



P.O. Box 1760, Carman, MB
Canada R0G 0J0
T 204.745.6488
F 204.745.6213
@MbPulseGrowers
www.manitobapulse.ca

MPSG ANNUAL EXTENSION REPORT

PROJECT TITLE: Soybean Residue Management

PROJECT START DATE: April 1, 2014
PROJECT END DATE: March 31, 2018
DATE SUBMITTED: March 31, 2016

PART 1: PRINCIPAL RESEARCHER

NAME:	Dr. Yvonne Lawley
POSITION:	Assistant Professor
INSTITUTION:	University of Manitoba
EMAIL:	Yvonne_lawley@umanitoba.ca
PHONE:	204-474-6504

PART 2: EXECUTIVE SUMMARY

Farmers throughout Manitoba are investing resources and time incorporating soybean residues using tillage. The objectives of this on-farm research project were to (1) evaluate soybean management strategies on-farm with field scale tillage equipment in a range of soybean growing areas across Manitoba, (2) evaluate the impact of soybean residue management strategies on subsequent crop performance and spring soil properties. (3) conduct research that provides useful information to farmers for making sound agronomic decisions about crop and land management, and (4) build a team of partners with complimentary skills for on-farm soybean research in Manitoba. During the summer 2015 growing season, wheat and corn test crops were grown in two trials established in the fall of 2014. Soybean residue management treatments were established in one new experiment in the fall of 2015. In the spring of 2015, daytime surface soil temperatures at planting were warmer in residue management treatments with tillage. There were no differences between residue management treatments at harvest. This project would not have been possible without the contributions of several farmers and equipment dealers. The energetic help of graduate students Patrick A. Walther and Greg Bartley, graduate students instrumental in this project. Use of brand names for equipment or crop variety names in this project does not represent endorsement by farmers, researchers, or funders of this project.

PART 3: PROJECT ACTIVITIES AND PRELIMINARY RESULTS

Project Activities

On-farm experiments focused on soybean residue management were established in the fall of 2014 near Boissevain and Winkler, MB and in the fall of 2015 near Carman, MB. Four tillage treatments were applied to soybean residue after harvest: 1) Standard tillage practice using a deep till cultivator or double disc 2) No tillage, 3) Vertical tillage conservative (residue left on soil surface), and 4) Vertical tillage aggressive (little residue left on soil surface). Pictures of these treatments can be found in the Appendix. These treatments were randomized and replicated four times throughout the field. Large field length plots were established to accommodate the use of farm scale equipment. The plot width accommodated planter width and one true combine pass to measure harvest yield. The farmer's own cultivation equipment was used for the standard tillage treatments and the vertical tillage equipment was provided by local equipment dealers. In the spring of 2015 a corn test crop was established in the experiment near Winkler and a wheat test crop was established in the experiment near Boissevain. In season measurements included: soil moisture, soil temperature, and wheat or corn plant stand counts. Aerial images of the experiment and NDVI readings were captured using cameras mounted on a UAV in August. At harvest, test crops were harvested with commercial combines and yield was measured with calibrated weigh wagons provided by MPSG.

Project Results

Soil temperature at 5 cm depth was measured at both Winkler and Boissevain experiments during the spring of 2015 before planting occurred at each site. The discing treatment at Winkler had the highest daytime temperature and lowest nighttime temperature the week before planting (April 18th to April 25th) compared to other treatments (Figure 1). Vertical till conservative appears to be the next warmest daytime temperature, which can be seen more clearly in Figure 2 for the day before planting. It should be noted that there was very little soybean residue left on this field after harvest occurred, regardless of treatment. In Boissevain, the vertical till aggressive treatment had the highest day time temperature at 5 cm the week before planting is (Figure 3). The no-till treatment had the coolest day time temperatures the day before planting.

There was no statistical yield differences between soybean residue management treatments at Winkler or Boissevain (Table 1). Wheat yields ranged from 67 bu/ac for vertical till high disturbance to 69 bu/ac for deep tillage and vertical till low disturbance in Boissevain. At Winkler, corn yields ranged 132 bu/ac for the no-till treatment to 134 bu/ac for vertical till low disturbance. It should be noted that Winkler received a significant hail event the morning of August 28th, 2015 that resulted in severe defoliation of the corn crop. The hail impacted the entire trial area, and resulted in reduced overall yield potential of the crop.



APPENDIX



Picture 1: Soybean residue management treatments (1) Vertical till – high disturbance, (2) Vertical till – low disturbance, (3) Conventional till – deep tillage cultivator, (4) No tillage at Winkler, MB

Table 1: Wheat yield at Boissevain and corn yield from Winkler for residue management treatments conventional tillage (deep tillage), vertical till high disturbance, vertical till low disturbance, and no tillage.

Treatment	Boissevain	Winkler
	Wheat	Corn
	----- bu/ac -----	
Deep Tillage	69	133
Vertical till - high disturbance	67	133
Vertical till - low disturbance	69	134
No tillage	68	132

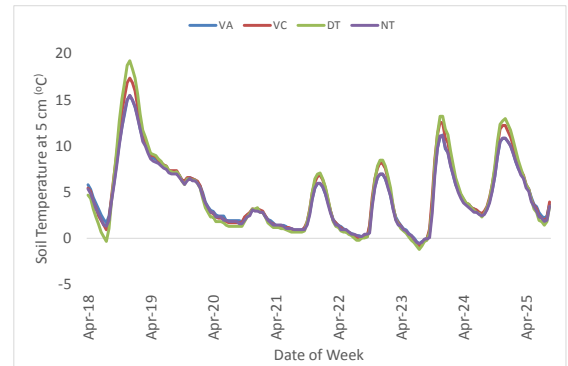


Figure 1: Soil temperature (°C) at 5 cm the week before planting (April 18 to April 25, 2015) at Winkler, MB for soybean residue management treatments vertical till aggressive (VA), vertical till conservative (VC), conventional tillage (DT), and no-tillage (NT).

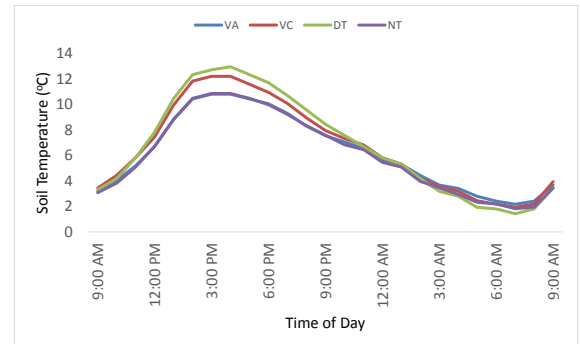


Figure 2: Soil temperature (°C) at 5 cm the day before planting (April 24 to April 25, 2015) at Winkler, MB for soybean residue management treatments vertical till aggressive (VA), vertical till conservative (VC), conventional tillage (DT), and no-tillage (NT).

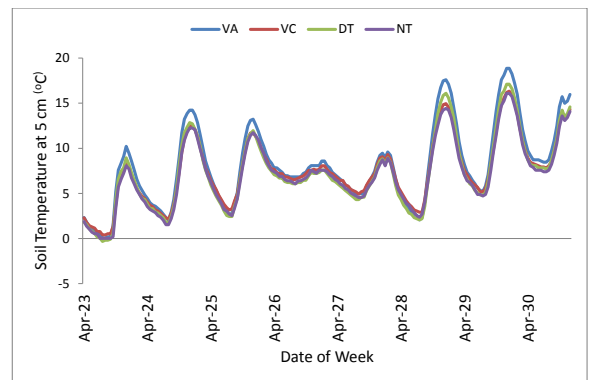


Figure 3: Soil temperature (°C) at 5 cm the week before planting (April 23 to April 30, 2015) at Boissevain, MB for soybean residue management treatments vertical till aggressive (VA), vertical till conservative (VC), deep tillage (DT), and no-tillage (NT).

