

**REPORT OF THE EPIGEAN ARTHROPOD FAUNA  
IN THE “LAGUNA DON TOMAS”, SANTA ROSA  
(LA PAMPA, ARGENTINA)**

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**ABSTRACT:** In this study a relay of the arthropods' families was made in adjoining zones next to the wetland area known as “Laguna Don Tomás” in Santa Rosa city, La Pampa, Argentina. Diversity and abundance of Arthropod families present in the area were analyzed; also measured was the variability in community composition during the different seasons of the year. A total of 4 classes of arthropods, distributed in 16 orders, 46 families and 52 morphs were obtained, in which the family Formicidae was the most abundant in all samples. The number of families varied seasonally, being higher during spring and summer dropping during winter months.

**KEY WORDS:** Arthropods, Laguna Don Tomás, Formicidae.

Wetlands are systems characterized by a high primary productivity that subsequently feeds a trophic network including zooplankton, arthropods, macro-invertebrates, reptiles, birds and mammals directly or indirectly related to the water mass. However, productivity is so high that a big part of the biomass produced is not consumed directly and dies (Márquez, 2003), generating an excess of organic matter that together with humidity allows growth of mushrooms, bacteria, detritivorous invertebrates and terrestrial arthropods.

Richness and abundance of arthropods in wetlands depend on several factors such as their palaeoecological record, climatic regime, dimensions, water mass characteristics, habitat heterogeneity, vegetation and management conditions (Amat-García & Blanco, 2003). Composition and richness of arthropod species in wetlands are also related with several anthropic factors such as filling deposits, livestock establishment, trash accumulation and residual waters (Amat-García & Quitiaquez, 1998).

Insect proliferation in wetlands, especially dipterians, is exploited as food resource by birds that are very well represented in these ecosystems. Other groups of vertebrates such as amphibians and some mammals also have insectivorous diets. Pollination of native plants in these environments is carried out by some species of insects, evidencing, the trophic and ecological importance of arthropods in these ecosystems.

Studies on arthropods diversity in temperate region wetlands are of great interest from a methodological point of view, such as the work of Keiper et al. (2002) in wetlands of North America, in which the composition, richness, population abundance, nutritious habits and distribution of these organisms was evaluated.

Wetlands in Argentina have remained poorly known, although Bar et al. (2004) have worked in Esteros del Iberá (Corrientes Province). At the present,

studies on arthropod biodiversity are important in order to increase the knowledge of the faunas present in the different environments. In La Pampa Province, there are even less studies of this nature, and the ones available are related to other types of ecosystem such as grasslands (Pall, 2009 pers. com.; Pall et al., 2010 pers. com. unpublished).

The present work was carried out in the periphery of "Laguna Don Tomás", located in La Pampa Province, Argentina, which is a hypereutrophic water-body highly affected by the adjoining city —Santa Rosa, the capital of La Pampa province (Echaniz et al., 2008).

The aim of this work was to carry out a report of the terrestrial arthropod fauna from the areas near the "Laguna Don Tomás" water-mass, analyzing the diversity and abundance of the families present, as well as the variability in the composition of the community during the different seasons of the year.

## MATERIALS AND METHODS

### Study Area:

"Laguna Don Tomás" (36° 18' 18.31 " S and 64° 18' 49.02 " W), is a shallow hypereutrophic body of water highly modified, located west of Santa Rosa City (Figure 1 and 2). It is surrounded by three basins built to avoid flooding of the city; average depth is 2.3 m (which varies according to the rain times) and surface area is 135.2 has. Maximum length and width are 1565 and 1181 m, respectively (Echaniz et al., 2008).

In the surroundings of the lagoon there are places that have been anthropically modified and where the vegetable composition is variable, with halophilous vegetation and psammophilous grasslands covering the flooding areas. It is located physiographically in the oriental region of humid-dry climate, with an average of annual precipitations of 600 mm.

A recreational park was built next to the lagoon and fishing is also practiced by many people, which influences directly or indirectly the fauna inhabiting the environment.

### Methods:

Four sampling sites were chosen, in the vicinities areas of the water-body, representing all the different environments occurring in the "Laguna Don Tomás" Wetland.

At each site, two 80 m long transects (separated by 30 m) were defined. Five pit-fall traps of 7 cm in diameter (Agosti *et al.*, 2000) and 750 c.c. of capacity were placed at 20 m one from the others in each transect and their location was recorded with GPS. Each trap contained 70% alcohol and some detergent drops to avoid break-down of the arthropods and evaporation of the liquid during warm days. Captures were carried out during one year (2008-2009), in every season; vegetation samples were also collected.

The collected material was identified and later housed in the Invertebrate II laboratory of the Facultad de Ciencias Exactas y Naturales (FCEyN) at the Universidad Nacional de La Pampa (UNLPam). The taxonomic identification of families was carried out by naked eye and with binocular magnifying glasses and using the keys and diagnosis of Triplehorn et al. (2005), Sáenz & De la Llana (1990) and Bolton et al. (2007).

## RESULTS

A total of 6555 specimens belonging to 4 classes, 16 orders and 46 families were obtained (Table 1). The most representative family was Formicidae (Insecta: Hymenoptera), which maintained a high number of individuals during all the samplings. Thus, it was considered as the dominant family (90%). A total of 4795 specimens were counted in all the samplings.

Fluctuation in the diversity of arthropod families could be related to the time of the year, with a higher number of individuals and families during spring and summer. Although the Formicidae was the most abundant, there were also other families that were present but in smaller number (Table 1), rendering the Class Insecta the most diverse in these environments.

Arthropod richness was higher during the spring months, with 30 families represented, while in summer only 26 were recorded. In cold months the number drops to 21 families in autumn and 8 in winter, with only 311 specimens counted in the latter (Figure 3 and 4).

Due to the great number of specimens in the family Formicidae (Figure 5), they were taxonomically identified using the keys previously mentioned and the work of Fernández (2003). Their nutritious habit was also determined.

### Plant composition of the sampled places:

There are some plant species shared by some of the sampled sites: Sites A and C had a quite similar plant composition, sharing *Hordeum murinum*, *Medicago minimum*, *Daucus pusillus* and *Bromus brevis*. Sites D and A share *Daucus pusillus* and *Plantago patagonica*. Sites B, C and D share *Distichlys sp.* *Cenchrus pausiflorus*, *Conyza bonariensis*, and *Jaraba ichu* occur at site A, *Salicornia ambigua* at site B, *Taraxacum officinale* at site C and *Cynodon dactylon* at site D.

## DISCUSSION

As asserted by Bar et al. (2004), insects were the most representative group, mainly in the warm months between spring and summer. Their numbers drop (specimens and families) during the coldest months in autumn and winter. Diversity can be attributed to the space heterogeneity related with the complex structure of the biotopes that offer numerous microhabitats.

In agreement with Keiper et al. (2002), we consider that wetlands in temperate areas are very important from a methodological point of view because they offer diverse habitats for insect capture. This was demonstrated in the present work, where a great number of specimens was collected in different areas, which qualitative and quantitative data contributing to assess the diversity in the environments that harbor them.

The present diversity in the study area coincides with the diversity found in other places of La Pampa Province studied in previous works (Pall, et al. personal com.).

## CONCLUSIONS

A total of 4 classes of arthropods was obtained, distributed in 16 orders and 46 families, of which the Formicidae was the most numerous in all samples. It was represented by 5 species with their respective nutritious habits: *Pheidole bergi*, *Solenopsis saevissima*, *Crematogaster quadriformis*, (omnivorous) *Acromyrmex striatus* (cutter) and *Linepithema humile* (generalist).

Arthropod fauna diversity in the periphery of the “Laguna Don Tomás” drops sharply during the winter months because of the more restricted availability of food resources and unfavorable climatic conditions for reproduction.

The similarity in the vegetable composition is related to the great anthropic effect suffered by the study area and the proximity among the sampling places.

This work represents the first contribution towards the knowledge of the arthropod fauna of areas near “Laguna Don Tomás”. Information provided in this study constitutes a tool for characterizing the wetland, as well as for the assessment of current biodiversity considering feasibility of creating a municipal and/or provincial reserve in the studied area.

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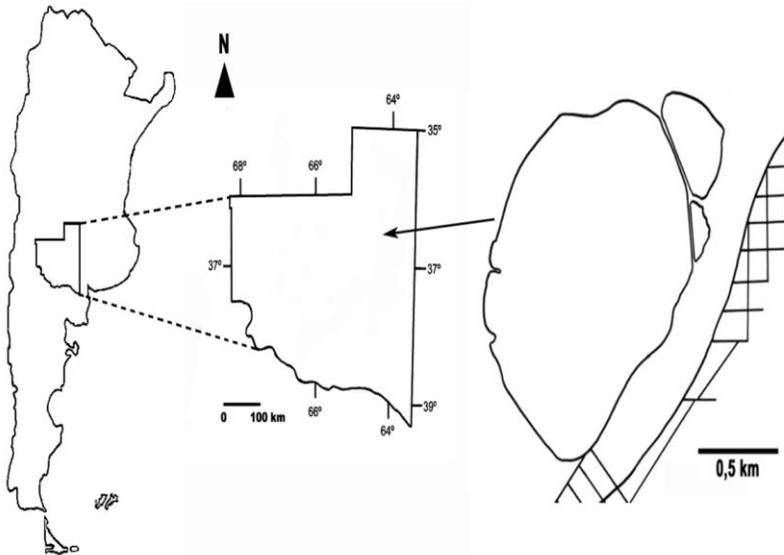


Figure 1. Outline of “Laguna Don Tomás”, showing its geographical location in La Pampa Province, in the central region of Argentina.



Figure 2. Satellite Image of the wetland "Laguna Don Tomás". Asterisks (\*) indicate the 4 sampling sites. Image extracted from Google Earth, year 2009.

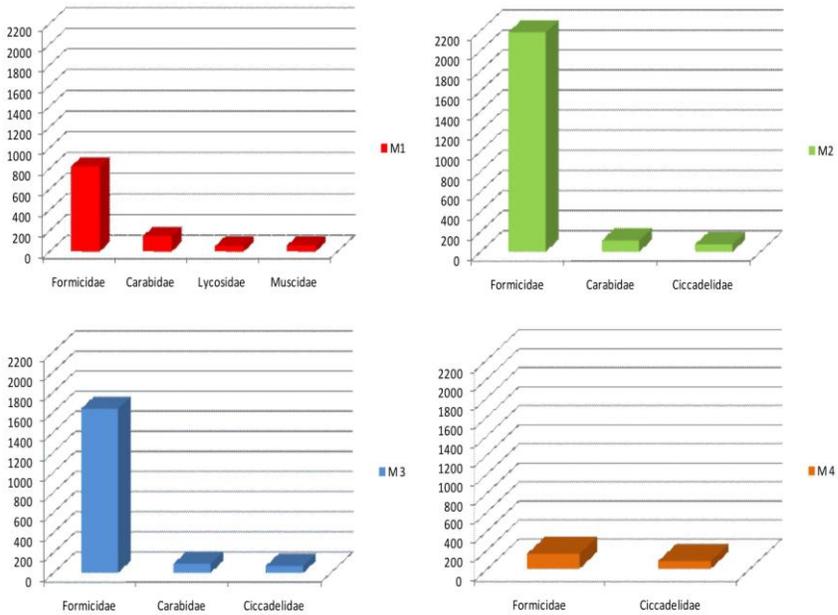


Figure 3. Distribution of the families that presented higher percentage of individuals (n: greater than 50) during the four samplings carried out during 2008-2009 in the “Laguna Don Tomás”, La Pampa Province, Argentina, that had N greater than two specimens per family; M1: first sampling (Spring), M2: second sampling (Summer), M3: third sampling (Autumn) and M4: fourth sampling (Winter).

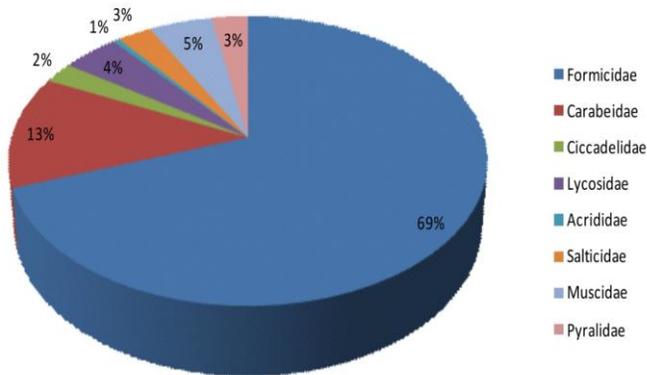


Figure 4. Distribution of the richness of most representative families during the four samplings carried out during 2008-2009 in Laguna Don Tomás, La Pampa, Argentina; M1: first sampling (Spring), M2: second sampling (Summer), M3: third sampling (Autumn) and M4: fourth sampling (Winter).

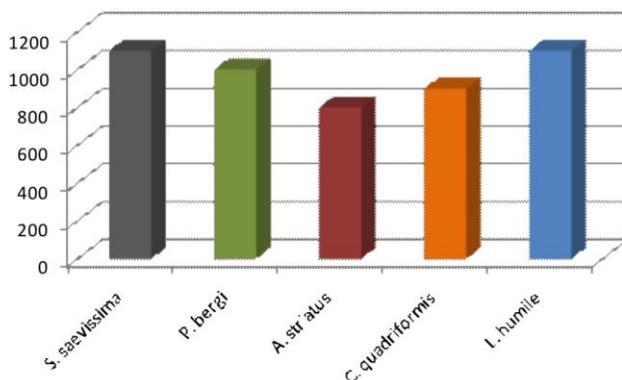


Figure 5. Distribution of Formicidae richness during the four samplings carried out during 2008-2009 in "Laguna Don Tomás", La Pampa, Argentina.

Table 1. Taxonomic arrangement of family distribution obtained during the four samplings of 2008-2009 in "Laguna Don Tomás", La Pampa, Argentina.

Class	Order	Family
Aracnida	Araneida	Lycosidae
		Salticidae
		Sicariidae
		Thomisidae
Aracnida	Escorpionida	Bothriuridae
Insecta	Acarí	Opillicaridae
Insecta	Hymenoptera	Formicidae
		Vespidae
		Mutillidae
		Braconidae
		Syrphidae
Insecta	Lepidoptera	Pyralidae
		Pieridae
Insecta	Homoptera	Cicadellidae
		Aphididae
Insecta	Coleoptera	Coccinellidae
		Dasytidae
		Elateridae
		Scarabaeidae
		Chrysomelidae
		Aichophilidae
		Carabidae
		Curculionidae
Insecta	Orthoptera	Acrididae
		Grillotalpidae
		Grillidae
Chilopoda	Scolopendromorpha	Litholiidae
Insecta	Heteroptera	Reduviidae
		Pentatomidae
		Lygaeidae
		Rhopalidae
Insecta	Diptera	Muscidae
		Calliphoridae
		Culicidae
		Drosophilidae
		Simuliidae
		Tephritidae
		Chloropidae
Insecta	Dictyoptera(Mantodea)	To determining
Insecta	Dermaptera	Labiduridae
		Labiidae