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## Iowa farmers test new oat varieties

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# IOWA FARMERS TEST NEW OAT VARIETIES



Iowa 103, first distributed in 1913, is now the most widely grown variety of oats in the state.

AGRICULTURE EXPERIMENT STATION  
IOWA STATE COLLEGE OF AGRICULTURE  
AND MECHANIC ARTS

C. F. Curtiss, Director

AGRONOMY SECTION  
Farm Crops

Ames, Iowa

## SUMMARY

Improved varieties of oats developed and distributed by the Iowa Agricultural Experiment Station are returning to the state annually more than the total annual appropriation made by the state for the support of the Iowa State College and Experiment Station combined; more than 15 times the amount appropriated by the state to all of the work of the Agricultural Experiment Station; more than 200 times the funds expended on all the crop improvement work.

Beginning in 1913, the Iowa station distributed seed of Iowa 103. This white grained, early variety, selected from Kherson, in 292 tests made by Iowa farmers on their own farms, outyielded the home varieties 3.73 bushels per acre.

Beginning in 1914, the Iowa station distributed seed of Iowa 105, an early maturing, short strawed variety recommended for rich black soils. In 205 tests made by Iowa farmers on their own farms, this variety outyielded the home varieties 2.53 bushels per acre.

In 1919, the Iowa station began distributing Iowar seed. This is a white grained, early variety, making a somewhat greater growth of straw and yield of grain at the station than Kherson from which it was selected. In 330 tests made by Iowa farmers, Iowar outyielded the home varieties 5.93 bushels per acre.

The Iowa Station began the distribution of Iogren seed in 1922. This medium late maturing, yellow grained variety selected from Green Russian, makes a greater yield of straw than the other varieties distributed. In tests at Ames, it has been one of the very best in yield of grain. Tests over the state have not been completed. In 111 tests made in 1922 and 1923, it outyielded the home varieties 3.64 bushels per acre.

Iowa 103 is now grown more extensively than any other variety in the state, constituting 23 percent of the total acreage. Iowar ranks second with 15 percent.

The four varieties distributed by the station now constitute over 46 percent of the total oat acreage of the state.

Iowa 103 has shown its greatest superiority in southern Iowa, altho excellent results were secured in central and northern Iowa.

Iowar is not so well suited to southern Iowa as to the northern part of the state.

Iowa 105 is a special purpose oat, recommended only for rich, heavy black soils.

Pure seed sources of these pedigreed varieties are maintained by rigid field and bin inspection. Lists of such sources are available annually.

## TRIALS WITH NEW OAT VARIETIES CONDUCTED BY IOWA FARMERS

By H. D. HUGHES and JOE L. ROBINSON\*

In this bulletin are reported the results secured by Iowa farmers in comparing some of the pure-line pedigreed varieties of oats, which have been developed at the Iowa Agricultural Experiment Station, with the commercial varieties grown in various sections of the state. The farmers carrying on this cooperative experimental work to find the best oat varieties for the different soils and sections of Iowa are well distributed over the state.

Comparison of oat varieties at the Iowa station began about the time that field investigations were first established and the new, pure-line, pedigreed varieties which the farmers have been testing are the result of many years of variety comparison and selection. Old varieties were dropped from the tests as their lack of merit became established and new ones were substituted. The results of the first tests were reported in 1889. Later reports were made in 1881, 1908, 1912, and 1918<sup>1</sup>.

### *NEW PEDIGREED VARIETIES ORIGINATED AT AMES*

In early years, the commercial varieties available from seedsmen and growers in different parts of the country were compared. More recently, however, only the best commercial varieties have been retained and the work has consisted largely of comparing pure-line varieties originated at the experiment station with their parents, with other commercial varieties and with each other. Many pure-line, pedigreed varieties of oats have been isolated from the commercial varieties which were found best adapted to the climatic and soil conditions of Iowa. The more promising of these have been compared in the breeding nurseries thru a series of years and the best ones increased and compared with the commercial varieties in the variety test plots.<sup>2</sup> A number of the pedigreed varieties have

\*The testing of farm crops by Iowa farmers, cooperating with the Farm Crops Section of the experiment station, was begun in 1910. The work reported here was developed with the assistance of John Buchanan, who occupied the position of Superintendent of Cooperative Experiments from June, 1912, to March, 1920. Joe L. Robinson has held this position since April, 1920.

<sup>1</sup>In Bulletins 15, 96, 128 and 175, respectively. The first three are out of print.

<sup>2</sup>The oat breeding work at the Iowa station was begun in 1905 by L. C. Burnett, under a cooperative arrangement with the Bureau of Plant Industry, United States Department of Agriculture. Mr. Burnett has continued with this work to the present time and the new varieties, tests with which are reported here, are a result of his efforts.

been found superior to the commercial varieties with which they were compared in tests at Ames.

### *TESTED BY IOWA FARMERS*

Information which was obtained indicated that the results of variety tests conducted only in central Iowa, at the experiment station at Ames, might not reliably indicate the relative value of the different varieties under soil and climatic conditions found in other sections of the state.

The desirability of comparing the several oat varieties for yield in other sections of Iowa was apparent. The station has no fields in the different localities, and farmers were asked accordingly to cooperate in making variety comparisons on their own farms.

The testing of oat varieties by individual growers was undertaken for three purposes:

First, to determine the relative yielding ability of the various commercial varieties.

Second, to determine the adaptation of the new varieties originated at the experiment station to the different sections and soils of Iowa by comparing them in yield with the locally grown varieties.

Third, to establish local centers for seed increase and distribution of those pedigreed varieties which proved superior in the different parts of the state.

The call for cooperators met with ready response. Many farmers offered to give the time and attention necessary to secure accurate results. The experiment station gave explicit directions regarding the test and supplied enough seed of a pedigreed variety to plant one acre. The station variety was seeded and compared with the home variety being grown on the farm where the test was made. In each test, the two varieties compared were grown side by side on carefully measured one-acre plots. These plots were usually rather long and narrow so that soil conditions as nearly uniform to both plots as possible were secured.

Each acre was cut and threshed separately and the yields, with other detailed information regarding the conditions under which the test was made were reported to the experiment station on specially prepared report blanks.

Many who were supplied with seed and undertook these tests failed to complete the test or to send in accurate reports. No data were included in the comparisons here reported which gave evidence of inaccuracy or un-uniform conditions for the test. Only those reports were included which were complete and accurate and indicated that the varieties were grown under uniform conditions.

We realize that certain variable factors were not eliminated in these tests. All of the varieties were not grown in the same locality nor in equal numbers each year. They were not subjected to the same climatic, soil and seasonal conditions. Two varieties, with markedly different characters, may perform entirely differently under varied growing conditions. Mechanical errors occur in individual tests, which cannot be detected or measured. We believe however, that the number of tests herein reported is sufficiently large to overcome these imperfections and that the averages possess considerable dependability.

In the comparisons between the home and new oat varieties on the different soil areas, not enough tests are included in this report to warrant drawing definite conclusions concerning the value of the individual home varieties. The results, however may indicate to some growers of certain varieties the possibility of more productive varieties. We suggest that those interested in securing new varieties seed only a part of the oat acreage to the new variety before changing to it completely. One should remember, however, that a test for only one year or two years is of little significance due to seasonal variations. One season may favor an early maturing kind and the very next season a late maturing variety. A comparison of varieties to possess any reliability must be extended thru a series of years.

#### TESTS WITH THE IOWA 103 OAT

The variety tests with oats at Ames seemed to indicate that, at least for central Iowa, the Kherson was one of the best of

TABLE I. COMPARATIVE YIELDS OF IOWA 103 AND HOME GROWN VARIETIES  
(1913 to 1918, inclusive)

No. of tests	Variety	Bu. per acre	Difference	Favor of
292	Iowa 103	50.21	3.73	Iowa 103
	Home variety	46.51		
71	Iowa 103	52.64	2.47	Iowa 103
	Kherson	50.17		
34	Iowa 103	52.51	2.94	Iowa 103
	Green Russian	49.57		
28	Iowa 103	48.60	3.25	Iowa 103
	Early Champion	45.35		
31	Iowa 103	46.17	6.45	Iowa 103
	Swedish Select	39.72		
21	Iowa 103	50.66	5.55	Iowa 103
	Silvermine	45.11		
107	Iowa 103	49.33	3.79	Iowa 103
	Miscellaneous	45.54		

TABLE II. COMPARATIVE YIELDS OF IOWA 103 AND HOME GROWN VARIETIES, ARRANGED BY TIERS OF COUNTIES FROM NORTH TO SOUTH (1913 to 1918, inclusive)

Tier of counties	No. of tests	Yield bushels per acre		Difference	Favor of
		Iowa 103	Home variety		
1	28	49.07	47.53	1.54	Iowa 103
2	30	52.64	49.24	3.40	Iowa 103
3	45	51.66	47.39	4.17	Iowa 103
4	41	51.21	47.82	3.39	Iowa 103
5	35	50.37	49.18	1.19	Iowa 103
6	38	51.32	46.72	4.60	Iowa 103
7	20	44.76	39.14	5.62	Iowa 103
8	24	51.70	44.62	7.08	Iowa 103
9	31	46.41	42.91	3.50	Iowa 103

the early varieties. A large number of selections for pure lines have been made from this variety, beginning as early as 1906. A selection made in 1906, known as Number 103, later designated "Iowa 103," gave sufficient promise in the variety tests to justify increasing the seed supply. This was not a particularly high yielding variety, but it was consistent; it had white grain, and seemed to meet the demand for an early white grained oat to replace the yellow Kherson which was discounted on the market.

Sufficient seed of Iowa 103 was available to distribute it for testing in different parts of the state in 1913. Tests the first season indicated that it was a variety well suited to different parts of the state. Cooperative tests with this variety were continued thru the years 1913 to 1918 inclusive and during this six year period, complete data and observations were secured on a total of 292 individual one-acre test plots. In these comparisons, Iowa 103 outyielded the home varieties an average of 3.7 bushels per acre and was superior in 69 per cent of the trials. In 29 percent of the comparisons, the home variety was the heavier yielding, while it was reported as yielding equally well in 2 percent of the trials.

Iowa 103 has outyielded individual varieties in the state from 2.46 bushels per acre in the case of Kherson to 6.44 bushels when compared with Swedish select. The comparative yield with other varieties is given in table I.

One of the objects in getting tests of Iowa 103 in different parts of the state was to determine whether it might be particularly suited to certain sections.

Table II, which gives the comparative yield of Iowa 103 and the home variety by tiers of counties, neither adequately answers this question of adaptation from the standpoint of soil nor climate. However, it does show how Iowa 103 yields in comparison with the home varieties in northern, central and southern Iowa.

Iowa 103 was the highest yielding variety in all sections of

TABLE III. COMPARATIVE YIELDS OF IOWA 103 AND HOME OAT VARIETIES ON THE FIVE PRINCIPAL SOIL AREAS (1913 to 1918, inclusive)

Variety	Wisconsin drift			Iowan drift			Southern Iowa loess			Missouri loess			Mississippi loess		
	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	favor of Diff.	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of
Iowa 103	78	50.41	3.17	60	50.53	3.05	54	46.39	4.56	54	50.85	2.60	46	53.19	5.72
Home variety	78	47.24	Iowa 103	60	47.48	Iowa 103	54	41.83	Iowa 103	54	48.25	Iowa 103	46	47.47	Iowa 103
Iowa 103	20	48.04	2.70	10	63.96	2.95	17	44.94	2.47	16	54.89	2.18	8	61.80	1.85
Kherson	20	45.34	Iowa 103	10	61.01	Iowa 103	17	42.47	Iowa 103	16	52.71	Iowa 103	8	59.95	Iowa 103
Iowa 103	18	52.57	0.78	7	50.81	3.83	4	46.83	5.00	1	85.47	25.47	4	53.88	1.38
Green Russian	18	51.79	Iowa 103	7	46.98	Iowa 103	4	41.83	Iowa 103	1	60.00	Iowa 103	4	52.50	Iowa 103
Iowa 103	6	40.10	0.45	3	44.85	7.95	7	46.13	3.04	4	55.21	4.48	8	55.24	8.33
Early Champion	6	40.55	Early Champion	3	36.90	Iowa 103	7	43.09	Iowa 103	4	59.69	Early Champion	8	46.91	Iowa 103
Iowa 103	7	41.48	4.15	3	57.57	13.09	7	47.51	6.99	9	46.72	5.44	5	43.00	6.70
Swedish Select	7	37.33	Iowa 103	3	44.48	Iowa 103	7	40.52	Iowa 103	9	41.28	Iowa 103	5	36.30	Iowa 103
Iowa 103	8	61.29	11.79	4	39.13	1.12	1	55.00	13.00	4	42.79	2.02	4	47.75	1.42
Silvermine	8	49.50	Iowa 103	4	40.25	Silvermine	1	42.00	Iowa 103	4	40.77	Iowa 103	4	46.83	Iowa 103
Iowa 103	19	52.84	3.09	33	47.65	2.05	18	46.84	5.60	20	48.47	2.03	17	52.29	8.05
Miscellaneous	19	49.75	Iowa 103	33	45.60	Iowa 103	18	41.24	Iowa 103	20	46.44	Iowa 103	17	44.24	Iowa 103



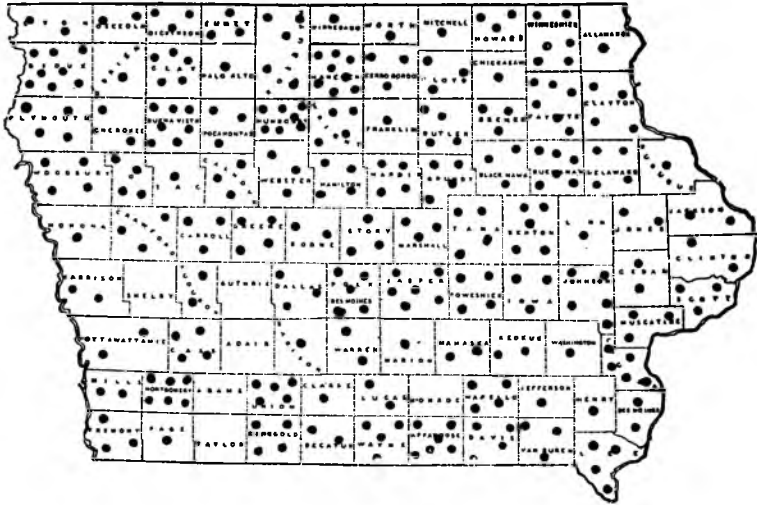


Fig. 1. The location of the 292 tests in which the Iowa 103 was compared with the home variety and from which the data used in this publication were obtained is shown by dots.

the state (table II) by from 1.19 bushels to 7.08 bushels per acre. The tests show it to be slightly better adapted to southern Iowa than to the northern half. This advantage apparently was due to a relatively lower yield from the home varieties of southern Iowa, rather than to an increased yield from Iowa 103 when grown in southern sections.

TABLE IV. COMPARATIVE YIELDS OF IOWA 105 AND HOME GROWN VARIETIES (1914 to 1919 inclusive)

No. of tests	Variety	Bushels per acre	Difference	Favor of
205	Iowa 105	52.63	2.53	Iowa 105
	Home variety	50.10		
45	Iowa 105	56.81	1.49	Iowa 105
	Kherson	55.32		
30	Iowa 105	47.02	1.73	Iowa 105
	Green Russian	45.29		
20	Iowa 105	56.30	5.41	Iowa 105
	Early Champion	50.89		
13	Iowa 105	43.95	3.91	Iowa 105
	Swedish Select	40.04		
15	Iowa 105	56.40	3.82	Iowa 105
	Silvermine	52.58		
82	Iowa 105	52.19	2.24	Iowa 105
	Miscellaneous	49.95		

The adaptation of a particular variety to a certain section of the state may depend somewhat upon the character of the soil. In table III, the results of tests with Iowa 103 and the more extensively grown home varieties are grouped accordingly to the five principal soil areas of Iowa.

In many cases the number of tests was not sufficient to indicate accurately the difference in yield. The number of comparisons with the "home variety" and "miscellaneous" were probably sufficient however, to be indicative. Iowa 103 seemed to be somewhat better suited to the southern Iowa loess and to the Mississippi loess than to the other soil areas of the state. It apparently was better suited to the Iowan drift and the Wisconsin drift areas than to the Missouri loess.

#### TESTS WITH THE IOWA 105 OAT

Because of the need for an oat variety which would stand up until harvest on rich soils and under adverse weather conditions, careful watch was kept on all strains being tried at the experiment station in order to isolate such a strain. Among the new selections made from Kherson, one strain was found which thru several years tests seemed to stand better than the varieties generally grown. This new oat known as Number 105, was compared for yield with other varieties available and it showed up well over a period of several years.

The seed accordingly was increased and was first distributed in 1914 under the name "Iowa 105". The 1914 results warranted further trials and the 205 tests which were conducted during the six-year period, 1914 to 1919, gave an average of 2.53 bushels per acre in favor of the Iowa 105 as compared with all home grown varieties.

This variety is recommended only for the more fertile soils, because the growth of straw is too short when grown on many upland soils. However, the chief merits of this variety are ability to stand on soils where other varieties lodge and good yielding qualities.

TABLE V. COMPARATIVE YIELDS OF IOWA 105 AND HOME VARIETIES, ARRANGED BY TIERS OF COUNTIES FROM NORTH TO SOUTH

(1914 to 1919, inclusive)

Tier of counties	No. of tests	Yield bushels per acre		Difference	Favor of
		Iowa 105	Home variety		
1	36	51.27	49.10	2.17	Iowa 105
2	23	55.28	52.29	2.99	Iowa 105
3	28	52.64	52.87	.23	Home variety
4	29	53.80	51.18	2.62	Iowa 105
5	19	51.31	50.19	1.12	Iowa 105
6	22	51.57	49.51	2.06	Iowa 105
7	16	58.15	48.96	9.19	Iowa 105
8	14	45.89	44.39	1.50	Iowa 105
9	18	58.11	49.36	8.75	Iowa 105

TABLE VI. COMPARATIVE YIELDS OF IOWA 105 AND HOME OAT VARIETIES ON THE FIVE PRINCIPAL SOIL AREAS (1914 to 1918, inclusive)

Variety	Wisconsin Drift			Iowan drift			Southern Iowa loess			Missouri loess			Mississippi loess		
	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of
<b>Iowa 105</b>	60	51.22	0.77	39	49.96	1.26	28	50.21	4.96	45	58.85	4.49	33	51.94	2.49
<b>Home variety</b>	60	50.45	Iowa 105	39	48.70	Iowa 105	28	45.25	Iowa 105	45	54.36	Iowa 105	33	49.45	Iowa 105
<b>Iowa 105</b>	11	50.45	0.65	6	62.63	5.04	8	52.05	2.49	12	63.25	1.54	8	56.32	0.70
<b>Kherson</b>	11	51.10	Kherson	6	57.59	Iowa 105	8	49.56	Iowa 105	12	61.71	Iowa 105	8	55.62	Iowa 105
<b>Iowa 105</b>	20	48.51	2.15	2	50.00	4.00	4	38.16	0.58	2	53.38	5.25	2	40.50	6.00
<b>Green Russian</b>	20	46.36	Iowa 105	2	46.00	Iowa 105	4	37.58	Iowa 105	2	48.13	Iowa 105	2	46.50	Green Russian
<b>Iowa 105</b>	2	44.28	0.72	4	51.46	7.69	5	54.77	9.75	5	67.12	2.47	4	55.52	4.45
<b>Early Champion</b>	2	45.00	Champion	4	43.77	Iowa 105	5	45.02	Iowa 105	5	64.65	Iowa 105	4	51.07	Iowa 105
<b>Iowa 105</b>	2	27.00	1.00	1	50.00	2.00	3	49.54	7.32	5	52.56	9.19	2	28.00	6.50
<b>Swedish Select</b>	2	28.00	Swedish Select	1	52.00	Swedish Select	3	42.22	Iowa 105	5	43.37	Iowa 105	2	34.50	Swedish Select
<b>Iowa 105</b>	7	56.59	2.45	1	17.50	3.50	2	52.50	8.50	3	59.77	5.50	2	74.02	22.22
<b>Silvermine</b>	7	59.04	Silvermine	1	21.00	Silvermine	2	44.00	Iowa 105	3	54.27	Iowa 105	2	51.80	Iowa 105
<b>Iowa 105</b>	18	56.08	1.73	25	47.98	0.56	6	51.54	4.81	18	55.81	5.46	15	50.42	2.62
<b>Miscellaneous</b>	18	54.35	Iowa 105	25	48.54	Misc.	6	46.73	Iowa 105	18	50.35	Iowa 105	15	47.80	Iowa 105



Fig. 2. Map showing the five principal soil areas of Iowa.

Since Iowa 105 was selected and distributed as suitable primarily for very heavy, highly fertile soils, on which oats frequently lodge because of rank growth it might not be expected to be better adapted to one section of the state than another. However, in many respects this variety is very similar to Iowa 103, and in the cooperative tests somewhat greater relative average yields of Iowa 105 were secured in southern than in northern Iowa, as was true for Iowa 103.

The data presented in table VI indicate that the Iowa 105 was particularly well suited to the southern Iowa loess and the Missouri loess, and that it is better suited to the Mississippi loess than to the Wisconsin drift or the Iowan drift. These results were not expected inasmuch as the heavier and more fertile soils, on which lodging is



Fig. 3. Where oats lodge the yield is greatly reduced and it is very difficult to harvest. The Iowa 105 oat is recommended for planting on rich black loam soils where lodging is likely to occur.

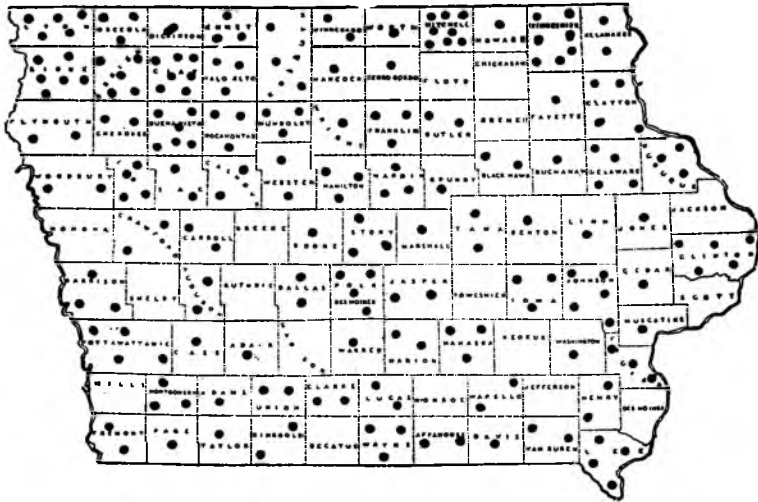


Fig. 4. The location of the 205 tests in which the Iowa 105 oats were compared with the home variety and from which the data used in this publication were obtained is shown by dots.

most prevalent, are found most often in these last two soil areas. The results seem to indicate further that in relative ability to yield, Iowa 105, like 103, is better suited to southern Iowa than to northern Iowa, and that climatic adaptation is more important than soil type.

The chief advantage of Iowa 105 is its ability to stand when other varieties lodge. Lodging occurred on 90 of the test plots where Iowa 105 was tried. Home grown varieties lodged an average of 24.24 percent as compared with 12.41 percent for the Iowa 105 on these 90 test plots during the six-year period. In other words, Iowa 105 lodged only about half as much as the home grown varieties with which it was compared. In 70 percent of the cases where lodging occurred, it was more severe in the plot of the home variety than in the plot of Iowa 105. Iowa 105 lodged more than the home variety in 14.45 percent of the cases, while in 15.55 percent of the cases, lodging was equal.

#### IOWA 105 VERSUS IOWA 103

Fifty-four comparisons were made in 1916 and 1917 between the Iowa 105 and Iowa 103 varieties. The average yield per acre for the 54 tests in the two years was 56.96 bushels for the Iowa 103, and 55.17 bushels for the Iowa 105.

No great amount of lodging occurred in these tests with either variety. In the 18 tests where lodging occurred, 12

percent of the Iowa 103 lodged as compared with 8 percent of the Iowa 105. These figures confirm the results of tests made at the experiment station and in other tests over the state, all of which indicate that Iowa 105 is less subject to lodging than Iowa 103.

#### TESTS WITH IOWAR OAT

The Iowar variety was developed from a single plant of Kherson selected in 1911. The variety was increased and compared in variety tests at the experiment station until 1919, when it was first distributed over the state. Iowar makes a somewhat greater growth of straw and is more leafy than Iowa 105. It grows from three to six inches taller than Iowa 103, and usually matures from three to five days later. The grain is white, medium in size and noticeably awned.

The distribution of Iowar seed was made in much the same manner as with the Iowa 103 and Iowa 105 varieties which preceded it. Three bushels were sent to each grower to be seeded on one acre in comparison with an acre of his home grown variety. The first year Iowar outyielded the home varieties by approximately four bushels per acre. Its high yields in 1919 made it very popular in 1920, when it yielded an average of 8.50 bushels more per acre than the home grown varieties with which it was compared.

Yields obtained from 330 one-acre tests during the five-year period, 1919 to 1923, inclusive, show that Iowar yielded 5.93 bushels more per acre than the home varieties with which it was compared. The seasons 1919 to 1923 were favorable to the mid-season maturing varieties. This was shown by the fact that Iowar made smaller increases in yield over the midseason varieties, like the Silvermine and Green Russian, than over



Fig. 5. An increase field of Iowar oats.

TABLE VII. COMPARATIVE YIELDS OF IOWAR AND HOME GROWN VARIETIES  
(1919 to 1923, inclusive)

No. of tests	Variety	Bushels per acre	Difference	Favor of
330	Iowar	50.26	5.93	Iowar
	Home variety	44.36		
148	Iowar	51.44	7.05	Iowar
	Iowa 103	44.39		
42	Iowar	52.93	6.39	Iowar
	Iowa 105	46.54		
29	Iowar	49.37	5.51	Iowar
	Kherson	43.86		
26	Iowar	49.44	3.62	Iowar
	Green Russian	45.82		
8	Iowar	47.61	0.02	Iowar
	Silvermine	47.59		
77	Iowar	47.68	5.07	Iowar
	Miscellaneous	42.61		

the early varieties, represented by Kherson, Iowa 103 and Iowa 105. It is doubtful whether Iowar would show a similar lead over Iowa 103 thru a longer period of years. The period 1913 to 1919, during which Iowa 103 was tested out over the state, is probably more truly representative of the average Iowa season than the years 1919 to 1923.

In southern Iowa, the Iowar did not show the superiority over Iowa 103 that was noted for the state as a whole. This confirms the belief that Iowa 103 is better adapted to southern Iowa than to any other region, and also that Iowar is less adapted to that region than to any other in the state.

Without reference to soil area, it would seem from table VIII that Iowar did not show the superiority in the southern tiers of counties that it had in the northern portion of the state. The number of tests conducted in the southern one-third of the state was less than in the central and northern portions, but they are deemed sufficient to be fairly indicative.

In central and northern Iowa, Iowar surpasses the home variety in yield from approximately 6 to 7 bushels per acre, while in southern Iowa the difference was only  $1\frac{1}{2}$  to 4.

A study of the comparative yields when grouped according to soil areas, as presented in table IX, is enlightening. The superiority of Iowar on the two soil areas of northern Iowa, Wisconsin drift and Iowan drift, is readily apparent. In the southern part of the state on the southern Iowa loess soil area, Iowa 103 practically equaled Iowar in yield, while in northern Iowa, Iowar outyielded Iowa 103 approximately eight bushels per acre

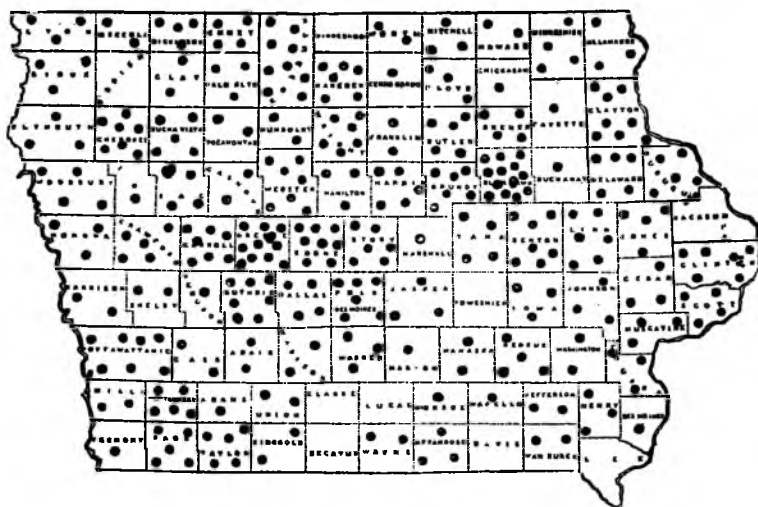


Fig. 6. The location of the 331 tests in which the Iowar was compared with the home variety and from which the data used in this publication were obtained is shown by dots.

Whether the variations in yield were due to the different soil areas or to location in the state is not apparent. The relative yields on the Missouri loess, extending from the northern to the southern boundary on the west side of the state, were encouragingly higher. But whether the yields were as satisfactory on the southern parts of these areas as on the northern parts is not known. Table VIII shows that somewhat lower yields were secured in southern Iowa than in northern Iowa when the results were grouped according to tiers of counties.

The map, fig. 6, indicates that a relatively large number of these tests were made on the Missouri and Mississippi loess areas. It is probable that location, with respect to season and climate, had a greater effect on the relative yield than the particular soil type on which the test was made.

TABLE VIII. COMPARATIVE YIELDS OF IOWAR AND HOME VARIETIES ARRANGED BY TIERS OF COUNTIES FROM NORTH TO SOUTH (1919 to 1923, inclusive)

Tier of counties	No. of tests	Yield bu. per acre		Difference	Favor of
		Iowar	Home variety		
1	35	50.73	44.42	6.36	Iowar
2	20	53.54	47.59	5.96	Iowar
3	45	53.40	46.25	7.15	Iowar
4	56	53.49	47.06	6.43	Iowar
5	68	50.06	43.64	6.42	Iowar
6	40	52.39	46.17	6.72	Iowar
7	28	48.51	39.37	4.14	Iowar
8	13	41.52	39.95	1.57	Iowar
9	20	42.69	39.03	3.66	Iowar



TABLE IX.—COMPARATIVE YIELDS OF IOWAR AND HOME OAT VARIETIES ON THE FIVE PRINCIPAL SOIL AREAS. (1919 to 1923, inclusive)

Variety	Wisconsin drift			Iowan drift			Southern Iowa loess			Missouri loess			Mississippi loess		
	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of
<b>Iowar Home variety</b>	97	50.91	7.50	76	52.72	5.48	38	41.09	3.25	72	51.75	6.63	47	50.08	4.29
	97	43.41	Iowar	76	47.24	Iowar	38	37.84	Iowar	72	45.12	Iowar	47	45.79	Iowar
<b>Iowar Iowa 103</b>	53	50.72	7.87	29	58.48	8.47	18	39.23	1.17	33	53.14	8.12	15	51.31	6.13
	53	42.85	Iowar	29	50.01	Iowar	18	38.06	Iowar	33	45.02	Iowar	15	45.18	Iowar
<b>Iowar Iowa 105</b>	13	55.82	13.80	6	45.10	0.44	4	40.06	6.38	10	51.46	2.60	9	59.13	3.35
	13	42.02	Iowar	6	45.54	Iowa 105	4	33.68	Iowar	10	48.86	Iowar	9	55.78	Iowar
<b>Iowar Kherson</b>	5	55.28	10.61	9	49.07	3.74	4	39.80	5.95	9	51.72	4.41	2	44.50	4.81
	5	44.67	Iowar	9	45.33	Iowar	4	33.85	Iowar	9	47.31	Iowar	2	39.69	Iowar
<b>Iowar Green Russian</b>	12	48.33	1.21	3	59.50	8.83	2	43.50	10.00	7	48.86	4.00	2	49.00	2.50
	12	47.12	Iowar	3	50.67	Iowar	2	33.50	Iowar	7	44.86	Iowar	2	46.50	Iowar
<b>Iowar Silvermine</b>	2	36.00	3.15	3	35.25	1.25	0	.....	.....	2	75.82	5.12	1	51.50	0.0
	2	39.15	Silvermine	3	36.50	Silvermine	0	.....	.....	2	70.70	Iowar	1	51.50	.....
<b>Iowar Early Champion</b>	2	52.50	7.00	4	47.74	2.57	1	64.50	14.60	0	.....	.....	0	.....	.....
	2	45.50	Iowar	4	45.17	Iowar	1	49.90	Iowar	0	.....	.....	0	.....	.....
<b>Iowar Misc.</b>	10	49.11	5.57	22	51.05	4.84	9	42.69	2.03	11	45.36	9.63	18	45.20	3.62
	10	43.54	Iowar	22	46.21	Iowar	9	40.66	Iowar	11	35.73	Iowar	18	41.58	Iowar

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## TESTS WITH THE IOGREN OAT

A superior yielding midseason variety of oats has long been in demand in north central Iowa. This demand was met by the introduction of the Iogren in 1922. This new oat is a yellow grained variety, selected from Green Russian at the experiment station in 1911. In the variety tests at Ames, it has been one of the very best yielding of all the varieties developed. In the 111 tests where it was compared with local varieties in different parts of the state, it outyielded them an average of 3.64 bushels per acre. In considering the superiority of Iogren over the varieties previously distributed, Iowa 103, Iowa 105, and Iowar, it must be borne in mind that over half of the tests made with Iogren were in comparison with these new varieties, which had already shown their superiority over the home varieties, and had largely displaced them.

Iogren has not been tested over the state a sufficiently long period of years to determine definitely its adaptation. However, the results obtained at the experiment station and those secured during the two years in which it has been compared in different parts of the state, indicate that it will prove a popular variety in some sections at least. Where a midseason oat is desired, which is fairly well adapted to the heavy black corn soils and which will give a large production of both straw and grain, Iogren should be found useful.

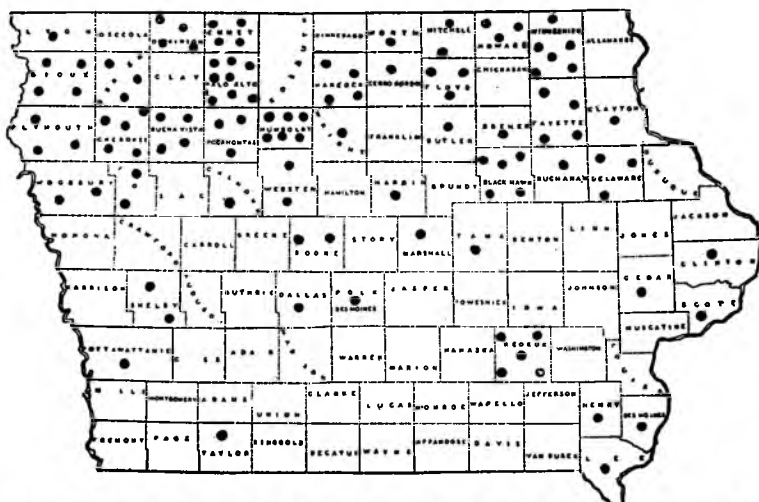


Fig. 7. The location of the 111 tests in which the Iogren was compared with the home variety and from which the data used in this publication were obtained is indicated.

In table X results of 24 tests are reported in which Iogren outyielded Green Russian, its parent variety, by 4.62 bushels per acre; in 35 tests, Green Russian produced 1.17 bushels more per acre than Iowar. In 23 tests with unnamed varieties, or varieties little grown, Iogren showed an advantage of 6.16 bushels per acre.



Fig. 8. Iogren is a superior midseason variety where its type is adapted.

So few tests were made with Iogren below the fourth tier of counties from the north that no reliance can be placed on the averages secured for the individual tiers of counties in southern Iowa. However, considering the average result for the 22 tests made in the southern five tiers of counties and comparing these with the tests made in the four northern tiers, a material difference is noted. The difference in yield indicates that Iogren is better adapted to northern than to southern Iowa. There are limited sections in southeastern Iowa, however, where Green Russian has given good results; it is altogether probable that in these regions, Iogren will be found superior.

### SURVEY OF OAT VARIETIES GROWN IN IOWA

The extent to which the introduction of the new oat varieties, originated at the experiment station, have influenced

TABLE X. COMPARATIVE YIELDS OF IOGREN AND HOME VARIETIES (1922 and 1923)

No. of tests	Variety	Bu. per acre	Difference	Favor of
111	Iogren	49.30	3.64	Iogren
	Home variety	45.66		
35	Iogren	49.80	1.71	Iogren
	Iowar	48.09		
13	Iogren	51.62	3.61	Iogren
	Iowa 103	48.01		
9	Iogren	48.80	2.73	Iogren
	Iowa 105	44.07		
7	Iogren	47.86	2.85	Iogren
	Kherson	45.01		
24	Iogren	49.90	4.62	Iogren
	Green Russian	45.28		
23	Iogren	48.02	6.16	Iogren
	Miscellaneous	41.86		

TABLE XI. COMPARATIVE YIELDS OF IOGREN AND HOME VARIETIES,  
ARRANGED BY TIERS OF COUNTIES FROM NORTH TO SOUTH  
(1922 and 1923)

Tier of counties	No. of tests	Yield in bushels per acre		Difference	Favor of
		Iogren	Home variety		
1	21	50.60	46.89	3.71	Iogren
2	23	50.85	46.17	4.68	Iogren
3	28	45.56	42.51	3.05	Iogren
4	17	53.81	48.36	5.45	Iogren
5	4	54.25	48.85	5.40	Iogren
6	8	49.25	49.24	0.01	Iogren
7	6	42.66	38.16	4.50	Iogren
8	2	45.50	54.00	8.50	Home variety
9	2	46.00	41.50	4.50	Iogren

oat production in Iowa can best be determined by comparing oat production figures for 1910 (before the new varieties were distributed) with those for 1924.

#### ACREAGE OF VARIETIES IN 1910

In order to ascertain the varieties of oats being grown in Iowa in 1910 and the distribution and relative importance of each, 500 Iowa farmers were asked that year to inform the station of the varieties most generally grown in their respective localities. Thirty-four different varieties were reported as being grown to some extent at that time. Those most commonly grown were Kherson, Early Champion, and Green Russian, while Silvermine and White Russian were grown extensively in a few localities. In 1910, the Green Russian and Early Champion were the only varieties found in practically all parts of the state. At that time, Kherson was just coming into its own and during the years immediately following 1910, the acreage of this variety increased markedly. In the variety tests at the experiment station, Kherson, Green Russian, and Silvermine were among the very best, all three giving nearly the same average yields thru a series of years, but Early Champion was mediocre and White Russian was quite inferior.

The relative importance of the varieties in the different districts of the state in 1910, expressed in percent of total oat acreage, is shown in table XIII. The districts are numbered in order from west to east—1, 2, 3 in northern; 4, 5, 6 in north central; 7, 8, 9 in south central, and 10, 11, 12 in southern Iwa. (See map fig. 9).

Taking the state as a whole, Kherson oats constituted 8.36 percent of the total grown; Early Champion, 26.27 percent; Green Russian, 28.72 percent; White Russian, 6.0 percent, and Silvermine, 4.0 percent. The remaining 26.65 percent consisted of miscellaneous varieties, mixed seed and varieties of which the name was unknown.

The average acreage for the state did not accurately indi-

TABLE XII. COMPARATIVE YIELDS OF IOGREN AND HOME OAT VARIETIES ON THE FIVE PRINCIPAL SOIL AREAS (1922 and 1923)

Variety	Wisconsin drift			Iowan drift			Southern Iowa loess			Missouri loess			Mississippi loess		
	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of	No. tests	Yield	Diff. favor of
Iogren	43	48.59	4.16	27	48.32	4.29	8	43.00	3.00	21	53.63	3.66	12	50.71	0.71
Home variety	43	44.43	Iogren	27	44.03	Iogren	8	40.00	Iogren	21	49.97	Iogren	12	50.00	Iogren
Iogren	13	48.22	2.54	7	54.03	6.63	2	41.00	2.00	9	50.85	1.55	4	49.62	2.38
Iowar	13	45.68	Iogren	7	47.40	Iogren	2	39.00	Iogren	9	52.40	Iowar	4	52.00	Iowar
Iogren	5	51.00	7.66	1	49.00	4.00	2	42.00	1.50	2	67.00	11.30	3	49.66	7.01
Iowa 103	5	43.34	Iogren	1	45.00	Iogren	2	40.50	Iogren	2	55.70	Iogren	3	56.67	Iowa 103
Iogren	3	57.73	0.30	3	40.67	5.57	1	40.00	9.00	1	46.00	16.00	1	40.00	0.00
Iowa 105	3	57.43	Iogren	3	35.10	Iogren	1	49.00	Iowa 105	1	30.00	Iogren	1	40.00	.....
Iogren	3	43.67	5.00	3	53.34	0.31	1	44.00	4.00	0	.....	.....	0	.....	.....
Kherson	3	38.67	Iogren	3	53.03	Iogren	1	40.00	Iogren	0	.....	.....	0	.....	.....
Iogren	13	49.37	5.06	4	42.47	3.02	1	46.00	16.00	4	52.75	0.22	2	64.50	9.00
Green Russian	13	44.31	Iogren	4	39.45	Iogren	1	30.00	Iogren	4	52.97	Gr. Russian	2	55.50	Iogren
Iogren	6	43.58	4.35	9	47.28	3.97	1	48.60	6.00	5	55.50	10.60	2	46.00	10.50
Miscellaneous	6	39.23	Iogren	9	43.31	Iogren	1	42.00	Iogren	5	44.90	Iogren	2	35.50	Iogren

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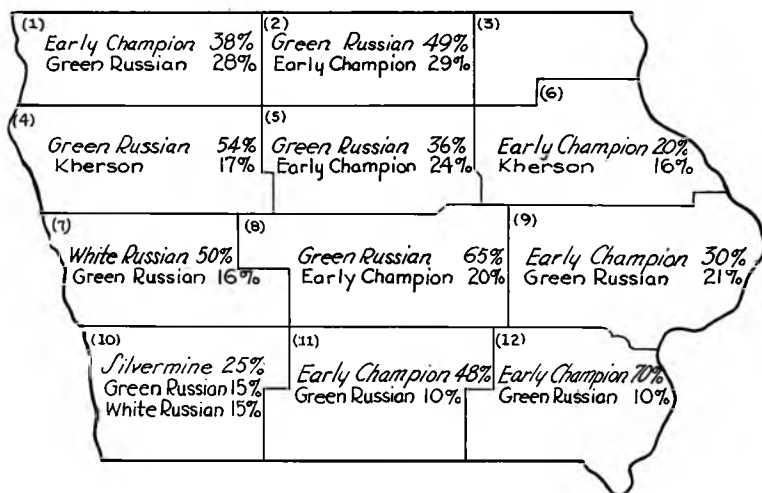


Fig. 9. The leading varieties and the percent of the total oat acreage devoted to each in the different districts of the state as estimated in 1910.

cate the popularity of these varieties in the different sections. For example, White Russian constituted only 6 percent of the total acreage, but it comprised 50 percent of the acreage in west central Iowa, and 15 percent in southwestern Iowa; Silvermine constituted only 4 percent of the state total, but 18 percent in east central Iowa and 25 percent in southwestern Iowa; Green Russian comprised 28.72 percent of the total state acreage, but at least 50 percent in certain localities of central, northern and northwestern Iowa. Early Champion predominated in the east central and southeastern portions of the state. In the southeast corner district, as much as 70 percent of the acreage was reported to be planted to Early Champion and nearly 50 percent of the acreage in south central Iowa.

Considering the state as a whole, approximately 41 percent of the oats grown were early, 38 percent medium, and 21 percent late in maturity. In southern and southeastern Iowa, early varieties predominated, while medium to early varieties were more common in northern, central and eastern Iowa. In western and southwestern Iowa, late to medium late varieties were grown more extensively than elsewhere.

We believe that in general the varieties grown most extensively in the various sections were grown because they had been found superior to other varieties. In some localities, it is probable that certain varieties had become prominent because of favorable publicity which they had received.

TABLE XIII. ESTIMATED PERCENT OF THE TOTAL OAT ACREAGE DEVOTED TO DIFFERENT VARIETIES IN VARIOUS DISTRICTS OF IOWA, 1910

District	Kherson	Early Champion	Green Russian	White Russian	Silvermine	Other varieties
1	19	38	28	..	..	15
2	10	29	49	..	..	12
3*	..	..	..	..	..	..
4	17	10	54	..	..	19
5	20	24	36	..	..	20
6	16	20	12	..	..	52
7	..	..	16	50	..	34
8	..	20	65	..	..	15
9	10	30	21	..	18	21
10	..	..	15	15	25	45
11	..	48	10	..	..	42
12	..	70	10	..	..	20

\*Data for district 3, where by far the smallest acreage of oats is grown, was not available.

#### ACREAGE OF VARIETIES IN 1924

Iowa farmers were asked in 1924 to give information similar to that secured in 1910. A total of 449 replies were received. The estimates for 1924 are grouped by districts in table XIV and are comparable to the data in table XIII for 1910.

A greater familiarity with and appreciation of variety differences is apparent from the 1924 replies as compared with those of 1910. Ten different varieties were reported to be grown to some extent in practically all parts of the state. However, the only five varieties which were grown to such an extent as to be significant, were Green Russian, Kherson, Iowa 103, Iowa 105 and Iowar.

The Kherson is an important variety, particularly in the western part of the state where it constitutes from 10 to 20 percent of the acreage. A small acreage of Early Champion is grown thruout the state, tho in no section is it now one of the more important varieties. The Iowa 103, first distributed from the station in 1913, apparently is grown more extensively than any other variety. In each of the six districts constituting the southern half of the state, this variety comprises from 30 to 40 percent of the total acreage. It is also one of the most important varieties in north central and northwestern Iowa.

Iowar, first distributed from the station in 1919, is the second most important variety in the state as measured by acreage in 1924. It is an important variety all thru central and northern Iowa, with noticeably smaller acreages in the southern part of the state.

Iowa 105 shows a fairly uniform distribution. As a special purpose oat, recommended for planting on low fertile soils where other varieties are inclined to lodge, we might expect



Fig. 10. Field of pure seed waiting the thresher.

to find a greater acreage of Iowa 105 in the central and north central part of the state, but this is not the case.

Green Russian is the most important variety grown in the northwestern fourth of the state. It is also an important variety in central Iowa, as well as in limited areas in the southeastern corner of the state.

Silvermine can hardly be considered an important variety except in a very limited area in the northeast corner, tho it is found to some extent extending down the east side of the state. Like Silvermine, Swedish Select is now found in appreciable quantities only in the northeast corner. These two varieties certainly are not the best ones for those localities. Variety data for this section of the state for 1910 are not available. The largest acreage of mixed oats and oats of unknown variety names, is also found here.

TABLE XIV. ESTIMATED PERCENT OF THE TOTAL OAT ACREAGE DEVOTED TO VARIOUS VARIETIES IN DIFFERENT PARTS OF THE STATE IN 1924

District	Kherson	Early Champion	Iowa 103	Iowa 105	Iowa 106	Jogren	Green Russian	White Russian	Swedish Select	Silvermine	Mis. and unnamed
1	6.8	3.7	15.5	11.5	15.0	.7	29.2	.3	.5	2.4	14.4
2	16.9	3.9	7.7	10.5	12.8	.5	8.0	.3	.8	1.5	37.2
3	8.9	3.2	3.9	5.9	6.0	1.4	4.2	1.5	10.8	10.0	44.2
4	17.8	5.0	17.9	7.5	15.9	1.9	24.8	.2	1.0	1.6	6.4
5	8.4	3.8	23.6	11.2	18.0	.8	10.0	1.5	2.1	1.1	19.5
6	9.0	4.3	8.7	6.1	21.6	.8	.5	9.2	4.0	3.0	32.8
7	10.0	1.8	29.5	10.6	12.1	.3	15.1	.9	2.9	1.9	15.0
8	4.1	1.6	81.4	11.0	20.9	.8	17.7	.1	.3	4.8	7.3
9	8.2	2.9	80.6	8.1	17.8	.2	4.2	.4	8.8	7.0	17.8
10	21.8	1.5	36.9	8.9	9.9	.0	6.2	.4	1.3	1.1	12.5
11	12.5	8.2	29.4	6.2	7.1	.7	10.6	8.4	.7	6.0	15.2
12	9.1	5.4	42.9	7.1	5.0	1.5	10.0	.7	.2	2.8	15.8
<b>State</b>	<b>11.1</b>	<b>8.8</b>	<b>28.2</b>	<b>8.7</b>	<b>18.5</b>	<b>0.8</b>	<b>11.7</b>	<b>1.6</b>	<b>2.4</b>	<b>8.6</b>	<b>19.8</b>



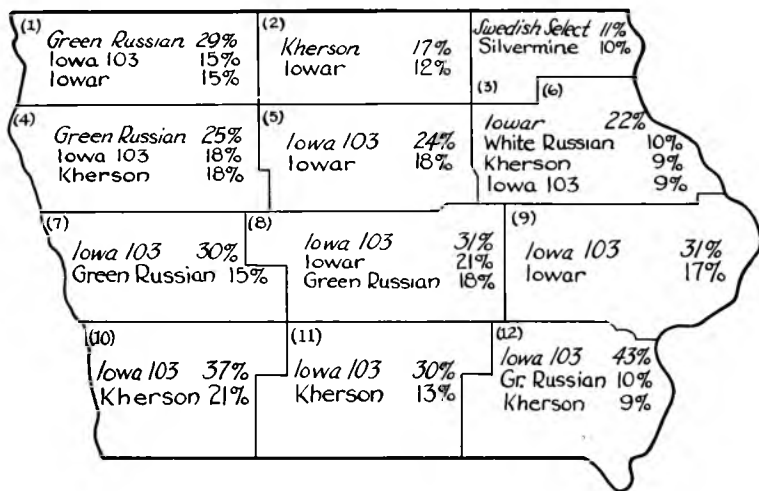


Fig. 11. The leading varieties and the percent of the total oat acreage devoted to each in the different districts of the state as estimated by 449 farmers for 1924.

#### NEARLY HALF OF IOWA OAT ACREAGE IN 1924 PLANTED WITH STATION VARIETIES

Over 46 percent of Iowa's five million acres of oats in 1924 were planted with varieties originated at the experiment station. These varieties, in a large number of tests throuth the state, have shown their ability to outyield the commercial sorts previously grown. Iowa 103 constituted 23 percent of the total oat acreage. Iowar ranked second with 13 percent; Iowa 105 constituted over 8 percent. Iogren, first distributed in 1922, was grown only to a limited extent. Of the commercial varieties listed as important in 1910, only Kherson has made a gain. In 1910, approximately 8 percent of the acreage was of the Kherson variety, while in 1924 its acreage had increased until it constituted approximately 11 percent of the oat acreage of the state.

The greatest decrease in acreage occurred with Early Champion. In 1910 it was the second most important variety in the state, practically equalling Green Russian, but in 1924 it was one of the least important, constituting less than four percent of the total acreage. Green Russian, which was the most important variety in 1910, showed an acreage reduction of considerably over 50 percent. Noting these changes, it is perhaps well to again mention that in the variety tests at the station, Early Champion was shown to be one of the poor yielding varieties while Kherson, Green Russian and Silver-

TABLE XV. PERCENT OAT ACREAGE OF IOWA DEVOTED TO CERTAIN VARIETIES IN 1910 AND 1924; ALL PERCENTAGES BASED ON THE TOTAL OAT ACREAGE OF THE STATE

Variety	Year		Percent increase	Percent decrease
	1910	1924		
Kherson .....	8.36	11.1	2.74	.....
Early Champion .....	26.27	3.8	.....	22.47
Iowa 103 .....	.....	23.2	23.2	.....
Iowa 105 .....	.....	8.7	8.7	.....
Iowar .....	.....	13.5	13.5	.....
Iogren .....	.....	.8	.8	.....
Green Russian .....	28.72	11.7	.....	17.02
White Russian .....	6.00	1.6	.....	4.4
Silvermine .....	4.00	3.6	.....	.4
Other varieties .....	26.65	22.2	.....	4.45

mine were among the best. In view of this fact, the markedly greater decrease in acreage of Early Champion is significant. The percent of the total oat acreage in the state devoted to different varieties in 1910 and 1924, with the increase or decrease for each, is shown in table XV.

#### ACRES OF STATION VARIETIES GROWN IN IOWA IN 1924

Acreege of Iowa oats in 1924 (Estimate Nov. 1) .....	5,774,000
Acreege of Iowa 103 for state in 1924, (23.2 percent of total for state) .....	1,339,568
Acreege of Iowar for state in 1924, (13.5 percent of total for state) .....	779,490
Acreege of Iowa 105 for state in 1924, (8.7 percent of total for state) .....	502,338
Acreege of Iogren for state in 1924, (0.8 percent of total for state) .....	46,192
<b>Total acreage of station varieties grown .....</b>	<b>2,667,588</b>

#### BUSHEL'S PRODUCTION GAINED BY THE GROWING OF STATION VARIETIES

Iowa 103 gained for the state .....	4,996,589 bushels (1,339,568 acres x 3.73 bu.)
Iowar gained for the state .....	4,622,376 bushels (779,490 acres x 5.93 bu.)
Iowa 105 gained for the state .....	1,270,915 bushels (502,338 acres x 2.53 bu.)
Iogren gained for the state .....	168,139 bushels (46,192 acres x 3.64 bu.)
<b>Total production gained from the growing of station varieties .....</b>	<b>11,058,019 bushels</b>

#### INCREASED FINANCIAL RETURNS TO THE STATE SECURED FROM THE PRODUCTION OF PEDIGREED VARIETIES BY THE STATION AS BASED ON THE PRODUCTION OF 1924.

11,058,019 bushels @ 40 cents per bushel equals \$4,423,208.

## ACREAGE DISTRIBUTION OF STATION VARIETIES IN ACCORD WITH ADAPTATION SUGGESTED BY COOPERATIVE FARMER'S TESTS

Yield trials made with Iowa 103 in comparison with home varieties by 292 farmers, representing all parts of the state, indicated that this variety outyielded the local varieties in southern Iowa to a greater extent than those in the northern part of the state. It will be noted from the map fig. 11, that the increase in acreage of Iowa 103 in the state has been in accord with this. The map shows that Iowa 103 is now the most important variety in each of the six districts constituting the southern half of the state. A grouping of the variety tests according to the soil areas indicated that this variety was not so well suited to the Missouri loess as to other soil areas, but when the yields from southern Iowa were compared with those from northern Iowa it appears that climatic adaptation was probably more important than soil. This seems to be borne out in the fact that Iowa 103 is one of the important varieties in all districts on the Missouri loess.

Iowar, the second most important variety in the state, was not found to be an important variety in any southern district, but it was one of the most important varieties reported in four of the six districts in northern Iowa and in two of the three districts in central Iowa. The variety tests indicated greater superiority of Iowar in northern than in southern Iowa. As with Iowa 103, the distribution of Iowar according to soil type apparently is not significant.

Iowa 105, the special purpose oat, showed indication of running true to expectations; the larger acreages were reported in the northern and western districts of the state where the most heavy black soil is found. The greater relative yields were found in southern Iowa, but the important character for which this oat was recommended was not so much its ability to yield as its ability to stand on rich heavy soils.

On the whole, we believe that the extent to which these varieties have come into use in different parts of the state is in agreement with the values indicated by the variety comparisons; that the method used for distributing and testing these varieties in all parts of the state thru the cooperation of individual farmers is logical and sound.

### PURE SEED SOURCES ARE MAINTAINED

The new varieties of grain originated at the experiment station are pure lines, each tracing back to a single plant. They will continue year after year to reproduce themselves with ab-

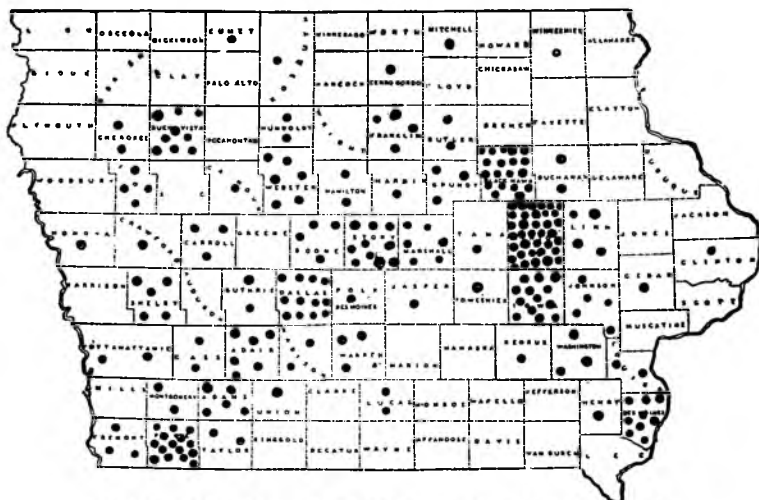


Fig. 12. The location of the 232 pure seed centers in the state.

solute uniformity. Their worth has been determined only after years of care, cultivation, propagation and comparison. It seems that after these efforts have been put forth, and new and really more profitable strains or varieties have been produced, that an attempt should be made to maintain their identity and purity.

#### CERTIFIED AND REGISTERED SEED

In order that sources of pure seed of known varieties may be located at all times in different parts of the state, the board of directors of the Iowa Agricultural Experiment Association,\* in 1920, authorized the certification and registration of seed in the name of the association, the requirements are listed in the following paragraphs.

*Certified seed* must meet the following requirements as determined by field and bin inspection:

1. The grain must contain not to exceed one-fourth of one percent of other varieties of the same species, and must be absolutely free from foreign grains.
2. Must be absolutely free from the noxious weeds named by the

\*The Iowa Agricultural Experiment Association is an organization of farmers who conduct experiments with field crops on their own farms in cooperation with the Farm Crops Section of the Iowa Agricultural Experiment Station. This association was organized in 1912. New seed is distributed from the experiment station thru this association. Seed lists, showing sources of certified seed and lists of seed which can be obtained from the experiment station are available. The lists are available to any Iowa farmers. Joe L. Robinson, Ames, is secretary of the association.



Fig. 13. Certified seed is first inspected in the field.

state seed law, which are: quack grass; Canadian thistle; common wild mustard or charlock; Indian mustard; buckhorn; perennial sow thistle; sour, curled or smooth dock; wild oats; corn cockle; dodder; sheep sorrel and wild carrot.

3. Must be free from morning glory seed in the bin inspection, containing not to exceed a total of five weed seeds per pound of grain.

4. In the case of rye, it must not be grown closer than 80 rods to another rye field.

5. Seed must germinate not less than 95 percent.

6. Seed shall not be lighter than two pounds below standard weight per bushel.

7. Any Iowa 103 or Iowa 105 will be certified if it meets the above requirements. All other varieties must have come directly from the experiment station or from registered or certified seed. In case a field does not meet the requirements, the owner may apply to the seed certification and registration committee for permission to attempt to produce certified seed the following season without changing his seed. This privilege cannot be extended for more than one season, and then only where conditions warrant.

8. Smut will not prevent seed being certified, but the amount must be shown on the label used on the bag.

*Registered Seed* must meet the following standards as determined by field and bin inspection:

1. The grain must not contain to exceed one-fourth of one percent of other varieties of the same species, and must be absolutely free from foreign grains.

2. None of the noxious weeds shall be present in the field, which are designated by the state seed law as: quack grass; Canadian

thistle; common wild mustard or charlock; Indian mustard; buck-horn; perennial sow thistle; sour, curled or smooth dock; wild oats; corn cockle; dodder; sheep sorrel and wild carrot.

3. Grain must be absolutely free of all weed seed at the time of bin inspection.

4. In the case of rye, it must not be grown closer than 80 rods to another rye field.

5. Seed shall germinate not less than 98 percent.

6. Seed shall not be lighter than standard weight per bushel.

7. After 1922, grain shall have come directly from registered seed or the experiment station.

8. This seed shall be sold only in sealed bags, which have been sealed by an agent of the Iowa Agricultural Experiment Association.

During the five-year period, 1920 to 1924, inclusive, over 1,000 fields were inspected for certification or registration. Of this number, only 232, or 21 percent, were found of sufficiently high quality to be accepted as certified or registered. This acreage provided about 135,000 bushels of certified or registered small grain seed. This has served as a source of pure seed supply for a large portion of the state, as will be noted by the location of the different fields on the map fig. 12. Each of these 232 fields of certified grain was virtually a pure seed center for its community. The importance of maintaining sources from which pure seed is available can hardly be over-estimated, for without it the work of producing and testing these varieties would be lost.

The inspection and certification of seed grain was begun in 1920, immediately following the distribution of Iowar. A plentiful supply of pure, genuine Iowar is available. Iowa 103 was distributed in 1913 and Iowa 105 in 1914, eight and seven years before the certification work was begun. It is very difficult to find absolutely pure seed of these varieties in spite of the large acreage grown in the state. This is due largely to the lack of precaution during harvesting, threshing and storing. Possibly two fields of different varieties of oats, or a field of barley and a field of oats, have often been threshed in succession without taking proper precautions to prevent mixing.

Too often instances such as the following have occurred. A grower secures a start in one of the new oat varieties by conducting a cooperative experiment with the association. After seeing the new variety grow, and perhaps after helping with the threshing, his neighbors become convinced that the new variety is superior for the locality and secure seed from the first grower only to find later that it is badly mixed with another variety, or with some other small grain. Unless special precautions are taken, more and more mixing occurs each

year when the grain is threshed due to a carry-over of grain in the separator. Those who secure seed of an improved variety should use all means practically possible to prevent mixing.

