Tall Fescue Pastures for Productivity and Environmental Quality

Overview of a grant received from:
Georgia Grazing Lands Conservation Initiative (GGLCI) Program administered by USDA – Natural Resources Conservation Service (NRCS)

Being implemented by:
Madison County Cattleman’s Association (MCCA) in cooperation with USDA – Agricultural Research Service (ARS)
Distance of 24 miles
Experiment at the intersection of:
(1) Cliff Dawson Road
(2) GA 207 (Hog Mountain Road)

Research station:
GA 53
(Experiment Station Road)
What are the Issues?

Productivity

Environmental Quality
1. Soil quality
2. Water quality

Time

Balance

Profit

Seasons
Years
Decades
Objective

✔ Measure the effects of fertilization source and tall fescue-endophyte association on:
  • Tall fescue persistence
  • Cattle performance and production
  • Soil quality
  • Water quality
Experimental Design

✓ 14, 2.5-acre paddocks of ‘Jesup’ tall fescue
  • All with water flume to collect water runoff

✓ Total of 7 treatments, each replicated twice
  • Six treatments grazed by yearling heifers

- **Fertilization Source**
  - Inorganic
  - Broiler litter

- **Tall Fescue-Endophyte Association**
  - Endophyte-free
  - Novel endophyte
  - *Wild*-type endophyte

- One treatment cut for hay
  • inorganic fertilizer, novel endophyte
Time of Grazing

Month of Year

<table>
<thead>
<tr>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
<th>Autumn</th>
</tr>
</thead>
<tbody>
<tr>
<td>24%</td>
<td>84%</td>
<td>75%</td>
<td>69%</td>
</tr>
</tbody>
</table>

2005 – 71%
2004 – 82%
2003 – 66%
2002 – 33%
### Effect of Fertilization Source

**Years 1-3**

<table>
<thead>
<tr>
<th>Response</th>
<th>Inorganic</th>
<th>Broiler Litter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forage mass (lb/acre)</td>
<td>1312</td>
<td>&gt; 1250</td>
</tr>
<tr>
<td>Stocking rate (head/acre)</td>
<td>0.97</td>
<td>ns 0.93</td>
</tr>
<tr>
<td>Stocking weight (lb/acre)</td>
<td>893</td>
<td>ns 857</td>
</tr>
<tr>
<td>Average daily gain (lb/head/day)</td>
<td>1.6</td>
<td>ns 1.5</td>
</tr>
<tr>
<td>Live-weight gain (lb/acre)</td>
<td>547</td>
<td>ns 511</td>
</tr>
</tbody>
</table>

No significant interactions between fertilization source and tall fescue-endophyte association with any response variable.
# Cattle Performance

## Years 1-3

Average daily gain of heifers on pasture (lb/head/day)

<table>
<thead>
<tr>
<th>Period</th>
<th>Free</th>
<th>Novel</th>
<th>Wild</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>1.7</td>
<td>2.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Spring</td>
<td>2.1</td>
<td>2.2</td>
<td>1.4</td>
</tr>
<tr>
<td>Summer</td>
<td>1.5</td>
<td>1.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Autumn</td>
<td>1.3</td>
<td>1.4</td>
<td>0.9</td>
</tr>
<tr>
<td>Yearly</td>
<td>1.7</td>
<td>1.8</td>
<td>1.3</td>
</tr>
</tbody>
</table>
## Cattle Production
### Years 1-3

Live-weight gain of heifers on pasture (lb/acre)

<table>
<thead>
<tr>
<th>Period</th>
<th>Free</th>
<th>Novel</th>
<th>Wild</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>54</td>
<td>62</td>
<td>56</td>
</tr>
<tr>
<td>Spring</td>
<td>266</td>
<td>273</td>
<td>&gt; 218</td>
</tr>
<tr>
<td>Summer</td>
<td>105</td>
<td>104</td>
<td>&lt; 131</td>
</tr>
<tr>
<td>Autumn</td>
<td>113</td>
<td>117</td>
<td>87</td>
</tr>
<tr>
<td>Yearly</td>
<td>538</td>
<td>555</td>
<td>493</td>
</tr>
</tbody>
</table>
Plans for the Future

1. Continue to measure cattle and pasture response variables for long-term evaluation

2. Measure soil quality changes with time in response to grazing, type of fertilization, and endophyte association (e.g. compaction, soil organic matter, and microbial diversity)

3. Measure water runoff quantity and quality from paddocks (routinely for nitrogen and phosphorus; occasionally for ergot alkaloids and fecal bacteria)

4. Work directly with MCCA to conduct a major field day

5. Work with MCCA to distribute research results in user-friendly formats

6. Cooperate with cattle producers to obtain relevant scientific information on a routine basis