The Bean Report

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MANITOBA Pulse & Soybean GROWERS

THIS ISSUE...

QUICK LINKS

- **NEW!** Soybean fertility fact sheet
- Soybean seeding webinar
- Field pea production tips
- Current soil temperatures

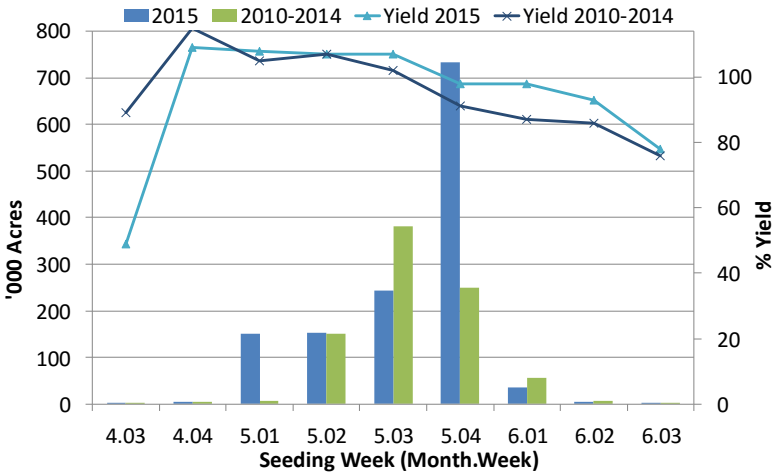


Figure 1. Soybean acres planted and relative yield by seeding week in Manitoba. Source: MASC

Planting Progress and Crop Update

Soybeans

The normal recommended planting window for soybeans in Manitoba is May 10 to 25. Historically, this is when 90% of the soybean crop gets planted (Figure 1). Yield potential remains at or above 100% during this time frame and risk of frost is minimized. Cool temperatures and recent scattered showers have led to a hold on soybean planting for most farmers. The four factors that need to be considered for soybean planting timing are as follows:

1. **Soil temperature** should be at least 10°C, >12°C ideal.
2. **Date** should be within 2 weeks of last spring frost date.
3. **Warm 24 hr forecast** for initial seed water uptake.
4. **Progress of other crops** and personal risk tolerance.

That being said, warm, dry conditions in early spring led to an early start for some farmers. It is estimated that up to 10% of soybeans were planted in early May. In the early part of May, dry soil conditions in some areas were leading to questions about seeding depth and tolerance to seed placed fertilizer. There was mixed success in 2015 with early planted soybeans but in general this can be risky. Prior to May 20 in most areas of Manitoba there is still a 75% chance of frost. Fortunately most early seeded soybeans have not emerged and should be protected from current cold temperatures. At emergence, soybeans can tolerate a light frost (-2°C). For information on weather conditions that affect frost and crop tolerance to frost, click here. Soil temperatures across the province can be monitored here.

Table 1. Days to emergence for soybeans based on soil temperature

Soil Temp.	Days to emergence
<10°C	Up to 3 weeks
10-12°C	Up to 2 weeks
>12°C	7-10 days (Optimum)

Soybean acres are expected to increase by as much as 10% from 2015. Excellent yields were achieved last year and new crop prices are strong.

Field peas

The majority of field peas have been seeded with land rolling and pre-emergent herbicide applications following. Many fields are emerging and at the 1-2 node stage. The growing point of field peas remains below ground during the early stages which makes them very tolerant to frost. They have been shown to withstand temperatures of –4°C to –6°C.

Weed control, cutworm monitoring and assessing plant stands should be top of mind for pea producers in the next few weeks. To optimize yield and avoid crop damage, ensure herbicide applications are made on time according to herbicide labels. For example, Odyssey can be safely applied up to the 6th node stage. The optimum established plant stand for field peas is 7-8 plants per square foot.

Field pea acres are expected to increase significantly in Manitoba this year; we could see up to 100,000 acres compared to 65,000 in 2015.

Soybean Seeding Depth

Seeding depth is important to ensure adequate moisture for germination and for good, even emergence. A soybean seed will imbibe 50% of its weight in moisture before germination. The recommended **seeding depth for soybeans is 0.75 to 1.5"**. There are certain environmental conditions and equipment factors to consider when determining if you should aim for the low or high end of this range. For example, dry soil conditions during the first week of May were leading growers to go deeper, closer to 2 inches. Going deeper than 2 inches may reduce soybean emergence and yield. Under warm, moist soil conditions, seeding shallower can result in good, rapid emergence. Understanding depth control of your equipment is also important when determining your target seeding depth. In some air seeders, depth can fluctuate from one end to the other by as much as ½" resulting in uneven emergence. Additional soil cover that may result from rolling is another consideration. If depth control is not ideal on your seeding unit and/or rolling flattens deep furrows, your target seeding depth should allow for variation of 0.5".

Dry Bean Planting Dates

Planting date studies in North Dakota have shown that typical late May to early June planting dates for all market classes of dry beans remain appropriate for optimum yield potential and reduced frost risk (edible beans are more sensitive to frost than soybeans). In studies conducted from 2012-2015, pinto, black and navy bean beans yielded the same between early, normal and late planting dates (Table 2). In fact there was a trend towards higher yields for normal and late planting dates alt-hough this was not significant.

Table 2. Dry bean market type yield response to early, normal and late planting windows in North Dakota 2012-15.

		Seed yield (cwt/acre)			
		Planting period[2]			
Market type (variety)	Trial No.[1]	Early	Normal	Late	LSD (0.05)
Pinto (Lariat)	6	19.6	19.5	20.5	NS
Black (Eclipse)	3	19.8	20.3	18.2	NS
Navy (Avalanche)	2	16.1	16.5	17.4	NS
Average		19.0	19.1	19.3	NS

[1]Pinto: Carrington=2012 (2 trials),2013-2015; Prosper=2012. Black: Carrington=2012, 2014-15; Navy: Carrington=2014-15.

[2]Early: May 11-24; Normal: May 22-June 5; Late: June 5-18.

Source: NDSU 2015

Rolling Field Peas

Land rolling is generally done immediately after seeding however concerns for soil erosion or inclement weather have caused delays. Peas can be rolled safely post-emergence up to the 5th node stage, with the following considerations:

- The shoot can be sensitive right at emergence, so it is suggested to wait until all seedlings have emerged.
- Roll during the warmest part of the day when plants are slightly wilted and the soil surface is dry. Avoid rolling when soils are wet or saturated to avoid compaction or crusting.
- Avoid rolling when the crop is stressed by frost, heat or herbicide application. Wait a few days between these "stresses" to allow the plants to recover.
- Prioritize weed control. If weed pressure exists and you are debating between rolling or spraying first, it is likely more economically beneficial to spray first. Yield of field pea can be reduced up to 25% by delaying weed control to 4 weeks after emergence (Harker et al. 2001).

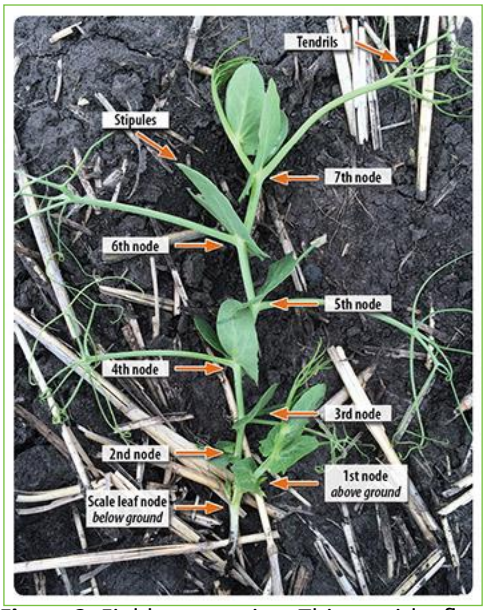


Figure 2. Field pea staging. This semi-leafless pea cultivar is at the 7th (above) ground node stage.

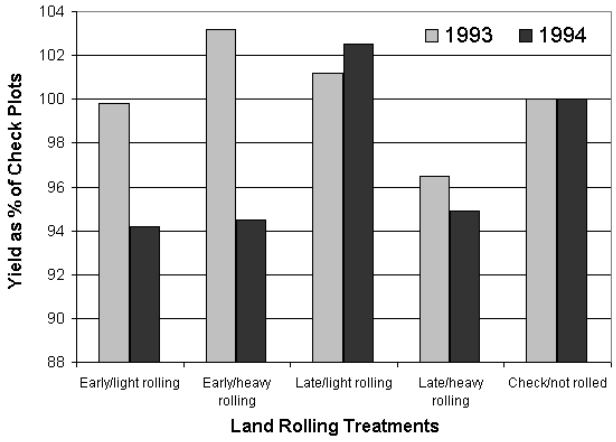


Figure 3. Effects of rolling field peas. Early rolling: immediately following seeding; Late rolling; 2-3 node stage; Light ballast: no water; Heavy ballast: water. Source: Alberta Agriculture

Soybean Seeding Rates

When determining the most economical seeding rate for soybeans, it is important to identify your target plant stand first, i.e. how many established plants you want in your field. To determine what the optimum plant stand for Manitoba is, a study was conducted from 2011-2013 at 8 locations across Manitoba, testing a range of soybean seeding rates from 80-200,000 seeds/ac in both wide and narrow row systems. The results of the study are shown in Figure 3. A quadratic equation was developed to explain the relationship between plant stand and yield. This quadratic relationship accounted for nearly 70% of the variability observed in the yield data, and several important conclusions can be made.

- Maximum yield is achieved at an established plant stand of 160,000 plants/ac (40 plants/m^2), and higher plant stands did not increase yield any further.
- Actual plant stands of 80, 120, and 140,000 plants/ac produced yields that were 84, 95, and 98% of the maximum yield respectively.
- In this study, various row spacings were tested and it was determined that optimum plant densities are consistent among row spacings.

However, the maximum yield produced at 160,000 plants/ac might not be the most economical plant stand. Seed cost, expected soybean price, and expected yield can help determine what the most likely economical plant stand will be. For example, assuming an expected soybean price of $10/bu, cost of seed at $65/unit, and expected yield of 35-40 bu/ac, the target plant stand that would provide the greatest relative return compared to 160,000 plants/ac is **140,000 plants/ac**. A change in any input value can result in a different target plant stand that provides the greatest relative return, therefore the most economic plant stand can change from year to year.

Once a target plant stand has been identified, you can determine your soybean seeding rate based on expected seed survival, i.e. how many seeds planted in the ground actually germinate, emerge, and contribute to an established plant stand. Factors that can effect expected seed survival are seed quality, equipment and handling, seedbed conditions, and pest pressure. On-farm studies in Manitoba have shown that the average seed survival is 71% for air seeders and 81% for planters.

Seeding Rates for Soybeans

Air seeders: 190-210,000 seeds/ac
(based on expected seed survival of 70-75%)

Planters: 170-180,000 seeds/ac
(based on expected seed survival of 80-85%)

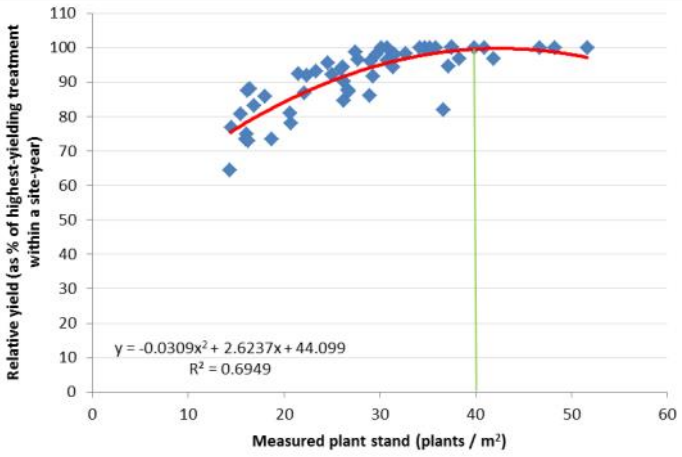


Figure 3. Relative soybean yield (% of average) based on measured plant stand (plants/m^2). Source: Mohr et al. 2014

Calculate your seeding rate based on seed survival and target plant stand.

Ex. Target plant stand = 140,000 plants/ac

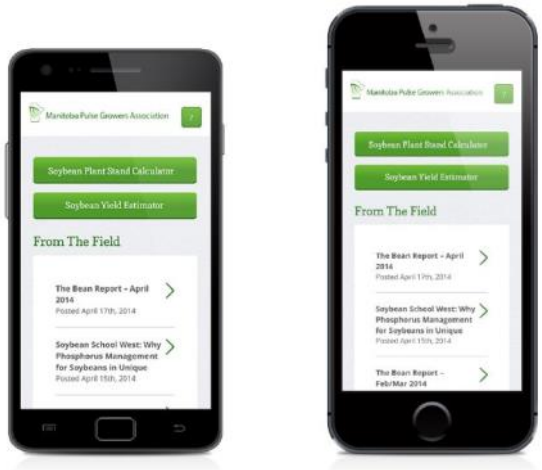
Expected seed survival = 71%

Seeding rate = Target plant stand/expected seed survival = 197,000 seeds/ac *(140,000/0.71 = 197,000)*

There are 140,000 seeds per unit and the unit weight or seeds/lb is usually listed on the seed bag for easy conversion to lbs/ac.

BEAN APP

To customize your target plant stands and seeding rates for your farm, use the MPSG Bean App. The FREE app currently features a seeding rate calculator, plant stand calculator and yield estimator. New tools are being added and will be available in June.



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