

larly under adverse growing conditions at Merced, although there was considerable variation at rates up to 4 lbs on young liners. In most instances, rates up to 4 lbs of simazine and diuron gave very little in the way of toxicity symptoms in orchard experiments. From these results it would appear that simazine may be safer on very young trees, while diuron may be safer on established trees in the more mature orchards—although both compounds appear to have an adequate margin of safety on bearing pear trees.

Apples

Results of 1964 herbicide tests in nurseries indicated diuron and simazine to be about equal in degree of toxicity to young apple liners. Young apple trees grafted to Gravenstein (consequently 1 year older) showed fewer injury symptoms than one-year-old apple liners. The grafted apples were grown in soil with an organic matter content of 3.2%, and the liners on a soil with 2.1%, which may also have influenced the results.

A comparison of diuron and simazine applications in apples indicated, as with pears, slightly more injury from diuron on young nursery trees than from simazine at equivalent rates. However, young apple trees treated in orchards showed no injury from either diuron or simazine up to and including 8 lbs per acre. The indications are that once trees are established in the orchard very little injury results from the use of 2 to 4 lbs of diuron or simazine for annual weed control.

Summary

Results of the 1965 screening trial in commercial nurseries suggested greater safety to young pear liners from simazine than from diuron at equivalent rates, although the extent of symptoms appeared to be somewhat comparable. Other herbicides in these tests appeared to be no safer than simazine or diuron and many

consistently gave poorer weed control. Both simazine and diuron can be expected to give commercial weed control for approximately six months at rates of 2 to 4 lbs per acre. Higher rates of diuron were used without encountering toxicity symptoms except in young liners where even a 4-lb application was not safe. From the results reported here, young trees growing in unfavorable soil conditions could be expected to be susceptible to injury from both diuron and simazine. Fall applications, combined with a contact herbicide, gave slightly longer weed control than spring applications. When diuron and simazine were compared on a pound-for-pound basis in established orchards, simazine gave somewhat better weed control. Low rates were less effective on soils containing high organic matter than on soils containing low organic matter. Both simazine and diuron appeared to have sufficient safety at herbicidal rates recommended for use in established apple and pear orchards.

The University of California weed control recommendation is for applications of diuron at 3.2 lbs per acre in a single fall application or 1.6 lbs per acre in split fall and spring applications for apples and pears. Simazine is recommended at 2 to 4 lbs per acre in a single strip application after harvest for annual weed control in established trees one year or older. These herbicides should not be used in shallow or sandy soils that are low in organic matter, such as are found in the desert valleys.

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POWDERY MILDEW can reduce yield and quality of cantaloupes in the arid inland valleys of California. The plants are defoliated, particularly around the crown of the plant. Thus the fruits become sunburned, ripen prematurely, and are lacking in soluble solids, and in general have poor edibility. The ratio of culls to marketable fruit increases tremendously. Powdery mildew is caused by the fungus, *Erysiphe cichoracearum*.

La Jolla trials

Cooperative trials were established with the USDA Horticultural Field Station, La Jolla, to determine the effectiveness of some of the newer fungicides for the control of powdery mildew of cantaloupe. Karathane has been the standard treatment used. The cantaloupe variety, Golden Gate, was used in the experimental trials since it is very susceptible to powdery mildew. Seed was planted in the greenhouse in peat pots on July 11, 1966, and transplanted to the field on August 8. Six plants were used per plot and all treatments were replicated five times. The materials and rates per 100 gallons of fungicidal mixture are as follows: Morestan (6-methyl 1-2, 3-quinoxalinedithiol cyclic carbonate) 1 lb 25% WP; Morocide (2-sec-butyl-4, 6-dinitrophenyl-3-methyl-2-butenate) 1 lb 50% WP; Karathane (dinitro(1-methylheptyl) phenyl crotonate) 1 lb 25% WP; ammonium polysulfide 65%, 2 pints; and the check treatment. Four ounces of Triton B-1956 spreader-sticker were used with the Karathane spray per 100 gallons. All materials were applied at the rate of 250 gallons per acre at a pressure of 250 psi. Spray applications were made every seven days, on August 24, 31, and September 7.

Plots were rated on a scale of 0 to 5

TABLE 3. THE EFFECT OF DIURON AND SIMAZINE ON THE FOLIAR CONDITION OF ALL AGE APPLE TREES FROM THREE NURSERY AND THREE ORCHARD TRIALS (AVERAGES, 1963-65)

Herbicide	lb/A	Nursery trees (1 & 2 yr. old liners)		Orchard trees* (1-3 yrs. old)	
		Ave.	Range	Ave.	Range
Diuron	1	0.4	0-0.8	-	-
"	2	2.8	2.8	0	0
"	4	2.3	0.3-3.7	0	0
"	8	4.2	4.2	0	0
Simazine	1	0.8	0-1.8	-	-
"	2	0.4	0-0.8	0	0
"	4	2.3	0-3.8	0	0
"	8	2.7	1.3-4.2	0	0
Check	0	0	0	0	0

* Young established orchard trees.

POWDERY MILDEW ON CANTALOUPE

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with "5" indicating dead plants, and those rated "1" consisting of plants with at least 1 colony of mildew. The results were as follows:

Spray material (seven-day application)	Disease rating	
	Sept. 7	Sept. 13
Morestan 1 lb. 25% WP	0.19 a	0.0 a
Karathane 1 lb. 25% WP	0.0 a	0.0 a
Ammonium polysulfide, 2 pints 65%	0.13 a	0.07 a
Morocide 1 lb. 50% WP	1.2 b	0.49 b
Check (no treatment)	3.8 c	3.8 c

Duncan's Multiple Range test used at 1% level. Treatments with some letter are not significantly different.

Morestan, Karathane and ammonium polysulfide gave excellent control of powdery mildew on the seven-day spray schedule. Morocide was not equal to the top three treatments even though twice the amount of active ingredient was used as compared with Morestan and Karathane treatments. Mildew was severe in the check plots.

Spray intervals

Since these materials showed excellent control with seven-day applications, the spray interval was adjusted to every 14 days in the same plots. The Karathane rate was dropped to $\frac{3}{4}$ lb of 25% WP. This rate had given excellent results in the arid inland valleys of California in previous experiments. All other materials were used at the same rate as in the seven-day applications. The plots were sprayed on September 20, October 4 and 18. Two hundred and fifty gallons of the fungicidal mixture were again applied. The results of the 14-day applications were as follows:

Spray material (fourteen-day application)	Disease rating	
	Oct. 4	Oct. 18
Morestan 1 lb. 25% WP	0.03 a	0.16 a
Karathane $\frac{3}{4}$ lb. 25% WP	1.3 b	0.98 b
Morocide 1 lb. 50% WP	1.2 b	1.2 b
Ammonium polysulfide, 2 pints 65%	1.4 b	1.4 b
Check	4.0 c	4.6 c

Morestan was significantly better (1% level) than any of the other materials when applied every 14 days. No significant difference was noted between Karathane, Morocide, and ammonium polysulfide. Check plots were almost completely dead on October 24, while the Morestan plots showed excellent growth.

Karathane dropped in effectiveness when applied at $\frac{3}{4}$ lb of 25% WP every 14 days as compared with 1 lb applied every 7 days. Further trials are needed to establish what results would be obtained by using 1 lb of 25% Karathane at 14-day intervals. Ammonium polysulfide should be tried at 3 or 4 pints every 14 days. Further trials are planned for the spring of 1967 to answer these questions.

Summary

Morestan, Karathane, and ammonium polysulfide gave significantly better control of powdery mildew on cantaloupe

than Morocide when sprays were applied every seven days. Morestan was significantly better than any of the other treatments, applied every 14 days.

The results presented here are not to be considered as University of California recommendations for the control of powdery mildew on cantaloupe. University recommendations for the control of this disease can be found in leaflet, "1967 Pest and Disease Control Program for Cucurbits," available at local Farm Advisor offices.

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