Bulletin B-441 November, 1954

Boll Weevil and Bollworm Control with Insecticides

Results of a Five-Year Study With 14 Dusts and Sprays

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CONTENTS

Cotton insect control has become a profit-and-loss yardstick for Oklahoma farmers during critical cotton years. Because of cotton's position in Oklahoma agriculture, Oklahoma A. & M. College researchers conduct tests each year to find new and better ways for controlling cotton insects. This bulletin reports results of five years of tests with 14 sprays and dusts. A summary on pages 12 and 13 lists the insecticides with test results and recommendations for their use.

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Results of a Five-Year Study With 14 Dusts and Sprays

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Control of insects on cotton has become a major necessity in recent years. Some years control of these insects has meant the difference between a profit and loss to cotton farmers. Because of the importance of cotton in this State, the Oklahoma Experiment Station conducts tests each year in the hope of discovering new and better methods of controlling injurious pests.

This bulletin reports the results of tests conducted during a five-year period, 1948-1952,* for the control of boll weevils and bollworms in central and eastern Oklahoma. Preliminary results and recommendations have been published by Dogger and Fenton (1,2) **. Fenton (3) reported on results with sprays and some of the new organics and Fenton and Tippit (4,5) on the blooming of cotton in relation to insect control.

Principal objectives of the tests were:

1. To determine the value of spraying versus dusting.
2. To determine the comparative value of different insecticides, especially the synthetic organics.
3. To determine the correct amount of toxicant to use per acre to obtain effective control.

*In addition to funds provided by the Station during this period, financial grants were made by the following agencies: Sherwin-Williams Company, Kansas City; California Spray Chemical Company, Oklahoma City; Pennsylvania Salt Company, Bryan, Texas; Phillips Petroleum Company, Bartlesville, Oklahoma; Julius Hyman Division Shell Oil Company, Denver, Colorado; Oklahoma Cotton Research Foundation, Oklahoma City.

** Numerals in parentheses refer to Literature Cited, page 22.

PROCEDURE

During the five-year test period, 14 insecticides were tested in various formulations as dusts or sprays on at least four varieties of cotton—Improved Rowden, Stoneville 62, Delta Pine, and Lankart. A total of 41 comparisons was made on farms at Bache, Canadian, Eufaula, Okemah, and Chickasha.

Boll weevil and bollworm infestations varied from year to year and from test farm to test farm. Weather conditions ranged from droughts to seasons of excessive rainfall. Soil fertility, soil type, and cultural conditions varied at different locations.

Treatments were replicated from two to five times and when possible and desirable the data were analyzed statistically. Results were evaluated by periodic infestation counts, fruiting records and yields. In some fields cotton was picked, in others snapped.

In general, each material was tested under average cotton growing conditions in eastern and central Oklahoma.

In most tests, dusts and sprays were applied with power equipment pulled by tractors. Some data were obtained in the experimental greenhouse at Stillwater or by means of small plot and laboratory tests. Size of the plots upon which most of the conclusions are based varied depending upon circumstances, but most plots were approximately an acre in area.

Infestation records were taken weekly, or oftener, by examining squares and bolls, and applications were made when needed, weather permitting. Dusts were applied in calm or nearly calm air. Windy weather often caused delays in dust applications. It was usually possible to apply sprays when they were needed.

For spray applications, one to three nozzles of the T-jet type or equivalent were used per row depending upon the height of plants, except in one field when the fan-type pattern spray nozzle was used. There was some variation in pressure, but an average pressure of 65 pounds was maintained.

SPRAYING VERSUS DUSTING

During four of the five years, dusts were compared with sprays. Results of these tests are summarized in Table 1. The average lint yield per acre was 447 pounds for the sprayed plots and 401 pounds for the dusted plots with corresponding gains over the checks of 180 and 157 pounds of lint respectively.

In evaluating these results, it should be remembered that they are averages and are not always comparable. Other things being equal, yields and increases as a result of boll weevil and bollworm control are correlated with soil fertility and with favorable seasons for cotton growth. The difference of 23 pounds of lint per acre in favor of sprays is not great enough to favor this method of application.

DUSTING TESTS

Results of tests with five dust formulations are summarized in Table 2. Since these tests summarize work done with different varieties, in different years, and in soils with various grades of fertility, gains over checks represent a better comparison than total yield. There was only a difference of 45 pounds of lint gain over the check between the treatment giving the greatest gain and the one giving the smallest gain. This difference is not believed significant enough to favor one dust combination over the other.

Calcium Arsenate

Calcium arsenate was compared with three other dust formulations in 1948, (Table 3). Boll weevils and bollworms were highly injurious. Infestation counts showed that while calcium arsenate gave equal weevil control to the other formulation, it failed to control bollworms and this was the direct cause of the difference in yields.

In 1949, a lime-free calcium arsenate dust was tested with DDT and gamma BHC as additives (Table 4). Best results were obtained when DDT was used with calcium arsenate, primarily because neither calcium arsenate nor gamma BHC controlled bollworms. In 1951, a lime-free calcium arsenate with 2 ½ percent DDT and 1 percent parathion gave good control with an increase of 140 pounds lint per acre over the check (Table 4). In 1952, 5 percent DDT and 1 percent parathion added to the lime-free calcium arsenate was compared to dieldrin-DDT, aldrin-DDT, methyl parathion, and heptachlor dusts (Table 5). It was as good as aldrin-DDT and better than the methyl parathion and heptachlor dusts.

A summary of all the tests with calcium arsenate is given in Table 4. From these data it appears that DDT should be added to calcium arsenate to control bollworms. The gamma BHC and parathion were added to suppress cotton leaf aphid and red spider mite infestations. About seven pounds of calcium arsenate and ½ to 1 pound of DDT should be used per acre per application for best control.

Toxaphene

Results of tests with a 20 percent toxaphene dust are summarized in Table 2; for a comparison with the 3-5-40 mixture see Tables 3 and 6. Yields and gains over checks were not quite as good as those obtained with the 3-5-40 mixture. These differences are also shown in Tables 3 3 and 9, summarizing tests in 1948 and 1949. In 1951, it was used with and without demeton (Table 8). Demeton apparently added little if anything to its efficiency in controlling boll weevils and bollworms. The toxaphene was used at from 1 to 2 pounds actual toxicant per acre depending upon the size of plants and severity of infestation. In 1951, when bollworms were unusually abundant and destructive, toxaphene dusts without DDT did not effectively prevent bollworm damage unless from 3 ¾ to 4 pounds of toxaphene were applied per acre.

3-5-40 Mixture

Tests with 3-5-40 mixture are summarized in Table 2 with individual field tests shown in Tables 3 and 9, and a comparison with 20 percent toxaphene in Table 6. In 1949, when bollworms were not a problem, it did not improve control over the 20 percent toxaphene dust; but, in 1948, when bollworms were serious and cotton fruiting was delayed, control was better than with toxaphene (Table 3). Results summarized in Tables 2 and 6 show that the two formulations were about equally effective. In 1949, results were as good with ten pounds dust per acre as with 15 pounds.

Aldrin—DDT Mixture

Tests with an aldrin-DDT mixture are summarized in Table 2 with individual field comparisons in Tables 5 and 7. In 1951, at Chickasha this dust mixture compared well with other dust formulations. In 1952, it was used at from 10 to 15 pounds per acre.

Dieldrin—DDT Mixture

Results with a dieldrin—DDT mixture are summarized in Table 2 with individual field test comparisons in Tables 5 and 7. In 1951 and 1952, it gave as good control as the best of the other dusts tested. It was used at the rate of 10 to 15 pounds per acre.

Other Dusts Tested

Six other dust formulations were tested. Some failed in one season and were not included in subsequent tests. Others showed promise but

so far sufficient data for a complete report are unavailable. However, the following paragraphs summarize the limited data available.

Chlordane—DDT Mixture—A chlordane—DDT mixture was tested at Chickasha in 1951 (Table 7). Used at the rate of 1 pound of chlordane and ½ pound of DDT per acre per application, it compared favorably with the other dust formulations tested in control of bollworms, but results were erratic against the boll weevil.

Potasan Dust—At Chickasha in 1951, potasan dust failed to control the boll weevil and bollworm sufficiently to increase yields over the check (Table 7).

Methyl Parathion Dust—A 2 percent methyl parathion dust failed to hold bollworms in check at Okemah in 1952 (Table 5).

Heptachlor Dust—At Okemah in 1952, heptachlor dust failed to control bollworms and as a result the increase over the check was not as great as with the other dusts tested, with the possible exception of the 2 percent methyl parathion (Table 5).

Gamma Benzene Hexachloride—Five percent gamma benzene hexachloride was very effective against the boll weevil in 1948 (Table 3) but failed to control the bollworm and, at the strength used, caused some burning of the tender growth of the plants. As a result there was no increase in yield over the check.

EPN*—EPN dust failed to control bollworms in a test at Canadian in 1951 (Table 8).

SPRAYING TESTS

Results of tests with four spray formulations are summarized in Table 10. As in the case of dusts, differences in yields are due mostly to variations in soil fertility, variety, or cultural conditions rather than because of differencs in control with the formulations tested. Gains over checks give a more accurate account of the effectiveness of one spray formulation over another.

Toxaphene-DDT (2-1)

Because toxaphene—DDT spray was one of the first spray formulations developed and since from the beginning it gave good control of both bollworms and boll weevils, more data are available than for any other spray formulation. It was first tested at Canadian in 1949 where

* Ethyl p-Nitro-Phenyl Thionobenzene phosphate.

a direct comparison was made with a 20 percent toxaphene dust and 3-5-40 dust used at 10 and 15 pounds per acre (Table 9). That year gains of lint per acre showed it was as effective as either dust. In 1950, it was compared with aldrin and a chlordane-DDT spray (Table 11). In this field, boll weevil infestation was so heavy that only 7 pounds of lint per acre were picked from the untreated spots. The low yield of 306 pounds per acre was directly attributed to 44-inch rows and a poor stand. It proved to be superior to aldrin or chlordane-DDT sprays in this field. In 1951, it proved to be better than four dust treatments (Table 8). At Chickasha in 1952 (Table 12), it gave the same control under drought and low boll weevil infestation as three other spray formulations.

All data with this spray formulation are shown in Table 13. The yields ranged from 167 to 558 pounds of lint per acre with an average of 441 pounds. The gains over the check ranged from 58 to 299 pounds of lint. From 1 to 2 pounds of actual toxaphene were applied per acre in these tests with half that amount of DDT.

Demeton (Systox)

Demeton was tested both in the field and greenhouse. It was not effective against either the boll weevil or bollworm. However, it was effective against the cotton aphid and the two-spotted spider mite both as a foliage spray and when applied to the soil. In the field, three pounds of technical material per acre applied to the soil gave a month's protection against aphids. When used at a ratio of 1 ½ parts demeton to 20 parts of toxaphene, complete protection was obtained against aphids and the two spotted spider mite. It was used at rates up to 1 pound technical insecticide per 100 pounds of cotton seed. At these rates it was not effective as a systemic.

Toxaphene

A toxaphene-demeton combination was tested at Eufaula and Chickasha in 1951 (Tables 7 and 15). The differences in yields reflect an unfavorable season for cotton at Chickasha, but at Eufaula growing conditions were favorable. At Chickasha it compared favorably with three other spray formulations and was better than a fourth. At Eufaula control was the same as that obtained with a toxaphene-oil solution, better than heptachlor and not as good as aldrin-DDT or dieldrin-DDT sprays

Toxaphene sprays without DDT did not effectively control heavy bollworm infestations when toxaphene was used at rates up to 2 pounds

per acre. However, control was obtained when the rate was increased up to 3 ¾ and 4 pounds actual toxaphene per acre. At this high rate some leaf burning was caused.

Aldrin-DDT

The data on aldrin-DDT spray formulation are shown in Tables 12 and 15 and summarized in Table 10. A spray concentrate containing 1 pound of aldrin and 2 pounds DDT per gallon was used at 1 to 2 quarts per acre. At Eufaula in 1951, it was the best of five formulations tested with the possible exception of dieldrin-DDT. At Chickasha in 1952, it was as effective as three other spray formulations under drought conditions.

Dieldrin-DDT

The data on this spray formulation are shown in Table 15 and summarized also in Tables 10 and 14. The spray concentrate contained ¾ pound dieldrin and 1½ pounds DDT per gallon. Direct comparison with certain other spray formulations was made only at Eufaula in 1951. Results in Table 15 show that it was one of the two best mixtures used.

Other Sprays Tested

Heptachlor—Heptachlor was tested on one farm at Eufaula in 1951, where, at ¾ pound actual poison per acre, it was the least effective of five formulations tested (Table 15).

Endrin—Endrin was tested at Chickasha in comparison with three other formulations in 1952 (Table 12). Under drought and low boll weevil infestations and with a moderate bollworm infestation, it was as effective as the three other formulations. Laboratory tests made in 1952 at Stillwater showed endrin to be very promising against the boll weevil. In the field it was used at 2/5 pound actual poison per acre.

Heptachlor-DDT—Heptachlor-DDT was tested at Chickasha in 1952 at ½ pound heptachlor and 1 pound of DDT per acre per application (Table 12). Because of drought, yields were low and weevil infestation light. Bollworms caused some damage. There was no significant difference between yields in plots sprayed with this formulation and three others.

Chlordane-DDT—In 1950, Chlordane-DDT was tested at ¾ pound chlordane and 1/3 pound DDT per acre per application in prebloom cotton and at 1 and ½ pound respectively in blooming cotton. Yields

were considerably lower than those in the toxaphene-DDT (2-1) sprayed plots (Table 11).

Aldrin—At Bache in 1950, an aldrin spray at rates of ¼ to ½ pound per acre gave an increase of 104 pounds of lint per acre. This increase was about half as much as that in plots sprayed with the toxaphene-DDT (2-1) mixture.

Oil Solutions of Aldrin and Toxaphene—Solutions of toxaphene and aldrin in an oil were tested in 1951. Results were equal to those obtained with standard oil-in-water emulsions. Foliage was burned severely with toxaphene but no injury was observed with aldrin.

SUMMARY

Fourteen insecticides were tested over a period of five years to evaluate their effectiveness as sprays or dusts to control boll weevils and bollworms in cotton.

There was no difference in effectiveness of applying insecticides as spray emulsions or as dusts so long as they contained insecticides effective against boll weevils and bollworms.

Calcium arsenate dust at an average of 7 1/5 pounds per acre gave excellent control of the boll weevil but failed against bollworms. When used with DDT, however, a specially prepared lime-free calcium arsenate gave excellent control of both pests. A 2½ percent DDT-calcium arsenate mixture used at 9 ½ pounds per acre gave as effective control as did 5 percent DDT at this rate.

A 20 percent toxaphene dust used at 10 to 15 pounds per acre gave excellent control of boll weevils and was also effective against a medium heavy infestation of bollworms. However, in one year, when bollworms were unusually destructive the above amount of dust per acre was not effective. For such a very heavy bollworm infestation, it was necessary to apply as much as 3¾ to 4 pounds of toxaphene per acre which meant increasing the amount of dust used.

The 3-5-40 mixture used at from 10 to 15 pounds per acre was very effective against both pests. However, in a very heavy bollworm infestation such as occurred in 1951, it was necessary to increase the amount of DDT applied per acre to the amount indicated in the preceding paragraph. Under such conditions the 3-10-40 mixture was more satisfactory because the amout of dust per acre could be held at 10 to 15 pounds and yet the amount of DDT was sufficient to bring bollworms under control.

A 2½ percent aldrin-5 percent DDT dust mixture was very effective against both pests when applied so as to use from ¼ to ½ pound aldrin and ½ to 1 pound DDT per acre.

A dust mixture of 1 ½ percent dieldrin-5 percent DDT was very effective against weevils and bollworms when used at ¼ to ½ pound dieldrin and ½ to 1 pound DDT per acre.

A toxaphene-DDT spray used at from 1 to 2 pounds toxaphene and ½ to 1 pound DDT per acre was very effective against boll weevils and bollworms. Used alone toxaphene as a spray was somewhat less effective than the 2-1 mixture of toxaphene-DDT. Against a very heavy bollworm infestation, from 3 ¾ to 4 pounds toxaphene was required per acre to obtain control.

An aldrin-DDT spray used at the rate of ½ pound aldrin and twice that amount of DDT per acre was very effective.

A dieldrin-DDT spray used at approximately 1/3 pound of dieldrin and 1 pound of DDT per acre was also very effective.

Demeton was ineffective against the boll weevil and bollworm. However, it controlled the cotton aphid and the two-spotted spider mite when used as a foliar spray or when applied to the soil. Three pounds of the technical material per acre in the soil gave a month's protection against aphids.

Table 1—Comparison of Sprays and Dusts For Boll Weevil and Bollworm Control—1948-1952.

Type of Formulation	Avg. Yields in Lbs. of Lint Per Acre	Avg. Gains in Lbs. of Lint Per Acre Over Check
Sprays (4 formulations)	447	+179.8
Dusts (5 formulations)	401.6	+157.4

Table 2—Summary of the Effectiveness of Five Dust Formulations.

Formulations Tested	Avg. Yields in Lbs. of Lint Per Acre	Avg. Gains in Lbs. of Lint Per Acre Over Check	Number of Year's Records
Calcium Arsenate Dust With 2½% to 5% DDT	455	+162	3
20% Toxaphene Dust + 40% Sulfur	400	+141	3
3-5-40 Dust	434	+146	2
2½% Aldrin-5% DDT Dust	334	+152	2
1½% Dieldrin-5% DDT Dust	385	+186	2

Table 3—Comparative Effectiveness of Seven Applications of Four Dust Formulations, Canadian, Oklahoma—1948.

Formulations Tested*	Avg. No. Pounds of Dust Used Per Acre	Avg. Yields in Lbs. of Lint Per Acre	Avg. Gains in Lbs. of Lint Per Acre Over Check
Calcium Arsenate	7.2	182	+26
3% gamma-BHC 5% DDT 40% Sulfur	9.7	370	+214
20% Toxaphene 40% Sulfur	10	307	+151
5% gamma-BHC	10	127	—29

*Dates of application: July 2, 8, 29; August 3, 9, 13, 21.
Variety: Improved Rowden.

Table 4—Comparative Effectiveness of Calcium Arsenate Dust With and Without Additives.

Formulations Tested	Average No. of Pounds of Dust Used Per Acre	Average Yields in Pounds of Lint Per Acre	Average Gains in Pounds of Lint Per Acre Over Check	Year
Calcium Arsenate	7.2	182	+26	1948
Calcium Arsenate With 5% DDT and 1% gamma-BHC	11.5	417	+174	1949
Calcium Arsenate With 1% gamma-BHC	11.5	349	+106	1949
Calcium Arsenate With 2½% DDT and 1% parathion	9.5	408	+140	1951
Calcium Arsenate With 5% DDT and 1% parathion	9.5	540	+173	1952

Table 5—Comparative Effectiveness of Five Dust Formulations, Okemah, 1952.

Formulations Tested*	Average Yields in Pounds of Lint Per Acre	Average Gains in Pounds of Lint Per Acre Over Check
Calcium Arsenate with 5% DDT and 1% Parathion	450	+173
1½% Dieldrin + 5% DDT	521	+244
2½% Aldrin + 5% DDT	432	+155
2% Methyl Parathion	374	+97
2½% Heptachlor	341	+64

*Dusting dates: July 1, 8, 22, 28; August 2, 7, 15.

Table 6—Comparative Effectiveness of 20% Toxaphene and 3-5-40 Dusts, Canadian, Oklahoma, 1948-49.

20% Toxaphene				3-5-40			
Avg. No. Lbs. of Dust Used Per Acre Per Application	Number of Applications	Avg. Yields in Lbs. of Lint Per Acre	Avg. Gains in Lbs. of Lint Per Acre Over Check	Avg. No. Lbs. of Dust Used Per Acre Per Application	Number of Applications	Avg. Yields in Lbs. of Lint Per Acre	Avg. Gains in Lbs. of Lint Per Acre Over Check
10	7	307	+151	10	7	370	+214
13	6	455	+103	13.3	6	471	+118
—	-	---	——	10.6	5	461	+107
Averages all tests:							
11.5	6.5	381	+127	11.3	6	434	+146.3

Table 7—Comparative Effectiveness of One Spray and Four Dust Formulations, Chickasha, Oklahoma, 1951.

Formulations Tested	Average No. Pounds of Toxicant Per Acre Per Application	Average Yields in Pounds of Lint Per Acre	Average Gains In Pounds of Lint Per Acre Over Check
2½% Aldrin plus 5% DDT dust	0.22 - 0.5	269	+149
Toxaphene-Demeton spray	2.55 - 0.09	262	+142
10% Chlordane plus 5% DDT Dust	1 - 0.5	252	+132
1½% Dieldrin plus 5% DDT dust	0.13 - 0.44	248	+128
2% potasan dust	0.22	137	+17

*Dates of application:—July 27, August 1, 6, 11

Table 8—Comparative Effectiveness of Four Dusts and One Spray Formulation, Canadian, Oklahoma—1951.

Formulations Tested*	Average No. Pounds of Toxicant Per Acre Per Application	Average Yields in Pounds of Lint Per Acre	Average Gains In Pounds of Lint Per Acre Over Check
Toxaphene-DDT Spray	2 .1	550	+282
Toxaphene-Demeton Dust	2 .0.15	408	+140
Toxaphene Dust	1.9	438	+170
Calcium Arsenate-DDT-Parathion Dust	9.5 0.23 0.10	408	+140
EPN Dust	0.31	272	+8

*Dates of Application: 7/3-5; 10; 16-17; 23, 28

Table 9—Comparative Effectiveness of Two Dusts and One Spray Formulation, Canadian, Oklahoma—1949.

Formulations Tested	Avg. No. Pounds of Dust Used Per Acre	Avg No. Pounds of Toxicant Per Acre Per Application	Avg. Yields In Lbs. of Lint Per Acre	Avg. Gains in Lbs. of Lint Per Acre Over Check
Toxaphene Dust	10	2.6*	455	+103
3-5-40 Dust	10	0.32-0.53**	461	+107
	15	0.40-0.67***	471	+118
Toxaphene-DDT	--	1.6-0.8†	437	+84
Spray	--	1.8-0.9††	457	+104
	--	1.8-0.9†††	447	+94

*Six applications made between June 16, and July 28.
**Five Applications made between June 23, and July 28.
***Six applications made between June 16, and July 28.
†Three applications made between June 8, and July 16
††Four applications made between June 15, and July 18.
†††Five applications made between June 15, and July 28.

Table 10—Summary of the Effectiveness of Four Spray Formulations.

Formulations Tested	Average No. Pounds of Toxicant Per Acre Per Application	Average Yields in Pounds of Lint Per Acre	Average Gains In Pounds of Lint Per Acre Over Check
Toxaphene—DDT 2-1 Mixture	1.6-0.8	441	+143
Toxaphene	2.55-0.09	465	+174
Aldrin-DDT	0.5-1	524	+244
Dieldrin-DDT	0.38-1	358	+158

Table 11—Comparative Effectiveness of Three Spray Formulations, Bache, Oklahoma—1950.

Formulations Tested*	Average No. Pounds of Toxicant Per Acre Per Appilcation		Average Yields in Pounds of Lint Per Acre	Average Gains in Pounds of Lint Per Acre Over Check
	Pre-Bloom	Bloom		
Chlordane—DDT	0.75-0.38	1-0.5	93	+86
Aldrin	0.25	0.5	111	+104
Toxaphene—DDT	1.8-0.9	2-1	306	+299

*Applications made July 17-19; 24-27; July 31-Aug. 2; Aug. 9-19; Aug. 14; Aug. 21-22; Aug. 29-35.

Table 12—Comparative Effectiveness of Four Spray Formulations, Chickasha, Oklahoma, 1952.

Formulations Tested*	Average No. Pounds of Toxicant Per Acre Per Application	Average Yields in Pounds of Lint Per Acre	Average Gains In Pounds of Lint Per Acre Over Check
Endrin	0.4	146	+48
Aldrin-DDT	0.5-1	148	+50
Heptachlor-DDT	0.5-1	156	+58
Toxaphene-DDT	2-1	167	+69

*Five applications made July 30—Aug. 21.

Table 13—Four Years' Record of Effectiveness of a Toxaphene—DDT Spray.

Avg. No. Pounds of Toxicant Per Acre Per Application	Avg. Yields in Lbs. of Lint	Avg. Gains in Lbs. of Lint Per Acre Over Check	Number of Applications	Date Range of Applications	Location	Year
1.6-0.8	437	+84	3	June 8-July 18	Canadian	1949
1.8-0.9	457	+104	4	June 15-July 18	Canadian	1949
1.8-0.9	447	+94	5	June 15-July 28	Canadian	1949
1.8-0.9	306	+299	9	June 14-Aug. 15	Bache	1950
1 to 2-0.5-1	558	+162	9	June 14-Aug. 15	Canadian	1950
1 to 2-0.5-1	506	+110	9	June 14-Aug. 15	Canadian	1950
1 to 2-0.5-1	516	+111	9	June 14-Aug. 15	Canadian	1950
1 to 2-0.5-1	454	+58	9	June 14-Aug. 15	Canadian	1950
2-1	550	+282	5	July 3-28	Canadian	1951
2-1	167	+69	5	July 30-Aug. 21	Chickasha	1952
1.5-0.75	447	+204	4	July 16-Aug. 10	Canadian	1949
Averages	441	+143	6.5	June 8-Aug. 21	--	--

Table 14—Effectiveness of a Dieldrin—DDT Spray During a Two-Year Period.*

Average Yields in Pounds of Lint Per Acre	Avg. Gains in Lbs. of Lint Per Acre Over Check	Location	Year	Variety
830	+368	Eufaula	1951	Stoneville 62
139	+48	Chickasha	1952	Stoneville 62
104	+57	Chickasha	1952	Lankart
Averages:				
357.7	+157.7	--	--	

*0.38 lb. dieldrin 1 lb. DDT used per acre.

Table 15—Comparative Effectiveness of Five Spray Formulations, Eufaula, Oklahoma, 1951.

Formulations Tested*	Average No. Pounds of Toxicant Per Acre Per Application	Average Yields in Pounds of Lint Per Acre	Average Gains In Pounds of Lint Per Acre Over Check
Aldrin-DDT	0.5*	899	+437
Toxaphene-Oil* Solution	2.5	707	+245
Toxaphene-Demeton	2.5	668	+206
Heptachlor	0.75	639	+177
Dieldrin-DDT	0.38*	830	+368

*Caused severe burning.

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