

**MAYACNEPHIA FORTUNENSIS (DIPTERA: SIMULIIDAE), A NEW  
BLACK FLY SPECIES FROM PANAMA**

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*Abstract.*—The larva, pupa, male and female of *Mayacnephia fortunensis*, new species, are described and illustrated. This report extends the distribution of the genus from the western United States, Mexico and Guatemala, southward to include Panama.

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Field studies related to a black fly pest problem at the Fortuna Hydroelectric Project, Chiriqui Province, Panama, revealed 10 simuliid species (Petersen et al., 1983). Nine of these belong to the genus *Simulium*; the tenth is described here as a new species of the genus *Mayacnephia* Wygodzinsky and Coscarón (1973). Nine species of *Mayacnephia* have been described, ranging from western U.S.A. south to the highlands of Mexico and Guatemala. The species described below represents the first member of this genus reported from Panama. Terminology follows Peterson (1981).

***Mayacnephia fortunensis* Petersen, NEW SPECIES**

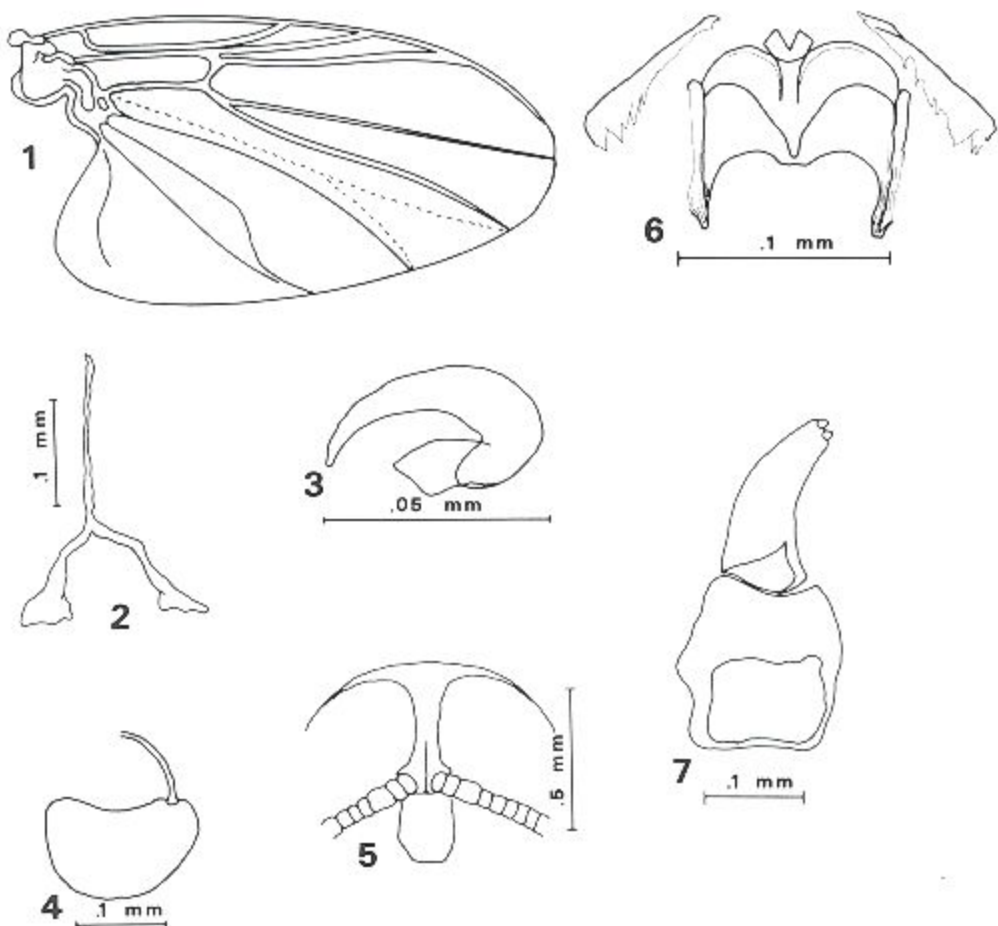
Figs. 1-14

Female.—Wing length 3.2 mm.

*Head:* Dichoptic; frontal angle 50–55° (Fig. 5). Antenna about 0.7 mm long; scape and pedicel light brown; flagellum brown with nine flagellomeres. Palpus dark brown. Sensory vesicle larger than in male, elongate with neck distad of vesicle midline. Frons and clypeus brown, with white pruinosity, irregularly clothed with yellow and black hairs. Postociput brown, densely clothed with yellow hairs. Distal cornua of cibarium slender, sharp-pointed, heavily sclerotized at ends, median distal space hyaline and smooth.

*Thorax:* Scutum dark brown, densely covered with yellow hairs; prescutellar region with a few long fine black hairs. Postpronotum and proepisternum with yellow hairs. Scutellum light brown, with long black hairs and short yellow hairs. Postnotum glabrous, with gray pruinosity. Pleural sclerites glabrous, with gray pruinosity. Wings, 3.2 mm long and 1.5–1.6 mm wide; Sc sparsely pilose ventrally; R<sub>1</sub> pilose dorsally with spines along distal third; R<sub>2</sub> completely pilose; CuA<sub>2</sub> and A<sub>1</sub> arcuate; basal cell present; A<sub>2</sub> ending before wing margin (Fig. 1). Legs brown except for tarsi which are light brown; calcipala well-developed, pedisulcus absent. Claws with large, blunt, subquadrate, basal tooth (Fig. 3).

*Terminalia:* Spermatheca somewhat kidney shaped, sclerotized, with at most



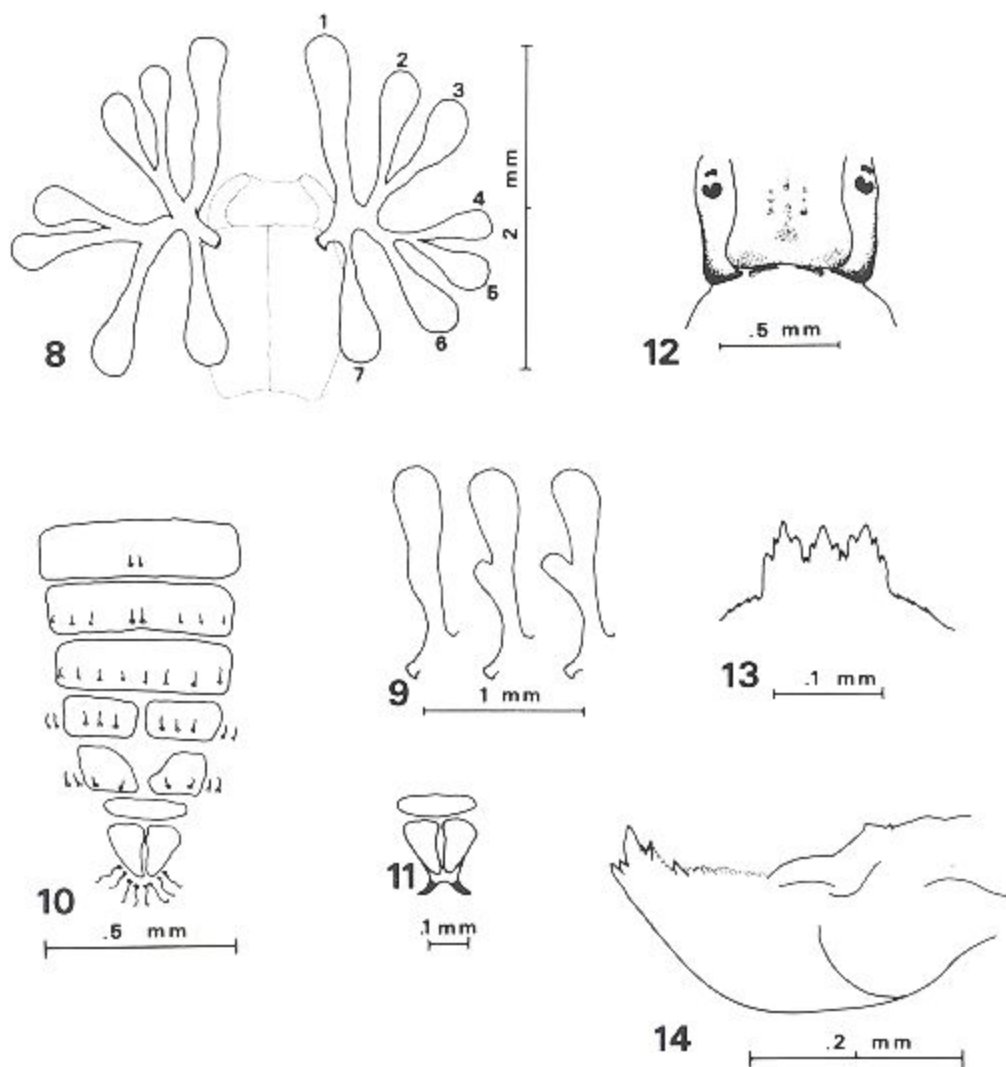
Figs. 1-7. *Mayacnephia fortunensis*. Figs. 1-5, Female. 1, Wing. 2, Genital fork. 3, Claw. 4, Spermatheca. 5, Portion of head showing frons and clypeus. Figs. 6-7, Male. 6, Ventral plate, median sclerite and paramere, ventral view. 7, Gonostylus, ventral view.

a slight membranous area at junction with spermathecal duct, without internal spicules; spermathecal duct not sclerotized (Fig. 4). Genital fork without lateral, anteriorly directed apodemes (Fig. 2).

**Male.**—General body color dark brown. Length: body, 2.1 mm (dry pinned specimens), 2.3 mm (alcohol preserved specimens); wing, 2.5 mm.

**Head:** Holoptic; frons and clypeus brown with silvery pruinosity; clypeus with pale yellowish to brownish hairs. Antenna with scape, pedicel, and base of 1st flagellomere dull yellow, rest of flagellomeres light brown. Palpus dark brown. Sensory vesicle globular and smaller than in female.

**Thorax:** Scutum dark brown, with short yellow hairs distributed evenly over entire surface, with long black hairs near scutellum, pleural sclerites glabrous, with grayish pruinosity. Scutellum light brown, with long black hairs and short yellow hairs, ventral portion with faint silvery pruinosity. Halter light brown. First abdominal tergite dark brown, with very long yellow hairs appearing brown-



Figs. 8-14. *Mayacnephia fortunensis*. Figs. 8-11, Pupa. 8, Respiratory filaments. 9, Variation in respiratory filament number 1. 10, Chaetotaxy of abdominal sternites. 11, Terminal abdominal hooks. Figs. 12-14, Larva. 12, Posterior portion of head capsule showing head spot pattern and cervical sclerites. 13, Hypostoma. 14, Mandible, inner lateral aspect.

ish at base. Tergites dark brown, distal borders appearing light brown in pinned specimens. Legs brown, except for tarsi which are light brown; hind basitarsus strongly expanded laterally, calcipala broadly rounded.

*Terminalia*: Gonostylus with 2 apical spines (Fig. 7). Ventral plate with distal margin deeply incised medially; ventral lip setose, moderately long, narrowing to a point distally. Basal arms short and slender in ventral aspect. Median sclerite Y-shaped, arms recurving inwardly; stem longer than arms. Paramere bladelike, without denticles. Serrated edges of paramere arms in Fig. 6 indicate torn surfaces of points of attachment to basal plates that in turn join basal arms of ventral plate.



**Pupa.**—Cocoon roughly pocket-shaped, loosely woven, without collar or rim. Cephalopterothecal length 2.1–2.5 mm. Respiratory organ with 7 thick tubular branches originating from 4 primary trunks (Fig. 8); branch 1 pleomorphic; sometimes with a boss on the mesal surface, which in 5 out of 72 pupae examined was enlarged as a thumb-like process (Fig. 9). Head and portions of thorax with small rounded platelets in an irregular pattern. Head with 2 + 2 single frontal trichomes and 1 + 1 single facial trichomes; thorax with 5 + 5 single dorsal trichomes. Pattern of ventral abdominal setae and hooks as in Fig. 10; posterior margins of tergites II, III and IV with 4 + 4 anteriorly projecting hooks; tergites VII–IX each with small posteriorly directed spines. Sternite VI with 3 + 3 hooks; sternite VII with 2 + 2 hooks accompanied by 2 + 2 hooks in pleural membrane; all hooks simple; posterior sternites with 8–10 irregularly formed, long hook-like setae. Abdominal sternites VI and VII divided longitudinally along middle by membranous, striate area. Dorsal terminal hooks well developed (Fig. 11).

**Larva.**—General body color dull creamy yellow with gray-green to dark brownish mottling, intensity varying from faint to dark. Length, about 7.5 mm; width of last larval instar head capsule 0.75 mm. Cephalic apotome pale, with a positive head pattern as in Fig. 12. First antennal segment as long as second. Postgenal cleft shallow. Cervical sclerites large, separated from upper ends of postocciput (Fig. 12). Hypostoma with 13 teeth in 3 groups, 4-5-4 (Fig. 13). Mandibles with two outer teeth, one large apical tooth and numerous mandibular serrations (Fig. 14).

**Diagnosis.**—The chaetotaxy of the pupal abdomen and the morphology of the pupal respiratory organ separate *M. fortunensis* from all other species of *Mayacnephia* described. *M. fortunensis* most closely resembles *M. grenieri* and *M. aguirrei* sharing with these species 3 + 3 spines on sternite VI and 2 + 2 spines on sternite VII, but differing from these species in the branching pattern of the respiratory organ, being 7-branched in *M. fortunensis*, 4-branched in *M. grenieri* and 2-branched in *M. aguirrei*.

**Types.**—Holotype ♂ (pinned, with pupal exuviae) PANAMA, Chiriqui Province, Los Planes de Hornito, 26 August 1980, J. L. Petersen. Allotype ♀ with pupal exuviae dissected and mounted in Euparal. Holotype and allotype deposited in US National Museum of Natural History, Washington, D.C. Paratypes: 9 ♂♂, 2 ♀♀, 5 pupae, 30 larvae, same data as holotype, deposited in the US National Museum of Natural History, Washington, D.C., the American Museum of Natural History, New York, and Gorgas Memorial Laboratory, Panama.

**Biology.**—All specimens have come from 3 temporary streams that traverse Los Planes de Hornito, 8°38'N, 82°13'W, Chiriqui Province, Republic of Panama. The streams were less than 1 m wide. Collecting sites were at about 1000 m elevation on a wooded slope of about 20–25° and heavily shaded by forest trees. Larval and pupal substrates were roots, green leaves, blades of grass, dead leaves, and rocks in the stream bed. Water temperatures were 19–20°C.

**Etymology.**—Latin: “of Fortuna,” for Cerro Fortuna, elev. 1495 m, prominent landmark near type locality.

#### ACKNOWLEDGMENTS

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