Forage Quality from the cows perspective

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Forage Quality

- Forages play one of two main roles in ruminant diets.
  - Physical
  - Nutrient Supplier or Chemical

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Categorizing Forages by Roles

- Physical
  - Alfalfa
  - Straw
  - Forage Hay
  - Stover
  - Corn Silage*

* We will discuss how later.

- Nutrient Suppliers / Chemical
  - Alfalfa / Haylage
  - Forage Hay / Silage
  - Corn Silage

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What is the Dairymen's goal?

- The goal of the dairy is to make the most economical milk possible.
  - This means we need to provide all the nutrients in a form that is efficiently used to achieve:
    - The most milk
    - Perfect Health
    - Enable her to get pregnant
    - Consistent production

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What do we look for in our forages (beyond cheap!)

- Alfalfa (90% Basis)
  - Crude Protein 19.8% or greater.
  - ADF 25.2% or less
  - Lignin 5.4% or less
- Alfalfa (100% Basis)
  - Crude Protein 22% or greater.
  - ADF 28% or less
  - Lignin 6% or less

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2014 Western Alfalfa

Feed Codes: LEGUME FORAGE
# of Samples: 5526
Date Range: 12/1/2014 To 12/3/2015
Region: West

ANALYSIS RESULTS	AVERAGE	# OF SAMPLES	ST DEV	COV	-1 SD	+1 SD
Dry Matter (%DM)	78.6	5526	21.5	27.4	57.1	100
Moisture (%DM)	21.4	5526	21.5	101	-0.13	43

PROTEINS	AVERAGE	# OF SAMPLES	ST DEV	COV	-1 SD	+1 SD
Crude Protein (%DM)	21.7	5485	2.87	13.2	18.8	24.5
Adjusted Protein (%DM)	21.6	4009	3.04	14.1	18.5	24.6
Soluble Protein (%CP)	45.7	5376	10.9	23.8	34.9	56.6
Ammonia (NPN) (%CP)	7.51	5376	5.32	70.8	2.19	12.8
ADF Protein (ADICP) (%DM)	1.47	5007	0.27	18.4	1.2	1.74
NDF Protein (NDICP) (%DM)	2.45	4935	0.79	32.2	1.66	3.24
Rumen Degr. Protein (%DM)	15.8	5376	2.36	14.9	13.5	18.2

FIBER	AVERAGE	# OF SAMPLES	ST DEV	COV	-1 SD	+1 SD
Acid Detergent Fiber (%DM)	31.3	5462	4.19	13.4	27.1	35.5
Neutral Detergent Fiber (%DM)	37	5472	5.08	13.7	31.9	42
Crude Fiber (%DM)	25.9	2	2.29	8.8	23.6	28.2
Lignin (%DM)	6.75	4960	0.93	13.8	5.82	7.68
Lignin / NDF Ratio	18.2	4934	1.64	9	16.6	19.9
peNDF	31.5	15	7.75	24.6	23.8	39.3
NDF 24 HR Digestibility (%NDF)	40.2	6	5.03	12.5	35.2	45.3
NDF 30 HR Digestibility (%NDF)	40.8	2257	5.2	12.7	35.6	46
NDF 120 HR Digestibility (%NDF)	47.1	5430	6.02	12.8	41.1	53.1
NDF 240 HR Digestibility (%NDF)	49.7	5437	6.38	12.8	43.3	56.1
uNDF 120 HR Digestibility (%NDF)	52.9	5430	6.02	11.4	46.9	58.9
uNDF 240 HR Digestibility (%NDF)	50.3	5437	6.38	12.7	43.9	56.7

CARBOHYDRATES	AVERAGE	# OF SAMPLES	ST DEV	COV	-1 SD	+1 SD
Soluble Fiber (%DM)	15.1	515	3.15	20.9	11.9	18.2
Ethanol Soluble CHO (Sugar) (%DM)	6.84	4890	2.4	35.1	4.44	9.24
Starch (%DM)	2.49	4910	0.94	37.8	1.55	3.43
Fatty Acids, Total (%DM)	1.47	2219	0.36	24.5	1.11	1.83
Crude Fat (%DM)	2.58	4933	0.51	19.8	2.07	3.09

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What do we look for in our forages…. Cont’d

Corn Silage (100% Basis)

- Dry Matter 28%-36%
- Starch 28% or greater
- NDF 38% or greater
- NDFD 55% or greater

Corn Silage is Primarily a forage crop.
70% of its mass is forage.

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2014 Western Corn Silage

Feed Codes: CORN SILAGE
# of Samples: 4859
Date Range: 12/1/2014 To 12/3/2015
Region: West

ANALYSIS RESULTS	AVERAGE	# OF SAMPLES	ST DEV	COV	-1 SD	+1 SD
Dry Matter (%DM)	34.8	4856	5.42	15.6	29.4	40.2
Moisture (%DM)	65.2	4856	5.42	8.3	59.8	70.6

PROTEINS	AVERAGE	# OF SAMPLES	ST DEV	COV	-1 SD	+1 SD
Crude Protein (%DM)	8.01	4343	0.85	10.6	7.16	8.86
Adjusted Protein (%DM)	7.92	1191	0.92	11.6	7	8.84
Soluble Protein (%CP)	54.9	4342	10.1	18.4	44.8	65.1
Ammonia (NPN) (%CP)	12.1	4342	4.31	35.6	7.78	16.4
ADF Protein (ADICP) (%DM)	0.9	4382	0.12	13.3	0.78	1.02
NDF Protein (NDICP) (%DM)	1.16	4383	0.25	21.6	0.91	1.41
Rumen Degr. Protein (%DM)	6.21	4342	0.76	12.2	5.45	6.97

FIBER	AVERAGE	# OF SAMPLES	ST DEV	COV	-1 SD	+1 SD
Acid Detergent Fiber (%DM)	26.4	4343	2.72	10.3	23.7	29.1
Neutral Detergent Fiber (%DM)	41	4344	4.07	9.9	36.9	45.1
Crude Fiber (%DM)	16	3	9.15	57.4	6.8	25.1
Lignin (%DM)	3.21	4079	0.42	13.1	2.79	3.63
Lignin / NDF Ratio	7.84	4077	0.72	9.2	7.12	8.56
peNDF	38	47	4.23	11.1	33.7	42.2
NDF 12 HR Digestibility (%NDF)	29.3	1855	3.89	13.3	25.5	33.2
NDF 24 HR Digestibility (%NDF)	52.9	4	2.09	4	50.8	55
NDF 30 HR Digestibility (%NDF)	55.3	4198	3.77	6.8	51.5	59
NDF 120 HR Digestibility (%NDF)	61.8	4839	3.94	6.4	57.9	65.8
NDF 240 HR Digestibility (%NDF)	72.1	4841	4.8	6.7	67.3	76.9
uNDF 120 HR Digestibility (%NDF)	38.2	4839	3.94	10.3	34.2	42.1
uNDF 240 HR Digestibility (%NDF)	27.9	4841	4.8	17.2	23.1	32.7

CARBOHYDRATES	AVERAGE	# OF SAMPLES	ST DEV	COV	-1 SD	+1 SD
Soluble Fiber (%DM)	4.78	1916	1.51	31.6	3.27	6.29
Ethanol Soluble CHO (Sugar) (%DM)	1.35	4367	0.67	49.6	0.68	2.02
Starch (%DM)	30.5	4416	5.07	16.6	25.5	35.6
Starch Degradability 7hr	74.6	1870	6.24	8.4	68.4	80.8
Fatty Acids, Total (%DM)	2.54	1867	0.37	14.6	2.17	2.91
Crude Fat (%DM)	3.23	4384	0.32	9.9	2.91	3.55

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New Technology

- Low Lignin Alfalfa..
- BMR Corn silage:
  - 3 Tons less per acre… but 70% digestible NDF, high starch makes it worth the effort.
  - Really valuable when intakes are limited.
  - A great example for Low Lignin Alfalfa application.
- Shredlage

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Shredlage

KP

University of Illinois at Urbana-Champaign

Photos provided by Kevin Shinners, UW Madison, BSE

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In Conclusion

- Digestibility is King.
- Followed only by Nutrient Density.

- Higher quality forages allow for more efficient production.

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Thank you

“If you want something new, you have to stop doing something old”
— Peter F. Drucker

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