BUPIRIMATE EVALUATION FOR THE CONTROL OF APPLE POWDERY MILDEW

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Summary

A new pyrimidine fungicide, bupirimate, was evaluated for the control of apple powdery mildew (*Podosphaera leucotricha*) in a trial near Wanganui in 1973-74. Bupirimate at rates of 100, 200 and 400 ppm provided highly significantly better mildew control than benomyl at 200 ppm or binapacryl at 250 ppm. Further evaluation is proposed for the coming season.

INTRODUCTION

Powdery mildew (*Podosphaera leucotricha*) is one of the most serious fungus diseases of apple trees in the main apple-producing regions of New Zealand. Pruning has been a widely practised cultural method established to eradicate the source of primary mildew infection. However, changes in cultural practices no longer reduce powdery mildew carry-over. Consequently 6 to 10 sequential applications of a fungicide at intervals of 10 to 14 days are at present essential for the control of secondary mildew infection. Fungicide applications for control of mildew usually commence at the 'pink stage' and conclude at the termination of lateral extension.

Following reports from the U.K. and Spain (Finney and Farrell 1974) of good mildew control with bupirimate, a trial in the 1973-74 apple growing season evaluated this fungicide for mildew control under New Zealand conditions. Bupirimate is a pyrimidine fungicide with indicated activity against a wide range of powdery mildews. It has protectant and eradicant activity when applied as a foliar spray, and is freely systemic in sprayed leaves. There is no evidence of phloem mobility, thus the fungicide is not translocated from sprayed to other leaves. (Anon., 1974.)

The trial was located near Wanganui in a block of nine year old Gravenstein variety apples, harbouring a severe primary mildew infection.

METHOD

The treatments were applied on a 10 to 14 day schedule from the 'pink stage' till the termination of lateral extension. Nine applications were applied between 5th October 1973 and 18th January 1974, through a diaphragm pump, operated at a pressure of 1400 kPa. Spraying was by hand-gun, and all treatments were applied to the point of run-off.

Azinphos-methyl at 375 ppm was included as a tank mix for all treatments, following petal fall, for the control of codling moth (*Cydia pomonella*) and Australian leaf roller (*Epiphyas postvittana*). For the duration of the trial no other pesticide was included with any treatment. The fungicides applied in the trial were, benomyl as the 50% WP, binapacryl as a 50% WP and bupirimate as a 25% EC.

The trial was a randomised block design of one tree per plot, and four replications.

At the interim assessment on 14th December 1973, 15 leaves were selected at random from each tree, while at the final assessment on 28

Orchards and Vineyards

January 1974, all leaves on each of ten laterals per tree were placed into five groups for degree of mildew infection. The classes used for recording mildew infection at both of these assessments were:—

- Class 1 = no mildew infection
- Class 2 = <5% mildew infection
- Class 3 = 6 to 25% mildew infection
- Class 4 = 26 to 50% mildew infection
- Class 5 = > 50% mildew infection

The fruit from each treatment was assessed visually for the presence of russet and a general fruit finish evaluation. The fruit was divided into those acceptable as commercial 'Fancy Grade Fruit' (New Zealand Fruit-grower Regulations) and those not acceptable because of excess russet.

The data were analysed using Duncans T-test and in the case of percentage leaves infected, the analysis was on transformed data.

RESULTS AND DISCUSSION

Mean mildew score per leaf and percentage leaves infected are shown for the interim assessment (14.12.1973) and for the final assessment (28.1.1974) in Table 1.

TABLE 1: EVALUATION OF VARIOUS FUNGICIDES FOR THE CONTROL OF APPLE POWDERY MILDEW IN AN ORCHARD IN WANGANUI

<i>Treatment in ppm</i>	<i>Interim assessment, 14/12/73</i>		<i>Final assessment, 28/1/74</i>	
	<i>Mean mildew score/leaf</i>	<i>% leaves infected</i>	<i>Mean mildew score/leaf</i>	<i>infected % leaves</i>
untreated	4.15 aA	99.6 aA	3.71 aA	89.8 aA
benomyl 200	3.23 bB	96.5 aA	2.44 bB	75.5 bB
binapacryl 250	2.90 bB	96.8 aA	2.41 bB	77.8 bAB
bupirimate 100	1.70 cC	51.7 bB	1.72 cC	53.6 cC
bupirimate 200	1.52 cC	44.8 bB	1.46 cdC	34.7 dD
bupirimate 400	1.42 cC	37.7 bB	1.42 dC	36.9 dCD
CV%	13.2	15.5	9.4	9.5

Table 1 shows that all treatments had significantly reduced the mildew infection per leaf at the interim assessment, however, bupirimate at all rates was significantly better than both benomyl and binapacryl which were similar. Only the bupirimate treatments had significantly reduced the number of leaves with mildew infection.

The ranking between treatments had not significantly altered at the final assessment. Bupirimate was remarkably similar for all rates at both assessments, and at the final assessment maintained its highly significant advantage over benomyl and binapacryl. The indication at the interim assessment of an improvement in mildew control associated with an increase in rate of bupirimate was confirmed with significance at the final assessment. The benomyl and binapacryl treatments caused a significant reduction in the percentage leaves infected at the final assessment. A reduction in both the percentage leaves infected and the incidence of mildew infection per leaf was also evident on the untreated trees in the period between the two assessments, and was attributed to the normal reduction in mildew activity associated with higher summer temperatures.

No differences in the presence or absence of russet or in fruit finish appraisal were detected between treatments, all being fancy. However,

Orchards and Vineyards

as a direct consequence of severe powdery mildew infection all fruit from the untreated trees had extensive russet and was thus down graded.

Bupirimate at 400 ppm as the EC formulation caused slight chlorosis and necrosis of a small percentage of leaves, resulting in some premature leaf loss.

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