Forage Research Update

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WISCONSIN - What are "Normal" Forage Test Results?

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Whether or not a particular analysis is "normal" is a frequently asked question. To help answer this question, the average analyses for the last 100 haylage, hay, and corn silage samples submitted to the UW Marshfield Soil and Forage Testing Lab are in Table 1. Information available at http://uwlab.dyndns.org/marshfield/.

For each forage type, the average, maximum, minimum and standard deviation are presented. Standard deviation is the range that includes 2/3 of the samples. For example, for haylage dry matter, 2/3 of the samples were between 31.2% (40.0 – 8.8) and 48.8% (40.0 + 8.8). While the average is a good guideline, the minimum and maximum will tell the lowest and highest values that have occurred. If test value is outside this range, the analysis should be checked carefully and the ration adjusted accordingly.

Haylage. Haylage analyses are mainly alfalfa, though over half the samples have some grass. The average dry matter was 40%, meaning these haylages were put up at an average of 60% water. Samples outside the range of the standard deviation likely produced poor quality haylage. Haylage averaged 20.6% crude protein, and 21.4% of it was rumen undegradable protein (RUP). Acid detergent fiber (ADF) and neutral detergent fiber (NDF) averaged 35.0 and 42.5%, respectively. Many consultants figure a 10-point spread between ADF and NDF. This spread is only true at about 10% bloom alfalfa. At earlier stages (see minimums) the spread is less, and at later maturity stages the spread is more. Neutral detergent fiber digestibility (NDFD) average was 46% of NDF, slightly lower than desired. NDFD range including 2/3 of the samples was 40-51%. Remember that grass generally has higher NDFD than alfalfa. Ash average was 12.3%, almost 2% higher than ash content of hay. Ash values above 9% generally reflect soil contamination and reduced total digestible nutrients.

Hay. Hay averaged 83.4% dry matter. Crude protein (18.6%) was slightly lower than for haylage, but RUP was higher. Lower crude protein likely reflects more grass in the hay samples than in haylage. RUP was slightly higher than for haylage because some RUP of haylage is lost during the fermentation process. ADF and NDF content were in excellent ranges. The maximum values likely reflect mature grass hay. Ash content was slightly lower than for haylage but tended to have the same range.

Corn Silage. Corn silage averaged 34.6% dry matter or about 65% moisture – exactly what is recommended! The range, however, is great and likely reflects some spoiled silage on both ends. Crude protein averaged 7.6% with little variation (2/3 of samples were within 0.8% of the average). NDF averaged 43%, which is good, but the range was 36-55% - likely due to the drought this summer. NDFD averaged 77%. Nonfiberous carbohydrate (NFC) averaged a respectable 42%, but some samples were as low as 28.6%. These low NFC corn silage samples likely had little to no grain development due to the drought.

	DM, % as fed	CP, % of DM	RUP, % of CP	ADF-CP, % of DM	NDF-CP, % of DM	ADF, % of DM	aNDF, % of DM	NDFD, % of NDF	Ash, % of DM	NFC, % of DM	pH	Starch	Non Starch NFC
HAYLAGE													
Average	**40.0**	**20.6**	**21.4**	**1.4**	**3.5**	**35.0**	**42.5**	**45.6**	**12.3**	**24.9**	**4.33**		
Maximum	86.0	29.4	29.9	2.6	10.2	45.6	60.7	72.9	18.0	36.4	5.89		
Minimum	25.8	12.3	15.7	0.2	1.3	22.4	26.9	35.5	5.7	10.7	3.56		
Std. Dev.	8.8	2.7	2.6	0.5	1.3	4.4	6.4	5.9	2.2	5.3	0.42		
HAY													
Average	**83.4**	**18.6**	**26.8**	**0.7**	**3.6**	**33.1**	**43.6**	**45.9**	**10.6**	**27.6**			
Maximum	98.1	28.0	51.1	2.0	5.7	48.3	74.3	74.5	17.3	39.3			
Minimum	37.1	4.9	12.9	0.2	0.0	23.3	29.4	30.3	6.0	8.8			
Std. Dev.	12.0	4.9	8.4	0.3	0.8	5.7	10.6	8.7	2.2	5.5			
CORN SILAGE													
Average	**34.6**	**7.6**		**0.4**		**26.4**	**43.3**	**58.9**	**5.2**	**42.2**		**28.4**	**12.9**
Maximum	46.3	10.5		0.6		42.9	55.0	77.0	8.3	52.0		39.4	15.0
Minimum	24.6	5.6		0.2		19.9	35.9	30.7	2.7	28.6		14.8	6.5
Std. Dev.	4.2	0.8		0.1		3.0	4.0	9.4	0.8	4.9		5.3	2.1