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## **Eight new *Psychomyia* from Borneo (Trichoptera, Psychomyiidae)**

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### **Abstract**

Eight new *Psychomyia* (Trichoptera: Psychomyiidae) are described from Borneo: *P. falcata* sp. nov., *P. adebratti* sp. nov., *P. mendolongensis* sp. nov., *P. aprilis* sp. nov., *P. spinosa* sp. nov., and *P. trifurcata* sp. nov. from Sabah (Malaysia) and *P. pajauensis* sp. nov., and *P. ramosa* sp. nov. from Kalimantan Timur (Indonesia).

Key-words: Insecta, Trichoptera, Psychomyiidae, *Psychomyia*, new species, Borneo.

### **Zusammenfassung**

Von Borneo werden acht neue Arten von *Psychomyia* (Trichoptera: Psychomyiidae) beschrieben: *P. falcata* sp. nov., *P. adebratti* sp. nov., *P. mendolongensis* sp. nov., *P. aprilis* sp. nov., *P. spinosa* sp. nov. und *P. trifurcata* sp. nov. von Sabah (Malaysia) und *P. pajauensis* sp. nov. und *P. ramosa* sp. nov. von Kalimantan Timur (Indonesien).

### **Introduction**

The world fauna of Psychomyiidae includes nearly 400 described species, of which about 90% are exclusively Palearctic or Oriental. The Oriental psychomyiid fauna contains nearly 230 species within the genera *Paduniella* (34 species), *Lype* (4 species), *Padangpsyche* (1 species), *Psychomyia* (99 species), *Psychomyiella* (7 species), and *Tinodes* (82 species).

The Malaysian Psychomyiidae are poorly known, and only eleven species within three genera have so far been described. *Paduniella borneensis* BANKS, 1931 was described

from Sabah; *Tinodes anakkunci* MALICKY, 1995, and *T. multispinosus* SCHMID, 1972 from West Malaysia; *T. igok* KIMMINS, 1955, *T. silvicolus* KIMMINS, 1955, and *T. tricalcaratus* KIMMINS, 1955 from Sarawak; and *Psychomyia enyo* MALICKY, 2000, *P. demodokos* MALICKY, 2000, *P. alkibiades* MALICKY, 2000, *P. deidameia* MALICKY, 2000, and *P. deiphobos* MALICKY, 2000, all from Sabah (BANKS 1931, KIMMINS 1955, MALICKY 1995, 2000, SCHMID 1972).

The Indonesian Psychomyiidae are represented by 25 species within five genera. *Paduniella koehleri* MALICKY, 1995, and *P. semarangensis* ULMER, 1913 were described from Bali and Java, respectively (MALICKY 1995; ULMER 1913). *Padangpsyche batakorum* MALICKY, 1993 was described from Sumatra (MALICKY 1993). *Psychomyiella feuerborni* ULMER, 1951, and *P. fulmeki* ULMER, 1930 from Sumatra, and *P. thienemanni* ULMER, 1951 from Java (ULMER 1930, 1951). The genus *Tinodes* is represented by *T. dependens* ULMER, 1951, and *T. sumatrensis* ULMER, 1930 from Sumatra; *T. flavopunctatus* ULMER, 1910, *T. ihalauwi* MALICKY, 1998, *T. timotii* MALICKY, 1998, *T. prihatmoi* MALICKY, 1998 from Java; and *T. tegenungan* MALICKY, 1995, *T. kawiensis* MALICKY, 1995, *T. luhurensis* MALICKY, 1995, and *T. pujungan* MALICKY, 1995 from Bali (ULMER 1910, 1930, 1951; MALICKY 1995, 1998). The Indonesian *Psychomyia* includes nine described species. Of these, the eight species *P. anaksuasan* MALICKY, 1995, *P. anaktiri* MALICKY, 1995, *P. dara* MALICKY, 1993, *P. dasaratha* MALICKY, 1993, *P. hutapadangensis* MALICKY, 1993, *P. kotamobagu* MALICKY, 1993, *P. struwelpeter* MALICKY, 1993, and *P. zimmermanni* MALICKY, 1993 were described by MALICKY (1993) from Sumatra and Sulawesi, and one species, *P. capillata* ULMER, 1910, by ULMER (1910) from Java.

### Material and methods

The material from which the herein new species are described were collected by Stig ADEBRATT on a single locality in Sabah between March and April 1988, and by Prof. Erik MJOBERG in Kalimantan Timur, Indonesia, in 1925-1926. No date or exact locality is at present available for the material collected by MJOBERG.

In addition to the new species, 4 males of *Psychomyia aigina* MALICKY, 1997 were collected by ADEBRATT at Mendolong Nersery. *P. aigina* was originally described from Batu Apoi Belalong, Temburong in Brunei (MALICKY 1997), only some 40 kilometers from Mendolong Nersery.

The type material of the herein described species is deposited in the collection at the Swedish Museum of Natural History, Stockholm, Sweden. All specimens are stored in 70% alcohol, except the holotype of *P. mendolongensis* sp. nov. which is conserved in Euparal. Terminology on genitalia mainly follows NIELSEN (1957).

### Descriptions

#### *Psychomyia falcata* sp. nov. (Fig. 1)

Material examined: Holotype [♂]: Malaysia: Borneo, Sabah, Sipitang, Mendolong Nersery, 5.iv.1988, light trap [Stig ADEBRATT leg.]. Paratype [1 ♂]: as holotype, except 6.iv.1988.

**Etymology:** *falcata*, from Latin, *falcatus*, meaning armed with scythe, referring to the apical shape of phallus.

**Diagnosis:** *P. falcata* sp. nov. can be separated from other *Psychomyia* by the combination of superior appendage being slightly sigmoid in lateral view; the sigmoid apical part of harpago; the short coxopodite; and the dorsal triangulares on segment X; and the substraight, dorsally oriented, proximal part, and the hook-shaped apical part of phallus. A dorsal process of segment X is also present in *P. palawarella* MEY, 1998 from the Philippines. A similar sigmoid harpago is also present in *P. demodokos*, also from Sabah.

**Holotype** (♂). Wings (Fig. 1A): Fore wing 2.3 mm; Sc ends in wing margin at about 0.6x the fore wing length; crossvein Sc—R1 on line with crossvein R1—R2+3; Dc rhomboid, about 0.1x the fore wing length; nygma basally in fork 2; fork 2 about 0.4x the fore wing length; Mc about 0.2x the fore wing length; fork 3 as long as Mc; fork 4 2.0x the Dc length; Cu1b in right angle to hind margin of the wing; Cu2 substraight; A2 reduced; wing coupling by five setae in row along posterior margin of the wing. Hind wing 1.9 mm; hamuli includes 23 substraight setae in row of about one third the hind wing length; crossvein R—M in right angle to anterior wing margin; fork by R2+3 and R4+5 nearly half the hind wing length; fork by M1+2 and M3+4 nearly 0.6x the hind wing length; fork 5 about one fourth the hind wing length. Genitalia (Figs 1B-D): Segment IX, lateral view (Fig. 1B), anterior, dorsal and ventral margins substraight; anterior margin in right angle to dorsal and ventral margins; nearly as high as long. In ventral view (Fig. 1D), anteriorly hyperboloid; in dorsal view (Fig. 1C), anteriorly rounded. Superior appendage, lateral view (Fig. 1B), slightly sigmoid, tapering distally and with enlarged, posteriorly undulating apex. In dorsal view (Fig. 1C), midway slightly bent medially; apex enlarged and with median lobe; excision proximally to apical lobes with row of about 6 stout, medially oriented setae. Coxopodite short, in lateral view (Fig. 1B), slightly longer than maximum breadth of superior appendage; with long apical setae; in ventral view (Fig. 1D), tapering; apex rounded. Small, rounded, ventral branch of coxopodite seen in lateral view (Fig. 1B), indistinct in ventral view (Fig. 1D). Harpago, lateral view (Fig. 1B), slender along its length; proximal part curving anteriorly, looping dorsally and posteriorly at midway, running parallel with phallus; distally sigmoid and pointed; in ventral view, tuboid, slightly converging posteriorly; apically rounded (Fig. 1D). Segment X nearly invisible in lateral view; in dorsal view (Fig. 1C), about half as long as superior appendage and reaches nearly phallic apex; proximally fused with superior appendage; with undulated lateral and slightly convex median margins; posteriorly pointed; with pair of preapical, dorsolaterad processes formed as acute triangles. Phallus, lateral view (Fig. 1B), proximal third slender; distal two third angled posteriorly; gradually thicker towards apex; ends into large, upwardly hooked, pointed apex; in dorsal view (Fig. 1C), tuboid but more slender towards apex; apex slightly thicker than preapical area.

***Psychomyia adebratti* sp. nov. (Fig. 2)**

**Material examined:** Holotype [♂]: Malaysia: Borneo, Sabah, Sipitang, Mendolong Nersery, 27.iii.1988, light trap [Stig ADEBRATT leg.].

**Etymology:** *adebratti*, named after Stig ADEBRATT, the collector of the species.

**Diagnosis:** *P. adebratti* sp. nov. is easily separated from other *Psychomyia* by the re-

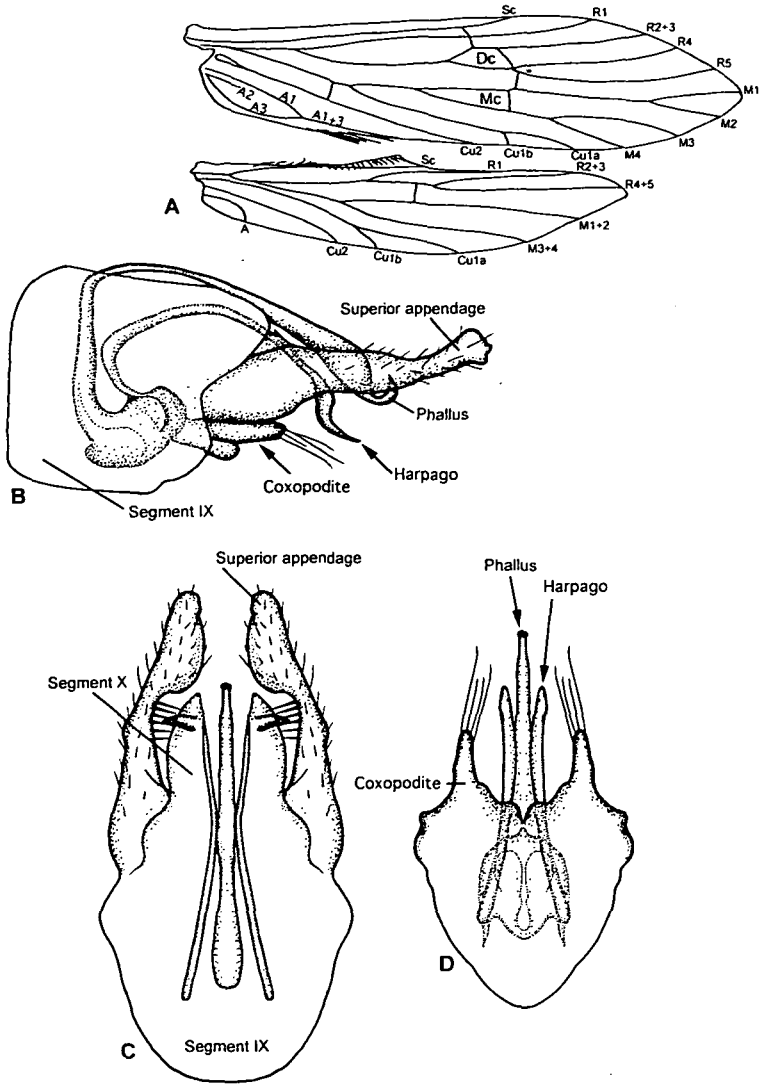


Fig. 1: *Psychomyia falcata* sp. nov. — A: right wings. B: genitalia, lateral view. C: genitalia, dorsal view. D: genitalia, ventral view.

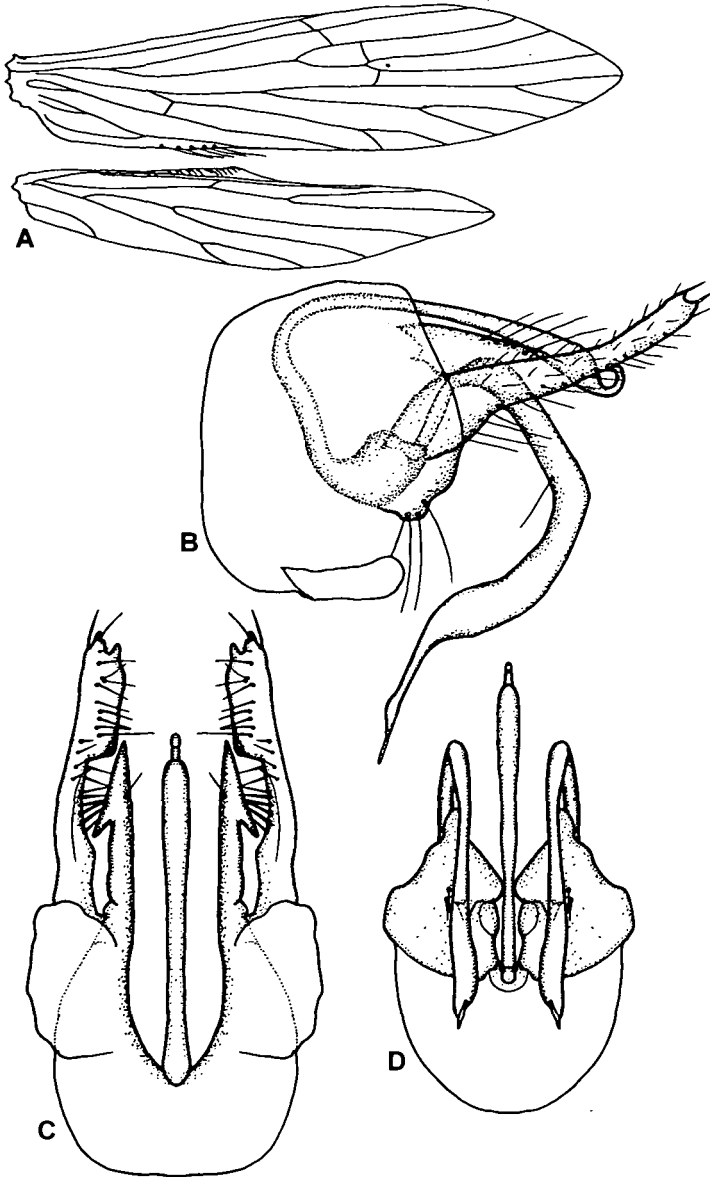


Fig. 2: *Psychomyia adebratti* sp. nov. — A: right wings. B: genitalia, lateral view. C: genitalia, dorsal view. D: genitalia, ventral view.

duced coxopodite, the large and strongly ventrally curved harpago, the hook-shaped phallic apex, and the arrow-shaped distal part of segment X. A large, strongly downwardly curved harpago is also present in *P. nimmoi* SCHMID, 1997 from India, but that species is otherwise quite distinct from *P. adebratti* sp. nov.

Holotype (♂). Wings (Fig. 2A): Fore wing 2.6 mm; Sc ends in wing margin at about 0.5x the fore wing length; crossvein Sc—R1 slightly basal to crossvein R1—R2+3; Dc trianguloid, about 0.1x the fore wing length; nygma basally in fork 2; fork 2 about 0.4x the fore wing length; Mc apparently open; fork 3 slightly shorter than fork 4; fork 4 nearly 2x the Dc length; Cu1b forms acute angle to hind margin of the fore wing; Cu2 substraight; A2 fuses with basal part of A1; wing coupling by five stout setae in row along posterior margin. Hind wing 2.0 mm; with 19 substraight hamuli in row of about one third the hind wing length; crossvein R1—Rs present and fuses with Rs at some distance basally to bifurcation of Rs; crossvein R—M not visible; fork by R2+3 and R4+5 about 0.4x the hind wing length; fork by M1+2 and M3+4 nearly 0.6x the hind wing length; fork 5 about 0.2x the hind wing length. Genitalia (Figs 2B-D): Segment IX, lateral view (Fig. 2B), anteriorly rounded; anterior margin in right angle to ventral margin; about 1.2x higher than long. In ventral view, anteriorly rounded (Fig. 2D); in dorsal view anteriorly substraight (Fig. 2C). Posteroventral part expanded into rounded lobes (Fig. 2B) forming broad ventral plates (Fig. 2D). Lateral part expanded into pair of broad lobes (Fig. 2C). Superior appendage, lateral view (Fig. 2B), slightly sigmoid, tapering slightly distally and with distal third parallel-sided. In dorsal view (Fig. 2C), substraight; apex medially expanded, distally undulated; excision proximal to apex with row of about eight, medially oriented, stout, setae. Coxopodite reduced. Harpago, lateral view (Fig. 2B), very long, proximal part slender, median and distal part thicker, except for a thin apex; proximal part directed dorsoposteriorly, median part strongly bent ventrally, distal part curves anteroventrally; in ventral view (Fig. 2D), tuboid, broader basally to apex. Segment X with only basal part visible in lateral view; in dorsal view (Fig. 2C), slightly longer than half the length of superior appendage and as long as phallus; proximally fused with superior appendage; lateral and median margins substraight and parallel; apex arrow shaped, with lateral, anteriorly pointed, barb. Phallus, lateral view (Fig. 2B), proximal third slender, oriented anterodorsally; at distal two third angled posteriorly; gradually thicker towards apex; ends into large, anteriorly hooked, pointed apex; in dorsal view (Fig. 2C), tuboid, apex slender.

### *Psychomyia mendolongensis* sp. nov. (Fig. 3)

Material examined: Holotype [♂]: Malaysia: Borneo, Sabah, Sipitang, Mendolong Nersery, 27.iii.1988, light trap [Stig ADEBRATT leg.]. Paratype [1 ♂]: as holotype, except 28.iv.1988.

Etymology: *mendolongensis*, named after the type locality.

Diagnosis: *P. mendolongensis* sp. nov. can be separated from other *Psychomyia* by the combination of a superior appendage which in lateral view expands dorsally at its proximal half, the harpago with dorsoapical megasetae; the fusion of superior appendage and segment X into a common structure having a basal comb of long microtrichiae followed by three prominent branches. The superior appendage which is fused with segment X, and strongly bifurcation of the common appendage is also present in many

other species, e.g. *P. pruhii* (MARTYNOV, 1935) (India), *P. anaktiri* MALICKY, 1995 (Sumatra), *P. anaksusuan* MALICKY, 1995 (Bali), *P. aigina* MALICKY, 1997 (Brunei), *P. alkibiades* MALICKY, 2000 (Malaysia), *P. enyo* MALICKY, 2000 (Malaysia), and *P. anteia* MALICKY, 1997 (Laos).

Holotype (♂). Wings (Fig. 3A): Fore wing 2.7 mm; Sc ends in wing margin at nearly 0.5x the fore wing length; crossvein Sc—R1 present basally to crossvein R1—R2+3; Dc trianguloid, about one sixth the fore wing length; nygma basally in fork 2; fork 2 about one third the fore wing length; Mc apparently open; fork 3 slightly shorter than fork 4; fork 4 about 1.3x the Dc length; Cu1b in acute angle to posterior margin of the hind wing; Cu2 substraight; A2 fuses with basal part of A1; wing coupling by eight stout setae in row along posterior margin of the wing. Hind wing 2.1 mm; crossvein R—M present; fork by R2+3 and R4+5 about 0.4x the hind wing length; fork by M1+2 and M3+4 nearly 0.5x the hind wing length; fork 5 about one fifth the hind wing length. Genitalia (Figs 3B-D): Segment IX, lateral view (Fig. 3B), anteriorly straight; angle between anterior and ventral margins rounded; the segment about as high as long and narrowing posteriorly; posterior margin widely excised. Superior appendage, lateral view (Fig. 3B), proximal part oriented dorsoposteriorly, dorsal margin produced, rounded; distal half slender, slightly curved dorsally; apex dilated, ending in narrow process. In dorsal view (Fig. 3C), proximal third broad, slightly narrowing posteriorly and with substraight lateral and median margins; completely fused with segment X. Distal two thirds trifurcated, with very long, thick microtrichiae in basal comb; basal branch originates medially, covered by short, dark median setae along its length; median branch longer than basal branch, smooth and dilating; third branch slightly converging, broad, with truncate apex. Coxopodite, lateral view (Fig. 3B), proximal part oriented dorsally and curves posteriorly; produced at center by dorsal rectangular plate; in ventral view (Fig. 3D), apparently flat, twisted about 90°, and with long, thick microtrichia in row along inner margin; long, thin setae present along ventral margin on distal part. Harpago, lateral view (Fig. 3B), large, proximal half thicker than distal half, strongly sigmoid, dilated, apex truncated; dorsally and posteriorly oriented megasetae present on distal part. In ventral view (Fig. 3D), tuboid and converging. Segment X fused with superior appendage along its length. Phallus, lateral view (Fig. 3B), proximally oriented dorsally; distal two third curved ventroposteriorly; dilating towards apex; apex slender, forms anteriorly open hook; in ventral view (Fig. 3D), tuboid along its length, distal part being more slender.

***Psychomyia aprilis* sp. nov.** (Fig. 4)

Material examined: Holotype [♂]: Malaysia: Borneo, Sabah, Sipitang, Mendolong Nersery, 19.iv.1988, light trap [Stig ADEBRATT leg.]. Paratype [1 ♂]: as holotype, except 26.iv.1988.

Etymology: *aprilis*, named after April, the month when the type specimens were collected.

Diagnosis: *P. aprilis* sp. nov. can be separated from other *Psychomyia* by the combination of long, slender and dorsally curved superior appendage, the hook-shaped apical part of phallus; the reduced coxopodite, and arrow-shaped segment X in dorsal view.

Holotype (♂). Wings (Fig. 4A): Fore wing 2.4 mm; Sc ends in wing margin at 0.6x the fore wing length; crossvein Sc—R1 invisible; Dc about trianguloid, about 0.13x the fore

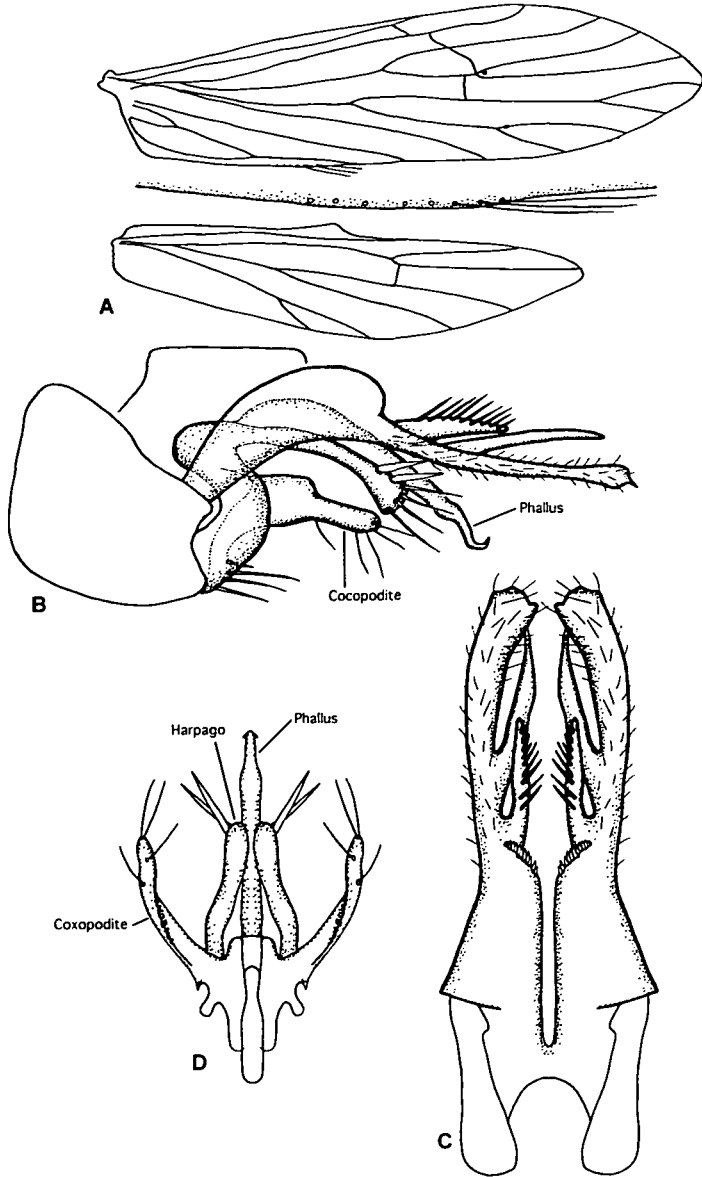


Fig. 3: *Psychomyia mendolongensis* sp. nov. — A: right wings. B: genitalia, lateral view. C: genitalia, dorsal view. D: genitalia, ventral view.



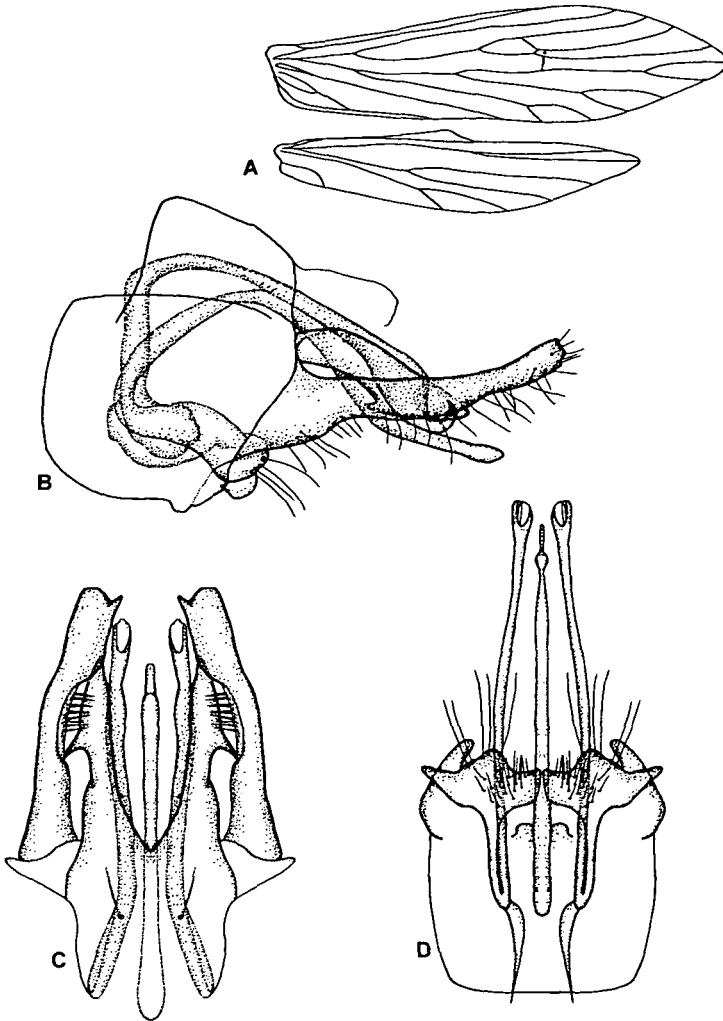


Fig. 4: *Psychomyia aprilis* sp. nov. — A: right wings. B: genitalia, lateral view. C: genitalia, dorsal view. D: genitalia, ventral view.

wing length; nygma basally in fork 2; fork 2 about 0.4x the fore wing length; Mc apparently open; fork 3 as long as fork 4; fork 4 about 1.4x the Dc length; Cu1b in acute angle to hind margin of the wing; Cu2 substraight; A2 fuses with basal part of A1. Hind wing 1.9 mm; crossvein R—M absent; fork by R2+3 and R4+5 nearly half the hind wing length; fork by M1+2 and M3+4 about half the wing length; fork 5 about one fourth the hind wing length. Genitalia (Figs 4B-D): Segment IX, lateral view (Fig. 4B), slightly convex anteriorly; angle between anterior and ventral margin rounded; the segment slightly longer than high and narrowing posteriorly; posteroventral margin slightly concave. Superior appendage, lateral view (Fig. 4B), oriented posteriorly; slightly narrowing towards apex; dorsal margin concave, ventral margin sinusoid; apex truncate. In dorsal view (Fig. 4C), slightly curved medially; proximal third broad, slightly narrowing posteriorly and with substraight lateral and median margins; separate from segment X; median part excised, with about seven, medially oriented, dark stout setae about as long as the breadth of the median part of the appendage; distal third dilated and rectanguloid, with posteromedian, short, pointed process. Coxopodite, lateral view (Fig. 4B), very short; divided into rounded dorsal and ventral lobes; in ventral view (Fig. 4D), the ventral lobes widens into smooth laterally oriented and setose, trianguloid, medially oriented branches. Harpago, lateral view (Fig. 4B), large; proximal part much thicker than median and distal parts, oriented anteriorly and bends sharply dorsoposteriorly; distal half tuboid and sigmoid; apical part substraight and oriented posteriorly. In ventral view (Fig. 4D), tuboid with slightly dilated apex; the branch pair slightly converge; slightly longer than phallus. Segment X, dorsal view (Fig. 4C), proximally wide and narrowing towards the middle; distal half strongly arrow-shaped; lateral barbs directed anterolateral and acute at apex; apex acute. Phallus, lateral view (Fig. 4B), proximal part oriented dorsally; at distal two third bent posteriorly, forming a substraight posterior part with apical hook; strongly widening basally to hook; in ventral view (Fig. 4D), tuboid along its length, except distal part being more slender.

*Psychomyia pajauensis* sp. nov. (Fig. 5)

Material examined: Holotype [ $\sigma$ ]: Malaysia: O Borneo, Pajau River [MJÖBERG leg.]. Paratypes [8  $\sigma$ ]: as holotype.

Etymology: *pajauensis*, named after the type locality.

Diagnosis: *P. pajauensis* sp. nov. is easily separated from other *Psychomyia* by the combination of a slender, sigmoid superior appendage, the very long and slender harpago, the strongly sigmoid and apically dilating coxopodite, the phallus with substraight apex, and the shape of a short segment X. Similar coxopodite is also present in *P. ramosa* sp. nov.

Holotype ( $\sigma$ ). Wings (Fig. 5A): Fore wing 3.3 mm; Sc ends in wing margin at 0.7x fore wing length; crossvein Sc—R1 invisible; Dc about trianguloid, about 0.1x the fore wing length; nygma basally in fork 2; fork 2 about one third the fore wing length; Mc apparently open; fork 3 slightly shorter than fork 4; fork 4 about 2.4x the Dc length; Cu1b in acute angle to hind wing margin; Cu2 substraight; A2 fuses with basal part of A1. Hind wing 2.6 mm; crossvein R—M in right angle to anterior wing margin; fork by R2+3 and R4+5 about 0.4x the hind wing length; fork by M1+2 and M3+4 about 0.6x the hind wing length; fork 5 about one fourth the hind wing length. Genitalia (Figs 5B-D): Segment IX,

lateral view (Fig. 5B), rounded and slightly higher than long, narrowing posteriorly. In dorsal view (Fig. 5C), anteriorly truncate, lateral margins slightly concave, with trianguloid, slightly produced posterolateral corners. In ventral view (Fig. 5D), anteriorly truncate, lateral margins convex; posterior margin produced at center. Superior appendage, lateral view (Fig. 5B), oriented posteriorly, stick-shaped and sigmoid; dorsal and ventral margins subparallel; densely arranged, ventral setae present in row towards apex of phallus; apex rounded. In dorsal view (Fig. 5C), broad along its length; slightly converging towards apex; proximal two third with inner margin sinusoid, lateral margin substraight; slightly narrowing posteriorly; separate from segment X except at basalmost part; median part with dorsal, diagonal band of tiny setae; distal third dilated with rounded anteromedian lobes carrying anteromedially oriented, stout setae; apex rounded. Coxopodite, in lateral view (Fig. 5B), well developed; strongly sigmoid and becomes distally broader towards apex; apical part curved upwards and with stout seta at end; in ventral view (Fig. 5D) stick-shaped, slender, with subparallel lateral and median margins; slightly curving medially. Harpago, lateral view (Fig. 5B), very long; basal part oriented ventrally, bends quickly into horseshoe-shaped part about two thirds its length and hidden within segment IX; distal third slightly curved posteriorly and tapering towards apex; reaches coxopodite apex. In ventral view (Fig. 5D), tuboid, stick-shaped, parallel-sided; and apically pointed; the two branches parallel; noticeably longer than phallus. Segment X, dorsal view (Fig. 5C), separates from superior appendage; with the two branches separated by longitudinal suture; the whole segment arrow-shaped and strongly tapering; with strong setae in longitudinal row at lateral margins. In lateral view (Fig. 5B), distinctly produced above superior appendage; distal part widely excised. Phallus, lateral view (Fig. 5B), distal one fourth slightly thinner than proximal three fourth; proximal third oriented dorsally, bends sharply posteriorly into substraight distal part; apex dilated, without hook. In ventral view (Fig. 5D), tuboid, stick-shaped, parallel-sided; narrowing but rounded apex.

***Psychomyia spinosa* sp. nov.** (Fig. 6)

Material examined: Holotype [♂]: Malaysia: Borneo, Sabah, Sipitang, Mendolong Nersery, 26.iv.1988, light trap [Stig ADEBRATT leg.].

Etymology: *spinosa*, from Latin, spinosus, meaning thorny, prickly, referring to the apical spines of harpago.

Diagnosis: *P. spinosa* sp. nov. can be separated from other *Psychomyia* by the short coxopodite, and the complicated segment X including laterally curved dorsal branches; and the apical spine on the harpago.

Holotype (♂). Wings unknown. Genitalia (Figs 6A-C): Segment IX, lateral view (Fig. 6A), rounded, about as high as long. In dorsal view (Fig. 6B), anteriorly rounded, lateral margin slightly excised at midway. In ventral view (Fig. 6C), anteriorly rounded; separated from coxopodite by transverse suture. Superior appendage, lateral view (Fig. 6A), oriented posteriorly, basally thick with decreasing thickness towards apex; sinusoid, distal third with substraight ventral margin; dorsal and ventral margins subparallel from proximal one third; apex rounded. In dorsal view (Fig. 6B), slightly curved medially; proximally broad and fused with segment X; medially slender, with short row of stiff medially oriented setae; apical third produced medially and with longitudinal row of me-

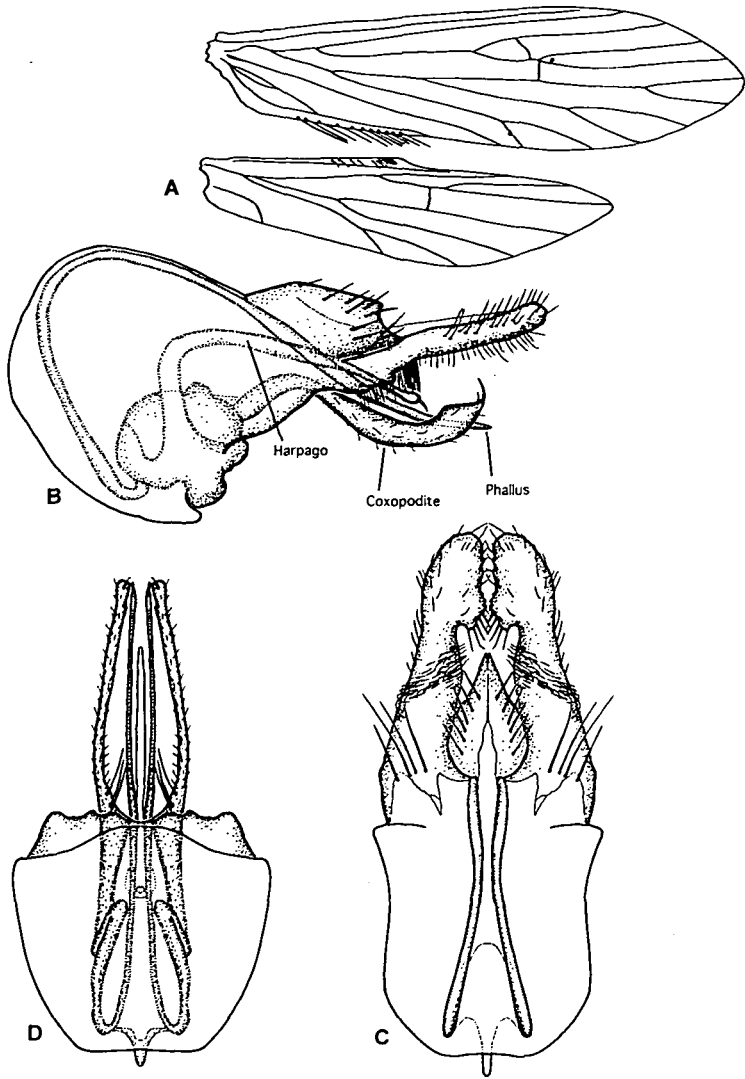


Fig. 5: *Psychomyia pajauensis* sp. nov. — A: right wings. B: genitalia, lateral view. C: genitalia, dorsal view. D: genitalia, ventral view.

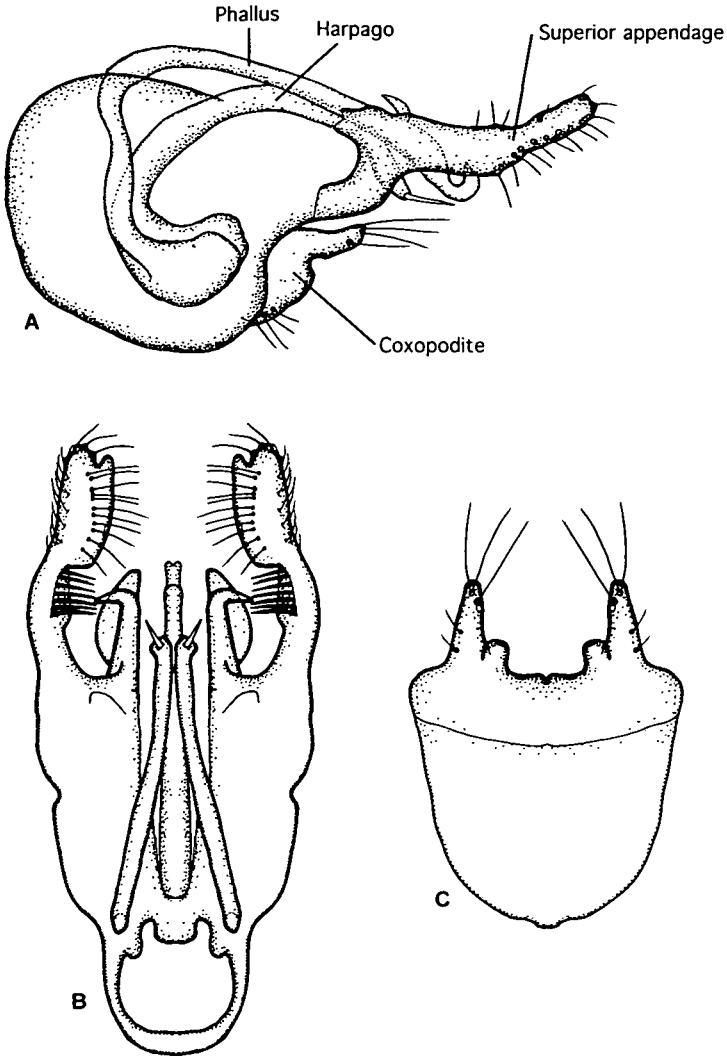


Fig. 6: *Psychomyia spinosa* sp. nov. — A: genitalia, lateral view. B: genitalia, dorsal view. C: genitalia, ventral view.

dially oriented setae; apex bifurcated. Coxopodite, lateral view (Fig. 6A), well developed, short; proximal half broad, distal half slender, oriented posteriorly and with apical setae. In ventral view (Fig. 6C), narrowing towards apex, parallel-sided, with a small, knob-shaped, basomedian process. Harpago, lateral view (Fig. 6A), long, tuboid, narrowing towards apex; basal part oriented anterodorsal and curved posteriorly along its length; apex oriented ventroposteriorly and with a small, posteriorly oriented apical megaseta. In ventral view (Fig. 6C), tuboid, stick-shaped, parallel-sided; with converging left and right branches, slightly bent laterally; not reaching phallic apex. Segment X, dorsal view (Fig. 6B), separate from superior appendage except for proximal part; with the right and left branches well separated along their length; each branch divides into dorsal and ventral lobes; dorsal lobe being slender and apically bent dorsolaterally, dilating; ventral lobe being half-orbiculoid with substraight inner margins; reaches phallic apex. In lateral view, apex of dorsal lobe can be seen above the superior appendage. Phallus, lateral view (Fig. 6A), tuboid along its length; proximal third oriented dorsally and with slightly sinusoid anterior margin; distal two thirds slightly curved ventrally; apex ends in small upward hook. In dorsal view (Fig. 6B), tuboid, stick-shaped, parallel-sided but slightly narrowing towards slightly cleft apex.

*Psychomyia ramosa* sp. nov. (Fig. 7)

Material examined: Holotype [ $\sigma$ ]: Malaysia: O Borneo, Pajau River [MJÖBERG leg.]. Paratypes [4  $\sigma$ ]: as holotype.

Etymology: *ramosa*, from Latin, *ramosus*, meaning branching, referring to the presence of median branches on the superior appendage.

Diagnosis: *P. ramosa* sp. nov. can be separated from other *Psychomyia* by the combination of unique, median, finger-like branches medially on the superior appendage, an apically broad superior appendage with a characteristic median, sclerotized hook, the hook-shaped apical part of phallus, the presence of two uniquely derived dorsal branches of coxopodite, and the long, dorsally curving, ventral branch of the coxopodite. Similar coxopodite is also present in *P. pajauensis* sp. nov.

Holotype ( $\sigma$ ). Wings (Fig. 7A): Fore wing 3.3 mm; Sc ends in wing margin at about 0.6x the fore wing length; crossvein Sc—R1 absent; Dc nearly trianguloid, about 0.1x the fore wing length; nygma basally in fork 2; fork 2 about 0.4x the fore wing length; Mc closed, nearly one fourth the fore wing length; fork 3 about 0.8x as long as fork 4; fork 4 about 2.7x the Dc length; Cu1b in acute angle to posterior margin of hind wing; Cu2 substraight along its length, except distal part being bent posteriorly; A2 fuses with basal part of A1; about 10 stiff setae present in row along anal area of posterior wing margin. Hind wing 2.6 mm; with about 18 hamuli; crossvein R1—Rs present, fuses with basal part of R2+3; crossvein R—M about right angled to anterior margin of the wing; fork by R2+3 and R4+5 about 0.4x the hind wing length; fork by M1+2 and M3+4 nearly 0.6x the hind wing length; fork 5 about one fourth the hind wing length. Genitalia (Figs 7B-D): Segment IX, lateral view (Fig. 7B), anteriorly rounded, dorsally produced into rectangular. In dorsal view (Fig. 7C), anteriorly truncate, convex lateral margin. In ventral view (Fig. 7D), anteriorly narrowing and bilobate; lateral margins slightly convex; posteriorly connected to coxopodite by transverse suture. Superior appendage, lateral view (Fig. 7B), oriented posteriorly, basally thick, with quickly decreasing thickness towards its middle;

dorsal margin of distal half substraight, ventral margin substraight along its length, except on distal one fourth which is produced ventrally into a rectangular; apex narrowing. In dorsal view (Fig. 7C), inclining medially at distal third of its length; proximal part broad, with parallel lateral and median margins. A median finger-like process is present at about half its length; trianguloid excision present immediately distally to the finger-like process; apex produced anteromedially into triangular; median part of apex with strong sclerotized spine oriented anteriorly. Coxopodite, lateral view (Fig. 7B), well developed and trifurcated; ventral branch long, setose, proximally substraight and oriented ventroposteriorly, distally curved gently posteriorly. Second branch very short, oriented dorsoposteriorly, hidden inside proximal part of ventral branch. Dorsal branch boomerang-shaped, with proximal part oriented dorsally, strongly curved posteriorly at middle; densely covered by strong microtrichia at dorsal part of apex. In ventral view (Fig. 7D), the ventral branches incline slightly inward. Dorsal branch, in dorsal view (Fig. 7C), forms a single posteriorly oriented process. Harpago, lateral view (Fig. 7B), long, tuboid and finger-like, slightly narrowing towards apex; basal part oriented dorsoposteriorly and curved ventroposteriorly at its middle. In dorsal view (Fig. 7C), tuboid and with parallel lateral and median margins, the right and left branches convergent towards apex; apex rounded; not reaching phallic apex. Segment X, lateral view (Fig. 7B), visible above superior appendages, rhomboid and with substraight margins, covered by long setae. Phallus, lateral view (Fig. 7B), tuboid along its length; proximal third oriented dorsally and curves gently into a posteroventral distal part; slightly dilated immediately basally to dorsally oriented apical hook.

*Psychomyia trifurcata* sp. nov. (Fig. 8)

Material examined: Holotype [ $\sigma$ ]: Malaysia: Borneo, Sabah, Sipitang, Mendolong Nersery, 26.iv.1988, light trap [Stig ADEBRATT leg.].

Etymology: *trifurcata*, from Latin, tri-, a prefix meaning three, and furcae, meaning branches, referring to the apparent trifurcating superior appendage.

Diagnosis: *P. trifurcata* sp. nov. can be easily separated from other *Psychomyia* by the substraight superior appendage and segment X (in lateral view), and additional median branches of fused superior appendage forming a characteristic cross (seen in dorsal view), the harpago being apically dilated and dorsally curved laterally, and the widely hooked apical part of phallus.

Holotype ( $\sigma$ ). Wings (Fig. 8A): Fore wing 2.2 mm; Sc ends in wing margin at about 0.6x the fore wing length; crossvein Sc—R1 apparently absent; Dc long, nearly 0.2x the fore wing length; nygma basally in fork 2; fork 2 about 0.4x the fore wing length; Mc closed, about 0.2x the fore wing length; fork 3 very short, about half the length of fork 4; fork 4 about 1.4x the Dc length; Cu1 undivided; Cu2 substraight along its length; A1 and A2 completely fused; about 5 stiff setae present in row in anal area of posterior wing margin. Hind wing 1.8 mm; with about 13 hamuli; crossvein R1—Rs present and fuses with Rs basally to bifurcation; crossvein R—M about right angled to anterior wing margin; fork by R2+3 and R4+5 nearly half the hind wing length, with nygma at base; fork by M1+2 and M3+4 nearly 0.6x the hind wing length; fork 5 about 0.2x the hind wing length. Genitalia (Figs 8B-D): Segment IX, indistinct (Figs 8B,C,D), dorsoposterior part produced and separated from anterior part by dorsal suture (Fig. 8B), in dorsal view

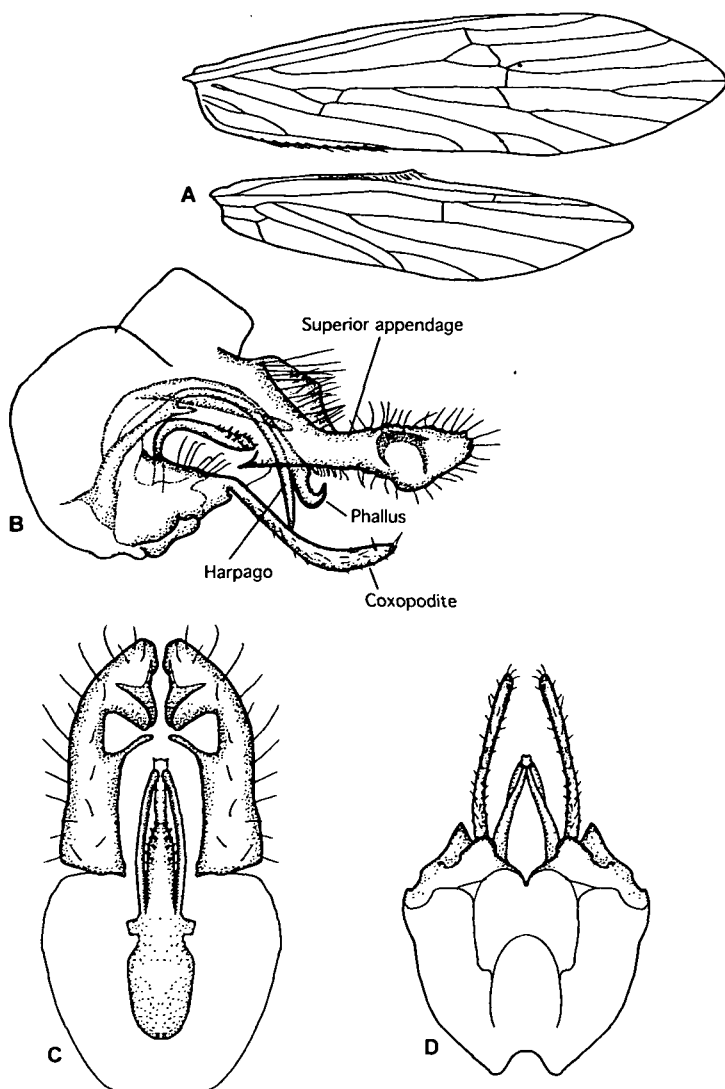


Fig. 7: *Psychomyia ramosa* sp. nov. — A: right wings. B: genitalia, lateral view. C: genitalia, dorsal view. D: genitalia, ventral view.



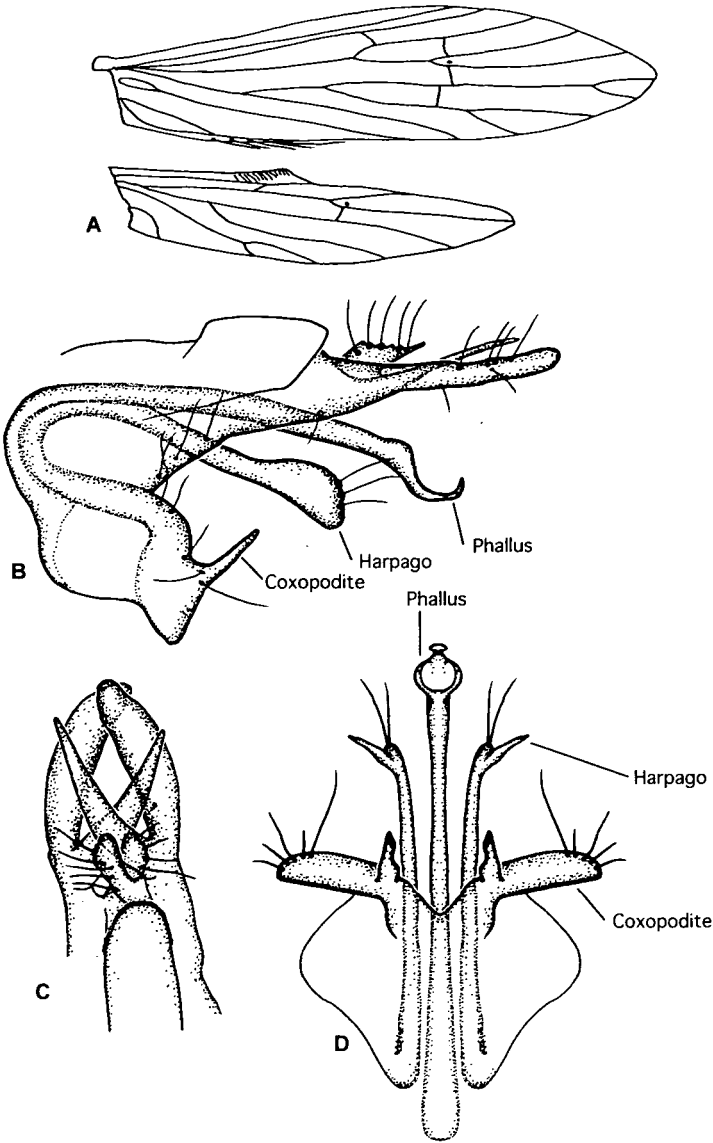


Fig. 8: *Psychomyia trifurcata* sp. nov. — A: right wings. B: genitalia, lateral view. C: genitalia, dorsal view. D: genitalia, ventral view.

(Fig. 8D), tongue-shaped, covering basal part of superior appendage and segment X. Superior appendage, lateral view (Fig. 8B), oriented posteriorly, basally thick and gently narrowing towards the middle; distal half substraight and parallel-sided. A median process originates from ventrobasal part of appendage, being nearly as long as the main branch; needle-shaped and slightly curved ventrally. In dorsal view (Fig. 8C), main branch is thick, rounded, inclining medially along its length; proximal part as broad as distal part, with subparallel lateral and median margins; median processes dilating and oriented mediposteriorly and crossing. Coxopodite well developed, bifurcates. In lateral view (Fig. 8B), median branches visible as short, pointed, smooth, and dorsoposteriorly oriented process. In ventral view (Fig. 8D), median branches short, parallel; lateral branches longer, lobe-shaped and setose, oriented laterally. Harpago, lateral view (Fig. 8B), with proximal-most part oriented dorsally; median part strongly curved into a horseshoe-shaped loop; distal part dilated, club-shaped, and with apical setae; markedly shorter than phallus. In ventral view (Fig. 8D), slender, tuboid and running parallel, except for spinose apical part curving laterally. Segment X, lateral view (Fig. 8B), visible above superior appendages as small rhombus being dorsally undulated. In dorsal view (Fig. 8C), short, slightly dilated, and with setae in row along median margin; the right and left branches crossing over at same manner as the branches of the superior appendages. Phallus, lateral view (Fig. 8B), tuboid along its length, running closely to harpago at proximal half, but more dorsal at distal half; distal part slightly dilated basally to widely excised apex, forming a hook. In ventral view (Fig. 8D), apically expanded and spherical.

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