



7-1-1910

# Stand and Soil Fertility as Factors in the Testing of Varieties of Corn

University of Tennessee Agricultural Experiment Station

C. A. Mooers

Follow this and additional works at: [http://trace.tennessee.edu/utk\\_agbulletin](http://trace.tennessee.edu/utk_agbulletin)

## Recommended Citation

University of Tennessee Agricultural Experiment Station and Mooers, C. A., "Stand and Soil Fertility as Factors in the Testing of Varieties of Corn" (1910). *Bulletins*.  
[http://trace.tennessee.edu/utk\\_agbulletin/501](http://trace.tennessee.edu/utk_agbulletin/501)

The publications in this collection represent the historical publishing record of the UT Agricultural Experiment Station and do not necessarily reflect current scientific knowledge or recommendations. Current information about UT Ag Research can be found at the [UT Ag Research website](#). This Bulletin is brought to you for free and open access by the AgResearch at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Bulletins by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact [trace@utk.edu](mailto:trace@utk.edu).

UNIVERSITY OF HAWAII  
LIBRARY  
*Withdrawn*

# BULLETIN

OF THE

## Agricultural Experiment Station

OF THE

## UNIVERSITY OF TENNESSEE



NUMBER 89

JULY 1910

### STAND AND SOIL FERTILITY AS FACTORS IN THE TESTING OF VARIETIES OF CORN

BY

C. A. MOOERS

KNOXVILLE, TENNESSEE

# The Agricultural Experiment Station

OF THE UNIVERSITY OF TENNESSEE

---

BROWN AYRES, President

---

## EXPERIMENT STATION COMMITTEE

BROWN AYRES

HUGH L. ANDERSON

T. F. P. ALLISON

HARRIS BROWN

## TREASURER

JAMES MAYNARD

## SECRETARY

WM. RULE

## STATION OFFICERS

BROWN AYRES, President of the University

H. A. MORGAN, Director, Zoologist and Entomologist

S. M. BAIN, Botanist

C. A. MOOERS, Chemist and Agronomist

C. A. KEFFER, Horticulturist

S. E. BARNES, Field Expert in Dairying, in cooperation with the U. S.  
Dept. of Agr.

M. JACOB, Veterinarian

\_\_\_\_\_, Animal Husbandman

S. H. ESSARY, Assistant Botanist and Mycologist

G. M. BENTLEY, Assistant Zoologist and Entomologist

MAURICE MULVANIA, Assistant Bacteriologist

E. C. COTTON, Assistant Entomologist

F. H. DENNISS, Dairyman

SHERMAN LEAVITT, Soil Chemist

J. F. VOORHEES, Consulting Meteorologist

W. K. HUNTER, Assistant Chemist (Soil Investigations)

W. H. MAYNARD, Assistant Chemist (Fertilizers and Feeds)

W. A. CAMPBELL, Farm Foreman

S. M. SPANGLER, Assistant in Plot Work

J. E. CONVERSE, Assistant in Cooperative Experiments, Crossville

W. N. RUDD, Assistant in Cooperative Experiments, McMinnville

L. R. NEEL, Assistant in Cooperative Experiments, Columbia

S. A. ROBERT, Supt. West Tenn. Exp. Station, Jackson

F. H. BROOME, Librarian and Secretary

MISS RUBY FRANKLIN, Office Assistant

MISS MARGARET COOMES, Stenographer

The Experiment Station building, containing the offices and laboratories, and the plant house and part of the Horticultural Department, are located on the University campus, 15 minutes walk from the Custom House in Knoxville. The experiment farm, the barns, stables, dairy building, etc., are located one mile west of the University, on the Kingston Pike. The fruit farm is adjacent to the Industrial School and is easily reached by the Lonsdale car line. Farmers are cordially invited to visit the buildings and experimental grounds.

---

Bulletins of this Station will be sent, upon application, free of charge, to any farmer in the State.

# STAND AND SOIL FERTILITY AS FACTORS IN THE TESTING OF VARIETIES OF CORN

## COMMENTS ON THE VARIETIES USED IN THE EXPERIMENTS

To determine the comparative productiveness of several varieties of corn is not always a simple matter and is apt to become increasingly difficult as the number of the leading varieties is reduced. Among the major factors which require attention may be mentioned season, soil fertility, and optimum stand. The factor of season, for practical purposes, is finally eliminated by long continuation of the trials and will not be especially considered at this time. The factor of soil fertility has proved to be of fundamental importance at this Station. A number of varieties have been found which are valuable only on relatively rich land. On the other hand, some of the best "poor-land" varieties are not the heaviest yielders on rich soils. The factor of stand, with special reference to optimum stand, which may be defined as the number of stalks per unit area (one acre, for example) which will produce the largest yield under any given soil and climatic conditions, appears to have been generally overlooked in station work of this kind, but may be of considerable importance, as is demonstrated by the data presented in the tables which follow. It probably is of greatest consequence in the South, where the long season permits a wide range of varieties to be grown. Leaming, an example of one of the best early varieties for this State, when planted early reaches maturity in about 121 days, and under favorable weather and soil conditions the stalks have averaged 8 1-2 feet in height. On the other hand, the Huffman variety under similar conditions reaches maturity in about 142 days, with an average height of 12 1-4 feet. The difference of nearly four feet in height, not to mention the three weeks' difference in length of season, is sufficient to warrant the determination for each variety of the rate of planting or "stand" that will give the highest yield per acre on the given soil. Also the question arises whether varieties which require practically the same length of season and are of similar height may not differ with respect to optimum stand.

The varieties of field corn tested for the past five years at this Station are principally those that gave most promise in preceding trials. The list, together with some data of interest in connection

with the experiments, is given in Table I, in which the varieties are arranged according to season, beginning with the earliest and ending with the latest, from data collected here.

The height of stalk, etc., in particular the number of ears per stalk, is of course variable, and the figures given, although carefully obtained from several seasons' records, should be considered as affording only a rough means of comparison.

TABLE I—Miscellaneous data concerning the varieties used in the experiments—Order of variety arrangement approximately according to length of season, from earliest to latest

Variety	No. of days from planting to maturity		Average data obtained under favorable field conditions				
	When early planted Apr. 15- May 15	When late planted June 4-7	Height of stalk	Height of ear	No. of ears per stalk	Relative size of ear	Per ct. of grain in ear corn
1. Iowa Silver Mine.....	120	99	Ft. In. 8 3	Ft. In. 4 2	1.05	68	84 6
2. Leaming .....	121	97	8 5	3 11	1.03	67	84 0
3. Riley's Favorite .....	122	99	8 9	4 2	0 97	66	85 8
4. Reid's Yellow Dent ..	124	100	8 10	4 4	0 98	75	85 2
5. Boone Co. White .....	127	108	9 10	4 10	0.98	79	82 3
6. Albermarle Prolific. . .	130	112	11 11	5 11	1.80	53	85 0
7. Hickory King .....	132	116	9 10	4 11	1.06	67	87 8
8. Cocke's Prolific .....	134	112	11 4	6 1	1 49	67	81.1
9. Webb's Impr'v'd Watson	135	117	10 1	5 5	1.04	85	83 4
10. McMackin's Gourdseed.	136	112	11 3	6 0	0 99	89	84 0
11. Marlboro Prolific. ....	139	112	11 0	5 4	1.45	64	83.5
12. Sanders' Improved....	138	116	11 4	6 0	1.22	66	87 4
13. Higgs .....	142	116	11 3	5 8	1.06	81	82.4
14. Huffman .....	142	124	12 3	7 3	0.98	95	85.2
15. Shaw's Improved .....	142	124	12 6	6 9	0.97	100	79 7

Next to height the most important difference in habit of growth of the varieties is the number of ears per stalk, which varies from 1.80 for Albermarle Prolific to 0.97 for Shaw's Improved, the conditions of favorable soil and season being the same for all.

#### RATE-OF-PLANTING EXPERIMENTS AND VARIETY TRIALS ON RICH LAND

For the past five years experiments have been conducted on the rich alluvial soil of the Experiment Station farm. Both the second bench land, which is rarely overflowed and which has been designated by the Bureau of Soils as "Huntington loam," and the fine sandy loam of the river bank, which is overflowed yearly, have been utilized. Each of these soils lies well for experimental purposes and is more than ordinarily uniform in fertility. Furthermore, changes were made from year to year in the location of the plats, and errors

due to inequality of soil were thus greatly reduced. The varieties were planted each year in a solid block, that is, without paths to separate them, so that field conditions were closely approached. They were arranged, however, in three groups—tall, medium and short—and each group was repeated three times—once at the rate of 6,000, once at 8,000, and once at 10,000 stalks per acre. The correct number was obtained as nearly as possible by carefully thinning out a too thick stand, but insects and accidents sometimes did damage which could not be repaired, and as each variety was allowed only 1.40 of an acre, a fair comparison can not be made except by the averaging of a number of seasons' results.

In order to facilitate comparisons and to bring out the effect of the different rates of planting on the yield, the varieties have been arranged in four groups. Under "A" are placed those grown principally for grain, and they have been arbitrarily subdivided into three groups, according to the length of season. Under "B" are placed

TABLE II—Average yields per acre of four crops of corn at three rates of planting when grown on rich alluvial soil (Huntington loan)—Seasons of 1905-1907

Group and variety	6000 stalks per acre		8000 stalks per acre		10000 stalks per acre	
	Grain	Stover	Grain	Stover	Grain	Stover
<b>A. Grain varieties</b>						
Early—120 to 124 days						
1. Iowa Silver Mine .....	47.6	1.16	52.7	1.29	59.8	1.42
2. Leaming .....	47.5	1.05	57.6	1.37	60.2	1.40
3. Riley's Favorite .....	48.1	1.19	58.0	1.36	61.7	1.45
4. Reid's Yellow Dent .....	50.6	1.30	61.6	1.59	64.3	1.61
Average .....	48.5	1.18	57.5	1.40	61.5	1.47
Medium—126 to 136 days						
1. Boone Co. White .....	53.2	1.46	63.6	1.84	70.5	2.11
2. Hickory King .....	54.0	1.81	62.4	2.06	74.1	2.36
3. Webb's Improved Watson .....	57.6	1.72	70.9	2.22	80.3	2.44
4. McMackin's Gourdseed .....	61.2	1.94	...	2.02	72.5	2.38
Average .....	56.5	1.73	65.6	2.04	74.4	2.32
Late—142 days						
1. Higgs .....	66.8	2.41	71.1	2.52	80.0	2.48
2. Huffman .....	70.6	2.55	86.3	3.12	81.1	3.24
3. Shaw's Improved .....	62.2	2.76	75.2	3.17	72.5	3.56
Average .....	66.5	2.57	77.5	2.94	77.9	3.09
<b>B. Silage varieties</b>						
Medium and late prolifics— 130 to 139 days						
1. Albermarle .....	68.9	2.07	75.3	2.33	75.0	2.66
2. Cocks .....	67.0	2.31	73.2	2.53	78.0	3.05
3. Marlboro .....	71.2	2.10	66.5	2.23	69.4	2.60
4. Sanders' Improved .....	65.0	2.11	67.4	2.35	63.2	2.60
Average .....	68.0	2.15	70.6	2.36	71.4	2.75



only the prolific varieties, which often produce several ears to a stalk and which are especially well suited for silage use on account of both the small size of their ears and their high yielding capacity. This grouping allows, therefore, of a comparison between varieties which differ as to length of season and height of stalk and also between single-ear-to-a-stalk varieties with those which have a strong tendency to produce two or more ears. Table II gives the results from four crops with fifteen varieties.

Since the character of the season has much to do with the results from different rates of planting there have been prepared two additional tables, one, Table III, giving the average yields of two crops grown in favorable seasons, and the other, Table IV, of two crops grown under unfavorable (dry weather) conditions.

TABLE III—Average yields per acre of two crops of corn at three rates of planting when grown on rich alluvial soil under favorable weather conditions—Crops of 1905 and 1906, early planting

Group and variety	6000 stalks per acre		8000 stalks per acre		10000 stalks per acre	
	Grain	Stover	Grain	Stover	Grain	Stover
<b>A. Grain varieties</b>						
<b>Early</b>						
1. Iowa Silver Mine . . . . .	51.5	1.21	61.5	1.40	72.6	1.61
2. Leaming . . . . .	51.2	1.17	63.7	1.54	71.1	1.59
3. Riley's Favorite . . . . .	53.5	1.35	67.8	1.56	71.6	1.53
4. Reid's Yellow Dent . . . . .	55.9	1.41	76.6	1.82	81.0	1.80
Average . . . . .	53.0	1.29	67.4	1.58	74.1	1.63
<b>Medium</b>						
1. Boone Co. White . . . . .	61.0	1.66	72.4	2.05	86.6	2.37
2. Hickory King . . . . .	64.9	1.90	75.7	2.46	86.0	2.87
3. Webb's Improved Watson . . . . .	64.6	1.86	79.6	2.22	90.5	2.70
4. McMackin's Gourdseed . . . . .	64.1	2.06	...	2.24	87.5	2.33
Average . . . . .	63.6	1.87	75.9	2.32	87.7	2.57
<b>Late</b>						
1. Higgs . . . . .	71.5	2.38	82.7	2.62	96.3	2.84
2. Huffman . . . . .	77.1	2.45	100.5	2.79	97.6	3.22
3. Shaw's Improved . . . . .	66.1	2.59	86.0	3.12	79.2	3.57
Average . . . . .	71.6	2.47	89.7	2.84	91.0	3.21
<b>B. Silage varieties</b>						
<b>Medium and late prolifics</b>						
1. Albemarle . . . . .	81.5	2.41	90.2	2.49	96.7	3.20
2. Cocke's . . . . .	74.2	2.39	94.7	2.62	98.0	3.52
3. Marlboro . . . . .	84.8	2.08	76.7	2.39	88.6	2.95
4. Sanders' Improved . . . . .	77.6	2.31	84.9	2.66	76.1	2.88
Average . . . . .	79.5	2.30	86.6	2.54	89.9	3.14

TABLE IV—Average yields per acre of two crops of corn at three rates of planting when grown on rich alluvial soil under unfavorable (dry weather) conditions—Crops of 1906, late planting, and 1907

Group and variety	6000 stalks per acre		8000 stalks per acre		10000 stalks per acre	
	Grain	Stover	Grain	Stover	Grain	Stover
<b>A. Grain varieties</b>						
<b>Early</b>						
1. Iowa Silver Mine .....	43.7	1.12	43.8	1.18	47.0	1.22
2. Leaming .....	43.8	0.92	51.6	1.20	49.3	1.21
3. Riley's Favorite .....	42.6	1.04	48.2	1.16	51.9	1.37
4. Reid's Yellow Dent .....	45.4	1.20	46.6	1.36	47.7	1.42
Average .....	43.9	1.07	47.6	1.23	49.0	1.31
<b>Medium</b>						
1. Boone Co. White .....	45.5	1.27	54.8	1.62	54.5	1.88
2. Hickory King .....	43.2	1.72	49.1	1.66	62.2	1.86
3. Webb's Improved Watson .....	50.6	1.59	62.3	2.22	70.2	2.17
4. McMackin's Gourdseed .....	58.3	1.83	52.9	1.79	57.6	2.42
Average .....	49.4	1.60	54.8	1.82	61.1	2.08
<b>Late</b>						
1. Higgs .....	62.2	2.43	59.5	2.42	63.7	2.11
2. Huffman .....	64.1	3.10	72.2	3.28	64.6	3.25
3. Shaw's Improved .....	58.2	2.97	64.7	3.23	65.8	3.55
Average .....	61.5	2.83	65.5	2.98	64.7	2.97
<b>B. Silage varieties</b>						
<b>Medium and late prolifics</b>						
1. Albemarle .....	56.4	1.74	60.4	2.17	53.2	2.13
2. Cocke's .....	59.8	2.24	51.8	2.44	57.9	2.59
3. Marlboro .....	57.7	2.12	56.4	2.08	50.3	2.25
4. Sanders' Improved .....	52.4	1.92	50.0	2.03	50.4	2.32
Average .....	56.6	2.01	54.7	2.18	53.0	2.32

REMARKS ON THE RESULTS REPORTED IN TABLES II, III, AND IV.

A comparison of the average results by groups for the four seasons (Table II and Diagram 1) shows that (1) both the early and the medium varieties under "A" responded to thick planting much better than any of the other groups and gave decidedly their highest yields when planted at the 10,000 rate; (2) both the late group under "A" and the prolific group gave their highest yields when planted at the 10,000 rate, but the increase in grain production was only slightly greater than that at the 8,000 rate, 0.4 bushel for the late varieties and 0.8 bushel for the prolifics; (3) of all the groups the late varieties under "A" gave the largest yields and under favorable conditions evidently have the greatest capacity for the production of both grain and forage; (4) the medium varieties under "A" increased in productiveness with the increase in number of stalks per acre to a greater extent than any of the others, and with the most favorable



stand were excelled only by the late varieties under "A"; (5) the prolifics varied less in yield when planted at different rates than any of the others and proved superior to the mediums under "A" at two out of three rates of planting; and (6) the early group possesses less productive capacity on this type of soil than any of the others.

A comparison of the yields obtained in favorable seasons with those obtained in unfavorable seasons shows up, as might be expected, especially to the advantage of the thick planting under the favorable conditions. That the thickest rate did not appreciably decrease the yield of any group in the unfavorable seasons is of special significance in its bearing on farm practice. The difference between the yields at the 8,000 and the 10,000 rate for the medium group under "A", for example, was 6.3 bushels in favor of the 10,000 rate in the unfavorable

FIG.

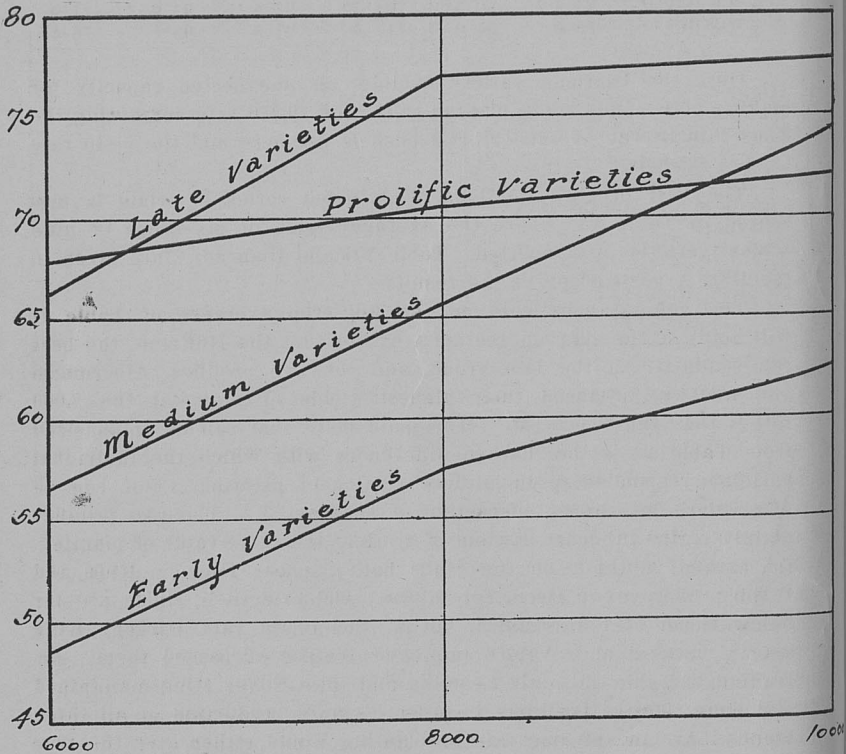


DIAGRAM 1.—YIELDS OF EACH OF THE FOUR GROUPS OF CORN WHEN PLANTED AT THREE DIFFERENT RATES ON FERTILE ALLUVIAL LAND—FROM THE AVERAGE RESULTS OF TABLE II.

seasons as compared with 11.3 bushels in the favorable seasons. In short, the two unfavorable seasons had the effect of reducing and making uniform the yields at all three rates of planting and did not affect disastrously the higher rates of planting as was rather expected.

Four rates of planting for two years with the Huffman and Leaming varieties on the fertile loam of the river bank are reported in Table V.

TABLE V—Results from rate-of-planting experiments on sandy river bank

Two stalks per hill in check rows	No. of stalks per acre	Yields per acre of shelled corn					
		1905		1906		Average for two years	
		Huffman	Leaming	Huffman	Leaming	Huffman	Leaming
Ft.		Bu.	Bu.	Bu.	Bu.	Bu.	Bu.
3 x 5	5810	55.8	43.0	73.5	80.0	64.7	61.5
3 x 4	7260	53.3	52.2	99.3	75.2	76.3	63.7
x 3.3	8800	63.3	60.3	104.4	83.5	83.9	71.9
x 2.8	10370	72.9	61.0	117.3	91.8	95.1	76.4

Here the Huffman variety exhibits an unexpected capacity for making high yields when planted thick, the 10,370 rate surpassing the 8,800 rate by the average of 11.2 bushels per acre and the 5,810 rate by 30.4 bushels.

The best because the longest-continued series of trials is presented in Table VI, where the average yields of six crops of nine typical varieties are reported. Table VII and Diagram 2 are given to facilitate a comparison of the results.

The general comments on the four-crop averages of Table II will apply to the six-crop averages, except that the Huffman, the best representative of the late group, and the two prolifics, Albermarle and Cocke's, produced their highest yields of grain at the 8,000 rather than the 10,000 rate. The main point that can be emphasized from Table VI is the marked differences with which the individual varieties responded to the different rates of planting. This can be understood best by an inspection of Diagram 2. The two prolifics plainly varied the least in yield of grain at the three rates of planting. In marked contrast, on the other hand, appear Hickory King and Webb's Improved Watson, for at the 6,000 rate their yields are far below those of the prolifics, but at the 10,000 rate Hickory King nearly equalled and Webb's Improved Watson surpassed them. According to Table VII, only Leaming and Iowa Silver Mine maintained the same relative positions in order of grain production at all three stands. In fact, no one rate of planting would either give the true relative productiveness of the varieties or bring out characteristics such as have been mentioned.

TABLE VI—Average yields per acre of six crops of corn grown on rich alluvial soil (Huntington loam)—Seasons of 1905-1909

Variety	6000 stalks per acre		8000 stalks per acre		10000 stalks per acre	
	Grain	Stover	Grain	Stover	Grain	Stover
	Bu.	Tons	Bu.	Tons	Bu.	Tons
Iowa Silver Mine .....	46.8	1.17	54.5	1.32	58.1	1.39
Leaming .....	48.2	1.15	60.1	1.41	63.4	1.50
Reid's Yellow Dent .....	49.9	1.26	62.2	1.50	65.1	1.55
Boone Co. White .....	54.2	1.43	60.3	1.74	64.9	1.92
Hickory King .....	53.9	1.72	62.2	2.00	71.1	2.25
Albermarle .....	67.7	2.10	72.0	2.33	71.5	2.57
Cocke's Prolific .....	67.3	2.29	72.8	2.54	72.8	2.88
Webb's Improved Watson .....	55.0	1.70	70.1	2.10	75.2	2.19
Huffman .....	68.8	2.89	77.0	3.02	72.5	3.26

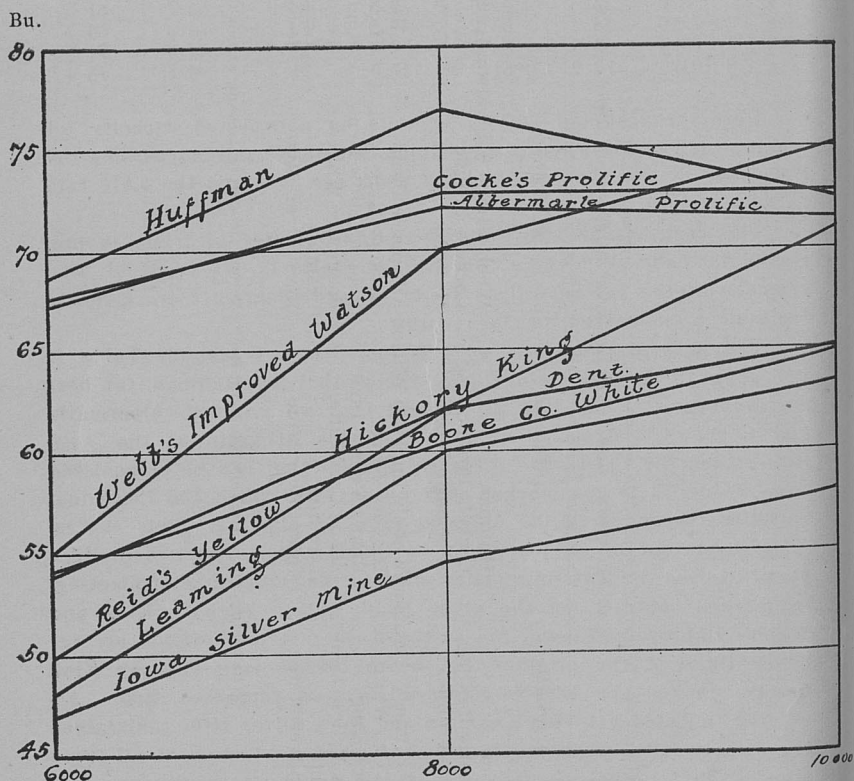


DIAGRAM 2.—AVERAGE YIELDS OF EACH OF NINE VARIETIES OF CORN AT THREE RATES OF PLANTING—AVERAGE OF SIX CROPS ACCORDING TO THE DATA OF TABLE VI.

TABLE VII—Order of grain production of nine varieties of corn at each of three rates of planting and with most favorable, or optimum, stand. From the average of six crops on rich alluvial soil

Rank	At 6000 rate	At 8000 rate	At 10000 rate	With most favorable stand and yield of grain at same
1st	Huffman .....	Huffman .....	Webb's Impr'v'd Watson	Huffman ... 8000 stalks, 77.0 bu.
2nd	Albemarle Prolific .....	Cocke's Prolific .....	Cocke's Prolific .....	Webb's Imp. Watson..10000 " 75.2 "
3rd	Cocke's Prolific .....	Albemarle Prolific .....	Huffman .....	Cocke's Prolific .....
				8000 " 72.8 "
				or 10000
4th	Webb's Impr'v'd Watson	Webb's Impr'v'd Watson	Albemarle Prolific .....	Albermarle Prolific... 8000 " 72.0 "
5th	Boone Co. White .....	Hickory King* .....	Hickory King .....	Hickory King .....
				10000 " 71.1 "
6th	Hickory King .....	Reid's Yellow Dent *	Reid's Yellow Dent .....	Reid's Yellow Dent ..10000 " 65.1 "
7th	Reid's Yellow Dent....	Boone Co. White .....	Boone Co. White .....	Boone Co. White....10000 " 64.9 "
8th	Leaming .....	Leaming .....	Leaming .....	Leaming .....
				10000 " 63.4 "
9th	Iowa Silver Mine .....	Iowa Silver Mine .....	Iowa Silver Mine....	Iowa Silver Mine....10000 " 58.1 "

\* The grain yield of Hickory King and Reid's Yellow Dent were the same at this rate—8000 stalks per acre.

## VARIETY TRIALS ON BOTH POOR AND FERTILE UPLANDS

The experiments with varieties of corn on poor upland at the Experiment Station farm were made at two rates of planting—6,000 and 8,000 stalks per acre. As each rate was possibly too high for any of the varieties except for silage purposes, no conclusions on this point can be drawn, but attention is called to the relatively inferior yields made by the late varieties, Higgs, Huffman and Shaw's Improved, all of which ranked high in the rich-land experiments. Also the relatively high-yielding capacity of Hickory King under unfavorable conditions should be noted. Diagrams 1 and 3 can be used to bring out the comparisons of the yields obtained by the different groups on two soils of decidedly different fertility.

TABLE VIII—Average yields per acre of four crops of corn at two rates of planting when grown on poor upland

Group and variety	6000 stalks per acre		8000 stalks per acre	
	Grain	Stover	Grain	Stover
	Bu.	Tons	Bu.	Tons
<b>A. Grain varieties</b>				
Early—120 to 124 days				
1. Iowa Silver Mine .....	31.5	0.93	23.5	0.76
2. Leaming .....	26.7	0.75	20.7	0.76
3. Riley's Favorite .....	26.7	0.76	25.3	0.91
4. Reid's Yellow Dent .....	26.7	0.96	26.5	0.97
Average .....	27.9	0.85	24.0	0.85
Medium—126 to 136 days				
1. Boone Co. White .....	32.1	1.37	26.1	1.14
2. Hickory King .....	40.7	1.27	37.8	1.51
3. Webb's Improved Watson .....	32.9	1.28	33.4	1.45
4. McMackin's Gourdseed .....	32.1	1.41	26.1	1.67
Average .....	34.5	1.33	30.9	1.44
Late—142 days				
1. Higgs .....	22.1	1.24	27.9	1.76
2. Huffman .....	28.3	1.86	27.2	2.12
3. Shaw's Improved .....	18.1	1.81	20.4	2.42
Average .....	22.8	1.64	25.2	2.10
<b>B. Silage varieties</b>				
Medium and late prolifics—130 to 139 days				
1. Albermarle .....		1.45	35.8	1.87
2. Cocks .....	30.3	1.34	32.7	1.87
3. Marlboro .....	34.5	1.40	33.8	1.68
4. Sanders' Improved .....	32.1	1.41	32.9	1.79
Average .....	32.3	1.40	33.8	1.80

In addition to trials reported from the poor uplands in Table VIII, a number of the most important varieties have been tested on different farms in various parts of Middle Tennessee, under the supervision of a well-trained Station man, who attended to the crops from the time of planting to the time of harvesting. Also a number of

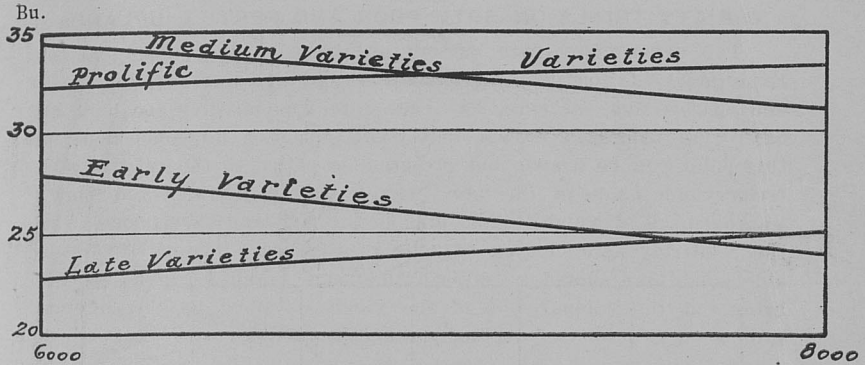


DIAGRAM 3—YIELD OF GRAIN FROM EACH OF FOUR GROUPS OF CORN WHEN PLANTED AT TWO RATES ON POOR UPLAND—FROM THE AVERAGE RESULTS OF TABLE VIII.

miscellaneous trials on both poor and fertile uplands at the Station farm have been made during the last five years. In all of these experiments Hickory King has been taken as a basis of comparison, and in several instances yields have been gotten from as many as nine plots of this variety grown alternately with the same number of plots of some other variety, thus specially tested to reduce the factor of soil inequality to the minimum. In nearly every instance either different rates of planting were made or, as was frequently done, a favorable number of stalks as determined by previous rate-of-planting trials was allowed to each variety. Table IX gives a summary of all the available data from poor-land trials and Table X from fertile uplands. Diagram 4 shows the comparative yields of the different varieties when grown on the three types of soil under consideration, poor upland, fertile upland, and rich alluvial land.

TABLE IX—Miscellaneous variety trials on poor uplands which produced from 21.2 to 40 bushels of Hickory King corn per acre

Hickory King in comparison with—	No. of trials	No. of trials in favor of Hickory King	Average yield of grain per acre in favor of Hickory King
			Bu.
1. Iowa Silver Mine.....	12	8	5.2
2. Leaming.....	12	8	5.0
3. Boone Co. White.....	11	10	9.0
4. Webb's Improved Watson.....	12	10	8.2
5. Higgs.....	3	3	12.4
6. Huffman.....	7	6	9.9
7. Albemarle Prolific.....	9	9	6.4
8. Cocke's Prolific.....	3	3	7.9



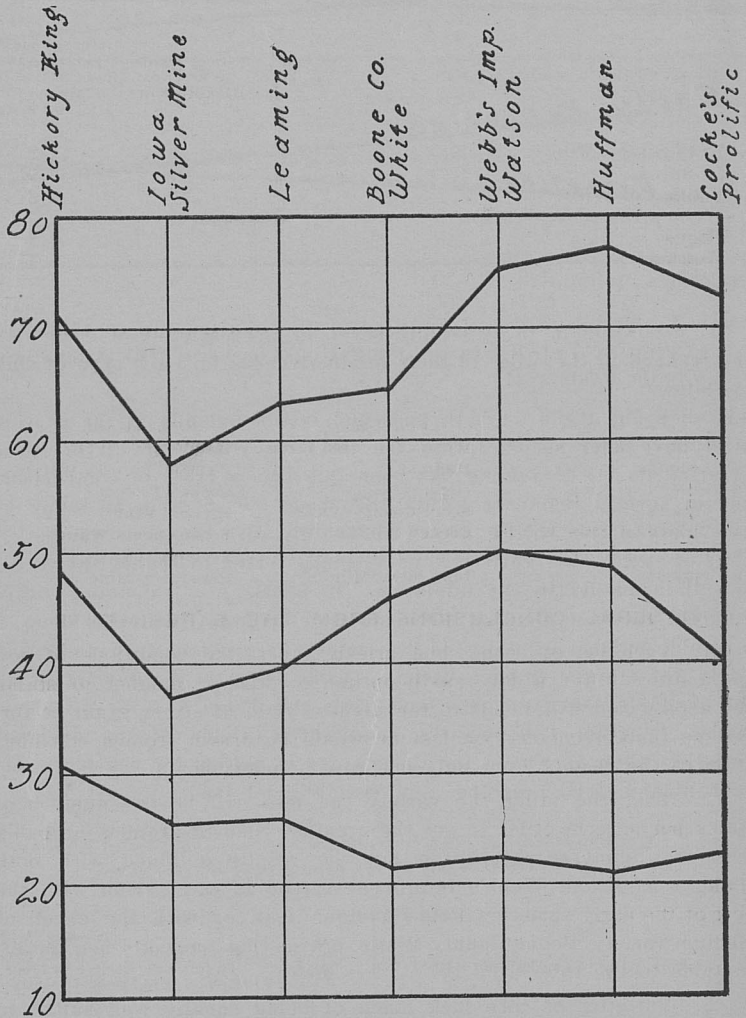


DIAGRAM 4.—COMPARATIVE YIELDS OF GRAIN OF SEVEN VARIETIES OF CORN ON THREE SOILS DIFFERING IN FERTILITY.

The upper curve represents rich alluvial soil; the middle curve fertile upland; the lower curve poor upland. The figures represent bushels of grain per acre.

TABLE X—Miscellaneous variety trials on fertile uplands which produced from 31.6 to 64.8 bushels of Hickory King corn per acre

Hickory King in comparison with—	No. of trials	No. of yields in favor of Hickory King	Average yield per acre in favor of (+) or against (–) Hickory King
			Bu.
1. Iowa Silver Mine .....	3	3	+ 11.2
2. Leaming .....	12	10	+ 8.9
3. Boone Co. White .....	5	3	+ 2.2
4. Webb's Improved Watson .....	10	6	– 2.0
5. Higgs .....	2	1	+ 4.3
6. Huffman .....	5	3	– 0.4
7. Cocke's Prolific .....	3	2	+ 7.9

According to these results seven of the varieties of corn may be arranged in the order of their productiveness for each type of soil, as follows:

Rank	Poor Upland	Fertile Upland	Rich Lowland
1st	Hickory King	Webb's Improved Watson	Huffman
2nd	Leaming	Huffman	Webb's Improved Watson
3rd	Iowa Silver King	Hickory King	Cocke's Prolific
4th	Cocke's Prolific	Boone County White	Hickory King
5th	Webb's Improved Watson	Cocke's Prolific	Boone County White
6th	Boone County White	Leaming	Leaming
7th	Huffman	Iowa Silver Mine	Iowa Silver Mine

### GENERAL CONCLUSIONS FROM THE EXPERIMENTS

1. Varieties of corn when grown under like conditions of soil and culture differ widely as to optimum stand or number of stalks per acre which will result in the highest yield of either grain or forage, so that erroneous conclusions would be drawn from a consideration of the results from only one rate of planting.

2. That the taller the variety the less will be the number of stalks per acre in order to get the greatest yield of grain is probably true as a general proposition but the results obtained with both Hickory King and Webb's Improved Watson in comparison with the best of the early varieties, Reid's Yellow Dent, or with the excellent medium variety, Boone County White, proves that there are marked exceptions to the rule.

3. Varieties of corn lack much of being equally well suited to both poor and rich land, so that those of superior value on one may be of inferior value on the other.

## COMMENTS ON THE VARIETIES OF CORN RECENTLY TESTED

---

In addition to soil adaptability and productiveness, the length of season and the probable market condition, or soundness, of a variety are of great practical importance. On many farms corn is followed by wheat, a rotation not well suited to the late varieties. There are demands both for very early corn and for silage corn, and furthermore there are the grower's personal likes and dislikes, so that a number of varieties are needed to answer all requirements. For several reasons, therefore, a brief additional discussion of the varieties reported in this bulletin is important.

### THE EARLY VARIETIES

Of the four early-maturing varieties three are yellow corns with reb cobs; namely, Leaming, Riley's Favorite, and Reid's Dent. Iowa Silver Mine is a white corn with a white cob. All are standard varieties frequently grown in the states to the north of Tennessee and but little grown farther south. Their early maturity, and also their adaptability to poor lands, makes them of more or less importance throughout the State. None can be especially recommended for soundness of grain as grown under our conditions. If the crop be cut and shocked in hot weather, as might be the case in the latter part of August, heating, with serious loss, is apt to follow and their rather scant covering of husks favors the ravages of the corn earworm. All these varieties are short—8 to 9-foot stalks, with ears 4 to 4 1-2 feet above the ground, being the rule even on rich bottom land. They should therefore be planted, as the results of this bulletin prove, considerably thicker than the coarse varieties so often grown. Failure to keep this point in mind has often been the cause of dissatisfaction. Reid's Yellow Dent is probably the best of the four for the more fertile soils and Leaming for the poor uplands, although for the latter Iowa Silver Mine is little if any inferior. On the poor soil of the Cumberland Plateau both of the last-mentioned varieties have done extra well and have shown superior vigor and thrift as compared with the varieties that so easily surpass them on the rich lands. The seed can be obtained through seedsmen, but there is need of first-class home-grown seed, which is considered to be more desirable, because acclimated, than either Northern or Western-grown seed.

## THE MEDIUM VARIETIES

The four medium varieties reported in this bulletin vary greatly both as to habit of growth and adaptability to soil. All are white-grained with white cobs.

Boone County White is a standard variety in the southern part of the corn-belt, where it has the reputation of being well suited to rich land. This reputation has proved to hold good here. It is the earliest of the midseason varieties, produces as a rule one medium-sized ear to a stalk, is not suited to poor or average upland, and sometimes is lacking in soundness. On fertile land, however, some of the most successful farmers in this State consider it a desirable and reasonably satisfactory variety.

Hickory King is said to have originated in Virginia. At any rate, it is extensively grown in certain counties of that State, and its use is rapidly spreading throughout Tennessee. The ears are small and very thoroughly protected by husks and more than one ear is frequently produced on the stalk. The grains are so large and flat that when once seen they are likely to be remembered. No other variety grown at this Station equals this one in the high percentage of shelled corn—70 pounds of ear corn as grown under average field conditions running from 61 to 63 pounds of shelled corn. None of the other varieties surpass it in soundness, and no other has proved its equal as a grain producer on either poor or medium upland, and its capacity to give high yields even on rich land has been demonstrated more than once. For example, a block of 16 1-40-acre plots planted at the rate of 10,000 stalks per acre on fertile bottom land at the Station farm averaged in 1909 nearly 90 bushels of shelled corn to the acre. The chief objections urged against it are the hardness of grain and the difficulty with which it is husked. Selection and breeding may overcome these defects as well as increase the yield. Also selections are suggested both for a one-eared variety for grain and for a prolific strain for silage, for which purpose on poor uplands it is even now well suited. Failure to plant thick enough is not an uncommon cause of unsatisfactory yield, especially if ranker-growing and large-eared varieties, which require wide spacing, have, so to speak, established the rate of planting.

Watson corn is an old and well-known variety in certain counties of Middle Tennessee. About twenty years ago Mr. M. C. Webb, of Shelbyville, began to select from it with the object of effecting certain improvements, especially in the type of ear and of grain. This selection has been continued until a distinct and constant type has been obtained. The ears are large, the cobs are white, and the grain is creamy white. This variety ranks along with Hickory King in hardness and soundness of grain. In fact, of all of the varieties

tested here these two stand out as unequaled in these respects. Webb's Improved Watson is well suited to either fertile upland or rich bottom land and is worthy of extended trial throughout the State. Attention is called again to the fact that this variety responds well to thick planting and that a failure to get a full stand is more apt to result in a serious loss than in the case of either a large-eared variety like the Huffman or a prolific variety like the Albermarle.

McMackin's Gourdseed is a variety originated by Dr. J. B. McMackin, of Wayland Springs, Tenn. The ears are large; the grain is extra deep and inclined to chaffiness, a fact which should be considered in the further improvement of this variety. It is, however, a promising variety, especially for fertile soils, and Table II shows that in common with some other large-eared varieties it gives comparatively high yields when planted at a low rate, which is a point in its favor.

#### THE LATE VARIETIES

Shaw's Improved is grown to some extent farther south, but has not proved of sufficient value in our experiments to warrant further attention. It is very late in maturing and produces an excessive growth of stalk.

Higgs is a typical red-cob corn of late maturity and is grown to a limited extent in this State. The seed was received from Mr. W. W. Ogilvie, of Lewisburg, Marshall County. The ears are of medium size with deep grain. The lateness of this variety and its adaptability to rich rather than poor land are against its common use. However, the fact that it has met the approval of some of our most successful farmers indicates it to be a good foundation for an improved and standardized red-cob corn.

The Huffman variety was originated about sixty years ago and is the product of continued and painstaking selection on the part of a prominent Bedford County farmer, Mr. G. C. Huffman, of Normandy. The work of improvement has been continued by his son, T. L. Huffman, and the result is as true to type and as well standardized a variety of corn as any thus far tested by this Station. Mr. Huffman thought that a variety which produced only one large ear to a stalk was desirable from the point of view of economy both in harvesting and in plant production, since the two small ears such as are produced by a prolific variety each require about as much labor in harvesting as the one large ear, and the prolific plant is obliged to produce nearly two ears with two sets of husks to one ear with one set of husks for the other. Mr. Huffman therefore selected continuously for a single ear to the stalk; also for a large cylindrical ear with comparatively small cob and for deep pearl-white grains, with large

germs, but with only a slight dent, and set in straight rows. All of these particulars now characterize this variety, and the exceptionally deep grain with only a small dent is a rather unusual combination. From a score-card point of view the chief defects of the variety are the wide furrow spaces between the rows and the rather poor development of the butt of the ear, which is inclined to be flat with grains too easily dislodged. It has won first premium, however, at the State Fair for the past three years. All of the records obtained at this Station show that it is well suited only to the most fertile uplands and to the rich alluvial soils. On such soils its productiveness has been unequalled. From a practical point of view its principal drawback is lateness of maturity coupled with the time required for the ears to dry out thoroughly and get into prime market condition—a fact which should be carefully considered and which necessitates early planting for the satisfactory results secured by the many who like this variety.

### THE PROLIFIC VARIETIES

The prolific varieties, such as are here considered, are to be found only in the Southern States; all produce white grain and have white cobs. Their season is rather long, the stalk and leaf production is heavy, and the tendency to produce more than a single ear to a stalk is marked, even five or six ears to a stalk being not uncommon. The ears are small, well covered with the husks, and with shallow, hard grains, often resembling flint corn, and with relatively large cobs. Probably a number, if not all, have been obtained from selection from Cocke's Prolific, the ears of which certainly give no indication of any definite selection. Of the four varieties here reported Albermarle produces the smallest ears and on the average the largest number per stalk. It is therefore especially well suited for silage purposes, the small ears passing easily through the rollers of the cutter.

The Marlboro variety produces ears which show more uniformity and have deeper grains than the others. The superiority of any one of the first three varieties will probably depend upon the soil condition. Cocke's Prolific has proved to have a slightly higher producing capacity of both grain and stover when planted on rich land than the others. On less fertile land both Albermarle and Marlboro seem somewhat superior to Cocke's. According to our results, however, none is well suited to poor land or is recommended for even average upland. Sanders' Improved has given results inferior to the three others. The grain is deep and the ears are of uniform appearance, showing that attention has been paid to selection for uniformity.