

## FISHES OF THE LAGUNAS ENCADENADAS (PROVINCE OF BUENOS AIRES, ARGENTINA), A WETLAND OF INTERNATIONAL IMPORTANCE

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### Introduction

The Lagunas Encadenadas (36° 30' - 37° 30' S, 61° 00' 63° 30' W) form a large endorheic wetland, i.e. the drainage lies in an enclosed basin. The wetland is situated in the south-west of the Province of Buenos Aires and has a total area of nearly 58,000 hectares (Fig. 1). The system comprises a chain of five main lagoons (Alsina, Chochico, Del Monte, Del Venado, and Epecuen) (Fig. 2), distinguished by a well defined east-west gradient in salinity from fresh water to saline.

From a hydrological viewpoint these waterbodies are part of the "diagonal group" of a larger lacustrine basin (Frenguelli 1956) along the northeastern slope of the Sierra de la Ventana (Mazza 1962; Ringuelet 1962). Periodic floods affect the zone, often with critical consequences, as in 1986 when the town Villa Epecuen was completely covered by water. As a result of flooding, in recent years there has been an enlargement of the inundated zone: the modified landscape includes land/inland water ecotones biologically unique due to the biodiversity they support (Lopez et al. 1993; Eerden & Ledema 1994). The chain of lagoons form the most southerly wetland in South America having this particular combination of hydrological, physico-chemical and biological characters. Although it is an isolated system, a few years ago a canal for water-level control in dry periods was constructed. This connects the lagoons to the Salado River drainage in the north, though it is temporarily closed now because of the recent inundations in the 1980s.

Concerning the regional biogeographical aspect, this wetland is within the Pampasian dominion of the Guayano-Brazilian subregion (Ringuelet 1961, 1981). In addition, it may be regarded as a transition zone between the Pampasian and Sub-Andean dominions, also influenced by Patagonian elements. Ringuelet (1975) noted that the Lagunas Encadenadas are inhabited by fish species from the meridional pampean plains, in the south of the Salado River basin. Additional information about the fish fauna from this region is provided by Mac Donagh (1934), Ringuelet et al.

(1967), Gallardo (1970), Ringuelet (1975), Lüling (1981), Menni et al. (1988), and Lopez et al. (1993).

### The fishes of the Lagunas Encadenadas

During two recent collection trips to the Lagunas Encadenadas, the second author recorded thirteen species of fish; the material was caught at thirteen sampling localities. From the collected material and available data in the literature, we can make the following points.

The fish fauna of this wetland comprises eighteen species from eleven families and six orders (Table 1). The list also includes three species reported by Luling (1981) that we did not confirm (marked with double asterisks in Table 1).

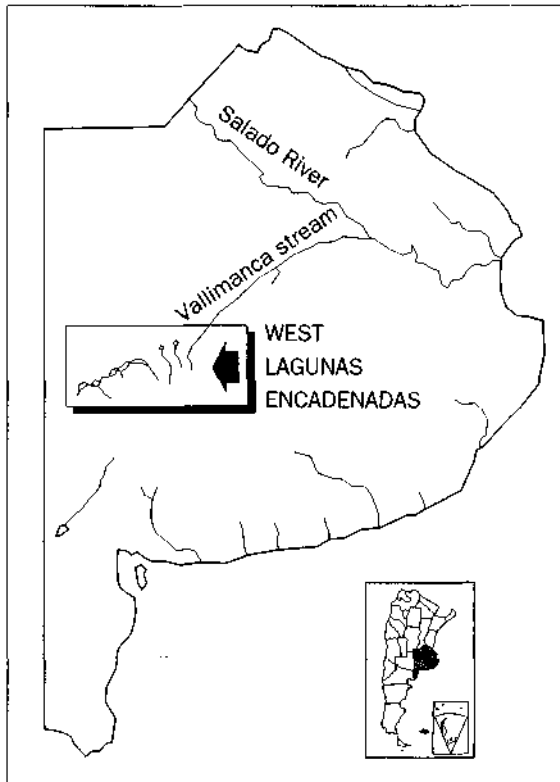


FIG. 1. Lagunas Encadenadas del Oeste within Argentina and the Province of Buenos Aires.

Four species, including one exotic, are new records for these waterbodies (marked with a single asterisk in Table 1).

With the exception of the cypriniform *Cyprinus carpio*, all of the other species belong to the Guayano-Brazilian subregion.

Fish species diversity decreases from east to west, i.e. from the most freshwater lagoon (Alsina, with 15 species) to the most saline one (Epecuen, 1 species). A similar diversity pattern has been found in zooplankton species (Lopez et al. 1993).

Lüling (1981) and other authors have already noted the remarkably high salinity at Epecuen, accounting for the presence of the crustacean *Artemia salina*, and noting the absence of any fish species. Our new record of *Jenynsia lineata*, found along the shore line of Epecuen, is supported by the remarkable euryhalinity of this species but also may reflect recent changes in physico-chemical conditions of the lagoon, resulting from the recent overall alteration to the system of lagoons.

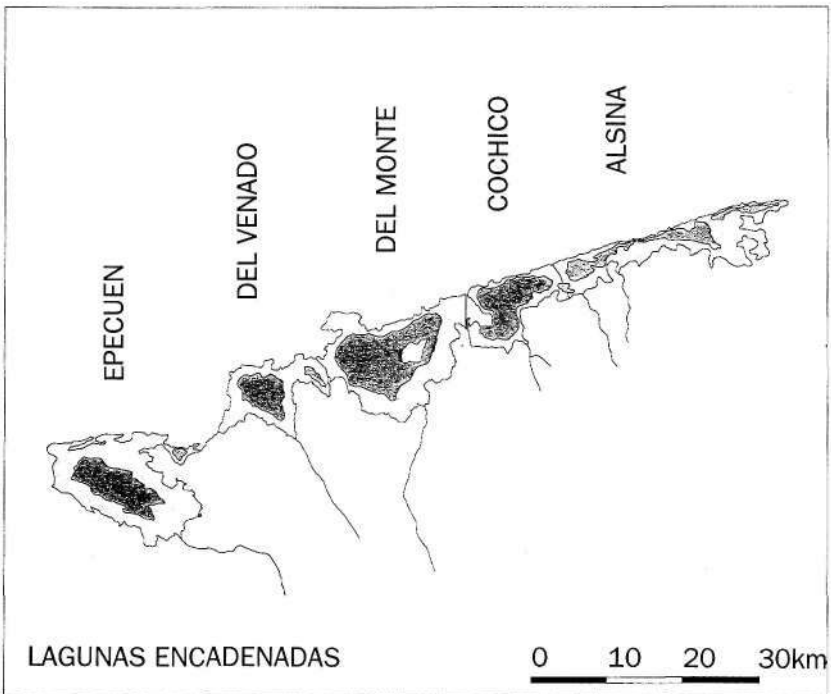


FIG. 2. Lagunas Encadenadas showing the range of extension of water during the period 1981 to 1993 (modified from Eerden & Iedema 1994).

Table 1. Fish species from the Lagunas Encadenadas del Oeste (Buenos Aires, Argentina).

	Alsina	Cochico	Del Monte	Del Venado	Epecuen
* <i>Cyprinus carpio</i>	X				
<i>Oligosarcus jenynsi</i>	X	X	X	X	
<i>Astyanax cf. eigenmanniorum</i>	X	X	X	X	
** <i>Astyanax taeniatus</i>	X	X			
<i>Bryconamericus iheringi</i>	X	X		X	
<i>Cheirodon cf. interruptus</i>	X	X		X	
** <i>Cheirodon cf. galusdae</i>	X	X			
<i>Cyphocharax boga</i>	X	X	X	X	
** <i>Galeocharax humeralis</i>	X	X			
* <i>Hoplias malabaricus</i>	X				
<i>Corydoras paleatus</i>	X	X	X		
* <i>Loricariichthys anus</i>		X			
* <i>Parapimelodus valenciennis</i>	X				
<i>Rhamdia sapo</i>	X	X	X		
<i>Cnesterodon decemmaculatus</i>				X	
<i>Jenynsia lineata</i>		X	X	X	X
<i>Odontesthes bonariensis</i>	X	X	X	X	
<i>Cichlasoma facetum</i>	X	X			
Number of species:	15	14	7	8	1

The presence of the exotic *Cyprinus carpio* shows the extent of the advance of this species southwards, and the progressive occupation of the waterbodies of the Province of Buenos Aires (Lopez et al. 1994).

The records of *Hoplias malabaricus*, *Loricariichthys anus* and *Parapimelodus valenciennis* extend the distribution area of three species of Brazilian biogeographical lineages. Therefore, they have to be listed together with the highest widespread neotropical taxa (i.e. *Rhamdia*, *Astyanax* and *Jenynsia*) that reach the most southern and western limits of the Guayano-Brazilian subregion. These new reports should be considered in association with the artificial canal that now connects the lagoon system to the Salado River basin, enhancing the advance of fish populations. Their ultimate adaptation to this particular lentic environment depends on the ecological fidelity and resistance capability of each species (Ringuet 1975).

### **A wetland of international importance**

In agreement with Eerden & Iedema (1994) we believe that the Lagunas Encadenadas form a wetland of international importance. Moreover, because of its land/inland water ecotone character, the study of these waterbodies should be integrated into the Ecotone Programme, within the Man and the Biosphere Programme (MAB-UNESCO) (Decamps 1990).

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