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Remote sensing to detect deterioration of Flooding Pampa rangeland by the use of glyphosate

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Key words : temperate grasslands, photosynthetically active radiation absorbed, seasonal variation

Introduction A technique based on spraying glyphosate to Flooding Pampa's rangelands in late summer has been widespread during the last decade. This technique eliminates green vegetation growing in late summer with the aim of improve germination and establishment of cool season (C₃) annual grasses, which, in turn, increases winter forage offer and allows increment of meat production. We postulate that this technique would negatively affect plants that vegetate in summer, causing changes in the seasonal pattern of above-ground net primary production (ANPP). Considering that ANPP of Flooding Pampa's grasslands can be accurately estimated using the spectral information provided by remote sensing (Piñeiro et al., 2006, Grigera et al., 2007), we used the amount of photosynthetically active radiation absorbed (APAR) by the capopy to compare the seasonal pattern of the APAR of non-treated vs. glyphosate-treated rangelands.

Materials and methods We used data provided by a geographic information system (GIS) built and maintained by the LART (Laboratorio de Análisis Regional y Teledetección, Faculty of Agronomy IFEVA, UBA/CONICET). The spectral information was provided by the MODIS and consisted of gridded-16 days composite images at a spatial resolution of 250 m². We selected 7 paddocks of native rangeland (never treated with glyphosate) and 8 paddocks that have been treated with glyphosate in late summer from 1 to 5 years consecutively. Monthly, from June 2003 to June 2005, we calculated APAR as the product of PAR obtained from the nearest weather station and fPAR derived from MODIS NDVI for each paddock. We compared monthly APAR among non-treated vs. glyphosate-treated paddocks during two consecutive periods (June 2003-May 2004 and June 2004-May 2005). Kruskal-Wallis test by ranks was used ($p < 0.05$).

Results and discussion APAR of glyphosate-treated paddocks during the warmest months was significantly lower than that of the non-treated paddocks in the first (Figure 1a) and in the second (Figure 1b) period. APAR of glyphosate-treated paddocks during the whole warm season (from November to March) was lower than that of the non-treated paddocks in both periods (558 vs 826 MJ/m² · 150 days in the first and 605 vs 876 MJ/m² · 150 days in the second period), which may be a consequence of the increment of dead material of cool-season grasses and the reduction of warm-season species population.

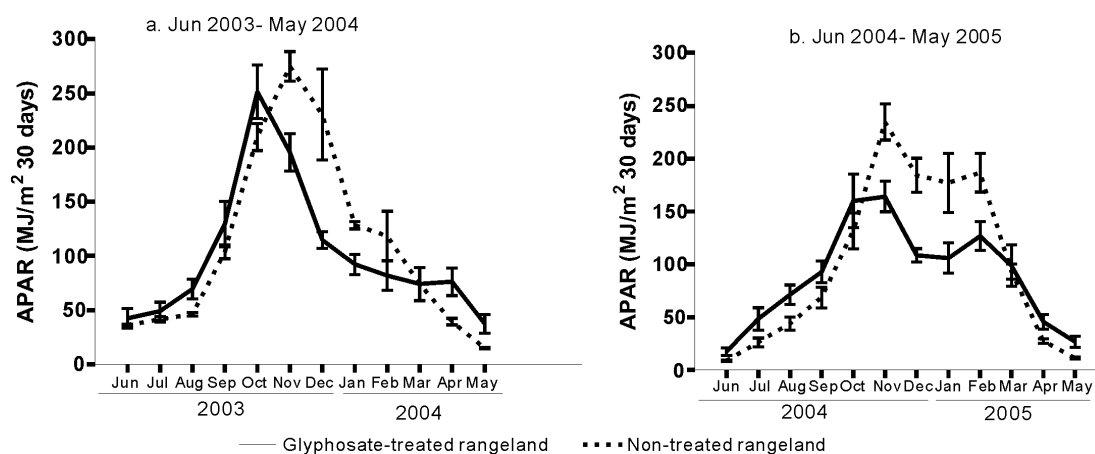


Figure 1 Amount of photosynthetically active radiation absorbed (APAR) by the capopy of glyphosate-treated and no-treated paddocks in the first (a) and in the second (b) period.

Conclusions The reduction of the APAR during the warm season as a consequence of spraying glyphosate annually in late summer suggest a deterioration process related to the lost of warm season species and the reduction of biodiversity.

References

- Grigera, G., Oesterheld, M. & Paón, F. 2007. Monitoring forage production for farmers' decision making. *Agricultural Systems* 94: 637-648.
- Piñeiro, G., Oesterheld, M. & Paruelo J.M. 2006. Seasonal Variation in Aboveground Production and Radiation-use Efficiency of Temperate rangelands Estimated through Remote Sensing. *Ecosystems* 9: 357-373.