

EARLY BLIGHT CONTROL WITH QUADRIS

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Abstract

An experiment to evaluate the efficacy of the new broad spectrum fungicide Quadris (azoxystrobin) on early blight development in 'Shepody' (Solanum Tuberosum L.) potatoes was planted at the Powell Butte site of Central Oregon Agricultural Research Center in 1997. Early blight was first observed in the experiment on August 5 and the percentage of the leaf area infected with early blight nearly doubled each week after mid-August in the untreated control plots. The plots treated with Bravo (chlorothalonil) and Quadris (0.25 lb ai/acre) reduced the incidence of early blight as compared with the untreated control for the entire growing season except for the last foliar observation date. On that date, only Quadris (0.25 lb ai/acre) reduced the incidence of early blight as compared with the untreated control. Infection levels in the plots treated with the low rate of Quadris (0.15 lb ai/acre) were similar to the untreated control during September, suggesting that either a higher rate or more frequent applications of Quadris are needed to suppress early blight under favorable conditions. Higher total yields than the untreated control were observed with the Quadris (0.25 lb ai/acre) treated plots. Fungicide treatments did not affect tuber size or specific gravity.

Introduction

Early blight (*Alternaria solani*) is the most common annually occurring foliar disease of potatoes in central Oregon. Early blight is most severe under alternately wet and dry conditions; consequently, the problem is frequently observed in sprinkler irrigated potato growing regions. If not controlled it can reduce both tuber yield and quality in some cultivars, particularly 'Norkotah' (*Solanum Tuberosum L.*) and 'Shepody' (Douglas and Garner, 1974; James, 1991).

New fungicide formulations and chemistry are continually being developed for the control of various foliar diseases on potatoes. Quadris (azoxystrobin), a broad-spectrum fungicide developed by Zeneca Ag Products, is the first of a new class of pesticidal compounds called 13 methoxyacrylates, which are derived from naturally occurring strobilurins. The active portion of the azoxystrobin molecule was originally discovered in a mushroom (*Strobilurus tenacellus*) and was enhanced to make it stable in sunlight and provide some degree of systemic activity. The chemistry works by inhibiting fungal mitochondrial respiration.

This study was designed to evaluate the efficacy of Quadris on the development of early blight in Shepody potatoes.

Materials and Methods

An experiment to evaluate the efficacy of the new broad spectrum fungicide Quadris on early blight was planted at the Powell Butte site of Central Oregon Agricultural Research Center on May 22, 1997. The experiment was planted with the cultivar Shepody and arranged in a latin square design with four replications. Individual plots were 20.25 ft (three rows) X 9 ft and were

bordered on each end with five feet of unplanted row. Each of the three rows in a plot contained 27 seed pieces, spaced nine inches apart. The experiment was fertilized, cultivated, sprinkler irrigated, and managed according to practices commonly used in central Oregon.

Treatments included an untreated check, Quadris applied at a rate of 0.15 and 0.25 pounds of active ingredient per acre per application, and one and one-half pint of Bravo WS per application. Bond (latex agricultural sticker, Loveland Industries) was added to the Quadris spray solutions at a concentration of 0.125% (volume to volume). The Quadris and Bravo treatments were initially applied on July 15 at 60% row closure and continued every two weeks for the remainder of the growing season (July 29, August 12, August 26). Applications were made using a carbon dioxide powered backpack sprayer delivering 30 gallons per acre at 32 psi with Teejet 8003 flat fan nozzles. Early blight was allowed to develop naturally during the course of the growing season. Each plant in the center plot row was rated for the percentage of the leaf area covered by early blight lesions using the Manual of Assessment Keys for Plant Diseases (James, 1971). Early blight observations commenced July 29 and continued weekly until September 16.

Vines were flailed on September 22, and a 15-foot section from the middle row of each plot was harvested October 13, 1997. Plots were graded into four size and three grade categories. The total number of tubers per plot was determined and used to calculate the average tuber size. Specific gravity was obtained using the air/water method.

Results

Early blight symptom development is summarized in Table 1. Early blight was first observed in the experiment on August 5 in the untreated control. The percent of the leaf area infected with early blight nearly doubled each week after mid-August in the untreated control plots. Both rates of Quadris and Bravo significantly reduced early blight infection as compared with the untreated control during much of August. On September 2 and 9, Bravo and the higher rate of Quadris significantly suppressed early blight infection levels below those of the untreated control. However, infection levels in the plots treated with the low rate of Quadris were similar to the untreated control during September suggesting that either a higher rate or more frequent applications of Quadris are needed to suppress early blight under favorable conditions. Only Quadris applied at the high rate reduced the incidence of early blight on September 16 when compared with the untreated control.

Fungicide effects on yield, tuber size, and specific gravity of Shepody potatoes are summarized in Table 2. No statistically significant differences in yield were observed among the fungicide treatments except for total yield. Total yields of the plots treated with Quadris at 0.25 pounds of active ingredient per acre were significantly greater than yields of the untreated control. Total yields inversely mirrored the percentage of total leaf area infected with early blight.

Table 1. Fungicide treatment effects on the development of early blight in Shepody potatoes, Powell Butte, OR, 1997.

Treatment	Total Leaf Area Infected With Early Blight Lesions (%)							
	Jul 29	Aug 5	Aug 12	Aug 19	Aug 26	Sep 2	Sep 9	Sep 16
Check	0.0	0.1	0.8	4.2	9.2	15.5	30.1	54.1
Quadris 0.15	0.0	0.0	0.3	2.2	5.8	12.3	24.3	43.4
Quadris 0.25	0.0	0.0	0.4	2.0	5.0	8.3	17.5	36.0
Bravo	0.0	0.0	0.3	2.8	5.8	9.4	17.4	43.4
LSD (P0.05)	NS	NS	0.3	1.6	2.7	6.2	9.1	12.2

Table 2. Fungicide treatment effects on yield, tuber size, and specific gravity of Shepody potatoes, Powell Butte, OR, 1997.

Treatment	Yield (cwt/ha)				Tuber	Specific Gravity
	Total	Ones	Undersize	Culls	Size (oz)	
Check	314	192	17	94	9.0	1.084
Quadris 0.15	341	191	14	110	9.2	1.086
Quadris 0.25	399	222	23	144	9.1	1.085
Bravo	362	174	26	138	9.0	1.085
LSD (P:0.05)	56	NS	NS	NS	NS	NS

Literature Cited

- Douglas, Dexter R. and Jay G. Garner. 1974. Control of Early Blight of Potato in Eastern and Southeastern Idaho. University of Idaho Current Information Series No. 239.
- James, Clive. 1971. A Manual of Assessment Keys for Plant Diseases. Canada Department of Agriculture Publication No. 1458.
- James, Steven R. 1991. Early Blight--A Management Guide. Potato Patches. Volume 2, Number 5.

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