

Successful Winter Wheat Seeding

The key to a successful winter wheat crop is getting a good start in fall. Having a healthy, vigorous plant at freeze-up means better winter hardiness, resulting in plants that resume growth early in spring and take advantage of spring moisture. To successfully seed winter wheat, planning begins far in advance of the August 20 to September 15 seeding window.

Planning

Experienced growers begin planning 6-8 months before seeding when spring seeding plans are being worked out. Stubble must be available in the above seeding window, so growers must use spring seeding to maximize their chances. In most areas this means seeding Argentine canola, flax and mustard in late April or early May or barley and oats in mid May. A grower tool called the WeatherMan-ager is available at www.wintercereals.com to model seeding dates and maturity of different spring crops in various locations across the prairies. Planning when spring stubble will be available increases the seeding window and allows growers to seed earlier, an important part of successful winter wheat production.

Stubble

Stubble for winter wheat must be harvested in time for seeding but it also must provide adequate snow trapping to insulate the crop through the winter. Snow Trapping Potential or STP is used as a guide to determine whether a stubble field will provide adequate snow trap.

$$STP = \frac{\text{stubble height}(cm) \times \text{stems per } m^2}{100}$$

A post seeding STP of 20 or higher is acceptable for winter wheat. The impact of stubble disturbance must be considered before seeding, so target a pre-seeding STP of 40 or more. This will allow for knocked down stubble during the seeding operation. Cereal stubble generally has a pre-seeding STP of 80 or greater while oilseeds are often in the 30-50 range. Chemfallow is more fragile so STP should be substantially higher than 40 to result in a post-seeding STP of 20 or more. Stubble from pulse crops is very fragile and usually does not retain enough growth through the disturbance of seeding to yield a post-seeding STP of 20 or better.

While wheat and durum provide an adequate amount of stubble, diseases transmission is a risk; therefore winter wheat seeding is not recommended on these stubbles.

Field Preparation

Preparing a field for winter wheat begins at harvest time.

- Swathing or straight cutting the spring crop as high as possible will increase STP.
- As with all direct seeded crops, straw and chaff should be carefully spread the full width of the cut to avoid straw or chaff rows. These rows can inhibit germination and cause temporary immobilization of important nutrients like nitrogen.
- Harrowing should not be used as a method of straw and chaff management as it will knock down too much stubble and reduce STP.
- An application of glyphosate is the other important part of preparing a field for winter wheat. Pre-harvest application is preferred to control perennial weeds, while post-harvest application

will also control weed and volunteer crop germinating after harvest. Regardless of timing, a key aspect of the burn-off is to kill all spring cereal plants before winter wheat emerges. Without this, a “green bridge” is created where wheat streak mosaic can be transferred from spring cereals to the newly seeded winter wheat. The spring cereals should be completely dried down before the emergence of the new winter wheat crop therefore spraying should be done 7-10 days before seeding.

Seeding

Winter wheat production has become a successful practice across the prairies due in part to the advancement of direct seeding. Seeds can be placed at a uniform, shallow depth while stubble can be left standing. Therefore direct seeding of winter wheat is a must for successful production.

Date

Seeding date is important because plants that enter the winter with well established crowns are most durable. To enter winter with an established crown, optimal seeding date varies across the prairies (table 1). As a general rule, seeding dates should be earlier as one moves north and east on the prairies. Overall the range of dates is August 20th to September 15th. Seeding too early can result in excessive growth in the fall and plants that are less resistant to winter injury. However, early seeding is usually not a problem as removal of the previous crop rarely occurs early enough for this to happen. Late dates of seeding are a greater threat to the crop, usually resulting in poor establishment and lower winter-survival potential. Plants that enter the winter with well-developed crowns (area at the base of the shoot from which secondary roots develop) are normally most desirable. However plants with two to three leaves by freeze up are not usually disadvantaged.

Table 1. Optimal date for winter wheat seeding

Location	Date
1. Lethbridge, Alta.	September 9
2. Maple Creek/Estevan, SK.	September 6
3. Kindersley/Swift Current, SK	September 3
4. North Battleford/Saskatoon/Wynyard/Yorkton SK.	August 30

(Dr. Brian Fowler 2002)

Depth

Fall seeding usually mean seeding into dry soil, therefore growers are recommended to seed as shallow as possible (no deeper than one inch). Winter wheat seeds need only a small amount of moisture to initiate germination therefore shallow seeding when the soil is dry allows the seed to precipitation to begin germination. As seeding depth increases more precipitation is needed to initiate germination and emergence time is delayed (table 2).

** The one notable exception to seeding shallow is if the top inch of soil is dry but moisture is available at 1.5-2 inches. In that case seeding to moisture may be acceptable.

Table 2. Effect of soil temperature and seeding depth on time to emergence of spring wheat

(De Jong and Best, 1979)

Soil Temperature (C)	Time to Emergence (days)				
	Seeding Depth (inches)				
	1/2	1	2	3	4
5	17	21	23	29	37
12.5	6.8	7	8.8	11	11.5
19.4	3.8	4	6	6.5	7
26.7	3.2	3.8	4.5	5	5.5

Rate

Winter wheat grower's seeding rate should be sufficient to establish a targeted plant population. Optimal population is a range from 20 to 30 plants per ft². Higher plant populations are generally of most benefit in higher moisture areas however most crops will benefit from higher populations as they increase main head formation and even maturity. These densities usually translate to a 1.5 to 2.5 bushel per acre seeding rate. For further information on seeding to obtain a specific plant population see the Seeding Rate Calculator on the Alberta Agriculture, Food and Rural Development website - <http://www1.agric.gov.ab.ca/app19/calc/crop/seedcalculator.jsp?crop=Winter+Wheat>.

Fertilizer

The best guide for fertilizer needs is a soil test prior to seeding.

Immobile nutrients such as phosphate and potassium should be placed in or near the seed row at seeding time (maximum of 50 lbs of combined P₂O₅ and K₂O in the seed row). Phosphate is important for early growth as well winter hardiness and should be applied at 20-30 lbs of P₂O₅ per acre with depending on soil test recommendations. Potassium can be applied as needed per soil test requirement.

Mobile nutrients such as nitrogen and sulfur can be applied at low rates in the seed row, side-banded, mid row banded or top-dressed in the spring. All nitrogen and sulfur needs do not have to be applied at seeding, as there is a danger that if the plants access too much nitrogen in fall winter hardiness may be reduced. For more information on fertilization see FARM FACT Winter Wheat Fertility.

Summary

The key to a successful winter wheat crop is getting a good start in fall. Growers who plan their previous crop, select proper stubble, prepare their field and use optimal seeding date, rate and depth with adequate fertilizer increase their chances of growing a successful crop. These factors all contribute to the establishment of a healthy, vigorous plant in fall, the first step towards harvesting the best crop possible next summer.

