

Control of Soft Wax Scale on Citrus Trees

SOFT wax scale, *Ceroplastes destructor*, which is regarded as a serious pest of all kinds of citrus trees in parts of Australia, has now become firmly established in many commercial orchards at Kerikeri, Bay of Islands County. A limited number of citrus trees in home orchards at Devonport, Auckland, have also become infested in recent years, but so far infestation appears to be confined to these two areas. The results of tests made at Kerikeri last year to determine the efficacy of D.D.T. in controlling the pest are described in this article by P. Everett, Orchard Instructor, Department of Agriculture, Auckland.

THOUGH efforts are being made to eradicate soft wax scale at Devonport to prevent its spread to commercial citrus areas, similar efforts at Kerikeri have proved unsuccessful, mainly because of the large number of infested trees. Consequently it has become necessary for citrus fruit growers in the infested areas to adopt control measures each year. This pest should not be confused with hard wax scale (*Ceroplastes sinensis*), which is common on citrus and other trees throughout New Zealand.

A series of spraying tests for the control of soft wax scale was conducted at Kerikeri in 1940 by the Plant Diseases Division of the Department of Scientific and Industrial Research, in conjunction with the writer, and these tests indicated that good control could be secured by thoroughly spraying infested trees twice each season with summer spraying oil at a dilution of 3 per cent., the first application being given about mid-February and the second about 14 days later. This spraying programme, where adopted in commercial orchards and where complete spray coverage was secured, has resulted in good commercial control of the pest.

An Australian report (p. 634, "The Agricultural Gazette of New South Wales", December 1, 1947) indicates that a period of 4 to 6 weeks elapses from the hatching of the eggs until the young scales settle permanently. The possibility of securing good control during this period of development by the use of D.D.T. at a cost very much less than that of making two applications of 3 per cent. summer spraying oil was considered worth investigation, and the test described below was conducted at Kerikeri early in 1949.

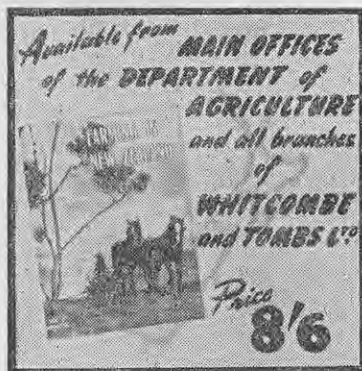
Orchard Tests

Two orchards of New Zealand grapefruit trees in bearing were selected, both orchards being fairly generally infested with soft wax scale. The test blocks in each orchard were divided into 6 plots, 3 for tests and 3 for checks, and the number of trees in the different plots varied from 14 to 27. All test plots were sprayed with D.D.T., 1lb. of a wettable powder containing 50 per cent. of active ingredient in 100 gallons of water being used. All check plots were sprayed with summer spraying oil emulsion at a dilution of 3 parts of emulsion in 83 parts of water, which resulted in the spray containing 3 per cent. of oil. All spray

applications were made with a portable power sprayer, 6-nozzle brooms being used and operated at a pump pressure of 425 to 450lb. per square inch, which ensured complete coverage. The following table shows the number and dates of applications to the various plots:—

Test plot	Date sprayed	Check plot	Date sprayed
A	21/2/49	A	21/2/49
B	3/3/49	B	16/3/49
C	21/2/49	C	21/2/49
	3/3/49	C	16/3/49

On the date of the first spray application there was a heavy infestation of scales in every plot, all in the "young star" stage of development, and emergence of the young scales appeared to be practically completed for the season. Before the second application of D.D.T. on March 3, many of



the young scales had commenced to produce their waxy covering, which affords some protection against insecticidal sprays.

Results of Tests

Little or no control of soft wax scale was secured in any of the test plots and there was moderate to heavy general infestation at the final inspection on May 19.

The degree of control secured by the use of summer spraying oil in one of the orchards where the tests were conducted was as follows:—

Plot	Dates spray applied	Degree of control secured
A	21/2/49	Good commercial control
B	16/3/49	Moderate commercial control
C	21/2/49	Excellent commercial control
C	16/3/49	

In the orchard in which the above results were obtained the test plots

were separated from the check plots by a dense shelter belt about 20ft. high, and this appeared to be fully effective in preventing the spread of soft wax scale from the test plots to the check plots. In the other orchard there was no shelter belt between the test and check plots, all being part of the same orchard block, and there was considerable spread of the pest in the "young star" stage of development from heavily infested trees in the test plots to the nearby oil-sprayed trees which were in check plot A. As the degree of control secured in check plots B and C was the same in both orchards, there can be no doubt that the considerable infestation observed in plot A was the result of reinfestation from nearby trees.

Extent of Reinfestation

The extent of infestation in which reinfestation occurred in this test and the distance the infestation was from the source are worth attention. The trees were spaced 22ft. apart on the square, and the amount of reinfestation which occurred on the first, second, and third rows respectively from severely infested trees was heavy, moderate, and very light. It is probable that the young scales were carried from tree to tree by wind.

Although D.D.T. failed to effect any appreciable control of soft wax scale in these tests, a good commercial control was secured by one application of summer spraying oil at a dilution of 3 per cent. oil when applied on February 21 and an excellent control was secured by repeating the application on March 16. Where only one oil spray application was made on March 16 the degree of control secured was only moderate.

As a result of observations made during the period of the tests the following recommendations are made for the control of soft wax scale:—

1. To permit complete spray coverage, lightly prune all citrus trees that are dense with foliage.
2. Spray all infested and adjacent citrus trees with summer spraying oil diluted to give 3 per cent. of oil in the resultant emulsion. Make the first application between February 20 and 24 and repeat 10 days later.

Dates of application, correct dilution of the oil, and complete spray coverage are of the utmost importance.

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