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Cottonseed Treatments in Tennessee

University of Tennessee Agricultural Experiment Station

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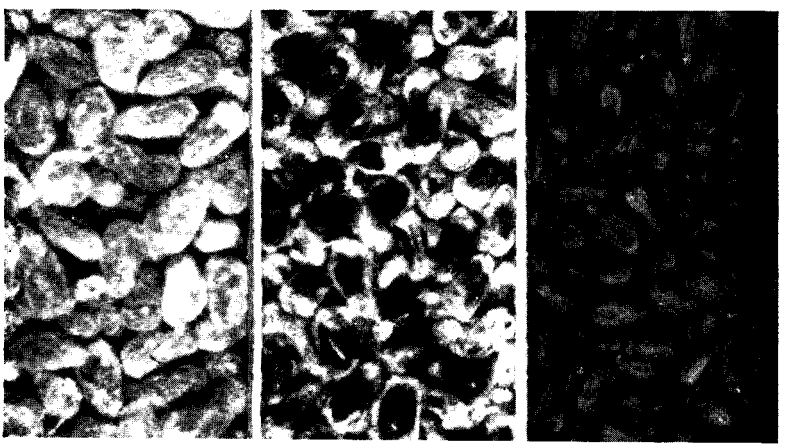

Fuzzy Mechanically delinted Acid-delinted

Three types of seed used in the experiments.

KNOXVILLE, TENNESSEE

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COTTONSEED TREATMENTS IN TENNESSEE

By

N. I. HANCOCK and D. M. SIMPSON[1]

INTRODUCTION

A good stand of plants, evenly distributed, is necessary for a maximum yield of cotton. The stand depends largely upon viability of seeds and environment of seedling plants during early growth.

The prevalence of disease organisms[2] makes it difficult to secure cotton planting seed free from contamination. These organisms lie dormant inside and outside the seed coat and become active when the seeds are planted. Tennessee lies on the northern border of the Cotton Belt, where soil temperature usually is too low for rapid growth of young cotton seedlings at planting time, in late April or early May. Moreover, the soils where cotton is planted are generally of a silty, silty-loam, or clay-loam texture and do not warm up rapidly in the spring. Such conditions render young cotton seedlings highly susceptible to disease attack and emphasize the need for disease control.

Growers have attempted to meet these conditions by increasing the planting rate to compensate for loss of stand; but this method has been only partly successful, because many cotton-seedling diseases are highly infectious and spread rapidly from diseased to healthy plants.

A large percentage of the disease organisms are seed borne, and seem to be most successfully controlled by disinfection of seed. Numerous materials and various treatments for disinfecting cotton-seed have been tested by the Tennessee Agricultural Experiment Station and the U. S. Division of Cotton and Other Fiber Crops and Diseases. A number of the trials were carried out as part of the cooperative program of the Cotton Disease Council, composed of agricultural workers in the United States. Certain portions of the studies will be included in the report by the Seed Committee on seedling diseases of cotton. It is the purpose of this bulletin to discuss the results obtained in Tennessee.

EXPERIMENTAL METHODS

The data in most cases represent averages from several tests. Data from different tests, relating to the same subject, have been combined and condensed.

The illustration on the front of the bulletin shows the three types of seed used: fuzzy, with no fuzz removed; mechanically delinted, with part of fuzz removed; and acid-delinted, with all fuzz removed.

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[2]Some of the disease-producing organisms are: *Glomerella gossypii, Fusarium moniliforme, Bacterium malvacearum,* and *Rhizopus* species.

Each test was planted in single-row plots. A plot consisted of 20 to 100 hills, 6 inches apart, with 5 seeds, hand-dropped, per hill. The plots of each seed lot, or treatment, were randomized and repeated a number of times to minimize experimental error.

Counts of seedlings were begun as soon as the seedlings appeared above ground, and were continued at 3- to 4-day intervals until emergence was completed. Final count was made from 23 to 30 days after planting, and ample opportunity was given each treatment to show its value, although, in Tennessee, cotton generally is thinned before this stage of growth. Germination data, therefore, are based on percentages of seeds that produced seedlings which survived until thinning was completed.

In some of the tests, record was kept of emerged plants that died before thinning time. Percent of mortality is based on the number of plants that emerged, and not on the number of seeds that were planted. In many tests, plants removed at thinning time were examined for disease lesions on the roots. Records are presented to show the percent of plants which suffered distinct lesions following various treatments.

ORGANIC-MERCURY COMPOUNDS EFFECTIVE AS DISINFECTANTS

Many kinds of chemical compounds have been placed on the market for seed disinfection, and a number of these have been used on cottonseed with varying degrees of success. While disease control is the primary purpose of disinfection, such control to be of value must be attained without injury to viability of seeds or to vigor of growing seedlings. If disease-control materials at recommended dosages prove to be toxic to growing seedlings, the remedy may be worse than the disease.

Numerous tests have demonstrated that certain organic-mercury compounds apparently are the most effective materials available for cottonseed disinfection. These materials in prepared forms are sold at most retail seed stores under the trade names of "2% Ceresan" and "New Improved Ceresan." They are relatively inexpensive, and may be applied to the seed on the farm with home-made dusting apparatus.

TABLE 1—*Effects on seedling stands produced by treating fuzzy seed with 2% Ceresan.*

Year	Jackson			Knoxville		
	Number of tests	Seedling stand		Number of tests	Seedling stand	
		Untreated	Ceresan-treated		Untreated	Ceresan-treated
		Percent	Percent		Percent	Percent
1936	4	65.5	69.3	4	67.9	59.3
1937	5	34.7	62.2	9	67.1	67.1
1938	9	50.5	65.8	18	57.0	71.4
1939	11	49.3	60.0	20	47.9	62.4
Weighted average	29	49.4	63.5	51	56.1	66.2

TABLE 2—*Effect on percentage of dead and diseased seedlings produced by treating fuzzy seed with 2% Ceresan.*

Seed lot	Laboratory germination	Jackson		Knoxville				Type of seed-borne contamination[1]
		Root lesions		Mortality		Root lesions		
		Untreated	Ceresan-treated	Untreated	Ceresan-treated	Untreated	Ceresan-treated	
		1938						
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
1	72	14.1	10.9	9.6	4.6	11.3	3.4	*Bacterium malvacearum*
2	89	19.6	6.6	33.4	2.7	37.1	5.3	*Glomerella gossypii*
3	87	8.9	4.8	3.7	1.9	12.2	5.9	*Fusarium moniliforme* (light)
4	84	4.0	0.6	3.2	1.7	3.1	1.3	No contamination
5	88	27.3	8.7	17.1	1.6	28.6	2.3	*G. gossypii* and *F. moniliforme*
6	89	32.9	3.1	46.3	3.2	36.4	6.3	*G. gossypii* and *F. moniliforme*
7	89	13.9	6.4	17.7	2.8	31.2	7.6	*G. gossypii* and *F. moniliforme*
8	83	8.2	4.0	2.3	2.9	3.8	3.2	*F. moniliforme* (light)
Average		16.1	5.6	16.7	2.7	20.5	4.4	
		1939						
1	96	58.8	0.8	8.4	0.7	47.7	2.9	*G. gossypii* and *F. moniliforme*
2	95	17.4	7.0	0.6	1.0	14.1	2.9	*F. moniliforme*
3	88	62.9	1.7	24.0	1.5	58.6	4.5	*G. gossypii* and *F. moniliforme* (light)
4	84	50.8	1.9	4.7	0.7	30.7	2.4	*G. gossypii* and *F. moniliforme*
5	93	77.3	1.9	10.5	1.2	54.4	7.8	*G. gossypii*
6	94	13.7	8.6	1.0	0.5	5.6	2.7	*B. malvacearum* (5%) and *F.* species (light)
7	83	6.1	1.3	0.7	0.4	3.9	0.2	*F. moniliforme*
8	49	13.9	14.3	1.6	1.2	10.8	4.7	Storage injury and *Rhizopus* species
Average		37.6	4.7	6.4	0.9	28.2	3.5	

[1]Determinations made by Dr. C. H. Arndt, at South Carolina Experiment Station.

Comparative tests of untreated and Ceresan-treated fuzzy seeds are shown in table 1. At Jackson, for the 4-year period, treated seeds produced approximately 14 percent more live plants than an equal number of untreated seeds of the same seed lots, and at Knoxville the increase has averaged approximately 10 percent.

Beneficial results from treatment may not be obtained every year, since seed lots of varying degrees of vitality and contamination are planted and weather conditions during planting seasons are not always the same. At Jackson in 1936, under very dry conditions, only a small increase in number of seedlings was obtained through treatment of seeds wth Ceresan. At Knoxville, where germination usually is better, under dry conditions Ceresan-dust treatment tends to delay germination; and a few cases have been observed in which the total stand at thinning time was slightly less. Under the conditions of 1937, 1938, and 1939, appreciable benefits resulted from Ceresan dust treatment, particularly at Jackson.

SEED TREATMENT REDUCES NUMBER OF DISEASED SEEDLINGS

When seed are disinfected before planting, not only is germination increased, but also fewer seedlings die, and the surviving seedlings are healthier. In table 2, under "Mortality," it is shown that in 1938 at Knoxville 16.7 percent of plants from untreated seeds died before thinning time, as compared with 2.7 percent from treated seeds. Plants were examined at thinning time for disease lesions on the roots. At Knoxville, lesions were found on 20.5 percent of plants from untreated seeds and 4.4 percent from treated seeds. At Jackson, similar reductions in root lesions were obtained by seed treatment. Experiments conducted in 1939 gave comparable results.

It may be observed further in table 2 that the mortality of seedlings from untreated seeds was particularly high in the case of some seed lots and low in the case of others. Such differences are apparent in both 1938 and 1939. Moreover, the seed lots which had high rates of seedling mortality and root lesions all gave satisfactory laboratory germination percentages. Hence, high laboratory germination percentage does not assure freedom of seed from contamination, although factors favorable for production of good seed are generally unfavorable for development and dissemination of disease-producing organisms.

Further evidence of the effectiveness of Ceresan in reducing the number of diseased and dead plants is shown by data in table 3 from tests of fuzzy, acid-delinted, and mechanically delinted seeds. These data show that Ceresan reduced the number of dead and diseased plants in all three types of seed. Untreated acid-delinted seeds had fewer dead plants and fewer root lesions than untreated seeds of

TABLE 3—*Effect on percentage of dead and diseased seedlings produced by treating fuzzy, acid-delinted, and mechanically delinted seed with 2% Ceresan.*

1938

Type of seed	Jackson			Knoxville				
	No. of tests	Root lesions		No. of tests	Root lesions		Mortality	
		Untreated	Ceresan-treated		Untreated	Ceresan-treated	Untreated	Ceresan-treated
		Percent	Percent		Percent	Percent	Percent	Percent
Fuzzy—normal	1	39.7	14.4	2	18.6	5.5	11.0	2.3
Acid-delinted	1	10.4	9.5	2	6.7	2.6	4.7	2.8
Mech. delinted	1	15.4	3.8	2	7.2	3.6	6.5	2.3

1939

Fuzzy—normal	1	50.8	3.4	2	53.5	5.9	8.3	2.3
Acid-delinted	1	8.6	1.2	2	15.1	3.5	5.3	5.2
Mech. delinted	1	42.1	1.5	2	42.2	5.3	6.3	1.6

other types, since the acid treatment removed a large percentage of external seed-borne contamination.

ACID-DELINTED AND MECHANICALLY DELINTED SEED COMPARED WITH FUZZY SEED

Seeds of most upland varieties of cotton are covered with dense fuzz, which is not removed by ordinary ginning. These fuzzy seeds are regularly used for planting. Experiments have shown, however, that removal of part or all of the fuzz improves their physical condition and enhances their value for planting. Several methods are employed for removal of fuzz. Most common are machine delinting, or reginning, as practiced at the oil mills; and chemical processes, such as treatment with sulfuric acid or chlorine gas.

In the East, partial removal of fuzz by machine delinting is coming into more general use as the advantages of delinting are recognized and establishments are set up to render this service available to the farmers. Many commercial breeders now make a practice of mechanically delinting their seed and treating them with Ceresan before offering them for sale. Mechanical-delinting machinery was installed recently at three places in West Tennessee.

Chemical methods of delinting are more generally practiced in western cotton areas, where the planting season usually is dry and removal of all fuzz is an important aid to prompt germination, and where there are commercial establishments for using both the sulfuric-acid and chlorine-gas methods. In Tennessee there is no commercial establishment using the chlorine-gas method and only one plant using the sulfuric-acid method. A home method using sulfuric acid is described in Tennessee Experiment Station Circular 61. Satisfactory delinting can be obtained by this method if directions are followed carefully.

TABLE 4—*Effect on seedling stands produced by acid-delinting and treating with 2% Ceresan.*

Year	Jackson					Knoxville				
	Number of tests	Seedling stands				Number of tests	Seedling stands			
		Fuzzy		Acid-delinted			Fuzzy		Acid-delinted	
		Untreated	Ceresan-treated	Untreated	Ceresan-treated		Untreated	Ceresan-treated	Untreated	Ceresan-treated
		Percent	Percent	Percent	Percent		Percent	Percent	Percent	Percent
1936	4	65.5	69.3	75.2	82.5	4	67.9	59.3	73.3	71.0
1937	5	34.7	62.2	34.3	56.8	9	67.1	67.1	66.1	69.8
1938	1	45.6	53.6	61.4	66.2	2	57.7	69.5	75.7	73.1
1939	1	32.4	45.8	41.6	57.2	2	46.8	61.6	63.3	66.1
Weighted average		46.7	62.5	52.3	67.0		63.8	64.9	68.6	70.0

Some of the advantages of delinting are shown by the data in table 4, where results are given from comparative plantings of fuzzy and acid-delinted seed. Twenty-eight tests were conducted from 1936 to 1939, inclusive. Acid-delinted seeds gave higher percentages of surviving plants than fuzzy seeds in 3 years out of 4 at both Jackson and Knoxville. Besides germinating more rapidly and evenly, delinted seeds frequently are able to germinate under soil conditions that are too dry for fuzzy seeds. However, if heavy rains follow planting and cause a water-soaked condition of soil, the benefits from delinting are not always apparent; in some soil types, oversoaking of seeds may result in poor germination. Such a condition occurred at Jackson in 1937 and probably accounts for the unfavorable results in that season. Acid-delinted seeds are more susceptible than fuzzy seeds to injury from oversoaking. Seed treatment with Ceresan improved the stand of seedlings from both fuzzy and acid-delinted seeds. The improvement was particularly outstanding under the adverse conditions at Jackson in 1937.

TABLE 5—*Effect on seedling stands produced by acid-delinting, mechanically delinting, and treating with 2% Ceresan.*

Year	No. of tests	Seedling stands					
		Fuzzy		Acid-delinted		Mechanically delinted	
		Untreated	Ceresan-treated	Untreated	Ceresan-treated	Untreated	Ceresan-treated
Jackson							
		Percent	Percent	Percent	Percent	Percent	Percent
1937	1	17.2	47.4	20.2	44.7	10.2	33.7
1938	1	45.6	53.6	61.4	66.2	55.4	59.8
1939	1	32.4	45.8	41.6	57.2	43.6	66.6
Weighted average		31.7	48.4	41.1	56.0	36.4	53.4
Knoxville							
1937	1	55.8	57.1	62.7	65.1	54.3	59.6
1938	2	57.7	69.5	75.7	73.1	71.5	73.7
1939	2	32.7	48.7	49.0	54.7	48.4	71.0
Weighted average		47.3	58.7	58.4	64.1	58.8	69.8

Comparative data from planting of fuzzy, acid-delinted, and mechanically delinted seeds are shown in table 5. In general, better stands of seedlings were obtained from both types of delinted seeds than from fuzzy seeds. The low germination of the mechanically delinted seeds in 1937 was most probably caused by injury during the process of delinting. Mechanical injury to seeds is discussed elsewhere in this bulletin. In these, as in preceding tests, Ceresan treatment of seeds resulted in improved stands of seedlings. It is shown in table 3 that in all the tests there were fewer diseased and dead plants in plots grown from acid-delinted or mechanically delinted than from fuzzy seeds.

TABLE 6—*Effect on rapidity of seedling emergence produced by acid-delinting and mechanically delinting fuzzy seed.*

Emergence at designated number of days after planting							
Jackson				Knoxville			
Days after planting	Seed type			Days after planting	Seed type		
	Fuzzy	Acid-delinted	Mechanically delinted		Fuzzy	Acid-delinted	Mechanically delinted
	Percent	Percent	Percent		Percent	Percent	Percent
9	6.1	35.7	24.8	13	9.1	45.5	47.1
13	28.0	58.1	51.2	16	65.6	79.6	84.6
17	84.6	95.1	94.2	19	88.6	93.5	94.8
21	100.0	100.0	100.0	30	100.0	100.0	100.0

The data of table 6, obtained at Jackson and Knoxville in 1939, indicate the relative speed of germination for fuzzy and delinted seeds under average conditions at the two locations. Seventeen days after planting at Jackson, and 19 days at Knoxville, fuzzy seed lacked from 5 to 10 percent of equaling delinted seed in number of plants produced. The advantages of prompt germination are manifold. Semi-dormant seeds are exposed to attack from soil and seed-borne micro-organisms for a shorter period of time. Simultaneous germination of a large percentage of the seeds lessens the difficulty of seedlings in cracking through the soil. This is important particularly in soils that form heavy crusts upon drying. The seedlings are of more nearly the same size, and cultivation can be given sooner without the difficulties experienced with plants of irregular size.

Whether delinting of cotton planting seed by either method is profitable for Tennessee farmers is largely a question of availability of delinting facilities, and local costs. These methods of delinting are relatively new in Tennessee, and estimates of costs vary in different localities. The grower should weigh advantages against cost. In every case, however, seeds should be treated with Ceresan.

SATISFACTORY RESULTS WITH NEW IMPROVED CERESAN

As previously stated, numerous materials have been tested for cottonseed disinfection. Tests conducted in Tennessee and in other states indicate that in general the organic-mercury dusts—ethyl mercury phosphate (New Improved Ceresan), and ethyl mercury chloride (2% Ceresan)—are the best materials on the market for cottonseed treatment. Satisfactory results have been obtained with both of these dusts; but comparisons made in 1937 and 1938 at Jackson and Knoxville show that somewhat better results were obtained with New Improved Ceresan. (See table 7).

This is fortunate, because New Improved Ceresan is the dust generally recommended for treating small grains, and the dealer therefore needs to stock only this one dust.

TABLE 7—*Comparison of 2% Ceresan with New Improved Ceresan dust, as measured by final survival of seedling plants.*

Year	Jackson			Knoxville		
	Number of tests	Seedling stands		Number of tests	Seedling stands	
		2% Ceresan	New Improved Ceresan		2% Ceresan	New Improved Ceresan
		Percent	Percent		Percent	Percent
1937	1	41.9	49.5	1	60.6	60.8
1938	1	59.9	64.3	2	72.1	74.9
Weighted average		50.9	56.9		68.3	70.2

RATE OF TREATING COTTONSEED WITH CERESAN DUST

The amount of organic-mercury dust to apply to cottonseed is based on two primary considerations: (1) It should be sufficient for effective seed disinfection; and (2) it should not be sufficient to cause injury to the seeds or young seedlings.

TABLE 8—*Effect on seedling stands produced by treating fuzzy, acid-delinted, and mechanically delinted seeds with New Improved Ceresan at varying rates per bushel of cottonseed.*

Seed type	Jackson				Knoxville			
	No. of tests	Seedling stand			No. of tests	Seedling stand		
		Dust per bushel				Dust per bushel		
		1 oz.	1½ oz.	2 oz.		1 oz.	1½ oz.	2 oz.
		Percent	Percent	Percent		Percent	Percent	Percent
Fuzzy	1	44.4	45.8	56.6	2	49.7	48.7	48.3
Acid-delinted	1	49.8	57.2	49.2	2	57.7	54.7	47.8
Mech. delinted	1	64.0	66.6	66.4	2	76.5	71.0	70.7
Average		52.7	56.5	57.4		61.3	58.1	55.6

Tests were conducted at Jackson and Knoxville in 1939 (table 8) with fuzzy, acid-delinted, and mechanically delinted seeds; New Improved Ceresan being used at the rates of 1, 1½, and 2 ounces per bushel of cottonseed. Under conditions of heavy rainfall and wet soil at Jackson, best results were obtained from 2 ounces of dust on fuzzy seeds, and 1½ ounces on delinted seeds. At Knoxville, under relatively dry soil conditions, best results were obtained from 1 ounce of dust per bushel on both fuzzy and delinted seeds. A slight toxic affect was noted in the Knoxville test when 2 ounces per bushel was applied, particularly on the delinted seed.

It is believed that satisfactory disease control without injury to seeds or seedlings can be obtained by the use of 1½ ounces of New Improved Ceresan per bushel of cottonseed. Pending complete information, this general recommendation should be followed. The cost is extremely low.

METHOD OF TREATING COTTONSEED WITH CERESAN DUST

A drum, such as that described in Circular 61, can be used for dusting seed. It is important that some dust cling to each seed. Turning 1½ bushels of seed and dust for 5 minutes will give good distribution of the dust. Two men should be able to treat from 10 to 12 bushels per hour, or 80 to 100 bushels per day. There is a commercial machine on the market, which should be obtained if large quantities of seed are to be treated.

Dusting of seed is dangerous unless certain precautions are followed. The dust is poisonous, and should be handled outdoors or where there is free air circulation, so that none will be inhaled. After the operation is completed, hands and face should be washed. Dusted seed should be stored where it will not be accessible to livestock. It should not be sold to oil mills nor fed to animals.

SEED INJURY

The hull, or seed-coat, that surrounds the embryo of the cottonseed serves several purposes. Without this protective covering the embryo would stand little chance of germination and emergence if planted under average conditions in the field. Weakness of the seed-coat because of immaturity, insect injury, gin cutting, or scarification may result in lower germination.

Evidence of injury from mechanical delinting was observed in 1937. Fuzzy, acid-delinted, and mechanically delinted seeds of the same seed lot, planted under the same conditions, at Jackson, showed that definite injury to this seed lot was caused by mechanical delinting (table 5). Experiments in 1938 and 1939 showed that the germination percentage of the seeds could be reduced by artificial scarification of the seed-coat surface. Data presented in table 9 indicate that the reduction in seedling stands increased with heavier scarification.

TABLE 9—*Effect on seedling stands produced by scarifying the seed coat.*

1939

Location	Seedling stands			
	Fuzzy[1]	Acid-delinted		
	Not scarified	Not scarified	Scarified (light)	Scarified (heavy)
	Percent	Percent	Percent	Percent
Jackson	56.4	55.8	49.6	38.8
Knoxville	74.3	68.9	63.6	43.5
Average	65.4	62.4	56.6	41.2

[1]Fuzzy seeds were treated with New Improved Ceresan before planting. Other seed lots were not so treated.

The use of mechanically delinted seeds for planting is increasing rapidly, and new installations of machinery for delinting cottonseed are being made. Operators of mechanical delinters should use all caution to prevent gin cutting or excessive scarification of seeds during the delinting process. Pending further investigation, not more than 100 pounds of linters per ton should be removed.

STORAGE OF COTTONSEED

Cottonseed deteriorates rapidly if stored in bulk at a moisture content of 12 percent or more. If seed cotton is damp or "green" at time of ginning, the seeds are likely to contain more than 12 percent moisture. This may be reduced to below 10 percent if the seeds are spread in a thin layer on a tight roof or platform in direct sunlight and dried for several hours. For more than one year's storage, a moisture content of 6 to 8 percent is preferable, and storage in tight containers, such as metal drums, aids in preventing the reabsorption of moisture by the seeds during humid weather. Dry seeds do not require aeration during storage and may be sealed in air-tight containers for several years without appreciable loss in germination percentage. Damp seeds should never be piled in bulk or placed in tight containers. Seeds keep better when stored in a cool place.

TABLE 10—*Laboratory germination*[1] *of untreated and 2% Ceresan-treated seeds after 30 months' storage.*

Stored at—	Laboratory germination			
	Fuzzy		Acid-delinted	
	Untreated	Ceresan-treated	Untreated	Ceresan-treated
	Percent	Percent	Percent	Percent
Jackson	77	88	87	91
Knoxville	83	89	91	88
Average	80.0	88.5	89.0	89.5

[1]Initial germination of untreated fuzzy seed averaged 90 percent.

Acid-delinted and fuzzy seeds treated with Ceresan dust can be stored safely (table 10) under the same conditions as untreated seeds. In general, seeds that have been stored properly for one or two years germinate more promptly and are freer from seed-borne micro-organisms than first-year seeds.

PLANTING RATES FOR THE THREE TYPES OF SEED

It has been stated that laboratory germination is not always an accurate measure of field performance. In table 11 it is seen that untreated seed of all three types show a difference between laboratory and field behavior of around 30 percent, and treated seed, 20 percent. The data in this table were taken over a period of 3 years, at Knoxville and Jackson, and represent 8 different tests. This loss must be counteracted by the planting of sufficient seed.

TABLE 11—*Comparison of seedling stands in the field with laboratory germination percentages of the same seed lots.*

Item	Fuzzy		Acid-delinted		Mechanically delinted	
	Untreated	Ceresan-treated	Untreated	Ceresan-treated	Untreated	Ceresan-treated
	Percent	Percent	Percent	Percent	Percent	Percent
Germination (laboratory)	76.0	76.7	80.0	77.0	81.3	81.7
Seedling stands (field)	39.5	53.6	49.8	60.0	47.6	61.6
Difference	36.5	23.1	30.2	17.0	33.7	20.1

It is obvious that the number of plants per lineal foot depends upon the number of seeds planted. The planters are adjusted on this basis, but recently a misconception has arisen with reference to the number of seeds dropped per foot when a given amount of mechanically delinted or acid-delinted seed are used.

TABLE 12—*Weight, volume, and calculated planting rates of different types of cottonseed*[1].

Type of seed	Wt. per measured bushel	Seeds per pound	Seeds per lineal foot—10 lbs. per acre	Wt. per acre—10 seeds per lineal foot
	Pounds	Number	Number	Pounds
Fuzzy	29.4	4240	2.8	35.7
Mech. delinted 102-lb. cut	31.3	4489	3.0	33.3
Mech. delinted 164-lb. cut	38.4	4743	3.2	31.2
Acid-delinted	40.8	4937	3.4	29.4

[1]These seed are from 1939 crop of Stoneville 2B.

Table 12 shows that although delinting does alter the size and weight of seed to some extent, the difference is not enough to justify much reduction in weight of seeds per acre, especially when the loss shown in table 11 is considered. Ten seeds per lineal foot may seem rather high, but this rate is not excessive when one considers the loss from seedling diseases and low temperatures which are prevalent at planting time in Tennessee. It is advisable, therefore, to measure the planting rates as follows: Acid-delinted seed, 25 pounds per acre; mechanically delinted seed, 30 pounds; fuzzy seed, 45 pounds.

SUMMARY

Seedling diseases are an annual hazard to stands and health of cotton plants. This is true especially in Tennessee, where adverse growing conditions at planting time are common.

Inexpensive insurance against these diseases may be secured by disinfection of seed with certain organic-mercury dusts. Of these dusts, New Improved Ceresan, applied at the rate of 1½ ounces per

bushel of seed, is recommended. The application may be made at any convenient time before planting. Dusting can be done with home-made equipment on the farm.

One should be careful to avoid inhaling the dust, and wash hands and face thoroughly after dusting is completed. Ceresan-dusted cottonseed should never be sold to the oil mills nor left in a place where it might be accessible to livestock.

New Improved Ceresan is the same dust used to control smuts on small grains, and the dealer therefore needs to stock only this one dust for both small grains and cottonseed.

Acid-delinted or mechanically delinted seeds are planted more evenly and germinate more quickly than fuzzy seeds, especially under conditions of low temperature and low soil moisture. Delinting is recommended, therefore, where facilities are available and the cost is not excessive. Care should be taken to avoid injury to the seed-coat, or hull, which surrounds the embryo.

The weight of cottonseed is not altered appreciably by delinting, so that the planting rates should not be greatly decreased from those ordinarily used for clean fuzzy seed.

Seeds that are to be saved for planting should be dried thoroughly, and stored in a cool place. Dry seeds untreated or treated with Ceresan can be stored profitably for future use.

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[1]Cooperative with U. S. Department of Agriculture.
[2]On leave.

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Bulletins of this Station will be mailed free to any farmer in the State. Write Agricultural Experiment Station, University of Tennessee, Knoxville, Tennessee.