

## Winter Cereals For Pasture

Livestock producers can use winter cereals to produce pasture in the same year that it is needed. Winter cereals can supplement perennial pasture or increase the carrying capacity of a livestock operation.

Winter cereals are the first choice for growing annual pasture because seed is readily available and the crop is easy to establish. The best cereals to use are fall rye, winter wheat and winter triticale. They may be fall seeded and fall grazed, or overwintered and grazed in the spring. Winter cereals may also be seeded in the spring and used in the year of seeding.

### Fall seeding

Grazing fall-seeded winter cereals is a common practice in Alberta. Winter cereals may be grazed in the autumn as soon as they have enough top growth, or they may be overwintered and used as early spring pasture. Fall rye is the hardiest of all the winter cereals and the most resistant to diseases that may injure or kill the crop in the winter and early spring. Producers who need early spring pasture should consider fall rye as their first choice. Winter wheat and winter triticale can be used for pasture in winter wheat growing areas.

Fall-seeded winter cereals should be seeded by August 15. This will ensure pasture is available in the autumn. Seeding after mid-August may also decrease the winter hardiness of the crop and reduce production in the following spring. Seeding rates vary with the moisture availability. Seed at 80 lb/ac in low moisture areas, and 110 lb/ac in higher rainfall areas and on irrigated land. The higher seeding rates ensure an adequate plant population, which will maintain maximum forage production.

Use a soil test to determine how much fertilizer to apply. Higher rates of nitrogen increases the amount of top growth available for grazing in the autumn. If a winter cereal is needed in the spring for grazing, reduce the fall application of nitrogen and ensure that phosphorous levels are adequate. Research has shown that high

nitrogen levels decrease the cold hardiness of plants, whereas phosphorous enhances the overwintering ability of the plants.

Grazing can begin when there is about six inches of top growth. Winter cereals continue to stay green and produce top growth until it snows, providing the initial frosts are not severe and the days are warm enough for the plants to grow. Plant growth slows as daytime temperatures fall. In central Alberta, growth begins slowing down in late August and is significantly reduced after mid-September.

Winter cereals begin growing very early in the spring. Fertilize the crop with nitrogen early in the spring to promote growth. Spring grazing of fall-seeded winter cereals requires careful management to get the maximum pasture production. Fall-seeded winter cereals go through a cold period (vernalization) which promotes seed production. These crops are quick to produce seed heads in the spring and by early May the initiated seed heads emerge from the crown within the tiller. If the seed heads are grazed off, seed yields will be severely affected as will plant regrowth for pasture production. This means producers should ensure the tillers are grazed while they are still in the leafy state, before the stems elongate. Growing conditions will determine how many tillers the plant produces.

The best way to keep plants in a vegetative state of growth is to use a rotational grazing system. By keeping the rotations short and using an adequate number of livestock, the winter cereals will tiller and produce leafy material for pasture.

### Spring seeding

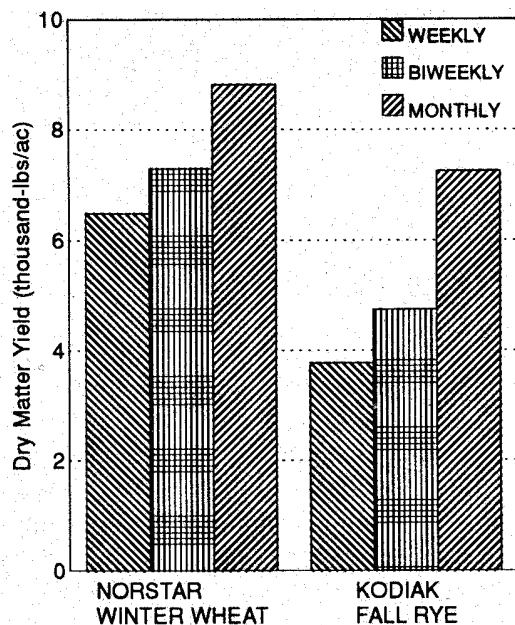
Spring-seeded winter cereals make excellent pasture in the year of seeding. They produce only vegetative top growth through the summer and autumn. Spring-seeded winter cereals regrow well and are well-suited for use in rotational grazing systems if they can be rested from three to four weeks between grazings.

Seeding rates are similar to those for fall-seeded winter cereals, 80 lb/ac in drier areas and 110 pounds/acre in the higher rainfall areas.

Ensure that phosphorous, potash and sulphur levels in the soil are adequate before seeding. Under good moisture conditions, winter cereals respond well to an initial nitrogen application of 70 - 100 lb/ac. Split applications applied after every grazing or every second grazing may be more beneficial because there is less leaching and volatilization of the nitrogen. When applications of nitrogen are split, production of top growth can be controlled. High applications of nitrogen may be wasted or may increase nitrate levels in plants during droughty weather.

Grazing can begin once the crop is six inches tall. A good rule of thumb is to permit grazing when the drill rows have filled in and are no longer visible. This takes about 6 weeks. Research in central Alberta indicates fall rye will be ready to graze two or three weeks earlier than winter wheat. Winter triticale is ready for grazing sometime between the two. These crops are easy to manage in a grazing system because they will not head out. However, winter wheat is very susceptible to leaf diseases. If it is left too long between grazings, the quality and yield may be affected by them.

Under good growing conditions, a rotational grazing system using a one-week grazing period and a three-week rest period has been the most productive method of grazing spring-seeded winter cereals (Figure 1). Production decreases in the autumn as daytime temperatures drop. Stocking rates and rotations may have to be adjusted to compensate for the lower production.



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Figure 1. Frequency of clipping on regrowth of irrigated pasture at Brooks.

Spring-seeded winter cereals may be grazed well into the autumn. Fall rye and winter triticale tend to be more productive in the autumn than winter wheat.

## Intercropping

Growing two crops together is known as intercropping. Spring cereals and winter cereals work well together when they are intercropped and may be used as summer and fall pasture or as silage/fall pasture.

### Intercrop - pasture

Spring cereals seeded alone are difficult to manage for grazing because it is hard to keep them in a vegetative state. The nature of the plant is to produce seed in the year of seeding, which reduces the productivity of the plant as a pasture forage. However, spring cereals are better than winter cereals at producing top growth early in the spring. This characteristic is important for producers who need early pasture in the year of seeding.

Pasture that is seeded in the spring with 20 - 25 lb/ac of spring oats or barley added to the 100 - 110 lb/ac of winter cereal will be available for grazing earlier than a winter cereal seeded alone. Depending on growing conditions, mixtures with oats or barley should permit grazing to begin one to two weeks earlier. Winter wheat benefits more from mixing with spring cereals than fall rye. Livestock will graze the spring cereals until the winter cereals are growing well. Grazing of spring cereals should begin before they reach the boot stage. By the time spring cereals are grazed twice, the winter cereals will be well-established. Grazing of the spring cereals declines as they begin to produce seed heads and the vigorously growing winter cereals take over as the main source of pasture. Intercropping can be used through the summer in the same way as winter cereals seeded alone.

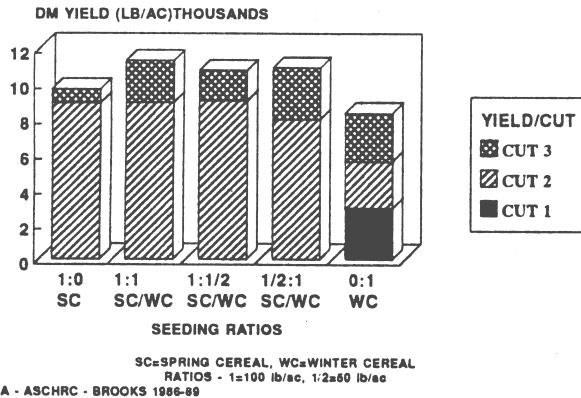
### Intercrop - silage/pasture

A silage/pasture intercropping system, which uses spring cereal as a silage crop and winter cereal as pasture after the silage has been removed, provides a higher quality silage crop along with high quality pasture that is productive well into the autumn. Research at Lacombe and Brooks indicates that the intercrop regrowth in the autumn has a crude protein of 21.2 per cent and digestibility (IVDOM) of 75.6 per cent.

The winter cereals and spring cereals should be seeded together at 3/4 rates of each crop, depending on the moisture conditions in the area (Table 1).

**Table 1. Intercrop seeding rates (lb/ac)**

Crops	Moisture conditions	
	dry	wet
Winter cereals	60	80
Barley	55	75
Oats	45	60



*Figure 2. Seeding ratios for intercropped spring cereals/winter cereals.*

This seeding rate should produce an adequate balance between silage and pasture production. Research at Brooks indicates that increasing one crop to the full seeding rate will increase production of that component and reduce production of the other component. This gives a producer some flexibility in managing for the component that is the most important to the livestock operation.

A crop grown in a silage/pasture intercropping system should receive the same amount of fertilizer as a normal silage crop plus a top dressing with nitrogen after silaging to promote the growth of the winter cereals for pasture. The amount of fertilizer to top dress should be based on soil tests taken after the silage crop is removed.

A healthy winter cereal stand must be maintained in a silage/pasture system. Lodging of the spring cereal crop will kill the underseeded winter cereal. The silage crop should be harvested early (two to three weeks after heading) to allow the winter cereal enough time to regrow and produce good fall pasture.

Leaving the spring cereal to be harvested for grain will weaken and thin-out the underseeded winter cereals, substantially reducing regrowth by the winter cereal. The silage crop should be cut to three inches to take advantage of the quality and quantity of winter cereal in the mixture.

**Table 2. Quality of intercropping silage**

	Protein %	Digestibility %
Oats	10.2	58.0
Barley	10.6	64.3
Winter cereal	19.5	74.7
Oats/winter cereal	14.0	62.8
Barley/winter cereal	12.8	66.8

Source: Baron, Salmon, Najda and de St. Remy - Lacombe and Brooks

Results from Lacombe and Brooks (Table 2) indicate the quality of the silage may be improved by the addition of the winter cereal. Protein levels increased by three per cent and digestibility by four per cent when a winter cereal is in the silage crop. Silage yields may be reduced by 10 - 15 per cent, depending on the amount of moisture the crop receives during the growing season. The drier areas may expect lower yields while the higher rainfall and irrigation areas may experience no yield reduction at all.

The crop may be grazed once the winter cereals has regrown to six or eight inches. Winter cereal regrowth in an intercropping system has fewer tillers than a normal spring-seeded winter cereal. The tillers are much larger and stand more erect, which makes them easier to graze. If the regrowth is grazed too low or trampled by farm equipment, the plant will produce more tillers that are finer and grow close to the ground, much the same as winter cereals seeded alone. Ideally winter cereals should only be grazed as low as the tops of the spring cereal stubble. This allows the plant to continue growing upright and retain enough leaf material to encourage quick regrowth. There are indications that the final fall grazing should remove as much of the top growth as possible. This removes the leaf material that snow molds and other pathogens feed on, thus reducing "winter kill" by pathogens.

Grazing of regrowth works well in a rotational grazing system. The winter cereals regrow quickly, depending on the moisture, fertility and daytime temperatures in September, October and November. If temperatures decline gradually in the autumn, winter cereals can remain green and viable, even down to -20°C.

Fall rye and winter triticale are the most productive winter cereals in an intercropping system. They are more productive than winter wheat in the autumn months. Winter wheat is also more susceptible to plant diseases when underseeded to spring cereals.

## Problems associated with grazing winter cereals

Livestock grazing winter cereals should have access to a complete mineral mix. Low micro-nutrients levels in the soil may lead to mineral deficiencies in the livestock when they are grazing the winter cereals. Consult with a livestock nutritionist to determine the minerals needed in the mineral mix.

Nitrate poisoning may occur if the winter cereals have been fertilized with high levels of nitrogen fertilizer. Stress from drought, hail or frost may increase the nitrates in the plants to levels that are toxic to livestock. Livestock can withstand high levels of nitrates better when they are grazing than when they are feeding on plant material harvested as greenfeed or hay. Rumen microbes are able to adjust to higher levels of nitrates over time, which enables livestock to graze winter cereals in the autumn with a lower risk of nitrate poisoning.

Fall rye is not as palatable as winter wheat or winter triticale, but animals will readily graze fall rye if there is no other choice. Palatability is not a problem when grazing fall rye.

Winter cereals are high in protein and low in fibre. This may cause diarrhea problems when livestock are first introduced to winter cereals. This condition will last for a couple of weeks before the feces becomes firmer. The high quality along with the high moisture of the forage will keep the livestock "loose" throughout the grazing period.

## Summary

Producers who need additional pasture may benefit by using winter cereals. These crops are a source of high quality forage that can easily be used for pasture.

Winter cereals can be used to maintain the pasture base while perennial pasture is being rejuvenated or reseeded. The quality of the crop for forage in the autumn allows producers to maintain cattle gains as perennial pastures become unproductive and deteriorate in quality.

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