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Experiment Station

3-1-1950

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Recommended Citation

Grafius, J. E. and Dirks, V. A., "James Hulless Oats" (1950). *Bulletins*. Paper 401.
http://openprairie.sdstate.edu/agexperimentsta_bulletins/401

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JAMES

Hulless

OATS



AGRONOMY DEPARTMENT
AGRICULTURAL EXPERIMENT STATION
SOUTH DAKOTA STATE COLLEGE, BROOKINGS

James HULLLESS OATS

By J. E. GRAFIUS and V. A. DIRKS¹

A demand for hullless oats in South Dakota was created by the release of Nakota in 1939 by the South Dakota Agricultural Experiment Station. Nakota proved to be desirable as swine and poultry feed but was lacking in leaf rust resistance, *Puccinia coronata* (Pers.) Cda., and because of this was eventually discarded in favor of varieties of common oats that were resistant to this pathogen.

In the spring of 1950, over 2,000 bushels of James, a new hullless oat, were released by this same station. James has the same leaf rust resistance that is to be found in Clinton and Mindo. In addition, it has many other desirable characteristics, including high yield.

History

James was derived from the cross of (Bond x Double Cross Bond, C.I. 3650) x Nakota. Previous to naming, this variety was designated by the cross number 4018-135, C.I. 5015.² The object of the cross was to obtain a hullless oat with the many desirable characteristics of Nakota, plus leaf rust resistance. This objective was accomplished.

James has been tested for performance in four areas in South Dakota. It has also

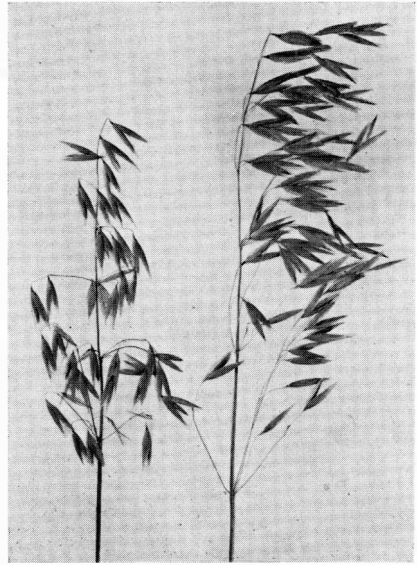


Figure 1. Comparison of Clinton (left) and James. Note the multiple florets on the hullless oat (James) contrasted to two and three florets per spikelet on the common oat.

been tested in neighboring states so that information is available to farmers in adjacent areas. Farmers in other states should contact their experiment station for recommendations before purchasing seed of this variety.

Plant and Seed Characteristics

James is a mid-early, stiff-strawed, hullless oat (Figs. 1 and 2). The seed and plant characteristics of this variety can be described best by comparing it with the varieties shown in Table 1.

In comparison with Nakota, James shows an improvement in earliness, lodging resistance, leaf rust resistance and test weight. The increase in test weight is largely due to increase in leaf rust resistance. It should be pointed out that James, like Clinton and Mindo, is susceptible to race 45 of leaf rust and

¹Agronomist and Assistant Agronomist, respectively.

²The unselected F₃ seed was obtained in 1942 from Dr. H. C. Murphy U.S.D.A. in cooperation with Iowa State College, Ames, Iowa. This generosity advanced the release of James by at least two years.

Table 1. Average plant and seed characteristics of James, Clinton
Vikota, Mindo, and Nakota, grown at Brookings, 1946-49.

Variety	Date headed	Lodging resistance	Height inches	Test* weight lbs./bu.	Stem rust resistance	Leaf rust resistance	Helminthosporium victoriae resistance
James	.....6/18	R†	33	45.0	MR	MR	R
Clinton	.....6/18	R	32	36.8	MR	MR	R
Vikota	.....6/18	MS	30	33.5	MR	R	S
Mindo	.....6/15	R	30	36.4	MR	MR	R
Nakota	.....6/20	MS	34	40.9	MR	S	R

*The legal test weight for hullless oats is 42 pounds per measured bushel.

†R—resistant, S—susceptible, MR—moderately resistant, MS—moderately susceptible.

rices 3 and 7 of stem rust, *Puccinia graminis avenae*, Eriks. and Henn. While no good tests on shattering are available, field observations indicate that it is equal to Nakota which was satisfactory in this respect.

The new release has the Markton type smut resistance and hence is resistant to all known races of both *Ustilago avenae* (Pers.) Rostr. and *Ustilago kolleri* Wille.³

James, like Nakota, has a tendency to "throw" a slight percentage of hulled oats (about 0.1 percent) of which about one-half will produce hullless types the next generation. The use of the Carter disk for seed cleaning will tend to keep the hulled types at a minimum. Under field conditions, an average of one hulled type for every two square rods has been found in the foundation seed stock.

Yield Data

The yield data are presented in Table 2. The 1945 yields are not included in the averages in order to avoid the bias introduced by the use of the yield data for the year in which the variety was selected. That is, the superiority of a variety in the year it was selected is obvious, as high yield is one of the factors for which the variety was selected. The yield in the selection year is therefore not competitive and one degree of freedom is sacrificed.

In calculating the yields of hullless oats it is necessary to adjust for hulls in order

that the data may be comparable to that from common oats. This adjustment was made on the assumption that approximately 0.3 of the weight of common oats was due to the hull and that the remaining 0.7 was due to the groat. The yield of hullless oats in terms of common oats would then be:

$$\frac{\text{weight in lbs./ acre}}{.7 \times 32} = \text{bushels per acre}$$

It will be observed that the average yields of James, when adjusted for hulls, compare favorably with the yields of the standard varieties. At Brookings the 4-year average for James exceeds all others by a statistically significant difference. Ecologically, this variety is best suited to

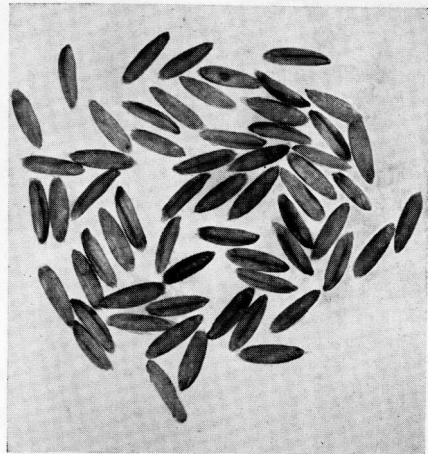


Figure 2. Seed of the new hullless oat.
Actual Size

³Conclusions from data furnished by Dr. E. D. Hansing, Kansas State College, Manhattan, Kansas.

Table 2. Yield comparisons in bushels per acre of James with four standard varieties at four locations in South Dakota.

Variety	Brookings 1946-49	Highmore 1947-49	Cottonwood 1947-49	Eureka 1948-49
James*	82.0	74.8	36.6	30.5
Clinton	75.4	64.4	31.4	30.0
Vikota	63.5	70.5	37.1	31.4
Mindo	72.4	69.0	38.8	31.0
Nakota*	68.2			
Least significant difference	5.1	5.6	5.0	4.5

*Hulless, adjusted for hulls by dividing by 0.7.

eastern South Dakota and should be restricted west of the Missouri river to small acreages for a special purpose crop and to areas in the Black Hills.

Average yields by themselves are often misleading as they do not show the yearly fluctuation of a variety. The ability of a variety to produce an acceptable yield every year is just as important as the total or average yield over a period of years. This stability of yield can be seen in Table 3.

Yields of James have been consistently good when compared with Clinton (Table 3) and in no case was the yield of

James statistically less than the yield of Clinton.

Cultural Practices in South Dakota

James oats should be seeded at the rate of 50 pounds per acre.

No special equipment is needed for harvesting. James may be cut with a binder, windrowed, or direct combined in accordance with the best practices for common oats in the particular area. Hulless oats should not be cut green as this will cause the oats to be light weight and hard to thresh.

For feed purposes no special cleaning is required. For seed purposes, it is best to scalp with a fanning mill and then use a Carter disk.

Storage under South Dakota conditions presents no serious problem. Hulless oats that have a moisture content of 13 percent or less have been found to store well.

Summary

A new hulless oat, James, C.I. 5015, has been described. This variety was derived from the cross of (Bond x Double Cross Bond) x Nakota. It is stiff-strawed, mid-early and has produced a high yield of good quality grain in eastern South Dakota. James has the White Russian type of stem rust resistance, *Puccinia graminis avenae*, Eriks, and Henn., and the Bond type leaf rust resistance, *Puccinia coronata* (Pers.) Cda. It is resistant to both species of smut, *Ustilago kollerii* Wille. and *Ustilago avenae* (Pers.) Rostr.

Table 3. The stability of yield of James, Vikota, Mindo and Nakota in respect to Clinton

Station and variety	1946	1947	1948	1949	av ²
Brookings					
James	0 ¹	0	+	+	+
Vikota	—	0	0	0	—
Mindo	0	0	0	0	0
Nakota	—	—	+	0	—
Clinton	0	0	0	0	0
Highmore					
James	—	+	+	0	+
Vikota	—	—	0	0	—
Mindo	—	0	+	0	0
Clinton	—	0	0	0	0
Cottonwood					
James	—	0	0	0	+
Vikota	—	0	0	0	+
Mindo	—	0	0	0	+
Clinton	—	0	0	0	0
Eureka					
James	—	—	0	0	0
Vikota	—	—	0	0	0
Mindo	—	—	0	0	0
Clinton	—	—	0	0	0

¹0 = no statistically significant increase over Clinton; + = a significant increase; — = a significant decrease.

²Based on averages in Table 2.