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FarmLink Research Report 2015

The value of hardseeded legume for forage and for competition with annual ryegrass

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Project Partners



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Trial Site Location Temora Agricultural Innovation Centre

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Introduction

This project is a component of two other projects, B.PSP.0013 Pasture legumes in the mixed farming zone of WA and NSW: shifting the baseline (funded by MLA and AWI) and B.AHE.0236 Understanding photosensitisation in livestock grazing the pasture legume *Biserrula pelecinus* (funded by MLA). In this component of the project, two mixed pastures (biserrula/subterranean clover and bladder/gland clover) have been sown and are being compared to subterranean clover sown for their ability to support livestock production and also to compete with the important cropping weed, annual ryegrass.

Reasonable seed-set of sown species has been achieved on all treatments and assessment of livestock production and sown pasture-weed competition will continue throughout 2016.

Background

The integration of hardseeded legumes such as biserrula, bladder clover and gland clover has been underway in southern NSW since the mid 2000's. These legumes have been found to perform well in comparison to traditional legumes such as subterranean clover, particularly in years with average and below average rainfall. Development of rotation systems using these legumes as 'on-demand' breaks in the crop rotation has also been undertaken since 2012 with much success.

Our focus with hardseeded legumes has more recently moved towards quantifying livestock production on these legumes. Additionally, as a result of differences in palatability between the species there is capacity to use livestock to strategically reduce the population of problem weeds such as annual ryegrass during the pasture phase of the crop-pasture rotation. So far, hardseeded legumes used in an 'on-demand' capacity in the rotation are used as monocultures. Many producers cite ease of management, particularly with regard to herbicide selection as a key reason for using these species as monocultures. However, from an animal production perspective, monocultures rarely provide an optimally balanced diet with respect to energy-protein balance and exclusive use of a legume-based diet can result in metabolic disorders such as bloat. Additionally, biserrula, while extremely productive, when used as a monoculture, can cause issue with primary photosensitisation in non-pigmented grazing livestock.

Given these issues, we have designed this study to examine the use of mixed legume swards which incorporate a mix of hardseeded legumes or hardseeded legumes sown with traditional legumes. Our aim over the lifetime of the study is to quantify the effect of mixed legume swards on livestock productivity and health as well as the balance between sown species and weeds.

Treatments

In late May 2015, the following treatments were sown in a replicated trial (n=3), with each plot 0.4 ha in area:

- Biserrula (cv. Casbah) plus subterranean clover (cv. Dalkeith)
- Bladder clover (cv. Bartolo) plus gland clover (cv. Prima)
- Subterranean clover (cv. Dalkeith)

Results

Owing to dry conditions in early-mid spring, growth on all plots was slow and the decision was made to allow plants to set seed prior to any grazing occurring. All legumes appeared to have senesced and set seed by early November. Interestingly, following rainfall in November, biserrula initiated a further round of pod & seed production (Figure 1).



Figure 1: Biserrula showing seed pods produced in early spring (brown pods) and second round of flowering and pod production following rainfall in November. Middle and bottom photo shows bladder/gland clover and subterranean clover plots taken on same day

Seed production varied significantly between the species sown (Table 1) with biserrula producing significantly more seed cumulatively (>5900 seeds/m²) compared to other species. Subterranean clover seed production was lowest of all species.

	Early spring seed set		Late spring summer seed set	
	Species 1	Species 2	Species 1	Species 2
Treatment 1 Biserrula/subclover	2715	189	3258	0
Treatment 2 Bladder/gland	760	2046	0	0
Subclover	250		0	

Table 1 Seed production (seeds/m²) produced by in the biserrula/subterranean clover, bladder/gland clover and subterranean clover only treatments at Temora, NSW in 2015.

Grazing was undertaken for two weeks in late November. This grazing period was too short to allow assessment of livestock production on any of the species and in any case, feed availability, particularly on the subterranean clover only treatments was not adequate to assess livestock performance on this species. Monitoring of annual ryegrass seedhead number was undertaken over the grazing period and this showed greater removal of initial population of ryegrass seedheads (78% removal) on biserrula over the two week grazing period compared to bladder/gland clover treatments (47% removal).

Discussion

Results from the initial establishment season have again confirmed the ability of hardseeded legumes to grow and set seed under adverse seasonal conditions. The value of indeterminate pattern of growth in facilitating additional seed set was also shown with biserrula where following late spring rain, an additional round of seed set resulted in a more than doubling of overall seed production. Bladder, with a slightly deeper root system, and gland clover which is early maturing also showed better capacity to produce seed in challenging conditions compared to subterranean clover. With production of a seedbank critical for pasture performance in subsequent years, the performance of hardseeded legumes was very encouraging. Additionally, the role of biserrula as tool in grazing-assisted removal of annual ryegrass offers potential to integrate with other tactical control measures to lessen the impact of this weed on cropping systems