ASPECTS THAT LIMIT THE SURVIVAL OF LEGUME SEEDLINGS

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SUMMARY

Low rates of early seedling survival can be major limitations to the successful introduction of legumes, particularly following aerial oversowing of seed in hill and high country environments. Factors restricting seedling survival include competition from existing vegetation, nodulation failure and slow onset of symbiotic N₂ fixation.

In humid and subhumid environments, techniques have been developed to increase legume establishment by controlling the competition from existing vegetation. This involves hard grazing prior to oversowing, herbicide application to suppress or kill vegetation, use of stock trampling to disturb soil and vegetation, and managed grazing after oversowing. In soils devoid of rhizobia, nodulation failures can limit seedling establishment unless inoculation and pelleting techniques ensure high populations of rhizobia on the seed at sowing. However, low levels of available soil-N may limit seedling growth and survival in legume species with slow onset of symbiotic N₂ fixation.

Major limitations to seeding establishment still occur in semiarid environments and further research is required to develop reliable and cost-effective establishment techniques.

INTRODUCTION

The importance of inoculation, fertilizer and grazing management in establishing oversown legumes into existing swards on New Zealand hill and high country has been long known (Sewell, 1950; Suckling, 1954). However, establishment is often poor (Cullen and Ludecke, 1967; Charlton, 1977; Lowther, 1983) and in semiarid environments may be so low as to prevent the introduction of more productive legume species (Musgrave and Lowther, 1976). This paper discusses some recent New Zealand research into methods of improving the survival and persistence of establishing legume seedlings with emphasis on hill and high country environments where aerial oversowing of seed onto the soil surface is often the only practical and/or economical method of sowing.

EFFECT OF GRAZING MANAGEMENT AND HERBICIDES

On unplowable hill country, aerial oversowing is the only practical means of introducing new legume species or