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Short Communication

Predation of *Aegla denticulata* (Crustacea, Aeglidae) upon the ammocoetes stage of *Geotria australis* (Chordata, Petromyzontidae) in a confined environment

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ABSTRACT. First description of *Aegla denticulata* Nicolet, 1849's predatory behavior upon *Geotria australis* Gray, 1851's ammocoetes larval stage, in a confined artificial environment.

Keywords: *Aegla denticulata***,** Anomuran Custacea*, Geotria australis***,** lamprey, aquarium, trophic interaction.

The predatory behavior of the *Aegla* freshwater crabs has been poorly documented since most species of this genus are omnivorous-detritivorous (Bahamonde & Lopez, 1961; Bueno & Bond-Buckup, 2000; Santos *et al*., 2008). Nevertheless, there are some reports of predatory behavior in aeglids, *i.e.*, *Aegla abtao* (Schmitt, 1942) upon the freshwater mussel *Diplodon chilensis* (Gray, 1828) in southern Chilean lakes (Lara & Moreno, 1995), and the observation of opportunistic predation upon fishes, *Astyanax fasciatus* (Hubbs & Innes, 1936) and *Crenicichla* sp., entangled in gill nets, by the aeglids *A. grisella* (Bond-Buckup & Buckup, 1994) and *A. singularis* (Ringuelet, 1948), in two rivers of southern Brazil. In both rivers, the fish showed an initial pattern of consumption (eyes and fins), and then predation of the whole body, probably performed by a high number of aeglids (Savaris *et al*., 2012). However, currently, there are no studies describing the trophic interaction between *A. denticulata* Nicolet, 1849 and *Geotria australis* ammocoetes larvae, in fluvial and lacustrine systems of Chile. Here we report, for the first time, a predatory behavior of *A. denticulata* upon lamprey ammocoetes *Geotria australis* Gray, 1851 in circumstantially confine conditions.

The anomuran-crustacean *A. denticulata* and the lamprey *G. australis* larval stage ammocoetes are part of the benthic community inhabiting sandy and muddy substrates of the coastal river systems of central southern Chile (Neira, 1984; Jara, 1989). *A. denticulata* is an endemic species with a continuous geographic distribution from Angol (Araucanía Region) to Chiloé Island (Los Lagos Region) (Jara, 1996). At present, there are a few studies that have characterized the diet of this anomuran-crustacean as an omnivorous-detritivorous, feeding on detritus, microalgae and larval stages of benthic macroinvertebrates (Isler, 1988).

The lamprey *G. australis* is a native species which has a subgondwanic distribution. In Chile, it is distributed from Santiago (Metropolitan Region) to Tierra del Fuego (Magallanes Region) (Neira, 1984; Ruiz, 1993). This species has three ontogeny stages before it reaches its adult stage: 1) Ammocoete (subcutaneous eyes, oral opening with folded lips, without marginal papillae, gill area arranged as furrow with seven undeveloped openings, and a brown colored body), 2) Macroftalmia (developed eyes, inner mouth with fleshy lips and supra and infraoral dental lamina, gill openings exposed to the outside and a dark silver dorsal and ventral body coloration), 3) Hypermetamorphic (semicircular mouth opening, with oral and supra-oral odontoid pieces well-developed, eyes relatively small and covered by translucent membrane, gill opening with folds on each edge, developed dorsal fins, a silver body coloration and a bluish pigmentation on the fins) (Ruiz & Marchant, 2004).

The context of the trophic interaction between both species (*A. denticulata* and *G. australis*) occurred during an electrofishing sampling in the Piren River, located in

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the Araucanía Region, central southern Chile. Alongside with fishes, three *A. denticulata* and seventeen *G. australis* specimens were captured and kept in recovering aquariums during 20 min. The morphometric measurements of the three specimens of *A. denticulata* were: chelipeds (10.3 ± 5.0 mm), carapace length (22.3 ± 5.6 mm), carapace width (19.6 ± 4.5 mm) and body length (29.0 ± 8.5 mm) and, for 17 specimens of ammocoetes in larval stages of *G. australis* were: weight body (1.10 ± 0.35 mm) and body length (50.4 ± 12.7 mm). The aquarium was 25 L capacity, and the water was changed every 5 min to maintain the physical and chemical parameters constant, allowing for a complete recovery of fishes before making them free (Table 1).

Table 1. Physical and chemical characteristics of the water column in the aquarium (mean ± SD). ORP: oxidation-reduction potential, TDS: total dissolved solids.

Parameter	mean ± SD	Unit
Temperature	12.6 ± 1.9	°C
ORP	122.7 ± 42.1	mg L^{-1}
pH	7.2 ± 0.4	-
Conductivity	31.6 ± 19.6	µs cm^{-1}
TDS	34.2 ± 15.7	mg L^{-1}
Dissolved oxygen	7.1 ± 0.6	mg L^{-1}
Alkalinity	21.3 ± 5.5	mg L^{-1}
Color	7.6 ± 3.7	U Pt-Co
Turbidity	3.5 ± 2.3	UNT
Sedimented solids	0.2 ± 1.1	mg L^{-1}

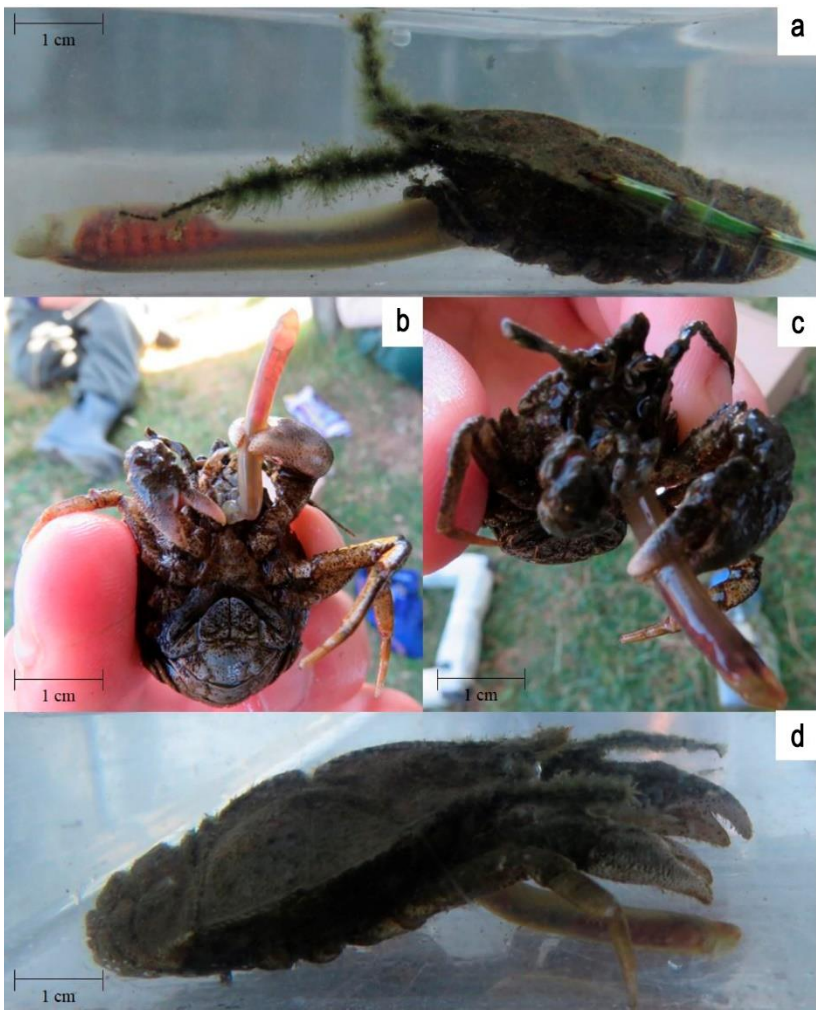

Figure 1. Predatory behavior of *Aegla denticulata* upon the ammocoetes larval stage of the lamprey *Geotria australis* in a confined environment. a) Lateral view of the predatory interaction, a subadult individual of *A. denticulata* feeding upon a larval stage of lamprey. The aeglid has lost most of its periopods caused by the electro shock activity, b) ventral view of the predatory interaction between *A. denticulata* and ammocoete of *G. australis*, c) front view of the predatory interaction. The aeglid uses its chelipeds to immobilize and pushes the ammocoete into the jaws, d) lateral view of the predatory interaction, an adult individual of *A. denticulata* feeding upon a smaller ammocoete of *G. australis*.

The predatory interaction by the aeglid *A. denticulata* upon the ammocoete larval stage of the lamprey *G. australis* occurred after 7 min of exposure. Most of the individuals (fishes and aeglids) captured were completely recovered from the narcosis induced by the electroshock after 10 min. In some aeglids, the electroshock (over 30 Hz) causes loss of pereiopods, altering their locomotory ability but did not affect their predatory behavior (Fig. 1a). The interaction began with an active persecution of *A. denticulata* on ammocoetes in the aquarium; once the contract was established *A. denticulata* caught and immobilized the ammocoetes with chelipeds, pushing the caudal portion of the ammocoetes body into the mandibles, finally devouring the lamprey alive. In the present case, lampreys were only partially consumed (Figs. 1b-1d).

The observed depredatory interaction of *A. denticulata* upon *Geotria* ammocoetes occurred in a confined unnatural space but the very fact of its occurrence points to the aeglids carnivorous capacity. Therefore, it is possible that depredatory interactions occur in nature since field observation confirms the co-existence of *A. denticulata* and ammocoetes in muddy deposits along protected banks of small to medium size rivers in central-southern Chile. If *A. denticulata* populations are able to control the population size of *Geotria* through depredation upon the ammocoetes, the possibility remains as an open question, deserving perhaps a research effort to begin understanding that particular aspect of the river ecology in southern Chile.

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