AGRI-FACTS
Practical Information for Alberta's Agriculture Industry

Revised June 1998 Agdex 130/53-1

Grazing Tame Pastures Effectively

To be effective, the nutrients supplied by the pasture must be in balance with the nutrients required by grazing cattle. Given a choice, cattle tend to select plants higher in protein and lower in fibre than that of the total available forage. However, plants not selected or unpalatable plants do not necessarily have poor nutritive value. To maximize overall utilization and potential weight gain per acre, cross fencing can be used to obtain more uniform grazing.

Grazing should be managed according to how much is left, rather than how much has been grazed. To get forage grazed to a shorter height takes more time and effort and results in a lower dry matter intake of forage. Consequently, animal performance will decline. The highest individual animal production will occur when forage supply exceeds demand, providing quality is maintained. Figure 1 illustrates how the optimum grazing range is calculated.

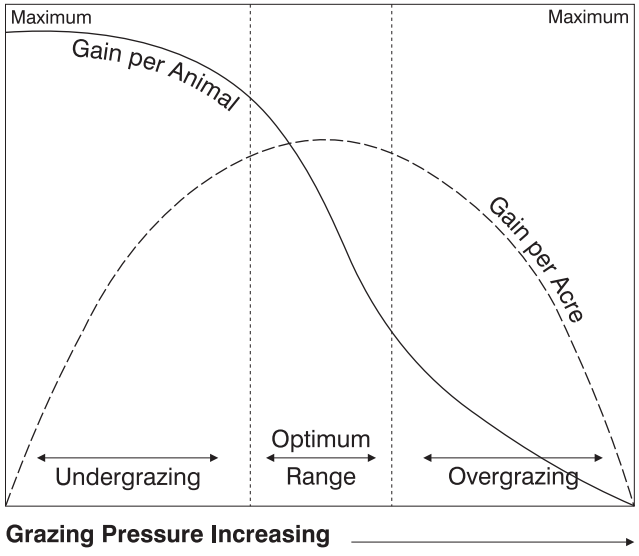

Figure 1. Influence of grazing pressure on animal gain and unit area gain (Mott, 1973)

Pasture production

The amount of pasture produced and available to livestock varies from year to year. The quality of this forage, especially if over mature, may also affect palatability and daily intake. Various research results show that an annual yield of 1,365 kg (3,000 lb) dry matter per acre can be achieved on a well managed pasture. If more intensive management is used, the amount of available forage will increase. However, a lack of fertilizer and lack of moisture are the two most important factors contributing to low pasture production. These factors, combined with severe overgrazing, can easily reduce the availability dry matter to less than 454 kg (1,000 lb) per acre.

The fastest growth of forage occurs before mid-summer or mid-July. At the Pembina Forage Association pasture in north-central Alberta, approximately two-thirds of the forage was produced in the first third of the season. At the Melfort Research Station, results from a seven-year study on a smooth brome-alfalfa pasture showed that 70 per cent of the forage was produced by the first week of July. With early growing grass species lacking the ability to regrow, the amount produced by early July can be as high as 90 per cent of the total for the season.

These conditions explain why shortages of pasture occur late in the season if stocking rates are not adjusted to the decreasing amount of forage available. Regrowth sometimes does not occur, resulting in low forage production after mid-July. Factors affecting regrowth are the species involved, low fertility, moisture or lack of it and overgrazing especially. With good regrowth throughout the year, forage quantity and quality become more constant, making stocking rates much easier to determine.

However even with species known for good regrowth and with appropriate management, forage growth ceases after a killing frost. Late fall grazing and winter grazing must be done on fields that show optimum yields, 680 to 900 kg (1,500-2,000 lb) per acre of good quality regrowth. A legume mixture would improve quality. The most commonly used grass species for late season grazing are the "hard" grasses such as creeping red fescue, crested wheat grass and Russian wild rye grass.

Alberta
AGRICULTURE, FOOD AND RURAL DEVELOPMENT

Determining stocking rates

Since forage production depends on soil and climatic conditions as well as the condition of the pasture stand, calculating a stocking rate for each individual pasture and farm is necessary. Applying average values to a specific situation could lead to a forage surplus or to overgrazing.

The stocking rate is expressed as the number of Animal Unit Months (AUM) supplied by one acre of pasture for one year. An Animal Unit (AU) is considered to be one mature 454 kg (1,000 lb) cow with or without calf, or the equivalent, and is based on an average daily forage consumption of 12 kg (26 lbs) of dry matter. Table 1 provides the stocking rates for seeded tame pastures in Alberta. Because animals are not of equal size, animal unit equivalents are given below:

Animal Unit Equivalents	A U
mature cow – with or without calf	1.0
mature bull	1.3
yearling steer or heifer	0.67
weaned calf	0.5

Table 1.

Stocking rates for seeded tame pastures in four condition classes AUMs/acre in Alberta (*Wroe, 1983*)

Annual precipitation zones		Pasture condition class			
		Excellent	Good	Fair	Poor
mm	in.	0.75	0.50	0.40	0.25
250-350	10-14	1.25	0.80	0.60	0.40
350-450	14-18	2.00	1.40	1.10	0.70
450-550	18-22	3.30	2.20	1.60	1.10
550-650	22-26	7.50	5.00	3.75	2.50
Irrigation					

This table assumes average inputs and continuous grazing. Use stocking rates from the next higher precipitation zone when using a fertilizer program and rotational grazing. This only applies to the 350 to 550 mm zones.

Pasture conditions classes

Condition	Definition
Excellent	1. 75 to 100% of the top yield for the area 2. 95% of the production coming from adapted grasses and legumes* 3. 10 to 50% of the production coming from an adapted legume 4. Less than 5% of the total production coming from weeds or undesirables 5. Fertilizer program is average to above average
Good	1. 60 to 75% of the top yield for the area 2. 90% of the production coming from adapted species* 3. Less than 5% legume in the stand 4. Less than 10% of the production coming from weeds or undesirables 5. Fertilization program average
Fair	1. 50 to 60% of the top yield for the area 2. 60% of the production coming from adapted species* 3. 20% or more of the total production coming from weeds or undesirables 4. Fertilization program below average or non-existent
Poor	1. 33 to 50% of the top yield for the area 2. Less than 50% of the production coming from adapted species* 3. Should be cultivated and reseeded to adapted grasses and legumes 4. Fertilizer response questionable

* Adapted grasses and legumes or species means those names in **Varieties of Hay and Pastures for Alberta** – Agdex 120/32

Example: Calculating number of pasture acres required

Assume
- 450 to 550 mm annual precipitation zone
- excellent pasture condition class (2.0 AUM/acre)
- grazing season 165 days (5.5 months)
- 80 cow/calf pairs (80 AU)

$$\text{Required pasture} = \frac{\text{AU x Months grazing}}{\text{AUM/acre}}$$

$$= \frac{80 \times 5.5}{2.0}$$

= 220 acres for the season

Note: If using superior management and rotational grazing, the pasture required could be as low as 135 acres.

Example: Calculating pasture capacity

Assume
- annual precipitation zone 450 to 550 mm
- 200 acre grass-legume pasture (excellent condition – 2.0 AUM/acre)
- want 120 days grazing (4 months)

$$\text{Pasture capacity} = \frac{\text{Acres x AUM/acre}}{\text{months grazing}} = \frac{200 \times 2.0}{4} = 100 \text{ AU}$$

100 AU equivalents are 100 cow/calf pairs or 133 yearlings

The modern cow and calf – adjusting for size

A generation ago, most cows were of the traditional British breeds, weighed 750 to 950 lb. and weaned a 305 lb. calf. Crossbreeding programs with mostly continental European breeds have increased cow size to an average of 1,200 to 1,300 lb. The range in cow weights extends from 1,000 to 1,600 lb. These larger cows require more energy for maintenance and for greater milk production.

Calves are bigger too. The genetic changes that boost cow size also yield a larger-framed calf. This calf size combined with a general shift towards earlier calving, clearly suggests the modern calf requires more nutrition than the standard calf. **The bottom line is that bigger cows and heavier calves graze more grass, so adjustments need to be made when matching livestock needs with available forage.**

Critical factors to consider are cow size (live weight), milk production level and calf size. In Table 2, the energy requirements of the 1,000 lb. AU with standard milking ability and an average calf are compared with those of a large 1,500 lb. cow and her calf. The comparison is somewhat extreme; nonetheless, it illustrates the effect that genetics can have on feed requirements. A 1,500 lb. cow will require 33 per cent more energy. If she is a heavy milker as well, she will need 58 per cent more energy. Add to that a large-framed calf (500 lb.), and energy needs rise to 71 per cent more than the standard cow. **The forage required is more or less proportional to the increase in live weight, particularly when you consider that, generally, larger cows will be heavier milkers and raise larger than average calves.**

Table 2.

Effect of cow size, milk production and calf size on energy requirements[1]

Cow class	Energy/forage requirements (Mcald/d or lb./d)[2]	(%)[3]	(AU)
1,000 lb. cow			
standard milker and average calf	24	100	100
1,500 lb. cow[4]			
standard milker and average calf	32	133	1.33
heavy milker and average calf	38	158	1.58
heavy milker and larger calf	41	171	1.71

1 Adapted from Beef Cattle Allowance Tables, 1987, Alberta Agriculture, Food and Rural Development

2 Assumes forage has 1.0 Mcal/lb. of dry matter

3 % of energy/forage requirements based on the 1,000 lb. cow as the standard

4 Standard milker produces 10 lb./d, heavy milker producers 20 lb/d; average calf weighs 300 lb., large calf weight 500 lb.

If producers stock their pastures with the same numbers of these larger animals as they once did with standard-sized animals and if they do not reduce the grazing period appropriately, overgrazing will result. The total livestock demand for forage will exceed the capability of the land to supply forage, and the grazed pasture will suffer. **A practical solution is to adjust for changes in cow size on an Animal Unit equivalent basis by adding 0.1 AU for every 100 lb. increase in live weight above the standard AU**.

For example, a 1,250 lb. lactating cow would constitute 1.25 AU. Figure 2 shows how this adjustment for cow size would be put into practice for 1,000 lb., 1,250 lb. and 1,500 lb. lactating cows with calves. The pasture with a carrying capacity of 100 AUMs would provide one month of grazing for 100, 80 and 67 head, in the preceding weight classes. This simple adjustment can also be applied to other classes of stock.

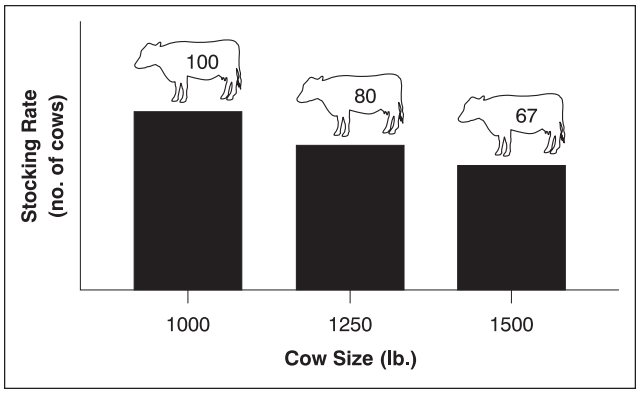

Figure 2. The number of cows that can graze a field with a carrying capacity of 100 AUMs for one month declines as cow size increases.

The grazing system

No one grazing scheme is best for all situations. A combination of deferment, rotation, seasonal rest and late season grazing of first cut hay fields can be incorporated into a grazing plan. Of particular importance in any plan are stock density and frequency of grazing. These factors are more important than the kind of grazing schedule developed. Stock density refers to the number of animal units per acre at any one time and frequency, the length of grazing period and rest interval (i.e. 12 head per acre for 2 days, rested for 22 days).

Well planned fencing, including a central water supply system, will facilitate the easy movement of livestock and allow water to be available to all pastures. A central water system also reduces alleys and eliminates extra fences. Effective cross fences can be expensive, utilizing one or two wires, preferably electrified, with 13.5 meters (30 feet) post spacings.

Rotational (short duration) grazing is the most versatile way to manage pasture production and control feed quality. The system may vary from area to area although the key is to have smaller pastures (minimum four) and rotate livestock from one to another. The success of this system is related to having the stocking rate and forage production in balance plus allowing a sufficient regrowth period (three to five weeks) before re-grazing.

Rotational grazing requires a high stocking intensity for a short period. If stock remain in a field too long, the more palatable regrowth is grazed prematurely, which decreases subsequent production. The number of fields is more important than the actual size of the fields.

If fields cannot be grazed uniformly, stock density should be increased either by increasing the number of animals or dividing the field. Fields are best divided according to topography, soil type and forage species present rather than by simply cross fencing the field into neat squares.

Fencing is especially necessary to separate woodland from cultivated land, tame from native pastures and wetland from highland areas.

Spring grazing

In the spring, the first grazing on tame pasture should begin when there is 15 cm (6") growth. At this stage of development, the field will be approaching 454 kg (1,000 lb)/acre on pastures with a dense plant stand. If there is a high proportion of legumes, especially alfalfa, an increased height should be used [20-30 cm (8-12") growth].

Grazing too soon, especially on rangeland, is a major factor leading to deteriorating pasture condition. Grazing a pasture too early will result in the vegetation being removed before the plants have had a chance to replenish root reserves. The result is poor pasture performance for at least the remainder of the growing season and usually longer. For each day of grazing before the pasture is ready, the grazing season can be reduced by up to three days.

Table 3 gives the approximate relationship between three yields of a dense pasture stand and the approximate consumption of mature beef cattle.

Table 3.

Animal intake as influenced by pasture yield (*Bjorge, 1982*)

Yield of forage at start		Approximate daily intake		Monthly intake	
kg/acre	lb/acre	kg	lb	kg	lb
454	(1,000)	15	(32)	450	(960)
227	(500)	9	(20)	270	(600)
114	(250)	5	(10)	150	(300)

If it is necessary to remove beef cattle and calves from wet winter quarters in the spring, providing free access to the summer pasture is not a good idea. It is much better to provide a spring pasture, saved specifically for early spring use and rested after use. Continue to provide preserved feed until other pastures are ready for grazing. Beginning the grazing season correctly will facilitate higher stocking rates later on, better plant and animal performance and a longer grazing season.

Grazing frequency

Cattle **should not** be moved from pasture to pasture simply by the calendar, but based on the growth rate of the pasture and the specific height of forage. In the spring, when forages are growing rapidly, rotate pastures quickly, 4 days or less) grazing to a higher height 15 to 20 cm

(6-8") but sufficient to avoid heading and physiological maturity of the forage. As summer progresses and grass growth rate declines, decrease the frequency of rotation.

Allow the cattle to graze the grass to as low as 10 cm (4"), thereby increasing the rest period between grazings. Slowing the rotation enables a feed reserve to be carried from periods of rapid growth to periods of slower growth. The final grazing should allow 5 to 7.5 cm (2-3") of carryover for rapid growth the next spring.

Rest period

Since grazing puts a stress on pasture plants, a successful grazing system must include a sufficient rest period. After a uniform grazing, the livestock should be removed for a time. This period will vary with the species, management and climatic factors, but as suggested in Figure 3, a three- to five-week rest period is required before the next grazing.

This period is especially important when some overgrazing is evident in the pasture. If the pasture is grazed very close to the ground, the lack of leaf material causes slower regrowth for up to two weeks. After this time, regrowth proceeds at the same rate as it would if clipped at higher heights.

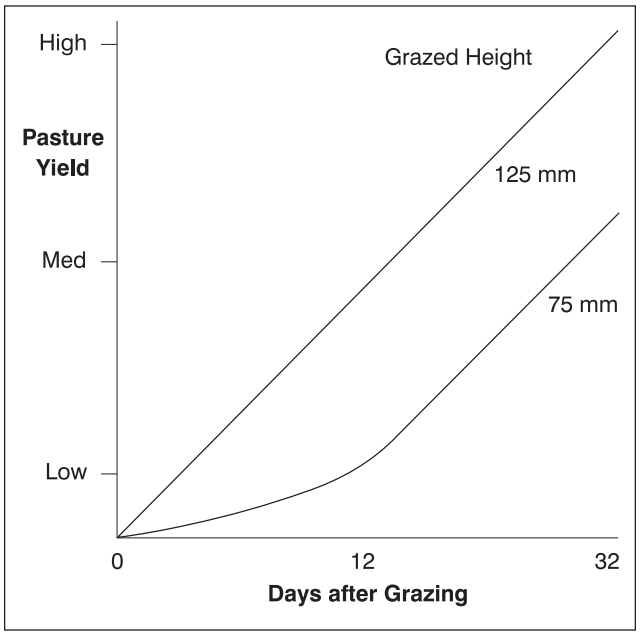

Figure 3. The effects of cutting height on subsequent regrowth rate (Porter, 1983)

Handling pasture excesses and shortages

Since one-half to three-quarters of the annual production generally occurs by the first week of July, there is usually an excess of forage relative to the number of livestock grazing during the late spring period. If the pasture is not clipped, growth stops after heading occurs. On large continuously grazed pastures, heading may be more prominent because of selective grazing. Smaller pastures are easier to manage correctly.

Use mechanical clipping to remove stems and heads, but retain the leaves for rapid photosynthesis. Clipping after grazing also provides for more uniform regrowth, resulting in less selective grazing and better survival of the original forage mixture. The alternative to clipping is to leave one or two pastures out of the rotation after initial spring grazing and to stockpile the forage for hay, emergency use or fall use.

It is better to defer grazing one or two pastures to maintain high quality in the remaining pastures. The deferred pastures need not be grazed all at once since the performance of young stock may be reduced. In the fall, mature cows can effectively clean up these pastures and still gain weight.

Pasture shortages normally start to appear mid-July to mid-August. The following factors should be considered in eliminating pasture shortages and preventing overgrazing:

- use second growth hay field for pasture
- use annual crops such as late seeded oats, fall rye seeded in early August or spring seeded fall rye, Norstar winter wheat or annual rye grass
- reduce stocking rates (cull cows or sell yearlings) before the shortages occur.

Keeping records

Good records can be valuable in assessing grazing performance. Past records can be useful in indicating future use. Mapping pastures to illustrate areas of overuse, sufficient use and under use can be a guide for future pasture developments such as locating fences or water, or the distribution of salt-mineral areas. An interim weighing of cattle can be used to project gain for the season. Similarly, a nutrient analysis of forage clippings and an estimate of daily intake can determine when and what supplementation is required.

01/01/500