

Development of Internal Discoloration of Horseradish Root in Commercial Fields

M. Babadoost

Department of Crop Sciences, University of Illinois, Urbana, IL 61801

E-mail: babadoos@uiuc.edu

Introduction

Internal root discoloration of horseradish is a complex disease caused by *Verticillium dahliae*, *V. longisporum*, and *Fusarium solani*. This study was conducted to determine development of this disease complex in commercial fields during the growing season.

Materials and Methods

A field trial was conducted at a commercial field near Collinsville, Illinois. The field had history of internal discoloration of horseradish root. Three horseradish cultivars, 15K, D25-E2, and 1573 were used in this study. Roots of all three cultivars were from a horseradish field in 2004 with no visual symptom of the discoloration complex or any other root diseases. Roots (0.4- to 0.5-inch in diameter) were selected, washed with tap water, and cut into 6-inch segments (sets).

Field was plowed prior to planting and the sets were planted on 11 May. Sets were planted 24-inch apart within the rows spaced 36-inch apart. Each plot consisted of one 20-foot row. A total of 10 sets were planted in each plot. The plots were arranged in a split-plot design, cultivar being as the main plot and treatment (month) as sub-plots. Treatments (Table 1) were randomly arranged in each plot. Each treatment (month) was replicated three times.

During the season, weeds were controlled by cultivation and hand weeding. The field was not irrigated. Precipitation and temperature in the field were not recorded. Therefore, the data from the Belleville weather station, the nearest weather station to the experimental site, are presented. Precipitation was 4 days (0.71 in.), 4 days (2.21 in.), 5 days (3.94 in.), 7 days (2.11 in.), 6 days (5.69 in.), and 0 day (0.00 in.) during 11-31 May, June, July, August, September, and 1-11 October, respectively. Average monthly high and low temperatures (EF) were 78/54, 88/64, 88/66, 88/67, 84/59, and 73/51 during 11-31 May, June, July, August, September, and 1-11 October, respectively.

Plants were dug on 10 June, 8 July, 26 August, 23 September, and 11 October. Main roots were sectioned and evaluated for the incidence (percentage of roots discolored) and severity (percentage of root area affected) of internal discoloration.

Results and Discussion

Symptoms of internal discoloration of roots were not observed until August. Incidence and severity of the disease were significantly higher in September and October than previous months. Similar results were obtained from field surveys during 2002-2004. The results of these studies indicate that internal discoloration of horseradish roots develops slowly in the beginning of the

season and symptoms of the disease may not be observed until about three months after planting sets. Disease incidence and severity in cultivar 15K were lower than those of cultivars D25-E2 and 1573.

Table 1. Incidence and severity of internal discoloration of horseradish roots in a commercial field during the growing season in 2005.

Time	Horseradish cultivar					
	15K		D25-E2		1573	
	Incidence	Severity	Incidence	Severity	Incidence	Severity
June	0.0 b*	0.00 b	0.00 c	0.00 b	0.0	0.00 b
July	0.0 b	0.00 b	0.00 c	0.00 b	0.0 c	0.00 b
August	10.0 ab	1.83 ab	16.7 b	1.00 b	36.7 b	3.83 b
September	20.0 a	2.00 ab	90.0 a	11.83 a	100 a	30.17 a
October	23.3 a	2.17 a	80.0 a	13.33 a	100 a	29.50 a
LSD_(P=0.05)	15.2	2.11	14.5	3.75	11.2	4.48

* Mean of 30 plants (10 plants/plot). Values within each column with a letter in common are not significantly different from each other according to Fisher's protected LSD ($P=0.05$).