Factsheet: Residual Effects of Faba Bean and Faba Bean Inoculants on Yield and Protein of Succeeding Wheat Crop

Objective:

The objective of this experiment was to determine the rotational impact of faba bean stubble, treated with different inoculant combinations, on succeeding wheat yield and protein and to provide the overall economic outcome from each system.

Methodology:

This demonstration was conducted at the AAFC Scott Research Farm in spring 2016. A randomized complete block design with four replications was used; adopting 2015 plots seeded to two faba bean varieties with varying amounts of inoculant (Nodulator peat and TagTeam granular). In 2016, wheat was seeded into the faba bean stubble to determine the effects of faba bean and different inoculant combinations on wheat yield and protein. There were 16 treatments (two faba bean verities and eight inoculant options). Fertilizer was applied to the target 60 bu/ac wheat crop at seeding. Soil analysis was done prior to seeding to get nutrient application recommendation

Table 1: Demonstration treatment list for 2016 growing season

Treatment	Faba bean variety	Inoculant formulation and rate
1	Snowdrop	Un-inoculated check
2	Snowdrop	Nodulator peat for faba bean
3	Snowdrop	0.5x rate TagTeam Granular for faba bean
4	Snowdrop	1x rate TagTeam Granular for faba bean
5	Snowdrop	2x rate TagTeam Granular for faba bean
6	Snowdrop	Nodulator peat for faba bean + 0.5x rate TagTeam Granular for faba bean
7	Snowdrop	Nodulator peat for faba bean + 1x rate TagTeam Granular for faba bean
8	Snowdrop	Nodulator peat for faba bean + 2x rate TagTeam Granular for faba bean
9	FB9-4	Un-inoculated check
10	FB9-4	Nodulator peat for faba bean
11	FB9-4	0.5x rate TagTeam Granular for faba bean
12	FB9-4	1x rate TagTeam Granular for faba bean
13	FB9-4	2x rate TagTeam Granular for faba bean
14	FB9-4	Nodulator peat for faba bean + 0.5x rate TagTeam Granular for faba bean
15	FB9-4	Nodulator peat for faba bean + 1x rate TagTeam Granular for faba bean
16	FB9-4	Nodulator peat for faba bean + 2x rate TagTeam Granular for faba bean

The full report is available at www.warc.ca. Project was supported by the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Canada-Saskatchewan Growing Forward 2 bi-lateral agreement
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Key Findings:

- Nitrogen is recycled primarily through the decomposition of crop residues that are returned to the soil but a considerable amount of N is also available to succeeding crops through below-ground residual N.
- apart from their N benefits, pulses can also mobilize and access P already present in the soil. Legume roots can also acidify root zone and solubilize calcium phosphates common in prairie soils, this explains why pulses/legumes are sometimes not highly responsive to P fertilization.
- The non-N benefits may also include the interruption of disease cycles, reduced weed populations, and increased availability of other nutrients, improved soil structure, and release of growth substances from legume residue.
- Results showed that neither variety nor inoculants had significant effects on most of the measured parameters, more especially wheat yield
- The general trend in wheat yield on both stubbles was that, yields on stubble with granular inoculant components were consistently higher than those with no granular components.
- there was a significant effect of variety on bushel weight, with FB9-4 recording significantly higher bushel weight than the snowdrop variety: 78.2 kg/hL vs. 77.9 kg/hL, respectively
- Economically, there was no advantage in double-inoculating faba bean or using a different inoculant formulation over the granular or even higher rates of granular inoculants. At best, farmers can stick to the recommended rate of granular.
- Yields from the 2015 faba bean was typical of the target yield for faba bean, so faba bean still remains a viable option for inclusion into existing crop rotations around northwestern Saskatchewan.

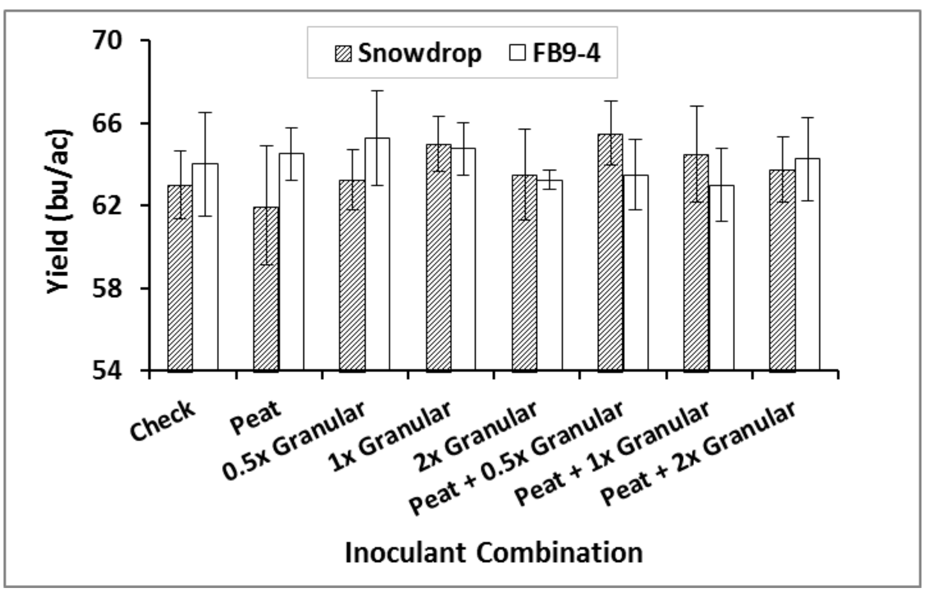

Figure 1: Effects of faba bean variety and inoculant combinations on yield (bu/ac) of succeeding wheat in 2016 growing season at Scott, SK.

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