

Pastures and Forage Crops for Horses ¹

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Florida has over 500,000 horses, third only to Texas and California in the U.S. The predominant breed of horse in Florida is the American Quarter horse, which is closely tied to the state's agricultural industry. Horses have traditionally been used for herding cattle, but recent increases in the horse population in Florida are mostly attributable to the increasing popularity of pleasure horses, including miniature-type breeds that are used for showing and recreation. Horse operations vary in terms of the number of horses, from small (1–3 horses) to large commercial operations that breed, train, or stable horses. Large-scale horse operations are presently concentrated in the central (with Marion County as the nucleus) and the southeastern regions (Palm Beach/Broward/Dade counties) of Florida.

Florida pastures and forage crops can provide a major part of the nutritional needs of horses almost year-round. Planning for pastures or forage crops to be utilized as horse pasture should consider peculiarities of the equine digestive system. Horses are herbivores that can and should consume forages

and are able to utilize the same pastures as cattle. However, the horse is not a ruminant. It has a simpler, less robust digestive system that is more sensitive to what it grazes than is the case with cattle. Horses lack the rumen, the large vat where cattle and other ruminants ferment and degrade poor quality, high fiber, cellulosic materials through the action of microorganisms. Horses instead have an adapted and enlarged colon where the fermentative process occurs. Thus, horses, because of the location of the colon, are hindgut digesters and require higher quality, less fibrous forages.

A pasture serves several purposes for the horse; it is both an area for exercise and a source of high quality forage. A high quality pasture and/or hay can provide a balanced ration of energy, protein, minerals, and vitamins that a horse needs. However, even on a good quality pasture or hay, free-choice vitamin/mineral mix and water are needed to adequately meet the horse's daily nutrient requirements. Horses not receiving supplemental feed will consume about 1.5–2.5 percent of their body

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weight as forage per day. Thus, an average horse weighing 1,000 lbs would require a minimum of 15 to 25 lbs of dry forage or hay per day. Even on fine-stemmed, leafy, high quality pastures, care should be taken to ensure that the horses consume adequate amounts of fiber, which they require for normal gastrointestinal function. The fiber content of a good horse hay should contain 30–40% acid detergent fiber (ADF) and 50–65% neutral detergent fiber (NDF) in order to provide for normal gastrointestinal function. On lush pasture, supplemental hay may be required to ensure adequate intake of fiber.

Pastures for horses can be grown in nearly all locations in Florida. Variations in soil and climatic conditions make some locations and sites better suited to production of particular forage species than others. The role of improved pastures in supplying forage varies from farm to farm, depending on the type of horse, available facilities, quality of these facilities, and personal preference of the operator. It is possible for horses to receive a large portion of their feed from pastures; however, if this is to be achieved, careful consideration must be given to planning and carrying out a forage production and utilization program. The factors that must be considered in improved pasture production are: site characteristics, production goals, forage varieties, liming and fertilization, and grazing management.

SITE

Successful establishment and long-term productivity of a horse pasture will depend on the suitability of the site for the forage species chosen and whether the forage meets the production goals and management abilities of the owner. Soil characteristics and the climate of an area must be considered when selecting the forage for a site. Soil drainage is of particular importance because some forages, like perennial peanut and bermudagrass, do not tolerate poorly drained soils, while others, such as bahiagrass, are adapted to a wide range of soil drainage types. Most Florida soils are low in fertility and pH, and those limitations are generally overcome by using fertilizer and lime, if recommended by a soil test. Forages used in Florida vary widely in cold tolerance. Before planting, it is important to

determine if the forage can survive typical winters in that part of the state. In addition, choice of forage species for a given site must take into consideration whether the owner is relying on the pasture for nutrition or simply as a clean place to exercise. Higher nutritive value forages usually require more management, while those with the primary purpose of maintaining cover often require less.

LAND AREA REQUIRED (STOCKING RATE)

An often overlooked but extremely critical decision is pasture stocking rate. Stocking rate refers to the amount of land that will be required for each horse. The stocking rate will vary with pasture species grown and its productivity, size and age of the horse, amount of grain and other supplements fed, and grazing management. Typically, on less productive sites, one mature horse weighing 1,100 pounds may require 2 to 2 1/2 acres of pasture. On productive sites and well-managed pasture, 1 to 1 1/2 acres will be adequate during summer. The number of horses in a pasture may be increased if more supplemental feed is provided or horses are rotationally grazed. The capacity of a pasture to supply forage varies throughout the year.

In the summer, forage yield and quality of warm-season perennial grasses may be adequate to meet the requirements of a mature horse. In the winter, forage yield and quality on the pasture will be inadequate, and supplemental feeds will be needed to adequately meet the horse's nutrient needs. Where it is possible to vary the number of animals on a pasture, more horses may be stocked on a unit area of pasture in the summer and less in the winter. In rotational grazing, animals are moved around pastures or stabled every 14 to 21 days to allow grazed pastures to regrow or recover before further grazing. The aim of this type of grazing management is to efficiently utilize the pasture and avoid overgrazing that may lead to the development of bare spots as forage plants are weakened and unable to recover from grazing. In general, when there is more than one horse per acre, use as an exercise area becomes the primary role of the pasture, and source of feed becomes secondary. Avoid placing too many horses on too few acres for prolonged periods of

time—this practice results in destruction of the pasture and encroachment of weeds.

VARIETIES

Characteristics that should be considered when choosing forage species and varieties (cultivars) include:

- Adaptation to soils and climate
- Season of growth
- How the forage will be used (grazed or hay)
- The class of horse (breeding stallion, mare, growing horse)
- Level of management required for optimum pasture production versus the skill of the manager

Detailed discussion of production and management of forage crops mentioned below are available in the *Florida Forage Handbook* (Table of Contents: <http://edis.ifas.ufl.edu/AG170>).

Warm-season Perennial Grasses

Bahiagrass is an ideal, general-use pasture grass. Once established, it can withstand heavier grazing pressure than the other pasture grasses in common use. Therefore, horses are less able to destroy a stand of bahiagrass when pastures are overstocked, and grass production is inadequate to meet their needs. Bahiagrass produces more forage in the summer than winter, and its nutritive value is often low during July, August, and September. When mature, all of the bahiagrasses are fibrous and low in feeding value, but the quality of the pastures can be improved by overseeding some of the pastures with summer legumes such as alyceclover.

Recommended cultivars include Pensacola, Argentine, Tifton-9, and UF-Riata. Pensacola is the most widely grown cultivar of bahiagrass. It is persistent under close grazing and low input management. Tifton-9 produces more top growth than other cultivars but may be less tolerant of overgrazing. Both Tifton-9 and Pensacola are more frost resistant than Argentine or Paraguay 22.

Argentine and Paraguay 22 have wider leaves than Pensacola or Tifton-9. Argentine can develop the ergot disease on the seed, which can cause ergot alkaloid toxicity that can lead to abortion in horses.

Improved hybrid bermudagrass covers rapidly from vegetative plantings and is vigorous and highly productive. It is both more responsive to fertilization and has higher requirements for its growth than bahiagrass. It makes an excellent hay crop when harvested frequently (every 4 to 5 weeks). Bermudagrasses require careful management and can be severely damaged by continuous overgrazing. They should not be planted on sites that flood or have very poor drainage.

Recommended cultivars include Coastal, which is fine stemmed and popular among horse owners, Suwannee, Tifton-44, Jiggs, Florakirk, and Tifton 85. Tifton 85 is vigorous, high yielding, and can have improved digestibility. Florakirk is recommended only for hay production. Current data indicate that Alicia, an older but popular variety, is less digestible and less productive than Tifton 85. All of the improved hybrid bermudagrasses must be established from vegetative planting material. Common bermudagrass can be established by planting seed, but the common types are usually of low quality, more susceptible to leaf diseases and are not particularly well suited for use in Florida.

The **stargrasses** are related to the bermudagrasses and are adapted only to South Central and South Florida. Three cultivars—Ona, Florona, and Florico—are recommended. These grasses are very productive when grown under high fertility. It should be noted that the potential for prussic acid poisoning does exist with stargrasses. The stargrasses make excellent hay, but many horse owners prefer the finer-stemmed bermudagrass hays.

Limpo grass (*Hemarthria altissima*) is adapted to poorly drained soils. Floralta is the recommended cultivar, but no horse performance information is currently available.

Callide Rhodesgrass is adapted to Southern Florida. Callide is adapted to periodic flooding common during the summer months on flatwoods soils in South Florida and provides better grazing

during the cool season than bahiagrass. Callide is known to contain less oxalates than most other grasses and is therefore suitable for horse grazing. Callide requires higher levels of fertilization and more careful controlled grazing than bahiagrass, but it produces better forage quality than bahiagrass and should tolerate controlled grazing by horses.

Warm-season perennial grasses that are not recommended (because of their low production or low quality), but may invade a horse pasture, are common bermudagrass, centipedegrass, carpetgrass, and torpedograss. Common bermudagrass, if highly fertilized, can be quite productive. It will often provide ground cover in high traffic areas when other grasses will not. Centipedegrass is adapted to areas with good drainage, and carpetgrass and torpedograss are adapted to moist flatwoods sites but have low productivity. These grasses tolerate close grazing and may invade more productive grasses when pastures are overstocked.

Summer Annual Grasses

Pearl millet is useful to complement perennial summer grasses and is higher in nutritive value than most perennial grasses. It is highly productive under adequate fertility. It will not tolerate flooding, and growth can be so rapid that grazing management is difficult.

Sorghum and sorghum-sudangrass hybrids CANNOT be recommended for horse pastures because of prussic acid poisoning, which may cause abortion in mares in early pregnancy and problems with the urinary tract.

Winter Annual Grasses

Cool-season annual grasses are an excellent choice for extending grazing from the late fall through the early summer. **Small grains**, including oat, rye, and wheat, all furnish good grazing during December, January, February, and March if planted in October–November. They will not tolerate flooding, and cost of land preparation, planting, and fertilization is high. **Ryegrass** has less seedling vigor than the small grains but can be a valuable winter forage crop. It has a high moisture requirement and responds to liberal fertilization. It can be planted

alone or in mixture with small grains and/or various cool-season legumes. Cool-season annual grasses can be used to overseed perennial grasses or sown on dedicated land. They produce palatable and nutritious horse pastures.

Summer Legumes

Rhizoma peanut is an excellent forage for horses, and because the feed value is similar to that of alfalfa, it is sometimes used as a substitute for alfalfa. Rhizoma peanut is a persistent, perennial rhizomatous legume adapted to well-drained soils over the entire state. Rhizoma peanut may be grazed or cut for hay or silage. Florigraze is the recommended cultivar, and it is propagated using underground stems (rhizome). This crop is slow to establish and often requires two seasons to develop complete ground cover. The perennial peanut is best established in a clean seed bed, and any perennial grass to be mixed with it should be planted later. Forage quality of summer grass pasture is increased by the addition of Florigraze (See EDIS publication SS-AGR-35 *Perennial Peanut Establishment Guide* <http://edis.ifas.ufl.edu/aa183>).

Alyceclover is a high-quality annual legume that is readily accepted by horses. Seedlings can be made from March through June at a rate of 15 to 20 lb/A. Alyceclover types currently available are susceptible to attack by root-knot nematodes. It should not be planted on soils subject to long periods of flooding. It is an excellent hay crop and is frequently planted following watermelons to take advantage of the residual fertility.

Winter Legumes

Clovers make excellent winter pastures for horses, especially when mixed with the small grains or ryegrass for overseeding bermudagrass and bahiagrass sods. A mixture of clover is usually recommended. White and red are better adapted to wetter sites, while crimson and arrowleaf are better adapted to well-drained locations. For other information, see EDIS publication SS-AGR-49 *Winter Forage Legume Guide* (<http://edis.ifas.ufl.edu/DS127>).

Alfalfa is forage of choice for many horse owners. Alfalfa is typically fed to horses as hay or in mixture with a grass such as timothy; most of Florida's alfalfa hays are shipped in from the Midwest or West. Alfalfa has been grown with some success in recent years if planted on moderately to well-drained sites. It requires intensive management, including high levels of fertility and favorable moisture conditions. Excellent hay can be made from this plant, but high humidity in Florida makes drying difficult.

PASTURE MANAGEMENT

A good level of pasture management can ensure that the pasture is the main source of feed for horses, and less supplemental feed is required during most of the year. A combination of forage plants will more adequately meet the forage needs of horses on pastures than will reliance on one forage plant. Typically, a perennial forage species such as bahiagrass, bermudagrass or stargrass (South Florida), may serve as the base pasture to supply most of the forage needs on pasture during the summer. Depending on the need of the operation during the summer—for more yield or higher quality—summer annual grasses (e.g., pearl millet) and legumes (e.g., alyceclover) may be grown to meet the needs. During the cool season, ryegrass and clovers may be used to meet forage needs.

Establishing Pastures

Before land preparation begins, soil samples should be taken from the site and tested. Soil testing should be conducted to determine the fertilization and liming program. Land preparation determines the overall success of pasture establishment. A clean, tilled, weed-free seedbed is essential for all perennial crops. Start land clearing and preparation in early spring or during the dry period. By tilling frequently, the vegetation is exposed to the heat of the sun and killed by desiccation. It may be necessary to kill existing vegetation with herbicide before land preparation begins.

Forage crops may be established by seed or vegetative materials. Type of planting material needed, recommended planting rate, planting dates, and time-to-graze information for each forage crop is

given in Table 1. Winter- and summer-annual forage grasses and legumes can be overseeded on sods by either broadcast or sod drilling, or they can be seeded into prepared seedbeds. When overseeding, the sod should be grazed very heavily, mowed, or burned to remove the top growth. The small grains (rye, wheat, oat, and triticale) may perform poorly when overseeded on a bahiagrass sod unless the sod has been disturbed by disking or chopping. Bahiagrass should be cultivated (disked) to obtain 30 to 50% disturbance in order to provide good seed-to-soil contact and reduce the competition from the bahiagrass. More information on pasture establishment may be obtained from EDIS publication SS-AGR-161 *Forage Planting and Establishment Methods* (<http://edis.ifas.ufl.edu/AG107>).

Maintaining Pastures

Routine soil testing will aid the development of an efficient liming and fertilization program, which in turn is necessary for maintaining productive pastures. Soil pH will change over time depending on soil type and type of nitrogen fertilizer used on the pasture. Lime or dolomitic lime (supplying calcium and calcium and magnesium, respectively) may be required to increase soil pH to between 5.5 and 6.5, which is the range in which nutrients are most available to the plant. Nitrogen, phosphorus, and potassium are the three major nutrients required for the growing grass. Where there is a good stand of a legume in the pasture, an inorganic nitrogen application may not be required because legumes are able to utilize nitrogen from the air (nitrogen fixation) and make it available to the companion grass (nitrogen transfer). Furthermore, inorganic nitrogen fertilizers may adversely affect legume stand persistence. Under grazing, nutrients are recycled back to the pasture through manure and urine, and thus additional nutrient application with fertilizer may be less than what is needed for a hay crop where the forage is harvested and removed from the land. More information on liming and fertilizing pasture is available in the EDIS publication SS-AGR-176 *Fertilizing and Liming Forage Crops* (<http://edis.ifas.ufl.edu/AG179>). Proper land preparation during pasture establishment will go a long way in minimizing weed infestation in the

pastures. Adequate weed control can be accomplished through a combination of grazing management, herbicide applications, and mowing. See EDIS publication SS-AGR-08 *Weed Management in Pastures and Rangeland* (<http://edis.ifas.ufl.edu/WG006>) for more information on herbicide recommendations for pastures.

As indicated above, significant amounts of nutrients are recycled through the manure of grazing animals. However, since the manure is not well distributed on the pasture, manure should be spread with a light drag. Do this during hot, dry weather. Internal parasites will be killed by the hot sun. Mowing areas where horses do not graze and dragging pastures to spread manure piles will improve the quality and the utilization of the pasture. Pests of pastures are not usually severe enough to justify insecticide application, but occasional outbreaks can be controlled with chemicals. Judicious use of chemicals involves carefully reading the labels and following directions for use. Some chemicals may be injurious to horses, and some may require that the horse does not graze the pasture for specified periods after applications. Please read and follow instructions provided on insecticide labels.

Grazing management is a valuable tool for maintaining pastures. Pasture may be continuously grazed or rotationally grazed. In continuous grazing, horses graze the same pasture for the entire grazing season or year. In rotational grazing, the pasture is divided into paddocks that are grazed in sequential order. Rotational grazing is a valuable management practice for maintaining and efficiently utilizing productive pastures. Available pasture may be subdivided into 2 to 10 paddocks. Horses graze a paddock for 3 to 21 days and are moved to another paddock. This allows the forage plants to recover in a given paddock while another paddock is being grazed and helps prevent overgrazing and the resultant bare spots or "sand spots." The length of time between grazing depends on type of pasture, site conditions, season of the year, and how quickly the plants are growing. Dividing pastures also affords the manager some flexibility in pasture management. During periods of excessive forage growth in the summer, some paddocks may be closed and used for

stockpiling forage or for making hay or silage for later use during periods of limited forage availability, further reducing the need for supplemental feeds. Fencing is essential for success in rotation grazing and pasture management. Proper fencing also makes the pasture safer. To improve safety on the pasture, fill in holes in the pasture and remove sharp objects, stumps, loose wires, and other materials that may injure the horse.

Hay

Among supplementary feeds that may be required to augment forage from the pasture, hay is the most important. Being a herbivore, hays are a very important component of horse diets and are a primary source of fiber that is needed for normal gastrointestinal function. Good quality horse hay should be mold- and dust-free and should not contain extraneous materials such as weeds and poisonous plants. Good quality horse hay contains about 12 to 20% crude protein, with grass hays at the lower end of the range and legume and annual forage hays at the upper end. Poor quality grass hay may contain 6% crude protein or less. Many horse owners commonly use color of hay as the determinant of hay quality, but color should not be the only indicator of hay quality. A forage analysis report that indicates percent content of moisture, crude protein, acid detergent fiber (ADF) and/or neutral detergent fiber (NDF), calcium, and phosphorus provide objective criteria for judging hay quality. Forage analysis is also useful for ration formulation and supplemental feeding decisions. Please consult your local Extension office for assistance with hay sampling and analysis.

Production of good quality hay involves a combination of proper management practices, including fertilization and cutting frequency. In Florida, climatic conditions restrict hay making mostly to the spring and fall when there is adequate soil moisture to permit forage crop growth, and the weather favors rapid drying of the cut herbage. Hay fields will be grazed during the summer months when it is not usually possible to make hays because of excessive rains. Some forage crops make better hays than others. Therefore, production of hay from horse pastures may be a consideration in the planning, choice, and establishment of horse pastures, and

subsequent subdivision of pasture and allocation of paddocks. The bermudagrasses (Coastal, Florakirk, Tifton 85, and Jiggs) and stargrasses (Florona) make better hay than bahiagrass.

Table 1. Planting guide for forages.

Crop	Planting rate (lb/A)	Planting material	Planting date**	Months from planting to grazing
Grasses				
Bahiagrass	25–30	seed	March (irrigated); June to August (rainfed)	3–12
Seeded Bermudagrass	10–15 20 (if coated)		March (irrigated); June to August (rainfed)	
Bermudagrass	1,200	sprigs or green tops	Jan 15–Aug 15	3–12
Stargrass	1,000–1,500	sprigs or green tops	Jun 1–Aug 15	3–12
Ryegrass	20–30	seed	Oct 1–Nov 15	1–2
Pearlmillet	12–15 (in rows) 20–40 (broadcast)	seed	Mar 15–Jun 30	1–2
Small Grains				
Rye	90–120	seed	Oct 15–Nov 15	1–2
Wheat	100–120 (forage) 60 to 80 (grain)	seed	Oct 15–Nov 1 (grazing) Nov 15–Dec 20 (grain)	1–2
Oats	100–120 (forage) 60 to 80 (grain)	seed	Oct 15–Nov 1 (grazing) Nov 15–Dec 15 (grain)	1–2
Triticale	90–120 (1–2 bu/acre)	seed	Nov 15–Dec 20 (grain)	1–2
Legumes				
Rhizoma Peanut	80–100 bu/acre 900–1200	rhizomes	Dec–Mar 15	8–15
Alfalfa	15–20	seed	Oct 1–Nov 15	4–7
Alyceclover	15–20	seed	Apr 15–Jun 30	2
Crimson clover	20–25*	seed	Oct 1–Nov 15	2–3
Red clover	10–15*	seed	Oct 1–Nov 15	3–4
Arrowleaf	8–12	seed	Oct 1–Nov 15	3–4
White	3–4	seed	Oct 15–Nov 15	3–4
<p>* Assumes broadcast planting on bahiagrass or other perennial grass sod. Solid stands drilled into a prepared seedbed can be seeded at lower rates. Seeding rates would be reduced approximately 20% for each component if a mixture were used.</p> <p>** For fall-planted, cool-season annuals, producers in North Florida may begin planting in the early part of the planting date range. Producers in South Florida should wait and plant in the latter 1/2 to 1/3 of the planting date range.</p>				