Better Management of Your Horse’s Pasture

A well maintained pasture can provide fresh air and exercise for your horse, and it can also supply a significant part of the horse’s nutritional needs. If managed properly, even a small pasture can greatly decrease feeding costs, stable cleaning and other management chores, and it can greatly increase the horse’s enjoyment of life.

All too often, horse pastures suffer from neglect. Pastures commonly house more horses than they can support, resulting in bare ground and weed infestations. Not only do these abused pastures fail to provide nutritious forage for your horse, the bare spots can be churned to dust and mud that present health risks such as respiratory disease, sand colic and thrush.

Mismanaged pastures also contribute greatly to degradation of the environment through erosion and water pollution from contaminated runoff. And, at the very least, overused pastures present an eyesore to your neighbors.

Environmental land management can be challenging when a number of horses are concentrated on a small parcel of land, such as on acreages. Where several acreages are situated near one another and near urban areas, maintaining good neighbour relations becomes critical. Suitable management of your pastures is a way to improve the appearance and productivity of your land and to prevent neighbour complaints.

Successful pasture management is not complicated, but it means horse owners must become much more aware of the quality and condition of their pastures. This chapter describes how to improve existing pastures and suggests strategies for getting the most potential out of pastures for your horses.

What’s Growing in Your Pasture?

Effective pasture management requires an understanding of the forage species that should grow in your horse’s pasture. Furthermore, gaining an appreciation of how pasture plants grow and develop, and how grazing and repeated trampling by hooves may affect the pasture, will help you make sound management decisions.

Grazing alfalfa

Horses can be grazed on alfalfa pasture. Alfalfa is a legume and is higher in protein and slightly higher in energy than grass. In the spring, all grasses and legumes are lush and less mature. The less mature the stand, the higher in energy and protein. Introduce your horses to alfalfa pasture gradually, just as you would introduce them to a fresh, spring grass pasture.
Growing up Tall
Like horses, plants go through several growth stages. Being able to recognize these different stages of plant growth is essential for making decisions on when and how long your horses can effectively graze the pasture.

Pasture plants have three distinct growth stages (Figure 20):
1) vegetative
2) elongation
3) reproductive

The “vegetative growth period” is the development of the leaves. This is a vulnerable stage for the forages and occurs in the spring as well as during the regrowth from grazing or mowing. Pasture plants use their leaves to gather solar energy from the sun, which they use to manufacture food, grow and reproduce. Avoid grazing during this vulnerable stage, so the plants have a “head start” for a longer and healthy growing season.

Once the plant develops enough leaves and stores enough energy, it enters the second growth stage, elongation. Elongation is the stage when the stem grows taller, but the number of leaves remains relatively the same. Pasture plants are best grazed when they enter the elongation phase. The elongation phase both optimizes the nutritional quality of the pasture plant and ensures the plants will survive the grazing by your horse.

The final, reproductive stage is the period when the seedhead or flower develops, and pollination occurs. Once the seedhead or flower develops, all new growth ceases. Horses prefer to bypass grasses that are this mature and search for grasses in the two earlier phases.

The nutritional quality of pasture forage also varies depending on the plant’s stage of growth. As a plant matures from the vegetative to reproductive stage, the fibre content increases and the nutritional value for horses decreases.

Although vegetative plants are the most nutritious, they are also the most fragile and susceptible to damage by grazing or trampling. Plants require some leaf area to support their own growth. Without these leaves, they have to rely on the limited energy stores in their roots for survival. Allowing your horse to graze off too much of the leaf area (termed “overgrazing”) will slow the regrowth of the plant and possibly damage the root system. The plant could eventually die if overgrazing continues.

Advantages of grass-legume pasture mixes
- Mixing of grass and legume species provides a better level of nutrition for grazing horses because legumes provide more protein, energy (calories), calcium and vitamins than do grasses.
- The ability of legumes to “fix” nitrogen in the soil may reduce the amount of nitrogen fertilizer needed in the pasture. If legumes make up 40 per cent of the pasture, nitrogen fertilizer is not usually needed.
- Grasses and legumes have differing levels of production throughout the growing season, providing a steadier production of forage over the entire grazing season than an all-grass pasture.
- A balance of 40-60 per cent grasses and 40-60 per cent legumes is ideal for horse pastures.

Figure 20. Grazing should take place when pasture plants are in the elongation stage of growth, before legumes flower and grasses produce seedheads. Grazing during the elongation stage optimizes the nutritional quality of the forage and the total pasture yield, while leaving enough food stores in the roots for pasture plants to regrow.
Selecting Plant Species for Horse Pastures in Alberta

Different pasture forages exhibit different growth characteristics, which you can take advantage of when designing a new pasture or improving an existing pasture. Ideally, you should select from forage species that possess the following characteristics:

- adapted to your local climate and soil
- adapted to the style of grazing management you will use
- provides a uniform amount of forage throughout the grazing season

There are two main types of forages: grasses and legumes. The primary difference between the two forages is that legumes have a mutually advantageous relationship with soil bacteria that enables them to utilize nitrogen from the air to make plant protein. Grasses do not have this ability and can only obtain nitrogen from the soil. As a result, legumes, particularly their leaves, are much higher in protein than grasses.

Common cool-season grasses in Alberta include meadow and smooth brome grasses, timothy, orchardgrass, creeping red fescue, and intermediate and crested wheatgrasses. Some grasses are bunch grasses, growing from a crown or above ground stem. Others are sod-forming grasses that spread by horizontal underground stems (rhizomes). Popular legumes include alfalfa, white clover, red clover and bird’s-foot trefoil.

Grasses and legumes are complementary. Cool-season grasses have the greatest growth in the early spring and again in late summer or early fall, whereas legumes remain productive during the hotter summer months. The varying growth patterns of grasses and legumes provide more uniform grazing throughout the growing season. For example, when brome grass goes dormant under the stress of the hot, dry summer, alfalfa will produce good grazing; then, the roles reverse in the fall.

Ideally, a pasture should contain at least one species of grass and one legume. Single species pastures carry a higher risk of damage due to disease or drought and are less flexible in season-long grazing management systems. There is little advantage to including more than three or four grasses and legumes in the mixture. Plants are competitive creatures, and the most aggressive species in the mix may eventually crowd out the others.

Alberta has a wide range of climates and soil types. As a result, forage species selected for a pasture in one area of the province may differ from species adapted for another location. Even on the same property, different species may need to be chosen for each pasture, depending on the drainage, soil type and grazing pressure each area will receive.

Figure 21 shows a map of Alberta with recommended species mixtures for horse pastures in each region. For more information on specific forage species, refer to Alberta Agriculture’s *Alberta Forage Manual* (Agdex 120/20-4).

![Figure 21. Grass and legume forage species suitable for horse pastures in different regions of Alberta. Ideally, horse pastures should contain at least one legume species and one or two grass species.](image)

**Table 1.** Suitable forage species for each area

<table>
<thead>
<tr>
<th>Area 1 – Brown soil zone</th>
<th>Legumes:</th>
<th>Alfalfa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasses:</td>
<td>Russian wild rye</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crested wheatgrass</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area 2 – Dark Brown soil zone</th>
<th>Legumes:</th>
<th>Alfalfa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasses:</td>
<td>Meadow brome grass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smooth brome grass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermediate wheatgrass</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area 3 – Black soil zone</th>
<th>Legumes:</th>
<th>Alfalfa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasses:</td>
<td>Meadow brome grass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smooth brome grass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Timothy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creeping red fescue</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area 4 – Gray luvisol soil zone</th>
<th>Legumes:</th>
<th>Alfalfa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grasses:</td>
<td>Meadow brome grass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Smooth brome grass</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Timothy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creeping red fescue</td>
<td></td>
</tr>
</tbody>
</table>
**Forage Species to Avoid**

Although most forages can be grazed by horses, a couple of species may be harmful and should be avoided in a pasture mix for horses.

**Alsike clover** (*Trifolium hybridum*)

Alsike clover has been associated with the occurrence of photo-sensitization (over-sensitive to sunlight) and/or liver damage in horses. Unfortunately, the amount of alsike clover needed to cause harm is unknown, and some horses are thought to be more sensitive than others.

Affected horses may or may not show signs of photo-sensitization (sun-burned appearance of light-skinned areas, usually on the face, muzzle and legs). Similarly, blood tests may or may not show disruption of normal liver function.

See “Which Clover is it?” for help on distinguishing Alsike clover from red and white clovers.

**Endophyte-infected Tall Fescue** (*Festuca arundinacea*)

Older varieties of tall fescue may be infested with an endophyte (a fungus that lives inside the plant) that can be harmful to pregnant mares. The endophyte produces mycotoxins that cause prolonged gestation, stillborn foals, retained placenta, reduced or absent milk production and difficulty rebreeding. The endophyte does not appear to have adverse effects on non-pregnant mares, geldings, stallions or growing horses.

Tall fescue may be found in pastures in southeast Alberta as well as in the Peace River area. The endophyte can also be present in tall fescue hay.

Pregnant mares grazing endophyte-infected tall fescue should be removed from the pasture 30 to 60 days before foaling and/or treated with the drug Domperidone to counteract the effects of the mycotoxins. You can dilute endophyte-infected hay by feeding other forages along with the infected tall fescue. Newer, endophyte-free varieties of tall fescue are available and should be used if you want tall fescue in your pasture mix. Other varieties of fescue, including creeping red fescue, do not contain the harmful endophyte.

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**Which Clover Is it?**

**Figure 22.** Red clover.
- Pink to purple flowers
- Hairy leaves and stems
- Upright growth habitat
- Leaves have a watermark (a white “V” on the leaf)

**Figure 23.** White clover.
- White to pink flowers
- Leaves and stems are not hairy
- Growth of stems is along the ground
- Leaves have a watermark

**Figure 24.** Alsike clover.
- White to pink flowers
- Leaves and stems are not hairy
- Upright growth habitat
- Leaves usually have NO watermark

Drawings courtesy of the United States Department of Agriculture, Natural Resource Conservation Service.
Pasture Can Be a Rich Source of Nutrients

Quality forage, whether it is hay or pasture, should be the foundation of your horse’s feeding program. Good quality pasture can provide much of the nutrition a horse needs. Pasture also provides an economical forage. The cost of pasture as a feed is estimated to be nearly one-tenth the cost of hay.

Meeting Your Horse’s Nutritional Needs

The ability of pasture to supply the feed requirements of your horse will depend on several factors:

1) Species growing in the pasture

Legumes are higher in protein and digestible energy (calories) and lower in fibre than grasses. Therefore, a pasture with a higher proportion of legumes, such as alfalfa or clover, will possess a higher nutritional value compared to an all-grass pasture.

2) Plant’s stage of maturity

Pasture forages are high in nutritional value when actively growing and become lower in nutritional value with maturity. The more immature the plant, the more nutritious and palatable; however, the smaller the plant, the less feed it provides.

3) Season

Spring grass contains the highest levels of protein and lowest levels of fibre of any grass of the year. As the grazing season progresses into summer and fall, a reduction in growth and an increase in maturity of the forage leads to a lower nutritional value.

4) Horse’s physiological state

In many cases, good quality pasture can meet the nutritional needs of most adult pleasure horses, along with water, salt and trace mineral supplementation. Even growing two-year-olds can get all they need from good quality pasture. Weanlings, yearlings, pregnant and lactating mares and horses in hard work, however, may be left short by an all-pasture diet. These groups of horses have higher nutritional requirements and would likely require grain feeding (0.5 to 1.0 per cent of body weight) as well as grazing.

Taking representative samples of the forage growing in your pasture at different times of the year and sending them to a laboratory for chemical analyses is the most accurate way to help you determine the overall feeding value of your pasture.

How Much Pasture is Your Horse Eating?

Pasture intake will vary depending on the season, species and quality of pasture grazed, length of grazing time and grazing management.

In addition to what your horse consumes, you must also account for how much forage your horse damages through trampling. One rule of thumb is that a horse will eat, trample or damage 1 pound of forage per pound of body weight per month (or 1 kg forage per 1 kg body weight). Therefore, to sustain an average 1,100 lb (500 kg) horse, a pasture must be capable of producing at least 1,100 lbs (500 kg) of forage each month. With proper grazing management, the amount of forage needed per horse can be reduced by 10 to 20 per cent.

The amount of forage a pasture produces varies by the type of forage growing and the season. Grass and grass-legume pastures produce more forage over the grazing season than pastures consisting of native rangeland species. Growth is most abundant in the spring and early summer, while growth slows in the summer and fall.

In Alberta, approximately 60 per cent of the forage on pastures will be produced by early July. Table 9 shows the average forage production that can be expected with proper management of different types of pasture.

Table 9. Average forage production (per acre) on well managed grass and grass-legume pastures.

<table>
<thead>
<tr>
<th>Month</th>
<th>Grass Pasture</th>
<th>Grass-Legume Pasture</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>720 lbs (325 kg)</td>
<td>1750 lbs (795 kg)</td>
</tr>
<tr>
<td>June</td>
<td>1700 lbs (775 kg)</td>
<td>2600 lbs (1180 kg)</td>
</tr>
<tr>
<td>July</td>
<td>1550 lbs (705 kg)</td>
<td>1900 lbs (860 kg)</td>
</tr>
<tr>
<td>August</td>
<td>1600 lbs (725 kg)</td>
<td>2000 lbs (910 kg)</td>
</tr>
<tr>
<td>September</td>
<td>1030 lbs (470 kg)</td>
<td>2050 lbs (930 kg)</td>
</tr>
<tr>
<td>Total over grazing season</td>
<td>6600 lbs (3000 kg)</td>
<td>10,300 lbs (4675 kg)</td>
</tr>
</tbody>
</table>

Source: Modified from grazing research data collected at Lacombe, Alberta (Courtesy of Dr. Vern Baron, Agriculture and Agri-Food Canada)
Preventing Laminitis and Colic

Horses that are allowed to over-eat lush pasture may be at risk for colic or laminitis. Fat horses and ponies are particularly at risk of laminitis, colic and other problems of over-indulgence. But all horses may be at risk if they are not properly adapted to grazing lush pasture. Tips for preventing laminitis and colic on lush pasture:

- Gradually adjust time on pasture.
  Start with two hours of grazing and gradually build up to full-time turnout over a period of two or more weeks. Keep in mind, your horse may only need to be on pasture five to six hours per day to meet its nutritional needs on lush, spring pasture.

- Make sure your horse is well fed before placing it on pasture.
  Turning a hungry horse out to pasture is just asking for disaster. Instead, feed your horse hay before turning out to graze. It is best to feed in a stall or corral away from the pasture, because giving a choice between lush grass or hay while on pasture is like asking a child to choose vegetables over candy.

- Observe horses daily when first turned out on pasture.
  Check for lameness or heat in the hooves, indicative of laminitis, and watch for signs of abdominal discomfort (rolling, kicking or biting flank), which are signs of colic. Call your veterinarian immediately if anything seems amiss.

- Adjust feed to need.
  Pasture-related colic and laminitis can largely be avoided by providing only the amount of feed your horse needs. In some cases, you may have to totally eliminate grazing from your horse’s feeding program to better control their daily feed intake.

If you have any questions about turning your horse out onto spring grass, consult your veterinarian for a recommendation.

Nitrate Toxicity and Horses

Plants naturally take up nitrogen from the soil in the form of nitrate, which they use to make plant protein. Any time the plant is stressed, such as during a drought or after a frost, plant growth slows. If the plant is not growing, the nitrate is not being turned into protein and is accumulating within the plant tissues instead.

Cows and other ruminants are most sensitive to nitrates. Nitrate levels above 0.5 to 1 per cent in the total diet dry matter are known to cause toxicity in cattle and sheep. Horses digest nitrates somewhat differently than cattle and are therefore thought to be more tolerant of nitrates in their feed. There are reports of growing horses and pregnant and lactating mares receiving 1.8 to 2 per cent nitrate in their hay without any adverse effects. It is recommended that nitrate concentrations should not exceed 1 per cent of the horse’s total diet, just to be safe.

Nitrate accumulation is most common in fast-growing annual crops, such as oats and barley. However, nitrates can also accumulate in hay crops and pastures if they were fertilized just before being stressed by drought or frost. Pastures with elevated nitrate levels can safely be used by gradually adapting the animals to pasture and by supplementing grazing with hay.

Equine Grazing Behaviour

Horses are instinctively selective grazers, basing their choice of pasture plants on what tastes good (palatability) as well as availability. Horses prefer to eat young, immature plants and will graze some areas of a pasture down to the bare ground. In other parts of the pasture, plants are avoided and allowed to grow to maturity, which lessens palatability and nutrient availability. In addition, horses will not graze in areas where they defecate, so pasture plants around manure piles are also mature and less palatable. This grazing pattern is often called “spot” grazing.

Horses can also graze much closer to the ground than cows can because horses have upper and lower incisors. However, clipping off the plants too close to the ground can cause problems for plant regrowth.
Close cropping of pasture plants, trampling and selective grazing can seriously affect the productivity of a pasture (Figure 25). Selective grazing of areas with short, new growth over and over again, without giving the plants a reprieve, causes the plants to decline in vigor or persistence. As the desirable species of forage are grazed out or trampled, weeds tend to invade the pasture. Thus, horses can quickly turn a pasture into a weed patch or dry lot.

Although horses are selective in their grazing habits, they can be “persuaded,” with proper pasture and grazing management, to eat pasture that they might otherwise choose to avoid. This approach is not being unkind to your horses, it is simply managing their grazing to give them as much pasture as you can for as long as possible.

**How Many Horses Will My Pasture Support?**

The most common question asked by horse owners is, “How many horses can I keep on my property?” Unfortunately, the answer to this question is not always straightforward, and there is considerable variability. Several factors will determine the number of horses your pasture(s) will support:

**Acreage available for grazing**

Land available for grazing is what is left over after you exclude areas used for buildings, stables, trees, house, driveways, sloughs, rivers and creeks.

**Species of forage growing in the pasture(s)**

Horses kept on unimproved, “native” rangeland pastures often require more land to sustain each horse. Improved, “tame” grass and grass-legume pastures will produce more forage than native rangeland, allowing more horses to be supported by a smaller area.

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**Figure 25.** Spot grazing = portions of pasture being overgrazed and other portions of the same pasture being undergrazed. Spot grazing results in the appearance of “lawns” (closely cropped areas) and “roughs” (tall, over-mature plants and manure piles).
Quality of the pasture forage available
The more desirable the forage species growing in your pasture and the more forage available for grazing, the higher the pasture quality. If your pasture is overgrazed, full of weeds and bare spots, you have a poor quality pasture.

Soil and climate characteristics unique to your area of Alberta
Grey wooded soil supports more horses than the brown soil regions. With good rainfall or irrigation, less acreage may be required. During times of drought, the number of horses per pasture should be reduced.

Grazing management employed
How you manage your pastures can be the biggest factor that determines the number of horses your land can support. Proper management will increase the productivity and long-term survival of your pasture. The less land you have, or the more horses you pasture per acre, the more intensive management you will need to provide to maintain your pastures in healthy, useful condition.

Physiological state and size of horses grazing the pasture
Lactating mares with foals require almost twice as much feed as an idle mature gelding. Similarly, bigger horses graze more grass. Therefore, the number of horses your pasture will support should be adjusted based on the size and physiological state of the horses.

Municipal restrictions
Check with your local municipality to see if there are any regulations concerning horsekeeping. Areas may have regulations regarding number of horses allowed, odour, flies, disposal of manure and drainage onto neighboring properties.

Keep in mind, there are limits to a particular property’s ability to support animals. Sadly, you may have to face the fact that you just cannot house the number of horses you would like at your current location without causing detrimental effects to the environment.
Calculating Stocking Rates

When determining the number of horses your pasture can support or the amount of land needed to support the grazing of your horses, you are calculating the “stocking rate.”

The following equation can be used as a guideline for determining the number of pasture acres required for grazing:

\[
\text{Pasture acres required} = (\# \text{ horses}) \times \text{average body weight in pounds} \times 0.035 \times \text{(# grazing days)} \times \frac{\text{Average forage production, in pounds per acre}}{2,000 \text{ lbs per acre}}
\]

For example, say you have two, 1,100-lb horses and you want to graze them for 3 months. You estimate your pasture will produce an average of 2,000-lbs of forage per acre in that 3-month period (refer to Table 9 for average pasture forage production or well-managed pastures).

\[
\text{Pasture acres required} = (2) \times 1,100 \text{ lbs} \times 0.035 \times 120 \text{ days} = 4.6 \text{ acres would be needed for 120 days of grazing these 2 horses}
\]

Table 10 shows some reasonable estimates for the number of acres needed to support an average 1,100-lb horse for one month of grazing, based on the annual precipitation and the quality of the pasture.

<table>
<thead>
<tr>
<th>Annual precipitation</th>
<th>Number of acres needed to support one horse (1,100 lbs or 500 kg) for one month based on the annual precipitation and the quality of the pasture.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>inches</td>
</tr>
<tr>
<td>250 – 350</td>
<td>10 – 14</td>
</tr>
<tr>
<td>350 – 450</td>
<td>14 – 18</td>
</tr>
<tr>
<td>450 – 550</td>
<td>18 – 22</td>
</tr>
<tr>
<td>550 – 650</td>
<td>22 – 26</td>
</tr>
<tr>
<td>Irrigation</td>
<td></td>
</tr>
</tbody>
</table>

*If you have more than one horse, multiply the number of acres per month by the number of horses.
*If you have horses that weigh more or less than 1,100 lbs (500 kg), calculate your horse’s proportion to the generic 1,100-lb (500-kg) horse and multiply it times the number of acres per month. For example, if you pastured an 1,300-lb horse on excellent pasture that received 14–18 inches of rain, you would need 1.18 acres \((1,300 \div 1,100 = 1.18 \times 1.0 \text{ acre} = 1.18 \text{ acres})\). If you pastured a 550-lb (250-kg) weanling on the same type of pasture, you would need 0.5 acres for one month \((500 \div 1100 = 0.5 \times 1.0 \text{ acre} = 0.5 \text{ acres})\).
Grazing Management

Managing the grazing of your horses will have a greater effect on the productivity of your pasture than almost any other factor, including the species of forage growing there.

Two important practices that need to be implemented into your grazing management plan are **proper timing of grazing** and **a rest-rotation schedule**.

**Time to Eat**

A simple way to determine if your pasture is ready to graze is to measure the height of the forage (Figure 26). Using a ruler, record the height of the vegetation as it stands naturally (do not stretch or extend leaves) at several locations within the pasture and average the heights. Each 2.5 cm (1 in.) you measure is equivalent to approximately 100 to 250 kg (200 to 500 lbs) of forage.

A pasture should contain at least 15 to 20 cm (6 to 8 in.) of growth before horses are allowed to graze. This rule for grazing height holds true whether you are just turning your horses out in the spring, or you are returning them to a field that was allowed to regrow after a period of rest. Grasses and legumes need time for sufficient growth before grazing is allowed. If grazed too early, plants may die and be replaced by undesirable plants species and weeds.

**A Little R’n R**

Knowing when to stop grazing is just as critical to maintaining a productive pasture as deciding when to begin grazing. Pastures must have a periodic rest from grazing, so they can recuperate.

Once horses have grazed the majority of the grass in a pasture down to 8 to 10 cm (3 to 4 in.), remove the horses from the pasture. Never allow grass to be grazed shorter than 8 cm (3 in.). This practice ensures that the grass will have enough food reserves to permit rapid regrowth. You can put horses back on pasture when the grass has regrown to about 15 to 20 cm (6 to 8 in.).

Regrowth of pasture plants usually takes two to six weeks, depending on the time of year. In the spring, forages grow twice as fast as they do during the summer, so pasture rest periods may be shorter in the spring and longer in the summer and fall.

Rotating horses through a series of pastures (termed “rotational grazing”) or removing horses from pastures for part of the day (known as “limited grazing”) are practices that will provide rest periods.

The key to maintaining a productive pasture is to manage your horses so that grazing removes only a certain amount of the plant and leaf area, leaving enough behind for the plant to recover and begin regrowing again.
**Grazing Systems**

Several grazing schemes can be used to control your horse’s grazing and, at the same time, to promote healthy pastures. Keep in mind that no one grazing scheme is best for all situations, and a combination of techniques may work best for you.

**Rotational Grazing**

The concept behind rotational grazing is to break up larger pastures into smaller sections, so you can control your horse’s grazing in a smaller area. This practice encourages the horses to be less selective and to graze the available forage more evenly. Once one section is grazed down, the animals are moved to a new section while the grazed section is allowed to rest and recover from grazing and hoof damage.

As a first step towards a rotational grazing system, you may want to first try dividing an existing large pasture in half and then alternate grazing. Then, try further subdividing the pasture after you gain some experience (Figure 27).

Ideally, you want at least four smaller pastures that provide enough grazing for seven to ten days. This grazing duration gives each pasture a rest of three to five weeks. As the grass matures and growth slows during the summer, you will likely have to decrease grazing time and increase resting time.

The movement of horses should be based on the growth rate of the pasture and the specific height of the forage, not on the calendar. Begin grazing when the forage is 15 to 20 cm (6 to 8 in.) tall. Once horses have grazed a pasture down to 8 to 10 cm (3 to 4 in.) rotate them onto the next pasture.

In spring and early summer, when growth is fast, you may find that your horses cannot keep pace with the rapidly growing grass in your pastures. While you could wait for your horses to graze one pasture down to 8 to 10 cm (3 to 4 in.), the forage in your other pastures would mature and quickly become less palatable. Instead of waiting, you might choose to move your horses to other sections sooner, so they have a chance to graze the tops of all pastures. Alternatively, you might be able to harvest hay from one or more pastures that cannot be effectively grazed in the spring and early summer.

If the size of your available acreage is small, you may find that your first pasture has not yet recovered to grazing height by the time you have rotated through all the other pastures. To avoid overgrazing, supplemental feeding and/or reduced or restricted grazing time may have to be used to give each pasture adequate rest.

There may be several options for dividing your pasture into smaller plots for rotational grazing. Remember that all sections must allow access to water. Also, try to divide pastures in such a way that horses can have access to shade or shelter, especially if they will be confined to these areas for more than a few hours (Figure 27).

**Figure 27.** Options for dividing your pasture to facilitate rotational grazing.
Advantages of Rotational Grazing

- Increases the amount and quality of forage obtained by grazing
- More animals can be supported on the same acreage of pasture
- Reduces or eliminates selective or spot grazing
- Allows for more complete utilization of pasture forage
- Minimizes “rejection areas” where horses will not graze
- Promotes the growth of desired species and reduces the number of undesirable species and weeds.
- Can help control parasites and discourage some animal diseases
- May permit harvesting of excess forage in spring and stockpiling forage for the fall
- Provides better manure distribution and nutrient recycling
- Allows for frequent horse-human contact

Continuous Grazing

Many horse owners allow their horse access to a pasture continuously. The horse usually remains on the same piece of land over the whole grazing season. This type of grazing system is called “continuous grazing.” Although continuous grazing requires the least amount of capital investment and management, this type of system can be very unhealthy for the land. Unrestricted access allows horses to be highly selective during much of the grazing season, creating both overgrazed forage and areas of under-used and wasted forage. A loss of desirable forage species, invasion of weeds, erosion and the nonuniform distribution of horse manure are other problems commonly associated with continuously grazed pastures.

To maintain a healthy plant stand with continuous grazing, you will need a sufficiently large land area and you need to maintain a low stocking rate.

A Small Sacrifice

You can greatly improve the health and productivity of your pastures by creating and using a “sacrifice area.” A sacrifice area is a small enclosure such as a paddock, corral or pen, or turnout area. The concept is that a selected area is sacrificed from the grazing system and is used to confine the horses to protect pastures from over-use at critical times.

Sacrifice areas also have other benefits. They can serve as a central watering location for rotational grazing systems, and they provide a location for supplemental feeding. Sacrifice areas are also ideal for helping to juggle the turnout of compatible groups of horses when pasture area is limited. In addition, manure until the forage has regrown to a height of 15 to 20 cm (6 – 8 in.) before allowing your horses access to pasture again.

Practice Limit Grazing

The more horses you have on your property, and the less land you have, the more challenging it can be to manage your pastures. You can still preserve your pastures and keep them healthy by limiting the amount of time your horses graze. Although more hand-feeding will be required, pasture turnout can still contribute to your horse’s health.

There are many ways to modify a limited grazing routine to fit your horses, farm and schedule. You might choose to turn your horses out once or twice a day, before or after work, for a few hours each time. Night turnout is appealing to some owners because the absence of the sun prevents bleaching of the haircoat. There are also fewer bugs at night. If you have several horses, you could turn one group out at night and a separate group out during the day, so the ground suffers less abuse at one time.

Always remember to monitor the height of the grass. As the vegetation is grazed down to 8 to 10 cm (3 to 4 in.), remove your horses and place them into a corral or dry lot area (see the information on “Sacrifice areas” below). Wait

Fence me in

Portable electric fencing or tape is a simple and inexpensive way to create temporary paddocks in a large pasture to facilitate rotational grazing. And when it is time to rotate the horses into a new area, the electric barriers are easy to move. If you use only one tape or strand, then string it at a height of approximately 84 cm (33 in.); hang double strands at 50 and 90 cm (20 and 36 in.); space triple strands at 40, 70 and 100 cm (16, 28 and 40 in.). Easy-to-install electric fencing systems can be purchased from most farm supply stores.
deposits are confined to a smaller area, which can be cleaned and the manure removed more frequently.

When choosing a location for a sacrifice area, select a site on higher, drier ground, away from wetlands, streams or ditches. Surround the area with at least 8 to 15 m (25 to 50 ft.) of lawn, pasture, trees or bushes. This vegetative buffer will act as a natural filter for contaminated water running off the area.

For chore efficiency, you may want to keep the area close to the barn. You may have several turnout paddocks that you rotate stalled horses through during the day. Alternatively, you could set up a sacrifice area for each horse as a run off of each stall.

The amount of land you have available and the number of horses and their temperaments will all affect the size of the sacrifice areas you need. Approximately 100 square meters (1,000 ft²) will be needed for each horse. The shape of a sacrifice area can be square or it can be a long, narrow enclosure that allows horses to run and play. Approximately 6 to 9 m (20 to 30 ft.) wide by 30 m (100 ft.) in length will allow a horse to trot; 60 m (200 ft.) in length will allow a horse to canter.

Footing for the horses is an important consideration for sacrifice areas. The objective is to have a hard-wearing, steady surface that is able to cope with plentiful hoof traffic without degenerating into dust and mud. Hogfuel or woodchips may help eliminate the urine smell often present in outdoor confinement areas. Crushed rock (no larger than 5/8 in.) or sand will also work well in some situations.

The area should slope 2 to 4 per cent to avoid ponding of water and to reduce erosion. Roof runoff from barns and other structures should be drained away from the sacrifice area.

### Home on the Range

Many horses in Alberta may be grazing rangeland rather than cultivated pastures. The native vegetation in a rangeland ecosystem may involve hundreds of species that have evolved and adapted to the local soil and climate conditions over thousands of years.

Growth of native rangeland species typically follows rainfall. Because of this characteristic, most of the rangeland growth occurs in early summer, with very little occurring thereafter unless it rains (see Table 11).

Because the majority of growth occurs at one time, maintaining horses on native rangeland can be quite a challenge. Rangeland can easily be overgrazed unless forage production is matched with grazing pressure.

Tips for managing the grazing of horses on native rangeland:

1) **Practice rotational grazing**

Concentrate your horses’ grazing in a smaller area when growth is abundant in the spring and early summer, and allow other areas to remain unused. In essence, you are stockpiling or saving the forage. When the horses have grazed the first area down, rotate them into a new area where the forage has been stockpiled.

### Table 11. Average forage production (per acre) of rangeland pastures.

<table>
<thead>
<tr>
<th>Month</th>
<th>Mixed Prairie</th>
<th>Fescue Prairie</th>
<th>Aspen Parkland</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>450 lbs (205 kg)</td>
<td>200 lbs (90 kg)</td>
<td>200 lbs (90 kg)</td>
</tr>
<tr>
<td>June</td>
<td>100 lbs (45 kg)</td>
<td>950 lbs (431 kg)</td>
<td>350 lbs (160 kg)</td>
</tr>
<tr>
<td>July</td>
<td>0 lbs (0 kg)</td>
<td>50 lbs (22 kg)</td>
<td>0 lbs (0 kg)</td>
</tr>
<tr>
<td>August</td>
<td>0 lbs (0 kg)</td>
<td>0 lbs (0 kg)</td>
<td>0 lbs (0 kg)</td>
</tr>
<tr>
<td>September</td>
<td>0 lbs (0 kg)</td>
<td>25 lbs (12 kg)</td>
<td>0 lbs (0 kg)</td>
</tr>
<tr>
<td>Total over grazing season</td>
<td>550 lbs (250 kg)</td>
<td>1225 lbs (555 kg)</td>
<td>550 lbs (250 kg)</td>
</tr>
</tbody>
</table>

Source: Modified from *Range Pasture: in Alberta* (1988), Alberta Agriculture, Food and Rural Development
2) Confine horses to a sacrifice area during critical times
Regrowth of grazed rangeland may be slower than in cultivated pastures. As a result, there may not be sufficient regrowth in previously grazed pastures for you to be able to safely turn your horses back out without hurting the native grasses. Confining your horses to a corral or dry-lot (sacrifice area) will require you to hand-feed, but it will spare your rangeland pastures from damage that could be irreversible.

3) Inter-seed rangeland with higher producing grasses and legumes
The overall production of forage can be improved on native rangeland by introducing a compatible grass or legume.

Extending the Grazing Season
The grazing season in Alberta typically begins in mid to late May and carries into mid to late September. However, there are a few things that can be done to encourage plant growth earlier in the season or to extend grazing into the late fall.

• Proper fertilization in the spring may allow grazing to begin one or two weeks earlier in the season.
• Practice rotational grazing to keep forage in the vegetative growth stage.
• Stockpile forages to use in October and November by allowing a pasture to grow ungrazed starting in July (creeping red fescue is especially good for stockpiling).
• Seed a legume to provide forage during the hotter summer months when grasses go dormant.
• Plant specialty or annual crops, such as oats or fall rye, that will provide grazing in July and August.

Routine Pasture Management
Design and Layout
A good pasture contains a clean, reliable water source, mineral salt blocks and shelter from the sun and inclement weather. Careful arrangement of fences to provide for easy access to water, mineral, salt and shelter should be part of all pasture programs.

If you own portable fencing, water troughs and feed bunks, your pasture layout can be changed to better serve your needs throughout the year. You can design your pastures to manage for high rainfall years or drought. You can also move your fencing to change your horses use of their pasture, which will protect more susceptible areas from regular hoof traffic.

Soil Testing and Fertilizing
The quantity and quality of the forage produced by your pastures can usually be greatly increased by proper fertilization. In addition, application of the correct amount of fertilizer can decrease weed problems by making your grass plants so vigorous that weeds cannot get established.

To determine the amount of fertilizer your pastures need, you must first have your soils tested. Soil testing reveals the existing nutrient levels in the soil, as well as the nature and condition of the soil, all of which can be corrected to improve pasture production. For more information on soil testing, refer to “Step 1: Sample Your Soil” in the chapter “Managing Manure by Spreading on Cropland and Pasture.”

Once you have found out from your soil test what nutrients your pastures need, apply only those nutrients in the amounts recommended. Over-fertilizing is not only costly, but may also contribute to surface water pollution.

Commercial fertilizer mixtures typically supply combinations of nutrients in various proportions, the most common ones being nitrogen, phosphorus and potassium. These mixtures should only be used if ALL the nutrients they contain are lacking in the pasture. A better alternative would be to have a custom fertilizer mix created for your pastures based on the recommendations made in your soil analysis.

Be aware that the type of plant species growing in your pasture may affect which nutrients are needed for better production. Grasses benefit from nitrogen fertilization, whereas legumes respond better to phosphorus, potash and lime. A pasture containing a mix of grasses and legumes may not need nitrogen fertilization if the pasture contains at least 40 per cent legumes. In fact, untimely or excessive nitrogen fertilization of a grass-legume pasture may be detrimental because grasses might crowd out the legumes.
The timing of fertilizer application is just as important as the type and amount applied. Applying fertilizer several times throughout the grazing season is more beneficial than a single annual application. For example, a portion of the yearly nitrogen application can be applied in the spring to encourage initial spring growth, and another application can occur in the late summer to extend the grazing season and strengthen roots for winter. Additional applications of nitrogen can be made throughout the growing season. If you practice rotational grazing, a good time to apply nitrogen is just after you rotate your horses off the pasture. Most importantly, fertilizers should be applied only during the growing season when plants can utilize the nutrients.

Horses should be taken off the field when fertilizer is applied. Read the fertilizer product label to determine when it is safe to return horses to the pasture. If you have questions or concerns, consult with your veterinarian.

To monitor the effectiveness of your fertilizer program, you should perform new soil tests on your pastures every two to three years. Information on the fertilizer requirements of different crops can be found on Alberta Agriculture’s website (www.agric.gov.ab.ca) or in the Alberta Agriculture publications Alberta Fertilizer Guide (Agdex FS541-1) and Crop Nutrition and Fertilizer Requirements (Agdex FS 540-1). For information on using manure as a fertilizer for your pastures, see the chapter “Managing Manure by Spreading on Cropland and Pastures.”

**Weed Prevention and Control**

Weeds are undesirable plants that have either limited or no grazing value. Common weeds such as Canada thistle are invasive and reduce pasture production. Weeds thrive in overgrazed and abused pastures, competing with desirable plants for sunlight, moisture and nutrients, and often winning. Weeds severely reduce the feed value of your pasture, and at their worst, some weeds are even harmful to your horses (see the section “Hazardous Materials”).

The techniques for getting rid of existing weeds in your pasture include removal by hand, mowing and herbicide application. Weed removal should be done before perennial weeds bud and before annual weeds seed.

If you choose to apply herbicides, make sure the product you are using is effective for the specific weed you are trying to control and that you apply it at the correct time or stage of growth. Only spray areas with weeds and be aware of wind drift.

Horses should be removed from herbicide-treated pastures. Not only may the chemicals be harmful to horses, some herbicides make poisonous plants more attractive or palatable. The length of time horses will have to be held off pasture depends on the product used. Always read and follow all instructions and precautions on the product label.

Herbicide application may correct your current weed problem. However, if you do not change your management style to prevent weeds from becoming established, they will come back. Weeds often get started in handling areas, fence lines, watering sites or winter feeding areas. Monitoring these sites on a regular basis is the best method for early detection of weed problems.

**Tips for Weed Prevention:**

- Promote healthy growth of desirable pasture plants with a proper fertilization program
- Do not overgraze your pastures
- Buy certified weed-seed-free hay
- Mow pastures regularly before weeds go to seed or before they shade out developing grasses
- Early identification of undesirable weeds and poisonous plants

For more information on weed identification and eradication, see the Alberta Agriculture publications, Weeds of the Prairies (Agdex 640-4) and Crop Protection (Agdex 606-1). For more information on poisonous plants, refer to Poisonous Plants on Rangeland and Pasture (Agdex 130/666-1).
Hazardous Material

Because horses are very selective grazers, they are extremely good at avoiding poisonous plants — as long as they have a choice. When pastures are overgrazed and horses are hungry or bored, they are more likely to try a plant that could be harmful. Some of the poisonous plants found in Alberta are listed below. If you identify a potentially harmful species of plant in your pasture, it should be removed. Contact your veterinarian if you suspect poisoning.

Potential Poisonous Plants
Arrowgrass (*Triglochin maritima*)
Chokecherry (*Prunus* spp.)
Death camas (*Zigadenus* spp.)
Dogbane (*Agocynum* spp.)
Early yellow locoweed (*Ocytropis macounii*)
Horsetails or scouring rush (*Equisetum* spp.)
Lady’s-thumb (*Polygonum* spp.)
Low Larkspur (*Delphinium bicolor*)
Tall Larkspur (*Delphinium glaucum*)
Lupines (*Lupinus* spp.)
Milk-vetch (*Astragalus* spp.)
Monkshood (*Aconitum* spp.)
Mustards (*Brassica* spp.)
Saskatoon berry (*Amelanchier alnifolia*)
Showy milkweed (*Asclepias* spp.)
Western water hemlock (*Cicuta douglasii*)

Mowing

Horses are selective grazers, eating some plants close to the ground and leaving others untouched. Plants also grow rapidly around manure piles, as a result of the added fertility of the manure and because horses avoid grazing near these spots, so you will want to mow.

Mowing can increase the quantity and quality of grazing. Mowing your pastures cuts all the plants to the same height, stimulating more uniform regrowth and preventing grass plants from getting too tall and tough to be appetizing to horses. Cutting down weeds before they have a chance to go to seed is also a very important weed management technique.

Set your mower deck to a height of 10 to 15 cm (4 to 6 in.). Ideally, pastures should be clipped before grass seed heads emerge (“heading”) to encourage plants to produce leafy, higher quality vegetation. If you use rotational grazing, clip your pastures immediately after you remove your horses from the grazed area.

Harrowing

Pastures will also benefit from harrowing the manure. Dragging the pasture spreads manure evenly over the grazing area, thereby recycling the nutrients back into the soil more effectively.

Harrowing can be done when it is hot or cold, but it should be performed in dry weather. Harrowing at this time breaks up the manure clumps, so they can dry out and kill intestinal parasite eggs and larvae. In contrast, spreading...
manure in warm, moist weather encourages parasite eggs to hatch and thrive, increasing the risk of reinfecting your horse. After scattering the manure piles, do not let the horses graze the area for three to four weeks.

Harrowing can easily be incorporated into a pasture rest-rotation schedule. Immediately after an area has been grazed and the horses have been removed, mow the area and harrow while the grass is short and the manure is still fresh.

**Equipment Checklist**

The equipment you use to keep your pastures healthy does not have to be complex or expensive—it all depends on the size of your place and your needs.

- **Lawnmower**—riding lawnmowers (16 to 18 horsepower) are effective for small farms and can be used to pull harrows and manure spreaders; a tractor and rotary mower may be necessary for larger pastures.
- **Harrow**—harrows are used for spreading out manure piles in pastures and can also be used to smooth arena surfaces. You can buy a harrow or make one with a piece of chain-link fencing, an old metal bedspring or gate.
- **Manure spreaders**—a manure spreader can make the job of spreading your manure or compost throughout your pastures a lot easier. Choose a manure spreader that your riding lawnmower or truck can handle and that it is not too big to maneuver around your pastures. Make sure the spreader is adapted to horse manure. Cow manure is softer and breaks apart more easily, which makes a difference in how the tines in the spreader are structured.
- **Electric or portable fence**—use fencing to divide your pastures into smaller areas for rotation.

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**Breaking the Worm Cycle**

All horses carry some level of intestinal parasite burden. Considering that 99 per cent of a given worm population exists on pastures, it is not hard to see why proper pasture management is important.

Here are some tips for reducing the risk of reinfecting your horses on pasture:

- Have your veterinarian perform regular fecal egg counts on your pastures
- Establish and maintain a routine deworming program
- Remove horses from pastures after harrowing until manure is dried and partially decayed (approximately three to four weeks in the summer)
- Practice rotational grazing, giving pasture time to rest and manure time to break down
- Remove manure from pastures
- Graze cattle or sheep after horses to break the horse worm cycle (these livestock can ingest horse worm larvae without harm)

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**Pasture makeover tips:**

- **Start an appropriate fertilization program**
- **Manage the grazing of your horses to avoid overgrazing**
- **Mow mature, undergrazed forage**
- **Control weeds before they get to be a problem**
- **Interseed with a legume**

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**Rejuvenating Poor Quality Pastures**

Many people have existing pastures that are in need of some help. A loss of desired pasture species, an invasion of weeds or bare spots indicate your pasture is hurting. Plowing up a pasture and replanting can be very expensive and time consuming. Fortunately, large gains in production can be made in a poor quality pasture by applying the same management tools you would use on a healthy pasture.

Pastures can often be rejuvenated simply by applying the appropriate fertilizer. In addition to stimulating the growth of existing plants, fertilizer will stimulate dormant seed that is already in the ground. Have your soil tested to determine the proper fertilizer treatment.

A sound grazing system will also promote a healthy pasture by preventing overgrazing. Pasture grasses and legumes need time to rest and recuperate after they are grazed, so they can build up their own reserves. Monitor grass
height and remove your horses when the grass is grazed down to 8 to 10 cm (3 to 4 in.). Mow the uneven growth, harrow the manure and let the pasture rest until it has grown back up to 15 to 20 cm (6 to 8 in.) before allowing your horses back out to graze.

Weeds are the biggest culprits in decreasing pasture quality. They steal nutrients from desirable pasture species, and some are harmful to your horses. Weeds should be removed, either physically or chemically. Proper fertilization, grazing management, mowing and early identification will help you combat future weed problems.

Introducing a legume is also a good technique for reviving a horse pasture. Legumes, such as alfalfa, reduce the need for nitrogen fertilization, improve horse performance and provide better seasonal distribution of forage in mid-summer. Legumes can also be added to your existing pasture with plowing it up by interseeding.

There are two methods for seeding legumes into grass sod: frost seeding and no-till drill. Frost seeding is best performed in the early spring. Legume seed is broadcast on the soil and allowed to roll into tiny cracks formed by the natural freeze-and-thaw cycle of this season. No-till drill is performed in the late summer/early fall. Using this method, a tractor-pulled seeder is used to cut slits in the soil, deposit seed and then roll the slits closed in one operation with minimal disturbance to existing vegetation.

The drawback to any type of seeding is that grazing cannot occur until new plants are established, which can take up to six months. With frost seeding in the spring, that means horses cannot be turned out on the pasture until late summer. With no-till drill in the fall, horses should be able to begin grazing by spring. Where this practice is often not available, horses may be allowed to graze lightly when the new grass is 15 to 20 cm (6-8 in.) in height, but the effectiveness of the interseeding may be lessened.

Because interseeding might put your pasture out of commission for part or all of the normal grazing season, you may want to subdivide your pasture into at least two parts and improve it section by section. This approach keeps some turnout available and distributes expense over time. If only a small area of the pasture will be interseeded, you may be able to fence off the renewed areas and continue to use the remainder of the field.

Using the interseeding option to renovate your pastures is very costly and not always successful. If you decide to attempt interseeding you might want to select a small area as a test site. That way, you will be able to see how successful the technique is on your pasture with little loss of land, time and money.

Remember that once your pasture has been improved, you must continue to actively manage it, so it will remain a good pasture.
A Complete Pasture Overhaul

You may be in a situation where your current pasture is so far gone that you need to start over. Alternatively, you might have just moved to a new property and want to establish new pastures for your horses. It may also be necessary to seed a new pasture if you are converting a row crop field to pasture or where pasture sod does not exist for some reason.

A complete overhaul of an existing pasture should be a last resort. Pasture renovation can be very expensive, and the pasture may be off limits for a year or more while the new growth becomes established. If you have an existing pasture, consider all your pasture improvement alternatives to revive and support the vegetation already growing before settling on a costly seeding effort (refer to the section “Rejuvenating Poor Quality Pastures”). If less than 25 per cent of your pasture growth is desirable plants, opting for complete renovation makes sense.

Several factors are of vital importance in establishing a good horse pasture:
- Preparation of an adequate seedbed
- Matching plant species to your soil and climate
- Selection of high quality seed of an adequate variety
- Using proven seeding methods
- Supplying proper fertility
- Control of pests and weeds
- Keeping horses off the pasture until forage plants are well-established (one to three years)

Unless you have some crop growing experience, you are wise to involve some knowledgeable advisors and/or custom planters in a major pasture renovation or establishment process.

Information on forage species selection, seeding rates and seedbed preparation can be found in the Alberta Agriculture publication *Alberta Forage Manual* (Agdex 120/20-4).

The Bottom Line

- A productive pasture will decrease your feed costs, enhance your horse’s health and attitude, and improve the aesthetics of your property.
- Do not begin grazing until pasture vegetation averages 15 to 20 cm (6 to 8 in.) in height.
- Avoid overgrazing by removing horses when vegetation averages 8 to 10 cm (3 to 4 in.).
- Manage grazing more effectively by incorporating a rotational grazing system or limited grazing plan.
- Mow, harrow and fertilize when appropriate to keep your pasture productive.
- Give pastures adequate rest from grazing.
- Create a sacrifice area to conveniently keep horses off pastures when necessary.
- Keep a realistic stocking rate for your property.
- Take good care of your pasture, and it will take good care of your horse.
References and Further Reading

Alberta Agriculture, Food and Rural Development Publications:

Publication:  
Alberta Forage Manual (1992)  
Establishing Hay and Pasture Crops (1994)  
Varieties of Perennial Hay and Pasture Crops for Alberta (produced annually)  
Grazing Tame Pastures Effectively (1998)  
Poisonous Plants on Range and Pasture (1991)  
Winter Cereals for Pasture (1993)  
Alberta Range Plants and Their Classification (2000)  
Cattle Wintering Sites: Managing for Good Stewardship (2001)  
Horse Handling Facilities (1997)  
Crop Nutrition and Fertilizer Requirements (1998)  
Tips and References for Owners of Small Farms and Acreages (1998)  
Manure Management to Protect Water Quality (2000)  
Getting to Know Your Local Watershed (2002)  
Crop Protection (the “Blue Book” – produced annually)  
Weeds of the Prairies (2000)  

Agdex #:  
120/20-4  
120/22-2  
120/32  
130/14-1  
130/53-1  
130/541  
130/666-1  
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134/06  
420/580-2  
460/722-1  
540-1  
541-1  
570-8  
576-6  
576-8  
606-1  
640-4

To order both free and priced Alberta Agriculture, Food and Rural Development publications, call the toll-free line at 1-800-292-5697.

Other Resources  
• Environmental Guidelines For Horse Owners In British Columbia. 1995. British Columbia Ministry of Agriculture, Fisheries and Food.  
• Advanced Forage Management. 1999. Pacific Field Corn Association, Agassiz, BC.  
• Caring For the Green Zone, Riparian Areas and Grazing Management. 2nd Edition. 1998. Alberta Cows and Fish Program.  