

Forages for Horse Grazing

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Introduction

Horses have played a crucial role over millennia in the rise of humans, their explorative drive, development of their cultures, and their warfare.

More recently, horses have been kept and bred more for various recreational purposes including racing and showing. Shifting away from much of their original purpose, horses have increasingly become a status symbol and are kept on developed suburban land.

Horses are not ruminants and, unlike cattle, may not be able to digest low-quality forages. However, there is no need for regular purchase of expensive feedstuffs if land area is available for forage production. Pastures can be managed and optimized for forage growth in accordance with the nutritional requirements for the horse. This fact sheet will lay out some recommendations on how to address forage production and management.

Challenges for Horse Grazing and Keeping

Horses are inherently linked to American culture and as such play crucial roles in the heritage and traditions of rural and increasingly suburban areas. The horse embodies

the dream and self-identification of many and as such has been elevated from a pure livestock species with the utility of previous eras to a companion animal, part of the family, and often status symbol.



Although horses are mostly kept on pastures, they differ substantially from cattle in their grazing behavior and sensitivity to off-balance nutrition and general keeping. As with cattle, some breeds are more robust than others, and many aspiring horse owners prefer “warm”- or “hot”-blooded horses that are more difficult and challenging to keep than a small pony for the kids. Many prospective owners underestimate the land area needed to keep a horse engaged and healthy, and even seasoned farmers will have to obtain some knowledge before adding one or several pleasure horses to their land. Horses, like cattle, co-evolved with grasslands and as such are adapted to ingesting and digesting large amounts of vegetation.

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Although horses do not have a multi-compartment stomach system, they are able to digest structural carbohydrates.

Grazing Behavior

Horses are herd animals like cattle and they are herbivores, but their overall grazing behavior differs in such that they graze very close to the ground to which most improved forage plants are not adapted. Horses are also held in much smaller paddocks by many people which puts more pressure on the forage base than on large dedicated horse farms.

It should be noted that there is a conceptual and managerial difference between a *paddock* and a *pasture*. By definition, a pasture is a grazing management unit for the purpose of grazing while a paddock is a subdivision of a grazing management unit. A pasture is usually fenced permanently, and due to the long-term nature of it, is laid out differently than paddocks which are more of a temporary nature.

Many landowners keep only a few horses which allows the animals to graze very selectively. This means that the horses have the ability to return to recently grazed forage plants and defoliate them anew. Grasses and forbs cannot withstand continuous defoliation much less repeated grazing close to the ground. Since horses are kept year-round, pasture and paddock management strategies have to be developed that keep the horse healthy and the pastures productive in the long run.

Land Considerations

Unless a farm will be purchased anew specifically for horse ranching, it is likely that horses find their place on a cattle farm or so-called “ranchettes,” which are places with less acres and are increasingly used for holding pleasure horses. The key is to grow forage in a manner to provide for year-round soil cover, nutrition for the horse, and keep a pleasant appearance for the farm and the surroundings.

Therefore, learning about good forage management practices is paramount to keeping horses healthy and pastures productive. The basis for good pasture management is knowledge about the underlying soil conditions. Soil samples should be taken on a regular basis, ideally every year, to maintain soil fertility and pH levels. See the Cooperative Extension Service fact sheet FSA2153 at www.uaex.edu for further reference. Forages

require a pH of 6.5 and optimum levels of potassium, phosphorus, and nitrogen. Soil samples can be submitted and analyzed for free through the Cooperative Extension Service which will return recommendations for supplying needed amounts of nutrients and lime.

Fences used for cattle ranching are not suitable for horses. Barbed wire and protruding hot wires are a risk to horses which are prone to injure themselves quite easily. Please consult with the appropriate sources to determine how to set up and maintain a fence that keeps horses safely contained.

Forages

General Considerations

Forages are the best source of nutrition for horses. Even on small acreages, suitable forages can be established and maintained for the horses to graze. As pointed out above, there are challenges to keeping forage productive under certain circumstances and solutions to certain management problems will be covered later in this fact sheet. The challenge is to grow forage at a quality that is conducive to the health of the horses, is persistent under grazing and hoof traffic, and has a pleasant appearance year-round. It is more challenging to keep pastures productive than with cattle due to the grazing behavior of the horse. However, by following some general rules on forage production and maintenance, horse owners can be confident on providing the best diet possible for their horses.

Necessity for a Forage Management Plan

Keeping livestock such as cattle or horses essentially means successfully growing forage. In the case of cattle it is for meat or milk production goals. In the case of horses it is most likely for pleasure, but the objective of growing nutritious forage as long as possible throughout the year remains the same. The basis for managing forage is a site assessment that includes regular soil sampling, control of undesirable plants, and replacement of soil nutrients. Such a plan also requires that landowners are clear about the layout of pastures and paddocks including water access points, shelter areas, feeding areas, gates, and access lanes.

While it is less difficult to provide forage between March and October, it is more challenging to grow forage during the remainder of the year as this may

interfere with space requirements, pasture layout, and land available for planting annual forage crops among the perennial base forage. That base forage is most likely tall fescue and/or bermudagrass depending on the location.

A forage management plan also requires a strategy for acquiring needed machinery and equipment. One piece absolutely needed is a mower or a bush-hog. While it is not necessary to produce hay, it is absolutely necessary to be able to cut pastures to a specific height to remediate uneven grazing by the horse, conduct mechanical weed control, and clip pastures to a reference height to remove senesced matter and stimulate vigorous regrowth. A drag, either made of harrows or heavy beam, is useful for distributing manure piles that will spread nutrients more evenly.

Soil Fertility

Virtually all forages being used today are improved and adapted to a specific objective, even the native ones. These different forage varieties were developed for use with sometimes high fertilizer inputs, otherwise they are not competitive enough in a pasture environment. This means that landowners should account for regular fertilizer inputs which require an accurate estimate of the fertilizer needs. This can only be achieved with regular soil sampling of pastures and paddocks. Soil analyses are provided for free from the Cooperative Extension Service in Arkansas. Landowners can obtain soil boxes for sampling from the county Extension office, turn in samples to that location, and receive soil sample analyses for their place in the mail at no cost. The soil test report will mainly specify the replacement requirements for macronutrients such as nitrogen, phosphorus, and potassium (NPK) and pH for possible liming requirements. Analyses for micronutrients can be requested and may be necessary to address certain more complicated issues. To keep forage species productive and healthy, it is necessary to follow the fertilizer and liming recommendations to avoid yield losses and possible weed encroachment. From all nutrients, nitrogen (N) is the most limiting after water. Nitrogen fertilization, dry matter (DM), and crude protein (CP) are correlated, but there is a limit of responsiveness to N depending on the forage species, time of year, and other limiting growth factors.

There has been the argument made that legumes contribute to the N cycle as they can fix atmospheric N that is used in their metabolism. This is only

partially true. Growing legumes for the purpose of supplying N to the pasture is difficult. Since the vast majority of the fixed N (95 percent) is located in the above-ground biomass, legumes have to be either grazed or otherwise incorporated into the soil to contribute to the soil N pool. Contrary to common belief, the amount of total N contained in the plant does not equate to commercial N fertilizer replacements. At the most, 40 lbs N/acre can be expected if legumes are grown and make up substantial amounts of the overall forage DM in a pasture, which is rarely the case. The advantage of legumes lies in their high nutritive value even when mature and thus they help level out declining nutritive value of the grasses when these mature.

Many soils in Arkansas are natively acidic due to historically being covered by forests. Soil pH has an influence on the availability of soil nutrients. Most nutrients are most available at neutral or near-neutral levels. Some elements such as phosphorus (P) along with other elements are significantly less available at lower pH values. In addition, acidic soils are at risk of aluminum (Al) toxicity to plants as Al solubility increases rapidly at low pH levels. Liming is therefore a necessity to correct low pH values and probably a necessity long-term. Soils respond relatively slowly and in a non-linear fashion to liming due to soil biochemistry, so pH levels should be monitored along with the other fertilizer requirements.

The importance of taking soil samples on a regular basis cannot be stressed enough. Keeping track of required soil fertility levels will ensure that the maximum DM yields possible under the environmental conditions of the site are achieved. This does not mean over-fertilization but following the recommendations of the soil test report. If soil fertility and liming requirements are neglected, pastures will deteriorate over time, weeds will encroach, and landowners are forced to buy more feed.

Weed and Pest Control

The control of undesired plants is one of the most important aspects of management in horse pastures. Horses graze in a very patchy fashion which results in spots that are then occupied by weeds. There are even weeds that are toxic to horses. The animals rarely consume those plants, but landowners should not take any chances.

There are several different ways to address weeds. Chemical control, mechanical control, and

potentially control via grazing are options, although the latter is only recommended if other types of livestock such as cattle or goats can be used.

Mechanical control is a good option especially on smaller acreages when a quick response is needed. This is another reason to invest in a mower or bush-hog. In Arkansas, there are tall-standing weeds such as golden rod, different pigweed varieties, wooly cotton, and increasingly Johnsongrass among others. At some point in their life cycle, these weeds can be controlled mechanically if a quick clipping is required to make paddocks or pastures accessible to horses. A long-term plan for reducing weed pressure will very likely require some chemical control at some point. The more strategically weed control is managed, the less likely encroachment will occur. There are several poisonous plants that are reportedly toxic to horses. These include nightshade, locoweed, pea vine, and also ornamental shrubs that can potentially harm horses when grazed. Normally toxic plants are not grazed by horses unless grazing pressure is unusually high.

The number one pest problem is blister beetles which secrete cantharidin as a defense mechanism. Ingestion of even a single beetle may be fatal to the horse. Most often blister beetles occur in alfalfa stands when those are in bloom at higher than 20 percent. A higher bloom percentage is attractive to blister beetles, of which 2,500 species are known and dozens are present in the southeastern U.S. Since there are no safe levels for blister beetles, good agronomic practices have to be employed to keep the risk of blister beetle occurrence to an absolute minimum. Best management practices include spraying with an insecticide each time hay is removed from the field after a cut. Horses do not have to consume alfalfa hay to meet their nutritional requirements, but the large and lucrative market for alfalfa hay requires agronomic practices toward reducing blister beetle occurrences.

Suitable Forage Species

The species suitable to the property depends on climate and geography, soil type, and anticipated use. In Arkansas, rainfall of about 45-50 inches is sufficient to grow forages without irrigation. There are several cool- and warm-season forages available for use, each having its own advantages and disadvantages. It should be noted that it can be challenging to grow desired forages due to high weed pressure, shifting species composition over time, and the need for

diligent forage management. Due to the grazing behavior of horses, weeds can easily invade pastures and effective weed control requires some foresight and acting in a timely manner.

Forage grasses adapted to the area such as tall fescue and bermudagrass are robust but have their own shortcomings. Legumes such as alfalfa and clover are options but are not nearly as persistent and easy to manage as grasses. Although cost may not always be the decisive factor for keeping pleasure horses, growing forage with a combination of cool- and warm-season grasses is less expensive than buying hay and grains. Table 1 provides an overview of forages frequently grown or found in horse pastures throughout the southeastern U.S.

Cool-Season Forages

There are perennial and annual cool-season forages available. Perennial forages are those that do not have to be replanted every year, but they require a long-term strategy for fertilization, weed control, and grazing management.

Tall fescue is by far the most common perennial forage used in the northern part of Arkansas. The original wild-type fescues (such as Ky31) had different levels of toxicity based on the prevalence of an endophyte whose alkaloid production depended on growth stage, time of year, and age of stand. High toxic alkaloid levels have been shown to affect pregnant mares negatively with abortions as worst cases reported. Mares have also been shown to respond with low milk production to high toxicity levels. Newer fescue types still carry an endophyte (novel endophyte, NE+) as this is important for plant vigor and persistence, but this endophyte does not produce alkaloids toxic to the animal. If fields are to be established anew, then it is strongly recommended to use an NE variety, as this provides good nutrition without the historic negative side effects. Specific details on establishment and management requirements can be found in fact sheets FSA2133 and FSA3042 at www.uaex.edu.

Planting NE+ varieties is not cheap. However, given the nature of horse keeping for most owners, this is an expense that should be factored into the overall financial plan unlike in cattle raising where farmers would expect a return sometime in the future. Pastures seeded with NE+ will develop a relatively dense sod which can be easily maintained by following soil fertility recommendations and weed

Table 1. A general classification of grasses frequently grown or found in horse pastures throughout the Southeastern United States.

PERENNIALS		ANNUALS	
Warm-Season Perennial Grasses	Cool-Season Perennial Grasses	Warm-Season Annual Grasses	Cool-Season Annual Grasses
Bahiagrass Bermudagrass ¹ Big bluestem Carpetgrass Eastern gamagrass Indiangrass	Kentucky bluegrass Orchardgrass Perennial ryegrass Reed canarygrass Smooth bromegrass Tall fescue ³ Timothy	Browntop millet Crabgrass Forage sorghum Fox tail millet Pearl millet	Barley Oats Rescuegrass ² Rye Annual ryegrass Triticale Wheat

¹ Frequently or exclusively vegetatively propagated.

² This plant may act as an annual, as a biennial, or a weak perennial.

³ Tall fescue is not recommended for breeding mares and/or stallions.

Sources: *Southern Forages*. 4th Edition, 2007, *Equine News – Kentucky Equine Research Nutrition and Health Daily*.

control procedures. Novel endophyte fescue is also reasonably well drought resistant unlike endophyte-free cultivars of the past. Mechanical weed and brush control can be done using a bush-hog which will keep the pasture canopy low, lush, and aesthetical. Tall fescue can be grazed during the typical cool-season growing cycles in spring and fall, and in addition in winter when stockpiled the months prior. This gives it an advantage over bermudagrass which is more difficult to stockpile and much less desirable by livestock for grazing in winter.

Legumes such as clovers and alfalfa are cool-season forages (C3) by default, but some of them have characteristics of warm-season forages. Clovers such as white clover, red clover, and crimson clover are good choices, but horse owners should be aware that growing clovers consistently in Arkansas is relatively difficult. Perennials and biennials such as white and red clover don't persist well due to the type of soils on much of the pastureland in Arkansas, infrequent rainfalls, and high summer temperatures. Annuals such as crimson clover are better suited for Arkansas as those can be planted in fall and grazed in spring. During that time weed pressure is lower too. In addition, annual clovers can relatively easily be no-till planted into bermudagrass pastures. Bermudagrass lays dormant between mid-October and March during which annual clovers can be grown in those fields.

Clovers have small seeds and thus relatively low seeding rates. It is worthwhile to increase seeding rates by 50 percent to achieve stands when interseeded into bermudagrass fields. Many times

those fields have relatively low levels of P and K, which both should be corrected before planting if needed. Annual clovers can be grazed beginning in mid-March, and depending on the year can be grazed twice before the end of their life cycle in June of the same year. Like with cattle, horses should be adapted slowly to new diets high in nutritive value.

Small grains are winter annual forages, i.e., they can be planted in fall and used during the winter and early spring. These include wheat, rye, and oats, although oats are not winter-hardy enough for Arkansas. Small grains can be no-till-drilled into existing warm-season grasses such as bermudagrass when these are dormant. From an agronomic standpoint, however, it is best to plant small grains into a prepared seedbed. If land area is limited to just a few acres, then the former option is preferred.

If small grains are sod-seeded (no-till-drilled), then seeding rates should be increased somewhat to ensure good emergence and stand development. Depending on the time of planting, it may take several weeks if not longer before small grains should be grazed, so a long-term forage management plan is needed.

Warm-Season Forages

Bermudagrass is the dominant perennial warm-season forage in Arkansas. There are several varieties on the market that are either established via sprigging or seeding. One of the most used and cheapest varieties is 'Common,' which has been

planted extensively in the southern U.S. It is possible that this variety of bermudagrass is already present on the piece of land that owners have in mind for keeping their horses. Bermudagrass is well suited for keeping horses. Its dense sod, persistence under grazing, and competitiveness with other plants make it a good choice for a permanent pasture. This grass has a relatively low nutritive value, which is probably an advantage for horses that have the propensity to founder. Bermudagrass is also persistent under close clipping and develops a lawn-type sod if repeatedly mowed. This is a great advantage to keep pastures neat and presentable, and provide the horse with an even surface.

If bermudagrass has to be newly established, sprigged and seeded varieties are available. Sprigging has probably a higher success rate for establishing, but if seeding rates for seeded varieties are increased, stands can be successfully established within the same season. There are not many good herbicide options for grassy weeds during the establishment phase, but bermudagrass can be mowed closely and relatively often giving it an edge in persistence above the other grasses which should then disappear over time. Bermudagrass responds well to NPK fertilizer so soil tests should be taken regularly to replace minerals and adjust the pH. It should also be noted that although bermudagrass is relatively drought resistant, it will go dormant if precipitation is absent for weeks in summer. In that case it is recommended to remove animals and move them to a different pasture before sod damage takes hold. Bermudagrass is relatively traffic-sensitive, and horses can create compacted spots that will potentially be invaded by weeds.

Crabgrass is an excellent choice among annual warm-season grasses in Arkansas. It reseeds itself readily, has leafy growth, and is very good forage quality based on its morphology. In many pastures, bermudagrass and crabgrass dominate interchangeably. In pure bermudagrass hay pastures, crabgrass is considered a weed, but for pasturing horses crabgrass/bermudagrass pastures are a very good choice. Those pastures won't generate forage growth in winter and stockpiled bermudagrass is not preferred by horses.

There are several other annual warm-season grasses that are popular with cattle producers such as pearl millet and sorghum-sudangrass. Sorghum-sudangrass is not recommended because it can lead to cystitis, which is associated with the intake of sorghum-type forages. The production of pearl millet requires land to do so as it is difficult to overseed this forage into an existing stand of bermudagrass or tall fescue even at higher seeding rates than normal. Pearl millet can be either grazed or hayed which requires expensive equipment. It is always possible to buy hay which for many horse owners is more cost-effective than owning and operating hay-making equipment.