A NEW INVASIVE FRESHWATER FISH SPECIES IN CENTRAL CHILE:
JENYNSIA MULTIDENTATA (JENYNS, 1842) (CYPRINODONTIFORMES:
 ANABLEPIDAE)

NUEVA ESPECIE ICTICA INVASORA EN AGUAS CONTINENTALES
 DE CHILE CENTRAL: *JENYNSIA MULTIDENTATA* (JENYNS, 1842)
 (CYPRINODONTIFORMES: ANABLEPIDAE)

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RESUMEN

Se reporta la presencia de la especie *Jenynsia multidentata* en Chile central, avistada en agosto de 2008 en la localidad de Peñaflor. Durante 2009 se registra en la confluencia del estero Puangue y el río Maipo, extendiendo su distribución a un amplio sector de este estero. *Jenynsia multidentata* corresponde a la 26ª especie íctica introducida al país.

In Chile, the order Cyprinodontiform is composed of native as well as introduced species. All the native species belong to the genus *Orestias* (Cyprinodontidae), that are typical inhabitants of the Altiplano zone (Vila *et al.* 2006). The exotic species, on the other hand, include both Poeciliidae *Gambusia holbrooki* (Girard, 1859), introduced in 1927 for mosquito control (Moreno & Morán 1981) and *Cnesterodon decemmaculatus* (Jenyns, 1842), which was apparently introduced accidentally along with the introduction of the Argentinean silverside *Odonthestes bonariensis* (Cuvier & Valenciennes 1835) (Moreno & Revuelta 1968).

During a periodic monitoring of the Peñaflor area (Fig. 1) in August, 2008, we collected 4 individuals of 'one-sided livebearer' *Jenynsia multidentata* (Jenyns, 1842) inhabiting an affluent of the Maipo River and coexisting with other native fish species. In March, 2009, during a routine monitoring of the Puangue stream (Fig. 1), we observed a high density of *J. multidentata* in the confluence of this stream with the Maipo River (1.42 individuals/m²). We also registered the presence of this species

in the sector called Chorombo (Fig. 1), where it was not detected during a previous sampling in 2006 (C. Quezada-Romegialli, unpublished data). Although we do not know the precise location of the original introduction, these above-mentioned reports suggest that *J. multidentata* has successfully established itself in the waters of the Maipo River and has recently colonized new areas. This fact could lead to classify it as an invasive species (Colautti & MacIsaac 2004). Since *J. multidentata* is not used for fishing-game, as a resource purpose or for biological control, but it is commonly used as an aquarium species (Ghedotti & Weitzman 1996), it is likely that it was introduced accidentally by aquarists, as there is no obvious reason for a deliberate introduction.

Jenynsia multidentata has an elongated body, slightly laterally compressed, greatest vertical body depth between the anal and pelvic fins, mouth slightly oblique and dorsal-fin origin directly above the anal-fin origin (Fig. 2 in this paper, Ghedotti & Weitzman 1996). Although *J. multidentata* is often confused with *G. holbrooki* or *C. decemmaculatus*, it can be distinguished from the introduced poeciliids

FIGURE 1. Original distribution of *Jenynsia multidentata* (grey area on South America), including the records for central Chile (showing the hydrographic basins of the Maipo River and Puangue stream in the box). PU: Confluence of Puangue stream with Maipo river, CH: Chorombo, PE: Peñaflor.

FIGURA 1. Distribución original de *Jenynsia multidentata* (área gris en Sud América), incluyendo los registros en Chile central (indicando las cuencas hidrográficas del río Maipo y estero Puangue en el recuadro). PU: Confluencia estero Puangue con río Maipo, CH: Chorombo, PE: Peñaflor.

and congeners by: (1) the round or short, horizontal dash-shaped markings that form approximately five to seven rows and also lines that extend for more than four scales in length on the ventral caudal peduncle in adult females and large males; (2) the presence of a distinct swelling between the urogenital opening and anterior base of the anal fin in females; and (3) lack of a distinct rounded spot on the dorsal pectoral base (Fig. 2 in this paper, see also Ghedotti & Weitzman 1996 and figures therein). *Jenynsia multidentata* is viviparous and has a marked sexual dimorphism (Fig. 2) with most males being much smaller than most females (Ghedotti 2003). The individuals examined in the laboratory had total lengths of 15.21 to 56.75 mm ($n = 63$); the males had a mean length of 30.29 mm ($n = 34$; $SD = 4.67$), while the mean for females was 40.29 mm ($n = 29$; $SD = 8.45$). The coloration in alcohol is yellow-brown on the sides and dorsal surface, while the ventral surface and head are off white. Females larger than six centimeters in standard length often

lack the distinct markings mentioned above (Fig. 2 in this paper, Ghedotti & Weitzman 1996). Concerning its habitat, *J. multidentata* naturally occupies estuarine and near-shore environments varying in salinity from freshwater to fully marine. It is distributed in most of northern Argentina, from the Río Colorado to the lower Paraná River, and in coastal rivers from Uruguay to Brazil (Fig. 1 in this paper, Ghedotti 2003, Ghedotti & Weitzman 1996). Our field observations in Estero Puangue showed that at the end of the summer *J. multidentata* was associated with a rocky bed, tolerating turbid water with elevated nutrients (1339 $\mu\text{g/L}$ N-total, 913 $\mu\text{g/L}$ P-total) and conductivity (1487.33 $\mu\text{S/cm}^2$) levels, although well oxygenated (12.16 mg/L dissolved oxygen; 22.2° C temperature). However, during the rainy season when there is a greater quantity of sediment deposited, *J. multidentata* was associated with riparian vegetation. This species has been characterized as omnivorous,

TABLE I. Diet composition of *Jenynsia multidentata* in Puangue stream.

TABLA I. Composición alimentaria de *J. multidentata* en el estero Puangue.

Phylum	Class	Order/unranked	Family	Genus/Item
indet.	indet.	indet.	indet.	unidentified filamentous algae
indet.	indet.	indet.	indet.	plant remains
Bacillariophyta	Bacillarioficeae	Naviculales	Pleurosigmataceae	<i>Gyrosigma</i> sp.
			Naviculaceae	<i>Navicula</i> sp.
	Fragilariophyceae	Fragilariales	Fragilariaceae	<i>Synedra</i> sp.
	Coscinodiscophyceae	Meloseirales	Melosiraceae	<i>Melosira</i> sp.
Mollusca	Gastropoda	Bassomatophora	Lymnaeidae	<i>Lymnaea</i> sp.
Arthropoda	Insecta	Diptera	Chironomidae	indet. larvae
				indet. sub-adult
		Hemiptera	Formicidae	indet. adult

FIGURE 2. Views of *Jenynsia multidentata* a) adult female more than six centimeters in total length; b) adult female; c) adult male.

FIGURA 2. Vistas *Jenynsia multidentata* a) hembra adulta de más de seis centímetros en longitud total; b) hembra adulta; c) macho adulto.

with a high trophic diversity ($H = 1.73$) and numerous prey items ($n = 24$); the most important of which being nymphs of the order Ephemeroptera, adults of the order Amphipoda and filamentous algae (López-Cazorla *et al.* 2003). Our analysis of the stomach content of 5 individuals from the Puangue stream revealed the presence of numerous prey items (Table I), confirming the omnivorous characteristic.

Three of the individuals examined were females, two of which had several embryos in an advanced stage of development in their ovaries.

We transported 30 individuals of *J. multidentata* to the Limnology Laboratory, where they were maintained in a 70 L aquaria. We observed gregarious behavior; the fish usually moved in groups permanently associated with the substrate. These individuals devoured all the food offered to them, which included flakes of aquarium fish food, *Tubifex tubifex*, *Daphnia* sp. and live larvae of insects of the order Ephemeroptera.

Given its characteristics of an invasive species with omnivorous habits and tolerance to degraded habitat conditions and water quality, *J. multidentata* is likely to colonize other areas of the Maipo River. Since it prefers benthic areas and has a wide trophic niche, this species will surely compete with native fauna for space and food. It is important to note that of the 44 fish species described for Chile, 64% are in danger of extinction and 29% are vulnerable or insufficiently known (Habit *et al.* 2006, Vila *et al.* 2006). Taking into account that 25 introduced species were recognized until 2006 (Iriarte *et al.* 2005, Vila *et al.* 2006), it is primordial to consider in conservation plans both the direct and indirect effects that exotic fauna are producing a many native species.

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