2018 Georgia Grazing School:

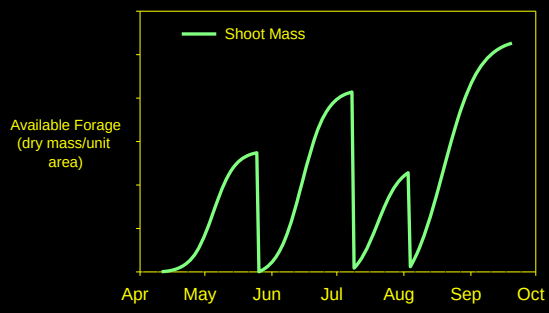
Manipulating forage growth and grazing behavior

Dr. Dennis Hancock
Prof. & Forage Ext. Specialist

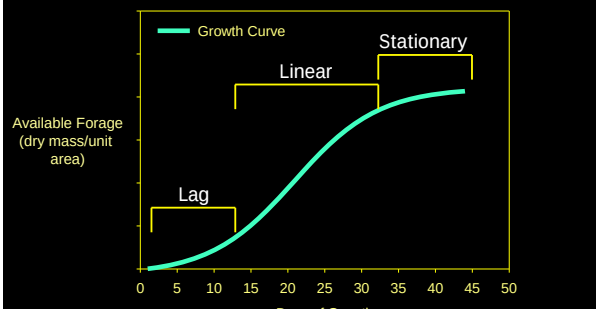
Manipulating forage growth and grazing behavior: The essence of rational grazing

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

Forage Managed for Hay



"How does your forage grow?"



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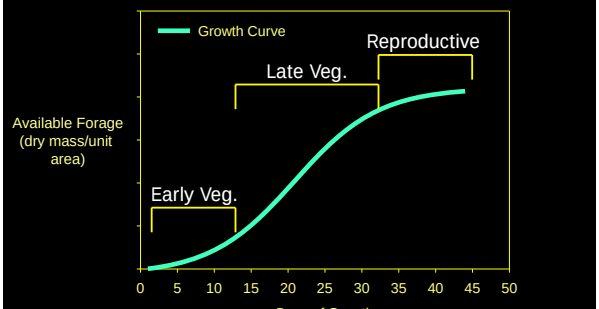
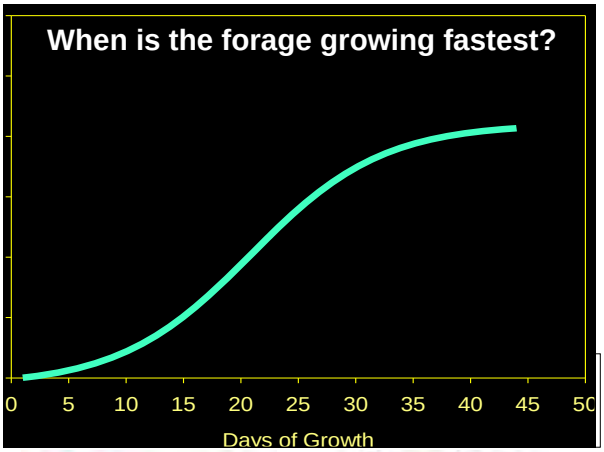
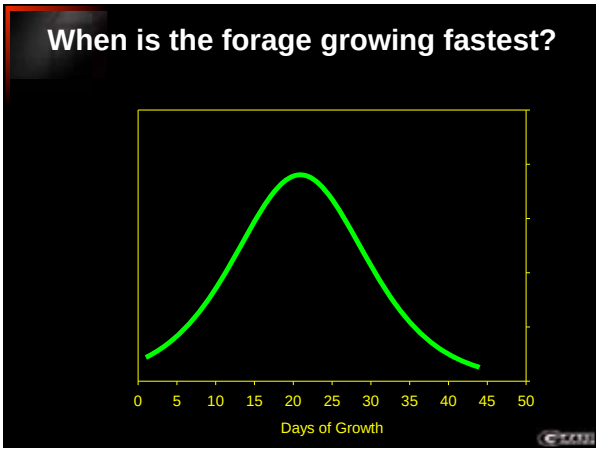


When is the forage growing fastest?



When is the forage growing fastest?



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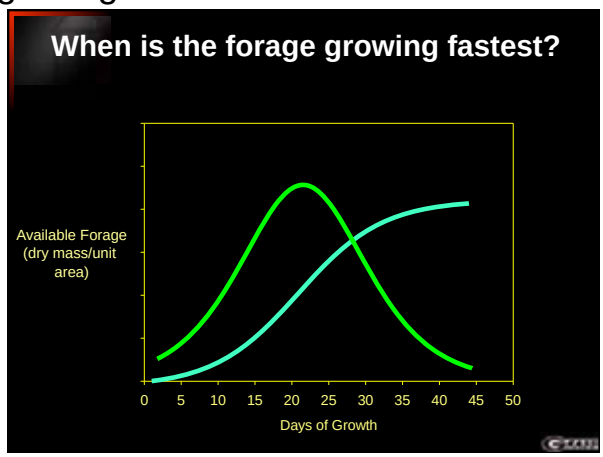

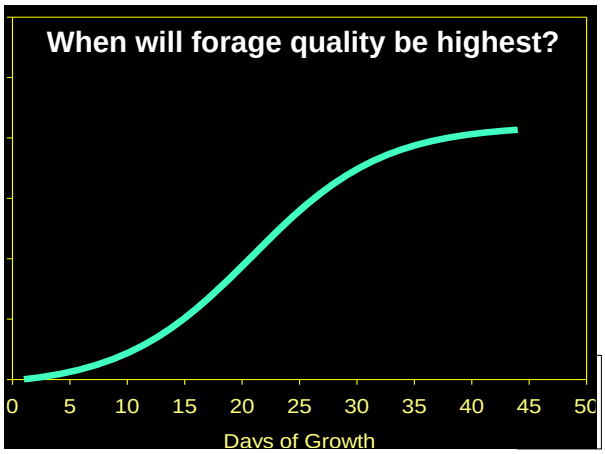

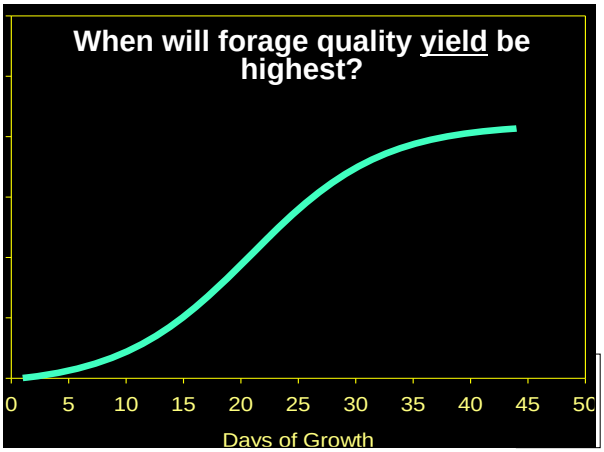

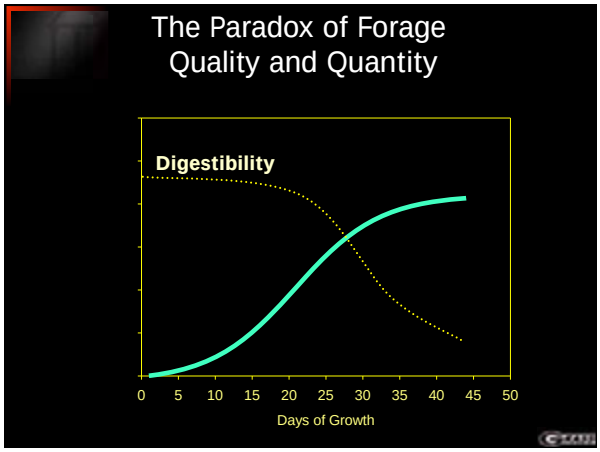

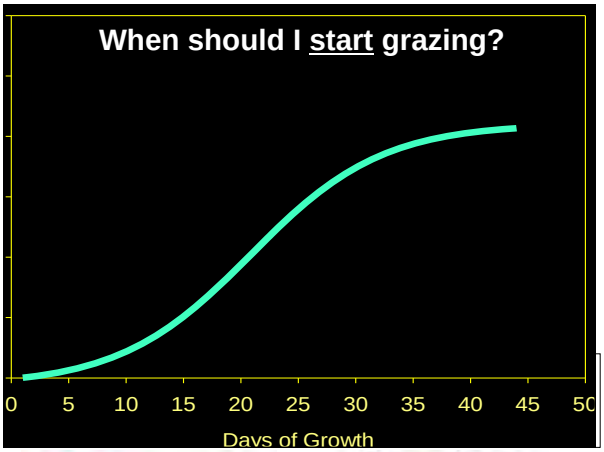

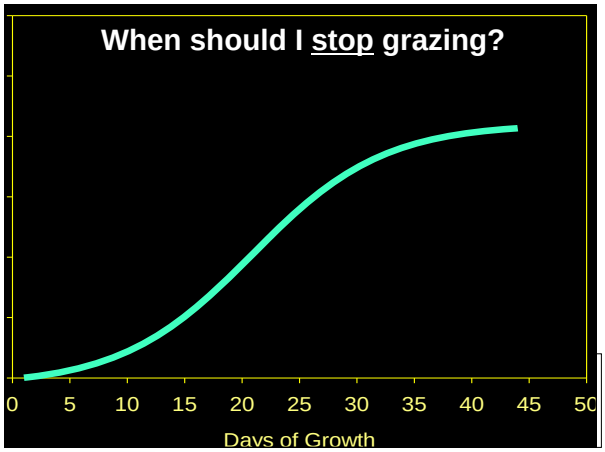

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Write this down in BIG **BOLD** letters!

"GRASS GROWS GRASS."

Benefits of Rational Grazing

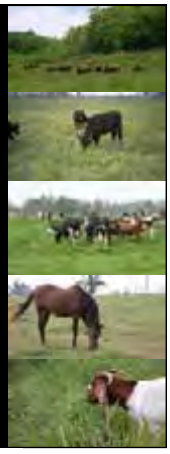
1. Better utilization of forage
2. Growth rate of forage is optimized
   - Kept in linear/exponential growth phase
   - Higher yield of forage

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

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



Forage Intake

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

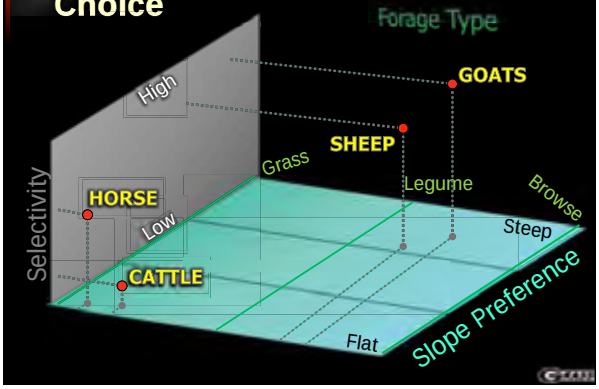
What happens when:

1. Pastures are very short
2. Pastures are tall
3. The animal's mouth size is below average
4. Animal is ill or uncomfortable (heat stress)
5. Grazing time is restricted

Extra Credit:

a. Animal starts feeling full
b. Forage is very fibrous
c. Intestinal passage rate is slow (fast)

Graphical Description of Diet Choice



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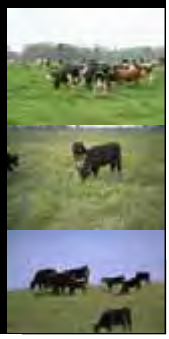
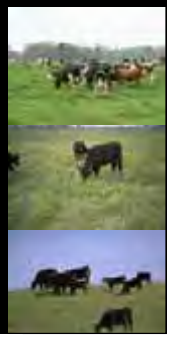
Grazing Behavior: Cattle

- 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.



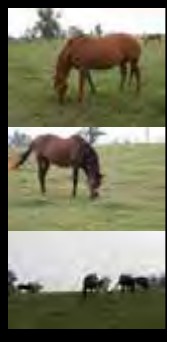
Grazing Behavior: Cattle

- 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



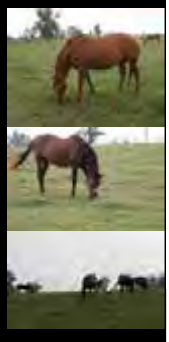
Grazing Behavior: Horses

- 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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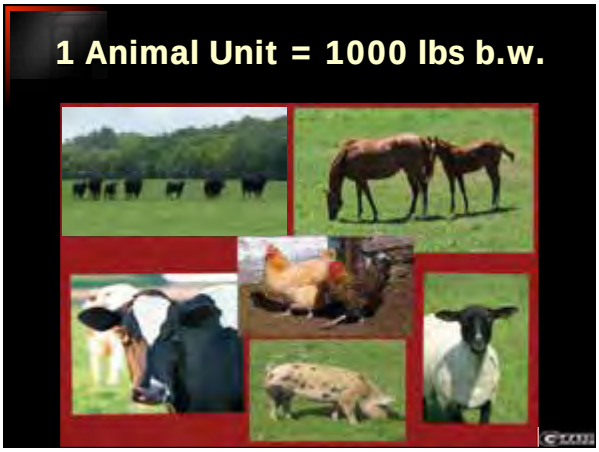

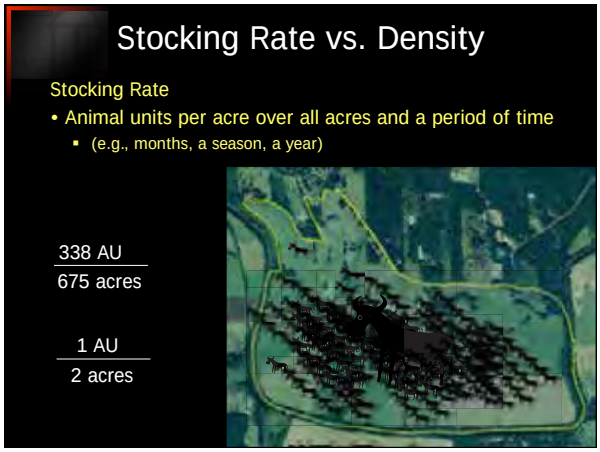

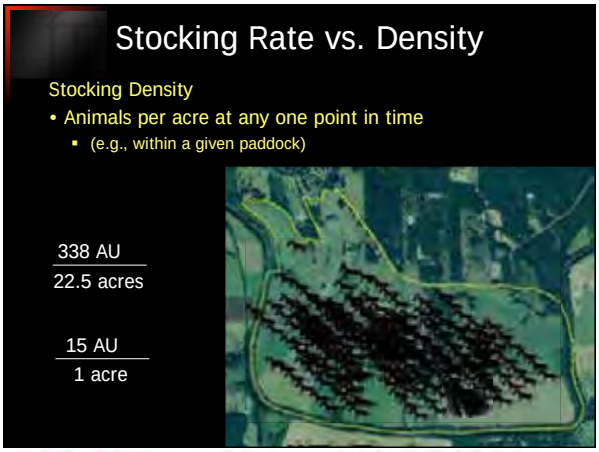

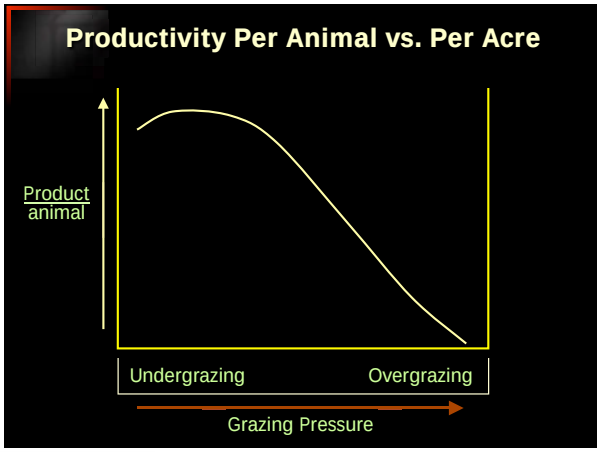

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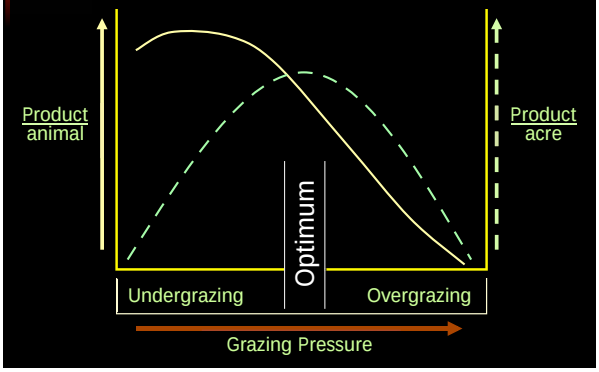
Productivity Per Animal vs. Per Acre



Benefits of Rational Grazing

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3. Higher stocking rates

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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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4. More animal gains/milk production per acre
5. Reduced feeding of conserved forage or supplements

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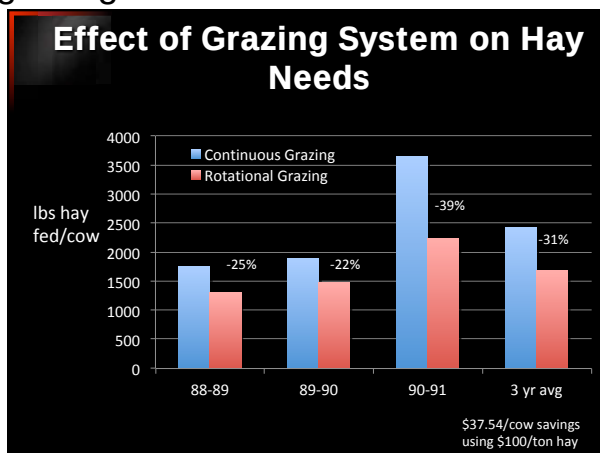

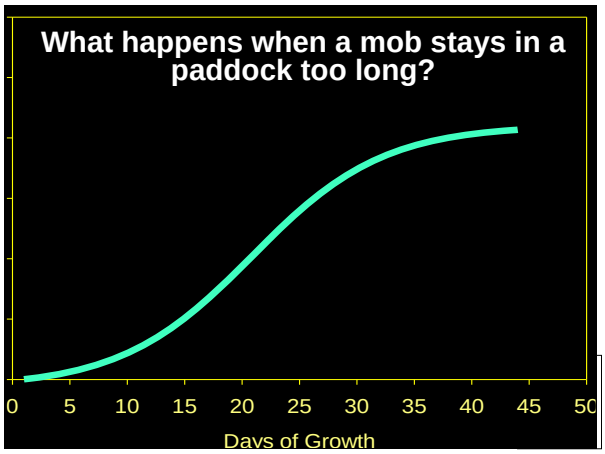

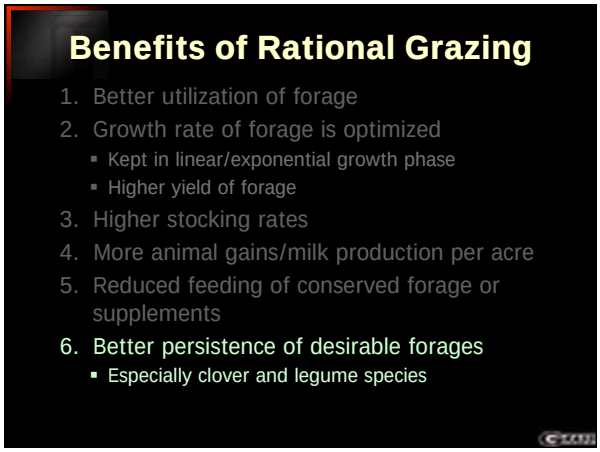

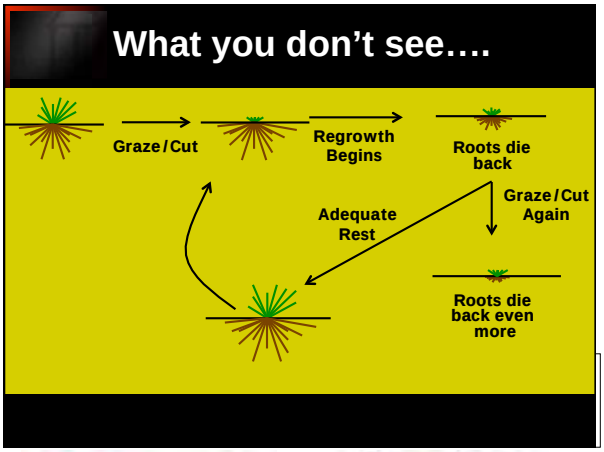

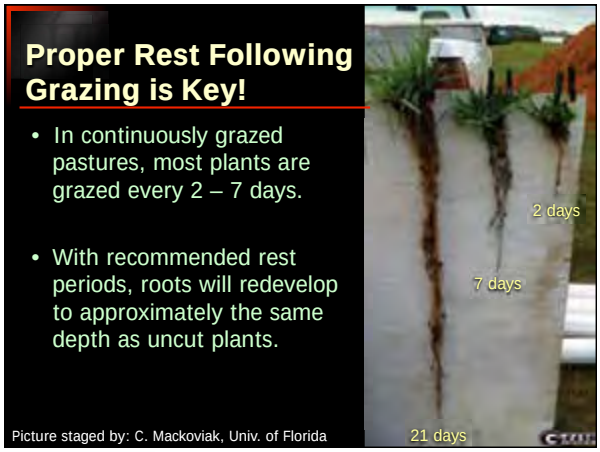

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Grazing Rules of Thumb

Crop	Target Height (inches) Begin Grazing	End Grazing*	Recommended Rest Period (days)
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	Rest Period or "Round"(d) 14	21	28
in.	---------- *(g TNC/m²)* ----------		
3			
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	Rest Period or "Round"(d) 14	21	28
in.	---------- *(lbs/acre)* ----------		
3			
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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   - Kept in linear/exponential growth phase
   - Higher yield of forage
3. Higher stocking rates
4. More animal gains/milk production per acre
5. Reduced feeding of conserved forage or supplements
6. Better persistence of desirable forages
   - Especially clover and legume species
7. Better weed suppression

"More than meets the eye…"

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