

THE LARVA OF *SHAOGOMPHUS SCHMIDTI* (ASAHINA, 1956) (ANISOPTERA: GOMPHIDAE)

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Received June 27, 2002 / Reviewed and Accepted November 4, 2002

The final instar (exuviae) from Primorye and the Amur R., Russia is described, illustrated and compared with *S. postocularis epophthalmus* (Sel.).

INTRODUCTION

The East Asian genus *Shaogomphus* CHAO (1984) includes so far four taxa, viz. *S. liefincki* Chao, 1984 (China), *S. p. postocularis* (Selys, 1869) (Japan), *S. p. epophthalmus* (Selys, 1872) and *S. schmidti* (Asahina, 1956) [= *Gomphus chankae* Bartenef, 1956].

S. p. epophthalmus and *S. schmidti* occur in Russia. The former inhabits the Amur River basin and is distributed sporadically in the Western Siberia plain and in the Altai mountains; beyond Russia it is known from northern China and Korean peninsula (KOSTERIN et al., 2001). *S. schmidti* is known from the extreme East of Manchuria (ASAHINA, 1956) and from the Lower Amur and Ussuri basins in the Russian Far East.

The larva of *S. p. epophthalmus* was described by HARITONOV & HARITONOVA (1982), but that of *S. schmidti* was hitherto unknown. Some larvae and exuviae of this species were collected by researchers of the Hydrobiology Laboratory of the Institute of Biology and Soil Sciences, Far East Branch of the Russian Academy of Sciences, Vladivostok. The description follows below.

MATERIAL AND METHODS

The material is deposited in the collection of the Institute of Biology and Soil Sciences, Far East Branch of Russian Academy of Sciences, Vladivostok (IBSS) and in the Amur Regional Insect Collection, Blagoveshchensk (ARCI):

Shaogomphus schmidtii. — RUSSIA, Primorya: Komissarovka R., 1 larva (♂), 1-VIII-1974, collector unknown (IBSS); — Raxdolnaya R., Poltavka, 1 larva, 1 ex. (sex not determined), 24-VI-1992, T.S. Vshivkova leg. (IBSS); — Astrakhanka, Kamen'-Rybolov, 3 ex. (1♂, 2♀), 22-VI-1997, T.S. Vshivkova leg. (IBSS); — ex. (2♂, 5♀), 25-VII-1997, P.Yu. Ivanov leg. (IBSS and ARCI); — Lake Khanka, 5 km S Turii Rog, 5 ex. (2♂, 3♀), 26-VII-1997, P.Yu. Ivanov leg. (ARCI); Khabarovskiy Krai prov.: Susanino, Amur R., 2 ex. (1♂, 1♀, with the respective teneral adults), 23 & 26-VI-2000, T.M. Tiunova leg. (IBSS).

S. postocularis ephophthalmus. — RUSSIA, Amurskaya prov.: 12 km S svobodny nr Malaya Sazanka, Zeya R., 2 ex. (♂), 7-VII-1991, E.I. Malikova leg. (ARCI); — same locality, 3 ex. (1♂, 2♀), 2-VII-1998, E.I. Malikova leg. (ARCI); — same locality, 2 ex. (1♂, 1♀), 25-VI-1999, E.I. Malikova leg. (ARCI).

Since two emerging *S. schmidtii* adults were collected together with their exuviae, the species identity could be easily ascertained.

Description and illustrations are based on last instar larvae (exuviae) using stereo-microscope equipped with camera lucida and micrometric ocular. The total length was measured from the anterior margin of labrum to the apices of the caudal appendages. The abdomen was measured ventrally across the middle of sternite VI above the bases of the lateral spines. Wing cases were measured from bases to apices of hind wings, parallel to costa.

DESCRIPTION AND COMPARISON WITH *S. POSTOCULARIS* *EPHOPHTHALMUS*

Figures 1-5, 7-10 and 6 & 11, respectively

Larvae are brownish-yellow, slightly brilliant, their body is mostly covered with short thin hairs (Fig. 1).

H e a d. — Shorter than wide, heart-shaped, covered with short hairs except for eyes, ocelli and five spots on occiput, the central one is triangular, the next two nearly round and lateral ones are oval or elongated. Eyes big, protruding laterally. Labrum supplied with long dense setae on the anterior margin. Antennae subcylindrical, three basal antennomeres bear long setae; third antennomere slightly flattened dorsoventrally, three times longer than wide; fourth antennomere narrow and short (Fig. 4).

Labium of medium size, prementum-postmentum articulation nearly reaching posterior margin of procoxae. Prementum (Fig. 2) longer than wide, rectangular, with conspicuous narrowing in the posterior third, its ventral side concave along the midline and wrinkled at the anterior part. Ligula convex, slightly prominent, with thick, short, whitish setae. Outer parts of distal margin of prementum supplied with thinner and longer setae. Palpi with 7-9 denticles on internal margin, enlarged gradually from base to apex, the last one often bifurcate; movable hook sharpened, nearly the same length as palpus (Fig. 3).

T h o r a x. — Prothorax narrow, sides of pronotum slightly protruded laterally. Disc of pronotum with a pair of big round bare spots, there are little hairy patches inside each spot. Synthorax hairy except for narrow stripes along pleural sutures.

Legs relatively long for the family, the extended hind leg reaches distal end of segment

VII; femora and tibiae bear several rows of long setae and mostly covered with short hairs, except for 2-3 longitudinal concave stripes on femora. Hairs and setae cover also tarsi except claws. Borrowing hook on pro- and mesotibia long and narrow, almost twice longer than maximum length of first tarsomere (Fig. 5).

Wing cases reaching distal half of abdominal segment IV.

A b d o m e n. — Convex dorsally, flattened ventrally. Segments VIII and IX have short and blunt dorsal spines (Figs 1, 8). Lateral spines present on VI-IX, acute, usually curved and relatively long. Lateral margins of VI-IX (IV-IX) supplied

with thin irregular setae, mostly at their basal half; those of VIII and IX also bear some short spinules, better developed on IX.

Each tergite covered with tiny hairs, bare marks present on tergites III-IX: a pair of bare points or strokes near middorsal line is on III-VIII and a group of irregular-shaped spots at bulges on each side of III-IX (Fig. 10). Marks are largest on VI and decreasing to both ends.

Female gonapophyses short and pointed, slightly divergent (Fig. 7); vestigial male primary genitalia hardly noticeable on IX sternite, and vestigial male secondary genitalia present on II and III sternites.

Caudal appendages almost equal in length to X segment measured ventrally. Cerci conical and pointed, reaching about $\frac{3}{4}$ of paraprocts, epiproct a bit shorter than paraprocts. Male epiproct with pair of tubercles at its $\frac{3}{4}$ (Fig. 9).

M e a s u r e m e n t s (mm). — Total length: 27.0-29.0; — wing cases length 6.0-6.5; — maximum

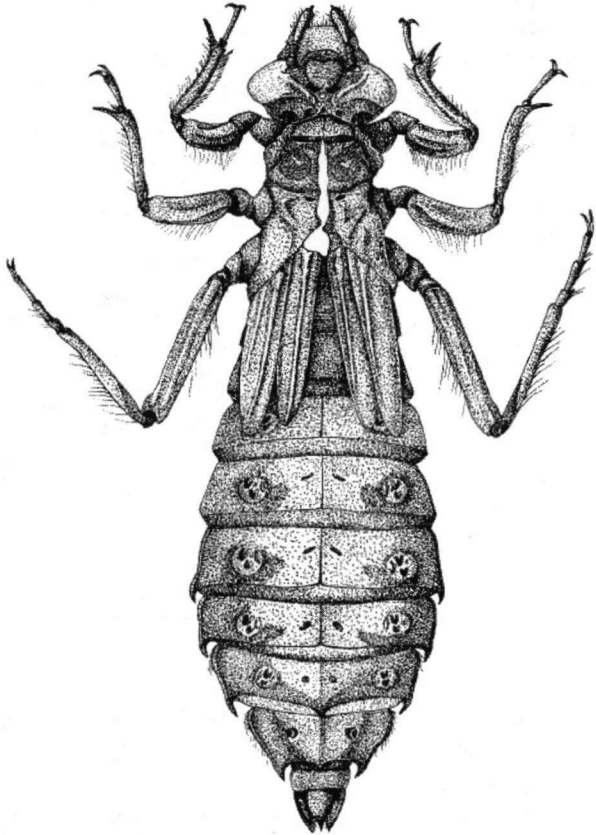
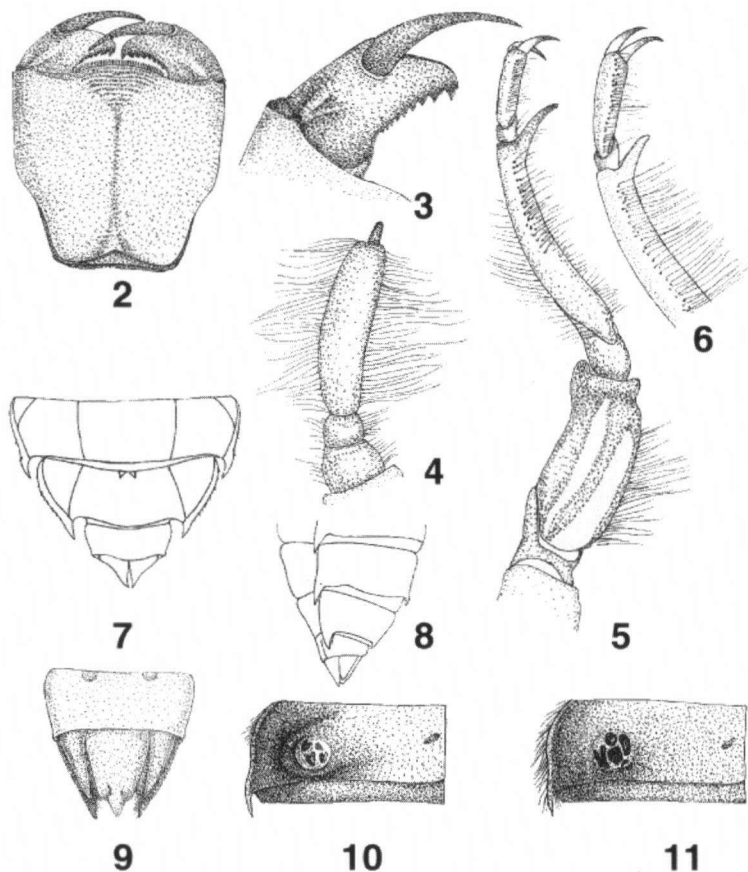


Fig. 1. *Shaogomphus schmidti*: female exuviae, dorsal aspect.

head width 5.6-6.0; — 6th abdominal segment width 7.5-8.0; — hind femur length 5.4-5.8; — caudal appendages length 0.9-1.1; — mentum length 3.1-3.4.

BIONOMY. — The larvae inhabit large lowland rivers and big lakes (like Khanka). The final instar larvae and exuviae were collected in June-July, the exuviae were found in bushes and on rocks ca 5-10 m from the water line.

COMPARISON WITH *S. POSTOCULARIS EPOPTHALMUS*. — The larva is very similar to



Figs 2-11. *Shaogomphus schmidtii* (Figs 2-5, 7-10) and *S. postocularis epophthalmus* (Figs 6, 11), larval structural features: (2) prementum, ventral view; — (3) left mandible; — (4) left antenna, dorsal view; — (5) right fore leg; — (6) right fore leg tibia and tarsus, scale the same as in Fig. 5; — (7) female abdominal segments VIII-X and caudal appendages, ventral view; — (8) same, lateral view; — (9) male abdominal segment X and caudal appendages, ventral view; — (10-11) spot pattern on abdominal tergite VII.

that of the co-occurring *epophthalmus*, differing from it in the following features:

- (1) It is smaller; total length of *epophthalmus* 29-32 mm, maximum head width 5.9-6.2, 6th abdominal segment width 8.0-8.8, hind femur length 6.3-6.8;
- (2) Less hairy;
- (3) Borrowing hook in *epophthalmus* is shorter and wider (Fig. 6), its length does not exceed 1.5 maximum length of the first tarsomere;
- (4) There are no bulges on the sides of the abdominal segments in *epophthalmus*, and bare spots are larger and rounded (Fig. 11).

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