Factsheet: Evaluating inoculant options for faba beans

Objective:

The project objectives were to determine the effects of two inoculants at different rates and in combination on Faba bean grown in various soil/climatic zones of Saskatchewan.

Methodology:

The study was conducted at Swift Current, Scott, Indian Head, Melfort, Yorkton, Redvers, and Outlook from 2015 to 2017. Two inoculants, Nodulator peat seed treatment (BASF) and TagTeam (Monsanto BioAg) a granular inoculant, were utilized in the study. Seed was treated with a registered seed treatment product for Faba bean at each location, excepting Indian Head. Supplemental fertilizer as 11-52-0 was applied at all locations at rates of 20 – 30 kg P_2O_5/ha and either side- banded or seed-placed depending upon location. Two faba bean varieties were evaluated in the trial to evaluate if they differed to inoculation treatments, varieties chosen were the zero tannin "Snowdrop" and the tannin variety "CDC SSNS-1." Target plant populations of both varieties was 43 – 58 plants m^{-2}, the tannin variety FB9-4 was used in the first year of the trial as opposed to the tannin variety CDC SSNS-1 used in years 2016 and 2017.

Table 1. Variety and Inoculant Treatments.

Treatments	Faba bean Variety	Inoculants
1	Snowdrop	Un-inoculated check
2	Snowdrop	Nodulator peat for Faba Beans
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 Beans + TagTeam granular for Faba Beans at 0.5x
7	Snowdrop	Nodulator peat for Faba Beans + TagTeam granular for Faba Beans at 1x
8	Snowdrop	Nodulator peat for Faba Beans + TagTeam granular for Faba Beans at 2x
9	CDC SSNS-1	Un-inoculated check
10	CDC SSNS-1	Nodulator peat for Faba Beans
11	CDC SSNS-1	0.5x rate TagTeam Granular for Faba bean
12	CDC SSNS-1	1x rate TagTeam Granular for Faba bean
13	CDC SSNS-1	2x rate TagTeam Granular for Faba bean
14	CDC SSNS-1	Nodulator peat for Faba Beans + TagTeam granular for Faba Beans at 0.5x
15	CDC SSNS-1	Nodulator peat for Faba Beans + TagTeam granular for Faba Beans at 1x
16	CDC SSNS-1	Nodulator peat for Faba Beans + TagTeam granular for Faba Beans at 2x

Key Findings:

- Over the three years of the trial the majority of sites failed to achieve a positive yield response to inoculation. Overall, the tannin variety faba bean was higher yielding than the zero tannin but both responded, or failed to respond, to inoculation treatments in a similar fashion.
- Bare, un-inoculated faba bean produced the lowest yields. Yields were greatest whenever faba bean was treated with an on-seed peat based inoculant. The granular inoculation treatments, while

The full report is available at www.warc.ca. This project was funded by the Saskatchewan Pulse Growers Association.
WARC Project # 24-16
SPG #AGR1513

numerically higher yielding, were not greatly higher than the un-inoculated. The relative failure of the granular inoculant to provide yields equal to a peat on-seed inoculant application is concerning and unexplainable.

- The granular and peat inoculants utilized with this study are produced by two different manufactures. It is highly probable that the strain of *Rhizobia leguminosarum* used within these products differs. Therefore it cannot be discounted that the strain used within the peat based formulation was superior to the strain within the granular formulation and accounts for the yield performance differences
- it is possible that, with extended pulse inclusion within rotations, the background "indigenous" levels of *Rhizobia leguminosarum* in these soils is now high, resulting in diminishing yield responses to annual inoculation.
- The average response to whenever peat based inoculant was applied (with or without granular applications) resulted in a 6.0% yield response which would provide an economic benefit. Although these results suggest that indigenous populations of *Rhizobia leguminosarum* may now be high through an extended history of pulse production in Saskatchewan, no commercial test is presently available to predict the likelihood of an inoculation response.
- Consequently this study suggests that producers continue to apply an inoculant to ensure the presence of adequate numbers of *Rhizobia leguminosarum* for faba bean production.

Table 4. Combined Site Factorial Analyses for Faba Bean Grain Yield (kg/ha), 2015-17.

Treatment	15 Site Year Summary Yield (kg/ha)
Variety	
Zero Tannin	3782 b
Tannin	3931 a
Inoculation	
Check	3719 c
Nod peat	3952 a
0.5X TT	3758 bc
1.0X TT	3815 b
2.0X TT	3790 bc
Nod + 0.5X TT	3955 a
Nod + 1.0X TT	3925 a
Nod + 2.0X TT	3940 a
Pr > F (p-value)	
Variety (V)	0.0001
Inoculation (I)	0.0001
V x I	0.125

The full report is available at www.warc.ca. This project was funded by the Saskatchewan Pulse Growers Association.
WARC Project # 24-16
SPG #AGR1513