

# Comparison of New Fungicides to Manage Sclerotinia Leaf Drop of Lettuce in 2000

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## Abstract

*Sclerotinia minor* and *S. sclerotiorum* are the two soil-borne pathogenic fungi that cause Sclerotinia leaf drop in Arizona. Moist soils and moderate temperature favor this disease. Some new fungicides in development were evaluated for control of leaf drop on lettuce during the winter vegetable growing season of 1999-2000. Sclerotia of each pathogen were applied to plots after thinning and just before the first of two applications of test compounds. In this trial, the final count of dead lettuce plants usually was numerically reduced, compared to nontreated plots, in plots infested with either pathogen that were treated with the standard compounds Ronilan or Rovral as well as the experimental compound Medallion; however, the reduction was significant only in plots infested with *Sclerotinia sclerotiorum*. The number of dead plants in plots infested with either *Sclerotinia minor* or *S. sclerotiorum* was significantly reduced by another experimental chemistry, Fluazinam. Finally, a biological control product, Serenade, significantly reduced disease in plots containing *S. minor*, but not *S. sclerotiorum*. Continued demonstration of efficacy by Serenade may provide the opportunity to utilize a biological control product to reduce the incidence of *Sclerotinia* leaf drop of lettuce caused by *S. minor*.

## Introduction

*Sclerotinia minor* and *S. sclerotiorum* are two soil-borne fungi that can cause leaf drop of lettuce in Arizona. As with other fungal diseases of vegetable crops, environmental conditions govern disease development. Mild to moderate temperatures and moist soil conditions favor leaf drop; therefore, the incidence of the disease normally is highest from December through March in western Arizona lettuce fields. To minimize the occurrence of Sclerotinia leaf drop, a fungicide treatment can be applied to the lettuce beds immediately after thinning when the plants are very small. This fungicide application, which can be followed in about 3 weeks by another treatment, forms a chemical barrier between the soil and the developing leaf canopy of the lettuce plant. With this chemical barrier in place, the bottom leaves and stem of each lettuce plant will be protected from colonization by the germinating sclerotia of the two species of *Sclerotinia* that cause leaf drop.

Timely application of an effective fungicide is a critical component of an overall disease management strategy when lettuce is planted in fields with a history of leaf drop. Some new agrochemicals are in development that have activity on a group of plant pathogens including those that cause leaf drop of lettuce. A fungicide trial was initiated during the 1999-2000 vegetable season to test the potential efficacy of these new chemistries on Sclerotinia leaf drop of lettuce.

## Materials and Methods

These studies were conducted at the Yuma Valley Agricultural Center. The soil was a silty clay loam (7-56-37 sand-silt-clay, pH 7.2, O.M. 0.7%). Lettuce 'Winterhaven' was seeded and watered November 2, 1999 in double rows 12 inches apart on beds with 40 inches between bed centers. Treatments were replicated five times in a randomized complete block design. Each replicate consisted of 25 feet of bed, which contained two 25 foot rows of lettuce. Plants were thinned December 1, 1999 at the 3-4 leaf stage to a 12 in. spacing. After thinning, for plots infested with *Sclerotinia minor*, 3.6 grams of sclerotia were distributed evenly on the surface of each 25-ft-long plot between the rows of lettuce and incorporated into the top 1-inch of soil. For plots infested with *Sclerotinia sclerotiorum*, 0.5 pint of a dried mixture of sclerotia and infested barley grain was broadcast evenly over the surface of each 25-ft-long lettuce plot, again between the rows of lettuce on each bed, and incorporated into the top 1-inch of soil. Treatment beds were separated by single nontreated beds. Fungicide treatments were applied with a tractor-mounted boom sprayer (flat-fan nozzles spaced 12 in. apart) that delivered 50 gal/acre at 100 psi. Fungicides were applied to the surface of the bed and plants on December 8 and again on December 21, 1999. Mean soil temperature (°F) at a depth of 4 inches was as follows: Dec, 60; Jan, 61; Feb, 65. During this trial, total rainfall of 0.05 inches fell on one day, February 21. Furrow irrigation was used for the duration of the trial. The severity of disease was determined at plant maturity (February 24) by recording the number of diseased (dead and dying) plants in each plot. As a point of reference, the original stand of lettuce was thinned to approximately 57 plants per plot.

## Results and Discussion

In this trial, the final count of dead lettuce plants was numerically reduced, compared to nontreated plots, in plots infested with either pathogen that were treated with the standard compounds Ronilan or Rovral as well as the experimental compound Medallion; however, the reduction was significant only in plots infested with *Sclerotinia sclerotiorum*. The number of dead plants in plots infested with either *Sclerotinia minor* or *S. sclerotiorum* was significantly reduced by another experimental chemistry, Fluazinam. Finally, a biological control product, Serenade, significantly reduced disease in plots containing *S. minor*, but not *S. sclerotiorum*. Similar results for Serenade were obtained in a previous field trial. Continued demonstration of efficacy by Serenade may provide the opportunity to utilize a biological control product to reduce the incidence of *Sclerotinia* leaf drop of lettuce caused by *S. minor*.

At the rate tested, Elevate did not reduce the incidence of leaf drop in this study; however, more positive results were recorded in the study conducted a year ago. In the same earlier trial, Medallion provided significant control of leaf drop caused by *S. minor*, contrary to results achieved this year. These inconsistent results in year to year comparisons of field trials emphasize the necessity of gathering data from multiple field trials before making final judgements on the relative efficacy of chemistries for disease control.

**Table 1. 2000 Sclerotinia leaf drop of lettuce fungicide trial.**

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Treatment <sup>1</sup>	Rate (lb a.i./A)	Dead plants per 25 ft plot <sup>2</sup>	
		<i>S. minor</i>	<i>S. sclerotiorun</i>
Nontreated control	-----	16.0	28.8
Elevate 50WDG	1.0	12.6	28.0
Fluazinam 4.17SC	0.5	5.0	15.4
Fluazinam 4.17SC	1.0	4.6	12.4
Medallion 50WP (Not incorporated)	0.178	12.6	13.2
Medallion 50WP (Incorporated) <sup>3</sup>	0.178	10.8	14.0
Ronilan 50DF	1.0	9.8	10.0
Rovral 4F	1.0	10.8	19.2
Serenade WP (Not incorporated)	5.0 lb product	11.0	23.0
Serenade WP (Not incorporated)	10.0 lb product	10.2	23.8
Serenade WP (Incorporated) <sup>4</sup>	5.0 lb product	9.2	25.6
Serenade WP (Incorporated) <sup>4</sup>	10.0 lb product	8.2	28.6
Serenade AS (Incorporated) <sup>4</sup>	1.0 gal product	8.6	31.0
Serenade AS (Incorporated) <sup>4</sup>	3.0 gal product	9.8	25.2
LSD (Least Significant Difference, <i>P</i> =0.05)		6.8	8.5

1 Treatments were applied after thinning on Dec. 8 and again on Dec. 21, 1999.

2 Disease assessment was performed at crop maturity on Feb. 24, 2000. Each 25 ft. plot contained approximately 57 plants. All diseased plants were dead or dying.

3 Treated and inoculated zone between lettuce rows was cultivated after application of chemical to a depth of 1-inch.

4 Product applied to bed surface between lettuce rows in 1.0 gal of water per plot. An additional 1.0 gal of water was applied to further incorporate the product into the soil.