

Evaluation of different Inoculants on the Soybean Productivity

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Background and Objectives

Soybeans grown in Manitoba are usually inoculated with *Bradyrhizobium japonicum* to ensure adequate bacteria populations are present to maximize nodulation and nitrogen fixation. Soybean farmers in Manitoba have a variety of inoculant choices available. The effectiveness of different inoculant types, however, is not fully understood in the various soybean-growing regions in Manitoba.

The current study is planned to determine if there is any additional yield benefit to:

1. Using in-furrow granular inoculant (instead of seed-applied liquid)
2. Double inoculating (seed-applied liquid + granular in-furrow) (compared to seed-applied liquid only)
3. Increasing the rate of inoculant (from 1x to 2x)
4. Using "enhanced" inoculant products

Materials and Methods

Design – Randomized block design

Replications – Three

Plot size – 7.1 m²

Seeding date – June 7

Treatments – 13 inoculant treatments (see Table 1)

Variety – NSC Reston

Weed control – Round up (0.5L/Acre) on June 16

Fertilizer – 27 lbs of actual P at the time of seeding

Harvesting – October 14

At R-4 crop stage, 10 randomly selected plants per plot were dig up gently and submerged in water to wash away dirt. Afterwards, nodules were counted on individual plant and average number of nodules per plant were determined from each plot. At the same crop stage, all above ground biomass was harvested from two 1m rows selected at random per plot and dried to record dry weight. Plots were harvested using Wintersteiger plot combine. Data were statistically analysed using ANOVA and the means were separated using LSD at $p = 0.05$.

Results

Table 1. Effect of different inoculant treatments on soybean growth and yield at Beausejour site.

Treatment	Yield (bu/acre)	Biomass (kg/ha)	Number of Nodules/plant
<i>Nodulator G 2X</i>	46.7	3494	75.3
<i>Cell-Tech L 2X</i>	46.4	4318	86.8
<i>Nodulator L+G</i>	45.5	3666	68.0
<i>Cell-Tech L + JmpS</i>	45.0	3338	83.8
<i>Cell-Tech + Optimize</i>	44.4	3289	88.8
<i>Nodulator G</i>	44.1	3716	87.8
<i>Nodulator L 2X</i>	43.7	2986	80.9
<i>Cell-Tech L</i>	43.6	3305	87.1
<i>Nodulator L</i>	43.1	3568	70.9
<i>Cell-Tech L + JmpS</i>	42.3	3621	80.3
<i>Cell-Tech G 2X</i>	42.3	3798	69.6
<i>Cell-Tech L+G</i>	42.3	4072	77.1
<i>TagTeam + P</i>	41.6	3232	74.7
<i>Control</i>	41.2	3117	87.8
<i>P</i>	0.5	0.25	0.26
<i>CV (%)</i>	7.3	18.7	15.5

Yield varied from 41.2 to 46.7 bushels/acre among different treatments although the differences were not statistically significant. Similarly, different inoculant treatments did not differ for biomass and number of nodules/plant.

Project Findings

Current study revealed that use of any kind or rate of inoculant did not result in greater soybean yield. Inoculant, even when applied at double dose, did not increase soybean yield. Manitoba Pulse and Soybean Growers are conducting this trial over many sites in Manitoba and it will be interesting to see how the overall results look like. Field history was not known in the present study conducted at Beausejour site. This field might have soybean grown in the past few years resulting in inoculant establishment in the soil.