Downy Mildew Control on Susceptible Cantaloup

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ABSTRACT

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Chlorothalonil and a zinc ion-maneb complex were applied with two types of sprayers to control downy mildew on cantaloup. Chlorothalonil 6F at 1.5 or 2.0 pt/50 gal/acre produced good disease control under tropical conditions. Zinc ion-maneb complex 80 WP was satisfactory only at the 3-lb rate applied with a mist blower. Significant differences in the number of exportable fruit or percentage of soluble solids were noted only between the fungicide treatments and the control.

Approximately 350 ha of cantaloup (*Cucumis melo* var. *cantalupensis* L.) are grown near Choluteca, on the Pacific Coast of Honduras, for export to the United States during December through March. Although a number of minor diseases occur, downy mildew caused by *Pseudoperonospora cubensis* (Berk. & Curt.) Rostow. is the most serious and may cause almost 100% loss in yield. On many farms downy mildew is the limiting factor of production. At present, the only fungicides recommended for control are the dithiocarbamates and chlorothalonil (3). Chlorothalonil has generally been reported to be superior to zinc ion-maneb complex in control of downy mildew and other foliar pathogens (2,4), but it costs more. Because of the potential seriousness of the disease and the high cost of fungicides, an experiment was done near La Lima to determine the minimum fungicide rates needed to maintain adequate control. The efficiency of two application methods was evaluated.

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MATERIALS AND METHODS

Seeds of cantaloup cultivar SJ-45 were sown in 9-m rows, 12 hills per row and 1.5

m between rows. Plot design was a randomized complete block using four rows per replicate with four replicates. Fungicides were applied at the rates of 1, 1.5, and 2 pt of chlorothalonil 6F and 1.5 and 3 lb of zinc ion-maneb complex 80% WP in 50 gal/acre. Applications were made with mist blowers or knapsack sprayers beginning 4 days after seedling emergence and continuing through harvest.

The mist blowers were Solo knapsack units with a 3-hp engine delivering 1 L/min at 5,000 rpm. The knapsack sprayers were CP-3 hand-pumped types using 10 psi and a flow rate of 500 ml/min. Plants were sprayed every 6–7 days and after rain. Between 3 February and 27 April, 15 applications were made.

All plants were infected naturally. Disease readings were made each week on 20 plants from the center two rows of each replicate beginning about 5 wk after emergence. Soluble solids were read on a Bausch & Lomb retractrometer from one fruit from each replicate each day of harvest. Yield data were also taken.

RESULTS

Downy mildew was present in the unsprayed plots within 3 wk after plant emergence, and 100% of the plants showed symptoms after 7 wk. Overall plant appearance and disease control were better in plots in which fungicides were applied by mist blowers, but the differences between knapsack and mist blower were not necessarily significant (Table 1). Soluble solids and yields were also slightly better, although not statistically significant, in the mist blower plots (Table 2).

The best control was obtained using 1.5 or 2 pt of chlorothalonil applied with a backpack sprayer or 3 lb of zinc ion-maneb complex applied with a mist blower. Disease control was poor with 1 pt of chlorothalonil or 1.5 lb of zinc ion-maneb complex, regardless of method of application. Control plots, receiving no fungicide, had severe infection, with almost complete defoliation, low yields, and low soluble solids. There was little significant difference in soluble solids and yields among fungicide treatments, but differences between treated and control plots were significant.

Table 1. Effect of fungicides on downy mildew cantaloup (percent of total surface area infected)

Application method	Fungicide (pt or lb/50 gal/acre)[z]					
	Chlorothalonil 6F (pt)			Zinc ion-maneb complex 80% WP (lb)		
	1.0	1.5	2.0	1.5	3.0	Control
Mist blower	21.7 bcde	9.6 ab	7.5 a	40.2 ef	16.2 abcd	
Backpack sprayer	32.6 def	29.4 cdef	15.2 abc	46.3 f	34.4 def	
						70.0 g

[z]Means followed by the same letter(s) are not significantly different ($P = 0.01$).

Table 2. Effect of fungicides on yield of cantaloup infected with downy mildew

Application (/50 gal/acre)	Soluble solids[y]	Exportable fruit (avg/plot)[y,z]
Mist blower		
Chlorothalonil 6F (pt)		
1.0	10.9 a	31.8 a
1.5	10.7 a	26.0 a
2.0	10.1 abc	29.8 a
Zinc ion-maneb complex 80% WP (lb)		
1.5	9.1 bc	22.8 ab
3.0	10.2 ab	33.5 a
Backpack sprayer		
Chlorothalonil 6F (pt)		
1.0	9.2 bc	13.8 abc
1.5	9.4 abc	26.3 a
2.0	9.7 abc	27.0 a
Zinc ion-maneb complex 80% WP (lb)		
1.5	9.4 abc	18.0 abc
3.0	8.8 c	17.3 abc
Control	6.9 d	1.6 c

[y]Means followed by the same letter(s) are not significantly different ($P = 0.05$).
[z]Results may be erroneous due to theft of an unknown quantity of fruit. Soluble solids must be 9.0 or greater for fruit to be exportable.

DISCUSSION

Cantaloup cultivar SJ-45 is a U.S.-bred cultivar that is the principal commercial cultivar in Honduras. Although it has good agronomic qualities, it is highly susceptible to downy mildew. Because the volume of water is often inadequate in the Choluteca area, fungicides were applied in 50 gal/acre; greater volumes are used commercially when possible.

In a natural epiphytotic, such as occurred in this study and happens annually in Choluteca, nearly maximum recommended rates of fungicide were used to maintain good disease control. As shown in Table 2, however, the numbers of exportable fruit were not significantly different, regardless of fungicide rate. This indicates that cultivar SJ-45 can tolerate considerable downy mildew without reduced yield. Because of the serious potential of the disease, however, and, in some cases, poor adherence to spray programs and growers' concern that the disease will cause severe losses as in previous years, the higher rates of chlorothalonil were used. The levels of disease control obtained with chlorothalonil in this study compare favorably with those of other investigators using this fungicide to control various foliar diseases (1,4,5).

The motorized mist blower is preferred for application largely because increased leaf movement allows more fungicide to be deposited on the undersurfaces of leaves.

LITERATURE CITED

1. HOITINK, H. A. J., G. DAFT, and W. W. P. GERLACH. 1975. Phytophthora shoot blight and stem dieback of azalea and Pieris and its control. Plant Dis. Rep. 59:235-237.
2. JONES, J. P. 1974. Fungicides for the control of target leafspot, soil rot, and powdery mildew of cucumber. Plant Dis. Rep. 58:636-639.
3. MULLIN, R. S., and T. A. KUCHAREK. 1971. Florida Plant Disease Control Guide. Florida Cooperative Extension Service. 374 pp.
4. PAULUS, A. O., J. NELSON, and S. BESEMER. 1976. Resistance of *Septoria leucanthemi* to benzimidazole fungicides. Plant Dis. Rep. 60:695-697.
5. SUMMERS, C. G., and W. D. McCLELLAN. 1975. Effect of common leafspot on yield and quality of alfalfa in the San Joaquin valley of California. Plant Dis. Rep. 59:504-506.