THE NEW ZEALAND COMMITTEE ON PESTICIDE RESISTANCE 1988 SUMMARY

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SUMMARY

The New Zealand Committee on Pesticide Resistance (NZCPR) was formed in April 1987. Its membership, aims and modus operandi were presented to the 40th Annual Conference of the Weed and Pest Control Society (Elliott *et al* 1987). Since that date both Task Groups have met several times in the pursuit of strategies to handle the problem of their respective sectors. The Fungicide Task Group has completed two strategies encompassing dicarboximides and phenylamides and these are reported in this paper. The first completed strategy from the Insecticide Task Group being one for mites and miticides is nearing completion and should be ratified by the NZCPR at its next meeting.

INTRODUCTION

The NZCPR was formed to meet the need to offer uniform strategies for the management of pesticide resistance in New Zealand. Similar groups exist overseas but the NZCPR is unique. Unlike its overseas counterparts, Agcarm invited participants not only from the pesticides industry but also from DSIR, MAFTech, Lincoln College and Massey University, to cover all major research and advisory groups so that any strategies could get maximum early penetration.

The initial membership of the NZCPR, its objectives, principal functions and the membership of the two task groups for fungicides and insecticides have already been described (Elliott *et al* 1987).

One of the aims of NZCPR is to publish resistance management strategies as they are finalised. It was decided that the ideal vehicle in which to do this is the Annual Conference of the N.Z. Weed and Pest Control Society. The NZCPR would also then have a permanent record in the Proceedings. Your committee approved of the suggestion and this, in effect, is the first annual report of the NZCPR.

TASK GROUPS

Insecticides Task Group

In its first year of operation the Insecticides Task Group has concentrated on two groups of pests for which effective chemical control has been seriously threatened by resistance — tetranychid mites and leafrollers (Tortricidae). The Group has encouraged resistance research with these pest complexes. Work is in progress to investigate current control problems.

In both instances it has proved necessary not only to develop a general strategy for resistance management but also to recommend implementation procedures for particular crops. This is illustrated in the proposed resistance management strategy for spider mites which is presented at this conference in the poster session and will be considered by NZCPR in late August.

The strategy for leafroller resistance management is in preparation and includes elements of improved insecticide use, cultural control and shelter management. It will be completed in August 1988. The Group will then address resistance management of aphids (especially *Myzus persicae*, greenhouse whitefly (*Trialeurodes vaporariorum*) and

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diamondback moth (*Plutella xylostella*). All strategies will be regularly reviewed and updated.

Fungicide Task Group

The fungicide task group, over the past 18 months has completed two strategies, the dicarboximide group and the phenylamide group. The Task Group is currently working on strategies for benzimidazoles, and DMI's (part of the EBI fungicides) firstly in horticultural crops and then in arable crops. These should be completed in time for the next meeting of the NZCPR in late August and will be published in the Weed and Pest Control Conference Proceedings in 1989, as well as selected Trade magazines to ensure user awareness.

Completed Strategies

Two strategies have now passed through all stages and are being implemented. Both strategies are for fungicide chemical groups — the dicarboximides and the phenylamides.

DICARBOXIMIDE RESISTANCE MANAGEMENT STRATEGY

1. Product Perspective:

1.1 Dicarboximides registered for use in New Zealand:—

chlozolinate	“Serinal”
iprodione	“Rovral”
procymidone	“Sumisclax”
vinclozolin	“Ronilan”

1.2 These products are highly active against *Botrytis* spp. (grey mould), *Monilinia* spp. (brown rot), *Sclerotinia* spp., and *Sclerotium cepivorum* (white rot of onions).

1.3 Their principal uses are in grapes, kiwifruit, summerfruit (stonefruit), strawberries and other berryfruit (canefruits, brambles), tomatoes, onions and beans, plus unregistered use in ornamentals.

This is a very important group for horticultural crops, especially those grown for export where few other products have broadly accepted residue tolerances. In some situations there are no alternative products for use close to harvest.

1.4 Research indicates that problems associated with the appearance of fungal strains resistant to this group of fungicides can be managed by appropriate strategies, and the products thus conserved for ongoing effective use.

2. Current Situation

2.1 Resistant strains of *Botrytis cinerea* have been reported from many parts of the world, where they have sometimes been linked with losses of disease control. The general response recommended has been to reduce usage. Resistant strains of *Botrytis cinerea* are common in New Zealand where they have been linked with loss of disease control. High frequency use of dicarboximides against *Botrytis cinerea* leads to a rapid increase in the proportion of resistant strains. Resistant strains tend to be less fit than sensitive strains.

2.2 Resistant strains of *Monilinia fructicola* have been detected in Australia and New Zealand, and circumstantial evidence obtained indicating an associated loss of disease control.

2.3 There are no reports of resistant strains to *Sclerotinia sclerotium* of *S. minor* or *Sclerotium cepivorum*. However there has been a loss of efficacy associated with accelerated soil breakdown of dicarboximide use for *S. cepivorum*. This is not resistance.

2.4 Where resistant strains have been found, strains are cross-resistant to all dicarboximides.

3 General Strategy

3.1 Comply with label rates at all times.

3.2 Do not apply more than three dicarboximide foliar applications per crop per 12 month period.

3.3 Use dicarboximides only when disease risk is high.

3.4 Confine dicarboximide usage to a portion of the crop cycle. Where greater than three foliar applications are necessary intersperse with alternative products during the low risk periods.

3.5 In a few crop situations a mixture of dicarboximide plus products of alternative chemistry may be appropriate, but they are not recommended as a general strategy. Dicarboximide frequency with or without a companion should still not exceed three per 12 month period.

3.6 Practise crop hygiene and cultural control.

3.7 Practise correct spray timing and application (control failure usually does not imply resistance).

4. Implementation

4.1 Specific strategies will need to be tailored to each crop situation. Local advisors should be consulted.

4.2 Labels have been modified incorporating the above strategies.

4.3 The following resistance statement is recommended for inclusion on all dicarboximide product labels:-

“Resistance to this fungicide and related products could develop from excessive use. To minimise this risk use strictly in accordance with label instructions.”

Selected References

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PHENYLAMIDE RESISTANCE MANAGEMENT STRATEGY

Product Perspective

1.1 The phenylamides (previously acylalanines) comprises a group of fungicides, differing slightly in their basic chemistry, but sharing a similar mode of action.

Phenylamides registered for use in New Zealand include:—

benalaxyl in “Galben M8-65”
 furalaxyl “Fongarid 25WP”
 metalaxyl “Ridomil 10G”
 in “Ridomil MZ 72WP”
 “Apron 54SD”
 in “Apron 70SD”

1.2 These products are highly active systemic fungicides against oomycete diseases including:—

Pathogen	Disease	Crop*
<i>Phytophthora infestans</i>	late blight	potatoes, tomatoes
<i>Phytophthora megasperma</i>	spear rot	asparagus
<i>Peronospora destructor</i>	downy mildew	onions
<i>Peronospora parasitica</i>	downy mildew	cabbages
<i>Peronospora viciae</i>	downy mildew	peas
<i>Peronospora sparsa</i>	dry berry	brambles
<i>Plasmopara viticola</i>	downy mildew	grapes
<i>Pseudoperonospora cubensis</i>	downy mildew	cucurbits
<i>Phytophthora</i> spp	damping off }	ornamentals
<i>Pythium</i> spp.	root rots }	nursery production
		tree crops
		seedling diseases

*Crop guide to principle uses.

Product labels should be referred to for specific recommendations.

1.3 Research indicates that problems associated with the appearance of fungal strains resistant to this group of fungicides can be managed by appropriate strategies, and the products thus conserved for ongoing effective use.

2. Current Situation

2.1 Resistant strains of *Phytophthora infestans* have been reported from many parts of the world and have led to loss of efficacy and reduced yields in potato crops. In New Zealand resistant strains have been found around Auckland and a few other sites in the North Island. The general response has been to reduce the number of applications and advocate the use of mixtures.

2.2 Resistant strains of other pathogens (*Peronospora parastica*, *Plasmopara viticola*, *Phytophthora cactorum*, *Pseudoperonospora cubensis*, and *Bremia lactucae* (lettuce downy mildew) have been reported from the field overseas, but have not yet been found in New Zealand.

2.3 Resistant strains appear to be only slightly less fit than sensitive strains.

2.4 Resistant strains so far tested have been found to be cross-resistant to all phenylamides.

3. General Strategy

3.1 Comply with label rates at all times.

3.2 Do not apply more than three phenylamide treatments per crop.

Where crops susceptible to the same pathogen are grown sequentially, no more than three phenylamide treatments should be applied within a 12 month period.

Where a phenylamide seed treatment has been used, there is no need for foliar treatments.

3.3 a) All foliar treatments should be applied in mixtures with a protectant fungicide.

b) Phenylamides alone may be used as a soil drench, in a single application preferably in spring.

3.4 Under no circumstances should phenylamides be applied in rescue attempts where disease has become prevalent and obvious.

The use of phenylamides should be restricted to periods that favour diseases, but while incidence is low. Use alternatives at other times.

3.5 To optimise systemic activity confine phenylamide use to the period when plants are growing fastest (e.g. in the pre-flowering period for potatoes). At other times, and particularly when foliage is mature, use alternatives.

3.6 The products are not recommended, nor do they have label claims for foliar treatment in glasshouses and should not be used because development of resistance is favoured in this situation.

3.7 Practise crop hygiene and cultural control where possible.

3.8 Practise correct spray timing and applications (control failure does not necessarily imply resistance).

4 Implementation

4.1 Specific strategies will need to be tailored for each crop situation.

4.2 Label claims incorporate the above strategies, and labels should be referred to for specific directions.

4.3 The following resistance statement is recommended for inclusion on all phenylamide product labels:—

“Resistance to this fungicide and related products could develop from excessive use. To minimise this risk use strictly in accordance with label instructions.”

Selected References

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CONCLUSION

It is pleasing to see that in only 18 months since its inception the NZCPR has issued two strategies for the betterment of the New Zealand agriculture/horticulture industry.

It is expected that a further four strategies (Insecticides — mites and miticides and leafroller; Fungicides — MBC's and DMI's) should soon be completed and ready for publication. It is a credit to all concerned that this has been achieved with such alacrity and is a milestone in New Zealand pesticide management.

ACKNOWLEDGEMENTS

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REFERENCES

- Elliott, G.S., Wearing, C.H., and Suckling, D.M., 1987. Formation of the New Zealand Committee on Pesticide Resistance. *Proc. 40th N.Z. Weed and Pest Control Conf.*: 84-89.