Emergence and early growth of Lotononis bainesii

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Lotononis bainesii is a tropical legume that persists under heavy grazing and tolerates frost (1). It is readily established on light-textured soils in the 700-800 mm rainfall zone of south-east Queensland, but is difficult to establish on cracking clay soils in the same environment. Pot experiments were carried out to compare the emergence and early growth of Lotononis with other legumes, which are more readily established on cracking clay soils.

Methods

In experiment 1, the effect of watering regime (watered daily, every 5 days, and at sowing only) and sowing depth (2, 10, 20, 40 mm) on emergence of Lotononis bainesii cv. Miles, Macroptilium atropurpureum cv. Siratro, Rhynchosia minima CPI 32963 and Stylosanthes hamata CPI 75171 were compared. Twenty-five seeds of CPI 32963 and Siratro, 100 seeds of CPI 75171 and 200 seeds of CPI 32963 and Siratro, 100 seeds of CPI 75171 and 200 seeds of Lotononis were sown in 15x15 cm pots containing cracking clay soil (Ug 5.16). Pots were arranged as a split plot, with watering regimes as whole plots, with three replicates. Emerged seedlings were counted at 7, 14 and 21 days and expressed as a percentage of viable seed. In experiment 2, the first six weeks growth of Lotononis, Siratro, CPI 32963, CPI 75171, and Indigofera schimperi CPI 73608 were compared. Seeds were sown in 15x15 cm pots containing a mixture of clay, peat and sand (in the ratio 3:2:1) with three replicates. After seven days, plants were thinned to four plants per pot. Plants were harvested at 2, 4 and 6 weeks after sowing. Total dry weight, dry weight of tops and roots, root/top ratios and relative growth rates were determined.

Results and Discussion

Emergence from depth (experiment 1) appears to be related to seed size. The large seeded siratro (1000 seed weight 13.99 g) and Rhynchosia (6.77 g) produced seedlings capable of emerging equally well from all sowing depths. Emergence of stylo seedlings (1000 seed weight 2.46 g), declined with increasing sowing depth. Seedlings of the small-seeded Lotononis(0.20 g) did not emerge from a depth of greater than 10 mm. We conclude that Lotononis seed should be sown on or near a moist soil surface, particularly on clay soils. If sown on a dry soil surface the swelling properties of the clay, on wetting, may result in the seed being buried to a depth of greater than 10 mm.

There were no differences between species (experiment 2) for total dry weight at week 6. Lotononis and Indigofera compensated for their small seed size with high relative growth rates. However, siratro and Rhynchosia had the highest, and Lotononis the lowest, root/top ratio of the species tested. A large root system in a seedling is clearly an advantage in establishment, particularly in a rapidly drying soil.

Field studies are required to fully develop strategies for the establishment of Lotononis on clay soils.

1. Bryan, W.W. 1972. Aust. J. Exp. Agric. Anim. Husb. 12 396-9.