

Effect of Fungicides on Development of *Cercospora* Summer Black Stem and Leaf Spot in Alfalfa

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SUMMARY

Cercospora summer black stem and leaf spot, a fungal disease of alfalfa, has been associated with a stand decline problem in La Paz County. In a continuation of a study initiated in 1987, we examined the ability of three fungicides to control the disease and decline problem. Bravo, Funginex, and Kocide significantly reduced the severity of *Cercospora* summer black stem and leaf spot. In addition, significant increases in yield were recorded on plots treated with fungicides.

INTRODUCTION

Production of alfalfa is an important agricultural activity in Arizona. In recent years, an alfalfa decline problem has appeared in alfalfa fields between Parker and Poston in La Paz County. General symptoms in affected fields include stunted plants with off-colored foliage and stand decline. The severity of the decline symptoms vary from year to year.

Cercospora summer black stem and leaf spot, a fungal disease of alfalfa, has been consistently associated with the decline problem. Growth of *Cercospora medicaginis*, the causal fungus of this disease, is favored by high temperature and relative humidity, the same environmental conditions associated with the onset of alfalfa decline. Infection of alfalfa by *Cercospora medicaginis* causes small brown spots on both leaf surfaces which enlarge to form reddish brown lesions. Heavy infection kills leaves and causes severe defoliation. Elongated dark brown lesions also can develop on the stems of the plant.

In 1987 we began a study to determine the role of *Cercospora medicaginis* and perhaps other fungal pathogens in the development and duration of the alfalfa decline problem in La Paz County. This report presents the findings from our 1988 fungicide trial.

MATERIALS AND METHODS

A field study was initiated in the Parker Valley during the summer of 1988. Three different fungicides were tested for their effect on alfalfa decline in a commercial planting of the cultivar CUF101. Fungicides tested included Bravo 720 (chlorothalonil), Funginex 1.6 EC (triforine), and Kocide 101. Only Kocide is registered at this time on alfalfa. Each treatment plot was 15 ft wide by 40 ft long and was replicated eight times in a randomized complete-block design. The fungicides were applied 10-14 days after cutting, on July 22, August 29, and October 5, using a tractor-mounted boom sprayer.

Disease severity was determined by collecting 25 stems from each plot (total of 200 stems per treatment) and counting the number of lesions on the leaves and stems of each sample. Plant material was collected just before cutting; the yield was determined after cutting and just before baling. Samples were also collected and sent to a laboratory for quality analyses (NIR analysis).

RESULTS AND DISCUSSION

Symptoms of *Cercospora* summer black stem and leaf spot did not appear until September; therefore, disease severity and yield data were collected for the September and October cuttings. The number of leaf lesions caused by *Cercospora medicaginis* was reduced significantly by the fungicide treatments, as shown in Table 1. Stem lesions also were less evident on treated alfalfa stems.

Yield was increased significantly by the use of fungicides in this trial, with Bravo and Funginex performing the best (Table 2). There appeared to be no difference among treatments with respect to the qualitative factors determined by laboratory analysis.

The tested fungicides appear to reduce the incidence and severity of *Cercospora* summer black stem and leaf spot and perhaps other fungal diseases of alfalfa as well, with a resultant increase in yield. Although light to moderate levels of *Cercospora* infection were present in 1988, severe alfalfa decline symptoms were not observed. We suspect that the severity of alfalfa decline is related to the duration of higher humidity associated with summer rainfall. The high humidity also would be most favorable for rapid development of *Cercospora* summer black stem and leaf spot. This trial will be repeated in 1989 to confirm the findings in this report.

Table 1. Effect of fungicides on development of *Cercospora* summer black stem and leaf spot.

Treatment and rate of Product/acre	<u>Mean Number of Lesions on*</u>	
	Leaves	Stem
September cutting		
Check	10.1 a	1.8 a
Bravo 1.0 qt.	1.9 c	0.6 b
Funginex 1.0 qt.	6.6 b	1.0 b
Kocide 2.0 lb.	7.3 b	0.9 b
October cutting		
Check	17.7 a	1.3 a
Bravo 1.0 qt.	4.9 c	0.2 b
Funginex 1.0 qt.	8.4 b	0.6 ab
Kocide 2.0 lb.	9.0 b	0.2 b

* For each cutting, values within a column followed by a different letter are significantly different (P = 0.05) according to Duncan's Multiple Range Test.

Table 2. Effect of fungicides on yield of alfalfa affected with *Cercospora* summer black stem and leaf spot.

Treatment and rate of product/acre	Yield (lb./10 ft. of windrow)	Percent increase in Yield
Check	6.0 *	0 c **
Bravo 1.0 qt.	6.9	14.4 a
Funginex 1.0 qt.	7.1	18.4 a
Kocide 2.0 lb.	6.4	7.2 b

* Combined yield data for September and October cuttings.

** Values followed by a different letter are significantly different (P = 0.05) according to Duncan's Multiple Range Test.