

Fruit Crops

COMPARISON OF INSECTICIDES FOR CONTROL OF KIWIFRUIT PESTS

A.M. CLIFFE

Ispray Limited, Nelson

Summary

An insecticide trial was laid down in 1976 to evaluate some new insecticides for activity against caterpillars and greedy scale (*Hemiberlesia rapax*), in kiwifruit (*Actinidia chinensis*). Excellent results against both were obtained with acephate at 100 g/100 litres. Carbofuran and diflubenzuron proved unsatisfactory.

INTRODUCTION

Caterpillar damage to kiwifruit occurs from the native leaf rollers, most commonly *Ctenopseustis obliquana*, and the small native moth *Stamopoda skelloni*. The other major pest is the greedy scale. Neither the insects, nor the damage are acceptable in our exports of kiwifruit and although good control of leafroller is usually obtained, control of greedy scale is more difficult and very time consuming if fruit must be sorted prior to export.

Acephate is a systemic and contact organophosphate insecticide which was first commercially used in New Zealand in 1972. It has low mammalian toxicity (acute oral LD 50 rat = 945 mg/kg) and a half life in soil of 5 days, decomposing microbiologically to phosphoric acid. It is registered in N.Z. for use against several lepidopterous insects and has shown activity against several scale species (Anon 1974, 1975). Carbofuran is a systemic carbamate with good activity against scale insects (Smith 1971; Anon 1974, 1975).

Diflubenzuron is a moulting inhibitor which interferes with the synthesis of chitin. A description of it and its activity against white fringe weevil was reported in 1976 (Henzell *et al* 1976). As it is particularly safe to humans, and has activity against lepidoptera, it was included in the trial.

METHOD

The trial block comprised 6 year old kiwifruit plants (var. "Hayward") which had been treated by a full spray programme in previous seasons. Plots consisted of pairs of vines which were randomised in each of five blocks. Two standard programmes were included for comparison. These were the standard MAF programme comprising four applications of azinphos methyl (50 g/100 litres) followed by two of phosmet (112 g/100 litres) plus wetting agent (Triton B 1956 – 25 ml/100 litres) and a full season programme of six azinphos methyl applications. Captan (100 g/100 litres), was applied at petal fall to all vines. There was a minimal amount of leaf spot, and no botrytis present in the trial at harvest.

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Treatments were sprayed by hand-gun to run-off on both sides of the vines. Applications were made according to MAF recommendations: pre-blossom (12 October), post-bloom (10 December), 10 January, 10 February, 11 March and 15 April. As carbofuran was observed to be noticeably weaker on leaf roller in early April, phosmet was substituted for the final spray. At harvest, 50 export sized fruit were picked, where possible, from each vine, and assessed for caterpillar damage and the presence of greedy scale. For simplicity all caterpillar damage was grouped as leaf roller. Both dead and live scale were recorded as neither are acceptable on fruit for export.

Leaf roller results were analysed using arc sin transformation and Duncans Modified Multiple Range Test at the 5% level of significance.

RESULTS AND DISCUSSION

Azinphos methyl, acephate at both rates, and the standard MAF programme gave excellent control of leaf roller but carbofuran and diflubenzuron did not give satisfactory control (Table 1).

TABLE 1: Percentage of fruit damaged by leaf roller (LR) and the number of greedy scale following insecticide treatment.

Treatments	Rate g/100	Total fruit	% L.R. damaged	Total greedy scale
acephate	37.5	464	0.6 c	3
acephate	75	500	0.2 c	0
carbofuran	18.75	484	3.1 b	6
diflubenzuron	25	484	8.3 a	12
azinphos methyl	50	500	0.4 c	3
standard MAF		500	0 c	2
untreated control		428	12.1 a	4
C V %			27	

Although greedy scale numbers on the fruit were very low, there were sufficient for the block to be rejected for export. Carbofuran and diflubenzuron were less effective than the standards, although in the former, four of the scales found were on one fruit. Acephate gave very good control of greedy scale and shows promise for further evaluation.

Fruit finish was good in all treatments except diflubenzuron which left the fruit drier and without the skin shine observed with other treatments.

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