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Growing Hay and Pasture for Michigan Horses
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Cooperative Extension Service
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Growing Hay & Pasture for **MICHIGAN HORSES**

Horses are an important part of the livestock population in the north central United States and a rapidly expanding segment of animal agriculture. In Michigan, the 2007 horse population estimate was 155,000, up from 130,000 in 1991. This growing population of horses is used for entertainment, sporting events and companionship — some even provide therapy for people with disabilities. The draft horse population continues to provide horsepower on some farms. Some horses are high performance animals used for racing. Whatever their purpose, horses need good pastures that are free of weeds and hazards.

Widespread drought across vast areas of the Midwest since 2000 has increased the cost of forages significantly. Good pastures can economically provide high quality feed. Outlined here are the basic principles for developing and managing forage crops for hay and pasture for horses. Each location is unique, and working out the details is challenging. A good way to start is to visit a success-

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ful horse pasture and your local county Extension office. Selecting seeding mixtures, fertilizer and other necessary materials provides an opportunity to match the grasses and legumes to suitable field soil and to add valuable forage resources. In many cases, pastures can be designed so that extra forage can be harvested for hay for winter feeding.

A pasture or a hayfield contains desirable plant species used as the primary feed source for grazing horses. It is not an exercise area, sacrifice lot or riding arena and should not be used as one. Continuous use or overgrazing will damage a pasture beyond recovery to a productive level. Make long-term decisions about the use of your fields, pastures, arenas and turn-out lots in advance of any seeding decisions.

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Keep in mind that well-managed pastures will protect lakes, streams and wetlands from sediment and manure runoff and will keep groundwater safe from nitrate leaching. Also, if there's a ditch in or near the pasture, the runoff through that ditch is going somewhere and may take manure and fertilizer nutrients with it.

Below are several alternatives for planning hay and pasture. Visiting with your local county Extension educator, you may explore other options as well.

- Designing a managed grazing program using temporary fencing equipment for existing pasture. Managed grazing could add one-third to the carrying capacity of your pasture.
- Improving existing pastures through frost seeding, fertilizing, interseeding or changing the grazing patterns to provide better use of production potential. Using recommended fertilizers can more than double the annual production of hay or pasture.
- Seeding new pastures or hayfields to last 5 years or more.



Winter cutworm.

- Seeding temporary pasture for 1 to 3 months of summer feed.
- Designing a comprehensive plan using combinations of practices over several years to achieve your goals. Leave yourself some room to try new things, but keep in mind the feed and space needs of your animals.

Productive pasture and haylands

The first step in developing productive pasture is sampling the soil to determine the pH and nutrient levels. If the soil has a low pH or lacks sufficient nutrients, the effort to rejuvenate or reseed existing pastures or hayfields will be less successful than it would be under better conditions. Fertilizer cost has risen dramatically in recent years, and the cost of a soil test can quickly be recovered by improved productivity.

The ideal time to sample the soil is several months in advance of any fieldwork. If lime is needed to improve the soil pH, it takes 6 months for lime to dissolve and be fully available in the soil. If that's not possible, try putting half down at seedbed preparation time and half at seeding time.

Established pastures needing fertilizer are best treated in the fall or early spring. Follow soil test recommendations for

best results. Using the right fertilizer at the right time will cut costs and add to the success rate and the life of the seeding. Review the recommendations and use all the fertilizer needed on the basis of the test results and your yield goals.

In no-till seeding, surface applications are used for both lime and fertilizer. These treatments have been successful on light and sandy soils in Michigan. Research has shown that using surface-applied lime on heavy clay soils for no-till seeding of alfalfa has not been successful.

Insects can become important plant pests. Be sure to check your pastures and hayfields regularly and use appropriate sprays only as needed. If the alfalfa weevil begins to appear in large numbers and you're well into rotational grazing, a timely cutting for hay can solve the problem. Check the stubble for reinfestation and spray, if necessary. In early spring, scout your pastures and hayfields for the winter cutworm. Heavy infestations of winter cutworms can devastate lush spring hay, and they can reappear late in the fall and defoliate pastures, making pastures susceptible to winter injury.

Before spraying, take into consideration that losing a few leaves to insects is not as bothersome as having to stable the horses so you can spray the pasture for

insect control. For more detailed information on alfalfa weevils or the winter cutworm, contact your local Extension office.

Planning pastures and haylands to last

Plant selection

Whenever possible, include a legume such as alfalfa with the grasses. Legumes draw nitrogen from the air. When legumes make up at least 30 percent of the pasture plants, legumes can annually supply 50 pounds of nitrogen per acre or more to grasses. This is an easy and cost-efficient way to supply needed nitrogen for the grasses. The nitrogen is free, but the legumes need phosphorus and potassium fertilizer along with good management to persist.

Alfalfa makes good hay and is long-lived with proper management. Try keeping the hay or pasture mixture about 50-50 grass and legume to avoid feeding too much straight legume to horses. Alfalfa is the first choice as a legume seeded for hay or pasture. Where wet soils require alternatives, try bird's-foot trefoil.

White clover, also a legume, rarely needs to be seeded because it is a native plant, and its seed is present in most soils. When pure stands of clover or bird's-foot trefoil are grazed, especially by white-skinned horses, the horses can

No-till pasture renovation refers to complete killing of the existing sod with a systemic herbicide, followed by the introduction of a more productive forage legume, grass or grass-legume mixture.

<http://www.extension.iastate.edu/Publications/PMI097.pdf>

become photosensitive (sensitivity of the skin to light, causing sores) or develop slobbering (also called siaframine toxicity). Consult your veterinarian if you observe these problems.

An improved cool-season grass such as timothy, bromegrass or orchardgrass is needed in most pasture mixes. The grass will increase dry matter production and decrease the potential problems with a pure legume pasture.

Avoid pasture mixes containing tall fescue. Tall fescue is generally low in palatability, and horses refuse to eat it. A pasture with tall fescue will over time become dominated by it. The endophyte that most tall fescue contains can cause health problems in grazing animals. If fescue is used, be certain to plant endophyte-free fescue seed.

Use Table 1 to select pasture and hayland seeding mixes. When planning a mixture of grass and legumes, select the appropriate soil drainage column for your field and then choose the species and seeding rate.

Seeding

Examine the conventional methods for seeding (plowing and tillage before drilling) before choosing no-till (drilling seeds directly into sod). In either case the results can be spectacular, but it takes planning. In some cases, you'll need to work the field a full season ahead of planting. Brush and weeds such as quackgrass should be dealt with using fall treatments of herbicide and/or tillage the year before you seed. Plow and work the field to destroy weeds before seeding, especially to kill quackgrass. If necessary, use a herbicide such as Roundup, following the label directions on rates and waiting time before seeding.



Alfalfa weevil.

Field preparation should be done as early in the spring as field conditions allow. The results should be a clean and fairly firm seedbed. When you walk in the field, your foot should sink no more than an inch or so — about the thickness of the heel on your work boot.

The most common option for stand establishment is a summer “open” seeding, or clear summer seeding of alfalfa. Dry spring weather, the need for extra oat straw and grain, or work schedules may prevent companion or cover crop spring seeding. The rules for summer seeding are:

- Seed between June 15 and August 1 in the northern regions of Michigan and before August 15 in southern regions. If the weather late in the summer is very dry, wait until next spring.
- Plowing the field after grain harvest will prevent some volunteer wheat, oats or barley.
- Generally follow the same seedbed preparation to develop good horse pastures in the spring.
- Plant only the legume portion of a grass-legume mix first, using herbicides to control grassy weed problems. Weeds are less likely to be competi-

tive in mid- and late summer seedings, but when chickweed is present, herbicide use is recommended. The grass seed can be planted after weeds have been controlled.

Seeding should be shallow. To establish a pasture or hayfield, use a drill that places the grass and legume seeds not more than 1/4 to 1/2 inch below the surface. On most soils, you'll need to pack the surface with press wheels, a roller or a cultipacker. On small acreage, much of the equipment used to establish lawns can be used to seed pastures.

Smooth bromegrass is difficult to seed unless you have a grass seed attachment. Other options are to mix the grass seed with the fertilizer. Among the many options for seeding, band seeding of the legume directly above the fertilizer band has given the best results.

Spring seeding using oats as a companion crop with alfalfa was a common practice for many years. Oats are popular in horse diets, so many farmers in the past harvested the oats for grain and clipped and baled the oat straw for bedding. Few horse owners have the machinery to combine the oats for grain. That and a reduced demand for straw bedding have led to significantly less use of oats as a cover crop for pastures or hayfields.

If using oats as a companion crop in establishing a new seeding fits your situation, an alternative is to cut the oats for hay or silage when the oat seeds reach the soft dough stage. Don't allow the oat hay or straw to stay on the field more than a few days. Removing the oat hay or straw from the field prevents the development of dead spots that later turn into weed patches.

Table 1. Pasture seeding mixtures selected on the basis of soil water drainage characteristics.*

	Well-drained				Less well-drained					Poorly drained	
	1	2	3	4	5	6	7	8	9	10	11
Long-lived grass	Seeding rate (lb/acre)										
Kentucky bluegrass						10					
Orchardgrass	2-4		2-4				2-4				
Reed canary grass (low alkaloid)											6
Smooth brome grass		3-6		3-6	3-6				3-6		
Timothy					2-4			2-4	2-4	2-4	
Legume											
Alfalfa	4-6	4-6									
Bird's-foot trefoil										6	
Ladino white clover			1/2-1	1/2-1	1/2-1	1/2-1	1/2-1	1/2-1	1/2-1		
Cover crop											
Annual ryegrass	2	2	2	2	2	2	2	2	2	2	2
Italian ryegrass		2	2	2	2	2	2	2	2	2	2

* 1 = loamy sands or sandy soils. 11 = very poorly drained soils that are totally saturated part of the year.

Cover crops can be used to establish the grass/legume mixture suggested for the seeding on the basis of soil water drainage.

For any soil water drainage classification, add up the pounds/acre of the various seeding mixtures in a column for the total grass/legume/cover crop mixture. For example, on a very sandy soil classified as a 1, you would add 2 to 4 pounds/acre orchardgrass plus 4 to 6 pounds/acre alfalfa plus 2 pounds/acre of either annual or Italian ryegrass. The total would be the seeding mixture and rate for the pasture seeding.

Do not use alsike clover in any mix — liver problems may develop.

First-year management

Delay plans to pasture the new seeding until the year following establishment. It may be tempting to graze or cut hay late in the fall the first year, but it is not recommended. Late grazing can subtract from next year's growth. In the northern regions, it is easy to kill a new alfalfa seeding by untimely fall use or very early spring grazing.

Careful grazing management can add life to legume pastures and hayfields. Allow a few flowers to show in the legume before cutting or pasturing. After the first year of production, alfalfa and other legumes have mature root systems and

Table 2. Characteristics of pasture mixes listed in Table 1.

Mixture	Appearance	Yield	Traffic
1	Excellent	Excellent	Fair
2	Fair	Excellent	Good
3	Excellent	Excellent	Fair
4	Fair	Excellent	Good
5	Fair	Excellent	Good
6	Excellent	Fair	Excellent
7	Excellent	Excellent	Fair
8	Fair	Good	Fair
9	Fair	Good	Fair
10	Fair	Good	Fair
11	Fair	Excellent	Excellent



a greater capacity to recover from early- and late-season harvest. Clear-seeded alfalfa planted in early spring without a companion crop can be cut for hay in the seeding year; and if growing conditions are favorable, additional cuttings can be taken.

Following the first year of use, most pastures will need maintenance applications of fertilizer. As stated above, rely on soil tests to monitor what's required. In general, grass-legume mixtures need phosphorus and potash. Pastures with less than 30 percent legumes will need extra nitrogen. Apply at least 75 pounds of nitrogen per acre to grass pastures during spring and again in late summer as needed. Fall applications of phosphorus (P) and potassium (K) will add to the winter hardiness and the productivity of pastures. Weeds generally invade weak pastures and are good indications that something other than spraying for weed control is needed. One such weed is hoary alyssum, which may cause stocking up and founder in susceptible horses. (For more information on hoary alyssum, visit pestid.anr.msu.edu.)

It is possible with intensively grazed pastures to reach full nutrient turnover; when little or no added fertilizer is required. When all of the manure is returned to the pastures and soil tests plus experience show that little fertilizer is needed, you will benefit little from the extra costs for P and K. Most pasture sites, however, are not likely to reach full nutrient turnover even with good pasture management because of past overuse and low levels of native soil fertility.

Temporary pastures

Plan a full complement of other permanent pastures for grazing rather than relying on temporary pastures year after



year. Situations may arise, however, that require using a temporary pasture site or an annual crop in pasture or hayland renovation.

Oats, wheat, ryegrass or barley, and triticale can provide short-term pastures for about 1 or 2 months. Sudangrass and sorghums are not recommended for horse pastures because cystitis syndrome may result. Cystitis syndrome is a serious bladder problem in horses that is usually fatal. Grazing horses for even short periods is simply not worth the risk.

Spring small grains should be planted in April at the rate of 2 bushels per acre. Follow soil test recommendations to apply P and K (40 pounds per acre) and use only a small amount of nitrogen. You can add additional nitrogen after the small grains have emerged. Weeds can be a problem in some fields, so destroying the old sod before seeding is recommended.

You can use no-till for seeding small grains for temporary pastures. This offers an option for sites needing erosion control. Fertilizers can be banded or top-dressed depending on the equipment used. A good management strategy would be to gain some experience on a limited scale before attempting a large planting. Do not start to graze the

small-grain pastures until the plants are 6 to 8 inches tall.

Improving existing pastures

Grassy sods with less than 30 percent alfalfa, clover or bird's-foot trefoil respond to added nitrogen as well as phosphorus and potassium. Fall applications of fertilizer and timely rains strengthen grass stands, and in many cases, 100 pounds of nitrogen, 20 pounds of phosphorus, and 80 pounds of potassium per acre will double pasture production the next season.

To improve pastures too wet for alfalfa, try frost seeding bird's-foot trefoil. Graze the fall pasture growth to expose the soil to freezing and thawing, and overseed in February or March. Do not expect to establish alfalfa using frost seeding. Experience in Michigan over the years shows a high probability of failure when alfalfa is frost seeded.

Managing established pastures

Horses are spot grazers, and their grazing characteristics differ from those of sheep or cattle. It takes 2 to 4 acres to produce feed for one mature horse for the 6-month grazing period, and pastures that produce 4 tons of hay per acre are capable of carrying a mature horse during the growing season. Horses trample quite a bit of pasture and do not graze areas soiled with manure. Keeping pastures productive requires detailed care and good management. Following are some key management items:

- Start grazing when the pasture is 6 to 8 inches tall. A good time to start grazing alfalfa is when it reaches the



bud stage. Pure stands of bluegrass and ryegrass pastures can be grazed several weeks earlier than alfalfa or alfalfa-grass mixtures.

- Allow horses to graze pastures to 2 to 3 inches before moving them on to the next paddock. It may be necessary to clip pastures to control old grass and weeds. Clipping can encourage legumes by controlling rank grass and weed growth that horses don't eat. Remove the excess clippings to avoid smothering the legumes.
 - Keep the horses out of the main pastures when they are wet and muddy. In wet weather, horses can punch up the fields badly and ruin good pastures.
 - If you are short of pasture for grazing, as can happen during midseason, stable the animals and feed hay to allow the grass and legumes a chance to regrow to 6 to 8 inches.
 - Using a chain harrow or similar implement to spread the manure will help promote more even regrowth and grazing.
 - Keep a sharp eye out for mechanical hazards such as wire, nails and old iron. Remove them from pasture promptly.
- Rotational grazing of a clean pasture can help control parasites and discourage some animal diseases. Rotational grazing involves subdividing pastures with temporary fence or moving horses from pasture to pasture. Wide colored poly tape or braided rope fencing materials are a relatively inexpensive way to electrify pastures for rotational grazing. Training horses to see the modern fences can be a problem. Placing white or colored flags on the fence can be helpful. Barbed wire and high-tensile fencing are not recommended as primary horse fencing — both can cause serious injury.
 - Use good legume management. When grazing alfalfa, allow 3 to 4 weeks for recovery between grazing periods, and allow a full rest period (4 to 6 weeks) in the fall. Good fall management can add years to the life and productivity of the pasture.
 - Use soil tests to monitor soil fertility levels. Don't guess at what's needed. Monitoring the levels of P and K tells you to add only what's needed for a long productive life for the pasture. Every farm is different, and even various fields within a farm will likely need

to be fertilized differently. Your local Extension office can help you calculate the fertilizer applications necessary to maintain top production.

Keeping the turf in paddocks

A good, well-managed and fertilized pasture provides ground cover and high quality forage for horses. Keep your mixtures simple and well-fertilized. During the early years of the pasture, avoid turning horses onto it when the surface is wet and soft, and never overgraze. Following the suggestions provided in this bulletin will maintain the life and productivity of your horse pasture or hayfield.

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