
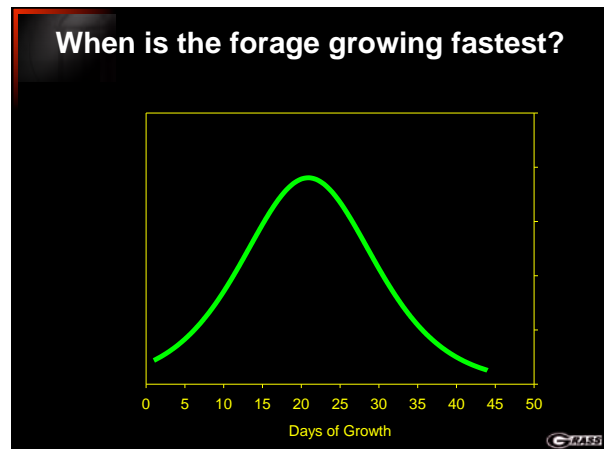
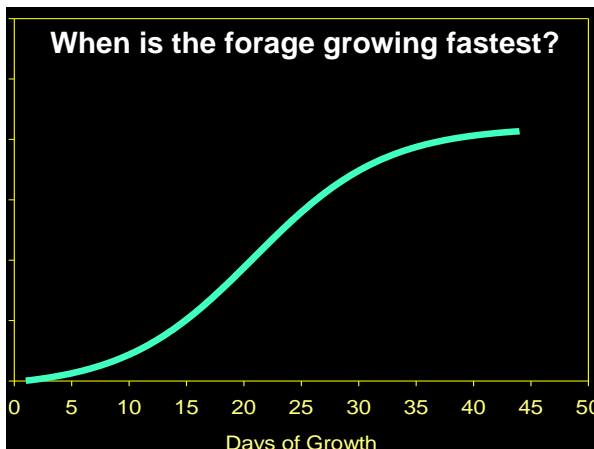
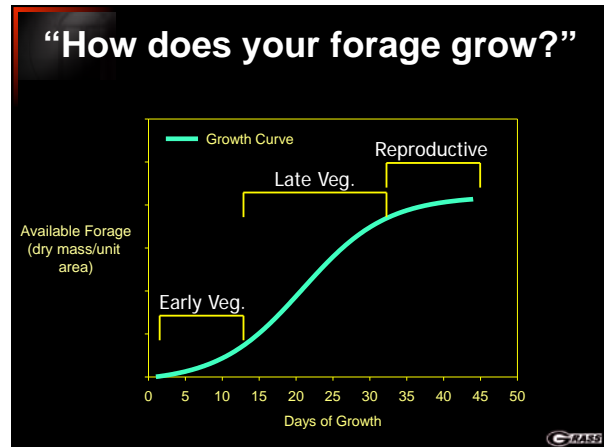
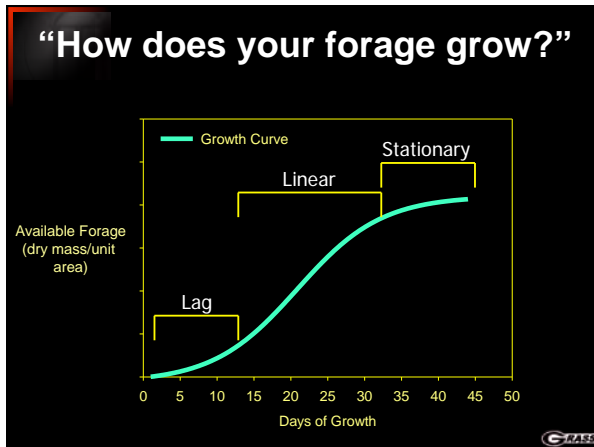
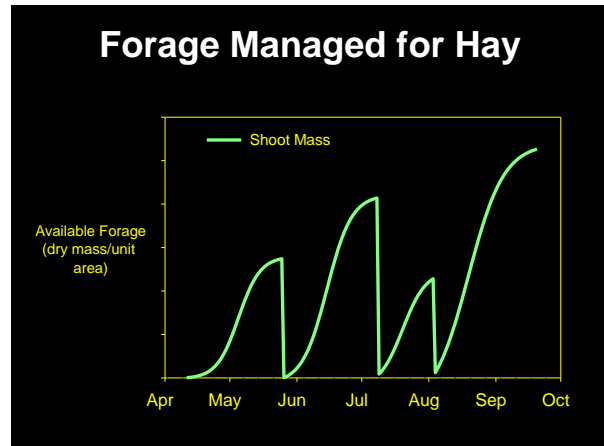


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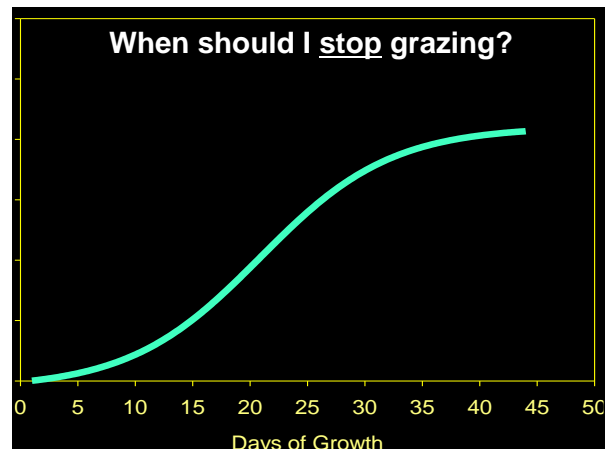
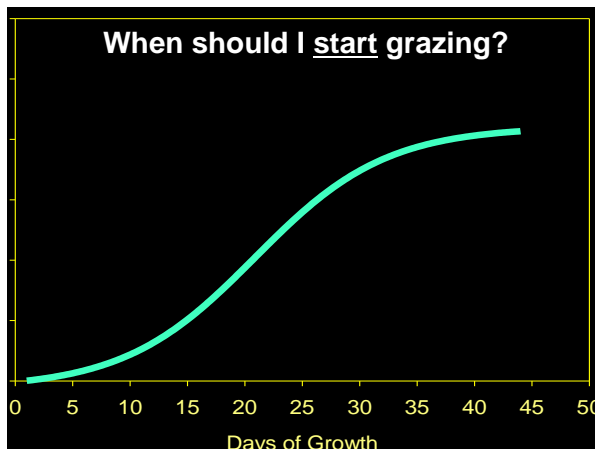
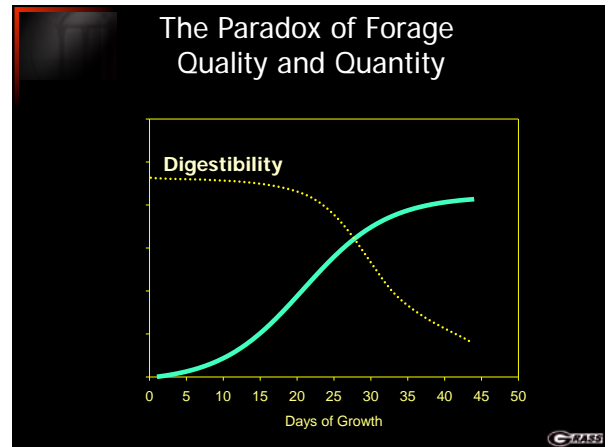
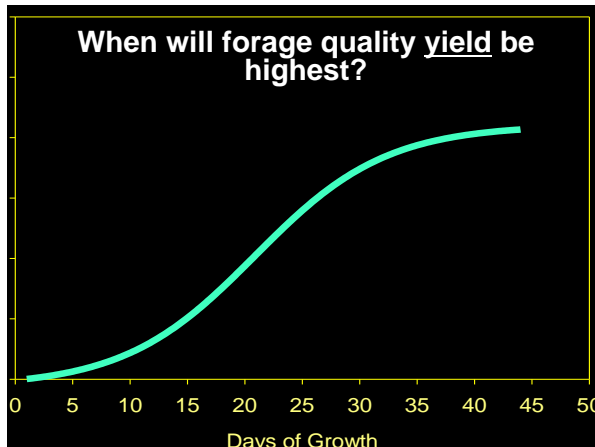
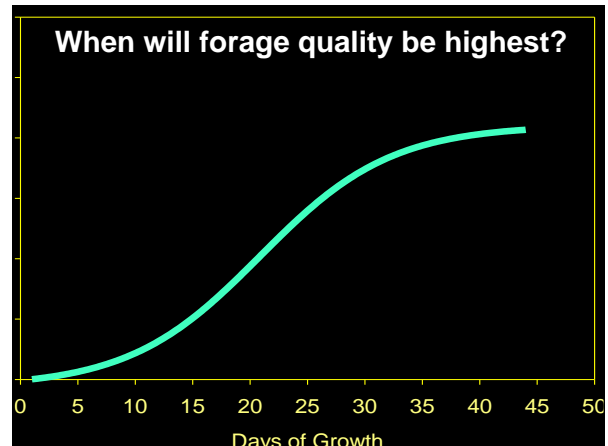
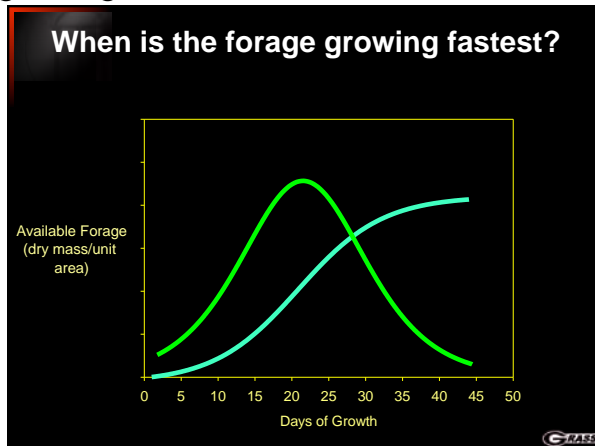
**Manipulating forage growth and
grazing behavior:
The essence of rational grazing**

Dennis Hancock
Extension Forage Specialist
UGA – Dept. of Crop and Soil Sciences

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Benefits of Rational Grazing

- Better utilization of forage
- Growth rate of forage is optimized
 - Kept in linear/exponential growth phase
 - Higher yield of forage



Animal productivity is primarily a function of feed intake.

Forage Intake

- Animal productivity (gains, milk, fiber, etc.) is primarily a function of feed intake.
- Forage Intake is a function of:
 - Bite size
 - Bite rate
 - Grazing time

$$\text{Forage Intake} = \left(\frac{\text{mass}}{\text{bite}} \times \frac{\text{bites}}{\text{min.}} \times \text{Minutes} \right)$$

Forage Intake

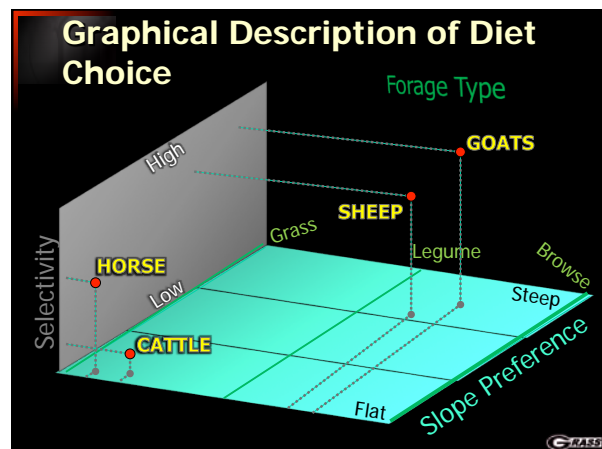
$$\text{Forage Intake} = \left(\frac{\text{mass}}{\text{bite}} \times \frac{\text{bites}}{\text{min.}} \times \text{Minutes} \right)$$

What happens when:

- Pastures are very short
- Pastures are tall
- The animal's mouth size is below average
- Animal is ill or uncomfortable (heat stress)
- Grazing time is restricted

Extra Credit:

- Animal starts feeling full
- Forage is very fibrous
- Intestinal passage rate is slow (fast)



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Grazing Behavior: Cattle

- Spend up to 8 hrs/day grazing
 - "Cows are union members. They refuse to graze more than 8 hours per day" - Voisin
 - Longest bouts are at dawn, late afternoon, and at sunset.
- Grass length affects bite rate:
 - 4-5 in. = swallowed right down
 - 10-12 in. = it has to be masticated.
- Bite rate generally runs 30-90 bites/min.

Grazing Behavior: Cattle

- Grazing time is genetically influenced.
 - Identical twins graze almost exactly the same amount of time (+/- 2%), but differences between pairs of twins will differ (+/-40%).
 - Bite rate is relatively constant (48-54 bites/min.), but some graze longer and sustain high rate longer.
 - Implication: Good grazers can be selected
- Grazing objectives:
 - Exercise and activity
 - Eat and retreat
 - Meet nutritional needs
 - Maintain relatively full gut



Grazing Behavior: Horses

- Spend 14.5 – 16.8 hrs/day grazing
 - 60-70% of the day
 - Mostly around dawn and before sunset
- Grazing time is altered by conditions.
 - Time dec. with heat, insect, etc. stressors.
 - Low forage quality = inc. passage rate & inc. forage intake

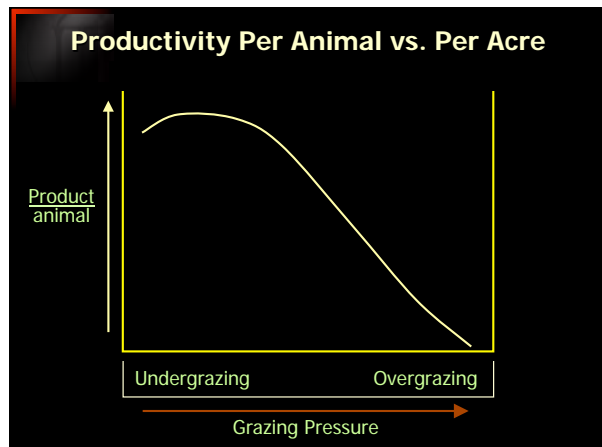
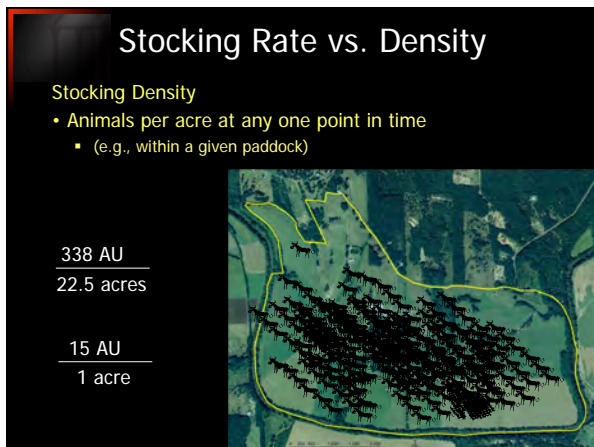
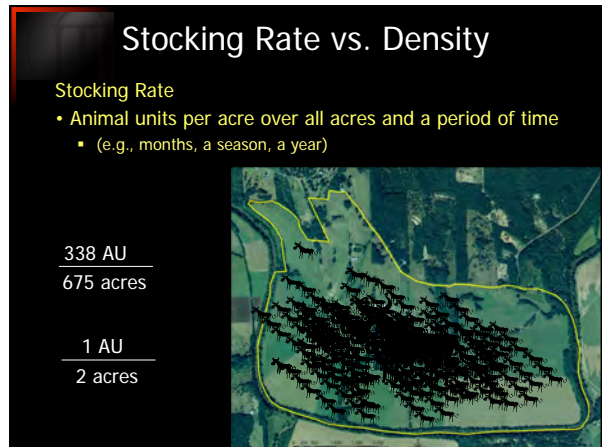
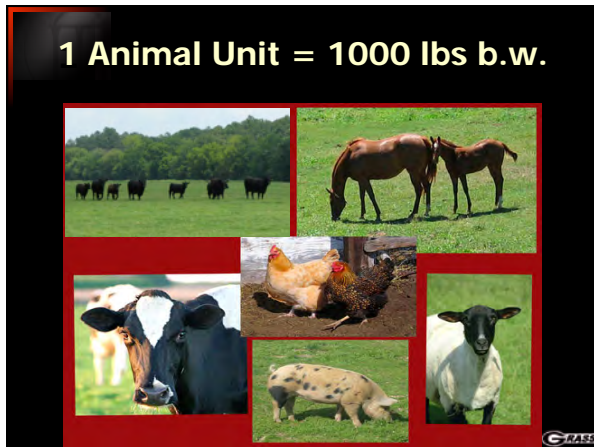
Grazing Behavior: Horses

- Tend to graze in 3 – 7 extended bouts/d
 - Bite rate ranges from 12-50 bites/min.
 - Single grazing bouts of up to 180 min.
 - Grazing bouts increase as group size increases from 1 to 4 horses
- Grazing objectives:
 - Meet nutritional needs
 - Maintain relatively full gut
 - Exercise and activity
 - Social (implications for selectivity)



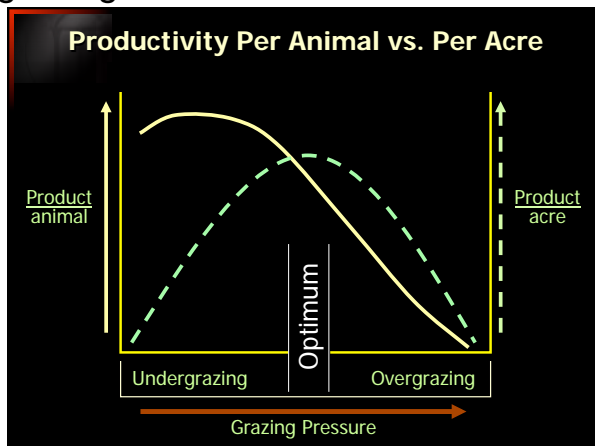
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4. More animal gains/milk production per acre

Effects of rotational stocking on performance of beef cattle grazing bermudagrass and endophyte-free tall fescue in central Georgia.

Item	Continuous	Rotational	Difference*
Cow weight at calving, lbs	1037	1017	NS
Cow weight at weaning, lbs	1090	1071	NS
Stocking rate, cows/acre	0.50	0.69	+38%
Pregnancy rate, %	93	95	NS
Weaning weight, lb	490	486	NS
Calf production, lb/ac	243	334	+37%

* NS = not statistically significant

Increase in gain per acre in rotational compared to continuous stocked pastures in studies from various southern states.

State	% Increase
Arkansas	44
Georgia	37
Oklahoma	35
Virginia	61

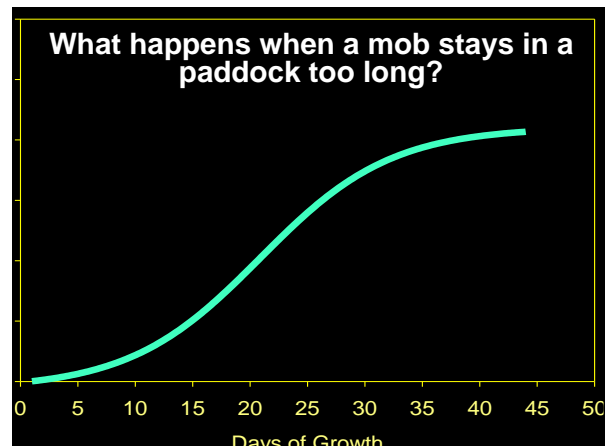
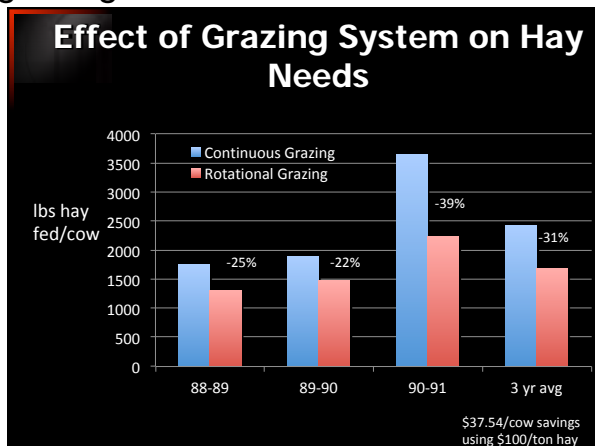
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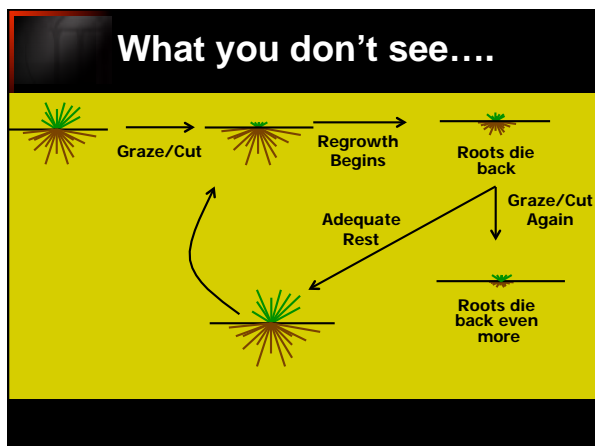


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- ### Benefits of Rational Grazing
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 - More animal gains/milk production per acre
 - Reduced feeding of conserved forage or supplements
 - Better persistence of desirable forages
 - Especially clover and legume species



Proper Rest Following Grazing is Key!

- In continuously grazed pastures, most plants are grazed every 2 – 7 days.
- With recommended rest periods, roots will redevelop to approximately the same depth as uncut plants.

Picture staged by: C. Mackoviak, Univ. of Florida



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Grazing Rules of Thumb

Crop	Target Height (inches)		Recommended Rest Period (days)
	Begin Grazing	End Grazing*	
Alfalfa (grazing types)	10-16	2-4	15-30
Annual Ryegrass	6-12	3-4	7-25
Bahiagrass	6-10	1-2	10-20
Bermudagrass	6-12	2-6	10-20
Clover, White	6-8	1-3	7-15
Clovers, Other	8-10	3-5	10-20
Orchardgrass	8-12	3-6	15-30
Pearl millet	20-24	8-12	10-20
Small grains	8-12	4	7-30
Sorghum/sudan	20-24	8-12	10-20
Switchgrass	18-22	8-12	30-45
Tall Fescue	4-8	2-3	15-30

* Height at end of grazing may need to be higher to optimize intake of quality forage or vigorous re-growth.



Management of residual stubble height and rest period ("length of round") on carbohydrate storage in Tifton 85 stems/stolons.*

Stubble Height in.	Rest Period or "Round" (d)		
	14	21	28
3	----- (g TNC/m ²) -----		
6			
9			

* Adapted from Liu et al., 2011. Crop Sci. TNC = Total non-structural carbohydrates.

Management of residual stubble height and rest period ("length of round") on effective Tifton 85 yields.*

Stubble Height in.	Rest Period or "Round" (d)		
	14	21	28
3	----- (lbs/acre) -----		
6			
9			

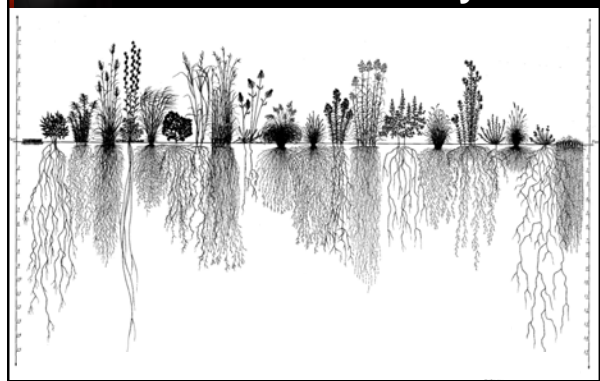
* Adapted from Liu et al., 2011. Crop Sci. Yields are grazing season totals (3-yr avg.) and include only that forage above the managed residual stubble height. SH did not affect CP or IVOMD. Both CP and IVOMD dec. (L from 60.2% to 58.2%) as rest inc. from 14 to 28 d.

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- Better weed suppression



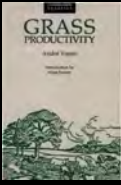
"More than meets the eye..."




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Resources

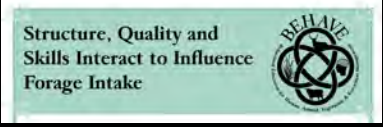


Grass Productivity – Andre' Voisin, 1959.
On Google Books or available for purchase




Rotational Grazing

From: Fleming, Earl; Crockett, Walter; Bowers, Roy; Harris, John; Smith, Earl; Johnson, and Ernie Cooper



Structure, Quality and Skills Interact to Influence Forage Intake

Resources



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- Commodities
- Sustainable Ag
- **Management-Intensive Grazing**
 - Forage Allocation
 - Management of Forage Supply
 - Grazing System Design
 - Economic Considerations
 - Farmer Case Studies
 - News & Events
 - FAQs
 - Links
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MANAGEMENT-INTENSIVE GRAZING

Commodities: Sustainable Agriculture

What is Management-Intensive Grazing?

Management-intensive Grazing (MIG) refers to several grazing systems wherein animals are allowed to graze only a small portion of the pasture (an individual paddock) while other paddocks are rested and allowed to recover. By rationing the pasture in a MIG system, Georgia farmers can make more efficient use of their land than if they continually keep animals in one large pasture (i.e., continuous stocking). Management-Intensive Grazing systems, of which there are many variations, can increase the yield of animal products per acre and, in most cases, net profit per farm.

Quick Links

- [Georgia Forages](#)
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