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Soybean Double Inoculant Trials

Comparing double vs. single inoculation strategies

Long-term Results (2013 – 2024)

Trial Information:

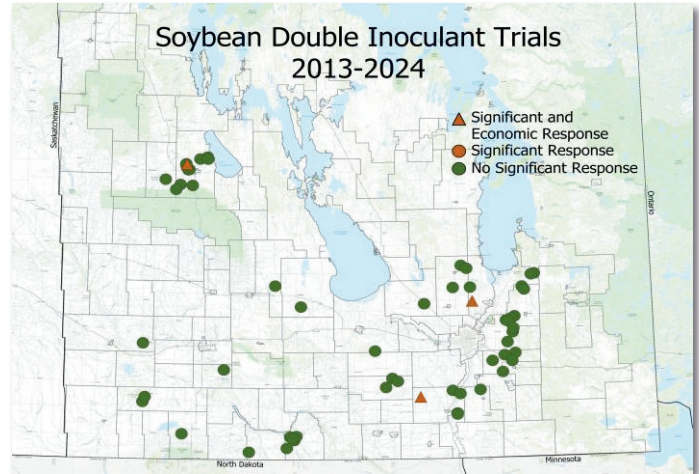
- 58 trials were conducted from 2013 to 2024.
- Treatments compared double (granular or peat in-furrow + liquid on-seed) vs. single (liquid on-seed alone) inoculant strategies.
- These trials require a minimum field history of two previous soybean crops and the most recent soybean crop within the last four years.

Supporting Data:

- Nodulation is rated at flowering (R1–R2) by counting the number of pink, active nodules per plant using a 0–4 scale:
 - 0 (None) = 0 nodules/plant
 - 1 (Poor) = 1–4 nodules/plant
 - 2 (Fair) = 5–9 nodules/plant
 - 3 (Good) = 10–19 nodules/plant
 - 4 (Excellent) = 20 or more nodules/plant
- Nodulation ratings at flowering were similar between single and double inoculant strips at 96% of trials.

Yield Results:

- 95% of the time, an additional granular or peat in-furrow inoculant did not improve soybean yield over liquid on-seed inoculant alone, resulting in a loss of roughly \$10/ac.
- There have been three trials where a significant yield response occurred (5% of the time). Of those responses, all three were economical, where the yield increase was large enough to pay for the increased seed cost (1.5–3.0 bu/ac increase).



Soybean History (Number of Previous Soybean Crops)	Number of Trials
2 crops	36 (63%)
3 crops	14 (25%)
4 crops	4 (7%)
5 or more crops	3 (5%)

Years Since Inoculant Last Applied	Number of Trials
1 year	12 (21%)
2 years	15 (26%)
3 years	20 (34%)
4 years	11 (19%)

Recommendations from this Research:

- Choose a soybean inoculation strategy based on field history. Consider a single inoculation strategy if the:
 - ✓ field has had at least two previous soybean crops,
 - ✓ previous soybean crops have been well nodulated,
 - ✓ most recent soybean crop was within the past four years, and the
 - ✓ field has had no significant flooding or drought.
- Granular in-furrow inoculants will have more resiliency and longevity in the soil in years with challenging spring conditions (excessive moisture or drought).





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Soybean Single Inoculant Trials

Comparing a single inoculation strategy vs. none

Long-term Results (2016 – 2024)

Trial Information:

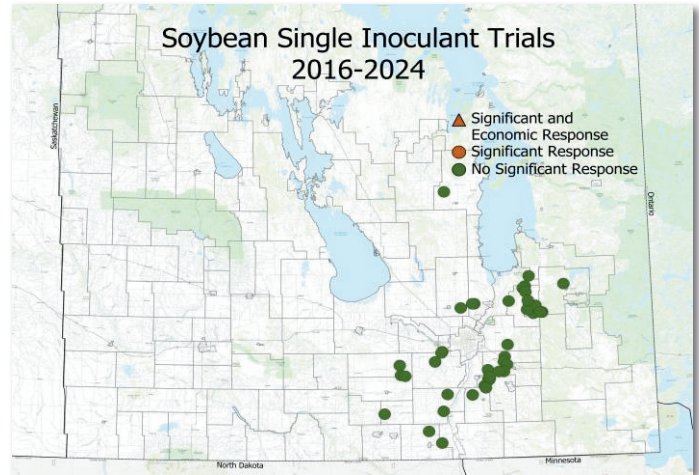
- 44 trials were conducted from 2016 to 2024.
- Treatments compared a single (typically liquid or peat on-seed) inoculant strategy vs. no inoculant applied at all.
 - 90% of trials testing liquid on-seed and 10% using peat on-seed.
- These trials require a minimum field history of three previous soybean crops and the most recent soybean crop within the last four years. Therefore, to date, these trials have occurred in central Manitoba where there is more soybean field history.

Supporting Data:

- Nodulation is rated at flowering (R1–R2) by counting the number of pink, active nodules per plant using a 0–4 scale:
 - 0 (None) = 0 nodules/plant
 - 1 (Poor) = 1–4 nodules/plant
 - 2 (Fair) = 5–9 nodules/plant
 - 3 (Good) = 10–19 nodules/plant
 - 4 (Excellent) = 20 or more nodules/plant
- Nodulation ratings at flowering were similar between single and no inoculant strips at 95% of trials.

Yield Results:

- A single inoculation strategy has never improved soybean yield on fields in Central Manitoba with more than three previous soybean crops.
- Assuming a cost of \$3/ac for liquid inoculant, and a soybean sell price of \$12/bu, a consistent yield increase of 0.25 bu/ac is needed to pay for the inoculant. Overall, the average yield difference has been 0.01 bu/ac between single vs. no inoculant treatments.



Soybean History (Number of Previous Soybean Crops)	Number of Trials
3 crops	17 (%)
4 crops	12 (%)
5 crops	8 (%)
6 or more crops	6 (%)

Years Since Inoculant Last Applied	Number of Trials
1 year	11 (25%)
2 years	10 (23%)
3 years	16 (36%)
4 years	7 (16%)

Recommendations from this Research:

- Naturalized populations of *Bradyrhizobium japonicum* are effectively colonizing root nodules and fixing nitrogen in fields with sufficient soybean history.
- Although yield responses have not occurred to date on soybean fields with more than three previous soybean crops, at a cost of roughly \$3.00/ac, liquid on-seed inoculant may provide peace of mind knowing the crop's N requirements are secured.

