

## **DEVELOPING A MANAGEMENT STRATEGY FOR CONTROLLING RHIZOCTONIA ROOT AND CROWN ROT IN SUGARBEET**

Mohamed F. R. Khan<sup>1</sup>, Carl A. Bradley<sup>2</sup>, Randy Nelson<sup>3</sup>, and Jahangir Khan<sup>4</sup>

<sup>1</sup>Extension Sugarbeet Specialist

North Dakota State University and University of Minnesota

<sup>2</sup>Extension Plant Pathologist, Department of Plant Pathology, NDSU

<sup>3</sup>Research Technician, Department of Soil Science, NDSU

<sup>4</sup>Graduate Research Assistant, Department of Plant Pathology, NDSU

### **Introduction and Objective**

In recent years, Rhizoctonia diseases (caused by *Rhizoctonia solani*), especially mid – to late-season root and crown rot, have been an increasing problem in sugarbeet fields in Minnesota and North Dakota. However few Rhizoctonia tolerant varieties are available, and these varieties typically have yield potentials 10 to 15% less than the best approved varieties. Research shows that Quadris fungicide applied before infection occurs effectively controls Rhizoctonia root and crown rot. However, it is difficult to know exactly when infection occurs in the field. The objective of the experiment was to determine if Rhizoctonia root and crown rot can be effectively controlled by applying Quadris based on soil temperature.

### **Materials and Method**

Research was conducted at Glyndon, MN, and at Amenia, ND. At Glyndon, Beta 3800 sugarbeet seeds were planted to stand with a John Deere MaxEmerge 2 planter into plots 11 feet wide and 30 feet long on April 28. Counter insecticide was applied at 11.9 lb/acre at planting to control sugarbeet root maggot. The experiment was arranged in a randomized complete block design with three replicates. Quadris was applied at 9 fl oz per acre in a 7 inch band to the four middle rows of six row plots using a back-pack sprayer. Fungicides were applied when soil temperature at the 4 inch depth were 50 to 55<sup>0</sup>F, 56 to 61<sup>0</sup>F, 62 to 67<sup>0</sup>F, 68 to 73<sup>0</sup>F, 74 to 79<sup>0</sup>F, 80 to 85<sup>0</sup>F, and higher than 85<sup>0</sup>F. Soil temperature information was collected using the nearest North Dakota Agricultural Weather Network (NDAWN) weather station. Dates of application were May 7, 21; June 7, 8; July 21 and 23. Fertilization was according to standard recommendations for sugarbeet. Plots were kept weed free using micro-rates of herbicides recommended for sugarbeet and hand-weeding. The same experiment was conducted at Amenia where planting was on April 29 and treatments were replicated four times. Quadris was applied on May 6, 21; June 7, 8; July 9 and 23. The middle-two rows of plots at Glyndon and Amenia were harvested October 5 for yield and quality determinations. Analysis of samples was done at American Crystal Sugar Company Quality Tare Laboratory, East Grand Forks, MN.

### **Summary of Results**

Rhizoctonia root rot incidence and severity were low at both Glyndon and Amenia; Rhizoctonia crown rot symptoms were not observed. At Glyndon ([Table 1](#)) and Amenia ([Table 2](#)), Quadris applied when the soil temperature was between 62 and 67<sup>0</sup>F resulted

in significantly higher recoverable sucrose per acre than the untreated check, Quadris applied at 80 to 85<sup>0</sup>F. Quadris was not applied at greater than 85<sup>0</sup>F since that soil temperature was not attained during the season so those plots were a second untreated check. At both research sites sugarbeet plants were at the 4 leaf stage when the soil temperature was at 62 to 67<sup>0</sup>F. Research done in Montana also indicates effective control of Rhizoctonia with Quadris applied at the 4 leaf stage (Jacobsen et. al; 2004).

**Table 1. Effect of Quadris applied at different soil temperature for Rhizoctonia control on sugarbeet yield and quality at Glyndon, MN, 2004**

Treatment Soil temperature	Date	Recoverable Sucrose/A	Recoverable Sucrose/T	Net T/A	% Sucrose
Quadris 50-55 <sup>0</sup> F	05-07	7186 ab	294 b	24.3 a	15.6 b
Quadris 56-61 <sup>0</sup> F	05-21	6882 abc	290 b	23.9 a	15.5 b
Quadris 62-67 <sup>0</sup> F	06-07	7338 a	297 ab	24.9 a	15.8 ab
Quadris 68-73 <sup>0</sup> F	06-08	7113 ab	295 ab	24.3 a	15.7 ab
Quadris 74-79 <sup>0</sup> F	07-21	6858 abc	297 ab	23.2 ab	15.7 ab
Quadris 80-85 <sup>0</sup> F	07-23	6053 c	291 b	20.9 bc	15.5 b
Untreated Check	-	6049 c	300 ab	20.3 c	15.9 ab
Untreated Check	-	6350 bc	311 a	20.5 c	16.3 a
LSD (P=0.05)		848	16	2.3	0.7

Means within a column followed by the same letter do not significantly differ.

**Table 2. Effect of Quadris applied at different soil temperature for Rhizoctonia control on sugarbeet yield and quality at Amenia, ND, 2004**

Treatment Soil temperature	Date	Recoverable Sucrose/A	Recoverable Sucrose/T	Net T/A	% Sucrose
Quadris 50-55 <sup>0</sup> F	05-06	6256 a	278 a	22.6 abc	15.5 a
Quadris 56-61 <sup>0</sup> F	05-21	6077 abc	269 ab	22.3 abc	15.2 ab
Quadris 62-67 <sup>0</sup> F	06-07	6363 a	271 ab	23.9 ab	15.4 a
Quadris 68-73 <sup>0</sup> F	06-08	6280 a	258 ab	24.7 a	14.8 ab
Quadris 74-79 <sup>0</sup> F	07-09	5555 ab	263 ab	21.4 bc	14.9 ab
Quadris 80-85 <sup>0</sup> F	07-23	5266 b	247 b	21.6 bc	14.2 b
Untreated Check	-	5355 b	267 ab	20.3 c	15.1 ab
Untreated Check	-	5269 b	254 ab	21.2 c	14.6 ab
LSD (P=0.05)		892	25	2.7	1.1

Means within a column followed by the same letter do not significantly differ.

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### **References:**

Jacobsen, J; N. Zidack, M. Johnston, K. Kephart and J. Ansley. 2004. Integrated management strategies for Rhizoctonia crown and root rot. In: 2004 Sugarbeet Res. And Ext. Rep. 34: 252-253.