

Chinoperla rhododendrona, a New Species of Perlidae (Insecta: Plecoptera) from Vietnam

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Abstract: A new perlid stonefly, *Chinoperla rhododendrona* n. sp., is described from a tropical mountain stream in central Vietnam. The male adult of this species can be characterized by the strongly setous body and unique L-shaped genital structure. The female adult can be distinguished by the posteromedially sclerotized and widely notched subgenital plate. The egg is unique among its congeners as it has smooth chorion and long and narrow collar. Illustrations of diagnostic characters are provided.

Key words: *Chinoperla rhododendrona*, new species, Perlidae, Plecoptera, description, Vietnam

Since the majority of stonefly species inhabit temperate streams in the northern hemisphere, stoneflies are considered a typically cold-adapted insect group (Zwick, 1986). The perlid stonefly genus *Chinoperla* Zwick (1980), however, is unique in distribution as it is limited to the oriental region, ranging from Southern China, Thailand, Peninsular Malaysia through Indonesia (Borneo and Sumatra), and westwards to India (Du et al., 1999; Sivec and Zwick, 1989; Zwick and Sivec, 1980; Zwick, 1981, 1982; Wu, 1948). Currently, six species of *Chinoperla* are considered valid (Sivec et al., 1988; Sivec and Zwick, 1989): *Chinoperla borneensis* Sivec and Zwick, *C. fascipennis* (Banks), *C. nigriceps* (Banks), *C. nigrifrons* (Banks), *C. unidentata* Sivec and Zwick, and *C. reducta* (Geijskes).

In the present paper, we describe a unique new species of *Chinoperla*, which was discovered from tropical mountain areas in central Vietnam.

MATERIALS AND METHODS

Adult material was collected from mountain areas in central

Vietnam during 2002-2006. Adults were collected by a sweeping net from riparian forests along the mountain streams. Eggs were obtained from a female adult and examined under a scanning electron microscope (JEOL 5002). Male and female genitalia were dissected and examined under a stereomicroscope (Leica MZ8). All the materials were preserved in 80% EtOH and deposited in the Aquatic Insect Collection of Seoul Women's University (SWU-AIC). The holotype material will be permanently housed in a museum or an institute in Vietnam in the future. Morphological terminology follows Sivec et al. (1988).

DESCRIPTION

Family Perlidae Latreille

Genus *Chinoperla* Zwick

Chinoperla rhododendrona Cao and Bae n. sp.

(Fig. 1 A-J)

Material examined: Holotype: ♂ (SWU-PLE-190; genitalia dissected), Do Quyen stream, Bach Ma NP., Thua Thien-Hue Prov., central Vietnam, 2006.IV.21, T.K.T. Cao. Paratypes: 1 ♂, 1 ♀ (SWU-PLE-191; genitalia dissected), Water supply station, Bach Ma NP., Thua Thien-Hue Prov., central Vietnam, 2005.VIII.14, T.K.T. Cao; 1 ♂ (SWU-PLE-192; genitalia dissected), Tri Sao trail, Bach Ma NP., Thua Thien-Hue Prov., central Vietnam, 2005.VIII.15, T.K.T. Cao. Other materials: 1 ♀ (SWU-PLE-193; genitalia dissected), Son Tra, alt. 200m, Da Nang Prov., central Vietnam, 2002.IV.4, V.V. Nguyen & D.H. Hoang; 1 ♀ (SWU-PLE-194; genitalia dissected), U Bo mountain, alt. 700m, Truong Son, Quang Ninh, Quang Binh Prov., central Vietnam, 2006.VI.10, P.H. Thai.

Male adult: Body length 7.7 mm; antennae 6.3 mm; forewings 8.2 mm; hindwings 7.5 mm. General body color dark brown, strongly pilose particularly on sides of

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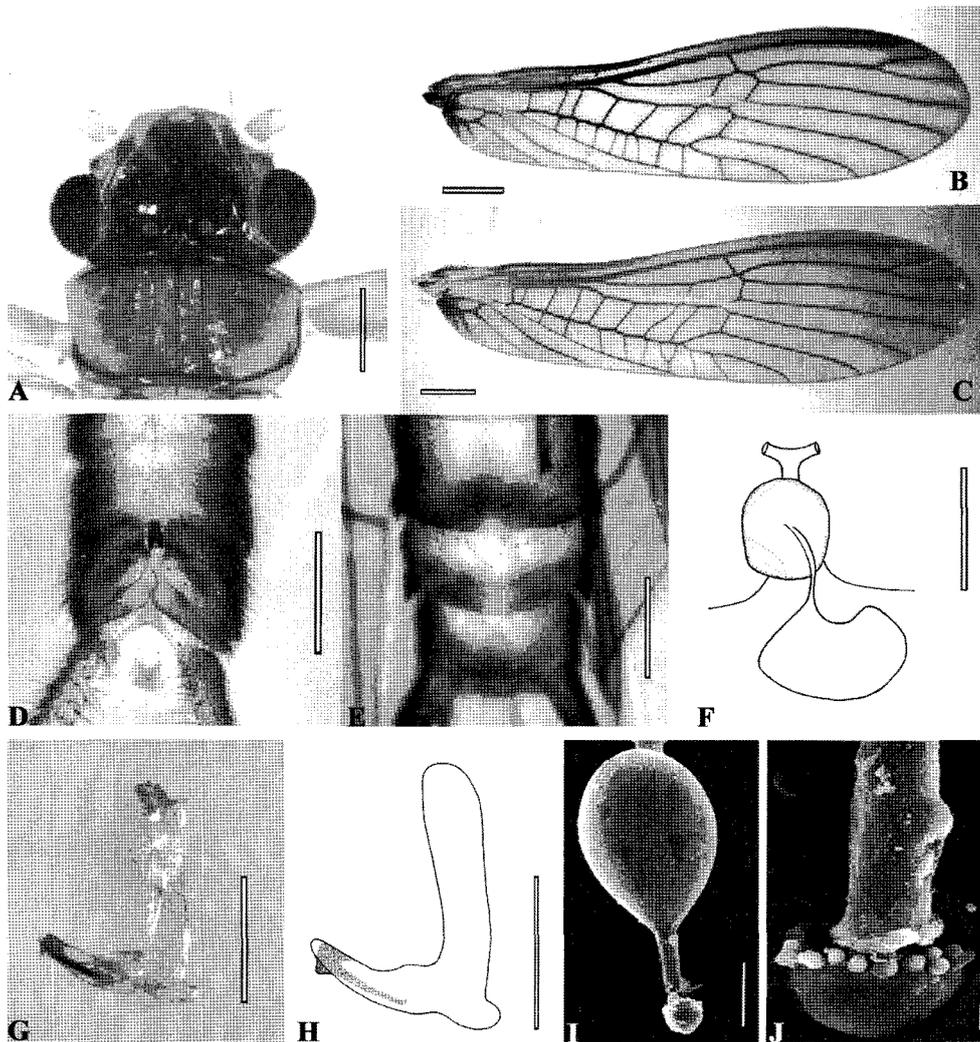


Fig. 1. *Chinoperla rhododendrona*, n. sp., adult. A. Male head and pronotum. B. Male forewing. C. Female forewing. D. Male dorsal terminalia. E. Female ventral terminalia. F. Female vagina. G-H. Everted aedeagus, lateral. I. Egg, lateral, 200x. J. Egg, anchor detail, 1000x. Scales: A, D, E-H, 0.5 mm; B-C, 1 mm; I-J, 0.1 mm.

abdomen. Head (Fig. 1A) as wide as pronotum (head width: 1.5 mm), dark brown; M-line somewhat indistinct. Ocelli small; distance between ocelli as far as distance from ocellus to inner margin of compound eye. Antennae relatively long; scape dark brown; remainder light brown. Mesal occipital knob very small, contact to anterior margin of pronotum.

Pronotum (Fig. 1A) brown, with darker bilateral markings, with darker rugosities, and with moderately developed anterolateral angles. Wings (Fig. 1B) evenly brownish; veins darker; Sc short, ending at level of origin of Rs, with two C-Sc crossveins beyond basal one; Rs forked; anterior branch of Rs again forked. Forelegs and midlegs proximal parts of femora, tarsi, and tibiae yellowish brown; distal parts dark brown. Hindlegs distal end of femora and proximal parts of tibiae and tarsi dark brown; remainder yellowish brown.

Abdomen greatly hairy. Abdominal terga I-VIII anterolaterally strongly sclerotized, posteromedially membranous. Abdominal tergum IX (Fig. 1D) anteromedially bearing small, elongate, and strongly sclerotized dark sclerite; sclerite ca. 1/3x length of tergum IX and deeply forked distally. Abdominal tergum IX almost split into halves forming small groove behind sclerite. Hemitergites slender; anterior processes long, pointed at tip, and regularly curved. Epiproct sclerite prominent, X-shaped, and strongly sclerotized. Abdominal sterna III-IV with well developed brushes of hairs on median area (hairs reduced on sternum V); abdominal sterna I-VII with membranous folds. Aedeagus (Fig. 1G-H) tubular, ca. 0.7 mm long, and mostly membranous; in lateral view, everted sac (Fig. 1G-H) relatively long, nearly as long as length of tube, recurved ventrally (internal sac standing at right angle to tube); distal half of everted sac strongly sclerotized; apex of everted sac

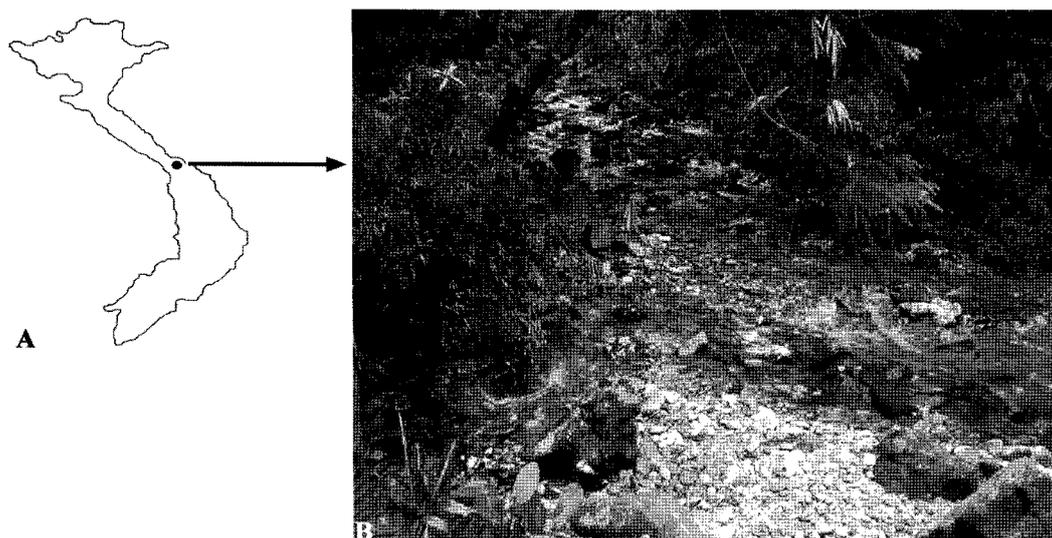


Fig. 2. *Chinoperla rhododendrona*, n. sp. A. Distribution. B. Habitat.

with single short triangular spinule on dorsal side. Cerci dark brown and hairy.

Female adult: Body length 9.7 mm; antennae 8.3 mm; forewings 10.5 mm; hindwings 9.2 mm. General morphology and color pattern similar to male but larger than male. Wings as in Fig. 1C, slightly different from male in increased number of crossveins between M and Cu. Subgenital plate (Fig. 1E) strongly sclerotized posteromedially, unproduced, and widely notched. Vagina (Fig. 1F) membranous, as long as wide, with narrow short simple spermathecal stalk; receptacle large and sac-like.

Nymph: Unknown.

Egg: Egg (Fig. 1I-J) elongate oval, ca. 0.35 mm long and 0.2 mm wide. Chorion smooth. Collar long and narrow, ca. 0.5x length of egg; anchor plate mushroom-shaped, with granules of anchor on short stalks. Micropyles not observed.

Etymology: The specific epithet, *rhododendrona*, is from the type locality “the Do Quyen stream” in Bach Ma National Park, where rhododendron or royal azalea blossom is characteristic.

“Do Quyen” is the Vietnamese word of the rhododendron.

Diagnosis: *Chinoperla rhododendrona* n. sp. can be distinguished from its congeners by the combination of the following characters: body is strongly pilose; the everted sac of male aedeagus is relatively long, nearly as long as tube, recurved ventrally and standing at right angle to the tube (Fig. 1G-H). The subgenital plate of female adult is strongly sclerotized posteromedially, unproduced, and widely notched (Fig. E). The egg is unique among its

congeners as it has smooth chorion and long and narrow collar (Fig. 1I-J).

Distribution: Central Vietnam (Fig. 2A).

Habitat and biology: Adults of *C. rhododendrona* were collected from stream sides of small to medium-sized (5-9 m wide) mountain streams (alt. 700-1100 m) in central Vietnam. The streams were 50-100% canopied by evergreen trees such as bamboo and ficus and the substrate consisted of boulder (30%), cobble (40%), gravel (20%) and coarse sand (10%), and abundant fallen leaves. The adults were collected from April to August, but were not found in October just after rainy season.

Remarks: Zwick (1980) renamed this genus as *Chinoperla* because the homonymous *Sinoperla* Wu (1948) was preoccupied for a Cretaceous stonefly group, which was described from China.

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