DIVERSITY OF THE PRESENT OSTRACOFAUNA IN LAGOONS OF THE CENTRAL REGION OF THE REPUBLIC ARGENTINA

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ABSTRACT: In this work, the present ostracofauna in the "Laguna Don Tomás" (36 º 18 ' 18.31 " S and 64 º 18 ' 49.02" W), located in the city of Santa Rosa, La Pampa, Argentina, is studied. Seasonal studies were carried out, 1447 valves and shells were recovered. Four species were identified and specimens of *Heterocypris símilis* with *Oichnuns simplex* were found. In all the samples, *H. similis* was the dominant species which would indicate a high degree of eutrophication in the area of study and it would allow to take this species how bioindicator of pollution.

KEY WORDS: ostracods, Lagoon, Santa Rosa, eutrophic.

Wetlands are systems characterized by having a high productivity plant that feeds a food web composed of zooplankton, arthropods, other macroinvertebrates and microinvertebrates, reptiles, birds and mammals directly or indirectly associated to water bodies. However, productivity is so high that much of the biomass is not consumed directly and dies (Marquez, 2003), generating an excess of organic matter. This, along with humidity, promotes the growth of fungi, bacteria, detritivorous invertebrates, and terrestrial arthropods.

This research was carried out along the periphery of the "Laguna Don Tomas" located in the province of La Pampa, Argentina. This is a hypereutrophic water-body, as it is highly affected by the surrounding city (Echaniz et al., 2008). The goal is to survey the ostracofauna of this lagoon by analyzing the diversity and abundance of species present, as well as the ontogenetic composition of ostracod populations. It is important to assess the biodiversity in this lake as it is a municipal water reservoir. Monitoring the ostracod species present might indicate changes in the level of eutrophication in this body of water through time. Ostracods are small crustaceans characterized by a bivalved calcified carapace. They are all essentially aquatic, mainly benthic, showing a wide ecological range inhabiting both marine and non-marine environments. They are very sensitive to environmental changes that reflect not only in variations in communiy structure, but also in structural and morphological changes of the shell at the individual level (Horne et al., 2002).

This work represents the first contribution to the knowledge of the ostracofauna in water-bodies of the province of La Pampa, so that the information provided in this study is a tool for site characterization as well as for biodiversity assessment.

Study area

The "Laguna Don Tomas" (36 º 18 '18.31" S and 64 º 18' 49.02" W) is a highly modified shallow hypereutrophic water-body located west of the city of Santa Rosa (Figures 1 and 2). It is surrounded by three basins that were built to prevent flooding of the surrounding city. It has an average depth of 2.3 m, which varies

according to the rainy season, and covers an area of 135.2 ha. Maximum length and width are 1565 and 1181 m, respectively (Echaniz et al., 2008).

In the vicinity of the lagoon there are sites that have been anthropogenically modified and where the vegetation composition is variable, i.e., halophiles in flood areas, and psammophile in the grasslands. It lies within the eastern subhumid-dry climate physiographic region, where the average annual rainfall is 600 mm (Pall et al., 2011).

MATERIALS AND METHODS

Sediment samples were taken using a 10 cm diameter and 2 cm high metal ring. The northern shore basin was sampled, because it is the site subject to less human action and lacks a wire mesh on the shore that prevents the deposition of sediment, as occurs with the other two basins. Sampling was conducted in July and October 2011 and January 2012.

The northern basin (Fig. 2) is a low saline endorrheic basin with a water input consisting of the contribution of rainfall, storm runoff from the city and the loading and unloading of the water table (Alvarez et al., 2009); it is characterized by halophytic vegetation present.

The samples were washed using a 63 μm mesh sieve and dried in an oven at 50°C. They were washed with Rose Bengal for the determination of live. We extracted the total number of individuals using the technique of picking. Identification of the species was done following the classification proposed by Moore (1961). Specimens were photographed using a Nikon microscope camera Si 80 drawing.

RESULTS

A total of 1447 specimens was recovered. These were assigned to 4 species (Fig. 3): *Limnocythere* sp. (Fig. 3A-D), *Cypridopsis vidua* (O. F. Müller, 1776) (Fig. 3E, F), *Heterocypris similis* (Wierzejski in Ramirez, 1967) (Fig. 3G, H) and *Kapcypridopsis* sp.. The dominant species in all samples was *H. Similis*, of which populations were found with complete live specimens. *Limnocythere* sp. was also generous with adults and juveniles, males and females. October sampling was conducted after rain, so that the basin had a higher water-level and lower water turbidity than in the July sampling. In January there was a high algal concentration, due to the high temperatures and low rainfall reached during this period, the water content was lower, with the highest turbidity of all samples taken.

The seasonal succession and species composition of ostracods were similar in the different sampling stations during the study. In all samples the dominant species is *H. similis*, with a type A (Whatley, 1988) ontogenetic structure of the population. Adult shells of *Heterocypris similis* were collected which showed the presence of *Oichnus simplex* Bromley 1981. The Shannon-Weaver index ranged from maximum values of 1.5 to minimum values of 0.5, the highest values recorded in the October sampling.

DISCUSSION

The similarity in the seasonal succession and species composition of ostracods may be cause by the relatively stable chemical water conditions throughout the year. The great dominance of *Heterocypris similis* indicates environmental

oligohaline, eutrophic to hypertrophic conditions, agreeing with Laprida (2006), who studied permanent and seasonal water-bodies in the province of Buenos Aires. An increased turbidity was observed during the January sampling.

The presence of *Oichnus simplex* Bromley (1981) only on shells of *H. similis* may be related to the larger size of these shells compared to the size of the other species present and the dominance of *H. similis* in all samples analyzed agrees with that reported by Ruiz et al., 2010, 2011 for modern and fossil specimens from different parts of Spain and Kihn et al., 2011 for the Quaternary of southern Buenos Aires province.

The highest values of the Shannon-Weaver index reported during the month of October would be associated with an increased supply of water and nutrients to the basin, providing optimal conditions for the development of ostracod populations.

CONCLUSIONS

The dominance of *H. similis* at all sampling points indicates eutrophic to hypertrophic conditions of the basin under study, whereby *H. similis* could be used as a species-level bioindicator of eutrophication of the water body. The presence of *Oichnus similis* points to low energy and high nutrient level of the water-body. The highest degree of turbidity in the basin was manifested during the summer months of algal blooms that hamper the normal development of the ostracofauna, being *H. similis* the only species of which live specimens were found. This is the first contribution to the knowledge of ostracofauna from the Laguna Don Tomás It is important to track seasonal changes in the ostracofauna to determine the different degrees of contamination that eventually may affect the basin because of its proximity to the city. Additionally, further sampling of the ostracofauna from the various non-polluted lagoons in the province of La Pampa would be extremely interesting in order to assess more ccurately the real impact of human activity on these lagoons and the potential usefulness of ostacods in measuring this impact.

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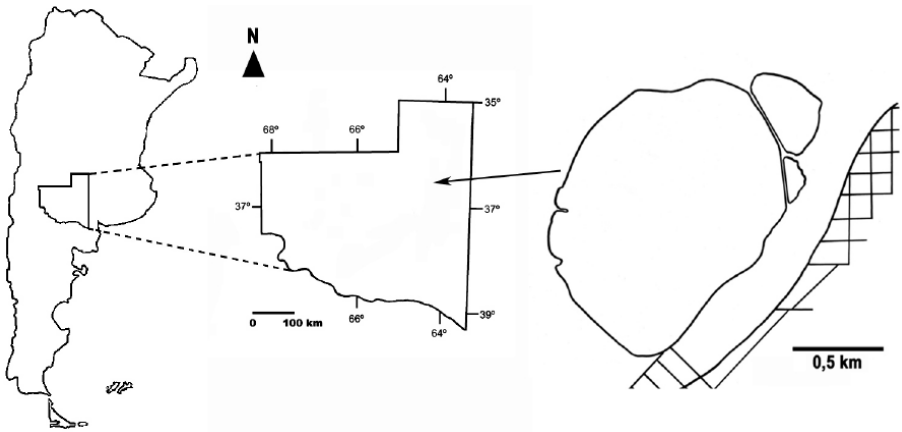

Figure 1. Geographical location of Lake Don Thomas in the province of La Pampa, central Argentina.

Figure 2. Location of the North basin and sampling sites (red) in Laguna Don Tomas (near the city of Santa Rosa) in the province of La Pampa, Argentina.

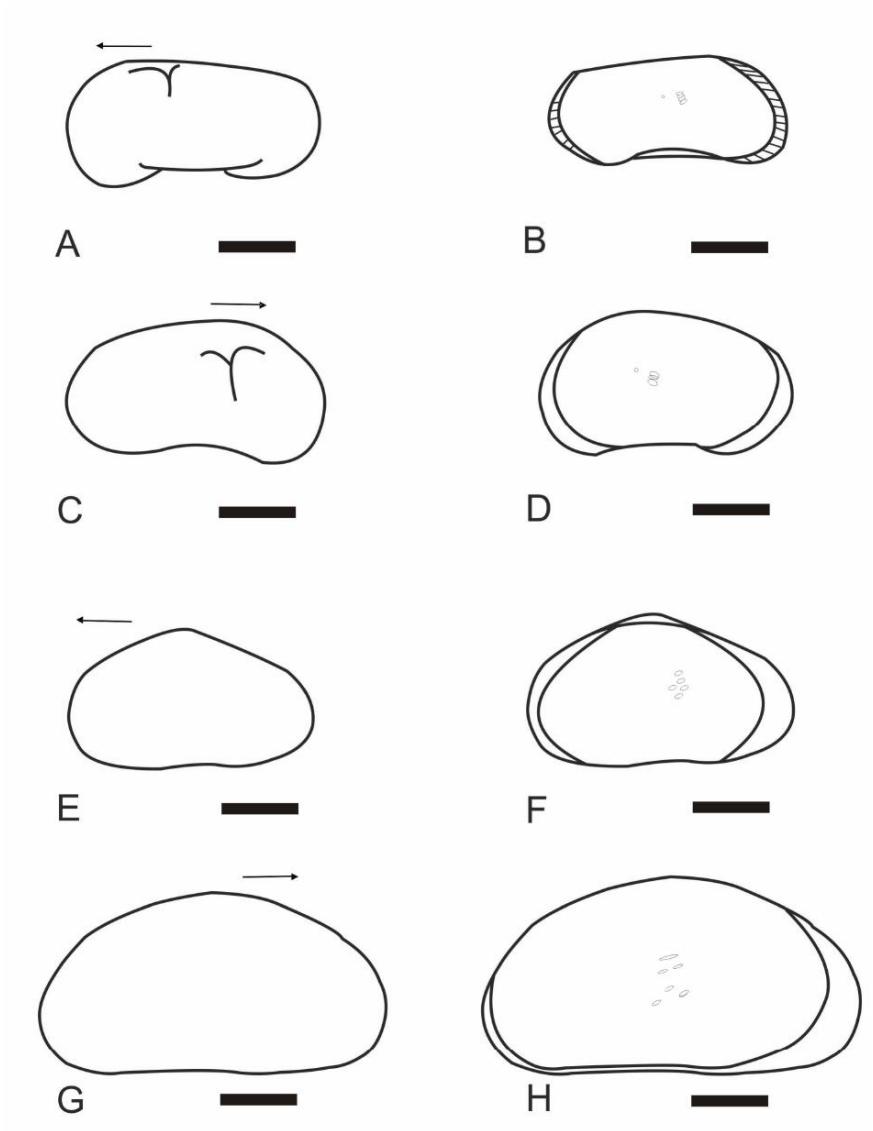

Figure 3. Ostracod species present in the Laguna Don Tomas: A-D: *Limnocythere* sp., E-F: *Cypridopsis vidua*, G-H: *Heterocypris similis*. (Scale 30μm).