Government of Saskatchewan

Agricultural Demonstration of Practices and Technologies (ADOPT)

FINAL REPORT

20140441

GRANULAR INOCULANT RATES AND STARTER NITROGEN USE IN SOYBEAN AND DRY BEAN IN SASKATCHEWAN

Funded by: The Saskatchewan Ministry of Agriculture under the Canada-Saskatchewan Growing Forward bi-lateral agreement

March 2017

Prepared by: South East Research Farm (SERF)

ADOPT #20140441

GRANULAR INOCULANT RATES AND STARTER NITROGEN USE IN SOYBEAN AND DRY BEAN IN SASKATCHEWAN

Lana Shaw, South East Research Farm

Introduction

Soybeans are a relatively new crop for Saskatchewan. There are varying recommendations for production and some have suggested that application of a starter urea along with the phosphate fertilizer may help to establish a strong stand of soybean. It is also commonly recommended to use granular inoculant in furrow along with a liquid seed-applied product. This may help with colonization of lateral roots and increase nitrogen fixation. The purpose of this demonstration was to test these varying recommendations and allow discussion of the subject at producer events.

Materials and Methods

There were two sites established for this trial: Redvers and Langbank.

At the Redvers location, the site was located at the South East Research Farm. The row spacing was 10 inches. The SERF Seedmaster drill was used to seed the trial, allowing varying rates of fertilizer an granular inoculant.

At the Langbank location, a Seedmaster plot drill own by Seedmaster was used to seed the trial on 12 inch row spacing. This seeder also allowed varying rates of fertilizer and granular inoculant

Th33003R soybeans were seeded at 72 lb/ac on May 19 at Langbank and on May 25 in Redvers. The seed was treated with liquid inoculant. Seven rates of granular inoculant (Cell-Tech) including an untreated control were applied in the seed row at each location. Phosphate fertilizer was applied at a rate of 58 lb/ac or 30 lb/ac actual P in a fertilizer band away from the seed. In half of the treatments, 20 lb/ac of urea was applied in a band below and to the side of the seed row. There is only a difference in starter N rate of about 10 lb/ac between the treatments with added urea and without added urea.

The trials in Langbank and Redvers were sprayed twice with Glyphosate for in-crop weed control. The Redvers location was also sprayed with Basagran to control glyphosate-resistant volunteer Canola.

Table 1. List of Treatments

Trt #	lb/ac CellTech	Urea
1	0	0
2	2.5	0
3	5	0
4	7.5	0
5	10	0
6	12.5	0
7	15	0
8	0	20 lb/ac
9	2.5	20 lb/ac
10	5	20 lb/ac
11	7.5	20 lb/ac
12	10	20 lb/ac
13	12.5	20 lb/ac
14	15	20 lb/ac

Each plot was counted for plant establishment by counting two meter rows. The average is presented in the results. Height was measured in the Langbank location but not in the Redvers location due to an oversight. Lodging was recorded at Langbank, but not at Redvers due to the fact that there was no lodging at that site.

Harvest samples were weight and tested for moisture. All soybeans reached physiological maturity prior to harvest and before a frost. The Redvers trial was harvested on October 7 and the Langbank trial was harvested on October 9. The yield samples were not processed for test weight or thousand seed weight due to a lack of available harvest help and the very consistent appearance of the samples. This is reflected in the reduced budget.

Results:

There were only minor visible differences in plant growth due to treatments. Establishment was good and there were no treatment effects on plant population. The treatments with no granular inoculant were paler green in the spring, but differences were less over time.

Plant emergence was not affected by treatment. Overall the plant stand was good in all plots.

Treatment did not have a real impact on height at the Langbank location. There was variability due to topography. There was lodging apparent in certain areas at Langbank, but this was largely in parts of some blocks and due to topography rather than treatment. No lodging occurred at Redvers.

There were no real differences in yield due to treatment (Figure 4, Figure 6) at either Redvers or Langbank. Overall the trials were highly productive and the variability in the sites seemed to have a larger impact than the treatment.

Figure 1. Lodging (1-10 rating) for soybean at Langbank location showing four replicates.

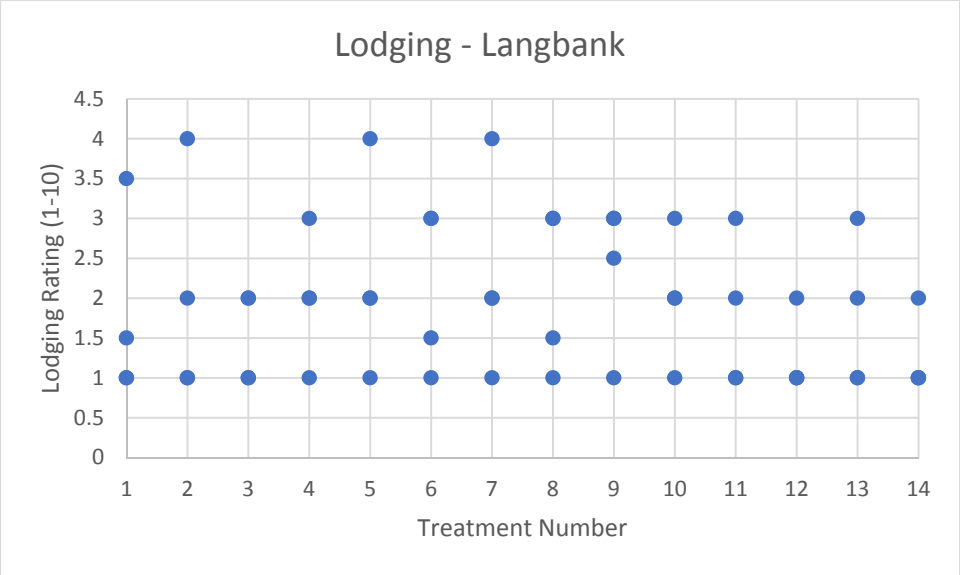


Figure 2. Soybean emergence rate (plants/m^2) for soybean at Langbank location showing four replicates.

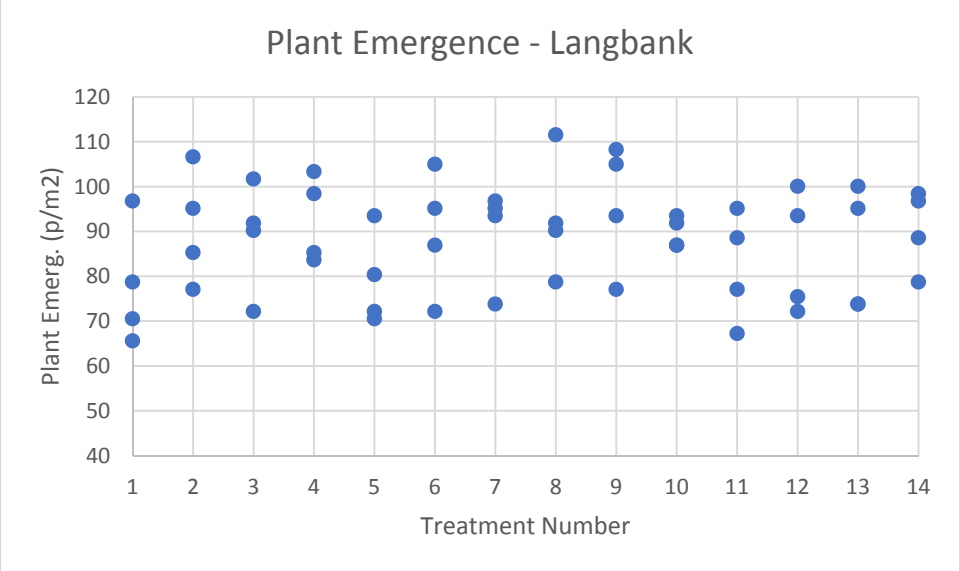


Figure 3. Soybean height (cm) for soybean at Langbank location showing four replicates.

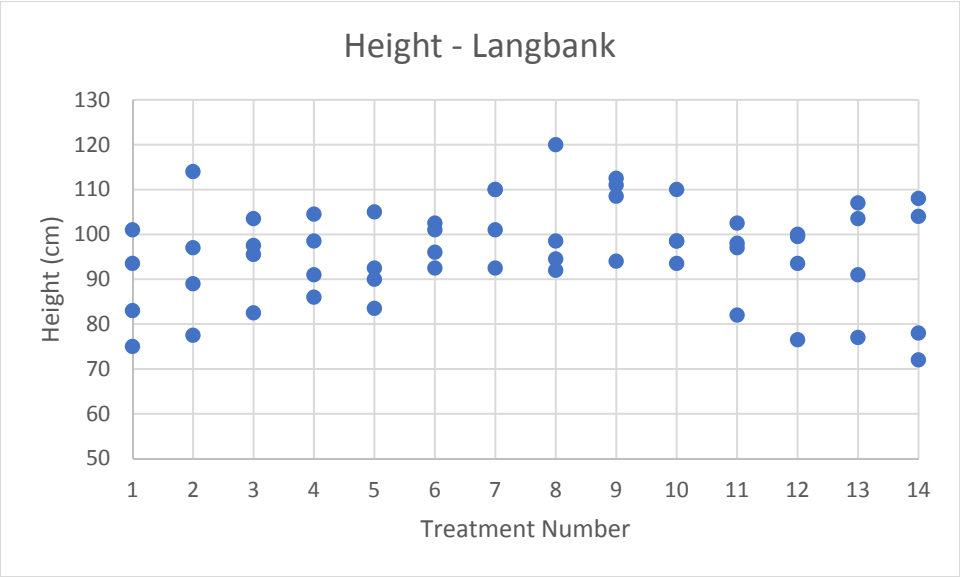


Figure 4. Soybean yield (kg/ha) for soybean at Langbank location showing four replicates.

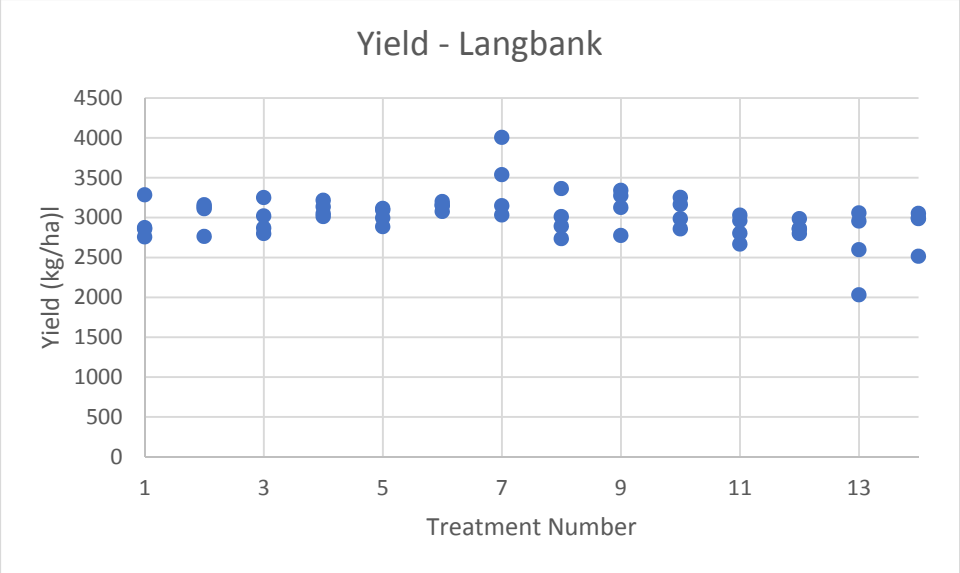


Figure 5. Soybean emergence (Plants/m^2) for soybean at Redvers location showing four replicates.

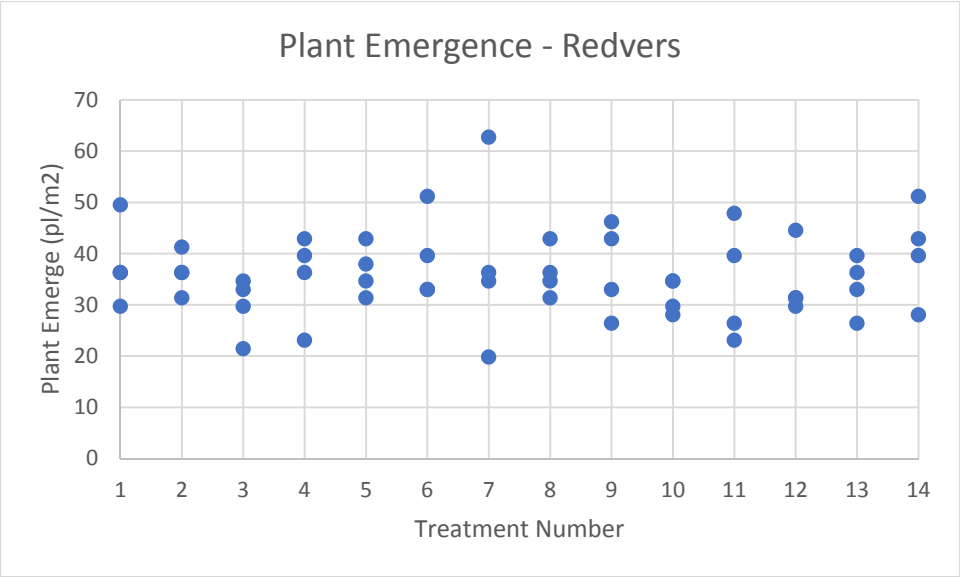
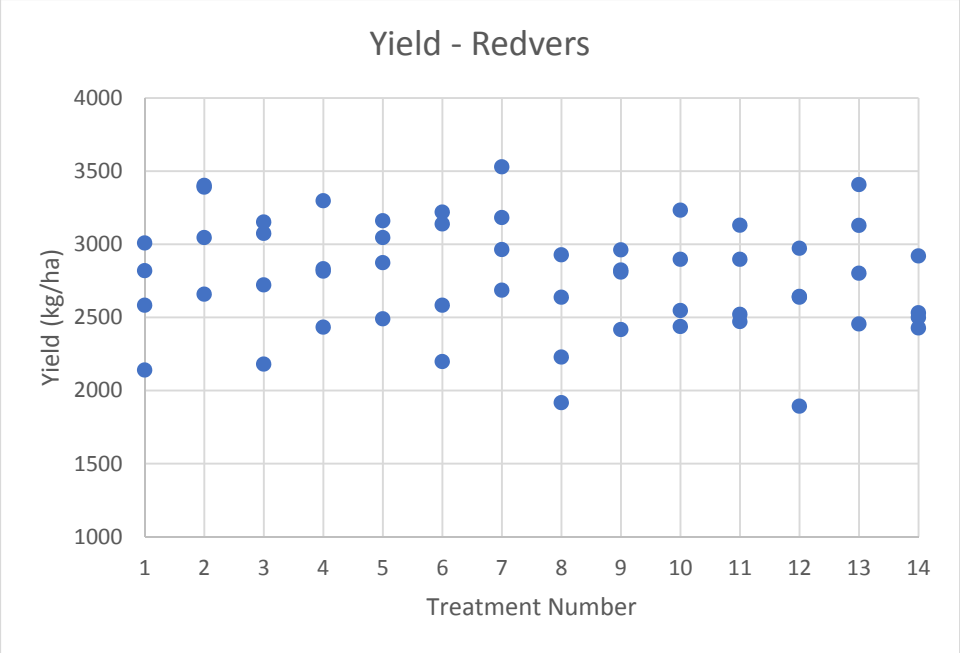


Figure 6. Soybean yield (kg/ha) for soybean at Redvers location showing four replicates.



Discussion and Conclusions

Overall, the plots were very productive with high yields. The treatment had very small impacts and there was more random variations at both sites that made any small effects unnoticable. This trial did not indicate any advantage to using starter N or using high rates of granular inoculant. This suggests that current recommendations of using no urea at the time of planting and using recommended granular rates are warranted. Inoculant effectiveness of the liquid product seems to have been very good this year, but we have found benefits of double inoculation with granular products in the past.

The trials were visited in two tours. The Langbank location was toured on June 25, 2015 as part of the Seedmaster Demonstration Farm tour. There were about 40 participants. The Redvers site was toured on July 25, 2015 by about 50 participants in the SERF Annual Field Day.