



University of Idaho  
College of Agriculture  
Cooperative Extension Service  
Agricultural Experiment Station

Current Information Series No. 215  
February 1974

**LIBRARY**

MAR 14 1974

*Howard B. Roylance*

*D. M. Wesenberg*

*P. M. Hayes*

*H. C. McKay*

**UNIVERSITY OF IDAHO**

# Barley Varieties

## for Southern Idaho



S  
53  
E222



# BARLEY VARIETIES FOR SOUTHERN IDAHO

**About the authors:** Howard B. Roylance is crop management specialist, University of Idaho Cooperative Extension Service, headquartered at Boise. D. M. Wesenberg is research agronomist and R. M. Hayes is agricultural research technician, Western Region, USDA-ARS, headquartered at Aberdeen. H. C. McKay is superintendent, University of Idaho Branch Agricultural Experiment Station, Teton.

Barley is an important cereal crop in Idaho. The state ranked fifth in the U.S. in barley acreage in 1973 with an estimated 835,000 acres and production of more than 43 million bushels, according to the Idaho Crop and Livestock Reporting Service. Barley is the most important feed grain in Idaho. However, approximately 54% of the 1973 acreage was planted with varieties approved for malting and brewing. A large portion of the Idaho malting barley acreage is marketed as malting barley at premium prices.

More than 50% of the Idaho acreage in recent years has been planted with two-row spring varieties. Piroline has been the most popular variety the past 8 years. It performs well under irrigation and on dryland. Six-row spring varieties accounted for about 35% of the 1973 Idaho acreage and six-row winter varieties for about 3%. Steveland and Woodvale were the most popular six-row varieties in 1973 and Luther was the most widely grown winter variety.

Winter barley will survive most years in the Boise Valley, 4 out of 5 years in the Magic Valley, and 3 or 4 out of 5 years in the Aberdeen area. Seeding winter barley in marginal areas after October 1 is unlikely to produce satisfactory stands. Winter barley is not recommended north of Idaho Falls in eastern Idaho because of the risk of winterkilling. Adapted varieties of winter barley perform well under irrigation and satisfactory yields are reported on dryland.

## *Diseases and Cultural Problems*

Three species of barley smut occur in Idaho — loose smut (*Ustilago nuda*), covered smut (*U. hordei*) and semiloose smut (*U. nigra*). Loose and covered smut are the most common. Most barley varieties currently grown in Idaho are susceptible.

Loose smut is first noticeable just after heading as a loose, black, spore mass which has replaced the entire kernel structure including the awns. The spores are disseminated by wind, leaving only the bare rachis when the crop is mature. Infection occurs at flowering. Covered smut first appears about heading time as a firm, black, spore mass covered with a grayish membrane. The spore mass replaces the kernels; however, the awns and parts of the hull are not completely destroyed. The spores tend to remain as an intact mass until harvest. During the growing season and at harvest, the spore masses are ruptured and the potentially infective spores adhere to barley kernels.

Both loose and covered smut are seedborne diseases — loose smut within the kernel and covered smut on the outside. Since these smuts are seedborne, only seed infected with the smut organism will produce smutted plants. The percentage of smutted plants within a field will not increase during the crop year. Yield losses are about equivalent to the percentage of smutted plants.

Both loose and covered smut can be controlled by seed treatment with Vitavax.\* At this time, however, only Foundation and Registered seed can be legally treated with Vitavax. Other fungicides currently available control only covered and semiloose smut. Vitavax-treated Foundation or Registered seed should be produced in isolated fields to keep it free of loose and covered smut. Planting Certified seed from Vitavax-treated Registered seed reduces the risk of loose smut.

Ergot, a fungus disease that attacks barley and other cereals, has been occasionally observed in Idaho barley. Because ergot is poisonous to humans and livestock, ergot grain is discounted on the market. Any grain containing more than 0.3% ergot by weight is graded "Ergoty" and is discounted. The amount of ergot in the grain fed to livestock determines how rapidly toxic effects will show. Toxicity is cumulative, depending on the amount of ergot eaten and the length of time over which it is consumed.

You can minimize ergot by removing nearby wild grasses before flowering, by crop rotation and by using ergot-free seed. Because no varieties are resistant, ergot infestations are possible in all varieties.

Late seeding of spring varieties increases the risk of infection by barley yellow dwarf virus and root, crown and foot rots. Each of these diseases reduces grain yield and quality. Seed treatment and crop rotation may help control bacterial leaf blight which is occasionally severe.

Certified seed guarantees varietal purity. It is high in germination and free from weed seeds. Varietal purity and correct identification are important, especially with malting barley. New barley varieties have been developed, tested and released in the Northwest to meet changing conditions of production and marketing. Varieties important in Idaho are described and compared in this publication.

\* Vitavax is the tradename of Uniroyal, Inc. for 75% 2,3-dihydro-5-carboxanilido-6-methyl-1, 4-oxathiin.



raill in test weight, but superior to Traill in lodging resistance and kernel plumpness. Height and heading date were similar to Traill.

### **Bonanza**

Bonanza is a blue-kerneled, smooth-awned malting variety that is similar to Conquest in appearance and performance in southern Idaho. Bonanza averaged about the same as Conquest in yield in irrigated trials at Aberdeen and Twin Falls in 1973.

### **Conquest**

Conquest is a blue-kerneled, smooth-awned malting variety that is relatively tall but stiff-strawed and resistant to lodging. It has good test weight and heads about the same date as Traill. Conquest yields under irrigation have averaged about 90% of Traill in 4 station-years (1970-1973) at Aberdeen.

### **Larker**

Larker is a white-kerneled, semismooth-awned malting barley. It has moderate resistance to lodging, is high in test weight and is about equal to Traill in height. Larker yields under irrigation have averaged about the same as Traill in 6 station-years (1970-73) at Aberdeen and Twin Falls. It heads 2 or 3 days earlier than Traill at Aberdeen. It is moderately susceptible to the smuts and powdery mildew and resistant to stem rust. It may have some tolerance to barley yellow dwarf virus.

### **Traill**

Traill is a white-kerneled, rough-awned malting barley with moderate resistance to lodging and high test weight. It is more likely to shatter than other six-rowed varieties commonly grown in southern Idaho. Traill yields under irrigation have averaged about 85% of Steveland at Aberdeen and about 90% of Steveland at Twin Falls. It usually heads 5 to 7 days later than Steveland at Aberdeen. It is usually about 10 inches taller and more susceptible to lodging than Steveland. It is moderately susceptible to the smuts and powdery mildew and resistant to stem rust.

## *Two-Row Spring Varieties*

### **Betzes**

Betzes is a white-kerneled, rough-awned barley classified as acceptable for malting in Montana, Colorado and Wyoming when produced east of the Continental Divide. Betzes will lodge more than most varieties currently grown in Idaho and is susceptible to smuts.

### **Klages**

Klages is a white-kerneled, rough-awned malting barley. Klages is a composite of 35 lines selected from 60Ab1810. It has a good straw strength, test weight and kernel weight when grown under irrigation. It averaged 8.7 and 10.1% higher than 60Ab1810 and Piroline, respectively, in yield in 7 station-years (1971-73) under irrigation at Aberdeen, Twin Falls and Tetonia. It is slightly superior to Piroline in lodging resistance under irrigation. It is similar to Piroline

in height and normally heads 3 days later than Piroline. It is not recommended for non-irrigated production in low-rainfall areas. The variety is named in honor of the late Dr. Karl H. Klages, head of the University of Idaho Department of Agronomy from 1936-62.

### **Piroline**

Piroline is a white-kerneled, rough-awned malting barley with good threshing characteristics. While new malting barley varieties are expected to replace Piroline, it has been the most popular variety in Idaho since 1966. It performs well on both irrigated and dryland sites. Piroline occupied about 1,000,000 acres or more than 28% of the total barley acreage in the Northwest in 1973, leading all varieties in acreage. It has good test weight and kernel weight and is superior to Betzes in lodging resistance. It is moderately resistant to barley yellow dwarf virus and resistant to powdery mildew.

### **Vanguard**

Vanguard is a white-kerneled, rough-awned malting barley similar to Piroline in agronomic performance under irrigation at Aberdeen and Twin Falls. It averaged about 10% higher than Piroline in yield under irrigation at Tetonia in 1971-73. Relatively little Vanguard was grown in southern Idaho in 1973, but it was the most popular variety in northern Idaho with an estimated 44,000 acres.

### **Shabet**

Shabet is a white-kerneled, rough-awned malting barley with moderate lodging resistance. It is superior to Betzes in lodging resistance, but inferior to Piroline and other recently developed two-row varieties. Shabet has yielded well on both irrigated and dryland sites in southern Idaho. It has good test weight and kernel weight. Shabet is less likely to shatter than Betzes.

### **Moravian and Moravian III**

Moravian is a white-kerneled, rough-awned malting variety grown on an estimated 19,500 acres in Idaho in 1973 — primarily on contract to Adolph Coors, Inc. Moravian has relatively weak straw compared with recently developed two-row malting barley varieties. It has averaged lower in yield than Piroline and other two-row malting barley varieties at Aberdeen. Premium prices and good management practices have nevertheless made Moravian an attractive cash crop for many farmers in southern Idaho.

Moravian III is a recently developed, white-kerneled, rough-awned malting variety scheduled for commercial contract production in 1974. Moravian III was tested under irrigation at Aberdeen, Twin Falls and Tetonia in 1973. It averaged about 23% higher than Moravian in yield at the three locations. Moravian III performed best at Twin Falls where it averaged 127 bu/A compared with 126.6 bu/A for Piroline and 95.2/A for Moravian. Moravian III averaged 7 inches shorter than Moravian at Aberdeen.



turing compared to the mixed blue-green and light-green Vale spikes. It heads down 6 days earlier than Vale and is 1 to 3 inches shorter, but similar in test weight and kernel weight. Woodvale may be slightly superior to Vale in lodging resistance. Woodvale is resistant to certain races of loose smut.

### *Two-Row Spring Varieties*

#### **Caribou**

Caribou is an early-maturing variety with white kernels and semismooth to smooth awns. It is well adapted to southern Idaho dryland, with a record of good yield, straw strength, test weight and kernel weight. Although Caribou is recommended for dryland, it has also performed well under irrigation at Aberdeen and Twin Falls. It is less resistant to lodging than Pirolina. Caribou may be more susceptible to ergot than other varieties currently grown in Idaho.

#### **Otis**

Otis is early-maturing, short-strawed, white-kerneled and smooth-awned. Early maturity makes Otis very popular on dryland in the Soda Springs area. It occupied about 30,000 acres in 1973. It heads about 2 days earlier than Pirolina at Tetonia. Otis has good test and kernel weight on dryland at Tetonia and Soda Springs.

### *Six-Row Winter Varieties*

#### **Alpine**

Alpine is a stiff-strawed, blue-kerneled, rough-awned feed barley. Adapted to irrigated production, it also yields satisfactorily on dryland. Because of its taller straw Alpine is preferred over Luther for dryland production in certain areas of southern Idaho.

#### **Kamiak**

Kamiak is early-maturing, white-kerneled and rough-awned. It has relatively stiff straw, but is more susceptible to lodging than Luther and Schuyler. It headed 15 to 19 days earlier than Luther at Aberdeen in trials conducted in 1971-73. It may be slightly superior to Luther in winterhardiness and is reported to be free of the "itch" which occurs during threshing or milling of Luther. Kamiak has not been adequately tested on non-irrigated land in southern Idaho. However, in a preliminary non-irrigated trial at Weston in 1973, it averaged higher in yield than Alpine and other commonly grown winter barley varieties.

#### **Luther**

Luther, a stiff-strawed, rough-awned feed barley, originated as a mutant of Alpine. It is well adapted for irrigated production and produces satisfactory yields on dryland. It is shorter than Alpine, which may be a disadvantage on dryland in certain seasons. It averaged 5 inches shorter and was more resistant to lodging than Alpine under irrigation at Aberdeen. Luther is similar to Alpine in test weight but has a smaller kernel.

#### **Schuyler**

Schuyler is a stiff-strawed, rough-awned barley with a dense semi-club type spike. It has been included in irrigated trials at Aberdeen and Twin Falls for several years and appears well adapted to irrigated production. It has not been adequately tested on Idaho dryland although it has shown wide adaptation in trials conducted in other states. It heads about 7 days earlier than Luther at Aberdeen. It has averaged higher in yield than Alpine and Luther at Aberdeen under irrigation, but slightly lower than these varieties at Twin Falls. Schuyler is capable of high yields under irrigation with test weight and lodging resistance equal to or better than Luther. It has averaged about the same as Luther in kernel weight at Aberdeen.

## **MALTING BARLEY**

Specific varieties of barley are classified by the Malting Barley Improvement Association as acceptable for malting and brewing. Barley acceptable for malting will command premium prices over feed barley. Malting barley must be delivered in pure carlots free of mixtures of other malting varieties, feed barley varieties, other grains, wild oats and foreign material. It must be sound, bright, plump, low-moisture barley within a specific protein range and free from other damage.

Protein content of Western Two-Row barley for malting should not exceed 12%. High levels of nitrogen will result in protein content above an acceptable level. In general, applying more than 40 pounds of nitrogen per acre following potatoes or beets will cause high protein. High rates of nitrogen also tend to promote lodging and subsequent reductions in kernel plumpness and yield.

Adequate irrigation is necessary to insure low protein, high plump-barley percentages and maximum yield. Properly threshed malting barley will contain less than 5% skinned and broken kernels, and will generally have short pieces of beard attached to the kernels. (Skinned kernels are kernels with the hull loosened or removed over the germ or with one-third or more of the hull skinned off.)

### *Six-Row Spring Varieties*

#### **Beacon**

Beacon is a white-kerneled, rough-awned malting barley recently released by the North Dakota Agricultural Experiment Station. Beacon averaged about the same as Traill in yield in irrigated trials at Aberdeen and Twin Falls in 1973. It was slightly lower than



## FEED BARLEY

### *Six-Row Spring Varieties*

#### **Deawn**

Deawn is a short-strawed, semismooth-awned barley with white kernels and good threshing characteristics. It averaged less than 85% of the yield of Steveland in irrigated trials at Aberdeen and Twin Falls in 1969-70. \* It is similar to Steveland in height and lodging resistance, but superior in test weight. It heads about 5 days later than Steveland at Aberdeen. It is resistant to loose smut.

#### **Gem**

Gem is early-maturing, semismooth-awned and white-kerneled. It has been a popular variety on both irrigated and nonirrigated sites although acreage has declined to only about 3% of the 1973 total. It generally yields less than other commonly grown six-row varieties under irrigation at Aberdeen and Twin Falls. It is early-heading and has good kernel weight and adequate test weight. It is less resistant to lodging than Vale and Steveland.

#### **Karl**

Karl is a midseason, white-kerneled, Traill-type barley with rough awns. It averaged about 8% higher than Traill in 12 station-years of testing (1967-73) under irrigation in southern Idaho. It averaged about the same as Traill in 57 station-years of testing in the Rocky Mountain Barley Nursery in 1968-70. It averaged about 7% less than Steveland in yield under irrigation at Aberdeen, but about 4% more at Twin Falls. Karl is usually 3 to 4 inches shorter and normally heads 2 days earlier than Traill. It has good test weight and kernel weight when grown under irrigation in southern Idaho. It is slightly superior to Traill in shatter resistance in southern Idaho.

Although Karl is generally equal or superior to Traill in agronomic performance under irrigation in southern Idaho, it is more susceptible to lodging and shattering than varieties such as Steveland and Woodvale. It is not well adapted to production on nonirrigated land in very low rainfall areas. Plant-scale evaluations of malting and brewing quality are currently being conducted by the Malting Barley Improvement Association in cooperation with Great Western Malting Company.

#### **Steptoe**

Steptoe is a high-yielding, white-kerneled, rough-awned variety with attractive grain. Steptoe has moderate lodging resistance, but it is not as stiff-strawed as Steveland, Vale and Woodvale. It is similar to Gem in lodging resistance under irrigation at Aberdeen and Twin Falls. Steptoe has averaged high in test weight under irrigation in southern Idaho but in non-irrigated trials has averaged less than Unitan and commonly grown two-row varieties. As indicated in the summary tables, Steptoe has an excellent yield

\* The trials reported in this publication were conducted in cooperation with M. J. Lebaron, Twin Falls; E. W. Owens, Aberdeen; S. Reed, Soda Springs, and E. Koller, Weston.

record in irrigated trials in southern Idaho. In three non-irrigated trials at two locations in southern Idaho (1972-73) Steptoe yields ranged from 30 to 40% higher than Pirolina. In the same non-irrigated trials Steptoe yields ranged from 92 to 141% of Unitan.

#### **Steveland**

Steveland is early maturing, short, blue-kerneled and rough awned. It has good threshing characteristics and is well adapted to irrigated production. It occupied about 100,000 acres in 1973 and was the most popular six-row variety in Idaho in 1972 and 1973. Steveland is not as stiff-strawed as Vale or Woodvale, but because of its short straw resists lodging well under gravity irrigation at Aberdeen and Twin Falls. Excellent yields and satisfactory lodging resistance have been reported in commercial production under sprinkler irrigation, especially after a heavy application of nitrogen.

Steveland is susceptible to certain races of loose smut, but is more resistant than Gem. It is resistant to local races of stem and leaf rust. It is not recommended for low-rainfall, non-irrigated areas because under these conditions yield and test weight are low.

#### **Trebi**

Trebi is a weak-strawed, blue-kerneled, rough-awned variety. It has poor lodging resistance compared to other commonly grown varieties. Trebi was selected from a bulk lot of barley introduced from Turkey.

#### **Unitan**

Unitan is relatively tall with white kernels and semismooth awns. It has less resistance to lodging than other commonly grown six-row varieties. Under irrigation at Aberdeen and Twin Falls, it yielded about the same as Steveland. The best two-row varieties generally outyielded Unitan on dryland in southern Idaho. It is resistant to loose and covered smut.

#### **Vale and Vale 70**

Vale has stiff straw, white kernels and smooth awns. It yields well under irrigation and resists lodging more than most other common Idaho barley varieties. Vale is resistant to several races of mildew. It is not recommended for dryland.

Vale 70 is a selection from Vale. The two varieties are similar in test weight, height, lodging resistance and heading date. Vale 70 averaged slightly higher in kernel weight, but Vale averaged about 4% higher in yield under irrigation at Aberdeen in 1970 and 1971. Vale 70 has been slightly superior in yield in trials at Ontario, Ore. The spike color distinguishes the two varieties. Vale has blue-green and light-green spikes before maturity; Vale 70 has light-green only.

#### **Woodvale**

Woodvale is stiff-strawed, white-kerneled and smooth-awned. A selection from Vale, it has a semi-club spike and other characteristics similar to Vale. However, Woodvale spikes are light-green before ma-



### SIX-ROW WINTER BARLEY IRRIGATED TRIALS

Variety	Average yield (bu/A)	Test weight (lb/bu)	Lodging* (%)	Height (in)	Heading date (June)	Kernel weight (gm/1000)
<b>Aberdeen (1970-71 to 1972-73)</b>						
Luther	139.2	50.0	12	37	12	37.9
Kamiak	135.9	50.3	5	34	5/26	38.3
Schuyler	145.0	51.1	9	33	4	36.8
<b>Twin Falls (1966-67 to 1970-71)</b>						
Alpine	110.5	50.1	39	45	—	38.1
Luther	117.0	50.2	16	40	—	34.8

\* 1970-71 data only at Aberdeen.

### SIX-ROW SPRING BARLEY IRRIGATED TRIALS

Variety	Average yield (bu/A)	Test weight (lb/bu)	Lodging* (%)	Height (in)	Heading date (June)	Kernel weight (gm/1000)
<b>Aberdeen (1970-73)</b>						
Step toe	147.0	51.8	16.3	33	16	47.1
Steveland	121.4	49.9	4.3	28	13	42.6
Vale	131.4	49.4	8.5	33	25	51.8
Woodvale	127.0	50.5	2.8	30	18	51.2
<b>Twin Falls (1970-73)</b>						
Step toe	149.8	52.5	14.5	35	—	49.9
Steveland	123.1	50.5	2.5	29	—	46.5
Vale	122.8	50.4	1.5	34	—	54.8
Woodvale	122.6	50.7	2.5	31	—	55.5

\* 1970 and 1971 data only at Twin Falls.

### TWO-ROW SPRING BARLEY IRRIGATED TRIALS

Variety	Average yield (bu/A)	Test weight (lb/bu)	Lodg- ing* (%)	Height (in)	Heading date (June)	Kernel weight (gm/ 1000)	Plump+ (%)
<b>Aberdeen (1970-73)</b>							
Betzes	106.2	54.1	33.5	35	21	40.4	83
Caribou	119.6	54.1	15.3	32	13	50.1	91
Klages ‡	122.1	54.4	8.5	35	23	45.0	90
Piroline	110.7	54.8	13.3	35	20	43.9	94
Vanguard	113.2	54.9	10.3	35	22	42.3	93
Shabet	116.9	53.4	27.3	36	24	45.0	87

#### Twin Falls (1970-73)

Betzes	121.0	54.4	52.5	34	—	41.1	82
Caribou	122.1	54.6	16.5	31	—	51.4	93
Klages ‡	130.6	55.7	6.5	32	—	46.2	93
Piroline	120.4	55.4	25.0	34	—	42.8	93
Vanguard	120.1	55.8	29.0	33	—	42.7	92
Shabet	121.1	54.2	38.5	34	—	45.4	89

#### Tetonia (1971-73)

<b>(July)</b>							
Betzes	76.2	52.8	—	—	17	41.8	94
Caribou	75.0	52.8	—	—	11	50.6	95
Klages ‡	77.7	53.1	—	—	20	45.4	95
Piroline	73.1	53.4	—	—	15	43.9	97
Vanguard	80.2	53.8	—	—	16	43.4	96
Shabet	88.5	52.9	—	—	18	49.6	96

\* 1970 and 1971 data only at Twin Falls.

+ Percent by weight over 6/64 screen.

‡ 1970 and 1971 data are for 60Ab1810.

### TWO-ROW AND SIX-ROW SPRING BARLEY DRYLAND TRIALS

Variety	Average yield (bu/A)	Test weight (lbs/bu)	Height (in)	Heading date (July)	Kernel weight* (gm/1000)
<b>Tetonia (1972-73)</b>					
Caribou	39.4	52.5	—	7	48.3
Piroline	43.3	53.5	—	11	40.9
Shabet	45.9	52.5	—	14	44.2
Step toe	57.1	48.7	—	8	47.1
Unitan	45.4	50.4	—	9	45.7
<b>Soda Springs (1968-71)</b>					
Caribou	45.3	47.1	—	—	40.9
Otis	38.7	46.3	—	—	40.4
Piroline	50.0	49.0	—	—	39.6
Shabet +	53.1	51.6	—	—	42.5
<b>Rockland (1969 and 1971)</b>					
Caribou	33.2	52.2	19	—	43.6
Otis	31.4	52.3	19	—	41.4
Piroline	30.9	52.7	23	—	37.4
Shabet +	33.3	49.6	24	—	34.6

\* 1972 data only at Tetonia.

+ 1969-71 data only.

Published and distributed in furtherance of the Acts of May 8 and June 30, 1914, by the University of Idaho Cooperative Extension Service, James L. Graves, director; and the U.S. Department of Agriculture, cooperating