Livestock impact on understory plant and beetle communities in grasslands and forests under silvopastoral use in Tierra del Fuego, Argentina

MV Lencinas; RM Soler; G Martínez Pastur; JM Cellini; MD Barrera; FJ Sola; PL Peri.

Lab. de Recursos Agroforestales, CADIC-CONICET. Houssay 200 (9410) Ushuaia, Tierra del Fuego, Argentina. mvlencinas@conicet.gov.ar
INTA-UNPA-CONICET, Río Gallegos, Santa Cruz, Argentina.
LISEA-UNLP, La Plata, Buenos Aires, Argentina.
In southern Patagonia, livestock (sheep and cattle) have a strong influence over soils in natural ecosystems under silvopastoral use...
... affecting biodiversity and community structure in grassland steppes...
... and in *Nothofagus antarctica* forests.
Livestock type and grazing intensity affect composition and abundance of vascular plants and above-ground beetles. Are communities homogenized by those factors in Tierra del Fuego?
The aim of this work was to analyse the impact of different livestock grazing intensities on vascular plant and beetle communities of natural grasslands and *Nothofagus antarctica* forests in Tierra del Fuego, Argentina, and to evaluate also the differential effect of sheep and cattle.
- 12 *N. antarctica* forests and 18 grasslands (500 to aprox. 2,000 ha each)
- established fences to evaluate two grazing intensities (high and low), controlled by feces counting
- two livestock types (sheep and cattle)

- soil characterized by moisture content and penetration resistance
- vegetation characterized by composition and cover
- beetles characterized by richness and abundance with pit-fall traps

- univariate (ANOVAs) and multivariate (DCA & MRPP) statistical analyses
> moisture and < penetration resistance in grasslands vs. forests.
> moisture and < penetration resistance with cattle vs. sheep.
NS differences between grazing intensities.

RESULTS AND DISCUSSION

NS differences for plant richness between ecosystems, livestock types or grazing intensities.

48 sp in forests
71 sp in grasslands
29% commons to both

NS differences for dicot cover, but more native in grasslands and low grazing intensity, and more exotic in forests and high grazing intensity.

Native monocot cover >> in grasslands, while exotic > in forests.
NS differences in native monocots among grazing intensities, but > exotic monocot cover in high vs. low grazing intensity.
Plant community assemblages mainly differed between forests and grasslands. Livestock type and grazing intensity did not greatly change assemblages.
RESULTS AND DISCUSSION

Cystopteris fragilis
Osmorhiza depauperata
Berberis buxifolia
Poa pratensis
Carex magellanica
Primula magellanica
Osmorhiza chilensis
Cotula scariosa
Hordeum commosum
Capsella bursa-pastoris
RESULTS AND DISCUSSION

<table>
<thead>
<tr>
<th>Family</th>
<th>Beetle sp.</th>
</tr>
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<tbody>
<tr>
<td>Brenthidae</td>
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<tr>
<td>Carabidae</td>
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<tr>
<td>Chrysomelidae</td>
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<tr>
<td>Coccinellidae</td>
<td>1</td>
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<tr>
<td>Curculionidae</td>
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<td>Erotylidae</td>
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<td>Perimylopidae</td>
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<td>Ptiliidae</td>
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<tr>
<td>Scaphidiidae</td>
<td>1</td>
</tr>
<tr>
<td>Scarabaeidae</td>
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</tr>
<tr>
<td>Scolytidae</td>
<td>1</td>
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<tr>
<td>Staphylinidae</td>
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<td>Tenebrionidae</td>
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<tr>
<td>Undetermined</td>
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<td><strong>Total</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>

29 sp in forests
41 sp in grasslands
30% commons to both

NS differences in beetle richness and abundance between ecosystems.
NS differences between livestock types and grazing intensities.
Under high grazing intensity, > richness and >> abundance with sheep vs. cattle.
Under low grazing intensity, NS differences between livestock type.
NS differences in richness between grazing intensities for both livestock type, neither in abundance for cattle.
>> abundance in high vs. low grazing intensity for sheep.
RESULTS AND DISCUSSION

Beetle community assemblages also mainly differed between forests and grasslands. Livestock type and grazing intensity did not greatly change assemblages.
RESULTS AND DISCUSSION

Cylydrorhinus fulvipes

Barypus clivinoides

Pycnochila fallaciosa

Metius sp.

Cylydrorhinus laterallis

Sericoides livida

Curculionidae

Trechisibus antarcticus

Staphylinidae

Puranius nigrinus

Hydromedion anomocerum
**Conclusions:**
- Livestock type and grazing intensity did not greatly affect plant community structure, although high grazing intensity allowed establishment and growth of exotic plants.

- Beetle communities were more sensitive to livestock type and grazing intensity than plants, increasing richness and abundance under sheep and high grazing intensity, due to species entry from associated environments, and/or increase in the abundance of some species.

- These studies allow the design of conservation strategies for silvopastoral management, and improve the knowledge of austral ecosystems.
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