Lab Capabilities

- Feed/Forage/Fat Analysis
- Vitamins
- Trace Minerals
- Liver Biopsies
- Pesticide Screens
- Microbiological Screens
- Manure/Lagoon/Fertilizer
- Water
  - Drinking/Livestock/Irrigation
- Waste Water
- Accredited by:
  - NFTA, AOAC, NIRSC, AOCS & KDHE
New this year...
FORAGE SAMPLING

• NFTA recommends probing a minimum of 10%
• Hay probe is essential for best sampling practices
• No probe? Best alternative is to cut the bale and collect multiple “slices” or “flakes”
• Worst scenario is to “grab” a handful of sample. This may result in lower protein, higher fibers & lower RFV/RFQ
Rectangular Bales

Big Round Bales

Square Bales

Sample 90° to grain
Sample # 41155
Sample: Alfalfa
Other ID: NIR 5th Cut 46 Bales

Date Received: 10/03/2011
Date Reported: 10/05/2011
Total Fee: $ 12.00

4 Example Feed Yard
1000 Corey Road
Hutchinson, KS
67501

<table>
<thead>
<tr>
<th>Analysis Item</th>
<th>Dry Basis</th>
<th>As Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry Matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein, Crude</td>
<td>21.97</td>
<td>19.49 %</td>
</tr>
<tr>
<td>ADF-Acid Detergent Fiber</td>
<td>24.68</td>
<td>21.90 %</td>
</tr>
<tr>
<td>aNDF - Neutral Detergent Fiber</td>
<td>28.94</td>
<td>25.68 %</td>
</tr>
<tr>
<td>NEL: Net Energy-Lactation</td>
<td>0.74</td>
<td>0.66 Mcal/lb</td>
</tr>
<tr>
<td>NEG: Net Energy-Gain</td>
<td>0.48</td>
<td>0.43 Mcal/lb</td>
</tr>
<tr>
<td>NEM: Net Energy-Maintenance</td>
<td>0.81</td>
<td>0.72 Mcal/lb</td>
</tr>
<tr>
<td>TDN: Total Digestible Nutrients</td>
<td>71.54</td>
<td>63.47 %</td>
</tr>
<tr>
<td>Calcium</td>
<td>1.35</td>
<td>1.20 %</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.32</td>
<td>0.28 %</td>
</tr>
<tr>
<td>Potassium</td>
<td>2.87</td>
<td>2.55 %</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0.26</td>
<td>0.23 %</td>
</tr>
<tr>
<td>RFV- Relative Feed Value</td>
<td>224</td>
<td>s.u.</td>
</tr>
</tbody>
</table>

RFV/RFV Grade Quality
Over 185 Supreme Excellent Dairy Hay
170 - 185 Premium Dairy Hay
150 - 170 Good Good Hay
130 - 150 Fair Average Hay
Under 130 Utility Poor Hay

Approved By: [Signature]

Copies:

ANALYTICAL RESULTS APPLY ONLY TO THE SUBMITTED SAMPLE AND MAY NOT REFLECT RESULTS OF SEEMingly IDENTICAL MATERIAL OR PRODUCTS.
NITRATE ($\text{NO}_3$)

• Reported as $\text{NO}_3$ & $\text{NO}_3$-N

• Conversions:
  • $\text{NO}_3$-N $\times$ 4.42 = $\text{NO}_3$
  • $\text{NO}_3$ $\div$ 4.42 = $\text{NO}_3$-N

• Be careful not to confuse the two as the danger thresholds are different
<table>
<thead>
<tr>
<th>NO₃</th>
<th>NO₃-N</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4,500 ppm</td>
<td>&lt; 1,000 ppm</td>
<td>Safe to feed under all conditions</td>
</tr>
<tr>
<td>4,500 – 6,500 ppm</td>
<td>1,000 – 1,500 ppm</td>
<td>Safe to feed to non-pregnant animals. If pregnant, limit to 50% of DM ration</td>
</tr>
<tr>
<td>6,500 – 9,000 ppm</td>
<td>1,500 – 2,000 ppm</td>
<td>Safely fed if limited to 50% of DM ration. If pregnant, limit to 25% of DM ration</td>
</tr>
<tr>
<td>9,000 – 15,500 ppm</td>
<td>2,000 – 3,500 ppm</td>
<td>Limit feed to 35-40% of DM ration. Feed &gt;9,000 should NOT be fed to pregnant animals</td>
</tr>
<tr>
<td>15,500 – 18,000 ppm</td>
<td>3,500 – 4,000 ppm</td>
<td>Limit feed to 25% DM ration. Do not feed pregnant animals</td>
</tr>
<tr>
<td>&gt;18,000 ppm</td>
<td>&gt; 1,000 ppm</td>
<td>Do not feed. Potentially toxic</td>
</tr>
</tbody>
</table>

All values on DMB
Symptoms

Chronic
• Reduced appetite
• Diarrhea
• Runny eyes
• Weight loss
• Abortions

Acute
• Cyanosis
• Labored breathing
• Convulsions, staggering
• Collapse, coma, death

Symptoms dependant upon age, BCS, pregnancy, nutritional status
Nitrate Concentration

Remaining
≈ 30% of NO₃ is spread across upper 2/3 of plant

≈ 70% of NO₃ is in lower third of plant

≈ 2% in leaf

≈ 1% in corn
Options

- Ensile
  - Reduce NO$_3$ Level 30 – 50%
- Dilute
  - Mix with low NO3 hay; top dress with starch source, i.e. grain
- Utilize propionibacteria
  - Condition for 10 days prior to feeding
- Don’t turn out hungry cattle
- Don’t overstock
- Provide fresh, low NO3 water
- Poor health/nutritional status increases risk
Prussic Acid (HCN)

• Constantly run into clients who confuse NO3 & HCN
  – Unlike HCN, NO3 will not dissipate after a hard freeze

• HCN poses a threat to grazing animals especially after a drought-ending rain or in regrowth

• Can kill an animal within minutes after exposure whereas NO3 can take days or weeks
Prussic Acid Symptoms

By the time symptoms are recognized it may be too late to treat the animal
HCN Symptoms

HCN toxicity acts more rapidly than NO3 toxicity.

- Excessive salivation
- Labored breathing
- Staggering
- Convulsions → coma → death
# HCN Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 600 ppm</td>
<td>Acceptable</td>
</tr>
<tr>
<td>600 – 1,000 ppm</td>
<td>Caution, may be toxic</td>
</tr>
<tr>
<td>&gt; 1,000 ppm</td>
<td>Considered toxic. Do not feed</td>
</tr>
</tbody>
</table>

All values on DMB
RFV vs RFQ

- Scale developed by hay brokers to market & sell dairy hay

- RFV is calculated from the ADF & NDF and is based on the intake of digestible energy

- RFQ is calculated from ADF, NDF, Protein, Fatty Acids, & NDFd. The key is the digestible NDF (NDFd)
### RFQ/RFV Scale

<table>
<thead>
<tr>
<th>RFQ/RFV</th>
<th>GRADE</th>
<th>QUALITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 180</td>
<td>Supreme</td>
<td>Excellent Dairy Hay</td>
</tr>
<tr>
<td>170 – 180</td>
<td>Premium</td>
<td>Dairy Hay</td>
</tr>
<tr>
<td>150 – 170</td>
<td>Good</td>
<td>Good Hay</td>
</tr>
<tr>
<td>130 – 150</td>
<td>Fair</td>
<td>Average hay</td>
</tr>
<tr>
<td>&lt; 130</td>
<td>Utility</td>
<td>Poor Hay</td>
</tr>
</tbody>
</table>
NIRS vs Wet Chem

• Wet chemistry uses chemicals to digest the sample prior to analysis

• NIRS = Near Infrared Spectroscopy

• NIRS is a useful tool but has limitations – high ash (dirt) levels, heat damage can affect results

• Use on alfalfa, alfalfa haylage, corn silage, grass hay (mixed/unknown), whole corn/milo, soybean hay

• NIRS, a.k.a. “Ring Test”