

Determining the Optimum Seeding Window for Soybeans in Manitoba

Project Duration: 2017 -2019

Objectives: The objective of this study is to determine the optimum seeding window for soybeans across Manitoba growing regions. Traditional recommendations are to plant soybeans when soil temperature has warmed to at least 10°C, which is typically May 15-25 in Manitoba (Manitoba Agriculture). However, farmers have started to seed soybeans earlier and recent work by Dr. Yvonne Lawley and Cassandra Tkachuk (2017) supports this trend. They evaluated seeding dates across a range of soil temperatures from 6 to 14°C in 2014 and 2015; the earliest seeding dates maximized yield regardless of soil temperature and it was concluded that calendar date is a superior indicator. To update seeding date recommendations across a wider range of environments and using defined calendar dates, this study was initiated at Arborg, Carman, Dauphin and Melita in 2017 and will continue through 2019.

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Results

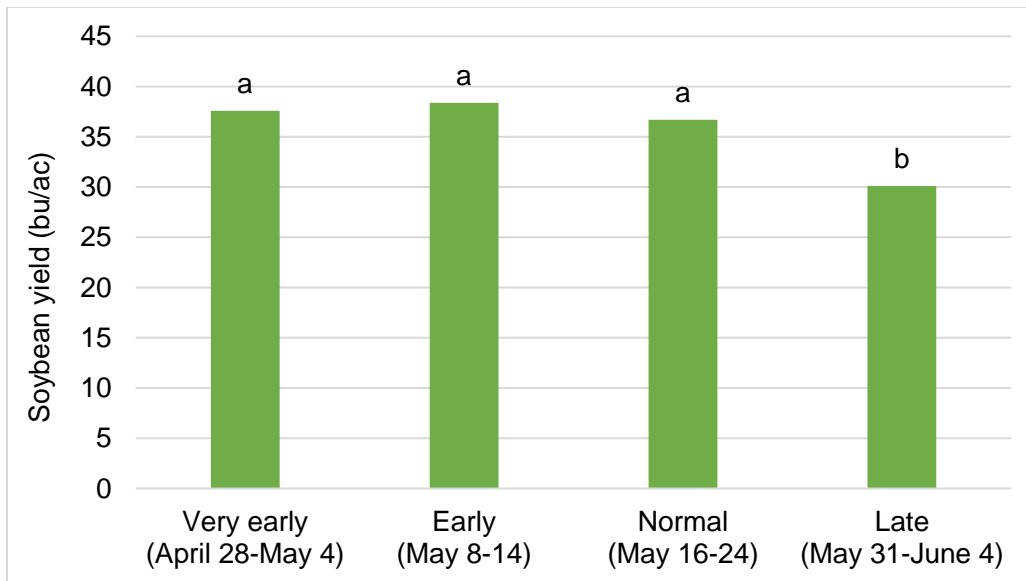


Figure 2. Soybean yield by seeding window among 7 site-years in Manitoba from 2017-2018. Means followed by the same letter are not statistically different at $P < 0.05$.

Project Findings

Overall, soybean yields were below average to average in these dry growing environments, ranging from 21-40 bu/ac, with the exception of Dauphin18 which yielded 64 bu/ac. Looking at individual environments (data not shown), yield maximization occurred in the first seeding window for 3 out of 7 environments, out yielding the second and third dates by 2-12%. In the other

4 out of 7 environments, yield maximization occurred in the second seeding window (early) by 1-14% compared to the first and third dates. In 2 out of those 4 environments (Carman17 and Melita17), soybeans in the first seeding date were beginning to emerge and were exposed to spring frost which is an important consideration for very early seeding (Figure 1). Yield differences among the first three seeding windows were statistically similar in 5 out of 7 environments and reduced yield with late seeding was consistent across all environments contributing to a meaningful overall effect of seeding date (Figure 2). Overall, soybean yield was statistically similar when seeded between April 28 and May 24, seeding beyond which reduced soybean yield by 20% on average. At Arborg18, soybean yield was statistically higher at the second seeding date compared to the first and last date. Due to this occurrence and associated frost risk observed at two other environments, farmers may want to consider waiting until the 2nd week of May to seed soybeans in Manitoba. Other measurements being collected include emergence, crop phenology, maturity and seed quality. This data continues to be analyzed to help refine overall seeding date recommendations.



Figure 1. Soybean seedlings in the first seeding window (April 28 to May 4) were emerging and exposed to the last spring frost in 2 out of 7 environments, making frost exposure an important risk with very early seeding.

Background/References/Additional Resources

Traditional recommendations are to plant soybeans when soil temperature has warmed to at least 10°C, which is typically May 15-25 in Manitoba (Manitoba Agriculture). However, farmers are starting to plant soybeans earlier and recent work by Tkachuk (2017) supports this trend. Tkachuk investigated soybean seeding dates across a range of soil temperatures from 6 to 14°C at Carman, Morden and Melita in 2014 and 2015. At three site-years, soybean yield was optimized with the earliest planting date.

Materials & Methods

The experimental design is a split plot RCBD, with seeding window as the main plot and variety as the split plot. The four seeding windows tested were “very early” (April 28 to May 4), “early” (May 8 to 14), “normal” (May 16 to 24) and “late” (May 31 to June 4). The short season variety S007Y4 and mid season variety NSC Richer were seeded within each seeding window. The preliminary combined analysis from 2017 to 2018 indicates that soybean yield was affected by the main effects of environment (E) and seeding date (SD), and their interaction (E x SD).

Data collected- plant height, lodging, days to maturity, yield

Agronomic Info (Stubble, soil type) - N= 138 lb/Ac, P= 30 lb/Ac, K= 600 lb/Ac

Fertilizer Applied – P = 15 lbs/acre at seeding

Pesticides Applied (doses and dates) –

Glyphosate @ 0.67 L/acre + Pursuit @ 85 ml / acre on June 12

Glyphosate @ 0.67 L/acre on July 5

Seeding Dates (PESAI Arborg)- May 4, May 14, May 23, May 31

Harvest Date- October 9