O-205 OATS

An Improved "Columbia type" Variety for Missouri

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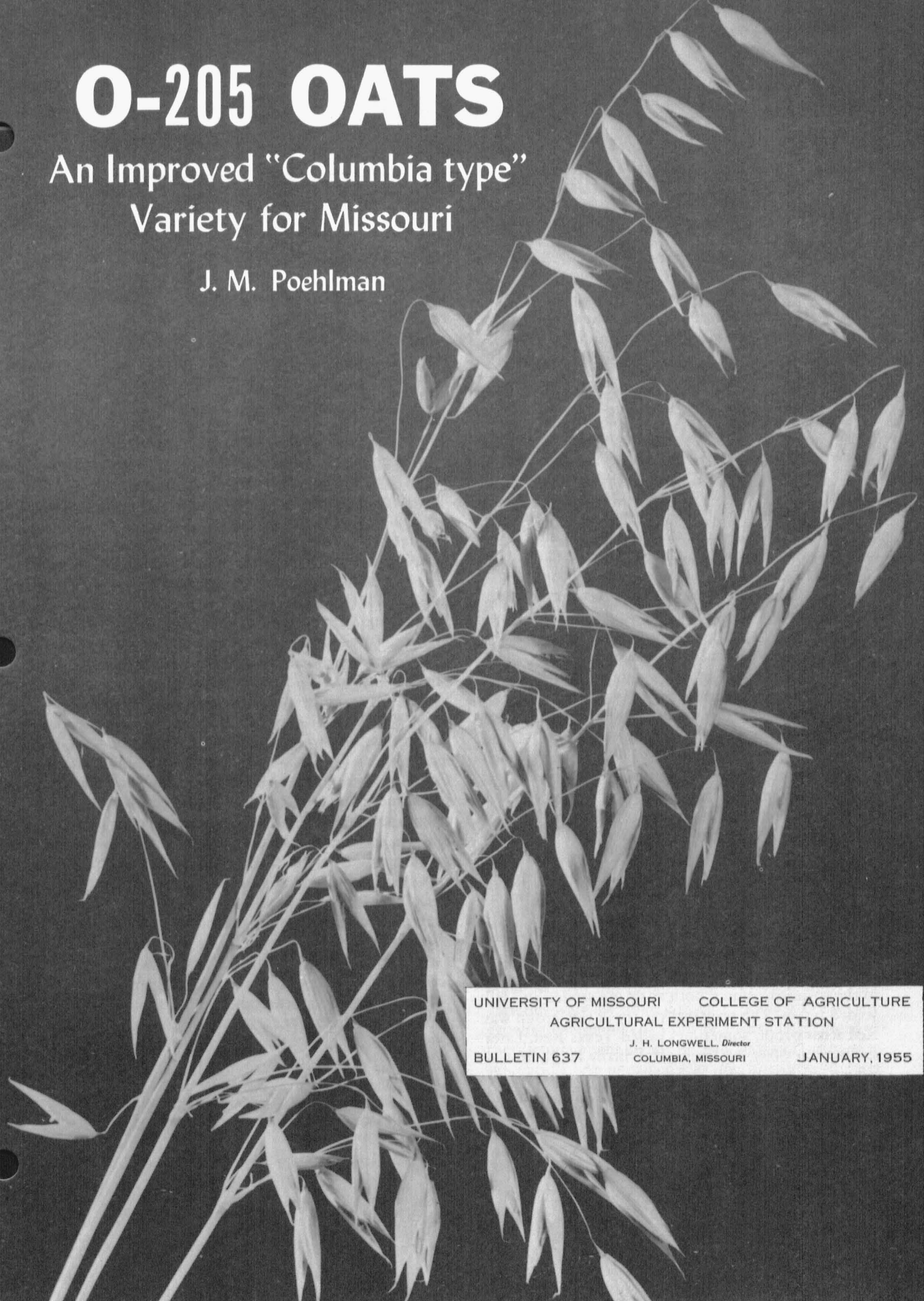

UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE
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An Improved "Columbia Type" Variety for Missouri

J. M. POEHLMAN

O-205 is a productive variety of oats for Missouri. It is vigorous, resistant to disease, and well adapted to Missouri's climate and soil. The straw is stiff and stands well under normal harvest conditions. The grain is heavy, with thin hulls; it is excellent for feed. 0-205 is a "Columbia-type" variety, improved in yield, straw strength and disease resistance.

OATS IMPROVEMENT WORK IN MISSOURI

Oats improvement studies in Missouri have been in progress for about 40 years, although limited testing of varieties was started much earlier. During this period thousands of strains and varieties were grown and compared for yield, earliness, grain quality, straw stiffness, and disease resistance. From these breeding studies have come a slow yet steady improvement in the Missouri oat crop. Several important milestones of progress may be noted here.

1. **Red Oats Best Adapted.**—The recognition before 1920 that the red oats varieties of Mediterranean origin, with their greater tolerance to heat and drought, were most productive in our short spring seasons was the first significant step in oats improvement for Missouri.[1] In the earlier days, mid-season varieties such as Silvermine and Swedish Select, which had originated in the northern and western areas of Europe, were most widely grown here. These varieties were too late in maturity to ripen before the onset of hot weather. Neither were the varieties of Kherson origin—Richland, Iogold, Albion, Nebraska 21 and State Pride, brought into Missouri from Iowa, Nebraska, Wisconsin and other states to the north—as early maturing as needed here, even though they were earlier than the Silvermine and Swedish Select varieties grown before. The red oats varieties, which had originated in Southern Europe, had become widely grown in the southern states, both as spring seeded and fall seeded types. The principal variety of this group was Red Rustproof, sometimes called Texas Red. Later the Burt or Sixty day variety and finally Fulghum was grown in Missouri.

[1]Helm, C. A., and L. J. Stadler. Productive Methods for Oats in Missouri. Missouri Agricultural Experiment Station Circular 105. 1922.

2. **Fulghum Takes Over in Missouri.**—The superior yields of Fulghum were recorded first in Missouri in 1919[2]. This variety first developed by J. A. Fulghum of Warrenton, Georgia, by propagation from a single, early plant found in his field of Red Rustproof, became widely grown in the South. It soon attracted much attention in the spring sown oats region. Many stocks of the Fulghum variety, which proved to be quite variable, were tested in Missouri, but the stock most widely grown was the early strain known as Kanota. However, it was seldom grown under that name in Missouri. Fulghum was resistant to smut when first imported into Missouri, but later was found to be susceptible to new races of the disease which then became widespread wherever the Fulghum variety was grown.

3. **Columbia Variety Developed.**—The development of the Columbia variety at the Missouri Agricultural Experiment Station with its earliness, vigor, high yield and excellent quality, was an outstanding achievement in oats improvement.[3] It was increased from a single off-type plant found in the Fulghum variety here in 1920 and was distributed in 1930. The Columbia variety spread rapidly in Missouri, and in states eastward, and by 1940 it was the variety leading in acreage in the United States. Grain of the Columbia variety was heavy, with thin hulls, and was so superior in quality to that of other red oats varieties that a special market classification, known as "special red oats," was established for this variety in the grain grading standards of the United States Department of Agriculture. Extremely vigorous and productive for so early a variety, Columbia still remains the standard of excellence by which adaptation of new oats varieties in Missouri is measured.

4. **Mo. O-200 and Mo. O-205, New Diease-Resistant Varieties of Columbia Origin.**—While Columbia was superior to other early varieties in yield and grain quality, it possessed little resistance to the

[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.

TABLE 1--COMPARISONS OF MO. 0-205 WITH OTHER OATS VARIETIES IN MISSOURI.

	0-205	Andrew	0-200	Columbia	Mindo	Cherokee	Nemeha	Clinton	Clintland	Clintafe
Yield in Bushels per Acre:										
1948 to 1954 (38 tests)	57.3	54.8	52.7	51.3		49.6		47.6		
1948 to 1951 (28 tests)	59.7	57.0	54.3	52.0	53.0	51.2	49.3	48.9		
1953 to 1954 (8 tests)	52.4	49.0	48.1	49.8		46.1		44.0	43.4	37.1
Maturity	medium early	early	early	early	early	early	early	late	late	late
Height	tall	tall	tall	tall	short	short	short	short	short	short
Straw Strength	strong	strong	weak	weak	strong	strong	strong	very strong	very strong	very strong
Disease Resistance:										
Smuts	resistant	resistant	resistant	susceptible	resistant	resistant	resistant	resistant	resistant	resistant
Crown Rust	moderately resistant	susceptible	susceptible	susceptible	susceptible	susceptible	susceptible	susceptible	resistant	resistant
Stem Rust, Race 2	resistant	resistant	resistant	susceptible	resistant	resistant	resistant	resistant	resistant	resistant
Stem Rust, Race 7	resistant	resistant	resistant	susceptible	susceptible	susceptible	susceptible	susceptible	susceptible	susceptible
Stem Rust, Race 8	susceptible	susceptible	susceptible	susceptible	resistant	resistant	resistant	resistant	resistant	resistant
Victoria Blight	resistant	resistant	resistant	resistant	resistant	resistant	resistant	resistant	resistant	resistant
Grain Quality:										
Bushel-Weight										
(1948-1951)	31.3	29.9	31.5	30.9	28.8	29.9	29.9	29.1		
(1953-1954)	32.3	31.5	32.8	32.3				30.4	31.0	30.1
Per cent hulls (1949-1953)	28.5	28.1	28.1	27.5	32.2	28.4	29.0	30.1	31.1*	33.5*

* 1953 only.

smut and rust diseases. Neither was its straw suitable for combine harvesting although there was no trouble on that score as long as it was harvested with a binder.

During the decade, 1940 to 1950, many new, disease-resistant varieties of oats were developed throughout the Corn Belt. These varieties derived part of their disease resistance from Victoria, a South American variety, or Bond, an Australian variety. A number of these, including Boone, Tama, Clinton, Cherokee, Mindo, and Andrew were introduced into Missouri and grown in varying amounts. In years such as 1943, 1945, and 1947 when rust was heavy they produced outstanding yields, even though several of these varieties matured later than experience had demonstrated to be desirable for Missouri. Furthermore, all these new varieties had superior straw, a necessary quality with the increased use of the combine harvester and higher applications of fertilizer amendments. While a few varieties such as Andrew, Mindo, and Cherokee were as early as Columbia in maturity, none possessed the inherent "red-oats" adaptation which enables a variety to ripen normally and produce favorable yields of bright, heavy grain in seasons characterized with high June temperatures. It was these features that marked the Fulghum and Columbia varieties as consistent yielders in Missouri. The need to return to varieties of this origin became increasingly apparent.

As early as 1936 crosses had been made at the Missouri Agricultural Experiment Station between Columbia and new smut and rust resistant strains of Victoria and Bond origin. Many additional crosses have been made since to combine the earliness and adaptation of Columbia with the disease resistance and superior straw of these newer varieties. Two varieties *Mo. 0-200* and *Mo. 0-205* have already resulted from these efforts.

Mo. 0-200 was developed from the cross, Columbia x Bond-Iogold.[4] It is early, and very productive of heavy grain, but is not as stiff-strawed as desired; thus its use has been limited to the less fertile areas of the state. Also races of rust which infect the varieties of Bond origin—0-200, Clinton, Cherokee, Andrew, Mindo, etc.—have become widespread, and 0-200 can no longer be classed as resistant to this disease.

Mo. 0-205 is exceptionally productive of heavy grain. It possesses a new type of crown rust resistance derived from its Victoria parentage and is resistant to smut, stem rust and Victoria blight. It is widely adapted, challenging for the first time the supremacy of the Columbia variety in the southern Corn Belt area. The merits of this outstanding variety are reported in this bulletin.

THE BREEDING OF O-250 OATS

The Mo. 0-205 variety of oats was selected from a Columbia x Victoria-Richland cross made in 1936 by the late B. M. King at the Missouri Agricultural Experiment Station. The Columbia parent variety and its origin has been discussed. Victoria was introduced from South America in 1927 and was found by Dr. H. C. Murphy at the Iowa Agricultural Experiment Station to be resistant to crown rust and smut. Richland was a short-strawed, stem-rust resistant variety selected from Kherson at the Iowa Agricultural Experiment Station. The cross Victoria x Richland was made in 1930 and Boone, Tama, Vicland and other varieties were distributed from it. They were widely grown throughout the Corn Belt until the spread of the Victoria blight disease in 1946, to which they were susceptible. An unnamed selection from the Victoria x Richland cross, C. I. 3311, was crossed with Columbia to produce the 0-205 variety.

[4]Poehlman, J. M., 0-200, A New, Early, Variety of Oats for Missouri. Missouri Agricultural Experiment Station Bulletin 534. 1949.

Figure 1.—Reselections from the Columbia x Victoria-Richland Cross were increased at Lathrop, Missouri in 1947. Some of the reselections were resistant and others susceptible to Victoria blight. Resistant selections are standing erect while the susceptible selections are badly lodged.

Bulked progenies of the Columbia x Victoria-Richland variety were grown through the first five generations. In the fifth generation 2700 panicles were selected at random. These were grown in the oats breeding nursery at Columbia in 1941. Three reselections, made from one of these panicle rows in the F_6 generation, were advanced into yield tests in 1944. Later it was learned that these three lines were not pure for resistance to Victoria blight.[5] From one of these lines, 04014 (C. I. 4803), two strains, 04197 (C. I. 5323) and 04205 (C. I. 4988), previously selected in the F_8 generation, proved to be resistant to Victoria blight and moderately resistant to crown rust. These two selections were increased and distributed, without mixing, to Missouri farmers in 1951 under the name Mo. 0-205. The chronological development of the 0-205 variety is listed below.

CHRONOLOGICAL DEVELOPMENT OF MO. O-205 OATS

1936	Cross "Columbia x Victoria-Richland (C. I. 3311)" made in the greenhouse and the F_1 generation grown in the field.
1937-40	Bulk F_2, F_3, F_4, and F_5 generations grown in the field. 2700 panicles selected at random from the F_5 in 1940.
1941	Panicle row No. 3524, was resistant to crown rust, stem rust and smut, but was reselected for uniformity.
1942	Five panicle rows from 1941 row No. 3524 were grown in the nursery; all were resistant to crown rust, stem rust and smut.
1943	Five increase rows grown originating from 1941 row No. 3524. Row 1403 was accessioned 04014 (C. I. 4803). Row 1404 was accessioned 04015 (C. I. 4617). Row 1405 was accessioned 04016 (C. I. 4627).
1944-47	04014, 04015, 04016 grown in yield tests and each found in 1946 to be segregating for resistance to Victoria blight.
1943	Ten reselections made from each 04014, 04015, and 04016.
1944	Reselections of 04014, 04015, 04016 grown in panicle rows.
1946	Reselections of 04014, 04015, 04016 grown in increase rows. Tests in greenhouse showed reselections to be either resistant, susceptible, or segregating to Victoria blight.
1947	Reselections tested for yield and increased in field at Lathrop, Missouri (Fig. 1).
1948	Two Victoria blight-resistant reselections, No. 04197 (C. I. 5323) and No. 04205 (C. I. 4988) from 04014 (C. I. 4803), grown in drill plots at Columbia.
1949	1 acre of each 04197 and 04205 grown at Columbia.
1950	30 acres of each 04197 and 04205 grown in Missouri.
1951	Mo. 0-205, strains 04197 and 04205, distributed to Missouri farmers.
1953-54	Strain 04205 (C. I. 4988) reselected and increased. The increase from this purification will be used as the foundation seed for Mo. 0-205 in Missouri in the future.

COMPARISON OF O-205 STRAINS

No apparent differences have been observed in Missouri between the two sister strains distributed to Missouri farmers under the name Mo. 0-205. They cannot be distinguished from each other in the field and have varied by only 0.9 bushels per acre in yield trials in Missouri (Table 2). Results reported from other states indicate a slight yield advantage for the C. I. 4988 strain, and this has generally been interpreted to mean that the C. I. 4988 strain has a wider adaptation than the C. I. 5323 strain. Tests in the greenhouse at the Iowa Agricultural Experiment Station have shown the C. I. 4988 strain to be resistant to powdery mildew while the C. I. 5323 strain is susceptible.[6] The mildew resistance of C. I. 4988 is a characteristic useful in identifying this strain from C. I.

[5]Poehlman, J. M., and C. H. Kingsolver, Disease Reaction and Agronomic Qualities of Oats Selections from a Columbia x Victoria-Richland Cross. Agronomy Journal 42:498-502. 1950.

[6]Finkner, R. E., et al., Reaction of Oat Varieties to Powdery Mildew. Agronomy Journal. 45:92-95. 1953.

TABLE 2--PERFORMANCE COMPARISONS OF THE TWO STRAINS OF MO. 0-205 OATS

Strains	Yield bu./acre	Bushel-Weight lbs./bu.	Date Headed	Height inches	Lodging per cent	Crown Rust per cent
Tests in Missouri, 1948 to 1954:	(29)*	(29)	(15)	(23)	(17)	(10)
04197 (C.I. 5323)	53.0	31.7	June 3	36	12	16
04205 (C.I. 4988)	53.9	31.2	June 4	37	13	11

* Numbers in parenthesis refer to number of comparisons.

5323, but it has no apparent utility value in Missouri since mildew is never found on oats growing in the field in this state. A purification of C. I. 4988 is being increased and will be used as the foundation seed of 0-205 in Missouri in the future. All Missouri certified seed will then be the C. I. 4988 strain only.

HOW O-205 OATS WERE INCREASED

The first drill plots of 0-205 oats were grown at Columbia in 1948. Plots of strains 04197 and 04205, averaging one-fortieth acre in size, each produced about one bushel of seed. In 1949, approximately one acre of each the 04197 and 04205 strains were grown in 1950 by farmers under contract for the Missouri Seed Improvement Association. In 1951 the increase was distributed to Missouri farmers to be grown under certification, and to Agricultural Experiment Stations in adjacent states. Over 39,000 acres of Mo. 0-205 were grown under certification in 1953 in Missouri, Kansas, Nebraska, Iowa, Illinois, Indiana, Ohio and North Dakota exceeding the certified acreage of any other variety in that year, except the combined acreage of the various Clinton strains.[7]

DESCRIPTION OF O-205

Mo. 0-205 is similar to its Columbia parent in plant and growth characteristics. It is tall, vigorous, productive, with widespreading panicles and a light green leaf color like Columbia. The straw is strong and this variety has a vigorous root system which enables it to resist the lodging due to wind and rain storms. The kernels are reddish-brown, striped like Columbia, and usually somewhat darker. The darkness of the color varies in different years. The hulls are thin and the test-weight is high. 0-205 is resistant to crown and stem rust, smut, and Victoria blight. It heads and ripens two to three days later than Columbia and about three days earlier than Clinton.

ARE O-205'S HYBRID OATS?

Many new varieties of oats, originating from crosses between two varieties, are loosely referred to as "hybrid" oats. This is not a correct use of the term "hybrid" and sometimes lead farmers to believe, drawing from their experience with hybrid corn, that new seed must be obtained each year. 0-205, although hybrid in its origin, is not a hybrid variety in this respect. It is pure and will not "run out." When kept free of mixture it may be replanted year after year without replacement of seed.

O-205 LEADS IN YIELD

Mo. 0-205 has been the leading variety in yield in tests conducted in Missouri during the six-year period, 1948 to 1953. In 38 tests the average acre yield of 0-205 was 57.3 bushels as compared to 54.8 bushels for Andrew, 52.7 bushels for 0-200, 51.3 bushels for Columbia, 49.6 bushels for Cherokee, and 47.6 bushels for Clinton (Table 3). 0-205 was superior in yield in every section of the state where it was tested. In addition to the tests in Missouri, 0-205 has been tested

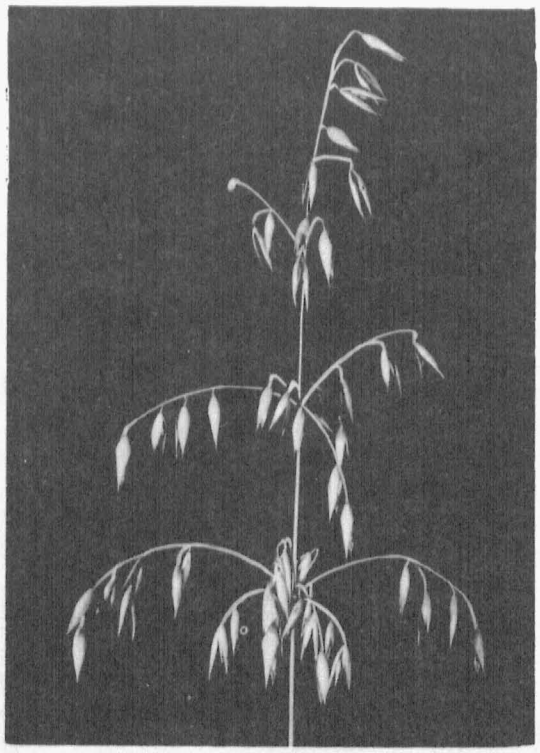

Figure 2.—A typical panicle of Mo. 0-205 oats. This variety has a wide spreading panicle like its Columbia parent.

[7]Saunders, J. M., Report of Seed Certified in 1953 by State Certifying Agencies. U.S.D.A. Federal Extension Service Mimeographed Report.

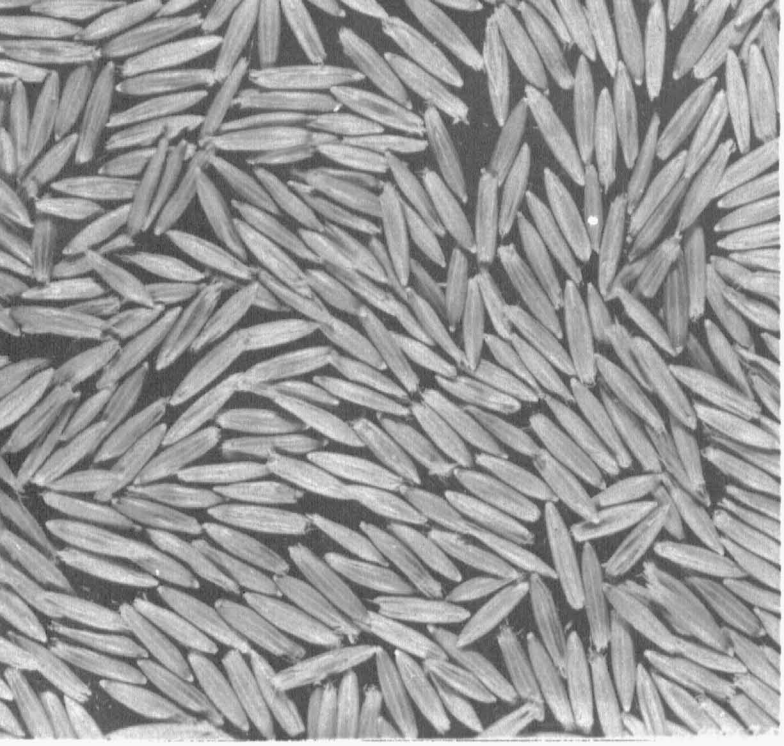

Figure 3.—Seed of the Mo. 0-205 variety. Kernels of these oats are reddish-brown in color and have the striping characteristic of the Columbia variety. 0-205 has a low percentage of hulls making it a good variety for feed.

in uniform nurseries in many states in the north central oats region. The excellent yield record of 0-205 compared with locally adapted varieties in these extensive tests demonstrates the broad adaptation of this outstanding variety.

EARLINESS OF O-205

The Missouri 0-205 variety of oats has averaged two days later than the Columbia variety and three days earlier than Clinton as measured by date of heading at Columbia, Missouri, during the six-year period, 1948 to 1953. The comparisons of date heading (which are less influenced by adverse weather and thus make a better standard of comparison than dates of ripening) between four varieties at Columbia, Missouri, is given in Table 4.

The need for oats to mature ahead of the hot, dry summer weather has made earliness an essential quality before any variety can be successfully grown in Missouri. In this respect Columbia has been the standard for many years and a large measure of its continued high production has resulted from its vigorous, early growth and its early heading and ripening. The fact that 0-205 is later in heading than Columbia is perhaps a greater disadvantage in southern Missouri than in north Missouri, since the spring season advances more rapidly in the southern area. However, 0-205 has still been the highest yielding variety in all sections of Missouri. The later maturity of 0-205 may be of some advantage in north Missouri in those years when oats ripen normally without maturity being hastened by hot weather. It has been observed that 0-205, like Columbia and 0-200, will ripen more normally and produce more brightly colored seed in years with high temperature during the 2-3 weeks preceding harvest than will such varieties as Andrew, Cherokee, or Clinton which do not have Columbia or Fulghum parentage.

TABLE 4--DATE OF HEADING AT COLUMBIA, MISSOURI, OF FOUR VARIETIES OF OATS DURING THE SIX-YEAR PERIOD, 1948 to 1953.

Year	Columbia	Andrew	Mo. 0-205	Clinton
1948	May 31	May 28	June 3	June 5
1949	June 4	June 3	June 6	June 8
1950	June 4	June 4	June 5	June 10
1951	June 8	June 9	June 10	June 14
1952	June 3	June 3	June 6	June 8
1953	June 3	June 2	June 3	June 7
Days later than Columbia		1 day earlier	2 days later	5 days later

HEIGHT OF O-205

Mo. 0-205 is a tall growing variety, being comparable to Andrew and Columbia in this respect as indicated by the following comparisons:

	0-205	Andrew	Columbia	Clinton
Average height in 29 tests (1948-'54)	37 in.	36 in.	37 in.	33 in.

On many soils in Missouri which are medium to low in fertility, unless heavy fertilization is practiced, a tall variety is desirable, especially in hot dry spring seasons such as those experienced in 1952 and 1953. Also, if oats are cut for hay or ensiled, common practices in local areas, a tall variety adds to the total yield. 0-205 is well suited for these purposes. On the

TABLE 3--YIELD OF MO. 0-205 IN COMPARISON WITH OTHER VARIETIES IN MISSOURI.

Location of Tests	Years Tested	No. Tests Reported	Mo. 0-205*	Andrew	Mo. 0-200	Columbia	Cherokee	Clinton
			bu./A.	bu./A.	bu./A.	bu./A.	bu./A.	bu./A.
All Missouri Tests	1948-'54	38	57.3	54.8	52.7	51.3	49.6	47.6
Northwest Missouri (Bethany)	1948-'54	6	71.6	67.0	61.1	55.5	60.6	55.4
Central Missouri (Columbia)	1948-'54	6	68.2	63.4	65.8	64.8	58.7	57.7
Southwest Missouri (Pierce City)	1948-'54	7	42.8	41.4	42.2	38.8	38.9	39.2
Southeast Missouri (Sikeston)	1948-'54	6	48.7	44.1	39.8	43.5	41.0	35.8

* Strain 04205 (C.I. 4988) used in these comparisons.

other hand, if soils are high in organic matter, and if heavy fertilization is used, a shorter-strawed variety may be more desirable, since tall growing oats usually lodge more severely from rain and windstorm damage than do shorter kinds. However, there are no short-strawed varieties available that will match 0-205 in yield in Missouri.

LODGING RESISTANCE OF O-205

0-205 is a stiff-strawed variety being somewhat similar to Andrew in this respect, and considerably superior to Columbia. Comparisons of lodging of 0-205 with Andrew, Columbia and Clinton are as follows:

	0-205	Andrew	Columbia	Clinton
Average lodging in 24 tests in Missouri (1948-'54)	14 %	23 %	28 %	16 %

Lodging in oats may result from any of the following reasons: (1) rain and windstorm damage, (2) weakening of the straw by disease, and (3) breaking over of straw after ripe. Most of the lodging recorded above was caused by rain and windstorm. Height of the plant, stiffness of the straw, and root anchorage are all important factors in determining the amount of rain and windstorm damage that a variety can take without lodging. Observations made in the field indicate that 0-205 is especially resistant to wind and rainstorm damage and will stand well even though it is a tall growing variety. Oats do not have as stiff straw as wheat and lodging may be expected in any of the varieties currently grown in a wet year when planted on soils of high fertility or if excessive fertilizer applications, especially those high in nitrogen, are used on the oats crop.

The disease resistance of 0-205 aids it in withstanding attacks from rust and blight without the deterioration in straw quality that accompanies attacks by these diseases. The exact nature of the disease resistance of 0-205 will be described later.

Lodging after ripening, while in the field awaiting the combine, has been a serious defect of the Columbia variety. In this respect 0-205 is much improved over Columbia, and is similar to the Andrew variety. Neither, however, will stand as long after ripening before lodging as will the Clinton variety which has a thicker, heavier straw.

In addition to the damage and loss of yield from lodging, there is an even larger loss from shattering, when oats are left standing for the combine. This loss is in no way related to the amount of lodging and may be large even though the oats are standing erect when harvested. Preliminary estimates have placed

Figure 4.—Comparative earliness of 0-205 (right) and Clinton (left). The average date of heading of 0-205 is about 3 to 4 days earlier than Clinton in Missouri and 2 to 3 days later than Columbia.

these losses as high as 15 to 25 per cent.[8] No specific varietal differences in the amount of shattering have been observed. The best way to prevent this loss when oats are to be harvested with a combine-thresher is to windrow them first. The windrowing is done by cutting with a windrower, or a binder from which the binding mechanism has been removed, at the stage of ripeness reached for binding. They may then be threshed by a combine with a pick-up attachment. Through this method of harvesting lodging after ripening can be prevented, and damage resulting from lodging after windstorms, as well as loss by shattering can be materially reduced.

DISEASE RESISTANCE OF O-205 OATS

0-205 is resistant in varying degrees to the major diseases of oats, smuts, crown or leaf rust, stem rust, and Victoria blight. Each will be discussed separately.

Smuts.—The smut resistance of 0-205 was inherited from its Victoria parentage. 0-205 possesses excellent resistance both to the loose and covered smut diseases.,

Crown Rust.—The 0-205 variety is moderately resistant to crown rust. While pustules of crown rust may develop on 0-205 they are smaller and are found less frequently than pustules on Columbia or other susceptible varieties. The protective qualities of this resistance was demonstrated at Sikeston, Missouri, in 1950. In that season crown rust was already flecking the top leaves as the plants were heading out. Under those severe rust conditions 0-205 yielded 53.6 bushels per acre as compared to 35.7 bushels for Andrew and 21.8 bushels for Clinton. The bushel weights of the grain for the three varieties were 25 pounds, 23 pounds and 18 pounds per bushel, respectively.

[8]Poehlman, J. M. Growing Good Crops of Oats in Missouri. Missouri Agricultural Experiment Station Bulletin 501. 1947.

Figure 5.—The crown rust resistance 0-205 was demonstrated at Sikeston in 1950. In that year Clinton was severely damaged by crown rust (lodged variety on left), while 0-205 (extreme left, background) was uninjured. The Columbia variety on the right escaped much crown rust injury through its earliness.

It has been suggested that the crown rust resistance of 0-205 may be a more stable type of resistance than that found in varieties such as Clinton.[9] The moderate resistance of 0-205 is inherited in a more complex manner than the resistance in Clinton and it appears reasonable that it may not be as easily breached by new races of the rust organism as resistance in varieties with a more simple form of inheritance. It may be recalled that Clinton (and Andrew) varieties were highly resistant to crown rust when first distributed but are now susceptible since new races to which they have no resistance now prevail.

Stem Rust.—0-205 is resistant to races 2 and 7 of stem rust but susceptible to race 8. This is the same type of resistance found in Andrew. By contrast, Clinton (and the new Clintland and Clintafe varieties) possess resistance to races 2 and 8 and are susceptible to race 7. For several years race 8 was the most widespread race of stem rust but in 1953 and 1954 race 7, to which 0-205 has resistance, was the prevailing race.

Victoria Blight.—0-205 is resistant to this disease. Only varieties with the Victoria type of crown rust resistance are susceptible to Victoria blight. While the moderate crown rust resistance of 0-205 was apparently derived from Victoria, it is not the same type of resistance identified with Victoria in the blight susceptible Victoria derivatives.

[9]Poehlman, J. M. Are Our Oat Varieties Too Resistant to Disease? Abstracts, American Society of Agronomy. 1952.

TABLE 5--COMPARATIVE GRAIN QUALITY OF MO. 0-205, ANDREW, COLUMBIA AND CLINTON VARIETIES OF OATS.

	0-205	Andrew	Columbia	Clinton
Bushel Weight (lbs./bu.)	32.5 lbs.	31.5 lbs.	32.5 lbs.	30.9 lbs.
Per Cent Hull*	28.5 %	28.1 %	27.5 %	30.1 %
Yield† (bu./A.)	56.5 bu.	53.8 bu.	49.8 bu.	46.6 bu.
Yield of Groats‡ (lbs./A.)	1286 lbs.	1238 lbs.	1156 lbs.	1042 lbs.

* Per cent hull from 5 comparisons at Columbia, 1949-1953.
† Yields from 34 comparisons in Missouri, 1948 to 1953.
‡ Yield of groats is yield of kernels (with hulls removed).

GRAIN QUALITY OF O-205

The 0-205 variety of oats produces heavy grain with a high bushel weight and a low hull percentage. For these reasons it makes a good variety to use for livestock feed. Comparison of 0-205 with Andrew, Columbia and Clinton are made in Table 5. The high quality of Columbia oats has long been known and a market subclass, "Special red oats," was established in the grain standards of the U. S. Department of Agriculture so that the Columbia variety could be marketed at a premium above other red oats varieties. It will be noted that the 0-205 variety has exceptionally high test-weight, like Columbia. It has a slightly heavier hull than Columbia, but a thinner hull than Clinton. The yield of groats, based on average yields of these varieties in Missouri, averaged 50 pounds per acre above Andrew and 244 pounds per acre above Clinton.

The grain color of 0-205 appears to be slightly darker on the average than the color of Columbia. The grain varies in darkness of color from year to year.

USE GOOD PRODUCTION PRACTICES

Use of a good variety is only one step in the successful production of a crop of oats. Good seedbed preparation, early seeding, use of fertilizer, planting with a drill, and timely harvesting, 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 Missouri Agricultural Experiment Station Bulletin 644, *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, Missouri.