7.3 GRANULAR LEGUME INOCULANTS (YALLA-Y-POORA VIC)

Researchers: David Pearce and Lesley Mutch
DPI (Rutherglen Centre)
Ph. 02 60 304500.

Location: SFS Yalla-Y-Poora Research site

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Rainfall (2005): 543 mm
GSR: (Apr – Nov) 359 mm

Summary:
The 2005 field trials have shown promising results in terms of an improved delivery system for legume inoculants. In all three legumes tested (peas, lupin, and faba beans), experimental (but non-commercial) granular inoculants performed as well as the traditional peat slurry carrier. This shows granular technology has a place in our inoculation strategies. Faba beans and lupins showed the greatest benefits of inoculation with almost double the yields of uninoculated (nil) treatments.
The introduction of these new products offer producers an opportunity to choose the type of delivery system which best suit their business and budget.

Background:
Landholders today are trying to streamline their operations to save time and money. The development of root nodule bacteria products that are easy to apply provides greater flexibility at sowing and encourages the adoption of annual inoculation. Two inoculant manufactures are currently developing granular inoculants to meet these objectives, although neither is yet commercially available in Victoria**. Those evaluated here from ALOSCA were non-refrigerated products designed for the Western Australian soils.** The advantages of granules over normal peat inoculants are that granules are less messy and time consuming than slurry inoculation, ALOSCA granules are not required to be refrigerated, with the bonus of having a extended shelf life.

Objectives:
Our aim was to test different manufacturers' products to see how granules preform against the traditional peat product in different soil types and climatic zones, and to find an optimal rate of product application for effective nodulation. This data will be used by manufacturers to assess the likely response of their products on legume performance.

Methodology:
Granular inoculants were sourced from the two granular manufacturers (Becker Underwood Pty Ltd and Bay Classic Pty Ltd (ALOSCA)) in Australia and stored according to their instructions with Becker Underwood Pty Ltd granules stored at 4°C on arrival and the ALOSCA product at room temperature (as it is sold in WA). Granules were applied at two rates of application (5 and 10kg/ha) and two sowing depths (Table 7-8).

A randomised block design was used with plot size of 21.3m^2.

All trials were sown with a cone seeder, with the granules sown through the cone together with the seed and superphosphate (120kg/ha of single super). The cone seeder was sterilised after each treatment to eliminate potential contamination of rhizobial treatments. Best practice weed and pest management was undertaken.

Plant sampling was undertaken twice during the growing season with a total of twenty plants taken per treatment.

Table 7-8: Treatment List

Trt	Seed/Fertiliser Trt
A 10	A granules sown @ 10kg/ha with seed
A 10 U	A granules sown @ 10kg/ha 2cm below seed
A 5	A granules sown @ 5kg/ha with seed
B 10	B granules sown @ 10kg/ha with seed
B 10 U	B granules sown @ 10kg/ha 2cm below seed
B 5	B granules sown @ 5kg/ha with seed

Treatment Manufacturer:
A= Alosca
B= Becker Underwood

Results and Discussion

Peat inoculation improved performance of all three legumes tested (Table 7-9, Table 7-10, Table 7-11) compared to nil inoculation. Experimental granules from the manufacturer, Becker Underwood Pty Ltd, which were refrigerated prior to use, also improved performance of all 3 legumes in terms of nodule number indicating this technology may be an effective alternative to peat inoculants in a similar comparison.

The best results for these granular inoculants were achieved on lupins and faba beans. Commercial granules from the manufacturer Bay Classic (ALOSCA), which are designed for acid sandy soils and which were not refrigerated, performed relatively poorly in our trials, and will require redesign and repeat evaluation for this environment.

Table 7-9: Field Pea (Kaspar)

Treatment	Nodule No.[23]	Nodule Score	Grain Yield (t/ha)
Control	0.86	0.36	2.39
Peat	2.92	2.44	2.80
Alosca	0.89	0.61	2.13
Becker	3.09	2.39	2.53
Alosca 10	0.57	0.28	2.16
Alosca 10 U	1.22	1.06	1.91
Alosca 5	0.89	0.48	2.32
Becker 10	2.78	2.43	2.63
Becker 10 U	3.05	2.32	2.56
Becker 5	3.44	2.44	2.39
LSD (Type)	**0.66**	**0.54**	**0.42**
LSD (Type x Rate)	**0.70**	**0.57**	**0.45**
LSD (Type x Rate x Sow)	**0.81**	**0.66**	**0.51**

Table 7-10: Lupin (Jindalee)

Treatment	Nodule No.	Nodule Score	Grain Yield (t/ha)
Control	0.44	0.30	0.87
Peat	2.61	1.56	1.43
Alosca	1.29	0.65	1.13
Becker	5.00	1.87	1.41
Alosca 10	0.63	0.46	1.08
Alosca 10 U	2.38	0.78	1.16
Alosca 5	0.88	0.71	1.14
Becker 10	6.73	2.18	1.36
Becker 10 U	3.08	1.45	1.40
Becker 5	5.20	1.99	1.46
LSD (Type)	**3.16**	**0.46**	**0.22**
LSD (Type x Rate)	**3.35**	**0.49**	**0.23**
LSD (Type x Rate x Sow)	**3.87**	**0.56**	**0.27**

[23] Nodule numbers were square root transformed prior to analysis.

Table 7-11: Faba Bean (Farah)

Treatment	Nodule No.	Nodule Score	Grain Yield (t/ha)
Control	0.58	0.31	1.50
Peat	17.12	2.76	2.35
Alosca	2.45	0.77	1.94
Becker	18.27	2.75	2.53
Alosca 10	3.95	1.27	2.10
Alosca 10 U	1.41	0.62	1.99
Alosca 5	1.98	0.43	1.74
Becker 10	23.66	2.89	2.48
Becker 10 U	14.20	2.86	2.63
Becker 5	16.95	2.49	2.47
LSD[1] (Type)	**6.63**	**0.47**	**0.34**
LSD[1] (Type x Rate)	**7.03**	**0.50**	**0.36**
LSD[1] (Type x Rate x Sow)	**8.12**	**0.58**	**0.41**