Extending the Summer Grazing Season

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Seasonal Forage Production

Spring
- Small grains
- CLOVERS
- Annual ryegrass
- Orchardgrass
- FEESCUE

Summer
- Summer annuals
- Lespedeza
- Crabgrass
- Bermudagrass
- Native W.S.G
- Old World Bluestem

Fall
- Stockpiled bermudagrass
- CLOVERS
- Annual ryegrass
- Orchardgrass

Winter
- Stockpiled fescue
- Small grains

100 days
100 days
100 days
65 days
Bermudagrass for Extending the Forage Season

- Characteristics
- Varieties
- Establishment
- Fertility
- Harvest Management
Bermudagrass

■ **Pros**
  - High forage production/animal carrying capacity
  - Tolerant of abusive conditions and drought
  - Damaged stands can fill in

■ **Cons**
  - High fertilizer requirement
  - Winter hardiness
  - Not shade tolerant
Temperature range for bermudagrass

- Optimum temperature for bermudagrass is 85° to 95° F.
- Growth falls off rapidly when the temperature is below 70° F with virtually no growth below 50° F.
- Cool night time temperatures, below 60° F, greatly slow growth.
- Mid-May to mid-September??
Bermudagrass Adaptation Zones

Cold tolerance is the #1 selection criteria for the transition zone
## Some Available Varieties

### Hybrids/sprigged
- Tifton 44*
- Midland*
- Midland 99*
- Ozark*
- Hardie*
- World Feeder*
- Vaughn’s #1*
- Greenfield*
- Jiggs
- Russell
- Alicia
- Coastal
- Tifton 85

### Seeded
- Wrangler*
- Cheyenne II*
- Jackpot
- Giant
- Arizona Common
- Several Blends*
## Branded Blends

<table>
<thead>
<tr>
<th>Blend</th>
<th>Source</th>
<th>Components</th>
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</thead>
<tbody>
<tr>
<td>Pasto Rico</td>
<td>K-F Seeds</td>
<td>Common, Giant</td>
</tr>
<tr>
<td>Texas Tough Plus</td>
<td>E. Texas Seed Co.</td>
<td>Common, Giant, Majestic</td>
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<tr>
<td>Sungrazer Plus</td>
<td>K-F Seeds</td>
<td>KF-194, CD90160</td>
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<tr>
<td>Rancho Frio</td>
<td>Pennington Seed</td>
<td>Cheyenne, Mohawk, Giant</td>
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<tr>
<td>Green Acres</td>
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<td>Jackpot, KF-194</td>
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</table>
Yields relative to Midland 99 in Oklahoma Tests

Numbers below bars = number of test environments.
Bermudagrass Sprigging

- 20-40 bu/acre
- Plant sprigs so portion is aboveground
- Weed control
Planting from Cuttings

- Long stolons with several internodes
- Cut, gather, and plant immediately
- Good soil moisture
Establishment from seed

- Seed per pound
  - 2 million hulled seed
  - 1.5 million unhulled seed
  - 800,000 coated seed

- Hulled seed will germinate in about 5 days at 65° soil temperature. Unhulled seed in 7-10 days
Planting bermudagrass seed

- Fine, firm seedbed
  “Alfalfa seedbed”
- Plant shallow – surface to ¼” deep
  light stimulates germination
- Moist seedbed
- Eliminate competition before planting and during establishment
- Seeding rate = 4-10 lbs/A
Management

- No N until stolons begin to form
- Weed control to eliminate shading
Hay vs. Pasture

1st cutting at 16-18”

2nd cutting through fall – every 24-30 days

Graze to maintain vegetative stage

Fertilize in August for fall stockpile grazing
Nutrients removed in hay by various forages in Arkansas

<table>
<thead>
<tr>
<th>Forage</th>
<th>N</th>
<th>P\textsubscript{2}O\textsubscript{5}</th>
<th>K\textsubscript{2}O</th>
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<tbody>
<tr>
<td>Bermuda</td>
<td>42</td>
<td>14</td>
<td>48</td>
</tr>
<tr>
<td>Fescue</td>
<td>36</td>
<td>14</td>
<td>48</td>
</tr>
<tr>
<td>Clover / Grass</td>
<td>40</td>
<td>13</td>
<td>45</td>
</tr>
<tr>
<td>Ryegrass</td>
<td>37</td>
<td>14</td>
<td>47</td>
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Univ. of Ark. Forage Database http://feedanalysis.uaex.edu/

6 tons of bermuda hay = 1220 lbs fertilizer/a
Dry matter yield of bermudagrass in response to broiler litter application (Huneycutt, et al., 1988)
# Fiber Characteristics of Coastal Bermudagrass

<table>
<thead>
<tr>
<th>Forage</th>
<th>NDF, %</th>
<th>ADF, %</th>
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</thead>
<tbody>
<tr>
<td>early veg</td>
<td>66</td>
<td>30</td>
</tr>
<tr>
<td>late veg</td>
<td>70</td>
<td>32</td>
</tr>
<tr>
<td>15 - 28 days</td>
<td>74</td>
<td>33</td>
</tr>
<tr>
<td>29 – 42 days</td>
<td>76</td>
<td>38</td>
</tr>
<tr>
<td>43 – 56 days</td>
<td>78</td>
<td>43</td>
</tr>
</tbody>
</table>

NRC, 1989.
NDF - Effects on Intake
Plant Cell

Cell Solubles & Metabolic Machinery

Cell Wall
Akin et al., 1977

72 hrs in Rumen Fluid

Top leaf

Bottom leaf

Top Sheath

Bottom leaf

Top Stem

Bottom Stem
Orchardgrass leaf after 6 hrs in buffer (a) and rumen fluid (b)

Fig. 1. Scanning electron micrograph of bermudagrass leaf blade incubated 48 h with rumen fluid showing loss of mesophyll (M), partial degradation of epidermis (E) and parenchyma bundle sheath (B), and resistance to degradation of sclerenchyma (S) and lignified vascular tissue (V). The cuticle is intact, and leaf morphology is rigid. Bar = 50 μm.

Fig. 2. Scanning electron micrograph of orchardgrass leaf blade incubated 48 h with rumen fluid showing loss of tissues except the sclerenchyma (S) and lignified vascular tissue (V). The cuticle (C) is a thin sheet with all epidermis degraded, and leaf morphology is less rigid than in bermudagrass. Bar = 100 μm.

Akin et al., 1977
Dry Matter Loss - Orchardgrass vs. Bermudagrass

Rainfall (inches) vs. DM Loss (%)

- OG - 15.3%
- BER - 13.0%
Digestibility - Orchardgrass

<table>
<thead>
<tr>
<th>Rainfall Amount (inches)</th>
<th>% Digestibility</th>
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</thead>
<tbody>
<tr>
<td>0.0</td>
<td>67.4%</td>
</tr>
<tr>
<td>1.0</td>
<td>15.3%</td>
</tr>
<tr>
<td>2.0</td>
<td>4.1%</td>
</tr>
<tr>
<td>3.0</td>
<td></td>
</tr>
</tbody>
</table>
Digestibility - Bermudagrass

% Digestibility vs Rainfall Amount (inches)

- 76.1%
- 40.0%
- 13.0%

Rainfall Amount (inches):
- 0.0
- 1.0
- 2.0
- 3.0

% Digestibility:
- 68.0
- 64.0
- 60.0
- 56.0
Summary

- High forage yield possible – 6 tons/a
- High fertility requirement
- Endophyte-free
- Moderate-good quality hay and pasture
- Very tolerant of close grazing
- Good summer production
- Well-suited for intercropping cool-season forages
- Not tolerant of shade!!!
- Poor choice for wildlife improvement
- Seeded or sprigged
- Cold-tolerance is primary variety selection criteria
- S. Missouri is northern limit of adaptation range
Warm-Season Forage Options

- Native Grasses:
  - Big Bluestem
  - Switchgrass
  - Indiangrass
  - E. Gamagrass

- Bermudagrass

- Bahiagrass

- Old world bluestems

- Crabgrass

- Summer annuals

- Lespedeza

- Alfalfa
Native warm-season grasses

- Good forage yield under low/moderate fertility
- Not tolerant of abusive grazing
- Fair hay quality; Good pasture quality
- Endophyte free
- Establishment can be difficult
- Not suited for intercropping other forages
- Favored forages for wildlife improvement
- Limited forage-use period
  May 15-Aug 15
Old-world Bluestem

- Caucasian bluestem is considered most productive of old world bluestems
- Used in Ozark area for >30 years
- Yields up to 8 tons/a in Arkansas tests
- Hard to establish good stands
- Fair hay quality; Good pasture quality
- Tolerates close grazing but must be vegetative growth for good animal gain
- Lower fertilizer requirement than bermudagrass
Crabgrass

- Highly palatable
- Good reseeder
- Sensitive to close grazing
- Maintains quality over wide range of maturity better than bermudagrass (AR)
- More digestible than bermudagrass (2x rate) (AR)
- Seeding rate = 4-6 lbs/a; 5-10 lb improves establishment rate (Dalrymple, 1998)
- 2 yr old seed better than fresh
Harvest Management

- Short (1”) cutting height and long harvest intervals (6 wk) reduce crabgrass percent
- Tall cutting height (7”) and frequent harvest intervals (1 wk) increase crabgrass content and total yield
- Split N application reduces nitrate potential

-Aiken, Dalrymple, Teutsch
Nutrients in average 4x5 round bale of bermuda hay

16 lbs N
5 lbs P$_2$O$_5$
18 lbs K$_2$O

Fertility Value $17.25$

<table>
<thead>
<tr>
<th>County</th>
<th>P</th>
<th>K</th>
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</thead>
<tbody>
<tr>
<td>Bradley</td>
<td>+216</td>
<td>+1283</td>
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<tr>
<td>Cleburne</td>
<td>+92</td>
<td>+232</td>
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<tr>
<td>Drew</td>
<td>+20</td>
<td>+186</td>
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<tr>
<td>White</td>
<td>+22</td>
<td>+172</td>
</tr>
<tr>
<td>Yell</td>
<td>+143</td>
<td>+342</td>
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</tbody>
</table>
Strip-Feeding Hay to Reduce Waste

- Electric fence
- Polywire
- Bales staged along field edge

Water Source
Questions?