

Date:
December, 2002

Forage Fact # 20

What's What in Feed Tests: A Vocabulary Enhancer

Feed Terms

- * % Moisture
- * CP = Crude Protein
- * ADIN = Acid Detergent Insoluble Nutrients
- * ADIP = Acid Detergent Insoluble Protein (ADIN * 6.25)
- * TDN = Total Digestible Nutrients
- * NDF = Neutral Detergent Fibre
- * ADF = Acid Detergent Fibre
- * DE = Digestible Energy
- * DP = Digestible Protein

Do you need supplemental energy?

Look at your TDN value - average to good hay values range from 53-64 %.

How much of the feed will the cows eat?

Look at your ADF/fibre value - good forage is in the low 20's. The higher the ADF (30's and up) the poorer the quality of forage, the less they will eat.

Published by P.R.F.A. of
BC:

P.O. Box 908

Dawson Creek, B.C.

V1G 4H9

Interpreting Your Feed Test

Feed test results can be used to: balance rations, improve future crop management, and to determine fair prices for your feed based on nutritive values. Feed tests are of little value unless they are understood and used.

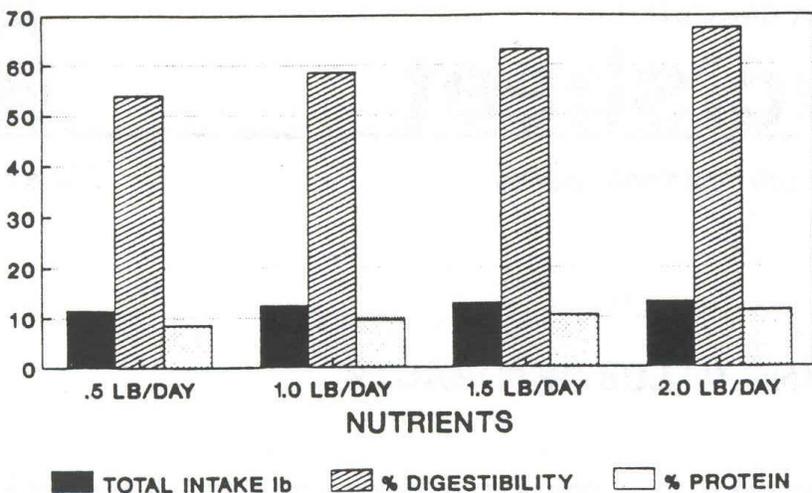
You have sent away properly sampled feed samples and now you have gotten your analyses back but what does it all mean?

When you are talking nutrition and feeds with your neighbour, feed salesperson,

veterinarian or livestock specialist, it is important that you both speak the same language and understand what the other person means. Understanding the terminology used on the feed sheets is the key to determining the quality of your feed.

Our goal here is to define and explain the values and terms you will find on your feed analysis form. We will also explain what most producers consider to be the most important values in a feed test "at a glance".

NUTRIENTS REQUIRED 500 LB (225 kg) GROWING STEER CALF



This graph illustrates what the feed requirements are of a growing calf steer. He needs to consume feed with a crude protein value of 10 and TDN of 50 or more to gain 1 lb/day.

Peace River Forage Association
of British Columbia



A Glimpse of What Your Feed Analysis Could Look Like

Feed Analysis

Producer	Client Sample ID	Client Sample Code	Client Comments
Peace River Forage Associati	CS South of House - Oct 4, :		

Sample Code	Client Sample Description
Grass Hay	2 Red Clover/Grass Hay mixes

Analyte	Units	As Fed	Dry Basis
Moisture	%	22.2	
Crude Protein	%	9.8	12.6
Acid Detergent Fibre	%	35.0	45.0
TDN (ADF)	%	36.81	47.29
DE (ADF)	Mcal/kg	1.62	2.08
NEG	Mcal/kg	0.24	0.31
NEL	Mcal/kg	0.66	0.85
NEM	Mcal/kg	0.78	1.01

Analyte	Units	As Fed	Dry Basis
Calcium	%	1.01	1.30
	%	0.15	
Potassium	%	0.98	
Magnesium	%	0.18	
Sodium	%	<0.01	
Salt	%	<0.03	

At a Glance:

1. Energy (TDN) values
> 55% TDN is good feed.
2. Protein (CP) values
average alfalfa > 8%.
3. Fibre (ADF) values good
feed is in low 20's
poor feed is over 30%.

Vitamins

- Routinely included in mineral mixes.
- Are not included in feed tests results.

Digestion

Refers to all changes that feed undergoes within the digestive tract with the end result that the broken down products are absorbed from the digestive tract for use by the animal.

This is what test feed results look like from Norwest Labs.

Energy - 1st Thing to Look At

Carbohydrates and fats are the two nutrients that supply the bulk of the energy needed by the animal. Energy is usually the first limiting factor for young stock that is trying to grow. Energy is measured as TDN (Total Digestible Nutrients). The two numbers to look at here are TDN Dry Basis and Fibre (Acid Detergent Fibre ADF) which are both expressed in percentages.

TDN Dry Basis compared with your animals nutrient requirements will tell you if you need supplemental energy (grain) or not. Fibre (Acid Detergent Fibre) will help predict how much of this feed your animals will eat. Generally better forage has a lower ADF.

Acid Detergent Fibre (ADF) - the fibrous, least-digestible portion of roughage. ADF consists of lignin and cellulose. Roughages high in ADF are lower in digestible energy than roughages that contain low levels of ADF. As ADF levels increase, digestible energy levels decrease.

Dry Basis - (aka Dry Matter) total weight of feed minus the weight of water in the feed.

As Fed or Dry Matter Basis

Almost all feeds contain moisture in them even though air dried. Because of this, most feed labs report both an 'As Fed' and a 'Dry Basis' number to reflect the nutrient content that takes the water content into account.

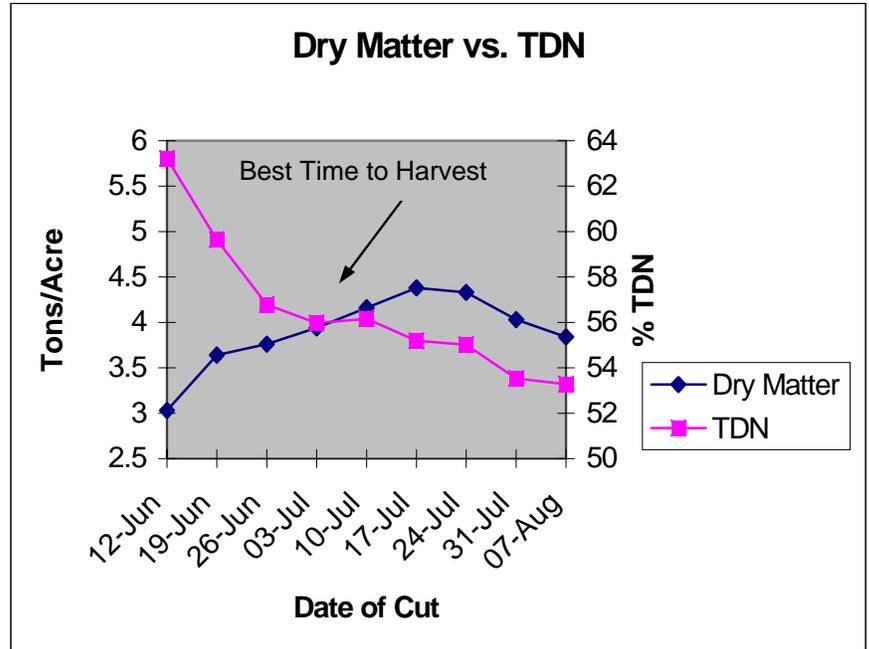
For most dry hay rations stick to using the Dry Basis figures for comparing feeds, and become particularly attentive to the reported 'As Fed' figures when feeding moisture dependent feeds such as silages. When comparing the nutrient content of feed, make sure you are using the same basis, preferably Dry Basis (Matter).

Protein - 2nd Value Looked At

Proteins are the building blocks for muscles and other tissues and organs in the animals' body. It is measured as Crude Protein (CP) and expressed as such on your feed analysis. Comparing this number with your animals' nutrient requirements will tell you if you need to supplement with protein feed such as canola pellets or other commercial protein supplements.

Advantages of Feed Testing

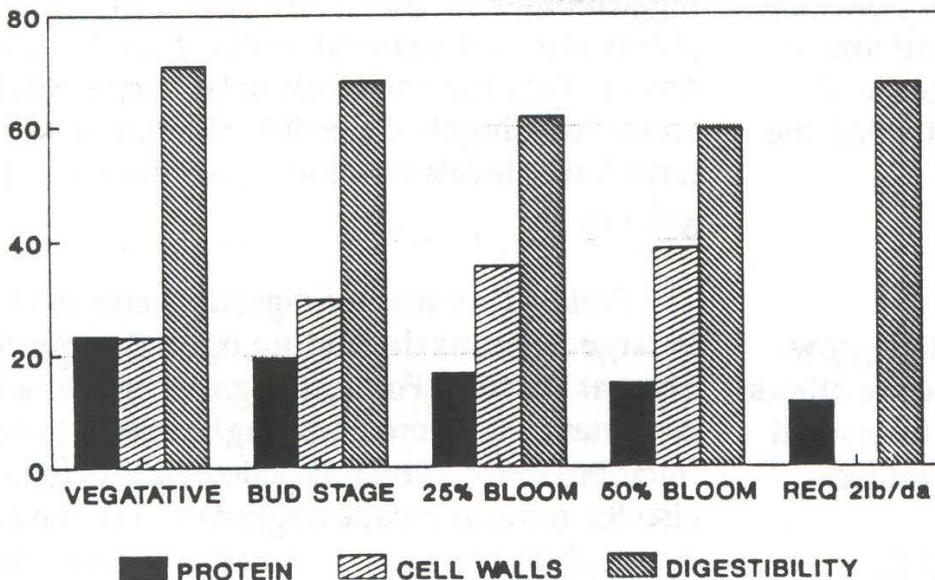
Feed tests enable us to determine when plants are most digestible and when they have the most nutrients available for the animals. We can see in the below graph as alfalfa matures, crude protein levels decrease as does the digestibility of the forage. The bars on the right side of the below graph indicate what is required for 2 lb/day gain on a growing steer calf.



The best time to harvest, according to the nutrition of alfalfa plants and dry matter yield, is the first week in July.

Source: C. Hoffchild, 1988 Undergrad Thesis using BCMAFF Variety Trial Project Data

EFFECTS OF MATURITY ON ALFALFA COMPONENTS AND DIGESTION



Source: BCMAFF Fact Sheet AGDEX 420.61

Concentrates

Feeds high in energy and low in fibre, for example, barley, oats, wheat, canola meal, soybean meal and molasses.

Digestible Energy (DE)

The gross energy minus the energy lost in manure.

Digestible Protein

The amount of crude protein actually absorbed by the animal (crude protein minus the protein lost in feces).

Feed Efficiency

The pounds (kg) of feed required to produce one unit of product, such as one pound (kg) body weight gain, or one pound (kg) of milk, or one dozen eggs.

... are sociologically, ecologically and economically sound.

Net Energy Growth (NEG)

Net energy used for deposition of body fat.

Net Energy Lactation (NEL)

Net energy used for lactation.

Net Energy Maintenance (NEM)

Net energy needed for maintenance.

Neutral Detergent Fibre (NDF)

Commonly called "cell walls". NDF gives a close estimate of fibre.

Minerals

Minerals are required for numerous functions in the animals' body.

Contact a veterinarian to pick the right minerals for your animals.

Nitrate Toxity Tests

- Crops of concern barley oats & weeds (pigweed, lambsquarter)
- Nitrate concentration declines as plants mature
- Safe range is 0.45-0.88%

Endophytes

When feeding straws from turf seed fields of some varieties, you may want to test for endophytes levels.

Nutrient Requirements of Beef Cattle

(Adapted and expressed on a moisture free basis = 100% Dry Matter)

Class of Stock	% TDN	%Protein (CP)	Calcium (Ca)	Phosphorus (P)
600 lb heifer @ 1.5 lb ADG	69	10.5	0.36	.21
900 lb heifer, 1.5 lb ADG, plus last trimester	69	9.2	0.37	.26
1100 lb 1st calf heifer, lactating	57	10	.40	.29
1300 lb cow, mid trimester	48	6.8	.24	.19
1300 lb cow, last trimester	55	7.6	.30	.21
1300 lb cow, lactating 20 lb milk	55	9.7	.39	.28

Note: We caution the use of these numbers as absolute even though a margin has been built into these numbers. Crude Protein levels below 7.5% for example may not accurately reflect the availability of protein for the animal's use. Similarly, TDN values below 50 are generally associated with higher fibre and therefore reduce animal intake.

Acid Detergent Insoluble Nitrogen (ADIN)

Acid Detergent Insoluble Nitrogen or ADIN is the measure used to estimate the effect of excessive heating on forages. ADIN fraction increases in forages damaged by heat from pelleting, the ensiling process or in hay baled at higher than recommended moisture content.

Essentially, heat damage reduces the availability of the crude protein to the animal and it has been estimated that 70% of the protein bound with the fibre is

Summary

Quality of forage determines the performance of the animal being fed. Consider these four aspects:

- 1) Intake: Fibre levels will affect voluntary consumption.
- 2) Digestibility: Quantity of nutrients absorbed through the digestive system.
- 3) Efficiency: Ratio of measurable animal production to nutrients supplied.
- 4) Anti-quality factors. Components of feed that inhibit above 3 aspects.

So there you have it! Has your vocabulary been enhanced?

Compiled by: Julie Robinson, Jim Forbes & Tom Pittman in Fall of 2002

Nutrient Management Project Funded by: PRFA of BC, Beef Cattle Industry Development Fund & Peace River Agriculture Development Fund.

Forage Facts Project Funded by: PRFA of BC, Investment Agriculture Foundation & Peace River Agriculture Development. The PRFA of BC would like to thank all the donators and supporters at their Forage Goods & Services Auction on Feb. 22, 2002.