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Two new species of the genus *Pahamunaya* Schmid (Trichoptera: Polycentropodidae) from Vietnam

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Abstract. Two new species of the genus *Pahamunaya* Schmid (Trichoptera: Polycentropodidae), *P. talon* sp. n. and *P. spinifera* sp. n., from Vietnam are described and illustrated. Examination of the holotype male of *P. khoii* Oláh and Johanson, in combination with an additional specimen of the same species, revealed new characters. New illustrations for this species are provided.

Key words. Caddisfly, Trichoptera, Polycentropodidae, *Pahamunaya*, new species, Vietnam

Introduction

Pahamunaya Schmid, a small caddisfly genus in the family Polycentropodidae, currently includes 14 species from the Afrotropical and Oriental regions. The genus was established by Schmid (1958) based on one species, *P. layagammeda*, from Sri Lanka. Subsequently, 12 more species were described from Africa and southeastern Asia: Angola (*P. angolensis* Marlier 1965), Borneo (*P. erymanthos* Malicky 2008, *P. nacesiveci* Malicky 2008, and *P. prometheus* Malicky 2008), Brunei (*P. espelandae* Oláh and Johanson 2010), Ghana (*P. occidentalis* Kjaerandsen and Netland 1997), Malaysia (*P. wamana* Oláh and Johanson 2010), Thailand (*P. akontios* Malicky and Chantaramongkol 1997, *P. jihmita* Schmid and Denning 1979, and *P. joda* Malicky and Chantaramongkol 1993a), and Vietnam (*P. directoris* Malicky 1995 and *P. khoii* Oláh and Johanson 2010). The fourteenth species, *P. taleban* (Malicky and Chantaramongkol) 1993b, originally described from Thailand in the genus *Polyplectropus*, was recently transferred to *Pahamunaya* (Malicky 2010).

To the two previously known species of this genus from Vietnam, we describe and illustrate two new species: *P. talon* and *P. spinifera*. Examination of additional material uncovered a specimen very similar to *P. khoii*. Comparison of this specimen with the holotype of *P. khoii*, kindly loaned by Prof. János Oláh, proved them to be the same. However, certain characters were missing from the original description and illustrations. Therefore, we reillustrate the male genitalia and head of this species.

Material and methods

The material presented in this paper was collected by personnel of the Royal Ontario Museum (ROM) and the American Museum of Natural History (AMNH).

Specimens were collected with Malaise or UV light traps. Abdomens were removed and cleared in 10% KOH, then washed and put in glycerin for further examination and drawing. All material is stored in 80% alcohol. Type material is deposited in the ROM and AMNH, consistent with the source of the material examined. Terminology follows that of Schmid (1998).

Pahamunaya talon sp. n.

(Figure 1)

Diagnosis. This species has an apparent similarity to *Pahamunaya akontios* Malicky and Chantaramongkol, especially in the general shape of segment X and complex inferior appendages, as viewed laterally; and, in possessing long, heavily sclerotized intermediate appendages. *Pahamunaya talon* differs from this species in having intermediate appendages curved posteroventrad in the shape of a talon, and a ventromesal, spatula-like process on sternite IX.

Description. Length of forewing 3.7-3.9 mm. General color of adult male in alcohol pale yellowish, thorax and dorsal part of abdomen slightly brownish. Wing venation and forks (Fig. 1A) fit generic description and match *Pahamunaya* wings illustrated by various authors. Forewings long and narrow with forks II, IV and V; discoidal cell closed, as long as Rs; thyridial cell closed, nearly twice as long as discoidal cell; median cell open; main cross-veins present. Hind wings narrow with forks II and V; anterior edge with shallow, linear emargination for two-thirds of length from apex.

Male genitalia. Sternite IX taller than wide, bean-shaped in lateral view; each side with basolateral triangular projection directed posterad; mesoventrally with elongate, near-rectangular process, as viewed laterally, or spatula-like with truncate apex, in ventral view. Segment X in lateral view, gently arched, slightly sclerotized posterolaterad; separated dorsomesally by membranous area in dorsal view. Preanal appendage fused with intermediate appendage and reduced to small, rounded lobe in lateral view. Intermediate appendage talon-like in lateral view, bearing single spine dorsally and directed posterad; lower inner angles form closed bridge under phallic apparatus. Inferior appendage trilobed: dorsal lobe elongate with truncate apex in lateral view and rounded apex in ventral view; mesal lobe claw-like, curved posterodorsad in lateral view and mesad in ventral view; ventromesal lobe with acute apex pointed posteroventrad in lateral view and posteromesad in ventral view. Phallic apparatus massive, arched, with elongate, trigger-like ventromesal projection; apical portion enlarged with spiny sclerite visible inside of inverted endotheca.

Distribution. Known only from the type locality in Quang Nam Province (Vietnam).

Material examined. Holotype male. Vietnam: Quang Nam Province, Ngoc Linh, 950 m, 15°11.2'N, 108°2.3'E, Malaise trap, 23 March 1999, D. Grimaldi, L. Herman, C. Johnson, K. Long, E. Sterling, AMNH. **Paratype:** 1 male, same data as holotype.

Etymology. This species is named for the talon-like intermediate appendage of the male genitalia (*talon* is Middle English for the hind claw of a bird of prey).

Pahamunaya spinifera sp. n.

(Figure 2)

Diagnosis. *Pahamunaya spinifera* is similar to *P. jihmita* Schmid and Denning, *P. directoris* Malicky, and *P. khoii* Oláh and Johanson, in the shape of segment X; in the long, heavily sclerotized intermediate appendages; and in complex inferior appendages, bearing two pairs of crossed filamentous processes. It can be easily distinguished from these species by sternite IX bearing an elongate, acuminate projection posterolaterally; and by the intermediate appendages bearing spines along their ventral margins.

Description. Length of forewing 3.2-3.9 mm. General color of adult male in alcohol pale yellowish, thorax and dorsal part of abdomen slightly brownish. Wing venation similar to *Pahamunaya talon*, described above.

Male genitalia. Shape of sternite IX irregular in lateral view, each side with nearly triangular projection posterodorsally and elongate, acuminate projection posterolaterally. Segment X slightly sclerotized, elongate, straight in lateral view, notched apically in dorsal view, with pair of papilla ventromesally, each with a single seta. Preanal appendage absent or completely fused with intermediate appendage. Intermediate appendage long, slender, extending posteriorly beyond segment X; in lateral view, basal third straight, subvertical, then slightly twisted and bent at 120 degree angle posteriorly, gradually tapering to acute apex; ventrally bearing spines, which shorten distally; in dorsal view, sinusoid, bent posteromesad, place of twist, or “elbow” smooth in holotype, but has angulated apex in some paratypes (as illustrated in Fig. 2B with dashed lines); lower inner angles form complete bridge under phallic apparatus. Inferior appendage complex, bearing dorsal digitate process, bent posterad in lateral view; apex in lateral view divided posteriorly into two, widely separated triangular lobes, with paired filamentous processes medially. Phallic apparatus large, arched, with digitate ventromesal projection directed posterad, apical portion nearly tubular.

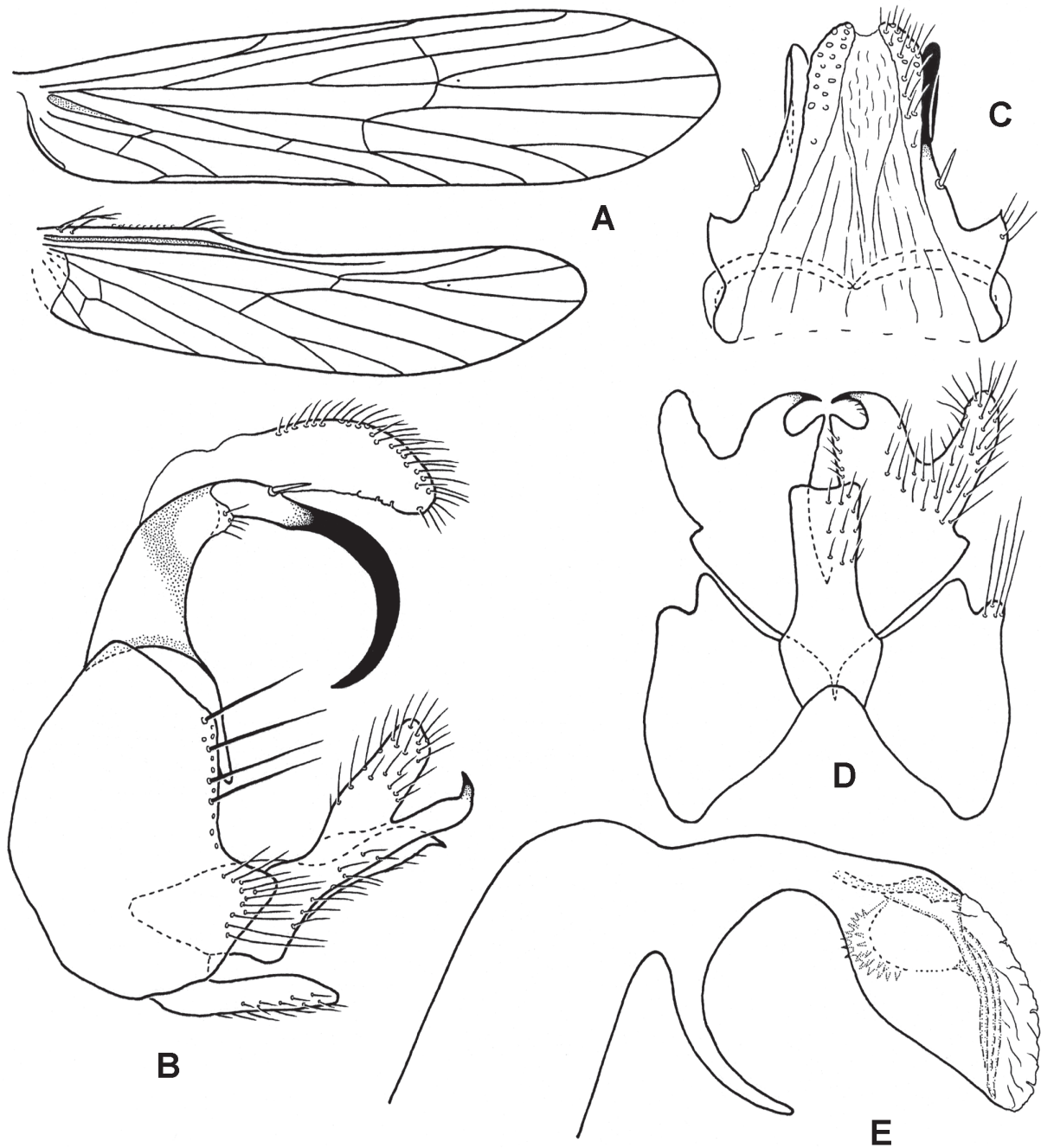


Figure 1. *Pahamunaya talon* sp. n., male. **A)** Fore- and hind wings. Genitalia: **B)** Lateral; **C)** Dorsal; **D)** Ventral; **E)** Phallic apparatus, lateral.

Distribution. Known from Quang Nam and Thua Thien-Hue Provinces in Vietnam.

Material examined. Holotype male. Vietnam: Thua Thien-Hue Province, Nam Dong District, Huong Loc Commune, ca. 9 km SE Khe Tre, riparian vegetation, Malaise trap, 26 May-1 June 2002, C. Darling, ROM 2002508. **Paratypes:** 2 males, same data as holotype; 1 male, Quang Nam Province, Ngoc Linh, 830 m, 15°10'N, 108°05'E, Malaise trap, 11-18 March 1999, K. Long, C. Johnson, AMNH; 7 males, ibid., 950 m, 15°11.2'N, 108°2.3'E, Malaise trap, 16 April 1999, D. Grimaldi, L. Herman, C. Johnson, K. Long, E. Sterling, AMNH.

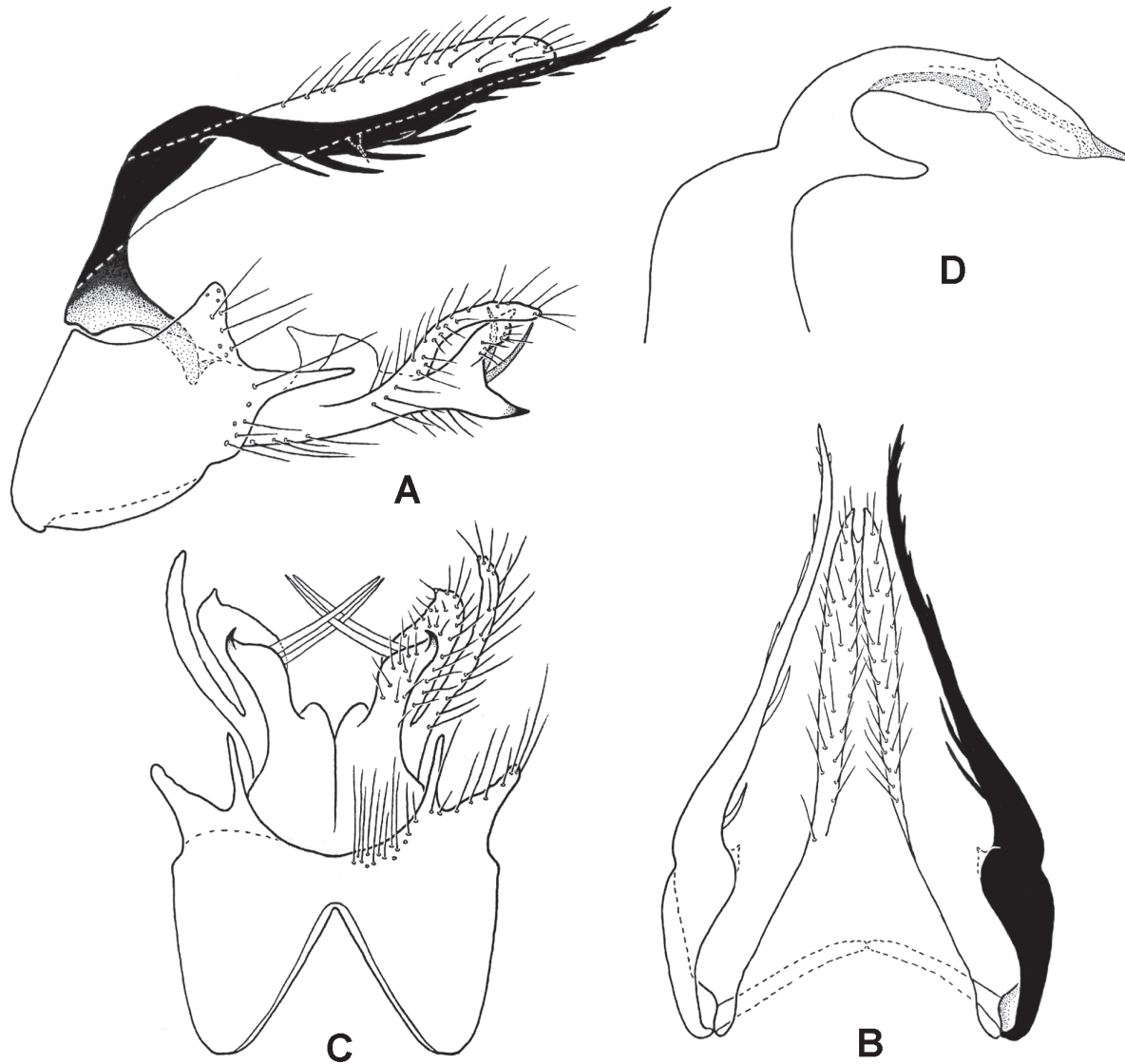


Figure 2. *Pahamunaya spinifera* sp. n., male genitalia. **A)** Lateral; **B)** Dorsal; **C)** Ventral; **D)** Phallic apparatus, lateral.

Etymology. This species is named for the spine-bearing intermediate appendage of the male genitalia (*spina* is Latin for “spine” and *fero* is Greek for “to carry or bear”).

***Pahamunaya khoii* Oláh and Johanson**
(Figure 3)

Pahamunaya khoii Oláh and Johanson 2010: 59-61, fig. 109-115.

Remarks. One specimen we received from the Royal Ontario Museum appeared to be very close to *Pahamunaya khoii*, described by Oláh and Johanson (2010) from Vietnam. However, certain characters seemed to be either different or lacking. Upon receipt of the holotype kindly provided by Prof. János Oláh, we determined that indeed we were dealing with the same species. Several characters were either

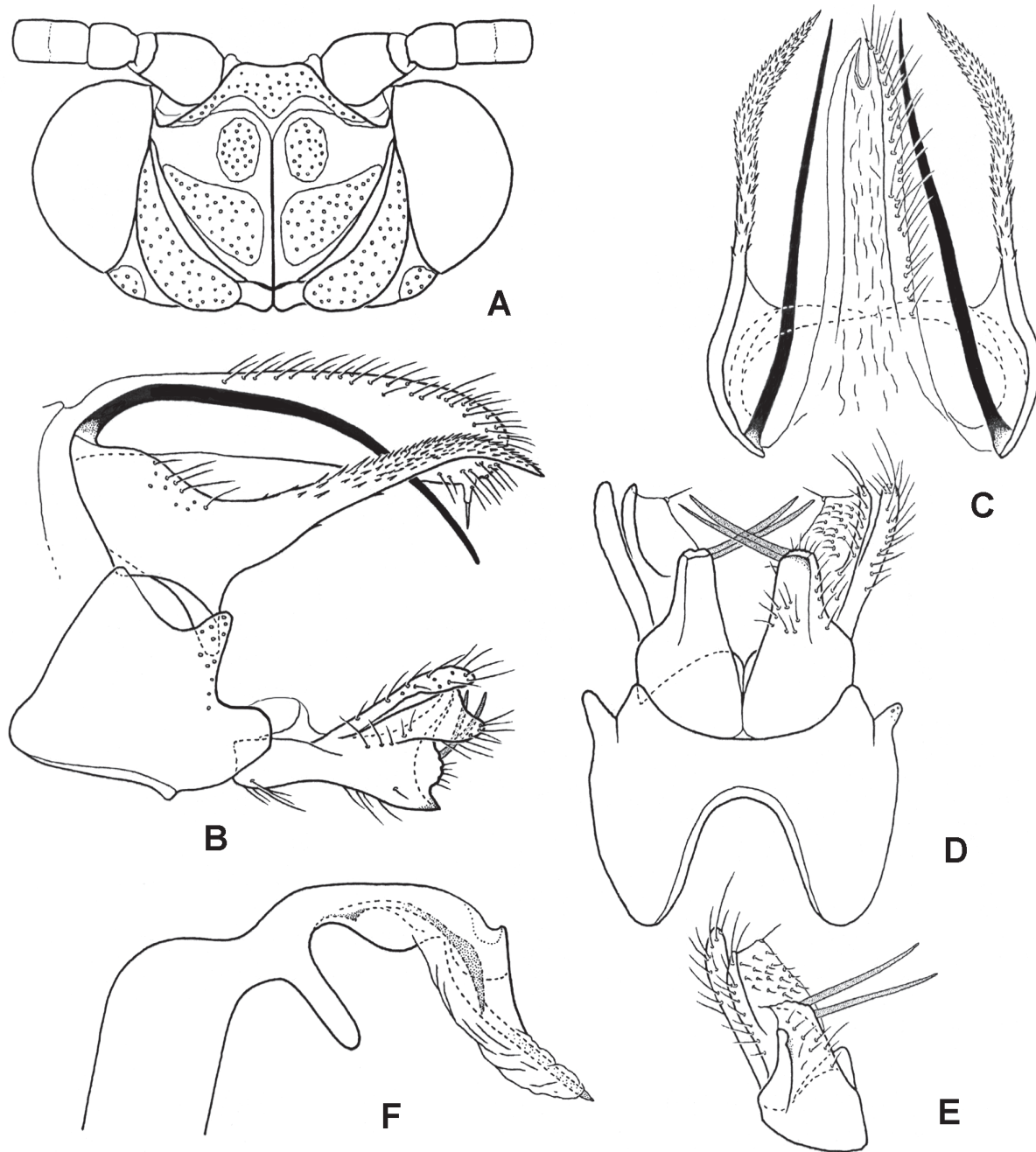


Figure 3. *Pahamunaya khoii* Oláh and Johanson, male. **A)** Head, dorsal. Genitalia: **B)** Lateral; **C)** Dorsal; **D)** Ventral; **E)** Left inferior appendage ventrolateral; **F)** Phallic apparatus, lateral.

omitted or not represented properly in the original description. We note that the posterior ocellar warts of the head are nearly triangular in shape with the acute angle directed anterolaterad. The inferior appendages bear paired filamentous processes similar to those of *P. spinifera*, *P. jihmita*, and *P. directoris*, but are not included in the original description. Finally, overall the inferior appendage is more robust and complicated compared to the original illustration. The holotype agrees with our specimen in all of these characters. We provide new illustrations of this species (Fig. 3) to reflect these features.

Distribution. Vietnam (Lam Dong, Thua Thien-Hue).

Material examined. Vietnam: Gia Lai Province, An Khe District, 6 km tributary of Azun River, NE Tram Lap, UV light, 20 June 1996, B. Hubley and D. Currie, 1 male, ROM 961073; Lam Dong Province, Baoloc, Duchma stream, sweep net, 26 October 1988, J. Oláh, holotype male (Oláh Private Collection).

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