

UNIVERSITY OF MISSOURI

COLLEGE OF AGRICULTURE

AGRICULTURAL EXPERIMENT STATION

BULLETIN 229

Fulghum Oats for Missouri



COLUMBIA, MISSOURI

JANUARY, 1925

THIS BULLETIN AT A GLANCE

1. Fulghum oats outyielded all other varieties in a six-year variety test, excelling Burt by 5%, Kherson by 12%, and Silvermine by 17%.

2. The yield of Fulghum is greatly affected by time of seeding. In three years' trials the average loss of Fulghum from a month's delay in seeding was 24 bushels per acre, or 45%.

3. Since Kherson is much less affected by delayed seeding the relative yield of Fulghum and Kherson is dependent on the time of seeding. With very early seeding Fulghum is far superior to Kherson, with average seeding Fulghum is only moderately superior, and with very late seeding Kherson is somewhat better than Fulghum.

4. Seven commercial stocks of Fulghum obtained from widely different sources did not differ materially in average yield in a 4-year test. All of these stocks were consistently better than the other standard varieties of oats for Missouri.

5. Fulghum oats are very highly resistant to the oats smuts. When this variety is grown seed treatments for smut control are entirely unnecessary.

Fulghum Oats for Missouri

L. J. STADLER

ABSTRACT.—In this bulletin are reported the results of a six-year test of Fulghum oats, a southern variety which has only recently been grown in Missouri. The advantage of Fulghum over Kherson was greatly increased by early seeding. When seeding is very late Fulghum is inferior to Kherson. Seven commercial stocks of Fulghum from different sources showed little difference in value in a four-year test. All of the Fulghum stocks gave very good yields and were highly resistant to smut.

When varietal recommendations for oats were last published by this Experiment Station, in 1922, the probable value of Fulghum oats for Missouri was pointed out; but since this variety had then been tested in comparison with other varieties for only three seasons a definite recommendation was withheld pending further investigation. Comparative yield tests of Fulghum for six seasons are now available and the value and the limitations of the variety under Missouri conditions seem fairly clear.

The varieties of oats recommended in 1922, as a result of all previous varietal trials of the Experiment Station, were Kherson, Sixty-Day, and Burt for all sections of Missouri, and, in addition, Silvermine for the northern third of the State.

The varieties Kherson and Sixty-Day, as commonly grown, are practically identical. These varieties trace back to separate importations from southwestern Russia, made about 20 years ago. Both quickly took a prominent place in the southern and southwestern part of the spring oats region. They are very similar in appearance and have on the whole given very similar results in yield tests. Each of these varieties when first imported was a mixture of types including both white-grained and yellow-grained strains, but for convenience of classification, the name Sixty-Day is now applied to the strains with white grains and the name Kherson to those with yellow grains. They are very early-maturing, with short, slender stems, short, sparsely-fruited heads, and slender grains.

Silvermine is a somewhat later-maturing variety, with taller and coarser stems and larger heads. The grains are white and plump, but when grown under typical Missouri conditions they are often poorly filled because of the shortness of the season. In North Missouri, however,

particularly when early seeding is possible, Silvermine matures well and often outyields the extremely early varieties.

Burt is a variety of very different type. It belongs to the Mediterranean group, of which Red Rustproof (Texas Red) is the best known representative. All common varieties of the Mediterranean group are characterized by rather large grains, with the upper grain of the spikelet particularly well-filled, and by a considerable degree of resistance to smut and possibly also to crown rust. These are primarily winter oats, adapted to fall seeding in warm climates, but they have also been found valuable for spring seeding in various parts of the spring oats region.



Burt

Fulghum

Kherson

Silvermine

Fig. 2.—Typical Heads of the Principal Missouri Oats Varieties.

Burt is the earliest maturing variety of oats in common use. Under Missouri conditions it usually matures 1 to 3 days before Kherson and Sixty-Day. The plants are taller than those of Kherson, and have somewhat larger heads, usually of the slightly nodding type shown in Figure 1. The grains are usually long and slender, with short, bushy hairs at the base. Most of the lower grains and many of the upper grains bear awns. The color of the grain ranges from whitish yellow to slightly reddish yellow. This variety, however, usually is badly mixed, and various types of plants and grains can be found in almost any stock of Burt.

The Fulghum variety was produced by J. A. Fulghum, of Warrenton, Ga., by the propagation of a single, exceptionally early plant found in a field of Red Rustproof. For several years this variety has been fairly

popular in the South, but it has only recently attracted attention in the spring oats region.

Varietal trials of spring-sown oats including Fulghum have been published by three experiment stations. In the spring oats tests of the Arkansas Experiment Station, Fulghum was included during the four-year period, 1916-1919. During this period Fulghum gave a higher

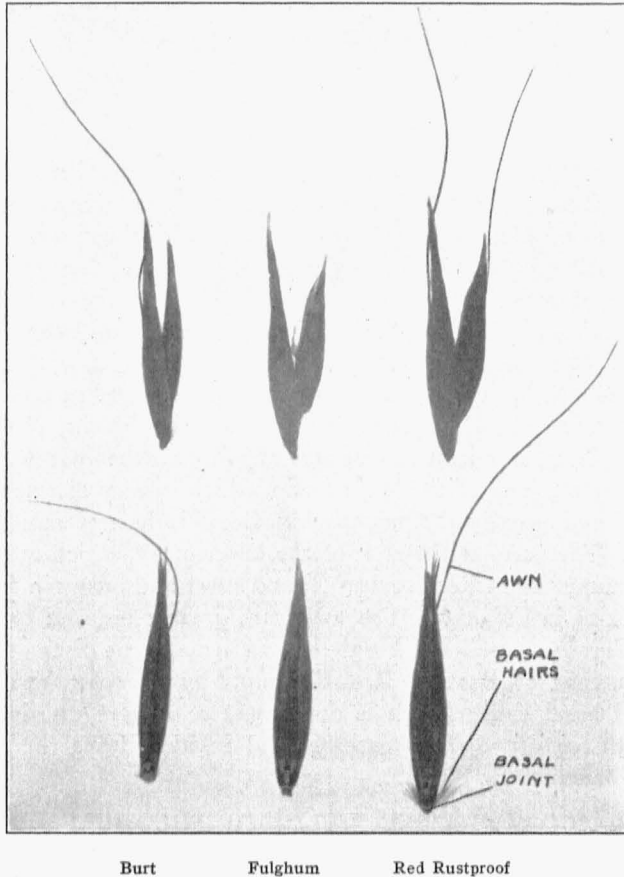


Fig. 3.—Detailed Comparison of Typical Grains of Burt, Fulghum, and Red Rustproof Oats (magnified). Note the basal hairs, basal joint, and awns. These features, together with differences of color, size, and plumpness, permit the identification of the threshed grain of these three varieties.

average yield than any other spring-sown oats variety. Two stocks of Fulghum were tested in comparison with other standard varieties by the Kansas Station during the four-year period 1917-1920. Both of these stocks excelled all other varieties in yield, but one was distinctly superior

to the other under Kansas conditions. This stock was given the name Kanota by the Kansas Station in order to distinguish it from other stocks of Fulghum, and under this name it is now quite widely grown in Kansas. The Ohio Station has reported the yields of Fulghum and a number of other varieties during the three-year period, 1918-1920. In the Ohio test also Fulghum was the highest yielding variety.

Fulghum, like Burt, belongs to the Mediterranean group of oats varieties. It is more similar to Red Rustproof than to Burt, but it can easily be distinguished from either of these varieties.

In early growth the Fulghum plant is less spreading than Red Rustproof, though more spreading than Burt or Kherson. In later stages of growth this difference is still apparent in the spreading of the stems at the lower joints. At maturity the plants are shorter than Burt and usually somewhat shorter than Kherson, though the latter comparison varies with the season. The heads are medium-short, with short branches, and are usually stiffly erect. Typical heads of the principal Missouri varieties are shown for comparison in Fig. 2.

The grains of Fulghum are shorter than those of Burt and Red Rustproof. They are more plump than those of Burt, though not quite so plump as Red Rustproof. Three-grained spikelets often occur in the upper part of the head. The grains are yellowish-brown, of a darker shade than Burt and with less of a reddish cast than Red Rustproof. The joint at the base of the lower grain, which is very distinct in Red Rustproof and usually distinct also in Burt, is hardly noticeable in Fulghum. The hairs at the base of the lower grain, which are usually long and numerous in Red Rustproof, and short and bushy in Burt, are few or lacking in Fulghum. The awns are greatly reduced or entirely absent. Threshed grain of Fulghum can usually be distinguished in bulk from that of Burt or Red Rustproof by the color, awns, basal joint, and basal hairs, but it is not possible to sort the individual grains with certainty. The features used in identifying the threshed grain are illustrated in Figs. 3.

COMPARATIVE YIELDS OF FULGHUM

Fulghum oats have been included in the preliminary variety test since its beginning in 1919. In this test each variety is grown in a number of small plots distributed over the experiment field, to avoid error from soil variations. The plots are usually 18 feet long and three to five rows wide, and the number of plots of each variety varies from four to six. The small plots are used to permit the testing of a large number of varieties and to gain the greater accuracy which results from extensive duplication of plots. The yields of the principal varieties in this experiment during the 6-year period, 1919-1924, are shown in Table 1.

TABLE 1.—YIELDS OF OATS VARIETIES AT COLUMBIA
(In Bushels per Acre)

Variety	Missouri Number	1919	1920	1921	1922	1923	1924	Average Yields		
								6 years (1919-24)	5 years (1919-23)	5 years (1920-24)
Fulghum.....	0124	72.4	39.8	45.4	25.2	56.3	37.4	46.1	47.8	40.8
Burt.....	015	56.3	43.5	49.1	30.7	49.2	34.6	43.9	45.8	41.4
Kherson.....	040	59.0	34.2	38.0	25.9	47.7	39.7	40.8	41.0	37.1
Monarch.....	044	62.9	36.6	29.6	30.9	46.4	31.3	39.6	41.3	35.0
Sterilis Selection.....	055	46.6	33.0	38.6	31.3	55.4	28.3	39.0	41.2	37.5
Irish Victor.....	036	70.3	35.5	29.8	23.2	52.4	----	----	42.2	----
Silvermine.....	050	55.0	35.1	31.7	25.8	53.8	----	----	40.3	----
Scottish Chief.....	049	65.9	34.2	26.6	21.7	52.1	----	----	40.1	----
Canadian.....	016	61.5	25.2	25.3	25.9	56.2	----	----	38.8	----
Silvermine Selection.....	051	55.3	34.8	22.1	25.0	49.5	----	----	37.3	----
Early Gothland.....	025	51.0	29.7	23.4	22.7	52.4	----	----	35.8	----
Joannette.....	038	49.3	35.2	19.3	22.3	47.4	----	----	34.7	----
Green Russian.....	035	----	33.0	26.1	29.0	53.4	36.3	----	----	35.6
Swedish Select.....	057	----	30.0	21.0	20.0	48.6	34.0	----	----	30.7

The 5-year and 6-year averages given in Table 1 permit the comparison of any two varieties tested, on the basis of their yields in the same seasons. Fulghum has outyielded all other varieties reported in Table 1 by a substantial margin. Several other varieties were tested for a period of less than 5 years, but none of these has outyielded Fulghum during the seasons in which it was tested. In the average yields for 6 years Fulghum has excelled Burt by 5% and Kherson by 12%. In the 5-year comparison it has excelled Silvermine by 17%. In five of the six seasons Fulghum has given the highest or the second highest yield of all the varieties reported. The exception is the season of 1922, a season of very late seeding and consequent low yields. As will be shown in the next section, late seeding is much more unfavorable to Fulghum than to other early-maturing varieties.

RELATION OF FULGHUM YIELD TO LENGTH OF SEASON

The effect of seeding at different dates on the relative yield of Fulghum at Columbia has been studied during three seasons, 1921, 1923, and 1924. These trials can not well be averaged for the earliest possible date of seeding varied rather widely in different seasons. The intervals between seedings has also varied. They will therefore be considered separately.

In 1921 six varieties of oats were tested at four dates of seeding, at two-week intervals beginning March 17. The yields in this trial are shown in Table 2.

TABLE 2.—YIELDS OF OATS VARIETIES WHEN SOWN AT SUCCESSIVE DATES, 1921
(In Bushels per Acre)

Variety	Date of Seeding			
	March 17	March 31	April 14	April 28
Fulghum.....	55.3	42.5	31.4	6.3
Silvermine.....	40.2	32.6	20.3	11.1
Iowa No. 105.....	37.5	37.7	27.2	11.9
Kherson.....	37.2	37.0	30.0	13.4
Red Rustproof.....	14.8	12.5	10.9	3.2
Swedish Select.....	16.4	14.4	17.3	6.0

It will be noted that the yield of Fulghum was greatly decreased by delay in planting. Its yield of 55 bushels when planted March 17 dropped to 42 bushels when planting was delayed two weeks and to 31 bushels with another two weeks' delay in planting. On the contrary Kherson was not greatly affected by moderately late planting. It gave as good a yield when planted March 31 as when planted March 17, and when planting was delayed until the middle of April, the yield of Kherson dropped only moderately. Thus a month's delay in planting has reduced the yield of

Fulghum 24 bushels, but the same delay has reduced the yield of Kherson only about 7 bushels. Fulghum was distinctly superior to Kherson when the two varieties were planted in the middle of March, but it had no material advantage when planting was delayed until the middle of April. The marked difference in the response of the two varieties to delayed planting is graphically shown in Fig. 4.

Silvermine, which has as usual given lower yields than Fulghum, behaves in similar fashion with regard to date of planting. Iowa No. 105, a selection of Kherson, has given practically the same result as that variety. Red Rustproof and Swedish Select were both too late to give good yields, even at the earliest date of planting in this season.

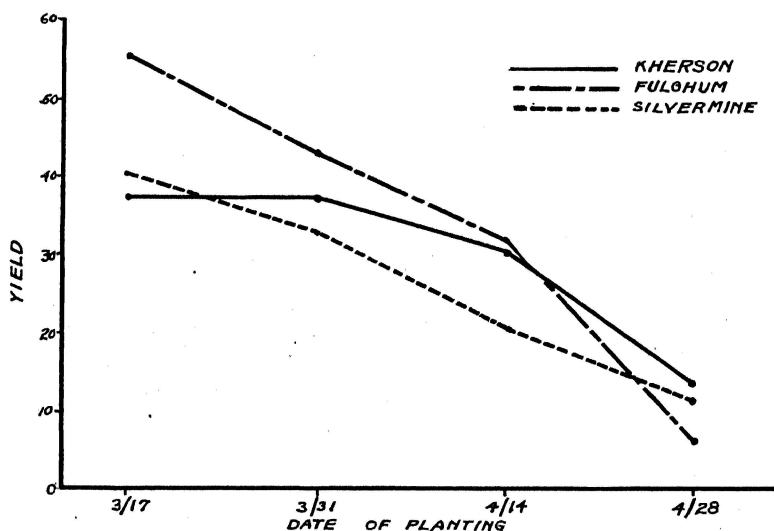


Fig. 4.—Relation of Date of Seeding to Yield of Fulghum, Silvermine and Kherson, 1921.

In 1922 weather conditions were so unfavorable that periodic seedings could not be made. A test of six varieties was planted on March 8, but later seedings could not be made until late April. The date of seeding trials were therefore abandoned. In the discussion of Table 1 it was pointed out that Fulghum was a leading variety in the variety test in every season except 1922. It is interesting to note that in the early seeding of 1922 Fulghum was outstandingly the highest yielder.

A second trial was made in 1923. In this season it was possible to make the first seeding on February 10 and a second on February 20, but both of these plantings were destroyed almost completely by freezes in early March. The first seeding from which yields were determined was

made on March 5. It was planned to make seedings at two-week intervals in 1923, but on account of unfavorable weather the second seeding could not be made until March 27, about three weeks after the first. The third seeding was made on April 12, about two weeks later. Red Rustproof and Iowa No. 105 were dropped from the test in this season and Burt was added. The results of the test are shown in Table 3.

TABLE 3.—YIELDS OF OATS VARIETIES WHEN SOWN AT SUCCESSIVE DATES, 1923
(In Bushels per Acre)

Variety	Date of Seeding		
	March 5	March 27	April 12
Kherson.....	35.7	29.6	30.3
Burt.....	33.0	30.3	27.8
Fulghum.....	42.1	34.0	17.1
Silvermine.....	31.7	18.6	18.7
Swedish Select.....	35.1	21.4	15.6

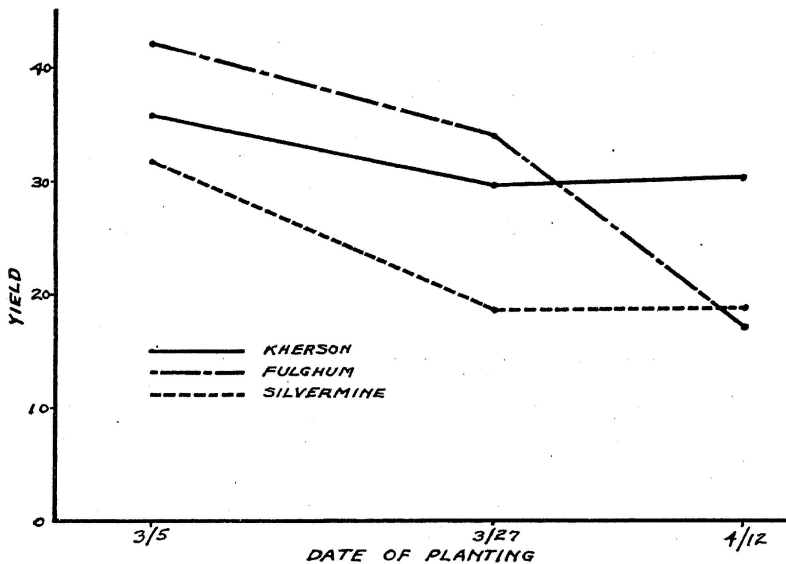


Fig. 5.—Relation of Date of Seeding to Yield of Fulghum, Silvermine, and Kherson, 1923

In general the results of this experiment are very similar to those of 1921. The successive seedings have given successively lower yields, and delayed seeding has caused a much greater loss in Fulghum than in Kherson. A delay in seeding of about five weeks (from March 5 to April 12) has reduced the yield of Fulghum in this trial about 25 bushels and the yield of Kherson only about 5 bushels. Fulghum again was the best of the varieties tested when seeding was relatively early but again it has

lost its advantage in the later seedings. Burt in this test gave results more similar to those of Kherson than to those of Fulghum, delayed seeding reducing its yield only slightly. On the other hand, Silvermine and Swedish Select, which gave fair yields in the seeding of March 5, lost heavily when seeding was delayed beyond this date. In other words the two distinctly early-maturing varieties have lost through delayed seeding only slightly; the two distinctly late-maturing varieties have lost very heavily; but Fulghum, though a relatively early-maturing variety, has behaved in its response toward delayed seeding very much like the late varieties.

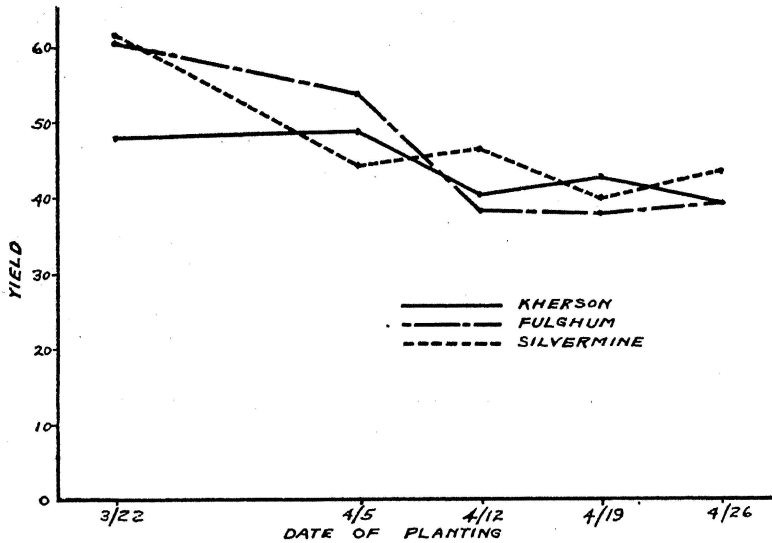


Fig. 6.—Relation of Date of Seeding to Yield of Fulghum, Silvermine, and Kherson, 1924.

A more comprehensive trial of the same sort was made in 1924. In this experiment Fulghum, Kherson, Silvermine and Swedish Select were seeded at five dates. It was planned to make six seedings at weekly intervals, but the second seeding was delayed for six days by unfavorable weather and was abandoned. Although the first seeding in this trial was later than the first seeding in the other two trials reported, the growing season for oats was fully as long, for cool, moist weather favorable to the growth of oats continued through the first week of July, or about two weeks later than usual. The superiority of the early seedings, which was very apparent in the early part of the season, was later reduced by the good growth made in the later plantings after the early-sown oats had almost matured. Nevertheless a distinct effect of delayed planting is

apparent in the data, particularly for the first three dates. The results are shown in Table 4.

TABLE 4.—YIELDS OF OATS VARIETIES WHEN SOWN AT SUCCESSIVE DATES, 1924
(In Bushels per Acre)

Variety	Date of Seeding				
	March 22	April 5	April 12	April 19	April 26
Fulghum.....	60.6	53.7	38.2	37.8	39.2
Silvermine.....	61.6	44.1	46.5	39.7	43.7
Kherson.....	48.2	48.9	40.5	42.9	39.2
Swedish Select.....	38.6	33.4	24.9	27.4	18.5

The comparative behavior of Fulghum and Kherson is very similar to that shown in the preceding trials. Again the Kherson has been affected only slightly by delayed seeding; again the Fulghum yield has been very greatly reduced. A month's delay in seeding has cut down the yield of Fulghum about 22 bushels and that of Kherson only about 5 bushels. As a result the marked superiority of Fulghum to Kherson in the early seeded trial has been completely eliminated in the later seedings.

These three tests, though varying rather widely with seasonal conditions, as would be expected, agree in the essential points. Each of the three supports the following conclusions:

- (1) Delay in seeding oats after the earliest date which will escape freezing, reduces yield.
- (2) Oats varieties differ widely in the loss resulting from delayed seeding. Fulghum suffers much more from delayed seeding than Kherson.
- (3) For early seeding Fulghum is the most productive variety. For late seeding Kherson is probably the most productive, but no variety of oats gave good yields from late seeding.

TABLE 5.—YIELDS OF FOUR VARIETIES OF OATS, AS AFFECTED BY DELAY IN SEEDING
(Average of 1921, 1923, and 1924 Trials)

Variety	Average Date of Seeding			Loss through Delay of One Month	
	March 15	March 31	April 15	bu.	%
Fulghum.....	bu. 52.7	bu. 43.4	bu. 28.8	23.9	45
Silvermine.....	44.5	31.8	26.2	18.3	41
Kherson.....	40.9	38.5	34.4	6.5	16
Swedish Select.....	30.0	23.1	20.1	9.9	33

The loss from delayed seeding in different varieties, as determined from the three years' results, is summarized in Table 5. In the preparation of this table the first seeding of each season and the two succeeding seedings which most nearly approached the two-weeks' intervals were

used. These are the first three seedings of 1921, the only three seedings harvested in 1923, and the first, second, and fourth seedings of 1924.

It will be noted in these average figures that although the yield of Fulghum has dropped materially as a result of the first two weeks delay in seeding, it is still the highest yielder in the tests seeded at the second date. In the late seedings, however, it is excelled in yield by Kherson. The average loss of Fulghum from a month's delay in seeding was almost 24 bushels per acre; that of Kherson only $6\frac{1}{2}$.

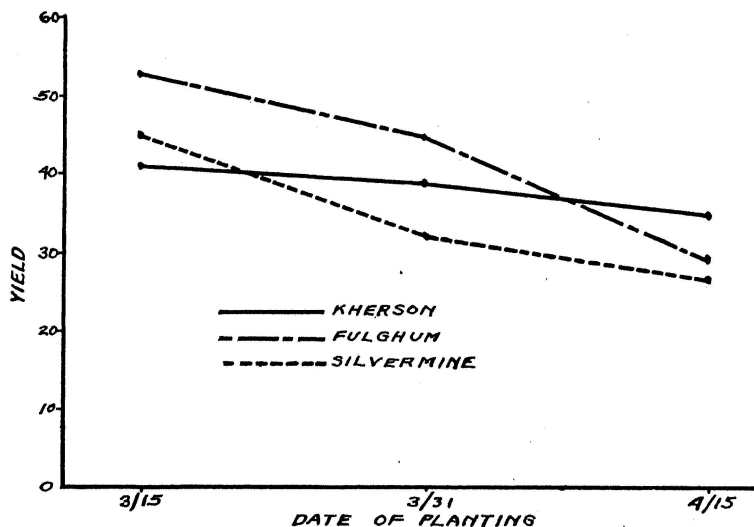


Fig. 7.—Relation of Date of Seeding to Yield of Fulghum, Silvermine, and Kherson. Average Yields of 1921, 1923, and 1924.

These data emphasize the importance of early seeding of oats in Missouri, particularly if Fulghum oats are to be grown. The average loss in yield of Fulghum for each day's delay in seeding has been about four-fifths of a bushel per acre. This loss is of course not uniform with each day's delay; it is less than the average early in the season, and becomes greater as the season advances.

The foregoing considerations must be taken into account in interpreting the results of the general variety tests. The date of seeding of the oats variety test is often somewhat later than the date of seeding oats in the best farm practice. The varieties can not be accurately compared unless the soil is put into uniformly good condition, and often there is no opportunity for this before several opportunities for planting a crop satisfactorily for practical purposes have passed. As a result the variety tests are sown relatively late, and tend to favor such varieties as Kherson,

Sixty-Day, and Burt at the expense of Fulghum. We may safely conclude that the superiority of Fulghum, as clearly shown in the general variety test, would be even more marked if the varieties could be compared in tests seeded at the earliest date practicable under farm conditions.

However the relative yields in the variety test are more nearly comparable to those which may be expected under the conditions of common farm practice. The usual date of seeding oats on Missouri farms is even later than the date of seeding in the variety tests. In the average season only about half of the Missouri oats crop is sown before April 1. The percentages of the oats crop sown by April 1 for the past six seasons, as determined by the Missouri Crop Reporting Service, were as follows:

1919	-----	72%
1920	-----	51%
1921	-----	94%
1922	-----	30%
1923	-----	58%
1924	-----	28%
Average	-----	56%

This extremely late seeding is the chief reason for the failure of the Missouri oats crop. It causes more reduction in yield than even the use of poor varieties. Under average Missouri conditions it is impossible, with any variety and with any cultural conditions, to produce a high yield of oats from April sowing. It is only in exceptionally long seasons that such seedings can be very successful, and even in these exceptional seasons earlier seedings will give better results. Fortunately oats will stand a great deal of cold weather in the early stages of growth without serious injury. It is only very rarely—probably not in one season in ten—that oats sown in the latter half of February will be killed by freezing. It is far more profitable in the long run to sow early every year, even though a second sowing is necessary in the occasional season when the crop is lost, than to delay seeding until the danger of freezing is past. *There is far greater danger of loss from late sowing than from freezing.* In ordinary seasons the bulk of the Missouri oats crop should be planted between February 15 and March 15, instead of between March 15 and April 15 as at present. In the southern part of the State earlier planting is possible than in the northern part, and because of the earlier beginning of hot, dry, summer weather earlier planting is also more necessary in this section.

The value of Fulghum for Missouri depends upon earlier seeding. For sowing at the time now most common, Fulghum has little or no

advantage over Kherson. But for earlier sowing its advantage is distinct and consistent, and it seems plausible to estimate that by sowing at the earliest possible date and by substituting Fulghum for the varieties now grown, the average acre yield of oats in Missouri could be increased at least 25%.

DIFFERENT STOCKS OF FULGHUM

In order to determine whether the high yielding power shown by Fulghum in the variety tests might be expected of other stocks of Fulghum, seven different stocks of Fulghum obtained from widely different sources have been included in the variety test since 1921. A wide difference in the value of different commercial stocks of Fulghum has been reported by the Kansas station, which found one stock so superior as to require a new name. This stock, now widely grown in Kansas under the name Kanota, was one of the seven included in our tests, under the Missouri number 065. The yields of the seven Fulghum stocks during the four-year period 1921-1924 are shown in Table 6.

TABLE 6.—YIELDS OF FULGHUM STOCKS AT COLUMBIA
(In Bushels per Acre)

Missouri Number	1921	1922	1923	1924	Average
042	45.2	29.5	54.8	32.7	40.6
065	42.0	26.6	60.6	33.7	40.6
0124	45.4	25.2	56.3	37.4	41.1
0145	39.2	25.2	65.9	35.9	41.6
0149	42.8	26.9	66.2	36.5	43.1
0151	39.8	23.1	65.4	37.6	41.5
0152	39.8	25.1	64.5	29.6	39.8

Some variation in the yield of different stocks is apparent in Table 6, and there is an average difference of more than 3 bushels per acre between the best and the poorest stocks compared. This difference is well beyond the probable limits of experimental error in this experiment, and may be safely considered to show that Fulghum stocks are not all equal in yielding capacity, as might have been expected from the fact that the variety was produced by individual plant selection.

For practical purposes, however, it is doubtful that any of the stocks tested is outstandingly better than the others, for none of them is consistently superior in yield. Stock 0149, which gave the highest average yield, was the highest yielder in only one season of the four, and was little better than the average in the other seasons. All of the 7

Fulghum stocks have been consistently among the highest yielders in the variety test during the four years in which they have been tested.

It is interesting to note that stock 065, the strain of Fulghum grown in Kansas under the name of Kanota, has not been outstanding when compared with the other six stocks of Fulghum under Missouri conditions. Under Kansas conditions this stock outyielded the other stock of Fulghum tested by about 8 bushels per acre, or 20 per cent, in a four-year test. The better strain matured about 5 days earlier than the poorer. But under Missouri conditions Kanota is not consistently better or worse than the six stocks of ordinary Fulghum oats with which it was compared in Table 6—stocks which probably are fairly representative of Fulghum oats as commonly grown. Nor has it differed materially in time of maturity from the type represented by these stocks, though the slight average difference (less than one day) is in favor of the Kanota. Usually the Fulghum stocks as a group have ripened slightly later than Burt and Kherson and distinctly earlier than Red Rust-proof.

The relative time of maturity of Fulghum, like its relative yield, is much influenced by the time of seeding. In the earliest seedings of the date-of-seeding trials already discussed Fulghum invariably headed before Kherson and usually ripened also a trifle earlier than Kherson. As seeding became later the ripening of the Fulghum was delayed more than that of the Kherson, so that in the late seedings Fulghum was decidedly later in maturity than Kherson. In very late seedings Fulghum did not ripen at all and produced but few heads, under conditions which permitted the maturing of a 10 or 15 bushel crop of Kherson.

to loose smut and covered smut. The Kherson stocks varied from 2% to 38% in infection, but the Mediterranean varieties were practically free from smut.

Similar tests were made in 1924. The Kherson stocks in this season varied from 5% to 63% in smut percentage, and again all of the stocks of the Mediterranean varieties were practically smut-free.

These tests included the seven stocks of Fulghum which were being compared in the variety test. No difference in the smut resistance of these stocks could be detected. Occasionally a smutted head was found in the Fulghum strains, but in no case was infection higher than one-tenth of one per cent. For a time it was thought that the few plants infected with smut were varietal mixtures, and that the true Fulghum was immune to the disease. But the possibility of smut in true Fulghum oats is demonstrated by the occurrence of heads in which the smut develops late, and the typical Fulghum character can be seen in the portion not yet destroyed by the disease.

Since Fulghum is so highly resistant to the smuts, seed treatments for these diseases are unnecessary when Fulghum is grown.

IMPROVEMENT OF FULGHUM OATS

The stock of Fulghum referred to in this bulletin are the ordinary stocks in common culture. In most varieties of oats the ordinary commercial stocks can be improved materially by selection, and since 1920 work has been done at this Station with the object of improving Fulghum by this means. Although the variety apparently was produced by individual plant selection, it is certainly not, as now grown, pure line. The existence of commercial stocks differing in productivity is a demonstration of this. Selections differing widely in productivity, and in such characters as time of maturity, resistance to lodging and the like can be isolated by individual selection from all of the stocks of Fulghum which we have grown.

It will probably be possible therefore to isolate higher yielding strains of Fulghum, which will supplant the commercial stocks now recommended. Hundreds of Fulghum selections have been grown at this Station, and among these are some which promise to surpass the parent variety in yield and practical value, at least under the growth conditions found here. But several years will be required for testing these selections before the best ones can be chosen. For the present we can not furnish seed of any selected Fulghum strain which can be confidently expected to outyield the ordinary Fulghum.

Possibly the best opportunity for improving the Fulghum variety lies in selection from hybrids between Fulghum and other desirable varieties.

Fulghum differs so widely from other varieties which almost equal it in yield that it would seem reasonable to expect very good results from a type combining the good qualities of both parents. Consequently hybrids of Fulghum and other good varieties are being closely studied.

SUMMARY

1. Fulghum oats outyielded all other varieties in a six-year variety test, excelling Burt by 5%, Kherson by 12%, and Silvermine by 17%.

2. The yield of Fulghum is greatly affected by time of seeding. In three years' trials the average loss of Fulghum from a month's delay in seeding was 24 bushels per acre, or 45 %.

3. Since Kherson is much less affected by delayed seeding the relative yield of Fulghum and Kherson is dependent on the time of seeding. With very early seeding Fulghum is far superior to Kherson, with average seeding Fulghum is only moderately superior, and with very late seeding Kherson is somewhat better than Fulghum.

4. Seven commercial stocks of Fulghum obtained from widely different sources did not differ materially in average yield in a 4-year test. All of these stocks were consistently better than the other standard varieties of oats for Missouri.

5. Fulghum oats are very highly resistant to the oats smuts. When this variety is grown seed treatments for smut control are entirely unnecessary.