

## Barley Versus Oat: Which Makes the Superior Forage Crop

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### Summary

Oat (*Avena sativa* L.) is the most popular, cool-season annual forage grown in North Dakota. Research in Minnesota and Wisconsin suggests that barley (*Hordeum vulgare* L.) is superior to oat for forage quality and, in some instances, comparable in yield. The objective of this study was to determine if barley is equal or superior to oat for forage yield and quality in southwestern North Dakota. Oat and barley cultivars were compared for forage yield and quality in randomized and replicated plots. Preliminary results indicate that oats produce more forage but barley produces higher quality forage under North Dakota conditions. Intercropping peas with either barley or oats maintains or increases forage yield and enhances quality compared with growing either cereal alone in low nitrogen (N) (<30 lb N/acre) environments.

### Introduction

Oat is the most popular, cool-season, annual forage crop grown in North Dakota. Oat comprised approximately 83% of the small grain acreage devoted to hay production in 1997 (E. Stabenow, North Dakota Agric. Stat. Serv., per. comm.). The remaining acreage was comprised of barley (14%) and other (rye, wheat) small grain crops (3%).

Research indicates that barley produces higher quality forage compared with oats in semiarid regions. The CP concentration of barley and barley-pea forage was superior to the CP concentration of oat and oat-pea forage in a study at Dickinson, ND (Carr et al., 1998).

Barley forage yield has been equal or superior to forage yield of oats in sub-humid regions (Cherney et al., 1982). The objective of this experiment was to determine if barley is superior to other cool-season, annual forage crops and crop combinations for yield and quality in southwestern North Dakota.

## Materials and Methods

Six barley cultivars developed for forage (Horsford, Haybet, Westford, and three experimentals) and grain (2-rowed = Conlon, Stark, Logan; 6-rowed = Foster, Robust, Stander) were compared with three oat cultivars grown for forage (Celsia, Mammoth, Triple Crown) and two for grain (Paul and Whitestone) for forage yield and quality in 1999 and 2000. Selected barley and oat cultivars also were grown with field pea so that comparisons among barley and oat sole crops and intercrops could be made.

A randomized complete block with four replications was used. Data were analyzed using appropriate statistical procedures available from SAS. Results from only preliminary analyses were available for this paper, so readers are cautioned that interpretations may be changed after thorough analyses of the data are completed.

## Results and Discussion

Forage yield averaged 1.5 tons/acre of dry matter across the 2 years of the study ([Table 1](#)). Nonorthogonal contrasts indicated that oat produced more forage than barley varieties but barley forage was higher in quality than oat forage (contrasts not provided). Under the low-N conditions that occurred during this study, intercropping either oat or barley with peas increased crude protein concentration of forage from 4.0 to 5.9% compared with growing the cereal crop alone, depending on the crop and variety grown. Intercropping peas with oat or barley also increased forage yield.

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## Literature Cited

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**Cherney, J.H., and G.C. Marten. 1982a.** Small grain crop forage potential: I. Biological and chemical determinants of quality, and yield. *Crop Sci.* 22:227-231.

**Table 1.** Forage yield, crude protein, acid- and neutral concentrations of annual crops grown at Dickinson, ND, during 1999 and 2000.

		-----Dry matter basis -----

<b>Treatment</b>	<b>Yield</b>	<b>CP</b>	<b>ADF</b>	<b>NDF</b>
	<b>Tons/ac</b>	----- % -----		
Conlon barley	1.2	8.5	33.5	57.0
Foster barley	1.3	8.7	34.4	57.9
Haybet barley	1.6	8.3	35.2	60.9
Haybet/Arvika	1.8	13.5	35.6	52.8
Horsford barley	1.3	8.9	34.6	56.7
Logan barley	1.2	8.5	33.6	54.6
Robust barley	1.2	8.8	35.3	58.4
Robust/Arvika	1.7	12.4	34.3	51.7
Robust/Trapper	1.5	14.7	34.5	50.0
Stark barley	1.2	10.5	33.4	55.6
Stander barley	1.2	9.5	31.8	56.2
Westford barley	1.5	9.3	39.2	62.3
ND experimental barley	1.2	9.4	29.7	54.0
BZ experimental I barley	1.5	8.7	36.8	60.4
BZ experimental II barley	1.3	8.8	37.6	61.8
Celsia oat	1.7	5.5	41.8	64.6
Paul oat	1.5	7.5	36.7	57.2
Paul/Arvika	2.0	12.6	38.9	50.0
Paul/Trapper	2.1	11.7	36.9	55.3
Mammoth oat	1.8	6.0	38.2	61.1
Whitestone oat	1.8	5.5	39.3	65.0
Whitestone/Arvika	1.8	9.5	36.6	56.3
Whitestone/Trapper	2.3	10.6	36.1	54.1
<b>Trial Mean</b>	1.5	9.5	35.8	57.1
<b>C.V. %</b>	23.1	17.7	9.7	6.7

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