

KEY TO FEMALES OF *PSYCHODA*

- 1 Eye bridge with 4 facet rows 2
 Eye bridge with 5 facet rows 72. *quiniversa*
- 2(1)Wing veins lacking spots at tips 3
 Veins with brown spots at tips; subgenital plate V-shaped, antenna with 13 flagellomeres, terminal
 smallest 76. *alternata*
- 3(2). Radial and medial forks incomplete, i.e., bases of R_3 and M_2 lacking and thus not attached to R_2 and
 M_1 respectively, antenna with 13 flagellomeres 4
 Radial and medial forks complete, thus R_3 and M_2 attached to R_2 and M_1 respectively 6
- 4(3) Apical lobes not differentiated from base of plate nor much wider than slender digit; apical
 flagellomere smallest 5
 Apical lobes small and slender, differentiated from base of plate; genital digit large, larger than
 apical lobe; subapical flagellomere (12) smaller than apical (13).. 74. *obeliske*
- 5(4). Sides of subgenital plate straight or slightly convex and width about equal to length; eyes separated
 by about 1 facet diameter. 73. *litotes*
 Sides of plate strongly convex; eyes separated by 1.5-2 facet diameters 75. *setigera*
- 6(3).Subgenital plate with pair of ovoid structures on inner face 7
 Plate without pair of ovoid structures on inner face 9
- 7(6)Apical sides of plate slightly concave, lobes differentiated; antenna with 14 flagellomeres 8
 Sides of subgenital plate convex, apical lobes not differentiated; antenna with 12 flagellomeres . .
 86. *savaiiensis*
- 8(7)Basal band of subgenital plate straight; apical lobes as wide as base 97. *bisacula*
 Basal band of plate curved and expanded in center; lobes narrower than base 100. *flagellata*
- 9(6) Inner face of subgenital plate with broad, V- or U-shaped structure on inner face 10
 Inner face of plate without V-shaped structure 12
- 10(9) Apical concavity of subgenital plate semicircular 11
 Apical concavity quadrate; U-shaped structure on inner facet of plate originates near center of plate
 87. *buxoides*
- 11(10)V-shaped structure with setose band on anterior margin; setose patch in center of plate; basal
 band of plate not expanded in center 98. *entolopha*
 V-shaped structure plain, without setae; basal band of plate expanded in center.
 89. *mimica*
- 12(9) Basal band of subgenital plate, simple without median projection (may be curved, but not
 expanded) 13
 Basal band of plate with posterior projection nearly reaching posterior margin 90. *laticeps*

13(12)Subgenital plate Y-shaped with apical lobes arising from slender stem	14
Plate not Y-shaped	16
14(13)Stalk of subgenital plate longer than apical lobes	15
Stalk shorter than apical lobes	81. <i>spondea</i>
15(14)Genital digit originates beyond center of plate; wing-like expansion arising from base and extending posteriorly to apical lobes	82. <i>artacula</i>
Long, slender genital digit originates near base of plate; no expansion at base of plate	83. <i>stenostypis</i>
16(13)Subgenital plate cordate, i.e. heart-shaped	17
Plate not cordate	18
17(16)Subgenital plate a single, cordate apex arising from wide base; pair of small, oval structures on inner face at base of cordate apex	84. <i>cordiforma</i>
Plate with a second cordate structure on inner face that resembles apical structure, thus giving plate appearance of possessing double cordate structures	85. <i>bicordata</i>
18(16)Lobes of spermatheca without ridged membrane	19
Lobes of spermatheca covered with finely ridged membrane; apical 3 flagellomeres equal in size, separated	78. <i>balaenica</i>
19(18) Inner face of subgenital plate lacking pair of lobes flanking genital digit	20
Pair of lobes on inner face flanking digit	91. <i>psilotes</i>
20(19) Apical lobes of subgenital plate not differentiated from base	21
Plate consisting of clearly differentiated apical lobes and broad base	24
21(20) Sides of plate convergent	22
Sides of subgenital plate divergent	79. <i>laticaula</i>
22(21) Basal band of subgenital plate straight and simple	23
Basal band with dome-like projection in center; length and width of plate about equal	93. <i>phratra</i>
23(22) Length of subgenital plate clearly exceeds width; spermatheca with distinct hemispherical lobes	80. <i>apparitia</i>
Length of plate less than width; spermatheca lacking lobes	88. <i>incompta</i>
24(20) Subgenital plate without lobe on midline of inner face	25
Plate with setose lobe on inner face attached to base at midline	99. <i>aculeata</i>
25(24) Apical lobes much less than half size of base	26
Apical lobes about half size of base, sides nearly parallel	94. <i>pitilla</i>
26(25) Apical lobes V-shaped, sides strongly divergent	95. <i>talamanica</i>
Apical lobes not V-shaped, sides parallel	96. <i>varablanca</i>

KEY TO MALES OF *PSYCHODA*

- 1 Eye bridge with 4 facet rows 2
 Eye bridge with 5 facet rows 72. *quiniversa*
- 2(1)Wing veins lacking spots at tips 3
 Wing veins with spots at tips 76. *alternata*
- 3(2)Radial and medial forks complete and bases of R_3 and M_2 attached to R_2 and M_1 respectively 4
 Radial and medial forks incomplete, i.e., bases of R_3 and M_2 lacking and not attached; antenna with 13 flagellomeres 75. *setigera*
- 4(3)Paramere long and slender, extends to or beyond tip of aedeagus; antenna with 14 flagellomeres 5
 Paramere very short, much shorter than distal part of aedeagus; gonocoxite short and hemispherical, antenna with 12 flagellomeres 86. *savaiiensis*
- 5(4)Abdominal tergites 6 or 7 with oval patch of black scales; terminal 3 flagellomeres equal and separated 6
 Tergites without black scales; terminal 3 flagellomeres unequal and partly fused 7
- 6(5)Scales on tergite 6; interocular suture present; inner margins of eye bridge convergent, anterior margin separated by about 6 facet diameters 91. *psilotos*
 Scales on tergite 7; interocular suture absent; inner margins of bridge nearly parallel, separated by 1-2 facet diameters 87. *buxoides*
- 7(6)Tip of gonostylus straight 8
 Gonostylus with unusual spiral curvature subapically 84. *spondea*
- 8(7)Gonostylus elongate and slightly curved 9
 Gonostylus in shape of bird head with beak 92. *rhis*
- 9(8)Gonocoxal apodemes setose apically 80. *apparitia*
 Apodemes bare apically 93. *phratra*

72. *Psychoda quiniversa* Quate, n.sp.
 Fig 25a-c

Grey species distinguished by 5 facet rows in eye bridge.

Female. Antenna with 14 flagellomeres, terminal 3 flagellomeres unequal in size, 14 smallest, 12 & 13 partly fused; ascoids trident-shaped with 3 anterior branches; palpus short, extends only to flagellomere 3; antenna about 3.3X palpus. Eye bridge with 5 row of facets; eyes separated by 1/2 facet diameter. Hair patch of frons extends to facet row 2, separated from patch on vertex. Palpal formula = 10:8:8:8.

Labellum with 4 long teeth.

Wing with radial and medial forks complete; R_{2+3} and R_2 about equal in length.

Subgenital plate with very small, parallel-sided apical lobes.

Measurements: Antenna 1.3 mm.; wing length 1.74-2.05 mm., width 0.7-0.87 mm.

Male. Aedeagus simple, paramere absent; small setose lobe under center of aedeagus; surstylus little longer than gonopod.

Measurements: Antenna 1.28 mm.; wing length 1.81 mm., width 0.84 mm.

Holotype ♀, allotype ♂, COSTA RICA, Guanacaste, Estación Pitilla, 9 km S of Santa

Cecilia, 10-14/VI/94, 700 m. (INBio).
 Paratypes: 1 ♀, same data; 1 ♂, Heredia, Estación
 Biol. La Selva. 22-25/VI/93 (INBio, USNM,
 LWQ).

Etymology: 'quini' L, five; 'versus' L, line;
 referring to five facet rows.

73. *Psychoda litotes* Quate, n.sp.
 Fig 25 d-f

Grey species distinguished by incomplete
 wing forks, 15-segmented antenna, ♀ subgenital
 plate with straight, convergent sides.

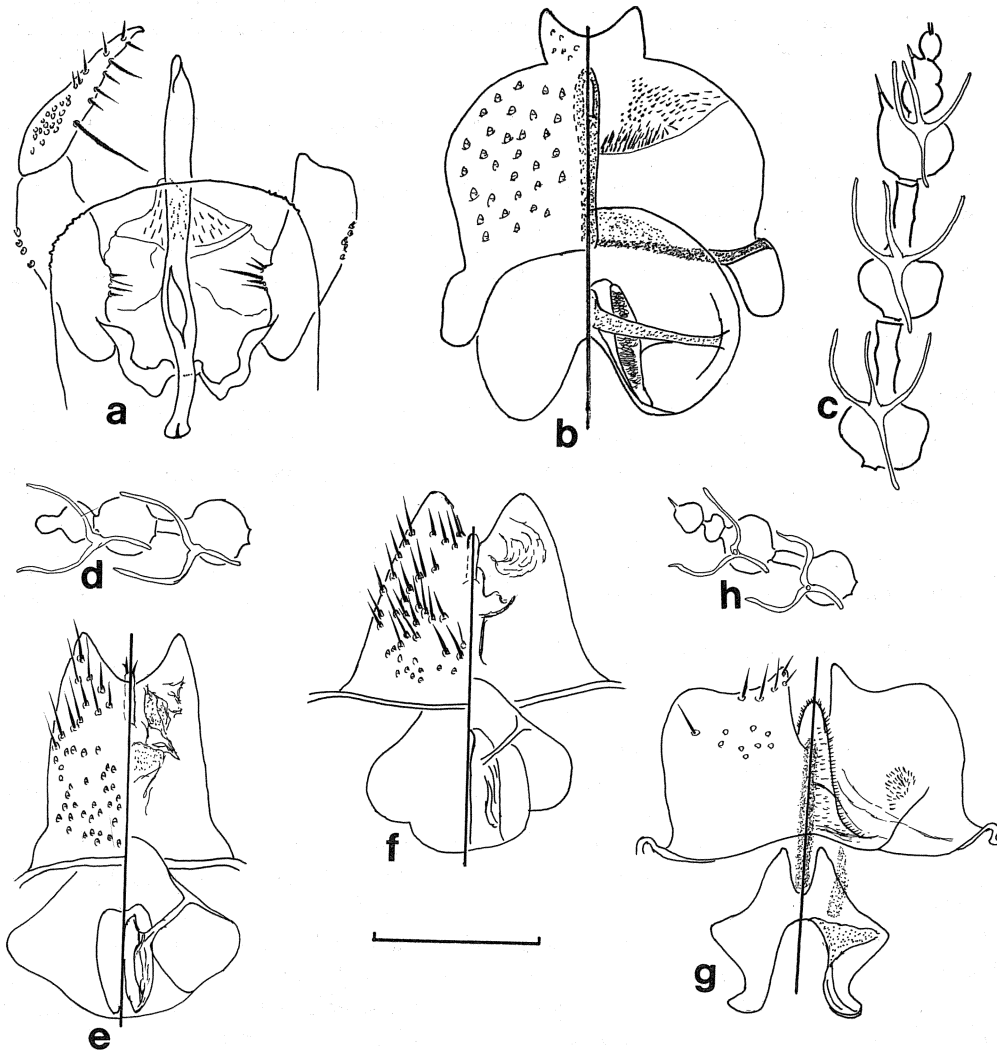


Figure 25. a-c. *Psychoda quiniversa*: a. ♂ gonopods and aedeagus, dorsal, right gonostylus not shown; b. ♀ genitalia; c. flagellomeres 9-14. d-f. *P. litotes*: d. flagellomeres 10-13, e-f. ♀ genitalia. g-h. *P. obeliske*: g. flagellomeres 10-13; h. ♂ gonopods and aedeagus, dorsal, right gonostylus not shown. Scale line = 0.1 mm.

Female. Antenna with 13 flagellomeres, flagellomere 13 very small, 12 intermediate in size between 11 and 13, all separated; ascoids Y-shaped; antenna about 3.0X palpus. Eyes separated by 1 facet diameter. Hair patch of frons extends to facet row 1 but does not merge with patch on vertex. Palpal formula = 6:7:7:10. Labellum with 4 short teeth.

Wing with radial and medial forks incomplete, bases of R_3 and M_1 lacking.

Subgenital plate simple, sides straight and convergent, with little internal ornamentation; spermatheca small, subquadrate; membranous plate of spermatheca wider than in other species.

Measurements: Antenna 0.75-1.03 mm. Wing length 1.21-1.57 mm., width 0.53-0.70 mm.

Male. Unknown.

Holotype ♀, COSTA RICA, Heredia, Estación Biol. LaSelva, 22-25/VII/94, 50-100 m. (INBio). Paratypes, 9 ♀, same; 2 ♀, Guanacaste, Estación Pitilla, 9 km S of Santa Cecilia, 10-14/VII/94, 700 m.; 1 ♀, Limón, Puerto Viejo de Talamanca, 20-22/VII/93, sea level (INBio, USNM, LACM, LWQ).

Etymology: 'litotes' Gr, simplicity, referring to simple ♀ subgenital plate without conspicuous characteristics.

Variation is noted in the subgenital plate with the base being broader and the sides more convergent in some specimens, but the internal structures and the distinctive spermatheca and membrane are identical in all specimens studied.

74. *Psychoda obeliske* Quate, n.sp.

Fig. 25g-h

Grey species distinguished by incomplete wing forks, 15-segmented antenna, and conspicuous rod on inner face of subgenital plate extending apically to apical concavity.

Female. Antenna with 13 flagellomeres, terminal flagellomere smallest, all flagellomeres separated; ascoids Y-shaped; antenna about 3.0X palpus. Eyes separated by 1 facet diameter. Hair patch of frons extends to facet row 1 but does not merge with patch on vertex. Palpal formula = 6:6:6:8. Labellum with 1 short and 3 long teeth.

Wing with radial and medial forks incomplete, bases of R_3 and M_1 lacking.

Subgenital plate unusual in that plate abruptly expanded on either side of apical lobes; large rod-like structure on inner face, extends apically from base to concavity.

Measurements: Antenna 0.74-0.80 mm. Wing length 1.45 mm., width 0.55 mm.

Male. Unknown.

Holotype ♀, COSTA RICA, Heredia, Estación Biol. LaSelva, 23/VII/94, 50-100 m. (INBio). Paratypes, 2 ♀, same (USNM, LWQ).

Etymology: 'obeliskos' Gr, obelisk; referring to rod on inner face of subgenital plate that is similar to shape of an obelisk.

75. *Psychoda setigera* Tonnoir

Fig. 26a-d

Psychoda setigera Tonnoir, 1922:84; Quate, 1955:202 (descr., illus., biblio.)

Grey species distinguished by incomplete wing forks, 15-segmented antenna, ♀ subgenital plate with convex sides

Female. Antenna with 13 flagellomeres, 13 smallest (sometimes with supernumerary enlargement that may appear to be additional segment), 12 and 13 fused; ascoids Y-shaped; antenna about 3.0X palpus. Eyes separated by 1 facet diameter. Hair patch of frons extends to facet row 1 but does not merge with patch on vertex. Palpal formula = 7:7:7:11. Labellum with 1 short and 3 long teeth.

Wing with radial and medial forks incomplete, bases of R_3 and M_1 lacking.

Subgenital plate with convex sides, with little internal ornamentation.

Measurements: Antenna 0.86-1.05 mm. Wing length 1.57-2.05 mm., width 0.65-0.80 mm.

Male. Genitalia with gonostylus cylindrical on basal 2/3, then suddenly constricted to end in sharp curved point, provided with number of very long hairs, paramere lacking; gonocoxal apodemes paired lobes flanking center of aedeagus, upper surface with striations; surstylus slender, little longer than gonopod.

COSTA RICA, San José, 2 km W of Empalme, I/95, 2300 m. P. Hanson; Heredia, Vara Blanca, 26/VII/93, 1800 m.; San Rafael de Vara Blanca, 18,26/VII/93, 1700 m.; Estación Biol. La Selva, 22-25/VII/93, 50-100 m.; La

Pacifica, 40 km SE of Liberia, 17/VII/93, 100 m.;
 Guanacaste, Volcán Cacao, E of Santa Rosa, 14-
 17/VII/93, 1000 m.; Estación Pitilla, 9 km S of
 Santa Cecilia, 10-14/VII/94, 700 m.; Limon,

Puerto Viejo de Talamanca, 20-22/VII/93, sea
 level.

Lacking from the male genitalia of Costa
 specimens is the slender, curved paramere which

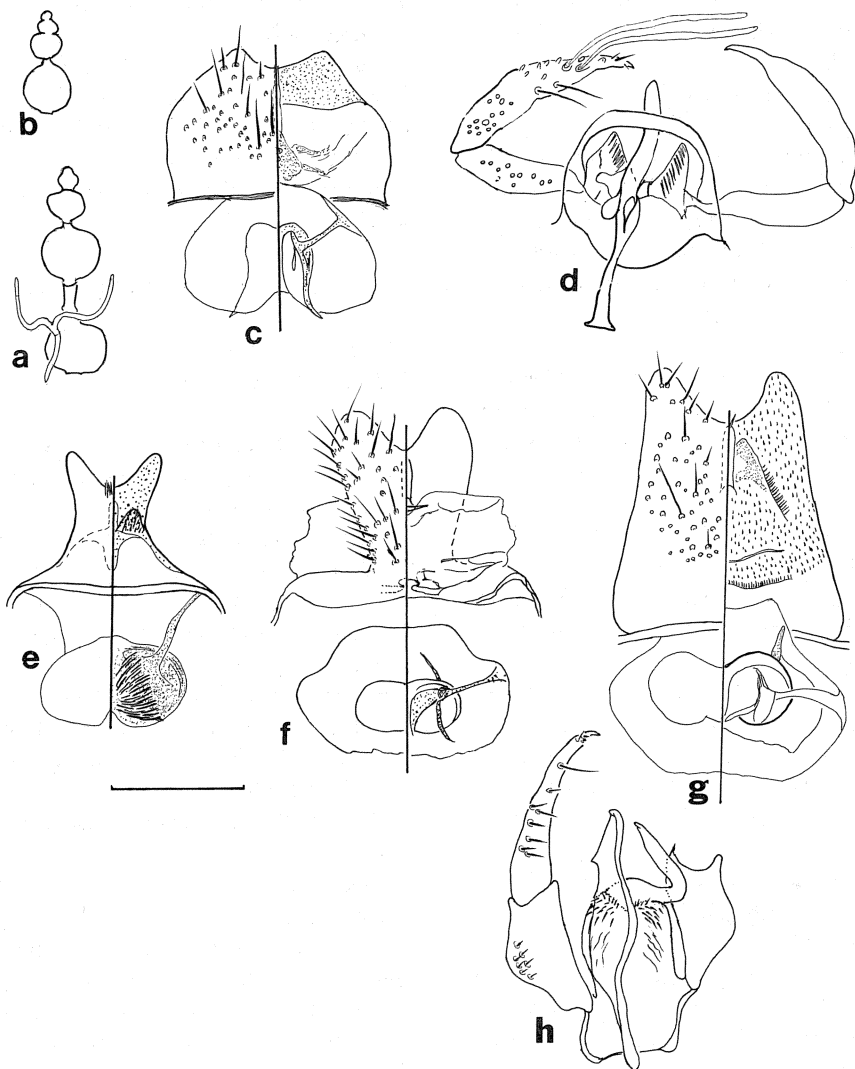


Figure 26. a-d. *Psychoda setigera*: a,b. tip of antenna; c. ♀ genitalia; d. ♂ gonopods and aedeagus, dorsal, right gonostylus not shown. e. *P. balaenica*, ♀ genitalia. f. *P. laticaula*, ♀ genitalia. g-h. *P. apparitia*: g. ♀ genitalia, h. ♂ gonopods and aedeagus, dorsal, right gonostylus not shown. Scale line = 0.1 mm.

is prominent in North American specimens; otherwise, however, there is a close resemblance in both males and females from the two areas and for now this marked difference is regarded as

intraspecific variation.

Variation occurs in the terminal flagellar segment. While most antenna have 13 flagellomeres, some are noted with a supernumerary

enlargement at the apex which gives the appearance of 14 flagellomeres (figs 26 a,b).

76. *Psychoda alternata* Say

Psychoda alternata Say, 1824:358; Quate, 1955:218 (illus., biblio.)

Distribution: COSTA RICA, Heredia, San Rafael de Vara Blanca, 18,26/VII/93, 1800 m., near Heredia, IX/92, M. Herrero; Guanacaste, Monteverde, 6/II/92, 1500 m.

This common cosmopolitan species is easily recognized by the brown spots on the wing tips, the 15-segment antenna, and V-shaped ♀ subgenital plate. It appears to be a domesticated species that is found in most areas with large human populations.

77. *Psychoda alternata* complex species 1

In many areas inhabited by *P. alternata* there are found several related species which I have referred to as the "*alternata* complex". I have a few damaged specimens from Monteverde, Guanacaste that belong to this complex, but are not suitable for describing. It seems worthwhile to state there are species of this complex other than *alternata* in Central America and, as in other areas, speciation has occurred. It is anticipated that other, related species will be found.

78. *Psychoda balaenica* Quate, n.sp.

Fig. 26 e

Grey species distinguished by unusual striations over lobes of spermatheca.

Female. Antenna with 14 flagellomeres, terminal 3 flagellomeres equal in size and clearly separated; ascoids Y-shaped; palpus short, extends only to flagellomere 3; antenna about 3.8X palpus. Eyes separated by 1 facet diameter. Hair patch of frons extends to facet row 1 near upper margin of eye bridge, separated from patch on vertex. Palpal formula = 7:7:6:7. Labellum with 1 short and 3 long teeth.

Wing with radial and medial forks complete; R_{2+3} and R_2 about equal in length.

Subgenital plate with sides of apical lobes divergent, spermatheca with many, striated bands

over dark lobes.

Measurements: Antenna 1.01 mm. Wing length 1.59 mm., width 0.67 mm.

Male. Unknown.

Holotype ♀, COSTA RICA, Guanacaste, Estación Pitilla, 9 km S of Santa Cecilia, 10-14/VI/94, 700 m.

Etymology: 'balaena' L, whale, referred to the baleen- or comb-like covering of the lobes of the spermatheca.

79. *Psychoda laticaula* Quate, n.sp.

Fig. 26 f

Grey species distinguished by subgenital plate having very small base, sides straight and divergent.

Female. Antenna with 14 flagellomeres, terminal flagellomere smallest, separated from preceding; flagellomeres 12, 13 partially fused, separated from 11; ascoids Y-shaped; antenna about 3.5X palpus. Eyes separated by 1 facet diameter. Hair patch of frons extends to facet row 1 and merges with patch on vertex. Palpal formula = 7:6:6:7. Labellum with 1 short and 3 long teeth.

Wing with radial and medial forks complete; R_2 little longer than R_{2+3} .

Subgenital plate consists largely of apical lobes with straight, divergent sides and small, inconspicuous base.

Measurements: Antenna 0.97-1.09 mm. Wing length 1.58-1.78 mm., width 0.67-0.82 mm.

Male. Unknown.

Holotype ♀, COSTA RICA, Limon, Puerto Viejo de Talamanca, 20-22/VII/93, sea level (INBio). Paratypes, 2 ♀, same; 2 ♀, Heredia, Estación Biol. LaSelva, 19,23/VII/94, 50-100 m.; 1 ♀, Heredia, San Rafael de Vara Blanca, 26/VII/93, 1700 m. (USNM, LACM, LWQ).

Etymology: 'latus' L, broad; 'caulis' L, stalk; referring to broad stalk of the ♀ subgenital plate.

80. *Psychoda apparitia* Quate, n.sp.

Fig. 26 g-h.

White with dark head, thorax and abdomen of slide-mounted specimens very pale and lightly sclerotized; ♀ subgenital plate with straight,

sclerotized; ♀ subgenital plate with straight, convergent sides, without apical lobes differentiated from base.

Female. Antenna with 14 flagellomeres, terminal 3 unequal in size, 14 smallest, 11 & 12 fused, but 12 & 13 separated; ascoids Y-shaped; antenna 4.0-4.5X palpus. Eyes separated by about 1 facet diameters. Hair patch of frons extends in narrow band to facet row 1, separated from patch on vertex. Palpal formula = 10:9:8:9. Labellum with 1 short and 3 long teeth.

Wing with radial and medial forks complete; R_{2+3} and R_2 subequal in length.

Subgenital plate with nearly straight, convergent sides, without definite base.

Measurements: Antenna 1.25-1.46 mm. Wing length 2.41-2.75 mm., width 1.06-1.18 mm.

Male. Eyes separated by less than 1 facet diameter.

Genitalia. Gonopod slender, gonostylus suddenly constricted at distal third and ending in sharp point; aedeagus with sharp, lateral projection in center of distal part; paramere sharply curved, ending just before apex of aedeagus; gonocoxal apodemes weakly bilobed, setose; surstylus slender, 1.5X length of gonopod.

Measurements: Antenna 1.24-1.48 mm. Wing length 1.83-2.41 mm., width 0.72-0.96 mm.

Holotype ♀, allotype ♂, COSTA RICA, Heredia, San Rafael de Vara Blanca, 18,26/VII/93, 1700 m. (INBio). Paratypes 11 ♀, 1 ♂, same; 4 ♀, 2 ♂, Heredia, Vara Blanca, 26/VII/93, 1800 m. (USNM, LACM, MNH, CAS, BBM, LWQ).

Etymology: 'apparitio' L, ghost, referring to ghost-like character produced by white vestiture in whole specimens.

81. *Psychoda spondea* Quate, n.sp.

Fig. 27 a-b

Pale species with dark head, subgenital Y-shaped; ♂ gonostylus with unusual twist subapically.

Female. Antenna with 14 flagellomeres, terminal flagellomere smallest, separated from preceding; flagellomeres 12, 13 partially fused, separated from 11; ascoids Y-shaped; antenna about 5.0X palpus. Eyes separated by 1 facet

diameter. Hair patch of frons extends to facet row 1 and nearly merges with patch on vertex. Palpal formula = 8:6:5:6. Labellum with 1 short and 3 long teeth.

Wing with radial and medial forks complete; R_2 and R_{2+3} about equal in length.

Subgenital plate Y-shaped or in form of goblet, with little ornamentation on inner face.

Measurements: Antenna 1.09-1.16 mm. Wing length 1.69-1.93 mm., width 0.72-0.87 mm.

Male. Gonostylus with distinctive, spiral curvature subapically, paramere lacking; gonocoxal apodeme bilobed, setose; surstylus slender, nearly 2X length of gonopod.

Measurements: Antenna 1.09-1.12 mm. Wing length 1.45-1.66 mm., width 0.6 - 0.72 mm.

Holotype ♀, allotype ♂, COSTA RICA, Limon, Puerto Viejo de Talamanca, 20/VII/94 (INBio). Paratypes, 2 ♀, 9 ♂, same; 1 ♀, Heredia, San Rafael de Vara Blanca, 18-26/VII/94, 1700 m. (USNM, LACM, MNH, BBM, LWQ).

Etymology: 'spondeum' L, vessel or goblet, referring to shape of apical lobes of ♀ subgenital plate.

82. *Psychoda articaula* Quate, n.sp.

Fig. 27 b-c

Pale, grey species distinguished by Y-shaped subgenital plate with apical lobes at apex of long, slender stalk and small base expanded into wing-like lateral expansion on each side of stem.

Female. Antenna with 14 flagellomeres, terminal flagellomere smallest, separated from preceding; flagellomeres 12, 13 partially fused, separated from 11; ascoids Y-shaped; antenna more than 4.0X palpus. Eyes separated by 1 facet diameter. Hair patch of frons extends to facet row 1 and merges with patch on vertex. Palpal formula = 7:6:6:7. Labellum with 1 short and 3 long teeth.

Wing with radial and medial forks complete; R_2 little longer than R_{2+3} .

Subgenital plate with apical lobes at apex of long, slender stem, base very narrow at center, but expanded into wing-like side pieces that extend apically beyond center of stem.

Measurements: Antenna 0.92-1.26 mm. Wing length 1.54-2.27 mm., width 0.65-0.96 mm.

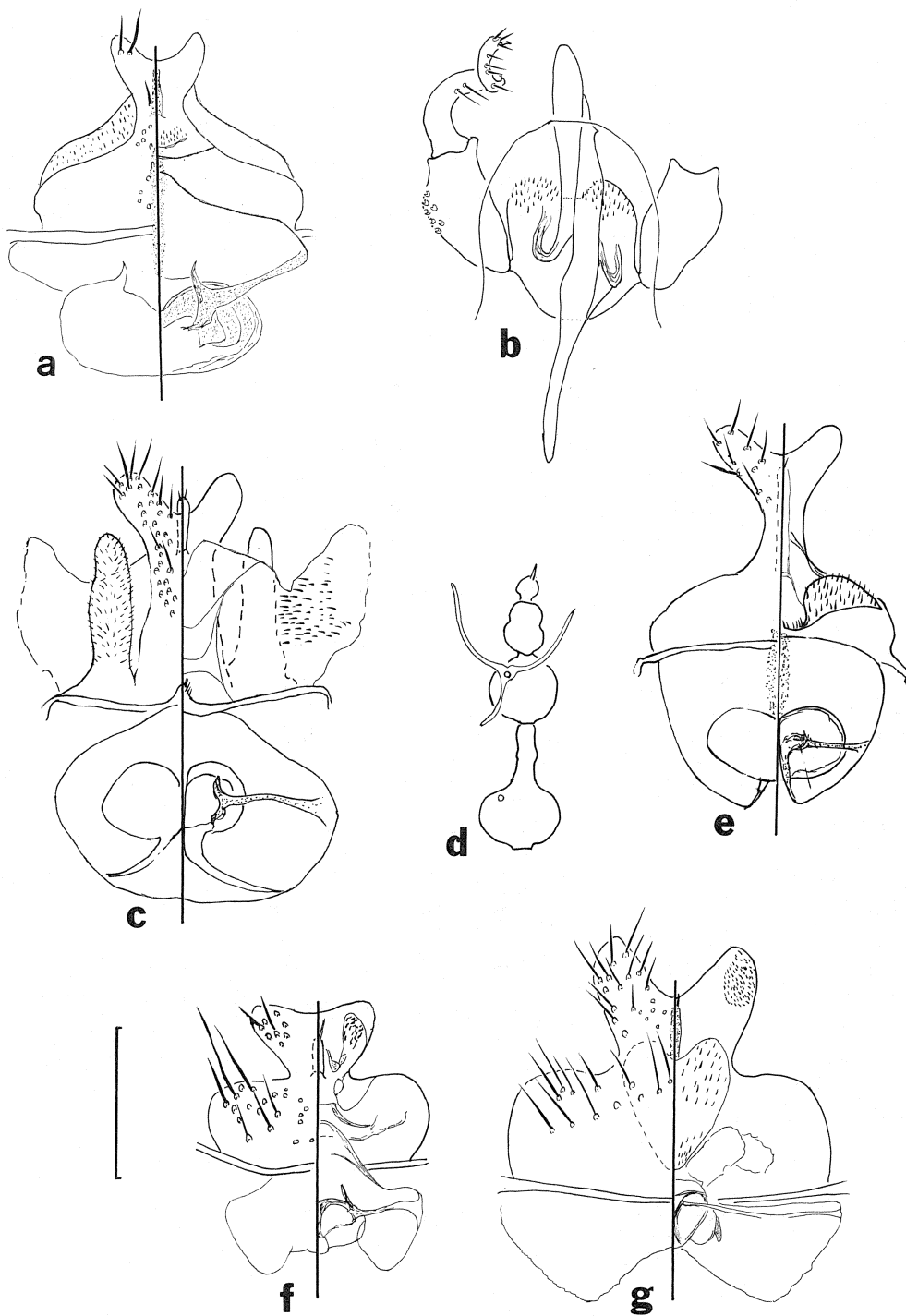


Fig. 27 a-b. *Psychoda spondea*: a. ♀ genitalia; b. ♂ gonopods and aedeagus, dorsal, right gonostylus not shown. c-d. *P. articaula*: b. ♀ genitalia; c. flagellomeres 10-14. e. *P. stenostypis*, ♀ genitalia. f. *P. cordiforma*, ♀ genitalia. g. *P. bicordata*, ♀ genitalia. Scale line = 0.1 mm.