

Description of *Goera jaewoni* n. sp., and Reports of Larval Stages of *G. interrogationis* and *G. parvula* (Trichoptera: Goeridae) from Korea

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A new goerid caddisfly, *Goera jaewoni* n. sp. (Trichoptera: Goeridae), is described from Korea. Larval stages of *G. interrogationis* Botosaneanu and *G. parvula* Martynov are also reported for the first time based on reared specimens. Line-drawings of the key characters and taxonomic and ecological notes are provided.

The caddisfly family Goeridae contains over 100 species in 10 genera and is widely distributed in all the biogeographic regions except for the Neotropical and Australian regions. The larvae inhabit running waters ranging from small headwater streams to large rivers. They usually construct cases of rock fragments (Wiggins, 1998). The prosternal horns are present and mesopleura are anteriorly extended as a prominent process. The adults lack ocelli and the scape of antenna is longer than the length of head.

Seven species in the family, *Goera curvispina* Martynov, *G. interrogationis* Botosaneanu, *G. japonica* Banks, *G. parvula* Martynov, *G. pilosa* (Fabricius), *G. tungusensis* Martynov, and *Lithax yamamotoi* Tsuda, were recorded from Korea by Yamada (1938), Tsuda (1942), Botosaneanu (1970), Kim (1974), Olah (1985), Yoon and Kim (1988), Mey (1989), Malicky (1993), Kumanski (1991), Park and Bae (1998), and Choe et al. (1999). Among these species, *G. japonica* was the only species known with the larval stage in Korea (Kim, 1974; Yoon and Kim, 1988).

This paper describes a new species and newly discovered larval stages of two species of Goeridae.

Materials and Methods

Adult and larval materials of Goeridae collected throughout South Korea were examined for this study. To associate the larval and adult stages, some larvae were brought from a stream and reared individually in the laboratory. All the materials were preserved in 80% ethanol and deposited at Seoul Women's University.

Reference materials of closely related species, for example, holotypes of *Goera ramosa* Yang and Armitage, *G. redacta* Yang and Armitage, and *G. spinosa* Yang and Armitage, deposited at Nanjing Agricultural University were also examined. Descriptions and diagnoses are provided with line-drawings of key characters. The abbreviations used in taxonomic account are as follow: M (male adult), F (female adult), and L (larva); CB (Chungcheongbug-do), GG (Gyeonggi-do), GW (Gangweon-do), HB (Hamgyeongbug-do), HH (Hwanghae-do), HN (Hamgyeongnam-do), JB (Jeonrabug-do), JN (Jeonranam-do), and PB (Pyeonganbug-do); Mt. (mountain) and Br. (bridge).

Taxonomic Account

Goera jaewoni n. sp.
(Fig. 1)

Material examined: Holotype: Male adult (in alcohol), KOREA, Gangweon-do, Inje-gun, Jingdong-ri, Bangtaecheon (Stream) at Beombawi, 1996 V 16, Y. J. Bae, at light, Seoul Women's University. Other material: 1M (teneral specimen), same data as holotype.

Diagnosis: Male adult of *G. jaewoni* can be separated from the related species in the genus by the shape of the process of sternite IX (Fig. 1-C), the inferior appendages (Figs. 1-A, 1-B), and the forked dorsal process of tergum X (Fig. 1-A).

Description: Male adult. Body length 6.8 mm; forewing length 8.5 mm; hindwing length 7.4 mm. General body color brown. *Head.* Head dark brown, with a pair of anterior setal warts and two pairs of posterior setal warts. Antennae dark brown; scapes with hairs, >7x length of pedicel. Compound eyes black. Ocelli absent.

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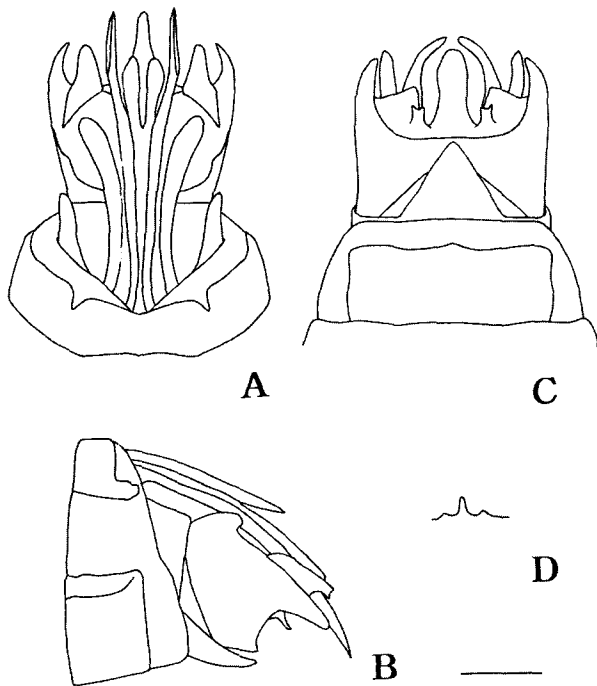


Fig. 1. Male genitalia of *Goera jaewoni*. A, Dorsal. B, Lateral. C, Ventral. D, Lobe on posterior margin of sternum VI. Scale bar=0.25 mm.

Maxillary palpi 3-segmented; segment III with long hairs. Labial palpi 3-segmented. *Thorax*. Thorax dark brown. Pronotum with two pairs of setal warts; meso-scutum with a pair of confined setal warts; meso-scutellum with a median setal wart. Wings light brown. Legs light brown; forelegs with two apical spurs; midlegs and hindlegs with two apical and two preapical spurs. *Abdomen*. Abdomen brown; lateral parts white; posterior margin of sternum VI with a short, triangular, and black lobe (Fig. 1-D); apical process of sternum IX triangular (Fig. 1-C). Distal segments of inferior appendages separated from basal segments (Fig. 1-B); upper part of distal segment protrude; mesal process blunt, with bifurcate ventral lobe (Figs. 1-B, 1-C). Dorsal process of tergum X single, forked apically (Fig. 1-A).

Etymology: This species is named after Mr. Jae Won Kim who pioneered Trichoptera systematics in Korea.

Remarks: *G. jaewoni* n. sp. can be placed to the species group No. 2 in the genus *Goera* (Yang and Armitage, 1996) by the presence of an elongated median dorsal process of tergum X. The adults were collected at window light near a mid-sized stream (width 10-15 m) where the water was clean and relatively swift, the substrate was consisted of boulders, cobble, pebbles, and gravels, and the environment was relatively well preserved.

Goera interrogationis Botosaneanu
(Fig. 2)

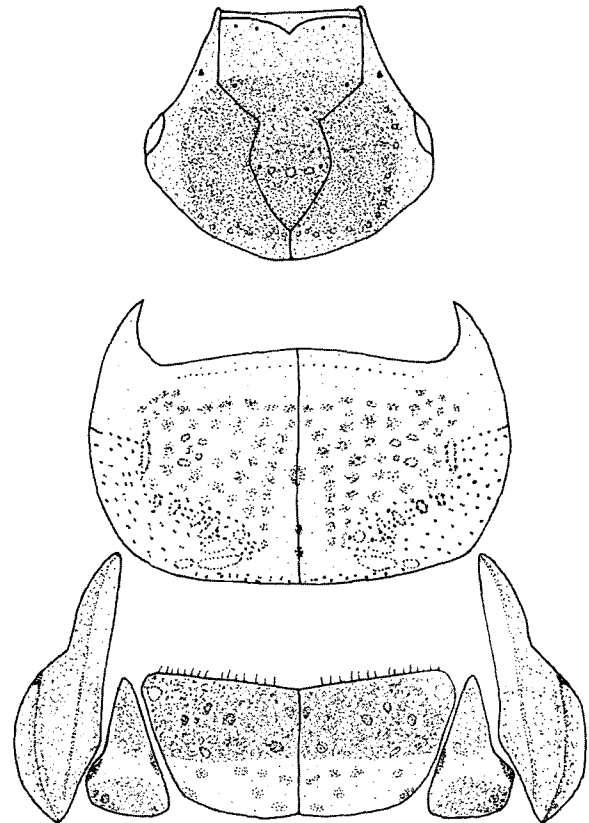


Fig. 2. Larval head and thorax of *Goera interrogationis*. Scale bar=0.5 mm.

Goera interrogationis Botosaneanu, 1970: 305 (M; PB); Olah, 1985: 137 (M; GW, HN); Park and Bae, 1998: 362 (M, F; CB, GG, JB, JN).

Material examined: 1F with larval exuvium (reared from pupa in lab): GG, Gapyeong, Seungcheonsa (Temple), 1999 V 12 (emerged 1999 V 17), S. J. Park.

Diagnosis: The larva of *G. interrogationis* can be distinguished from that of *G. japonica* by the granules on the pronotum which are concentrated in central part.

Description: Larva. Head central part darker than peripheral part. Pronotum with irregular dots and granules (Fig. 2); anterior part lighter than posterior part. Mesonotum with groups of irregular dots; anterior part of sa 1 darker than posterior part. Anal claws with an accessory hook.

Remarks: The larva of this species is described based on a reared larval exuvium. The larva of *G. japonica* (Kim, 1974; Yoon and Kim, 1988) is similar to this species but can be separated by the scattered granules on the pronotum. The larvae of this species inhabited in a small-sized (width 3-5 m) mountain stream where the current was swift and the substrate

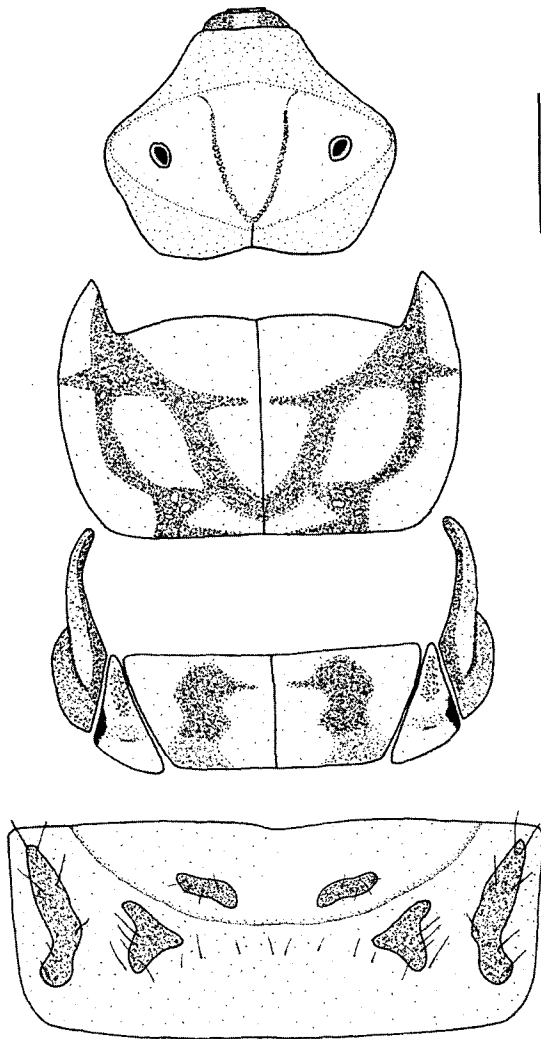


Fig. 3. Larval head and thorax of *Goera parvula*. Scale bar=0.5 mm.

was consist of boulders, cobble, and pebbles.

Goera parvula Martynov
(Fig. 3)

Goera parvula Martynov, 1935 (for full citation see Fischer, 1973) (M; Russia: S. Ussuri); Botosaneanu, 1970: 305 (M; HB); Kumanski, 1991: 25 (M, F; GW, HH, PB); Park and Bae, 1998: 364 (M; GG, JN).

Material examined: 5L: GW, Chiagsan (Mt.), Sangweonsagyegog, 1997 III 26; 2L: GG, Pocheon, Dopyeonggyo (Br.), 1997 X 14; 2M with larval exuviae (reared from pupae in lab): GG, Gapyeong, Seonbawi, 1999 V 12 (emerged 1999 V 13); 1M with larval exuvium (reared from pupa in lab): GG, Gapyeong, Seonbawi,

1999 V 17 (emerged 1999 V 13).

Diagnosis: The larva of *G. parvula* can be distinguished from related species by the net-shaped marking of black spots on the pronotum and mesonotum (Fig. 3).

Description: Larva. Head central part lighter than other part; frontoclypeal suture with many granules. Pronotum sa 1 with a thick and meandering black line; mesonotum with distinct net-shaped marking of black spots (Fig. 3). Anal claws without accessory hook.

Remarks: The larvae of this species inhabited in a mid-sized (10-15 m) mountain stream where the water was clean and swift.

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