



Soy9-2011 - Soybean Tillage Systems

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Soybean Tillage Systems

Purpose:

Two thirds of Ontario soybean production is conducted under a no-till or reduced tillage system. No-till has many proven economic and environmental benefits. However, producers are becoming increasingly dissatisfied with the performance of soybeans in no-till planting systems. Wet and cold planting conditions along with increased problems associated with corn residue has forced some growers to reconsider the viability of no-till production.

This project (2010-2012) will assess if no-till production can be significantly improved by fall and or spring single pass tillage systems, residue removal, or improved planting equipment. A variety of tillage systems will be tested in small plot trials, as well as the effects of precision seeding.

Methods:

Two small plot trials were established with 10 different tillage treatments as well as two planting systems in combination with three levels of corn residue removal. In the fall of 2010 four field scale trials were established and soybean yields were taken to harvest during the 2011 growing season. The previous crop at all sites was corn. This report will focus only on the tillage results.

The treatment list for the field scale trials included the following:

1. No-till planting
2. Fall RTS 2x*
3. Spring RTS 2x
4. Fall 1x + Spring 1x RTS

*RTS = Salford residue tillage specialist. 2x = two passes of the RTS

These treatments were randomized and replicated three times. Each treatment at the field scale was 20' wide by at least 1000' long. Trials were planted with a Kearney 15" vacuum planter with precision seed monitor. Yields were measured using a calibrated weigh wagon.

Results:

The spring of 2011 was wet and cool, which delayed planting to late May for most of these trials. Table 1, shows the results from the 4 trials set up in the fall of 2010.



Figure 1. A Salford RTS tillage unit (right) being operated in a field near Stratford, Ontario. The effects (right) of the Salford RTS on corn stalks and soil after being operated twice. Table 1. The Effects of Tillage on Yield (2011)

Treatment	Average Yield Across All Sites (bu/ac)	Yield Advantage (bu/ac)
No-Till	53.9	-
Fall RTS (2x)	55.9	2.0
Fall RTS (1x) + Spring RTS (1x)	55.5	1.6
Spring RTS (2x)	56.9	3.0

Small plot trials are being conducted in conjunction with these large scale field trials. The small plot trials are focusing on tillage treatments, as well as residue removal rates, precision seeding comparisons, and nitrogen applications. Table 2, below, shows the results of 5 tillage treatments, from 2 small plot trials, conducted in 2011.

Table 2. The Effects of Tillage on Soybean Yields at Two Small Plot Locations (2011, Lucan and Moorefield)

Treatment	Yield (Bu/ac)	Advantage (Bu/ac)
No-till	50.6	-
Fall RTS (2x)	51.2	0.6
Fall RTS (1x) + Spring RTS (1x)	52.9	2.3
Spring RTS (2x)	54.6	4.0
Fall Moldboard Plow + Spring Cultivate	54.7	4.1

These results show a similar trend as the field scale sites. The only significant difference is the poor performance of the fall RTS (2x) treatment.

Summary:

This was the first year of a three year study, so final conclusions will be made at the end of the study period. To date it would appear that spring time minimal tillage provided as much yield as fall minimal or fall primary tillage.

Next Steps:

The late planting of these plots may have influenced the results of tillage in 2011. In 2012 there will be a higher priority made to seed these trials early (late April to mid May). Of course this is highly dependent on weather conditions, and may still be unachievable.

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