

**2010 Forage Quality – Lessons Learned**  
**Drs. Greg Penner and Steve Hendrick**

<b>Alfalfa Hay</b>	<b>CP (%)</b>		<b>TDN (%)</b>		<b>NDF (%)</b>	
Yorkton/Foam Lake	16.5	(13 – 20)	57	(52 – 64)	59	(54 – 64)
Weyburn	13.6	(7 – 20)	56	(52 – 65)	57	(39 – 70)
Tisdale	15.5	(9 – 20)	57	(56 – 57)	57	(46 – 72)
Moose Jaw	13.0	(7 – 20)	56	(56 – 57)	57	(56 – 59)
Saskatoon	15.6	(7 – 26)	57	(53 – 63)	54	(43 – 68)
Rosetown	16.1	(10 – 21)	58	(55 – 61)	55	(45 – 60)
North Battleford	13.4	(9 – 16)	54	(51 – 58)		
Swift Current	10.4	(8 – 16)	56	(53 – 58)	61	(57 – 65)
<b>SASKATCHEWAN</b>	<b>14.6%</b>		<b>57%</b>		<b>57%</b>	

<b>Alfalfa/Grass Hay</b>	<b>CP (%)</b>		<b>TDN (%)</b>		<b>NDF (%)</b>	
Yorkton/Foam Lake	12.5	(9 – 20)	58	(52 – 63)	65	(60 – 69)
Weyburn	12.7	(6 – 19)	67	(53 – 72)	63	(55 – 60)
Tisdale	14.3	(9 – 21)	57	(53 – 61)	63	(45 – 76)
Moose Jaw	13.6	(6 – 18)	57	(55 – 59)	60	(55 – 68)
Saskatoon	11.9	(9 – 18)	57	(52 – 64)	63	(53 – 69)
Rosetown	12.5	(11 – 14)	57	(53 – 59)	59	(57 – 61)
North Battleford	10.7	(6 – 17)	57	(52 – 63)	62	(43 – 77)
Swift Current	14.5	(13 – 17)	58	(57 – 60)	54	(47 – 60)
<b>SASKATCHEWAN</b>	<b>12.7%</b>		<b>56.9%</b>		<b>62.4%</b>	

CP – Crude Protein

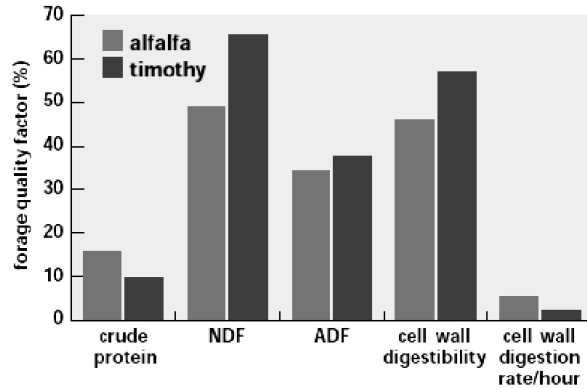
TDN – Total Digestible Nutrients (energy)

NDF – Neutral Detergent Fibre (limits how much a cow can eat of that feed)  
**Forage quality is affected by many different factors:**

1. Forage type

a. Grasses vs. Legumes

**Figure 2.** Forage quality of alfalfa and timothy components of a mixture..



Source: Collins, M. 1988. Composition and fibre digestion in morphological components of an alfalfa-timothy sward. Anim. Feed Sci. Tech. 19:135-143.

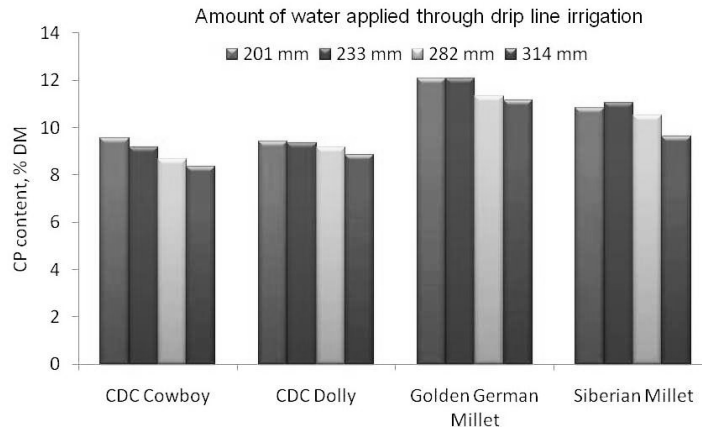
b. Cool-season vs. Warm-season

- i. Cool-season grasses often have higher digestibility and crude protein (CP)

2. Temperature and precipitation

- a. Cooler temperatures will often improve quality
- b. Forages with higher moisture require higher intakes to get the same nutrients
  - i. This may potentially limit nutrient intake and result in poorer performance

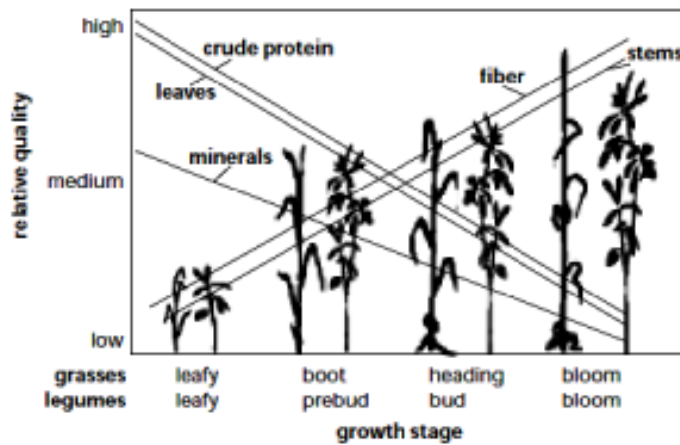
**Figure 3.** Effect of additional moisture on crude protein content of annual forages. Crude protein was expressed on a DM basis (Paul Jefferson, unpublished).



- c. More leaching of the soil in terms of minerals, especially selenium

### 3. Maturity stage

**Figure 3.** Effect of plant maturity on forage intake and digestibility.



Source: Adapted from Blaser, R., R.C. Hammes, Jr., J.P. Fontenot, H.T. Bryant, C.E. Polan, D.D. Wolf, F.S. McClagherty, R.G. Klein, and J.S. Moore. 1986. Forage-animal management systems. Virginia Polytechnic Institute, Bulletin 86-7.

- a. Leaf-to-stem ratio
  - b. Changes in nutrient content can occur rapidly
- ### 4. Fertility
- a. Fertilization (N) can increase yield and protein in grasses
- ### 5. Daily fluctuations in forage quality
- a. Soluble sugars are highest in afternoon and lowest in the morning
- ### 6. Harvesting and storage effects
- a. Rainfall
    - i. Leaching of soluble sugars, minerals and vitamins
    - ii. Increased plant respiration further increases ADF and NDF
      1. Heating of the bales – mold
      2. Further loss of vitamins
  - b. Leaf shatter
    - i. Reduces crude protein and increases fibre levels

### **What are the nutritional requirements for a 1,300 lb cow?**

Let's assume she eats 2.5% of her body weight (in dry matter). This equates to 32.5 lbs of dry matter.

**55% TDN and 10% CP in 2<sup>nd</sup> trimester** (17.8 lbs TDN and 3.3 lbs CP)

**60% TDN and 12% CP in 3<sup>rd</sup> trimester** (19.5 lbs TDN and 3.9 lbs CP)

**65% TDN and 14% CP when milking** (21.1 lbs TDN and 4.6 lbs CP)

If your alfalfa hay has 57% TDN, 14.6% CP and 57% NDF (2010 Provincial average):

**Cows can really only eat 0.9-1.2% of their body weight in NDF:**

$1,300 \text{ lbs} \times 1.2\% = 15.6 \text{ lbs NDF}$

This means that a cow can only eat 27.5 lbs of this hay (in dry matter), much less than the 32.5 lbs that she should eat.

$15.6 \text{ lbs NDF} \div 57\% \text{ NDF in hay}$

Which only gives her 15.6 lbs of TDN and means she is short on energy from the 2<sup>nd</sup> trimester through to calving

### **TAKE HOME MESSAGES:**

- 1. Wet growing years will reduce forage quality, but you need to test your forages to know what quality you have**
  - a. Look at TDN, NDF and CP values**
- 2. Need to have a balance between forage yield and quality**
- 3. Know the requirements of your cattle**