

Seed yield of annual pasture legume - Rhizobium symbioses

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The pH of the surface layers of the red gradational and texture contrast soils of central western New South Wales vary from moderately acid to neutral. Recent work in Western Australia (1) has demonstrated the tolerance to moderately acid soils of some strains of *Rhizobium meliloti* and a greater ability of *Medicago polymorpha* and *M.murex* to nodulate in such soils. This study aimed to compare the seed yield of these and other annual pasture legumes when nodulated with various strains of *Rhizobium* spp in the Condobolin environment.

Methods

Seed of eight varieties (main plots) of annual pasture legumes was inoculated with various strains of *Rhizobium* spp. (sub plots) (Table 1) and sown (10 kg/ha) into 5m plots, with 1m bare buffers, which had been fertilized with 75kg/ha double superphosphate. The site pH was (0-7cm, Soil: H2O,1:5) 5.5-6.0

After sowing (3/8/84), 220mm rain fell during the following 14 weeks. Nodulation of roots was assessed to a depth of 20cm. Seed pods and burrs were harvested from ten, 0.04m quadrats/plot.

Results and Discussion

Paraggio yielded significantly ($P < 0.05$) more seed than all other medics and showed no response to inoculation whereas *M.murex* yielded least seed, but responded significantly ($P < 0.05$) to inoculation with WSM strains (Table 1). None of the remaining annual legumes tested responded significantly to inoculation. Modulation (not reported in detail here) was found to be poorest on the nil inoculum controls for all varieties and best on *M.murex* inoculated with WSM strains. The excellent seed yield of Paraggio indicates that it may be well adapted to this environment where the persistence of annual legumes is, in part, dependant upon the production of large seed reserves. The poor performance of *M.murex* did not appear to be due to poor nodulation, though it is possible that the late sowing time may have disadvantaged this species more than the others tested. These data indicate that *M.murex* may not be suited to the red soils of the Condobolin environment and that, in further work with this species, it should be inoculated with strain WSM419, which is now commercially available. Work is in progress to determine the place of this species in the annual medic - subterranean clover boundary area of central western New South Wales.

Table 1 Seed yield of inoculated annual pasture legumes

Annual legume variety	strain of inoculant					Variety Mean	Seed/pod** wt/wt %	
	control	Group	A/C	WSM397	WSM413			WSM419
<i>M. truncatula</i>	seed, g/m ² *							
Paraggio	79.1	72.4	78.0	74.6	67.5	86.3	76.3	30.4
Jemalong	53.4	75.3	73.8	53.7	55.1	53.7	60.8	27.8
<i>M. polymorpha</i>								
Circle Valley	42.2	65.3	46.9	60.0	61.4	47.3	53.9	38.3
<i>M. aculeata</i>								
SAD2356	51.7	58.6	60.1	62.6	55.6	59.0	57.9	24.4
<i>M.murex</i> CD50.3	6.8	6.9	10.8	9.4	10.7	9.7	9.0	19.1
<i>T. subterraneum</i>								
Nungarin	52.8	41.5					47.3	
Northam	35.0	41.3					38.3	
Seaton Park	32.5	28.8					30.8	

* Medics (except *M.murex*): variety l.s.d. (5%) = 13.2, strain x variety n.s. (l.s.d.(5%) = 20.4); *M.murex*: between WSM strain mean yield (10.0) and Group / or control l.s.d. (5%) = 2.8. *T.subterraneum* variety n.s (l.s.d. (5%) = 17.8), ** variety l.s.d. (5%) = 1.4%. Number of replications = 4.

1. Howieson, J.G. and Ewing M.A. (1986) Aust. J. Agric. Res. 37, 55-64.