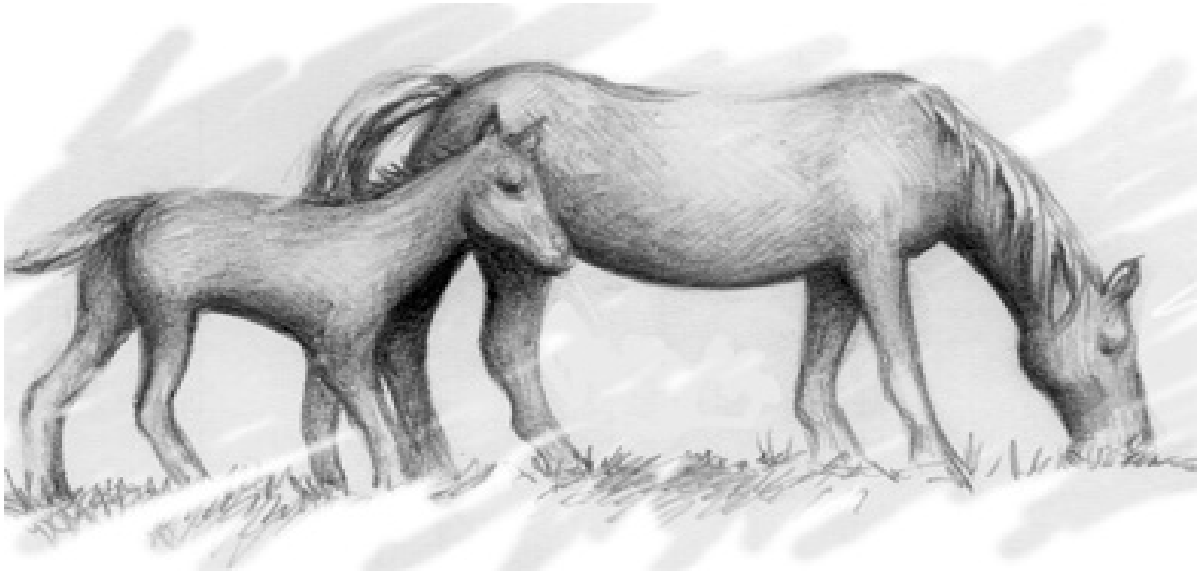
Agricultural Extension Service
The University of Tennessee

PB1651

Pastures for Horses



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Pastures For Horses

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Introduction

High-quality pastures can provide much of the feed needed by horses, while providing the most natural and healthy environment for exercise and rest. For most classes of horse, a well-managed pasture can provide all of the nutrients needed by the animal. For lactating mares and working horses, pasture can be an important part of their feed program. Productive pastures can provide an inexpensive, high-quality portion of the horse diet, while a poorly-managed pasture will supply limited, low-quality feed, will be unattractive and could potentially be the cause of some health/nutritional problems.

How Much Acreage Is Needed?

Before anything can be done, the first question that needs to be answered is "Is this a pasture or an exercise lot?" If pasture is expected to provide a majority of the diet, approximately two acres are needed for each mature horse (1000-1200 lbs). If the available acreage is limited, then exercise may be the primary use of the field. Close grazing and trampling will occur with a high stocking rate of horses, and it will be difficult to maintain a dense, weed-free grass stand in this area. Use of seed, fertilizer and herbicides is generally not cost-effective in exercise lots. The remainder of this publication is focused on forage management for pastures.

Selecting The Proper Forage Species

Several plants can be used for pasture in Tennessee. Grasses should be the primary forage in a pasture, because they tend to be more productive and more persistent than legumes such as red and white clover. Grasses can be divided into categories based on their growth seasons and life cycles (Figure 1). Knowing this information aids in determining which forage species will be selected for use in a pasture.

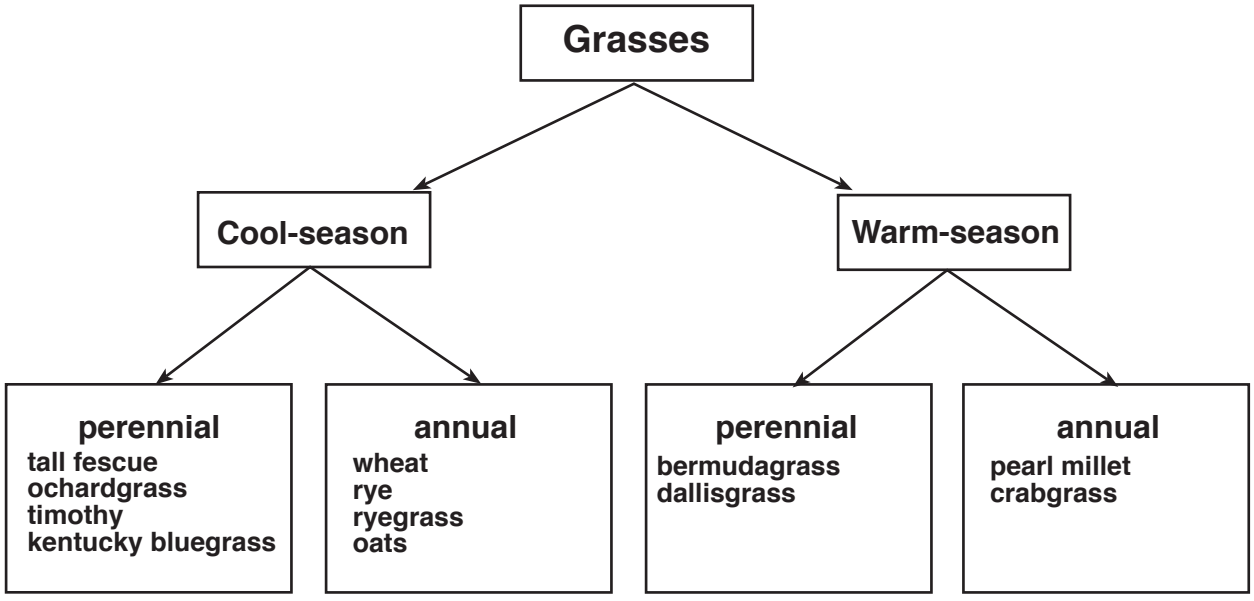


Figure 1. Categories of grasses.

Cool-season grasses produce most of their growth during the "cooler" times of the year. This is generally from March to June and September to November. During the summer these plants usually become dormant or die.

Warm-season grasses grow best during the warm periods of the year (June to October). These plants tend to be more efficient in their water use, and are therefore better adapted for growth during the hot and dry times of the year. These plants will either become dormant or die when the fall frosts begin.

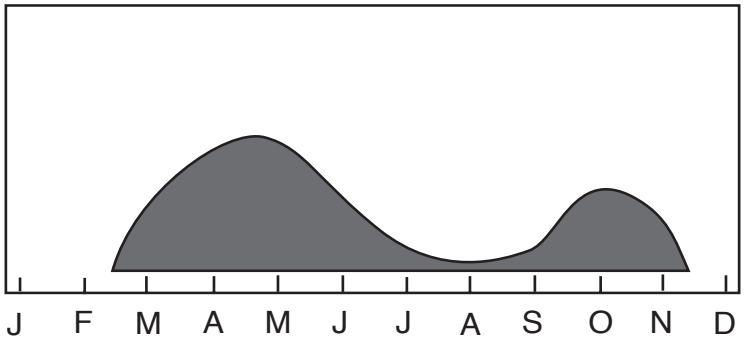


Figure 2. Yield distribution of cool-season grasses.

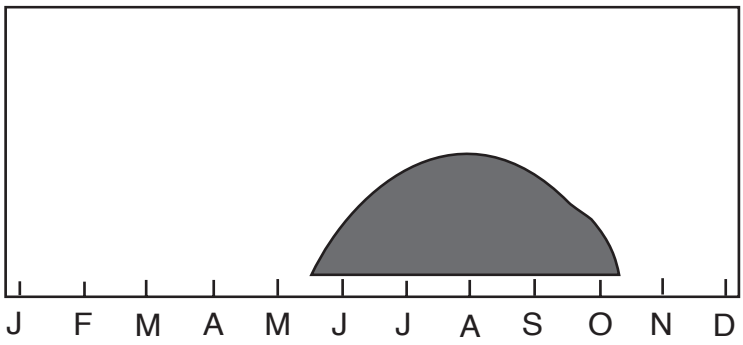


Figure 3. Yield distribution of warm-season grasses.

Within both the cool-season and warm-season categories, a further distinction can be made. A **perennial** plant is one that lives for more than one year. It may become dormant for part of the year, but it survives the dormancy period and regrows from roots and crowns to be productive again.

Annual plants are those that germinate from seed, grow, produce seed and then die within one year. None of the plant survives from year to year. The only way the species survives is to produce seed, and then that seed germinates to produce new growth the following year. Figure 1 lists the categories of various grasses grown in Tennessee.

When trying to determine which grass species is the best to use for pasture, you should consider several factors. The length of the growing season is one of the most important factors. Most pastures in Tennessee should use cool-season plants, because they have a much longer growing season than do the warm-season plants. It is also preferable to use perennial plants instead of annuals, due to the expense and weather risk. Annuals will have to be seeded each year, and a drought during stand establishment will risk complete loss of grazing for that season. This risk occurs each year. When perennial plants are established, the risk of drought killing the stands is reduced significantly. Drought during the early part of the growing season may reduce yield and delay grazing, but it will not typically completely eliminate the stand.

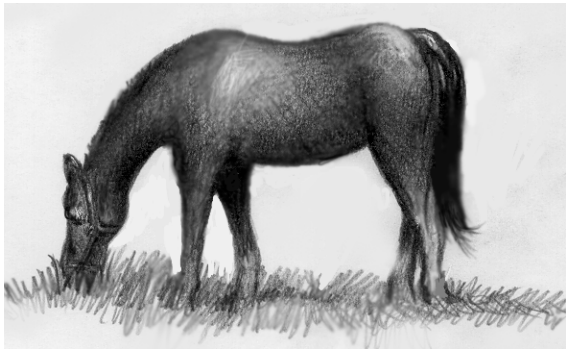
Tall fescue is the predominant grass used in Tennessee pastures. It is a persistent,

good-quality forage for horses. It also has the longest growing season of any of the forages that can be grown. The most common variety of tall fescue is "Kentucky 31" tall fescue. In the late 1970s, it was discovered that KY-31 tall fescue contained a fungal endophyte called Neotyphodium coenophialum. This endophyte grows between the cells inside the plant, and cannot be seen externally. The endophyte fungus causes mares to have reproductive problems, including extended gestation periods, difficult births and poor milk production. Endophyte-infected tall fescue can be used for mares 9-10 months of the year, but during the two months prior to foaling the mares need to be moved to another type of pasture, or stall-fed something other than endophyte-infected tall fescue hay. If a mare has been allowed to graze endophyte-infected tall fescue within two months of foaling, consult a veterinarian to consider various treatment alternatives that will prevent complications during foaling.

Many horse owners are completely opposed to having any tall fescue on their farm. It is important to understand that mares are the only class of horse with any difficulties related to the endophyte. Growing horses or adult horses other than late-gestation mares have shown no production problems when grazing infected tall fescue. Even with mares, remember that removing them from infected tall fescue two months prior to their expected foaling date will eliminate any problems.

Endophyte-free tall fescue, orchardgrass and timothy can all be used for pasture. The main problem with these grasses is their persistence. The stand life of these grasses will generally not be as long as endophyte-infected tall fescue. The endophyte dramatically improves the ability of tall fescue to withstand drought, grazing, trampling, etc., which cause much of the stand loss with the other cool-season perennial grasses.

A warm-season grass like bermudagrass can be used in the warmer areas of the state. Bermudagrass tends to form a thicker sod than most other grass species, so it holds up the best under heavy traffic. Due to the long dormancy period of bermudagrass, a cool-season annual grass like wheat or ryegrass should be seeded into the bermudagrass each year in early to mid-October. This will provide grazing during the late winter and spring, when the bermudagrass is dormant.



Warm-season grasses related to sorghum (johnsongrass, sorghum x sudangrass hybrid) should not be used for horses, due to a medical condition known as cystitis syndrome.

Year-Round Forage Production

The discussion so far has been about individual grasses. Remember that every acre used for pasture does not have to have the same forage species growing on it. The best forage producers want to provide grazing for their horses as much of the year as possible. The best way to do this is to use both cool-season and warm-season plants.

As previously discussed, the majority of acres should be seeded to a cool-season perennial grass, most likely endophyte-infected tall fescue. Look back at Figures 2 and 3. The cool-season grasses are less productive during the summer. Planting a few acres of a warm-season grass will provide grazing during the dormant season for the acres planted to cool-season grasses. This is the first step in developing a forage system.

After the base grasses are planted, legumes should be added to the pastures. Due to their nitrogen-fixing capability, ladino white clover (cool-season) and annual lespedeza (warm-season) can be added to most cool-season pastures to improve the quality of the forage, while adding nitrogen to the soil and decreasing the need for fertilizer. Red clover can be used successfully; however, the late spring growth of red clover can have a mold on the leaves that causes excessive salivation or "slobbering." This is not fatal to the animal, but it is unsightly.

Ladino white clover should be seeded at 2 lb per acre. If red clover is included, add 4 lb red clover per acre. On droughty hillsides, 8 lb of kobe annual lespedeza can be seeded to help summer grazing. These seed can be mixed together and broadcast across the field from February 15 to March 1. After March 1, these seed should be drilled into the pasture no more than 1/4 to 1/2 inch deep. Do not seed clovers after March 31. This should be done about every three years to maintain a consistent stand of clover. One good approach is to overseed one-third of the acres each year.

Preparing for New Seedings

The first step in successful pasture management is to have a good stand of grass. If the stand is thin, management will be much more difficult, due to decreased forage production and increased weed pressure. Since having a thick stand of grass is so important, establishment of a new stand is a critical part of pasture management. The first few months after seeding will determine the type of stand the pasture will start with. If attention is paid to a few details, a lot of time and money can be saved and considerable frustration avoided.

Conventional versus no-till seeding

There are two basic ways to plant a new stand of forage. One is conventional seeding, which involves preparing a seedbed by plowing and disking a field. This will mechanically kill all the plants that could cause competition for new seedlings. Once a smooth seedbed is prepared, seed can be drilled or broadcast onto the seedbed, and then cultipacked to ensure good soil-to-seed contact.

No-till seeding uses chemical means to remove all plant competition. With this method, a chemical such as Roundup® or Gramoxone Extra® used prior to seeding will kill all existing vegetation. Specially-designed no-till drills are used to place the seed in contact with the soil. These drills have disk coulters that slice through the soil to create a furrow. The seed is placed in this furrow, and then press wheels follow behind to press the soil back over the seed.

Both methods of seeding can be successful if done correctly. No-till seedings have the advantage of requiring less machinery time and better soil conservation. The basic principles of both seeding methods are the same, however. All weed competition is removed, either with a disk or herbicide, and seed is placed in contact with the soil. For both methods, pay attention to the following points:

(1) Fertilize according to soil test. Conditions in the field should be manipulated to favor the forage to be seeded. The first step in creating a favorable environment is to provide the nutrients needed for seed germination and seedling growth. An optimum pH, plus adequate nitrogen, potash and phosphate are required by the plant. The more acid the soil, the less these nutrients are available and the more conditions favor weeds over forage. Lime and fertilizer applications should be based on soil test results. With no-till seedings, pH will not be increased as quickly with lime application as in conventional seedings. When lime is applied to the soil surface, it takes longer to move through the soil profile and decrease acidity; while in conventional seeding, the lime is worked into the soil and mixed thoroughly with disking, and reacts more quickly to correct pH problems. For no-till seeding, if pH of a soil is below 5.5, apply lime at least six months prior to seeding to ensure adequate time for pH improvement, or conventionally establish

the field, which will allow the lime to be mixed with the soil during disking.

Taking a soil test — The University of Tennessee Soil Testing Laboratory in Nashville can analyze soil samples and provide fertilizer and lime recommendations. Soil samples should be taken 6 inches deep from approximately 20 places in a field. Mix the samples together in a bucket, and submit a composite sample for testing. A shovel can be used to take samples, but most Extension offices have soil probes available for use. A soil sample submitted to the lab should represent no more than a 10-acre field. If a pasture is larger than 10 acres, or has changes in topography, soil type, fertilization history or forage species, split the field into smaller "sub-areas" and submit a composite sample from each of these sub-areas. The results from a soil test will only be as accurate as the soil sample submitted. Contact your local Extension office to learn more about soil sampling and testing, or to receive soil test submission boxes and forms.

(2) Plant at the proper time. Seeding date is very important for successful establishment of forages. All forages have specific environmental conditions that result in their peak production. For instance, tall fescue is the most productive during the spring and fall, when temperatures are relatively cool and moisture is plentiful. Hot, dry conditions during the summer cause a somewhat dormant period for tall fescue. The response of a plant to environmental conditions will be even more dramatic when it is a seedling. Plants need to be seeded when temperature, day length and moisture favor the young seedlings. Recommended seeding dates for several forage crops are listed in Table 1.

Table 1. Recommended planting rates and dates for several forage crops.

crop	seeding rate (lb/acre)	seeding date
tall fescue	15	Aug 15 - Oct 1* Feb 20 - April 1
orchardgrass	15	Aug 15 - Oct 1* Feb 20 - April 1
timothy	9	Aug 15 - Oct 1* Feb 20 - April 1
wheat	90	Sept 1 - Nov 10
rye	120	Aug 15 - Oct 15
annual ryegrass	20	Aug 15 - Oct 15
bermudagrass	6 - 10 (seeded) 25 bu (sprigged)	April 15 - July 1
pearl millet	10 - 15	May 1 - July 15
red clover	8	Feb 15 - April 1
white clover	2	Feb 15 - April 1
annual lespedeza	25 - 40	Feb 15 - April 15

* Fall planting is usually the most successful for tall fescue, orchardgrass and timothy.

(3) Plant the proper amount of seed. The maximum production from a hay field or pasture can only be achieved if enough forage plants are present to provide the yield. If only half a stand of grass is present, no amount of fertilizer can be added to produce the maximum yield. It is important to plant enough seed to ensure a full stand. Take a few minutes before planting and check the seed flow rate through the seeder. With both broadcast seeders and no-till drills, mistakes can be made by planting too little seed, resulting in a poor stand due to a lack of seed, or planting too much seed, and having to buy more seed to finish the remainder of a field, resulting in wasted time and money. Calibrating the drill or seeder ensures that the proper amount of seed is placed in the field. Do not always depend on the seeding charts shown in the owner's manuals of drills, whether it is a rented or owned drill. As seeders get used, seed flow rates may change. It is useful to determine the seed put out over an acre, and then adjust the seed flow rate to meet the seeding recommendations. Contact your local Extension agent for more information concerning seeder calibration. Table 1 lists the recommended seeding rate for several forage crops. Check with your local Extension office to learn the recommended varieties of the crop you wish to plant.

(4) Plant when moisture is available. Water is the most critical nutrient for plant survival. Without nitrogen, potash or phosphate, a plant might not be very productive, but it should still be able to survive. A lack of water will result in the plant's death. When using a no-till drill to plant a forage, you must have adequate soil moisture.You are depending on the drill to slice open a furrow in the soil, drop the seed and then press the soil together for good soil-to-seed contact. If the soil is dry, it may be too hard for the disc openers to get into the soil, and soil-to-seed contact will be poor. A poor stand may result because seed was dropped on top of the ground instead of being placed in the ground.

A second reason adequate moisture is needed for successful stand establishment is because seeds need moisture to germinate. If the soil is dry, the seed will not germinate until rain comes. Often there is just enough moisture for the seed to germinate and begin to grow, but before the root system can get established, the seedling dries up and dies from moisture stress. Don't be lulled into thinking that just because you are able to drill or disk a field, all problems are solved. Without adequate moisture, seedlings have no hope of getting established.

(5) Plant at the proper depth. The first few weeks of a seedling's life are the most difficult. When a seed germinates, it must push its way through the soil to the surface so it can receive sunlight. Once in the sun, it can produce its own energy. Until that happens, it must depend on energy stored in the seed to grow. The deeper a seed is planted, the more energy required for it to emerge from the soil. Some seeds are relatively large and should be planted deep. Other seeds are small, and have very little energy stored. These seed should be planted very shallow. Table 2 gives recommended seeding depths for many forage crops.

Planting too deep is a problem with no-till plantings more often than with conventional plantings. No-till drills vary in the

Table 2. Recommended planting depth for forage crops.

crop	depth (inches)
clovers	1/4 to 1/2
bermudagrass - seeded sprigged	1/4 to 1/2 1 to 3
tall fescue, orchardgrass, timothy, annual ryegrass, small grains	1/4 to 1/2
pearl millet	1/2 to 1 1/2

method used to control coulter seeding depth. Coulter depth on some drills can be adjusted by adding or removing weights to the drill. Some drills have a hydraulic mechanism that can be raised or lowered to adjust coulter depth. A variety of mechanisms are used to adjust disk opener depth. When you calibrate the drill for seeding rate, check several furrows to determine the depth the coulter is cutting into the ground and the depth of seed placement.

Managing an Existing Pasture

Once the stand is established, several procedures should be routinely followed to ensure a productive life of the stand. Both newly established pastures and those that have been around for several years should be managed to maintain forage quality and production, as well as minimize weed pressure and stand loss.

(1) Evaluate the pasture for grass/clover stand and weed pressure. All pastures should be evaluated every year or two to determine the density of forage plants and the amount and type of weeds present in the field. Evaluating the stand will help determine if more grass or clover plants need to be added. Even with the best management, a severe summer drought can result in the loss of clover or grass in the field. If clovers need to be added, seed can be broadcast in late February or drilled in March. If the stand has few grass plants remaining, follow the procedures for establishing a new stand. If the stand is slightly weak and only a few grass plants need to be added, this can be done by grazing or clipping the pasture in mid-September to remove all topgrowth. Seed can be drilled in mid to late-September. Use the full seeding rate for the appropriate grass.

(2) Fertilize according to soil test results. Like new seedings, proper fertility levels in the soil are needed to ensure maintenance of adequate forage production. Low pH, phosphate or potash levels can increase weed pressure and decrease grass and clover growth. A soil test is the only way to know the fertility level of your soil, and the amount of lime and fertilizer required. See the section titled "Taking a soil test" in the new pasture establishment section in this publication.

Spring fertilization — lime, potash and phosphate can be applied any time of the year, usually either the spring or fall, whichever is convenient. Nitrogen should be applied to the grass when it is actively growing, just prior to when the forage is needed. For cool-season grasses, mid-March is the best time to fertilize. If a pasture has a 30 percent stand of clover, do not apply spring nitrogen. The nitrogen will stimulate grass growth too early, which will shade the clovers and result in their death. Adding the nitrogen will not increase the spring yield, since clovers produce nitrogen. The difference is that the clover nitrogen is produced over a longer period of the spring, so growth is spread over a longer period.

Fall fertilization — if tall fescue is used, a fall application of nitrogen will increase fall growth and the available grazing days during fall and winter. Orchardgrass and timothy do not produce as much fall growth, so nitrogen fertilization in the fall is usually not profitable for these grasses. For tall fescue pastures, apply 60 pounds of nitrogen per acre (180 lb ammonium nitrate) after the fall rains begin in September. Remember to graze or clip the pasture prior to fertilization, which will remove all of the old summer growth from the field.

(3) Control weeds. Often, a thin stand and high weed pressure are found together. Weeds will fill in areas that are not covered with a forage plant. Broadleaf weeds can reduce forage yield and quality, as well as decrease stand life. Several herbicides can be used to control broadleaf weeds. The type and amount of herbicide that is best will depend on the forage to be sprayed, and the weeds present. Be sure to read the label on the herbicide, and follow all label recommendations. Several herbicides will kill any clovers present, and may prevent the germination of seed, so be careful to understand any restrictions on using herbicides. Contact your local Extension office to determine the best herbicide recommendations for your situation.

(4) Use proper grazing management. Overgrazing, particularly during the summer, will many times result in the loss of stand in a pasture. When the leaves of a forage plant are removed, it must use carbohydrates stored in the roots and crown of the plant for regrowth of leaves. As leaves develop, it is then able to capture sunlight and produce energy for growth through photosynthesis. If the plant is constantly overgrazed, it has to continue to use its energy reserves to grow new leaves, without the opportunity to replace those reserves with excess energy made from the photosynthesis. The overgrazing reduces carbohydrate reserves until the plant is stressed to the point that it dies.

Proper grazing management allows the plant to be grazed by the horse, but prevents constant overgrazing. The best way to minimize overgrazing is to reduce pasture size, and move horses from pasture to pasture, allowing a 3- to 4-week rest period between grazing. Cool-season grasses such as tall fescue, orchardgrass, wheat and ryegrass should be grazed when they reach 8 inches tall, and animals should be removed when the forage is grazed down to 3 inches. Bermudagrass can be grazed down to 1-2 inches, because it has more leaves lower on the plant, and does not require as much energy from root reserves for regrowth.

Conclusion

Successful pasture production for horses can be simplified into three basic steps:

(1) Select the right forage(s).
(2) Start with a good stand.
(3) Manage the pasture properly to keep a good stand.

For most horse owners in Tennessee, an endophyte-infected tall fescue pasture overseeded with ladino white clover will provide the longest growing season with good persistence. If mares are to be bred, another type of grass can be planted on a small acreage or another type of hay can be fed for two months prior to the expected foaling date.

The farther south and west a farm is located in the state, the greater the potential for using bermudagrass as a forage. A bermudagrass pasture overseeded with wheat or ryegrass can provide a good-quality diet to the horse. Fall droughts can cause problems with establishment of the wheat or ryegrass, however.

Regardless of the forage selected, a solid fertility and weed control program combined with acceptable grazing management practices are musts to maintain pasture longevity. If the production and quality of a pasture is poor, a failure in one or more of these areas is usually the cause. Remember that successful pasture management is nothing more than creating and maintaining conditions in the pasture that favor forage plants over weeds.

a U.T. Extension Reminder...

Forage Testing Information

Sampling Information

Results and recommendations are no better than the sample submitted for testing. Please follow the sampling suggestions below for best results.

How much is needed? Approximately gallon of sample (forage or grain) should be sent for an adequate test.

How to sample:

Hay — obtain samples from approximately 10 bales. Best samples are obtained with the use of a forage sampling probe. Check with your local Extension office about the availability of these samplers. For square bales, take one core from one end of each bale. For round bales, take a sample from each side of the bales. If grab samples are taken, be sure to obtain a representative sample.

Silage or haylage — if haylage is in round bales, follow the same procedures as for round baled hay. If haylage or silage is chopped, then obtain 2-3 gallons of material from 10-15 places in the silo. For upright silos, run unloader and collect one sample per minute for several minutes. In both situations, mix all of the collected material together, then fill sample bag with this mixture. Be sure to seal bag to ensure correct moisture determination.

Grain — obtain several small samples from different areas of the bin or storage area. Mix as listed above. Commercial feeds should not be submitted.

Mailing Information

1. Seal the plastic bag containing the sample to be tested.
2. Put name and sample number on bag. Sample number is important for identification during the laboratory process, especially when more than one sample is submitted.
3. Be sure that name, address and sample number on information sheet correspond to information on bag.
4. For each sample to be tested, there is a $7 charge for the basic test and an additional $9 when calcium and phosphorus are requested. Make check payable to “The University of Tennessee.” Place checks and forms in an envelope and mail separately.
5. If you want your report to be faxed, there is an additional $1 charge. Please include this in your check.
6. Mail samples and envelope to:

Forage Testing Laboratory
Plant and Soil Science
The University of Tennessee
2431 Center Dr., Rm 364
Knoxville, TN 37996-4500

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