FURTHER EVALUATION OF PROCYMIDONE FOR GREY MOULD CONTROL IN GRAPES.

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SUMMARY

In replicated trials and under commercial usage, procymidone provided a high level of grey mould (*Botrytis cinerea*) control on grapes (*Vitis vinifera*). Procymidone afforded superior disease control to comparable rates of the related dicarboximide fungicides, vinclozolin and iprodione. Dichlofluanid proved ineffective against grey mould when applied over the full season and its substitution for a dicarboximide at the first treatment date proved inferior to a full dicarboximide programme.

INTRODUCTION

Grey mould is widely recognised as being a major disease of grapes and capable of causing economic yield reduction and markedly reducing berry quality. Chemical control measures have been practised for many years, with major periods of usage being over flowering to early berry development and then again pre-harvest as sugar levels rise in the bunches. It has also been traditional to apply fungicide at versison or bunch closure to control resident botrytis infection harboured on decaying plant tissue in the bunches. This stage offers the last practical opportunity to obtain fungicide penetration into the bunch and is seen as an important protective measure in averting infection near harvest.

The dicarboximide group of fungicides gained rapid commercial acceptance in grapes following the development of resistance by grey mould to benzimidazole fungicides. New Zealand trials have shown procymidone to be highly effective against sclerotinia on beans, tomatoes and stonefruit, and against botrytis on tomatoes, grapes and strawberries (Jackson and Smith 1979). This paper reports subsequent findings from replicated trials on grey mould control in grapes with procymidone and also on results following usage under commercial conditions.

METHOD

Replicated trials were carried out in Auckland (2) and Hawkes Bay and assessments of grower usage made in Auckland (2) and Hawkes Bay in one season and in Marlborough over two seasons.

In the replicated trials a minimum of two vines per plot were used and treatments replicated five times. On both Auckland sites Palamino was selected for the trials and Reisling Sylvaner in Hawkes Bay. Treatments were applied by motorized knapsack delivering 1015 litres/ha in the Auckland trials and by handgun delivering 1200 litres/ha at an operating pressure of 1500 kPa at the Hawkes Bay site.

Treatment dates were: Auckland 1 — 22/11/79 pre-flowering, 17/12 late flowering, 15/1 bunch closure and 11/2 pre-harvest. Auckland 2 — 5/12/79 early flowering, 17/12 late flowering and 24/1 bunch closure. Hawkes Bay — 29/11/79 50% flowering, 23/1 bunch closure and 20/2 pre-harvest.

Plots were harvested by strip picking 50 bunches from the centre of each plot. Bunches were then rated according to the degree of grey mould infection. 1 = nil infection, 2 = tr-5%, 3 = 5-25%, 4 = 25-50% and 5 = over 50%.

Details pertaining to method of grower usage are shown in Table 1.

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TABLE 1: Details of fungicide application for control of grey mould of grapes in five vineyards.

Location	Auckland 1	Auckland 2	Hawkes Bay	Marlborough 1	Marlborough 2
Variety	Palamino	Reisling Sylvaner	Chasselas	Reisling Sylvaner	Reisling Sylvaner
Block size	1 ha	2.1 ha	1.2 ha	4 ha	4 ha
Dates of treatment	17/11/79, 7/1, 14/2 11/3	25/10/79, 21.11, 4/1, 24/1, 11/2	10/2/79, 19/1, 7/2, 20/2	4/12/79, 28/1, 20/2, 10/3	27/11/80, 10/12, 26/1,
Application method	air assisted (Span)	airblast	hydraulic (Masoty)	hydraulic (Bralia)	hydraulic (Bralia)
Water rate litres/ha	415	505/842*	1045	1125 + /2245	1000/3000**

*from full foliage + first application only ** last application only

Assessments on the commercial blocks were by random selection of a minimum of 100 bunches per block and classification according to degree of infection using the same categories as for the trials.

RESULTS

The results of assessment of grey mould infection levels in the trials are shown in Table 2.

TABLE 2: Percentage of bunches affected by grey mould at three North Island vineyards.

Assessed	g/100 litres	Auckland 1 8/4/80			Auckland 2 14/4/80			Hawkes Bay 5/3/80		
		1**	2	3	1	2	3	1	2	3
untreated	-	38c	42a	13a	46b	22	17a	72	18	5
dichlofluanid	100	39c	45a	11ab	49b	23	13a	-	-	-
dichlofluanid*	100									
+ vinclozolin	50	53c	34b	9ab	-	-	-	87	10	2
dichlofluanid*	100									
+ procymidone	50	84a	13d	1c	-	-	-	89	8	1
vinclozolin	50	63b	31b	4b	-	-	-	86	12	1
iprodione	50	71b	22b	4b	79a	14	6b	-	-	-
procymidone	40	92a	7c	1c	86a	11	1b	92	7	1
procymidone	50	90a	9c	1c	86a	12	1b	94	6	0
procymidone	60	94a	5c	1c	-	-	-	97	3	0
CV%		16.8	33.6	101.1	10.7	NS	51.8	NA	NA	NA

*first application only
3 = 5-25%,

**infection category

1 = nil infection, 2 = tr - 5%,

In the Auckland 1 trial dichlofluanid alone failed to provide any reduction in the incidence of grey mould as measured by the harvest assessment. One treatment of dichlofluanid followed by three treatments of vinclozolin was inferior to four treatments of vinclozolin. All other treatments including a full programme of vinclozolin afforded a significant improvement in the level of disease control. Treatments containing procymidone were significantly superior to all others when

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measured as percentage of bunches with no grey mould.

The Auckland 2 trial also showed a full programme of dichlofluanid to provide virtually no control of grey mould, with all other treatments being significantly superior. Iprodione and procymidone at comparable rates provided a similar level of control at this site.

Relative to the Auckland trials, the Hawkes Bay trial had a low level of grey mould in the untreated plots at harvest. However, all treatments displayed a noticeable improvement in percentage of clean bunches compared to untreated.

The commercial usage assessments for the five blocks monitored are shown in Tables 3 and 4.

TABLE 3: Assessment of grey mould in three North Island vineyards after commercial spraying with three fungicides.

Assessed Treatment	rate/ha	Auckland 1 14/3/80			rate/ha	Auckland 2 13/3/80			rate/ha	Hawkes Bay 6/3/80		
		1**	2	3		1	2	3		1	2	3
procymidone	500g	90	9	1	468g	75	22	3	750g	85	15	0
iprodione	625g	73	17	7	468g	62	27	8	-	-	-	-
vinclozolin*	-	-	-	-	-	-	-	-	750g	80	15	5

* dichlofluanid 1.5 kg/ha applied at first treatment date only ** infection category as Table 2.

TABLE 4: Assessment of grey mould in a Marlborough vineyard in two seasons of commercial spraying with three fungicides.

Treatment	rate/ha	1979/80—17/3/80				rate/ha	1980/81—12/3/81			
		1**	2	3	4		1	2	3	4
untreated	-	19	40	26	13	-	0	20	16	64
procymidone*	600g	98	1	0	1	750g	99	1	0	0
iprodione	600g	59	29	11	1	-	-	-	-	-
vinclozolin*	600g	90	8	1	1	750g	91	8	1	0

*First treatment was with dichlofluanid 1.5 kg/ha in 1979/80 season only.

**Infection category see Table 2 (4 = 25.50%).

On all blocks procymidone provided superior control of grey mould to all other treatments as measured by the higher percentage of bunches without infection. On the 1979/80 Marlborough block vinclozolin appeared superior to iprodione but both were inferior to procymidone. On the Auckland 1 block iprodione was applied at a 25% higher rate than procymidone, but was still markedly inferior in the level of control afforded.

DISCUSSION

Procymidone provided a high level of grey mould control at all sites and proved consistently superior to the other fungicides evaluated. This difference has also been reported by the INRA in France where procymidone proved the most effective dicarboximide over a range of assessment sites in three successive seasons.

In the grower block assessments, the Marlborough 1979/80 and both the Auckland sites were treated with lower rates than those recommended on the product labels. Whilst these rates may not have allowed a full expression of chemical efficacy the data confirm the superior activity of procymidone on the basis of rate equivalence.

The use of dichlofluanid in the early flowering period has been based on its

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spectrum of activity including diseases additional to grey mould. The Auckland trial results show a full programme of dichlofluanid to have provided virtually nil control of grey mould; and its substitution for a dicarboximide at the first treatment time to have significantly reduced the level of control obtained relative to a full programme of dicarboximide. Therefore, in situations where conditions favour grey mould over the flowering period, the use of a dicarboximide fungicide in mixture with another fungicide active on the remaining prevailing diseases is likely to afford appreciably improved results.

No phytotoxicity was evident on any of the sites from any treatment when used alone or in mixture and procymidone proved to be compatible with the popular insecticides and other fungicides applied to grapes.

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REFERENCES

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