Managing A Pasture Based System in Today's Changing Climate

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How Will Climate Change Manifest Itself in Our Pasture/Grazing Systems?

- Warming?
- Rainfall/Snowfall Patterns?
- More Extremes?
- Biotic Stress (Disease & Pests)?
- All of the Above!

- Will the Impacts All Be Negative?
  - Warmer winters?
  - More CO2?
- Farmer, Forage, and Livestock Need to Recognize and Adapt (Plan) To Change!

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Promoting Soil Health on Protected Agricultural Lands

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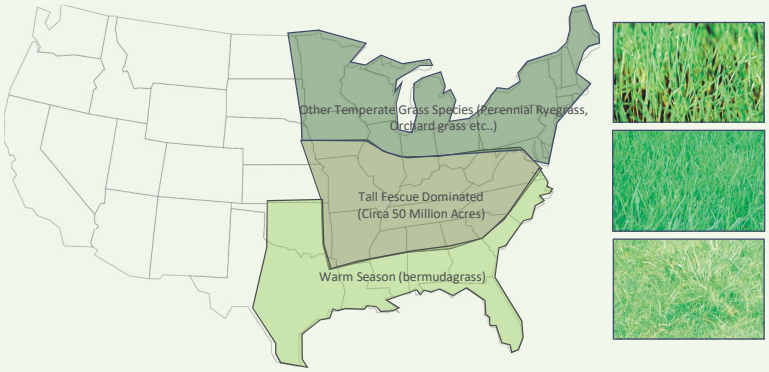
GRASS MONOCULTURES THAT DOMINATE PERMANENT PASTURES



- Cooler Northern climates favor temperate perennial grasses such as perennial ryegrass and orchardgrass.
- Tall Fescue, also temperate cool season grass, dominates much of the Mid Atlantic, lower Midwest, and upper Southeast.
- Much of this Tall Fescue is infected with a fungal "endophyte" that can be toxic to livestock.
- Most of the "Deep South" where the climate is much hotter, pastures are dominated by "Warm season" tropical perennials such as bermudagrass and bahaiagrass.

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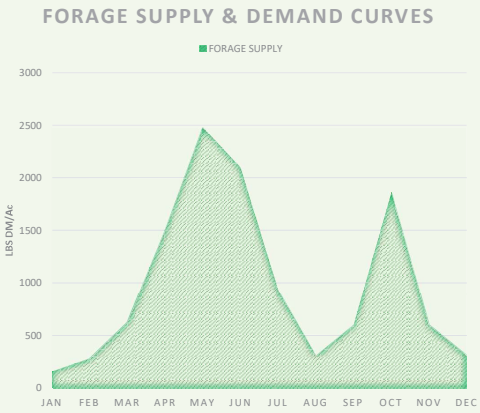
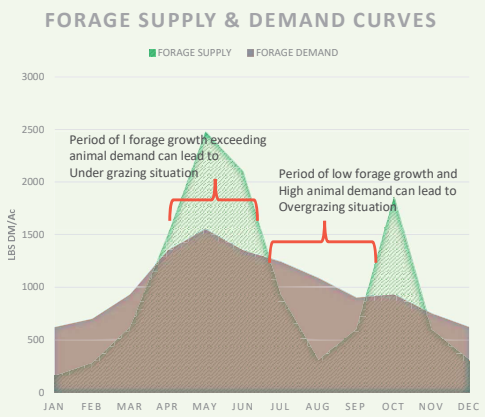
SEASONALITY OF GROWTH

- A “Utilization” vs a “Growth” Problem.
- All forages have “peaks” and “troughs” of growth.
- With most “cool-season” grasses, growth rates a higher in the Spring and Autumn, with often very low growth rates or even dormancy in the Summer and Winter.
- How will climate change the shape of these growth curves?
- What is Measured is Managed



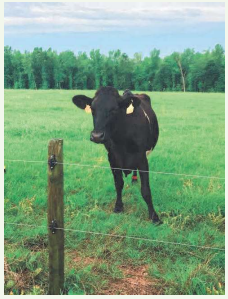
SEASONALITY OF GROWTH AND ANIMAL DEMAND



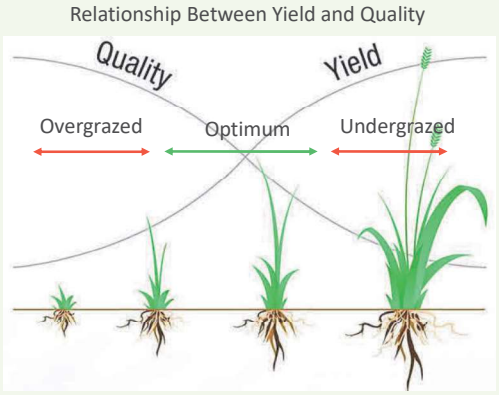
- The animal’s nutritional demand is often seasonal too, but when overlayed with seasonality of forage supply there are always periods of surplus and deficit to be managed.
- In continuously grazed situations (most common) this mismatch in supply and demand leads to periods of overgrazing and undergrazing

GRAZING MANAGEMENT

- Grazing management is predominantly a crop management tool.
- The main aim is to control the time (length) and frequency of grazing (harvest) to optimize the yield and quality of the forage plant.

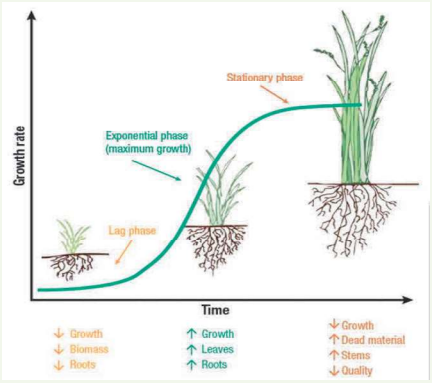


IMPORTANCE OF HARVEST MANAGEMENT IN FORAGES



- Like any crop, there is an optimum time to harvest forages that solves for yield and nutritional quality.
- In a continuously grazed situation, it is impossible to maintain the forage crop in this optimum state
- "Grass Grows Grass"

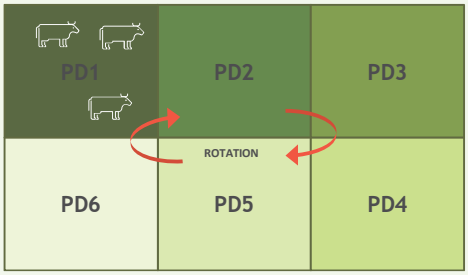
IMPORTANCE OF HARVEST MANAGEMENT IN FORAGES



- Grazing/Harvesting forages outside the "Optimum" growth stage also negatively impacts the processes that drive better soil health.
- Overgrazing causes lower growth rates/biomass production above and below ground (roots).
- Undergrazing also eventually lowers plant growth rates as leaf to stem ratio increase (less "solar panels")

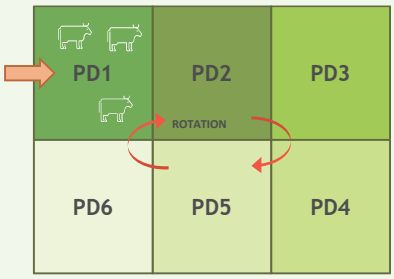
ROTATIONAL GRAZING

- Dividing pastures up into two or more "paddocks" to control the time and frequency of grazing.
- Speedup rotation during periods of high growth and slow down during periods of low growth giving time for forage to recover.



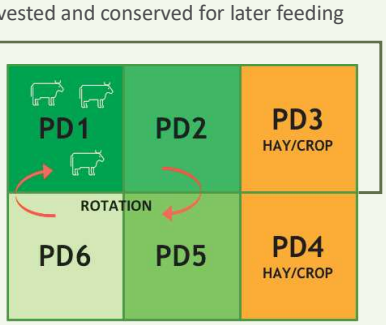
ROTATIONAL GRAZING ALLOWS CONTROL OVER OF FORAGE DEFICITS TO PREVENT OVERGRAZING.

- During periods of low growth rate the rotation can be slowed down to allow areas more time to recover.
- To prevent overgrazing where the animals are and ensure adequate nutrition, supplementary feeding can be conducted (eg hay)



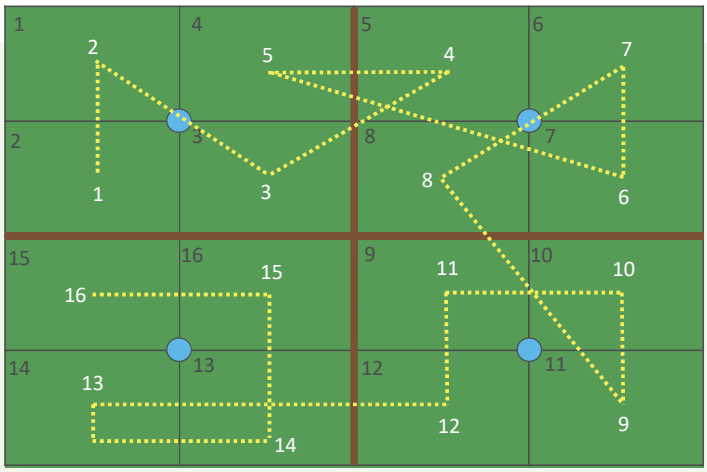
ROTATIONAL GRAZING ALLOWS CONTROL OVER OF FORAGE SURPLUS TO PREVENT UNDERGRAZING.

- During periods of high growth rate the rotation can be sped up to increase grass consumption rate and maintain quality.
- To manage surplus forage, areas can be removed from the grazing rotation and conserved as hay or silage to be fed back during deficits.



Management Strategies for Grazing Grassland

Rotation Based on Pasture Readiness

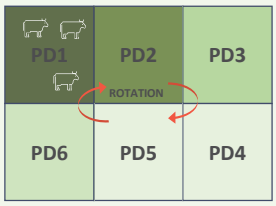


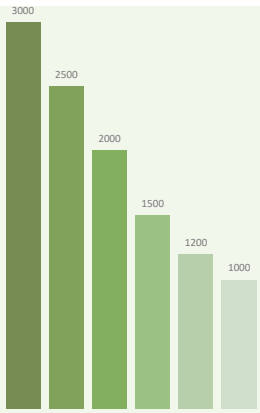
Justin Morris, USDA-NRCS

Slide Credit Stan Boltz
USDA-NRCS

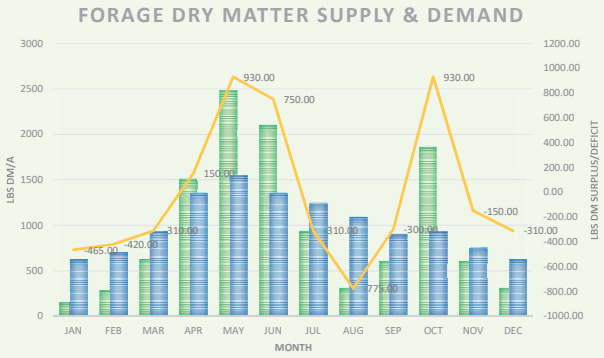
Managing The Rotation

- Measuring pasture mass (DM) and calculating "average cover" to make a "wedge"
- Set pre and post grazing DM targets (cover) = intake.
- Allocate area to achieve these targets (subdivision).
- Using Average DM cover to set the rotation length (how often you move animals).
- Review and alter plan





Matching Supply and Demand



Environment impacts voluntary food intake (DMI), regardless of quality.

Measuring Dry Matter

- The one thing you don't need a lab for, and one of the most fundamental "nutrient".
- Direct assessment (quad cuts, dry and weight).
  - Requires equipment and is time consuming so general not practical.
- Indirect assessments (rising/falling plate meters, forage sticks etc..)
- "Eye" – requires training and regular "calibration, but can be one of the most effective tools as we are more likely to use.

Dry Matter Measurement.

- Calibration!
- Be consistent.
- Be representative.

Dry Matter Guidelines

A.52. Approximate Pounds of Forage Available per Inch.

Species	Dry matter pounds/inch/acre Average[1]	Range[2]
Alfalfa or alfalfa-grass mixture	225	75 - 400
Arrowleaf clover	200	100 - 300
Bermudagrass	260	150 - 500
Caucasian bluestem	180	75 - 350
Crimson clover	200	100 - 300
Kentucky bluegrass	160	100 - 175
Native warm season bunchgrasses	100	50 - 250
Orchardgrass	180	75 - 300
Orchardgrass-clover	200	100 - 325
Red clover	220	100 - 300
Annual ryegrass	250	75 - 400
Oats, rye, wheat	150	75 - 250
Tall fescue	210	100 - 350
Tall fescue-white clover	190	80 - 325

[1]**The values should only be used as guides.** They represent average values taken from many sources. These estimates assume reasonably thick, well fertilized, actively growing stands.
[2]Range covers thin, non-fertilized, often unmanaged stands up to fertilized, thick stands with rapid growth and high yields.

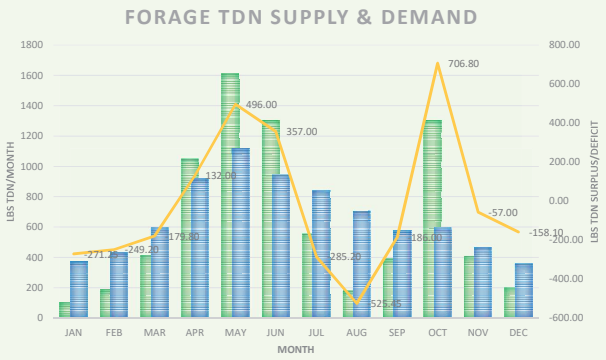
Source: Southern Forages, Ball, Hoveland & Lacefield

A.53. Guidelines for Rotational Stocking of Selected Forage Crops[1].

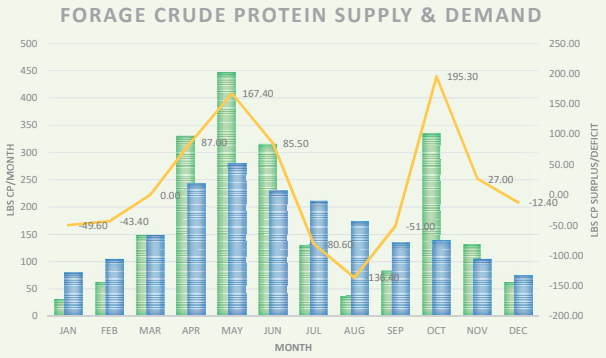
Crop	Target height, in. Begin grazing	End grazing[2]	Usual days rest
Alfalfa (hay types)	10-16	3-4	35-40
Alfalfa (grazing types)	10-16	2-3	15-30
Bahiagrass	6-10	1-2	10-20
Bermudagrass	4-8	1-2	7-15
Bluestem, big	15-20	10-12	30-45
Bluestem, caucasian	10-20	4-6	14-21
Bromegrass, smooth	8-12	3-4	20-30
Clover, white and subterranean[3]	6-8	1-3	7-15
Clovers, all others[3]	8-10	3-5	10-20
Dallisgrass	6-8	3-4	7-15
Eastern gamagrass	18-22	10-12	30-45
Fescue, tall	4-8	2-3	15-30
Indiangrass	12-16	6-10	30-40
Johnsongrass	16-20	8-12	30-40
Kentucky bluegrass	8-10	1-3	7-15
Lespedeza, sericea	8-15	4-6	20-30
Orchardgrass	8-12	3-6	15-30
Pearl millet	20-24	8-12	10-20
Ryegrass, annual	6-12	3-4	7-15
Small grains	8-12	3-4	7-15
Sorghum, forage	20-24	8-12	10-20
Sorghum/sudan hybrids	20-24	8-12	10-20
Switchgrass	18-22	8-12	30-45

[1]These are merely guidelines. Stocking rates and growing conditions greatly affect forage growth. Also, the more closely pastures are grazed, the longer the rest period generally needs to be for species that are sensitive to defoliation.
[2]The nutritional requirements of the livestock being grazed should be considered when deciding when to end grazing. The closer a pasture is grazed, the lower forage quality

TDN Supply and Demand

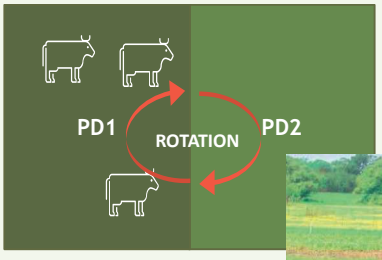


Crude Protein Supply and Demand



ROTATIONAL GRAZING CAN BE BASIC, AND STILL HIGHLY EFFECTIVE

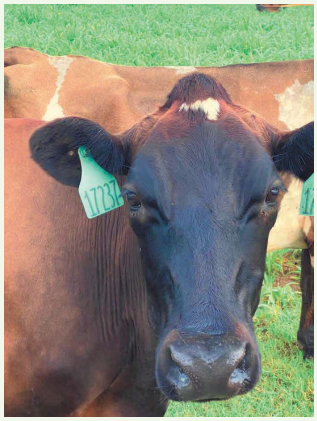
- Rotational grazing does not have to be complicated or expensive
- One cross fence creating two fields or “paddocks’ can vastly improve forage production, quality, and utilization.
- With good boundary fencing, temporary tread-in posts and electric poly-wire fencing can be an extremely cost effective means of rotating/resting pastures.



MULTI-SPECIES FORAGE SYSTEMS

- Incorporating multiple species in a pasture can improve overall productivity, extend growing seasons, and improve forage quality (different species grow better at different times of the year and under better conditions).
- Mixtures can include different grass species, forbs, and legumes (eg clover, alfalfa).
- Grass-legume (clover) mixes are particularly beneficial as legumes can fix nitrogen thereby reducing fertilizer requirements.
- Legumes are typically higher in nutritional value than grass, BUT are also more sensitive to poor soil fertility and overgrazing.

Thanks!



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