MELON APHID RESISTANCE MANAGEMENT STRATEGY

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Melon aphid, *Aphis gossypii*, also known as cotton aphid, is capable of becoming resistant to a wide range of insecticide groups. Pest management strategies aimed at preventing or minimising resistance will help maintain control and conserve the effectiveness of existing products.

PRODUCTS

Refer to Table 1 for products with label claims for *Aphis gossypii*, melon aphid (MA).

FORMS OF MELON APHID

Melon aphid (*Aphis gossypii*) has an indefinite number of anholocyclic lines (asexually reproducing populations), some of which may have particular host associations (Blackman and Eastop 1984). Each line can have distinct and different host plant preferences.

CURRENT SITUATION

Melon aphid is a polyphagous species that can transmit some plant damaging viruses. It has been recorded from more than 50 plant families (Steenis 1995). Melon aphid has a variety of life cycle strategies and it is not known if any populations require special overwintering hosts or if sexual forms occur in New Zealand. It can transmit over 50 viruses (Blackman and Eastop 1984) including water melon mosaic virus (WMV) and zucchini yellow mosaic virus (ZYMV) which are in New Zealand. Because feeding damage is less significant than virus infection, it is possible to tolerate larger melon aphid populations when virus sources are removed or reduced.

In New Zealand, a population of melon aphids has been found with resistance to pirimicarb, lambda-cyhalothrin and tau-fluvalinate with possible resistance to methomyl, demeton-S-methyl and acephate (Martin and Workman 1997).

Overseas, melon aphid is resistant to a wide variety of insecticides, including organochlorines, many organo-phosphates, carbamates and synthetic pyrethroids (e.g. Georgiou 1981; Hollingsworth *et al.* 1994; Silver *et al.* 1995).

GENERAL STRATEGY

The general strategy is to reduce the need for control of melon aphid by reducing virus sources and aphid reservoirs. Selection pressure on aphids in crops can then be reduced by applying insecticides only when necessary to reduce feeding damage. The following guidelines are recommended:

- a) Maximise virus control by standard management practices. These include:
 - use of virus-free seed (e.g. from pathogen testing schemes) or virus-free transplants
 - removal of infected plants within a crop
 - elimination of weed sources that may harbour viruses
 - removal of volunteer crop plants
 - use of virus-resistant cultivars
 - use of screens to prevent entry of aphids to greenhouses
- b) Remove alternative host plants for melon aphid, e.g. solanums, brassicas and ornamentals to create virus-free zones

- c) Maximise biological control (especially in greenhouses) by the use of parasitoids, predators or fungal pathogens of aphids
- d) Monitor plants to ensure insecticides are applied only when necessary
- e) Choice of effective insecticides should be based on a knowledge of insecticide resistance in local populations. Resistance to pirimicarb, lambda-cyhalothrin and tau-fluvalinate has been identified in Auckland and possibly Nelson
- f) Use the correct label rates and application procedures
- g) Alternation between insecticide groups should be practiced
- h) If control failures are suspected, crops should be treated with an insecticide from a different chemical group
- i) Research strategy: The distribution of resistance among the major cropping areas should be assessed

IMPLEMENTATION

- 1) Growers should implement virus control strategies.
- 2) Growers should monitor plants to ensure insecticides are only applied when necessary.
- 3) Insecticides registered for use against melon aphid should carry the following label statement:

IMPORTANT - RESISTANCE MANAGEMENT

Resistance to this pesticide may develop from excessive use. To minimise this risk use strictly in accordance with label instructions. Avoid using this insecticide exclusively all season and avoid unnecessary spraying or other methods of application. Maintain good cultural practices.

REFERENCES

- Blackman, R.L. and Eastop, V.E., 1984. Aphids on World Crops: an Identification and Information Guide. John Wiley and Sons, Chichester, UK.
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- Steenis, M. van, 1995. Evaluation and application of parasitoids for biological control of *Aphis gossypii* in glasshouse cucumber crops. Ph. D. Thesis, Wageningen, Netherlands.

PRODUCTS

TABLE 1: Products with label claims for *Aphis gossypii*, melon aphid (MA).

Pesticide group	Common name and product name	Type of label claim for each crop ¹								
		beans (not broad)	cucurbits	lettuce	potatoes	tomatoes	vegetable and forage brassicas	vegetable crops	strawberry tamarillo	ornamentals
Cyclodiene	endosulfan (Malix, Thiodan)				aphids	aphids	aphids in vegetable brassicas	aphids		aphids
Carbamate	methomyl (Lannate)	GPA ²		GPA		GPA	GPA in vegetable brassicas	aphids		GPA
Insecticidal soap	pirimicarb (Pirimor)	aphids	aphids	aphids	aphids	aphids	aphids			
	fatty acid (potassium salt) (Safer)							aphids in in fruit		aphids
Chloronicotinyl	imidachloprid (Gaucho)		aphids		aphids		aphids in forage brassicas			
Organo- phosphate	acephate (orthene)		aphids	aphids	aphids		GPA	aphids		aphids
	acephate and triforine (Saprene)									aphids
	chlorpyrifos (Chlorpyrifos, Lorsban)		aphids				aphids			aphids
	demeton-S-methyl (Metasystox)				aphids		aphids			aphids

Table 1 continued

Pesticide group	Common name and product name	Type of label claim for each crop									
		beans (not broad)	cucurbits	lettuce	potatoes	tomatoes	vegetable and forage brassicas	vegetable crops	strawberry	tamarillo	ornamentals
Organo-phosphate <i>cont.</i>	diazinon (Basudin, Diazinon, Gesapon)	aphids	aphids			aphids	aphids	aphids	aphids	aphids	
	dichlorvos (Nuvan)						aphids	aphids	aphids in berry fruit	aphids	
	dimethoate (Perfekthion, Rogor)				aphids		cabbage aphid in vegetable brassicas, aphids in forage brassicas		aphids		
		disulfoton (Disyston)	aphids			aphids		aphids in vegetable brassicas		aphids	
	fenitrothion (Verthion)						aphids in forage brassicas				
	maldison (Malathion, Yates Maldison)						aphids	aphids	aphids		
	methamidophos (Monitor, Tamaron)	aphids			aphids						
	methidathion (Supracide)						aphids in vegetable brassicas				

Table 1 continued

pesticide group	Common name and product name	Type of label claim for each crop								
		beans (not broad)	cucurbits	lettuce	potatoes	tomatoes	vegetable and forage brassicas	vegetable crops	strawberry tamarillo	ornamentals
Organophosphate cont.	omethoate (Folimat)						aphids in forage brassicas			
	parathion-methyl (Folidol)							aphids		
	pirimiphos-methyl + permethrin (Attack) mixture		aphids in glasshouse			aphids in glasshouse	aphids in vegetable brassicas			aphids
	terbufos (Counter)						aphids in forage brassicas			
Pyrethroid	thimet (Phorate)		aphids		aphids		aphids	aphids		aphids
	alpha-cypermethrin (Dominex)					aphids				
	pirimiphos-methyl + permethrin (Attack) mixture		aphids in glasshouse			aphids in glasshouse	aphids in vegetable brassicas			aphids
	pyrethrum + piperonyl butoxide (Yates pyrethrum)							aphids		aphids
	tau-fluvalinate (Mavrik Flo, Nursery Mavrik, Supershield, Guardall)					GPA		GPA		aphids

Not all products have label claims for control of melon aphid in all crops listed in a crop grouping

GPA = green peach aphid, (*Myzus persicae*)