..... 4. **albipunctatus**
   Radial fork little basad of medial; ♂ aedeagus unequally bifid distally and with broad base; ♀ unknown ..... 5. **illusorius**
4. Posterior eye margin straight and median margin truncate, eyes connected by interocular suture; node of flagellar segment 1 single; Rs not pectinate, R_5 ending beyond wing apex 5
   Posterior eye margin curved medially, no interocular suture; node of flagellar segment 1 consisting of 2 fused nodes; Rs pectinate, *i. e.* R_4 and R_5 branching from Rs in parallel manner and close together; R_5 ending in wing apex ..... 6. **spinitibialis okinawanus**
5. Wing with radial fork little distad of medial, both forks distad of Cu apex, brown spots at tips of veins, membrane pale colored; palpus 2 shorter than 3; ♀ subgenital plate with pair of saccular lobes on inner face ..... 7. **ishigakensis**

Wing with radial fork little basad of medial and both basad of Cu apex, no brown spots at vein tips, membrane brown; palpus 2 and 3 equal; ♀ subgenital plate with lobes.....8. **obtusalus**

6. R_{2+3} and R_2 about equal in length; basal flagellar segments nodiform with well formed nodes and short internodes; ♂ aedeagus dark but not black.....9. **lanceolatus**

R_{2+3} about 1/2 length of R_2, Rs pectinate; basal flagellar segments pyriform, internodes not clearly differentiated from nodes; ♂ aedeagus black, very heavily sclerotized..... 10. **aquilus**

4. **Telmatoscopus albipunctatus** (Williston): Quate, 1959, Ins. Micronesia (Bishop Mus.) **12** (4): 452.—Tokunaga, 1961, Philip. J. Sci. **88**: 490.

DISTRIBUTION: Tropicopolitan and southern Holarctic Region; Japan.

RYUKYU IS. OKINOERABU I.: Oyama, 30.VII.1963, Malaise trap, Yoshimoto, ♂, 9♀♀. OKINAWA: Kudeken, 20.III.1964, Miyatake, ♂; Nago, 24.III.1964, Shirôzu, ♀. ISHIGAKI I.: Kara-yama, 14-18.III.1964, Yoshimoto & Harrell, ♀.

5. **Telmatoscopus illusorius** Quate, n. sp. Fig. 2 d-i.

Large species similar to *albipunctatus*.

♂. Integument brown. Eyes separated by distance equal to 1 facet diameter, bridge with 4 rows of facets, partial 5th row near median margin, median margin truncate, eyes connected by inverted V-shaped suture; frons with triangular patch of hairs extending posteriorly to interocular suture. Ratio of palpal segments=8 : 24 : 20 : 23. Antenna with scape about 1.5× pedical; flagellum with aberrant segments and ascoids as illustrated, but typical specimens probably have nodiform antennae; ascoids broad, sinuous.

Thorax without patagia. Wing with radial and medial forks before center of wing and before apex of Cu, radial fork little basad of medial; Rs not pectinate, R_{2+3} does not attach to R_4, R_5 ends in acute apex. Ratio of fore leg=65 : 65 : 30, mid leg=70 : 85 : 35, hind leg=75 : 95 : 35. Genitalia as figured; aedeagus ending in 2 unequal, acute blades; surstyle with many tenacula distributed over distal 2/3.

Antenna 1.4 mm; wing length 2.5 mm, width 1.2 mm.

♀. Unknown.

Holotype ♂ (BISHOP 6659), Kara-yama, Ishigaki I., 14-18.III.1964, Malaise trap, Yoshimoto & Harrell.

6. **Telmatoscopus spinitibialis okinawanus** Tokunaga, 1961, Philip. J. Sci. **88**: 493.

RYUKYU IS. OKINAWA: Nago, 21-23. III. 1964, Malaise trap, Yoshimoto & Harrell, 2 ♂♂; Shoshi, 23.III.1964, Miyatake, 4♂♂, 4♀♀.

The Ryukyu form of this distinctive species differs from the mainland Japan specimens in the structure of the ♀ genitalia, as noted and illustrated by Tokunaga (*l. c.*), and recognized as a separate subspecies. Most of my specimens agree with the description of *okinawanus*. A few from Ishigaki I. are quite different from *okinawanus* although probably falling within the specific limits of *spinitibialis* as now conceived. These are not named as it seems advisable to await more material before adding new names to this species

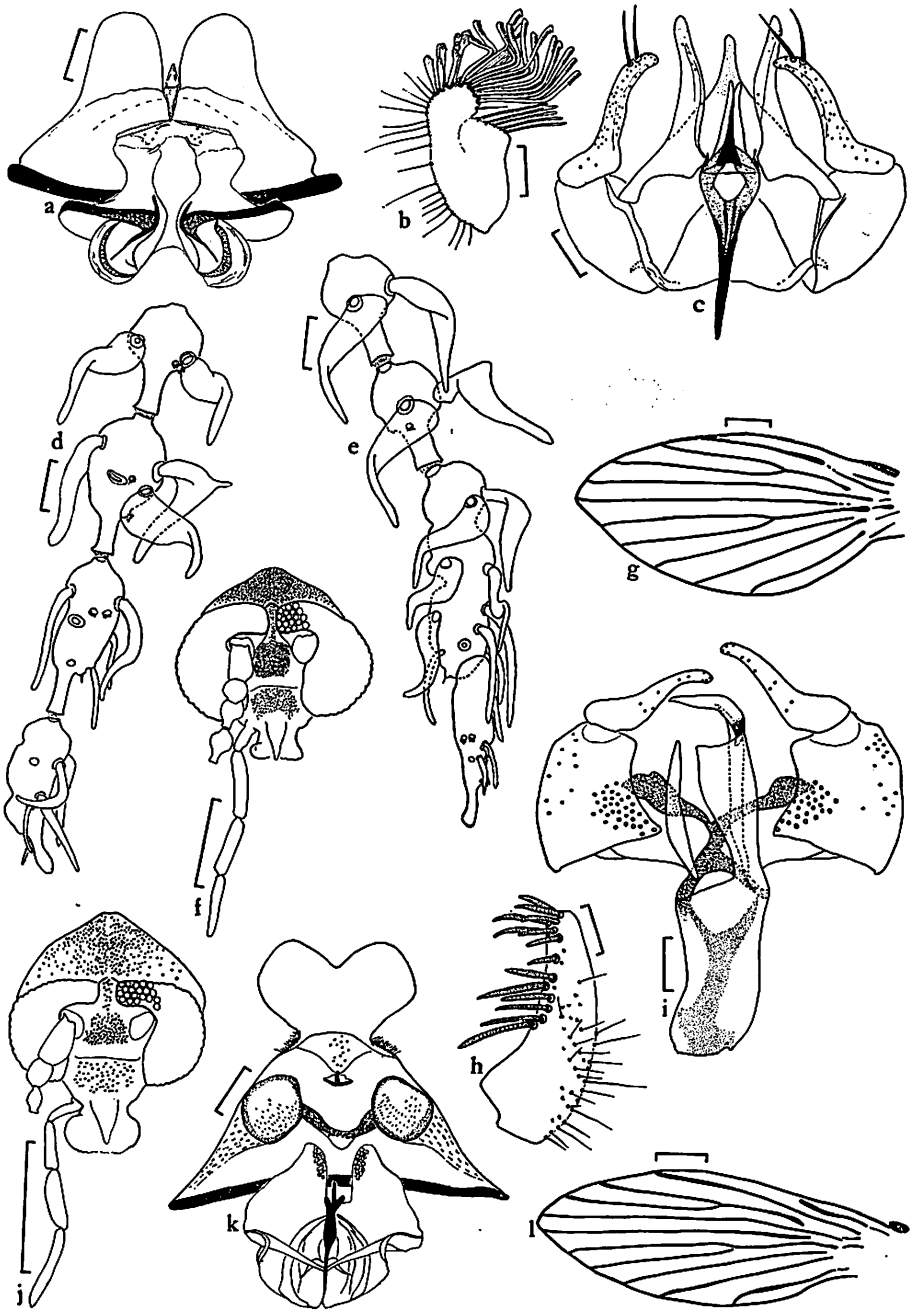

Fig. 2. a–c. *Brunettia spinistoma*: a, ♀ genitalia; b, ♂ surstyle; c, ♂ genitalia, dorsal. d–e. *Telmatoscopus illusorius*: d, ♂ antennal tip, left, showing aberrantly fused segments; e, ♂ antennal tip, right, showing aberrantly fused segments; f, ♂ head; g, ♂ wing; h, ♂ surstyle; i, ♂ genitalia, dorsal. j–l. *T. ishigakensis*: j, ♀ head; k, ♀ genitalia; l, ♀ wing. (Scale lines of wings & heads=0,3 mm, others=0,05 mm.)

which is either a plastic, polymorphic one or part of a species complex.

The synonymy of the *spinitibialis* with the North America *niger* (Quate, 1960, Pan-Pac. Ent. **26**: 156) is probably in error and should be ignored until we have a better understanding of the Asian forms.

7. **Telmatoscopus ishigakensis** Quate, n. sp. Fig. 2 j-l.

Pale colored species with spotted wings.

♂. Unknown.

♀. Eyes separated by distance equal to 3 facets, bridge with 4 rows of facets, bridges connected by inverted V-shaped suture, median margin truncate; frons with triangular patch of hairs extending posteriorly in wide band to interocular suture. Ratio of palpal segments=8 : 11 : 14 : 21. Scape about 2 × pedicel; ascoids composed of single sinuate branch.

Wing with radial fork little distad of medial, both forks distad of Cu apex; Rs not pectinate, R_{2+3} does not attach to R_4, R_5 ends beyond rounded wing tip; brown spots at tips of veins and forks; vein Sc swollen apically and Cu subapically. Subgenital plate with apical part truncated heart-shaped; pair of saccular lobes on inner face.

Antenna 0.94 mm; wing length 1.92-2.12 mm, width 0.75-0.82 mm.

Holotype ♀ (BISHOP 6660), Ishigaki I., 20-30.XII.1952, G. E. Bohart. Paratypes (USNM), 4♀♀, same.

8. **Telmatoscopus obtusalus** Quate, n. sp. Fig. 3 a-h.

♂. Body integument brown. Eyes separated by distance equal to 1½ facets, bridge with 4 rows of facets, median margin truncate, eyes connected by inverted V-shaped suture; frons with rectangular patch of hairs and narrow band of hairs extending posteriorly to upper eye margin. Ratio of palpal segment=8 : 14 : 14 : 21. Antenna damaged, see ♀, ascoids indistinct, but apparently many, single ones on each flagellar segment.

Thorax apparently without patagia. Wing membrane brown; radial fork little basad of medial and both well basad of Cu apex; Rs not pectinate, R_{2+3} short, does not attach to R_4, R_2 broken at fork, much longer than R_{2+3}, R_5 ends beyond rounded wing apex. Ratio of fore leg=50 : 42 : 22, mid leg=60 : 65 : 30, hind leg=60 : 80 : 30. Genitalia as figured; surstyle with constricted, beak-like apex; aedeagus symmetrically bifurcate at apex; surstyle with multiple tenacula confined to near tip.

Wing length 2.00 mm; width 0.80 mm.

♀. Similar to ♂. Eyes separated by 3 facets. Antenna 16-segmented, typically nodiform, ascoids single, paired on each segment, extend to basal 1/3 of following nodes; genitalia as figured, simple, without distinguishing ornamentation.

Antenna 0.84 mm; wing length 1.92 mm, width 0.75 mm.

Holotype ♂ (KU), between Shirahama and Hashidate, Iriomote I., 8.III.1964, Y. Miyatake; allotype ♀ (BISHOP 6661), Shirahama-Sonai, Iriomote I., 5.X.1963, Samuelson. Others: 2♀♀, Ushiku-mori, Iriomote I., 9.III.1963, Miyatake.

The 2♀♀ from Ushiku-mori have peculiarly modified antennae (fig 3d). The pedicel is

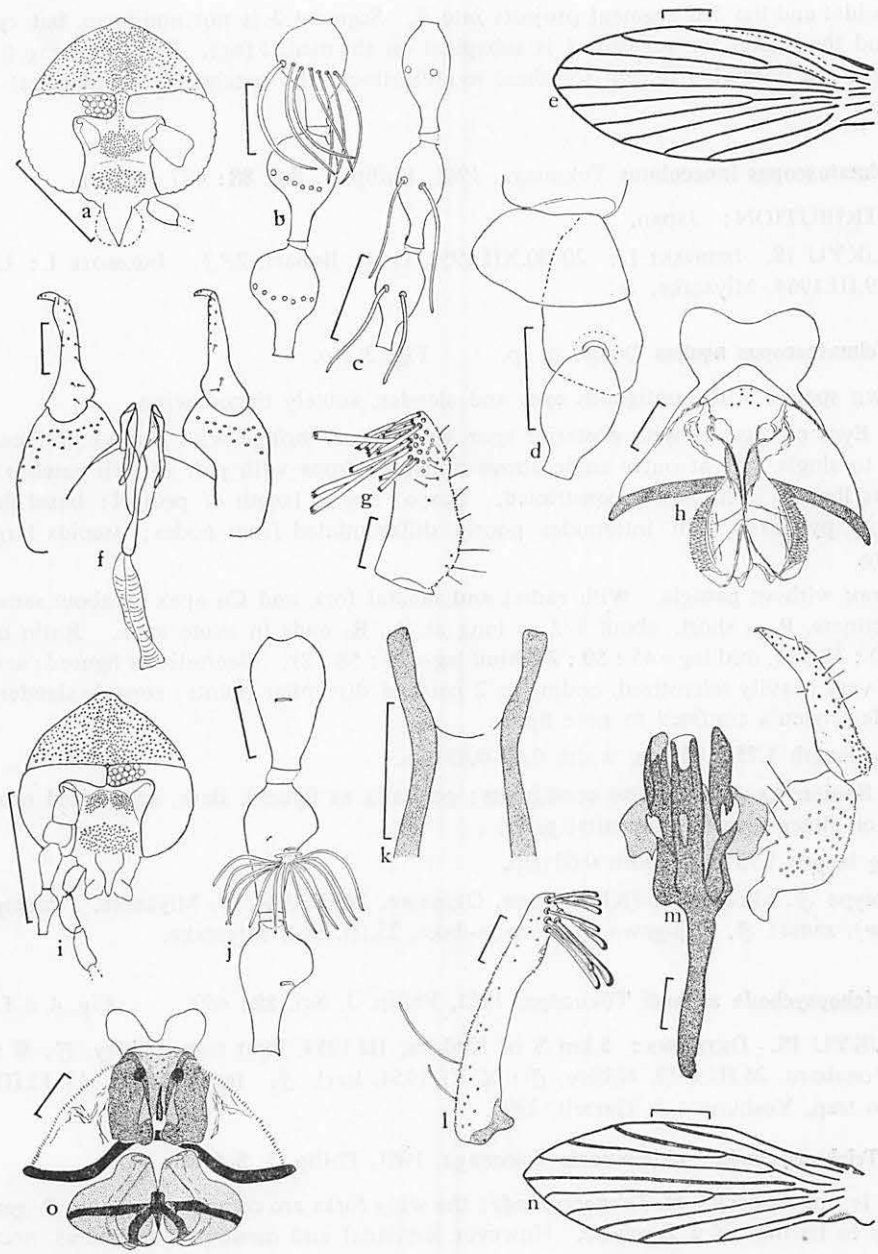

Fig. 3. a–h. *Telmatoscopus obtusalus*: a, ♂ head; b, ♂ antennal base; c, ♀ antennal segments 8–10; d, ♀ antennal base, aberrant; e, ♂ wing; f, ♂ genitalia, dorsal; g, ♂ surstyle; h, ♀ genitalia. i–o. *T. aquilus*: i, ♂ head; j, ♂ antenna, segments 3–5; k, ♂ cibarium; l, ♂ surstyle; m, ♂ genitalia, dorsal; n, ♂ wing; o, ♀ genitalia. (Scale lines of wings & heads=0,3 mm, others=0,05 mm.)

trapezoidal and the 3rd segment projects into it. Segment 3 is not nodiform, but cylindrical, and the socket for segment 4 is subapical on the medial face. The following flagellar segments are normal. Except for these modifications, the specimens are identical to the allotype.

9. **Telmatoscopus lanceolatus** Tokunaga, 1961, Philip. J. Sci. **88**: 497 (Illus.)

DISTRIBUTION: Japan.

RYUKYU IS. ISHIGAKI I.: 20-30.XII.1952, G. E. Bohart, 2♂♂. IRIOMOTE I.: Ushikumori, 9.III.1964, Miyatake, ♀.

10. **Telmatoscopus aquilus** Quate, n. sp. Fig. 3 i-o.

Brown species with contiguous eyes and slender, acutely tipped wing.

♂. Eyes contiguous with posterior spur on midline, bridge with 3 rows of facets, reduced to single row at outer angle above antenna; frons with pair of hair patches; cibarium as figured, with sides constricted. Scape 1½ × length of pedicel; basal flagellar segments pyriform with internodes poorly differentiated from nodes; ascoids large and palmate.

Thorax without patagia. With radial and medial fork and Cu apex on about same level Rs pectinate, R_{2+3} short, about 1/2 as long as R_2, R_5 ends in acute apex. Ratio of fore leg=40 : 38 : 15, mid leg=45 : 50 : 24, hind leg=40 : 58 : 21. Genitalia as figured; aedeagus black, very heavily sclerotized, ending in 2 pairs of dissimilar points; surstyle slender, with multiple tenacula confined to near tip.

Wing length 1.75-1.80 mm, width 0.60-0.65 mm.

♀. Similar to ♂, eyes also contiguous; genitalia as figured, dark, sclerotized ornamentation on inner face of subgenital plate.

Wing length 1.75 mm, width 0.60 mm.

Holotype ♂, allotype ♀ (KU), Yona, Okinawa, 24.III.1964, Y. Miyatake. Paratype ♂ (BISHOP), same; ♂, Hiji-gawa or Yonaha-dake, 25.III.1964, Miyatake.

11. **Trichopsychoda arnaudi** Tokunaga, 1961, Philip. J. Sci. **88**: 460. Fig. 4 a-f.

RYUKYU IS. OKINAWA: 5 km S of Kadena, III.1959, light trap, Nibley, ♂, ♀; 5 km S of Yonabaru, 26.III.1959, Nibley, ♂; X-XI. 1954, Earl, ♂. IRIOMOTE I.: 11-12.III.1964, Malaise trap, Yoshimoto & Harrell, 2♂♂.

12. **"Trichopsychoda" okinawensis** Tokunaga, 1961, Philip. J. Sci. **88**: 457.

This is not a species of *Trichopsychoda*; the wing forks are complete and the ♂ genitalia appears to be that of a *Psychoda*. However, antennal and mouthpart structures, necessary for proper generic placement, are not described and a new generic assignment must wait until the species is better known.

13. **Philosepedon memnonius** Quate, n. sp. Fig. 4 g-l.

♂. Body integument brown. Eyes separated by distance equal to 1½ facet diameters;

bridge with 4 rows of facets, interocular suture inverted V-shaped; vertex with sparse row of large sockets parallel to posterior eye margin, apex bituberculate, apicoventral part of head as illustrated. Ratio of palpal segments=8 : 16 : 21 : 20.

Wing with membrane hairy; costal cell darker than rest of wing; R_{2+3} without enlargement, R_{2+3} about 2× R_2. Ratio of fore leg=55 : 55 : 20, mid leg=58 : 70 : 26, hind leg=54 : 80 : 25. Genitalia as figured; aedeagus tubular, simple, paramere consisting of pair of

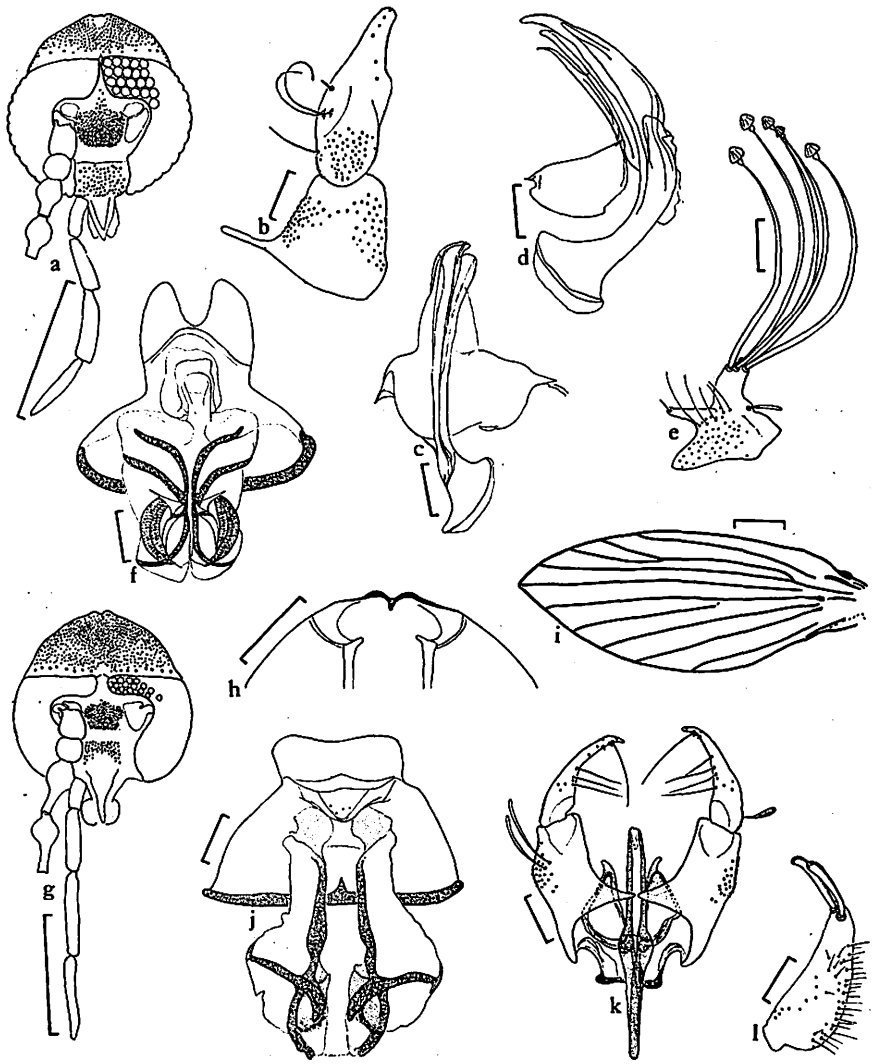

Fig. 4. a–f. *Trichopsychoda arnaudi*: a, ♂ head; b, ♂ coxite; c, ♂ aedeagus, dorsal; d, ♂ aedeagus, lateral; e, ♂ surstyle; f, ♀ genitalia. g–l. *Philosepedon memnonius*: g, ♂ head; h, ♂ head, apicoventral surface; i, ♂ wing; j, ♀ genitalia; k, ♂ genitalia, dorsal; l, ♂ surstyle. (Scale lines of wing & heads=0.3 mm, others=0.05 mm, except h=0.01 mm.)

acute lobes flanking aedeagus; surstyle with 2 apical tenacula.

Wing length 1.97–2.42 mm, width 0.72–0.95 mm.

♀. Similar to ♂; genitalia as figured.

Wing length 2.15–2.75 mm, width 0.75–1.10 mm.

Holotype ♂ (KU). Upper Nahara River, Iriomote I., 12.III.1964, Y. Miyatake; allotype ♀ (KU), Ushiku-mori, Iriomote I., 11. III. 1964, Miyatake. Paratypes (BISHOP, USNM, BMNH): 5♂♂, 2♀♀, same as holotype; 4♂♂, 10♀♀, same as allotype, collectors also Yoshimoto & Harrell; ♀, Inaba, Iriomote I., 10.III.1964, Shirôzu.

In addition to *memnonius*, there are 3 or 4 undescribed species of *Philosepedon* in the Ryukyu collections. I refrain from describing them because the material is limited and because of the uncertainty of properly associating sexes in short series.

KEY TO PSYCHODA SPECIES OF RYUKYU ISLANDS

1. Eyes separated 2
   Eyes contiguous; wing pale with 3 brown bands; ♀ subgenital plate small, sides straight and convergent ..... 14. **contigua**
2 (1). Wing with radial and medial forks incomplete, *i. e.*, bases of R_3 and M_2 lacking well before normal site of attachment to R_2 and M_1 respectively 3
   Wing with radial and medial fork complete, at most short section of base of R_3 and M_2 lacking 6
3 (2). Antenna with 15 segments 4
   Antenna with 16 segments, 13–15, completely or partly fused 5
4 (3). Hind femur longer than tibia; ♀ subgenital plate with truncated lobe above genital digit; ♂ (?) paramere extending nearly to tip of aedeagus, upper surface spinose on either side of aedeagus ..... 16. **innotabilis**
   Hind femur and tibia of equal length; ♀ genital digit arising from center of V-shaped, setose lobe; ♂ paramere not extending beyond center of aedeagus, not spinose ..... 15. **umbratica**
5 (3). ♀ subgenital plate quadrate, wider than long, with small apical lobes arising from straight, posterior margin; ♂ dististyle with saccular lobe on dorsal surface ..... 17. **malleola**
   Subgenital plate longer than wide, quadrate with apical concavity; ♂ dististyle simple, without lobe ..... 18. **formosana**
6 (2). Veins with brown spots at tips; antenna 15-segmented, segment 15 smallest, button-like; ascoids with rather short branches 7
   Veins without brown spots at tips; antenna 15- or 16-segmented, terminal segment same size as preterminal 9
7 (6). Radial and medial forks nearly on same level; ♀ subgenital plate without a single V-shaped piece 8
   Radial fork clearly distad of medial; ♀ subgenital plate consisting of only a V-shaped piece; 2 shafts of ♂ aedeagus ending on same level ..... 19. **alternata**
8 (7). ♀ subgenital plate U-shaped, sides thin and attenuate; ♂ dististyle inflated and bearing number of erect bristles on inner face ..... 20. **acanthostyla**
   ♀ subgenital plate broad with wide apical concavity, sides not thin and at-

tenuate; ♂ dististyle evenly tapering to acute, curved apex..... 21. **formosiensis**

9 (6). Antenna 14- or 15-segmented 10
Antenna 16-segmented 12

10 (9). Antenna apparently 14-segmented, actually segment 14 small and hardly visible between 13 and 15; ascoids 4-branched, except *savaiiensis* ♀.....11
Antenna distinctly 15-segmented, segments 14 and 15 equal sized and separated; ascoids 3-branched; ♂ surstyle short and stocky; ♀ unknown..... 31. **allodapa**

11 (10). Lateral shaft of ♂ aedeagus short and straight, ends well before tip of main shaft; ♀ subgenital plate with pair of rosette-like structures on inner face .....22. **savaiiensis**
Lateral shaft of ♂ aedeagus long and curved at tip, extends beyond tip of main shaft; ♀ subgenital plate bilobed, without rosette-like structures on inner face ..... 23. **quadrifilis**

12 (9). Palpus 3 longer than antenna 3; labellum with 3 spines.....13
Palpus 3 shorter than or equal to antenna 3; labellum with 2 spines.....15

13 (12). Without dark scales on wing or body 14
♂ with dark scales on frons, base of wing and tergites 4-6; dististyle bulbous at base and slender distally, surstyle moderately short; ♀ unknown...25. **bifurcata**

14 (13). ♀ subgenital plate with apical concavity deep, genital digit originates near margin of concavity; ♂ paramere unilobed..... 24. **longiseta**
♀ subgenital plate with broad, shallow apical concavity, genital digit originates well before margin, tip scarcely extends beyond margin; ♂ paramere bilobed.....26. **yama**

15 (12). ♂♂ 16
♀♀ 18

16 (15). Main shaft of aedeagus ending in recurved hook..... 17
Aedeagus large, heavily sclerotized, paddle-like, apex bearing cluster of setae .....27. **seorsa**

17 (16). Bristle at base of dististyle very long and flattened, as long as dististyle; hook of aedeagus long and slender.....28. **harrisi**
Dististyle with bristle at base much shorter than dististyle; hook of aedeagus short and broad.....29. **itoco**

18 (15). Eyes separated by more than 1 facet diameter; sides of subgenital plate parallel or divergent posteriorly.....19
Eyes narrowly separated by less then 1 facet diameter; subgenital plate small, sides convergent posteriorly.....27. **seorsa**

19 (18). Subgenital plate as wide as long.....20
Subgenital plate longer than wide, base expanded and projecting on each side like pair of flaps.....28. **harrisi**

20 (19). Subgenital plate with large, bilobed, sclerotized structure on inner face before digit.....29. **itoco**
Subgenital plate with rugose, circular structure below digit.....30. **crenula**

14. **Psychoda contigua** Quate, n. sp. Fig. 5 a-c.

♀. Body integument pale, yellowish. Eyes contiguous but lower margin separated, forming inverted V-shaped notch; frons with triangular band of hairs extending to anterior

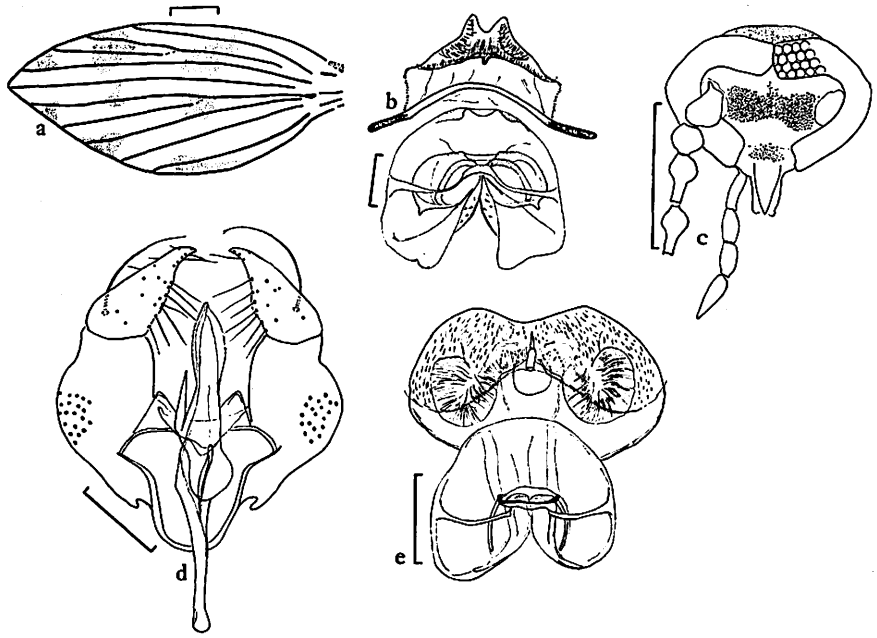

Fig. 5. a-c. *Psychoda contigua*: a, ♀ wing; b, ♀ wing; c, ♀ head. d-e. *P. savaiiensis*: d, ♂ genitalia, dorsal; e, ♀ genitalia. (Scale lines of wing & head= 0.3 mm, others=0.05 mm.)

eye margin. Labellum with 2 setae and 4 teeth; palpus short, ratio of segments=8 : 8 : 7 : 10. Antenna broken (distal part lacking).

Wing with 3 transverse, brown bands; forks complete. Genitalia as figured; subgenital plate small, sides markedly convergent, ending in pair of acute lobes separated by small, V-shaped concavity.

Wing length 2.07-2.22, width 0.82-0.97.

♂. Unknown.

Holotype ♀ (KU), Ushiku-mori, Iriomote I., Ryukyu Is., 11.III.1964, Y. Miyatake. Paratype: 1♀, same.

P. contigua belongs to a section (unnamed) of *Psychoda* which is characterized by the contiguous eye bridges. Apparently the small subgenital plate and banded wings also may be features associated with this group. At present only 3 other species from Borneo (Quate 1962) and 5 from the Philippines (Quate 1965) belonging to the group are known, but others from the Indomalayan area await description.

15. **Psychoda umbratica** Quate, 1965, Pac. Ins. 7: 898.

DISTRIBUTION: Philippines.

RYUKYU IS. OKINAWA I.: Chibana, III. 1959, light trap, C. Nibley, ♀, ♂; Futema, 28. V. 1955, Murphy, ♀. IRIOMOTE I.: Shira-hama, 7. III. 1964, Miyatake, ♀.

The specimens from the Ryukyus agree closely with those from the Philippines, except

they are larger. The wing length of the Ryukyu females range from 1.25-1.70 mm as compared to 0.95-1.02 mm of the Philippine material. No differences in the genitalia are detectable.

16. **Psychoda innotabilis** Quate, 1962, Pac. Ins. **4**: 72; 1965, *Ibid.* **7**: 900.

DISTRIBUTION. Philippines, Borneo.

RYUKYU IS. OKINAWA I.: 5 km S of Kadena, III. 1959, light trap, C. Nibley, 2♀♀; Nago, 21-23. III. 1964, Malaise trap, Yoshimoto & Harrell, ♀; Shimabuku, III. 1959, light trap, Nibley, ♂.

17. **Psychoda malleola** Tokunaga & Komyo, 1954, Philip. J. Sci. **83**: 310 (illus.).—Tokunaga, 1958, *Ibid.* **86**: 374.—Quate, 1962, Pac. Ins. **4**: 71 (illus.).

DISTRIBUTION: Japan, Borneo, Africa.

RYUKYU IS. OKINAWA: 5 km S of Yonabaru, 26.III.1959, light trap, Nibley, ♀; Chibana, III.1959, Nibley, 5♀♀; Yona, 27.XI.1963, Samuelson, ♀.

18. **Psychoda formosana** Tokunaga, 1957, Saikyo Univ. Agric., Sci. Rpt. **9**: 61 (illus.).—Quate, 1962, Pac. Ins. **4**: 70 (illus.).

DISTRIBUTION: Taiwan, Borneo, India.

RYUKYU IS. OKINAWA: Shuri, 4.III.1964, Miyatake, ♀. ISHIGAKI I.: 20-30. XII. 1952, G. E. Bohart, 2♀♀; Toro-gawa, 17. III. 1964, Miyatake, ♀.

19. **Psychoda alternata** Say: Quate, 1959, Ins. Micronesia (Bishop Museum) **12** (4): 469 (illus.).

DISTRIBUTION: Cosmopolitan.

RYUKYU IS. OKINAWA: Shuri, 4. III. 1964, Miyatake, ♀; Izumi-Goyama, 22. III. 1964, Miyatake, ♀; Chibana, III. 1959, Nibley, ♀; Koza, III. 1959, Nibley, ♀. IRIOMOTE I.: Shirahama, 6, 7. III. 1964, Miyatake, 7♀♀, 3♂♂.

20. **Psychoda acanthostyla** Tokunaga, 1957, Saikyo Univ. Agr., Sci. Rpt. **9**: 53 (Illus.).—Quate, 1962, Pac. Ins. **4**: 59 (Illus.).

DISTRIBUTION: Taiwan, Philippines, Borneo, Malaya, India, Caroline Is., Mariana Is.

RYUKYU IS. ISHIGAKI I.: 20-30.XII.1952, G. E. Bohart, ♀.

21. **Psychoda formosiensis** Tokunaga.

Psychoda formosiense Tokunaga, 1957, Saikyo Univ. Agr., Sci. Rpt. **9**: 66 (Illus. ♀).
Psychoda formosiensis: Quate, 1962, Pac. Ins. **4**: 59 (Illus. ♂).

DISTRIBUTION: Taiwan, Philippines, Borneo.

RYUKYU IS. ISHIGAKI I.: 20-30.XII.1952, G. E. Bohart, ♂.

22. **Psychoda savaiiensis** Edwards, 1928. Fig. 5 d-e.

DISTRIBUTION: Tropicopolitan, Japan, Taiwan.

RYUKYU IS. OKINAWA: 5 km S of Kadena, III. 1959, light trap, Nibley, ♀, ♂; 5 km S of Yonabaru, 26.III.1959, Nibley, ♀; Shimabuku, III. 1959, Nibley, ♀; Shoshi, 23.III.1964, Miyatake, ♀; Yona, 27.XI.1963, Samuelson, 4♀♀. ISHIGAKI I.: 20-30.XII.1952, G. E. Bohart, ♂; Kara-yama, 14-18.III.1964, Malaise trap, Yoshimoto & Harrell, 2♀♀.

23. **Psychoda quadrifilis** Edwards, 1928.—Quate, 1959, Ins. Micronesia (Bishop Mus.) **12** (4): 476. Fig. 6 a-d.

DISTRIBUTION: Widespread in Pacific basin from Hawaii to Ryukyus and Borneo.

RYUKYU IS. OKINAWA: Yona, 27.XI.1963, Samuelson, ♂.

In Micronesia *quadrifilis* has been divided into several subspecies (Quate 1959). There is additional variation in the Ryukyu, Philippine and Borneo specimens, but the pattern and relationships of these variants are not clear. Subspecific assignments are deferred until a clearer pattern of variation emerges.

The ♂ genitalia of the Ryukyu from differs in several respects from the Micronesian forms, as will be evident from the illustrations (fig 6 a-c); the latter are re-illustrated here for comparison. The Philippine form is figured in an earlier issue of this journal (Quate 1965). Females are not present in the Ryukyu collections.

24. **Psychoda longiseta** Tokunaga and Komyo, 1954, Philip. J. Sci. **83**: 313 (Illus.).

Psychoda hamatifera Tokunaga, 1958, *Ibid.* **86**: 385 (Illus. ♀).

DISTRIBUTION: Japan, Bonin Is.

RYUKYU IS. OKINAWA: 5 km S of Kadena, III.1959, light trap, Nibley, 9♀♀; Shimabuku, III.1959, Nibley, 13♀♀; Yona, 24-25. III. 1964, Malaise trap, Yoshimoto & Harrell, 2♀♀; Nago, 21-23. III. 1964, Yoshimoto & Harrell, 2♀♀. ISHIGAKI I.: Kara-yama, 14-18. III. 1964, Yoshimoto & Harrell, 8♀♀.

25. **Psychoda bifurcata** Tokunaga, Philip. J. Sci. **86**: 378 (Illus. ♂).—Quate, 1961, Proc. Haw'n. Ent. Soc. **17**: 437 (♀=*harrisi* Satchell).

RYUKYU IS. ISHIGAKI I.: Kara-yama, 14-18.III.1964, Malaise trap, Yoshimoto & Harrell, ♂.

26. **Psychoda yama** Quate, n. sp. Fig. 6 e-j.

♀. Body integument brown. Eyes separated by 2 facet diameters; eye bridge with 4 rows of facets, rounded on median margin; frons with band of hairs extending posteriorly to near upper eye margin, not joining vertex hairs. Labellum with 3 setae and 4 teeth; ratio of palpal segments=7 : 10 : 12 : 15. Antenna 16-segmented, terminal 3 segments of equal size and clearly separate; ascoids Y-shaped.

Wing with forks complete. Ratio of fore leg=37 : 30 : 15, mid leg=43 : 42 : 19, hind leg=45 : 50 : 22. Genitalia as figured; subgenital plate with convergent sides and broad, shallow concavity.

Antenna 1.00 mm (0.90-1.08); wing length 1.73±0.1 mm (1.55-1.95), width 0.67±0.04 mm (0.62-0.75). 23 spec.

♂. Similar to ♀; eyes separated by about 1 facet diameter, often with interocular

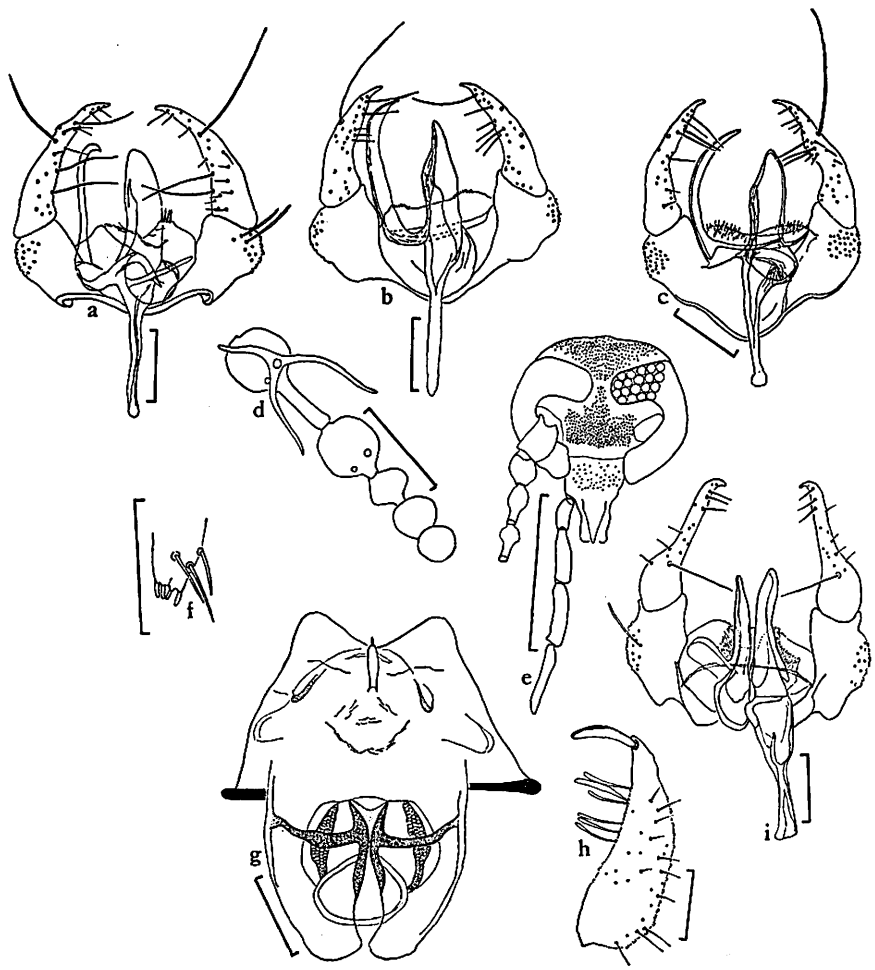

Fig. 6. a, *Psychoda quadrifilis* "Ryukyu form", ♂ genitalia; b & c, *P. quadrifilis*, Caroline Is., ♂ genitalia; d-i, *P. yama*: d, ♀ antennal tip; e, ♀ head; f, ♀ labellum; g, ♀ genitalia; h, ♂ surstyle; i, ♂ genitalia, dorsal. (Scale line of head= 0.3 mm, others=0.05 mm.)

suture and inner margin truncate. Genitalia as figured; dististyle ending in curved, hook-like apex; paramere bilobed and thickly setose; surstyle short and stocky.

Antenna 1.?-1.25 mm; wing length 1.40-1.77 mm, length 0.62-0.77 mm.

Holotype ♀ (BISHOP 6662), Iriomote I., Ryukyu Is., 11-12.III.1964, Malaise trap, Yoshimoto & Harrell; allotype ♂ (BISHOP), Kara-yama, Ishigaki I., Ryukyu Is., 14-18.III.1964, Malaise trap, Yoshimoto & Harrell. Paratypes (USNM, BMNH): 12♀♀, same as holotype; 12♀♀, 4♂♂, same as allotype; 4♀♀, 4♂♂, Nago, Okinawa I., 21-23. III. 1964, 100 m; 1♂, Yona, Okinawa I., 24-25.III.1964, Malaise trap, Yoshimoto & Harrell; ♀, ♂, Mt Banna, Ishigaki I., 17.XI.1963, Samuelson; ♀, Nakara-gawa, Iriomote I., 12.III.1964, Berlese funnel,

Yoshimoto & Harrell.

27. **Psychoda seorsa** Quate, n. sp. Fig. 7 a-e.

♀. Body integument brown. Eyes narrowly separated by about 1/2 facet diameter;

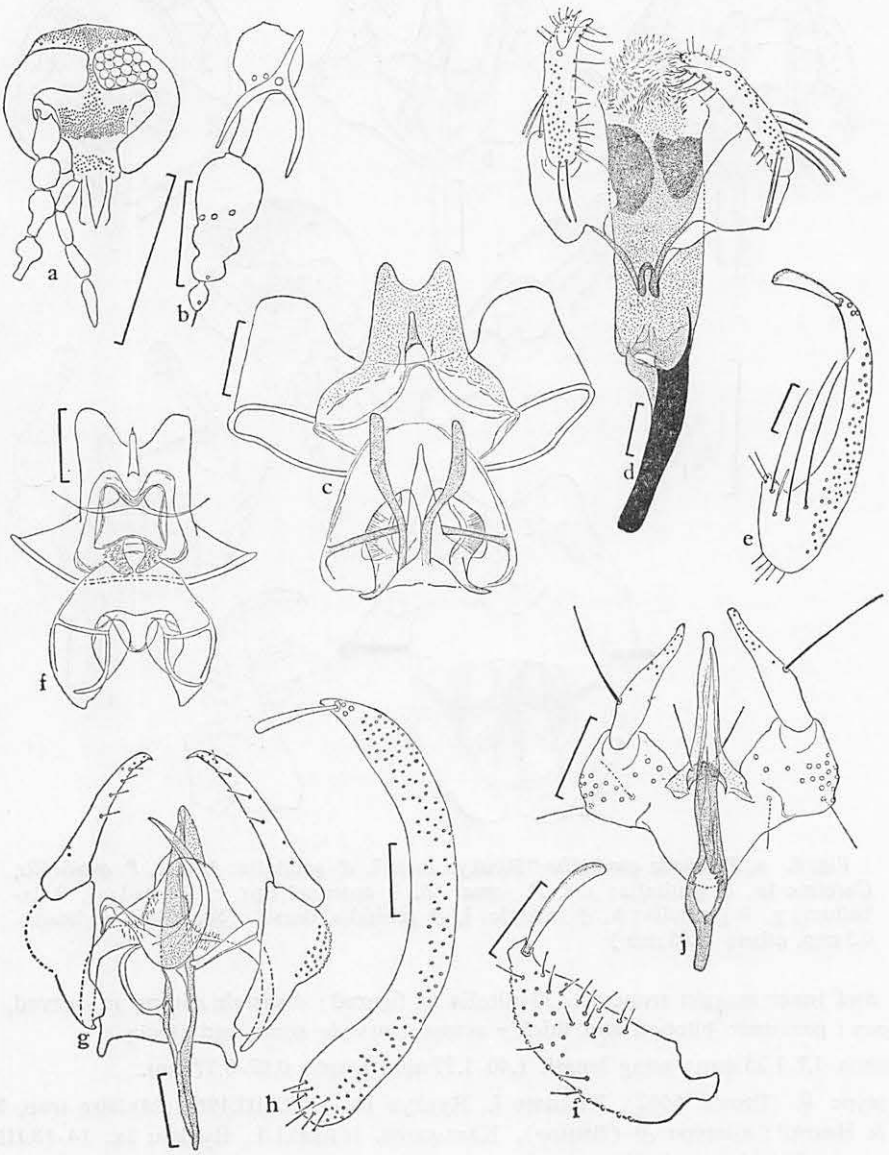

Fig. 7. a-e. *Psychoda seorsa*: a, ♀ head; b, ♀ antennal tip; c, ♀ genitalia; d, ♂ genitalia, dorsal; e, ♂ surstyle. f-h. *P. itoco*: f, ♂ genitalia; g, ♂ genitalia, dorsal; h, ♂ surstyle. i-j. *P. allodapa*: i, ♂ surstyle; j, ♂ genitalia, dorsal. (Scale line of head=0.3 mm, others=0.05 mm.)

eye bridge with 4 rows of facets, inner margin truncate but lower part angled laterally; frons with elongate triangular band of hairs extending posteriorly to upper part of eye but stopping well before vertex hairs. Labellum with 2 (sometimes 3) spines and 4 teeth; palpus with basal 3 segments of equal size, ratio=7 : 7 : 7 : 9. Antenna 16-segmented, 13-15 broadly fused, 16 separate.

Wing with forks complete. Ratio of fore leg=30 : 25 : 10, mid leg=32 : 33 : 13, hind leg=35 : 40 : 14. Genitalia as figured; subgenital plate darker than rest of abdomen, with straight, convergent sides.

Antenna 0.98-1.08 mm; wing length=1.52-1.62 mm, width=0.60-0.65 mm.

♂. Similar to ♀, but larger. Genitalia as figured; aedeagus large and paddle-like, very dark except apical part yellowish, apex membranous, inflated, with cluster of stout, sharp setae; dististyle thick, bifurcate subapically; surstyle with small lobe on dorsal surface at base.

Antenna 1.32-? mm; wing length 1.87-2.05 mm, width 0.80-0.82 mm.

Holotype ♀ (BISHOP 6663), allotype ♂ (BISHOP), Iriomote I., Ryukyu Is., 11-12.III.1964, Malaise trap, Yoshimoto & Harrell. Paratypes 3♀♀, ♂, same.

The 16-segmented antennae with the subterminal 3 segments fused and the distinctive genitalia of both sexes will readily distinguish *seorsa* from other species of *Psychoda*. The ♂ aedeagus is particularly unusual and quite unlike that structure in most *Psychoda*; it appears more like the aedeagi of some *Telmatoscopus* and might represent the retention of a primitive character, which has been lost in other *Psychoda* but more commonly retained in *Telmatoscopus*.

28. **Psychoda harrisi** Satchell, 1950, Trans. R. Ent. Soc. Lond. **101**: 171 (Illus.).—Quate, 1961, Proc. Haw'n Ent. Soc. **17**: 437 (Synonymy); 1962, Pac. Ins. **4**: 57 (Illus. ♀).

Psychoda bifurcata Tokunaga, 1958, Philip. J. Sci. **86**: 378 (♀=*harrisi*).
Psychoda hamatifera Tokunaga, 1958, *Ibid.* **86**: 385 (♂=*harrisi*).

DISTRIBUTION: Widespread in the Pacific; Hawaii, Caroline Is., Malaya, Philippines, Borneo, Australia, New Zealand.

RYUKYU IS. OKINAWA: 5 km S of Kadena, 1.III.1959, light trap, Nibley, 2♀♀, Koza, III.1959, Nibley, ♂; Shimabuku, III. 1959, Nibley, ♂. ISHIGAKI I.: 20-30. XII. 1952, G. E. Bohart, ♀; Kara-yama, 14-18. III. 1964, Malaise trap, Yoshimoto & Harrell, ♀. IRIOMOTE I.: 9-12. III. 1964, Yoshimoto, Miyatake, Harrell, 3♀♀, ♂.

29. **Psychoda itoco** Tokunaga & Komyo, 1954, Philip. J. Sci. **83**: 312; 1958, *Ibid.* **86**: 397 (Illus.). Fig. 7 f-h.

DISTRIBUTION: Japan.

RYUKYU IS. OKINAWA: 5 km S of Kadena, III. 1959, light trap, Nibley, ♂; Shimabuku, III.1959, Nibley, 3♀♀, 4♂♂; Koza, III.1959, Nibley, ♂; Nago, 21-23.III.1964, Malaise trap, Yoshimoto & Harrell, ♀.

30. **Psychoda crenula** Quate, 1962, Pac. Ins. **4**: 55.

DISTRIBUTION: Borneo.

RYUKYU IS. OKINAWA: Yona, 27. XI. 1963, Samuelson, ♀.

31. **Psychoda allodapa** Quate, 1959, Ins. Micronesia (Bishop Museum) **12** (4) : 483. Fig. 7 i-j.

DISTRIBUTION: Bonin Is.

RYUKYU IS. OKINAWA: Shimabuku, III. 1959, light trap, Nibley, ♂; Koza, III. 1959, Nibley, ♂; Chibana, III.1959, Nibley, ♂.

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1955 Japanese Psychodidae, II. Nine new species of moth flies. *Ibid.* **83**: 401-17 (1954).

1955 Japanese Psychodidae, III. New or little-known moth flies, with descriptions of ten new species. *Ibid.* **84**: 205-28.