

LICO
 Note the clean thresh of Hiland.
HILAND
 Comparison of threshability in awn removal of Hiland and Lico barleys.

Hiland—a better barley

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HILAND BARLEY² is a real advance in barley varieties for Wyoming producers. It yields consistently better than Trebi and Frontier on irrigated land throughout the State. It produces high yields under irrigation and has little down grain. In this respect it is far superior to Trebi and Frontier.

Hiland is particularly responsive to soil high in available nitrogen. The grain threshes well and the fine, semi-smooth awns are easily removed. This quality is important to feeders, as mouth sores are caused by poorly-threshed, rough, coarse-awned barley. The clean, awn-free thresh of Hiland reduces the dockage in the grain sold, and the awn-free seed is easy to plant as it feeds through the grain drill with least stoppage. Its thin hull, together with high test weight, insure a high concentrate feed. Hiland is medium early in maturity, which permits its excellent yield performance at the lower altitudes in Eastern and Northern Wyoming. And, it ripens early enough to produce mature grain in the intermountain valleys such as the Star Valley (Idaho/Wyoming border). Hiland has a high degree of resistance to certain strains of loose smut, *Ustilago nuda*. Its resistance to ergot, *Claviceps purpurea* was observed in field trials. Also, it has a high degree of resistance to foliar diseases such as bacterial blight, *Xanthomonas translucens*.

Usual harvesting methods are acceptable for Hiland. The grain does not shatter easily from the plant. When compared with other standard varieties, this variety has a high degree of shatter resistance.

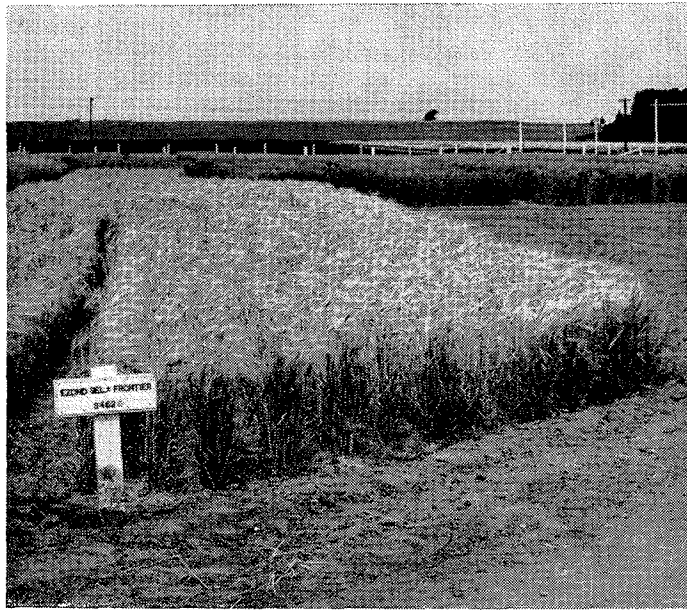
HISTORY OF BREEDING

Hiland is a selection from the cross Ezond W-3 selection x Frontier (C.I. 7155), which was made in the Wyoming Agricultural Experiment Station greenhouse by Dayton Klingman in 1942. The F₁ seed was grown and advanced to the F₄ generation. Selections were made from this generation on basis of its resistant reaction to certain strains of loose smut, *U. nuda*. Inoculation of the flowers was done by the hypodermic method. The inoculations and the selections were made by D. W. Bohmont and D. L. Klingman. Selection W.S. 4620, or C.I. 9530, now named Hiland, was resistant to loose smut in this trial.

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²Named by a staff committee of the Wyoming Agricultural Experiment Station.

Since 1947, 18 of the Ezond W-3 x Frontier selections and their parent varieties have been tested in replicated yield trials in Wyoming. Since 1951, two or more of the selections have been tested in the Great Plains Regional Nursery and in the Rocky Mountain Barley Nursery. D. W. Bohmont, in charge of cereal breeding at the University of Wyoming, 1948-1950; Charles R. Rohde, in charge of cereal breeding, 1950-51; and R. P. Pfeifer, in charge of cereal breeding since 1952, have tested and evaluated these selections.³ The original seed increase was grown at Laramie in 1952, and the second increase was produced at the Torrington Substation in 1953. It is from the Torrington increase that the original seed release is made.



HILAND

Original increase plot of Hiland at Laramie in 1952. Note and compare standability of grain with Frontier (page 5) and Trebi (page 7.)

Orrin Webster of the Nebraska Experiment Station has been most helpful and cooperative in directing the conduct of yield trials in Nebraska during the early testing period of these selections. G. A. Wiebe and Harland Stevens of the U.S. Department of Agriculture have aided in the testing by their direction and coordination of the Great Plains Barley Nursery and the Rocky Mountain Barley Nursery.

³Wyoming Agricultural Experiment Station Substation Superintendents who have aided in the work of testing the performance of Hiland are O. K. Barnes, T. L. Birch, R. J. Hyer, L. R. Landers, L. H. Paules, and W. L. Smith.

BOTANICAL CHARACTERS OF SEED AND SPIKE

Hiland is a 6-rowed barley having a normal rachis and a medium lax spike. The semi-smooth awns are slender in structure and thresh exceptionally clean from the seed.

The kernel averages 10.16 mm. in length and is classified as mid-long to long. The aleurone layer is colorless. The lemma is semi-wrinkled, which indicates its thinness. It is smooth, having neither hairs nor teeth on the nerves. The lemma base is of the depressional type, having no obvious transverse crease. The lemma color is yellow, sometimes having purple color at the base. The rachilla length averages 3 mm. and is normal in structure. The length of the smooth glume is 0.6 to 0.7 the length of the kernel.



FRONTIER

Frontier, an excellent irrigated barley. But Hiland is an improvement over Frontier in strength of straw and in yield.

COMPARISONS OF AGRONOMIC CHARACTER

Agronomic characters of Hiland are compared with the varieties Frontier, C.I. 7155; Trebi, C.I. 936; and Lico, C.I. 6279 in Table I. These data are averages of seven replications.

Table 1—Comparison of Agronomic Characters of the Barley Varieties Hiland, Frontier, Trebi, and Lico

Variety	C. I. no.	Plant height in inches	Heading date—day in June	Percentage of loose smut	Percentage of lodging	Percentage of shatter*	Test weight in lbs. per bu.
Hiland	9530	33	25	0	8	0	46.6
Trebi	936	37	28	0	45	Trace	45.7
Frontier	7155	37	29	0	62	0	41.5
Lico	6279	34	21	10	5	0	40.7

Data recorded at Laramie in 1952.

*Shattering data recorded at North Platte, Nebraska, 1952.

Shortness of straw, early heading date, freedom from loose smut (*U. nuda*), lodging resistance, shattering resistance, and high test weight are all favorable characters for Hiland. Production throughout Wyoming during the past seven years has consistently confirmed the relative association of agronomic characters of Hiland with other varieties, as indicated in Table 1. For an average of six station years' testing, Hiland has a plant height of 33.5 inches, 7 percent lodging, a trace of loose smut, and a test weight of 49.69 lbs. per bushel.

YIELD PERFORMANCE

On irrigated land, Hiland has consistently outyielded Frontier as well as most of the commercially accepted varieties in Wyoming. Its yield increase was 20.5 percent over Frontier (Table 2).

Table 2—Average Yield Performance for 2 Years (1952-1953) of 4 Barley Varieties Produced Under IRRIGATION at 4 Locations in Wyoming

Variety	Bushels per acre yield at:				Av. yield of 8 station years	Percentage of Frontier
	Laramie	Torrington	Powell	Afton		
Hiland	105.3	70.9	59.7	94.7	82.7	120.5
Frontier	79.8	68.9	51.8	73.9	68.6	100.0
Trebi	80.5	73.5	51.9	70.9	69.2	100.9
Lico	90.0	67.4	51.6	71.0	70.0	101.2

Selection of Hiland was accomplished at Laramie by testing it alongside Frontier in replicated trials. The seven years' data presented in Table 3 indicate the good year-to-year performance of Hiland when compared with Frontier. Other data not presented here have confirmed

the excellent performance of Hiland on land of high fertility (available nitrogen). The stiff straw together with the inherent yield of Hiland make it an excellent barley for growers who expect to produce 40 to 90 bushels of grain per acre.

Table 3—Yield Performance of the Varieties Hiland and Frontier Produced under IRRIGATION at Laramie from 1947 to 1953

Variety	Average yield per acre in bushels for years:							7-yr. Av. yield of Frontier	
	1947	1948	1949	1950	1951	1952	1953		
Hiland	103.6	103.8	136.7	74.5	104.7	132.1	78.4	104.8	114.5
Frontier	92.6	105.7	128.3	74.1	80.8	90.9	68.7	91.6	100.0

On dryland Hiland has not been an outstanding variety in yield (Table 4). Yet it has produced nearly as much grain as the variety Trebi, which is one of the best-yielding 6-rowed varieties for dryland that the Wyoming Station breeder has observed. Hiland will perform well on dryland in Wyoming where yields of 40 bushels per acre are usually harvested. The grain quality and the yield harvested from the intermountain valley at Afton have been excellent. (See Table 4 at the Afton location.)



TREBI

Under conditions of high yield, Trebi lodges severely.

Table 4 —Average Yield Performance for 2 Years (1952-1953) of 4 Barley Varieties Produced on DRYLAND at 4 Locations in Wyoming

Variety	Bushels per acre yield at:				Av. yield of 8 station years	Percentage yield of Frontier
	Archer	Gillette	Sheridan	Afton		
Hiland	18.8	27.8	25.8	51.5	31.0	128.0
Frontier	12.1	21.3	23.3	40.1	24.2	100.0
Trebi	17.4	31.5	30.5	50.4	32.5	134.1
Lico	16.4	26.1	26.7	37.1	26.6	109.8

HOW TO GET SEED

If you are a Certified Seed producer wanting Hiland seed in the spring of 1954, you must make your request to your County Agent. He will relay your request to the Pure Seed Committee of the Wyoming Crop Improvement Association. This committee will fill the requests according to the amount of seed available and will issue permits of sale for Hiland seed. Then you can purchase the seed from Leon Paules, Superintendent of the Torrington Experiment Substation, Torrington, Wyoming. The *only* seed available in 1954 is from the substation at Torrington.

SUMMARY

The variety *Hiland* (W.S. 4620, C.I. 9530) was developed at the Wyoming Agricultural Experiment Station. It is a selection from the cross Ezond W-3 x Frontier (C.I. 7155), made at Laramie in 1942.

Hiland has been grown in replicated yield trials at Laramie since 1947. Its yield performance over Frontier has been 14.5 percent. On irrigated land throughout Wyoming on an average of eight station years of testing it has outyielded Frontier by 20.5 percent.

Hiland is recommended for production under irrigation. On dryland its performance is better than Frontier but it does not usually exceed Trebi in quality of grain or in yield. Generally, Hiland is not recommended for use on dryland in Wyoming.

The agronomic characters of yield, lodging resistance, semi-smooth awns, smut resistance, high test weight, and clean threshability mark Hiland as a real improvement in barley varieties for Wyoming production.

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