



Forages for Horses

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Horses are herbivores, meaning that Hgrasses and other types of forages are natural dietary components. Absence of forage in the horse's diet can lead to digestive disorders. Basically the horse has an absolute requirement for roughage so that its digestive tract will function normally. This requirement can be supplied either as pasture or hay.

Forages contribute energy, protein, minerals and vitamins at various levels depending on the forage specie and quality. Stage of maturity greatly influences forage quality and availability of nutrients. Horses have limited ability to utilize poor quality forage, so good pasture management is vital if the horse is going to use the forage to its utmost.

Mature horses doing little or no work can be maintained without supplementation on high quality pasture. The main reason concentrate mixes are fed to hard working and productive horses is because the horse's digestive tract has a relatively small capacity, making it impossible for them to consume enough roughage to meet their nutrient needs.

Forage Quality

Nutrients

Forages and grains contain much the same nutrients, but their proportions and availability are different. Forages supply energy. One form is **fiber**. The horse does not break down fibrous energy as readily as energy sources like starch. As a forage's fiber content increases, the availability of energy decreases. Horses cannot utilize poor quality forage as efficiently as cattle can.

Table 1. Effect of maturity on energy and protein value of selected hays.

Stage of maturity	Digestible Energy (Mcal/kg)	TDN %	Crude Protein %	Digestible Protein %
Alfalfa				
Early bloom	2.42	55	17.2	13.4
Mid-bloom	2.29	52	16.0	11.6
Full bloom	2.16	49	15.0	10.1
Bluegrass				
Pre-grazed	2.15	50	15.0	12.6
Post-head grazed	2.0	45	10.0	
Orchardgrass				
	2.2	50	16.0	13.5

Protein is another nutrient that can be supplied at adequate levels by forage if the forage is managed properly. Mature forages will contain lower levels of protein and be less digestible than the same forage in the early growth stages. Research shows that horses can digest about 50 to 70% of forage protein.

A forage's stage of maturity, more than any other factor, affects how useful it is as a source of nutrients for the horse. The more mature the plant becomes, the less available the nutrients. Table 1 shows the dramatic effect that maturity has on digestible energy and protein.

Forages are good sources of **vitamins** particularly vitamins A, C and B-complex and can supply large amounts of minerals like calcium.

Determining Quality

Forage quality can be determined to a limited extent by visual inspection, or more accurately by chemical analysis. A forage's nutrient content is determined by management techniques and forage species. Grazing density can influence pasture forage quality by its influence on stage of maturity and leafiness.

In addition to stage of maturity, leafiness, presence of foreign material, color and the type of forage are all indicators of quality.

- Leafiness is a good indicator of quality, especially in legume hays, because the leaf contains twice the amount of nutrients as the stem.
- Freedom from weeds, mold and debris is critical to a high quality forage. Horses are very susceptible to colic and digestive disorders particularly when consuming forages containing foreign material.

Pasture Types and Management

Type

The forage's ability to meet the horse's nutrient needs is not only determined by those needs but also by how digestible and available the forage source is. In Kentucky, bluegrass and fescue pastures dominate simply because they are best suited for the state's environment.

Bluegrass pastures provide an excellent source of high quality forages for most classes of horses, particularly

in the spring. Mature idle horses, barren mares and mares in the first two-thirds of gestation can meet their nutrient needs adequately on well managed bluegrass pasture.

Fescue is probably the most predominant grass used in Kentucky, because it does very well on Kentucky soil. Fescue has a long, growing season and will provide forage during most of the year. However, endophyte infected fescue should not be fed to mares in late gestation or lactation and does not adequately meet the needs of the young growing horse.

Regardless of what species of plant dominates in grass pastures, the nutritional value can be enhanced by introducing some type of legume.

Mixed pastures (grass-legume pastures) usually are higher in protein. Also, because the growing seasons of most grasses and legumes vary, a mixture allows an extended grazing season. A common practice is over seeding with some type of clover, like sweet, white or ladino clover. Legumes also reduce fertilizer costs because of their nitrogen fixing capacity.

Management

Management practices are essential to maintaining a high quality pasture.

Plant height is critical from a nutritional standpoint. As plant height increases, digestibility decreases thus making the pasture less valuable. Also, as grass height increases the clovers and other low growing grasses are crowded out and weeds are more likely to gain hold. Pastures should be mowed or grazed adequately to keep grasses 3 to 4 inches high to optimize digestibility and allow for legume growth. Avoid over grazing as it can damage pasture plants and increase parasite and sand colic problems.

Manure control can be most effective via a chain harrow. Chain harrowing prevents manure build up in certain areas of the pasture and allows for more uniform grazing. It also exposes parasites and parasite eggs to sunlight and dryness, helping control them.

A good **fertilization** program, pasture rotation, and light grazing of new pastures and of pastures early in the spring are other management practices which allow for higher quality pastures. Nitrogen fertilization (25-50 lb N/acre) in early March can move the grazing season forward, particularly for grass pastures.

Stocking rates can help maintain good pastures. Obviously the stocking rate varies with type and class of horse, specie of grasses used in pasture, season and soil fertility. Generally you should allow 2 to 3 acres/horse year round to optimize pasture utilization while maintaining healthy pastures. Some horse operations use cattle to aid in pasture maintenance.

Using Forages in the Diet

Horses are expected to consume from 2.5 to 3.0% of their body weight in dry matter. For example, a 1200 lb mare is expected to consume 30-36 lb of dry matter/day. The greater the nutrient density of the feed stuff consumed, the smaller the amount which must be consumed to meet her nutrient needs. This point further emphasizes how important forage maturity is for meeting a horse's nutrient requirements.

Several factors affect either voluntary intake or horses' ability to consume enough forage to meet their nutrient needs. As stage of pregnancy increases, voluntary intake of forages decreases and nutrient needs increase. Because the horse at high work intensities has high nutrient needs, the mare in late gestation, the lactating mare and the young, rapidly growing horse probably cannot consume enough forage to meet their nutrient needs. However the mature idle horse, horses at light work and the pregnant mare early in gestation may meet their nutrient needs with good quality forage alone.

The cost of forage is a large part of feed cost on any horse farm. Decisions on how to supply that forage will depend on many factors, such as land availability, land that can be used as

pasture and type of operation. Regardless of how the forage is supplied, it should be done in the most economical way. So when purchasing hay, compare it on a nutrient cost basis as well as a cost per weight. For example compare the protein cost of the following hays:

Hay A:

Cost \$100/ton
Contains 18% crude protein (CP)

2000 lb x .18 CP = 360 lb CP
\$100/360 lb CP = \$0.27/lb CP

Hay B:

Cost \$80/ton
Contains 10% CP

2000 lb x .10 CP = 200 lb CP
\$80/200 lb CP = \$0.40/lb CP

In this example, hay A supplies protein at less expense than does hay B. Hay B contains more fibrous material, making the protein less available and compounding the problem of low protein.

Estimating costs of supplying nutrients from hay and grain rations is a little more difficult. Consider how to estimate cost and meet the needs of a group of mares in late gestation. If the energy content of hay A were higher than hay B, then less grain is needed with this hay. The mares require a total ration of 12% crude protein. Therefore a 70:30 ratio of hay A:grain and a 60:40 ratio of hay B:grain can be estimated to meet the group's needs. In this example two grain rations are available, a 12% and a 168% crude protein. The 12% CP mix will be combined with hay A and the 16% CP mix with hay B.

Cost calculations:

Ration 1

70:30 hay to grain mix
Contains 18% CP hay which costs
\$100/ton

12% grain mix which costs \$135/ton

Total ration cost =

$(.70 \times \$100) + (.30 \times \$135)$

Total ration cost = \$110.50/ton

Total ration CP =

$(.70 \times .18) + (.30 \times .12)$

Total ration CP = 16.2%

Ration 2

60:40 hay to grain mix

Contains 10% CP hay which costs
\$80/ton

16% grain mix which costs \$160/ton

Total ration cost =

$$(.60 \times \$80) + (.40 \times \$160)$$

Total ration cost = \$112/ton

Total ration CP =

$$(.60 \times .10) + (.40 \times .16)$$

Total ration CP = 12.4%

Both rations meet or exceed the mares' requirements. However by using ration 1 the horseman saves \$175.20/year between the two rations (based on a 20 head mare herd consuming 32 lb of ration/head/day).

Hay can be fed to horses on pasture to supplement their diet. Hay supplementation is usually done during the winter months or during drought situations. Feed hay according to the horse's body condition. Horses maintained solely on pasture should have access to a trace mineral salt block to allow for adequate intake of minerals and salt.

Toxicity Problems with Forages

Horses are extremely susceptible to molds, fungus and other sources of toxic substances in forages. Fresh, clean sources of forages are always recommended when feeding horses.

Some forages have toxic effects due to endogenous substances.

- **Sudangrasses** may contain a glycoside which can cause muscle weakness, urinary tract failure, neural degeneration and death.
- **Fescue** is another forage that could have toxic properties if contaminated by the endophyte fungus. Mares grazing infected fescue suffer from agalactia (extremely decreased milk production), prolonged gestation and tough placentas. Decrease the diet's fescue component by feeding supplemental grain or legume hay. The safest prevention is to remove mares from the fescue pasture or hay before the last 3 months of gestation.

Mold problems can occur in hay and grains harvested in humid environments. Be especially careful in Kentucky to harvest hay correctly and without mold.

Blister beetles contain a toxin, "cantharidin," which causes irritation to the digestive tract's lining and ingestion is fatal. In the past, blister beetles in alfalfa have not been a concern to most Kentucky horse producers. Recently, however, some blister beetles have been found in hay imported to Kentucky. Because no level of ingestion is safe, proper forage management techniques must be implemented to ensure that the hay is free of beetles.

Many poisonous plants produce toxins fatal to horses. Some common plants include ornamental shrubs (yews) and nightshade, but any plant known to cause problems in other species will probably affect horses. Usually, these plants are not palatable and horses will not eat them unless restricted from quality sources of hay or pasture.

