

New Soybean Inoculant Technology (2006 Final Report)

Purpose:

New inoculant technology called “pre-inoculants” allow for a shelf-life of up to four weeks of inoculated seed. Not only do these inoculants contain new highly efficient strains they also allow for an extended shelf life when using a pre-inoculant together with a fungicide seed treatment. These inoculants have extenders that enhance the survival of *B. japonicum* following treatment for 21 to 30 days without fungicides and 7 to 21 days with fungicides. Seed is treated before it is delivered to the farm. Reduced inoculation procedures at planting time and excellent coverage are significant advantages to the grower compared to drill box application.

There is limited field research data on possible yield gains in fields that have had a history of soybeans. There is considerable debate over the efficacy of new soybean inoculant strains on fields with a history of soybeans. Researchers from Ohio State have found that economic returns are high enough that most soybean fields including those with a history of soybeans should be inoculated. To date Ontario Ministry of Agriculture, Food and Rural Affairs recommendations are that economic returns are most likely on virgin fields, sandy or low ph soils. Field scale verification trials are required to assess these new inoculants on a wide range of soil types, crop rotations, and environmental conditions.

Methods:

Ten large scale replicated trials were set up in Perth County to assess possible yield benefits from using this product. Treatments included the untreated check and the pre-inoculant Cell Tech SCI.

Each treatment was 20 feet wide with a minimum length of 1200 feet. Most sites were field length strips (>1500 feet) In total, due to wet harvest conditions eight of the ten sites were harvested with a minimum of two replications per site.

Fields were treated as a whole when applying herbicides, fertilizers, and tillage practices. Crop inputs were applied perpendicular to the direction of the treatments. This ensured that mistakes or misses in field operations occurred across all trial treatments.

Results and Summary:

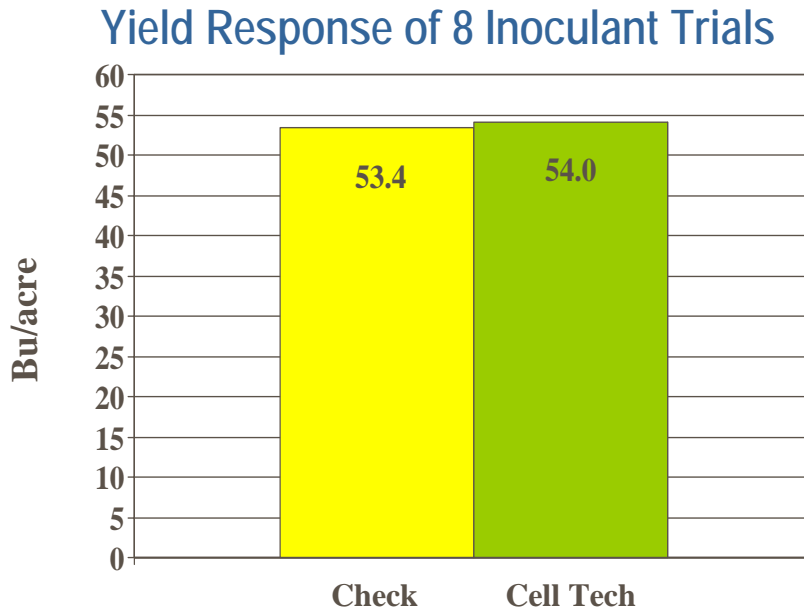
Plant stand counts were taken at 30 days after seeding. There was no statistical stand difference in the treated compared to the untreated seed.

Averaged across all sites no statistical yield benefit was observed in 2006. See graph #1. However at two of the eight sites there was a yield benefit of 3.3 bu/ac. Graph #2. It should be recognized that growing conditions in 2006 were extraordinary. Yields were

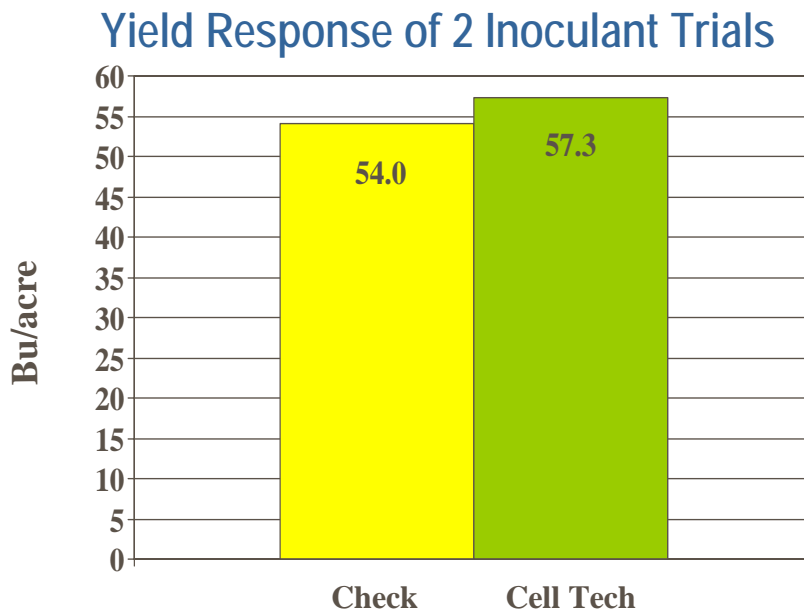
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approximately 5-10 bu/ac above long term averages. These excellent growing conditions may have influenced the results.

Graph #1. (Yields not statistically different)



Graph #2 (Yields statistically significant at $p=0.01$)



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Six of the eight sites showed no yield response to the inoculant. At the two sites that showed a statistical response the use of the “pre-inoculant” was very profitable.

Table #1: Profit per acre at the 2 sites with a statistically significant yield response.

Yield Benefit of 3.3 bu/ac	\$23.10
Cost of product, \$2.25/bag	\$3.38
Return per acre	\$19.72

Numbers based on a seeding rate of 200 000 seeds/acre and a selling price of \$7.00/bu

The two sites that showed a response were both long term no-till fields with a three year crop rotation of corn-soybeans-wheat. The previous crop at both sites was corn. One site was a silty clay soil and the other was a clay loam soil. Why these two sites responded so well to the inoculants is unclear but warrants further investigation.

Next Steps:

This study was conducted with funding from a one year OSCIA major grant. Due to the high yield response at two sites further investigations may be warranted.

Acknowledgements:

Special thanks to all those who participated in the project:

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Project Contacts:

Stay tuned for future results and contact Horst Bohner, horst.bohner@ontario.ca if you wish to be involved in 2007.