Maximizing Forage Yield with Soil Testing and Fertilization

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Nutrient Management Extension
After the 2011 Drought

• What do we do now.
Topics

• Comanche and Stephens Co Soil Test Results
• Fertilizing on a Budget
• Reference Strips
• Fertilizer Sources
Soil Test Results

• All samples from 2010 to current
• CAUTION: Includes lawn and garden
• What do you expect to see
  – pH
  – N
  – P
  – K
Soil pH

Comanche

Stephens

<5.5  5.5-6.5  6.6-7.5  >7.5
Nitrate

![Nitrate Graph]

- Comanche
- Stephens
Phosphorus

The graph on the left shows the distribution of phosphorus levels in two different regions, Comanche and Stephens, categorized into four brackets: <65, 65-120, 120-300, and >300. The graph on the right illustrates the percentage distribution of these levels in different ranges: 0-10, 10-20, 20-40, and 40-65.
Potassium

- Comanche
- Stephens
Fertilizing on a Budget

• Multiple approaches / scenarios
• First need some info
  – Yield history or potential
  – Soil Test: P, K, and pH
• Each scenario may have multiple options
• The correct option will be producer and environment dependent
Fertilizer on a Budget

• Scenario 1: Soil test show P and K adequate in all fields

• Option 1: Maximize yield and quality on limited acres
  – Choose field(s) with highest yield potential and only fertilize them to maximize yield.

• Option 2: Maximize return on each lb of N.
  – Or apply 50 lbs N ac per field over all fields.
Fertilizer on a Budget

- Scenario 2: Soil test show P is low in some/all fields while K is adequate.
  - Look at the sufficiency level of P on each field.
  - How much are you losing and how much to apply

<table>
<thead>
<tr>
<th>STP</th>
<th>% Suf</th>
<th>$P_2O_5$</th>
<th>STK</th>
<th>% Suf</th>
<th>$K_2O$</th>
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</thead>
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<tr>
<td>0</td>
<td>50</td>
<td>75</td>
<td>0</td>
<td>50</td>
<td>140</td>
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<td>&gt;65</td>
<td>100</td>
<td>0</td>
<td>&gt;250</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>
Fertilizer on a Budget

• Option 1: Max yield and quality with Nitrogen
  – Only apply N to the fields that have the highest P level.

• Option 2: Correct P deficiency
  – Apply P to the lowest values only and some N to select fields.
  – Apply litter to low P fields and commercial N to rest
Fertilizer on a Budget

• Scenario 2: Soil test show both P and K are low.
  – Look at the sufficiency level of P on each field.
  – How much are you losing and how much to apply
  – Keep in mind Total loss is P * K
  – P @ 60% and K @ 70% = 42% of Max yield
  – @ <50% max yield recovery of N investment will be low
Fertilizer on a Budget

• Option 1: Fertilize the worst field
  – Fertilize the field with the worst % Max yield

• Option 2: Fertilize the lowest Sufficiency
  – Fertilize with only P or K, which ever is impacting yield the most.

• Option 3: Focus on N
  – Fertilize the field(s) with the highest potential yield.
N-Rich Strip
N and P
Nitrogen Source and Time

- N Source can be very important just as important as the timing.
- Urea
- UAN
- Specialty
- Ammonium Nitrate
Experimental Details

- All N applied as a single, annual application.
- Results are yields averaged over two to three (Ardmore, August treatments) years.
  - Three to five harvests per year, depending on growth.
- Both sites were non-irrigated, acidic soils.
  - Ardmore pH = 5.2
  - Burneyville pH = 5.6
Bermudagrass Response to Ammonium Nitrate and Urea Applied in August or March at Ardmore, OK 1993-96.
Bermudagrass Response to Ammonium Nitrate and Urea Applied in August or March at Burneyville, OK 1994-96.
Summary

• 10 to 30% loss of N may occur from urea applied in mid summer to bermudagrass.
  – Loss is minimal if there is little surface residue and it rains within a day of application (Burneyville).

• Early spring applied urea is as effective as ammonium nitrate.
Thank you!!!

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