Field Evaluation of Head Lettuce Cultivars for Susceptibility to Sclerotinia Leaf Drop in 1997

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Abstract

Leaf drop of lettuce is caused by the plant pathogenic fungi Sclerotinia minor and S. sclerotiorum. Cool and moist environmental conditions favor disease development. Sixteen different cultivars of head lettuce were evaluated in the field for susceptibility to Sclerotinia leaf drop in plots inoculated with sclerotia of Sclerotinia minor or S. sclerotiorum. Significant differences were detected among the tested cultivars in the amount of lettuce plants killed by Sclerotinia minor. On the other hand, there were no significant differences among tested cultivars in the number of plants destroyed by Sclerotinia sclerotiorum

Introduction

Leaf drop of lettuce, caused by *Sclerotinia minor* and *S. sclerotiorum*, occurs every year in Arizona lettuce fields. As with other fungal diseases of vegetable crops, environmental conditions have a critical effect on the development of disease. Cool moist conditions favor development of leaf drop; therefore, the incidence of this disease is highest during the months of December through early March. To repress leaf drop, fungicides are applied to the plant bed when the lettuce seedlings are very small, so that an effective chemical barrier is established 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 pathogens that cause leaf drop. A desirable alternative to chemical disease management would be to plant cultivars of lettuce with resistance to Sclerotinia leaf drop in fields with a history of this disease. A field trial was initiated in 1996-97 to evaluate 16 different head lettuce cultivars for potential differences in susceptibility to Sclerotinia leaf drop caused by *S. minor* or *S. sclerotiorum.*

Materials and methods

This trial was conducted at the Yuma Valley Agricultural Center. Sclerotia of *Sclerotinia minor* were produced in 0.25 pt. glass flasks containing 15-20 sterilized 0.5 in. cubes of potato by seeding the potato tissue with mycelia of the fungus. After incubation for 4-6 wk. at 68 F, mature sclerotia were separated from residual potato tissue by washing the contents of each flask in running tap water within a soil sieve. Sclerotia were air-dried at room temperature, then stored at 40 F until needed. Inoculum of *Sclerotinia sclerotiorum* was produced in 2 qt. glass containers by seeding moist sterilized barley grain with sclerotia of this fungus. After 3 months incubation at 75-81 F in the laboratory, abundant sclerotia were formed. The contents of each container were removed, spread on a clean surface and dried. The resultant mixture of sclerotia and infested grain was used as inoculum.

Lettuce cultivars were seeded October 30, 1996 in double rows 12 in. apart on beds 40 in. wide. Lettuce was thinned at the 3-4 leaf stage to a 12 in. spacing on December 2. On December 3, 0.1 oz. or 0.5 pint of sclerotia

of *S. minor* or *S. sclerotiorum*, respectively, were distributed evenly on each lettuce bed in a band 12 in. wide and 25 ft. long. Each replicate consisted of 25 ft. of bed, which contained two rows of lettuce. Mean soil temperature (F) at the 2-4 inch depth was as follows: December 1996, 56; January 1997, 58; February, 61. Total rainfall (in.) was as follows: December, 0.00; January, 0.44; February, 0.07. Furrow irrigation was used for the duration of this trial. Leaf drop was monitored by recording the number of collapsed lettuce plants on February 12, 1997.

Results and Discussion

The results of this study are presented in Table 1. Significant differences were detected among the tested cultivars in the amount of lettuce plants killed by *Sclerotinia minor*. On the other hand, there were no significant differences among tested cultivars in the number of plants destroyed by *Sclerotinia sclerotiorum*. The data collected from this field study suggests that differences among lettuce cultivars in susceptibility to Sclerotinia leaf drop may exist. As with all biological studies, the results from only one trial should be considered to be preliminary in nature. Further testing is needed to confirm the differences among lettuce cultivars detected in this study.

Table 1. Results of 1997 field trial to evaluate sixteen different head lettuce cultivars for potential differences in susceptibility to Sclerotinia leaf drop caused by *Sclerotinia minor* or *S. sclerotiorum*. Mark Wilcox, Yuma County Cooperative Extension and Michael Matheron, Yuma Agricultural Center, University of Arizona.

Head lettuce cultivar	Percentage of plants killed by	
	S. minor	*S. sclerotiorum*
Morangold (3*)	23 a**	35
Winterhaven (6)	27 ab	52
Yuma (3)	30 abc	51
SXP-94R352 (7)	32 abcd	44
New Dominion (7)	32 abcd	46
Legacy (1)	32 abcd	52
Valley Queen (5)	34 abcd	55
BOS5825 (4)	38 abcd	56
Sonora (3)	40 bcd	52
Shiloh (2)	40 bcd	54
Westland (4)	41 bcd	53
Mojave (3)	41 bcd	48
Barnburner (2)	43 cd	50
Meritmore (4)	44 cd	42
Kofa (7)	47 d	49
El Toro (3)	67 e	53

* Seed Company: (1) American Takii; (2) Asgrow; (3) Harris Moran; (4) Orsetti; (5) Paragon; (6) Pybas; (7) Synergene.

** Values in each column followed by a different letter are significantly different according to the Duncan-Waller K-Ratio Test ($P=0.05$).