MONTANA STATE UNIVERSITY EXTENSION

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

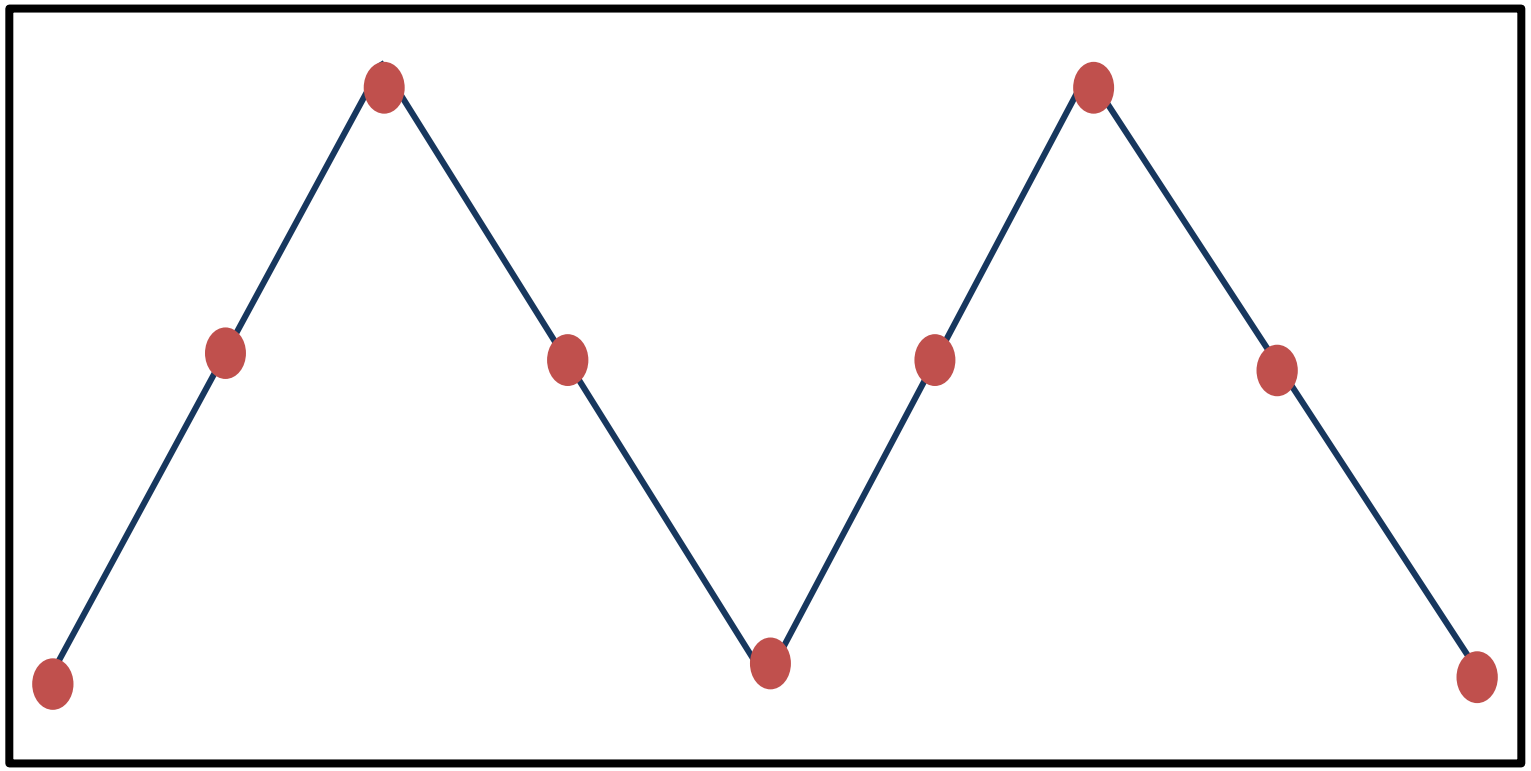
Square Bales

- 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

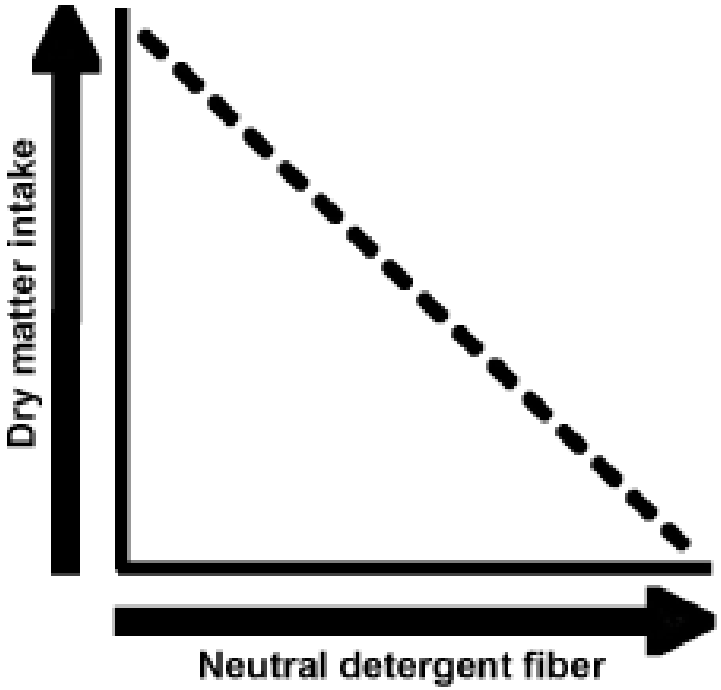
CHEAP

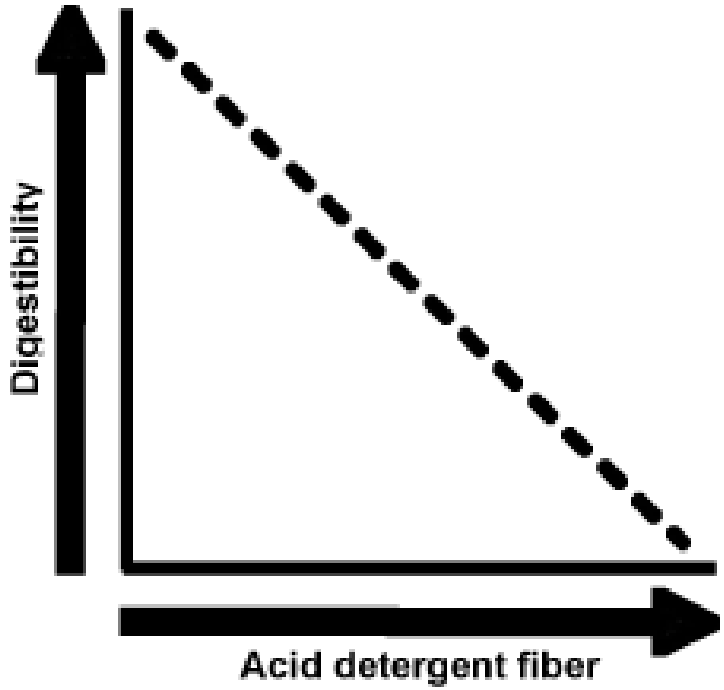
Protein

- Soluble
- Degradable
- ADICP
- Available

Fiber

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


Dry matter intake
Neutral detergent fiber


Digestibility
Acid detergent fiber

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 = [DMI (% of BW) x DDM (% of DM)] ÷ 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 = [DMI (% of BW) x TDN (% of DM)] ÷ 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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