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Project No. 84-T10 - Almond Diseases
Brown rot, scab, hull rot, leaf blight, leaf rust and shot hole.

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1. Brown rot blossom blight: The effectiveness of sodium pentachlorophenate (SPCP) in controlling brown rot blossom blight in an orchard containing high populations of benomyl-resistant *Monilinia laxa* was determined. Sodium pentachlorophenate was applied by air-blast sprayer (400 gal/acre) on January 10, 1984 in an orchard which experienced extensive blossom blight the previous year. The use of SPCP reduced the amount of brown rot on Ne Plus Ultra from 108 to 14 strikes per tree in plots receiving no other fungicide treatments (Table 1). Disease reduction was also observed in plots receiving standard fungicide treatments in addition to the SPCP application (Table 1). Fungicides were applied at pink bud and at full bloom stage of blossom with a air blast sprayer (100 gal/acre). The two spray program of Rovral 50W resulted in 14 strikes per tree without SPCP and 4 strikes per tree with a dormant SPCP spray (Table 1). Other fungicide treatments also showed the benefits of a SPCP application.

Population changes which occur following fungicide applications in an orchard containing benomyl-resistant isolates were also monitored. Fungicides were applied at 20% full bloom (February 8, 1984) and at 70% full bloom (February 14, 1984) using a air blast sprayer (100 gal/acre). Sporodochia of *M. laxa* were collected prior to fungicide application while blighted blossoms were collected following fungicide treatment from Ne Plus Ultra almond trees. Growth of the isolates on benomyl-amended agar was measured and used as a measure of resistance. A two spray program of Benlate 50W either singly or in combination with Captan 50W resulted in an increase in the ability of the isolates to grow on benomyl-amended agar ~~(Figs. 1 and 2)~~. The increase in growth was more evident in the Benlate alone spray than in the Benlate + Captan spray. Other fungicide applications, such as Rovral 50W + Benlate, Captan alone, and the non-sprayed control, did not alter the benomyl-resistant population since no increase in growth was observed ~~(Figs. 3-5)~~. Application of Rovral alone did result in decreased growth ~~on~~ lower concentrations of benomyl ~~though~~ a decrease in the level of resistance was not evident ~~(Fig. 6)~~.

2. Scab and leaf blight: Studies on control of scab and leaf blight were conducted in 1984. Results from the scab study were inconclusive due to insufficient disease in the research orchard. Results from the leaf blight trial show a trend toward disease reduction by a 3 application schedule of Wettable Sulfur 92% and a single dormant application of Sodium pentachlorophenate (Table 2). Other fungicide treatments, such as Bravo (1, 2, and 3 applications) Captan 50W (2 applications), and Ziram 76% (3 applications), reduced the amount of leaf blight when compared to the non-sprayed check. However, none of the fungicide treatments significantly reduced disease and only a trend toward disease reduction was noted.

3. Leaf rust: A revision in the nomenclature of the pathogen causing almond leaf rust has been proposed. The new name would be *Tranzschelia discolor* f. sp. *dulcis* which suggests a strain difference between species which cause rust on almond, peach, and prune. Twig lesions have also been found in orchards and a histological study is being conducted to further study the pathogen.

4. Shot hole: Earlier work has shown that shot hole will reduce yields and that spores of the fungus overwinter in healthy buds of dormant trees. The correlation between spore populations in dormant buds and disease levels may be utilized as a disease forecasting system. In vitro studies on spores have shown that Ziram will inactivate spores which may explain the effectiveness of Ziram sprays in controlling shot hole.

~~Table 1.~~ Control of blossom blight caused by Monilinia laxa by various fungicide treatments[x] with and without a dormant sodium pentachlorophenate spray[y] on Ne Plus Ultra almonds.

	Rate	Blighted shoots per tree	
Fungicide	(lbs/acre)	+SPCP	-SPCP
Control	-	14 cde[z]	108 a
Benlate 50W	1.5	5 de	52 b
Rovral 50W	1.0	4 e	14 cde
Benlate 50W + Rovral 50W	1.5 + 1.0	1 e	15 cde
Captan 50W	8.0	5 e	28 c
Benlate 50W + Captan 50W	1.5 + 8.0	4 e	21 cd

[x]Fungicides were applied at 20% full bloom (February 8, 1984) and 70% full bloom (February 14, 1984) stage of blossom with a air blast sprayer (100 gal/acre).

[y]Fungicide was applied at the rate of 15 lbs/acre on January 10, 1984 using a air blast sprayer (400 gal/acre).

[z]Means not followed by the same letter differ significantly (P = 0.05, ~~LDS = 15.9~~).

least significant difference = 15.9 strikes per tree.

TABLE 2

TIMING AND FREQUENCY OF FUNGICIDE APPLICATIONS IN REDUCING LEAF BLIGHT OF NEPLUS ULTRA ALMOND

Treatment[a]	Rate/Acre	No. of Applic.	Ave. No. Leaf Blight Per Three Trees[b]
Wettable sulfur 92%	20 lb	3	76[c]
Sodium pentachlorophenate 79% (SPCP)	15 lb	Dormant only	78
Bravo 500	6 pt	2	84
Ziram 76%	8 lb	2	87
Captan 50W	8 lb	2	92
Ziram 76%	8 lb	3	102
Bravo 500	6 pt	3	112
Bravo 500	6 pt	1	134
Check	-	-	155

[a] Trees were sprayed 1, 2, or 3 times as indicated. SPCP applied at dormant, 1/18/84. First spray, 3/28; second spray, 4/17; third spray, 5/17. Airblast sprayer, 100 gal/acre.

[b] Average of three trees in each of four replications.

[c] Data are not statistically significant, P=0.05.

Figure 1. Growth of *Monilinia laxa* isolates on benomyl-amended potato dextrose agar before and after a pink bud and full bloom application of Benlate 50W.

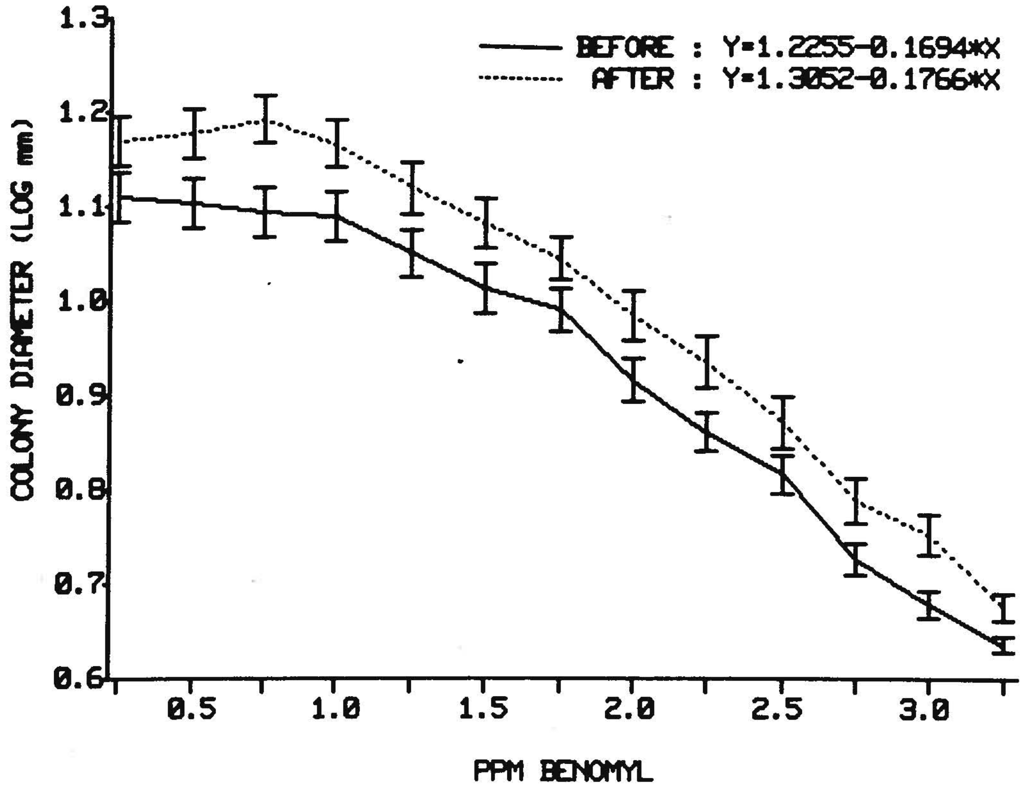

Figure 2. Growth of *Monilinia laxa* isolates on benomyl-amended potato dextrose agar before and after a pink bud and full bloom application of Benlate 50W + Captan 50W.

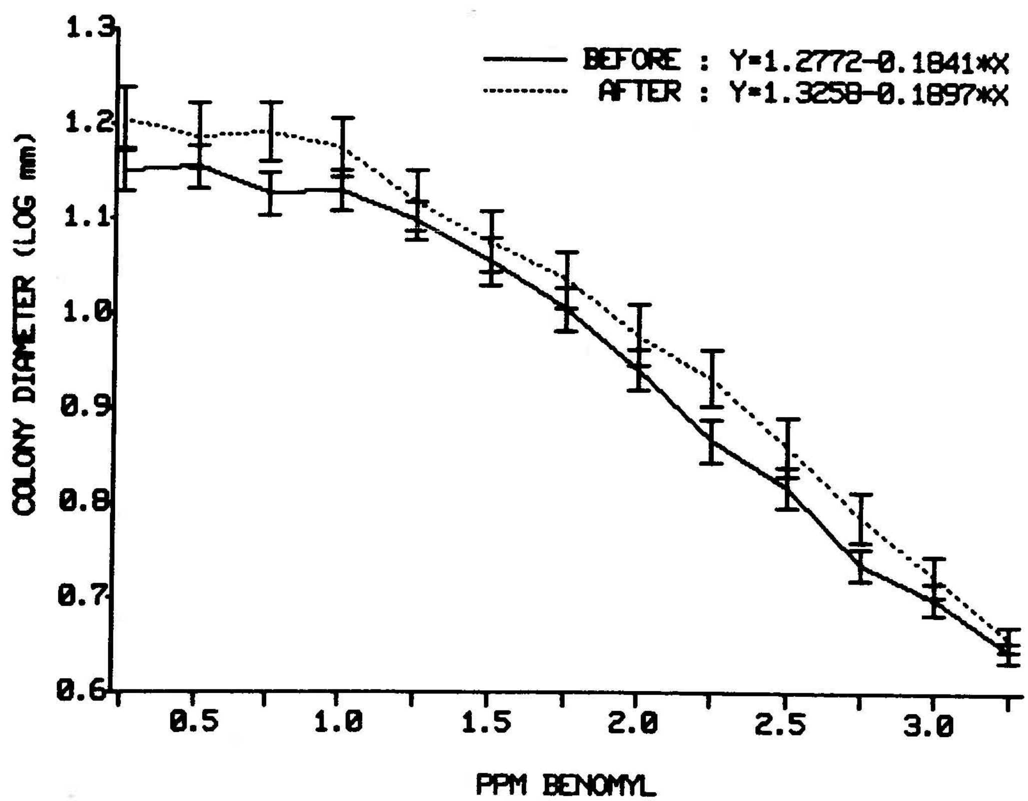

Figure 3. Growth of Monilinia laxa isolates on benomyl-amended potato dextrose agar before and after a pink bud and full bloom application of Benlate 50W + Rovral 50W.

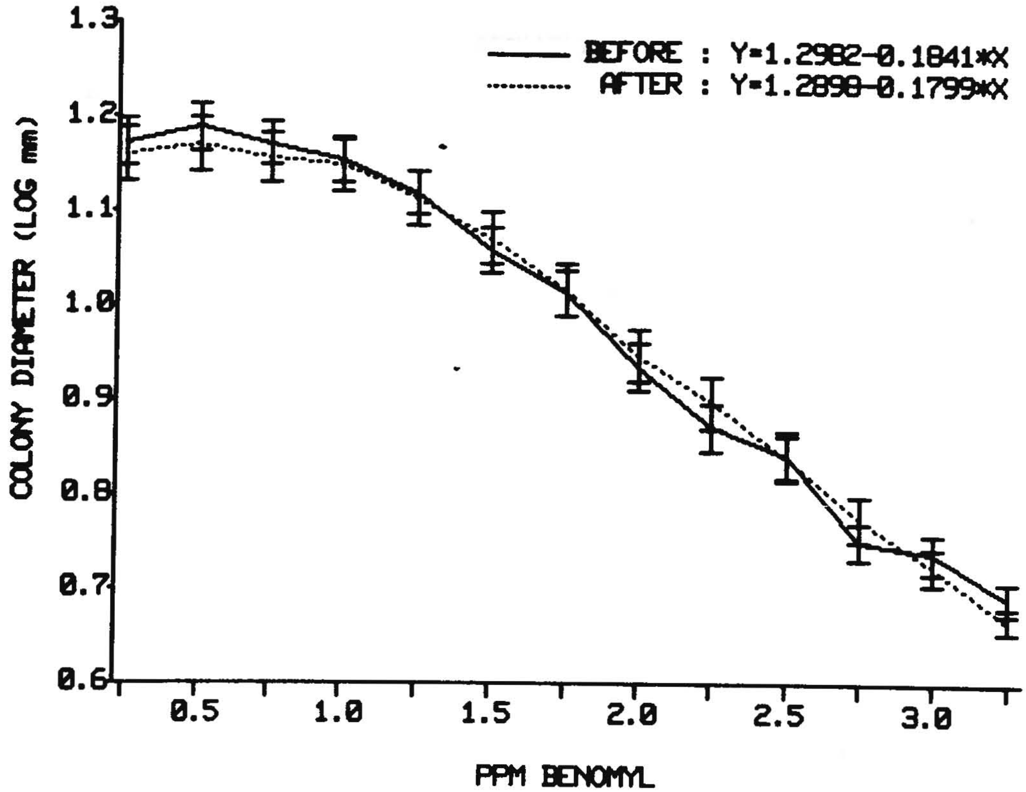

Figure 4. Growth of Monilinia laxa isolates on benomyl-amended potato dextrose agar before and after a pink bud and full bloom application of Captan 50W.

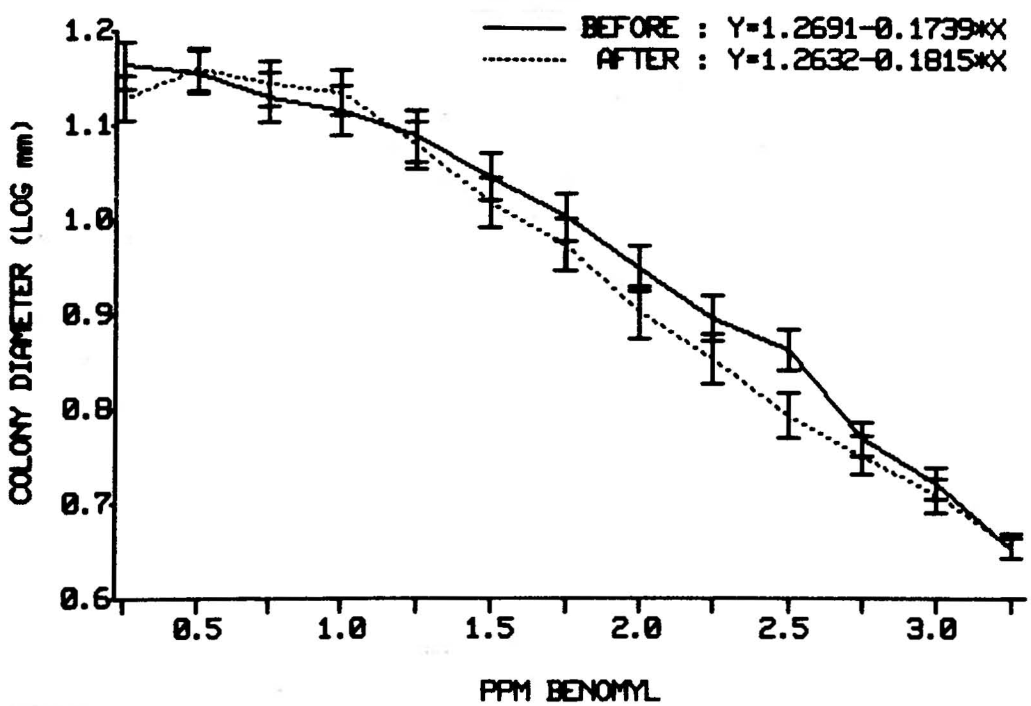

Figure 5. Growth of Monilinia laxa isolates on benomyl-amended potato dextrose agar before and after blossom period without a fungicide application.

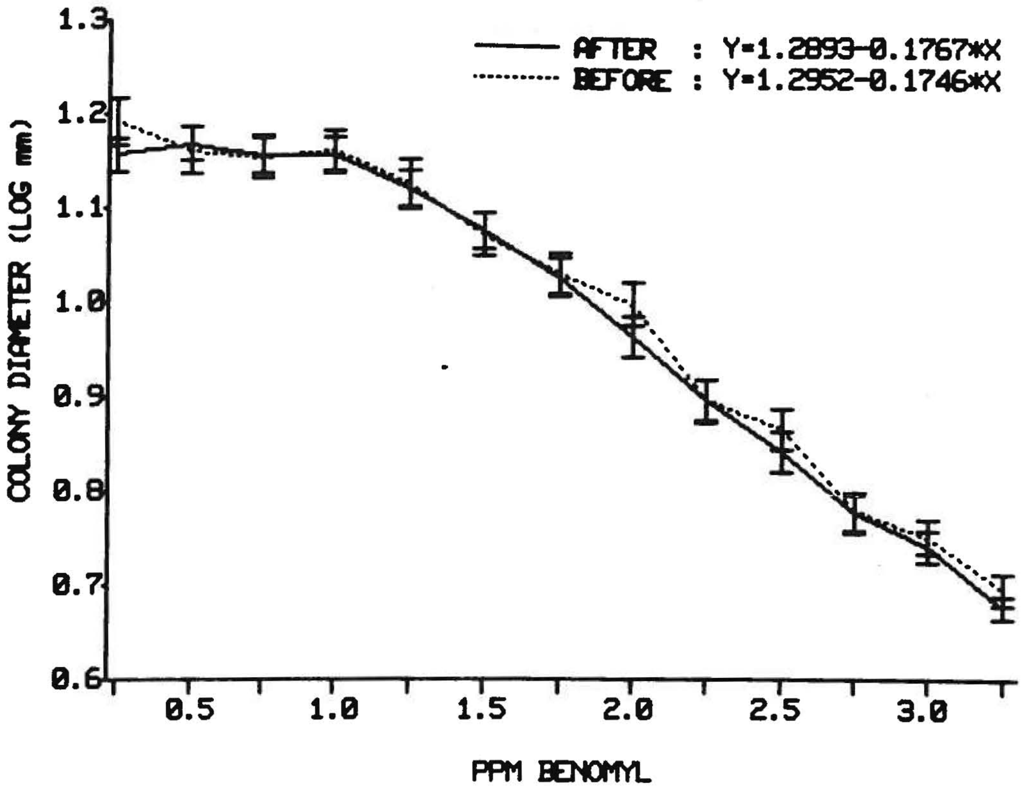

Figure 6. Growth of Monilinia laxa isolates on benomyl-amended potato dextrose agar before and after a pink bud and full bloom application of Rovral 50W.