



PRODUCTION

Annual Crops for Greenfeed, Silage and Grazing

April 2008

Annual crops can provide emergency or supplementary forage in all areas of the province. Some producers also consider annual forage because it is a short-term land commitment. Spring or winter cereal crops are both well suited to these roles. They are easy to seed, establish quickly and can provide pasture later in the growing season when perennial production is decreasing and demand is at its highest.

Oats, barley and triticale have traditionally been the most widely used cereals for greenfeed, silage and pasture. However, many other crops are also being used to lesser extents. Spring cereals are a good choice if the crop may not be needed exclusively for grazing. Spring cereals produce much of their forage production eight to 10 weeks after seeding. (Figure 1) This growth is difficult to stockpile for late season use without considerable wastage from trampling and maturity. If conditions warrant, these crops can easily be harvested for greenfeed or grain or swath grazed.

Spring cereals, however, do not re-grow well after being grazed. Maintaining cereal pasture for late season use is difficult. When late summer grazing capacity is needed, winter cereals such as fall rye, winter wheat and winter triticale may be more suitable. While seed costs for these crops may be higher, they provide better quality forage in the late summer and fall.

When seeded in the spring, winter cereals produce little seed and stay leafy. Compared to barley or oats, only five to 10 per cent of winter cereal plants typically head in the year of seeding. Winter cereals can also provide early season pasture the following spring. Fall rye is the most winter hardy winter cereal. Typically fall rye will produce well for one or two years. However, some producers have reported grazing fall rye more than two years.

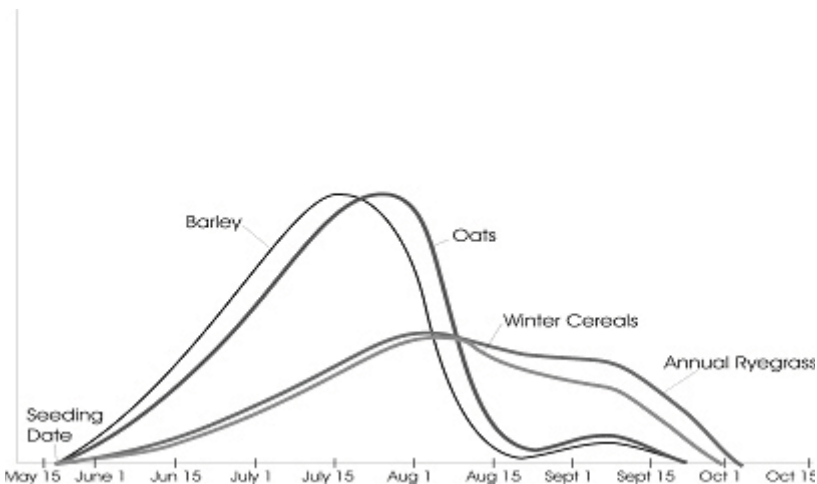


Figure 1: Typical growth curves for common annual forage crops grown in Saskatchewan

Cool Season Spring Crop Options

Cool season or C3 crops include spring cereals, canola, peas and annual ryegrass. Spring cereals, peas and canola produce the majority of their growth early in the summer with production declining by late summer. Trampling losses of all these crops will be high if grazed after heading or podding and if cattle are not restricted to limited areas. Varieties that produce high grain yields often produce high forage yield. For some crops, forage varieties are available.

Oats

- Oats are a high yielding annual forage, particularly in the black and grey-wood soil zone.
- Graze when oats reach 10 inches (25 cm).
- Not as good overall quality as barley for silage.
- Staggering the spring seeding date will spread out pasture production.
- Useful as a greenfeed or swath grazing crop.
- Oats should be harvested at the late milk stage for silage and greenfeed.
- Forage oat varieties include CDC Bell, CDC Baler, and Murphy.

Barley

- Barley is suitable for swath grazing, greenfeed or silage in all soil zones of the province.
- It is the preferred cereal for swath grazing and silage.
- Barley produces the best combination of yield and quality for silage of any of the cereals.
- Smooth-awned varieties are recommended however not necessary.
- Graze when barley reaches 10 inches (25 cm). Cut in the early dough stage for greenfeed or silage.
- Not as much potential for regrowth as oats.
- Forage varieties include AC Ranger, CDC Cowboy, Westford, Dillon, Binscarth and Stockford

Triticale

- Triticale can produce similar forage yields to oats on black soils. It is more tolerant of dry conditions than oats.
- Graze when triticale reaches 10 inches (25 cm). Cut in the milk stage for greenfeed and silage.
- Lodging is not usually a problem.
- Palatability may be lower than oats or barley especially if cut late for harvest.
- Rough awns similar to barley.
- Triticale is later maturing than oats or barley.
- Triticale will not tiller or re-grow as well as oats after cutting.
- Some of the varieties available are AC Ultima, Banjo, Bunker, Tyndal and Fridge

Wheat

- Wheat is suited to all soil zones of the province.
- Some wheat varieties can produce as much dry matter as oats or barley.
- Quality for silage or greenfeed is generally lower than barley.
- Harvest wheat in the soft-dough stage for greenfeed or silage.
- Regrowth after cutting or grazing is not as good as oats.

Peas

- Peas are adapted to the dark brown, black and grey soil zones.
- Peas are generally not used for grazing unless included with a cereal.
- Generally cereal/pea mixtures yield less dry matter but more protein per acre than cereals alone.
- Seed pea/cereal mixtures at full pea seeding rate with 33 per cent cereal seeding rate to ensure legume population remains in stand.
- Trials indicate peas have a better chance of increasing the forage protein content if the mixture is seeded on stubble land where the amount of available nitrogen is low.
- Forage varieties that would be suitable include CDC Sonata, CDC Tucker, Trapper and 40-10.

Canola

- Canola is best adapted to the black and grey soil zones.
- All varieties of canola and mustard except industrial use oils can be fed to livestock.
- Cut at the early to mid-pod stage of development, protein content averages 14 to 15 per cent and TDN 58 to 60 per cent (dry matter basis).
- Quality and palatability decline as the plant matures. Canola cut near maturity tends to be coarse and stemmy.
- It may take a few days for cattle to become accustomed to the taste of canola, but they eventually find it quite palatable.
- Canola cut for hay should be crimped to hasten the drying process. It may take seven to 10 days to dry to proper moisture content for baling and two to four days to wilt to acceptable moisture levels for ensiling.
- High levels of sulphur in canola can cause feeding problems. It is recommended to feed no more than 50 to 60 per cent of the total ration as canola or mustard hay or silage. It is advised to test for nitrates prior to feeding.
- Ensure adequate levels of trace minerals that include both copper and selenium are fed on a daily basis.

Turnips

- Seeding turnips is similar to seeding canola. Turnips, like canola, are also susceptible to many pests and insects.
- Crop can be grazed in 60 to 90 days and may be grazed a second time if managed properly. Livestock can consume the leaves and dig out the tubers in the fall. There may be a choking hazard when livestock eat the tubers.
- Turnips may have to be supplemented with hay or straw to increase fibre intake.
- May be a health issue with young animals due to glucosinolates in turnips. May also accumulate nitrates.
- Not recommended for dairy animals as it may taint the flavour of milk.
- See "Extending the Grazing Season with Turnips" on the Western Beef Development Centre website for more information.

Annual Ryegrasses

- Annual rye grasses are adapted to the grey and black soil zones.
- They are shallow rooted and intolerant of drought.
- Annual ryegrasses do not establish as rapidly as cereal crops, as a result, production is generally later in the summer and fall.
- Growth continues slightly later into fall than winter cereals.
- Very productive under high moisture and high soil fertility conditions.
- Italian types produce very little seed in the year of seeding. They will stay leafy so they are well suited to be used for grazing or stockpiled for fall and early winter pasture.
- Westerwolds types produce seed in the year of establishment. It is taller and better suited to cutting. However it will not produce as much greenfeed or silage as a cereal crop. Westerwolds types can be used for summer grazing if the stocking rate is heavy enough to remove seed heads early. This type may volunteer from seed in subsequent crops.

Warm Season Crop Options

Warm season or C4 crops include corn, millet, sorghum and sorghum-sudangrass. These crops generally need warm soils to germinate and more heat than cereal crops to mature. In order to achieve optimum forage production from these crops, they should be allowed to mature through July and August. They are generally slow to develop through the seedling stage. As a result they are not good competitors with weeds. Green foxtail is difficult to control in millet stands.

Warm season crops can tolerate dry conditions during the summer but yields are improved with good soil moisture, especially rains in July and August. In years with cool summers, the warm season crops do not yield well. Warm-season grasses cannot tolerate frost.

Millets

- Millets can be grown in all soil zones of the province, but often do not out-yield cereals for greenfeed, silage or pasture.
- The most common types of millets grown in Saskatchewan are Proso millet, Foxtail millet and Pearl millet.
- Proso millets tend to tiller more than the other two. They are earlier maturing but often lower yielding.
- Foxtail millet varieties vary from early to late maturing. Later maturing varieties like Golden German often yield better than early maturing varieties.
- All millets are slow to dry down for greenfeed and as a result should be crimped or sprayed with glyphosate to speed drying. These measures are not necessary if the crop is to be used for swath grazing.
- Because of the late maturity and their ability to hold quality, some types of millet may be well suited to swath grazing.

Sorghum and Sorghum-Sudangrass

- Sorghum and sorghum-sudangrass have yielded well in Saskatchewan. However, the concern with these crops is they can accumulate prussic acid which is poisonous to livestock. This has generally limited their use as a forage crop.

Corn

- Corn is better adapted to areas of the province receiving more than 2000 corn heat units per year.
- Herbicide tolerant varieties are available.
- Corn is useful as a silage crop or it can be left standing for late fall or early winter pasture.
- Corn will generally produce more forage than cereal crops. However, without good weed control, corn will not reach its full yield potential. Forming a cob is very important to the grazing value of corn.
- The relatively high cost of seed and fertilizer has limited the use of dryland corn for forage production in much of Saskatchewan.
- Late summer frost can substantially reduce yields.

Fall Cereals

- Fall cereals are best used for pasture production. They are adapted to all soil zones of the province.
- Grazing can begin once the rows have filled in.
- Fall rye is generally more winter-hardy than winter wheat or winter triticale.
- Fall rye can be pastured prior to stem elongation in the spring and still produce a grain crop if moisture conditions are adequate.
- Spring seeded winter wheat, fall rye and winter triticale tends to yield similarly for pasture. Winter triticale or winter wheat is more palatable to livestock than fall rye.
- Under good moisture conditions, fall rye produces lower forage yields than oats or barley. In contrast, rye will produce more forage in drought prone areas.
- The early maturity of winter cereals allows them to be cut for hay or silage sooner in the second year than spring cereal crops.
- Fall rye makes acceptable silage if cut in the mid-milk to early dough stage. If cut late, the hay is usually of low quality, is hard to handle and difficult to cure. Winter wheat and winter triticale can also be used for silage. Silage quality of winter triticale or wheat will be slightly higher than fall rye.

Table 1: Harvest Stage of Annual Crops for Greenfeed or Silage

Crop	Proper harvest stage
Oats	Late milk
Barley	Soft dough
Spring or Fall Rye	Early dough
Spring or Winter Triticale	Soft dough
Spring or Winter Wheat	Early dough
Annual Ryegrass	Not applicable
Foxtail Millet	Early heading
Corn	70 per cent plant moisture
Peas (small seeded)	First pods wrinkle
Peas (large seeded)	First pods wrinkle
Pea/Cereal Mixture	At proper cereal stage

Seeding Rates

Seeding rates for annual forages vary throughout the province. Typically seeding rates are higher in the black and grey soil zones than the brown and dark brown. The general rule when using annual crops for forage production is to use slightly higher seeding rates than used for crop production purposes.

Fertilizing Annual Crops for Forage

Generally, annual crops used for forage should be fertilized to the same level as the crop would be if used for grain production. A soil test will provide recommendations specific for the land being seeded. A well-balanced fertility program will help to ensure optimal forage production for your area.

Typical Stocking Rates for Annuals

Stocking rate will depend on soil fertility and precipitation. Past experience will provide a good basis for setting a stocking rate. If grazing annual crops for the first time some typical stocking rates for broad geographical areas of the province are provided in Table 2.

Table 2: Typical stocking rates for annual pastures and the number of animals and acres per animal needed for each soil zone in Saskatchewan

Soil Zone	AUM/ac.	Number of 1300 lb. cows/ac.	Acre/1300 lb. cow	Number of 700 lb. steers/acre	Acre/700 lb. steer
Brown	1.5	1.1	0.8	2.1	0.50
Dark Brown	2.0	1.5	0.6	2.8	0.35
Black	2.5	1.9	0.5	3.6	0.25
Grey	2.0	1.5	0.6	2.8	0.35

Stocking rates for swath grazing will range from 60 to 100 days/acre. Swath grazing stocking rates will depend on crop yield and on how well the animals utilize the swathed forage.

Possible Herd Health Problems Associated With Grazing Annuals

Producers considering grazing annual crops should be aware of a number of possible health concerns that may affect the herd. Generally, most commonly used annual crops provide safe, nutritious and productive pasture, silage and greenfeed. However, environmental factors such as frost and drought, as well as some plant diseases can adversely affect the quality of these crops for livestock feed. A number of these possible herd health concerns are described below.

Nitrate Poisoning

Nitrates in feed are converted to nitrites during digestion. This reduces the oxygen-carrying capacity of the blood and the animal can die by asphyxiation. Several factors increase the levels of nitrates in feed including high levels of soil nitrogen, type of crop, and frost or drought that reduces or stops growth will cause plant nitrate levels to increase. If the plant recovers it will use the accumulated nitrates for growth. High nitrate feed can be fed by blending with low nitrate feed to safe levels.

Atypical Interstitial Pneumonia (AIP)

This disease is also known as pulmonary emphysema or fog fever. It is sometimes associated with moving cattle from poor to a new lush pasture in the late summer and fall. If AIP is suspected, remove animals from the pasture. Avoid exerting the animals.

Grass Tetany

Grass tetany is most prevalent on lactating cows put on lush spring pasture. Prevention of this condition is possible through the proper supplementation of magnesium oxide and limestone, along with an adequate energy level in the diet. Consult a nutritionist for specific recommendations.

Grain Overload

Grain overload can occur when mature cereal crops are grazed. Caution is advised when turning animals into cereal crops either swathed or standing that are at a mature stage of development.

Milk Fever/Winter Tetany

Annual cereal crops (especially barley and oats) grown in some areas of Saskatchewan can accumulate excessive levels of potassium. When fed as a large percentage of the ration (hay or silage) it has been found that some cows develop milk fever/tetany symptoms two to three weeks prior to calving. A feed analysis will determine nutrient and mineral levels which can be used to develop acceptable feed rations.

This information was compiled from various sources by Allan Foster, Rangeland and Forage Agriologist, Saskatchewan Agriculture, Tisdale, Saskatchewan.

For more information on using annuals for grazing, silage or greenfeed, contact:

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