PASTURE MANAGEMENT FOR OPTIMAL PRODUCTIVITY

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Department of Animal and Dairy Sciences
University of Georgia – Tifton
Grazing

Species

Management

Fertility

Quality
FOCUS ON FERTILITY
Soil Fertility

Fix the Soil

For the Forage

Healthy Forages Like Healthy Soils
Test, Test, Test Your Soil!

Sample Hayfields every year

Sample 1/3 of your pastures each year
Food for Thought:

Soil test recommendations:

Choose Lime – Every time!
How Soil pH affects availability of plant nutrients
Approximate lbs of nutrients removed by Bermudagrass

- Nitrogen
- Phosphate
- Potash
- Magnesium
- Sulfur

- 500 lb animal
- Bermudagrass (6 tons)

Southern Forages 4th Ed
Fertility

**How Does it Improve Efficiency?**

- 55 lb N/acre
- Spring vs. fall growth
- Grazed every 4 wk – 50% greater herbage accumulation

**Herbage Accumulation, lb DM/acre**

- Argentine
- Pensacola
- Tifton 9
- UF Riata

Vendramini et al., 2013
Fertility
How Does it Improve Efficiency?

When combined with improved grazing methods, even low rates of fertility are beneficial for the forage production system.

Vendramini et al., 2013
Remember:

Fertility is the biggest economic input that can affect the output!

Forages Like Fertilizer!!
FOCUS ON FORAGE QUALITY
Our Forage Production Goals?
Stage of Maturity

Forage Quality and Quantity

QUALITY

YIELD

Stage of Maturity
"Forage quality can make the difference between high and low production & between profit and loss!"
What is “High Quality Forage”?

- Results in high intake
  - Consumed in large amounts
  - High DMI

- Is digestible
  - Large amounts of nutrients
  - High TDN

- Contains proper balance of needed nutrients
Unless you Test...

It’s Just a Guess!
Relative Forage Quality (RFQ)

- Heifer, 18–24 mo.
- Dry cow
- Mature horse, lt. work
- Dairy, last 200 days
- Heifer, 3–12 mo.
- Stocker cattle
- Nursing Mare
- Hard-working Horse
- Heifer, 12–18 mo.
- Lactating beef cow
- Brood Mare
- Working Horse
- Dairy, 1st 120 days
- Dairy calf

Adapted from Undersander et al., 2011
* Typical expected range and extent of what is commonly low or high for a species for RFQ in samples of various forage species submitted to the UGA FEW Lab.
Livestock need Nutrients!

High quality forages are the most economical source of meeting livestock needs!
## Matching Animal Requirements and Forage Quality

<table>
<thead>
<tr>
<th>Stage of Production</th>
<th>TDN % Required</th>
<th>CP % Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Pregnant</td>
<td>48</td>
<td>7</td>
</tr>
<tr>
<td>Peak Lactation</td>
<td>60</td>
<td>12</td>
</tr>
<tr>
<td>Late Lactation</td>
<td>55</td>
<td>9</td>
</tr>
</tbody>
</table>

Kim Mullenix, Auburn University
Forage Quality

- Palatability: "Will they eat it?"
- Intake: "How much will they eat?"
- Digestibility: "How much will be digested?"
- Nutritive Value: "How nutritious is it?"

- Animal Performance: "If they won't eat it, it don't matter!"
FOCUS ON FORAGE SPECIES
True or False?

“One species of forage can maintain my herd all year round?”

FALSE
Species Selection

■ There is NOT A MIRACLE FORAGE:
  - That grows all year long
  - Is always high quality
  - Fixes it’s own nitrogen
  - Can withstand continuous overgrazing
  - Can withstand extreme heat and cold

■ Choosing the right combination of forages is key!
Forages for a Longer Grazing Season: Diversity is Key
There’s no such thing a true Monoculture Pasture, to get the best utilization out of your pasture, mix things up!
Bermudagrass  

Bahiagrass
Remember:

Perennial Grasses are our most important “tool” and should provide the basis for almost all forage programs!
The Basics

Bermuda
- High-yielding, sod-forming, warm-season perennial grass
- Grows best on well-drained, fertile soils with ample moisture availability

Bahia
- Deep rooted, sod-forming warm season perennial grass
- Adapted to a wide range of soils and conditions
The Basics

Several Bermudagrass varieties available – the better performing to date being Hybrid varieties which require vegetative propagation

Hybrid bermudagrass varieties can potentially produce well over 4-6 tons of hay per acre, and can be cut four to five times per year when moisture is available.
Warm Season Perennial Grass Variety Trial – Tifton (avg. over 2006-2008)

Source: D. Hancock UGA
Quality and Fertility

**Bermuda**
- Typical RFQ 90-100
- Range in RFQ 80-140
- Fertility is Required!
- Check you pH
- Follow your soil test recommendations
- Replace you N, P, and K
- Pay Attention to Potassium – K is CRITICAL!

**Bahia**
- Typical RFQ 85-90
- Range in RFQ 75-110
- Less digestible than ‘Coastal’ bermudagrass of the same age (maturity level).
- Fertility
  - More forgiving when fertility is forgotten
  - Responds well to proper fertility and management!
Bermuda
■ Typically Higher yielding than Bahia
■ Generally Higher quality than Bahia
■ If you have good soil conditions – plant BG

Bahia
■ Will grow on soils too poorly drained for BG
■ Is more shade tolerant than BG
■ Can be successfully used in silvopasture and sod based rotation
Bahiagrass Attributes

- Freedom from severe disease and insect infestations (Generally)
- Tolerance to Close Grazing (Generally)
- Good Drought Tolerance (Generally)
- Adequate Forage Quality (when properly managed)
- Low to moderate level of management
- Low to moderate fertility requirements
Remember:
Species doesn’t matter if Forage Management is not focused on Forage Quality!
Annual Grasses

Summer
- Pearl Millet
- Sorghum x Sudangrass
- Sudangrass
- Crabgrass!

Winter
- Oats
- Wheat
- Rye
- Annual Ryegrass
Complementary Plantings

Winter Annuals
- Most common
- Can be planted alone or mixed
- Can be managed for reseeding
- Drilled, Broadcast, or Prepared seedbed
- Grazed or Hayed
- Timing is Critical

Summer Annuals (excluding crabgrass)
- More expensive than WA’s
- Difficult Management
- Potential for prussic acid poisoning and nitrate toxicity
- Graze/Hay (dependent on species)

Consider Sacrifice Areas
What is a Sacrifice Area?

- An area where livestock are held for a period of time
- Usually during inclement weather
  - Extreme wet (winter)
  - Drought
- Or while waiting for other pasture areas to re-establish or break dormancy and begin productivity for the season
- Commonly used for hay feeding during times of low quantity grazeable forage and harsh weather
What you need to know about Sacrifice Areas

- Renovation of some sort needs to occur on the area selected as the “Sacrifice Paddock”

- Ideal locations include
  - Weak stands or area in pasture than can be excluded
  - Areas that need additional nutrients
  - Areas that are in need of re-seeding/re-establishing
  - Areas being transitioned from one forage crop to another
Renovation option

- Seeding an annual forage to provide quick cover of bare soil created in sacrifice area
  - *Summer or Winter Annual (season dependent)*
  - *Provides a short-term grazing or hay crop and prepares the land for permanent pasture establishment in the fall*
  - *DO NOT use the same area as a sacrifice paddock the year following establishment*
Annual Rotation

- Identifying and “Annual Rotation” sacrifice area that **will not** be in permanent perennial pasture
  - *Rotate between winter annual and summer annual grass plantings*
  - *Use for grazing when grass in other pasture areas is limited*
  - *Common in my area –*
    - Annual Ryegrass – Crabgrass
FOCUS ON GRAZING
Fencing + Animals =/= Grazing System
Grazing Management

When grazing management occurs through the implementation of grazing methods within a grazing system, a number of goals and objectives can be achieved successfully!
Grazing Management

Requires an understanding of:

Animal

Plant

Soil
### Nutrient requirements of different classes of cattle

<table>
<thead>
<tr>
<th>Class of Animal</th>
<th>Stage of Production</th>
<th>TDN % Required</th>
<th>CP % Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mature Cows</td>
<td>Dry Pregnant</td>
<td>48</td>
<td>7</td>
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<td>55</td>
<td>9</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; calf Heifers</td>
<td>---------------</td>
<td>62</td>
<td>12</td>
</tr>
<tr>
<td>Growing calves</td>
<td>(500 lb)</td>
<td>61</td>
<td>11</td>
</tr>
</tbody>
</table>

Adapted from NRC for Beef Cattle 7<sup>th</sup> ed. (2000)

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Kim Mullenix, Auburn University
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Dry Matter (lbs/acre) of different bermudagrass and bahiagrass varieties after different growth periods in Louisiana

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Bermudgrass</th>
<th></th>
<th></th>
<th></th>
<th>Bahiagrass</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Russell</td>
<td>Coastal</td>
<td>Jiggs</td>
<td></td>
<td>Tifton-9</td>
<td>Pensacola</td>
<td>Argentina</td>
</tr>
<tr>
<td>2</td>
<td>292&lt;sup&gt;a&lt;/sup&gt;</td>
<td>511&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1080&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td>908&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1008&lt;sup&gt;dc&lt;/sup&gt;</td>
<td>1528&lt;sup&gt;c&lt;/sup&gt;</td>
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<td>4</td>
<td>4523&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3788&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5988&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td>3791&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4200&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5301&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>6</td>
<td>5981&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6082&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7688&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>5621&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5589&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6014&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>8</td>
<td>7284&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6733&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9525&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>10</td>
<td>6831&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>5881&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>7857&lt;sup&gt;bc&lt;/sup&gt;</td>
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<sup>abcd</sup>Rows with means with different superscripts are different (P<0.05)

Dore et. al. LSU 2006
CP (%) of different bermudagrass and bahiagrass varieties after different growth periods in Louisiana

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<td></td>
<td>Russell</td>
<td>Coastal</td>
</tr>
<tr>
<td>2</td>
<td>20.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>20.8&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>4</td>
<td>11.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>11.3&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>6</td>
<td>9.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.7&lt;sup&gt;ab&lt;/sup&gt;</td>
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<td>8</td>
<td>6.9</td>
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<tr>
<td>10</td>
<td>6.8</td>
<td>6.6</td>
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Dore et. al. LSU 2006
NDF (%) of different bermudagrass and bahiagrass varieties after different growth periods in Louisiana

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<tr>
<td>2</td>
<td>63.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>57.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>58.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>63.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>64.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>60.7&lt;sup&gt;ab&lt;/sup&gt;</td>
</tr>
<tr>
<td>4</td>
<td>67.9</td>
<td>62.0</td>
<td>63.8</td>
<td>64.3</td>
<td>67.8</td>
<td>63.4</td>
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<tr>
<td>6</td>
<td>69.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>66.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>68.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>67.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>65.6&lt;sup&gt;b&lt;/sup&gt;</td>
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Dore et. al. LSU 2006
Other Factors to Consider in Dore Study

- Harvest height = 2 inches
  - Recommended LOWEST height for Bermuda/Bahia

- Applied Fertility
  - Nitrogen @ 100 lbs/acre
  - Phosphorous @ 40 lbs/acre
  - Potassium @ 120 lbs/acre
# Efficiencies of Grazing Systems

<table>
<thead>
<tr>
<th>Grazing System</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Stocking</td>
<td>30-40%</td>
</tr>
<tr>
<td>Slow Rotation (3-4 paddocks)</td>
<td>50-60%</td>
</tr>
<tr>
<td>Moderate Rotation (6-8 paddocks)</td>
<td>60-70%</td>
</tr>
<tr>
<td>Strip Grazing</td>
<td>70-80%</td>
</tr>
</tbody>
</table>

Adapted from D. Hancock UGA
## Rest Period for Forage Species

<table>
<thead>
<tr>
<th>Forage Species</th>
<th>Cool weather</th>
<th>Hot weather</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cool-season grasses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual ryegrass, tall fescue</td>
<td>10-14</td>
<td>35-50</td>
</tr>
<tr>
<td><strong>Warm-season grasses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bermudagrass, dallisgrass</td>
<td>35-40</td>
<td>14-21</td>
</tr>
<tr>
<td><strong>Legumes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>clovers, alfalfa</td>
<td>21-28</td>
<td>30-40</td>
</tr>
</tbody>
</table>

Adapted from Southern Forages 5th Edition
Proper Height and Rest = The Key to Grazing Success

- Most plants are grazed every 2-7 days
- Animals will choose new growth over older, more mature, stemmy plants

With recommended rest periods, roots will redevelop to approximately the same depth as uncut plants.

Continuously Grazed

Rotational Grazing
Grazing Management Recommendations

- Graze no lower than 2 inches in Bermuda/Bahia dominant pastures
- Don’t graze too soon or too often
- Keeping the bahiagrass between 2 and 6 inches – will keep the quality relatively high (in comparison).
Focus on the WHOLE SYSTEM