

Forage Legume Establishment from the Soil Seed Bank

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Summary

Rotating wheat (*Triticum* spp.) with fallow cannot be sustained profitably without government price supports in the Great Plains of North America. Replacing fallow with legume pasture enhanced wheat production both biologically and economically in Australia. An important characteristic of the legume pasture species used in Australian ley farming is the ability to regenerate naturally from seed produced during previous pasture periods following the wheat phase. Our objective was to identify forage legume species capable of regenerating from the soil seed bank in western North Dakota, USA. Ten different legume species were established at one location in 1999, 30 species at a second location in 2000, and 29 species at a third location in 2001. Legume seedlings were counted during the spring following the year of establishment. More than 200 seedlings m⁻² were counted in plots of balansa clover (*Trifolium michelianum* Savi), berseem clover (*T. alexandrinum* L.), birdsfoot trefoil (*Lotus corniculatus* L.), black medic (*Medicago lupulina* L.), burr medic (*M. polymorpha* L.), crimson clover (*T. incarnatum* L.), Persian clover (*T. resupinatum* L.), and red clover (*T. pratense* L.) during at least one location-year. Forage dry matter (DM) production ranged from around 2 to almost 5 Mg ha⁻¹ for birdsfoot trefoil and red clover depending on the location-year, and was similar to forage DM production by alfalfa (*Medicago sativa* L. subsp. *sativa* var. *sativa*) that persisted in the second year following establishment ($P > 0.05$). Crude protein (CP), acid detergent fiber (ADF) and neutral detergent fiber (NDF) concentrations suggested that forage quality was equal or superior for birdsfoot trefoil compared with alfalfa and red clover. Our results suggest that birdsfoot trefoil may have the greatest near-term potential as a self-seeding pasture species in a wheat-pasture system patterned after Australian ley farming in the Great Plains.

This paper has been submitted for publication in a scientific journal and will be summarized in future press releases.