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VARIETIES OF CORN IN KANSAS



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SUMMARY

The soil and climate of Kansas vary so much that no one variety of corn is well adapted to all parts of the state. During the nine-year period, 1911 to 1919 inclusive, between 150 and 200 variety tests of corn were conducted annually throughout the state in co-operation with farmers to determine the best varieties for each locality. The outstanding principles of corn production shown by the results of these variety tests may be summarized as follows:

1. Where moisture or plant food is the limiting factor, the variety of corn should be of such size that it will utilize the available supply of these materials to the best advantage.

2. Because of seasonal variations, no one variety will consistently prove superior to all other varieties in a given locality. In seasons more favorable than normal, large, late-maturing varieties yield best, while in years during which drouth prevails during the latter part of the growing season, early varieties may give best results.

3. Thoroughly acclimated varieties give best results. Home-grown seed of an adapted variety will outyield introduced seed, other things being equal.

4. When it is necessary to import seed corn, that which is grown in an environment similar to the one in which it will be grown should be secured. It is better to introduce seed corn from a relatively unfavorable environment to a more favorable one, than from a favorable to an unfavorable environment. Medium-sized varieties adapted to growing on creek and river bottom land in west central Kansas often give excellent results on uplands in eastern Kansas, but eastern Kansas varieties introduced into west central Kansas rarely yield as well as the local varieties.

5. Varieties of corn developed under adverse climatic conditions in western Kansas are usually more vigorous and hardy than varieties similar in size developed in the cornbelt states. For this reason early varieties of corn from western Kansas will, when grown in eastern Kansas, outyield equally early varieties from the northern states.

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VARIETIES OF CORN IN KANSAS

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CORN GROWING IN KANSAS

Because of the great variation in soil, rainfall, and climate no one variety of corn is well adapted to growing in all parts of Kansas. In certain parts of eastern Kansas the average annual precipitation is as much as 40 inches, while in the western part of the state it is less than 20 inches. The elevation of western Kansas is from 1,500 to 2,500 feet greater than that of the eastern part of the state. The growing season in southeastern Kansas is from six weeks to two

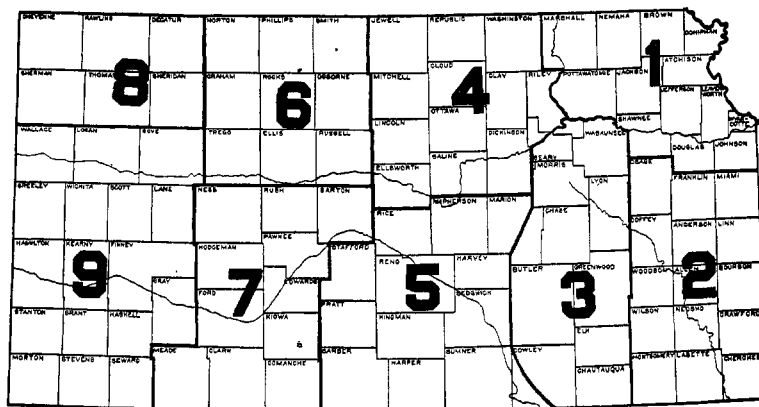


Fig. 1.—Corn-growing sections of Kansas

months longer than that in the northwestern part of the state. The soil varies from deep, highly productive loams to thin shale soils which cannot be cultivated profitably. For these reasons varieties of corn grown in one locality or on a certain kind of soil are likely to be poorly adapted to another locality or to a different soil.

In a general way Kansas may be divided into nine corn-growing sections (fig. 1) based on differences in soil and climate. The division lines have been arbitrarily located. The characteristics upon which the divisions are based merge so gradually into one another that it is impossible to locate exact dividing lines.

The soils of northeastern Kansas (sec. 1, fig. 1) are derived largely from glacial drift and usually are exceptionally well adapted

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to corn. As a rule they are deep friable silty clay loams, containing in their virgin state an abundant supply of organic matter. The climate of this section is more favorable for corn than that of any other part of the state.

In southeastern Kansas (sec. 2, fig. 1) the soils are residual in character and are derived largely from sandstone and shale. They are often deficient in organic matter and relatively low in fertility. Practically all the soils of this section are silt loams, clay loams, and clays underlaid by retentive subsoils of heavy clay.

The "flint hill" section of Kansas (sec. 3, fig. 1) is largely pasture land. Nearly all the upland in this section is poorly adapted to corn, because of the shallow soil. The creek and river bottoms grow splendid corn, and some of the more level and deeper soils on the upland in the northern part of this section produce corn fairly well.

The climate largely governs the corn crop in the remainder of the state. For this reason the various divisions are based entirely on climatic factors. The precipitation gradually decreases from east to west, and as the rainfall diminishes the conditions for corn become more adverse. Hot winds, which are very detrimental to corn during the pollinating period, often prevail. The soil as a rule is very uniform, although some distinction must be made between bottom land and upland in choosing varieties.

COOPERATIVE VARIETY TESTS OF CORN

Since 1911 the Agronomy Department of the Kansas State Agricultural College has conducted variety tests of corn in cooperation with farmers throughout the state to determine the varieties best adapted for each locality. Each test included from six to ten varieties. The seed was furnished by the Agronomy Department. The seed for each variety in any given test was secured from the same source. The list of varieties, however, varied with the different corn-growing sections. (Fig. 1.)

The varieties were grown side by side and given the same cultural treatment. Each variety was husked separately and the yields determined. From 150 to 200 variety tests were conducted each season. Results for only those tests which were satisfactorily conducted and were reasonably reliable from an experimental standpoint were used in compiling the data presented in this bulletin.

RELATION OF CERTAIN FACTORS TO YIELD OF VARIETIES OF CORN

When these experiments were started it was recognized that certain factors, such as the length of the growing season, annual precipitation, and fertility of the soil, had a direct relation to the kind of corn that should be grown in any given locality. The importance of these factors, however, was not fully appreciated and it was found advisable to make changes in the work to adapt it to the requirements of the various sections of the state, and to different soils within a section. Because of the importance of these factors in choosing varieties of corn it seems advisable to discuss them preliminary to presenting the results of the work, although most of the data on which these principles were formulated were secured from the results of the cooperative tests.

RELATION OF THE LENGTH OF THE SEASON TO THE GROWING PERIOD

For best results corn should have a growing period long enough to utilize the entire season favorable for its development. A variety of corn that requires 130 days in which to mature will produce a larger yield than one that ripens in 100 days, providing conditions are equally favorable throughout both periods. This principle is illustrated by the yields of two varieties, Kansas Sunflower and Pride of the North, which were grown on the Agronomy Farm of the Kansas State Agricultural College for seven consecutive years, 1903 to 1909. Kansas Sunflower is well suited to eastern Kansas conditions, while Pride of the North is an early variety which will mature long before the end of the growing season. They produced average yields of 58 and 50.7 bushels per acre, respectively. The longer-growing variety outyielded the other by 7.3 bushels.

EFFECT OF ANNUAL PRECIPITATION ON RELATIVE YIELDS OF LARGE, MEDIUM, AND SMALL VARIETIES

In central and western Kansas the annual precipitation rather than the length of the growing season is usually the limiting factor in the growth of corn. For this reason the varieties that produce the maximum average yields are considerably smaller than those grown in the same latitude in eastern Kansas where the rainfall is greater.

Three varieties of corn—Kansas Sunflower, Pride of Saline, and Freed White Dent—were grown at the Fort Hays Branch Experiment Station in Ellis County in 1909, 1910, and 1912, and at the Colby, Garden City, and Tribune Branch Experiment Stations and

in a number of cooperative tests with farmers in eastern Kansas in 1914, 1915, 1916, and 1917. The results are given in Table I.

TABLE I.—EFFECT OF ANNUAL PRECIPITATION ON THE YIELDS OF LARGE, MEDIUM, AND SMALL VARIETIES

VARIETY	Number of days to mature	Average yield in bushels per acre		
		Eastern Kansas (a)	West central Kansas (b)	Western Kansas (c)
Kansas Sunflower.....	125	44.3	20.1	10.1
Pride of Saline.....	115	42.1	21.8	13.3
Freed White Dent.....	105	38.8	27.2	18.5

(a) Average of 17 tests conducted in Riley, Butler, and Allen Counties.

(b) Average of 8 tests conducted at the Fort Hays Branch Experiment Station.

(c) Average of 10 tests conducted at the Colby, Garden City, and Tribune stations.

It will be observed that the larger and later-maturing varieties produced best in the eastern part of the state, while the earliest and smallest variety (Freed White Dent) outyielded the others in west central and in western Kansas. The difference in yield was due to the relative size of the three varieties. In eastern Kansas the Freed White Dent did not grow sufficiently long or large to take advantage of the moisture available. In the western part of the state where the moisture is limited and not sufficient to maintain a large, late-growing variety, low yields from such varieties were obtained.

Shallow soils in eastern Kansas, because of their inability to retain a reserve of moisture, are often subject to drouth. Varieties of corn grown on these soils are subject to the same condition as those grown under limited rainfall. For these reasons early varieties usually give best results on shallow soils in eastern Kansas.

EFFECT OF FERTILITY OF THE SOIL ON RELATIVE YIELDS OF LARGE, MEDIUM, AND SMALL VARIETIES

In many parts of eastern Kansas the rainfall is usually sufficient and the growing season long enough to produce large yields of corn. The soil, however, is too poor to produce good crops. This principle is illustrated in Table II) which gives the yields of large, medium, and small varieties on good soil and on poor soil. The tests from which these data were obtained were conducted in Allen, Riley, and Butler Counties. Those conducted on soils below the average in productivity were compared with others made on soils better than the average.

It will be noted that on the poor soils the earliest and smallest variety yielded best in two of the three seasons and that as a

TABLE II.—RELATION OF PRODUCTIVENESS OF THE SOIL TO YIELDS OF LARGE, MEDIUM, AND SMALL VARIETIES

VARIETY	Number of days to mature	Normal height of stalks in feet	Yield in bushels per acre					
			1914		1915		1916	
			Poor soils	Productive soils	Poor soils	Productive soils	Poor soils	Productive soils
Hildreth Yellow Dent.....	135	9 to 12	26.3	47.8	22.6	52.5	8.2	28.7
Commercial White.....	125	8 to 10	37.0	59.6	28.3	51.1	12.2	41.0
Pride of Saline.....	115	7 to 9	39.8	55.0	30.4	48.0	16.6	41.3
Freed White Dent.....	105	6 to 8	36.6	53.8	35.9	41.2	23.1	35.4

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rule the yield decreased with the lateness of the variety, while on the fertile soils the large varieties produced best. In 1915, a season of abundant rainfall throughout the growing period, the yield increased with the size of the variety. In 1914 and 1916 drouth during the latter part of the season interfered with the development of Hildreth Yellow Dent, the latest variety, and it failed to yield as well as the earlier varieties. On the average the small varieties which mature in from 105 to 115 days will produce best on poor soils in eastern Kansas. On the medium-fertile lands, the medium-sized varieties which ripen in 115 to 125 days are best. Rather large, late-maturing varieties are the most suitable for productive creek and river bottom lands.

EFFECT OF SEASONAL CONDITIONS ON RELATIVE YIELDS OF VARIETIES

There is no one variety that will consistently outyield every other variety in any given locality. Seasonal conditions at the time the corn is fertilizing and filling have a dominant effect on the yield. Where late midsummer drouth occurs the early varieties may have the advantage because they mature in time to avoid serious injury. In other seasons early varieties may be injured by drouth, while late corn may be benefited by rains that are too late to be of value to the earlier corn.

The results given in Table III show the variation in yields of early, medium, and late varieties due to variation in seasonal conditions. These data were obtained from variety tests conducted in Allen, Butler, Cowley, Reno, Riley, and Dickinson Counties. The figures are averages for five tests each year.

TABLE III.—EFFECT OF SEASONAL CONDITIONS ON YIELDS OF LATE, MEDIUM, AND EARLY VARIETIES

VARIETY	Number of days to mature	Average yield in bushels per acre		
		1914	1915	1916
Hildreth Yellow Dent.....	135	39.1	55.0	12.1
Commercial White.....	125	47.7	49.9	14.4
Pride of Saline.....	115	51.0	52.6	18.5
Freed White Dent.....	105	48.9	45.2	23.3
Sherrod White Dent.....	95		36.4	26.2

In 1914 conditions for growth were favorable until after midsummer when drouth caused serious injury, especially to those varieties that matured late. The medium-maturing varieties yielded best. In 1915 growing conditions remained favorable throughout the season and the longer the growing period of the

variety the better the yield. Late varieties therefore produced best. In 1916 rains were abundant until the last of June when drouth set in and prevailed for the remainder of the growing season. Varieties which matured early yielded best, since they matured ahead of the drouth, the effect of which was not severe until the latter part of July.

From the foregoing it will be seen that the adaptability of the variety of corn to the conditions under which it is to be grown is all important. The size of the variety and the time required for it to mature must be such that it will best utilize the growing season or use to the greatest advantage the available moisture or plant food where these materials are the limiting factors in production. Every farmer will have to decide for himself the variety or varieties best adapted for growing under his particular conditions. If the season is short or if the annual rainfall is deficient or the soil unproductive and subject to drouth, early or medium-early varieties will give best results. If the moisture supply is abundant, the growing season long, and the soil deep and highly productive large late-maturing varieties can be grown to the best advantage. If the conditions are intermediate between those suggested, medium-sized varieties will prove most satisfactory.

VARIETIES OF CORN INCLUDED IN COOPERATIVE TESTS

When the cooperative variety tests of corn were begun the varieties that were most commonly grown and considered to be standard throughout the state were included in the tests. As the work progressed, it was necessary to make many changes to adapt it to the requirements of the various sections of the state. Inferior or poorly adapted varieties were discontinued, while newly discovered ones of merit were added. The tables which follow in which the results of the variety tests are reported include only those varieties which were grown for a series of years and which were included in all the tests conducted in the respective sections. Many varieties which do not appear in the tables were tried out.

It was found that introduced seed was at a decided disadvantage when compared with locally adapted seed. In order to avoid this source of error, adapted seed of each variety was secured each year. For instance, seed used in the tests in southeastern Kansas was secured from that part of the state; seed used in central Kansas was obtained in that part, etc. This necessitated the obtaining of two to three lots of seed of the same variety each year. As far as possible, seed was secured from the same sources each season. Because

of failure of some of the growers to produce seed, this was not always possible. In most cases, however, seed of the same strain and from the same locality was secured each year.

VARIETY TESTS OF CORN IN NORTHEASTERN KANSAS

The varieties most extensively grown in northeastern Kansas (sec. 1, fig. 1) are Reid Yellow Dent and Boone County White. These varieties, however, do not yield as well as some others which were grown in the experimental tests, yields of which are given in Table IV. It will be seen that Pride of Saline and Shawnee White produced the highest yields. Pride of Saline and Iowa Silvermine are especially adapted to the poorer soils in this section. On the more fertile soils Shawnee White is probably the best variety except in the northern part where it may not mature satisfactorily in short seasons. Boone County White does well on the better soils in this section. Kansas Sunflower almost always yields well in northeastern Kansas, but it has never been a popular variety. Commercial White, in general! matures too late for this section, but gives good results on bottom land along the Kansas River.

VARIETY TESTS OF CORN IN SOUTHEASTERN KANSAS

In experimental tests in southeastern Kansas (secs. 2 and 3, fig. 1), including the area south of the Kansas River and counties east of Cowley and Butler, Commercial White and adapted strains of Boone County White have given the best yields on bottom lands. The data secured in these tests are given in Table V. Midland Yellow Dent and Kansas Sunflower are two outstanding varieties of yellow corn for this area. Hildreth Yellow Dent gives good results on very fertile land in favorable seasons only. For average conditions Midland Yellow Dent is the best variety of the three.

Pride of Saline and Commercial White gave the best yields on upland as shown by experimental tests the results of which are given in Table VI. Kansas Sunflower is well adapted to the northern portion of this area while Midland Yellow Dent is the best yellow variety for the southern part. Shawnee White does well on good soil in the northern half of this area. On very thin soils, especially those subject to drouth, small, early varieties like Freed White Dent give the best yields.

TABLE IV.—VARIETY TESTS OF CORN IN NORTHEASTERN KANSAS

	Average yield of ear corn in bushels per acre									Average, 1914 to 1919
	1911	1912	1913	1914	1915	1916	1917	1918	1919	
Number of tests	1	3	1	13	8	5	13	11	7	
VARIETY										
Pride of Saline			14.8	34.2	56.1	43.9	37.9	24.1	38.9	39.2
Shawnee White				32.2	56.0	42.3	36.9	24.2	35.1	37.8
Iowa Silvermine				32.9	54.1	41.8	33.4	26.9	34.4	37.2
Boone County White	24.0	27.2	10.8	30.0	52.8	40.7	34.5	18.5	34.7	35.2
Kansas Sunflower	29.5	37.9	11.8	30.1	49.8	44.4	38.2	18.7	30.6	35.3
Reid Yellow Dent	28.5	33.0	12.0	29.2	50.7	39.3	34.0	22.5	35.5	35.2
Commercial White	27.5	38.23	14.8	31.3	58.2					

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TABLE V.—VARIETY TESTS OF CORN ON BOTTOM LAND IN SOUTHEASTERN KANSAS

	Average yield of ear corn in bushels per acre									Average, 1913 to 1919
	1911	1912	1913	1914	1915	1916	1917	1918	1919	
Number of tests.....	5	3	4	5	4	11	9	3	5	
VARIETY										
Commercial White.....	37.1	31.8	28.7	38.0	66.1	21.0	45.0	24.5	44.2	38.2
Pride of Saline.....		32.7	28.8	39.6	67.4	24.0	36.6	23.4	41.5	37.3
Boone County White.....	34.4	35.0	24.7	31.6	73.8	22.3	30.2	20.3	40.4	34.8
Kansas Sunflower.....	40.2	36.7	23.7	35.6	60.0	23.7	39.9	17.5	38.6	34.1
Midland Yellow Dent.....			22.0	40.2	61.2	20.3	42.9	20.3	37.5	34.8
Hildreth Yellow Dent.....	41.9	29.33	24.5	34.3	69.9	18.6	38.6	21.9	34.4	34.6
Reid Yellow Dent.....	30.0	32.7	26.3	32.0	62.3					

TABLE VI.—VARIETY TESTS OF CORN ON UPLAND IN SOUTHEASTERN KANSAS

	Average yield of ear corn in bushels per acre								Average, 1912 to 1919
	1911	1912	1914	1915	1916	1917	1918	1919	
Number of tests.....	3	4	10	14	15	12	4	5	
VARIETY									
Pride of Saline.....		40.8	37.8	39.2	17.9	26.4	8.6	27.0	28.2
Commercial White.....	32.7	42.0	37.7	41.2	14.2	27.5	9.0	23.8	27.9
Boone County White.....	14.3	34.7	31.7	35.6	16.1	22.9	7.6	24.0	26.7
Kansas Sunflower.....	37.53	42.6	33.8	36.1	14.5	22.9	6.3	24.9	25.9
Reid Yellow Dent.....	25.3	35.2	32.0	31.8	13.9	20.8	8.6	22.4	23.5
Midland Yellow Dent.....				36.7	16.5	27.1	7.3	25.5	(a) 22.6
Freed White Dent.....							14.8	26.5	

(a) Average for five years only. During the same years Commercial White and Kansas Sunflower yielded 23.1 and 21 bushels per acre, respectively.

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VARIETY TESTS OF CORN IN EAST CENTRAL KANSAS

In east central Kansas (secs. 4 and 5, fig. 1) medium-sized varieties which mature in 110 to 120 days give best results on the average. Pride of Saline has been an outstanding variety in this part of the state. It has yielded consistently high every season. (Tables VII and VIII.) Iowa Silvermine also does well. Kansas Sunflower is probably the best yellow variety for this area and is quite extensively grown. Reid Yellow Dent does well in favorable seasons in the northern part, but the average yield is not so great as that of the more hardy, better acclimated varieties. Commercial White and Boone County White yield relatively well on the better soils in the southern two-thirds of this area. Freed White Dent, the smallest and earliest variety in the tests, made the highest average yield during the four years that it was grown, because of its ability to produce relatively well in dry seasons. In a longer period it probably would not make so favorable a showing.

VARIETIES OF CORN FOR WEST CENTRAL KANSAS

In experimental tests in west central Kansas (secs. 6 and 7, fig. 1), the earlier varieties yielded best. The figures are given in Table IX. Early strains of Iowa Silvermine and Freed White Dent, both of which mature in 105 to 110 days, made the highest yields. The larger later varieties were usually injured by drouth during the latter part of the season and therefore did not yield so well as those which matured early. On creek and river bottom lands in this area, Pride of Saline and similar varieties made the best yields.

In variety tests of corn conducted as the Fort Hays Branch Experiment Station, located in west central Kansas, a larger number of varieties were included than in the cooperative tests. Also the work extended over a longer period of time. The results of these tests are reported in Table X.

It will be noted that in tests conducted in seasons favorable for the production of corn; namely, 1907 and 1915, and in the bottom-land test in 1910, the medium-sized varieties made the best yields, while in the less favorable seasons, i. e., average seasons for western Kansas, the early varieties produced best. The corn crop was practically a failure in 1911, 1913, 1916, 1917, and 1918.

The bottom land on which tests were conducted in 1906, 1907, 1910, and 1915 was a sandy loam, well adapted to the production of corn. The upland tests were conducted on silty loam typical of the upland soils in that locality.

TABLE VII.—VARIETY TESTS OF CORN IN NORTH CENTRAL KANSAS
(Sec. 4, fig. 1)

	Average yield of ear corn in bushels per acre							Average, 1914 to 1919 (a)
	1912	1914	1915	1916	1917	1918	1919	
Number of tests	11	7	15	13	12	3	5	
VARIETY								
Pride of Saline	36.6	32.7	55.4	27.0	32.4	13.2	31.3	32.0
Iowa Silvermine		32.8	52.6	26.4	25.1	12.7	31.7	30.2
Boone County White	27.5	28.5	53.3	23.9	30.6	9.6	32.5	29.7
Reid Yellow Dent	30.2	27.9	55.8	23.1	26.1	11.8	32.0	29.4
Kansas Sunflower	35.5	27.7	48.2	25.5	30.1	9.8	33.7	29.2
Freed White Dent			56.9	27.2	25.0	18.6	35.3	(b) 32.6
Commercial White	31.9	30.7	56.6	23.4				

(a) No yields were obtained in 1911 and 1913 because of drouth.

(b) Average for five years. During the same years Pride of Saline averaged 31.9 bushels per acre.

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TABLE VIII.—VARIETY TESTS OF CORN IN SOUTH CENTRAL KANSAS

(Sec. 5, fig. 1)

	Average yield of ear corn in bushels per acre								Average, 1912 to 1919 (a)
	1911	1912	1914	1915	1916	1917	1918	1919	
Number of tests.....	3	8	11	8	9	12	4	8	
VARIETY									
Pride of Saline.....		19.6	20.3	44.4	14.8	22.2	17.7	26.8	23.9
Kansas Sunflower.....	13.2	16.9	15.6	40.2	13.4	18.5	13.4	26.7	20.9
Commercial White.....	14.53	19.4	16.4	38.7	11.7	22.8	11.9	24.1	20.7
Boone County White.....	10.2	17.5	18.0	39.6	12.7	19.4	12.8	24.4	20.6
Iowa Silvermine.....				36.0	16.7	15.1	15.5	27.4	(b) 22.1
Freed White Dent.....					18.6	14.7	20.5	28.8	(c) 20.6
Reid Yellow Dent.....	12.7	17.1	19.4	35.8	13.4	18.9			

(a) No yields were obtained in 1913 because of drouth.

(b) Average for five years. Pride of Saline averaged 25.2 bushels per acre during same years.

(c) Average for three years. Pride of Saline averaged 20.4 bushels per acre during same years.

TABLE IX.—VARIETY TESTS OF CORN IN WEST CENTRAL KANSAS

	Average yield of ear corn in bushels per acre							Average, 1912 to 1919
	1912	1914	1915	1916	1917	1918	1919	
Number of tests	3	4	7	5	2	1	5	
VARIETY								
Pride of Saline	33.5	9.0	49.4	10.1	18.3	15.9	13.0	21.3
Kansas Sunflower	37.0	7.7	42.4	7.8	16.4	14.2	10.9	19.3
Reid Yellow Dent	30.8	10.4	45.4	5.2	15.8	15.2	10.3	19.0
Iowa Silvermine		16.6	51.4	9.2	18.9	16.5	12.5	(a) 20.8
Freed White Dent			49.2	10.2	15.7	19.1	16.9	(b) 22.2

(a) Average for six years. Pride of Saline averaged 19.3 bushels per acre during the same years.
(b) Average for five years. Pride of Saline averaged 21.3 bushels per acre during the same years.

TABLE X.—VARIETY TESTS OF CORN AT THE FORT HAYS BRANCH EXPERIMENT STATION

VARIETY	Yield in bushels per acre									Average, '09, '10, '15, '16, '19 (a)
	1906	1907	1909	1910		1915		1916	1919	
	Bottom land	Bottom land	Upland	Upland	Bottom land	Upland	Bottom land	Bottom land	Bottom land	
Freed White Dent.....			28.5	13.2	44.8	51.6	55.1	2.2	11.3	29.5
Reid Yellow Dent.....	24.8	57.0	12.4	7.1	40.6	38.2	58.8	1.5	12.9	23.0
Pride of Saline.....	21.0	66.0	16.2	6.1	46.7	50.6	69.3	3.8	4.0	28.1
Sherrod White Dent.....			28.9	12.0	37.3	37.1	35.0	9.5	14.0	24.8
Boone County White.....	24.2	59.4	15.4	11.8	43.4	37.8	54.5	4.8	2.8	24.3
Kansas Sunflower.....	20.0	62.0	11.5	8.5	47.1	35.5	55.9	4.2	13.3	23.7
Iowa Silvermine.....	29.7	53.4	14.7	9.8	41.5	57.1	66.7	5.8	2.6	28.3
Hogue Yellow Dent.....			17.7	10.2	34.5	36.9	43.5	4.7		(b) 24.6
Blue and White.....	23.1	71.4	17.6	8.6	34.5					

(a) No yields were secured in 1908, 1911, 1913, 1917, and 1918 because of drouth. Records were not complete for 1912. Upland tests in 1916 and 1919 were failures because of drouth.

(b) Average for four years. Pride of Saline and Freed White Dent averaged 32.1 and 32.5 bushels per acre, respectively, for the same years.

For growing on the upland, Freed White Dent proved to be the best variety that has been tested at the Fort Hays station, while Pride of Saline and an adapted strain of Iowa Silvermine produced best results on the creek bottom.

VARIETY TESTS OF CORN IN WESTERN KANSAS

In western Kansas (secs. 8 and 9, fig. 1) early varieties which mature in 100 to 110 days almost always give best results because of the short seasons and limited rainfall. Freed White Dent has given the highest average yield in experimental tests conducted in this area, as shown in Table XI. Colby Bloody Butcher, and other earlier and smaller varieties, however, will probably prove more certain than Freed White Dent for the northern half of this area and throughout western Kansas.

TABLE XI.—VARIETY TESTS OF CORN IN WESTERN KANSAS

	Average yield of ear corn in bushels per acre					
	1914	1915	1917	1918	1919	Four-year average, 1915 to 1919 (a)
Number of tests.....	3	4	4	5	4	
VARIETY						
Freed White Dent.....	12.0	47.2	13.4	21.7	19.1	25.4
Sherrod White Dent.....	12.1	40.7	9.3	15.3	19.3	21.2
Colby Bloody Butcher.....		44.5	12.1	22.9	20.8	25.1
Iowa Silvermine (adapted strain)....	11.9	29.2	13.6	13.6	13.8	17.5
Hogue Yellow Dent.....	10.3	37.9				
Pride of Saline.....	5.6	34.6	11.4	15.8	9.6	17.9

(a) No yields were obtained in 1918 and 1916 because of drouth.

HISTORY AND DESCRIPTION OF VARIETIES

In the brief history and description of the varieties of corn which follow are included those characteristics and adaptations which are of importance to the farmer in choosing a variety. The descriptions are based on well-developed ears grown under average conditions and in average seasons. The ears shown in the illustrations are fairly typical.

BOONE COUNTY WHITE

History—Boone County White was originated in Boone County, Ind., from which it derived its name. In 1876, James Riley began selecting a large-growing variety of corn known as White Mastodon for earlier maturity and smaller size. By continuous selection he accomplished his purpose and at the same time developed a deeper-grained variety. The work of selection for deep kernel and uniformity of type was continued by O. C. Block of Illinois, who be-

gan breeding the Boone County White about three years after Mr. Riley began to distribute his corn.

Boone County White corn has been quite extensively grown in Kansas since about 1905.

Characteristics.—Boone County White, as it is grown in Kansas, is a medium late-maturing variety requiring from 120 to 125 days to ripen. It grows from 8 to 10 feet in height, depending on the season and soil. A typical ear (fig. 2) of standard size is $9\frac{1}{2}$ to $10\frac{1}{2}$ inches long and about $7\frac{1}{4}$ inches in circumference, very nearly cylindrical in shape, and has straight rows of kernels varying in number from 16 to 20. The kernels are usually wide, rather thick, deeply indented and about one-half of an inch in depth.

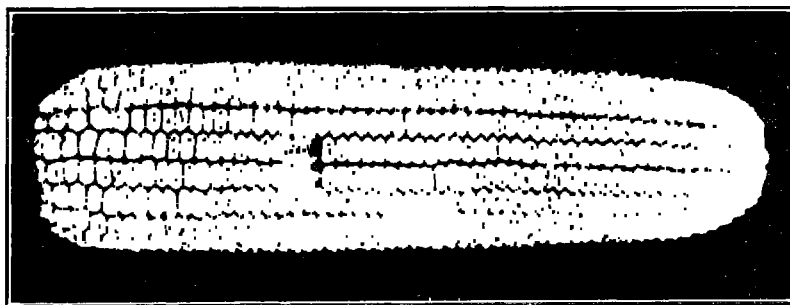


FIG. 2.—A typical ear of Boone County White

The size and type of Boone County corn grown in Kansas vary according to the locality in which it is grown and the sort of selection to which it has been subjected by the growers or breeders.

Adaptations.—Boone County White, especially acclimated strains, is well adapted to growing on the more fertile soil types of eastern Kansas. This variety, however, has not proved to be as hardy as other varieties which have been grown in Kansas for many years. It is poorly adapted to poor soils or adverse seasons. It is grown extensively in northeastern Kansas and to a lesser extent throughout the eastern half of the state. Its popularity and wide distribution have been largely due to its excellence as a "show corn" rather than its superior adaptability to Kansas conditions. The uniformity of type established by long selection has made the Boone County White second only to Reid Yellow Dent as a "show corn."

REID YELLOW DENT

History.—Robert Reid and his son James Reid developed the Reid Yellow Dent corn. In 1846, Robert Reid moved from Ohio to Tazwell County, Ill., taking with him a large late red corn known as Gordon Hopkins corn. The following year a poor stand of this variety was obtained and the missing hills were replanted to an early yellow dent corn grown extensively in Tazwell County. A natural cross between the varieties resulted, from which James Reid developed the Reid Yellow Dent. Fifty years of careful and systematic selection have firmly established in this variety certain characteristics. No other corn breeds as true to type as does Reid Yellow Dent.

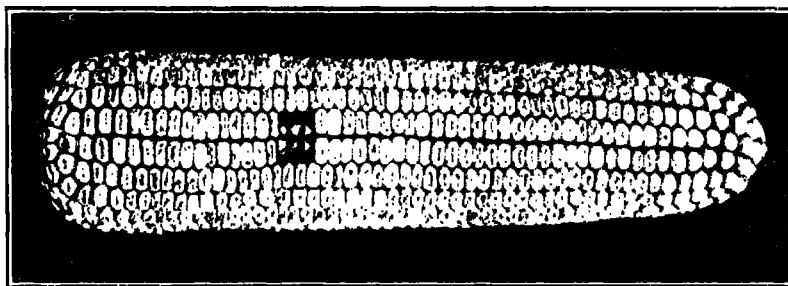


FIG. 3.—A typical ear of Reid Yellow Dent

Characteristics.—Reid Yellow Dent, as grown in Kansas, is a medium-maturing variety that ripens in 115 to 120 days. The stalks vary from 8 to 9 feet in height, are medium-heavy with medium-heavy foliage. A typical ear (fig. 3) is from 9 to 10 inches in length and 7 to 7¼ inches in circumference; nearly cylindrical with deeply rounded butts and well-covered tips. The rows of kernels are distinctly paired and vary from 18 to 20. The kernels are medium in width and depth and are inclined to be narrow with rounded or pointed tips. The type, however, as regards size, shape, and indentation of kernels, varies considerably with different breeders. Some of the strains are smooth-dented, while others are rough.

Adaptations.—Reid Yellow Dent is extensively grown in north-eastern Kansas. It has never proved popular in other parts of the state. The results obtained in the variety tests show that it is not so well adapted to Kansas conditions as many other varieties. It appears to be deficient in hardiness and lacks the ability to yield well under adverse conditions. On good soil in favorable

seasons, however, it produces good yields of an excellent quality of corn. Because of its uniformity in type and the excellence of ear characters, Reid Yellow Dent is superior to all other varieties as a "show corn." Like Boone County White, the growing of this variety in Kansas was largely due to the advertising it received through the corn shows rather than any superior adaptability for growing under Kansas conditions.



FIG. 4.—Ears of Shawnee White

SHAWNEE WHITE

History.—Shawnee White was developed by J. A. Ostrand of Elmont, Shawnee County, Kan. It was originally brought to Shawnee County from western Indiana or eastern Illinois in 1883. Mr. Ostrand states that when the corn was first grown in Shawnee County it was early, but very hardy and prolific. The ears were originally long and slender with an average of 16 rows of kernels. The kernels were shallow, smooth in type, and very hard. By continuous selection Mr. Ostrand developed corn with a medium-deep

kernel somewhat similar to smooth Boone County White, but with comparatively slender ears. This corn was first brought to the attention of the Kansas Agricultural Experiment Station staff in 1914. It has been included in the variety tests for northeastern Kansas since that time.

Characteristics.—Shawnee White is a medium late-maturing variety requiring about 120 to 125 days in which to ripen. The stalks are medium-heavy, fairly leafy, and grow from 8 to 9 feet in height under average conditions. Standard-sized ears (fig. 4) are $9\frac{1}{2}$ to $10\frac{1}{2}$ inches long and about 7 inches in circumference. The ears are more slender than the ears of other standard Kansas varieties and have from 16 to 18 rows of kernels. The kernels are medium-deep, somewhat rounded at the crown, but hold their size well next to the cob. The indentation varies from a smooth to a wrinkled dent. The proportion of horny to crown starch is relatively large.

Adaptations.—Shawnee White is well adapted to the better lands in the northeastern portion of Kansas, especially in those counties bordering on the Kaw River from Manhattan east. It has outyielded all other varieties in this and adjacent territory during the six-year period, 1914 to 1919, inclusive. It has not equalled certain other varieties in Southeastern and central Kansas.

COMMERCIAL WHITE

History.—Commercial White was developed by selecting white-cobbed ears of St. Charles White, a large-growing, late-maturing, red-cobbed variety of corn extensively grown throughout southern Missouri. The originator, P. E. Crabtree, started selecting this variety in 1902 while farming in Barton County in southwestern Missouri.

Characteristics.—Commercial White is a large-growing variety which requires from 125 to 130 days in which to mature. The stalks grow from 9 to 10 feet high under average conditions. They are large at the base, taper uniformly to the tassel, and, as a rule, stand up well. The leaves are broad, heavy, and abundant. This variety tassels and silks late as compared with other varieties similar in size, but develops the ears more rapidly after fertilization has taken place.

Typical ears are 10 to $10\frac{1}{2}$ inches long and about 7 to $7\frac{1}{4}$ inches in circumference. They are slender as compared with Boone County White and tend to taper at the tip. The butts are not

well rounded. The number of rows of kernels per ear varies from 16 to 18 and the rows are distinctly paired. The kernels average one-half of an inch in depth and are smoothly but often deeply dented. They are thick in proportion to their other dimensions and are likely to be somewhat rounded at the crown. The percent of crown starch is relatively low and the germs are large. The kernels, as a rule, are very sound and strong in vitality, germinate well, and produce strong thrifty plants, characteristics which are outstanding ones for this variety.

Adaptations.—Commercial White has proved superior to all other varieties for the more productive soils in southeastern Kansas as far north as the Kaw River Valley and as far west as Marion, Harvey, and Sedgwick Counties. Similar results were secured in southwestern Missouri by the Missouri Agricultural Experiment Station. This variety matures too late to be adapted to the northern and western parts of Kansas. It is, however, a good silage corn anywhere in the eastern half of the state.

KANSAS SUNFLOWER

History.—Kansas Sunflower originated from an early yellow variety of corn introduced from Iowa into Douglas County, Kan., in 1887. John Moody of Eudora, Kan., obtained seed of this variety in 1890 and continued growing it for some time, carefully selecting the seed each season. Five years later he sold his entire crop to the Barteldes Seed Company of Lawrence, from whence it was distributed under the name of Kansas Sunflower. This firm continued the distribution for several years and it became widely grown throughout the state. The Agronomy Department of the Kansas State Agricultural College secured Kansas Sunflower corn from Mr. Moody in 1904 and it was grown on the College Farm and extensively distributed until 1914.

Characteristics.—Kansas Sunflower is a medium-large variety which ripens in 120 to 125 days. The stalks grow from 8 to 9 feet in height, are fairly leafy, and under favorable conditions sucker rather badly. The variety is comparatively hardy and a vigorous grower. The ears (fig. 5) are 9 to 9½ inches in length and 7 inches or slightly less in circumference, which is small as compared with other varieties of the same size of stalks. The ears taper slightly and have 14 to 18 rows of kernels. The butts and tips are inclined to be irregular and the butts are not well rounded. The ears are often not as firm or solid as they should be. The kernels are comparatively broad, medium-deep, and of medium

indentation, being neither distinctly rough nor smooth. They are likely to be slightly rounded at the crown, but are usually nearly square at the tips. The grain of Kansas Sunflower is a bright rich yellow—a color characteristic of the variety.

Adaptations.—Kansas Sunflower is well adapted for growing throughout eastern Kansas. It has never been popular in north-eastern Kansas because of its inferiority to Reid Yellow Dent and Boone County White as a show corn or in the quality of corn produced, while to southeastern Kansas other varieties are equally well adapted. Kansas Sunflower has given good results in a strip of territory about two tiers of counties wide paralleling the south side

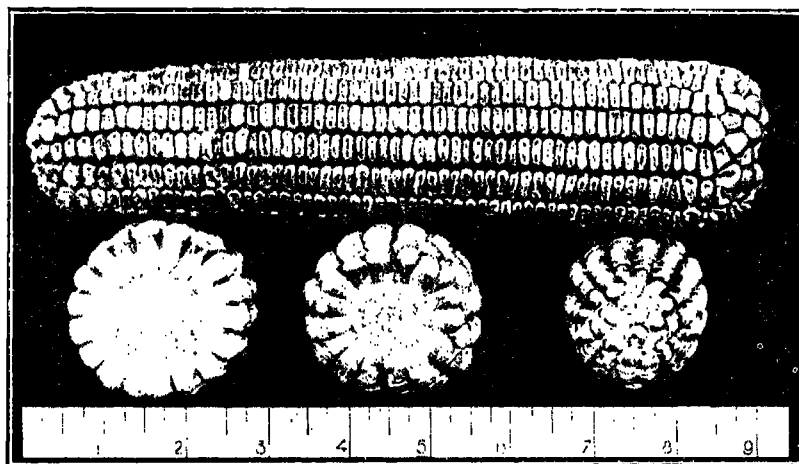


FIG. 5.—Ears of Kansas Sunflower

of the Kaw River and throughout east central Kansas (secs. 4 and 5, fig 1). It is quite extensively grown in this territory and is perhaps the best yellow variety. Because of the small size of the ears and lack of show characters Kansas Sunflower has not been a very popular variety even though it has consistently given good yields.

MIDLAND YELLOW DENT

History.—Midland Yellow Dent was developed by O. A. Rhoads of Columbus, Cherokee County, Kan. It has been grown on the same farm since 1884. The foundation stock of the variety was a local-grown yellow corn without name and of unknown origin. Mr. Rhoads carefully selected seed each year for a certain type. He writes: "We have tried many other varieties but did not succeed in

finding a corn that was better adapted for growing under our conditions, While the Midland Yellow Dent does not breed as true to type as some other varieties, it usually produces corn if there is any produced in the locality."

Midland Yellow Dent first attracted the attention of the Kansas Agricultural Experiment Station staff in 1912. It was included in the variety tests in 1913, but because of the drouth but few data were secured that season. Seed was not available for planting in 1914, but the variety has been quite thoroughly tested in southeastern Kansas since that time with favorable results.

Characteristics.—Midland Yellow Dent is a medium-large variety requiring 120 to 125 days to mature. It grows from 8 to 9 feet in height under ordinary conditions. The stalks are medium-heavy and fairly leafy. Good ears are from 9 to 9½ inches long and about 7 inches in circumference. They taper somewhat. The butts are fairly well rounded and the tips usually well filled. The normal number of rows per ear is 18 to 20. The kernels are rather narrow and are thick in proportion to their width as compared with most other varieties. The indentation varies from a dimple to a wrinkled dent. The kernels are somewhat rounded at the crown and are medium in depth.

Adaptations.—Midland Yellow Dent is exceptionally well adapted to southeastern Kansas conditions. It has proved to be superior to all other yellow varieties for growing under average conditions in the twelve southeastern Kansas counties.

HILDRETH YELLOW DENT

History.—E. C. Hildreth of Altamont, Labette County, is responsible for the distribution of Hildreth Yellow Dent corn. In 1902 he secured from a neighbor, seed of a large, late, somewhat mixed variety of corn. A bushel of the resulting crop was sent to the Agricultural Experiment Station at Manhattan, where it was grown in both the general field and in the variety tests. Because of its excellent yield that season, breeding operations were started the following year by the station to eliminate the mixed types. E. C. Hildreth and his nephew, W. R. Hildreth, also started improvement work in Labette County. As a result the best strains of Hildreth corn grown at the present time have been greatly improved in uniformity, type, and appearance of ears and kernels,

Characteristics.—Hildreth Yellow Dent is a large variety requiring 130 to 135 days to mature. The stalks are heavy and grow

to a height of 10 to 12 feet under conditions to which it is best adapted. The ears are likely to be located too high on the stalk to husk conveniently. Standard-size ears are $9\frac{1}{2}$ to $10\frac{1}{2}$ inches long and $7\frac{1}{4}$ to $7\frac{1}{2}$ inches in circumference; nearly cylindrical in shape, with 18 to 20 rows of kernels. The indentation is medium-deep without being rough or chaffy. The kernels are deep and are inclined to taper or become shoe peg in shape.

Adaptations.—Hildreth corn is adapted only to highly productive bottom lands in southeastern Kansas. Under very favorable conditions of soil and climate it is a heavy producer, but because of its size and long growing period it does not produce good grain yields on medium to thin soils or in adverse seasons. It ripens too late to produce well-matured corn in the northern third of the state.

PRIDE OF SALINE

History.—Pride of Saline is a white dent corn that was developed in western Kansas by C. H. Kellogg of Russell County. In 1891 Mr. Kellogg secured seed of a white corn grown in that county. Its origin and history are unknown. He grew this variety on his Saline River bottom farm many years, selecting the seed each season with the purpose of keeping within the variety, early-, medium-, and late-maturing strains. In 1904 the Fort Hays Branch Experiment Station secured seed of Mr. Kellogg for use on the station farm. The variety proved to be an excellent one for growing on the creek bottom soil in that locality and it has been grown on the station farm since that time.

Characteristics.—Pride of Saline is a medium-sized variety that matures in 115 to 120 days. In height it varies from 7 to 9 feet, depending on conditions. The stalk is heavy for a medium-sized variety and is quite leafy. Under favorable growing conditions it is likely to sucker badly, a characteristic likely to be found in most varieties developed under western Kansas conditions.

Well-developed ears (fig. 6) are from $8\frac{1}{2}$ to $9\frac{1}{2}$ inches long and $6\frac{1}{2}$ to 7 inches in circumference. The ears have from 14 to 18 rows, taper somewhat, have comparatively large shanks, and medium to poorly rounded butts. The cob is likely to be rather large in proportion to the size of the ear. The kernels are rounded at the crown, hold their size well at the tip, are medium to slightly less than medium in depth, and are dimpled to wrinkled in indentation. The corn contains a relatively small percent of crown starch and

is often too hard to be fed to the best advantage without grinding.

Adaptations.—Because of its hardiness, vigor, and drouth resistance acquired as a result of having been grown in west central Kansas for over 30 years, Pride of Saline is well adapted to a wide range of territory in Kansas. In size and time required to mature, it is well suited for growing throughout central Kansas, on river and creek bottoms in west central Kansas, and on uplands in the eastern part of the state. It has outyielded all other varieties in this territory. In northeastern Kansas where Reid Yellow Dent and Boone County White are grown, Pride of Saline is not popular because of its inferiority in uniformity and type of ears.

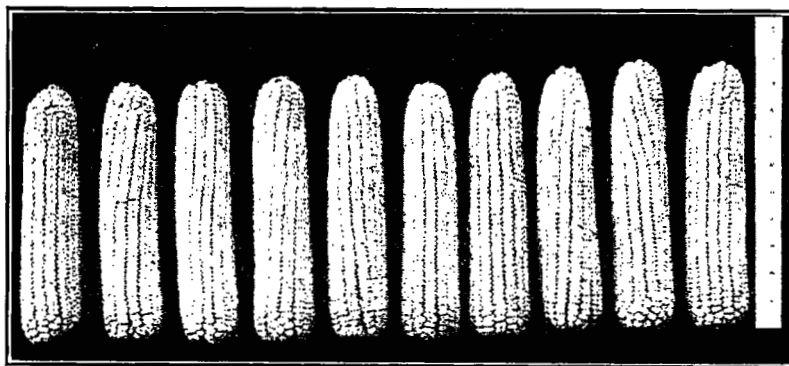


Fig. 6.—Typical ears of Pride of Saline. This variety of corn is best adapted to growing under average Kansas conditions

IOWA SILVERMINE

History.—Iowa Silvermine was developed by J. A. Beagley of Sibley, Ill., from a prize-winning lot of white corn which he bought at the Ford County Farmers' Institute in 1890. This corn was carefully selected each season. In 1895 the Iowa Seed Company purchased from Mr. Beagley the product of 20 acres planted to this variety and distributed it under the name of Iowa Silvermine.

Characteristics.—Iowa Silvermine is an early variety which matures in about 100 to 120 days depending on the strain. It grows from 7 to 8 feet in height under ordinary conditions. The stalks are rather sturdy but not leafy and do not sucker excessively. The ears are 9 to 9½ inches long and 7 inches, or slightly less, in circumference. The ears of those strains most extensively grown in Kansas are comparatively slender in proportion to the length (fig. 7), while the ears of Iowa Silvermine grown in Illinois and

other eastern states are described as being short in proportion to the circumference. As a rule, the ears are very similar to those of Boone County White except they are slightly smaller.

Adaptations.—Iowa Silvermine is widely grown in Kansas. In size and time required to mature, it is well adapted to central Kansas and to the thinner soils in the eastern part of the state. In all probability this variety was the foundation stock from which many of the local strains of corn now grown in central and western Kansas have been developed. Numerous strains of this variety are grown in Kansas, which vary greatly in size and type of ear. Those

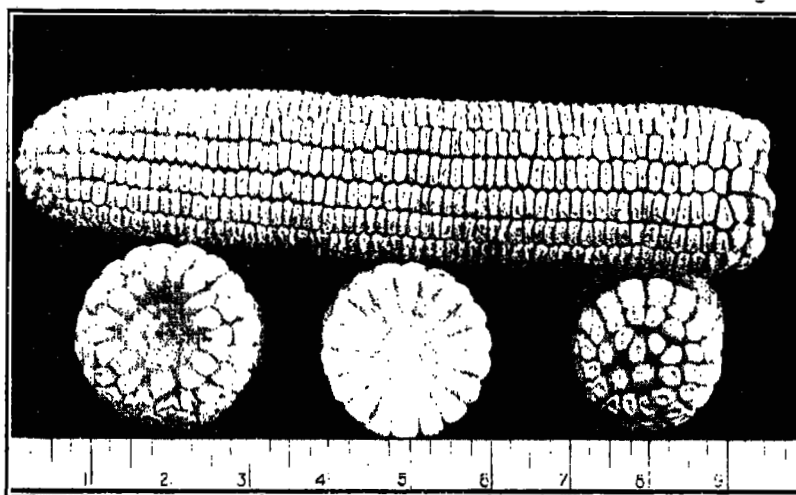


FIG. 7.—Ears of Iowa Silvermine

grown in western Kansas are usually of a smoother type and earlier in maturity than those grown in eastern Kansas. Thoroughly acclimated strains compare favorably with many other varieties for growing in the respective sections of the state, but this variety has not been an outstanding one in any part of Kansas.

FREED WHITE DENT

History.—This variety is a product of western Kansas. It was developed by J. K. Freed of Scott City, who began selecting a badly mixed variety of a local corn for the purpose of establishing a more uniform type of ear and kernel. The original source of the foundation stock is unknown. The corn has been grown in Scott County for at least 30 years. The variety is not a pure one, as it contains yellow and calico mixtures.

Characteristics.—Freed White Dent is an early variety which matures in 105 to 110 days. It ranges in height from 6 to 8 feet, depending on the growing conditions. The stalks are sturdy, fairly leafy, and are likely to sucker extensively under favorable conditions, but not to so great an extent as most other western-developed varieties. The corn is a vigorous and rapid grower, especially in the seedling stage.

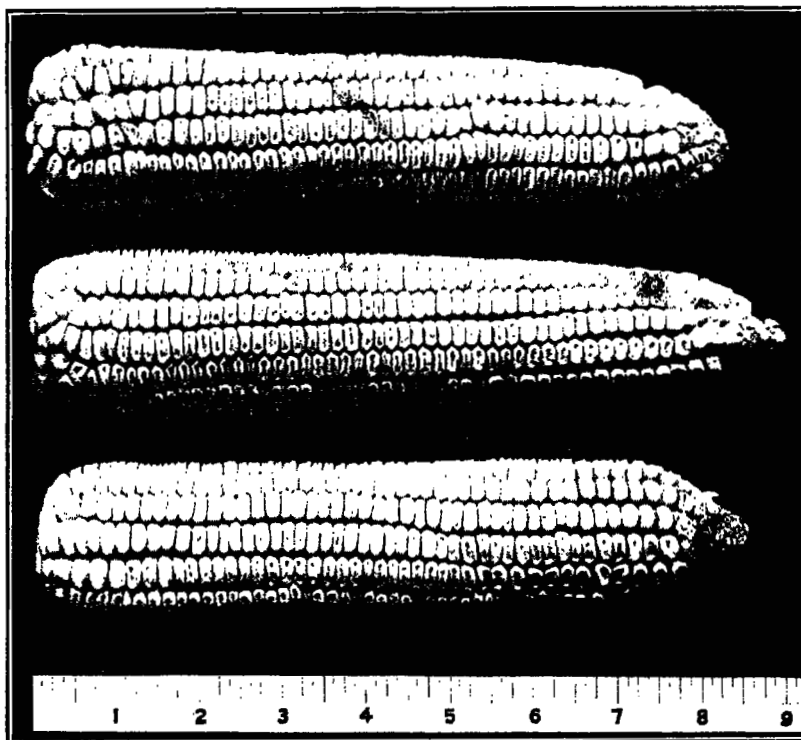


FIG. 8.—Ears of Freed White Dent

The ears (fig. 8) are 7 to 8½ inches long and about 6½ to 6¾ inches in circumference. They vary in shape from a slight to a decided taper. The butts are not well rounded as a rule, but are superior to most other western Kansas varieties in this respect. The number of rows of kernels varies from 12 to 16. The kernels average about three-eighths of an inch in depth, are inclined to be well rounded at the crown but hold their size well at the tip. In type they are smooth- to wrinkle-dented. The percent of crown starch is very low and the corn is hard to almost flinty.

Adaptations.—Freed White Dent corn is primarily adapted for growing in western Kansas and on the uplands in west central Kansas. Because of its hardiness and vigorous growing habits, it is an exceptionally high-yielding early corn for growing anywhere in Kansas. It has given good results on the thin soils in southeastern Kansas. In the northeastern part of the state it is a high yielder but because of the near-flinty type of grain it is not so popular as other early varieties similar in size. For central Kansas, Freed White Dent is a superior early variety and will often yield as well as the larger standard varieties if good stands are secured.

SHERROD WHITE DENT

History.—Sherrod White Dent is another product of western Kansas. It was developed by G. W. Sherrod of Goodland, Sherman County, from a badly mixed variety of corn which included a number of types and varieties. Mr. Sherrod by systematic selection produced a variety of pure white corn that breeds remarkably true to type as compared with other dent varieties grown in western Kansas.

Characteristics.—Sherrod White Dent matures in 95 to 100 days. It grows from 5½ to 7 feet in height. The stalks are sturdy and medium-leafy. For a western Kansas corn it produces remarkably few suckers, freedom from the excessive suckering habit characteristic of western corn being an outstanding feature.

Typical ears of Sherrod White Dent range from 7 to 8 inches in length and are about 6½ inches in circumference. The ears are usually tapering and tend to have the swelled, poorly rounded butt, characteristic of western Kansas varieties. The rows of kernels range from 12 to 16. The kernels are smooth-dented in type, about three-eighths of an inch in depth, rounded at the crowns, comparatively free from crown starch, and tend to be flinty.

Adaptations.—Sherrod White Dent is well adapted to growing in the western one-third of the state. It is a good early corn for growing in other parts of Kansas, but is not so heavy a producer under favorable conditions as Freed White Dent.

COLBY BLOODY BUTCHER

History.—Very little is known regarding the development and early history of Colby Bloody Butcher. This variety was being extensively grown in Thomas County when the Colby Branch Experiment Station was established in 1914. It was recommended by local farmers as being the variety best adapted for growing in that part of the state and was used for planting at the Colby station for that

season. The results secured were so satisfactory that the growing of it was continued. Its performance in the variety tests conducted on the station and in tests conducted in cooperation with farmers, shows that this variety is the best that could have been obtained. Colby Bloody Butcher has been grown in Thomas County for more than 25 years.

Characteristics.—Colby Bloody Butcher matures in 95 to 100 days. It grows from 5 to 7 feet in height. The stalks are sturdy and heavy for their height and are quite leafy. It suckers rather freely but not to the same degree as many other western varieties of corn. The ears range from 7 to 9 inches long and average about 6 inches or slightly less in circumference. The rows of kernels vary from 12 to 16. The kernels are similar to those of other western varieties in type and shape. They have the typical red color of the Bloody Butcher type of corn. Colby Bloody Butcher is a remarkably heavy-yielding variety for its size and earliness. The large size of the ears in proportion to the stalk is one of its outstanding characteristics.

Adaptations.—Colby Bloody Butcher is exceptionally well adapted to growing in western Kansas. It is also an excellent early variety for growing throughout the state. Wherever it has been grown it attracts favorable attention because of its high-producing capacity in relation to its size.

OTHER DENT VARIETIES

Many varieties other than those discussed have been included in the experimental tests. While some of them are well adapted for growing in Kansas and in some cases are quite extensively grown, they are not outstanding ones.

White Wonder.—White Wonder, a variety grown and distributed by the 101 Ranch of Bliss, Okla., was thoroughly tested in southern Kansas. It proved to be of considerable merit but did not equal Commercial White in southeastern Kansas or Pride of Saline in the south central part of the state.

Hiawatha Yellow Dent.—Hiawatha Yellow Dent is a large rather late variety grown to some extent in northeastern Kansas. It is not so popular as Reid Yellow Dent nor so good a yielder as Shawnee White and Boone County White.

Calico.—A number of varieties known as Calico corn are grown in Kansas. They are characterized by the variegated color of the grain. The kernels are white or yellow, striped with varying shades

of red. Calico corn varies as greatly in size, length of growing period, and type of ears as do the white and the yellow varieties. Many calico varieties are excellent yielders but they are not superior to the best adapted white variety for any given section of the state.

Bloody Butcher.—Bloody Butcher is a name applied to corn having a deep red grain. The cap or rather the crown end of the kernel varies in color for the different varieties, but is usually lighter than the remainder of the kernel. Colby Bloody Butcher is the only variety of this class that has proved to be an outstanding one in any part of the state. As a rule Bloody Butcher corn is not any more productive than corn of any other color. Like Calico, the different varieties of Bloody Butcher vary as greatly as do those of the white and the yellow varieties.

Blue and White.—A variety of corn having both blue and white kernels in varying proportions is quite generally grown in southeastern and central Kansas under the names of "Blue and White" and "Blue Jay." It is very similar to Pride of Saline except for the color of the grain. It is equally hardy and drouth-resistant and is adapted to practically the same conditions. Blue and White has given quite satisfactory results but is not superior to Pride of Saline or Freed White Dent under conditions to which these varieties are adapted.

Hogue Yellow Dent.—Hogue Yellow Dent is an early variety grown quite extensively in Nebraska. It is well adapted to central Kansas and is one of the best early yellow varieties for that part of the state. It is not so productive as Freed White Dent.

FLINT CORN

Flint varieties of corn are grown to some extent in the extreme western part of Kansas. Because of their earliness and dwarf stature, and their hardiness and vigorous growing ability, they are more certain producers of grain than the dent varieties of corn. Flint corn suckers profusely and under favorable conditions often produces two or more ears per plant. The ears (fig. 9) are small and are located near the ground, which makes husking slow and tedious work. The grain is very hard and flinty and cannot be fed to best advantage without grinding. For these reasons flint corn is not so popular as the dent varieties even though it often produces better yields. Where flint corn can be harvested by pasturing livestock on it before the grain becomes hard it is often a more profitable crop than dent corn. There are numerous varieties of flint corn

that vary in size and time required to mature. White Australian is the variety most extensively grown in western Kansas.

SOFT OR SQUAW CORN

Soft varieties of corn are also grown to a limited extent in western Kansas. They are also known as "squaw corn" and "flour corn." Soft corn is very similar to flint corn in plant and ear characters, but differs in that the kernels are soft and starchy. The varieties grown in western Kansas are somewhat larger than the flint varieties and are usually better yielders. Like the flint corn

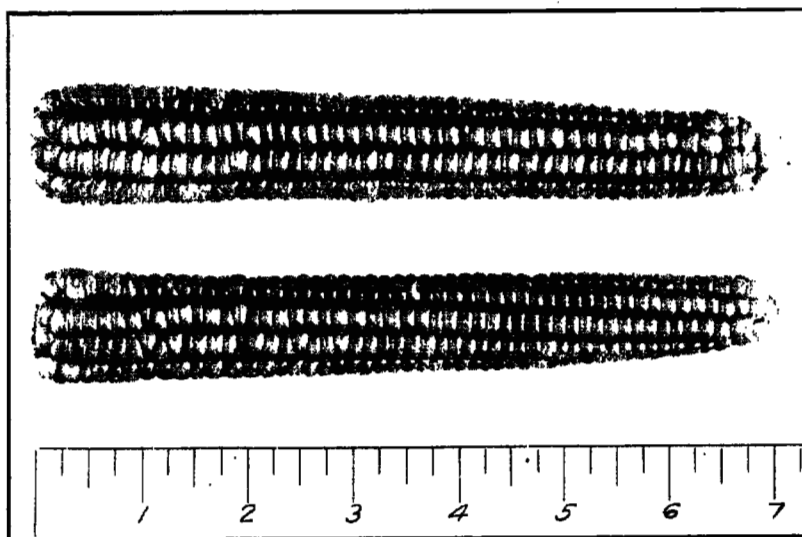


FIG. 9.—Ears of flint corn

the soft varieties are early and are more reliable grain producers than the dent corn. They also have the same disadvantages in harvesting as the flint corn and are difficult to husk. For feeding livestock the grain is more satisfactory because of its soft character. It is not so high in feeding value as the flint corn, however. Soft corn varies in color, including pure purple, red, and white varieties and varieties with all combinations of these colors. A variety known locally as "Rainbow corn" is the best soft corn for western Kansas. It derives its name from the variegated color of the ears.

LOCAL VARIETIES

It is not claimed that all of the varieties well adapted to growing in Kansas are included in the foregoing discussion. Only those varieties which have been brought to the attention of the experiment station staff and have been thoroughly tested have been discussed. There are, no doubt, in many parts of the state one or more local varieties of corn grown and properly selected in the respective localities for many years that are superior ones for growing under the conditions under which they were developed. The varieties recommended for the respective sections of Kansas may or may not be superior to these local varieties.

ACCLIMATED VARIETIES BEST

A variety of crop is acclimated when it possesses the ability to thrive in an environment as a result of having been grown in that environment for many generations. Practically all tests show that thoroughly acclimated corn outyields recently introduced corn as a rule, and that the longer corn has been grown in a given locality, the greater its superiority over recently introduced corn.

Kansas-grown seed of seven different varieties was compared with seed of the same varieties introduced from seven other states. These comparisons were made on the Agronomy Farm at Manhattan during the seven-year period, 1903 to 1909 inclusive.¹ With but one exception, the seed produced in Kansas outyielded that introduced from other states. For the 40 comparisons that were made the average yield was 6.5 bushels per acre in favor of the Kansas-grown seed.

Similar results were obtained in the variety tests of corn conducted in cooperation with farmers throughout eastern Kansas in which acclimated or home-grown seed of Kansas Sunflower, Boone County White, and Reid Yellow Dent corn were compared with seed of the same variety introduced from other parts of the state. In a majority of the tests the home-grown corn was originally secured from the same source from which the introduced seed was obtained. That is, the introduced and the home-grown seed were of the same strain of corn but the home-grown seed had been locally grown for several years and had thus become more or less acclimated. During the seven-year period, 1911 to 1917, 55 comparisons were made. The results are summarized in Table XII.

¹ Ten Eyck, A. M. Corn. Kan. Agr. Expt. Sta. Bul. 193:429-471. Figs. 19.

For every season the home-grown seed outyielded that introduced from 2.5 to 5 bushels per acre.

TABLE XII.—COMPARATIVE YIELDS FROM HOME-GROWN AND FROM INTRODUCED SEED

YEAR (a)	Number of tests	Average yield in bushels per acre		
		Home-grown seed	Introduced seed	Difference in favor of home-grown seed
1911.....	7	28.3	23.2	5.1
1912.....	15	34.4	29.4	5.0
1914.....	12	29.9	26.4	3.5
1915.....	8	58.4	49.8	8.6
1916.....	18	21.3	18.8	2.5
1917.....	10	36.2	32.9	3.3
Average.....	65	34.25	30.08	4.17

(a) No data were obtained for 1913 because of drouth.

The great difference in favor of the home-grown seed the first two seasons was due to the fact that the average distance which the introduced seed was transferred in those seasons was greater than for the other seasons. The introduced seed used in 1911 and 1912 was grown on the Agronomy Farm at Manhattan and in some cases it was transferred a considerable distance. From 1914 to 1917, inclusive, the corn used in cooperative experiments was secured from several sources; namely, northeastern, southeastern, and central Kansas. Since the seed used in the respective tests was supplied from the nearest source, the average distance which the introduced corn was transferred for these seasons was relatively short. The superiority of home-grown seed was especially evident when the introduced seed was transferred from a congenial environment to one that was less favorable.

These results show that the general opinion among farmers that it is advisable to obtain new seed every few years is an erroneous one. The only time when it is desirable to change seed is when an inferior variety has been grown or where the farmer has made no effort to select the seed properly year after year. In these cases it will pay to secure good seed from a nearby farmer who properly selects his seed, provided the soil conditions on the two farms are similar. If, for some reason, home-grown seed is not good in vitality or quality, better results can be obtained by securing first-class seed grown as near home and under conditions as nearly like those under which it will be planted as possible. Every farmer

should select and save his own seed, as the corn which was grown on his farm is likely to be better suited for planting thereon than that grown elsewhere.

IMPORTING SEED CORN

It is sometimes necessary to import seed corn because of crop failures. Results of tests show that under Kansas conditions it is advisable to secure seed from a similar or less congenial environment rather than a more congenial one.

In variety tests conducted at Manhattan it was noted that thoroughly acclimated varieties of corn secured from parts of the state a considerable distance west of Manhattan sometimes out-yielded varieties similar in size from the eastern part of the state. For instance, Pride of Saline, which was developed on river bottom land in Russell County and subsequently grown at the Fort Hays Branch Experiment Station at Hays, yielded relatively well in its class; Freed White Dent, another western Kansas variety, proved to be a superior one for its class. Very early varieties developed under semiarid conditions in western Kansas and adjoining states proved to be much superior to equally early varieties from Iowa and other northern states when grown in eastern Kansas.

The environment for corn in western Kansas is not favorable because of cool nights during the spring and hot dry conditions that are likely to prevail during midsummer. Natural selection is very rigid and weak plants are rapidly eliminated. Corn that is grown under these conditions for many years acquires a hardiness and vigor that are rarely developed in varieties produced in a congenial environment. The data presented in Table XIII show the value of these factors as measured by comparing varieties developed in western Kansas with similar varieties developed in more favorable environments.

TABLE XIII.—SEED CORN DEVELOPED IN WESTERN KANSAS COMPARED TO SIMILAR VARIETIES DEVELOPED IN A MORE FAVORABLE ENVIRONMENT

VARIETY	Average yield in bushels per acre					
	1914	1915	1916	1917	1918	1919
Freed White Dent.....	51.1	24.3	55.1	20.7	19.3	.....
Corn Planter.....	35.8	12.3	43.5	13.0	10.0	.....
Difference.....	15.3	8.0	11.6	7.7	9.3	.....
Sherrod White Dent.....	.....	.....	26.2	16.8	21.1	21.6
Colby Bloody Butcher.....	.....	.....	.....	19.6	19.6	25.3
Silver King.....	.....	.....	18.1	12.7	13.8	18.2

Freed White Dent was compared with Corn Planter, and Sherrod White Dent and Colby Bloody Butcher with Silver King. Freed White Dent and Corn Planter are similar in size and time required to mature. Seed of Corn Planter was secured each season from the Henry Field Seed Company of Shenandoah, Iowa. Freed White Dent was obtained annually from J. K. Freed of Scott City, Kan. Silver King was secured every year from southern Wisconsin while Sherrod White Dent and Colby Bloody Butcher were obtained from Sherman and Thomas Counties, respectively, in western Kansas. The yields are averages for five or six tests conducted each year in Riley, Allen, Butler, Cowley, Dickinson, and Reno Counties. In both comparisons the hardy western Kansas varieties produced marked increases in yield.

Similar results were secured in a comparison of Reid Yellow Dent and Pride of Saline. The former variety is perhaps the best selected and bred variety in existence. It was developed in Illinois, however, in an environment exceptionally well adapted to corn, while Pride of Saline is a product of western Kansas. The Reid Yellow Dent used in these tests had been grown in eastern Kansas for seven or eight years and was therefore acclimated to a considerable extent. The Pride of Saline corn used was grown in central Kansas each season. Two comparisons were made—one in a group of counties, including Marshall, Nemaha, Brown, and Doniphan in northeastern Kansas, the most favorable corn-growing section in the state; the other in Allen and Wilson Counties in southeastern Kansas where soil and climate are less congenial. The results are given in Table XIV. The yields are averages of 42 tests of which four or more were conducted in each section for the respective seasons.

TABLE XIV.—COMPARATIVE YIELDS OF A HARDY VARIETY AND A NON-HARDY VARIETY OF CORN BOTH GROWN UNDER CONGENIAL AND UNDER NON-CONGENIAL CONDITIONS

LOCATION OF EXPERIMENTS	Average yield in bushels per acre							
	1914		1915		1916		1917	
	Pride of Saline	Reid Yellow Dent	Pride of Saline	Reid Yellow Dent	Pride of Saline	Reid Yellow Dent	Pride of Saline	Reid Yellow Dent
Northeastern Kansas.....	29.0	26.2	64.1	61.6	44.4	37.9	37.9	34.0
Southeastern Kansas.....	45.8	36.6	45.5	27.4	20.4	13.7	34.0	27.5

Pride of Saline outyielded Reid Yellow Dent every year in both parts of the state. The difference in the relative yields, however, was much greater where the conditions were the least favorable.

These results indicate that a hardy variety which is adapted to adverse conditions may have little if any advantage over a variety that is not hardy, when grown under favorable conditions. On poor soils or under unfavorable climatic conditions, however, the hardy variety will produce much the better yield.