

Soybean Field-Scale Seeding Date and Rolling Trial

Brent VanKoughnet of Agri Skills Inc. was contracted to complete an agronomic evaluation of multiple seeding dates of soybeans in a field scale environment. In addition to seeding dates the effect of rolling at multiple growth stages was also evaluated.

The field scale trial was located just south and east of Carman Manitoba. Certified Richer soybeans (generously provided by Northstar Genetics) were planted with a John Deere max-emerge vacuum planter on 30 inch spacing on the dates listed below with the following soil temperatures and emergence dates:

Seeding date	Soil temp	Moisture Conditions	Emergence date
April 30	7-8 C	ideal	May 17 (17 days)
May 9	10 C	damp	May 22 (13 days)
May 17	11 C	ideal	May 27 (10 days)
May 24	14 C	ideal	June 4 (10 days)
May 30	12 C	ideal	June 8 (9 days)

Seed was all sourced from the same seed lot and was treated with a 1.5x rate of liquid inoculant in two batches, one for the first two dates and one for the next three dates. Inoculant extender was used on the second batch to ensure effectiveness over the extended period. The field has grown inoculated soybeans two other times in the past 6 years. The planting rate was 170,000 seeds per acre. Soil conditions varied from ideal to damp over the range of seeding dates.

Each seeding date treatment was approximately 1000 ft by 60ft and replicated in blocks seven times.

On June 2 and again on June 4, a 50ft roller was pulled across the field at right angles to the seeding date treatments in two separate strips. This layout effectively provides evaluation points for all 5 different crop stages repeated twice per treatment and over 7 replicates. Both rolling treatments took place under ideal conditions at 2:00 to 3:00 pm and 26 to 27 degrees Celsius.

Rolling crop stage and estimated damage

Seeding date	Crop Stage at rolling (see) photos	Visual crop damage
April 30	Early second trifoliolate*	none
May 9	Unifoliolate to Early first trifoliolate	none
May 17	Cotelydon to Early unifoliolate	none
May 24	Emerging (hooked)	none
May 30	sprouting	Not emerged /none

* many plants recovering from frost damage



A damaging frost took place on May 29/30 that effected the April 30 treatment only, especially where there was significant surface trash. In certain areas over 50% of plants were frozen back to the cotyledons and significantly delayed in maturity. The May 9 treatment, although also at a vulnerable stage, was unaffected due to the trash that was moved by the zero till coulters given the wet conditions at planting.

See attached photos



Eighteen 30 inch rows or 45 ft out of the center of each 60 ft treatment was harvested and weighed for all 5x7 (35) strips.

The table below summarizes the yield for each treatment over all seven replicates. Yield comparisons of rolled versus not rolled were not evaluated.

yield in bushels per acre

Replicate	30-Apr	09-May	17-May	24-May	30-May
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one	45.04	44.86	43.88	44.86	43.26
two	42.29	42.73	42.64	40.51	41.22
three	39.63	43.44	43.00	42.64	42.55
four	40.60	42.20	41.67	40.34	38.65
five	41.49	41.67	41.40	41.05	38.65
six	38.12	38.92	40.69	44.18	45.63
seven	39.98	39.63	39.36	42.38	42.91
Average	41.02	41.92	41.81	42.28	41.84

Harvest evaluation also revealed the following plant height, pod height and plant stands.

Seeding date	Plant height	Height of lowest pods	Plant stand/m ²
April 30	30 inches	3 inches	27
May 9	32 inches	3.5 inches	30
May 17	35 inches	3.5 inches	33
May 24	35 inches	3.5 inches	35
May 30	36 inches	3.5 inches	35

Conclusions

Yields were virtually identical across all seeding dates. The earliest seeding date (April 30) made a remarkable recovery after the frost. If the frost were any more severe we would have lost many plants instead of just delaying them. Alternatively, if the field had been trash free there would have been virtually no damage. There is a very fine line. The minimal disturbance provide by the zero till coulters under wet conditions made all the difference for frost susceptibility in the May 9 treatment. Variations in time to emergence were not as dramatic as would normally be expected. (18 days versus 9 days) Average day temperatures (and as result soil temperatures) were unusually low in the last two weeks of May. Under normal end of May temperatures and moist conditions soybeans can emerge within a week. Seeding date also had little to no effect on plant height or pod height. Harvest maturity was estimated to be no more than one week apart from earliest to latest even though seeding was 30 days apart. In the end, the earliest seeding dates exposed the crop to considerable risk and provided no additional yield return in this year.

Although rolling treatments were not taken to yield, there is no reason to expect any yield penalty given no visible injury of plants at any stage including what is normally considered the very vulnerable stage of hooking just prior to emergence. It should be emphasized that rolling conditions were absolutely ideal. Caution should be exercised at vulnerable stages and/or under less than ideal conditions.

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