

Predicting annual medic emergence in the Murray Mallee of South Australia

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Past studies have shown the poor pasture legume status of cereal farms in the Central District of South Australia, as indicated by the level of total seed reserves in the top 5 cm of soil (1). More recently, the importance of measuring the readily-germinable (soft) seed reserve as a guide to farmers who must decide whether to sow additional legume seed into stubble paddocks has been emphasized (2, 3). This paper describes the status of medics in the Murray Mallee and the value of predicting emergence in stubble paddocks prior to the break of season, enabling the guesswork to be taken out of decisions on whether and where to sow additional medic seed.

Methods

The potential medic emergence of 18 paddocks (180 sampling sites) in the Murray Mallee region of South Australia was assessed during 1-16 April 1992 using two Methods as follows:

1. Germination/emergence of annual medics *in situ* in stubble paddocks following application of water to steel infiltrometer rings of c.285mm diameter.
2. Germination/emergence of annual medics from soil core samples (100mm diam. x 50mm deep) collected in the field and transported to the Waite Institute for watering in pots.

In the first method, five litres of water was added to each of the steel cylinders after these had been driven c. 50 mm into the soil. The cylinders were covered with white polypropylene sacks (pegged in position) to minimise water loss by evaporation and to prevent interference by grazing animals. Additional waterings of two litres were made every second day until complete emergence of medic seedlings was achieved (usually 7-10 days).

The second method involved the extraction of four adjacent (N,S,E,W) soil cores (100mm diameter x 50mm deep), taken as close as practicable to the perimeter of the cylinder. Half of these core samples were placed in containers at the Waite Institute and watered to field capacity to ensure the germination of seed and emergence of seedlings from soft seed. As a further test, the remaining soil cores were sieved to determine the total seed reserve in the top 50mm of soil.

Results and discussion

Total medic seed reserves ranged from near 0 to 153 kg/ha, emergence following ring watering from 29 to 1102 plants/m², and natural emergence following opening rains on 6-8 April from 1 to 809 plants/m². Clearly several paddocks had very poor medic seed reserves, as defined earlier (1). The regressions (Table 1) confirm the ring watering technique as one giving an easy, reliable and cheap estimate of potential medic emergence, which can be of significant value when on-farm decisions are being made regarding pasture legume sowings (2, 3).

Table 1. Regression equations showing interrelations of seed reserves (SR), pot emergence (PE), ring emergence after watering (RE) and natural regeneration (NR) of annual legumes.

NR Plants/m ²	Y = 0.634x + 5.67	(r ₂ ² = 0.72***)	x = RE
NR Plants/m ²	Y = 0.432x + 21.25	(r ₂ ² = 0.46**)	x = PE
SR (kg/ha)	Y = 0.140x + 13.95	(r ₂ ² = 0.64***)	x = RE
NR Plants/m ²	Y = 3.50x + 24.24	(r ₂ ² = 0.64***)	x = SR

P < 0.01; * P < 0.001

References

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