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Changes on floristic composition of Flooding Pampa rangeland by the use of glyphosate

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Introduction To increase winter forage production of native rangelands of Flooding Pampa, a technique based on spraying glyphosate herbicide in late summer has been widespread during the last decade in this region. Glyphosate application eliminates green vegetation growing in late summer, improving germination and establishment of cool season (C_3) annual grasses, that enhances winter forage and meat production. We postulate that this technique would negatively affect plants that vegetate during summer, such as perennial grasses and legumes, decreasing floristic diversity and deteriorating the rangeland.

Materials and methods In a commercial farm located in the Flooding Pampa region, we selected 13 paddocks dominated by native rangeland (30-120 ha each) and used them for cow-calves operation. Five paddocks have never been treated with glyphosate and other 8 paddocks have been treated with glyphosate in late summer from the last 5 years consecutively. In spring (October-November 2006) and summer (January-February 2007), plant basal cover and species composition were estimated using the step-point method along five 10-m-long transects (200 points per transect) randomly placed in each paddock. Plant species were gathered in functional groups (Jacobo et al., 2006). Kruskal-Wallis test by ranks was used.

Results Basal cover of C_3 annual grasses in glyphosate-treated paddocks was significantly higher than that of non-treated ones (Figure 1(a) and 1(b)), showing the effectiveness of glyphosate application to enhance winter forage offer. Nevertheless, glyphosate-treated paddocks achieved lower basal cover of C_3 perennial grasses and warm season legumes in spring and summer (Figure 1(a) and 1(b)), which may be consequence of the deleterious effect of this systemic herbicide in late summer over these functional groups, which are growing actively. Basal cover of C_4 creeping grasses was higher in glyphosate-treated paddocks in summer (Figure 1(b)), consistently with the higher tolerance of *Cynodon dactylon*, the main species of this functional group, to this herbicide. Species richness was significantly lower in glyphosate-treated paddocks respect to non-treated ones (6.8 vs. 12, $p < 0.01$), suggesting the reduction of vegetation diversity.

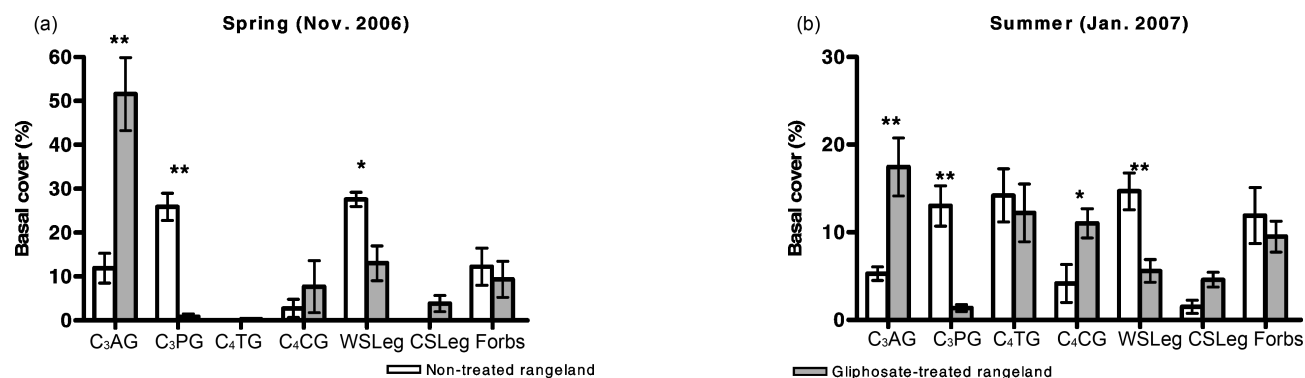


Figure 1 Basal cover (%) of functional groups growing in spring (a) and summer (b). Functional groups: C_3 AG: C_3 annual grasses; C_3 PG: C_3 perennial grasses; C_4 TG: C_4 tussock grasses; C_4 CG: C_4 creeping grasses; WSLeg: warm season legumes; CSLeg: cool season legumes and Forbs. ** $p < 0.01$ * $p < 0.05$.

Conclusions The technique of spraying glyphosate in late summer in native rangelands of Flooding Pampa reduces basal cover of functional groups of great forage value and species richness, deteriorating this resource.

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Jacobo E., Rodríguez A., Bartoloni N., Derigibus V.A., (2006). Rotational grazing effects on rangeland vegetation at a farm scale. *Rangeland Ecology and Management*, 59, 249-257.