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South Dakota State University Agricultural
Experiment Station

4-1-1957

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D. D. Harpstead

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Recommended Citation

Harpstead, D. D., "Liberty Barley" (1957). *Bulletins*. Paper 462.
http://openprairie.sdstate.edu/agexperimentsta_bulletins/462

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liberty barley

Combining a foundation field of Liberty barley



AGRONOMY DEPARTMENT
AGRICULTURAL EXPERIMENT STATION
SOUTH DAKOTA STATE COLLEGE, BROOKINGS

LIBERTY BARLEY

D. D. HARPSTEAD¹

Liberty is a new barley developed and released by the South Dakota Agricultural Experiment Station. It adapts to a wide variation in climate and has a sufficiently high yield potential to utilize climatic factors as they exist. Disease resistance is another of its merits.

Tests conducted throughout the state during a 4-year period, 1953-56, verify Liberty's wide adaptation and its ability to outyield present varieties under dryland and irrigated conditions. It also produced the highest average yields in tests from 1954 through 1956 in the major barley producing area of the United States.

In the spring of 1956 the station released approximately 600 bushels to the South Dakota County Crop Improvement Associations.

History. Liberty comes from a cross made at the South Dakota station in 1945 by J. E. Grafius.² He crossed an unnamed selection with Titan.

The unnamed selection came from a multiple cross—Lion with Chevron and an offspring of these

crossed with Manchuria. Though the selection was high yielding, rust resistant, and smooth awned, it did not fulfill all the requirements of an acceptable variety. Titan was a stiff-strawed type that had many desirable agronomic qualities.

Characteristics. Liberty is a six-row barley with a smooth awn and stiff straw. It has medium green leaves and plump seeds that thresh free of awns.

Heat tolerance weighs heavily in favor of Liberty in a midseason maturity class. Data on relative maturity, plant height, heat tolerance, and reaction to stem rust appear in table 1.

Disease Reactions.³ This new barley is resistant to prevalent races of stem rust and mildew. Stem rust

¹Assistant agronomist, South Dakota Agricultural Experiment Station.

²Formerly agronomist, South Dakota Agricultural Experiment Station.

³Disease evaluations were made through the cooperation of J. F. Hennen, assistant plant pathologist, South Dakota Agricultural Experiment Station.

has been one of the major yield-reducing diseases of barley. Liberty is known to be susceptible to loose smut, spot blotch, and the various leaf and head blights.

Table 1. Summary of Agronomic Data on Liberty Barley in Comparison with Four Standard Varieties Grown at the South Dakota Experiment Station During the Period 1954-56

Variety	Heading Date	Plant Ht. (in.)	Heat Tol.*	Stem Rust†
Liberty	6-15	31	4	R
Traill	6-15	31	5	R
Kindred	6-14	33	6	R
Plains	6-10	24	8	R
Odessa	6-16	28	6	S

*Heat damage for 1955 only; 0=no damage, 9=most severe damage.

†R=resistant; S=susceptible.

Yield and Test Weight. The yield of a barley variety under any growing condition depends upon its ability to make maximum use of the available growth factors. Liberty's midseason maturity and heat tolerance allow it to utilize late spring rains and still mature satisfactorily during the period of high summer temperatures.

Table 2 indicates Liberty's superior performance under South Dakota conditions. This table gives yield summaries of Liberty and four other widely grown varieties. The excellent yields under irrigation demonstrate the usefulness of Liberty in this type of farming.

New Variety Considerations. Agronomic usefulness of a new variety release should not be based on yields alone. Though high yield under ideal conditions is necessary, the ability of a variety to produce

Table 2. Summary of Liberty Yield and Test Weight Data in Comparison with Four Standard Varieties Grown at Four Areas in South Dakota

Variety	Yield in Bushels per Acre, 1953-56				
	Brookings	Highmore	Eureka	Cottonwood	Newell*
Liberty	49.0	38.6	29.0	28.2	65.3
Traill	44.5	35.4	21.2	23.8	—
Kindred	37.5	29.2	16.4	19.5	49.3
Plains	42.0	34.6	26.1	31.8	49.4
Odessa	42.7	29.4	21.4	22.7	56.2
L.S.D.†	3.3	3.1	3.7	2.8	3.0

*Yields taken under irrigation in cooperation with ARS, U. S. Department of Agriculture.

†Least significant difference (the smallest amount two varieties can differ in yield for that difference to be considered significant).

good yields under a range of conditions can be of greater value to the farmer.

A similar situation exists in disease resistance. Complete resistance would be the ideal, of course. In the absence of this, resistance to

the most damaging diseases combined with other desirable traits is the most beneficial.

The release of Liberty is an attempt to supply the grower with a barley that has as many of the desirable characteristics as possible.