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SEED TREATMENT AND GERMINATION OF COTTON SEED

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Poor Germination of Cotton Seed Has Caused Much Concern Among Growers—Delinting the Most Common Method of Seed Treatment—The Results of Other Methods of Treatment Given

ONE of the biggest difficulties facing the cotton grower is that of getting a good stand. While this is largely dependent upon the method of seed bed preparation and the amount of seed used, the preparation of the seed itself is an important consideration and is a factor which can be controlled more definitely than some of the others. Methods of seed treatment to increase the amount and rate of germination and to increase the uniformity of planting by removing the lint have received considerable attention from experiment stations in the cotton belt.

In the spring of 1924, studies were conducted at the University Farm at Tucson, and at the Salt River Valley Experiment Farm at Mesa, to determine the effect of different methods of treatment and methods of planting on the germination of cotton seed. Three plantings were made at each place. Those at Mesa were made on April 4, April 22 and 23, and May 15 and 16. Those at Tucson were made on April 18 and 19, May 7 and 8, and May 28 and 29. The seed used was of the Acala and Pima varieties and was taken from the seed used for general planting on the farm at Mesa. All of the Pima seed had been oil mill delinted and a sample of oil mill delinted Acala was also included for comparison with the untreated Acala. The Pima seed showed a laboratory germination of 82.5 percent by the standard method, the Acala 90.0 percent, and the oil mill delinted Acala 81.0 percent.

The most common form of seed treatment is mechanical delinting, a process developed primarily for the purpose of removing the lint from the cotton seed previous to hulling and pressing at the oil mill. Considerable quantities of delinted seed are used throughout the South for planting purposes and practically all of the seed of the Pima variety used in Arizona is so treated. Many other

methods of seed treatment have been advocated, some of which are giving good results. The methods and tests included in this experiment were as follows:

1. Delinting with sulphuric acid.
2. Prewetting or wetting with water just before planting.
3. Soaking for 24 hours.
4. Rolling in dry nitrate of soda, dry lime, wood ashes and road dust.
5. Plastering the lint to the seed with wheat flour and lime pastes.
6. Effect of date of planting.
7. Effect of depth of planting.

The sulphuric acid treatment gave the best results as it not only increased the total germination in most cases but also hastened the germination. The effect of this treatment upon the total germination was as follows:

	Tucson	Mesa
Acala, untreated	72.4	40.1
Acala, H ₂ SO ₄ delinted	76.2	57.1
Pima, oil mill delinted	73.8	62.5
Pima, H ₂ SO ₄ delinted	67.2	68.6

It is apparent that the value of treating with sulphuric acid is less in the case of Pima than with seeds carrying a large amount of lint. The purpose of treating the seed is to enable it to take moisture from the soil as readily as possible and a partly

particularly noticeable with the Acala variety. Conditions at Mesa more nearly approximated those found in the field and the results obtained there would seem to indicate that as field conditions become increasingly unfavorable, the advantage of the acid treated seed would be correspondingly greater.

In many cases, the rapidity of germination is of greater importance than the total germination that a particular lot of seed will show under ideal conditions. On the heavier soils of the Salt River Valley and other sections of the State, a light rain will often cause considerable crusting of the surface which tends to prevent the emergence of the seedlings, whereas seedlings already up would not be affected. In extensive variety test plantings at Yuma, it was observed that the one variety which had been treated with sulphuric acid came up fully three days earlier than the untreated varieties. Daily counts of seedlings were made on the different tests included in the experiments at Tucson and Mesa which showed a much more rapid germination for the treated seed. The total number of seedlings emerging during the five day period immediately following the appearance of the first seedling is shown in the following table.

Treatment	Dates of planting							
	Tucson				Yuma			
	4-18	5-7	5-28	Aver.	4-4	4-22	5-15	Aver.
Acala, untreated	20.0	19.0	38.7	25.9	21.3	15.3	36.0	24.2
Acala, H ₂ SO ₄ delinted	25.7	37.3	52.3	38.4	48.0	35.0	50.0	44.3
Pima, oil mill delinted	51.3	66.7	79.0	65.7	36.7	58.7	60.7	52.0
Pima, H ₂ SO ₄ delinted	53.0	52.0	72.3	59.1	59.7	65.0	66.7	63.6

naked seed like oil mill delinted Pima would have difficulty in this respect than would the lint covered seed of the short staple varieties. Soil and moisture conditions at Tucson were more favorable than at Mesa which accounts for the higher germination

The germination of the Acala seed was increased materially in every instance. This is a very important consideration since it would often mean the difference between a good and poor stand and might eliminate the

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