

## Yield responses of faba bean to inoculation

J.H. Silsbury

Agronomy Department, Waite Agricultural Research Institute, Glen Osmond, S.A. 5064

Few farmers in South Australia inoculate grain legumes. A crop of pea or faba bean is normally nodulated by *Rhizobium leguminosarum*, carried over from previous crops. This organism which nodulates pea, bean, vetch and lentil, persists in the soil for several years. Little research on nodulation of grain legumes has been conducted in southern Australia and little is known of their inoculation requirements. Evidence that the strain of *Rhizobium* normally used to inoculate peas and beans (Group E, Strain SU391) is not particularly effective on "Fiord" faba bean has been obtained from pot trails. These have shown the strain NA533 to be more effective on "Fiord" than is SU391 giving earlier nodulation and fixing more nitrogen. The aim of this experiment was to test the effectiveness of NA533 on faba bean in the field under 'normal' farm conditions.

### Methods

Trials were conducted at six sites in the cereal districts of South Australia in 1988. They consisted for 16 drill-sown plots, 100 m long and one drill-width wide at each site. All were sown at about 90 kg/ha by farmers with their own equipment and maintained and managed by them. Treatments were:

1 not inoculated;

1 inoculated with SU391;

2 inoculated with NA533;

3 inoculated with both SU391 and NA533.

The season was late starting with a very wet June, but all sites were sown by July 18. Samples were taken to assess nodulation and nitrogen fixation by the acetelyne reduction Method. Plots were finally harvested for grain yield when mature.

### Results and discussion

No significant improvement in nodulation or in the estimated rate of nitrogen fixation arising from inoculation was found over the whole trial. Analysis of the grain yield data showed treatment, site and the treatment x site interaction to be highly significant. Grain yields (t/ha)

not inoculated	1.01
SU391	1.15
NA533	1.28
SU391+NA53	1.19

These results show that although the response to inoculation was small, NA533 gave about a 20 per cent increase in grain yield over not-inoculated and about 10 per cent increase over the 'standard' inoculant S0391. Inoculation of faba bean with NA533 is thus clearly of economic benefit, costing about \$2.50 per

hectare for inoculant for a gain of about \$20 per hectare return from increased yield. 1988 was a poor season and the results of inoculation with NA533 need to be tested in a more favourable year.