

VI.4d. The Tricladida and Hirudinea

CLAUDE DEJOUX

The Tricladida

These organisms are extremely abundant in Lake Titicaca, and also in most of the aquatic habitats in the Andes and the Altiplano, a fact already recorded by Beauchamp (1939) in his study of the material collected by the Percy Sladen Expedition.

At first sight one may be led to think that there are several species of triclad in Lake Titicaca, such is their variability in colour and even in shape. In fact there is only one, cosmopolitan species in the lake: *Euplanaria dorotocephala* Woodworth, 1897, a species very widespread in the United States. According to Beauchamp (*op.cit.*), this was described for the first time from Trinidad by Kennel in 1888.

The diverse appearance of this triclad is the reason for the multiplicity of descriptions under different names, leading to at least ten synonyms. Many descriptions are based on the endemic character of certain forms, for example the individuals described under the name *Dugesia titicana*, by Hyman in 1939.

Brief description of the species

Without giving a complete description of *Euplanaria dorotocephala*, some general characters of its morphology and structure are given here. The mean size of sexually mature individuals is of the order of 8 to 10 mm, but extreme individuals of 5 and 17 mm have been recorded. The general form is elongate, the breadth being about 1/5th of the length (Fig. 1). The mouth is situated about 7/10ths of the way along the body, the genital pore being closer to the mouth than the posterior extremity of the body. The characteristic spear-shaped head in the form of an equilateral triangle has two protruding lateral lobes, also triangular in shape. This shape is of course very altered in preserved specimens, but the lobes still remain paler than the rest of the body.

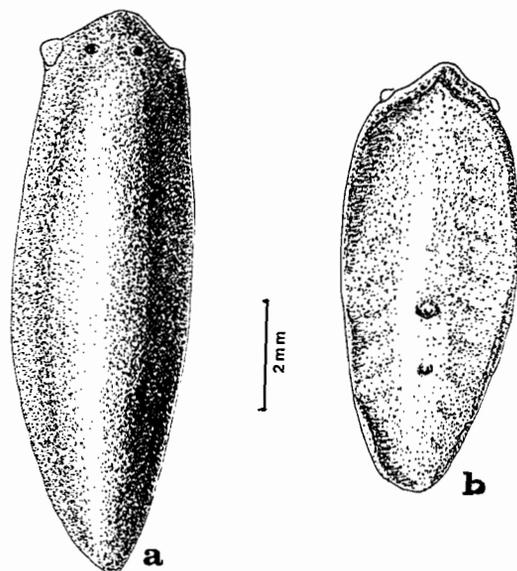


Figure 1. *Euplanaria dorotocephala*. a) dorsal view: b) ventral view.

The eyes are placed at the anterior margin of the lobes at the internal margin of an unpigmented patch.

In live specimens the colour ranges from deep black to pale beige, the upper and lower sides being the same colour, or the dorsal side being occasionally darker. On darkest individuals only, there is a colour pattern consisting of two dark bands running from one end of the body to the other and converging anteriorly to enclose a paler central area.

According to the detailed description of the internal anatomy made by Beauchamp (*op.cit.*), the brain is in the form of an inverted V and the numerous (ca. 35) digestive caecae are irregularly spaced on each lateral branch. The testes can be either dorsal or ventral depending on the individual; the ovaries are situated at the level of the 4th and 5th pair of caecae. The penis is rather short, with a conical, or rarely tapering, free part.

Ecology and distribution

E. dorotocephala is found both in still and running waters. In Lake Titicaca it is particularly abundant under stones and pebbles along the shore where its density can exceed 5000 individuals per square metre. Generally, the light form is more frequent than the dark form, which dominates in running water. Although this species prefers firm, well-oxygenated substrates in the littoral zone, it is also found abundantly among the submerged macrophytes. Here it can account for nearly half of the epiphytic invertebrate population in

terms of number of individuals, as can be seen from the percentages given below from a recent study of macro-invertebrates associated with the aquatic vegetation in the Bolivian part of the lake (Dejoux, in press).

<i>Myriophyllum elatinooides</i> at surface: 3.7%	<i>Myriophyllum</i> at bottom: 6.2%
<i>Elodea potamogeton</i> : 45.6%	<i>Chara</i> spp.: 1.7%
<i>Schoenoplectus tatora</i> : 11.8%	<i>Potamogeton strictus</i> : 1.1%
<i>Ranunculus trichophyllus</i> : 25.5%	Crucifera indet.: 45.4%

E. dorotocephala has been found everywhere in the Bolivian part of the lake, down to a depth of 9.5 m, which seems to be its lower limit. It has been recorded from the Peruvian part of the lake by Medina (1982) and by Morales *et al.* (1989), these latter however noting its absence from the inner part of Puno Bay, the most highly eutrophicated part of the Lago Grande.

Judging from the information given by Beauchamp (*op. cit.*), who recorded its very frequent occurrence in freshwater habitats in the United States "from the Atlantic to the Pacific and in the Great Lakes," as well as in the Caribbean (Trinidad), *E. dorotocephala* would appear to be a very cosmopolitan species.

The Hirudinea

According to Ringuelet (1978, 1981) the literature on Neotropical Hirudinea is very sparse. These animals are distributed throughout the South American continent in regional taxonomic assemblages corresponding to the major ecological zones related to altitude and latitude. The high Andes constitutes one of these regions.

Four species of leech have been recorded from Lake Titicaca, all belonging to the Glossiphoniiformes and the family Glossiphoniidae.

- *Gloiobdella michaelsoni* Blanchard, 1900. This species has been collected at Puno and in the Rio Desaguadero. It is a cosmopolitan species also known from Argentina, Brazil, Chile, Paraguay and Uruguay.
- *Helobdella festai* Dequal, 1916. Also known from Ecuador, this species has been collected from Juli and Puno bays (Ringuelet, 1981).
- *Helobdella simplex* Moore, 1911. This species has been recorded from Pomata and from Puno Bay (Ringuelet *op. cit.*); it is also known from Argentina and Uruguay.
- *Helobdella titicacensis* Ringuelet, 1959. This species, known from Puno and Pomata (Ringuelet, 1960), is not endemic to Lake Titicaca since it has also been recorded by this author from water courses and high altitude lakes in Peru.

Distribution of Hirudinea in the Bolivian part of the lake

The records of the above species are all restricted geographically to the Lago Grande since they all refer to Puno Bay and the Pomata and Juli regions. More complete studies would probably show that the Hirudinea have a much wider distribution and perhaps that other species occur in Lake Titicaca. It is known that identification, even to the generic level, frequently requires study of internal organs following special fixation on collection. Not having done either of these in our extensive study of the benthic fauna of the lake, the distribution data given below concern the family Glossosiphoniidae taken as a whole.

The Hirudinea occur in almost all the major biotopes of the lake, from wave-washed shores (under stones and pebbles) to bare sediments in the deepest parts of the lake; the deepest specimen yet recorded was collected in the Lago Grande at a depth of 175 metres.

In relative and also absolute abundance, the greatest density and richness occurs under stones near the shore, where densities of 300 to 400 individuals per square metre are not uncommon. They can account for 3% of the total benthic population in this type of habitat, which is generally very rich in macro-invertebrates (see Chapter VI.4j).

The Hirudinea are a frequent component of the fauna of the submerged macrophyte stands, but generally do not account for more than 2% of the invertebrate population in this habitat. On a more detailed scale, the highest densities occur amongst *Chara* (5% of all invertebrates present and 60 ind. m⁻²).

On bare sediments at moderate depth, they do not usually account for more than 2% of the benthic population and the maximum densities recorded are barely 20 individuals per square metre.

In conclusion, the Hirudinea, although very widely distributed throughout the lake, can only be considered as a minor group in this ecosystem.

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