



Description of the larva and redescription of the adult male of *Diamphipnoa helgae* Illies, 1960 (Plecoptera: Diamphipnoidae)

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Abstract

Based on specimens reared *in situ* in the National Park “Los Alerces,” Chubut Province, Argentinean Patagonia, we describe the larvae and redescribe the adult male of *Diamphipnoa helgae* Illies 1960.

Key words: Plecoptera, *Diamphipnoa*, Patagonia, Argentina.

Introduction

Diamphipnoidae is a family endemic to the Subantarctic region of southern Argentina and Chile. It is currently represented by 2 genera and 6 species (Illies, 1960; Stark, 2008; Stark *et al.* 2009). Only the larvae of *Diamphipnoa annulata* (Brauer, 1869) and *Diamphipnopsis samali* Illies, 1960 were briefly described by Illies (1960).

These stoneflies are considered unusual in Argentina (Pessacq & Miserendino, 2008), and are mainly found in small pristine streams within the Valdivian forest, Patagonia. Many unidentified larva of *Diamphipnoa* Gerstaecker, 1873 were collected from a stream in the National Park “Los Alerces,” Chubut Province, Argentina; to identify these specimens several adults were successfully reared. Based on the original description of Illies (1960) the adults seemed to be *D. helgae* Illies, 1960, but differed in the possession of two small elongated processes between the terminal lobes of male tergum X, not described or illustrated in the original description. In order to clarify the identity of the specimens; photographs of the holotype of *D. helgae* were studied, in which the elongated processes were clearly visible. The objective of the present contribution is to describe the larva of *D. helgae* and redescribe the adult male of *D. helgae*.

Material and methods

Figures were drawn with the aid of a camera lucida coupled to a Leica MZ6 stereomicroscope. Biogeographic areas follow Morrone (2006). Larvae and adults were associated by specimens reared *in situ*. About 20 larvae were placed in a 10 l perforated bucket in the stream from which they had been collected. They were inspected once a month during the winter and every one or two weeks in spring. Within the bucket, small tree branches were placed to assist adults during emergence. Larvae and larval exuviae were preserved in alcohol (70%), once emerged, adults were preserved in alcohol and some pinned.

Diamphipnoa helgae Illies, 1960

(Figs. 1–2)

Diamphipnoa helgae Illies 1960: 685–687 (description of male and female, illustrations of male abdominal segments IX–X in dorsal, ventral and lateral view, detail of epiproct, female abdominal segments VII–X in ventral view). Vera 2006: 59 (list of Chilean Plecoptera). Vera 2006: 59 (list of Chilean Plecoptera).

Specimens studied. Argentina. Three males and larval exuviae, reared *in situ*, unnamed stream in the western margin of Futalaufquen Lake, access road to Puerto Limonao, about 2 km before harbor (42°52'81" 71°37'30"), National Park "Los Alerces", P. Pessacq & C. Pardo leg, 15/XII/2011. Two males and larval exuviae, same locality as above, P. Pessacq leg, 20/XII/2011. Three male larva, same locality as above, P. Pessacq leg, 16/VIII/2010. Eight male and four female larvae, same locality as above site, P. Pessacq & G.H. Omad leg, 8/XI/2010.

Last instar larva description. Measurements (in mm, 8 males, 4 females): total length: male 36.1 ± 1.5 , female 39.9 ± 1.8 ; head max. width: male 5.1 ± 0.1 , female 5.8 ± 0.15 ; antennae: male 17.9 ± 0.6 , female 19.2 ± 0.6 ; pronotum max. width: male 5.4 ± 0.25 , female 6.25 ± 0.17 ; pronotum max. length: male 3.9 ± 0.18 , female 4.3 ± 0.3 ; cerci: male 27.1 ± 1.4 , female 29 ± 1.2 .

Habitus. Large, dark green Plecoptera, with flattened long legs. Antennae and cerci with a very dense row of hair like-setae.

Head. Brownish; eyes dark brown; antenna brown, about half body length, scape about two times wider than pedicel and slightly longer, flagellum with 90–110 flagellomeres. Left mandible (Fig. 2b) with two acute apical teeth, basal to these a longer acute tooth with a much smaller tooth on its outer base, or, in some specimens, two teeth broadly joined at base, basal to this, two short and obtuse teeth and a short mola. A dense row of long setae on mandible basal inner margin, and a row of setae extending between apical tooth and mola. Right mandible (Fig. 2a) with two apical teeth, the ventral one bigger, basal to these two small teeth joined at base or one small wide tooth, followed by a short tooth and a small mola. On the dorsal side, a short wide tooth hidden by the mola in ventral view; a dense row of long setae on mandible basal inner margin. Maxilla (Fig. 2c) palp five-segmented, first palpomere shortest, remaining ones about the same length, first to fourth palpomeres with a subapical row of short spines. Galea longer than lacinia, ending in a very dense bunch of hair-like setae (radula). Lacinia with a row of long hair-like setae on its inner margin, apex flat and concave, with three teeth, the medial one wide and square, the other two narrow, fingerlike, the external one shorter. Prelabium (Fig. 2 d) longer than wide, with a three-segmented palp, basal palpomere shortest and widest, second and third about the same length. Glossa short, with a bunch of hair-like setae on its apex and a row of short hair-like seta on its middle, paraglossae longer than glossae, with long hair-like setae, on its distal half. **Thorax.** Dorsally green, ventrally light green. Pronotum: lateral sides straight and slightly convergent, anterior side slightly concave, posterior side convex. Metanotum posterior margin slightly concave between wing pads (Fig. 2f). Legs covered by small spine-like setae, with a very dense row of hair-like setae on posterior margin of femur and tibiae; coxa and trochanter green, femur dark green with scattered oval pale spots, tibiae reddish with darker spots on dorsal side; tarsi brown, distal tarsomere the longest, tarsomere proportions about 2.5:1:5; tarsal claws acute. **Abdomen.** Round in cross section, dorsally green, ventrally light green, with the characteristic abdominal gills in segments I–IV; covered by small spine-like setae, distal margin of segments with a row of short spine-like setae. Tergum X ending in an acute long process in the male (Fig. 2h), rounded in the female (Fig. 2g). Cercus brown, slightly longer than abdomen, brown, with 55–65 annuli.

Adult Male, redescription. Measurements (in mm, n=3): total length 25.1 ± 0.25 , head max. width 5.7 ± 0.1 , antennae 27.5 ± 0.5 , pronotum max. width 4.6, pronotum max. length 2.5 ± 0.1 , cerci 13.2 ± 0.2 . Front wing length 37.2 ± 1.58 .

Habitus. Large dark green with long, flattened legs, long antennae and cerci. Wings mottled with orange.

Head. Dark green, with irregular black pattern. Antennae longer than body, pedicel about two times wider than scape and slightly longer, flagellum with 80–100 flagellomeres. In basal half of flagellum alternating brown and light yellow narrow bands. Mandibles with an apical concave tooth, three basal acute teeth and a wide and long mola with transversal ornamentation. Maxilla palp four-segmented, first palpomere the shortest, remaining ones about the same length. Labium longer than wide, with a three-segmented palp, basal palpomere the shortest, second and third about the same length.

Thorax. Pronotum dark green, with four triangular marks mentioned as specific distinctive character and drawn by Illies (1960), meso- and metanota light green, thorax venter light green. Coxa and trochanter green, femur dark green with scattered oval pale spots, tibiae reddish with darker spots on its dorsal side; tarsi brown, distal tarsomere the longest, tarsomere proportions about 2.5:1:6; tarsal claws acute.

Abdomen. Tergum 10 (Fig. 1a–c) wide at base, narrowing to apex, ending in two big lobes; between these lobes, two small elongated processes (Fig. 1b), their ventral side irregularly toothed (these teeth are visible in lateral view, Fig. 1c).

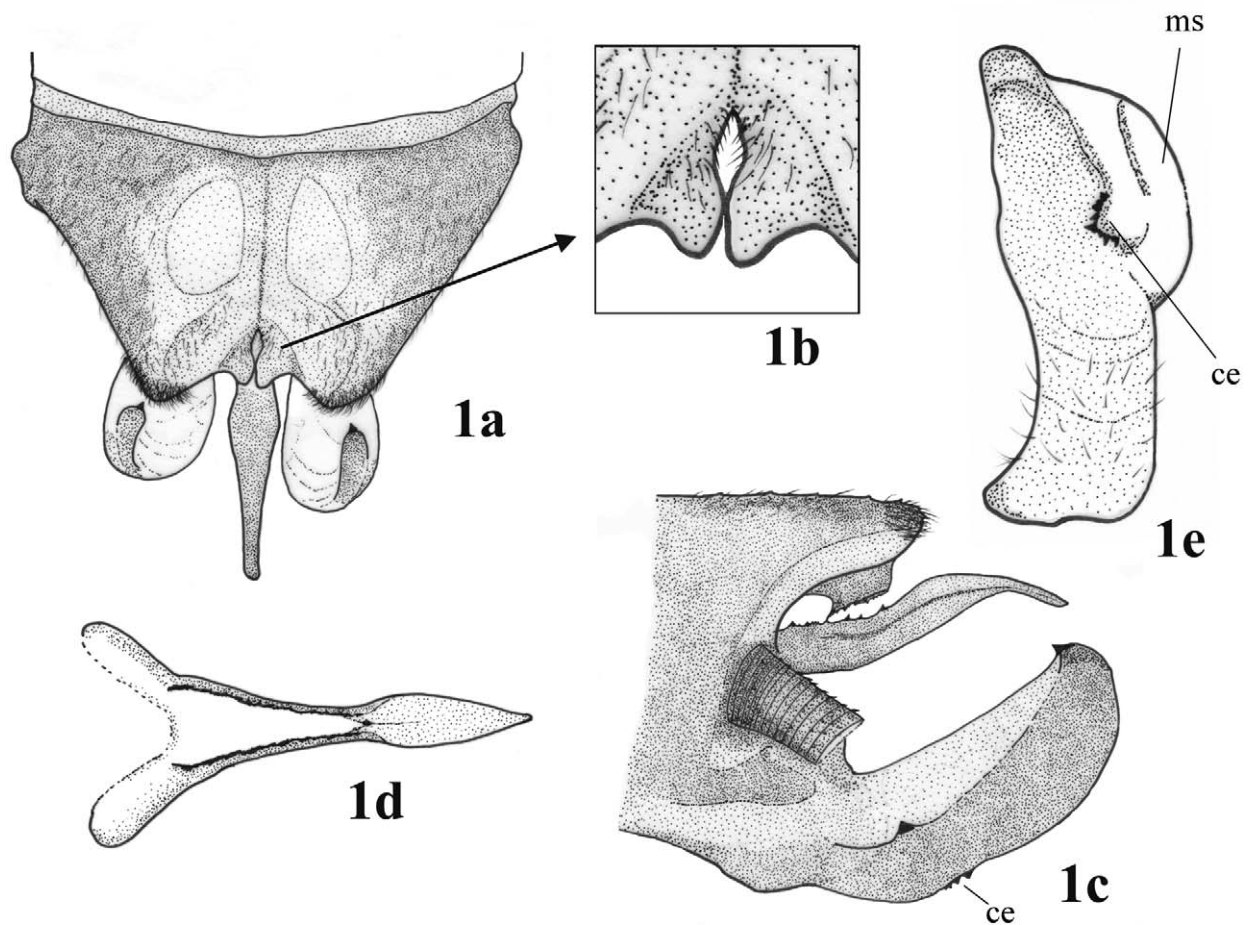


FIGURE 1. *Diamphipnoa helgae*. Adult male. 1a, abdominal segment X, epiproct and paraprocts, dorsal view. 1b, detail of elongated process on the medio-distal margin of segment X. 1c, abdominal segment X, epiproct and paraprocts, lateral view. 1d, epiproct, dorsal view. 1e, paraproct, posterior view showing “crown” like spines and membranous extension on its inner margin. ms= membranous swelling on inner side of paraproct. ce= crown of irregular spines.

Distal part of epiproct shallowly S-shaped (Fig. 1c), apex acute, in dorsal view (Fig. 1d) widened near middle or distal third, basal half dorsally irregularly toothed. These teeth are opposed to the ones on the elongated processes.

Paraprocts (Figs. 1c, e) curved upwards, dorsal half poorly sclerotized, ventral half heavily sclerotized, with a subapical and medial or medio-basal spine on its dorsal margin and with a “crown” (Figs. 1c, e) of small irregular spines on ventral margin, opposite to the medial or medio-basal spine. Specimens put in alcohol, shortly before they are fixed, show an irregular, somehow rounded membranous swelling (Fig. 1e) on the inner side of the epiproct. The size of this structure varies individually. In pinned and fresh specimens, this membranous structure is not apparent. Also, in dry specimens the paraprocts acquire a position perpendicular to the main body axis, like the dorsal view drawings in the original description (Illies, 1960). In fresh or alcohol preserved specimens, they remain parallel to the main body axis. The “crown” of small irregular spines on the ventral margin of the paraprocts varies in position from external-posterior (visible in lateral view) to inner-posterior (mainly visible in posterior view).

Diagnosis. Male adult segment X in dorsal view ending with two large triangular lobes, between these, two small finger-like processes. From the brief description and poor illustrations of the larva of *D. annulata* (Illies 1960), it seems possible to distinguish larvae of both species by the posterior margin of metanotum, slightly concave between wing pads in *D. helgae* but shaped like an inverted U or V in *D. annulata* and paraglossae longer than the glossae, subequal in *D. annulata*.

Distribution. Western Rio Negro (Bariloche) and Chubut provinces (National Park “Los Alerces”, present record) in Argentina and Malleco (Curacautin) and Osorno (Puyehue lake) regions in Chile (Illies, 1960).

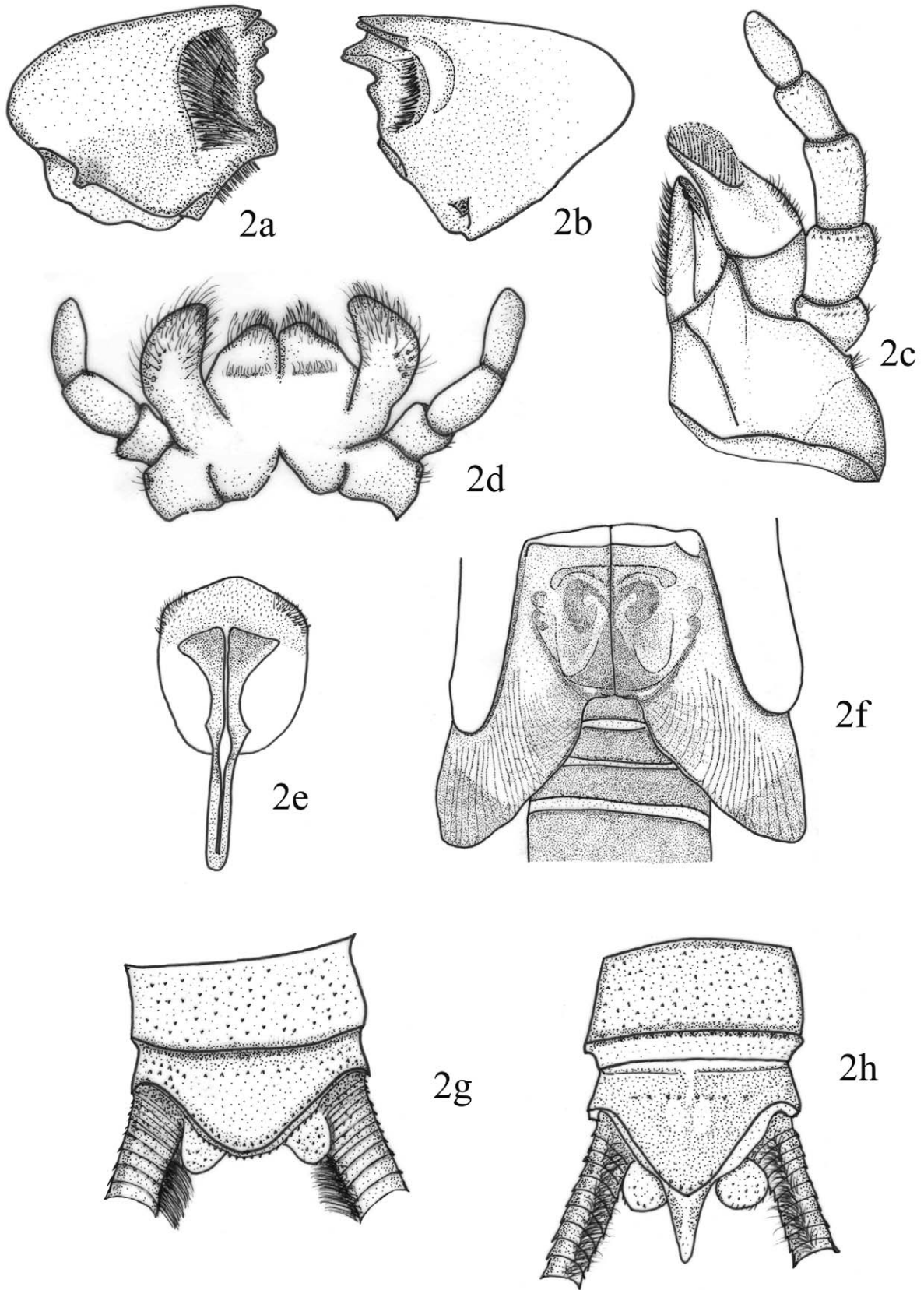


FIGURE 2. *Diamphipnoa helgae*. Larva. 2a, right mandible, ventral view. 2b, left mandible, ventral view. 2c, maxilla, ventral view. 2d, labium, dorsal view. 2e, hypopharynx, dorsal view. 2f, posterior wingpads, dorsal view. 2g, female abdominal segments IX and X. 2h, male abdominal segments IX and X.

Remarks. Specimens were collected in a small (1–2 m wide) shaded high gradient stream in a *Nothofagus* forest in “Los Alerces” National Park, Argentinean Patagonia. This stream had a fast current, rocky substrate composed primarily of boulders, cobbles, and pebbles, and with typical riffle-pool reaches. All specimens were collected in riffles with boulders or cobbles, and occasionally in the small falls at the head of the pools. Trout, introduced in the early twentieth century and present in all rivers of the area, apparently are absent in this small stream characterized by the high gradient and presence of many small waterfalls. Interestingly, but predictably, these large stoneflies were not found in any stream with trout. This is the first record of *Diamphipnoa helgae* for Chubut Province.

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