Pattern of Hard Seed Breakdown in Some Annual Self-Reseeding Legumes under Mediterranean Field Conditions

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The 22nd International Grassland Congress (Revitalising Grasslands to Sustain Our Communities) took place in Sydney, Australia from September 15 through September 19, 2013.

Proceedings Editors: David L. Michalk, Geoffrey D. Millar, Warwick B. Badgery, and Kim M. Broadfoot

Publisher: New South Wales Department of Primary Industry, Kite St., Orange New South Wales, Australia

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Keywords: Seed softening, hardseedness, pasture persistence.

Introduction

In the last decade a new generation of annual pasture legumes was released and introduced in the seed market for the Australian ley systems. In Sardinia (Italy), despite good agronomic performances in the first year, several of these new varieties showed low autumn re-establishment, reducing their competitiveness against native species and depressing any attempt for a long term pasture improvement (Porqueddu *et al*. 2010). Hardseedness may influence legume persistence. A study on the pattern of hard seed breakdown on some self-reseeding annual pasture legumes was carried out.

Materials and methods

Thirteen accessions of annual pasture legumes were compared (Fig. 1). Samples of mature pods from Surigheddu site (North Sardinia, 40°35'38.21'N – 8°22'49.21'E, average annual rainfall of 540 mm) were collected in early June 2010 and 2011 after senescence. To estimate total hard seed and the rate of seed softening, 100 seeds for each accession were placed in fine mesh envelopes. Three replicate strips for each accession were buried in the same site 1 cm deep in mid June 2010 and June 2011. The first samples were tested for hard seed on 30th July, 30th August and 30th September 2010, 2011 and 2012; for seeds removed in 2011, on 30th July, 30th August and 30th September 2011 and 2012. The seeds were then placed directly onto moist filter paper in Petri dishes at 20°C for 20 days. Germinated and hard seeds were counted at each date.

Results and discussion

The initial hard seed in July was high for all accessions in both years, except for *Ornithopus sativus* (Fig.1 and 2). Significant differences among accessions were observed in the progress of softening during summer period. By the end of summer in the year after ripening, *Trifolium brachycalycinum* Antas, *T. mutabilis*, and *O. compressus* Pabarile strongly reduced the hard seed level. The same trend was recorded in the two accessions of *T. hirtum*, but only in the first year. At this time, 60% of *Lotus ornithopodioides A* and 70% of the three accessions of *T. spumosum* seed remained hard. *T. spumosum* showed higher between-season dormancy with significant variation between accessions.

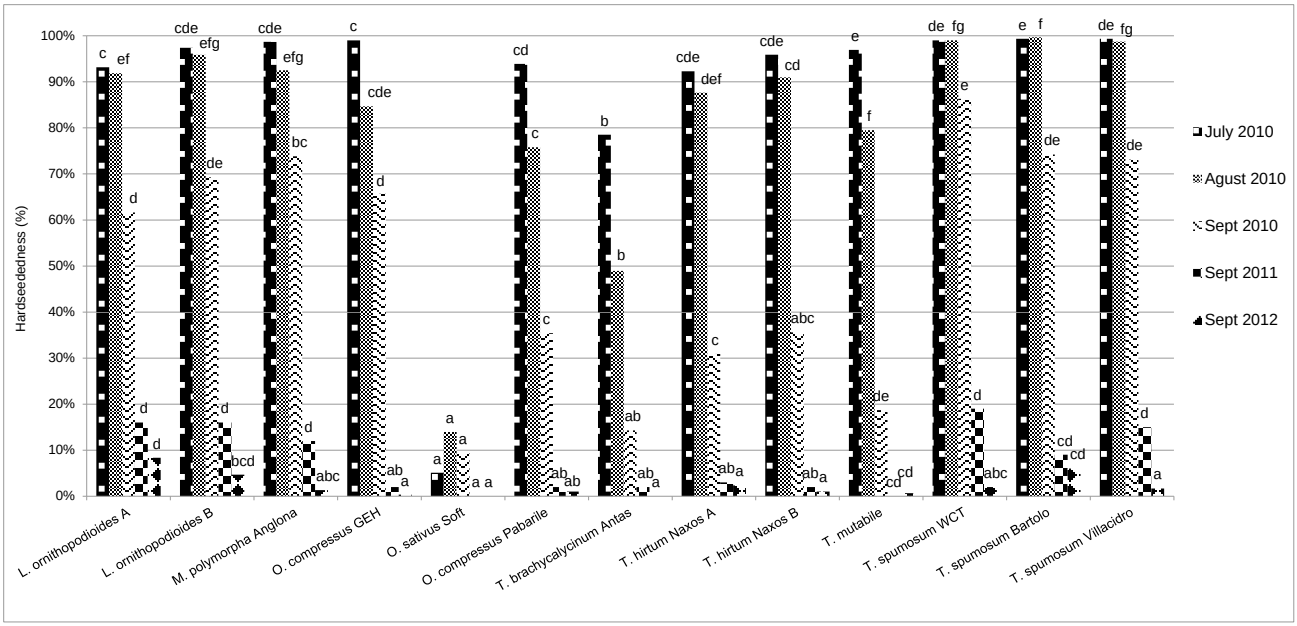

Figure 1. Residual hard seed (%) from mature pods collected in 2010 ($P \leq 0.05$).

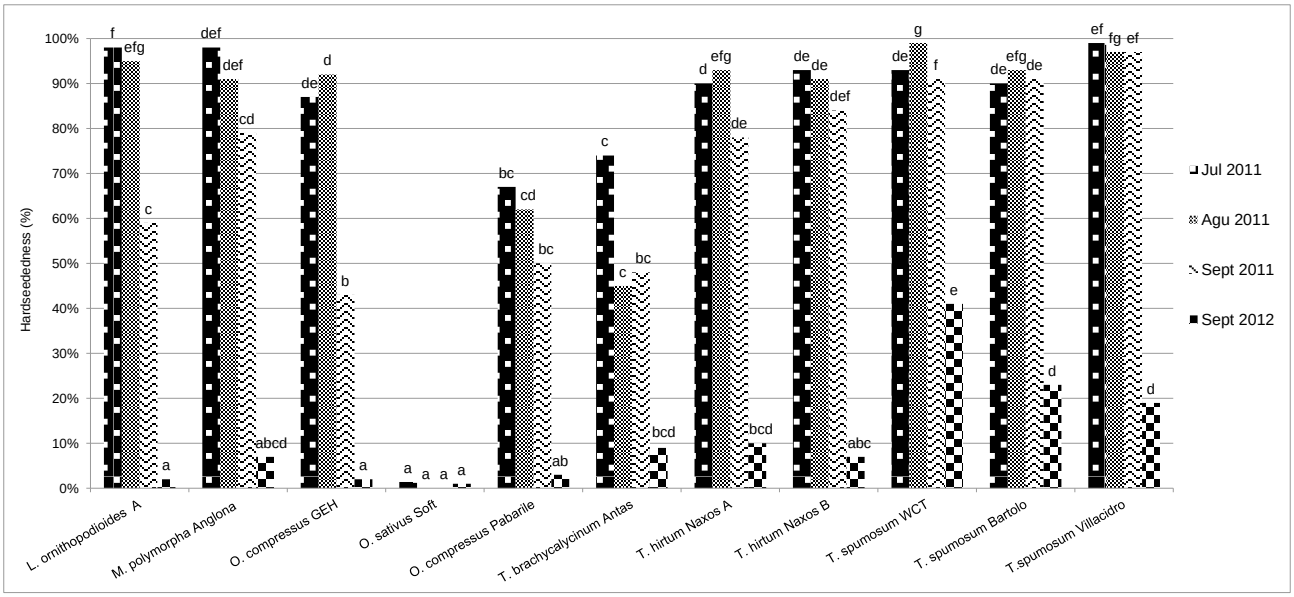

Figure 2. Residual hard seed (%) from mature pods collected in 2011($P \leq 0.05$).

Conclusions

Most accessions showed higher hard seeds at the end of the first summer compared to subterranean clover. The existence of a high variability in hardseededness among the tested species is a favourable trait. Accessions with high hard seed level may be combined into mixtures with different softening pattern for reducing inter- and intra-annual fluctuations of a legume-based permanent pasture.

Acknowledgements

The authors wish to acknowledge Mr Daniele Dettori, Mr Daniele Nieddu and Mr Piero Saba for their technical help.

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