Purchased forages: How do we decide what to buy?

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Gonzalo Ferreira
Dairy Management Extension Specialist
Department of Dairy Science, Virginia Tech

Introduction

Estimated diet composition

	lb AF	% DM	lb DM	% CP	lb CP	% NDF	lb NDF
Corn silage (**mature/non-cracked**)	80	40	32.0	8	2.6	42	13.4
PURCHASED haylage (baleage)	5	**20**	1.0	22	0.5	35	0.5
Expeller soybean meal	14	90	12.6	45	5.7	15	1.9
Total	99	46	45.6	**19.3**	8.8	34.6	15.8

Purchasing Forages

- Why do farmers need to buy forages?
  - Shortage in forage stocks
  - Unfavorable climatic conditions (e.g., drought stress)
  - Simply good opportunities?

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How Much Forage Do You Need?

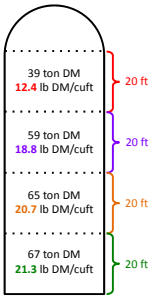
- Prepare a FORAGE BUDGET
  - Forage needs
    - Lactating cows
    - Dry Cows
    - Heifers
  - Forage inventories
    - Don't forget to include shrinkage

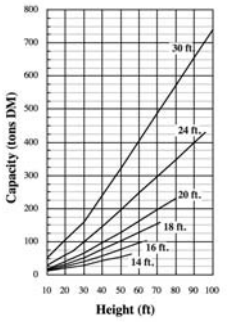
Forage Balance: Needs

	Existence,	Forage Needs,	Forage Needs, ton						
	heads	lb/head/day	Mar	Apr	May	Jun	Jul	Aug	Period
CORN SILAGE									
Lactating cows	100	66	102	99	102	99	102	102	**606**
Dry cows	20	20	6	6	6	6	6	6	**36**
Heifers	110	16	27	26	27	26	27	27	**160**
Total Corn Silage Needs			**135**	**131**	**135**	**131**	**135**	**135**	**802**
HAY									
Lactating cows	100	6	9	9	9	9	9	9	**54**
Dry cows	20	17	5	5	5	5	5	5	**30**
Heifers	110	8	14	13	14	13	14	14	**82**
Total Hay Needs			**28**	**27**	**28**	**27**	**28**	**28**	**166**

Forage Balance: Inventories

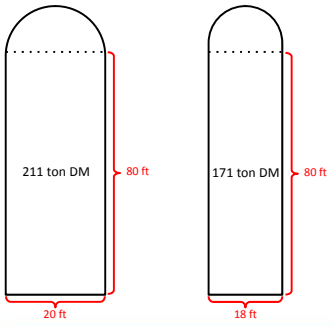
Inventories in Tower Silos



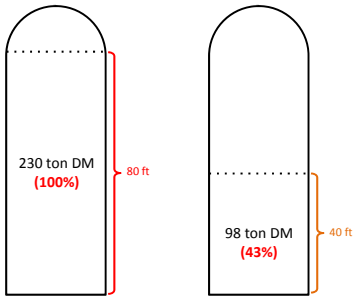


Buckmaster and Vandervort (1993) *PSU Cooperative Extension H-70*

Inventories in Tower Silos



Inventories in Tower Silos



Forage Balance

	Forage Needs, ton						
	Mar	Apr	May	Jun	Jul	Aug	Period
CORN SILAGE							
Initial corn silage inventory, tons	800	641	487	328	174	15	**800**
Total corn silage needs, tons	135	131	135	131	135	135	**802**
Shrinkage, %	15	15	15	15	15	15	**15**
Corn silage consumption, ton/month	159	154	159	154	159	159	**944**
Corn Silage Balance	**641**	**487**	**135**	**131**	**135**	**-144**	**-144**
HAY							
Initial hay inventory, tons	150	117	85	52	20	0	**150**
Total hay needs, tons	28	27	28	27	28	28	**166**
Shrinkage	15	15	15	15	15	15	**15**
Hay consumption, ton/month	33	32	33	32	33	33	**196**
Hay Balance	**117**	**85**	**52**	**20**	**-13**	**-33**	**-46**

Forage to Purchase

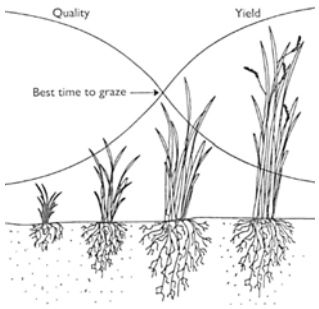
- Deficit attributed to corn silage
  - 144 tons of corn silage @ 35% DM = 50.4 ton DM
  - Approximately 60 tons of hay @ 85% DM
- Deficit attributed to hay
  - 46 tons of hay
- Hay to be purchased = 104 tons

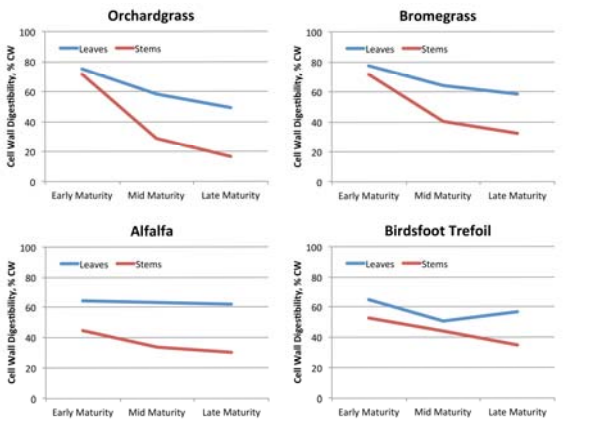
What Do You Need

- Try to match requirements with inventories
  - Need energy?
  - Need protein?
  - Need NDF
  - Need peNDF?
  - Need DCAD?

Evaluate different scenarios

Need Energy and Protein?





Mowat et al. (1969) *Can. J. Plant Sci.*

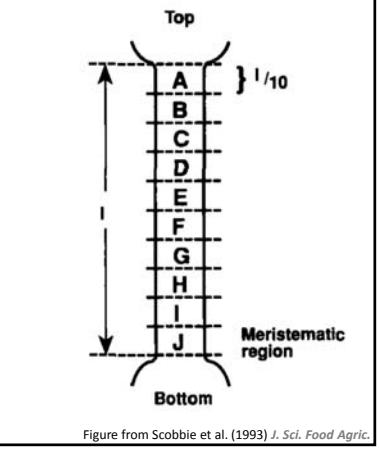
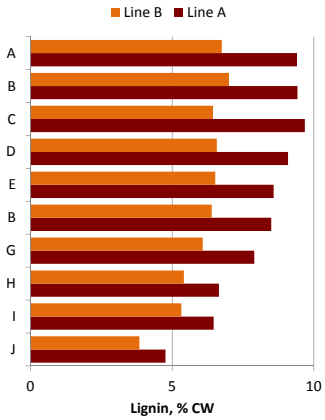


Figure from Scobbie et al. (1993) *J. Sci. Food Agric.*



Data adapted from Scobbie et al. (1993) *J. Sci. Food Agric.*

TABLE 7. Estimating the peNDF of feeds using chemical and physical measurements in the laboratory (69).

Feed	NDF	1.18-mm sieve	peNDF[1]
	(% of DM)	(Fraction retained)[2]	(% of DM)
Standard	100	1.00	100.0
Grass hay	65	0.98	63.7
Legume hay	50	0.92	46.0
Legume silage, coarse chop	50	0.82	41.0
Legume silage, fine chop	50	0.67	33.5
Corn silage	51	0.81	41.5
Brewers grains	46	0.18	8.3
Corn, ground	9	0.48	4.3
Soybean meal	14	0.23	3.2
Soybean hulls	67	0.03	2.0
Rice mill feed	56	0.005	0.3

[1]peNDF is calculated by multiplying NDF by the fraction retained on a 1.18-mm sieve.

[2]Using vertical shaking.

Mertens (1997) *J. Dairy Sci.*

Need DCAD?

- Analyze forages for minerals (Na, K, Cl and SO_4)
- Legumes hay
- Drought stressed corn silage
- Sorghum hay or haylage

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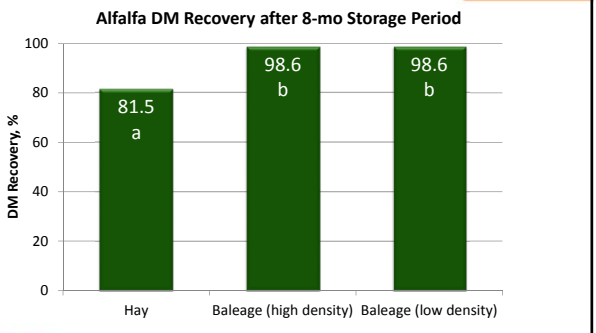
Need DCAD?

Potasium concentration (DM basis) in different forages

Forage Type	Origin	K^+
Haylage, Sudangrass	Cnel. Suarez	**3.56%**
Silage, Forage sorghum (30% DM)	Cnel. Suarez	1.26%
Silage, Forage sorghum (30% DM)	Cnel. Pringles	1.77%
Silage, Corn (35% DM)	Cnel. Suarez	1.35%
Silage, Corn (26% DM)	Pehuajó	2.19%
Silage, Corn (42% DM)	Trenque Lauquen	**1.71%**
Silage, Corn (22% DM)	Trenque Lauquen	**3.07%**
Silage, Barley (38% DM)	Navarro	0.98%
Silage, Barley (46% DM)	Navarro	0.47%
Silage, Barley (41% DM)	Cnel. Suárez	1.69%
Silage, Wheat (47% DM)	Trenque Lauquen	1.78%

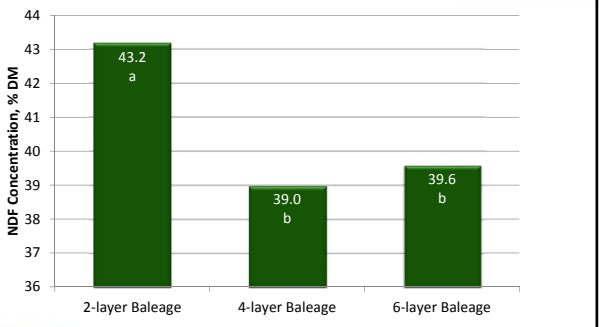
Storage

Storage



Han et al. (2004) *Crop Science*

Storage



Hancock and Collins (2006) *Crop Science*

Mixer Type

- Vertical
  - Hay
  - Haylage
  - Baleage
- Horizontal
  - Hay
  - Haylage
  - Baleage?

Mixer Capacity

- Diets formulation
  - One bale/baleage for the whole pen?
  - Chopping hay and <u>then</u> loading?
  - Discuss with your nutritionist

Mixer Maintenance

- Are you ready to handle purchased forages?

How Much Should I Pay?

FeedVal 2012

Estimates the market value of dairy feed ingredients

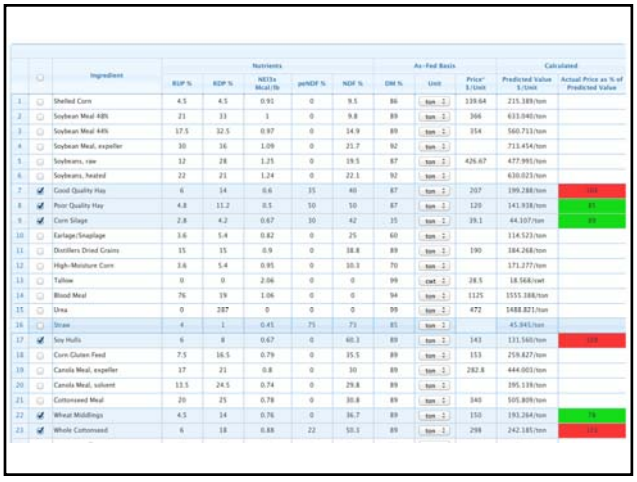
Online Tool (Open)

Presentation (Download)

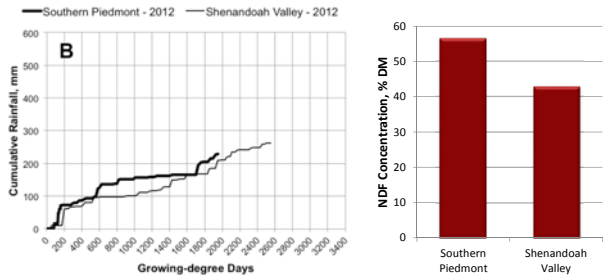
Demo (Click to View/Hide the Video)

		Ingredient	Nutrients		
			RUP %	RDP %	NEl3x Mcal/lb
1	✓	Shelled Corn	4.5	4.5	0.91
2	✓	Soybean Meal 48%	21	33	1
3	✓	Soybean Meal 44%	17.5	32.5	0.97
4		Soybean Meal, expeller	30	16	1.09
5	✓	Soybeans, raw	12	28	1.25
6		Soybeans, heated	22	21	1.24
7	✓	Good Quality Hay	6	14	0.6
8	✓	Poor Quality Hay	4.8	11.2	0.5
9	✓	Corn Silage	2.8	4.2	0.67

Cabrera et al (2012) http://dairymanagement.wisc.edu



Purchasing Standing Crops?



Final Remarks

- Perform forage balance and decide what to purchase **WITH** your nutritionist
- Claim forage quality analyses for the forages you are purchasing
- Periodically fine tune forage quality and management (i.e., minimize shrinkage)
  - Monitor moisture of silages
  - Use scales/balances, TMR tracker, etc
  - Is your mixer in good conditions?

Acknowledgements

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  - USDA-NIFA Multistate Project VA-136291 (NC-2042, Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises)