



PENNINGTON™

Equine Forages & Grazing Recommendations

PENNINGTON OFFERS ELITE LINE OF PASTURE FORAGES FOR HORSES

Equine experts agree that a good pasture program should be an integral part of every horse farm. A good pasture program entails a number of components including fertilization, weed control, grazing management and perhaps most importantly, the right selection

and combination of forages. As the premier grass seed supplier in the country, Pennington Seed offers an elite line of forages for the horse industry. These forages are university researched, farmer proven and backed by Pennington's exclusive quality guarantee.

PENNINGTON FORAGES FOR HORSE PASTURES

Cool Season Perennials:

“Jesup MaxQ” Tall Fescue – Widely adapted, nutritious and highly palatable. It contains a non-toxic endophyte which offers persistence, grazing and drought tolerance equal to toxic fescue varieties. In extensive university research and on-farm use, MaxQ has proven to have no adverse effects on horse breeding or foaling.

“Texoma MaxQ II” Tall Fescue - Developed at the renowned Noble Foundation in Ardmore, OK, Texoma features advanced technology that combines a non-toxic endophyte with a proven variety of tall fescue. Like Jesup MaxQ, it is widely adapted, nutritious, highly palatable and university proven to be safe for all classes of horses including pregnant mares. Grows well where KY 31 tall fescue is grown and better than KY 31 in the south central U.S.

“Olympia” Orchardgrass – High quality forage with excellent palatability. Superior grazing tolerance and persistence compared to other orchardgrass varieties. Excellent for hay or grazing.

“Durana” & “Patriot” White Clovers – Excellent as companion species with both cool and warm season grasses. As legumes, Durana & Patriot manufacture enough nitrogen to support their own growth needs while sharing some nitrogen with companion grass species. They are the most grazing tolerant and persistent clovers on the market today.

Cool Season Annuals:

“Passerel Plus” Annual Ryegrass – Extremely nutritious and palatable. Disease resistant, cold tolerant and late maturing. Provides large amounts of succulent forage into late spring and early summer.

“Wintergrazer 70” Rye – A proven cereal grain forage with excellent tolerance to lower soil pH levels and cold temperatures.

Warm Season Perennials:

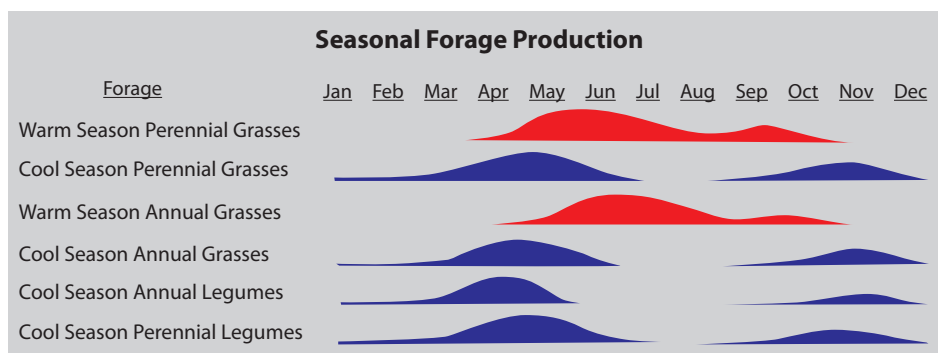
“Cheyenne II” Bermudagrass – Improved seeded bermuda offering exceptional yields and excellent quality. Highly digestible forage with a high leaf to stem ratio. Excellent for hay or grazing.

“Mohawk” Bermudagrass – Developed with improved cold tolerance. Fine leafed for superior palatability and digestibility. Excellent for hay or grazing.

“Ranchero Frio” Bermudagrass Blend – A blend of premium bermuda varieties including Giant, Mohawk, Cheyenne and Cheyenne II for rapid emergence and high yields. Excellent for hay or grazing.

FORAGES FOR HORSE PASTURES

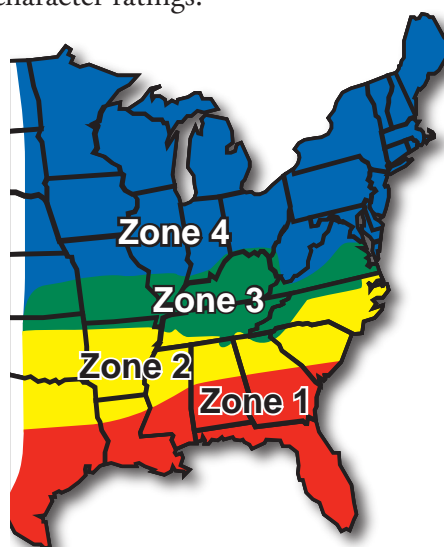
Pasture forages are classified into perennial or annual grasses and legumes. Perennial forages are those that come back year after year without having to replant. Annual forages are planted (or emerge as volunteer plants), grow, mature and complete their life cycle typically in 12 months or less. Legumes have the ability to capture atmospheric nitrogen and transform it into forms the plants use to promote and sustain their growth. This nitrogen can also be shared with companion pasture grasses thus reducing the total amount of purchased nitrogen needed for optimum forage production. Perennial and annual forages are further delineated into either cool season or warm season categories depending on the time of year in which they actively grow. As expected, cool season forages grow during the cooler months of the year while warm season forages grow during the warmer months. Examples of each are listed in the Pasture Species chart, along with plant character ratings.



PASTURE SPECIES	Seedling Vigor ¹	Tolerance To:		Adaptation Zone ²
		Drought	Grazing	
Warm Season Perennial Grasses				
Bahiagrass	F	E	E	1, 2
Bermudagrass	F	E	E	1, 2, 3
Cool Season Perennial Grasses				
Kentucky Bluegrass	E	F	E	3, 4
Orchardgrass	E	G	F	2, 3, 4
Tall Fescue ³	E	E	E	2, 3, 4
Timothy	G	F	F	4
Cool Season Perennial Legumes				
Alfalfa	G	E	F	1, 2, 3, 4
Red Clover	E	F	F	1, 2, 3, 4
Ladino Clover	F	F	F	1, 2 ,3 4
White Clover	F	G	E	1, 2, 3 4
Cool Season Annual Legumes				
Arrowleaf Clover	F	G	G	1, 2
Crimson Clover	E	F	E	1, 2
Ball Clover	P	G	E	1
Cool Season Annual Grasses				
Annual Ryegrass	E	G	E	1, 2, 3, 4
Oats	E	F	F	1, 2, 3, 4
Rye	E	G	G	1, 2, 3, 4
Wheat	E	G	G	1, 2, 3, 4
Warm Season Annuals				
Pearl Millet	E	E	F	1, 2, 3, 4
Browntop Millet	E	E	F	1, 2, 3, 4

¹ E=Excellent; G=Good; F=Fair; P=Poor; ²See Adaptation Map;

³ Novel Endophyte Varieties



*FORAGES TO AVOID FOR HORSES

Sorghum, sudangrass, johnsongrass and sorghum-sudangrass hybrids should not be used as forages for horses. Horses grazing these forages can develop a condition known as cystitis which can lead to paralysis and urinary disorders. Hay from these forages are generally safe to feed. Toxic fescue should not be used as pasture for pregnant mares in late gestation. A number of annual and perennial legumes can be used in horse pasture forages mixes, however arrowleaf clover and vetch are somewhat unpalatable to horses.

(*Information adapted from Southern Forages – 4th Edition - Ball, Hoveland & Lacefield)

FESCUE FOR HORSES?

Until now, the mention of using tall fescue for horse pastures often brought strained looks and words of disdain from horse owners, especially those with breeding mares. However, with the release of Pennington's Jesup MaxQ and Texoma MaxQ II tall fescue varieties, horse professionals are once again putting this popular forage to use on their farms.

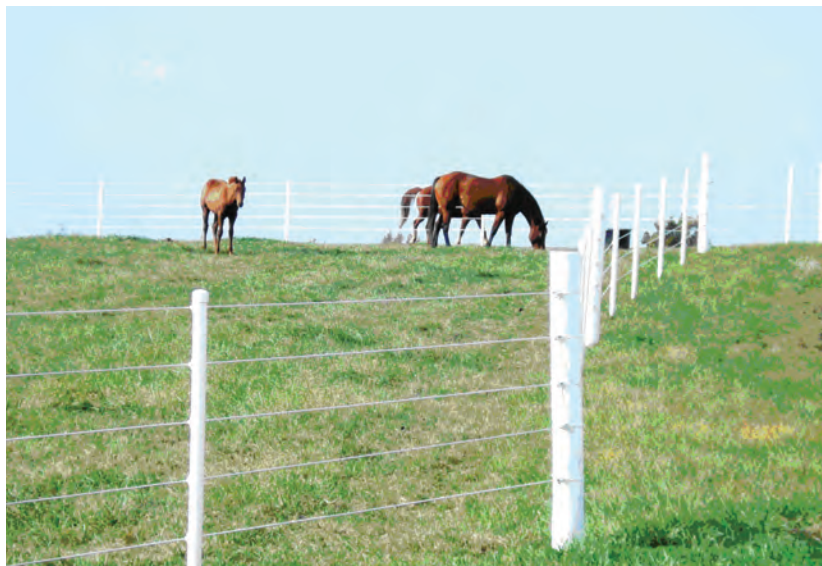
Tall fescue is a popular forage with wide adaptation over a large portion of the U.S. It is estimated that some 40 million acres of pasture ground is covered in tall fescue. Much of this acreage is covered by traditional tall fescue varieties that contain an endophyte (fungus) that produces compounds – that when ingested – are toxic to many species of animals including horses.

Fescue toxicity effect on breeding mares is well documented and includes foaling difficulties, weak foals, poor milk production and retained placentas. There is also evidence that toxic fescue has adverse effects on equine breeding and gestation.

In the late 1970's and early 1980's, forage breeders developed a number of fungus-free cultivars of tall fescue that eliminated the problems associated with the toxic endophyte varieties. However, it quickly became evident that fungus-free varieties lacked vigor and would not persist under real farm scenarios.

In the late 1990's, Pennington Seed, Inc., in partnership with Ag-Research of New Zealand and the University of GA, released Jesup MaxQ, a revolutionary new endophyte-infected tall fescue that solved not only the toxicity problems associated with traditional tall fescue varieties, but also the stand vigor and persistence problems associated with fungus-free varieties. Jesup MaxQ tall fescue contains a novel "friendly endophyte" that gives the plant the same toughness

and longevity of toxic varieties like KY 31, but with no detrimental effects on livestock health and performance.



With the release of Pennington's Jesup MaxQ and Texoma MaxQ II, horse professionals are once again putting tall fescue to use on their farms.



Texoma MaxQ II, a new tall fescue variety containing a second generation novel endophyte, was released by the Noble Foundation in Ardmore, Oklahoma in 2011 in cooperation with Grasslanz, NZ and Pennington Seed. The production, safety and animal health benefits of Texoma are identical to those of Jesup MaxQ.

The safety of Jesup MaxQ and Texoma MaxQ II as a pasture forage for horses is well documented by university testing and on-farm use. In a three-year study led by Dr. Peter Ryan at Mississippi State University, pregnant mares were grazed on either MaxQ, fungus-free or toxic fescue pastures. Scientists reported no foaling difficulties related to forage consumption for either the mares grazing MaxQ or fungus-free fescue pastures while all but one of the mares grazing toxic fescue experienced foaling difficulties related to fescue toxicity. This led the researchers to conclude that **"there is a minimal or no health risk to pregnant mares grazing non-toxic endophyte-infected tall fescue."** Dr. Ryan, who has been studying fescue toxicity for 10 years, stated, *"We've been using MaxQ since 2000 and we've never lost a mare or foal and we've never had any serious pregnancy related problems associated with this forage."*

HORSE PASTURE RENOVATION GUIDE

Horses are herbivores, therefore their base diet should consist of roughages. In fact, equine specialists say providing only forage in the form of a high quality pasture or hay and a good mineral supplement is sufficient to meet the nutritional needs of many classes of horses.

No matter how large or small, a good pasture program should be the foundation of every horse farm. Developing a good pasture program involves much more than simply applying a little fertilizer periodically and giving the pasture an occasional mowing. Sometimes it means starting over and completely renovating the pasture. Reasons to consider complete renovation are given in the table below.

Reasons to Renovate a Pasture:

- To replace toxic grasses
- To plant an improved forage variety
- To use forages that extend the grazing season
- To kill existing weeds & undesirable grasses
- To level or smooth a pasture

If renovating a horse pasture, there are several management tips that can serve to help ensure success.

Choose forages that are adapted to your area.

Fescue, orchardgrass, timothy and brome grass don't perform well in areas where deep sandy soils are prevalent. Conversely, bahiagrass and certain hybrid bermudagrasses won't grow in cold climates. Your local university extension office or farm supply dealer can provide information on forages best suited for a particular region or area.

Don't necessarily opt for the cheapest forage.

There can be major differences in forage quality and yield among varieties. For instance, Kentucky 31 tall fescue seed can be purchased much cheaper than Jesup MaxQ or Texoma MaxQ II fescue. However, the toxic effects of KY 31 on horses are profound, while no toxicity occurs with horses grazing MaxQ or MaxQ II pastures. Also, purchase only high quality seed. They may cost slightly more, but having a guaranteed germination percentage

and a list of any weed seed is good information and well worth any added expense.

Match the forage to the soil type. Some forages perform better than others on certain soil types. For example, bermudagrass performs best when planted on a well drained upland soil. It does poorly on wet, mucky soils.

Collect soil samples to determine existing soil fertility and pH levels. Use soil test results to apply needed fertilizer and lime.

Prioritize pasture renovation. Toxic pastures should be renovated first followed by unproductive pastures. It may only be practical to renovate a portion (20% - 35%) of the pasture each year until total renovation is accomplished.

Utilize summer & winter annuals to help offset forage shortages due to renovation. Hybrid pearl millet or winter annuals (rye, ryegrass, legumes, wheat, oats, etc.) can provide large amounts of highly nutritious forage for horses while permanent pastures are developing.

Use proven grazing systems like rotational, strip or flash grazing to better utilize existing forage. Horses are notorious "spot grazers." Utilizing a grazing system helps prevent spot grazing and allows the grass to have a much needed rest period for regrowth and replenishment of food reserves.

Research and ask questions. Local university extension offices and farm supply dealers are good sources of information pertaining to forages and pasture management. Also, reputable seed suppliers like Pennington Seed have forage specialists available to assist and a website, www.pennington.com, that contains excellent forage information.

Stocking Rates for Horse Pastures

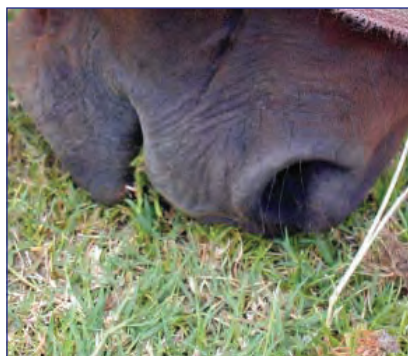
- | | |
|---------------|----------------|
| • Mare & foal | 1.75 – 2 acres |
| • Yearling | 1.5 – 2 acres |
| • Weanling | .5 – 1 acre |

MAINTAINING HEALTHY HORSE PASTURES

C.D. Teutsch, Virginia Tech, and S.R. Smith, University of Kentucky



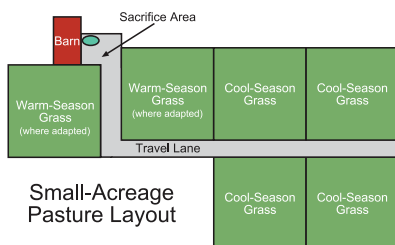
Well-maintained pastures can serve as an economical and high-quality feed source. Here a mature pleasure horse grazes contently in a field of annual ryegrass.



Horses can graze very closely. In this photo a horse grazes a bermudagrass sod too close.



Close and frequent grazing weakened this sod, resulting in a pasture that is less productive and more susceptible to erosion and weed encroachment.



This is an example of a small-acreage pasture layout for pleasure horses. The inclusion of a warm-season grass provides grazing during the summer.

PASTURE MANAGEMENT

Once pastures have been established (18-24 months after planting), sound pasture management is critical for maintaining a healthy and vigorous sod that benefits the horse, owner, and environment.

SOIL TEST PASTURES. Pastures should be soil tested every 2-3 years in order to provide a baseline for tracking changes in pH and fertility.

MAINTAIN ADEQUATE SOIL PH. Soil pH can dramatically affect nutrient availability and plant growth. Maintain pH between 6.2 and 6.5 for grass-legume pastures by applying lime according to the soil test.

MAINTAIN ADEQUATE PHOSPHORUS AND POTASSIUM. Phosphorus and potassium should be maintained in the high range as determined by soil testing.

DISTRIBUTE DUNG PILES. Drag pastures to distribute dung piles and encourage uniform grazing.

PROVIDE 2-3 ACRES PER HORSE. If land area is limited, grazing must be controlled to maintain healthy pastures.

SUBDIVIDE PASTURES. Establish four or more pastures and graze them rotationally.

REST PASTURES BETWEEN GRAZING EVENTS. Resting pastures allows plants to replenish food reserves. Allow pastures to regrow to a height of 8-10". In the spring when cool-season grasses are growing rapidly, rest periods will be shorter. In mid-summer when plant growth is slower, rest periods will be longer.

LEAVE PLENTY OF LEAF AREA. Do not graze closer than 2-4". Leaving plenty of leaf area results in faster regrowth and helps maintain a vigorous sod. Horses tend to graze some areas closer than others, so rotate horses to a fresh pasture when heavily grazed areas are at 2-4". Clip ungrazed areas of the pasture.

DO NOT GRAZE PASTURES WHEN PLANTS ARE NOT GROWING. Feed hay in a sacrifice area to avoid overgrazing pastures during the winter and summer.

REMOVE HORSES FROM PASTURES DURING WET WEATHER. Hoof action can seriously damage established sods during wet periods of the year. Place horses in the sacrifice area and feed hay when the soil is soft.

PASTURE LAYOUT AND DESIGN

Proper pasture design allows horse owners to control grazing. In some cases it is advisable to establish a permanent perimeter fence and cross-fence with temporary fencing until a suitable layout is found.

INDIVIDUAL PASTURES SHOULD BE SQUARE. Long and narrow or odd shaped pastures are not uniformly grazed.

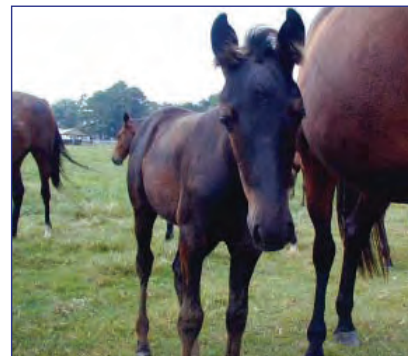
PASTURES SHOULD BE UNIFORM. Pastures should contain similar forage species, soil types, slopes, and aspects.

HORSES SHOULD HAVE ACCESS TO FRESH WATER AND SHADE. Ideally, each pasture should contain water and shade. In some cases lanes can allow access to the barn from all pastures (see small-acreage example).

LIMIT ACCESS TO TREES. Trees should be fenced out to prevent girdling.

ESTABLISH A SACRIFICE AREA. Allow 600 to 1,000 sq ft per horse of well-drained area located near the barn. In most cases a rock pad will be required to keep area from becoming muddy (see diagram of rock pad).

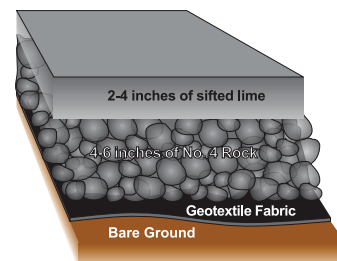
USE ELECTRIFIED POLYTAPE TO CONTROL GRAZING. For this type of fencing to be effective, it must be electrified at all times.



Healthy pasture sods supply a safe exercise surface for growing foals.



Sacrifice areas often become muddy and require the construction of a rock pad.



Rock pads are constructed by placing geotextile fabric over the soil, covering it with 4-6" of No. 4 rock, and capping the rock with 2-4" of sifted lime.



Trees must be fenced out to avoid girdling by horses. In this photo an unfenced tree has been fatally injured.

For more information on maintaining healthy horse pastures, contact your local Virginia Cooperative Extension Office or visit the Virginia Cooperative Extension website at <http://www.ext.vt.edu/resources/>.

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Information on Equine Forages and Pasture Management
Details Inside!