Native Grass Research Overview

June 14, 2012

Biofuels Integration Study
Biofuels Integration

- Weaned steers (600# starting weight)
- Three forages and two grazing treatments

<table>
<thead>
<tr>
<th></th>
<th>SG</th>
<th>BB/IG</th>
<th>EG</th>
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<tbody>
<tr>
<td>Continuous (~100 days)</td>
<td></td>
<td>3 ac each</td>
<td></td>
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<tr>
<td>Early season (30 days)</td>
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Ames, Springfield, & Greeneville (42 paddocks total)
Study continues ’10 – ’12; put-and-take stocking
Biofuels Integration

- Biofuels- hay production component
- Springfield, Crossville, Knoxville
- Established 2009, harvests 2010 - 2012
- Species:
  - Alamo switchgrass
  - Alamo/big bluestem/indiangrass
  - Big bluestem/indiangrass
- Harvest:
  - November only
  - May + November
  - June + November
A Related Project

Alamo only
Knoxville, Greeneville
Same harvest treatments
(May + Nov, Jun + Nov, Nov)
Four nitrogen fertilization treatments
• 30 + 30, 30 + 60, 60 + 30, 60 + 60
• Applied at green-up and/or after harvest
Legume Intercropping

- Evaluate potential for legumes to be grown in biomass, forage, or integrated production systems
- Reduce input costs, improve water quality, enhance wildlife habitat value
- Tried hairy vetch, common vetch, partridge pea, Illinois bundle flower, alfalfa, red clover, ladino clover, crimson clover, arrowleaf clover, alsike clover, and trailing bean
- Red clover and partridge pea most reliable
- Spring competition (red clover, hairy vetch, crimson clover) can weaken or eliminate NWSG in some cases
**Legume Grazing Project**

- Bred dairy heifers (1,000# +/-)
- Four forage treatments

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<tr>
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<th>SG</th>
<th>BB/IG</th>
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<tr>
<td>No legume</td>
<td>3 ac each</td>
<td></td>
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<tr>
<td>Legume</td>
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Spring Hill (16 paddocks total)
Established in ’08, stocked ’09 (pilot)
Study continues 2010 - 2012
Continuous grazing, ~100+ days, put-and-take stocking
Eastern Gamagrass Grazing

- Knoxville, 2012 (pilot), continue ‘13 – ‘15
- Heifer breeding groups (~14 animals each + bull)
- Pastures = 3 ac
- Compare to Sudex
- Rotational grazing
- Established 2010 (4 pastures) and 2011 (4 pastures)
Winter Annual/Natives Grazing

- Fall 2012, Spring Hill/Greeneville
- Cereal rye into Alamo switchgrass
- Continue through 2015 (3 years)

- Graze Nov/Dec, Feb – Apr 15(?)
- Graze switch May – Aug, annually
- Develop more sustainable system
Winter Annual/Natives Pilot

- Fall 2011 - 2012, Greeneville
- Cereal rye, wheat, annual ryegrass into Alamo switchgrass
- Three spring harvest dates, early Apr. late Apr. mid-May

<table>
<thead>
<tr>
<th>Species</th>
<th>Harvest Time</th>
<th>Forage Yield (tons DM/ac)</th>
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<tbody>
<tr>
<td>Rye</td>
<td>Late</td>
<td>3.35</td>
</tr>
<tr>
<td>Rye</td>
<td>Mid</td>
<td>3.10</td>
</tr>
<tr>
<td>Wheat</td>
<td>Late</td>
<td>2.65</td>
</tr>
<tr>
<td>Ryegrass</td>
<td>Late</td>
<td>2.62</td>
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<table>
<thead>
<tr>
<th>CAG Harvest</th>
<th>Switchgrass Yield (tons DM/ac)</th>
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<tbody>
<tr>
<td>None</td>
<td>5.6*</td>
</tr>
<tr>
<td>Early</td>
<td>4.7*</td>
</tr>
<tr>
<td>Mid</td>
<td>4.4*</td>
</tr>
<tr>
<td>Late</td>
<td>4.2*</td>
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* Indicates statistical significance.
Patch-burn Grazing

- Used in Great Plains, never tried in eastern US
- Reduced management, comparable gains, wildlife friendly

- Three locations (Lewisburg, BGAD, Quicksand)
- 20 – 25-ac pastures (14 total, 7 reps)

- Compare to rotational grazing
- Planted this spring, graze 2014 - 2016
Patch-Burn Grazing

Dormant Season
- Grass & Forb Residue
- Minimal Thatch

Growing Season
- Burn
- Heavily Grazed
- Recovered Grass & Abundant Forbs

Dormant Season
- Burn
- Minimal Thatch
- Grass & Forb Residue

Growing Season
- Recovered Grass - Lightly Grazed -
- Recovering Grass & Abundant Forbs
- Heavily Grazed
- Recovered Grass - Lightly Grazed -
- Recovering Grass & Abundant Forbs
- Heavily Grazed

Growing Season
- Lightly Grazed
- Recovered Grass & Abundant Forbs
- Minimal Thatch
- Grass & Forb Residue

Dormant Season
- Burn
- Heavily Grazed
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Growing Season
- Recovered Grass - Lightly Grazed -
- Recovering Grass & Abundant Forbs
- Heavily Grazed
- Recovered Grass - Lightly Grazed -
Wildlife Grazing Project

- How do grazing strategies impact wildlife?
  - Virtually no data east of Great Plains

- Three reps (3 pastures each) near Knoxville
  - 25-ac pastures, big blue/indian/little blue blue blend
  - Planted this spring, graze 2014 – 2016

- Compare rotational, rotational + winter annual, continuous grazing strategies
- Monitor stand vigor, wildlife response, cattle performance
Establishment
Native Grass Fertility

- Except for biofuel feedstock production, no data pertinent to our region
- Data needed to identify appropriate application rates/recommendations for forage production
- One experiment for N, one for P & K
- Planted, fertility treatments to begin in 2013 or 2014
- Knoxville, Springfield
- Will look at switch, big blue, gama
- Wide range of application rates

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<tr>
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<tr>
<td>0</td>
<td>0</td>
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<tr>
<td>30</td>
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<tr>
<td>240</td>
<td>240</td>
<td>360</td>
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Big Blue/Indian Variety Trial

- Except for one trial (Lexington), no data pertinent to our region
- Many southern origin varieties not tested
- Indiangrass (n = 6):
  - Osage (OK), Rumsey (IL), Boone (KY), Prairie View (IN), Americus (AL/GA), and Virginia (VA)
- Big blue (n = 7):
  - Rountree (IA), Kaw (KS), OZ-70 (MO/OK), Mammoth (KY), Karst (KY), Prairie View (IN), and Earl (TX)
Other Projects

- Beef producers survey
- Dormant-season establishment (BB, EG, SG)
- Economic decision support tool
- Pollinator/grazing project
- Summer nurse crop (millet)
- Summer forage systems grazing project
- Wildlife response to production NWSG
Questions?