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VARIETY TESTS WITH COTTON AND CORN.

Williamson Method of Corn Culture.

By

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AND

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VARIETY TESTS OF COTTON

By J. F. Duggar, Director and Agriculturist

and

L. N. Duncan, Assistant in Agriculture.

In order that the results of our unpublished variety tests of cotton may be in the hands of farmers in ample time for use in making plans for another year, this brief bulletin is presented. The results of other experiments made in 1905 and 1906 with cotton and corn will be reserved for future publications.

In addition to the varieties of cotton grown in plots of sufficient size to give an accurate measure of the yield per acre, a much larger collection of varieties has been grown, each on a small area, with a view to making descriptions of all obtainable varieties. We expect to publish a bulletin containing all these descriptions early next spring.

The two tables that follow give the yields in plot tests with 32 varieties of cotton in 1905 and with 20 varieties in 1906.

They were grown on ordinary upland. The soil where this test was made in 1905 was a stoney, reddish-gray sandy loam and the soil where varieties of cotton grew in 1906 was a gray sandy loam free from stones.

Yields of lint and seed and total value per acre of varieties of cotton in 1905.

Rank	Variety	Yield lint per acre	Yield seed per acre	Total value per acre*
		Lbs.	*Lbs.*	
1.	Toole	531.2	851.2	$67.04
2.	Cook's Improved	528.0	828.8	66.52
3.	Cleveland	520.0	840.0	65.68
4.	Bancroft's Herlong	488.0	948.8	61.76
5.	Christopher	480.0	916.8	61.62
6.	Schley	480.0	880.0	61.36
7.	Rowden	480.0	868.8	61.28
8.	Pullnot	480.0	768.0	60.58
9.	Layton	480.0	755.2	60.49
10.	Russell	464.0	896.0	59.63
11.	Strickland	459.2	902.4	59.12
12.	Willett's Red Leaf	452.8	792.0	57.61
13.	Crossland	456.0	723.2	57.50
14.	Hawkins	456.0	688.0	57.26
15.	Alex. Allen	440.0	832.0	56.42
16.	Culpepper (av. 5 plots)	433.6	812.5	55.55
17.	Haggaman	432.0	776.0	55.11
18.	Peterkin	432.0	688.0	54.50
19.	Texas Bur	424.0	806.4	54.40
20.	Southern Wonder	420.8	819.2	54.11
21.	Blue Ribbon	416.0	916.8	54.06
22.	Cameron	424.0	736.0	53.91
23.	Truitt	416.0	768.0	53.22
24.	Woodfin's Prolific	404.8	800.0	52.15
25.	Jackson's Limbless	411.2	691.2	52.13
26.	King No. 1	408.0	696.0	51.79
27.	Shine	400.0	792.0	51.54
28.	No. 148 (U. S. D. A. Selec.)	400.0	772.8	51.41
29.	Berry's Big Boll	392.0	824.0	50.85
30.	Welborn's Pet	376.0	680.0	48.00
31.	Rogers	324.0	611.2	41.54
32.	Dickson†	160.0	320.0	20.64

*Lint at 11 1-2c; seed at 70c.
†Ruined by boll rot.

The fertilizer used consisted of the following ingredients and amounts per acre, all applied before planting:

1905.		1906.
80 lbs.	Nitrate of soda	80 lbs.
160 lbs.	Cotton seed meal	80 lbs.
240 lbs.	Acid phosphate (14 per ct. available)	200 lbs
64 lbs.	Muriate of potash	48 lbs.
544 lbs.		408 lbs.

The crop was injured by excessive shedding late in the summer of 1906, and by a severe wind and rain storm in September, 1906, which considerably reduced the yield.

Yields of lint and seed and total value per acre of varieties of cotton in 1906.

Rank	Variety	Yield lint per acre	Yield seed per acre	Total value per acre*
		Lbs.	*Lbs.*	
1.	Cook's Improved	617.6	1076.8	$69.30
2.	Cleveland	608.0	1184.0	69.09
3.	Layton	612.8	1072.0	68.78
4.	Toole	608.0	1048.0	68.14
5.	Pullnot	596.8	1124.8	67.55
6.	King No. 1	592.0	1136.0	67.15
7.	Peterkin	588.8	1076.8	66.42
8.	Hawkins	552.0	1088.0	62.82
9.	Alex. Allen	536.0	1072.0	61.10
10.	Pride of Georgia	516.8	1200.0	60.08
11.	Willett's Red Leaf	512.0	976.0	58.03
12.	Christopher	504.0	1008.0	57.46
13.	Culpepper	503.3	1069.0	57.02
14.	Russell (U. S. D. A. Selec.)	488.0	1048.0	56.14
15.	Sunflower	472.0	1184.0	55.49
16.	Truitt	480.0	1008.0	55.06
17.	Russell (Ala.)	472.0	1016.0	54.31
18.	Floradora	460.8	1108.8	53.84
19.	Bancroft's Herlong	440.0	908.8	50.36
20.	No. 148 (U. S .D. A. selec.)	390.4	852.8	45.01

*Lint at 10c per pound and seed at 70c per 100 pounds.

The tables show that in total value of lint and seed the five leading varieties were in order in 1905, Toole, Cook's Improved, Cleveland, Bancroft's Herlong, and Christopher, and in 1906, Cook's Improved, Cleveland, Layton, Toole and Pullnot.

Sunflower and Floradora are long staple varieties and such staples commanded in Opelika in the fall of 1906 a premium of about four cents per pound.

By assigning a price of 14 cents per pound to these long staples, the total value of their lint and seed becomes respectively $74.37 and $72.27. However, the land on which

these two varieties and Willett's Red Leaf grew is slightly lower and richer than that occupied by other varieties, so that even at a premium of four cents per pound it is not certain that the long staples head the list in total value of product. The bolls of these two long staple varieties being small picking is more difficult than with big boll varieties like Cook's Improved and Cleveland.

The Experiment Station has no seed for sale or distribution. Hence we give below the addresses of the parties from whom our seed was obtained:

Variety.	Seed from.
Alex. Allen	A. W. Allen, Temple, Ga.
Bancroft's Herlong	Edward Bancroft, Athens, Ga.
Berry's Big Boll	Harvey Seed Co., Montgomery, Ala.
Blue Ribbon	South Carolina Experiment Station, Clemson College, S. C.
Cameron	R. R. Cameron, West Green, Ala.
Christopher	R. H. Christopher, LaGrange, Ga.
Cleveland	J. R. Cleveland, Decatur, Miss.
Cook's Improved	J. R. Cook, Schley, Ga.
Crossland	U. S. Dept. of Agriculture, Washington, D. C.
Culpepper	J. E. Culpepper, Luthersville, Ga.
Dickson	Capers Dickson, Oxford, Ala.
Floradora	R. D. Tatum, Palmetto, Ga.
Haggaman	U. S. Dept. of Agriculture, Washington, D. C.
Hawkins	B. W. Hawkins, Nona, Ga.
Jackson's Limbless	Harvey Seed Co., Montgomery, Ala.
King No. 1	T. J. King Co., Richmond, Va.
Layton	R. D. Layton, Cresston, S. C.
No. 148 (U. S. D. A.)	U. S. Dept. of Agriculture, Washington, D. C.
Peterkin	J. A. Peterkin, Ft. Motte, S. C.
Pride of Georgia	U. S. Dept. of Agriculture, Washington.
Pullnot	J. E. Bradbury, Athens, Ga.
Rodgers	R. H. Rodgers, Darlington, S. C.
Rowden	J. A. Shine, Faison, N. C.
Russell	James Moore, Auburn, Ala.
Russell (U. S. D. A.)	U. S. Dept. of Agriculture, Washington.
Schley	R. D. Tatum, Palmetto, Ga.
Shine	J. A. Shine, Faison, N. C.
Southern Wonder	L. F. Grier, Oxford, Ala.
Strickland	U. S. Dept. of Agriculture, Washington, D. C.
Sunflower	M. Schaefer, Yazoo City, Miss.
Texas Bur	C. E. Smith, Locust Grove, Ga.
Toole	W. W. Toole, Augusta, Ga.
Truitt	G. W. Truitt, LaGrange, Ga.
Welborn's Pet	N. L. Willett Drug Co., Augusta, Ga.
Willett's Red Leaf	N. L. Willett Drug Co., Augusta, Ga.
Woodfin's Prolific	S. V. Woodfin, Marion, Ala.

TEST OF VARIETIES OF CORN.

All tests of varieties of corn except that made in 1906

were published in Alabama Experiment Station Bulletin No. 134, issued in December, 1905. The results of the experiment made in 1906 are given below.

Yield of shelled corn per acre in 1906.

Rank	Variety.	Per cent stand.	Yield per acre.
		Per ct.	*Bus.*
1.	Sanders	97	28.9
2.	Marlboro	97	28.3
3.	Mosby	93	26.0
4.	Henry Grady	97	25.7
5.	Local White Cob	97	25.4
6.	Albemarle	96	25.1
7.	Experiment Station Yellow	97	24.7
8.	McMackin's Gourd Seed	96	24.4
9.	Cocke's Prolific	97	24.3
10.	Boone County Special	97	24.0
11.	Boone County White (Tenn.)	97	23.7
11.	Boone County White (Ind.)	97	23.7
12.	No. 77 U. S. D. A. Selection	97	23.4
13.	Henry Grady (white cob select)	97	23.1
14.	Red Corn	97	22.3
15.	Hickory King	97	22.0
16.	Leaming	97	18.6
16.	Reid's Yellow Dent	97	18.6
17.	Silver Mine (Iowa)	97	17.9
18.	Riley's Favorite	97	15.7

The best yields were made by Sanders, Marlboro, Mosby and Henry Grady, all except the latter being prolific or several-eared varieties. Sanders, Mosby, and Henry Grady are the varieties which in previous experiments made here have taken high rank. The early northern varieties are again shown to be worthless for Alabama conditions, the yield being low and the grain of very inferior quality.

The fertilizer used per acre consisted of

80 lbs. Nitrate of soda.
80 lbs. Cotton seed meal.
240 lbs. Acid phosphate.
40 lbs. Muriate of potash.

440 lbs. Total

The soil was a reddish-gray, stony, sandy loam, and this

upland field was the same on which the test of varieties of cotton was made in 1905.

We obtained seed of Albermarle from J. E. Stone, Sylacauga, Ala.; Henry Grady from W. J. Headden, Austelle, Ga.; Experiment Station Yellow from Ala. Expt. Sta., Auburn, Ala.

Seed of other varieties except the local white cob and Experiment Station Yellow were furnished by the U. S. Dept. of Agriculture, Washington, D. C., the early varieties having been grown in the North.

WILLIAMSON METHOD OF CORN CULTURE.

The press of the southern states has given much space during the past year or two to a discussion of a method of corn culture successfully practiced and ably advocated by Mr. McIver Williamson, of Darlington, S. C.

The distinctive features of this method are as follows:

(1) Dwarfing the corn plant by withholding fertilizers until the plant is several feet high and by omitting all cultivation from the time the plant is about eight inches high until it is about eighteen inches high.

(2) Thick planting in the row, which is made possible by the small size of the plants.

(3) Use of the turn plow in the last cultivations.

(4) Planting on land enriched by plowing under the entire growth of cowpeas.

To determine whether the dwarfing of plants and thicker planting have a favorable effect on the yield of corn two plots of poor gray sandy upland soil on the Experiment Station farm at Auburn were prepared alike and in accordance with Mr. Williamson's plan, the details being as follows: A fair growth of velvet bean vines was plowed under on both plots with a two-horse plow in February. Then rows were laid off 6 feet apart and bedded out, the water furrow thus formed being subsoiled, by using a Dixie turn plow with wing removed. Then with the same plow a slight list was formed in the water furrow. This list was

opened and corn planted and covered on both plots without fertilizer, planting it thick on the Williamson plot and about half as thick on the check plot. Unfortunately we were not able to plant this experiment early, as is recommended. The first and last cultivations of the two plots were similar. Fertilization of both plots was identical, namely the very heavy application, as advised for the Williamson method, of 200 pounds of cotton seed meal, 200 pounds of acid phosphate and 400 pounds kainit per acre applied to both plots June 23; and 200 pounds nitrate of soda applied to both plots in side furrows July 7.

The details of cultivation were as follows:

Williamson plot.	Check plot.
April 19 planted.	Planted.
May. Middles cultivated shallow.	Middles cultivated shallow.
May 21	Two trips to row with Diverse Cultivator.
June 1	Hoed and thinned to 1 plant every 33 inches.
June 7	Cultivated with scooter and scrape 5 furrows per row.
June 21. Hoed and thinned to 1 plant every 16 inches.	....
June 23. Two side furrows with scooter and scrape.	Two side furrows with scooter and scrape.
June 23. Applied 800 pounds complete fertilizer per acre in side furrows.	Applied 800 pounds complete fertilizer per acre in side furrows.
June 23. Finished cultivating middles deep with Dixie turn plow.	Finished cultivating middles with scooter and scrape.
July 7. Cultivated with scooter and scrape, plowing in cowpeas.	Cultivated with scooter and scrape, plowing in cowpeas.
July 7. Applied in both side furrows 200 pounds nitrate of soda per acre.	Applied in both side furrows 200 pounds nitrate of soda per acre.

A study of the statements above will show that the treatment of the two plots was identical except in the following points:

(1) Later hoeing of the Williamson plot.

(2) Double thickness of planting on the Williamson plot.

(3) Omission of two cultivations on the Williamson

plot, namely, those given to the check plot on May 21 and June 7.

(4) Use of turn plow on the Williamson plot in cultivating middles on June 23.

The result of the thicker planting and the omission of cultivation between the early part of May and June 23 resulted in dwarfing the plants on the Williamson plot, which is the end aimed at in that system of culture. Its advocates claim that the dwarfing of the plant tends to promote the production of grain.

The yield of shelled corn was 30.5 bushels per acre on the Williamson plot and 29.5 bushels per acre on the check plot. This is a gain of one bushel per acre, or 3.4 per cent in favor of the Williamson method.

On the Williamson plot each plant averaged only about one-third (.346) of a pound of shelled corn; on the check plot the yield of grain per plant was almost exactly double this (.667 of a pound).

The ears were slightly larger on the check plot where the plants had greater distance, the average weight of shucked ear or nubbin being .54 of a pound as compared with an average weight of .45 of a pound on the Williamason plot. The variety used was Cocke's Prolific.

Naturally the plants with wider spacing on the check plots afforded a greater number of ears per plant, one hundred plants on the Williamson plot affording only 96 ears and nubbins as compared with 156 ears and nubbins per 100 plants on the check plot.

The average height from ground to the joint or node from which the ear or lower ear grew was 44 1-2 inches on the check plot and only 36 1-4 inches on the Williamson plot. The stalks on the Williamson plot were much more slender and broke down worse, the broken-over plants on the Williamson plot constituting 29 per cent, and on the check plot 14 per cent. This means a greater tendency for the corn to rot in the field on the Williamson plot.

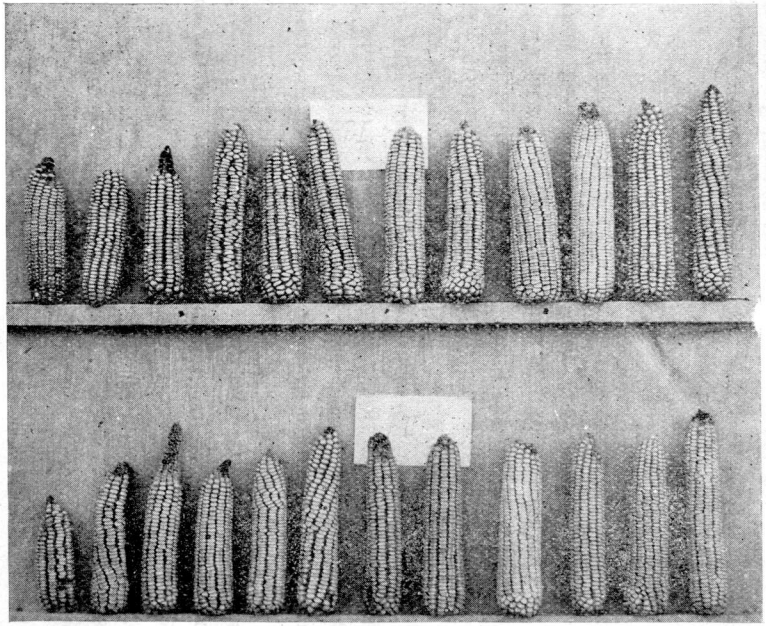

FIG. 1—*Ears and nubbins of which the average weight is the average weight for the plot.* (1, *above*) *From check plot;* (2, *below*) *From Williamson plot.*

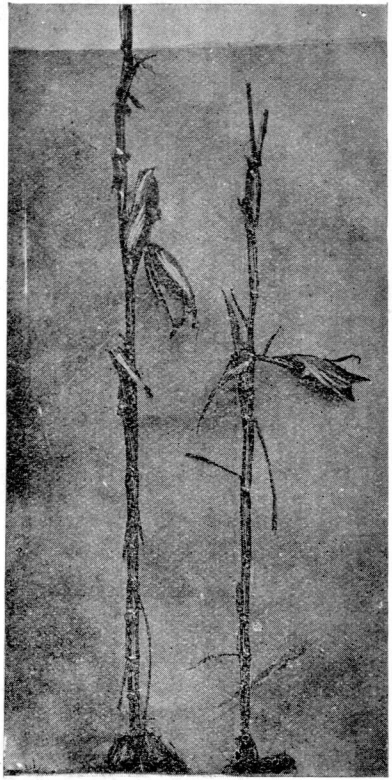

FIG. 2—*Stalks after harvest showing relative average height of ears and size of stalks; the smaller plant is from the Williamson plot.*

A study of the rainfall record for April, May, June and July indicates that at no time during the growing season did either plot suffer for moisture. The frequency of rains was doubtless favorable to the thick planting. Frequent rains at the time when cultivation of the Williamson plot was omitted prevented any injurious effect from this neglect. It is doubtful whether in average seasons such thick planting as was done on the Williamson plot (16 inches between plants) would have escaped disastrous firing.

It is obvious that we did not obtain profitable returns from this unusually large application of fertilizers; 1,000 pounds of commercial fertilizer cost $12.80, while the value of the crop at 70 cents per bushel was only $21.35. Our experiments in a number of localities in Alabama, and especially on a tract of gray sandy land similar and adjacent to that used for the Williamson experiment lead us to believe that the proportion of kainit in the Williamson fertilizer is too high.

It is an open question whether the unusually large yields obtained by Mr. Williamson on upland in South Carolina are not due more to the frequent plowing under of a crop of cowpea vines, to the liberal use of nitrogenous fertilizers, and to close planting, than to the dwarfing of the corn plant through omission of cultivation and withholding until late the application of fertilizers. Our previous experiments lead us most heartily to recommend plowing under a crop of cowpeas or other legumes as a fertilizer for corn, or the liberal use of nitrogenous fertilizers, and in many cases somewhat thicker planting than is customary, but a single year's test does not permit us to recommend all the details of the Williamson method. The experiment will be repeated, and in such a way as to inform us which of the details of the method are the really essential ones and responsible for the large yields sometimes secured.