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Hay is for Horses, but Pastures too: Keeping them Green and Productive

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Equine Interest Group

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Relative Proportions of Grass, Forbs, and Browse in the Diets of Livestock

	Type of Livestock			
Type of Forage	**Cattle**	**Horses**	**Goats**	**Sheep**
	---------- % ----------			
Grasses	65-75	70-80	20-30	45-55
Legumes and broadleaf	20-30	15-15	10-30	30-40
Browse	5-10	0-5	40-60	10-20

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Pasture Management

- Many pastures that are presently unproductive can be improved with a little management.
- There are several methods that may apply to improving pastures.

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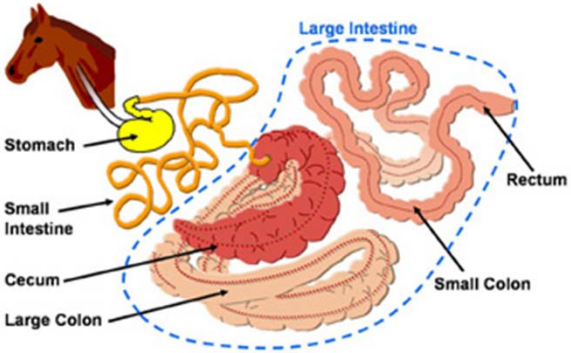
Grazing Behavior of Horses

- The anatomy of horses dictates that they graze closer to the ground than other species.
  - Horses also tend to be more selective grazers.
  - They will readily locate to graze the highest quality forage.
- This implies good pasture management through rotation must be accomplished to effectively use the pasture.

The equine digestive system is designed for forage consumption



Factors Affecting Nutrient Availability

- Soil type (composition)
- Soil pH
- Nutrient removal
  - Harvesting
  - Grazing
  - Other biological activities

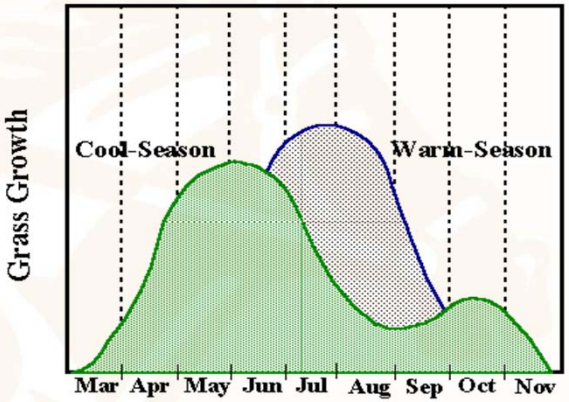


Figure 2. Seasonal growth distribution of cool- and warm-season grasses.

The Soil

- **Evaluate Pasture in the Spring**
  - Soil Testing
    - How to take a soil sample?
  - Fertilizing
    - What the soil test report tells me?
  - Liming
    - Making sure that all the nutrients requirements depend on pH

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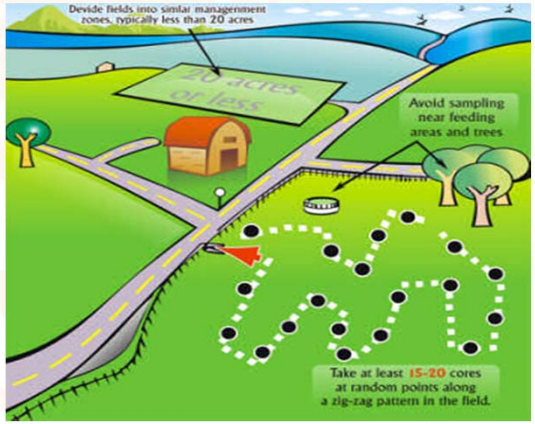

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What Nutrient Levels are Acceptable in the Soil?

- **What my soil should contain?**
  - 40 to 60 units of P (phosphate)
    - It takes about 10 units of P_2O_5 to raise the soil one unit
  - 220 to 260 units of K (potash)
    - It takes about 2.5 units of K_2O (potash) to raise the soil one unit

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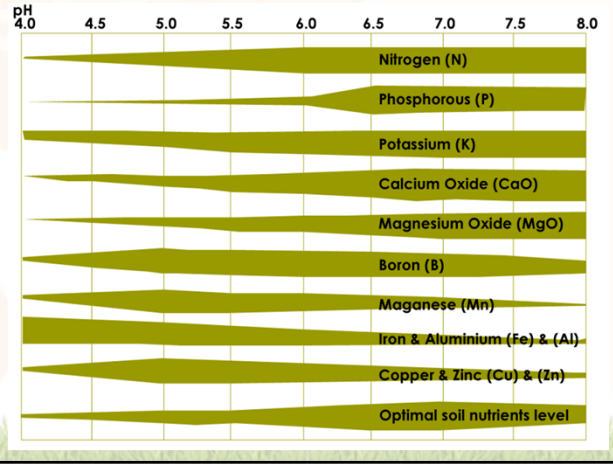
pH Effect on Nutrient Absorption



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Soil Nutrients

- Maintenance face?
  - If at least 30% legume add, P and K based on soil test
  - If pasture is less than 30% legume, then N, P, and K will be needed.
  - 50 lbs (units) of nitrogen (~150 lb of ammonium nitrate or 110 lbs of urea)
    - Can give an additional 1,000 lbs of dry matter and increase crude protein in the grass by two units.
    - Use split applications for higher rates
      - » Late March to early April
      - » Late August when fall rains begin

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Nutrient Management

- **Do I need to remove horses when applying granular fertilizer?**
  - **NO**
  - Just be careful not to have fertilizer spills where a horse could eat enough of the material to be toxic.
- **Do I need to remove horses when applying liquid fertilizer?**
  - **YES**
  - Liquid nitrogen is a salt that could burn the grass and concentrate in the leaves for longer period.
  - Keep horses off the pasture until rain comes and wash the fertilizer off the plants into the soil.

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Species Selection

- Important factors
  - Intended Use.
  - Animal Requirements.
  - Environmental Constrains.
  - Management Constrains.

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Nutrient Management

- Break the manure piles to increase nutrient cycling.
  - Should be done in summer because hot dry summer increases microbial activity

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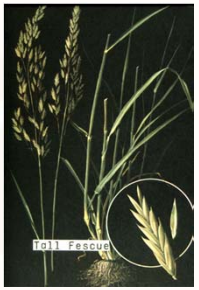
Forage Species for Pasture

- **Tall Fescue**
  - Vigorous sod-forming cool season grass
  - Can withstand much trampling
  - Suggested for areas of surface abuse
  - Use endophyte free or novel endophyte
    - KY31 can cause problems with decrease milk production, creased growth, and placental abnormalities
    - Remove pregnant mares from endophyte infected fescue during the last 120 days of pregnancy



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Are Pregnant Mares Safe in Max Q?

Pasture	Number of Days Early (-) or Late (+) Foaling	Foaling Problem
Endophyte Free (EF)	-9 to +15 (average 0.4 late)	None
Jesup MaxQ	-12 to +2 (average 5 day early)	None, except one partial placental retained
Toxic Tall Fescue (KY31= E+)	+6 to +21 (average 13 day late)	Late births, Difficult births (2), Retained placenta (3), Poor mammary development (4), abortion (1).

Source: Mississippi State University

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Forage Species for Pasture

- **Bermudagrass**
  - The seeded types, which include common bermudagrass, offer more flexibility in establishment method and may be a better option if you have a relatively small land area.
  - Seeded bermudagrass also tend to have lower, denser growth, which can mean better persistence under heavy grazing.
  - In horse pastures that are subject to high grazing pressure and traffic, common bermudagrass may have certain advantages.

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Forage Species for Pasture

- **Bermudagrass**
  - Well adapted for grazing and is very productive between May and September.
  - Hybrid types will typically produce higher dry matter yields than the seeded types and will keep higher total digestible nutrient (TDN) levels at similar stages of maturity.
  - You can do vegetative propagation from March through April.

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Forage Species for Pasture

- **Bahiagrass**
  - Tolerates low fertility and overgrazing than bermudagrass
  - Tolerates high stocking rates (thick sod)
  - Longer growing season than bermudagrass
  - Keep it short (4 to 6 inches)
  - Tifton 9, Pensacola, Argentine, UF-Riata
  - It has a longer growing season than bermudagrass (April through October)

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Warm-season Grasses

- **Dallisgrass**
  - Close to bahiagrass, but less persistence.
  - Requires higher fertility soils with better water-holding capacity.
  - Quality is generally better than both bahiagrass and bermudagrass.
  - Seed viability is often very low.
  - Health problems: ergot (fungus) forms in the seed head.

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Forage Species for Pasture

- **Annual Ryegrass**
  - Very palatable to horses and provides high quality forage from November through May.
  - In most situations you can broadcast the seed or drill it into existing bermudagrass or bahiagrass sod in September and October.
  - Annual ryegrass can reseed very well, and once seed are in the soil, some will germinate each year.
  - Grazing down or clipping summer growth in the fall and lightly harrowing the ground will let the annual ryegrass seed germinate.

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Forage Species for Pasture

- **Crabgrass**
  - It volunteers in Mississippi pastures and reseeds itself very well.
  - You can seed it from March through May.
  - Most crabgrass is “common,” but a two varieties called red River and Quick-n-Big has been developed specifically for grazing.
  - Crabgrass pastures are productive from May through September and have nutritional quality that is generally higher than perennial warm-season grasses.
  - Crabgrass has a more even growth profile through the summer than the other warm-season annual species, such as millet, so it is often easier to manage and maintain nutritional quality.

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Not Recommended Species

- **Johnsongrass, Sorghum, Sudangrass, and Sorgum x Sudan Hybrids**
  - Prussic acid production
  - Problems:
    - Cystitis, paralysis, and urinary tract disorders

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Suitability of Forage Species for Grazing

Species	Frequent Close Grazing	Rotational Grazing
Legumes		
Alfalfa	◊	●
Red clover	◊	●
White clover	○	●
Grasses		
Annual ryegrass	○	●
Bahiagrass	●	●
Bermudagrass	●	●
Native warm-season grass	◊	●
Tall fescue	○	●

◊ **Not Suitable** ○ **Suitable** ● **Highly Suitable**

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Legume Selection?

- Important in pasture:
  1. **Legumes are nitrogen fixers**
     a) When 35% of the pasture are legumes, adequate nitrogen is supplied by the legume to maintain productivity of the grasses.
     b) Economics: legumes vs. fertilizer
  2. **Legumes contains about 2X the protein levels of grasses**
     a) Increase the nutrient levels in the pasture
  3. **Legumes enhance the acceptability, digestibility, and palatability of the pasture.**

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Legume Selection?

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Legumes

- **Perennial Clovers**
  - White clover (best suited)
    - Ladino-type (high yielding, low persistence)
    - Dutch-type (resistance to close grazing, tolerance to low fertility, longer persistence)
- **Annual Clovers**
  - Crimson, berseem, ball, and arrowleaf clover.
  - **Do Not** use alsike clover
    - Cause sensitivity to light and possible liver damage

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Legume Selection?

- **Alfalfa**
  - Excellent quality
  - Very productive
  - Good summer growth
  - Good drought tolerance
  - Requires good drainage
  - Requires high pH
  - Varieties with improved grazing tolerance
  - Prone to insect damage
  - Bloat hazard

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Legume Selection?

- **Red Clover**
  - True clover included in pastures for horses where tall fescue is being seeded
  - More tolerant to poorer drained soils and lower pH.
  - Needs to be reseeded more often in MS because it usually a biennial forage due to environmental conditions.
  - Bloat potential

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Legume Selection?

- **White Clover**
  - Seed at 2 lb/ac with 15 lb/ac tall fescue
  - Shallow-rooted perennial
  - Makes little growth during hot, dry summer weather
  - Prostrate growth (close to the ground) that is well suited for pastures
  - Can tolerate cloze grazing
  - Bloat potential
  - Use the ladino type
    - Regalgraze, Durana, Patriot

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Weed Control

- Weeds can be control by clipping or herbicide applications
  - Clipping should be done when plants area flowering and before seed heads are develop
    - May require several clippings a year
  - Spray weeds when they are 2 to 4".
    - Spring is a good time.
    - Read the label
    - Grazing restrictions are important

Weed Control

- No Grazing Restrictions
  - Chaparral, Cimarron Plus, Metsulfuron, Outrider, Overdrive, Grazon Next (aminopyrolid)
  - Still be cautious and use judgment
- 7 Day Restriction
  - 2,4-D Amine or ester (1 to 4 pt/ac)
- Check the MSU Weed Control Guidelines for more information.

Pasture Management

- **Every 3 -5 years reseed your pastures**
  - Hoof action and heavily grazed areas are a major issue
  - Very expensive to do.
  - Rotation is a cheaper approach.
- Important to have a sacrifice field
  - Winter feeding
  - Wet conditions

Pasture Renovation – Grazing Management

- **Reasons**
  - Overgrazed, low productivity and more weeds than desirable plants
  - Owner wants to establish a more productive species
- Let plants to establish before start any heavy grazing.
  - Mayor issue with stand failure (especially with fescue)

When to Graze?

- **How much dry matter a horse consume?**
  - 1.5 to 3% of their body weight
  - At least 50% of dry matter should be forage
- **Rest periods are important**
  - They can change with species
  - Let growth to get 10-12” before start grazing.

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Optimal Rest Period for Forage Species

	Weather	
Forage Species	Cool	Hot
	---------- days ----------	
Cool-season grasses Annual ryegrass, tall fescue	10-14	35-50
Warm-season grasses Bahiagrass, bermudagrass, dallisgrass	35-40	14-21
Legumes Alfalfa, clovers	21-28	30-40

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Pasture Management - Trampling

- Ensure a good level of soil fertility
- Use strong sod-forming grasses and legumes that are tolerant to trampling for heavy traffic area
- Improve drainage where practical
- Use managed grazing with adequate rest periods
- Limit the extend of trampling damage by using only one area as much as possible for grazing during wet periods.

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Pasture Needs for a Horse?

- **How much land?**
  - Mare with a foal = 1.75 to 2.0 acres.
  - Yearlings and mature horse = 1.5 to 2 acres.
  - Weanlings = 0.5 to 1.0 acre.
- **Grazing Management**
  - How many grazing hours a day.
    - Mares 17 hrs a day.
    - Cattle 8 hrs a day.

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Pasture Management - Grazing

- The goal of grazing management should be to supply the maximum amount of nutrition possible from the forage present while maximizing yield and stand persistence.
- Rotational grazing allow overgrazed pastures to rest.

Rotational Grazing

- Dividing the total pasture area into smaller areas or paddocks.
  - Allows plants to rest and reestablish the plant root reserves.
  - Length of rest period depends on the species type (cool- vs. warm-season).
  - Pasture should not be grazed to less than a 3" stubble height.

Considerations When Planning Paddocks

- **Shape and layout**
  - Rectangular shapes better horse, square for cattle.
    - Provides more exercise area.
    - Minimum with 20 to 40 ft.
- **Gate size and placement**
  - Closes to the direction of travel.
  - Wide enough to get multiple horses through at once and to get equipment through.

Rotational vs. Continuous Grazing Effects on Yearling Horses

Grazing Method	Daily Gains (lb)	Days of Grazing
Continuous	0.52	25
Rotational	1.35	37

Lewis, 1995

Considerations When Planning Paddocks

- **Water availability**
  - Place water troughs in the fence line near the middle of the paddock.
  - Require 0.5 gal/cwt for maintenance.
  - High temperature or work may increase to 1.5 gal/cwt or more.
  - Type of feed affect water intake.
  - 1,000 lb mare needs 4 gal/day for lactation.

Considerations When Planning Paddocks

- **Fencing**
  - Safety
  - Security
  - Ease of maintenance
  - Ease of installation
  - Cost
  - Appearance

Stocking Rates

- The stocking rates in previous slide can be increased with elevated levels of management
  - Mowing, fertilizing, over-seeding, and rotating pastures can allow higher animal densities while maintaining proper vegetative cover.

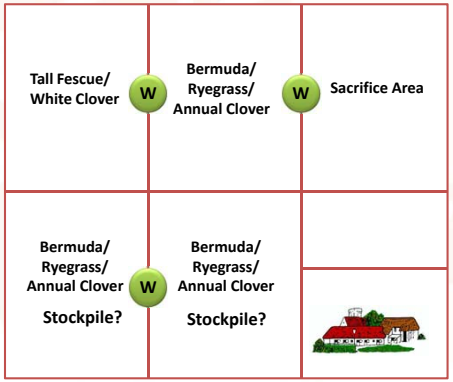
Stocking Rates

- One horse can be maintained on:
  - ½ acre pasture, if turn-out time is <3 hr/day.
  - 1 acre of pasture, if turn-out time is 3 to 8 hr/day.
  - 1.5 acre of pasture, if turnout time is 8 to 12 hr/day.
  - >2 acres of pasture with unlimited turnout time.

Stocking Rates

- Example: 6 acres of land, 3 mares late lactation (1000 lb), 7 days grazing period and 20 days rest
  - 4 Paddocks
  - DM intake in 30 lbs (3% BW)
  - Pasture production 1500 lb/ac
  - Grazing efficiency 50%
  - Acres per paddock = 0.9
  - Total acres per grazing paddock = 3.4
  - Stocking rate = 0.9 head/ac
  - Stocking density = 3.5 head/ac

Stocking Rate



Cost of Subdividing the Pastures

- **Initial Cost**
  - Six Acre Pasture
    - Total cost of converting this pasture to a three-paddock rotation is estimated to be $1,067.30.
    - If these costs are spread out over five years, the annual cost for this improvement is $213.46.
  - Cost associate fencing, water, and shade.

Grazing Frequency and Grazing Intensity Combinations Within Grazing Systems

		Frequency (Rotation Rate)				
		Very High (<15d)	High (15-25d)	Medium (~30d)	Low (>40d)	Very Low (4-6 wk)
Intensity	Very High (2" residual)					'Hay' Mgmt.
	High (3" residual)	Over-grazing/over-stocking			Fall & Winter	
	Medium (4" residual)			Summer		
	Low (5" residual)		Late-spring/ Early-summer	Under-stocking/under-grazing		
	Very Low (6" residual)	Spring				

Savings and Return on Investment

- Horse owners would recoup these costs by feeding less hay during the winter.
- Assuming the horses are fed 25 pounds of good-quality (mixed alfalfa/ grass) hay per head per day during the winter at a cost of $175/ton, the cost per day of feeding these three horses is $6.56.
- Based on the estimated annualized cost of $213.46 per year, this horse owner would need to get an additional 33 grazing days per year to recoup this investment.
- This amounts to an attainable goal of only one month of additional grazing per year

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Questions?

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