



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Controls of Seeding Recruitment of Annual Species in Temperate Perennial Pastures

P. Cornaglia

Universidad de Buenos Aires, Argentina

M. P. Clavijo

Universidad de Buenos Aires, Argentina

H. Harkes

Universidad de Buenos Aires, Argentina

Ayala Torales

Universidad de Buenos Aires, Argentina

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/1-2/21>

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Controls of seedling recruitment of annual species in temperate perennial pastures

P. Cornaglia, M.P. Clavijo, H. Harkes and A. Ayala Torales

Cátedra de Forrajicultura. Facultad de Agronomía. Universidad de Buenos Aires. Argentina. E-mail: cornagli@agro.uba.ar

Key words : emergence, dormancy, brome grass, red clover, production stability

Introduction Temperate pastures are characterized by low growth rates during the winter. The incorporation of annual species in the mixture gives the opportunity to balance the distribution of the forage allowance through the year. However, successful seedling recruitment every year depends upon the environmental conditions which: (1) allows the reproduction of the mother plant at the end of the growing season (Forcella, 2000) and (2) breaks the dormancy of the seeds (Benech et al., 2000). The objective of this work was to evaluate the patterns of seedling recruitment of two annual species, brome grass (*Bromus catharticus*) and red clover (*Trifolium pratense*), under different environmental conditions.

Materials and methods We registered the emergence of brome grass and red clover seedlings in two temperate pastures during 2005-2006 in a dairy farm located at General Las Heras, Buenos Aires province, Argentina (34°59'S; 58°50'W). The grazing regime was low intensity and high frequency. Density of emerged seedlings of the two species (seedlings/m²) was estimated by the frequency grid method from Vogel and Masters (2001). We also registered the distribution of rainfall and the air temperatures during the period of evaluation. We analyzed the results through the repeated measures method (Manova).

Results and discussion Seedling recruitment of brome grass occurred since April to June in both years (80%-90%) [Figure 1(a)]. However, the total density of seedlings recruited differed between years: it was significantly higher in 2005 compared with 2006 ($p < 0.001$). We propose two possible explanations: the first is associated with moisture requirements of postmaturity in brome grass. Whereas seeds postmatured under drought conditions, can emerge under a dense canopy, seeds postmatured under high moisture conditions need lighted gaps for successful emergence (Mollard et al., 2007). Differences between rainfall in summer 2005 (regular) and summer 2006 (+50%) could make the differences about this subject. The second is associated with rainfall during the fall, necessary for emergence after the dormancy break. Again, both years differ by 50% in fall rainfall. Seedling recruitment of red clover was less than that of brome grass but it occurred along the whole year, and it was less significant in 2006 than in 2005 ($p < 0.001$) [Figure 1(b)]. Legumes produce hard seeds and the hardness loss is regulated by temperature whereas the survival of the seedlings is influenced by moisture conditions (Frame et al., 1998).

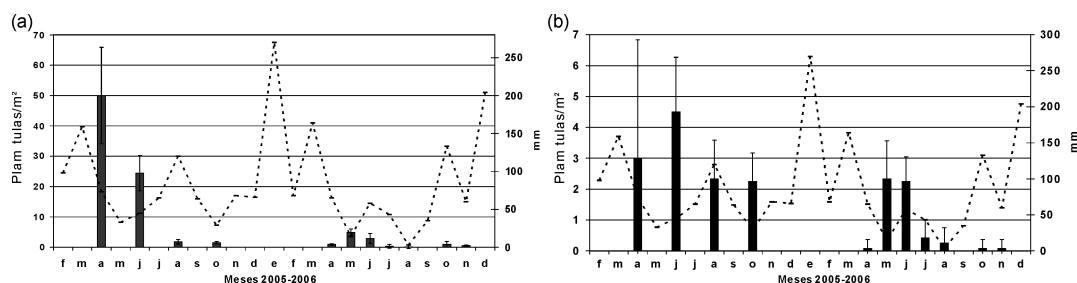


Figure 1 Seedling density of (a) brome grass and (b) red clover (seedling/m²). Vertical lines show standard deviation. Dotted lines show monthly rainfall.

Conclusion Brome grass and red clover showed different patterns of seedling recruitment. The main factor that explained the trend of seedling recruitment observed in brome grass was the occurrence of rainfall previous and during the period of emergence. Red clover didn't show a specific pattern. Knowledge of these factors is required for defining strategies that guarantee the stability of forage production during the useful life of the pasture.

References

- Benech, R., Sánchez, R., Forcella, F., Kruk, B. and Ghersa, C., (2000). Environmental control of dormancy in weed soil seed banks. *Field Crops Research* 67, 123-129.
- Frame, J., Chalton, J. and Laidlaw, A., (1998). Temperate Forage Legumes. Wallingford: CAB International.
- Forcella, F., Benech, R., Sánchez, R. and Ghersa, C., (2000). Modeling seedling emergence. *Field Crops Research* 67, 123-129.
- Mollard, F., Insausti, P. and Sánchez, R., (2007). Flooding induces secondary dormancy in *Setaria parviflora* seeds. *Seed Science Res.* 17, 55-62.
- Vogel, K., Masters, R., 2001. Frequency grid—a simple tool for measuring grassland establishment. *J. Range Manage.* 54, 653-655.