AGRONOMY

COTTON

Cotton Variety Test: Since a large portion of the Coastal Plain soils are infested with the wilt fungus (*Fusarium vasinfectum*), only the varieties resistant to this disease are generally recommended. Results from the variety test since 1939 (see Table 4) show that Tifton Station 21, Coker's 4 in 1, Coker's 100 W.R., and W. W. Wannamaker's Stonewilt have given highest yields.

On land known to be free of wilt, Stoneville 2B and Deltapine 14 may be expected to give high yields.

Cotton Fertilizer Test: Varying factors such as rotations and soil types make it impossible to recommend definite fertilizers for optimum yields under all circumstances. Nevertheless, certain recommendations can be made which should be helpful for the individual in determining his fertilizer requirements.

FORMULAS AND RATES: The cotton plant may be expected to give profitable returns from application of the three main plant food elements—nitrogen, phosphorus, and potash. For cotton planted on land of average fertility it is recommended that 500 pounds per acre of either a 3-8-8, 3-9-9, or 4-8-8 be applied at time of planting. Additional nitrogen will be needed unless the cotton is following a legume crop. This nitrogen can be secured from top dressing with 100 pounds of nitrate of soda or its equivalent at the time the plant begins to put on squares. Where "cotton rust" is severe, potash will also be needed in the top dressing. This may be obtained from adding 50 to 100 pounds of muriate of potash to the nitrogen top dressing.

NITROGEN STUDIES: Symptoms of nitrogen deficiency may be recognized by a stunted growth of young plants and a yellowish green color of leaves. Nitrogen requirements vary in relation to the reserve in the soil. Approximately 30 pounds of actual nitrogen is needed for the average land. Most forms of nitrogen used in fertilizers leach from the light soils of South Georgia very readily. Therefore, it is generally considered best to split the application of this element. This is done in most cases by applying 500 pounds of a mixed fertilizer containing 3 per cent nitrogen at time of planting, and the remaining 15 pounds of nitrogen is obtained from use of some quickly available nitrogen as a top dressing.

Cotton shows differences in response to the various forms of nitrogen. Inorganic forms of nitrogen such as soda, urea, and cyanamid, are the cheapest sources of nitrogen and they become quickly available for plant use. However, they leach from the soil very readily when heavy spring rains occur. Organic and ammonia forms of nitrogen are slower to become available but give better results in rainy seasons. Such organics as cottonseed meal, peanut meal, and tankage are more expensive than inorganic nitrogen. For these reasons it is more desirable to use mixed fertilizer which derives 70 to 80 per cent of the required nitrogen from inorganic. The smaller part of organic will not be too costly and yet supply some nitrogen which will not leach from the soil in case of heavy spring rains. Table 5 presents the results from a study of the various sources of nitrogen.

TABLE 4.

YIELD COTTON VARIETIES IN TEST SINCE 1939

VARIETY	*Yield in Pounds Lint Per Acre*						*Wt. 100 Bolls in Lbs.*	*Per Cent Lint*	*Length Staple in 32nd Inches*
	1939	1940	1941	1942	1943	Avg.			
1. Tifton Station 21*	418	575	680	534	379	517	1.38	37.4	32.6
2. W. W. Wannamaker's Cleveland W. R.*	468	594	610	524	369	513	1.17	37.0	32.6
3 Coker's 4 in 1*	475	574	618	509	368	509	1.18	34.6	33.5
4. Stoneville 2B	404	549	630	534	369	497	1.34	35.0	33.3
5. Summerour's Hibred	481	538	634	485	330	494	1.35	41.9	29.1
6. Marett's White Gold	454	564	577	488	386	494	1.36	35.4	33.6
7. Marett's Cleveland	451	546	593	456	337	477	1.20	34.5	33.4
8. Rhyne's Cook	451	547	522	492	347	472	1.37	35.7	31.0
The following varieties have been in this test only three or four years									
9. Deltapine 14	.....	648	639	550	389	557	1.21	39.7	32.9
10. W. W. Wannamaker's S x C	.....	558	589	533	373	513	1.19	36.7	32.1
11. Rhyne's Stoneville	.....	556	598	485	354	498	1.39	34.8	33.0
12. Coker's 100 W. R.*	.....	.....	669	521	386	525	1.25	35.8	33.0
13. W. W. Wannamaker's Stonewilt*	.....	.....	570	517	403	497	1.28	35.1	32.8

* Figures given for these varieties were obtained from the highest yielding of two strains.

TABLE 5.

COTTON—SOURCES OF NITROGEN TEST

SOURCES OF NITROGEN	*Yield in Pounds Seed Cotton Per Acre*								
	1936	1937	1938	1939	1940	1941	1942	1943	Avg.
1. Sulphate of ammonia	996	1054	1189	1167	1372	1208	1158	902	1131
2. Urea	834	1090	1111	1248	1368	1219	1161	831	1108
3. Ammonia nitrate limestone	903	1118	1153	1145	1367	1269	1054	-----	1144*
4. Calcium nitrate	942	777	1181	984	1176	1220	-----	-----	1047**
5. Peanut meal	1027	973	1112	1174	1308	1215	1109	809	1091
6. Cottonseed meal	937	1055	1113	1194	1263	1113	987	851	1064
7. Cyanamid	956	1250	1075	1070	1265	1040	988	872	1065
8. Tankage	1006	973	1091	1101	1294	1173	1005	752	1049
9. Nitrate of soda (Chilean)	909	924	1175	1009	1201	1227	1175	1010	1079
10. Nitrate of soda (Arcadian)	900	886	1086	1034	1253	1237	1175	967	1067
11. Nitrate of soda (Champion)	903	918	1130	949	1230	1265	1155	959	1064
12. Ammophos and soda	884	970	1041	1046	1223	1132	1156	796	1031
13. Nitrate solution base	-----	-----	1064	1153	1352	1218	1162	897	1141**
14. 60% sulphate, 40% nitrate	-----	-----	-----	1095	1311	1198	1194	960	-----
15. Calnitro	-----	-----	-----	1084	1213	1253	-----	-----	-----
16. Check (no nitrogen)	812	712	839	768	1042	939	818	644	822

* 7-year average.
** 6-year average.

PHOSPHORUS STUDIES: Deficiencies of phosphorus are seldom noted on cotton in South Georgia except on virgin soil or where no fertilizer has been applied for several years. Lack of phosphorus will result in late-maturing cotton. Slow growth of young plants and abnormal branching are characteristics of phosphorus deficiency. From 30 to 50 pounds of phosphorus will give good results on cotton. This may be obtained from applications of from 400 to 600 pounds of a mixed fertilizer containing 8 per cent phosphoric acid.

POTASH STUDIES: The most commonly deficient element in Coastal Plain soils is potash. A deficiency of potash may be recognized on cotton by the slightly yellow color appearing between leaf veins with the entire leaf gradually turning reddish brown. The leaves crinkle and shed early, causing a loss in the late crop of fruit either by shedding or developing immature bolls. This deficiency on cotton is commonly called "rust". This lack of potash hampers the harvesting of the crop and results in lower yields of inferior cotton.

A number of tests have been conducted during the past years studying the response of cotton to potash. Results from these tests show that potash obtained from a mixed fertilizer containing 8 per cent potash is not sufficient for most conditions. Where there is a severe potash deficiency it would be profitable to top dress the cotton with 100 pounds per acre of muriate of potash.

Table 6 gives some idea of returns that may be expected from higher applications of potash. This test was conducted on land known to be severely deficient in potash. These fertilizer treatments were made on the same plots for the 3-year study. Generally, it would be more desirable to split the application of so high a potash fertilizer. The application of 500 pounds per acre of a 3-9-6 fertilizer plus a top dressing of 100 pounds of muriate of potash should be expected to yield fully as well and avoid stands being reduced from use of a high grade fertilizer.

Several characters of importance were found to be improved from the highest application of potash. Most important among these were reduction in shedding of young fruit, increase in boll size, improved picking quality, and higher oil content of cotton seed.

SECONDARY ELEMENTS: The main elements to be considered in commercial fertilizers are nitrogen, phosphorus, and potash. However, all fertilizers contain supplies of a number of other elements which are beneficial to plants. The most important of these elements are sulphur, calcium (lime), chlorine, and magnesium. Most materials used in mixed fertilizers contain one or more of these elements, and the mixed goods usually carry more calcium and sulphur than phosphorus. Tests have been under way since 1937 to study the value of secondary elements in cotton production. Table 7 is a report of one of these studies. In this study all treatments contained at least the recommended amounts of nitrogen, phosphorus, and potash. The other elements were added in various treatments at the rate commonly carried in a commercial mixture of a 3-8-8 fertilizer. Some treatments show these elements in double quantity to test the response of cotton. This test remained on the same plots throughout the 5-year study.