



# Fungicides for leafspot control on strawberry

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**C**ommon leafspot of strawberry is characterized by small white spots with distinct reddish-brown borders. The disorder, caused by the fungus *Ramularia tulasnii*, has become common in nurseries and commercial fields with the introduction of susceptible cultivars such as Douglas and Chandler. Severe disease epidemics cause stunting of plants and occasional fruit infection. Development of the disease is enhanced by overhead sprinkler irrigation, rains during late fall, winter, and spring, and consequent periods of humidity.

Fungicide trials conducted by Paulus, Welch, Voth, and Bringhurst in 1972 showed that foliar fungicide sprays of benomyl, thiophanate methyl, chlorothalonil, and copper were effective for control of common leafspot. Here we report on trials conducted from 1983 to 1986 in southern California strawberry fields to compare the older fungicides with newly developed fungicides for control of the disease.

## Santa Maria 1983-84

In this trial, we used the cultivar Chandler, planted on September 2, 1983. Be-

fore planting, the strawberry plants were dipped for 3 minutes in a fungicide solution containing benomyl (Benlate 50W) at the rate of 8 ounces in 100 gallons of water. Plots were 20 feet long in a raised bed with two rows of strawberry plants. Light leafspot infection was present before application of the first spray.

Treatments consisted of the fungicides anilazine (Dyrene), chlorothalonil (Bravo 500), iprodione (Rovral), benomyl + captan, or cupric hydroxide (Kocide 101), and the nontreated control (table 1). Rohm and Haas B1956 spreader-sticker at 4 ounces per 100 gallons of water was used in all plots. Sprays were applied to complete coverage of the leaves with a 2-gallon CO<sub>2</sub> Hudson sprayer at 30 pounds per square inch on November 17, 30, December 12, January 3 and 19. Disease was rated on January 29.

Significantly better control was obtained with applications of anilazine and chlorothalonil than with any other material tested. Cupric hydroxide provided intermediate control. Commercial control was not obtained with applications of captan + benomyl. Iprodione was not significantly different from the control.

## Irvine 1985-86

Fungicide trials conducted by Greathead, Welch, and Gubler in the Watsonville strawberry growing area in 1984 showed that sprays of flusilazol (NuStar) or penconazole (Topas) were effective for control of common leafspot. A trial was conducted in southern California during 1985-86 to test these two fungicides and several others for control of the disorder.

Leafspot-infected strawberry plants of the cultivar Chandler from a nursery in northern California were planted November 13 in two 20-foot-long row plots at the University of California South Coast Field Station, Irvine. Infected leaves were left on the plants to ensure development of adequate disease for the trial. Plots were replicated four times.

Treatments consisted of the fungicides flusilazol (NuStar), penconazole (Topas), diniconazole (Spotless), myclobutanil (Systhane), or thiophanate methyl (Topsin-M) + captan, and the nontreated control (table 2). Rohm and Haas AG 98 spreader-sticker at 4 ounces per 100 gallons of water was used in all plots. Application procedures were the same as in the 1983 trial. Fungicides were applied on December 19, and January 2, 16, and 30, and disease was rated on February 6.

Flusilazol and penconazole were significantly better for control of common leafspot of strawberry than all other materials tested. Diniconazole and myclobutanil provided some control but would not be considered commercially effective by a strawberry grower. Thiophanate methyl + captan was not significantly different from the control.

## Conclusions

Of the fungicides currently registered in California for the control of common leafspot of strawberry, anilazine gave good control and cupric hydroxide provided intermediate control. Good control was obtained with chlorothalonil but this material is only registered for use in the nurseries of northern California. Commercial control was not obtained with captan combined with either benomyl or thiophanate methyl. Fungicides not currently registered, but which showed promise in our tests, included flusilazol (NuStar) and penconazole (Topas).

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TABLE 1. Effect of foliar fungicide sprays in control of common leafspot of 'Chandler' strawberry, Santa Maria, 1983-84

Fungicide and rate/acre in 100 gal water	Disease rating Jan. 29*
anilazine (Dyrene) 50W, 3 lb	2.2 a
chlorothalonil (Bravo 500), 2 pt	2.3 a
cupric hydroxide (Kocide 101), 2 lb	3.1 b
benomyl (Benlate) 50W, 1 lb, + captan 50W, 2 lb	5.0 c
iprodione (Rovral) 50W, 1.5 lb	5.8 d
Nontreated control	6.3 d

\*Rated on a scale of 0 to 10: 0 = no disease; 10 = stunted plants and leafspots completely covering the leaves. Treatment means followed by same letter are not significantly different, Duncan's multiple range test at the 5% level.

TABLE 2. Effect of foliar fungicide sprays in control of common leafspot of 'Chandler' strawberry, Irvine, 1985-86

Fungicide and rate/acre in 100 gal water	Disease rating Feb. 6*
flusilazol (NuStar) 40%, 2.5 fl oz	1.2 a
penconazole (Topas) 10W, 1.1 lb	2.0 a
diniconazole (Spotless) 25W, 4 oz	4.8 b
myclobutanil (Systhane) 40W, 2.5 oz	5.0 b
thiophanate methyl (Topsin M) 70W, 11.5 oz, + captan 50W, 2 lb	6.5 c
Nontreated control	6.8 c

\*See table 1 footnote.