AgriARM Applied Research Management

Field Pea, Lentil and Soybean Response to Rhizobial and Mycorrhizal Inoculation

Field peas and lentils have been grown in the thin-black soil zone for several decades and are recognized for their rotational benefits. To ensure adequate root nodulation, growers are advised to use rhizobial inoculants that are either applied directly to the seed or in-furrow as a granular or peat-based product. For soybeans, inoculation is especially critical since the bacteria that infect soybean roots are of a different strain (*Bradyrhizobium japonicum*) than field pea or lentil; thus, native populations in the soil will not exist in most Saskatchewan fields. Arbuscular mycorrhizal inoculants (*Glomus intraradices*), are relatively new to western Canadian farmers and are not specific to pulse crops. These organisms form symbiotic relationships with most plants and essentially increase their root areas, thereby enhancing their ability to utilize soil resources. While many growers are aware of the overall importance of arbuscular mycorrhizal fungi, growers have limited experience with these inoculants and may be hesitant to invest in this technology.

Trials were conducted at Indian Head in 2013 and 2014 to demonstrate the effects of traditional granular rhizobial and mycorrhizal inoculant products (alone and in combination) on the yield of field peas, lentils and soybeans.

Overall, field pea plant densities and yields were significantly higher in 2013 than 2014. There were no statistical results or trends to suggest that field pea yields were increased with any inoculants. Lentil plant densities and seed yields were higher in 2013 than in 2014 as well. In 2013, there was an overall trend of higher lentil yields with rhizobial inoculant, but this was not the case in 2014 where yields were lower and other factors were more limiting. Soybean yields were low both years; however, there was a consistent yield increase with rhizobial inoculant, with significant increases in both years individually and when averaged across years. There was no evidence of any yield benefits associated specifically with the mycorrhizal inoculant for peas, lentils, or soybeans.

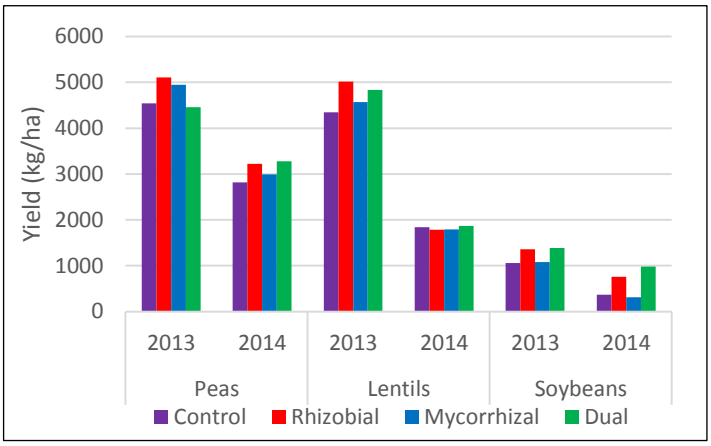

Figure 1: Effect of inoculants on pea, lentil and soybean yield in 2013 and 2014.

Although this demonstration did not show conclusive agronomic benefits to the inoculant treatments for field peas or lentils, rhizobial inoculation is recommended for these crops to ensure that both potential N fixation and seed yields are maximized.

For soybeans, which have not previously been grown in the region and require a different strain of bacteria, there were substantial benefits to rhizobial inoculation in both years. Whether mycorrhizal inoculation is likely to provide tangible agronomic benefits under normal field conditions is less understood; however, this demonstration failed to show any benefits to mycorrhizal inoculation for any of the pulse crops evaluated.

The benefits of mycorrhizal fungi and potentially under some circumstances, mycorrhizal inoculation, are not exclusive to pulse crops and the product used in this demonstration may also be used with cereals and oilseeds such as flax. It is possible that the potential benefits of mycorrhizal inoculants are affected by management factors such as crop rotation, tillage practices and seeding equipment.

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