

Annual Crops: An Excellent Way to Increase Your Feeding Flexibility

Supplement Perennials with Annuals

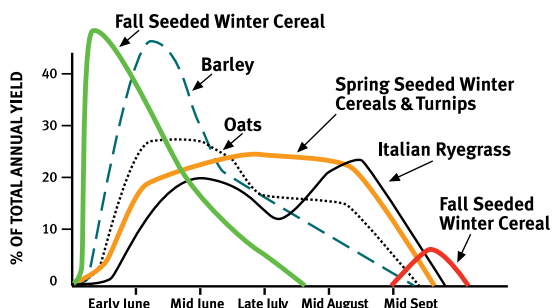
Annual crops can provide rest and recovery of perennial pastures from grazing or crop stress. They can be used to provide additional feed in years when you need it, such as during or after a drought, or they can become a routine part of your feeding strategy to give you added feeding flexibility. As part of your annual pasture rotation plan, annuals allow you to use more of your farm for grazing.

Because an annual crop can be grazed four to six weeks after spring seeding, and fall-seeded winter cereals can be grazed as early as mid-May, you can consider your selection of annuals based on when you need them. (See growth chart below). Remember, for every day you delay grazing on your perennial pastures in the spring, you can gain three additional grazing days in the fall. Even if seeding is delayed, you can begin the grazing season on a perennial pasture, and move to an annual pasture when it's ready. The perennial pasture will still profit from the rest.

Although not a cheap feed source, if you cut annual cereals as green feed they can provide better quality than perennial hay – especially if the crop is cut when heads are half full, for maximum energy value. Annual cereals are also an excellent source of silage.

Not only will annuals help you get maximum returns from your perennial pastures, they can help you extend your grazing season either in early spring or in late fall.

Growth Patterns of Forage Crops



You can select an annual crop to supplement your perennial pastures based on when you will need the additional feed. Courtesy of Alberta Agriculture, Food and Rural Development.

Crop Selection

The most low-risk options for Manitoba growing conditions are winter and spring cereals, although there are many other options. Even though barley and annual ryegrasses have shown to be slightly higher in total digestible nutrients (TDN), your decision should be based on agronomic characteristics. Before you select a crop, review the agronomic data, keeping in mind your specific growing conditions, when you want to use the crop, and how you will harvest it (grazing, silage or green feed). The table on the following page is a good starting point.

Crops for Grazing

Feed quality is similar between all cereals when they are used for grazing, and any minor difference can be managed with harvesting strategies. As indicated, your selection should be based mainly on the crop suitability to your growing conditions, and when you wish to harvest.

Barley and oats are good choices for early spring grazing because of their early growth habit, yield, palatability and grazing re-growth. Three year trials averaged over five Manitoba locations showed barley when cut for green feed yielded an average of 4.1 tonnes per acre dry matter (DM), and oats green feed an average of 4.2 tonnes per acre DM. However, caution must be taken with spring cereals so that grazing does not occur below the growing points. Otherwise, re-growth will be significantly reduced.

Performance of Annuals Compared to Other Pasture Types

Pasture Type	Stocking Rate* (head/ac)	Carrying Capacity (head/day/ac)	Beef Yield (lb/ac)	Cost** (\$/ac)	Cost per *** Pound of Beef (\$/lb)
Low input grass pasture	0.8	74	162	38	0.23
High input grass pasture	1.8	202	468	92	0.20
Meadow bromegrass/alfalfa	2.4	257	524	111	0.21
Alfalfa	1.6	180	344	112	0.33
Annual	1.4	154	320	126	0.39

* Based on 3-year study of a mid-weight of 800-lb animals over 100 days.

** Costs include maintenance (fence, etc.), water system, fertilizer, establishment, land rental, livestock management and operating interest.

*** Beef yield per acre ÷ cost per acre.

Data from Alberta Agriculture, Food and Rural Development, Lacombe, Alberta

Greenhouse Gas Mitigation Program for Canadian Agriculture

Reducing greenhouse gas through healthy pastures, efficient feed practices and better manure management



Agriculture et Agroalimentaire Canada
Agriculture and Agri-Food Canada



Since winter cereals require an over-wintering period to initiate seed head production (the process that brings the growing point above ground), spring-seeded winter cereals often have better re-growth. They provide better grazing yields than hay yields in the year of seeding. However, the trade-off is that spring-seeded winter cereals are usually ready for grazing later than the spring cereals.

Fall seeding winter wheat, it should be noted, may provide a green bridge (or food source) for the wheat curl mite, the insect responsible for spreading wheat streak mosaic in later-emerging, spring wheat crops.

Of the winter cereals, fall rye is usually more winter-hardy than winter wheat and winter triticale, with a higher yield. However, yield is dependent on growing conditions.

Crops for Silage

For silage, barley and oats often provide better feed quality than other spring cereals. If you're using winter cereals, plant in the fall rather than the spring because plants need to overwinter to produce seed heads. Seed heads provide more energy, protein and yield in silage.

Stages for cutting annuals to be used as silage are typically similar to green feed (See selection chart), but crops are not allowed to dry down as much. Consult your Farm Production Advisor or forage specialist to learn more about silage.

Selection Data for Annual Forages

Crop	Optimum Seeding Date	Seeding Deadline	Seeding Rate Kg/Ha	Seeding Depth (cm)	Days to Emergence	Days to Maturity	When to Harvest
Oats	May 1 – Jun 20	mid-Aug for fall grazing	90-115	4-7	10	100-103	Green feed – milk to early dough stage Grazing – pre-boot stage
Barley	May 1 – May 31	June 20	90-120	4-5	8	84-90	Green feed – early to mid-dough stage Grazing – pre-boot stage
Wheat	May 1 – May 31	June 20	100-135	3-8	10	99-105	Green feed – mid-dough stage Grazing – pre-boot stage
Winter Wheat – Spring Seeded	May 1 – May 31	mid-June	100-135	3-8	10	Next season	Grazing – 15-20cm
Winter Wheat – Fall Seeded	Aug 1 – Sept 15	Sept. 15	100-135	3-8	10	99-105	Fall grazing – 15-20 cm Spring grazing – pre-boot stage Green feed – early dough
Triticale	Apr 15 – May 15	June 1	110-150	5	10	104-108	Green feed – dough
Spring Rye	May 1 – May 31	June 20	45-95	2.5-5	12	80	Green feed – early dough
Fall Rye – Spring Seeded	May 1 – May 31	mid-June	45-95	2.5-5	12	Next season	Grazing – 15-20 cm
Fall Rye – Fall Seeded	Aug 1 – Sep 15	Sept. 15	45-95	2.5-5	10	88-104	Fall grazing – 15-20 cm Spring grazing – pre-boot stage Green feed – early dough stage
Corn	May 1 – May 25	June 10	55,000-70,000	2.5-5	5-10	100-115	Silage – 65-70% moisture Grazing – late fall-early winter
Turnips	May 1 – June 25	June 5	4.5-9	1.5-1.8	5-10	60-100	Graze – tops @ 60-75cm Re-graze – tops and bulbs, late fall
Peas	May 1 – May 25	June 10	130-200	5-8	8	89-93	Silage/Swath Grazing – when pods are formed
Foxtail Millet (Siberian, German)	May 25 – Jul 10	July 15	20-25	1-2.5	10	80-110	Silage/Swath Grazing – early heading
Proso Millet	May 15 – July 10	July 15	25-35	1-2.5	10	85-90	Silage/Swath Grazing – early heading to bloom stage
Forage Sorghum	May 15 – Jun 1	June 5	6-8	2.5-3.5	10	80-120	Silage/Swath Grazing – mid-dough or 60-70 cm
Sorghum – Sudangrass Hybrid	May 26 – Jun 16	July 5	20-30	1-2.5	10	80-110	Silage/Swath Grazing – boot stage or 60-70 cm
Italian Ryegrass (Pasture Type)	Apr 10 – Jun 1	June 5	20	less than 2	6-10	40-60	Grazing – 15-20 cm Hay – early bloom
Westerwold Ryegrass (Hay Type)	Apr 10 – Jun 1	June 5	20	less than 2	6-10	40-60	Grazing – 15-20 cm or boot stage Hay – early bloom

Crops for Green Feed

There are a wide variety of annual crops that can be used for green feed, and most are harvested at the soft dough stage, when adequate levels of energy and protein will provide maximum yields. Since the growing point is well above ground at this harvest stage, re-growth is often compromised, especially if post-harvest moisture is not available.

Nitrate Levels

Annual crops can accumulate nitrates more than perennial crops – especially if they have received high levels of nitrogen fertilizer or are stressed due to drought or cold temperatures. If nitrate levels are high enough, animals can suffer from nitrite poisoning. It's important to test your crop before allowing animals to graze or before cutting it for green feed. Your Farm Production Advisor can perform a quick test to tell you if nitrates are present. For a reading on the specific amount, you will have to send a sample to a feed testing lab.

Avoid grazing or cutting the crop during and shortly after high stress periods — for example, immediately after a rainfall if it has been dry for a few consecutive weeks. This delay in harvesting will allow the accumulation of nitrates to dissipate as crop growth resumes. If you have cut a crop for green feed, but you're concerned about nitrates, ensiling has been shown to reduce them up to 50 per cent.

Intercropping for Maximum Potential

Intercropping is the practice of combining a spring annual (ex: oats) with a winter annual (ex: fall rye) for season-long benefits. Intercropping has been shown to produce overall more dry matter than each crop on its own because of the constant productivity all season long. The spring cereal begins growth early in the season, shutting down towards the later part, while the winter cereal remains active and produces until late in the fall.

Intercropping also gives you the option of harvesting the spring cereal for silage, leaving the winter cereal below for mid to late-season grazing. If more silage or an early grazing season is preferred, seed the spring cereal more heavily,

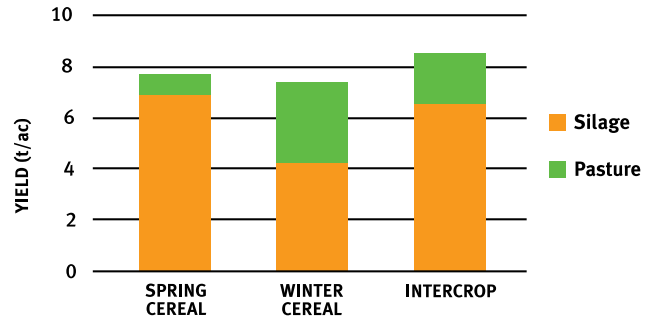
Which Yields More?

One method of reducing feeding costs is to maximize the yield of your annual forage. Cutting annuals for silage, rather than for green feed, usually results in more nutrients being harvested because harvesting losses are lower. Since yields of annual forages in grazing regimes rely on re-growth, their yields are often further compromised due to the difficulty in managing grazing height. Grazing height must be kept above the growing point, which can only be accomplished by managing stock density and adequate rest periods for re-growth.

taking care not to seed so much that it restricts growth of the winter cereal underneath. If more later-season grazing is needed, then seed the winter cereal at a slightly heavier rate.

Barley and fall rye make a good intercropping combination. Spring seed both crops at approximately three quarters the normal seeding rate to provide even growth throughout the season.

Advantages of Intercropping



Courtesy of Western Forage/Beef Group. Based on research from V. Baron et al, Lacombe Research Centre.

Production Tips

Fertility

Annual crop fertility is just as important for grazing, green feed and silage crops as it is for grain production. Fertilize spring and winter cereals according to soil fertility tests. Because spring-seeded winter cereals grow more evenly throughout the summer, split applications of nitrogen are recommended. This will maintain good fertility conditions throughout the growing season and reduce the risk of high levels of nitrate accumulation in the plant. Applications of phosphate, potassium and sulfur may also be necessary. Potassium is especially beneficial for overwintering fall-seeded cereals.

Feed Value of Annuals Cut for Green Feed

Crop	Tonne/Acre	% Protein	% TDN
Corn*	2.6	12.0	62.0
Barley	2.5	12.4	65.7
Oats	2.4	12.5	64.9
Peas*	2.3	19.0	56.4
Wheat	2.3	11.3	62.8
Triticale*	2.3	10.5	57.1
Spring Rye*	2.2	9.6	54.1
Sorghum*	2.2	10.9	58.8
Rapeseed*	1.9	15.3	58.5
Foxtail Millet	1.7	11.5	63.7
Sorghum Sudangrass Hybrid	1.7	9.6	70.2
Fababeans*	1.5	17.7	63.3
Proso Millet	1.4	11.2	65.4
Sunflowers*	1.3	11.7	57.0
Italian Ryegrass (pasture type)*	1.4	15.4	65.7
Westerwald Ryegrass (hay type)*	1.0	16.3	63.5
Fall Rye (SPRING SEEDED)*	0.7	21.8	62.2

*Crops tested in Manitoba 1984 and 1985. Remainder also from 1989-1990

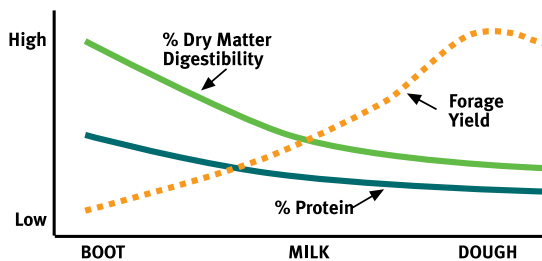
Grasshopper Control

Experience has shown that grasshoppers prefer wheat over oats, and oats over barley. For chemical control of grasshoppers, consult your *Guide to Crop Protection* published by Manitoba Agriculture, Food and Rural Initiatives. For biological control, Ecobran™ has proven to work well when it is spread in alternate strips approximately 100 feet wide. Used this way, it's economical as well as effective.

Maturity

As the plant matures, yield and energy will increase until the dough stage. However, the plant also becomes more fibrous as it matures, with protein beginning to fall right after the boot stage. Higher yields can be maintained at the expense of protein, and vice-versa. But because protein is an inexpensive supplement if required, the most-often recommended harvest stage for green feed and silage crops is at or near the dough stage. However, if the crop is intended for silage, harvesting stages may differ between crops to accommodate achieving the proper plant moisture for ensiling.

How Stage of Maturity Affects Yield and Quality of Annual Forages



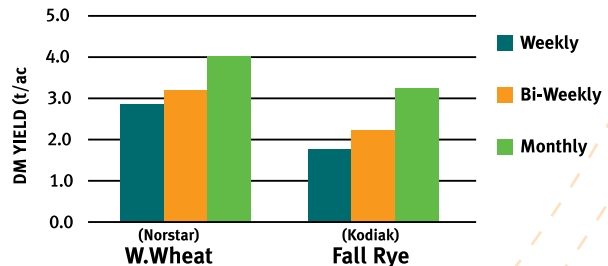
Disease

The same disease problems apply to annual crops for forage production as annual crops for grain crop production. Of most concern are the leaf diseases, which will reduce forage yield and quality. Choose varieties adapted to your area and have good disease resistance packages. It is important to be aware of the potential for spreading the leaf streak mosaic virus in spring wheat when including winter wheat in your feeding strategy. For more information on disease control, consult the *Guide to Crop Protection*.

Managing Grazing

Just as perennial pastures benefit from rotational grazing, so can annual forage pastures. Giving them a rest by grazing one week on, three weeks off, can maximize your yields (see below).

Effects of Grazing Frequency on Winter Cereal



Courtesy of the Western Forage/Beef Development Group, based on research from G.Reimer & R. Gaudie, AAFRD

Yields increase significantly when grazing occurs one week out of the month, as opposed to every second week or every week.

You Can Help Reduce Greenhouse Gas

Healthy pastures and riparian areas are better able to sequester carbon, and more-widely distributed manure reduces greenhouse gas emissions compared to manure packs. For more information on greenhouse gas, and how livestock producers can do their part to help reduce it, visit the following two websites.

- Canadian Cattleman's Association: www.cattle.ca
- Greenhouse Gas Mitigation Program: www.agr.gc.ca/progser/ghgm_e.html

For More Information

- Your local Manitoba Agriculture, Food and Rural Initiatives Growing Opportunities Centre.
- Manitoba Agriculture, Food and Rural Initiatives website: www.manitoba.ca/agriculture
- Forage Beef website: www.foragebeef.ca. A forage and beef production website that contains information gathered from Manitoba, Alberta and Saskatchewan.
- Your local Agriculture and Agri-Food Canada (PFRA) office.
- Manitoba Forage Council website: www.mbforagecouncil.mb.ca

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- Manitoba Forage Council

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