Pasture Management on Small Holdings

Ian N. Morrison Faculty of Agriculture, Forestry and Home Economics, University of Alberta

CR wishes to note this was a paper for specific a location. It is suggested that you contact your local agriculture specialists as to specific forages for your area once you understand what to ask.

Introduction

While most horse owners might imagine themselves living on a farm or ranch with lush pastures or wide open expanses of range land, the reality is that most of us live close to towns or cities and keep our horses on hobby farms or acreages. Our 'wide open spaces' typically range from 3 to 5 acres up to 20 or 40 acres. These are what are defined as 'small holdings'.

Few acreage owners are experienced pasture managers, and many are mis-managers, largely because of over-stocking. While the quickest solution to this might be to sell one or more horses, or to swap the Trakehner for a miniature pony, this is probably 'not on' for most of us.

So the question becomes "How do I do a better job of managing my pasture(s) to increase forage production, provide my horse(s) with high quality feed; decrease expenses associated with buying hay and concentrates; and keep my property looking attractive, productive and free of weeds?"

My intent in this presentation is to answer these questions by providing some practical information on the growth characteristics of pasture grasses and legumes; some advice on which grasses and legumes thrive best, particularly under heavy grazing; and a few tips on how to manage your pastures to improve productivity and maintain healthy stands (relatively) free of weeds.
**Pasture Composition**

Desirable pasture species include grasses as well as legumes like alfalfa and clovers, which generally are more palatable and have higher nutrient value than grasses and help maintain fertility by fixing nitrogen in the soil.

Forage grasses can be classified into two distinct groups: bunchgrasses, which form clumps and don't spread very far laterally, and rhizomatous grasses, which are spreading or "creeping" and form sods. On the one hand, bunchgrasses have fibrous roots and distinct crowns, with new shoots or tillers arising from crown buds. They reproduce mainly by seed. Common bunchgrasses are crested wheatgrass, timothy and meadow brome grass. On the other hand, rhizomatous grasses grow out in patches with new shoots arising from terminal buds on rhizomes that resemble roots but actually are a form of underground stem. They also reproduce from seed and vegetatively from rhizome nodes, which are small swellings along the length of the rhizomes that can sprout new shoots and roots. Smooth brome grass, creeping red fescue and Kentucky bluegrass belong in this group; as does quack grass. Most people can easily visualize quack grass rhizomes and know its ability to regenerate from rhizome fragments after gardens are rototilled or fields are disced or cultivated. The rhizomatous grasses are generally more aggressive in their growth habit and typically can withstand heavier grazing and trampling than bunchgrasses.

Forage legumes are herbaceous forbs, mostly with tap roots and well-developed crowns which produce new shoots produced from crown buds. Tap roots generally penetrate deeply into the soil (in the case of alfalfa up to 1 metre or more) with primary and secondary lateral roots branching off the main tap root. Most forage legumes either do not spread laterally, e.g. red clover, sweet clover and most alfalfa cultivars, or, if they do, their spread is quite limited, e.g. rangelander, alfagraze or "Spredor" type alfalfas. One legume that does spread laterally, however, is common white clover which frequently grows wild in tame pastures and is a valuable forage legume. It is relatively shallow rooted and spreads laterally by horizontally growing, above-ground stems called stolons, the same as a strawberry. New shoots and roots develop from nodes at leaf axils along the stolons in much the same way as new shoots are produced from the underground nodes of rhizomatous grasses.
The ability of forages to withstand grazing is related to their growth habit, with grasses normally being able to withstand heavier grazing than legumes. This is because the growing points of grasses are typically closer to the ground and more protected than the growing points of legumes which are often more exposed (Table 1). However, for both perennial grasses and legumes, regrowth after grazing is related to the vigour of the plant which, in turn, is related to the amount of foliage remaining and the storage reserves in the roots and crowns or rhizomes. These reserves consist of sugars that are produced in the leaves and transported to the below-ground parts where they are converted to starch and other carbohydrates. Depletion of these reserves by grazing too early in the spring, repeated close grazing throughout the summer, or late fall grazing not only reduces regrowth but leads to winter kill.

Table 1.

<table>
<thead>
<tr>
<th>Grasses</th>
<th>Legumes</th>
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</thead>
<tbody>
<tr>
<td>1. New shoots from crown buds or rhizome nodes</td>
<td>1. New shoots from crown buds; branches from axillary meristems</td>
</tr>
<tr>
<td>2. Growing points close to ground during vegetative growth</td>
<td>2. Growing points exposed at tips of shoots</td>
</tr>
<tr>
<td>3. Stem elongation (jointing) [\Rightarrow] flowering</td>
<td>3. Flowers borne on terminal shoots or in leaf axils</td>
</tr>
<tr>
<td>4. Can generally withstand heavy grazing pressure</td>
<td>4. May succumb to intensive grazing</td>
</tr>
</tbody>
</table>

Forage Selection

In establishing a new pasture, the choice of the most suitable pasture mix will depend on the site, including soil type and texture, internal drainage, slope, winter snow cover, intended grazing intensity, etc. etc. On very dry sites on the brown and dark brown soils, crested wheatgrass or Russian wild ryegrass are good choices, but on the moister black and grey wooded soils of central and west-central Alberta, timothy and creeping red fescue are better adapted. Timothy especially survives well where surface drainage is poor as long as the soil is not completely waterlogged for periods of more than two to three weeks. (CR note: Over 13 counties see our show and site visits around the world so
Species type and varieties that are most suited for hay crops may not be the best choice for pastures. Whereas hay varieties are selected for high production and rapid regrowth after one or two cuttings, they may not be able to withstand the repeated grazing common to pastures. On small holdings where persistence is of premier importance, it is wiser to choose hardier, less productive species than ones that will yield more under less severe conditions. For example, smooth brome grass is an excellent choice in mixtures for hay crops, but is less able to recover after grazing than meadow brome grass which increasingly is becoming the species of choice for pastures. Not only does meadow brome grass regenerate better than smooth brome grass after grazing, it continues to grow well into the summer months when smooth brome growth is very slow.

Under intensive grazing on small holdings, creeping red fescue and Kentucky bluegrass are good choices on both grey wooded and black soils where there is good moisture. These grasses have fine leaves and do not produce as much forage as smooth brome grass or timothy under low grazing pressure. But, because they are sod forming and can withstand close clipping they stand up very well to both heavy grazing and trampling. Commercial forage mixtures commonly contain 4-5% creeping red fescue and about 10% Kentucky bluegrass, along with other grasses like meadow brome and timothy. Over time the proportion of fescue and bluegrass will increase in the stand providing good groundcover and suppressing weeds.

On productive, well-drained sites, alfalfa is the most common forage legume in pastures. It is highly palatable, has a high protein content, and grows more uniformly throughout the season than most grasses. It is widely adapted over a very broad range of soil types (except those with low pH), and is relatively drought tolerant. Properly managed it can be grazed into the late summer as long as there are 'rest periods' from time to time to allow for regrowth. On continuously grazed sites, under moderate to heavy grazing pressure, alfalfa stands will eventually thin, becoming displaced by grasses and weeds. It is susceptible to waterlogging and will die out in low spots and other sites where drainage is poor. The "creeping rooted" kinds of alfalfa are notably more grazing tolerant and winter hardy than the hay types.
Both red clover and Dutch white or wild white clover are good pasture species, especially well suited for production on moister soils and in areas where the pH is too low to support vigorous alfalfa stands. Red clover and white Dutch clover are short- to medium-lived clovers that reproduce by seed. Neither is very persistent on heavily grazed pastures. Where these clovers die out after three or four years, they are often replaced by wild white clover which is extremely tolerant of grazing. As such it frequently becomes the dominant legume in overgrazed pastures on small holdings. In fact, its presence is a good indicator of heavy stocking rates and declining pasture productivity.

Alsike clover thrives across a wide range of conditions in cool, moist climates and is particularly well adapted to grow on poorly drained soils and in the grey wooded soil zone of west central and northern Alberta. However, alsike clover is not recommended for horse pastures as it is considered toxic. The evidence for this is somewhat inconclusive, and it is not even known for certain if it is the alsike clover itself, or some other factor like an associated bacteria, that causes the problem (Nation, 1989 and 1991).
Nevertheless, there appears to be a link between alsike clover and occurrences of photosensitization and/or liver dysfunction in horses, and so it is recommended that horses should not be grazed on alsike over long periods of time. Alsike clover has been observed growing in many areas where horses are pastured. Because of its 'low' toxicity rating (and on the assumption that poisoning occurs only after horses have been feeding on alsike clover for extended periods of months, or even years) horse owners need not be alarmed if there is some alsike on their properties. Nevertheless, good judgment dictates that alsike be avoided wherever possible.

**Stocking Rates**

Horses are notoriously selective spot grazers, leaving some areas untouched and completely overgrazing and trampling other areas. For the most part, horses prefer grasses and tame legumes over native forbs. When forage is sparse they will graze between 14 and 17 hours/day, compared to cattle which typically graze about 12 hours/day.

For the most part, the nutritional needs of a horse can be met by grazing on good quality pasture, providing they have access to salt and a mineral mix. However, as pasture quality declines in late summer and fall, it is recommended that mares with foals, and weanlings, be provided extra concentrates or grain to ensure adequate intake of protein and energy.

A mature, 500 kg (1100 lb) horse will consume about 10 kg (22 kg) of dry matter daily. Horses require about 1.5 times as much pasture as cattle, with lactating mares requiring half as much again. This means, that to pasture a horse over the summer, about 4-6 acres of improved tame pasture, or 8-12 acres of native pasture is required. This will be affected by the condition of the pasture, with stocking rates being higher on well-maintained pastures compared to those in poor condition as illustrated in Table 3.

**Stocking Rates (Acres/Horse/Month)**

<table>
<thead>
<tr>
<th>Range/Pasture Conditions</th>
<th>Good</th>
<th>Poor</th>
</tr>
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</table>
Pasture Management on Small Holdings

<table>
<thead>
<tr>
<th>Tame Pasture</th>
<th>1.5</th>
<th>3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown Soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grey Wooded/Black</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Native Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry South</td>
<td>6.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Parkland</td>
<td>5.0</td>
<td>9.0</td>
</tr>
</tbody>
</table>

Overgrazing not only severely decreases pasture productivity but leads to unsightly pastures with bare spots and/or ugly weed infestations. The condition of the pasture is largely dependent on how frequently it is grazed and how much regrowth occurs between grazings. The cardinal rule of thumb is:

**Don't graze until regrowth is at least 15-20 cm (6-8 in) tall Stop grazing when 5-10 cm (2-4 in) tall.**

Overgrazing seriously depletes the root reserves of desirable perennial pasture species. This, in turn, results in weakened plants, reduced regrowth and thinning of stands. Not only does the overall productivity of pastures decline rapidly with overgrazing, but the pasture becomes invaded with weeds.

**Weed Control**

Two herbicides that can be used with reasonable effectiveness for spot treatment of tough-to-kill weeds are Banvel II (dicamba) alone or mixed with 2,4-D, and Target (dicamba, MCPA, mecoprop mix). These are hormone type herbicides that are generally safe to use on established grasses but are very injurious to most legumes and other broad-leaved plants, including shrubs and trees. As with any herbicide, label instructions must be followed closely and great care taken to avoid movement of the chemicals off target. Areas that have been sprayed should not be grazed for at least 7 days after treatment.

Lontrel (clopyralid) is a very potent (and expensive) herbicide that is highly effective in controlling Canada thistle and some other weeds, including scentless chamomile and, interestingly, alsike clover. It, too, is very damaging to desirable forage legumes like alfalfa, and so must be used sparingly only on established forage grasses. There is no
grazing restriction for Lontrel and so treated areas can be grazed immediately after treatment.

Escort (metsulfuron) is a relatively new herbicide specifically intended for use on pastures and rangeland. It is active at very low dosages and will control a range of weeds including Canada thistle, dandelion, sow thistle, and wild rose. It must be measured out in very small quantities which may be a deterrent for many owners of small holdings who are not equipped to use products of this kind. There is no grazing restriction applied to the use of Escort.

In cases where people either don't want to use herbicides, or aren't sufficiently knowledgeable or properly equipped to apply them as recommended, then the only recourse is to control weeds like thistles by mowing them repeatedly. Other weeds like dandelions can be kept partially in check by maintaining a healthy, competitive pasture. This, in turn, implies that the pasture is well managed, fertilized regularly and not overgrazed.

**Tips for Better Pasture Management**

In a continuous grazing system, horses are put into a pasture and not moved throughout the season. This necessitates low stocking rates and is really only suited to areas of low productivity under dry conditions. On small holdings, continuous grazing generally leads to a rapid decline in pasture productivity, a loss in forage quality and the obvious necessity of providing additional hay or concentrates to keep animals in condition. Forage grasses and legumes don't get a chance to regrow, resulting in reduced vigour and invasion by weeds.

Even on small holdings pastures should be cross-fenced and horses moved from one paddock to another. Electric fencing works well, provided the outside fences are well-constructed and maintained, preferably from high tensile wire or a similar fencing material that is non-injurious to horses. "Fencing with Electricity" published by Alberta Agriculture, Food and Rural Development offers good advice on proper installation of electric fences.

In a rotational, or controlled, grazing system, the animals are moved according to a schedule which is adjusted through the season depending on the composition of the pasture, the vigour of the stand, the number of horses, and temperature and rainfall. As a rule, the animals should be moved before they graze over the same area twice and when there is
still enough foliage to support rapid regrowth.

To promote uniform development and maximum forage production, rough areas should be mowed and the area harrowed to spread manure. Mowing delays maturity and stimulates regrowth of palatable forage. Harrowing not only helps to destroy the eggs of intestinal parasites, but it also encourages more vigorous and uniform regrowth.

In pastures where legumes such as alfalfa or clovers comprise less than 20% of the biomass, productivity will be substantially increased from application of a nitrogen fertilizer. Since there is also a reasonable probability that other nutrients are also deficient, it is recommended that a fertilizer like 20-10-10-5 be used. This blend contains 20% nitrogen, 10% phosphorous; 10% potassium and 5% sulphur. A good guideline is to add at least 50 to 60 kg of actual nitrogen per hectare (45 to 55 lbs/ac). If the product is purchased in 25 kg bags, then each bag will contain just 5 kg of actual nitrogen and so it will be necessary to spread 10-12 bags over 1 ha (~4-5 bags/acre) to get the desired amount of nitrogen. The other nutrients will normally be in adequate supply. More precise fertilizer recommendations can be obtained from private soil testing laboratories, but for many small acreage owners this probably is unnecessary.

**Conclusion**

As indicated at the outset, pasture management on small holdings is a particular challenge considering that oftentimes the number of horses exceeds the 'carrying capacity' of the pasture. In addition to practicing rotational grazing, in some cases it may be possible to confine horses in corrals for part of the day to limit the number of hours spent grazing. Not only will this reduce pressure on the pasture, but it will help keep the horses from getting too fat during the early summer when forage growth is rapid. The trick is to extend the grazing period from spring to fall by controlled grazing and to allow enough regrowth late in the summer and early fall to ensure that the grasses and legumes regain enough vigour to overwinter and resume growth in the spring. This will necessitate getting winter hay supplies in early enough to begin feeding in late September or early October before the pasture is literally grazed to within an inch of its life. In the spring, it will be necessary to keep horses off the pasture until the 3rd week of May until such time as the grass is 5 cm (2 in) or more above your ankles.
References

http://www.gov.mb.ca/agriculture/crops/forages

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Ian N. Morrison - Dr. Morrison is the Dean of the Faculty of Agriculture, Forestry and Home Economics at the University of Alberta. He was formally Head of the Dept. of Plant Science, University of Manitoba. His specialization is in agronomy and crop management with an emphasis on weed control in forage and field crops.

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