

LIVESTOCK

by *Ryan Reuter*

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Understanding and Interpreting Noble Foundation Forage Tests

The Noble Foundation offers feed and forage testing services to interested farmers and ranchers. The value of testing hay and/or forage is enormous, while the cost is minimal. This fact sheet shows how to interpret the results of a hay analysis from the Noble Foundation.

Sample Information

The quality of the results is directly influenced by the quality of the sample and the information provided about it. The Foundation publication "Sampling Hay and Standing Forage" (NF-FO-97-02) reviews hay and forage sampling procedures and is available by calling (580) 223-5810. When submitting a sample, fill out the sample information sheet shown in Figure 1. Identify the sample so that it's clear which forage it represents (example: 2nd cutting - Thomas Place). Indicate what plant (bermudagrass, native grasses, alfalfa, etc.) and type (hay, standing forage, silage) of forage it is. This information allows for a more precise analysis and more accurate supplementation recommendations.

Figure 1.

THE SAMUEL ROBERTS **NOBLE** FOUNDATION

The Samuel Roberts Noble Foundation, Inc.
2510 Sam Noble Parkway
Ardmore, Oklahoma 73401
580.223.5810 • www.noble.org

Forage Sample Information Sheet

Name _____ Ranch Name _____
Address _____ Phone _____
City _____ State _____ Zip _____
E-mail _____

Lab Use Only	Sample I.D.	Forage Type	Test	Animal Code*
<i>Example</i>	<i>North 40-2nd cutting</i>	<i>Bermuda</i>	<i>E</i>	<i>3, 18, 38</i>

*See reverse for animal codes. Available only with roughages using Tests E, F, G and H.

All analyses performed by: Ward Laboratory, 4007 Cherry Ave. / P.O. Box 788, Kearny, NE 68848-0788
Ward Laboratory will also bill you for analysis services. The Noble Foundation accepts no money for testing services.

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Then determine which analysis package will meet your needs. The available tests and their prices are:

Test Description	Minerals included
A. Crude Protein Only	Ca, P, K, Mg
B. Crude Protein and Nitrate-N (NO3-N)	Ca, P, K, Mg, Zn, Fe, Mn, Cu
C. Crude Protein & macro minerals	
D. Crude Protein & all minerals	
E. Crude Protein & ADF (TDN)	
F. Crude Protein, ADF (TDN) & NDF (RFV)	
G. Crude Protein, ADF (TDN), NDF (RFV), & all minerals	Ca, P, K, Mg, Zn, Fe, Mn, Cu, & S
H. Crude Protein, ADF (TDN), NDF (RFV), & macro minerals	Ca, P

*There is no charge for testing services for Noble Foundation cooperators.

Do not pay for information that won't be used. Therefore, if you are only interested in crude protein, select test A. If you need to evaluate protein and energy (TDN), which is recommended, select test E. If you have alfalfa hay and want to know relative feed value (RFV), select tests F, G or H.

Tests E through H allows you to indicate the type of animal consuming the forage. The list of animals is on the back of the sample information sheet. Locate the animals you would like to use and enter the corresponding code number into the sample information. Noble Foundation Specialists will calculate supplemental feeding recommendations (if necessary) for that situation.


Results

After the information sheet is completed and turned in with the sample, the sample is processed and mailed to Ward Laboratories in Kearney, Neb., for analysis. Results will be mailed to you, along with a bill from Ward Labs, in about 10 to 14 days. (Foundation cooperators will not receive a bill.)

The results will look like this:

Sample Information →

Results →



Agricultural Testing Services
The Hummel-Baker-Noble Foundation, Inc.
2511 East Noble Highway P.O. Box 2100
Adrian, Oklahoma 73402 Telephone (806) 225-3600

Sample Description: 2-Gar Hay Jeffrey Renter Sample Type: Roughage
Lab Number: 47482 Date: 6/19/02 15316 W. OKC Blvd Crop: Out Hay
County: OK-Canadian El Reno, OK 73434 Test Fees: Test F

	Dry Matter (%)	Moisture (%)	Crude Protein (%)	ADF (%)	NDF (%)	TDN (%)	RFV	Water Solubles (g/kg)
As Fed	89.4	10.6	4.3	44.3	68.8	44.9		
Dry Matter			4.8	49.2	71.8	52.3		

Cattle Type	Nutrient Requirements			Nutrient Deficiency			Nutrient Deficiency		
	CP (%)	TDN (%)	g/kg DM	CP (%)	TDN (%)	g/kg DM	CP (%)	TDN (%)	g/kg DM
1200 lb Mature Cow, Early Lactation, Superior Milk Production	1.19	17.3	24.3	1.01	4.77		None	0.21	
Supplements	As Fed	CP%	TDN%	Ton	Feed	Head/Day	As Fed	CP%	TDN%
20% Range Cubes**	18	61	\$172	N/A	N/A	N/A	18	61	\$172
40% Range Cubes**	34	65	\$290	N/A	N/A	N/A	34	65	\$290
Softens Meal**	47	75	\$165	N/A	N/A	N/A	47	75	\$165
Continued Meal**	42	69	\$212	N/A	N/A	N/A	42	69	\$212
Softens Hails**	11	73	\$90	N/A	N/A	N/A	11	73	\$90
Alfalfa Hay**	15	50	\$80	N/A	N/A	N/A	15	50	\$80

Cattle Type	Nutrient Requirements			Nutrient Deficiency			Nutrient Deficiency		
	CP (%)	TDN (%)	g/kg DM	CP (%)	TDN (%)	g/kg DM	CP (%)	TDN (%)	g/kg DM
800 lb Yearling Heifer (Heifer, Late Gestation, 1.08 ADG)	1.41	9.5	15.7	1.15	2.41				
Supplements	As Fed	CP%	TDN%	Ton	Feed	Head/Day	As Fed	CP%	TDN%
20% Range Cubes*	18	61	\$172	3.8	\$6.33		18	61	\$172
40% Range Cubes*	34	65	\$290	3.7	\$6.42		34	65	\$290
Softens Meal*	47	75	\$165	3.1	\$6.25		47	75	\$165
Continued Meal*	42	69	\$212	3.2	\$6.35		42	69	\$212
Softens Hails*	11	73	\$90	3.2	\$6.14		11	73	\$90
Alfalfa Hay**	15	50	\$80	N/A	N/A		15	50	\$80

* - Use Cubes with this label ** - Supplement not Appropriate

Animal fed only (and not correct supplement) may not receive a true estimate for the amount of feed needed.

A large supplement (over 200 lbs) should be applied to a pasture or other feeding site. Supplement should be applied to a pasture or other feeding site. Supplement should be applied to a pasture or other feeding site. Supplement should be applied to a pasture or other feeding site.

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Item	Description
Dry Matter %	The percentage of the weight of your forage sample that <i>is not</i> water. Supplement requirements are calculated based on the dry matter percentage of your hay.
Moisture %	The percentage of moisture in the hay sample when it was tested.
Crude Protein (CP)%	The percentage of the hay that can supply nitrogen or amino acids to meet an animal's crude protein requirements.
Acid detergent fiber (ADF)%	The percentage of the hay that is considered to be very slowly digested. It contains cellulose and lignin.
Neutral detergent fiber (NDF) %	The entire fibrous portion of the hay. NDF contains ADF plus some more rapidly digested carbohydrates.
Total digestible nutrients (TDN)%	A calculated value (estimated from ADF) that represents the overall digestibility or energy value of the forage.
Relative Feed Value (RFV)	A calculated value that represents the digestibility and intake potential of the forage. It is calculated from ADF and NDF and is only nutritionally applicable to alfalfa hay fed free choice to dairy cows. RFV is often used in marketing all types of hay.
Dry Matter Intake (DMI)	An estimate of the amount of forage the animal will voluntarily consume if given free access. It is expressed in pounds per day and is estimated from TDN of the forage. Actual DMI may vary considerably due to environmental and other effects.
Nitrate Nitrogen (NO ₃ -N)	The following table can be used to interpret nitrate nitrogen results.
<u>NO₃-N, ppm</u>	<u>Recommendation</u>
0 - 750	Considered safe for all cattle.
751 - 1,150	Considered safe for non-pregnant cattle
1,151 - 2,250	Some risk for all cattle. May cause abortion and decreased growth.
>2,250	Potentially toxic for all cattle. Acute toxicity symptoms, including death.
Request OSU Extension Facts F-2903, "Nitrate Toxicity in Livestock", Oklahoma State University, for more information and suggestions for feeding forage high in nitrate.	

Application

Results are reported on an as-fed basis on the top line of the results section. These numbers are useful when weighing out forage or supplements to feed cattle. The bottom line of the results section is the analysis on a dry-matter basis. These values represent the forage with the water removed. Dry matter values should be used to calculate supplement needs, to compare one forage to another, or when buying and selling hay.

For a cow-calf producer, two important values are CP and TDN. Beef cow nutrition is commonly discussed in these basic terms.

If you selected tests E through H (which include ADF), our database has calculated CP & TDN deficiencies, and if any deficiencies exist, recommended supplements for the animals you selected. Default animals will appear if specific animal codes were not indicated when the sample was submitted. Default animals are:

(continued on next page)

- * 1200 lb mature cow, early lactation, average milk production
- * 1200 lb mature cow, middle gestation
- * 800 lb yearling bred heifer, late gestation, ADG of 1.0 lb

If there is a deficiency (box A), find the supplement in the list with the lowest cost (box B). This is typically the most economical supplement to use. Prices are updated about every two months, and are an average of feeds available in the Noble Foundation's service area. Check with your feed supplier to confirm supplement prices.

When using supplement recommendations, be aware of the following:

- Actual dry matter intake and nutrient requirements may vary considerably from estimates due to environmental conditions and inherent animal variation.
- You should almost always supplement to meet a CP deficiency, or dry matter intake will be less than expected.
- You should supplement to meet a TDN deficiency when animals need to gain or maintain weight or condition.
- Always provide a quality mineral supplement and adequate clean water.
- Closely monitor cattle performance and body condition to be sure nutrient requirements are being met.

If you have any questions concerning your forage analysis, call a Foundation livestock specialist at (580) 223-5810.

The Samuel Roberts NOBLE FOUNDATION, Inc.
2510 Sam Noble Parkway
Ardmore, Oklahoma 73401

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