

## Short Communication

# Attempted predation by introduced salmonids on a native catfish in an Andean River in Argentina

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**Abstract:** Interspecific predator-prey interactions play an important role in the structure of communities. However, predation events in the wild are rare, and difficult to observe, and rarely documented. The objective of this work is to report the attempted predation on *Hatcheria macraei* by some of the salmonids with which it occurs in syntropy. During a survey of ichthyofauna in the Castaño River, an adult specimen of *H. macraei* was captured with evidence of a bite on the caudal fin. Despite not having been able to make the specific identification of the predator in the predation attempt on *H. macraei*, this report adds to the enormous base of information on the devastating effects of introduced salmonids on aquatic ecosystems and the native species that live there inhabit. It is necessary to control the expansion of salmonids, by protecting areas of high value for native fish and prohibiting future aquaculture projects to prevent the invasion of this species to new locations in these aquatic ecosystems.

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## Introduction

Interspecific predator-prey interactions play an important role in community structure (Miller et al., 2006). This relationship is defined as a trophic interaction in which one organism (predator) consumes another (prey) as a source of energy and usually involves the death of the prey (Lourenço et al., 2014). The effects of predator-prey interactions can affect the biomass of upper and lower trophic levels, and this phenomenon is known as the “trophic cascade effect” (Carpenter et al., 1985). Also, the structure of food webs can be modified by selectivity effects in predator-prey interactions in natural ecosystems (Brose et al., 2019). However, predation events in nature are rare and difficult to observe, in addition to being rarely documented.

Fishes in the family Salmonidae, native to the Northern hemisphere, have been successfully introduced to the Southern hemisphere (Crawford and Muir, 2008) and have led to biotic homogenization, habitat alteration, and loss of native or endemic

species throughout the world (Rahel, 2002). Trout are invasive predatory fish that were introduced to South America at the beginning of the last century for aquaculture, sport fishing, and commercial fishing (Miloch et al., 2020). Subsequently, they expanded their distribution, producing severe changes in freshwater ecosystems (Leprieur et al., 2008; Lobos et al., 2020). Thus, the main areas of establishment of trout populations were high-altitude lakes and rivers, where the basins provide adequate habitat (Baigún and Quiros, 1985).

Siluriformes have a wide geographic distribution in both freshwater and coastal seas around the world, with the exception of Antarctica (Lundber et al., 2004). However, some authors have reported that the populations are decimated due to pollution, the destruction of riparian vegetation, and the introduction of exotic, voracious, and aggressive species (Arratia, 1983). Within the family Trichomycteridae, the genus *Hatcheria* is monotypic, with the torrent catfish *Hatcheria macraei*, Girard 1855 being its only

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species. This catfish is endemic to South America and is widely distributed in Argentina and Chile (Unmack et al., 2012). Likewise, in Argentina, it is a taxon that dominates the Andean-Cuyana ichthyofauna (Acosta et al., 2016).

The Province of San Juan is irrigated by two main fluvial systems, constituted by the basins of the Jáchal River and the San Juan River. This last river takes its name at the junction of the Los Patos and Castaño rivers. Both have their hydrographic basins in the Andes Mountains and flow into the Calingasta Valley (Pittaluga and Suvires, 2006). The Castaño River runs through the depressed area of the basin and receives water supplies, mainly in summer, from rivers and streams, mostly temporary, both from the mountains and the foothills. The feeding regime of the Castaño River is mainly snowy and the highest flows are observed during the spring and summer months (November to February) due to the melting of snow in the Andean sub-basins. In addition, it has an increase in flow due to summer rains in the foothills (Pittaluga and Suvires, 2010). The torrent catfish (*Hatcheria macraei*) and the salmonid species *Oncorhynchus mykiss*, Walbaum 1792; *Salmo trutta*, Linnaeus 1758 and *Salvelinus fontinalis*, Mitchill 1814 are coexist in this water body (Acosta et al., 2016). The objective of this work is to report the attempted predation on *H. macraei* by some of the salmonids with which it occurs in syntropy.

### Materials and Methods

On November 23, 2018, an ichthyofauna survey was carried out in the Castaño River (31°0'41.72"S, 69°32'49.06"W, 1642 masl) in the Calingasta Department in the San Juan Province, Argentina, and an adult specimen of *H. macraei* was captured. The capture was carried out through a half-world fishing net that was placed against the current and with a hoe the substrate was removed so that the individuals entered the net.

### Results and Discussions

The individual presented evidence of a bite on the caudal fin (Fig. 1). Subsequently, the individual was



Figure 1. Dorsolateral view of the adult individual of *Hatcheria macraei*, the red circle indicates the bite on the caudal fin.

released in the same place of capture. Although the predator could not be determined, we assume that the attack was carried out by a salmonid, since they are the only aquatic predators with dentition that are present in said body of water.

The salmonid species present in the Castaño River feed on invertebrates, but also have among their items vertebrate prey such as fish and amphibians (Townsend, 1996; Macchi et al., 1999; Power et al., 2002; Quiroga et al., 2017; García et al., 2017; Miloch et al., 2020; Zarco et al., 2020). In addition, the use of *H. macraei* as a trophic item by *O. mykiss* has recently been documented (García et al., 2017; Rios, 2021). Of the reports mentioned above, one of them occurred in the Las Burras stream, a tributary close to the present report (García et al., 2017). This stream is a closed basin with respect to the Castaño River and is only connected to it for a short period of time during exceptional floods and for the time that the water lasts. However, we cannot know if the attempted predation of the individual of *H. macraei* was caused by

*O. mykiss*, but there is a possibility that it is the same interaction previously reported.

Although it is difficult to directly observe predation events in nature, indirect observations can provide novel information on the trophic habits of species. In this sense, the attempted predation on *H. macraei* could be a new trophic interaction between torrent catfish with *S. fontinalis* and/or *S. trutta*, since there are reports of consumption of other catfish by these salmonids in Argentine Patagonia (Macchi et al., 1999). Despite not having been able to make the specific identification of the predator in the predation attempt on *H. macraei*, this report adds to the enormous base of information on the devastating effects of introduced salmonids on aquatic ecosystems and the native species that live there inhabit (Miloch et al., 2020). In addition, it must be taken into account that, in general, many of them have critical conservation states (Quiroga et al., 2017; Miloch et al., 2020; Zarco et al., 2020).

Finally, it is necessary to control the expansion of salmonids, by protecting areas of high value for native fish and prohibiting future aquaculture projects to prevent the invasion of this species to new locations in these aquatic ecosystems (Lobos et al., 2020; Rios, 2021). The latter is of great importance, since mainly the introduction of salmonids in Argentina is carried out through public and state organizations (Cabrera et al., 2017; Quiroga et al., 2023). It is also necessary to modify provincial laws that restrict and penalize salmonid fishing so that free fishing of these exotic species is allowed throughout the year (Provincial Law No. 606-L). However, ecological population studies of the introduced species are recommended to constantly evaluate and monitor their structure and population dynamics in order to adjust and/or modify the proposed management actions.

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