Forage Fact # 83

Date:
January 2013

Beef Nutrition - What to Look At & How Much?

Feed Quality Challenges

Heavy rainfalls and humid days delayed many producers from putting up their winter feed in 2013 (hay, haylage, silage, swath grazing). A majority of the feed was done in late August and September. Many were concerned about the quality of feed they were able to put up and whether it would provide the necessary nutrients their livestock needed. Even without the challenging weather conditions experienced this year, farmers and ranchers are very conscientious about how their hayfields and pastures are performing in terms of forage quantity and quality. Feed sampling and ration balancing are excellent tools to determine the performance of hayfields and pastures and ensure livestock are getting adequately fed.

Feed Sampling & Analysis

Forage Fact #18 about feed sampling provides excellent advice on the procedure to sample hay, haylage and silage. One thing to note is that it is a good idea to refrigerate dry hay samples and freeze haylage and silage samples to preserve their quality until they are sent to the feed analysis lab. FF 18 also provides valuable information about buying, borrowing or making a probe. Grab samples (where samples are literally grabbed by hand) are not as accurate as probe samples because many of the fine leaf material is lost when transferring to a bag. This leads to an underestimation of nutrients as this fine leaf material normally contains a high proportion of nutrients.

Photo: Cows eating hay rolled onto snow which increases the spread of nutrients throughout the field.
Photo credit: Barry Yaremcio

Where To Get Feed Probes

Peace River Forage Assn
(250) 789-6885
Sandra or Talon
Silage probe as well

Ministry of Agriculture
1 877 772 2200
Shelley or Ellen

Other Resources

FF #18 - Feed Samples: Only as Good as the Samples You Take!

FF#20 - What's What in Feed Tests: A Vocabulary Enhauncer

AB Agri-Fact 420/52-4 - Beef Ration Rules of Thumb

Cattle Nutrition Presentation, Barry Yaremcio, Dec 2013

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For more Forage Facts visit:

www.peaceforage.bc.ca

Peace River Forage Association of British Columbia

What Do I Look At & How much Do I Need?

Source: AB Agri-Fact Beef Ration Rules of Thumb

Beef Cows

	Crude Protein (%)	Total Digestible Nutrients (TDN)
Mid pregnancy	7	55
Late pregnancy	9	60
Post calving	11	65

Feeder Cattle

	Crude Protein (%)	Total Digestible Nutrients (TDN)
550-800lbs	14	70
800-1050lbs	12	70
1050lbs-finish	10	78

Crude protein and energy are the first things to look at on your feed analysis. Protein provides the building blocks to produce muscle and milk; energy is needed so these building blocks can be utilized to their full potential. There are many measures of energy but the one most commonly used in the beef cattle industry is Total Digestible Nutrients (TDN).

With feeders in particular, different protein and energy levels will affect the animal's rate of gain. Using a ration balancing program, such as **CowBytes** from AB Agriculture, will help attain a desired rate of gain. Test results from home grown feeds or custom mixes can be entered and used to develop rations for all ages and classes of cattle.

Adjustments to TDN Values

Advice received from Barry Yaremcio, AB Beef & Forage Specialist, is to use the document to the right to cross check feed test energy (TDN) values. Laboratories use area specific formulas to estimate the TDN of feeds. However, feeds grown in the Peace Region have different physical properties (less fiber, more protein) than those grown in other areas, say the United States. For Peace grown feeds, that are sent out of the area to be analyzed, the formula used can provide less accurate TDN results. Research has shown that acid detergent fiber (ADF) consistently provides the correct energy values for feeds. This is because ADF is a measure of all the indigestible components of a feed (cellulose, lignin, etc.) and not a product of a formula.

How to Use Example (see colored boxes): You have an alfalfa-grass mix hay feed analysis with an ADF value of 38. Your adjusted TDN% is 61.13.

Analysis Tip

When looking at values on a feed analysis always compare dry matter values. This value makes it possible to compare silage and hay as water is removed and not diluting the nutrients. Forage Fact #20 goes through the vocabulary associated with feed analysis.

DE Values for Forages
Nutrition Section

DE values (Mcal/lb) calculated from R.F.E.U. equations.
Reference – Feeder's Day Report, pp-46, 1984
4.4 Mcal DE = 1 kg TDN, 2.2 Mcal DE = 1 lb TDN

All values are on a Dry Matter Basis

ADF	All Forages DE	TDN %	Alf – grass % Grass Hays DE	TDN %	All Hays except Cereals DE	TDN %	Cereal Hays CP	Cereal hays DE	TDN %
24	1.32	66.14	1.37	68.64	1.32	66.14	4.0	0.91	45.60
25	1.31	65.64	1.37	68.64	1.31	65.64	4.5	0.93	46.60
26	1.30	65.14	1.36	68.14	1.30	65.14	5.0	0.95	47.60
27	1.29	64.64	1.35	67.64	1.29	64.64	5.5	0.98	49.10
28	1.28	64.13	1.34	67.14	1.28	64.13	6.0	1.00	50.11
29	1.27	63.63	1.33	66.64	1.27	63.63	6.5	1.02	51.11
30	1.26	63.13	1.31	65.64	1.26	63.13	7.0	1.05	52.61
31	1.25	62.63	1.30	65.14	1.25	62.63	7.5	1.07	53.61
32	1.25	62.63	1.29	64.64	1.24	62.13	8.0	1.09	54.61
33	1.24	62.13	1.28	64.13	1.23	61.63	8.5	1.11	55.62
34	1.23	61.63	1.27	63.63	1.22	61.13	9.0	1.14	57.12
35	1.22	61.13	1.26	63.13	1.21	60.63	9.5	1.16	58.12
36	1.21	60.63	1.25	62.63	1.20	60.13	10.0	1.18	59.12
37	1.20	60.13	1.24	62.13	1.19	59.63	10.5	1.20	60.13
38	1.19	59.63	1.22	61.13	1.18	59.12	11.0	1.23	61.63
39	1.18	59.12	1.21	60.63	1.17	58.62	11.5	1.25	62.63
40	1.17	58.62	1.20	60.13	1.16	58.12	12.0	1.27	63.63
41	1.16	58.12	1.19	59.63	1.15	57.62	12.5	1.30	65.14
42	1.15	57.62	1.18	59.12	1.14	57.12	13.0	1.32	66.14
43	1.15	57.62	1.17	58.62	1.13	56.62	13.5	1.34	67.14
44	1.14	57.12	1.16	58.12	1.12	56.12	14.0	1.36	68.14
45	1.13	56.62	1.14	57.12	1.11	55.62			
46	1.12	56.12	1.13	56.62	1.10	55.12			
47	1.11	55.62	1.12	56.12	1.09	54.61			
48	1.10	55.12	1.11	55.62	1.08	54.11			
49	1.09	54.61	1.10	55.12	1.07	53.61			
50	1.08	54.11	1.09	54.61	1.06	53.11			

DE Values for Forages on AB Agriculture website at:
www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/crop14244/

What Do I Look At & How much Do I Need?

Source: Major Minerals for Beef Cows. 2010. Barry Yaremcio.

Important Macro & Micro Minerals

Mineral	Min	Max	Deficiency	Toxicity
Calcium (Ca)	0.5%	1.8%	Not common in cattle whose diet is a majority forage based. Rickets in young, osteomalacia in old and reduced milk production	Not a toxicity but if Ca is over-supplemented in the diet it can cause milk fever as the body does not retain Ca but then requires a lot during calving which results in low blood Ca
Phosphorous (P)	0.2%	0.4%	Common: irregular heat cycles, lower fertility, reduced feed intake. Severe: bone fractures **Need Vit D in diet to use P efficiently	Mimics calcium deficiency
Magnesium (Mg)	0.2%	0.4%	Grass tetany - nervousness, lack of coordination & muscle twitching (usually older cattle who also have a calcium deficiency on rich pasture)	Not common in cattle but results in severe diarrhea, sluggish appearance and decreased feed digestibility
Potassium (K)	0.5%	2.5%	Not common in cattle whose diet is a majority forage based	Grass tetany (see magnesium deficiency)
Sulphur (S)	0.15%	0.4%	Weight loss, anorexia, weakness	Occurs when high sulphates are in drinking water - interferes with the absorption and utilization of other nutrients especially copper and selenium
Selenium (Se)	*4.5mg	*6.5mg	White muscle disease (weak, stiff, seem double jointed), retained placenta	Weight loss, lameness, loss of hair, blind staggers

Macro mineral	Adequate to Good Source	Marginal to Poor Source
Calcium (Ca)	Forages	Grains
Phosphorous (P)	Grains	Forages
Magnesium (Mg)	Forages & grains	n/a
Potassium (K)	Forages	Grains
Sulphur (S)	Forages & grains	n/a

*If cattle are getting between 4.5 - 6.5 mg/day of selenium then they also need to receive 300 - 500 IU/day of Vitamin E.
Peace Region soils are deficient in selenium so it needs to be supplemented to livestock. There are many commercial supplements specifically formulated for this region to supply selenium. Check at your local Ag feed store.

Important Mineral Ratios

Minerals have many interactions with each other and some in particular are very important. Calcium and phosphorous should be monitored and maintained in a ratio of 2:1 to 7:1 (Ca:P). Maintaining this ratio is important because Ca and P play an important role in bone formation/turnover and nerve functions. Potassium, Magnesium and Calcium interact to make the tetany ratio (K/(Mg+Ca)). This is how grass tetany can be prevented. The maximum this ratio can be is 2.2:1. If Potassium is too high (>1.75%) and one of the other two are low (Ca <0.6%, Mg <0.3%) then this ratio will be out of balance and livestock performance will be affected.

Beef calf with white muscle disease (selenium deficiency)

How Much Salt?

On a feed analysis sodium (Na) is usually reported. A Rule of Thumb for salt is Na x 2.5 equals NaCl (salt). If the sodium content of a feed is 0.1% or more (salt would be 0.25% or more) then the feed will supplement all the salt the animal requires.

If supplementing salt: cattle consume 75% of their salt intake at night so be sure to place salt close to sleeping area. Salt is one of the few feedstuffs that livestock will seek out and consume willingly whereas mineral can be bitter and less desired. Mixing loose salt and mineral will increase mineral consumption.

How Important Are Vitamins?

Fat Soluble Vitamins: Need to be supplemented or injected. Stored in liver and fat tissues.		
A	Important for bone development, vision and reproduction	**Deficiency:** decreased feed intake, slowed growth, rough hair coat, diarrhea, increased susceptibility to infections, and night blindness
D	Vital in bone development & immunity	**Deficiency:** Not common in livestock that remain outdoors (naturally absorbed from the sun). Symptoms are depressed appetite, irritability, tetany, swollen and stiff joints, rickets, and convulsions
E	Very important in early pregnancy, improves calf growth rates, decreases respiratory infections, improves immunity **Works with selenium in muscle development	**Deficiency:** White muscle disease (caused by a deficiency in selenium or vitamin E)
K	Only fat soluble vitamin that is produced in the rumen. Important in blood coagulation.	**Deficiency:** Excessive bleeding and/or haemorrhaging that could result in death. Possible cause is eating moldy sweet clover
Water Soluble Vitamins: Produced in a normal functioning rumen. Cannot be stored in the body.		
B	Thiamin, riboflavin, niacin, pantothenic acid, folic acid, vitamin B6, vitamin B12, biotin and choline	**Deficiency:** Occurs in cattle with reduced feed intake and can be compounded by the need to raise a rapid immune response (uses lots of vitamin B)
C	Provides calves with better health until they have a normal functioning rumen and produce their own	**Deficiency:** Occurs when cattle become stressed through handling, transportation or disease

Feed Analysis Summary

A feed analysis is only as good as the sample that is taken. Follow the procedure outlined on FF 18 to make sure the sample is representative of the feed in your yard or field. The first two most important nutrients to analyze are protein and energy. Determine which group of cattle your feed is most suited for (cows or feeders) and assess if you are going to have to supplement energy and/or protein into your feeding ration. Once energy and protein are balanced then take a look at your minerals and vitamins. Follow the Rules of Thumb to see if the ratios are in balance and if the feed will be able to supply what is required. If you have a rationing program it will automatically calculate these ratios for you.

Feed Rationing Programs

CowBytes
Available from AB Agriculture
Cow/calf, back grounding, feedlot
Cost: $50/copy
1 800 292 5697

SheepBytes
Online software - access from any computer
Ewes & rams, replacements, lambs
Cost: $100 1st year & $50 to renew
www.sheepbytes.ca

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