How To Sample Forages for Nutrient Analysis

a KSRE Livestock PFT Signature Program

Presented By Brett Melton, District Livestock Agent, River Valley Extension District

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How to Sample Forages for Nutrient Analysis

Bales…Bags…Bunkers…Standing

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Collect a Representative Sample of the Forage being Tested

- **Objective**
  - Representative sample of the forage or feed
  - Tons to lbs., lbs. to grams, (grams) to ppm
- **Sampling error**
  - Taking the sample
  - Handling the sample prior to analysis

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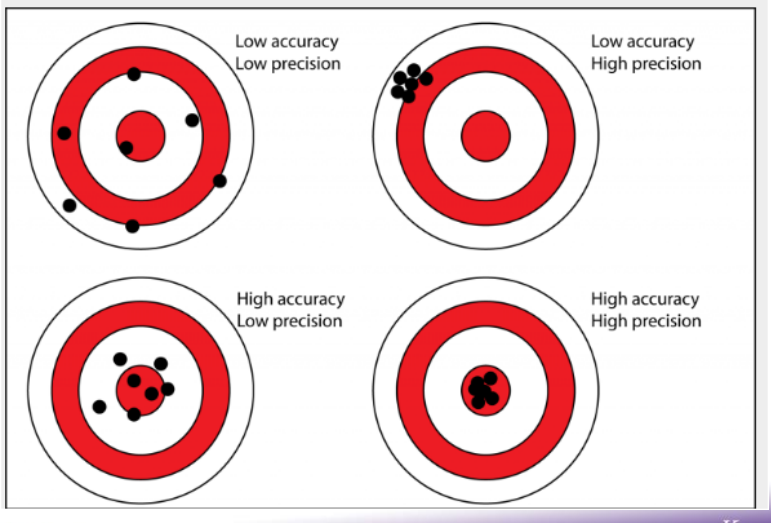
Accuracy and Precision



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What is a forage lot ?

- A forage lot consists of forage harvested from one field:
  - at the same cutting and maturity within a 48-hour period
  - Usually contains fewer than 100 tons of hay.
  - A forage lot should be similar for forage type, field (soil type), cutting date, maturity, variety, weed infestation, type of harvest equipment, weather during growth and harvest and storage conditions.

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Select Uniform Lots of Hay

	Hay field 1st cut		Hay field 2nd cut		
	Grass infested	Pure	Grass infested	Pure Rain Damage	Pure No Rain
Lot #	1	2	3	4	5

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Sampling Bales

- Group bales
  - Field, source, forage type, Quality
  - Risk management (nitrates)
- Sort and store bales such that group/lots of hay can be identified and maintained during feeding

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Sampling bales

- Sample as close to feeding as possible
- Rule of thumb: Sample 10-20% of bales in lot
  - Randomly selected bales
- Use an approved sampling device
  - Many options available
  - Ensures consistent stem/leaf ratio

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Weathering Damage of Large Round Bales

- Most damage occurs in the outer 12 inches of the bale
  - 50% of the hay in a bale with a radius of 30 inches is in the outer 9 inches of the bale
  - Proper core-sampling procedures must be adjusted to consider this change

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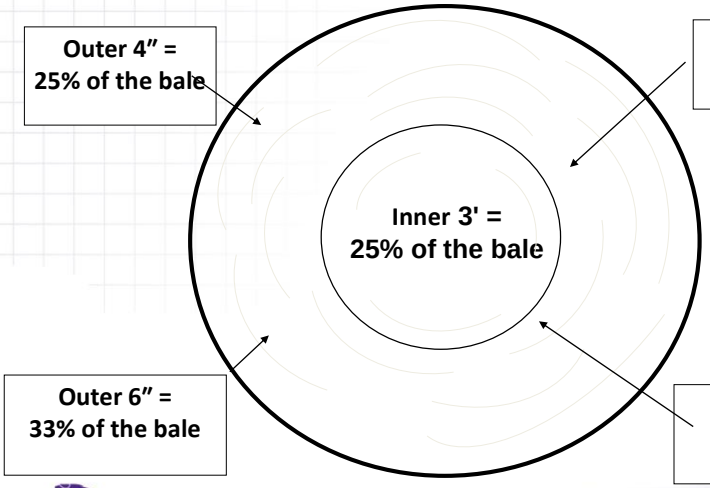
Six Foot Diameter Round Bale



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Hay Composition in Different Depths of Unprotected Large Round Bales

Sampling depth interval, inches	% of DM DM,%	IVDDM	NDF	ADF
0-3	56.4	43.0	59.5	46.7
3-6	75.5	50.2	58.1	45.1
6-9	81.0	52.1	58.0	45.2
9-12	82.4	53.0	56.2	43.3
12-30	83.9	55.0	53.5	41.5

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Sampling Big Squares

- Stem/Leaf ratio most consistent on ends
- Sample from ends with probe at 90°
  - Drill style work well…
- Safety
  - Bales fall…it happens

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Sampling Silage

- During harvest
  - Dry matter/moisture
  - 30-40% dry matter or 60-70% moisture
  - Koster tester, microwave
- Post-ensiling
  - Ensiling process takes 21 days
  - Usually sample at 28 days

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Don't be these guys!

Keith Bolsen SILAGE SAFETY FOUNDATION

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Sampling Silage

- **Bunkers**
  - Use loader or rake to collect silage from entire silage face
  - Collect grab (3-4) samples from bucket
  - May need multiple loader trips on a large bunker
  - Silage is delivered on some operations
    - Sample from middle of truck or wagon

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Silage Bags

- Multiple bags
  - Different days, different conditions, who knows?
- Sampling methods
  - Grab sample from face (8-10 locations)
    - Only represents small amount of silage
    - Sample multiple times during day
  - Probe along sides
    - Both sides…challenge
    - Need to patch holes with bag tape

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Sampling Standing Forage
(crop residues, forage sorghum)

- Representative sample of the forage
  - Not easy
  - Difficult to determine what livestock will eat
- Whole plant samples
  - Pulling plants = soil contamination
  - clipped at the same height
  - Mark clippers

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Standing forage

- Protocols
  - Walk diagonal line sample 1 plant every 50-100 steps
  - 4 corners and the center
- Chop whole plant in 1-3 inch pieces and place in clean bucket
  - Mix and then subsample in gallon bag

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How do we sample this?

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Composite sampling

- Take similar weight/or volume of sample on different days/times
- Place in refrigerator (3-5 days)
- Place an equal amount (weight or volume) of each sample in a clean container
- Mix slightly
- Then fill a 1 gallon zipper bag for analysis

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Final Thoughts

- Forage analysis is often overlooked as a management tool
- Feedstuffs variation can be potentially be huge
- Poor sampling technique or protocols create more problems than producers think

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