



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 root 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. 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. The root will be badly infected to the point of canopy collapse. (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, including drainage, manure, clover and oil seed radish.***

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. Common host can include soybeans, dry beans, sugarbeets and corn.

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 in 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.

Fungicides: Quadris applications are effective in controlling Rhizoctonia root rot in sugarbeets. (Table 2).

Table 1 - RHIZOCTONIA TOLERANT VARIETIES	
VARIETY	RHIZOCTONIA TOLERANCE RATING
HM 27RR	Good
HM 28RR	Good
HM 131RR	Fair-Good
HM 110RR	Fair-Good
SX1291RR	Fair-Good

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	---
BASED ON 6 TRIALS WITH HEAVY INFESTATIONS.	

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.) When average soil temperatures at the 4 inch levels approach 65°, significant infections can occur. Reduced foliar rates are not recommended.

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.

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; 3) when using low vigor varieties; 4) dribbling in-furrow or with in-furrow fertilizer. 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, do not reduce rate more than one-half.

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. (See Tables 3 and 5) Common nozzles used are 4002E and 2502. ***Growers should***

monitor nozzle flow because nozzle plugging might occur. A 50 mesh screen is recommended for all Quadris applications. A nozzle assembly bracket for the planter is available from John Deere dealers. In furrow applications should be in a T-band.

Fields that have a history of low Rhizoctonia pressure planting of any variety are acceptable. In those fields with moderate Rhizoctonia, consider using a Rhizoctonia Resistant variety or a susceptible with 1 or 2 applications of Quadris. For heavy Rhizoctonia fields, a resistant variety should be used in combination with at least one Quadris application.

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	5.3	5.6	6.6	7.1	7.9
Quadris Rates in fl. oz./Acre					
Band widths narrower than 3 in. are not recommended.					

"All varieties can benefit from a Quadris application."

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.

Table 4 - RHIZOCTONIA AFFECT ON YIELD QUALITY AND REVENUE							
*Averages of 2009/2010 SBA Trials							
TREATMENT	REV/ACRE	RWSA	RWST	TONS/ACRE	% SUGAR	Dead Beets 1200 ft. of row	% control vs. check
In-Furrow + 6-8 Leaf—Low Rate	\$1,264	8799	303	29.2	20.1	35	82%
In-Furrow	\$1,245	8544	299	28.7	20.0	55	72%
6-8 Leaf Normal Rate	\$1,206	8414	297	28.3	19.9	35	82%
2-4 & 6-8 Leaf Low Rate Twice	\$1,172	8184	297	27.6	19.7	44	78%
2-4 Leaf	\$1,149	7991	297	26.9	19.9	102	48%
Check	\$1,055	7139	289	24.7	19.4	202	0%
LSD (5%)	—	588	9	1.7	0.5	46	—
* Susceptible varieties with moderate levels of Rhizoctonia.							

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Quadris In-Furrow GPA Tables

Table 5 - Gallons Per Acre in 30/22 Inch Rows

<u>Nozzle</u>	<u>PSI</u>	<u>3 mph</u>	<u>3.5 mph</u>	<u>4 mph</u>	<u>4.5 mph</u>
015E	20	7.3 / 9.9	6.2 / 8.4	5.4 / 7.3	4.8 / 6.5
015E	25	8 / 10.9	6.8 / 9.3	5.9 / 8.0	5.3 / 7.2
015E	30	8.6 / 1.7	7.4 / 10.1	6.4 / 8.7	5.7 / 7.8
02E	20	9.2 / 12.5	7.9 / 10.7	6.9 / 9.4	6.2 / 8.4
02E	25	10.2 / 13.9	8.8 / 12.0	7.7 / 10.5	6.9 / 9.4
02E	30	11.2 / 15.2	9.6 / 13.1	8.4 / 11.4	7.5 / 10.2

NOTES:

- * Using 015 nozzles increases the chance of nozzle plugging
- * Keep pressure at 20 psi or above
- * 40015 E, 4002E, 6502E and 2502 are common nozzles
- * 40015 E, 4002 E and 6502 E nozzles will spray an even band
- * 2502 nozzles will concentrate more spray in the center of the band