Reducing Winter Feeding costs

Using what you have effectively

Barry Yaremcio, Beef and Forage Specialist

Ag Info Centre, Stettler

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Alberta

Agenda

- Determining forage quality by testing
- Animal nutritional requirements
- Swath grazing advantages and concerns
- Straw / grain and silage rations
- Lower quality feeds – when to use
- Cost of feeding cows over winter
- Feed quality this year
- Supplementation concerns

Feed Testing

The starting point for any feeding program

What to Test?

- Baled forage and silage
  - Green feed
  - Round bale silage
  - Hay
  - Straw
- Use a core sampling tool

http://www.starqualitysamplers.com/forage.php

What analysis to request?

- MINIMUM (most years):
  - Moisture
  - Protein
  - Calcium
  - Phosphorus
  - Magnesium
  - Potassium
  - Sodium
  - Acid Detergent Fibre (energy)
  - Neutral Detergent Fibre

- Additional analysis:
  - Acid Detergent Insoluble Nitrogen (heated bales)
  - Nitrate
  - Sulphur (canola and brassicas)

Accuracy of Analysis

- Representative samples are important

	Protein	Energy TDN	Calcium	Phosphorus
Grab	10.5	57 %	1.32	0.23
Core	12.5	63 %	1.10	0.17

Grab sample impact on grain and protein inclusion in after calving ration

Want 65% TDN

- Energy reported low by 5%
- Remove 6 pounds of hay
- Add 6 pounds of barley
- Cost difference 3 cents a pound
- Added cost 30 cents per day
- 90 days = $27.00 per cow

Want 11% protein

- Protein reported low by 2%
- Remove 2 pounds of hay
- Add 2 pounds of peas
- Cost difference 5 cents a pound
- Added cost 10 cents per day
- 90 days = $9.00 per cow

Accuracy of Analysis

- Wet chemistry compared to NIRS for minerals

Nutrient	Protein	ADF	NDF	Calcium	Phos.	Mag.	Potas.	Sodium
NIR	13.8	28.3	50	0.45	0.38	0.23	0.98	0.02
Wet Chem	13.8	25.5	48	0.16	0.20	0.13	0.96	0.02

Supplementation for a Cow in Late Pregnancy

NIRS analysis		Wet Chemistry	
• Limestone	nil	• Limestone	4 oz.
• Phosphorus	nil	• Phosphorus	nil
• Magnesium	nil	• Magnesium	1 oz.

With improper calcium / magnesium supplementation risk is higher for downer cows, milk fever or winter tetany

Compare nutrient content on a “Dry Basis”

Alfalfa Grass Hay vs Barley Silage

Alfalfa hay

- Moisture 15 % or 85% DM
- **Protein 12.8 % (as fed)**

- $\frac{12.8\ \%}{1 - 0.15}$ or $\frac{12.8\ \%}{0.85}$

= **15.0 % Dry basis**

Barley silage

- Moisture 65 % or 35% DM
- **Protein 4.2 % (as fed)**

- $\frac{4.2\ \%}{1 - 0.65}$ or $\frac{4.2\ \%}{0.35}$

= **12.0 % Dry basis**

Protein and feed intake

- Downward spiral when protein is deficient
- Takes 2-3 days for intake to improve

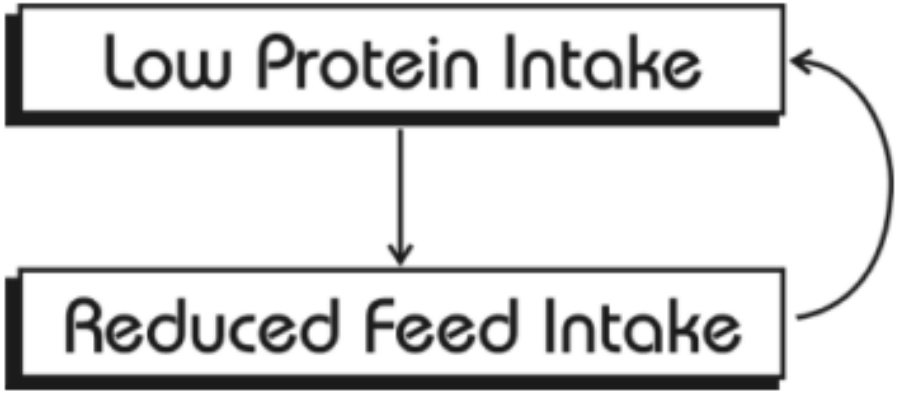
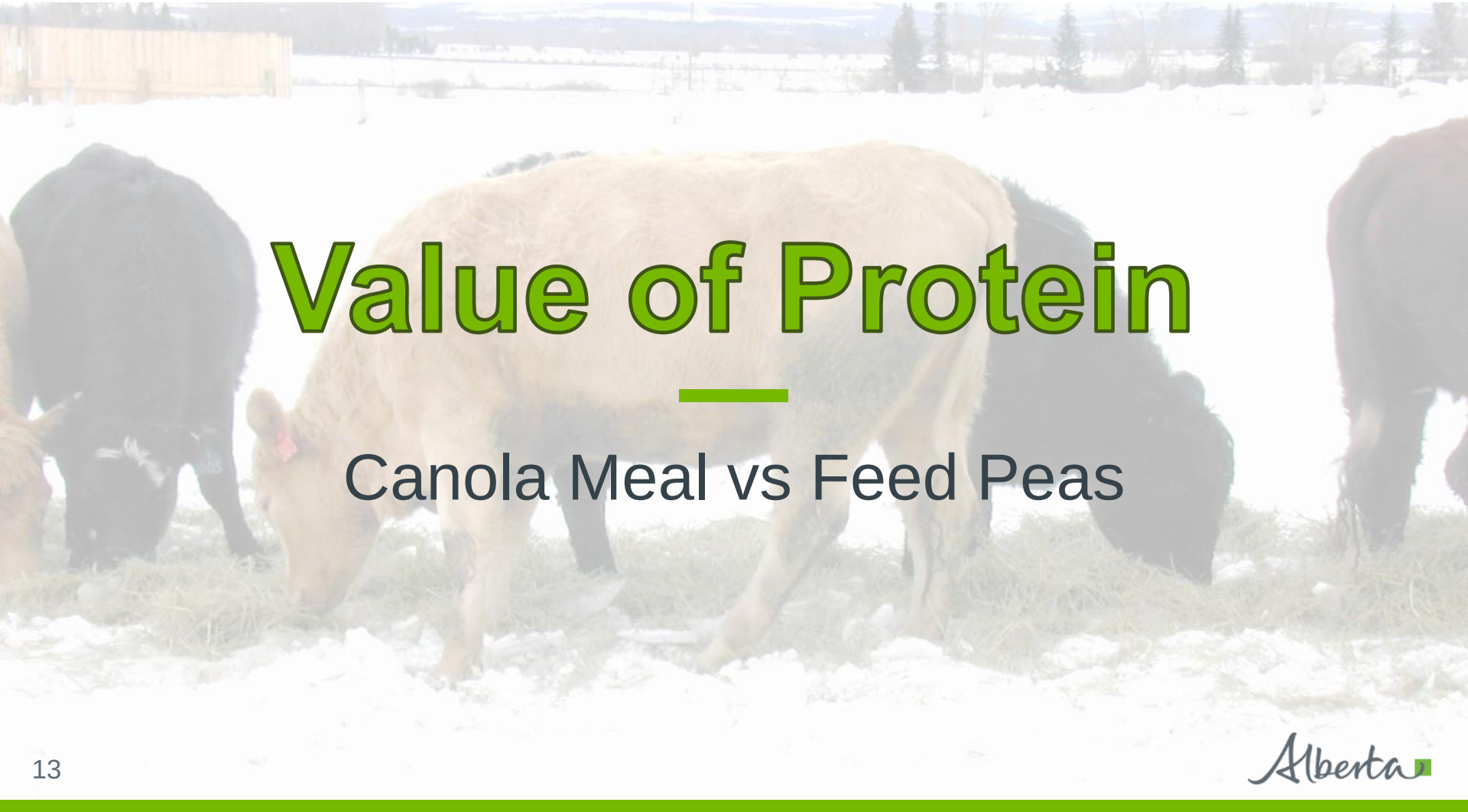


Figure 1. Low protein intake results in reduced feed intake which, in turn results in lower dietary protein.



Value of Protein

Canola Meal vs Feed Peas

Canola meal

- Cost: $290 / tonne
- Protein : 38 %
- Pounds Protein: 837 per tonne
- Calculation

$$\frac{\$290.00}{837 \text{ lbs}} = 34 \text{ cents / lb}$$

Feed peas

- Cost: $ 240 / tonne
- Protein : 24 %
- Pounds Protein: 528 per tonne
- Calculation

$$\frac{\$240.00}{528 \text{ lbs}} = 45 \text{ cents / lb}$$

Protein feeds

Feed	Protein %	Ca %	Phos %
Corn distillers Grain	30.5	0.05	0.81
Wheat distillers Grain	39.0	0.17	0.96
Barley malt sprouts	22.2	0.19	0.6
Urea	281	---	---
Lentil screenings	21.0	0.31	0.45
Peas screenings	24.0	0.17	0.4
Stillage	48	0.4	1.20

Comparing four samples

Sept 2019	Sample 1	Sample 2	Sample 3	Sample 4
% Dry matter	88.7	90	85	84
Protein	8.8	10.3	9.7	7.7
Calcium	0.76	0.86	0.69	0.74
Phosphorus	0.13	0.2	0.08	0.22
Potassium	1.37	1.35	1.4	1.2
Magnesium	0.17	0.18	0.15	0.17
TDN	57	56	60	52

Single Feed Evaluator

How well does a feed meet animal needs?

http://www.beefresearch.ca/resources/decisiontools.cfm

Feed Value Calculator

Comparing the dollar value of different feeds

http://www.beefresearch.ca/resources/decisiontools.cfm

Nutritional requirement of different Animals

Nutrition for Cow – Calf Operations

- What to do to improve production efficiency?
- Considerations to reduce costs?
- Impact of nutrition on animal performance:
  - Reproduction
  - Health
  - Weight gain

Protein and Energy Required

Stage of Production Mature cows	Protein Required (Dry Matter)	TDN required
Mid – pregnancy	7 %	55 %
Late – pregnancy	9 %	60 %
After Calving	11 %	65 %

Mid pregnancy: 1400 lb. cow

- Last year:
- Mixed hay 20 lbs.
- Straw 10 lbs.
- Salt 0.08 lbs.
- Vitamin ADE 0.012 lbs.
- Vitamin E 0.012 lbs.

➢ Can also use 20 lbs straw and 10 lbs grain at this stage of pregnancy

- This year:
- Mixed hay 35 lbs.
- Salt 0.08 lbs.
- Vitamin ADE 0.012 lbs.
- Vitamin E 0.012 lbs.

Late pregnancy feeding: 1400 lb. cow

- NO NDF calculation:
- Mixed hay, 35 lbs
- Salt 0.08 lbs
- Vitamin ADE 0.012 lbs
- Vitamin E 0.012

➢ Can also use straw and grain at this stage of production

- With NDF included:
- Mixed hay 24 lbs
- Grain 6 lbs
- Salt 0.08 lbs
- Vitamin ADE 0.012 lbs
- Vitamin E 0.012 lbs
- Lower energy and protein in this years' hay

After Calving ration: 1400 lb. cow

- Last years' hay:
- Mixed hay 35 lbs
- Grain 6 lbs
- Salt 0.08 lbs
- Vitamin ADE 0.015 lbs
- Vitamin E 0.02

- This years' hay:
- Mixed hay 27 lbs
- Barley grain 12 lbs
- Canola meal 1.5 lbs
- Salt 0.08 lbs
- Vitamin ADE 0.015 lbs
- Vitamin E 0.02 lbs
- Lower energy and protein in this years' hay

Energy requirements and cold weather

- -20 C is the lower critical temperature for cattle with a developed winter hair coat
- Animals require more energy to keep warm below this point. Bedding helps.
- Feed an additional 2 pounds of grain per head per day for every additional 10^{o} C drop in temperature
  - -20 - 4 pounds, -30 – 6 pounds, -40 – 8 pounds

Feeder and back grounding calves

Feed intake of calves

- Ranges from 1.5 to 3.3% of body weight.
- Stress, illness and bad pen conditions reduce feed intake.
- Thin animals will consume more feed
- Typical intake is 2.0 to 2.5%

Dry Matter Intake		
Weight	**% body weight**	**lb/head/day**
400*	1.5	6.0
500*	1.8	9.0
550	2.6	14.0
650	2.5	16.0
750	2.4	18.0
850	2.3	19.5
950	2.2	21.0
1050	2.2	23.0
1150	2.1	24.0
1250	2.0	25.0
1350	1.9	26.0
1450	1.8	26.0

*Newly weaned calves

Dr. J. McKinnon, Ph.D., Department of Animal and Poultry Science, University of Saskatchewan

Growing Calves Rule of Thumb

Size of Calf	% Protein
500 lbs..	15 %
600 lbs..	14 %
700 lbs..	13 %
800 lbs..	12 %
900 lbs..	11 %
1000 lbs..	10 %

Energy requirements depend on weather, rate of gain, male / female

500 lb. feeder calf (2 lb. ADG)

- Last years' hay:
- Mixed hay 7 lbs
- Grain 7 lbs
- Canola meal 1 lb
- Salt 0.04 lbs
- Vitamin ADE 0.01 lbs
- Vitamin E 0.01 lbs

- 2.1 lbs ADG

- This years' hay:
- Mixed hay 6.75 lbs
- Grain 6.75 lbs
- Canola meal 2.4 lbs
- Salt 0.04 lbs
- Vitamin ADE 0.012 lbs
- Vitamin E 0.012 lbs

- 2.0 lbs ADG

700 lb. feeder calf (2 lb. ADG)

- Last years' hay:
- Mixed hay 10 lbs
- Grain 10 lbs
- Salt 0.04 lbs
- Vitamin ADE 0.01 lbs
- Vitamin E 0.01 lbs

- 2.3 lbs ADG

- This years' hay:
- Mixed hay 10 lbs
- Grain 8.5 lbs
- Canola meal 1.8 lbs
- Salt 0.04 lbs
- Vitamin ADE 0.012 lbs
- Vitamin E 0.012 lbs

- 1.8 lbs ADG

Protein Lick tubs or Blocks

- Protein is short late in the grazing season when the grass is over mature.
- Feed quality is lacking this year (low protein and energy)
- No practical way to supplement with grain or hay
  - Concerns with variable intake
  - Concerns with actual intake per animal compared to the average
  - Cost?
  - What are the animals actually receiving?

Protein Supplementation

30% Poured blocks

- Expected Intake 0.34 kg
- Dry matter content 60%
- Protein delivered 102 grams
- Cost $184 for 113 kg tub
- Cost per day = 55 cents / head

32 % Beef Supplement

- Expected intake 0.45 kg
- Dry matter content 90%
- Protein delivered 144 grams
- Cost $ 675 for 1000 Kg tote
- Cost per day = 30.6 cents / head

A 1400 lb. cow in late pregnancy requires
1346 grams of protein per day

Other Nutrients Supplied at recommended intake

Nutrient	30% tub 0.34 kg	32% supplement at 0.45 kg
Calcium	10 g	36 g
Phosphorus	5 g	2 g
Magnesium	2 g	1 g
Potassium	1 g	1 g
Salt	0 g	25 g
Selenium	1.22 mg	1.62 mg
Rumensin	0 mg	162 mg*

*400 mg/kg Rumensin in the supplement – for a 1400 lb. cow = 11 mg/kg ration concentration

Considerations

- Calcium and magnesium supplementation required in most straw / grain, grass hay or cereal silage rations
- Selenium, copper, manganese, zinc deficient in most parts of the province
- Cobalt and Iodine not present in western Canada

- Rumensin @ 22 mg/kg of diet (DM) for coccidiosis prevention
- Rumensin @ 33 mg/kg of diet (DM) for improved feed efficiency
- Bovatec # 36 mg/kg of diet (DM) for coccidiosis and feed efficiency

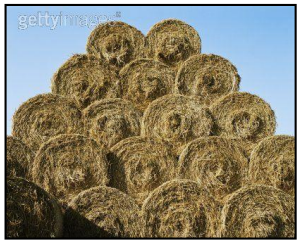
- Rumensin can kill dogs and horses

Considerations

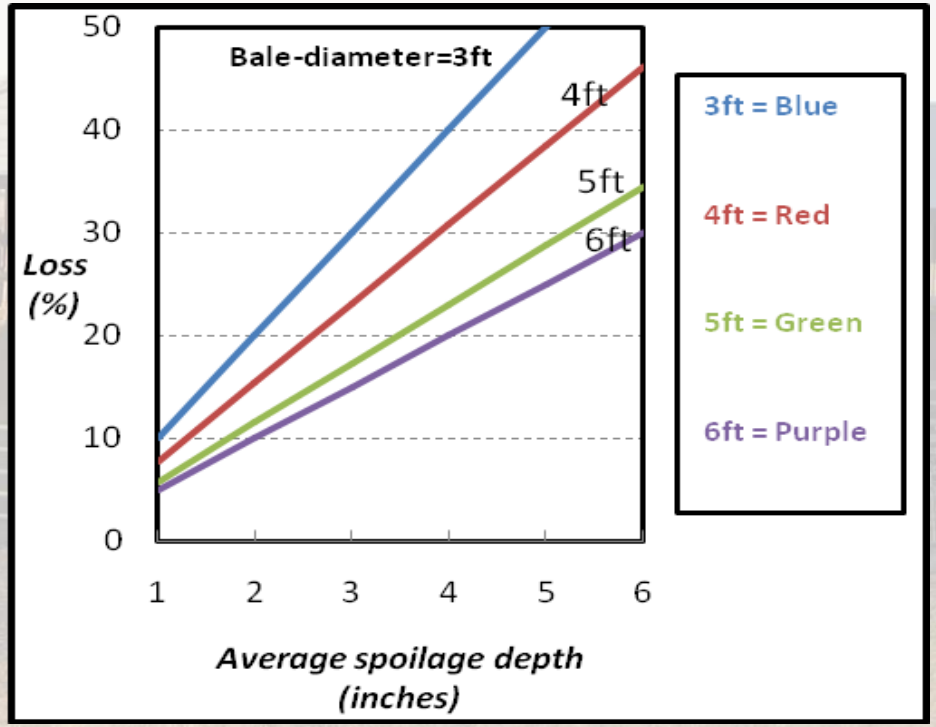
- Depending on tub – if no sodium (salt) present, a salt product is needed.
- Straw / grain rations – a 2:1 mineral does not provide sufficient calcium. Add ½ bag of limestone to 1 bag of mineral to develop a 3:1 final product
- May need to add dried molasses to the limestone mixes to improve intake (5 to 7% by weight)

Minimize Stored feed loss

- If possible store bales under sheds
- Tarped bales are better than uncovered
- Do not stack bales
  - Pyramid stacks – most damage
  - Mushroom stacks – intermediate damage
  - Single bales, in rows with space between (no touching) – best



How much feed is lost?



Depth of Spoilage and Bale diameter (Buckmaster 1993)

Feed Waste

- Placing forage into different types of feeders results in 3 to 15% loss (Buskirk 2002)
- Unrolling long hay on snow - 13% waste (Yaremcio 2007)
- Bale processor chopping meadow brome hay onto snow – 19% waste (Yaremcio 2007)
- Chopped pit silage fed on snow – 26%* waste (Yaremcio 2007)
- Long round bale silage fed on snow – 23% (Yaremcio 2007)
- Bale grazing – 19% waste (Lakeland Applied Research Association 2010)

Impact of feed waste on nutrition

- Reduction in nutrients consumed of unrolled meadow brome alfalfa hay with13% DM waste

Nutrient	Feed test / delivered	Consumed
Protein	11.0 %	8.4 %
Calcium	0.48 %	0.32 %
Phosphorus	0.23 %	0.18 %
Magnesium	0.15 %	0.12 %
Potassium	1.85 %	1.51 %
Sodium	0.02 %	0.017 %
ADF	37.44 %	30.5 %

Yaremcio 2009

What mineral should be fed?

Depends on Ration:

- 16 : 8 mineral “A”
- (2 : 1)
  - Cereal greenfeed
  - Grass hay
  - Grain / straw
  - Swath grazing cereals
  - Cereal silage

- 10 : 10 mineral “B”
- (1 : 1)
  - Alfalfa hay
  - Alfalfa 50% grass 50%
  - Canola greenfeed
  - Alfalfa / straw

In some situations: these minerals will not work:

May need a 24 : 6 (4 : 1) mineral or limestone

Comparing Minerals:

- Product “A”
- Calcium 16 %
- Phosphorus 8 %
- Magnesium 3 %
- Copper 3000 mg/kg
- Manganese 6000 mg/kg
- Zinc 10,000 mg/kg
- Selenium 30 mg/kg
- **Intake 50 grams**

- Product “B”
- Calcium 10 %
- Phosphorus 10 %
- Magnesium 2 %
- Copper 2000 mg/kg
- Manganese 4500 mg/kg
- Zinc 6500 mg/kg
- Selenium 30 mg/kg
- **Intake 75 grams**

Which mineral is better?

Nutrients Supplied…

Product "A"	
Calcium	8 g
Phosphorus	4 g
Magnesium	1.5 g
Copper	150 mg
Manganese	300 mg
Zinc	500 mg
Selenium	1.5 mg
Intake	**50 grams**

Product "B"	
Calcium	7.5 g
Phosphorus	7.5 g
Magnesium	1.5 g
Copper	150 mg
Manganese	337 mg
Zinc	325 mg
Selenium	2.25 mg
Intake	**75 grams**

Both products are virtually the same

Swath Grazing

Points to consider

- Reduce yardage costs by $0.40 to $0.50 cents per cow per day
- 40% higher nitrogen retention when manure and urine is deposited on the field vs drylot
- Cows are able to consume loose snow to meet water requirements

Points to consider

- Good for dry cows in mid and late pregnancy
- Need protection from the wind
- Limit access to reduce feed refusal (waste)
  - Move electric fence every 3 days
- Monitor cow condition and manure quality

Grazing Corn vs cereal crops

- Corn has less protein than cereal crops
- Stalks are very fibrous and low quality
  - More critical to limit access to force consumption and have short duration moves
  - May need to feed supplemental hay to entice stalk consumption if longer between moves

Mixing salt, minerals and vitamins

- Free choice consumption is possible up to 4 to 5 ounces per head per day
- Typical straw – grain free choice mix
  - 35 grams salt
  - 110 grams limestone (4 ounces)
  - 28 grams of magnesium oxide (1 ounce)
  - 6 grams each vitamin ADE (10 million) and vitamin E (50,000)
- Dried molasses to improve intake
  - 7 % of mixture. Adjust as needed to get correct intake

28 grams = 1 ounce

Questions?

Contact information

Barry Yaremcio
Beef and Forage Specialist
Alberta Ag-Info Centre
barry.yaremcio@gov.ab.ca
403-742-7926
310-3276 (Rite)