AGRI-FACTS
Practical Information for Alberta's Agriculture Industry

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# Winter Wheat in the Parkland Area of Alberta

Winter wheat production has historically been concentrated in southern Alberta. In fact, winter wheat was the primary wheat crop in southern Alberta until the development of Marquis red spring wheat.

Winter wheat seeded acres and yield have been inconsistent outside the traditional growing areas. The primary reasons for this variability in production have been poor winter survival in the lower snowfall areas of east-central and eastern Alberta and poor agronomic adaptation for the Parkland and Peace River areas. Recent variety developments and changes in land management practices are now making winter wheat production possible in these non-traditional areas, especially in the Parkland region of central Alberta.

## Advantages

Winter wheat offers producers the following advantages:

- provides soil cover during the fall and winter, reducing the potential for soil loss due to water and wind
- spring moisture is not lost from a seeding operation
- uses early spring moisture in dry areas more efficiently than spring cereals
- when spring weather conditions make seeding difficult, winter wheat is already established in the field
- may yield 10 to 15 per cent higher than Canadian Western Red Spring wheat
- matures earlier than spring cereals, spreading out harvest operations and reducing the potential for grade losses due to early frost
- after a bad spring or crop loss due to weather, producers can still get partial compensation by seeding a winter crop in the fall for additional yield
- provides another tool for weed management since the crop is seeded and growing when weeds in a spring-cropping situation have had little crop competition (fall and early spring)

## Parkland eco-region suited for winter wheat production

The agro-climatic conditions in the Parkland area of Alberta differ greatly from those in the traditional winter wheat growing areas. In southern Alberta, winter cereals are chosen as a way to use spring moisture to obtain high returns. In the Parkland area, the objective is to produce an early maturing crop that will diversify crop rotations. The Parkland area has a relatively short, cool season and produces spring wheat, barley, canola, oats and peas. Because of the short, cool season, cropping options are somewhat limited.

The Parkland area traditionally produces CWRS and CPS spring wheats. Early frost, which can occur quite often in the Parkland, can significantly reduce the grade of spring wheat. Winter wheat may mature in August, well before a fall frost is likely (Table 1). Consequently, the use of winter wheat to replace a proportion of the spring wheat in the rotation may reduce the risk of grade loss in this short season area.

**Table 1. Average maturity dates for CDC Clair winter wheat compared to other cereals in the Parkland (Black soil) and the Parkland-Prairie transition (Dark Brown soil)[1]**

| | Soil Zone | |
|---|---|---|
| Crop | Black[2] | Dark Brown[3] |
| CDC Clair (winter wheat) | August 18 | August 12 |
| AC Crystal (CPS) | September 10 | August 30 |
| AC Barrie (HRS) | September 5 | August 20 |
| Pika (winter triticale) | August 22 | August 15 |
| Muskateer (fall rye) | August 10 | August 6 |

*[1] Varieties are not current but provide an example of relative maturity dates. [2] Black soil zone locations were Lacombe and Olds. [3] Dark Brown soil locations were in Botha and Trochu*

A long-held belief has been that winter wheat will readily winterkill when grown in Parkland areas. A study by Environment Canada and the Crop Development Centre (Saskatoon), however, ranked the risk of winterkill in the Parkland area (Olds to Barrhead and the foothills to Stettler, which includes Black and Dark Brown soils) as no worse than that in the conventional winter wheat area.

The Stettler to Coronation area (Parkland-Prairie transition area) and the northeastern Parkland have a slightly higher risk for winterkill. The main factor in the ranking was adequate snow cover, which is essential to protect the crop from severe winter air temperatures.

The winter hardiness of current varieties is not a limiting factor for winter wheat production in most of central Alberta. For many years, Norstar was the variety with the best winter survivability, but it was not really suited for Parkland conditions because it was tall and prone to lodging.

Several other varieties are now available with winter survivability as good as or better than Norstar, and these varieties also have superior agronomic characteristics (Table 2).

Fall rye has excellent winter survivability and is the standard that other winter cereal crops (winter wheat and winter triticale) must be measured against. Many winter wheat varieties now can survive winter almost as well as fall rye.

Research at the Field Crop Development Centre in Lacombe has indicated it is possible for winter wheat to combine early maturity with yields similar to CPS wheat. The risk of significant winterkill can be greatly reduced if planting occurs between the third week of August and the first ten days of September.

# Successful production practices

Winter wheat works well when direct seeding into standing stubble of early harvested crops (greenfeed, silage, or even or early canola). The standing stubble aids in snow trapping, which reduces the risk of winterkill and the risk of soil erosion from wind or water.

Winter wheat must be seeded shallow, less than 1 inch (2.5 cm), even in a dry fall because winter hardiness decreases rapidly with deeper seeding. Successful production is often associated with seeding equipment

**Table 2. Winter wheat varieties for Alberta**

| **Canadian Western Red Winter "Select" varieties** | | | | | |
|---|---|---|---|---|---|
| **Variety** | **Relative maturity** | **Protein %** | **Height (cm)** | **Winter survival** | **Lodging** |
| AAC Gateway | M | 12.9 | 77 | fair | very good |
| CDC Buteo | M | 12.3 | 91 | very good | fair |
| Emerson | M | 12.7 | 86 | good | good |
| Moats | M | 12.7 | 91 | good | fair |
| Radiant | L | 12.0 | 90 | very good | very good |

*Results from test years 2007 - 2009*

that does minimal soil disturbance and maintains the snow-trapping ability of anchored stubble and crop residues.

The effect of fall-applied fertilizer on winter survival has been debated for years. Current research indicates that winter survival is not related to fall fertilization, as long as application rates are reasonable for moisture conditions at seeding. Phosphorus in the seedrow is effective and side-banded nitrogen eliminates the potential for seed-placed fertilizer salt damage.

The use of ESN is an effective way to place nitrogen with the seed and avoid seedling burn. Recommendations derived from research suggest producers can put three times the safe level of regular nitrogen with the seed if it is environmentally sustainable nitrogen (polymer-coated N). If nitrogen is not applied at seeding, it can be broadcast early in the spring, but this practice may not be as effective as fall fertilization. Spring surface-applied nitrogen is subject to losses to the atmosphere and at least a centimetre of rain is needed to bring the nitrogen into the root zone.

In the spring, the winter wheat plants may look as if all the leaves and roots are dead. This appearance does not mean the plants cannot recover. If new, white roots appear from the crown, the plant is alive and likely to recover.

To assess the viability of a crop, dig up a few plants in the early spring, take them into the house and try to grow them for 7 to 10 days. If new roots develop, the plants are alive. Remember that winter wheat has a great ability to recover.

If 50 per cent of the plants are killed, the yield potential has only slipped to about 90 per cent of what it would have been with no kill. At 30 per cent plant survival, the yield potential is still 75 per cent of what the crop would have yielded with no winterkill.

Winter wheat in a rotation system in the Parkland area of Alberta has potential advantages in comparison to available grades of spring wheat. The use of winter wheat in a rotation requires careful consideration. Although winter wheat matures significantly earlier than spring wheat, harvest and replanting of the crop may overlap. Consequently, it may be necessary to hold enough seed over each year to replant in the subsequent fall.


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