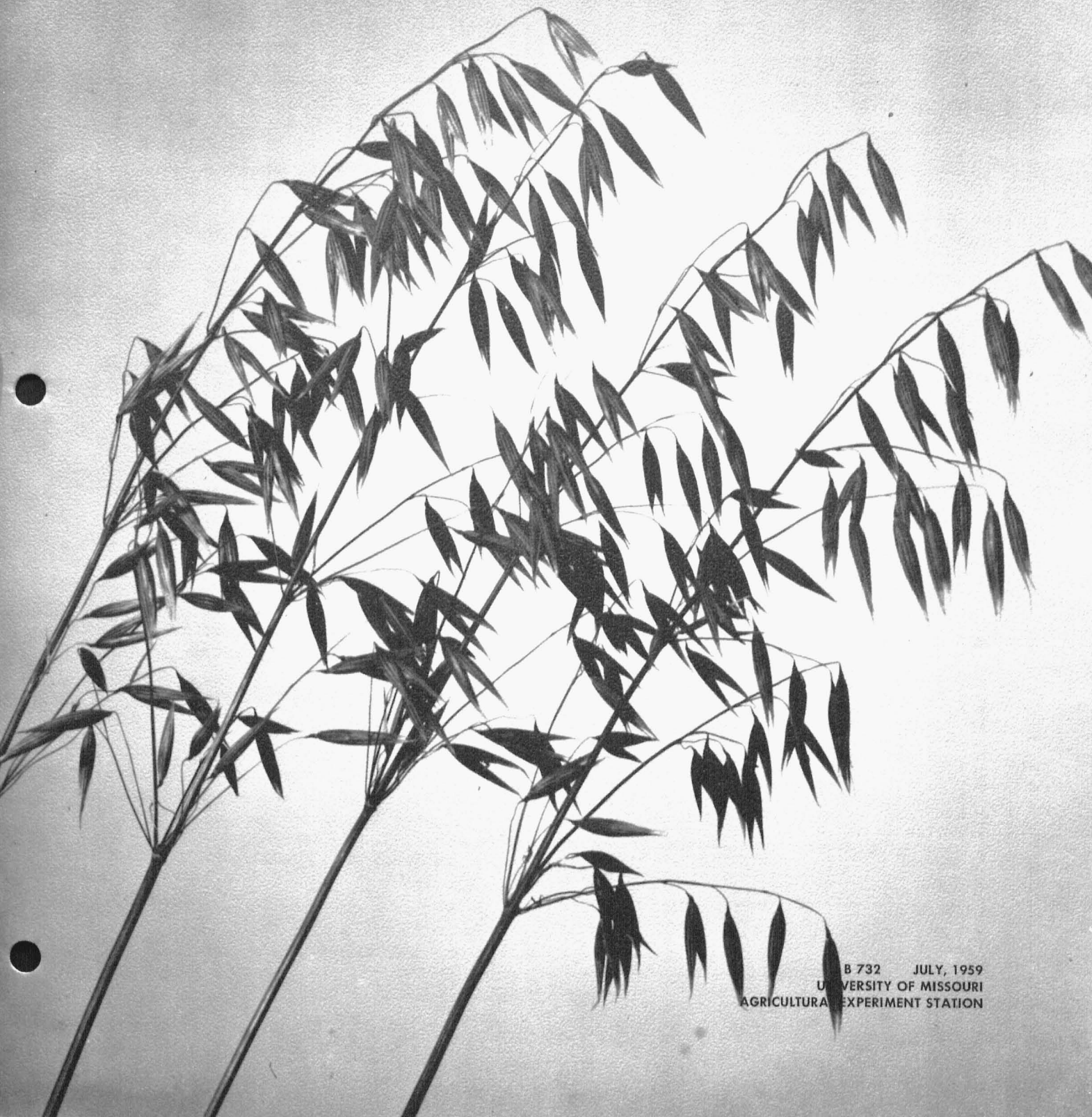
MACON OATS

A new selection adapted to Missouri



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UNIVERSITY OF MISSOURI
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MACON OATS

A new selection adapted to Missouri

J. M. POEHLMAN, DALE SECHLER,
CHARLES HAYWARD AND MARVIN WHITEHEAD

Macon is the latest in a succession of Columbia-type varieties of oats developed at the Missouri Agricultural Experiment Station. It is early, vigorous, resistant to disease, and well adapted to Missouri soil and climate.

Macon is distinctly improved in seed quality, producing heavy, light-colored grain, excellent for feed or processing. It has exhibited more resistance than Mo. O-205 to the prevailing races of crown rust. It is also resistant to stem rust, smut and victoria blight.

ORIGIN

The variety designated Macon originated from the cross Columbia x Marion made by H. C. Murphy, at Ames, Ia. Bulk seed harvested from second generation plants was sent to Missouri in 1942. The increase from a single third generation plant selected in 1942 was designated Mo. 04102 (C. I. 4986) and was tested for several years. Macon is the increase from a single plant reselection made at the Missouri station in 1947 in the eighth generation from Mo. 04102. Both selections were made by J. M. Poehlman. Macon has been tested under the numbers of Mo. 04346 and C. I. 6625.

The original selection, 04102, was grown in yield tests at the Missouri station, 1945 to 1954, in the Uniform Red Oat Nursery from 1948 to 1953, and in the Uniform Early White Oat Nursery in 1950 and 1951. The reselection 04346 (C. I. 6625), which has now been named Macon, has been grown in yield tests at the Missouri Agricultural Experiment Station since 1951, in the Uniform Red Oat Nursery since 1952, and in the Uniform North Central States Nursery in 1958.

Preliminary increase of seed of Macon was made in 1957; foundation seed was produced in 1958. It was distributed to certified growers in 1959.

Acknowledgments

The variety Macon has resulted from the coordinated research efforts of the Department of Field Crops, Missouri Agricultural Experiment Station and the Crops Research Division, U. S. Department of Agriculture. Carl Hayward, Norman Brown, Arnold Matson, Lloyd Cavanah and Wynard Aslin, staff members of the Department of Field Crops, contributed to the development of this variety. Richard Morris, Bethany, Mo., and Ray McClure, Marshall, supplied land for tests. Macon has been tested by oat breeders in other states through Cooperative Uniform Nurseries conducted jointly with the U. S. Department of Agriculture. The Agricultural Experiment Stations in Arkansas, Colorado, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Nebraska, New Jersey, North Carolina, Ohio, Oklahoma, Texas and Virginia gave permission to use data recorded at their stations in Table 2 of this bulletin.

This bulletin reports on Department of Field Crops Project 203, Breeding Oats.

PERFORMANCE

Table 1 compares the performance of Macon with other varieties of oats in Missouri. These tests cover an 11-year period, 1948 to 1958, and were conducted principally at Columbia, Bethany, Marshall, Pierce City, and Sikeston, Missouri.

Table 2 compares the performance of Macon with other varieties of oats in states along the southern border of the spring oat producing area. This data was summarized from the red oat uniform nursery and includes results reported from fifteen states in the latitude of Missouri. The Missouri Station cooperates with other state agricultural experiment stations and the U. S. Department of Agriculture in uniform tests of each other's promising varieties. These tests appraise the general adaptation of a variety over a wide range of environmental conditions.

COMPARISON WITH OTHER VARIETIES

Yield—Over a ten-year period Macon has outyielded all varieties with which it has been compared in the Uniform Red Oat Nursery except Mo. O-205 and Andrew. In a recent two-year period, 1956 and 1957, it was exceeded also by Clintland, Minhafer, and Nehawka. In Missouri tests, yields of Macon equalled the yields of Mo. O-205 and exceeded those of Andrew, Minhafer, and Clintland.

In 1957, under severe crown rust conditions in Missouri, Macon outyielded Mo. O-205. In that year race 216 of crown rust was present which injured Mo. O-205 more than Macon. The data reported in Tables 1 and 2

indicate that Macon will yield as well as Mo. O-205 in Missouri, but that it may not have the wide adaptation found in Mo. O-205.

Earliness—Macon is an early maturing variety like Columbia and Andrew. It normally heads two to three days before Mo. O-205 and three to four days ahead of Clintland and Newton. *This earliness is essential for the adaptation of a spring-sown oat variety in Missouri.*

TABLE 1--COMPARISON OF MACON WITH OTHER OAT VARIETIES IN MISSOURI

	Macon	0-205	Andrew	Cherokee	Columbia	Minhafer	Clintland	Burnett	Newton	Difference for Significance
Yield, bushels per acre:										
1948-1958 (54 tests)	59.9	61.1	58.2	53.0	53.8					2.6 bu.
1956-1958 (11 tests)	67.6	67.7	64.3	60.6	59.7	64.8	64.0	67.4	66.8	6.9 bu.
Maturity	early	medium early	early	early	early	early	medium late	medium late	medium late	
Height	tall	tall	tall	short	tall	medium	short	medium	short	
Straw Strength	moderately strong	moderately strong	moderately strong	strong	weak	strong	very strong	strong	very strong	
Disease Resistance:										
Crown Rust	moderately resistant	moderately resistant	moderately susceptible	moderately susceptible	susceptible	resistant	resistant	moderately resistant	moderately resistant	
Stem Rust, Race 7	resistant	resistant	resistant	susceptible	susceptible	resistant	susceptible	resistant	resistant	
Stem Rust, Race 7A	resistant	resistant	resistant	susceptible	susceptible	resistant	susceptible	susceptible	resistant	
Stem Rust, Race 8	susceptible	susceptible	susceptible	resistant	susceptible	resistant	resistant	resistant	susceptible	
Smut	resistant	resistant	resistant	resistant	susceptible	resistant	resistant	resistant	moderately susceptible	
Grain Quality: Bushel weight, pounds per bushel:										
1948-1958 (52 tests)	32.4	31.5	30.7	30.8	31.1					0.52 lbs.
1956-1958 (11 tests)	32.9	31.2	30.9	31.2	30.8	32.3	32.3	31.5	31.2	1.08 lbs.
Groat percentages:										
1956-1958 (11 tests)	75.6	74.4	76.4	75.2	75.6	76.3	77.3	75.8	74.8	1.03 %

TABLE 2--COMPARISONS OF MACON WITH OTHER VARIETIES GROWN IN THE COOPERATIVE UNIFORM RED OAT NURSERY TESTS IN 15 STATES IN MISSOURI LATITUDE*

Variety	Yield Bu./Acre	Test Weight Lbs./Bu.	Height In.	Lodging %	Date Headed	Date Ripe	Groats %
			Ten-year average, 1948-1957				
Number of comparisons	(141)	(133)	(120)	(99)	(117)	(52)	
Mo. 0-205	61.0	31.6	34	25	6/6	7/1	
Andrew	59.5	30.9	33	26	6/4	7/1	
Macon	55.6	32.5	34	30	6/4	6/30	
Columbia	53.0	30.9	34	39	6/5	6/27	
Cherokee	52.3	31.2	31	25	6/4	6/30	
Nemeha	51.5	31.1	31	23	6/4	6/30	
Clinton	49.8	30.5	32	18	6/7	6/30	
			Two-year average, 1956-1957				
Number of comparisons	(29)	(28)	(24)	(20)	(23)	(10)	(16)
Mo. 0-205	50.9	31.0	32	40	6/4	6/24	68.6
Minhafer	50.8	31.6	32	19	6/4	6/25	68.6
Andrew	50.6	29.9	31	36	6/3	6/24	70.1
Clintland	49.6	31.4	31	18	6/6	6/25	66.9
Nehawka	49.6	30.8	29	31	6/2	6/23	67.0
Macon	48.5	32.5	32	37	6/4	6/23	70.5
Putnam	47.6	31.2	30	37	6/3	6/23	66.3
Newton	46.2	29.6	30	22	6/5	6/25	60.9
Cherokee	45.0	30.8	30	33	6/3	6/24	67.1
Nemeha	44.3	30.8	30	28	6/3	6/24	66.8
Columbia	43.9	30.6	32	55	6/3	6/24	69.8
Clinton	43.0	39.6	30	21	6/6	6/24	68.9

* The Uniform Red Oat Nursery is grown each year in 12 to 15 states and data for this table has been summarized from data reported from the Agricultural Experiment Stations in these states. (See acknowledgments.)

Height—Macon is comparable to Mo. O-205 in height. It normally grows 2 to 3 inches taller than Clintland, Newton, or Cherokee. This height is desirable in dry seasons for oats harvested as hay or for silage, but is undesirable on highly fertile soils where lodging might occur.

Straw Strength—The straw of Macon is moderately strong, being comparable to Mo. O-205 and Andrew in this respect. Macon, like Mo. O-205, often withstands lodging from heavy rainstorms before ripening as well as stiffer-strawed varieties such as Clintland.

Disease Resistance—Macon has a favorable combination of disease resistance that will protect it from damage under most disease conditions.

Crown Rust—Crown rust infections during the early years of testing indicated Macon possessed a moderate type of resistance comparable to the resistance in Mo. O-205, Andrew, Cherokee, and Burnett. This resistance was inherited from the Marion parent. A race of crown rust that infects varieties which derive their crown rust resistance from Victoria, race 216, was widespread in Missouri for the first time in 1957. In the presence of this Victoria-infecting race, Mo. O-205 was more severely damaged than Macon, indicating greater resistance is present to this race in Macon than in Mo. O-205. The earliness of Macon will enable it to escape some crown rust damage in many seasons.

Stem Rust—Macon is resistant to races 2, 5, 7, 7A and similar type races of stem rust. It is susceptible to race 8 of stem rust. The stem rust resistance of Macon was inherited from the Marion parent and is conditioned by the gene designated A.

Smut—Macon is highly resistant to oats smut, the resistance being inherited through Marion from Markton parentage.

Seed Quality—The grain of Macon is normally light grey in color and is moderately plump and heavy. The color of the grain is lighter than grain of Columbia or Mo. O-205 and does not have the dark striping characteristic of those varieties.

The outstanding feature of the Macon seed quality is the heavy firm kernel. This is reflected in the bushelweight which, in Missouri tests, has averaged 1 pound per bushel above Mo. O-205 and Columbia and 2 pounds above Andrew and Cherokee. Similar results have been reported for the uniform nursery tests in the 15 states.

Groat percentages (percent of kernels after hulls are removed) of Macon are higher than those of the other varieties in the "uniform nursery" tests of the 15 states.

Like Columbia and Mo. O-205, Macon ripens with a bright grain color. The glumes do not discolor with high temperature prior to ripening like those of Andrew, Cherokee, Nemeha, and similar varieties.

Grain of Macon will be readily accepted either for feed or for processing.

OATS IMPROVEMENT WORK IN MISSOURI

Oats improvement studies have been in progress for more than 40 years in Missouri, with limited variety testing much earlier. During this period many thousands of strains have been studied and compared for yield, earliness, grain quality, straw stiffness, and disease resistance.

From these breeding studies has come a slow but steady improvement of the oats crop. Steps important in this progress have been:

1. Recognition before 1920 that early red oat varieties of Mediterraean origin were most productive in Missouri.[1] The red oat varieties are most tolerant to heat and drouth.

2. Demonstration of the high yield of Fulghum oats and the spread of this early red oat variety over the state during the 1920s.[2]

3. Development of the high yielding, early, Columbia variety by selection from Fulghum.[3]

4. Development and distribution of early Columbia-type varieties with resistance to the major oat diseases. Mo. O-200, derived its resistance from a combination of Bond and Iogold;[4] Mo. O-205 inherited its resistance from a strain of Victoria x Richland.[5] Macon inherits its disease resistance from the variety Marion. This gives greater diversification in the disease resistance of adapted varieties.

[1]Helm, C. A., and L. J. Stadler. Productive Methods for Oats in Missouri. Missouri Agricultural Experiment Station Circular 105. 1922.
[2]Stadler, L. J. Fulghum Oats for Missouri. Missouri Agricultural Experiment Station Bulletin 229. 1925.
[3]Stadler, L. J., and R. T. Kirkpatrick. Columbia Oats, a New Variety for Missouri. Missouri Agricultural Experiment Station Bulletin 278. 1930.
[4]Poehlman, J. M. O-200, A New, Early, Variety of Oats for Missouri. Missouri Agricultural Experiment Station Bulletin 534. 1949.
[5]Poehlman, J. M. O-205 Oats, an Improved "Columbia Type" Variety for Missouri. Missouri Agricultural Experiment Station Bulletin 637. 1955.

Use of a good variety is only one step in the successful production of a crop of oats. Good seed bed preparation, use of fertilizer, planting with a drill, and timely harvest, all supplement the proper choice of variety. Only when all of these practices are carried out can a good variety perform its best.

For a discussion of the practices necessary to produce a good crop of oats, see Station Bulletin 731, *Growing Good Crops of Oats in Missouri.* This bulletin may be obtained from your County Agent, or by writing to *Mailing Room, Mumford Hall, Columbia, Mo.*