

AGR1513: Evaluating Inoculant Options for Faba Beans

A three year study was initiated in 2015 to investigate the effect of two rhizobia inoculant formulations, peat-based on-seed and granular in-furrow, on yield and growth of faba beans across differing soil/climatic regions of Saskatchewan. Trials were established annually at Swift Current (Brown soil zone) and Outlook (Brown-Dark Brown transitional soil zone), Scott (Dark Brown soil zone), and Melfort, Yorkton, Indian Head, and Redvers (Black soil zone). Two faba bean varieties, a tannin and a zero-tannin, were treated either with a peat-based on-seed formulation (Nodulator® brand by BASF) at the recommended rate of application (1.2 kg inoculant for 982 kg seed), or a granular in-furrow formulation (TagTeam® brand by Monsanto BioAg) at 0.5x, 1.0x, or 2.0x recommended application rates, based upon row spacing used at each cooperating test site. Additional treatments included a dual inoculation combining the peat-based inoculant applied at all three granular application rates. The peat-based formulation was applied immediately prior to seeding using a damp inoculation method, granular products were applied at seeding.

Significant responses with respect to faba bean seed yield, at any individual test location over the three years of trialing, were few (2 of 15 site years). However, combined site analyses indicated an overall faba bean seed yield increase of approximately 230 kg/ha (3.5 bu/ac). This greatest yield response occurred with the peat-based inoculant formulation by itself, or in combination with a granular application, however the dual inoculation treatments were not statistically greater yielding in comparison to the peat-based solo application. Inoculation had no statistically significant effect on seed protein, nitrogen content, total seed nitrogen uptake, or seed test weight. Inoculation did not statistically influence vegetative biomass, tissue nitrogen content or total biomass nitrogen uptake, but did result in an increase in plant height.

The overall minimal response cannot be attributed to soil providing adequate nitrogen for faba bean yield, as the majority of sites were low in soil nitrogen according to spring soil testing procedures. Although mineralized nitrogen being released throughout the growing season is expected, the amounts of nitrogen removed in biomass and seed suggests that soil nitrogen sources would be unlikely to provide the quantities measured. Rather it is more likely that indigenous populations of *Rhizobium leguminosarum* were present at most trial locations and formed effective nodulation and subsequent biological nitrogen fixation to come close to optimizing faba bean growth and seed yield production. All sites involved in the trial have an extended history of pulse crops within their rotations. While most pulses within their respective rotations have been field peas and/or lentils, the *Rhizobium leguminosarum* inoculants applied are able to infect and provide nitrogen fixation in faba beans. Results from this trial suggest that inoculation of faba beans is still recommended, but producers can choose an inoculant formulation based on cost and convenience for their operation. A single dose of inoculant is sufficient to provide optimal faba bean seed yield.