Forage Sampling and Analysis Interpretation

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Why Sample?

• Forage quality

• Nutrient requirements

• Additional feeds or supplements

• Mix forages
Equipment

- Forage probe
- Bucket
- Sample bags
- Drill

- Square foot box
- Clippers
- Bucket
- Sample bags
Large Round Bales

• Sample at least 10%
• Collect 2 cores from each bale
• Collected from the circumference
Square Bales

- Sample at least 10%
- Perpendicular to the bale surface
- 2 cores from large squares
Standing Forage

• Random selection
• Use the “M” pattern
• Regular intervals
• Clip at grazing height
  – Cut samples to 3 inches long
• Increase sample numbers for larger fields or pasture
• Large variations = more samples per field or pasture
“M” Pattern
Silage Sampling

• If packed and stored properly, CP and fiber will be stable
  – Can sample before packing
  – Multiple samples from each chopper wagon
  – Middle of the load
  – Store in fridge or freezer
  – Mix all samples together
Silage Sampling

- **Upright Silo**
  - Don’t sample from top or bottom 3 feet
  - Remove spoilage to collect sample

- **Silage Bunker**
  - Do not collect from the face
  - Remove silage similar to feeding and place the pile on the bunker floor

- **Bag**
  - Can collect from the face
  - Core samples can also be collected
TMR Sampling

• Mix the TMR
• Distribute in the bunk
• Collect samples along the bunk
  – Top, middle, and bottom
• Place all samples in a bucket and mix
• Collect ¼ of the total sample
Sampling Tips

• Always collect plenty of sample

• Collect a representative sample

• A corded drill and forage probe make your job easier
Forage Analysis Interpretation

- Dry matter
- Protein
- Fiber
- Energy
- RFV and/or RFQ
- Minerals
- Nitrates, mold, mycotoxins
Protein

• Soluble
• Degradable
• ADICP
• Available
Fiber

- Lignin – not digestible
- ADF – cellulose and lignin
- NDF – hemicellulose, cellulose, and lignin
- NFC – non-structural carbohydrates, starch
Energy

• Crude fat – ether extract
• TDN – digestible fiber, protein, lipid, and carbohydrates
  – Calculation based on ADF and NDF
  – Best used for forage-based rations
• NE system – accounts for energy losses in digestion
  – Calculations based on TDN
  – Best used for concentrate-based rations
RFV and RFQ

• RFV – allows comparisons across like forages
  RFV = \[
  \frac{[\text{DMI} \times \text{DDM}]}{1.29}
  \]

  Digestible Dry Matter (DDM) = 88.9 – [0.78 x ADF (% of DM)]
  Dry Matter Intake (DMI) = 120 ÷ NDF (% of DM)

• RFQ – uses digestibility as well as fiber
  RFQ = \[
  \frac{[\text{DMI} \times \text{TDN}]}{1.23}
  \]

  Digestible Dry Matter (DDM) = 88.9 – [0.78 x ADF (% of DM)]
  TDN = (NFC x 0.98) + (CP x 0.93) + (FA x 0.97 x 2.25) + (NDFn x (NDFD/100) – 7)
Minerals

• Ash – total mineral content
  – Forages: 3-12%
  – Concentrates: 1-4%
  – Excessive values may mean soil contamination

• Macro and micro-mineral analysis

• Many forage analyses may include Ca, P, K, and Mg
Other Analyses

• Nitrates – especially important during drought or after frost
• Mold and yeast counts – times of increased moisture
  – Does not identify species of mold
• Mycotoxins – produced by molds
  – Expensive
  – Small concentrations can be toxic
Questions

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