Pyrethroid resistance in citrus thrips

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Around 1995, citrus growers in the Letsitele region of Limpopo province became aware of resistance in citrus thrips, *Scirtothrips aurantii*, to cypermethrin and other pyrethroids. They switched to other products such as chlorfenapyr (Hunter) and fipronil (Regent) and later found that they could use a pyrethroid once a year if they continued to use other insecticides with different modes of action before or after the pyrethroid. Research in California with *Scirtothrips citri* (Immaraju et al. 1990) suggested that resistance to the pyrethroid fluvalinate (Klartan) in that species was controlled by a recessive gene that faded in the population when selection pressure was reduced and unexposed thrips moved into sprayed orchards from elsewhere to dilute the gene pool. This may be what is happening in Letsitele with our species and the annual reversion of resistance due to reduced selection pressure is allowing the continued use of one pyrethroid spray a season.

However, situations have recently arisen in the Hoedspruit and Burgersfort areas where resistance to pyrethroids has occurred in *S. aurantii* that does not seem to diminish when spraying of these products in citrus is reduced. In these areas, other annual crops are grown that are often sprayed with pyrethroids for other pests and may be hosts for citrus thrips. If citrus thrips are exposed to pyrethroids on these crops the selection pressure for resistance in the gene pool is not decreased while pyrethroids are not being used on citrus and this may explain the lack of reversion. This situation may also occur in areas where macadamias are grown alongside citrus as macadamias are known hosts for *S. aurantii* and are sprayed in summer with pyrethroids for stinkbug control.

Cross-resistance between fluvalinate and formetanate (Dicarzol) was also found near Burgersfort where both products had a minimal effect on citrus thrips populations in a small field trial conducted by the author, Peter Stephen and Bruce Tate (mean pre-spray fruit infestation by larvae was 47%; 6 days after treatment, fruit infestation by larvae after formetanate (0.0125% a.i.) plus sugar was 35% and after fluvalinate (0.0072% a.i.) was 28%). Cross-resistance between these two products has been shown to occur in the *S. citri* species in California (Immaraju et al. 1990). This means that in these areas, spray options that can be used a few weeks after petal fall for high population densities of citrus thrips have become very limited.

If growers find themselves in this situation and suspect that pyrethroids or carbamates being used on other crops in their vicinity may be preventing resistance reversion, they will have to base their thrips control on Regent, Hunter, organophosphates (if they are effective and pre-harvest intervals permit), abamectin plus oil and tartar emetic plus sugar. (Note that resistance to tartar emetic is known for *S. aurantii* but reversion is rapid when there is no selection pressure (Groat et al. 1996).) The recently registered products spinosad (Tracer) and thiacloprid (Calypso) can also be used with oil. If imidacloprid (Confidor) is used before bloom for red scale control or other pre-bloom thripicides are sprayed, citrus thrips populations at petal fall will be suppressed and long-residual thripicides such as pyrethroids may not be required.

Most citrus growers rely heavily on abamectin for the control of summer populations of citrus thrips. In order to reduce the selection pressure for development of resistance to this product, sequential sprays should be avoided.

References cited