

Pesticide resistance in onion thrips

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Introduction

Several decades of pesticide use in agriculture has resulted in populations of insect pests that have developed resistance to certain groups of pesticides. Examples can be found in almost every crop type. In Australian onion crops, thrips populations resistant to commonly used insecticides have only recently been discovered. Managing existing resistant populations and preventing development of resistance among currently susceptible populations is the challenge currently faced by researchers and growers alike.

Resistance in onion thrips

Onion thrips is the most important insect pest of onion and if uncontrolled can reduce yield, damage bulb skins, and transmit damaging virus diseases. Onion growers currently have limited insecticides available to control this pest. On the current list is a generic registration for omethoate and dimethoate and species specific registration for malathion, methidathion and diazinon with the pyrethroid lambda-cyhalothrin also recently registered. While this addition of an insecticide in the synthetic pyrethroid group strengthens the ability of onion growers to control thrips, it's important that use of a broad range of insecticides be maintained. This is considered necessary because reliance on limited chemical groups could result in a rapid development of resistance among local thrips populations.

Resistance is a serious concern in onion thrips because overseas studies, including those in New Zealand, have recently detected pyrethroid and organophosphate resistance with levels high enough to cause major control problems.

The Australian situation

Growers experiencing poor control of thrips despite regular spray programs have suspected resistance

for some time. However, resistance is still difficult to diagnose in the laboratory and a rapid field test to diagnose resistance is currently not available in Australia. Recent laboratory based testing for onion thrips pesticide resistance has shed new light on the Australian situation. Unlike the overseas situation there has been no Australian evidence to date of resistance to the organophosphate compounds such as omethoate, dimethoate, methidathion, diazinon or malathion. Laboratory tests suggest that any reported control problems with malathion may be due to the registered label rate being too low to achieve effective control rather than insecticide resistance. However, there is evidence of pyrethroid insecticide resistance in several populations of onion thrips collected in South Australia and Tasmania, even though the chemical lambda-cyhalothrin has only been available to Australian growers for use against onion thrips since September 2005.

Management

The likelihood of pyrethroid resistance so soon after the issuing of the permit for lambda-cyhalothrin is a serious concern to sustainable management, and may be related to a history of use of related pyrethroid chemicals in growing regions in South Australia and Tasmania. There is already Australian



Figure 1. Screening of new pesticides for effective thrips management at Yanco Agricultural Institute.

evidence linking pyrethroid resistance to control failure in onion thrips. At present, pyrethroid resistance is not widespread, so in some regions such as the NSW Riverina and the Lockyer valley in Queensland, the chemical works very well. To maintain the effectiveness of pyrethroid insecticides against onion thrips their use must be carefully managed. This will require growers to follow a series of guidelines designed to manage resistance.

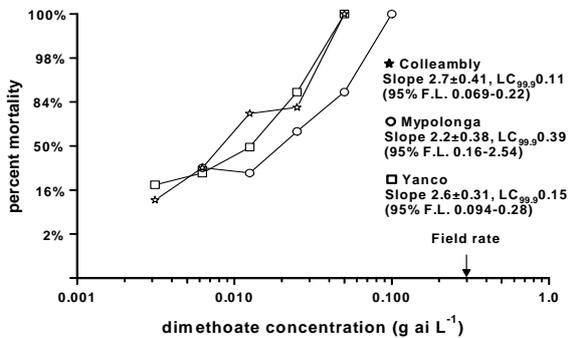


Figure 2. Laboratory testing for pesticide resistance among populations of thrips from three growing districts in southern Australia (Coleambally, Mypolonga and Yanco). This example, for dimethoate, shows a normal response for increasing concentration of the pesticide.

For onion thrips management these guidelines include:

- Avoid excessive use of all insecticides but especially pyrethroid insecticides. Use only when thrips pressure is considered too high (say 5 per plant).
- Use chemicals in rotation. Alternate to a new chemical group in the following calendar month.
- Always use the recommended rate on the label (or minor use permit). Sub-lethal doses applied by using low rates of chemical can speed up development of resistance.
- Monitor crops regularly. Do not use insecticides on a calendar basis but rather inspect your crop and spray only as required.
- Read the label. Follow any resistance management strategy that may be included on the product label.

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Always read the label

Users of agricultural or veterinary chemical products must always read the label and any permit, before using the product, and strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this publication.

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