

# EARLY BLIGHT CONTROL ON RUSSET NORKOTAH POTATOES

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## Abstract

An experiment to evaluate the efficacy of the broad-spectrum fungicide Quadris alternated with chlorothalonil on early blight was planted at the Powell Butte site of Central Oregon Agricultural Research Center on May 23, 2000. The leaf area infected with early blight was significantly less in the Quadris/Bravo treatments than the untreated check plots after August 14. This effect was not observed in the Fluazinam-treated plots until September. All of the fungicide treatments reduced early blight severity as compared to the untreated check in September. There were no differences in percent leaf area infected between the treatments that began with Quadris versus those that began with Bravo or between the high and low rates of Quadris. The lowest total yields were observed in the plots treated with the highest rate of Quadris. There were no differences among the treatments in yields of U.S. No. 1 grade, undersize (<4 oz.), or culls.

## Introduction

Early blight (*Alternaria solani*) is a leaf-spot disease that attacks potato leaves, stems and tubers. It is one of the most common annually occurring foliar diseases of potatoes in central Oregon. Early blight is most severe under alternately wet and dry conditions; consequently, the problem is observed frequently in sprinkler-irrigated potato growing regions. If not controlled, it can reduce both tuber yield and quality in some cultivars, particularly Russet Norkotah and Shepody (Douglas and Garner 1974; James 1991).

Quadris is a relatively new fungicide developed by Zeneca Ag Products that has shown promise in controlling early blight in initial field testing. Azoxystrobin, the active ingredient in Quadris, was derived from naturally occurring fungicides (strobilurins) produced by various species of edible, wood-decaying fungi. The active portion of the azoxystrobin molecule was enhanced to make it stable in sunlight and to provide some degree of systemic activity. It is a broad-spectrum fungicide in a new class of compounds called 13- methoxyacrylates. Quadris is highly active at low rates of application, has low acute toxicity, is not persistent in the environment and is active against spore germination, mycelial growth and sporulation. The chemistry works by inhibiting fungal mitochondrial respiration.

This study was designed to evaluate the efficacy of Quadris application rates alternated with chlorothalonil on the development of early blight on Russet Norkotah potatoes.

## Materials and Methods

An experiment to evaluate the efficacy of the broad-spectrum fungicide Quadris alternated with chlorothalonil (Bravo Weather Stik) on early blight was planted at the Powell Butte site of Central Oregon Agricultural Research Center on May 23, 2000. The experiment was planted with the cultivar Russet Norkotah and arranged in a randomized block design with four replications. Individual plots were 22.5 ft. long by 6 ft. wide (two rows) and were bordered on each end with a 5 ft. unplanted area. Each of the two rows in a plot contained 30

seed pieces, spaced 9 in. apart. Fertilizer was banded at planting at a rate of 1,100 lb/acre of 19.4 (N), 14.6 (P<sub>2</sub>O<sub>5</sub>), 14.6 (K<sub>2</sub>O) and 6.4 (S). The experiment was cultivated, sprinkler irrigated, and managed according to practices commonly used in central Oregon.

The following treatments were included in the study:

1. Quadris1 lb. ai per acre alternated with Bravo (1.13 lb. ai per acre)
2. Quadris2 lb. ai per acre alternated with Bravo (1.13 lb. ai per acre)
3. Bravol.13 lb. ai per acre alternated with Quadris (0.1 lb. ai per acre)
4. Bravo 1.13 lb. ai per acre alternated with Quadris (0.2 lb. ai per acre)
5. Fluazinam 500F 0.26 lb. ai per acre
6. Untreated check

The Quadris, Bravo and Fluazinam treatments were initially applied on July 31 at 75 percent row closure and continued every 2 weeks for the remainder of the growing season (August 13, August 28). Applications were made using a carbon dioxide-powered backpack sprayer delivering 30 gal./acre at 32 psi with Teejet 8003 flat fan nozzles. Early blight was allowed to develop naturally during the course of the growing season. All 60 plants in each plot were 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 31 and continued weekly through September 11. The area under the disease progress curve (AUDPC) was calculated and used as an indicator of disease severity.

Vines were killed by frost (17.6°F) during the early morning of September 23, 2000. The total production from each plot was harvested October 16, 2000. Plots were graded into four size and three grade categories.

## Results

No early blight lesions were observed when the plots received the first fungicide application on July 31, 2000. Early blight was first observed on the plants during the first week of August. Early blight progressed slowly during the first half of August, but increased later in the month, especially in the untreated check plots (Figure 1). After August 14, the leaf area infected with early blight was significantly less ( $P=0.05$ ) in the Quadris/Bravo treatments than in the untreated check plots. This effect was not observed in the Fluazinam-treated plots until the September 4 and September 11 observations. All of the fungicide treatments reduced early blight severity as compared to the untreated check (Figure 2). It was impossible to score the plots for early blight infection after September 11 because of natural vine maturity and senescence.

There were no differences in percent leaf area infected with early blight between the treatments that began with Quadris versus those that began with Bravo. Also, there were no differences in percent leaf area infected between the high and low rates of Quadris. Table 1 summarizes fungicide effects on the percentage of plants with any early blight lesions. Significantly fewer infected plants were observed in fungicide-treated plots as compared with the untreated check on the August 14 observation date. At all other observation dates, there were no differences in the percentage of plants with any early blight

lesions among the treatments. Unlike a similar experiment conducted in 1999, all plants in all treatments eventually were infected with early blight (James 2000).

Fungicide effects on yield and tuber size of Russet Norkotah potatoes are summarized in Table 2. The lowest total yields were observed in the plots treated with the highest rate of Quadris. There were no differences in yields of U.S. No. 1 grade, undersize (<4 oz.) or culls among the treatments.

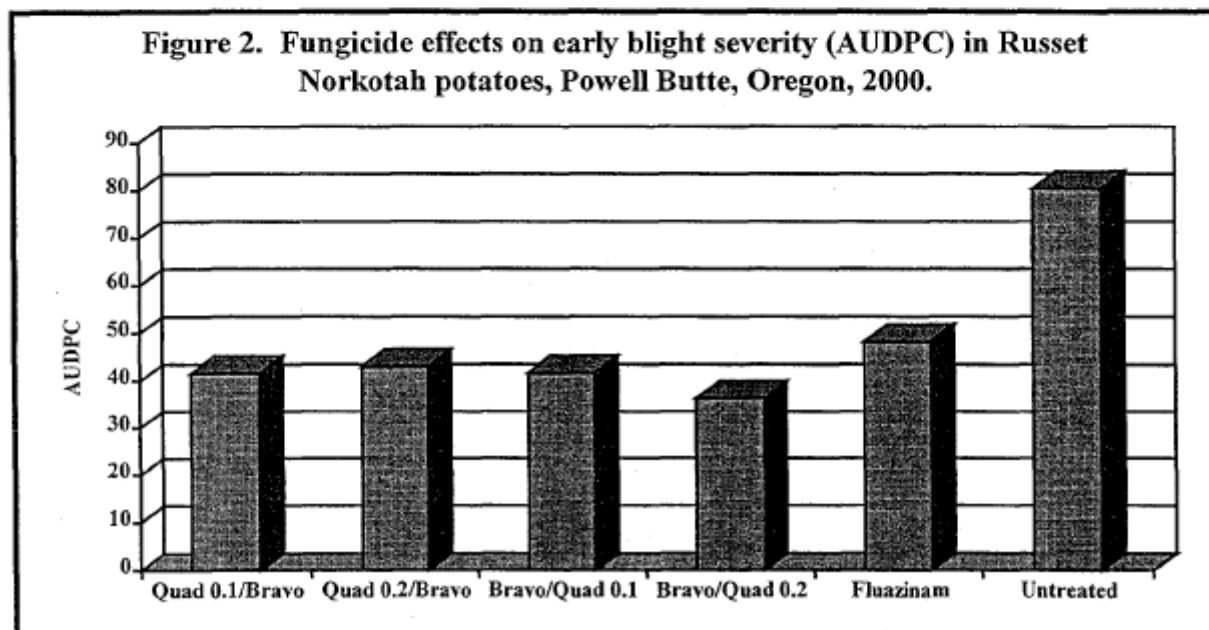
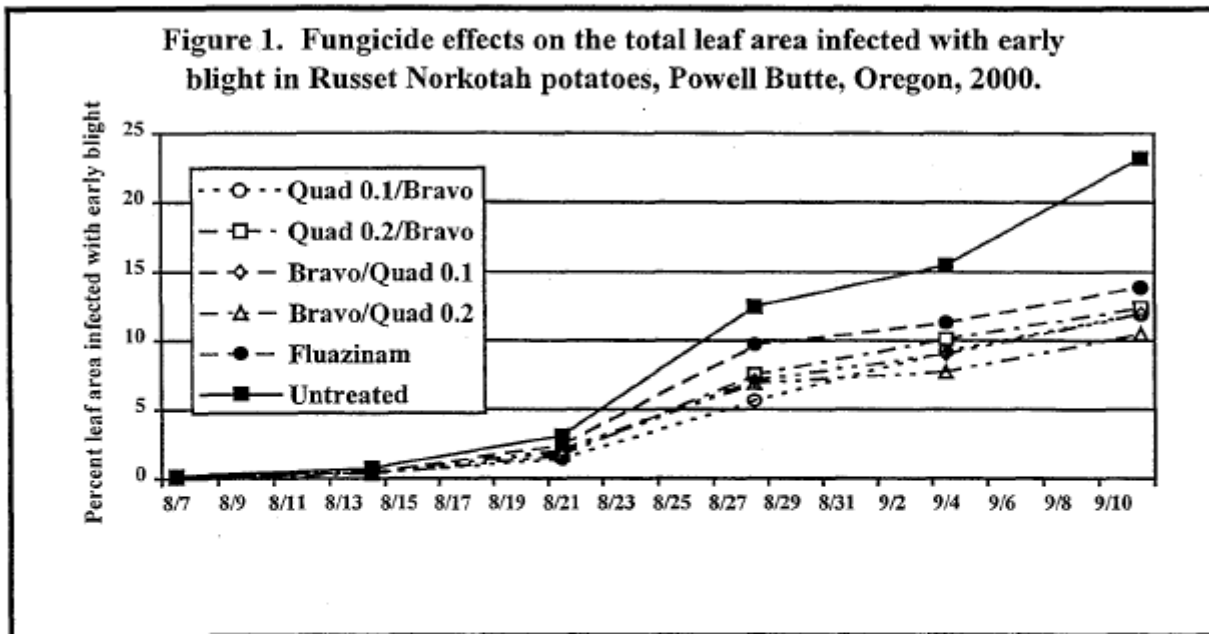


Table 1. Fungicide effects on the percent of plants with early blight lesions in Russet Norkotah potatoes, Powell Butte, Oregon, 2000.

Treatment	Rate (lb ai/a)	Plants with early blight lesions (%)					
		8/7	8/14	8/21	8/28	9/4	9/11
Quadris/Bravo	0.1/1.13	3.3	21.7	48.3	88.8	100.0	100.0
Quadris/Bravo	0.2/1.13	3.4	18.7	51.7	88.7	100.0	100.0
Bravo/Quadris	1.13/0.1	2.1	18.1	51.7	89.1	99.6	100.0
Bravo/Quadris	1.13/0.2	4.2	19.2	50.4	87.1	100.0	100.0
Fluazinam	0.26	3.4	20.4	59.2	90.8	100.0	100.0
Check		6.6	30.0	65.9	98.8	100.0	100.0
LSD 5%		NS	57	NS	NS	NS	NS

Table 2. Fungicide treatment effects on yield of Russet Norkotah potatoes, Powell Butte, OR, 2000.

Treatment	Rate (lb ai/a)	Yield (cwt/a)			
		Total	U.S. No.1	Undersize	Culls
Quadris/Bravo	0.1/1.13	567	487	20	56
Quadris/Bravo	0.2/1.13	503	425	25	53
Bravo/Quadris	1.13/0.1	574	474	26	71
Bravo/Quadris	1.13/0.2	564	477	27	59
Fluazinam	0.26	606	490	25	91
Check		595	470	23	100
LSD 5%		49	NS	NS	NS

### Literature Cited

- Douglas, D.R. and J.G. Garner. 1974. Control of early blight of potato in eastern and southeastern Idaho. University of Idaho Current Information Series No. 239, Moscow, Idaho
- James, C. 1971. A manual of assessment keys for plant diseases. Canada Department of Agriculture Publication No. 1458
- James, S.R. 1991. Early blight--a management guide. Potato Patches. Volume 2, Number 5.
- James, S. R. 2000. Controlling early blight on russet norkotah potatoes. Pages 30-34 in: Central Oregon Agricultural Research Center 1999 Annual Report, Special Report 1013, Oregon State University Agricultural Experiment Station, Corvallis, Oregon.

### Acknowledgments

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