EFFECT OF PLANTING RATE ON TOTAL YIELD, SALEABLE SEED YIELD, AND EAR-SIZE OF HYBRID CORN

EFFECT OF PLANTING RATE ON TOTAL YIELD, SALEABLE SEED YIELD, AND EAR-SIZE OF HYBRID CORN

By

HARTWELL PASS

Bachelor of Science

Oklahoma Agricultural and Mechanical College

Stillwater, Oklahoma

1941

Submitted to the Department of Agronomy

Oklahoma Agricultural and Mechanical College

In Partial Fulfillment of the Requirements

for the Degree of

MASTER OF SCIENCE

1948

APPROVED BY:

James S. Brooks
Chairman, Thesis Committee

Melvin D. Jones
Member of the Thesis Committee

J. D. Murphy
Head of the Department

O. C. McIntosh
Dean of the Graduate School

ACKNOWLEDGMENT

The writer wishes to express his sincere appreciation to his major advisers, Drs. J. S. Brooks, M. D. Jones, and A. M. Schlehuber for their constant advise and constructive criticism, and all instructors under whom work was taken.

TABLE OF CONTENTS

INTRODUCTION

The introduction and extensive use of hybrid corn varieties has given rise to a planting rate problem in Oklahoma. Comparatively recent studies have shown that adapted hybrids as a group have higher optimum stands than do open-pollinated varieties, that hybrids differ considerably in their planting requirements, and that the best rate for one hybrid is not necessarily the best for another.

A wide variation in productivity is found among Oklahoma soils. On the same farm it is not uncommon to find upland which produces only 20 bushels of corn per acre and lowland which produces 50 bushels or more. Common experience has shown that these different soils should be planted at different rates, and the corn on rich land is planted relatively thick and on poor land relatively thin, the rate being determined in each case by the judgment of the grower.

Each farmer, through experience and observation, has found the most desirable planting rate for the open-pollinated variety which he has been planting from year to year. Many of these farmers are now planting hybrid corn and do not have previous experience to guide them in selecting the proper planting rate. This leads to the question so often asked, "How thick should I plant my corn?". This is an important question, and one difficult to answer definitely. If the fertility of the soil, the use to be made of the crop, and the climatic conditions during the growing season were known, it would be possible to recommend a desirable planting rate.

From the standpoint of an individual grower the best planting rate depends on the use to be made of the crop. If the crop is for feed, and

quality is not a factor, seeding should be heavy enough to produce the maximum yield. If the crop is for the purpose of producing seed, a planting rate which would sacrifice a few bushels in total yield in order to increase the quality might be desirable and profitable. When the planting rate is high enough to obtain maximum production from the soil, the quality of the crop is reduced. The great pound-size ears so often displayed in corn exhibits and sales literature usually indicate inefficient use of a favorable environment for corn. An ear weighing about one-half pound seems to indicate the most efficient use of the land, as stated by Huber (3) 1/.

The experienced corn growers are probably not far wrong when planting a well-known variety on a well-known soil. However, a material difference of opinion frequently exists regarding the proper stand under any given condition. A reliable guide is therefore needed in order to determine with some degree of accuracy the proper stand of corn with regard to productivity of the soil, maximum yield, quality of grain produced, and variety or hybrid to be grown.

The primary objective of this investigation is to determine the affect of planting rate on yield and seed size of hybrid corn for seed production.

1/ Figures in parenthesis refer to "Literature Cited", p. 25.

REVIEW OF LITERATURE

Experimental data regarding the effect of planting rate on seed size and yield of saleable seed are very limited. However, considerable data are available concerning the effect planting rate has on total yield.

Varying soil and climatic conditions call for a varying number of plants per acre. This fact is brought out by the yields from different rates of planting on several different types of soil in Illinois by Hume, Center, and Hegnauer (4). Results from their test show that for maximum production the stand of plants should increase with the fertility of the soil.

Bryan, Eckhardt, and Sprague (2) of Iowa concluded that the number of plants per acre showed a greater effect on yield than spacing. In general no consistant and material advantage will result from spacing closer than 42 x 42 inches in Iowa. The closer spacings consistently had more lodged plants than the wider spacing.

Stringfield and Thatcher (8) working in Ohio reported that adapted hybrids as a group have higher optimum stands than do open-pollinated varieties of comparable seasonal requirements. The difference between the two optima amounts to about 1800 to 2000 plants per acre under favorable growing conditions. The effect of stand on grain yield is much greater at high than at low productive levels. The planting rate should be the one expected to give an optimum stand for the better soils. At optimum stands, competition tends to throw some of the plants into near or complete barrenness, tillering decreases, average ear weight approaches one-half pound, and fewer weeds are present.

Hybrids and open-pollinated varieties differ in their planting requirements for maximum yields according to results obtained by Brooks and Chessmore (1). Mooers' (7) work in Tennessee indicates that in general the small and short-season varieties require thicker planting than the large, long-season varieties.

Experimental results of McVickar and Shear (6) in Virginia show that the maximum yield of two hybrids or varieties of corn does not necessarily occur at the same planting rate, and therefore this factor should be evaluated in comparing corn performance in a variety test.

It is apparent from work conducted by Huber (3) of Pennsylvania that large ears resulting from too thin stands are not usually associated with the highest yields per acre. His conclusions were that an ear weighing about one-half pound seems to indicate the most efficient use of the land, and that large pound-size ears so often displayed in corn exhibits and sales literature merely indicate inefficient use of a favorable environment for corn.

The desired planting rate, according to Stringfield and Thatcher (8), may be obtained by estimating the yielding capacity of the field in question for an average season. If this estimate is 60 bushels or less of grain per acre, plant three viable seeds per hill or 42 inches of row space. For higher estimated yields the number of seed to be planted per 42 inches of row is obtained by dividing the estimated yield by 20.

Under ordinary planting conditions in Nebraska there may be considerable difference in seed size without greatly affecting the yield of corn according to Kisselbach (5). He compared large seed (29.2 gms. per 100 seed) with small seed (15.8 gms. per 100 seed). For a 10-year

period, the large seed yielded 43.8 bushels as compared to 42.4 bushels for the small seed. The plants produced from the small seed were one day later in tasseling.

Hickman in Ohio, according to Williams and Welton (9), planted seed from different parts of an ear of corn, viz., the butt, middle, and tip. No variation in time of maturity, yields of grain and stover, percent of barrenness, or ear-size was evident. Apparently one part of the ear is as valuable as another for use as seed. The fact remains, however, that there is need for accurate planting. By knowing the percent germination and having uniform seed size it is possible to plant at a rate that will give a desired stand of plants without thinning. This is particularly important when considering the high priced hybrid seed the farmer is required to purchase each year.

MATERIALS AND METHODS

This investigation was conducted in 1947 at two locations. One was on the Oklahoma Agricultural Experiment Station farm, Perkins, Oklahoma. The other was three miles east and two miles south of Stillwater, Oklahoma in the Stillwater Creek bottom.

The experimental design at each location was a split plot; the rates making up one block, and the varieties making up another block. This design was used in order to obtain the maximum accuracy of measurement of variety-rate interaction. The plots were 20 hills long, 42 inches wide, and the hills were spaced 40 inches in the row. Each variety-rate was replicated four times at each location.

Four single cross combinations, Wf9 x 38-11, K4 x 38-11, Kys x K201C, and CI7 x Kys were used. The seed was furnished by the Agronomy Department of Oklahoma Agricultural and Mechanical College. These crosses represent a range of maturity from early (U.S. 13) to late (Kans. 1583) and are included in several of the commercial hybrids grown in the state.

Seeding was done by the use of a modified two-row corn planter with a check row attachment (Figure 1), and the seed was hand dropped. The seedbed preparations and cultural practices were those recommended for growing corn in the area. To insure as near perfect stand as possible the seeding rate was two grains per hill more than the number of plants desired. The plots were thinned when the corn was about two feet high.

Results of previous rate studies by Brooks and Chessmore (1) at the Perkins farm indicated that the rates at this location should be one, two, and three plants per hill. This made a total of 12 variety-

Figure 1.-- A two-row corn planter modified for planting experimental plots.

rates for the Perkins location. There was no previous work to indicate the planting rates to use at the Stillwater location. It was anticipated that two plants per hill would produce less than the maximum yield. The rates used for the Stillwater location were two, three, four, and five plants per hill making a total of 16 variety-rates.

The Perkins location was planted April 7, 1947. The plots were thinned May 27 to the desired stand, and side dressed May 29 with 16-20-0 at the rate of 125 pounds per acre. The Stillwater location was planted April 23, 1947. The plots were thinned May 28 to the desired stand, and side dressed May 30 with 16-20-0 at the rate of 125 pounds per acre. The number of missing hills, number of plants, and number of lodged plants in each plot were recorded at harvest time. The plots were harvested and weighed in October. Ear counts and estimates of total damage due to ear worms and disease were made before shelling. The four replications of each variety-rate were combined after shelling. That is the four plots of variety one rate two, etc., were combined. It was thought that the individual plot yields would be more difficult to grade accurately than the composite of the four replications of each variety-rate.

Each composite was weighed and run through a spiral ring grader (Figure 2) which separated the grain into seven groups or grades as to kernel width and thickness. The grades are as follows:

Sizes	Screens
	(Screen numbers expressed in terms of 64ths of an inch)
Large round	Pass over a No. 21 round and over a No. 14 slotted.
Medium round	Pass through a No. 21 round; over a No. 18 round, and over a No. 13 slotted.

Figure 2.-- A spiral ring corn grader used to separate the grain according to size.

Small round	Pass through a No. 18 round; over a No. 16 round, and over a No. 12 slotted.
Large flat	Pass over a No. 21 round, and through a No. 14 slotted.
Medium flat	Pass through a No. 21 round; over a No. 18 round, and through a No. 13 slotted.
Small flat	Pass through a No. 18 round; over a No. 16 round, and through a No. 12 slotted.
Discard	Includes all corn that will pass through a No. 16 round screen.

Each individual grade was weighed and recorded. The percentage of each grade was later determined. The yield of saleable seed for each plot was calculated by combining the percentage of large and medium flats and multiplying each plot yield by this figure. Average ear-size was computed by dividing the plot yield, in pounds, by the number of ears in the plot.

RESULTS AND DISCUSSION

Two locations representing two soil fertility levels, an upland at Perkins and a bottomland at Stillwater, were chosen. The highest yield was produced at the two-plant rate for both locations. The average yield at the Stillwater location was considerably less than expected because the productivity of this soil was overestimated. Probably more complete information of the influence of rate on yield would have been obtained if a one plant per hill rate had been included. A comparison of results at the two locations shows that two plants per hill produced almost identical yields.

A summary of the data is presented in Table 1. The original data is included in the appendix (Tables 6 to 11). The analyses of variance of total yield for Perkins and Stillwater are given in Table 2.

Combining the yields of all hybrids in the test at Perkins, the two plants per hill produced 1.6 bushels per acre more than the one plant per hill rate, and 3.6 bushels per acre more than the three plants per hill rate. At Stillwater, the maximum yield was produced by the lowest rate, two plants per hill. The differences between the rates are not significant as indicated by the F values in Table 2. They are comparable to the results of unpublished work [1], in that the highest yield was produced at the two rate. The Perkins results also parallel findings of Brooks and Chessmore (1) and Mooers (7) which show a rise in yield as the number of plants were increased to a certain

---

[1] Unpublished. Courtesy of Dr. James S. Brooks, in charge of corn investigations and improvement, Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma.

Table 1.---Effect of planting rate on total yield, saleable seed yield, percentage of saleable seed, ear-size, discard seed, and lodging for corn test at Perkins and Stillwater, Oklahoma in 1947.

Plants Per Hill	Total Yield Bu./A	Saleable Seed Bu./A	Saleable Seed % of Total Yield	Ear-Size in Lbs.	Discard Bu./A	Lodging %
			All hybrids at each rate			
			Perkins			
1	29.2	20.1	68.7	0.42	0.7	20.6
2	30.8	16.9	54.9	0.30	1.9	56.6
3	27.2	12.3	45.4	0.20	2.7	60.8
			Stillwater			
2	30.6	17.7	57.7	0.33	1.7	22.5
3	27.1	11.7	43.0	0.23	2.9	27.3
4	20.8	7.2	34.7	0.17	3.1	31.1
5	20.5	6.8	33.3	0.14	3.0	32.5

Table 2.—Analyses of variance of total yield at different rates of planting four corn hybrids grown at Perkins and Stillwater, Oklahoma in 1947.

Source	D.F.	M.S.	F values Calculated	Required 5%	Required 1%
		Perkins			
Rates	2	53.00	2.79	5.14	10.92
Error (a)	6	19.03			
Hybrids	3	24.70	7.49**	3.86	6.99
Error (b)	9	3.29			
Rates x Hybrids	6	18.97	5.24**	2.66	4.01
Error (c)	18	3.62			
		Coefficient of variation 6.6			
		Stillwater			
Rates	3	405.08	2.86	3.86	6.99
Error (a)	9	141.80			
Hybrids	3	470.27	6.09*	3.86	6.99
Error (b)	9	77.27			
Rates x Hybrids	9	15.01	0.88	2.88	4.69
Error (c)	27	17.16			
		Coefficient of variation 16.8			

* Indicates that the F value exceeds the value required for significance at the 5% level.

** Indicates that the F value exceeds the value required for significance at the 1% level.

point, and then a decline in yield.

A noticeable difference in percentage and yield of saleable seed at different planting rates is shown in Table 1, in which varieties were combined for each rate at each location. The percentage and yield of saleable seed were highest at the lowest planting rate. Increasing the planting rate decreased both the percentage and yield of saleable seed. The percentage of discard seed was increased with the increased planting rates (Figure 3).

That there is a difference in the yield of saleable hybrid seed produced from different planting rates is indicated by the highly significant F values for rates in Table 3.

Noticeable differences in ear-size resulting from planting rate are shown in the data summarized in Table 1. The largest ears at both Perkins and Stillwater were produced by the lowest planting rate. Increasing the planting rate decreased the size of the ear (Figures 4 and 5). This is in agreement with results of Huber (3) and Brooks and Chessmore (1) which show that the large ear-size is not necessarily associated with the highest yield per acre. The planting rates resulted in a significant difference in ear-size as indicated by the F values (Table 4).

Results at both the Perkins and Stillwater locations indicated that as the planting rate increased, the percentage of lodged plants and amount of total ear damage increased.

The effect of hybrids on total yield showed the same tendency at each location after combining all rates for each hybrid at each location, (Table 5) Wf9 x 38-11 had the highest yield and Kys x K2010 the lowest. The calculated F values, 7.49 and 6.09, for varieties at

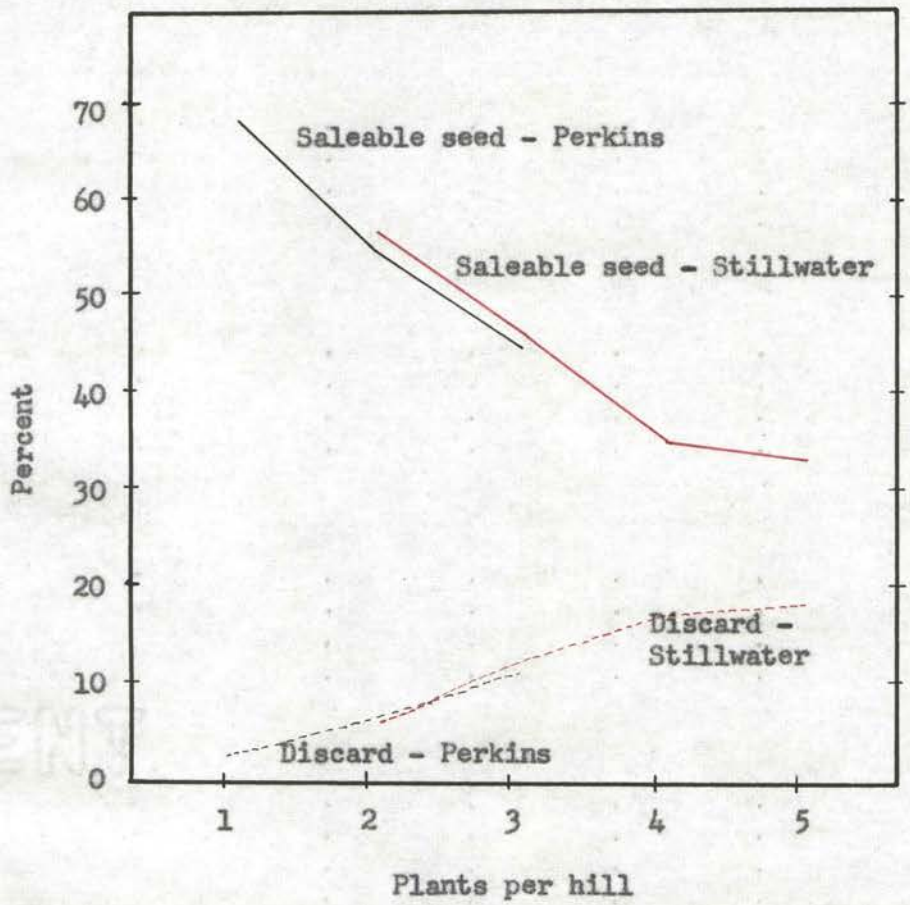

Figure 3.--Effect of planting rate on percentage of saleable seed and discard seed at Stillwater and Perkins, Oklahoma in 1947.

Table 3.--Analyses of variance of saleable seed yield at different rates of planting four corn hybrids grown at Perkins and Stillwater, Oklahoma in 1947.

Source	D.F.	M.S.	F values Calculated	Required 5%	Required 1%
		Perkins			
Rates	2	250.60	51.37**	5.14	10.92
Error (a)	6	4.88			
Hybrid	3	218.88	93.18**	3.86	6.99
Error (b)	9	2.35			
Rates x Hybrid	6	6.35	4.90**	2.66	4.01
Error (c)	18	1.29			
		Coefficient of variation 6.9			
		Stillwater			
Rates	3	414.56	15.67**	3.86	6.99
Error (a)	9	26.44			
Hybrid	3	123.50	5.43*	3.86	6.99
Error (b)	9	22.76			
Rates x Hybrid	9	5.95	1.18	2.25	3.14
Error (c)	27	5.05			
		Coefficient of variation 20.8			

* Indicates that the F value exceeds the value required for significance at the 5% level.

** Indicates that the F value exceeds the value required for significance at the 1% level.

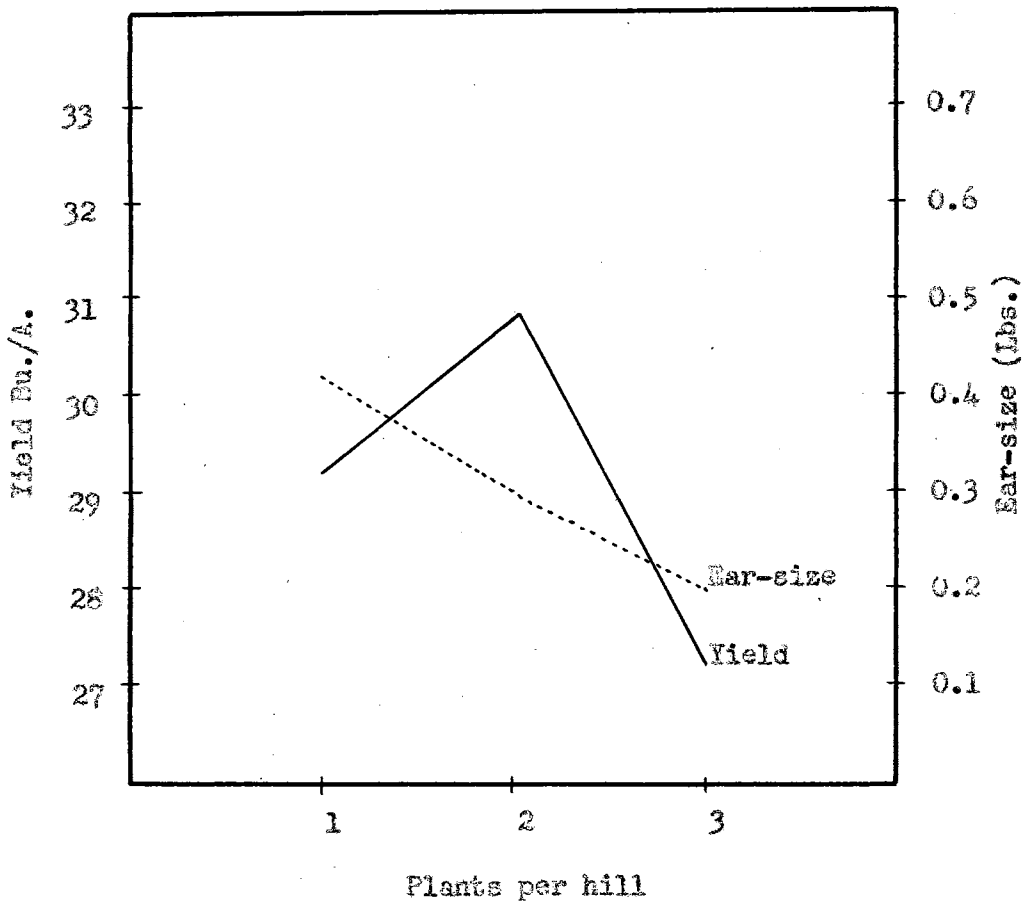

Figure 4.--Effect of planting rate on average yield of ear corn and ear-size at Perkins, Oklahoma in 1947.

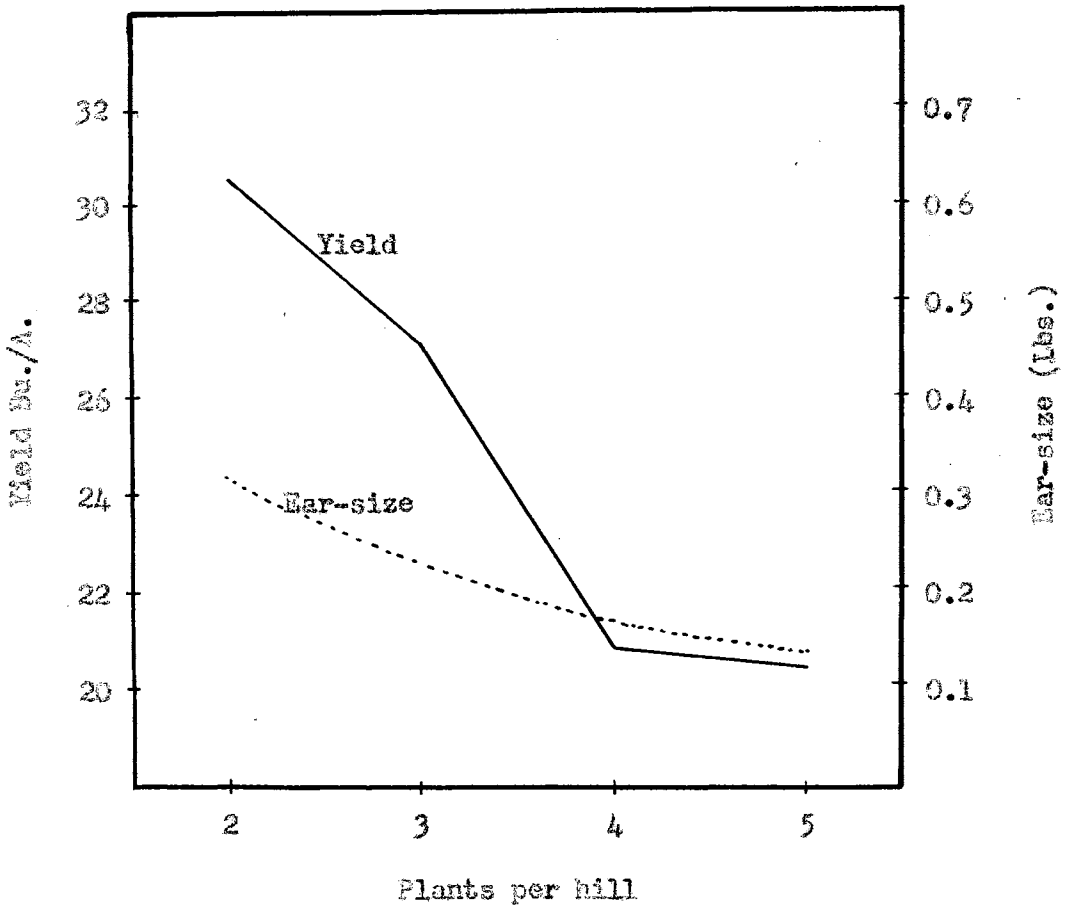

Figure 5.--Effect of planting rates on average ear corn yield and ear-size at Stillwater, Oklahoma in 1947.

Table 4.--Analyses of variance of ear-size at different rates of planting four corn hybrids grown at Perkins and Stillwater, Oklahoma in 1947.

Source	D.F.	M.S.	F values Calculated	Required 5%	1%
		Perkins			
Rates	2	0.21230	82.16**	5.14	10.92
Error (a)	6	0.00258			
Hybrid	3	0.01000	20.30**	3.86	6.99
Error (b)	9	0.00094			
Rates x Hybrid	6	0.00473	12.69**	2.66	4.01
Error (c)	18	0.00037			
		Coefficient of variation 6.4			
		Stillwater			
Rates	3	0.11909	22.39**	3.86	6.99
Error (a)	9	0.00532			
Hybrid	3	0.00612	4.53*	3.86	6.99
Error (b)	9	0.00135			
Rates x Hybrid	9	0.00083	2.27*	2.25	3.14
Error (c)	27	0.00036			
		Coefficient of variation 8.9			

* Indicates that the F value exceeds the value required for significance at the 5% level.

** Indicates that the F value exceeds the value required for significance at the 1% level.

Table 5.--Effect of hybrid on total yield, saleable seed yield, percentage of saleable seed, ear-size, discard seed, and lodging for corn test at Perkins and Stillwater, Oklahoma in 1947.

Hybrid	Total Yield Bu./A	Saleable Seed Bu./A	Saleable Seed % of Total Yield	Ear-Size in Lbs.	Discard Bu./A	Lodging %
			Each hybrid at all rates			
			Perkins			
Wf9 x 38-11	30.4	17.4	57.3	0.33	1.4	6.0
K4 x 38-11	30.1	11.2	37.3	0.30	2.2	60.8
Kys x K201C	27.4	21.5	78.5	0.30	0.5	56.5
CI7 x Kys	28.3	15.5	54.9	0.30	1.2	55.3
			Stillwater			
Wf9 x 38-11	30.3	13.7	45.3	0.22	3.1	9.8
K4 x 38-11	27.7	7.8	28.0	0.23	4.4	32.0
Kys x K201C	18.0	12.6	70.1	0.19	0.8	41.4
CI7 x Kys	22.8	9.1	40.1	0.21	2.5	30.1

Perkins and Stillwater respectively are highly significant and significant, indicating a real difference in production of different hybrids regardless of planting rates.

The F value of 5.24 obtained from the Perkins test for rates x hybrids interaction indicates a significant difference in planting rates required for different hybrids to produce their maximum yield. The best planting rate for one hybrid is not necessarily the best for another. The data from the Stillwater location were highly variable as is evident from the coefficient of variation, and did not show a significant difference in yield of different hybrids at different planting rates.

A varietal effect on percentage and yield of saleable seed is shown in Table 5. The hybrid Kys x K201C which ranked last in total yield at both locations was first at Perkins and second at Stillwater in yield of saleable seed. It produced the highest percentage of saleable seed at each location. The yield of discard seed was very low for Kys x K201C. The yield of saleable seed is different for different hybrids as indicated by the significant F values for hybrids at both the Perkins and Stillwater locations.

The interaction of rates x hybrids on yield of saleable seed at Perkins resulted in a highly significant F value, indicating that the yield of saleable seed of different hybrids is affected differently by planting rates. The data for Stillwater did not have a significant F value for rates x hybrids interaction.

That different hybrids produce ears that are of different size is indicated by the highly significant F value for Perkins and the significant value for Stillwater (Table 4).

The interaction of rates x hybrids resulted in a significant difference in ear-size as indicated by the F values (Table 4).

Results at both the Perkins and Stillwater locations indicate a noticeable effect of hybrid on lodging and total ear damage. This is evident when comparing results of Wf9 x 38-11 with the other three hybrids.

The high variability within the Stillwater test as indicated by the coefficient of variation (Tables 2 and 3) may explain why the rates x hybrids interaction for total yield and yield of saleable seed did not result in a significant F value. The significant F value for ear-size could be expected since the ear-size data are averages of a large number of ears and should vary less than measurements involving a smaller number of items. This idea is substantiated by the smaller coefficient of variation for ear-size (Table 4).

SUMMARY AND CONCLUSIONS

Studies were conducted to determine the effect of planting rate on total yield, saleable seed yield, and ear-size of hybrid corn for seed production. The tests were conducted on the Oklahoma Agricultural Experiment Station farm at Perkins, Oklahoma and on a farm in Stillwater Creek bottom southeast of Stillwater, Oklahoma. Four single cross hybrids Mf9 x 38-11, K4 x 38-11, Kys x K201C, and CI7 x Kys were used. These hybrids represent a range in maturity from early to late. The planting rates were one, two, and three plants per hill at Perkins and two, three, four, and five at Stillwater. A split plot design with four replications was used. Yields were determined for each hybrid at all rates; for each rate combining all hybrids and for each hybrid at each rate. The seed produced was size-graded to determine the amounts of saleable seed. Ear-size was determined for each rate and each hybrid. The data were analyzed by the analyses of variance.

The highest yield at each location was produced at the rate of two plants per hill. The four hybrids differed significantly in total yield but differences in total yield at the various planting rates were not significant. Results at the Perkins location indicated that different hybrids require different rates of planting to produce maximum total yield.

The four hybrids differed significantly in the amounts of saleable seed produced. The hybrids yielding the largest amount of saleable seed produced the lowest percentage of discard seed. The low planting rate produced the largest yield of saleable seed and the

smallest amount of discard seed. As the planting rate was increased the yield of saleable seed decreased and the amount of discard increased. The amounts of saleable seed produced at the different planting rates were highly significant, indicating that planting rate has a much greater influence on the size and quality of seed than on total yield. By careful selection of the proper hybrid and planting rate to correspond with the fertility of the soil, maximum yield of saleable seed should be obtained.

The affect of rate x hybrid interaction on total yield and yield of saleable seed was not significant at Stillwater but was highly significant at Perkins. The test at Stillwater was highly variable as indicated by the high coefficient of variation.

The results of these tests show that planting rate, hybrid, and interaction of rates x hybrid produce a significant effect on ear-size. The largest ears were obtained at the lowest planting rate at each location. As the planting rate was increased, the ear-size was decreased.

Lodging and total damage due to ear worms and disease were influenced by both planting rate and hybrid. Increasing the rate of planting increased the percentage of lodged plants and amount of total damage. The hybrids Kys x K201C and C17 x Kys showed the smallest amount of damage from ear worms and disease.

LITERATURE CITED

1. Brooks, James S., and Chessmore, Roy A.
Should hybrid corn be planted at a higher rate than open-pollinated varieties? Okla. Agri. Exp. Sta. Bul. 319:32-34. 1948.

2. Bryan, H. A., Eckhardt, R. C., and Sprague, G. F.
Spacing experiments with corn. Jour. Amer. Soc. Agron., 32: 707-714. 1940.

3. Huber, L. L.
Thin stands of corn produce bigger ears but lower yields than thicker plantings. Pa. Agri. Exp. Sta. Bul. 464. Sup. 2:10. 1944.

4. Hume, A. N., Center, O. D., and Hegnauer, L.
Distance between hills for corn in the Illinois corn belt. Ill. Agri. Exp. Sta. Bul. 126:357-374. 1908.

5. Kisselbach, T. A.
Effect of age, size, and source of seed on the corn crop. Neb. Agri. Exp. Sta. Bul. 305. 1937.

6. McVickar, M. H., and Shear, G. M.
Variations in response of different varieties and hybrids of field corn to planting rate. Jour. Amer. Soc. Agron., 38:933-935. 1946.

7. Mooers, C. A.
Planting rates and spacing for corn under southern conditions. Jour. Amer. Soc. Agron., 12:1-22. 1920.

8. Stringfield, G. H., and Thatcher, L. E.
Stands and methods of planting for corn hybrids. Jour. Amer. Soc. Agron., 39:995-1010. 1947.

9. Williams, C. G. and Welton, F. A.
Corn experiments. Ohio Agri. Exp. Sta. Bul. 282:89-90. 1915.

A P P E N D I X

Table 6.--Yield of ear corn in bushels per acre for three planting rates of four corn hybrids grown at Perkins, Oklahoma in 1947.

Hybrid	Replication 1	2	3	4	Total	Average
			One Plant per Hill			
Wf9 x 38-11	31.2	28.3	26.8	28.0	114.3	28.6
K4 x 38-11	33.6	32.3	29.3	30.4	125.6	31.4
Kys x K201C	32.3	28.3	29.1	28.0	117.7	29.4
C17 x Kys	26.4	26.7	28.8	27.5	109.4	27.4
			Two Plants per Hill			
Wf9 x 38-11	33.6	28.0	32.4	30.7	124.7	31.2
K4 x 38-11	29.1	30.1	38.7	33.9	131.8	33.0
Kys x K201C	28.5	27.2	31.5	26.1	113.3	28.3
C17 x Kys	30.4	28.8	34.4	29.1	122.7	30.7
			Three Plants per Hill			
Wf9 x 38-11	29.6	29.9	37.9	28.5	125.9	31.5
K4 x 38-11	25.6	26.7	29.3	21.9	103.5	25.9
Kys x K201C	24.5	26.7	29.3	17.6	98.1	24.5
C17 x Kys	24.8	26.4	30.1	25.6	106.9	26.7

Table 7.--Yield of ear corn in bushels per acre for four planting rates of four corn hybrids at Stillwater, Oklahoma in 1947.

Hybrid	Replication 1	2	3	4	Total	Average
			Two Plants per Hill			
Wf9 x 38-11	25.9	42.1	34.0	37.3	139.3	34.8
K4 x 38-11	26.7	35.4	28.5	42.1	132.7	33.2
Kys x K201C	22.1	29.9	17.1	30.7	99.8	25.0
C17 x Kys	24.6	27.3	24.5	41.1	117.5	29.4
			Three Plants per Hill			
Wf9 x 38-11	29.6	29.1	29.0	31.5	119.2	29.8
K4 x 38-11	34.5	27.7	24.3	38.7	125.2	31.3
Kys x K201C	34.8	10.9	12.0	31.9	88.7	22.2
C17 x Kys	30.5	16.6	18.9	34.1	100.1	25.0
			Four Plants per Hill			
Wf9 x 38-11	22.1	26.9	31.2	35.7	115.9	29.0
K4 x 38-11	8.3	21.9	29.6	35.7	95.5	23.9
Kys x K201C	1.9	11.5	8.0	28.2	49.6	12.4
C17 x Kys	7.2	14.4	13.8	35.5	70.9	17.7
			Five Plants per Hill			
Wf9 x 38-11	24.7	25.6	38.9	20.8	110.0	27.5
K4 x 38-11	15.0	26.9	33.3	13.9	89.1	22.3
Kys x K201C	10.5	9.6	6.9	22.4	49.4	12.4
C17 x Kys	9.4	16.0	20.8	29.3	75.5	18.9

Table 8.--Yield of saleable seed in bushels per acre for three planting rates of four corn hybrids at Perkins, Oklahoma in 1947.

Hybrid	Replication 1	2	3	4	Total	Average
			One Plant per Hill			
Wf9 x 38-11	22.6	20.5	19.4	20.3	82.8	20.7
K4 x 38-11	17.0	16.3	14.8	15.4	63.5	15.9
Kys x K201C	26.3	23.0	23.7	22.8	95.8	24.0
C17 x Kys	19.2	19.4	21.0	20.0	79.6	19.9
			Two Plants per Hill			
Wf9 x 38-11	18.6	15.5	17.9	17.0	69.0	17.3
K4 x 38-11	10.4	10.8	13.9	12.2	47.3	11.8
Kys x K201C	21.9	20.9	24.2	20.0	87.0	21.8
C17 x Kys	16.2	15.4	18.4	15.5	65.5	16.4
			Three Plants per Hill			
Wf9 x 38-11	13.5	13.7	17.3	13.0	57.5	14.4
K4 x 38-11	5.7	5.9	6.5	4.9	23.0	5.8
Kys x K201C	18.6	20.2	22.2	13.3	74.3	18.8
C17 x Kys	9.4	10.0	11.4	10.0	40.8	10.2

Table 9--Yield of saleable seed in bushels per acre for four planting rates of four corn hybrids at Stillwater, Oklahoma in 1947.

Hybrid	Replication 1	2	3	4	Total	Average
			Two Plants per Hill			
Wf9 x 38-11	15.7	25.6	20.6	22.6	84.5	21.1
K4 x 38-11	11.7	15.5	12.5	18.5	58.2	14.6
Kys x K201C	16.8	22.7	13.0	23.3	75.8	19.0
C17 x Kys	13.6	15.0	13.5	22.6	64.7	16.2
			Three Plants per Hill			
Wf9 x 38-11	13.0	12.8	12.7	13.8	52.3	13.1
K4 x 38-11	8.5	6.8	6.0	9.6	30.9	7.7
Kys x K201C	25.0	7.8	8.6	23.0	64.4	16.1
C17 x Kys	12.2	6.6	7.6	13.6	40.0	10.0
			Four Plants per Hill			
Wf9 x 38-11	8.2	9.9	11.5	13.2	42.8	10.7
K4 x 38-11	1.5	3.9	5.2	6.3	16.9	4.2
Kys x K201C	1.2	7.2	5.0	17.7	31.1	7.8
C17 x Kys	2.4	4.8	4.6	11.8	23.6	5.9
			Five Plants per Hill			
Wf9 x 38-11	8.7	9.0	13.7	7.3	38.7	9.7
K4 x 38-11	2.8	5.0	6.2	2.6	16.6	4.2
Kys x K201C	6.6	6.0	4.3	14.0	30.9	7.7
C17 x Kys	2.8	4.8	6.3	8.8	22.7	5.7

Table 10.--Average ear-size in pounds for three planting rates and four corn hybrids at Perkins, Oklahoma in 1947.

Hybrid	Replication 1	2	3	4	Total	Average
		One Plant per Hill				
Wf9 x 38-11	0.543	0.520	0.448	0.490	2.001	0.500
K4 x 38-11	0.344	0.367	0.314	0.390	1.415	0.354
Kys x K201C	0.403	0.359	0.379	0.448	1.589	0.397
C17 x Kys	0.417	0.476	0.404	0.464	1.761	0.440
		Two Plants per Hill				
Wf9 x 38-11	0.310	0.286	0.345	0.297	1.238	0.310
K4 x 38-11	0.286	0.320	0.349	0.310	1.265	0.316
Kys x K201C	0.260	0.266	0.274	0.264	1.064	0.266
C17 x Kys	0.290	0.292	0.307	0.272	1.161	0.290
		Three Plants per Hill				
Wf9 x 38-11	0.222	0.209	0.243	0.193	0.867	0.217
K4 x 38-11	0.162	0.196	0.224	0.198	0.780	0.195
Kys x K201C	0.159	0.182	0.196	0.123	0.660	0.165
C17 x Kys	0.184	0.192	0.220	0.184	0.780	0.195

Table 11.--Average ear-size in pounds for four planting rates and four corn hybrids at Stillwater, Oklahoma in 1947.

Hybrid	Replication 1	2	3	4	Total	Average
		Two Plants per Hill				
Wf9 x 38-11	0.375	0.418	0.365	0.341	1.499	0.375
K4 x 38-11	0.342	0.366	0.289	0.351	1.348	0.337
Kys x K201C	0.308	0.318	0.221	0.303	1.150	0.288
C17 x Kys	0.328	0.314	0.230	0.395	1.267	0.317
		Three Plants per Hill				
Wf9 x 38-11	0.308	0.214	0.219	0.249	0.990	0.248
K4 x 38-11	0.333	0.227	0.196	0.246	1.002	0.251
Kys x K201C	0.332	0.137	0.141	0.224	0.834	0.209
C17 x Kys	0.319	0.171	0.182	0.221	0.893	0.223
		Four Plants per Hill				
Wf9 x 38-11	0.138	0.155	0.186	0.170	0.649	0.162
K4 x 38-11	0.176	0.182	0.181	0.194	0.733	0.183
Kys x K201C	0.140	0.148	0.125	0.170	0.583	0.146
CI7 x Kys	0.129	0.137	0.162	0.177	0.605	0.151
		Five Plants per Hill				
Wf9 x 38-11	0.147	0.123	0.155	0.118	0.543	0.136
K4 x 38-11	0.178	0.168	0.149	0.127	0.622	0.156
Kys x K201C	0.145	0.124	0.090	0.129	0.488	0.122
CI7 x Kys	0.109	0.123	0.128	0.167	0.527	0.132

Typist: Elizabeth Hobbs Chessmore