
RESULTS OF THE 1989 NORTHWESTERN CANADA BARLEY TRIAL GROWN AT PALMER

S.M. Dofing

Assistant Professor of Agronomy, Palmer Research Center, Agricultural and Forestry Experiment Station, University of Alaska Fairbanks

S.A. Blake

Agricultural Assistant, Palmer Research Center, Agricultural and Forestry Experiment Station, University of Alaska Fairbanks

R.I. Wolfe

Research Scientist, Barley Breeding, Alberta Agriculture, Agriculture Canada, Beaverlodge, Alberta

MATERIALS AND METHODS

Thirty barley genotypes including three named cultivars, two cultivars in process of registration, and 25 experimental lines were evaluated at the Matanuska Research Farm, Palmer, Alaska. These genotypes represent a wide range of germplasm potentially adaptable to Alaska and northwestern Canada.

The soil at the experimental site consisted of a Knik silt loam with a pH of 5.8. Fertilizer consisting of 78 lb per acre N, P_2O_5 , and K_2O with 18 lb per acre S was broadcast and incorporated prior to seeding. Plots were seeded on May 3 using a tractor-mounted, four-row drill equipped with double-disk furrow openers and press wheels. One-half oz per acre Harmony herbicide with surfactant was applied with a sprayer when weeds were approximately three inches tall. Plots were harvested as they matured using a self-propelled cutter/binder, and bundles were dried using heated, forced air prior to threshing.

Characteristics measured included grain yield, heading date, maturity date, lodging susceptibility, and plant height. Grain yield was estimated by harvesting the center two rows from each four-row plot. Barley was considered headed when 50% of spikes had just emerged from the boot, and was considered mature when 50% of spikes had lost all green color. Lodging susceptibility was estimated visually using a scale of 1-9, with: 1=plants completely upright and 9=plants completely lodged. Plant height was recorded as the average distance from the ground to tip of plants, excluding awns.

The experimental design was a randomized complete block with four replications. Genotypic means and standard errors were estimated, and phenotypic correlation coefficients were computed for all characters.

RESULTS AND DISCUSSION

Favorable climatic conditions for barley production in 1989 at the Matanuska Research Farm resulted in exceptionally high grain yields. Mean grain yield for cultivars in this test was 92.5 bushels per acre (Table 1). A total of 908 growing degree-days (41 degree F base) were accumulated between May 1 and Aug. 31. 'Otal' required 98 days or 700 growing degree-days to reach maturity. A high temperature of 80 degrees F was recorded on July 19. Soil moisture was generally adequate throughout the growing season.

Table 1. Performance of 30 cultivars grown in the 1989 Northwestern Canada Barley Test at Palmer, Alaska.

Cultivar	Yield bu/A	Heading date July	Maturity date August	Lodging ¹ 1-9	Height in
Otal	96.1	1	9	6.0	40.5
BvS21-1	89.0	4	9	6.7	38.8
BvSJS-11	67.9	1	9	4.0	33.8
BvSLK-15	89.6	1	9	5.0	35.7
Jackson	83.4	2	9	3.9	33.2
BT663 (Stacey)	95.6	2	9	4.1	39.7
BT670	101.9	3	9	5.4	40.0
BVS19-76	87.1	3	9	3.7	38.8
BvS23-53	89.2	1	9	2.9	37.0
BT669	90.5	6	9	2.7	37.0
BvSO8-20	91.4	6	10	5.9	43.4
BvSOD-71	96.3	2	10	4.6	35.8
BvSOD-78	95.8	2	10	3.0	34.0
BvS83-41	95.4	4	10	3.4	41.5
BvS83-38	97.6	4	10	3.9	42.5
BvSO6-3	77.6	6	10	3.2	40.5
BvSBH-22	88.3	7	12	3.4	38.5
BT667	96.2	6	13	3.4	42.7
Heartland	93.5	4	13	3.6	39.8
BT634	93.5	6	15	3.2	41.0
LAB-699-027	96.4	9	18	4.4	40.2
LAB-703-048	98.3	6	19	4.4	39.7
BT633	87.4	9	20	3.9	39.5
LAB-703-044	93.4	8	20	3.3	42.2
LAB-703-064	92.5	5	20	4.8	41.2
BT483 (Brier)	98.2	8	21	4.2	42.3
BT637	90.8	12	21	5.0	41.5
BT631	95.6	9	21	3.5	40.8
BT636	101.5	11	21	2.9	42.5
LAB-698-009	105.0	10	22	4.0	43.0
Mean	92.5	5	13	4.1	39.6
Standard error	5.3	0.5	0.9	0.6	1.0

¹1= Plants Completely Upright; 9=Plants Completely Lodged

The performance of the 30 barley cultivars evaluated is presented in Table 1. Because early maturity is of prime importance under Alaskan growing conditions, cultivars are listed in order of increasing (later) maturity date.

Otal, developed at the Alaska Experiment Station, performed well in this test, as it combined high yield with early maturity. However, it was susceptible to lodging, and plant height was greater than average. It would be desirable, therefore, to improve the "defensive" characteristics of this cultivar without reducing yield.

The Canadian cultivar 'Jackson' combines a relatively short plant stature with fairly stiff straw and early maturity. However, it has not demonstrated exceptionally high yields in Alaska. In this test, its maturity was equal to that of Otal; however, in extensive Canadian testing its average maturity has been one day later than Otal.

BT663 is a Canadian experimental line which will be registered shortly in Canada as 'Stacey'. Its major strengths include a high level of scald resistance and early maturity. In this test, its maturity was equal to that of Otal; however, it has been two to three days later-maturing in Canadian trials. Additional testing is required to more accurately determine its maturity under Alaskan conditions. In addition, it demonstrated a lower susceptibility to lodging compared to Otal at approximately the same yield. The relative strengths and weaknesses of other cultivars may be determined from the data in Table 1. Later-maturing cultivars listed in this table would not be considered for use in Alaska.

Phenotypic correlation coefficients among traits are presented in Table 2. With the exception of correlations between yield and heading date and between maturity date and lodging, all phenotypic correlations were highly significant.

For the cultivars evaluated, early maturity was highly correlated with low yield, early heading date, and short plant height. High grain yield was correlated with susceptibility to lodging and tall plant height.

Table 2. Phenotypic correlation coefficients for five characters measured in 30 cultivars evaluated in the 1989 Northwestern Canada Barley Test grown at Palmer, Alaska.

	Heading date	Maturity date	Lodging	Height
Yield	0.08	0.30**	0.44**	0.56**
Heading date		0.80**	-0.25**	0.46**
Maturity date			-0.06	0.45**
Lodging				0.30**

** Significant at the 0.01 probability level.

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**Agricultural and Forestry Experiment Station
School of Agriculture and Land Resources Management
University of Alaska Fairbanks
James V. Drew, Dean and Director**

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