

New Fungicides Evaluated for Control of Sclerotinia Leaf Drop of Lettuce in 1997 and 1998

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Abstract

Sclerotinia leaf drop of lettuce is caused by two different species of this fungal pathogen, Sclerotinia minor and S. sclerotiorum. 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 seasons of 1996-97 and 1997-98. 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 high. Significant reduction in disease or increase in marketable heads compared to nontreated plants was usually achieved by application of the standard compounds Ronilan and Rovral as well as the new fungicides BAS 500 and an "unidentified" material. The future registration and subsequent availability of one or both of these new chemistries for lettuce could provide equivalent disease control to that of the current standard materials with 0.2 to 0.25 lb active ingredient (a.i.) per acre instead of the current 1.0 lb a.i. per acre required with the standard compounds.

Introduction

Sclerotinia minor and *S. sclerotiorum* cause leaf drop of lettuce every year in Arizona lettuce fields. As with other fungal diseases of vegetable crops, environmental conditions play a critical role in disease development. Cool to mild and moist conditions favor leaf drop; therefore, the incidence of the disease is highest from December through early March. 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 applications 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 that includes those that cause leaf drop of lettuce. A fungicide trial was initiated during the 1996-97 and 1997-98 vegetable seasons 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 "Coolguard" was seeded and watered October 31, 1996 on double rows 12 inches apart on beds with 40 inches between bed centers. "Barnburner" was seeded and watered November 4, 1997 for the second year trial. 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 3 in 1996 and December 12 in 1997 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 (hollow-cone nozzles spaced 12 in. apart) that delivered 100 gal/acre in the first study and 50 gal/acre in the second study, both at 100 psi. Fungicides were applied to the surface of the bed and plants on December 16, 1996 and January 2, 1997 in the first trial and December 17, 1997 and January 7, 1998 in the second trial. Mean soil temperature (F) during 1997-98 was as follows: Dec, 56; Jan, 58; Feb, 60; Mar 1-12, 63. Total rainfall (inches) in 1997-98 was as follows: Dec, 1.47; Jan, 0.04; Feb, 0.99; Mar 1-12, 0.00. Similar temperatures but lower rainfall was recorded in the 1996-97 study. Furrow irrigation was used for the duration of these trials. The severity of disease was determined at plant maturity by recording either the number of dead plants or the number of marketable heads from each plot. As a point of reference, the original stand of lettuce was thinned to approximately 50 plants per plot.

Results and Discussion

The final severity of leaf drop in these trials was high. Significant reduction in disease or increase in marketable heads compared to nontreated plants was usually achieved by application of the standard compounds Ronilan and Rovral as well as the new fungicides BAS 500 and an "unidentified" material. The future registration and subsequent availability of one or both of these new chemistries for lettuce could provide equivalent disease control to that of the current standard materials with 0.2 to 0.25 lb active ingredient (a.i.) per acre instead of the current 1.0 lb a.i. per acre required with the standard compounds.

Table 1. 1996-97 and 1997-98 Sclerotinia leaf drop fungicide trials.
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Treatment and rate of a.i./acre	Dead plants per plot in 1996-97		Marketable heads per plot in 1997-98	
	<i>S. minor</i>	<i>S. sclerotiorum</i>	<i>S. minor</i>	<i>S. sclerotiorum</i>
Nontreated control	10.8	26.4	18.4	16.4
Compound X 0.25 lb	-----	-----	29.4	22.6
Compound X 0.35 lb	-----	-----	24.4	23.8
BAS 505 0.3 lb	-----	-----	36.2	25.2
Rovral 4F 1.0 lb	3.8	13.2	24.6	26.4
BAS 505 0.2 lb	-----	-----	29.8	28.8
Ronilan 50DF 1.0 lb	3.8	12.6	15.6	33.4
BAS 505 0.25 lb	2.2	10.2	-----	-----
BAS 505 0.5 lb	5.6	14.4	-----	-----
LSD ($P=0.05$) *	3.4	8.8	7.9	8.1

* Least Significant Difference at $P=0.05$. Values in each column differing by more than the least significant difference are significantly different from each other.