Better Grass Management

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UGA Forage Breeding

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UGA Forage Extension
Five Strategies for Better Grass Management

1. Adjust pH
2. Maintain Fertility
3. Apply Rational Grazing
4. Incorporate Legumes
5. Use New Grass Cultivars
Management Strategy #1: Adjust pH

Figure 2. First-cutting alfalfa yield relative to soil pH.

Source: Wollenhaupt and Undersander, University of Wisconsin, 1991
Adjust pH for All Forages

Low pH is NOT just an alfalfa problem.

Productivity of most forages in Georgia will increase as pH becomes more neutral!
Management Strategy #2: Maintain Fertility

Don't forget micronutrients (e.g., boron)

GET A SOIL TEST REGULARLY!
At least yearly, esp. if you are making hay

DO WHAT IT SAYS!

Don’t forget micronutrients (e.g., boron)

Forages, 6th Ed., Barnes et al., eds.
Near-neutral pH and good fertility ARE ESSENTIAL to get the most out of your system.

Don’t build your grazing system on a weak foundation!
Management Strategy #3: Rational Grazing

The single biggest management change you can make to improve your pasture performance is “rational grazing”

Why “Rational”? 
1. Rations forage as needed 
2. Makes sense

(rotational grazing, intensive grazing, management intensive grazing (MIG), controlled grazing, strip grazing, rationed grazing, break grazing)
Irrational Grazing

Typical of *continuous stocking* grazing management

Overgrazing leads to weeds
It’s ALL about the grass

Ideally – mimic hay production – get on and get off

Increases forage productivity and persistence

Decreases drought impacts and weed encroachment
Setting up a rational grazing system
Step 1 – Pasture Subdivision

Fixed or easily movable electric fencing
Divide large areas into at least several paddocks

Hill country sheep pasture, New Zealand
Grazing Dairy, Georgia

Many paddocks to accommodate rapid rotation
Fencing options provide flexibility to your grazing program

Permanent fences for boundaries and major divisions

Step-in electric fence for temporary divisions
Many designs are possible

Center lane covered in gravel leads to parlor

Individual paddocks with water and permanently fenced
Sequential grazing with another species to fill production gaps (here – chicory)
Strip Grazing Brassicas in New Zealand

Increase utilization of forage by limiting trampling

Step-in electric fence for temporary divisions
Step 2 – Rotation Timing

PIONEERS OF ROTATION FAILED TO RECOGNISE THE IMPORTANCE OF THE “TIME” FACTOR

It was thought for a long time, and indeed is too often still thought to-day, that rational grazing consists in dividing the pasture into a greater or smaller number of paddocks (whether the fence is fixed or movable) and then shifting the herd from one paddock to the next. No thought was given to the “return” and particularly to the interval which must elapse before this return, or to the absolute necessity of varying this interval according to the season. The promoters of the rotational method, like their precursors in the eighteenth century, did not appear to attach much importance to varying the rest periods of the grass, on the one hand, or to the need for these rest periods being sufficiently long, on the other. They also overlooked the necessity for the periods of occupation being sufficiently short. In some books and papers on rational management of pastures, indeed, the “time” factor is partially or completely neglected.

Voisin, 1959
Optimum Rest Period Varies

Voisin, 1959
Be Flexible!

1. Allow pasture plants to regrow adequately

   - Enables plants to restore energy reserves for regrowth
   - Results in better yield
   - Varies depending on time of year, species, water availability, fertility, temperature
Be Flexible!

2. Prevent forage from getting too mature
### Rational Grazing Improves Efficiency

<table>
<thead>
<tr>
<th>System</th>
<th>Harvest Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanical</strong></td>
<td></td>
</tr>
<tr>
<td>Hay</td>
<td>30-70%</td>
</tr>
<tr>
<td>Silage</td>
<td>60-85%</td>
</tr>
<tr>
<td>Green Chop</td>
<td>70-95%</td>
</tr>
<tr>
<td><strong>Grazing</strong></td>
<td></td>
</tr>
<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, Daily Rotation</td>
<td>70-80%</td>
</tr>
</tbody>
</table>
Rotational vs. Continuous Stocking

Beef cow-calf grazing bermudagrass and endophyte-free tall fescue in central Georgia.

<table>
<thead>
<tr>
<th>Item</th>
<th>Continuous</th>
<th>Rotational</th>
<th>Difference*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow weight at calving, lbs</td>
<td>1037</td>
<td>1017</td>
<td>NS</td>
</tr>
<tr>
<td>Cow weight at weaning, lbs</td>
<td>1090</td>
<td>1071</td>
<td>NS</td>
</tr>
<tr>
<td>Pregnancy rate, %</td>
<td>93</td>
<td>95</td>
<td>NS</td>
</tr>
<tr>
<td>Weaning weight, lb</td>
<td>490</td>
<td>486</td>
<td>NS</td>
</tr>
<tr>
<td>Stocking rate, cows/acre</td>
<td>0.50</td>
<td>0.69</td>
<td>+38%</td>
</tr>
<tr>
<td>Calf production, lb/ac</td>
<td>243</td>
<td>334</td>
<td>+37%</td>
</tr>
</tbody>
</table>
Rational Grazing Increases Gain/Acre

Improved stocker cattle gain/acre from rotational vs. continuous stocking

<table>
<thead>
<tr>
<th>State</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>44</td>
</tr>
<tr>
<td>Georgia</td>
<td>37</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>35</td>
</tr>
<tr>
<td>Virginia</td>
<td>61</td>
</tr>
</tbody>
</table>

Average increase = 44%
Rational Grazing Decreases Hay Needs

<table>
<thead>
<tr>
<th>Period</th>
<th>Continuous</th>
<th>Rotational</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>88-89</td>
<td>-25%</td>
<td>-25%</td>
<td></td>
</tr>
<tr>
<td>89-90</td>
<td>-22%</td>
<td>-22%</td>
<td></td>
</tr>
<tr>
<td>90-91</td>
<td>-39%</td>
<td>-39%</td>
<td>$37.54/cow</td>
</tr>
<tr>
<td>3 yr avg</td>
<td>-31%</td>
<td>-31%</td>
<td>$100/ton</td>
</tr>
</tbody>
</table>

If hay is $100/ton, $37.54/cow savings if hay is $100/ton.
Rational Grazing vs. Business as Usual

37% more calf production

44% more stocker gain

31% less hay needed
Developing a plan

Do a pasture inventory
  – Acreage, water, soil fertility…
Seek advice
Identify cost-share opportunities
Sketch out the “ideal”
Develop a phase-in plan
Use training wheels
  – Temporary vs Permanent fencing
Build in flexibility
Rules of Thumb

A 2-4 day rotation works best for most beef operations
  – For tall fescue based pastures, 10 – 15 paddocks is best
  – Allows 24-30 day rest period.

Place water within 400-600 ft of all parts of paddock

Isolate shade, mineral feeder, and water from one another
  – Place shade away from paddock entrance
Benefits of Rational Grazing

1. Better forage persistence, utilization, and yield
2. Higher stocking rates
3. Better gains/milk production per acre
4. Less weed invasion
5. Better manure distribution
Management Strategy #4: Add Legumes

No need to apply N

<table>
<thead>
<tr>
<th>Legume</th>
<th>Amount</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>150+</td>
<td>$75</td>
</tr>
<tr>
<td>Red Clover</td>
<td>100+</td>
<td>$50</td>
</tr>
<tr>
<td>White Clover</td>
<td>75+</td>
<td>$38</td>
</tr>
<tr>
<td>Crimson Clover</td>
<td>50+</td>
<td>$25</td>
</tr>
</tbody>
</table>

Decrease fescue toxicosis by dilution

Highly nutritious: protein, vitamins, minerals
Legumes Can Fix Nitrogen

Inoculate legumes with proper *Rhizobium* strains
Make sure pH is above 5.5 (above 6.0 even better) to ensure nodulation
Legumes Have High Nutritive Value

- Alfalfa
- Other Legumes
- Cool Season Annual Grasses
- Cool Season Per. Grasses
- Bermudagrass
- Summer Annual Grass

Relative Forage Quality (RFQ)
Nutritive Value Needs of Animals

Relative Forage Quality (RFQ)

- Dairy 1st 120 days; Dairy calf
- Dairy last 200 days; Heifer, 3-12 mo.
- Stocker cattle
- Weanling horse; Mature horse, int. work
- Heifer, 12-18 mo.
- Lactating beef cow/mare
- Mature horse, mod. work
- Heifer, 18-24 mo.; Dry cow
- Mature horse, lt. work

Heifer, 18-24 mo.; Dry cow
Mature horse, lt. work

Dairy 1st 120 days; Dairy calf
Dairy last 200 days; Heifer, 3-12 mo.
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Seeding Legumes

No-till into grass in fall
   Good seed-soil contact
   Broadcasting not reliable
   Suppress sod by grazing

Fertility considerations
   Avoid excessive nitrogen
      -limit chicken litter
      -avoid grass competition
   Keep pH above 6
   Keep P and K levels adequate
“Five years ago, I sowed alfalfa and Bermuda grass on a field and they have been flourishing ever since.”

Daniel Lee – 1861(!)  
1st Professor of Agriculture at UGA
Irrigated Alfalfa in Bermudagrass

Alfalfa can suppress bermudagrass

Moultrie – December 13, 2006
Choosing alfalfa cultivars

Non-dormant cultivars
- autumn and winter growth
- fast regrowth
- risk of winterkill

Recommended dormancy levels
- Dormancy range 3-5 in Mountains; 4-7 in Piedmont; 7-9 in Coastal Plain
- Lower dormancy ratings will grow further south but be less productive in fall and winter

Dormant vs nondormant alfalfa in October in Indiana
Major Diseases

Aphanomyces Root Rot

Phytophthora Root Rot

Bacterial Wilt

Root Rots
Winter Survival, Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties

This publication is a listing of the winter survival, fall dormancy and pest resistance ratings of alfalfa varieties eligible for certification by seed certifying agencies. This publication does not list all important characteristics which should be considered carefully in the selection of alfalfa varieties. With the exception of some varieties listed as checks, all varieties listed can be purchased in the United States.

Varieties are submitted for listing by marketers and listing does not imply endorsement by the National Alfalfa Alliance. The variety information in this publication is that submitted for certification. The varieties listed by “Public” under the “Contact for Marketing Information” column are sold by many marketers. The remainder are “Proprietary Varieties,” which are sold by the specific marketers listed. Addresses of current marketers have been supplied by the developers and/or marketers.

This National Alfalfa Alliance publication is intended for use by Extension and agri-business personnel to satisfy a need for information on characteristics of certified eligible alfalfa varieties. The Alliance updates this publication annually to keep the information current.
Acid soils and aluminum toxicity limit alfalfa root growth.

Liming is essential.

Gypsum useful to avoid aluminum toxicity deeper in profile.

Donald Wood pulling deep soil cores to assess alfalfa rooting ability.
Grazing tolerant alfalfa

Grazing tolerance enables grazing if weather is unsuitable for hay production

Bulldog 805 selected for grazing tolerance survives when other cultivars do not
Legume cultivars from UGA

**Alfalfa**
- Bulldog 505
- Bulldog 805

**Red clover**
- Bulldog Red

**White clover**
- Durana (lower yield; persistent)
- Patriot (intermediate)
- Regalgraze (higher yield; rotational grazing)
Management Strategy #5: Use New Grass Cultivars

New grass cultivar trial at Tifton
Improved Tall Fescue

Fescue pastures soil tested, fertilized, and productive...but

Cattle didn’t gain

Low pregnancy rates

Why?

TOXIC TALL FESCUE!
Wild-type Endophyte Infected Fescue

Kentucky-31 type tall fescue
Endophytic fungus lives in fescue plant
Endophyte toxin causes animal disorders
  worse in spring and fall
  highest toxin in stems and seedheads
  increased toxin with high N application rates
Managing Fescue

Wild-type endophyte infected fescue

Management strategies
- keep plants vegetative
- clip seedheads
- add legumes
- plant endophyte free or non toxic endophyte cultivars

Endophyte free fescue

- No toxin problem = no animal problems
- Plants not as drought tolerant
- Animals will graze more readily than infected plants
- May have persistence problems
Surviving plants (above) produce persistent progeny (right)....in Tifton
Managing fescue

Novel endophyte fescue (MaxQ)
Endophyte strain doesn’t produce toxin
Animal performance is excellent
Plants persist as well as wild type
(but....make sure animals don’t overgraze!)

Eatonton, GA
MaxQ – Gains Like Endophyte Free

Experiment 1: Calhoun

<table>
<thead>
<tr>
<th></th>
<th>Toxic</th>
<th>MaxQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steers</td>
<td>520</td>
<td>575</td>
</tr>
<tr>
<td>Heifers</td>
<td>475</td>
<td>525</td>
</tr>
</tbody>
</table>

Experiment 2: Stockers

<table>
<thead>
<tr>
<th></th>
<th>Toxic</th>
<th>Free</th>
<th>MaxQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calhoun</td>
<td>1.03</td>
<td>1.84</td>
<td>1.81</td>
</tr>
<tr>
<td>Eatonton</td>
<td>1.14</td>
<td>2.24</td>
<td>1.91</td>
</tr>
</tbody>
</table>
Max Q – Persists Like Toxic Fescue

Continuous Stocking – Overgrazed
Eatonton, GA

Stand (%)

Spring Fall Spring Fall

Endo free
Toxic Endo
Max Q
Bermudagrass management

Plant sprigs late winter/early spring
K increases rhizome survival and decreases disease
N necessary
  – split applications
  – good response
  – need more work in grazing systems

Tifton 85 has larger leaves, fewer stolons, better digestibility than older cultivars, but winter hardiness issues in Piedmont
# Sprigged Bermudagrasses

Summary of the characteristics of the primary vegetatively propagated (sprigged) bermudagrasses in Georgia.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Overall Rating</th>
<th>Yield</th>
<th>Digestibility</th>
<th>Winter Hardiness</th>
<th>Persistence</th>
<th>Leaf Spot Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alicia (Alicia)</td>
<td>★★★☆☆☆</td>
<td>100</td>
<td>P</td>
<td>G</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Coastal</td>
<td>★★★★☆☆☆</td>
<td>100</td>
<td>F</td>
<td>G</td>
<td>G</td>
<td>E</td>
</tr>
<tr>
<td>Coastcross II</td>
<td>★★★★★☆☆☆</td>
<td>135</td>
<td>E</td>
<td>G</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Russell</td>
<td>★★★★★☆☆☆</td>
<td>130</td>
<td>G</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Tifton 44</td>
<td>★★★★★☆☆☆</td>
<td>90</td>
<td>G</td>
<td>E</td>
<td>G</td>
<td>E</td>
</tr>
<tr>
<td>Tifton 78</td>
<td>★★★☆☆☆☆☆☆☆</td>
<td>120</td>
<td>E</td>
<td>F</td>
<td>F</td>
<td>E</td>
</tr>
<tr>
<td>Tifton 85</td>
<td>★★★★★★☆☆☆</td>
<td>135</td>
<td>E</td>
<td>F</td>
<td>E</td>
<td>E</td>
</tr>
</tbody>
</table>

Ratings: E = Excellent, G = Good, F = Fair, P = Poor.

Selecting a forage bermudagrass variety by Hancock, Edwards, Green and Rehberg
http://pubs.caes.uga.edu/caespubs/pubcd/C919.htm
Park the Heavy Metal.
At the Dealer.

Think Year-Round Grazing
Bermudagrass Pasture Thru the Winter

Overseeding with annual ryegrass or cereals (oats, wheat, rye)

Overseeding with annual clovers or red clover

Avoid spring competition with regrowing bermuda

Grazing dairy near Wrens, GA on Jan. 3, 2007
Stockpile forage for autumn use

Save as stockpiled forage ("standing hay")

Then strip graze to avoid trampling losses
Grazing Days on Stockpiled Tall Fescue

<table>
<thead>
<tr>
<th>Available Forage (dry lbs/acre)</th>
<th>Continuous Stocking</th>
<th>Moderate Rotational Stocking</th>
<th>Strip Grazing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500</td>
<td>19-25</td>
<td>31-38</td>
<td>41-47</td>
</tr>
<tr>
<td>2000</td>
<td>25-33</td>
<td>42-50</td>
<td>54-63</td>
</tr>
<tr>
<td>2500</td>
<td>31-42</td>
<td>52-63</td>
<td>68-78</td>
</tr>
</tbody>
</table>
Stockpiling Tall Fescue Step-by-Step

Early- to mid-September

Closely graze or clip (2") the field
Remove livestock and apply 60-80 lbs N/acre

Late October - early November

Measure the amount of stockpiled forage available
Analyze forage quality
Strip graze the stockpiled tall fescue
Supplement with grain or by-products as needed

(Brood animals need minimal supplementation)
Five Strategies for Better Grass Management

1. Adjust pH
2. Maintain Fertility
3. Apply Rational Grazing
4. Incorporate Legumes
5. Use New Grass Cultivars
GRASS

HAY PRODUCTION SCHOOL

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