

## CHINCH BUG CONTROL TESTS—1955<sup>1</sup>

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Records of very damaging attacks on St. Augustine grass lawns by the chinch bug *Blissus insularis* Barber date back into the last century. The ravages of this insect have been most marked in the past decade, however. The increase in reports of injury may be at least partially accounted for by the fact that many more St. Augustine grass lawns have been planted in recent years due to the rapid expansion of private housing and tourist facilities in Florida.

Previous tests on control of the chinch bug conducted by Kerr (1956) showed that emulsion concentrates of DDT and parathion were more consistently reliable than chlordane, dieldrin, strobane, and demeton. These 1954 trials also indicated that DDT and parathion could be used satisfactorily at lower dosages than those often used in Florida.

*Methods and Materials:* In 1955, DDT and parathion were compared with malathion and lindane in a factorial test contrasting the emulsion concentrate and granular formulations of the four insecticides. Dieldrin granules were also tried in one or two plots at each location.

There was particular interest in the performance of malathion, because the use of parathion has been banned in at least one community. Commercial spray operators have been interested in turning to malathion as a phosphatic substitute for the very effective parathion. Since it was not possible to make observations on the effectiveness of one versus two applications, the effects of a single application were followed over a six-week period.

Insecticidal dosages are shown in table 1. Granules were applied at about 1.5X the emulsion concentrate dosages since some previous experience indicated this was necessary to get comparable control. Emulsion concentrates were applied with a sprinkling can at the rate of five gallons of liquid per 100 square feet of lawn. The granules were shaken from a jar with a perforated lid, and then washed from the grass foliage by light sprinkling. Care was taken to ensure that the soil was moist prior to application of the toxicants.

Chinch bug counts were made, as in 1954, by sampling one square foot of each plot with a flotation method. The sample was taken where it was estimated that the population level in each plot was highest. A pre-application count was made. The pre-application counts were arranged *à seri-*

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*atum* and the list was divided into high, medium, and low populations. In Tampa, the average number of chinch bugs per square foot in the high, medium, and low population replicates was 155.3, 74.9 and 45.7 respectively. At Fort Lauderdale, there was room for only two replicates, and the pre-application count was split into high versus low population (averages of 51.3 and 14.1 chinch bugs per square foot respectively) to determine the placing of the replicates. The location of the plots within the replicates was randomized. Plot size at Tampa was 43.5 square feet, and at Fort Lauderdale 65 square feet.

TABLE 1.—INSECTICIDES AND DOSAGES.

Insecticide	Amount of active ingredient per acre in pounds	
	Emulsion concentrate	Granules
DDT .....	10	15
Parathion .....	1.5	2
Malathion .....	6	10
Lindane .....	2.5	4
Dieldrin .....		8

The insecticides were applied on June 7 in Fort Lauderdale and on July 12 in Tampa. Subsequent counts were taken at two-, four-, and six-week intervals. The plots at Tampa were inadvertently sprayed by the cooperator there just prior to the six-week count, so the data for the count at that time are not included in the combined analysis for the two locations in table 2. In Fort Lauderdale, there were seven inches of rain during the first two-week interval and 1.71 inches in the following two-week interval. This was considerably less than the 12½ inches that fell there during the three-week testing period in 1954. The rainfall in Tampa was less extreme in both seasons.

*Results:* The data for locations 1 and 2, and for the two- and four-week counts, were combined and subjected to an analysis of variance. There was no interaction between locations and insecticides as there was in 1954 when the tests were conducted on widely differing types of turf at locations over 300 miles apart. With some of the insecticides, there was a statistically better control with one formulation or the other but the differences were too small to have practical meaning.

The finding of a significant *F* for replicates within locations was not unexpected and was also observed in 1954. It indicates that the level of the population at the start of the test may have an effect on the results attained. The number of chinch bugs left in the plots which had a high population at the start of the test was larger than the number left where the population was low at the outset.

The significant *F* value for locations probably reflects the fact that the average population at the start of the test at Tampa was much larger than the population at Fort Lauderdale. Yet the numbers of chinch bugs at the end of the test were nearly the same for each location.

The significance of the differences between treatment means was examined by Duncan's (1955) multiple range test. Results are shown in Table 2. At the time of the first or two-week count, all treatments reduced

chinch bugs populations significantly from the check. There were no significant differences among control figures for lindane, parathion, and DDT formulations. Malathion formulations were significantly less effective than parathion and DDT at the rates tested. By the multiple range test, however, some lindane means were not significantly different from some malathion means. Lindane, then, was intermediate between malathion and DDT or parathion in effectiveness. At the four-week count malathion formulations did not give significant reductions from chinch bug numbers in the check. Lindane, parathion and DDT formulations all gave significant reductions from the check at the four-week count and were not significantly different from each other. Dieldrin gave practically no control in the plots where it was tried.

TABLE 2.—NUMBERS OF CHINCH BUGS PER SQUARE FOOT. AVERAGE FROM COMBINATIONS OF ALL REPLICATES AT TWO LOCATIONS.\*

	Check	Mal. Gr.	Mal. E. C.	Lind E. C.	Lind. Gr.	Par. E. C.	Par. Gr.	DDT E. C.	DDT Gr.
Pre-treatment count .....	68.6	63.2	80.2	54.8	83.4	68.2	57.4	77.6	61.0
2 Weeks .....	72	26.8	17.6	4.8	3.6	1.8	0.0	2.0	1.8
4 Weeks .....	71.4	81.0	38.6	9.6	7.4	3.4	1.2	3.2	1.0

\* Any two means underscored by any given line are not significantly different from each other at 5 percent level. Any two means not underscored by the same line are significantly different.

A decline in the residual effectiveness of the insecticides with the passage of time is clearly shown. A significant  $F$  for counting dates  $X$  insecticides was expected, and table 2 shows that malathion, particularly, had rapidly lost its ability to control the insects. The other insecticides were not as effective in control after four weeks as after two weeks, although the numbers of bugs were still below a damaging level. It was pointed out above that the six-week counts could not be included in the analysis, but the data obtained showed a rapid rebuilding of chinch-bug numbers for most of the other materials. Parathion plots, especially, had large numbers of bugs present after six weeks, although DDT-treated plots still showed consistently small numbers of insects.

Although the average reduction in chinch bug numbers by lindane was not significantly different from that by DDT and parathion, lindane's performance was not as impressive because of its erratic control. While all of the parathion and DDT plots had counts ranging between 0 and 8 chinch bugs per square foot, lindane plots included some with counts of 14, 16, 18, 19, and 32 bugs.

*Summary:* A test for the control of chinch bugs on St. Augustine grass lawns was conducted at two locations with emulsion concentrate and granular formulations of DDT, parathion, malathion, and lindane. Malathion failed to give satisfactory control. Chinch bug numbers in some lindane plots were rather high, although the average control figure for this material was satisfactory. Granular formulations gave practically the same control as emulsion concentrates. All treatments except malathion formulations still showed very satisfactory average control four weeks from the date of application. Only DDT-treated plots had small numbers of chinch bugs after six weeks.

#### LITERATURE CITED

- Duncan, D. B.* 1955. Multiple range and multiple F tests. *Biometrics* **11**(1): 1:42.
- Kerr, S. H.* 1956. Chinch bug control on lawns in Florida. *Jour. Econ. Ent.* **49**(1): 83-85.

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#### NOTICE OF ANNUAL MEETING

The Thirty-Ninth Annual Meeting of the Florida Entomological Society will be held on August 30-31, 1956, at the Floridan Hotel, Tallahassee. This is the first meeting of the Society to be held in the state capitol and advance planning indicates that it will be one of the best. In addition to the program of presented papers, a tour of the North Florida Experiment Station is planned as part of the program.

So that the program can be printed in time for members to receive their copies before the meeting, all persons planning to present papers should submit the title and time required for presentation to Dr. S. H. Kerr, Department of Entomology, Agricultural Experiment Station, University of Florida, Gainesville, Florida, before July 31.