

Spider fauna (Araneae: Araneomorphae) in natural grasslands of Uruguay with different livestock management

Álvaro Laborda^A, Rafael A Tosi-Germán^A, Sebastián Donate^B and Oscar Blumetto^B

^A Universidad de la República, Montevideo, Uruguay

^B INIA Las Brujas, Uruguay, <http://www.inia.org.uy/online/site/1098811.php>

Contact email: alaborda@fcien.edu.uy

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Introduction

In Uruguay natural grasslands sustain cattle ranching and are the country's main renewable resource. This ecosystem not only serves a productive function, but also functions in geophysical processes of soils and sustaining the nation's biodiversity through complex trophic webs (Berretta 2009). Increased pressure from human activities that exploit natural resources makes it necessary to possess tools for detecting disturbances in ecosystems and assessing their conservation status. Identifying indicator taxa is essential for evaluating the degree of impact on natural grasslands and for applying this in the development of management plans for this habitat type (Avalos *et al.* 2007; Cardoso *et al.* 2004). Terrestrial arthropods are convenient biological indicators due to their sensitivity and fast response to changes in their environment. Additionally, they can be studied through cheap and simple surveys (Gardner *et al.* 2008). The order Araneae is the seventh most diverse group in the animal kingdom (Coddington and Levi 1991). Spiders are the most abundant generalist predatory arthropods in most terrestrial ecosystems; they regulate herbivore populations and occupy a key position in food webs (Lawrence and Wise 2000, Ferris *et al.* 2000). They are involved in important biological processes in most habitats (Ziesche and Roth 2008; Van Hook 1971). In addition to the fact that this group is poorly known in Uruguayan grasslands, this study tries to gain knowledge and compare the structure and composition of the spider fauna of natural grassland in two nearby areas under different cattle management.

Methods

This study took place in the estancia "Los Venados", which covers 4500 ha in the Arerunguá stream basin, located in Salto Department. Two sites were surveyed: Site 1 (S1), which was grazed by cattle and sheep; and Site 2 (S2) which was grazed by cattle and native Pampas Deer (*Ozotoceros bezoarticus*). Four seasonal surveys were made between February and November 2010. Spiders were collected using pitfall traps, entomological nets and manual nocturnal capture. Collected spiders were placed in appropriately tagged polypropylene bags and fixed in 70% alcohol. Specimens were then transferred to the laboratory for examination, for the identification of the specimens were used taxonomic papers (Harrod *et al.* 1991; Levi 1988;

Capocasale 2001; Mello-Leitão 1941). Statistical analyses were made using PRIMER 5 V. 5.2.

Results

1025 individuals were collected in S1 belonging to 15 families and 41 species; in S2 1046 individuals belonging to 15 families and 35 species were found. ANOSIM analysis showed no significant differences between sites ($R=0.007$; $P=0.2$). SIMPER analysis found *Larinia bivittata* Keyserling, 1885 (family Araneidae) to be a typical species for S1. S2 was also typified by *Larinia bivittata* along with *Alpaida rubellula* (Keyserling 1892) (family Araneidae). The species that most differentiated the sites were *Larinia bivittata*, *Hogna bivittata* (Mello-Leitão, 1939) (family Lycosidae), *Alpaida rubellula* and *Lycosa poliostrata* (C. L. Koch 1847) (family Lycosidae). The most important guilds were the high grass strata orbicular web builders (Araneidae) and the low strata hunting runners (Lycosidae).

Conclusion

The abundance and species richness in this study was higher than other surveys carried out in the country, such as Pérez-Miles *et al.* (1999) and Costa *et al.* (1991). Therefore spider diversity in natural grassland shows reasonably high levels when compared with other habitat types in the country. ANOSIM showed no differences in species composition among sites, which can be explained by the proximity of both sites and their similar vegetation structure. *Larinia bivittata* is a good candidate for an indicator species, as it was found in high numbers in both sites and is also the one that most discriminates between the sites. Frequent monitoring of *L. bivittata* could be used to estimate habitat deterioration. Among the guilds found, it is noteworthy to highlight the dominance of the Araneidae and Lycosidae families in the grassland spider community; species in these families should be included in future studies in this ecosystem. Because of the lack of work on spider fauna of natural grasslands in Uruguay, this study will be useful as a baseline for future research in the spider composition of these ecosystems and their response to both natural and anthropological variables. This knowledge will be helpful in understanding the assemblage and functions of grassland natural communities, and for improving management plans that prioritize conservation in this highly economically and biologically important biome.

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