

## BARLEY HAY QUALITY AT CARRINGTON

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Barley acreage used as a hay has increased in recent years. Our objective was to evaluate the agronomic and quality characteristics of eight barley cultivars and five experimental isolines of 'Bowman'.

The 13 barley cultivars and experimental lines ([Table 1](#)) were planted April 20, 2006 at the Research Extension Center at Carrington, ND. The previous crop was soybean. The experimental design was a randomized complete block with three replicates. A plot was seven 7-inch rows wide by 25 feet in length and the seeding rate was 1,200,000 seeds/acre. Nitrogen was applied during the fall at 90 lb/acre for a total soil N content of 139 lb/acre. Soil test for P and K indicated both were very high so non was applied. Weeds were controlled with 1.25 pints/acre of Widematch and 0.3 oz/acre Harmony GT. Forage harvest was taken 5 to 7 days after heading for the awned entries and at the soft dough stage for the awnless or hooded entries. After drying, the moisture sample from harvest was ground to pass a 1-mm screen and stored in plastic bags until forage quality analysis. The samples were submitted to the Animal and Range Sciences Department where crude protein (CP), acid- and neutral-detergent fibers (ADF, NDF), acid-detergent lignin (ADL), ash, and in vitro dry matter digestibility (IVDMD) were determined. Relative feed value (RFV), hemicellulose, and cellulose were calculated using the standard formulas.

Forage yield was the greatest from 'Westford', the latest maturing cultivar ([Table 1](#)). When comparing the forage yield, be sure to compare within awnless and awned entries since the harvest dates were different. 'Horseford' and 'Robust' were the lowest yielding entries.

Forage quality components each differed significantly at the 10% probability level or less ([Table 2](#)), which is quite different from Fargo data (see the other web site under barley hays) where most were non significant over 2 years. Crude protein was relatively high for both the awned and awnless entries with the orange lemma isolate having the highest level. 'Hayes' barley had the greatest IVDMD of entries tested with the orange lemma isolate the greatest IVDMD of the awned types. Westford had only average IVDMD. The fragile stem isolate had the highest RFV due to the lowest ADF and NDF, but it had only a moderate IVDMD. Hayes barley had a high ADF and NDF resulting in a relatively low RFV. Why the RFV of Hayes is low, but the IVDMD is high is unclear, especially since Hayes has a relative low ADL. Westford, the highest yielding entry, was above average in forage quality. The orange lemma isolate had the lowest ADL as anticipated, Westford also had a low ADL.

These 1-year data suggest that in the Carrington area, producers wanting to grow barley as a hay crop should select Westford for its high yield and above-average quality. Hayes barley would be a second choice for its high IVDMD. The orange lemma isolate may be a source of a lower lignin to increase the digestibility of barley hay.

See the Fargo data for a somewhat different result.

**Table 1. Agronomic data for 13 forage barleys grown at Carrington, ND, in 2006.**

Forage variety	Forage type	Days to heading	Plant	Harvest	Forage yield	Harvest date <sup>†</sup>	Days to harvest
			height	moisture			
			inches	%	ton/A		
Bestford	6-rowed awnless	61.0	28.5	75.2	2.6	29-Jun	70
Bowman	2-rowed awned	56.8	24.6	77.4	2.2	22-Jun	63
Conlon	2-rowed awned	55.3	26.2	77.4	2.3	22-Jun	63
Haybet	2-rowed awnless	60.8	26.0	71.1	2.6	29-Jun	70
Hayes	2-rowed awnless	67.3	21.1	72.2	2.5	29-Jun	70
Horseford	6-rowed awnless	56.0	24.2	77.8	2.1	26-Jun	67
I01-245	Late Bowman-awned	62.3	25.8	76.3	2.2	26-Jun	67
I90-255	Hooded Bowman	57.5	25.2	77.1	2.2	22-Jun	63
I92-601	Orange lemma Bowman-awned	57.0	26.0	78.1	2.3	22-Jun	63
I94-152	Fragile stem Bowman-awnless	56.0	25.0	74.9	2.6	26-Jun	67
I98-344-1	Awnless Bowman	55.5	24.6	74.6	2.4	26-Jun	67
Robust	6-rowed awned	57.0	26.4	79.2	1.9	22-Jun	63
Westford	6-rowed awnless	67.5	26.8	71.8	2.9	5-Jul	76
	Mean	59.2	25.4	75.6	2.4		
	CV, %	1.1	7.7	2.2	10.3		
	LSD 0.05	0.9	2.8	2.4	0.3		

<sup>†</sup> Harvest stage was 5 to 7 days post heading for the awned entries and soft dough for the hooded.

**Table 2. Forage quality of barley hays at Carrington, ND, in 2006.**

Entry	Quality component <sup>†</sup>								
	CP	ADF	NDF	ADL	Ash	HEMI	CELL	IVDMD	RFV
	----- % of dry weight -----								
Bestford	14.6	31.9	57.8	4.1	9.2	27.9	27.7	64.7	99.7
Horseford	14.3	29.5	56.7	3.4	9.7	27.2	26.2	68.2	108.1
Westford	14.5	30.1	57.3	3.2	10.4	27.2	26.9	66.4	106.5
Haybet	14.1	31.1	59.4	3.9	8.3	28.3	27.2	62.6	101.4
Hayes	14.6	31.9	60.3	3.3	10.7	28.4	28.6	70.3	98.8
Robust <sup>§</sup>	16.6	30.7	58.5	3.3	11.2	27.7	27.4	66.4	103.4
Conlon <sup>§</sup>	16.4	30.5	58.6	3.1	10.4	28.0	27.4	67.7	103.5
Bowman <sup>§</sup>	15.5	30.4	58.7	3.3	10.6	28.3	27.1	66.4	103.4
<b>Bowman isolines</b>									
Late maturing <sup>§</sup>	15.6	31.9	60.7	3.5	10.0	28.8	28.3	65.0	98.2
Orange lemma <sup>§</sup>	18.4	29.9	58.8	2.8	10.5	28.9	27.1	69.7	103.7
Fragile stem	14.9	28.6	56.5	3.2	8.7	27.9	25.4	67.7	109.7
Hooded	16.3	29.7	58.3	3.1	10.3	28.6	26.6	68.0	105.1
Awnless	15.0	30.2	57.5	3.6	9.1	27.3	26.6	65.6	105.8
Mean	15.5	30.4	58.5	3.4	9.9	28.0	27.1	66.7	103.8
LSD 0.05	1.9	2.0 <sup>‡</sup>	2.6 <sup>‡</sup>	0.4	1.3	1.2 <sup>‡</sup>	NS	3.3	6.9 <sup>‡</sup>
CV, %	7.3	3.8	2.6	5.7	7.9	2.5	4.0	2.9	3.9

<sup>†</sup> CP = crude protein; ADF = acid-detergent fiber; NDF = neutral-detergent fiber; ADL = acid-detergent lignin; HEMI = hemicellulose (NDF-ADF); CELL = cellulose (ADF-ADL); IVDMD = in vitro dry matter digestibility; RFV = relative feed value

<sup>‡</sup> Significant at the 10% probability level.

<sup>§</sup> Harvest stage = 5 to 7 days post heading; remaining awnless entries harvested at soft dough.