A DAY AT THE SALT RIVER VALLEY EXPERIMENT FARM

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The Inside on Some of the Experiments at the Mesa Experimental Farm; Scientific Inevstigations of Various Nature That Are Going On At the University of Arizona Experimental Station

A LARGE group of interested cotton growers gathered at the Salt River Valley Experiment Farm near Mesa, Arizona, on September 30 to inspect the cotton experiments. The meeting was arranged by County Agent Harry Stewart and the men of the Agronomy Division of the University together with the foreman of the Experiment Farm were on hand to explain the cotton tests in progress.

A number of detailed tests involving considerable laboratory equipment had been conducted during the summer months in an endeavor to ascertain what was going on on the inside of the cotton plants that might have a bearing on the shedding problem. It is common knowledge that the Pima variety of cotton usually sheds very little as compared with such upland varieties as Acala even when grown in the same environment. Consequently there must be some difference in the internal structure of these varieties or in the functioning of the life processes within the plants which would account for this marked varietal difference in shedding. The indications are that Pima cotton has the ability to utilize the water in its tissues to better advantage in furthering the growth of the plant which should alleviate shedding. Laboratory tests also show that the cell sap of the young bolls of Pima cotton has about the same concentration as do the leaves of the same plants, but the concentration of the cell sap in the bolls of Acala cotton is much less than that in the leaves, particualarly when the plants are suffering for water. The concentration of the cell sap or the amount of nutrients in solution has a great deal to do with the ability the soil and when soil moisture is scarce the young bolls of Acala cotton, not having as great a pulling power for what water is available as do the leaves, suffer to such an extent that excess shedding occurs. More experimental work must be done before conclusive proof of this theory it at hand.

An 8 acre field of alfalfa was plowed last spring and planted to cotton. This cotton attained a uniform growth in all parts of the field due to uniform water penetration of the soil in direct contrast with all of the other cotton plots on the farm which had not grown a preceding crop of alfalfa. This field required fewer irrigations than the other cotton and it was necessary to withold irrigations in order to avoid excessive vegetative growth. The Pima plants appear to have set a much more satisfactory crop of bolls than have the Acala and the plants spaced 30 inches apart in the row have set a much more satisfactory top crop than have those spaced 6, 12 or 18 inches apart. This is particularly true of Pima cotton which seems to have fared better on this alfalfa land than did the Acala.

Looking Over One of the Plots of Upland Cotton at the Experimental Farm at Mesa, Arizona.

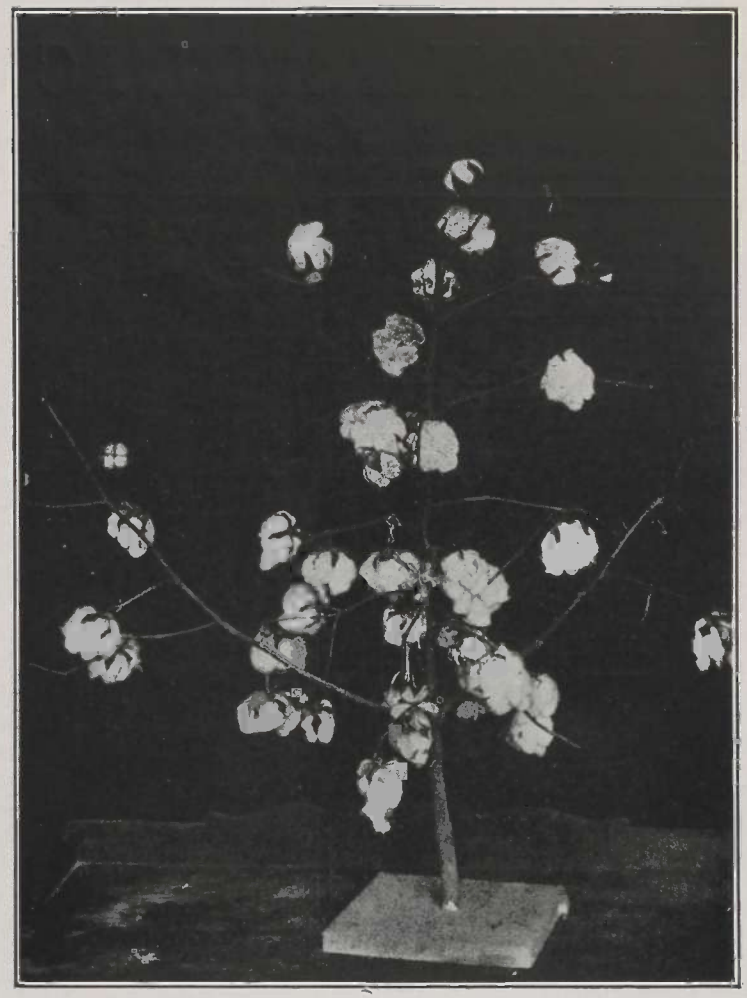
The cotton rotation tests which are in progress are of the utmost importance to cotton growers of Southern Arizona. The indications are that a well-planned rotation, properly carried out, will postpone the need for the use of expensive fertilizers for many years at least on most of our soils. Foreign countries that have been growing cotton for decades have learned that it is expedient to conform fairly closely to a systematic rotation which includes legume crops approximately 50 per cent of the growing seasons. In Egypt, for instance, an established rotation includes cotton one year out of three, the land being devoted to Berseem clover, corn and wheat the other two years. A longer rotation is in vogue in Turkestan, a country with soil and climatic conditions somewhat similar to those in Arizona. This rotation is an 8 year rotation in which cotton is grown 3 years out of the 8, alfalfa three years and mung beans, a legume, corn and wheat for the remaining two years. Since alfalfa is one of the major crops this rotation has possibilities for Arizona. If these countries which have had such long experience in growing cotton consider it safer and more profitable to follow such conservative cotton production programs as just described they should at least receive serious consideration by the cotton growers of this state. These rotations and others are included in the experiments at the Salt River Valley Experiment Farm and are being watched with interest

The irrigation tests this year com-

prise chiefly a comparison of frequent irrigations after blossoming time with less frequent irrigations following blossoming, although many irrigation effects can be pointed out in connection with the other cotton experiments on the Farm. A higher per cent of available soil moisture is necessary in soil that has been heavily cropped than is needed in a more fertile soil in order to develop a plant of sufficient size to support a large crop of bolls. The plots on which these irrigation tests are located have been heavily cropped and the plants required more water than did those growing on the plots which had been previously cropped to alfalfa, but the plants are not so large nor so heavily loaded with bolls as are those following alfalfa.

The importance of adequate water penetration cannot be stressed too much and was nicely demonstrated on all of the cotton plots under experimentation last year and again this year. Practically all of these plots are 600 feet in length. The foreman, Mr. C. J. Wood, leveled the lower 200 feet of each plot so that there was very little of any fall and water penetration was much better on that part of the plot than on the balance of each plot. Last year the yield of cotton was greater on these levelled areas at the lower end on all of the numerous cotton plots with the single exception of one plot where the irrigation water broke away and interfered with the regular irrigation schedule. Judging from the appearance of the plots this year the results of last year in this regard will be repeated. Some smaller plots near the center of the Farm are level from one end to the other. Water penetration has been such on these plots that they did not require half as many irrigations as did the other cotton on the Farm with the exception of that grown on alfalfa land. Every cotton grower knows that it is relatively easy to obtain good water penetration during the fore part of the season while the soil can still be loosened through cultivation, but after the plants become too large to permit the use of a cultivator, the soil soon becomes compacted following irrigation and from then on water penetration is a problem. Short runs and level borders help materially in overcoming this difficulty.

That cultivation is largely necessary in order to eliminate the competition of weeds and to provide for better moisture penetration is indicated by the cultivation tests which have been run for the last 2 or 3 years. Cultivating more frequently than is needed to accomplish these aims probably increases the cost of production unaccompanied by increased yields sufficient to justify the added expense. The plants on these areas which have never been cultivated since planting but where the weeds have been scraped off with hoes without forming a dust mulch, are as large and as well formed on the level parts of the plots where water penetration was obtained as are those that were cultivated in a normal fashion. The final criterion, of course, comes at harvest.



Experiments on an Individual Cotton Plant.

The Pima cotton was about the only variety in the variety tests this year that put on and held satisfactory bottom and middle crops of bolls. It is doubtful whether the top crop on the other varieties will make up the deficiency when harvest is completed.

While commercial fertilizers gave little response to the plants in the tests on the Experiment Farm this year some marked differences were obtained on the Earl Creed and Arthur Traunscht farms where cooperative tests were conducted. Ammonium sulphate stimulated plant growth beyond question of a doubt but did not seem to increase the bottom or middle crop. Some observers of these plots believe that the top crop is better on the ammonium sulphate plots than it is on the plots which receive other fertilizing elements or on those that were given no fertilizer treatment. Here again the final criterion will come at harvest.

The visitors at the farm manifested a keen interest in the experiments that were in progress and many expressed a desire to make a comparison between the anticipated results as they appeared on September 30, and the final yields at the end of the season.