Best Management Practices for Forage Sorghum

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Forage Sorghum Family

- **Forage Sorghum**: Harvest once, mainly for silage

- **Sorghum-Sudangrass**: Harvest multiple times, Hay and Grazing

- **Sudangrass**: Harvest multiple times, Hay and Grazing
Forage Sorghum
Sorghum-Sudangrass
Sorghum-Sudangrass
Sudangrass
Why Forage Sorghum?

- Unpredictable weather/climate conditions
- Ogallala Aquifer water level is shrinking
- More drought tolerant and higher water use efficiency than silage corn
Forage Sorghum

- Planting depth: 1.0 to 1.5 inches deep
- Planting date: early to mid-June
- Seeding rates: 15 lbs/A for dryland
  - 25 lbs/A for irrigated
Forage Sorghum

- Optimum Soil pH: 6.0 to 7.0
- Use: Silage
- Harvest Timing: late milk to early soft dough stage
- Sudangrass: the flag leaf stage
- Sorghum-Sudangrass: the flag leaf stage
N, P, and K Requirements for Forage Sorghum Silage Production

<table>
<thead>
<tr>
<th>DM Tons/Acre</th>
<th>Nitrogen</th>
<th>Phosphorus, P2O5</th>
<th>Potassium, K2O</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>50</td>
<td>45</td>
<td>80</td>
</tr>
<tr>
<td>15</td>
<td>75</td>
<td>65</td>
<td>100</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
<td>75</td>
<td>120</td>
</tr>
<tr>
<td>25</td>
<td>125</td>
<td>75</td>
<td>140</td>
</tr>
<tr>
<td>30</td>
<td>150</td>
<td>75</td>
<td>160</td>
</tr>
</tbody>
</table>
Nitrogen Deficiency Symptoms

- Pale green (chlorosis): more visible in older leaves
- Reduced root growth
- Slowed development
- Smaller leaf size
- Poor spikelet formation
- Reduced grain protein
Nitrogen Deficiency
Phosphorus Deficiency Symptoms

- Purpling of stems and lower leaves
- Reduced root development
- Stunted overall growth
- Poor seed production
- Increased winter injury
Phosphorus Deficiency
Potassium Deficiency Symptoms

• Chlorosis and necrosis on the leaf margins
• Retarded leaf development
• Stunted growth
• Increased susceptibility of lodging
• Increased winter injury
Potassium Deficiency
Iron Chlorosis in Forage Sorghum

- High soil pH with low organic matter soil
- Chlorosis in the younger leaves
- Interveinal chlorosis
- Iron sulfate can be applied
Iron Chlorosis in Forage Sorghum
Iron Chlorosis in Sorghum
BMR Forage Sorghum
## Forage Quality Characteristics between BMR vs. Conventional Forage Sorghum

<table>
<thead>
<tr>
<th>Forage Type</th>
<th>CP %</th>
<th>ADF %</th>
<th>NDF %</th>
<th>Lignin %</th>
<th>IVDMD %</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMR Forage Sorghum</td>
<td>9.2</td>
<td>27.6</td>
<td>45.9</td>
<td>3.6</td>
<td>81.3</td>
</tr>
<tr>
<td>Conventional Forage Sorghum</td>
<td>8.3</td>
<td>29.9</td>
<td>49.1</td>
<td>4.4</td>
<td>75.5</td>
</tr>
</tbody>
</table>

(Bean et al., 2001)
# Effects of Different Forage Sources on Dairy Cow Performance

<table>
<thead>
<tr>
<th>Forage Type</th>
<th>DMI lbs/day</th>
<th>NDF Intake lbs/day</th>
<th>Milk Production lbs/day</th>
<th>Milk Fat %</th>
<th>Milk Protein %</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMR6 Forage Sorghum</td>
<td>55.4</td>
<td>19.8</td>
<td>75.0</td>
<td>3.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Conventional Forage Sorghum</td>
<td>51.0</td>
<td>22.9</td>
<td>68.2</td>
<td>3.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Corn</td>
<td>53.5</td>
<td>19.8</td>
<td>74.4</td>
<td>3.9</td>
<td>2.9</td>
</tr>
</tbody>
</table>

(Oliver et al., 2004)
## Comparison of Nutrient Values for Beef

<table>
<thead>
<tr>
<th>Item</th>
<th>Sorghum</th>
<th>Corn</th>
<th>Barley</th>
<th>Wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Protein</td>
<td>12.6</td>
<td>9.8</td>
<td>13.2</td>
<td>14.2</td>
</tr>
<tr>
<td>ADF, %</td>
<td>6.38</td>
<td>3.30</td>
<td>5.77</td>
<td>4.17</td>
</tr>
<tr>
<td>NEm, Mcal/lb</td>
<td>6.38</td>
<td>3.30</td>
<td>0.93</td>
<td>0.99</td>
</tr>
<tr>
<td>NEg, Mcal/lb</td>
<td>0.61</td>
<td>0.70</td>
<td>0.63</td>
<td>0.68</td>
</tr>
</tbody>
</table>

(Beef NRC, 1996)
Ensiling Considerations

- Moisture Content
- Length of Cut
- Forage Preservation
- Toxicity Potential
Moisture Content

• Optimum Moisture Content: 60 - 70%

• Soft-dough stage: increase digestibility
Length of Cut

- Optimum length of cut: $3/8$ to $1/2$ inches long

- Longer cuts: cause packing problems
Forage Preservation

• High moisture forage sorghum: favors butyric acid-producing bacteria (foul-smelling, unpalatable feed, and excessive dry matter loss)

• Use of bacterial inoculant or organic acid can help minimize butyric acid production
Toxicity Potential in Forage Sorghum

- Prussic acid poisoning: plant cell injuries raise HCN levels, seldom a problem in silage

- Nitrate toxicity: high N in soil, drought, prolonged cloudy conditions, and frost/freeze
Toxic Levels

- Prussic Acid: 1000 ppm and above
- Nitrate: 2100 ppm and above
??? Deficiency
??? Deficiency
??? Deficiency
Thanks

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Questions?