

Considerations for Seeding in less than Optimal Conditions

Fall 2019 was unusual in many respects. Abundant rainfall in September and October led to delayed and incomplete harvest of many crops as well as limited post harvest field operations. With the potential for delayed seeding, farmers may need to take steps to optimize seeding operations to maximize yield potential. Farmers are often well into seeding by mid-May and in some years seeding is almost complete by then. However, given the current situation this year may be different. Planting date is only one of many yield-influencing factors. The following are tips to utilize the other factors to assist in maximizing seedling emergence and establishment.

Avoid “Mudding” It In

Wait for fields to dry enough to carry equipment before starting spring field operations. Prior to starting seeding many farmers will need to manage crop residue and deal with rutted fields. Most farmers have the machinery capacity to ‘catch up’ quickly once soil conditions improve and fields can be confidently seeded. Farmers have planted 60% of the province’s wheat crop, and 42% of the canola crop, in a single week given good working conditions.

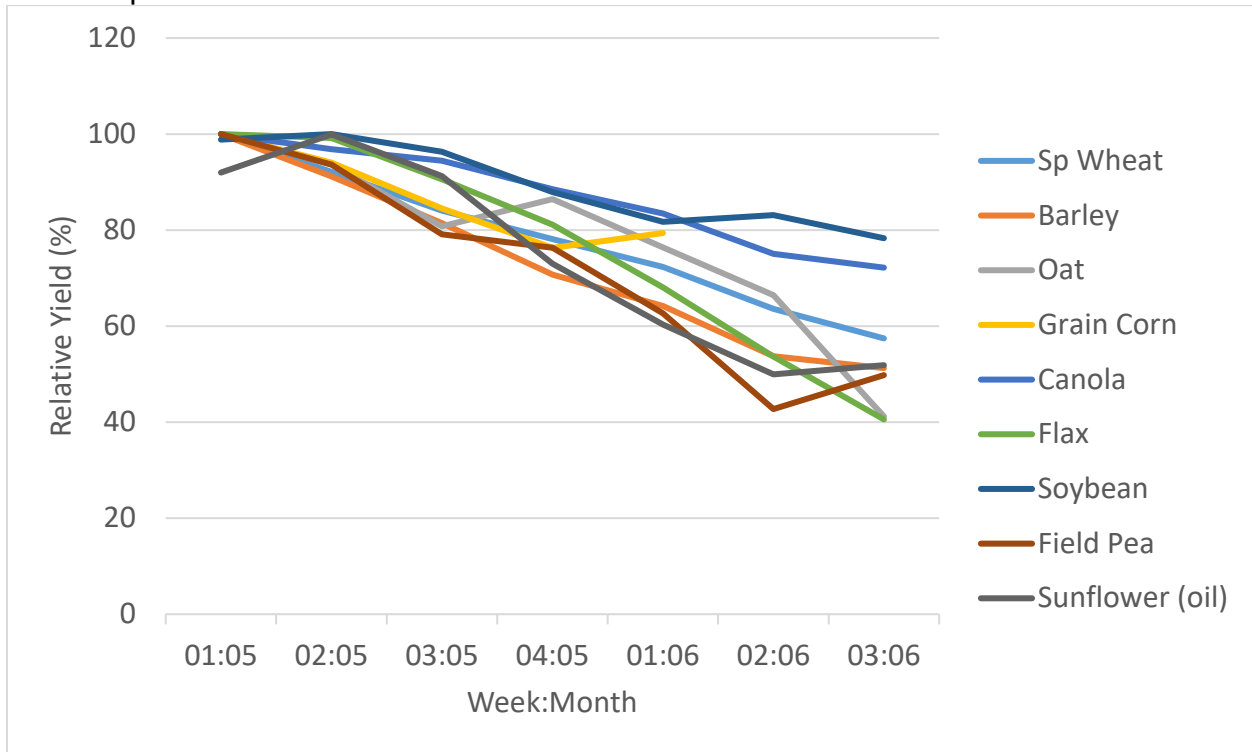
Early seeding favours higher yields, but does not guarantee them. Planting when the soil is too wet will lead to soil compaction, which can decrease yield much more than planting a few days later. Yield reductions resulting from "mudding seed in" are often greater than waiting a day or two for the soil to be ready.

Crop Choice

If seeding is delayed into the late stages of May, some crops have greater yield potential and higher economic return than others. Seeding plans may need to change depending on when farmers are able to access fields and prepare the soil for planting. By the fourth week of May, spring wheat, barley, grain corn, field pea, and sunflowers have dropped below 80% of average yield potential, while oat, canola, and soybeans remain above 85% of average yield potential. The figure below illustrates the relationship between seeding date and relative yield response. If seeding is delayed into June, consider Manitoba Agricultural Services Corporation (MASC) seeding deadlines for insurance coverage. Contact your local MASC agent or visit MASC’s website for further information:

www.masc.mb.ca/masc.nsf/crop_seeding_deadlines.html

Figure 1: Average relative yield reported to MASC during each sowing week for the selected crops grown in Manitoba for the period of 2010 – 2019. The vertical axis represents the percentage of average yield, and the horizontal axis represents the week each crop is sown.



Seeding for Success

The seeding operation is an important factor in maximizing yield potential, regardless of seeding date. Mistakes made during seeding are often irreversible, so extra care should be taken, especially when facing a late-planting scenario.

Seed Placement and Emergence

Delayed emergence is equivalent to seeding date delays, resulting in an equal reduction in yield. In order to have the crop emerge as quickly as possible, seeding should be as shallow as possible into moisture while still ensuring optimal seed to soil contact. While seeding quickly may be a priority in a late seeding situation, research has shown that uniformity of seed placement (depth) is one of the first things lost when planting speeds exceed 5 mph.

Determining soil temperature can indicate how quickly seed will germinate and emerge, and can assist in crop seeding sequencing. Measure soil temperatures, and aim to seed when the soil temperature at seeding depth reaches or exceeds the required minimum (Table 1). Targeting a shallower seeding depth can place seeds in warmer soil, which may result in faster germination.

Table 1: Minimum Germination Temperatures for Various Crops

	Cereals				Oilseeds			Pulses		
	Barley	Wheat	Oat	Corn	Canola	Sunflower	Flax	Peas	Soybean	Dry Bean
Temperature (°C)	3-5	4	5	10	5-10	6	4-9	4	10	10

Source: North Dakota State University, Alberta Agriculture & Rural Development, Canola Council of Canada, Saskatchewan Ministry of Agriculture

Plant Quality Seed & Consider a Seed Treatment

Using certified seed with high germination is optimal. If using farm-saved seed, test for germination and disease presence. Plant seeds with a good test weight, colour, size uniformity, and no indication of disease (shrivelled or discoloured seed). Seed treatments have been shown to have the largest benefits in cool and wet soils by reducing seed and soil borne disease concerns.

Target Plant Stand and Seeding Rate

A dense, uniform plant stand can enhance weed competition, increase yield potential, and compensate for lost plants due to insects, frost, and disease. Table 2 shows recommended plant stands for various crops. Use the table and the following formula to determine the seeding rate required to achieve the desired final plant stand.

Table 2: Target Plant Population for Various Crops

	Cereals				Oilseeds			Pulses		
	Barley	Wheat	Oat	Corn	Canola	Sunflower	Flax	Peas	Soybean	Dry Bean
Plants/ft ²	22-25	23-28	18-23		5-8		30-60	7-9		
Plants/ac (,000)				30-36		18- 22			140- 160	70- 125*
Mortality rate (%)	10-15	10-15	10-15	15	20-60	10	40-50	15- 20	15-20	15-20

*Dependant upon row spacing and bean type.

Source: Manitoba Agriculture and Resource Development, Canola Council of Canada, Flax Council of Canada, Manitoba Corn Growers Association, Ontario Ministry of Agriculture, Food and Rural Affairs

$$\text{Seed Rate (lb/ac)} = \frac{\text{Target plant stand/ft}^2 \times 1000 \text{ kernel weight (g)}}{\text{Expected seedling survival}^* \times 10}$$

*Expected seedling survival is used in its decimal form (90% = 0.9) and includes percent germination and seedling mortality

Ensure Adequate Fertility and Reduce Weed Competition

Provide adequate nutrition to meet your target yields and limit weeds with a pre-seed burn-off when necessary. Reduced plant competition and increased fertilizer availability for the crop will result in better crop establishment. Seeding later in the spring reduces crop response to applied nitrogen since yield potential is lower and in-season mineralization more closely matches uptake. Response to phosphorus fertilizer also declines as soil temperatures warm up, as warm soils permit plant roots to explore and access more soil P.

Take Home Message

Many farmers have the ability to plant many acres in just a few days, and many crops in our rotation maintain a good yield potential until the beginning of June. While early planting favours higher yields, it does not guarantee higher yields or seed quality at harvest. Getting the crop off to a good start by seeding into a good seed bed once the soils permit equipment access should be the first priority. Regardless of when planting begins, best practices should be used to ensure the crop is reaching its yield potential.