

Forage & Livestock: Managing the Animals in a System

Woodland Stewards Webinar
Series on Silvopasture

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WOODLAND STEWARDS

A Regional Extension Program for Landowners

Establishing a silvopasture: Forage

A good silvopasture site grows trees, **forage**, and livestock

1. Light
 1. All forages need sun – do you have enough?
 1. 25-45% tree canopy for warm season grasses
 2. 40-60% tree canopy for cool season grasses
2. Soil
 1. Suitable for some level of agricultural production (slope, rocks)
 2. Fertility and pH
 1. Grasses prefer pH about 5.5-6.5
 2. Legumes are more sensitive 6.2-6.8
 3. Water drainage
 1. Some species are more sensitive to saturated or dry soils
3. Space for machinery
 1. How will your forage be managed?
 1. Plant, brushhog, fertilize, disc, hay, or just graze

Establishing a silvopasture: Forage

I have a good site – now what?

Farm or production goals and needs

Potential of the site

Level of investment

Silvopastures are extremely diverse and can be customized to fit your system, your goals, your vision, etc.

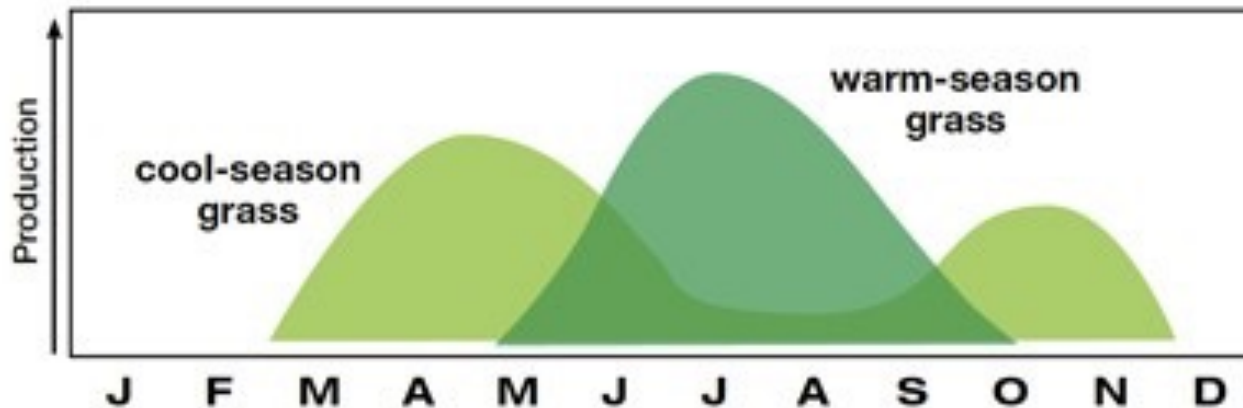
Choosing a forage: forage mass distribution

- Warm-season or cool-season

Midwest, Northeast – cool season forages

Mid-south “transition zone” – both cool and warm season forages

Lower south – subtropical – warm season, winter annuals



Choosing a forage: grasses versus legumes

Grasses

Pros

More persistent than legumes

Easier to manage (weed control)

Seed is less expensive

Cons

Requires N fertilization to meet the same crude protein amounts as legumes

Greater quality loss at maturity

Legumes

Pros

High quality, greater crude protein, greater digestibility

More legumes = better animal performance

Cons

Less persistent than grasses

When proportions are over 65%, bloat can be an issue, should be mixed with a grass

More sensitive to low pH

Choosing a forage: annuals and perennials

- Annual or perennial (any location)
 - Main Pro and Con for Annuals: can provide a lot of forage in a short time, but replanting every year is a greater costs
- Cool-season perennials
 - Orchardgrass, tall fescue, meadow fescue, alfalfa, white clover, red clover
 - Planted in Sept/Oct
- Warm-season perennials
 - Bermudagrass, native warm season grasses (big bluestem, little bluestem, Indiangrass), bahiagrass
 - Several options for planting, but generally spring
- Cool-season annuals
 - Cereal rye, annual ryegrass, crimson clover, Italian ryegrass, mammoth red clover
 - Planted in Sept/Oct
- Warm-season annuals
 - sudangrass, sorghum, pearl millet, cowpea
 - Planted in May/June – when soils are consistently 65 degrees

Choosing a forage: meeting animal requirements

- Livestock with higher nutrient requirements need higher quality forage
 - Cool season grasses > warm season grasses
 - Legumes > grasses
 - Annuals versus perennials, it depends, but mostly similar
- Relief from heat stress
 - Forage available in silvopasture during environmental extremes

Choosing a forage: Scenarios

- Cow-calf producer in the upper Midwest; April/May calving season, cattle in the silvopasture in summer (June, July, and August), soil pH is 6.5, good fertility, canopy is 30%

North					
Livestock Requirements		Site Requirements			Possible Forage Types and Species
Forage Quality	Time of grazing	Max Canopy	Soil pH	Fertility	Forage Type
**	May-Oct	40-60%	5.5-7.0	Medium	C3 Perennial Grass
***	May-Oct	40-60%	6.0-7.0	Medium	Perennial Legume

- Orchardgrass, meadow fescue, tall fescue (endophyte free), +/- white clover, red clover

Choosing a forage: Scenarios

- Cow-calf producer in Oklahoma; cattle cannot be in the pecan silvopasture 90 days prior to harvest (June-Sept), soil pH is 6.5, fertility is high, canopy is 40%

Mid-south					
Livestock Requirements		Site Requirements			Possible Forage Types
Forage Quality	Time of grazing	Max Canopy	Soil pH	Fertility	Forage Type
**	Oct-June	40-60%	5.5-7.0	High	C3 Annual Grass
***	Oct-June	40-60%	6.0-7.0	Medium	Annual Legume (cool season)
**	March-June; Sept-Nov	40-60%	5.5-7.0	Medium	C3 Perennial Grass*
***	March-June; Sept-Nov	40-60%	6.0-7.0	Medium	Perennial Legume

- Cool season annual or perennial grass +/- legume

Choosing a forage: Scenarios

- Cow-calf producer in the lower south; Jan/Feb calving season, cattle in the silvopasture in summer and early fall (July, August, September), soil pH is 5.2, fertility is low, canopy is 25%

South					
Livestock Requirements		Site Requirements			Possible Forage Types
Forage Quality	Time of grazing	Max Canopy	Soil pH	Fertility	Forage Type
*	May-Sept	25-45%	5.5-7.0	Low	C4 Perennial Grass
**	June-Sept	25-45%	5.5-7.0	High	C4 Annual Grass
***	June-Sept	25-45%	6.0-7.0	Medium	Annual Legume (warm season)

- Warm-season perennial, bermudagrass, bahiagrass

Planting Prep

I have chosen a forage, now what?

Time of planting and time to grazing:

Cool season perennials: usually a fall planting, light grazing can occur in the first growing season

Cool season annuals: Sept-Oct planting, grazing can occur 4-6 weeks after grazing in the south, usually not until spring in the north

Warm season perennials: usually a spring planting, light grazing in the first growing season

Warm season annuals: May-June planting, grazing can occur 4-6 weeks after grazing

Planting Prep

- Remove existing vegetation to help create conditions that promote good seed to soil contact
 - Fire, brushhog, mulching, tillage, and herbicide
 - Start 2-3 months prior to planting
- Fertility
 - Lime should be applied as soon as possible; P and K can be addressed prior to planting or shortly after planting

Planting Prep

No-till versus till

Tillage: Greater success with a seed bed – better seed to soil contact, plant with a drill or broadcast

Consider time and costs of tillage and if the equipment is available

May be more worth the investment for perennials

No-Till: Can produce great stands, requires more prep, especially for perennials, may require multiple applications of herbicide prior to planting

Need to have access to a no-till drill

A good fit for annuals, winter annuals are vigorous and commonly produced similar yields between w/o tillage















Planting in woodlands

What about minimal tillage (disturbance) and a broadcasting?



Planting in woodlands

Minimal success with this method



Establishing a silvopasture: Forage

Summary

- Silvopastures are diverse, create what works for you
- Big picture: farm goals, site potential, and level of investment
- Forages that fit requirements: distribution, quality, maintenance requirements, and equipment access
- If you want a successful, long-lived stand – put in the investment
- If you are not confident with specific species or variety, just try a few acres

Livestock and Grazing Considerations

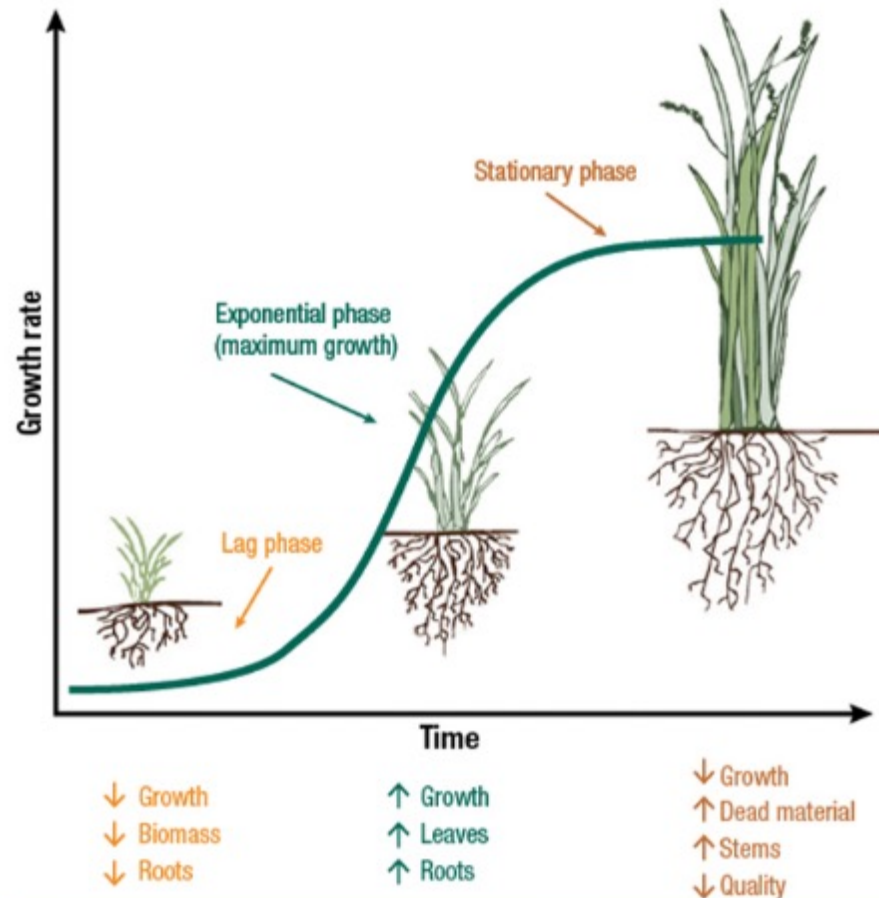


*Stock/Wisconsin News
Connection*

Forage Growth and Physiology

- Due to changes in plant structure, the nutritional attributes change with maturity.
- Must understand the growth curve of your respective forages to capitalize on optimum nutritional quality

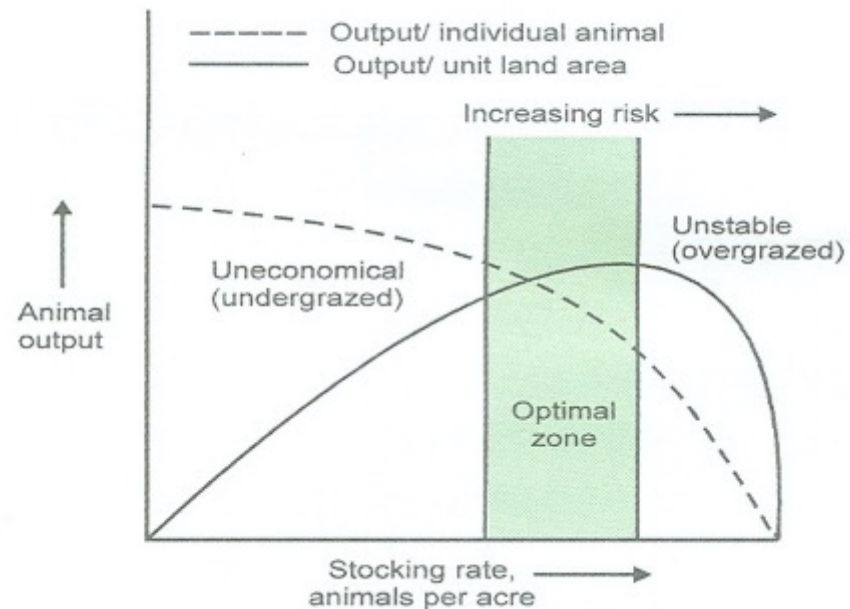
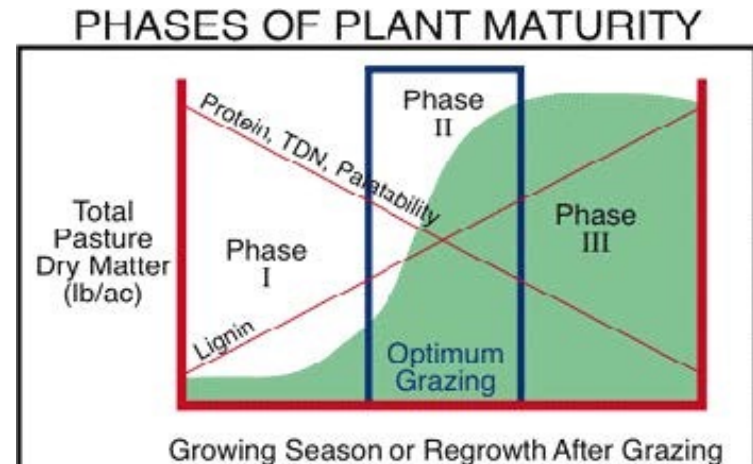
FIGURE 1 Plant growth curve



Growth rate of plants over time (or biomass-equivalent) showing three phases of pasture production and the relative effects on components.

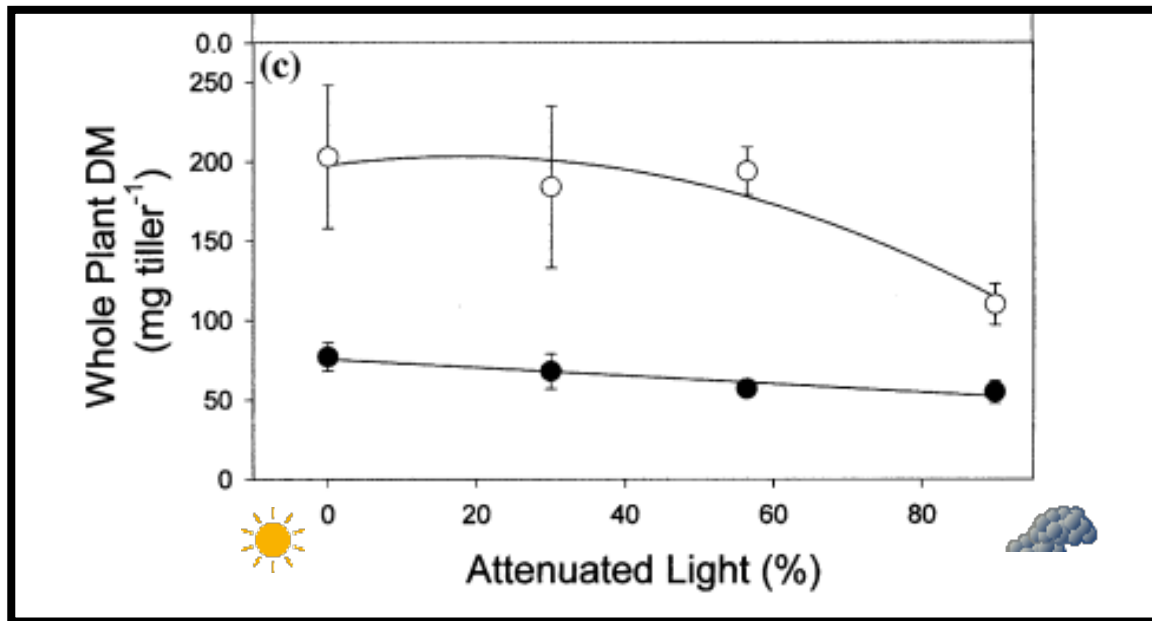
Grazing management

- Pasture management is based on extending the utility of the growth phase for optimal growth
- Growth phases are not static
 - Species
 - Climate
 - Moisture
 - Disturbance
 - Competition



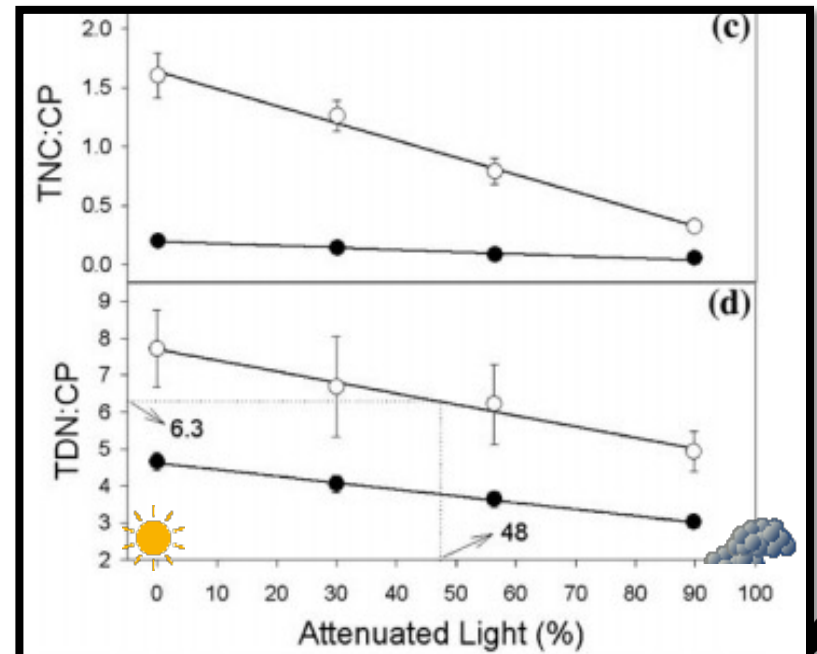
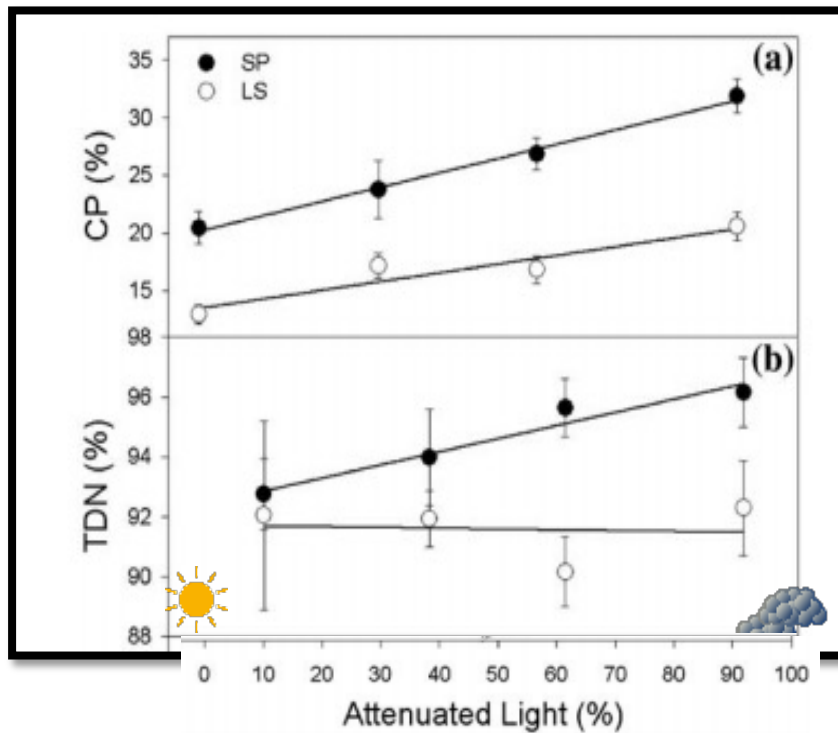
Shade/production relationship

- Belesky et al., 2006
 - Open, shaded, and transition woodlot zones on orchardgrass (“Benchmark”) in WV



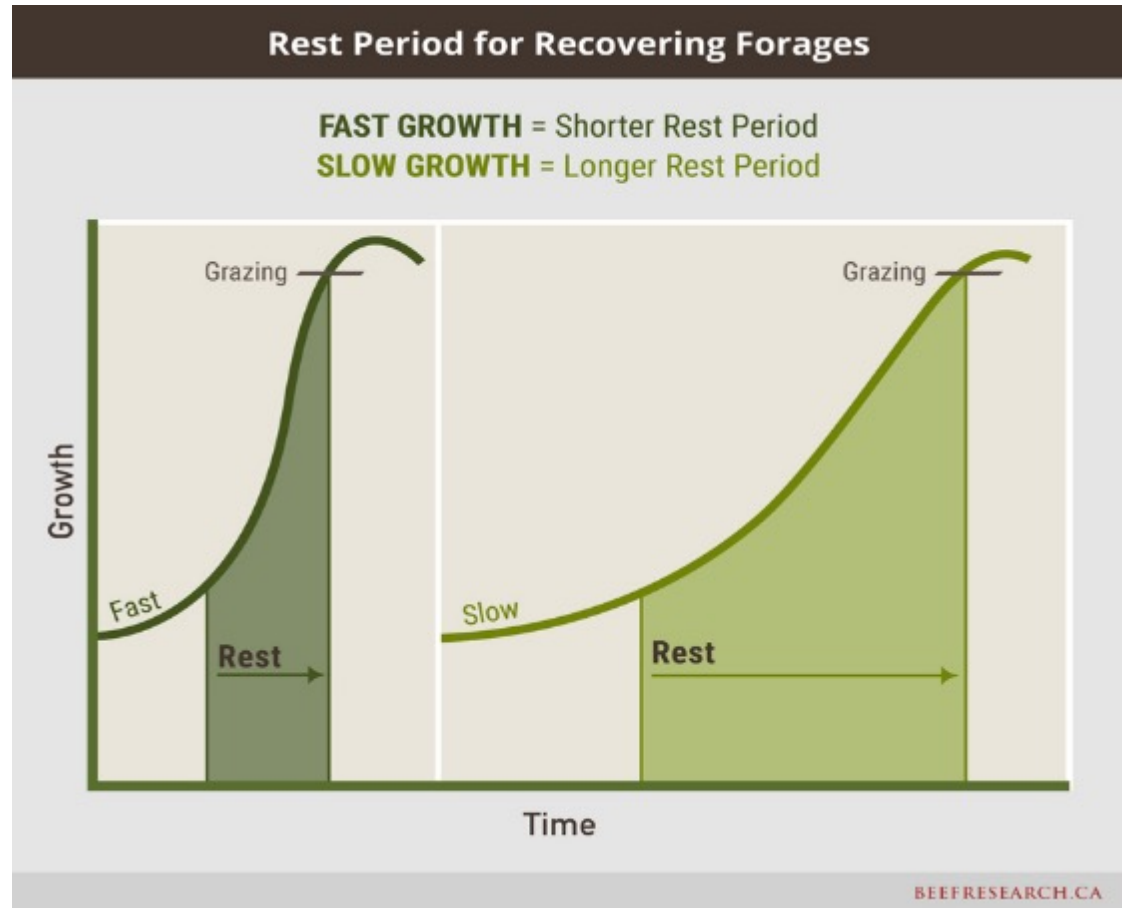
- Open circle: Late summer
- Closed circle: Spring establishment
- *Grazing regimen could affect stand persistence and performance*

Shade/production relationship



Grazing effect

- Adding grazing disturbance extends the growth curve
- Can reduce the maximum forage output




Grazing management

- Continuous grazing: Leaving animals in one pasture for the entire grazing season.
 - Low management inputs, prone to under- and overgrazing
- Rotational grazing: Subdividing the pasture into smaller paddocks and moving animals through to facilitate utilization and pasture rest
 - More labor intensive, can still be at risk of overgrazing
 - Breaks pest and disease cycles
- Managed Intensive Grazing (MIG), Holistic Grazing, Mob Grazing: Rotational grazing, but make it ~*INTENSE*~
 - Highly labor intensive, dubious ROI, no set definition of practice

- ▶ Designing a rotational system will be influenced by topography and available acreage
- ▶ Limited by infrastructure costs and labor limitations
- ▶ *Should optimize* the growth curves of the pasture

GRAZING SYSTEMS

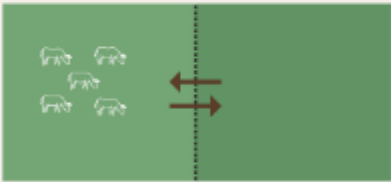
Continuous Grazing



1 Acre

A one-pasture system in which livestock have unlimited access to the pasture area, no rotation.

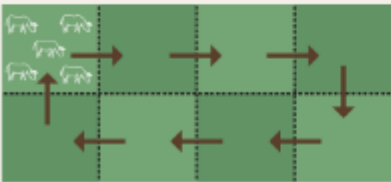
Slow Rotational Grazing



1 Acre

The pasture is divided into two or more paddocks. Livestock is rotated intermittently between the two paddocks to allow for some recovery in the pasture.

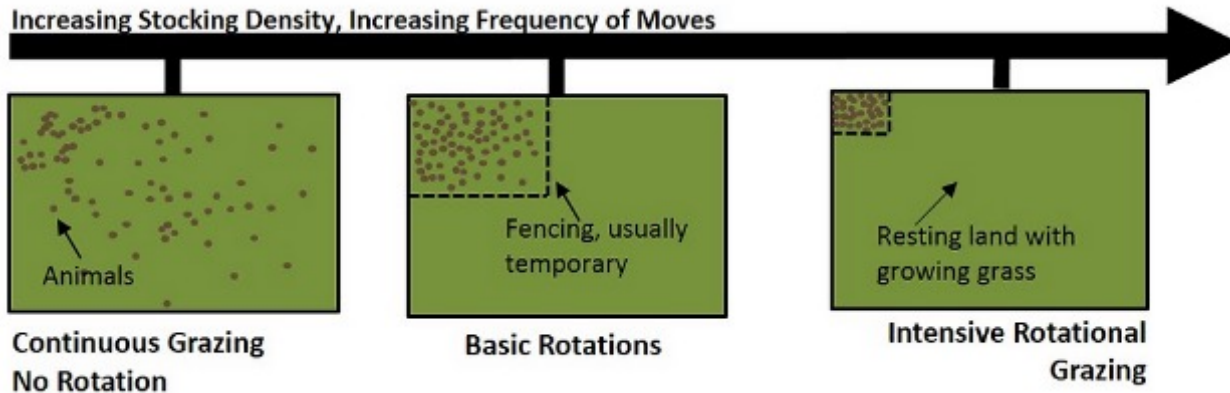
Intensive Rotational Grazing



1 Acre

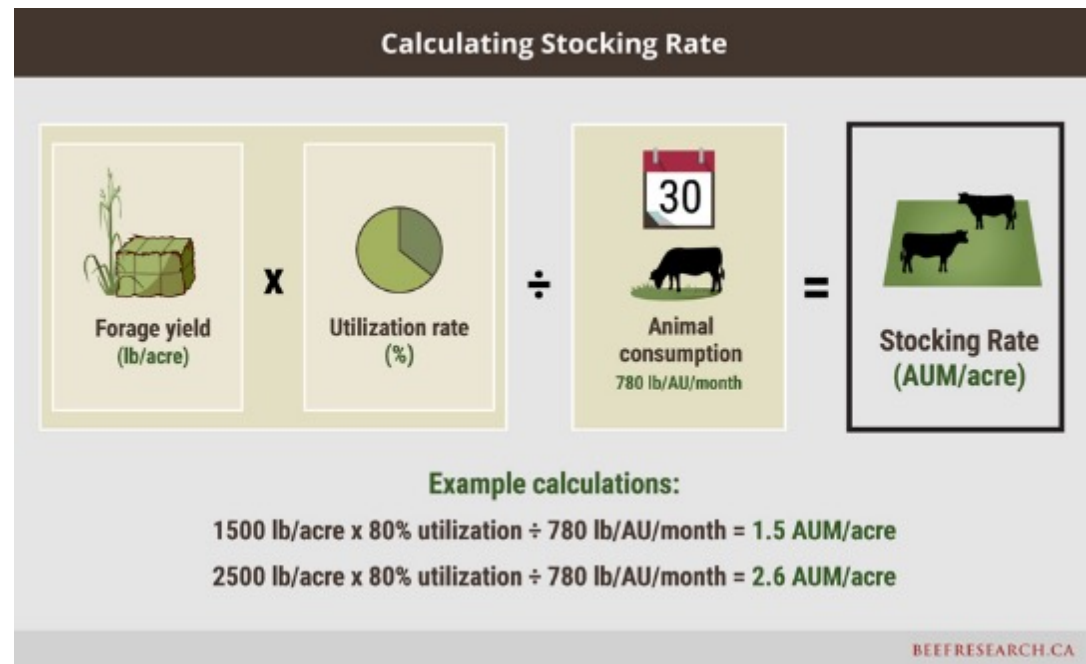
A more structured and intentional grazing system in which the pasture is divided into many paddocks and stocking density is matched accordingly.

Strip Grazing, Mob Grazing, Creep Grazing, LeaderFollower Grazing, Multi-Species Grazing, and more combinations are all intensive grazing systems.

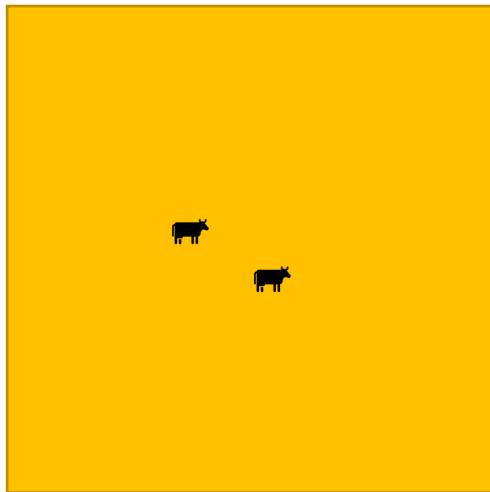


Stocking rate and stocking density

- AUM is a rate (measurement over time)
- The same stocking rate can mean different numbers of animals on the same area of land at different times
- I.e.: 1.5 AUMs might mean...
 - 177 AUs for 2 days
 - ~OR~
 - 3 AUs for 9 days

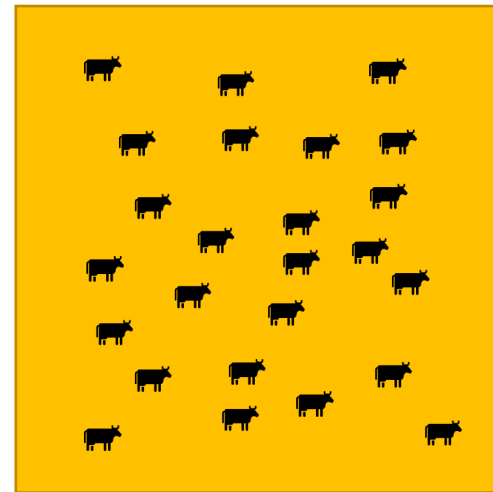


Stocking rate and stocking density



Stocking Rate: 2.6 AUM/ac

Stocking Density: 2 hd/ac for 30 days



Stocking Rate: 2.6 AUM/ac

Stocking Density: 25 hd/ac for 2.4 days

- What is happening to the forage growth curve when grazing density is varied?

Just give me some numbers!!



Grazing management is about keeping up with a constantly changing environment

Silvopasture Guidelines

- Shaded forages tend to have a slower growth curve
 - Regrowth will also be slower
- Quality peak for best grazing may differ than open pasture forages
- Timing and duration matter for forage regrowth
 - Forage growth helps protect root zones → preventing tree damage
- Best place to start: Half the grazing pressure and twice the rest period compared to your typical open pasture grazing.

Grazing Considerations

- We want the shade!
- Silvopasture success requires managing animals to get benefits while mitigating damage
 - Compaction, root damage, nutrient deposition, cribbing, etc.
- Hungry critters are destructive critters!



StephenBolwell.com

Sadly great old beech trees are now more frequently barked – in this case by ponies. This behaviour has become worryingly more prevalent in recent years as ponies run low on other food.

Forage or fodder?

- Woody perennial fodder species have distinct structures with variable nutrition
- What are the animals eating?





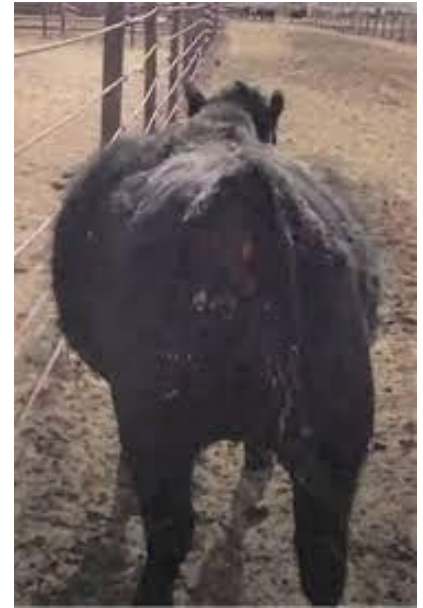
Fodder silvopasture

- Pollarding and coppicing pasture trees for fodder and shade
 - Mulberry
 - Willow
- Fodder and mast trees
 - Oaks
 - Hazelnut
 - Pecan
 - Fruits
 - Honey locust
 - Mesquite



Animal risks

- Bloat (lush, wet legumes)
- Tannins (woody species)
 - Juglone toxicity (Black Walnut)
 - Gallotannin toxicity (Young Quercus. Sp)
- Nitrate toxicity (stressed forages)
- Prussic Acid toxicity (stressed forages and trees)
- Fescue Toxicosis (endophyte infected)
- Isocuprussic Acid (Pine Needle Abortion)
 - Ponderosa Pines 
 - Loblolly, Lodgepole, Red, and White pine 



Questions?



The Woodland Stewards Webinar Series Program was created by a team of Extension professionals from the following programs:

