FIELD TESTING INSECTICIDES FOR CONTROL OF GREENHOUSE THRIPS IN AVOCADOS

P.S. STEVENS, D. ALLAN, P. ALLISON AND L. JAMIESON

HortResearch, Private Bag 92 169, Auckland

ABSTRACT

A two year research programme was carried out between 1999-2000 aiming to identify new pesticides for controlling greenhouse thrips in avocados. The most promising products from previous laboratory testing were then evaluated in three field trials between March and May 2000. Treatments consisted of a combination of registered and trial products. Results from all three trial sites showed that the registered combination of Carbaryl 80 W and Diazinon 50% WP provides good control of greenhouse thrips. Four additional products were identified with potential for controlling greenhouse thrips in avocados, and of these, one would be acceptable to organic growers.

INTRODUCTION

A two year research programme was carried out between 1999-2000 aiming to identify new pesticides for controlling greenhouse thrips in avocados. Specifically, the aim was to identify new products that would be compatible with an Integrated Pest Management programme for avocados. As a first step, a wide range of products was screened in the laboratory in order to determine which would have the greatest potential for control of greenhouse thrips (Stevens *et al.* 2000). The most promising products were then tested in three field trials between March and May 2000. Field-testing is a prerequisite for gaining registration for new products.

METHODS

Treatments consisted of a combination of registered and trial products. Some individual trial products cannot be identified prior to the completion of registration. Two of the products tested in field trials could be considered as 'organic' (BotaniGard and Product "X"), two products were of 'novel' types of chemistry (Calypso and Product "Y"), while the final product was an organophosphate (Malathion) with very limited persistence.

Small plot replicated field trials were carried out at sites in Whangarei, Mangawhai and Katikati. At each site 44 trees were set aside from the normal spray programme and individual trees were then treated with one of 11 treatments. The two organic products and the two 'novel' products were each tested at two rates, while the organophosphate was tested at a single rate. The effectiveness of all these products were compared with a 'standard' treatment of Carbaryl 80 W and Diazinon 50% WP, which at the time was the only product combination currently registered for control of greenhouse thrips in avocados. At each site results were also compared with those from trees that had been left

unsprayed. Sprays were applied twice at the Whangarei and Katikati sites and once at the Mangawhai site. The numbers of thrips infesting samples of fruit on each tree were checked before and after spray applications, and any thrips damage was categorised according to severity.

RESULTS

Results from all three trial sites showed that the combination of Carbaryl 80 W and Diazinon 50% WP provides good control of greenhouse thrips. The results from the three trial sites were generally consistent with each other.

Results from Whangarei (Table 1) showed that, with the exception of the lower rates of the two organic products, all treatments significantly reduced the levels of thrips relative to the untreated control. This applied both to the severity of thrips damage and to the percentage of infested fruit with live thrips. The results from the higher rates of the two organic products were of particular interest as these gave control equivalent to that achieved in the other treatments.

Table 1: Whangarei trial site. The percentage of fruit with thrips damage and thrips infestation after two applications of pesticides when assessed on 17.5.00 (34 days after the second spray).

Product Number	% fruit with severe thrips damage (>2cm^2)	% infested with thrips
Malathion	0 a	0.5 ± 0.5 ab
Product "X" (low rate)	5.5 ± 2.1 b	5.0 ± 2.4 c
Product "X" (high rate)	0.5 ± 0.5 a	0.5 ± 0.5 ab
BotaniGard (low rate	9.5 ± 5.2 b	3.0 ± 1.3 bc
BotaniGard (high rate)	1.0 ± 1.0 a	1.0 ± 1.0 ab
Calypso (low rate)	0 a	0.5 ± 0.5 ab
Calypso (high rate)	0 a	0 a
Product "Y" (low rate)	0 a	0 a
Product "Y" (high rate)	0 a	0 a
Standard (Carbaryl/Diazinon)	0 a	0.5 ± 0.5 ab
Untreated control	16.0 ± 11.5 b	6.5 ± 3.2 c

Values within a column followed by the same letter are not significantly different ($P<0.05$).

At Mangawhai all sprayed treatments significantly decreased the percentage of fruit infested with live thrips relative to the untreated control (Table 2). Similarly, at Katikati most of the treatments significantly reduced the incidence of live thrips compared to unsprayed control trees, apart from the low rate of Product "X", and both rates tested of BotaniGard (Table 3).

Table 2: Mangawhai trial site. The percentage of fruit with thrips damage and thrips infestation after a single application of pesticides when assessed on 19.4.00 (7 days after spraying).

Product Number	% fruit with severe thrips damage (<2cm^2)	% infested with thrips
Malathion	0 a	0 a
Product "X" (low rate)	1.0 ± 1.0 a	5.5 ± 5.5 ab
Product "X" (high rate)	2.5 ± 2.5 a	5.5 ± 3.1 b
BotaniGard (low rate	0 a	1.0 ± 1.0 ab
BotaniGard (high rate)	1.0 ± 0.6 a	2.0 ± 1.2 ab
Calypso (low rate)	0 a	0.5 ± 0.5 ab
Calypso (high rate)	0.5 ± 0.5 a	0.5 ± 0.5 ab
Product "Y" (low rate)	0 a	0 a
Product "Y" (high rate)	0.5 ± 0.5 a	0.5 ± 0.5 ab
Standard (Carbaryl/Diazinon)	0 a	0 a
Untreated control	7.0 ± 3.4 a	26.5 ± 9.3 c

Values within a column followed by the same letter are not significantly different (P<0.05).

Table 3: Katikati trial site. The percentage of fruit with thrips damage and thrips infestation after two applications of pesticides when assessed on 2.5.00 (19 days after the second spray).

Product Number	% fruit with severe thrips damage (>2cm^2)	% infested with thrips
Malathion	0 a	0 a
Product "X" (low rate)	0 a	2.5 ± 1.3 abc
Product "X" (high rate)	0 a	0 a
BotaniGard (low rate	0.5 ± 0.5 a	3.5 ± 1.7 bc
BotaniGard (high rate)	0.5 ± 0.5 a	3.0 ± 2.4 abc
Calypso (low rate)	0 a	0 a
Calypso (high rate)	0 a	0 a
Product "Y" (low rate)	0 a	0 a
Product "Y" (high rate)	0 a	0 a
Standard (Carbaryl/Diazinon)	0 a	0.5 ± 0.5 ab
Untreated control	1.5 ± 0.9 a	7.5 ± 4.5 c

Values within a column followed by the same letter are not significantly different (P<0.05).

DISCUSSION

Research carried out over the last two years has resulted in a much greater understanding of the ecology and biology of greenhouse thrips in avocados and effective approaches to control. Data from the unsprayed control trees can provide useful information as to the period over which thrips damage occurs, for example the percentage of fruit with severe thrips damage increased from 0.5% to 16% between mid-March and May in Whangarei. Other data not presented here also show that thrips damage can rapidly accumulate over autumn. In order to minimise damage caused by greenhouse thrips it is therefore important to remain vigilant from March onwards. The need for control measures for greenhouse thrips is best determined by scouting.

If thrips are present in the orchard, one spray will not be sufficient to achieve control. Three spray applications at two-three week intervals should clean up any larvae emerging from eggs laid within the fruit. The presence of larval thrips indicates that thrips control in the past has been inadequate and that adult thrips have been present on the trees for some time.

SUMMARY

Results from these trials have identified four products with potential for controlling greenhouse thrips in avocados, and of these, one would be acceptable to organic growers. However, growers cannot use these products until registration for use on avocados is obtained. As a result of this research, Malathion now has an extended label claim for thrips control.

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REFERENCES

Stevens, P., Froud, K., and Jamieson, L., 2000. Greenhouse thrips in avocados. AvoScene, March: 13-16.