

# EFFECT OF FUNGICIDES ON CONTROLLING RHIZOCTONIA CROWN AND ROOT ROT IN SUGARBEET

Mohamed F. R. Khan<sup>1</sup> and Aaron L. Carlson<sup>2</sup>

<sup>1</sup>Extension Sugarbeet Specialist, North Dakota State University & University of Minnesota

<sup>2</sup>Research Technician, Plant Pathology Department, North Dakota State University

Rhizoctonia root and crown rot, caused by *Rhizoctonia solani* Kühn, is one of the most damaging soilborne diseases of sugarbeet (*Beta vulgaris* L.) in the US. In North Dakota and Minnesota, *R. solani* AG-1, AG-2-2, AG-4, and AG-5 cause damping off and AG-2-2 causes crown and root rot of sugarbeet (Windels and Nabben 1989). The fungus survives as thickened hyphae (sclerotia) and is endemic in soils where sugar beet is grown. *R. solani* has a wide host range including broad leaf crops and weeds (Anderson 1982; Nelson et al. 1996). Severe disease occurs if sugar beet follows beans or potato (Baba and Abe 1966; Johnson et al. 2002). Crop rotations of 3 or more years with small grains planted before sugar beet is recommended to reduce disease incidence (Windels and Lamey 1998). In fields with a history of high disease severity, growers may plant varieties that are more resistant but with significantly lower yield potential compared to more susceptible varieties (Panella and Ruppel 1996). Research showed that timely application of azoxystrobin provided effective disease control but not when applied after infection, or after symptoms were observed (Jacobsen et al. 2002; Brantner and Windels, 2002).

The objective of this research therefore, was to determine the best time to apply fungicides for controlling Rhizoctonia crown and root rot (RCRR) of sugarbeet.

## MATERIALS AND METHODS

Field trial was conducted in Foxhome, MN in 2009. The experimental design was a randomized complete block with four replicates. Field plots comprised of six 30-foot long rows spaced 22 inches apart. Plots were planted on 18 May with Crystal 539RR which was resistant to Rhizomania and very susceptible to *Rhizoctonia solani*. Seeds were also treated with Tachigaren at 45 g/kg seed to provide early season protection against *Aphanomyces cochlioides*. Weeds were controlled with recommended herbicides.

Treatments were applied on 16 June, or 16 and 29 June. Fungicides were applied with a 4-nozzle (Flat Fan 4002E) bike sprayer calibrated to deliver 17 gpa of solution at 40 p.s.i pressure to the middle four rows of plots. Treatments were applied in a 7-inch band. Symptoms included wilting of individual plants and yellowing of leaves was observed. Eventual death of individual plants was observed and recorded. Blackening of petioles was not observed. First symptoms appeared in July and plants became brown to black carcasses after warm and dry weather conditions in September.

Both Quadris and Proline provided effective control of RCRR. The single application was as effective as two applications. There was no phytotoxicity when the fungicides were mixed with glyphosate and RCRR control was not compromised.

**Table 1. Effect of fungicides applied at different application dates on *Rhizoctonia* crown and root rot control at Foxhome, MN, 2009.**

Treatment and rate/A	Application dates	Dead Plants/ 60 ft row
Nontreated check		22
Quadris 9.2 fl oz/A	16 June	1
Quadris 9.2 fl oz/A	16, 29 June	1
Proline 5.7 fl oz/A + Premier 90 NIS 0.125% v/v	16 June	4
Proline 5.7 fl oz/A + Premier 90 NIS 0.125% v/v	16, 29 June	3
Proline 5.7 fl oz/A + Premier 90 NIS 0.125% v/v + Powermax 22 fl oz/A + Amstik 2.5 lb ai/100 gal	16, 29 June	1
Quadris 9.2 fl oz/A + Powermax 22 fl oz/A + Amstik 2.5 lb ai/100 gal	16, 29 June	1
LSD (P=0.05)		7

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