

QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

DIVISION OF PLANT INDUSTRY BULLETIN No. 324

CONTROL OF WOOLLY APHID (*ERIOSOMA
LANIGERUM* (HAUSM.)) IN THE STANTHORPE
DISTRICT, QUEENSLAND

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SUMMARY

During the 1962-63 and 1963-64 seasons, four trials were conducted to determine the value of new insecticides for the control of woolly aphid in apple orchards in the Stanthorpe district. BHC preparations, demeton-s-methyl, dimethoate, endosulfan, ethion and oil, lindane, menazon, phosphamidon, superior dormant oil and vamidothion were tested.

Vamadothion 0.05% was the only material which consistently gave good control and a single application was effective for the entire season. This material is now the standard recommendation for woolly aphid control in the Stanthorpe district.

I. INTRODUCTION

Woolly aphid (*Eriosoma lanigerum* (Hausm.)) is a serious pest of apple orchards in the Stanthorpe district. Resistant rootstocks, chiefly Northern Spy and Merton 778, are used in most orchards. These provide a measure of control, especially of root infestations. Some trees, however, are planted on susceptible seedling rootstocks.

The woolly aphid parasite *Aphelinus mali* (Hald.), introduced into the area in 1923, markedly limited populations of the pest (Jarvis 1926). The level of control exercised by this parasite has been reduced by the widespread use of broad spectrum pesticides, chiefly DDT, azinphos-methyl and carbaryl, against other members of the apple pest complex (Bengston 1960).

Direct chemical control of woolly aphid is therefore sometimes necessary and a semidormant spray application of BHC 0.1% gamma isomer has been recommended (Bengston 1960). The current work was prompted by the observation that considerable reinfestation of orchards was occurring during the summer following the semidormant spray application.

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II. MATERIALS AND METHODS

The materials used and the percentages of active constituents in prepared sprays were as follows:

BHC.—i. An emulsifiable concentrate of isomers containing 8.0% w/v gamma isomer used at 0.1% (1962-63 trial).

ii. An emulsifiable concentrate of isomers containing 7.0% w/v gamma isomer: 0.1% (1963-64 trial).

iii. An emulsifiable concentrate of lindane containing 7.0% w/v gamma isomer: 0.1%.

Demeton-s-methyl.—An emulsifiable concentrate containing 25.0% w/v active constituent: 0.025%.

Dimethoate.—A concentrate containing 30.0% w/v active constituent: 0.05%.

Endosulfan.—An emulsifiable concentrate containing 35.0% w/v active constituent: 0.044%.

Ethion and oil.—An emulsifiable dormant oil preparation containing 80.8% w/v mineral oil and 2.0% ethion: 1.6% w/v oil and 0.04% ethion.

Menazon.—i. A suspension containing 40.0% w/v active constituent: 0.05% (1962-63 trial).

ii. A dispersible powder containing 80.0% w/v active constituent: 0.015% (1963-64 trials).

Mineral oil.—An emulsifiable dormant oil preparation containing 82.0% w/v refined mineral oil, unsulphonatable residue not less than 90%: 3 in 100 (2.5% w/v).

Phosphamidon.—A concentrate containing 50.0% w/v active constituent: 0.04%.

Vamidothion.—An emulsifiable concentrate containing 40.0% w/v active constituent: 0.05, 0.025 and 0.0125%.

Randomized block layouts with single-tree plots on the variety Delicious were used in all trials. Treatments were applied at a pressure of 200-250 lb./sq in., using a small power spray with a hand-operated lance. Complete tree cover was aimed at.

The trees used in the various trials were located in commercial orchards and the growers made routine applications of pesticides to all trees for the control of other pests. These applications excluded any materials having appreciable activity against woolly aphid.

In the assessment of the control achieved in all trials, 100 laterals were examined on each tree for the presence or absence of woolly aphid. Laterals were chosen so as to be spaced as evenly as practicable around the tree and usually consisted of 10 laterals on each of 10 leaders.

III. RESULTS

(a) Trial 1, 1962-63

Trial 1 consisted of an 11 x 4 randomized block layout. The semidormant treatments (Treatments 1 to 4) were applied on September 18 and the summer treatments (Treatments 5 to 10) were applied on November 29. Assessments of the infestation were made on November 27 to 28 and on January 29. Results are given in Table 1.

TABLE 1
TRIAL 1, 1962-63: PERCENTAGE OF LATERALS INFESTED WITH WOOLLY APHID

Treatment	Percentage Infested Laterals	
	Nov. 27-28	Jan. 29
1. BHC 0.1% gamma isomer	0	62.25
2. Lindane 0.1%	0.5	45.75
3. Ethion 0.04% and oil 2 in 100 (1.6% w/v)	11.0	99.25
4. Superior oil 3 in 100 (2.5% w/v)	39.5	96
5. Dimethoate 0.05% .. .. .	..	63.5
6. Demeton-s-methyl 0.025% .. .. .	..	94.75
7. Menazon 0.05% .. .. .	..	5.25
8. Phosphamidon 0.04% .. .. .	..	90.5
9. Endosulfan 0.044% .. .. .	..	93.5
10. Vamidothion 0.05% .. .. .	..	0.5
11. Untreated	78.5	100
	(mean of treatments 5 to 11)	

Vamidothion and menazon were obviously superior to all other treatments. The various semidormant treatments all exercised some control as at late November but substantial reinfestation had occurred by late January.

(b) Trials 2 and 3, 1963-64

Trial 2 consisted of a 6 x 4 and trial 3 of a 6 x 5 randomized block layout. The semidormant treatments were applied in trial 2 on September 13 and in trial 3 on September 18. Vamidothion and the first application of menazon

were applied on December 16 in trial 2 and on December 12 in trial 3. The second application of menazon was made in trial 2 on February 21 and in trial 3 on March 2. Infestations in both trials were assessed on April 6 and results are given in Table 2.

TABLE 2
TRIALS 2 AND 3, 1963-64: PERCENTAGE OF LATERALS INFESTED WITH
WOOLLY APHID

Treatment	Percentage Infested Laterals Apr. 6, 1964	
	Trial 2	Trial 3
BHC 0.1% gamma isomer	27.0	56.6
Lindane 0.1%	50.25	19.2
Lindane 0.1% and vamidothion 0.05% ..	0.0	0.2
Menazon 0.015%	93.75	60.4
Menazon 0.015% (2 applications)	53.5	53.8
Vamidothion 0.05%	3.5	0.4

Treatments incorporating vamidothion were superior to all other treatments and were the only ones to give satisfactory results.

(3) Trial 4, 1963-64

Trial 4 consisted of a 6 x 5 randomized block layout. Vamidothion and the first application of menazon were applied on December 12 and the second application of menazon was made on February 21. Results were assessed on March 19 and are given in Table 3.

TABLE 3
TRIAL 4, 1963-64: PERCENTAGE OF LATERALS INFESTED
WITH WOOLLY APHID

Treatment	Percentage Infested Laterals Mar. 19, 1964
Vamidothion 0.05%	0
Vamidothion 0.025%	0.6
Vamidothion 0.0125%	9.8
Menazon 0.015%	48.4
Menazon 0.015% (2 applications)	23.2
Untreated	88.0

All three concentrations of vamidothion were superior to both menazon treatments. Vamidothion was satisfactory at 0.05 and 0.025% but at 0.0125% an undesirable number of aphid colonies persisted.

IV. DISCUSSION

Vamidothion (0.05%) proved to be the most satisfactory material for woolly aphid control in these trials. In trial 4, a comparable result was obtained with a concentration of 0.025% but not with 0.0125%. This result was achieved under experimental conditions where almost complete spray coverage was achieved. Observations have indicated that this may not always be practicable in commercial orchards. Marketing regulations, particularly those for the export market, demand a very high level of control. Under these circumstances vamidothion should be used at 0.05%. Menazon 0.05% prepared from a suspension was promising in trial 1. Subsequently in trials 2, 3 and 4, where it was used at 0.015% prepared from a dispersible powder, the results were disappointing. This latter usage represents approximately the same cost as vamidothion 0.05%.

BHC preparations and lindane were disappointing in all trials and failed to give protection throughout a season. This contrasts with earlier experience with these materials and suggests that a real difference has occurred in the response of the insect to this chemical.

Demeton-s-methyl, dimethoate, endosulfan, ethion and oil, phosphamidon and superior dormant oil did not exert sufficient control to be considered further as specific control measures against woolly aphid. Certain of these may be required for control of other apple pests but if used in this way the effect on woolly aphid populations could not be relied upon.

On the basis of the early part of this work, Bengston (1963, unpublished) recommended a single application of vamidothion 0.05% to foliated trees for the control of woolly aphid on apples and the results in commercial practice have been very satisfactory.

V. ACKNOWLEDGEMENTS

The co-operation and assistance of orchardists in these trials is gratefully acknowledged. All the data were examined by the Biometrics Branch of the Department. The results were stated to be obvious and no analyses were necessary.

REFERENCES

- BENGSTON, M. (1960).—How to control major pests of apples and pears in the Granite Belt. *Qd Agric. J.* 86:102-7.
- JARVIS, H. (1926).—The woolly aphid parasite (*Aphelinus mali* Hald.). *Qd Agric. J.* 26:105-8.