Biological Enhancement in Pulses

Objective:
To provide a side-by-side comparison of biological treatments that promote an agronomic improvement in the growth of pulse crops.

Trial Design:

- Trials located at Indian Head, Scott and Swift Current were seeded with CDC Impulse, a small red lentil. Trials at Outlook, Melfort, and Yorkton were seeded with the yellow field pea variety AAC Profit. Prince Albert was seeded with the green pea variety CDC Spectrum.
- All inoculant products were applied in-furrow at the time of seeding at the manufacturer's recommended rate of application (Table 1).

Results:

- Biological inoculant did not have a statistical influence on plant in-season biomass, canopy cover, plant height, plant maturity, seed protein, or seed size at any location.
- At no location did treatment granular biological enhancement products provide a yield enhancement.

Conclusions:
All trial sites used within this study have an extended history of pulse production, either with field pea and/or lentil. *R. leguminosarum* bacteria are able to infect pea, lentil and faba bean and provide biological N-fixation to occur, it is conceivable, that with extended pulse inclusion within rotations, the background endemic "indigenous" levels of *R. leguminosarum* in these soils is now high. Consequently, endemic rhizobia populations might result in diminishing yield responses to annual inoculant applications. No commercial test is presently available to measure soil rhizobium levels and predict the likelihood of an inoculation response. Consequently, agronomists will be averse to recommend producers forego fresh inoculant application to pulses. However, consideration could be made to suggest producers seek to utilize lower cost rhizobia inoculant formulations as compared to higher priced granular formulations.

Table 1. Granular pulse inoculation products evaluated in 2023.

Trt#	Product	Company	Active Microorganism	Technology*
1	Control			
2	AgTIV® Thrive	Premier Tech (Taurus)	*R. leguminosarum* + *Glomus intraradices*	R + MF
3	Cell-Tech® Pea/Lentil	Nexus BioAg	*R. leguminosarum*	R
4	AgTIV® Fuel G	Premier Tech (Taurus)	*R. leguminosarum*	R
5	Nodulator® Duo SCG	BASF	*R. leguminosarum* + *Basillus subtilis*	R + GP
6	Primo GX2 Pulse	Verdisian	*R. leguminosarum* + *Azospirilium*	R + PGPR
7	Launcher	Brett Young	*R. leguminosarum*	R
8	TagTeam® BioniQ®	Novozymes	*R. leguminosarum* + *Penicillium bilaiae* + *Basillus amyloliquefaciens* + *Trichoderma virens* + lipochitooligosaccharide	R + P + PGPR + LCO
9	LALFIX Start	Lallemand Plant Care	*Rhizobium leguminosarum biovar viciae* + *Mezorhizobium cicero* + *Bacillus velezensis*	R + GP
10	BOS NutriAg	NutriAG	*Rhizobium leguminosarumbiovar viceae* + *Pseudomonas*	R + PGPR+ GP

*R = rhizobium for nitrogen fixation; GP = growth promotion; PGPR = plant growth promoting rhizobacteria; MF = mycorrhizae fungi; P = phosphate solubilizer; LCO = signal molecule

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