



MISSISSIPPI STATE
UNIVERSITY™

EXTENSION

Center for Forage Management
and Environmental Stewardship

***Sustainable Small
Ruminant Grazing
Systems***

Rocky Lemus
Professor and Extension Forage Specialist
Center for Forage Management & Environmental Stewardship
Mississippi State University Extension Service
September 20, 2024

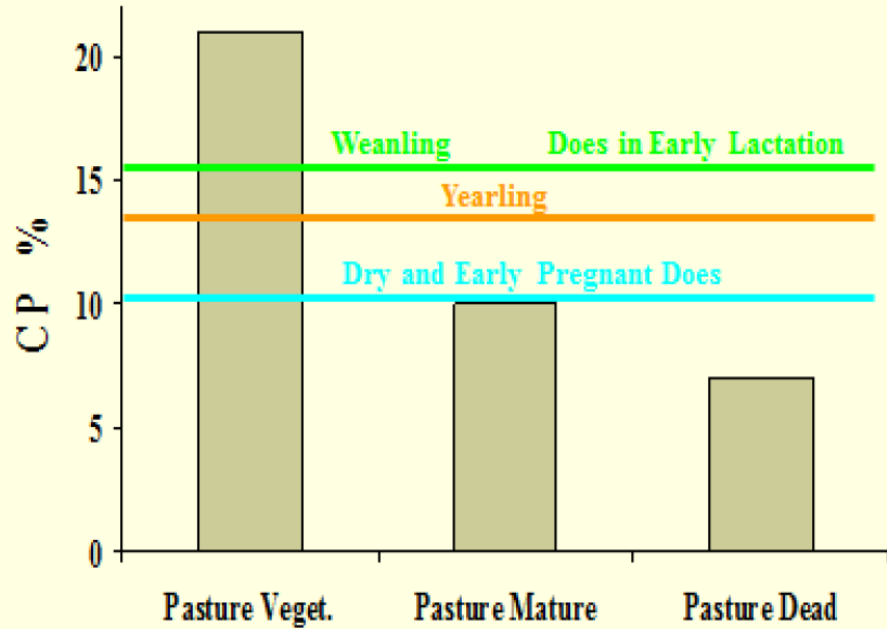
The Role of Forage Systems

- Ruminant livestock production systems are most efficient if:
 - There is maximal reliance on fresh plant material consumed by the animals
 - Minimal use of harvested forage or other supplemental feedstuffs.
- **Challenges and Considerations**
 - Seasonal growth patterns of forage and browse plant species.
 - Varying environmental conditions.
 - Changes in nutrient and energy requirements of animals in accordance with stage of production.
 - Changes in climate with variable conditions and shifting in temperature and rainfall averages.
- Possibilities to mitigate changes
 - The use of monocultures of annual or perennial cool- and warm-season grasses and legumes in different areas.
 - Mixtures of grasses, forbs, leguminous forages.
 - Trees and browse plants into silvopasture.
 - Strategic supplementation.
 - Use of inexpensive byproduct or alternative supplemental feedstuffs.
 - Modified birthing time, careful selection of species, breed within species, and individual animals within breed for specific production conditions, etc.



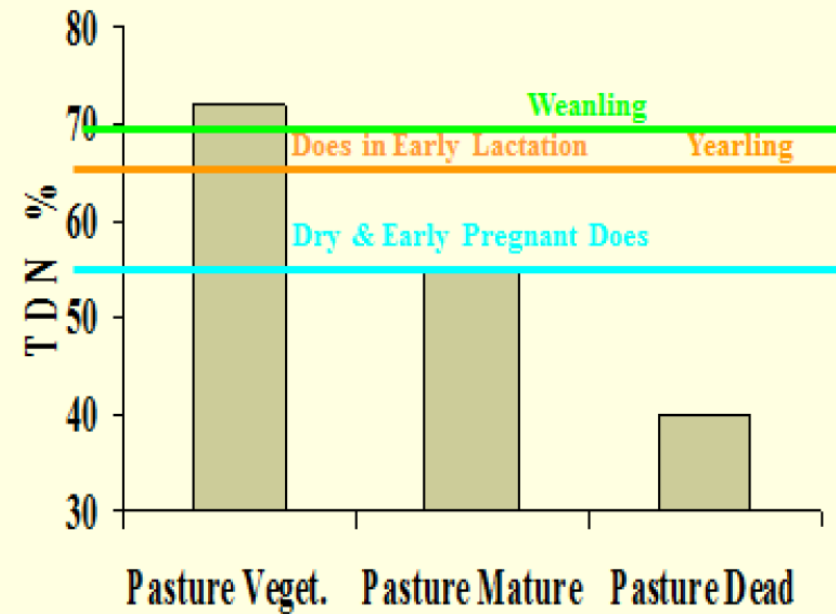
Forage Quality & Goat Requirements

PROTEIN



Forage Quality & Goat Requirements

TDN

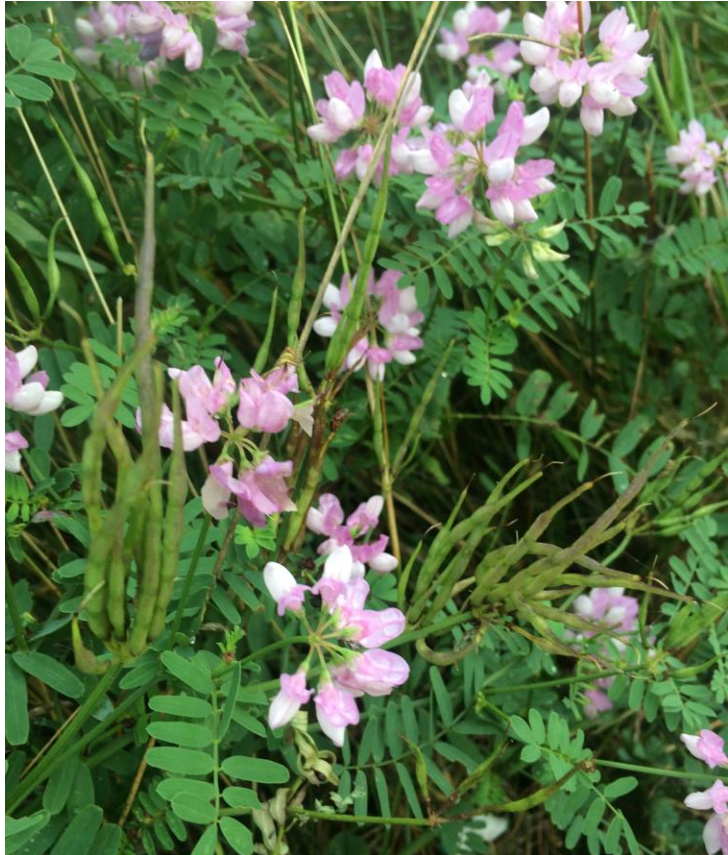


Percent contribution of different vegetation types to the diet of grazing ruminants

Vegetation type/ruminant	Spring	Summer	Autumn	Winter
<i>Woody species</i>				
Goats	5	76	45	38
Sheep	3	18	15	4
Cattle	2	10	5	3
<i>Shrubby species</i>				
Goats	7	11	27	28
Sheep	2	11	10	4
Cattle	2	4	4	3
<i>Grasses</i>				
Goats	88	13	28	34
Sheep	95	71	75	92
Cattle	96	86	91	94

Fedele, 2001

Forage Selection for Your Farm



- A pasture can be comprised of many kinds of plants.
- Which species to plant depends upon the purpose of the pasture and the soil type.
- The best pastures usually contain a mixture of grasses and legumes.
 - Selecting one or more grass and legume species is usually preferable to commercial pasture mixes which may contain plant species which are not adapted.

What is Forage?

- **Forage** is fibrous plant material.
 - Fresh (pasture), dried (hay), or fermented (haylage or silage).
- Forages provide both protein and energy at a lower cost, but they can vary in their nutritional quality.
 - Quality depends on the plant's maturity at the time of harvest, plant species, soil fertility, weather, available water, and storage method.

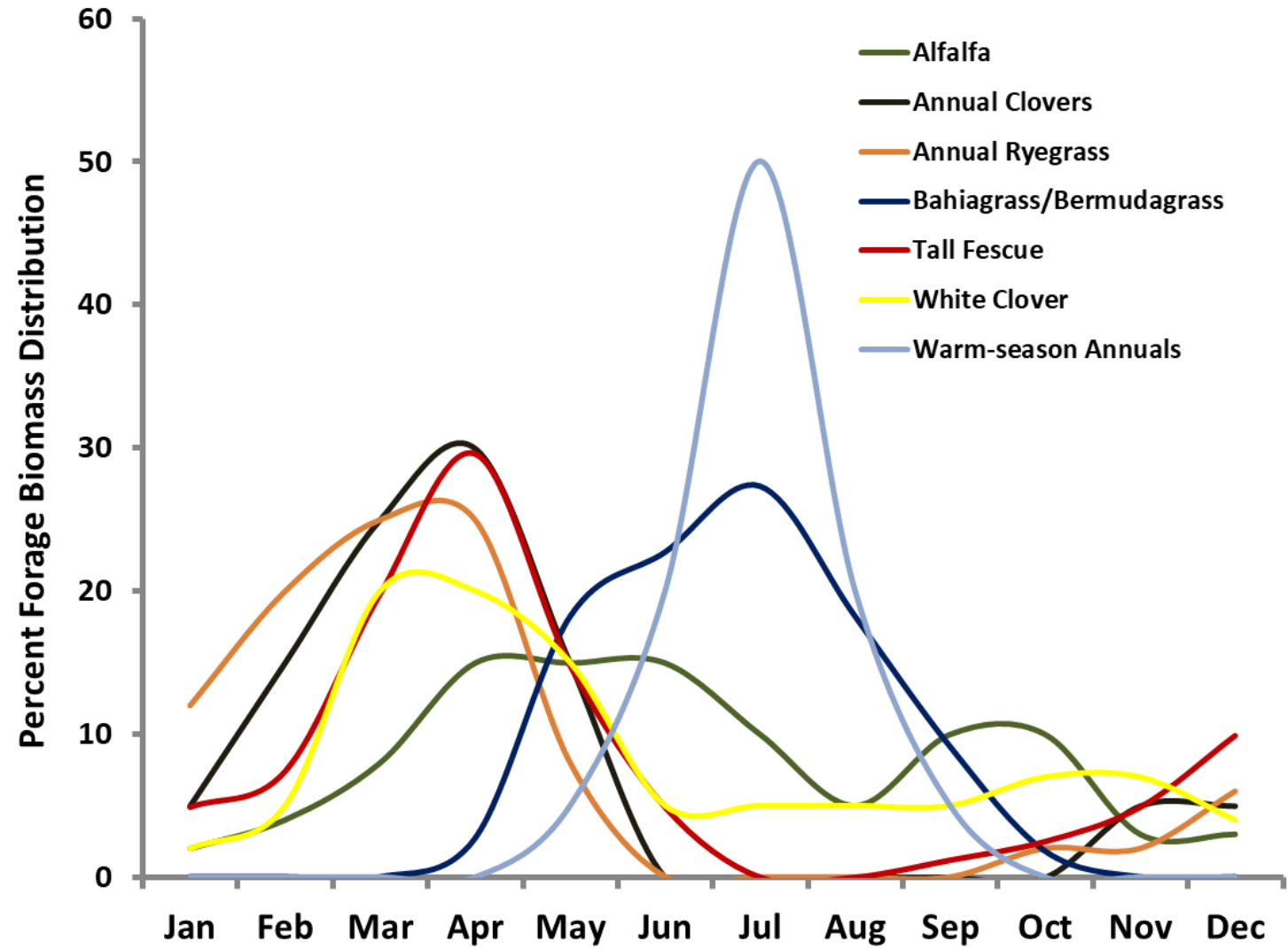




Types of Plants

- **Grass** – any one of several plant species that have leaves that are typically longer than they are wide, with parallel veins.
- **Forb** – broadleaf plants that are not grasses, sometimes divided to separate out *legumes*.
- **Legume** – plants that produce pod type fruits and are characterized by fixing atmospheric N.
- **Browse** – the leaves and growing tips of forbs and woody shrubs.

Forage Production from Base Forage





Ball



Balansa



Berseem



Winter Peas



Arrowleaf



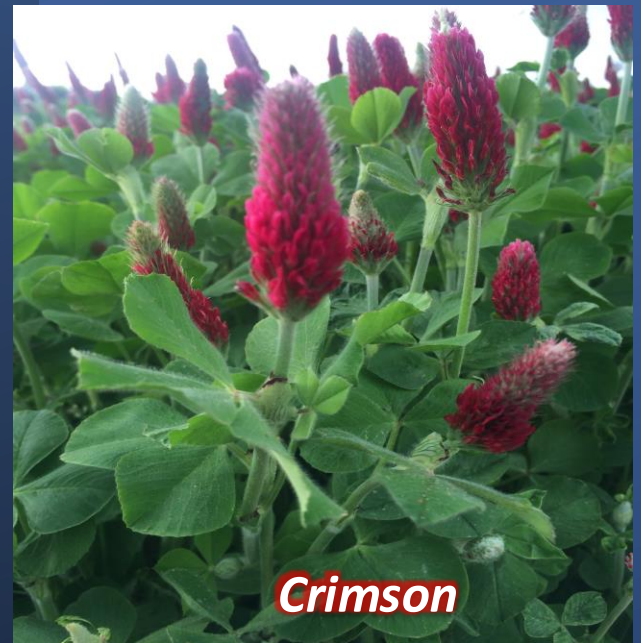
Hairy Vetch



Persian



Burclover



Crimson

Cool-season Annual Legumes



White clover



Red clover



Alfalfa

*Cool-season Perennial
Legumes*

*They can fix from 60 to 120
pounds of nitrogen per acre.*



Forage Soybeans



Cowpeas



Sun Hemp



***Sericea
Lespedeza***



***Annual
Lespedeza***



Alyce clover



***Partridge
Peas***



Dallisgrass



Bermudagrass



Bahiagrass



Crabgrass



Forage Sorghum



Pearl Millet



Sorghum-Sudan Hybrid



Ryegrass



Cereal rye



Triticale



Oat



Wheat

Cool-season Annual Grasses

- There are millions of acres planted annual ryegrass each year.
- Combination of small grains and annual ryegrass can extend the grazing season.

Forbs

Chicory



- Chicory contains tannins that have been shown to help in reduction of parasite loads.
- Leafy Brassicas include rape and kale which provide forage from leaves and stems.
- Root Brassicas include turnips, radish, and rutabagas which provide forage from leaves, stems, and roots.

Brassica



- Flowers of turnips have a high content of mustard oil which can be toxic to animals.
- Turnips may cause an off-flavor in milk.
- Immature rape can be high in nitrates.

Radish



Brush As A Base Forage

- Browse and grasses constitute 60-90 percent of the diet of goats.
 - As natural browsers, goats prefer to graze above the shoulder.
 - Being selective in nature, goats will choose brush, woody perennials and broad leaf plants.
 - Goat grazing restores biodiversity and the consumption of small brush will reduce fine fuel load, reducing fire hazard.
-



Managing for Brushy Species

- Because animals are grazing away from the ground, they pick up very few infective parasite larvae, and some browse plants have antiparasitic qualities.
- The protein content of browse is high, but availability of protein may be affected by tannins in the browse.
- Energy levels are moderate and will not support a high level of goat production, but usually adequate for does with twins.
- Calcium is adequate, phosphorus deficient and trace minerals unknown, so it is best to keep a high phosphorus mineral available.



Browse Species Consumed by Goats

Common name	Scientific name
Blackberry	<i>Rubus oklahomus</i>
Smooth Sumac	<i>Rhus glabra</i>
Winged sumac	<i>Rhus capallinum</i>
Poison ivy	<i>Toxicodendron radicans</i>
Oak spp.	<i>Quercus spp.</i>
Hawshorne	<i>Crataegus viridis</i>
Greenbriar	<i>Smilax bona-nox</i>
Elm	<i>Ulmus Americana</i>
Winged elm	<i>Ulmus alata</i>
Honey locust	<i>Gleditsia tricanthos</i>
Black locust	<i>Robinia pseudoacacia</i>
Multiflora rose	<i>Rosa multiflora</i>
Dogwood	<i>Cornus drumumdii</i>
Privet	<i>Ligustrum spp.</i>
Mulberry	<i>Morus spp.</i>
Sweet gum	<i>Liquidambar styraciflua</i>
Poplar	<i>Populus spp.</i>
Eastern red cedar	<i>Juniperus virginiana</i>
Russian olive	<i>Elaegnus augustifolia</i>
Honey suckle	<i>Lonicera japonica</i>
Pine	<i>Pinus spp.</i>

Pasture Management and Parasite Control

- Managing the pasture for the avoidance of parasites is more important than managing pastures for maximal production.
- Considerations
 - Strive to keep grazing height 5” or higher.
 - Graze a contaminated pasture with another livestock species.
 - The goat parasite larvae cannot survive in the gastrointestinal tract of another herbivore species such as cattle.
 - This does not apply to sheep, which share worms with goats.
 - Use control grazing practices to optimize pasture production.
 - This is a better practice than continuous grazing on the same pasture because goats will return to the same areas where their favorite plants are growing.
 - Those areas will then become heavily infected by gastrointestinal parasite larvae.

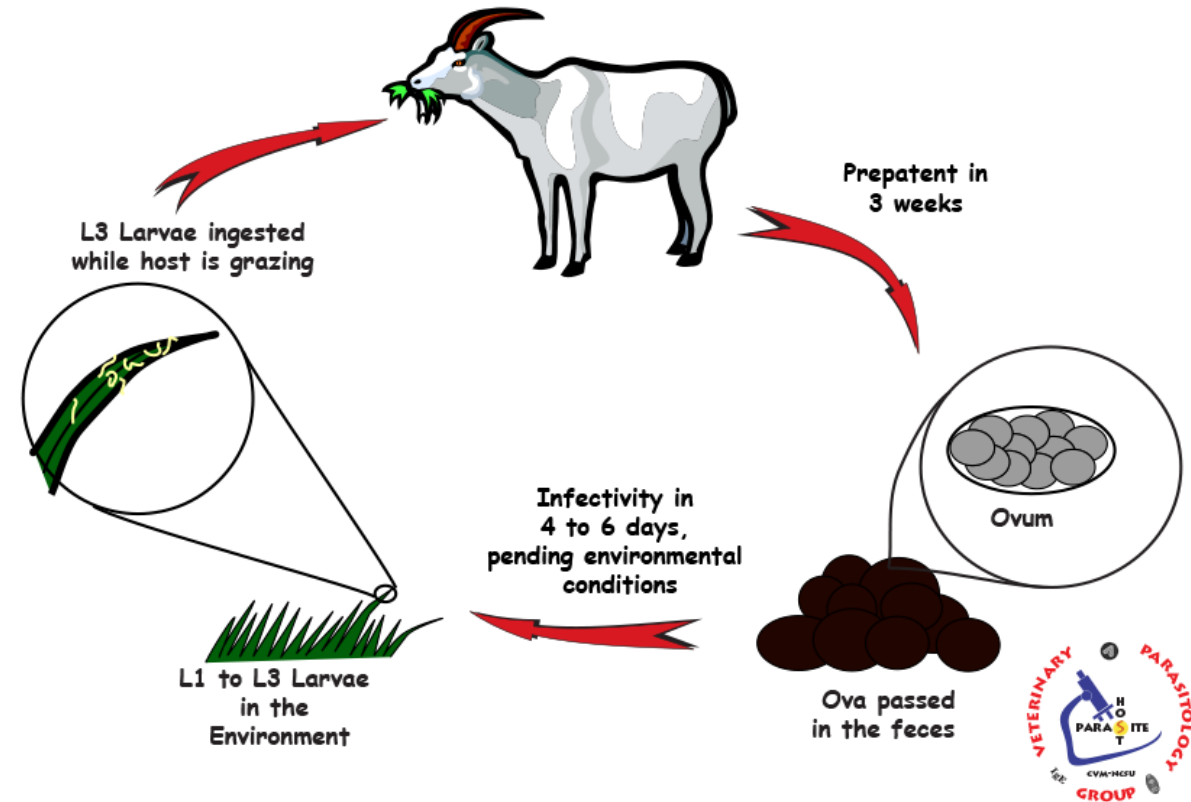


Parasite Load and Pastures

- One of the major components of an effective parasite control program is reducing the number of parasites to which goats are exposed.
 - One way to accomplish this is to manage pastures in a way that will reduce parasite load.
- Take a hay crop from the pasture area. This can be incorporated into a dose-and-move program in which goats are grazed on one pasture in the early grazing season and then moved to another goat pasture that was used for a first-cutting of hay
- Incorporate annual pastures into the grazing system .

NC STATE UNIVERSITY

Haemonchus contortus



Grazing Management for Small Ruminants

- Grazing management is how forage is utilized.
- The goal for grazing system management is to provide as much of the nutrients required by the animal from economical forage sources.
- This implies that nutrients from forages under some conditions may not be the cheapest, depending on the forage system.
- Well managed pastures can be one of the cheapest sources of nutrients.
- The time goats spend grazing depends on:
 - Number of hours on pasture
 - Forage availability
 - Pasture botanical and nutritional composition
 - Feed supplementation.



Continuous Grazing Management

- Continuous grazing is the simplest where animals are confined to one area during the grazing system and has the lowest harvest efficiency (percent of forage grown that is consumed).
- It has deleterious effects to forage in that species that are most preferred are most heavily defoliated, reducing their persistence.
- Forages closer to a water source, mineral source or barn are defoliated more extensively.
- Continuous grazing is the least preferred grazing system for goats since it promotes internal parasites which are a great problem in goats.
 - However, continuous grazing is the system of choice for controlling brush and weeds since the goal is to overgraze brush and weeds to reduce their persistence and thereby control them.

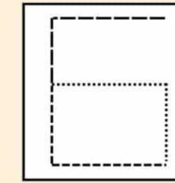


Rotational Grazing Management

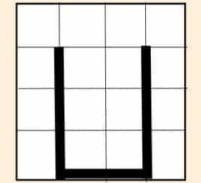
- Rotational grazing is a system where pasture is divided into multiple paddocks and each paddock is grazed for a period of time while the other paddocks are rested.
- Advantages:
 - Greater forage production (20%) in that plants are able to recover from defoliation.
 - Greater harvest efficiency due to less trampling.
 - More uniform grazing in that animals are “forced” to consume less desirable plants before they are moved to the next pasture.
 - Rotational grazing has the potential to increase harvest efficiency from the 40-50% observed with continuous grazing to 60-70% with rotation grazing due to reduced trampling losses.
- Disadvantages:
 - Extra cost of fencing and water points.
 - Increased labor and level of management required.
 - Often forage quality is slightly reduced, seldom a significant factor.
 - If the rest period is long enough, infective larvae numbers are reduced.

ROTATIONAL GRAZING Paddock DESIGN IDEAS

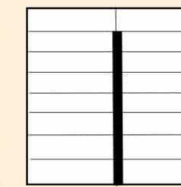
L METHOD



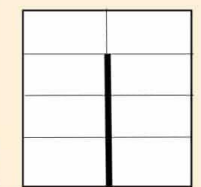
TWO ALLEYWAYS



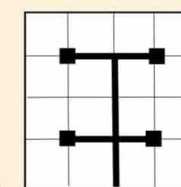
ONE ALLEYWAY



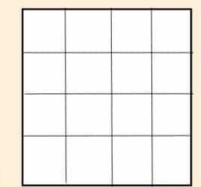
CLOCKWISE METHOD



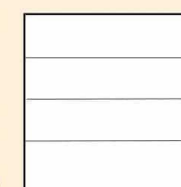
PIPELINE METHOD



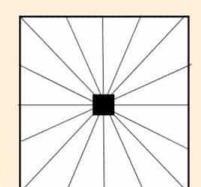
PORTABLE WATER METHOD



STRIP GRAZING



CELL / WAGON WHEEL





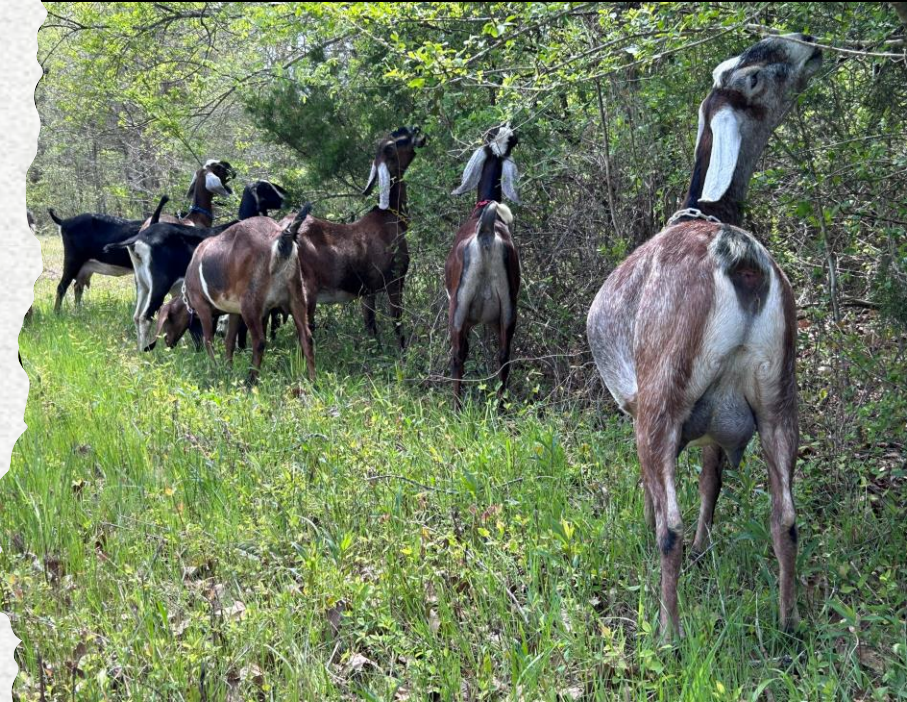
Prescribed Burning

Decreases residue for winter parasite survival.

Burning a pasture will **require having enough dead growth as fuel to support a fire.**

Summary

- Managing the forage system to provide as much of the nutrients required for animal production from pasture can greatly reduce production expenses, increasing enterprise profitability.
- A well-managed rotational grazing system can improve forage harvest efficiency, reduce consumption of internal parasite larvae and improve animal tameness.
- Good pasture management requires gathering information, planning and compromising to attain forage production objectives and the flexibility to cope with changes in the weather.



Final Message

- There is no "silver bullet" species for a grazing system.
 - No single species will be adapted to the entire farm, nor will it provide satisfactory production throughout the year.
- Choose forage species that are adapted to your climate, soil conditions, can resist grazing pressure and long-term persistence.
- Use controlled or rotational grazing practices that fit your needs to optimize pasture utilization and decrease issues with parasite loads.



Contact Information



Mississippi Forages



MSForages



Rocky_Lemus@msstate.edu



(662) 325-7718

