

***Procloeon spinosum*, a New Species of Baetidae (Insecta: Ephemeroptera) from Vietnam**

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ABSTRACT

A new species of Baetidae (Ephemeroptera), *Procloeon spinosum* Nguyen and Bae, is described from Vietnam. The larva of *P. spinosum* can be distinguished from that of its congeners by the combination of the characters of the 7th gills, which bear spines on the posterobasal margin, and the terminal segment of maxillary palp, which is approximately 1/3 times length of the 2nd segment. The larvae inhabit pools or slow current margins of mountain streams in Northern Vietnam.

Key words: *Procloeon spinosum*, new species, description, Baetidae, Ephemeroptera, Vietnam

INTRODUCTION

The mayfly genus *Procloeon* Bengtsson in the family Baetidae is distributed throughout the world, but members of this genus are poorly known in the Oriental Region. Walker (1853) described *P. debilis* (Walker) from India, Müller-Liebenau and Hubbard (1985) described *P. regularum* from Sri Lanka, and Waltz and McCafferty (1985) described *P. tatalis* from Taiwan. In Vietnam, the species of *Procloeon* have not been recorded, although a few other baetid mayflies are known: Ueno (1969) reported *Cloeon bimaculatum* Eaton and *C. marginale* Hagen and Soldán et al. (1987) described *Centroptella liebenauae* and *Centroptella colorata* from Vietnam.

In a series of systematic studies of Baetidae in tropical Southeast Asia, we herein describe a new species of *Procloeon* using larval materials collected from Vietnam.

MATERIALS AND METHODS

Larvae were collected from mountain streams in northern Vietnam between 2000 and 2002 using Surber nets and kick nets. The materials are preserved in 80% EtOH, and housed in the Aquatic Insect Collection of Seoul Women's University (SWU-AIC) and Hanoi University of Science. To examine ultrastructures of external morphology, larval body parts, such as mouthparts and gills, were dissected, slide-mounted, and examined under a microscope.

DESCRIPTION

Family Baetidae

Genus *Procloeon* Bengtsson, 1915

Procloeon spinosum Nguyen and Bae, N. Sp. (Fig. 1)

Material examined. Holotype. Mature female larva (SWU-EPH-3654): Vietnam, Lao Cai Province, Sa Pa, Cat Cat, 18 Oct 2000, V.V. Nguyen [SWU-AIC]. Paratypes. 2 mature male larvae and 2 mature female larvae (SWU-EPH-3655): same data as holotype [SWU-AIC]. Other materials. 9 larvae: same data as holotype; 15 larvae: Lao Cai Province, Sa Pa, Muong Hoa, 20 Oct 2000, V.V. Nguyen; 5 larvae: Ha Giang Province, Vi Xuyen, Tay Con Linh 9 Oct 2000, V.V. Nguyen; 15 larvae: Vinh Phuc Province, Tam Dao National Park, Thac Bac, 16 Oct 2000, 15 Feb 2001, V.V. Nguyen.

Mature larva. Dimensions (mm): Body length 7.40; antennae 2.74; forefemora 1.04, foretibiae 0.65, and foretarsi 0.61; midfemora 1.21, midtibiae 0.71, and midtarsi 0.61; hindfemora 1.19, hindtibiae 0.72, and hindtarsi 0.57; claws 0.19; cerci 2.65.

General body color light yellow to brown with dark brown markings. Head. Coloration light brown in vertex, with paired dark brown stripes medially. Antennae pale yellow, ca. 3 × length of head. Labrum with submarginal setae. Left mandible (Fig. 1A) with blunt denticles on incisors, with field of hairlike setae next to prothetica; molar area with one enlarged dentate tooth and series of small teeth. Right mandible (Fig. 1B) with blunt denticles on incisors, with field of hairlike setae next to prothetica; molar area with series of small teeth, with hairlike setae distally. Maxillae (Fig. 1C, D) with 3-segmented maxillary palp; maxillary

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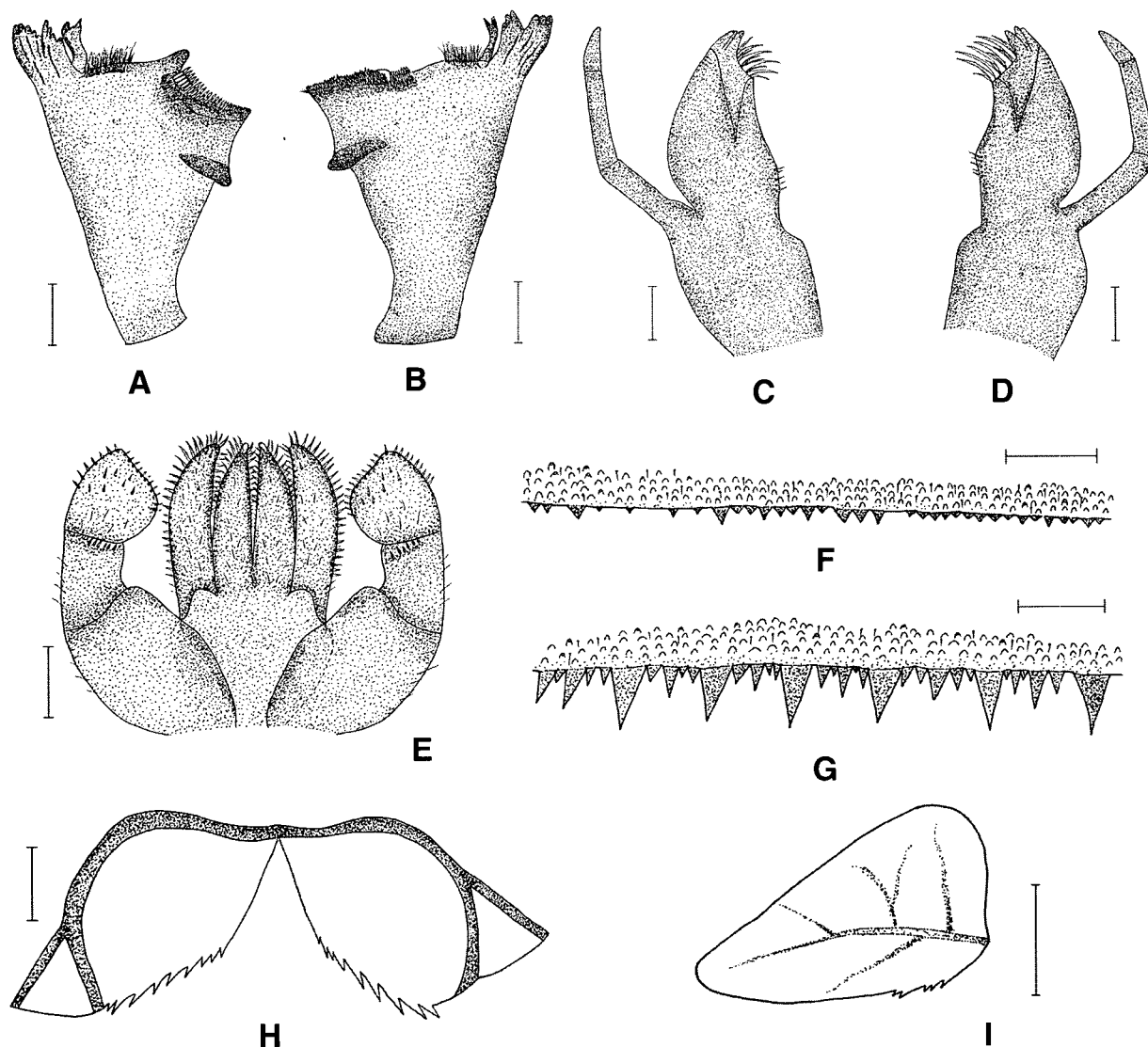


Fig. 1. *Procloeon spinosum*, n. sp., larvae: A, left mandible; B, right mandible; C, left maxilla; D, right maxilla; E, labium; F, abdominal tergum I; G, abdominal tergum V; H, paraprocts; I, gill 7. Scale bars=0.1 mm (A-I).

palp terminal segment ca. $1/3 \times$ length of 2nd segment, apically conical. Labium (Fig. 1E) with V-shaped glossae; glossae slightly narrower than paraglossae, elongated and apically attenuating, with rowed stout marginal setae; paraglossae elongated and apically attenuating, with rowed stout marginal setae; 2nd segment of labial palp with rowed 6 stout setae apically; terminal segment of labial palp somewhat truncate, with stout marginal setae. Thorax. Prothorax light yellow; mesothorax light brown, with irregular dark brown markings; metathorax brown; thoracic sterna white, without markings. Hindwingpads present and reduced. Femora light yellow to brown, apically darker in color; femora with sparse stout setae on anterior and posterior

margins, with transverse arc of hairlike setae dorsoapically; tibiae light brown, with distinct arc of hairlike setae dorso-basally; tarsi light brown, with scattered hairlike setae dorsally; claws brown, $< 1/2 \times$ length of tarsi, and with 2 rows of minute denticles basally. Abdomen. Abdominal terga with rowed acute spines on posterior margin, large and small spines alternating (spines greater in length in posterior abdominal segments) (Fig. 1F, 1G); tergum I light yellow; terga II-VI with somewhat rectangular dark brown markings on anterior margin, with median dark brown Δ -shaped marking, and with paired submedian light yellow area; tergum IV somewhat lighter in color; tergum VI somewhat darker in color; terga VII-VIII with somewhat rectangular

dark brown marking on anterior margin; tergum IX with median pale U-shaped marking on posterior margin, and with posterolateral dark brown markings near median U-shaped marking; sternum IX light yellow, with dark brown stripe along lateral margins; posterior margin of tergum X straight, with rowed >24 acute spines (lateral spines enlarged); paraprocts (Fig. 1H) V-shaped, with 9-12 large acute spines on distal half; terga I-IX with posterolateral projections (posterolateral projections on terga VII-IX well-developed). Gills on abdominal segments I-VII white, round apically, with well-developed dark brown tracheae; gills I-VI with dorsal and ventral lamellae; dorsal lamellae smaller in size, < 1/2 × width of ventral lamellae; gills VII (Fig. 1I) single, with ca. 5 spines on posterobasal margin. Caudal filaments < 1/3 × length of body, with broad brown band at mid-length; every 4th segment prominent, with whirl of simple stout setae, and with dark bands on every 4th intersegmental membrane; cerci with rowed long hair-like setae on inner side; terminal filament with rowed long hairlike setae on both lateral sides.

Adult. Unknown.

Diagnosis. The larva of *P. spinosum* n. sp. is similar in general morphology to *P. regularum* Müller-Liebenau and Hubbard from Sri Lanka and *P. tatalis* Waltz and McCafferty from Taiwan, but can be distinguished by the combination of the characters of the 7th gills, which bear spines on the posterobasal margin, and the terminal segment of maxillary palp, which is approximately 1/3 times length of the 2nd segment.

Etymology. The specific epithet *spinosum* ("spine" in Latin) refers to the spined gills on the abdominal segment VII.

Distribution. Northern Vietnam.

Habitat. Larvae of *P. spinosum* inhabit pools or slow current margins of mountain streams (643-1,250 m in altitude)

in Northern Vietnam. The streams are approximately 12-40 m wide and the substrate consists of mixed sand/gravel and larger stones such as boulders and cobbles. The larvae are more abundant in relatively slow current areas or pools in which leaf litters are abundant.

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