

# Cooperative Beet Seed Treatment Tests, 1947

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AN INCREASING number of chemical materials for seed treatment are being placed on the market every year. There is a need for definite information to serve as a guide to processing companies and to growers, as to the treatments apt to produce best results. The American Society of Sugar Beet Technologists appointed a Committee on Seed Treatments to investigate this subject.

A test was designed including 14 seed treatments and the untreated check. The US 215x216 variety was used, being sheared and sized to 7/64 to 9/64-inch segments and with an initial laboratory germination of 90 percent. The seed treatments were all applied in the Dow Chemical Laboratory at Midland, Michigan, under the supervision of Dr. Phelps Vogelsang and Perc Reeve, both being members of the Seed Treatment Committee.

Each test consisted of 6 replications of 120 seeds per row for each of the 15 variables. The tests were run in cooperation with the research staffs of the various sugar companies, with members of the Sugar Plants Office of the United States Department of Agriculture, and with members of the experiment station staffs of a few state universities located in the beet-growing areas. Seventeen tests were carried to completion. The location of these tests and the cooperating agencies are listed in table 1.

Table 1.—Locations of cooperative seed-treatment tests and the cooperating agencies for 1947.

Test Number	Location of Test	Cooperating Agency
1	Jerome, Idaho	Amalgamated Sugar Company
2	Rocky Ford, Colorado	American Crystal Sugar Company
3	Mason City, Iowa	American Crystal Sugar Company
4	Chaska, Minnesota	American Crystal Sugar Company
5	East Grand Forks, Minnesota	American Crystal Sugar Company
6	Billings, Montana	Great Western Sugar Company
7	Longmont, Colorado	Great Western Sugar Company
8	Longmont, Colorado	Great Western Sugar Company
9	Saginaw, Michigan	Farmers & Manufacturers Beet Sugar Association
10	Sheridan, Wyoming	Holly Sugar Corporation
11	Fort Collins, Colorado	Beet Sugar Development Foundation
12	Beltsville, Maryland	Sugar Plants Office, USDA
13	Fort Collins, Colorado	Sugar Plants Office, USDA
14	Scottsbluff, Nebraska	Sugar Plants Office, USDA
15	Huntley, Montana	Montana State College
16	Mitchell, Nebraska	University of Nebraska
17	Davis, California	University of California

Since it is almost impossible to conduct such a widespread test using all of the seed-treatment chemicals currently being offered to the public, the Committee selected the treatments shown in table 2. All percentage figures listed in this table are in comparison to the weight of seed.

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Table 2. Treatments in cooperative seed-treatment test, 1947.

Number	Seed Treatment
1	Untreated sheared seed 7/64- to 9/64"
2	$\frac{3}{8}$ percent New Improved Ceresan, no Superphosphate
3	1 percent Phygon, 10 percent Treble-superphosphate
4	$2\frac{1}{2}$ percent Phygon, 10 percent Treble-superphosphate
5	5 percent Phygon, 10 percent Treble-superphosphate
6	1 percent Arasan, 10 percent Treble-superphosphate
7	5 percent Arasan, 10 percent Treble-superphosphate
8	10 percent Arasan, 10 percent Treble-superphosphate
9	$\frac{1}{4}$ percent Cu Trichlor phenate, 10 percent treble-superphosphate
10	1 percent Cu Trichlor phenate, 10 percent treble-superphosphate
11 <sup>1</sup>	5 percent Arasan, 5 percent Cuproicide, 5 percent Chloranil, 10 percent treble-superphosphate
12	5 percent Arasan, 5 percent Cuproicide, 5 percent Chloranil, 10 percent treble-superphosphate
13 <sup>1</sup>	5 percent Arasan, 5 percent Cuproicide, 5 percent Chloranil, 10 percent treble-superphosphate
14	5 percent Arasan, $2\frac{1}{2}$ percent Phygon, $\frac{1}{4}$ percent Ceresan, 10 percent treble-superphosphate
15 <sup>1</sup>	10 percent Arasan, 10 percent treble-superphosphate

<sup>1</sup>Seed pelleted with Flyash-Feldspar carrier.

All chemicals, except in the case of treatment 2, were stuck to the seed with Methocel. Treatment 2 was a straight dust treatment, with the thought that it might serve as more or less a standard for comparison with the other treatments.

### Results

Nine of the 17 tests resulted in significantly better stands due to one or more of the treatments. In table 3 are listed the average number of seedlings obtained from 120 seeds planted in 6 replications for each treatment and also the grand average for all of the 9 tests.

Twelve of the 14 treatments resulted in significantly better stands than the untreated seed at Beltsville, Maryland. In contrast, only one treatment was significantly better than untreated seed at Huntley, East Grand Forks, Mason City, Fort Collins, and Saginaw.

The averages of each treatment for all nine locations in table 3 reveal some interesting comparisons. The averages of treatments 9 and 10 are the lowest and third lowest, respectively. Both of these treatments contained copper trichlorphenate. The addition of flyash-feldspar carrier for pelleting resulted in reduced stands in the treatment 13 and 14 comparisons. There was also a tendency for reduced stands in the treatment 15 and 8 comparison, while the stands in the treatment 11 and 12 comparisons were essentially the same.

It is of interest to note, although there is not too much spread between the highest and lowest average stand for the nine tests, that the four (treatments 14, 7, 12 and 11) highest average stands all contain 5 percent Arasan either alone or in combination with other fungicides.

Table 3.—Cooperative seed-treatment tests resulting in significantly better stands than untreated seed, 1947.

Treatment Numbers	Location of tests—Stand counts according to treatment numbers									
	Beltsville, Maryland	Scottsbluff, Nebraska	Sheridan, Wyoming	Jerome, Idaho	Mason City, Iowa	E.G.F., Minnesota	Saginaw, Michigan	Ft. Collins, Colorado	Huntley, Montana	Average of nine tests
1	50.9	49.0	43.6	29.8	81.8	78.0	66.2	97.3	69.2	62.8
2	64.1	81.0 <sup>1</sup>	52.0	12.8	85.5	79.0	72.7	100.6	83.3 <sup>1</sup>	70.1
3	88.8 <sup>1</sup>	50.0	52.3	19.3	85.2	81.2	70.8	103.6	69.7	69.0
4	86.0 <sup>1</sup>	67.0 <sup>1</sup>	47.5	15.8	83.8	87.6	71.2	87.1	63.2	67.7
5	86.7 <sup>1</sup>	58.0	53.1 <sup>1</sup>	17.8	81.2	77.9	62.7	94.3	69.6	66.8
6	79.0 <sup>1</sup>	53.0	58.5 <sup>1</sup>	35.0	80.0	85.3	57.0	100.3	61.8	67.8
7	80.3 <sup>1</sup>	66.0 <sup>1</sup>	54.6 <sup>1</sup>	31.4	88.8	85.7	82.8 <sup>1</sup>	95.1	71.2	72.0
8	88.1 <sup>1</sup>	61.0 <sup>1</sup>	60.0 <sup>1</sup>	26.7	87.8	83.3	73.5	97.1	62.9	71.2
9	64.7	47.0	38.5	37.4	76.3	66.4	53.8	68.1	63.2	57.3
10	83.3 <sup>1</sup>	70.0 <sup>1</sup>	39.0	35.0	75.5	69.7	53.8	74.1	62.7	62.6
11	114.4 <sup>1</sup>	36.0	47.6	41.8	95.5 <sup>1</sup>	76.7	56.8	113.3 <sup>1</sup>	66.6	72.1
12	90.1 <sup>1</sup>	69.0 <sup>1</sup>	50.7	32.7	85.7	86.3	70.5	89.0	77.7	72.4
13	96.9 <sup>1</sup>	60.0	26.5	41.2	67.3	70.6	51.7	95.1	51.5	62.3
14	100.4 <sup>1</sup>	54.0 <sup>1</sup>	48.6 <sup>1</sup>	43.7 <sup>1</sup>	81.8	92.0 <sup>1</sup>	79.2	93.1	77.5	76.6
15	100.8 <sup>1</sup>	56.0	56.8 <sup>1</sup>	43.7 <sup>1</sup>	80.0	75.9	60.8	96.6	51.5	69.1
Mean	85.3	59.0	49.0	31.4	81.7	80.0	65.6	94.6	67.0	
Difference required for significance	15.1	11.7	9.5	12.4	13.5	33.4	16.3	14.0	11.3	

<sup>1</sup>Significantly better than untreated seed at the 5-percent level of significance.

Table 4. —Cooperative seed-treatment tests not resulting in significantly better stands than untreated seed, 1947.

Treatment numbers	Location of tests—Stand counts according to treatment numbers								Average of eight tests
	Rocky Ford, Colorado	Longmont, Colorado	Longmont, Colorado	Ft. Collins, Colorado	Mitchell, Nebraska	Billings, Montana	Davis, California	Chaska, Minnesota	
1	41.2	65.3	66.3	88.3	52.6	83.3	45.0	105.0	68.4
2	48.3	65.0	67.0	82.3	62.1	75.5	47.5	94.0	67.7
3	37.0	62.7	63.5	75.2	61.1	78.2	46.7	90.0 <sup>1</sup>	64.3
4	42.3	61.5	70.5	77.2	54.3	89.0	47.2	91.0 <sup>1</sup>	66.6
5	46.6	56.8	68.8	62.0 <sup>1</sup>	55.4	78.0	40.8	77.0 <sup>1</sup>	60.7
6	42.2	59.7	68.7	74.8	56.9	77.5	57.5	89.0 <sup>1</sup>	65.8
7	51.3	71.0	71.2	83.2	63.2	88.3	49.2	79.0 <sup>1</sup>	69.6
8	31.7	71.0	69.2	81.2	55.3	88.0	57.3	90.0 <sup>1</sup>	68.0
9	37.5	48.3 <sup>1</sup>	61.0	72.2 <sup>1</sup>	59.8	77.2	37.8	78.0 <sup>1</sup>	59.0
10	33.2	57.5	58.2	59.5 <sup>1</sup>	53.1	69.4	45.2	74.0 <sup>1</sup>	56.3
11	59.6	49.7 <sup>1</sup>	68.5	71.5 <sup>1</sup>	60.8	88.0	53.7	99.0	68.8
12	50.9	53.8	61.7	73.7 <sup>1</sup>	51.0	89.5	44.3	93.0 <sup>1</sup>	64.7
13	38.3	59.0	61.2	52.2 <sup>1</sup>	47.8	70.1	42.5	79.0 <sup>1</sup>	56.3
14	46.3	61.0	69.3	79.5	51.0	71.9	44.7	89.0 <sup>1</sup>	64.1
15	32.9	64.3	63.3	62.7 <sup>1</sup>	57.4	80.8	52.2	95.0	63.6
Mean	42.8	60.4	65.9	72.0	56.3	80.6	47.4	88.2	
Difference require for significance	NS	11.8	NS	14.5	NS	NS	NS	11.5	

<sup>1</sup>Significantly less stand than untreated seed at 5-percent level of significance.



Eight of the 17 tests resulted in no significant increase due to seed treatment. The results for these tests are presented in table 4. Three of these tests resulted in reduced stands due to treatments. In the test at Chaska, Minnesota, 11 of the 14 treatments resulted in significantly reduced stands in comparison to non-treated seed. Seven treatments were deliterious at Fort Collins, Colorado, and one treatment resulted in reduced stands at Longmont, Colorado.

### Discussion and Conclusions

Testing 14 seed treatments over a wide variety of soil and climatic conditions naturally involves a great many variables. Although temperatures and rainfall for the germination period were available for 10 of the tests they are not presented here since they can be in no way correlated with the results.

One of the surprising features of the experiments is the relatively poor performance of the New Improved Ceresan treatment. This treatment was beneficial in only two tests, while over a period of years it has proved a fairly reliable treatment for sugar beet seed. This cannot be explained as injury due to the chemical, since it only proved deliterious in the Jerome, Idaho, test, and laboratory germinations gave no indication of injury 6 weeks after treatment.

Perhaps one factor which contributed to the relatively poor performance due to treatments was the initial high germination of the seed. Laboratory tests indicated a germination of 90.0 percent and also that the seed was relatively free from molds. Contributing also to the lack of response from treatments was the fact that most cooperators reported very little to no visible post-emergence damping-off.

The paucity of positive results makes generalizing extremely hazardous. However, there seems to be a slight tendency for treatments which included 5 percent Arasan to give slightly better results over the area covered by the 9 tests which gave significant differences.

However, the results from these cooperative tests will have to be viewed in the light that they are only 1 year's results and that additional tests will have to be made before more definite conclusions can be drawn as to performance of individual or mixed fungicide treatments.