

A New Species of *Pteronarcys* (Pteronarcyidae, Plecoptera, Insecta)  
from Korea

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韓國產 큰그물강도래屬(큰그물강도래科, 강도래目, 昆蟲綱)의 1新種

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적 요

1984년부터 1990년까지 전남의 영산강 상류, 섬진강 상류, 광양천의 상류에서 채집된 강도래목의 큰그물강도래과를 조사한 결과 *Pteronarcys*의 1신종이 확인되어 *Pteronarcys macra*로 명명하여 기재한다. 본 종은 *Pteronarcys sacchalina* Klapalek, *P. reticulata* Burmeister와는 유충, 성충의 생식기, 난의 형태등이 다르다.

Key words: *Pteronarcys*, egg, taxonomy, Plecoptera, Korea.

INTRODUCTION

The family Pteronarcyidae, which consists of two genera and twelve species, is one of the smallest groups within the rheophilic order Plecoptera. This family is distributed in the Nearctic and Palaertic regions. Two species (*Pteronarcys sacchalina* Klapalek and *P. reticulata* Burmeister) of the family are known to be Asian species (Nelson and Hanson, 1971).

Studies about the family Pteronarcyidae have been extensively accomplished by Needham and Claassen (1925), Ricker (1952), Nelson and Hanson (1971) and Nelson (1988). In Korea, Ueno (1938) described nymphs of *P. sacchalina* and *P. excauvata*. In view of the latter's synonymy with the former, the nymph of *P. excauvata* described by Ueno can be regarded as that of *P. sacchalina*. Yoon and Aw (1985) and Ra (1987) have also recorded nymphs of *P. sacchalina*.

In this study, we have described nymphal habitus, adult and egg morphology and named a new species of *Pteronarcys* from South Korea.

## MATERIALS AND METHODS

Species used in this study were collected in Yongsan, Somjin, Kwangyang River System of Korea from August 1984 to May 1990 (Fig. 1).

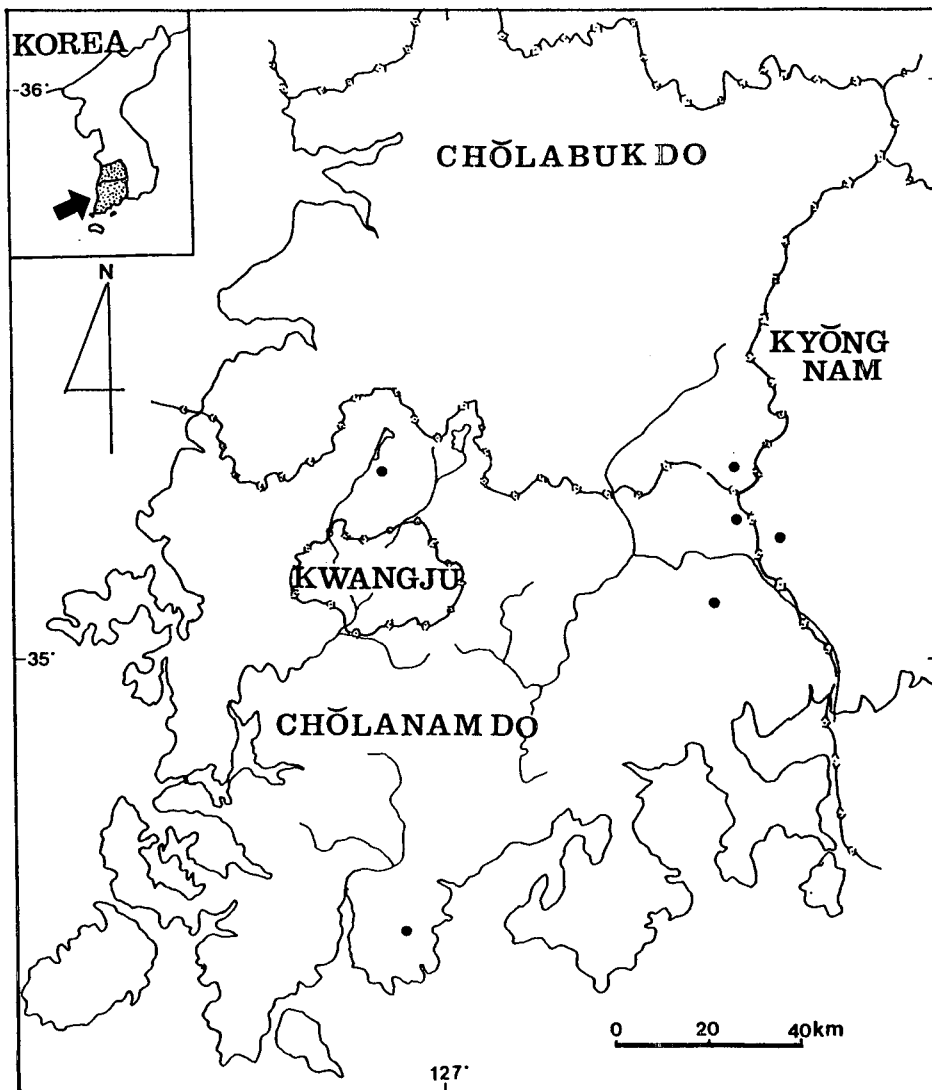


Fig. 1. Geographical distribution of *Pteronarcys macra* n. sp.

Figures of nymphal habitat, male and female terminal segments were taken after 10% KOH treatment. Adults were collected by aerial net or forcep, and these specimens were maintained by Mating Box (25 × 25 × 30cm).

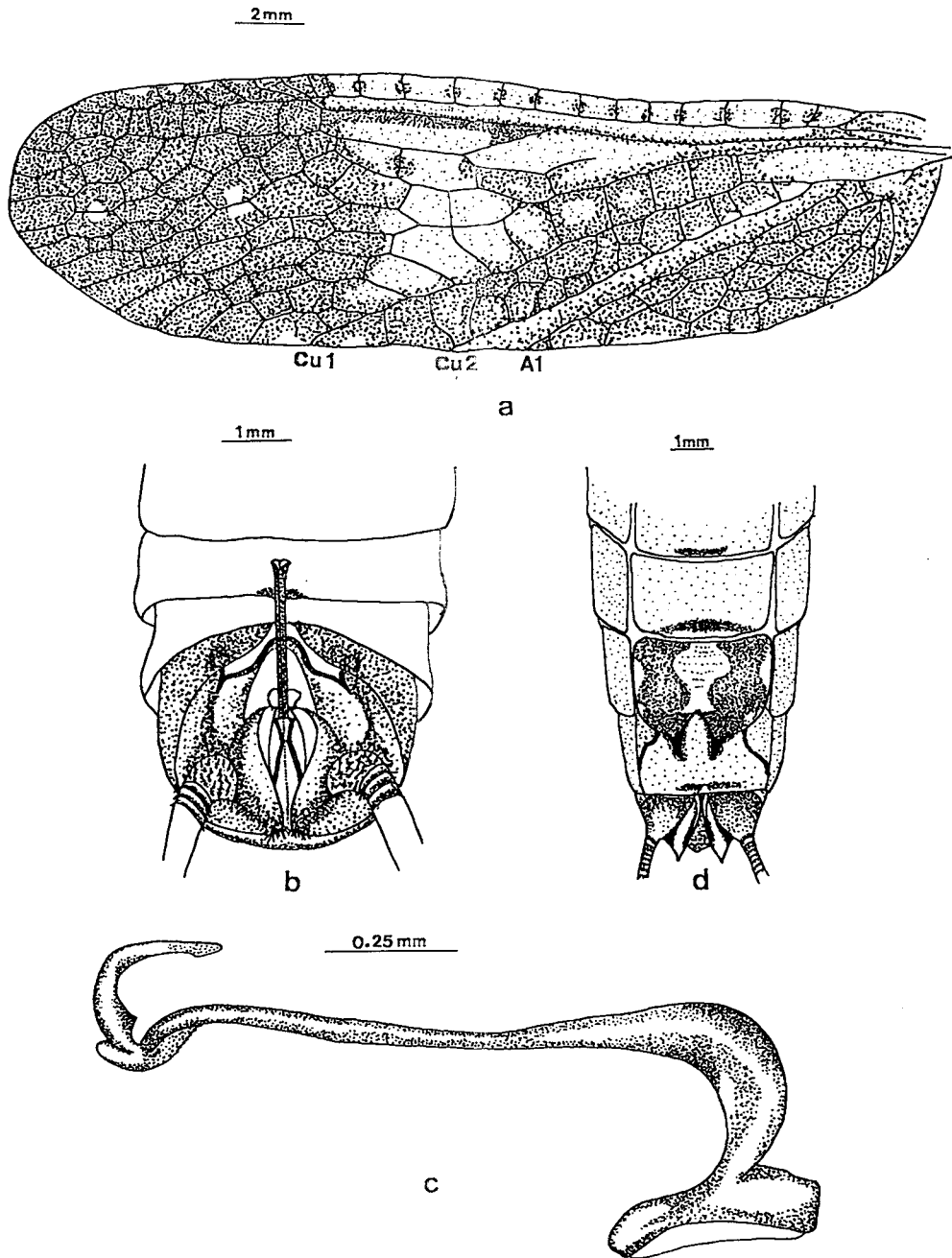


Fig. 2. Adult wing and terminalia of *Pteronarcys macra* n. sp. a, forewing and vein; b, genital structures of male, dorsal; c, aedeagus of male, lateral; d, subgenital plate of female.

Eggs were fixed in 2 M phosphate buffer with 2.5% glutaraldehyde (4°C) for one day, fixed in 1% Osmium tetroxide for about 2 hours, and dehydrated in an ethanol series, acetone and isoamylacetate, then they were dried in the laboratory, mounted with double stick tape, coated with gold for 2 minutes at 5mA using an ion coater, and observed with a SEM (JOLE, TSM-T330A) (Stark and Stewart, 1981; Stark and Szczytko, 1982; Uchida and Isobe, 1988). Specimens used in this study are deposited in the Entomological Laboratory, Department of Biology, Chonnam National University, Kwangju, Korea.

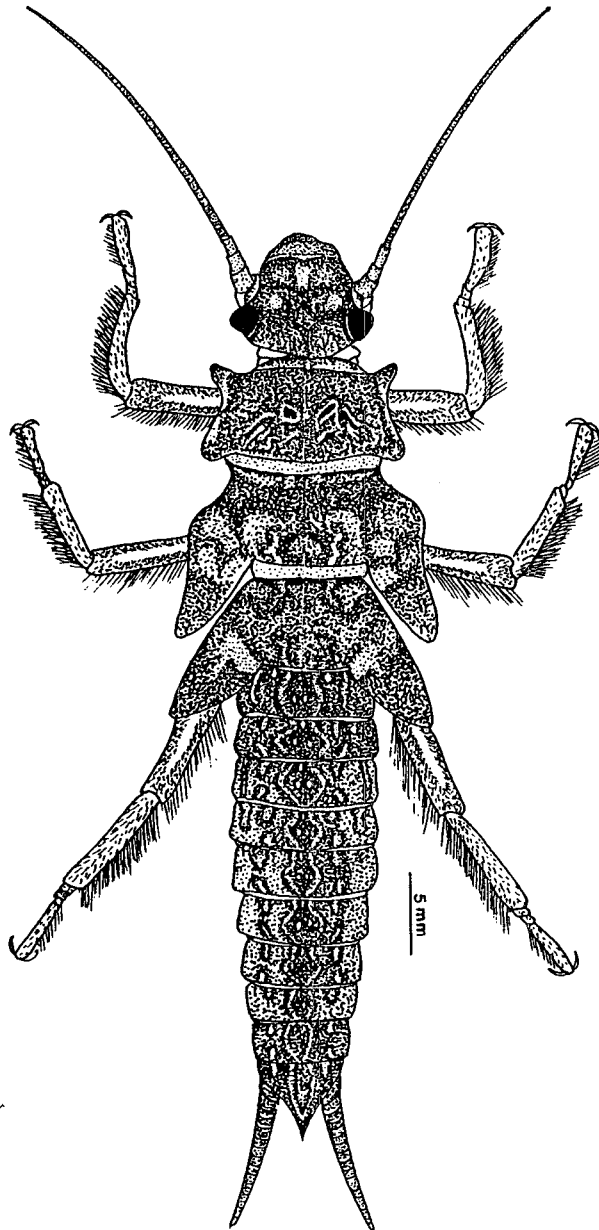


Fig. 3. Mature nymphal habitus of *Pteronarcys macra* n. sp.

## SYSTEMATICS

*Pteronarcys macra* sp. n. 한국큰그물강도래 (신칭) (Figs. 2-5, Plate 1)

**Material examined:** Holotype ♂, Kwangyang Mt. Paekun valley, Songpulsu, 5. VI 1990 (S.K. Baik), (Ent. Lab., Dept. Bio., Chonnam Univ.). Paratypes; 4 ♂♂, 8 ♀♀, Mt. Paekun valley, Songpulsu, 5. VI 1990 (Y.G. Cho); **Tamyang:** 2 ♂♂, 7 ♀♀, Mt. Pongp'ung valley, 15. V 1988 (Y.G. Cho); **Kurye:** 5 ♂♂, 17 ♀♀, Mt. Chiri valley, P'iaGol, 16. V 1987 (J.S. Kim).

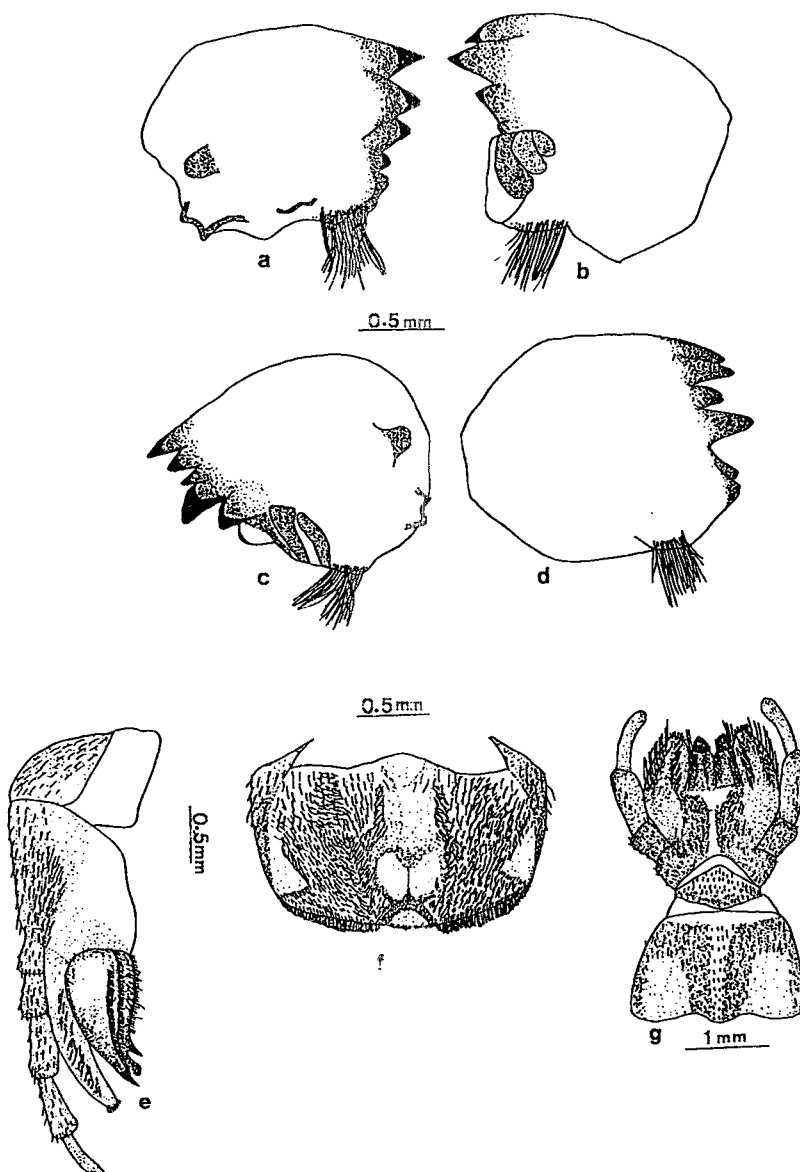


Fig. 4. *Pteronarcys macra* n. sp. nymphal mouthparts. a and b, right mandible (a, ventral; b, dorsal); c and d, left mandible (c, dorsal; d, ventral); e, maxillum; f, labrum; g, labium.

**Description:** Body length: male 31.7mm, female 36.2mm; forewing: male 26.2mm, female 39.2mm; antennae: male 21mm, female 22.6 mm; cercus: 8.0mm.

General colour blackish brown, pronotum symmetrical light marker, 1st abdomen with light parts. Cercus and antennae blackish brown, Legs dark brown, Wings dark brown with median light parts, especially veins blackish brown, between costal and radius dark brown marker (Fig. 2a). Forewing reticulate vein with 14 costal crossveins.

**Male:** 8th tergite depressed dorsoposteriorly, 9th and 10th tergite dorsoanteriorly. The epiproct located inside of paraprocts (Fig. 2b), and aedeagus connected to epiproct, its tip bends and is shape of long hook (Fig. 2c).

**Female:** 8th sternite very large, sclerotized subgenital plate with rounded claw. Hind margin of 6th and 7th sternite with black marker, 8th sternite with black marker of both sides and white region on median. Paraprocts extended to 10th sternite (Fig. 2d).

**Egg:** Length 560 $\mu$ m, width 650 $\mu$ m. Outline hemispherical, cross-section circular. Collar with outer surface vertically corrugated, surrounding rounded attachment disc, surface of disc cylindrical. Surface of chorion is composed of rounded and convex plastrons with numerous aerophyles, plastrons are widely distributed and more rounded in shape with a broader circular median field (plate 1).

**Mature nymph:** Body length 46.5-55.0mm, head capsule width 4.9mm, antennae 18.0-18.5mm, cercus 16-17mm.

Body from cylindrical, body colour dark brown, circumference of ocelli light yellowish brown. Pronotum with light marker, posterior margin of meso- and metanotum with light marker. Abdominal tergum with two lines of light marker and 1 pair of light dots in median line (Fig. 3).

Mandibles with fringes of setae extending from below to behind molar lobe, left mandible with incisor lobe bearing 5 teeth dorsal, 4 teeth ventral (Fig. 4a, 4b), right mandible with incisor lobe bearing 6 teeth (Fig. 4c, 4d). Labrum length twice its width, bearing long, thin setae at lateral margins. Anterior margin consisted of densely packed short and thin setae, posterodorsal surface with long and thin setae (Fig. 4f). Galea stubby-shaped with strong short setae apically. Lacinia with 2 sharp and rounded teeth, inner surface bearing setae line (Fig. 4e). Maxillary palps 5 segments, paraglossae and glossae approximately equal in length, dorsal surface covered with long and thin setae (Fig. 4g). Mentum smaller than submentum. Tibia, femorae densely covered with setae, dorsal margins of them bearing yellowish-white hair fringe, femorae with parts without setae, tip of tarsus with 2 spine bristle. Third tarsal segment more than twice as first and second tarsal segments together (Fig. 5a).

Branched gill patterns; 5 pairs on prosternum (3 pairs anterior, 2 pairs posterior), 3 pairs on mesosternum (2 pairs anterior, 1 pair posterior), 3 pairs on metasternum (2 pairs anterior, 1 pair posterior), 1 pair on 1st and 2nd abdominal sternum (Fig. 5b). Cercal segments with posterior whorl of short, stout, peg-like setae interspersed with numerous long and thin setae (Fig. 5c).

**Discussion:** *Pteronarcys macra* is closely related to *Pteronarcys sacchalina* in general features of the body. They can, however, be distinguished by the mark of the dorsal, morphology of mouthpart and femur. In *Pteronarcys macra*, the teeth of mandible is more pronounced than that of *P. sacchalina*. In *P. macra*, lacinia of left maxilla pyramid-shaped with 3 teeth apically (two pointed and one rounded), while in *P. sacchalina* it is with 3 teeth apically (two rounded and one pointed).

Tibia and femora densely covered with setae; dorsal margins bearing a yellowish-white hair fringe in *P. sacchalina* but partially bearing hair in *P. macra*.

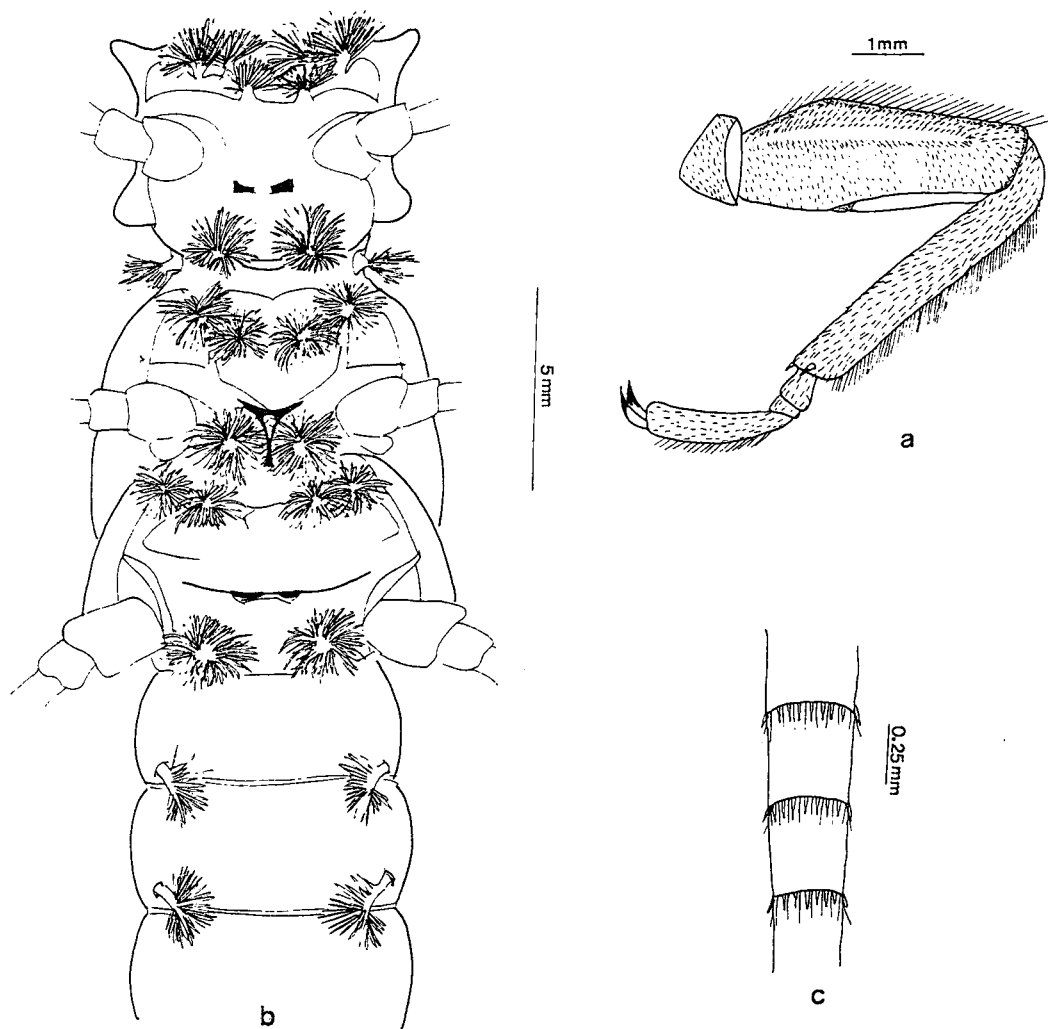


Fig. 5. Nymph of *Pteronarcys macra* n. sp. a, proleg; b, ventral view and gill patterns; c, cercus.

*P. macra* and *P. sacchalina* also clearly differ from the morphology of the terminalia. Collar with outer surface vertically corrugated, surrounding depressed attachment disc and collar is irregularly hexagonal in *P. sacchalina* but rounded attachment disc and collar is hemispherical in *P. macra*.

**Etymology:** The species is named *macra*, the Roman word meaning large and long.

**Distribution:** Korea.

## ABSTRACT

As results of investigating Pteronarcyidae fauna in the upper region of Yongsan, Somjin and Kwangyang River System, we described a new species of *Pteronarcys*, named as *Pteronarcys macra*.

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Explanation of plates

Plate 1. *Pteronarcys macra*, a and b; entire egg; a, dorsal; b, lateral; c, plastron; d, attachment structure, ventral.

