

Does High Impact Grazing and Trampling Affect Rangelands Floristic Composition?

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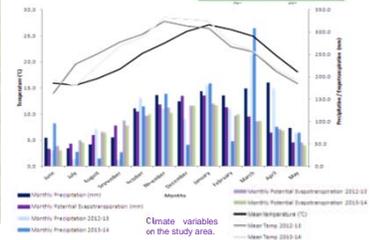
Background

In Northern Argentina traditional management of extensive grazing system, result in large accumulation of dead material (DM). Short duration grazing-trampling, the "herd effect", have been suggested as being able to increase productivity while maintaining or improving floristic composition (FC).

✓ The objectives of this study were to examine the changes on FC of the North-western Corrientes tall grasslands, after intensive grazing-trampling experiment.

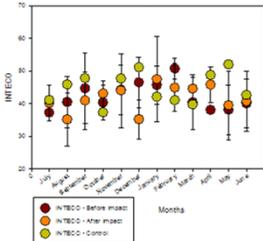


Plot in July 2012, before Winter high impact treatment (1), and the same plot one year after treatment (2). Plot in December 2012, before Summer high impact treatment (3), and the same plot one year after treatment (4).

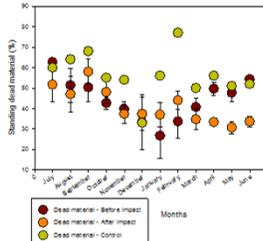


Results and discussions

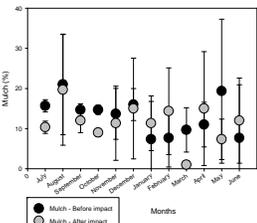
- Herd effect produced:
 - No significant effect on INTECO (1).
 - No significant changes on the proportion of BS (2).



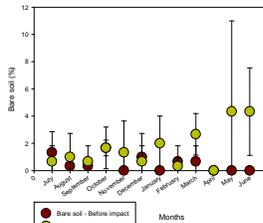
1. INTECO, before and one year after treatment.



2. Standing dead material, before and one year after treatment.



3. Soil mulch, before and one year after treatment

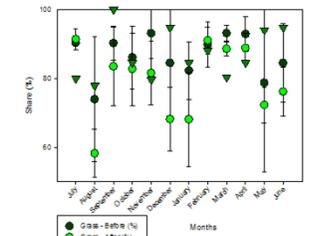


4. Bare soil, before and one year after treatment.

Conclusions

- High trampling management emerges as an alternative option to reduce SDM which does not significantly affect FC.
- Grasslands were resilient to the high impact, most of the effects are no longer evident one year after the treatment.
- For lasting effects (1 year) on SDM, we recommend to apply the treatment in Autumn before the resting period, or in early Winter.
- As expected, NDVI is not a good predictor of floristic composition.

- Mulch (M) did not significantly change. The exception was the October impact (3) with $p = 0.0034$.
- The herd effect had a lasting effect on SDM (4), applied in April ($p = 0.001$), June ($p = 0.01$) and May ($p = 0.004$).
- There was no significant effect of the treatment on grass proportion (5).
- INTECO and NDVI were not significantly related.
- Due to the high data variation, probably both, study and sampling size, need to be increased in future to assure statistical validity.
- Results should be taken with care because the DWRM does not include minor species. Further and deeper studies are needed for a better understanding of grassland resilience.



5. Grass proportion, before and one year after treatment.

Notes on materials and methods



Experiment layout. The arrows indicate the herd effect sequence. The color ramp indicates, blue for Winter; pink for Spring; orange for Summer, and green for Autumn.

*Data not collected due to broken radiometer.



At the INTA Corrientes experimental station we designed a three times replicated, 24 ha grazing experiment. There, in each month of the year a different area was subjected to three days high impact grazing of 150 cattle ha⁻¹ day⁻¹ (1). By the herd effect, grassland biomass was either consumed by cows or incorporated to the soil (2). FC was recorded monthly, prior to, and one year after the treatment by the dry weight rank method (DWRM), and with those data the trend and cover index (INTECO) was calculated. INTECO is widely used in Argentina to evaluate range condition and vegetation trends. Its calculation considers not only the biomass, but also the livestock preference for each species. Therefore the above ground biomass (AGB) was gathered by clipping five 0.25 m² quadrates in each replicate. AGB was hand separated in four groups, grass (G), grasslike (GL), legumes (L), standing dead material (SDM) and other species (O), weighed and oven dried at 60°C until constant weight (2). Mulch and bare soil were visually estimated. SR was measured with a field radiometer (3) and normalized difference vegetation index (NDVI) was calculated. All data was statistically analyzed with Infostat® through two tailed paired t-tests.