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DOES FALL SEEDED RADISH IMPROVE SOYBEAN PLANTING CONDITIONS AND PRODUCTIVITY IN THE FOLLOWING YEAR?

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Does fall seeded radish improve soybean planting conditions and productivity in the following year?

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Introduction

Soybeans are a relatively new crop to Saskatchewan. It is commonly recommended to blacken soil with cultivation prior to seeding to warm the seedbed and hasten emergence. Under Saskatchewan conditions, where no-till has shown considerable advantages for other crops, it is preferable to adapt the soybean crop to no-till production methods.

The purpose of this demonstration was to determine whether seeding tillage radishes in the post-harvest season would improve soybean productivity the following year. Since radishes has high N residue, it may help to break down wheat straw and improve conditions for soybean planting. This was evaluated with no-till, min-till (spring harrowing) and spring cultivation to also evaluate the effect of land preparation on soybean productivity.

Materials and Methods

The plot area was set up on recently-harvested wheat stubble on Sept 25, 2014. Tillage radishes were seeded in 24 plots measuring 20 feet by 30 feet that day using the SERF cone

seeder. The seeding rate was 5 pounds per acre. The plot area was well drained with even topography on a loam soil.

The trial's cultivation and harrowing treatments were done three days before seeding using small plot equipment. For the cultivation treatment, the plot area was cultivated and then harrowed. The harrowing treatment was only harrowed. The no-till treatment had no preparation before seeding.

Trt #	Treatment
1	No-till control
2	Spring Harrow
3	Spring cultivation + Harrow
4	Fall Radish No Till
5	Fall Radish + Spring Harrow
6	Fall Radish + Spring cultivation + Harrow

The trial was seeded on May 21 using TH33003 at 72 lb/ac using the Seedmaster no-till drill, which leaves considerable standing stubble. Phosphate fertilizer was banded during seeding at an actual phosphate rate of 30 lb/ac. Plant counts were taken in late June after full emergence. Pod clearance was measured before harvest by measuring the height of attatchment of the lowest pod on four plants in each pot. Average plant height was also measured shortly before harvest. The trial was harvested on Oct 6, 2015. Harvest samples were cleaned and yields were adjusted to 14% moisture.

Results

Tillage radishes were seeded considerably later than would be ideal due to poor harvesting conditions for the previous wheat crop in September 2014. As soon as the wheat crop was harvested, the trial was established, but this left little time for growth of the radishes in the fall. The radishes emerged and grew in October, but due to cool conditions in October, the above-ground growth was small. It seemed unlikely that such small plants would have a significant effect when they did not establish significant ground cover in the fall.

While the impact of the radishes may have not been large, the trial still gave us a good opportunity to test the effect of land preparation treatments. After planting the soybeans in May, the plots were checked for differences in emergence rates due to treatments. There were no apparent differences between plots and the trial was emerging evenly on May 29. Plant emergence rates did not vary significantly between treatments (Figure 1). This suggests that no-till seeding of soybeans at typical seeding dates in late May.

Treatments did not seem to result in differences in plant heights or pod clearance, which are often an indication of a physiological effect of establishment conditions (Figure 2, Figure 3). Yields were also not noticeably or significantly affected by treatments. If there were any differences, they were subtle and not noticeable given natural variability in the plot area.

Figure 1. Soybean plant stand (pl/m^2) by treatment number.

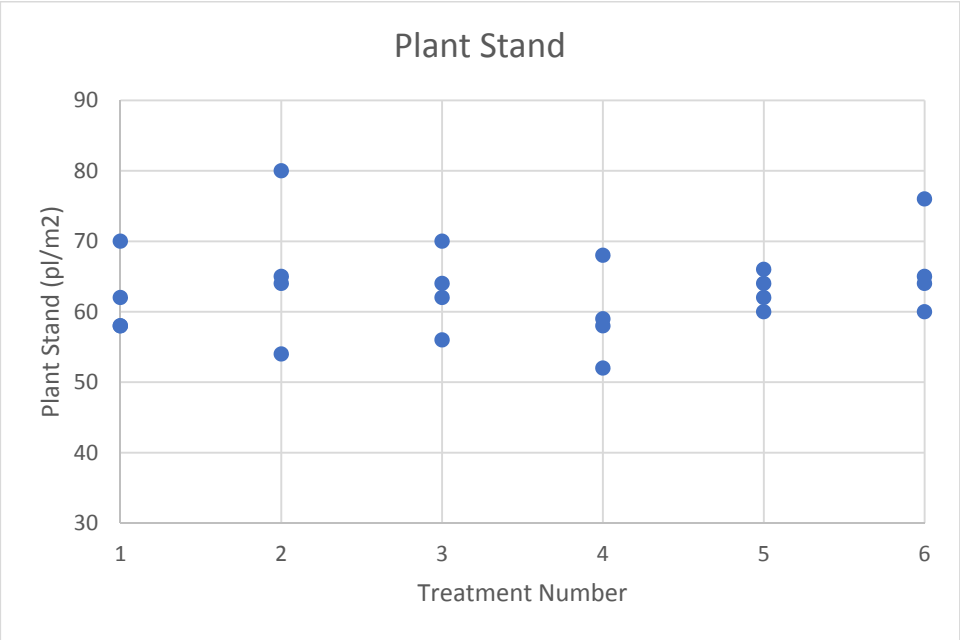


Figure 2. Soybean plant height (cm) by treatment number.

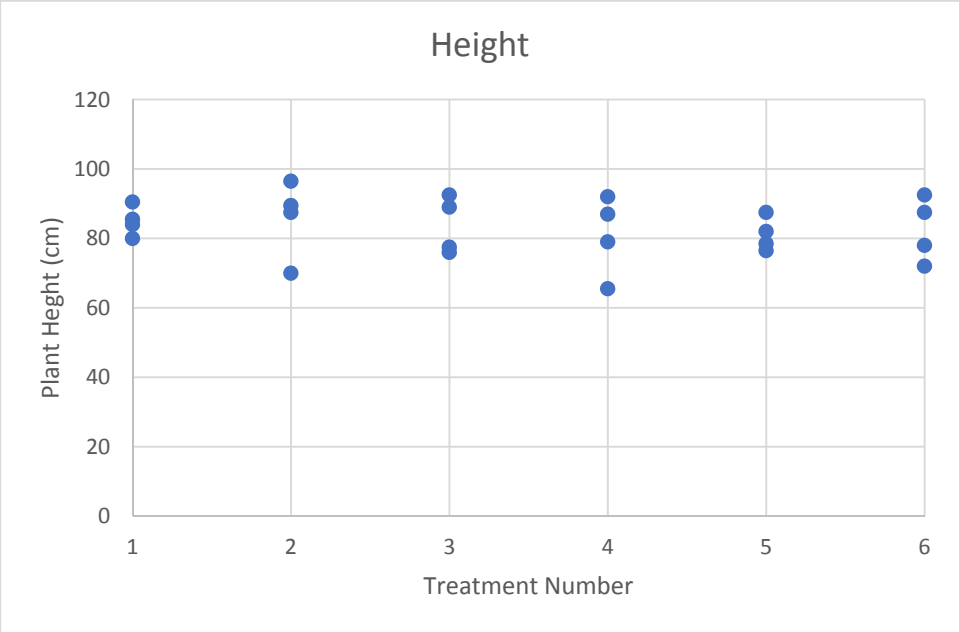


Figure 3. Soybean height of lowest pod attatchment (cm) by treatment number.

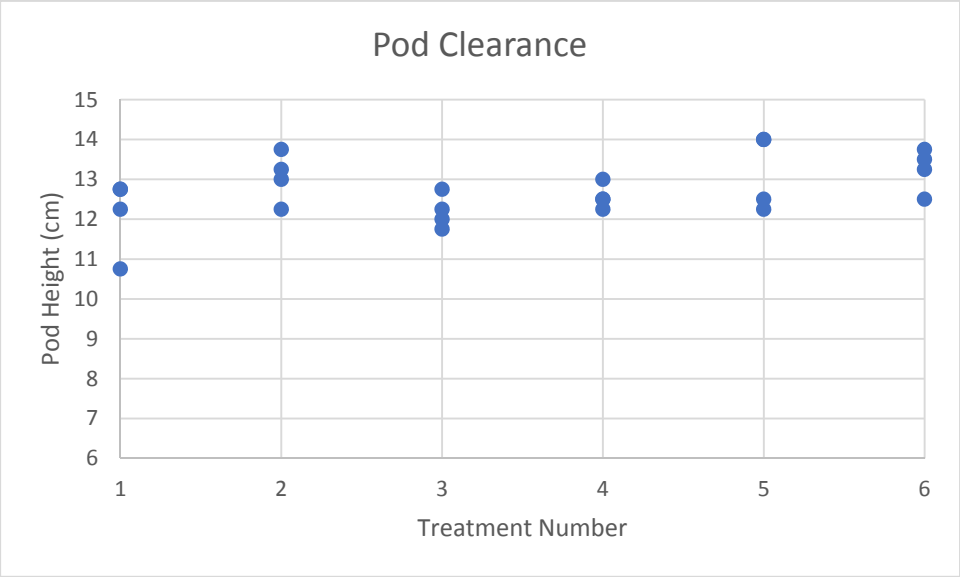
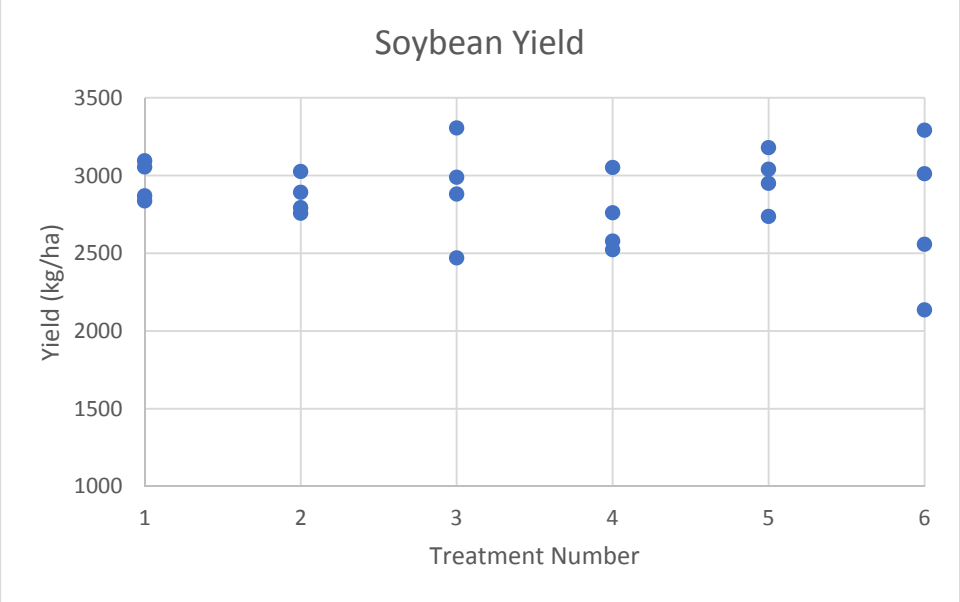


Figure 3. Soybean yield (kg/ha) by treatment number.



Discussion and Extension

Due to the fact that the radishes were seeded in late September, it is quite uncertain as to what effect they may have had if they had developed greater above-ground and below-ground biomass. In fall of 2015, SERF successfully seeded radishes in late August following harvest and they achieved considerable ground cover and developed fleshy tap roots. It certainly can't be concluded that they would have no effect. More work is needed in this area.

There was no effect of land preparation treatment (not-till vs. harrowed vs. cultivated. Since no-till has been shown to preserve moisture and soybeans will usually be moisture deficient in Saskatchewan, perhaps no-till production will prove to have long-term advantages when seeding in later May.

The trial was toured on July 24, 2015 during the SERF Annual Field Day by about 50 participants. There were no visual differences between treatments, so it didn't result in a very interesting demonstration.