



# MICHIGAN SUGARBEET REACH

Research & Education Advisory Council

## Management Guidelines for Controlling Rhizoctonia in Sugarbeets

### Description of the Problem

Rhizoctonia root and crown rot (*Rhizoctonia solani* AG 2-2 IV and AG 2-2 IIIB) is a serious root disease of sugarbeets in the Michigan Sugar Company growing region. It is estimated that Michigan growers lose on average 1 to 2 tons/A in yield and quality is also lowered. In problem fields, losses have been documented up to 10 tons/A and one percentage point of sugar content.

Approximately one fourth of our growing region has a serious Rhizoctonia problem which requires intensive management practices to protect the crop. Another one fourth to one third of our acreages has a moderate or sporadic Rhizoctonia problem and the remainder of the area has a less significant Rhizoctonia problem.

### Disease Symptoms

The infection can occur on the crown, side or tip of the sugarbeet root. The initial above ground symptoms of crown rot often begin at the base of the leaf petioles. The petioles will begin darkening near the crown and the symptoms will move up the petioles to the leaves (Picture 1).

Root lesions will be forming at this time. The root will be badly infected at the point of canopy collapse. As the infection progresses the leaves wilt and turn dark, forming a dry dark brown to black rosette which remains firmly attached to the crown (Picture 2).

In recent years, tip rot infections have become more common, possibly because Quadris is protecting the crown area. Tip rot infections can progress significantly before the leaves exhibit disease symptoms. (Picture 3) The first visual symptoms will be yellowing and then permanent leaf wilting. The disease is usually not evenly distributed through the field, but tends to occur in patches, as the disease spreads from beet to beet down the sugarbeet row.



Picture 1



Picture 2



Picture 3

## Management Strategies

Effective control of Rhizoctonia root and crown rot in sugarbeets requires an intensive and integrated approach. Good farming practices which maintain healthy soil are important.

Rhizoctonia problems will be worse on compacted and poorly drained soils. The use of tolerant varieties and Quadris fungicide are important management practices. Most of our rotational crops are hosts to Rhizoctonia which prevents growers from “rotating themselves out” of the problem but longer rotations between sugarbeets may reduce disease buildup.

**Tolerant Varieties:** Several Rhizoctonia tolerant sugarbeet varieties are available for our growing region (Table 1). Some of the tolerant varieties lack other desirable characteristics so it is important to consider the risks and benefits of a tolerant variety when selecting seed for a field. Rhizoctonia susceptible varieties should not be planted to Rhizoctonia problem fields. Growers should keep track of Rhizoctonia levels in their fields so that when they rotate back to that field they can make the correct variety selection for their conditions. When evaluating Rhizoctonia levels, keep in mind the tolerance of the variety being evaluated. Tolerant varieties may have low levels of disease and hide the potential for significant infection on susceptible varieties.

**Table 1 - RHIZOCTONIA TOLERANT VARIETIES**

VARIETY	RHIZOCTONIA TOLERANCE RATING
HM 39RR	Good
HM 27RR	Fair-Good
HM 28RR	Fair-Good
HM 29RR	Fair-Good
HM 131RR	Fair
HM 110RR	Fair
HM 50RR	Fair
SX 1281RR	Fair
HM42RR	Fair

**Table 2 - RHIZOCTONIA CONTROL RANKING**

CONTROL METHOD	APPROX. CONTROL
1. Resistant Variety & In Furrow	93%
2. Resistant Variety & 2-8 Leaf	90%
3. Susceptible variety with In-Furrow & 6-8 Leaf	74%
4. Resistant Variety—Unsprayed	67%
5. Susceptible Variety & In Furrow	61%
6. Susceptible Variety & 2 Applications of Half Rates at 2-4 and 6-8 Leaf	56%
7. Susceptible Variety & 2-8 Leaf	50%
8. Check	---
<b>BASED ON 6 TRIALS WITH HEAVY INFESTATIONS.</b>	

**Fungicides:** Quadris applications are effective (50 to 80 percent control in susceptible varieties) in controlling Rhizoctonia in sugarbeets (Table 2). The recommended Quadris rate for foliar applications is 10.5 fl oz/A in 30 inch rows and 14.25 fl oz/A in 22 inch rows, applied in a 7 inch band. (The most consistent foliar timing for Quadris has been between the 4 to 6 leaf stage. Later applications (6 to 8 leaf stage) have worked well in cold springs.) Reduced foliar rates are not recommended. Fungicide products that have efficacy on Rhizoctonia, sprayed as the first leaf spot spray, may provide subtle benefits. In-furrow Quadris applications have provided more consistent root rot control than foliar treatments. For in-furrow applications Quadris should be sprayed in a T-band after seed drop and before the closing wheels.

Do not dribble Quadris in the furrow or apply with a starter fertilizer. Emergence problems with in-furrow applications may occur in the following circumstances: 1) reducing the band width without reducing the rate; 2) conditions that slow emergence; and 3) when using low vigor varieties. The in-furrow Quadris rate is based on spraying a 7 inch T-band over the row. If your band width is narrower than 7 inches, the Quadris rate should be reduced proportionally (Table 3).

Until further research, band widths narrower than 3 inches are not recommended.

**In-furrow Application Practices:** Using 5-8 gallons/A of water is common. Nozzle selection should be based on desired band width and water output. Common nozzles used are 4002E and 2502. Growers should monitor nozzle flow because nozzle plugging is common. A nozzle assembly bracket for the planter is available from John Deere dealers. In furrow applications should be in a T-band.

**Table 3 - RECOMMENDED QUADRIS IN-FURROW RATES BASED ON BAND WIDTH AND ROW SPACING**

Band width	30" rows	28" rows	24" rows	22" rows	20" rows
7 inch	10.5	11.2	13.1	14.3	15.8
6 inch	9.0	9.6	11.3	12.3	13.5
5 inch	7.5	8.0	9.4	10.2	11.3
4 inch	6.0	6.4	7.5	8.1	9.0
3 1/2 inch	5.3	5.6	6.6	7.1	7.9
3 inch	4.5	4.8	5.6	6.1	6.8
Quadris Rates in fl oz/Acre					
Band widths narrower than 3 inches are not recommended.					

**SUMMARY:** Rhizoctonia on sugarbeets will reduce revenue per acre by reducing both tonnage and quality of sugarbeets. The disease level does not need to be high to justify a Quadris treatment. Both in-furrow and well-timed foliar applications will provide good but not complete control (Table 4). All varieties can benefit from a Quadris application. Rhizoctonia susceptible varieties benefit the most from a fungicide application, but research has often shown an economic response on tolerant varieties. The most effective approach of minimizing Rhizoctonia impact is coupling genetic resistance with an application of fungicide. Avoid planting susceptible varieties on problem fields. Growers who apply Quadris after the four leaf stage should consider using a triazole as the first leaf spot application for resistance management.

Infected beet roots that are put into permanent piles can affect long term storability. Problem Rhizoctonia fields should be considered for early delivery.

*"All varieties can benefit from a Quadris application."*

**Table 4 - RHIZOCTONIA AFFECT ON YIELD QUALITY AND REVENUE**

*\*Averages of three 2009 SBA trials*

TREATMENT	REV/ACRE	RWSA	RWST	TONS/ACRE	% SUGAR	1200 ft. of row	% control vs. checked
In-Furrow + 6-8 Leaf—Low Rate	\$1,147	8854	305	29.1	20.2	31	86%
In-Furrow	\$1,154	8723	305	28.8	20.0	55	75%
2-8 Leaf Normal Rate	\$1,069	8257	301	27.5	20.1	72	67%
2-4 & 6-8 Leaf Low Rate Twice	\$1,038	8094	299	27.0	19.8	48	78%
Check	\$949	7108	291	24.4	19.4	216	0%
LSD (5%)	—	749	11	2.2	0.7	62	—

*\* Susceptible varieties with moderate levels of Rhizoctonia.*

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