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## Overgrazing affects arbuscular mycorrhizae diversity and abundance in Patagonian steppe

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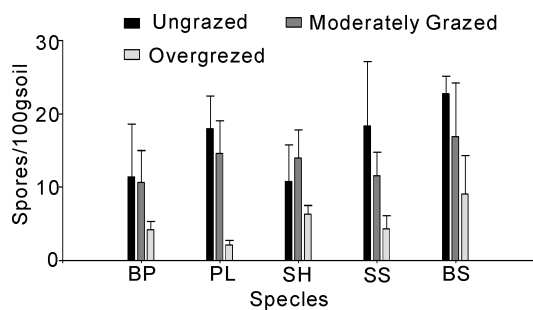
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**Key words :** overgrazing, Patagonian steppe, arbuscular mycorrhizae, diversity, abundance

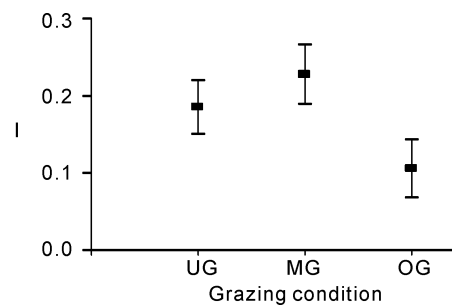
**Introduction** Arbuscular mycorrhizae fungi (AMF) are critical for survival of most plants in arid ecosystems (Titus et al., 2002). This also might be true in the case of Patagonian steppe, which faces desertification processes mainly as a result of overgrazing (León y Aguiar 1985). AMF diversity is affected by plant diversity; if the latter decrease it is expected that the former would do the same (Johnson et al., 2003). Losses in plant cover and substitution of palatable species by unpalatable ones are overgrazing consequences in the Patagonian steppe. Therefore, the effects of overgrazing on the AMF community were evaluated in the Patagonian steppe.

**Materials and methods** AMF spore abundance and diversity were evaluated in Patagonian steppe in ungrazed, moderately grazed and overgrazed plots. Soil samples were taken from the rhizospheric soil of the more conspicuous Patagonian steppe grasses (palatable *Bromus pictus* and *Poa ligularis*, less palatable *Stipa speciosa* and unpalatable *Stipa humilis*) and under bare soil patches. Spores were extracted by the methods of Gerdeman and Nicholson (1963) and Walker et al. (1982). Fungal density was considered as total spore number per 100 g of soil. Fungal specific spore density was quantified to calculate the biodiversity index Shannon-Weaver,  $H'$ . Trap cultures were made for spore identification.

**Results and discussion** AMF spore abundance in general was highest in the ungrazed plots and lowest in the overgrazed ones. AMF community associated with *S. humilis* was less affected by grazing and showed a higher AMF spore abundance under moderately grazed conditions. AMF fungal diversity was highest in ungrazed and moderately grazed plots and lowest in overgrazed plots. *Glomaceae* family was dominant in all sites and *Gigasporaceae* family disappeared in the overgrazed sites. *Pacispora sp.* was present in all sites and it was the first time ever it was found in an Argentinian ecosystem.



**Figure 1** Number of spores/100 g soil in the rhizospheric soil of *B. pictus* (BP), *P. ligularis* (PL), *S. speciosa* (SS), *S. humilis* (SH) and Bare Soil (BS); in ungrazed, moderately grazed and overgrazed plots.



**Figure 2** AMF spore biodiversity index (Shannon-Weaver),  $H'$ . Under ungrazed (UG), moderately grazed (MG) and overgrazed (OG) conditions.

**Conclusions** Overgrazing may alter the ecosystem functioning of the Patagonian steppe not only by reducing the plant cover but also by reducing AMF abundance and diversity, thus increasing the process of desertification.

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