

Evaluation of New Fungicides for Management of Sclerotinia Leaf Drop of Lettuce in 1999

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Abstract

In Arizona, Sclerotinia leaf drop of lettuce is caused by two different species of fungi, Sclerotinia minor and S. sclerotiorum. Relatively cool and moist environmental conditions favor this disease. Some new fungicides in development were evaluated for control of leaf drop on lettuce during the winter vegetable growing season of 1998-99. Sclerotia of each pathogen were applied to plots after thinning and just before the first of two applications of test compounds. The final severity of leaf drop in these trials was moderately high. Significant reduction in the final count of dead lettuce plants compared to nontreated plots was usually achieved by application of the standard compounds Ronilan and Rovral as well as an appropriate rate of the experimental compounds Elevate, Medallion or Serenade. Medallion and Elevate provided equivalent disease control to that of the current standard materials with 0.178 and 0.5 lb active ingredient (a.i.) per acre, respectively, compared to the current 1.0 lb a.i. per acre required with the standard compounds. 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.

Keywords: Sclerotinia minor, S. sclerotiorum, plant protection chemicals, vegetable diseases.

Introduction

Sclerotinia minor and *S. sclerotiorum* can cause leaf drop of lettuce in Arizona. As with other fungal diseases of vegetable crops, environmental conditions govern disease development. Cool to mild and moist conditions favor leaf drop; therefore, the incidence of the disease is highest from December through early March in western Arizona lettuce fields. To minimize the occurrence of Sclerotinia leaf drop, a fungicide treatment is 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 1998-99 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 10, 1998 on 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 January 5, 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 2 inches 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. 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 January 6 and 26, 1999. Mean soil temperature (°F) during 1998-99 was as follows: Dec, 57; Jan, 58; Feb, 62; Mar 1-19, 69. Total rainfall (inches) in 1998-99 was as follows: Dec, 0.05; Jan, 0.00; Feb, 0.53; Mar 1-12, 0.00. Furrow irrigation was used for the duration of the trial. The severity of disease was determined at plant maturity (March 19) by recording the number of dead plants in each plot. As a point of reference, the original stand of lettuce was thinned to approximately 50 plants per plot.

Results and Discussion

Significant reduction in the final count of dead lettuce plants compared to nontreated plots was usually achieved by application of the standard compounds Ronilan and Rovral as well as an appropriate rate of the experimental compounds Elevate, Medallion or Serenade. Medallion and Elevate provided equivalent disease control to that of the current standard materials with 0.178 and 0.5 lb active ingredient (a.i.) per acre, respectively, compared to the current 1.0 lb a.i. per acre required with the standard compounds. 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 in the future.

Table 1. 1999 Sclerotinia leaf drop of lettuce fungicide trial.
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Treatment*	Rate (lb a.i./A)	Dead plants per 25 ft plot	
		<i>S. minor</i>	<i>S. sclerotiorum</i>
Rovral 4F	1.0	18.2	24.7
Elevate	0.5	18.8	28.0
Medallion	0.178	19.4	16.0
Serenade	4 lb prod.	21.6	31.7
Elevate	0.75	22.2	30.7
Serenade	7 lb prod.	23.4	34.2
Ronilan 50DF	1.0 lb	24.4	14.2
Serenade	10 lb prod.	26.4	31.5
Nontreated control	-----	29.6	35.2
LSD (Least Significant Difference, $P=0.05$)		6.0	7.4

* Treatments were applied after thinning on Jan 6, 1999 and again Jan 26.