Rhizoctonia Management Trial

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Rhizoctonia root rot can negatively impact plant stand by causing seedling damping off in the spring, but it can also cause a reduction in quality and yield from late season infections. This reduction in quality can have a negative impact on factory operations as well as the storage of the beets in piles.

Research Objective

- To screen new products for control of Rhizoctonia root rot and develop recommendations for best management practices.

Methodology

Two trials were conducted near Renville to screen fungicide products for control of rhizoctonia and to compare best management practices. The trials were planted on May 20th using Beta 9098. Prior to planting, the site was inoculated by broadcasting with whole barley kernels infected with rhizoctonia provided by Dr. Chanda. The barley was then incorporated with a small field cultivator. Normal agronomic practices were used to keep the trials weed free. These trials were designed as randomized complete blocks with four replications. The treatment list for Trial A can be found in Table 1 and the treatment list for Trial B is in Table 2. Each plot consisted of six rows that were 35ft in length. The post applications took place on June 19th at the 6-8 leaf stage except for entry 10, which was applied five days earlier on June 14th. These applications were broadcast or banded using a custom-made bike sprayer. The sprayer used CO2 as a propellant and was designed to apply the treatment to the center four rows, leaving rows one and six untreated. Stand counts were taken on the center two rows in the spring, before and after the post application, and again prior to harvest. The center two rows of each six-row plot were harvested for yield and quality analysis on September 12th using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and samples of those beets were used for a quality analysis at the SMBSC tare lab. The beets on the harvester were also rated for root rot using a 1-7 scale; one being free of disease and 7 being severely rotten beets. The data was analyzed for significance using SAS GLM version 9.4.

Table 1. Treatment list and rates for Trial A.

Entry	Entry Description	Infurrow	Broadcast Post
1	Untreated Control	-	-
2	AZteroid FC 3.3	5.7 oz	-
3	Excalia	-	2 oz
4	AZterknot	-	18.4 oz
5	Aframe	-	15.5 oz
6	AZteroid FC 3.3	5.7	-
	AZterknot	-	18.4 oz

Photo 1. Post treatment application using a bike sprayer.

Results

Significant differences were observed for root yield in Trial A (Table 3) but not Trial B (4). Stand count data was nonsignificant (data not shown). The main difference observed was the harvester rot rating (Tables 3 and 4). Entries that combined two application timings generally had a lower rot rating, but some single application entries also had low rot ratings such as Elatus and Excalia. The vast majority of the entries had lower rot ratings than the untreated control. None of the adjuvants tested improved the efficacy of Quadris.

Table 2. Treatment list and rates for Trial B.

Entry	Entry Description	Infurrow	Post
1	Untreated Control	-	-
2	Elatus 45 WG + NIS	7oz + 0.25% v/v	-
3	AZteroid FC 3.3	5.7oz	-
4	Elatus 45 WG Banded + NIS	-	7.2oz + 0.25% v/v
5	Quadris Broadcast	-	15.5 oz
6	AZteroid FC 3.3	5.7 oz	-
7	Quadris Banded	-	15.5oz
8	AZteroid FC 3.3	5.7 oz	-
	Quadris Broadcast	-	15.5 oz
9	Quadris Broadcast	-	15.5 oz
	Reduced Volume (10gpa)	-	-
10	Quadris - 4 leaf	-	15.5 oz
	Excalia - 8 leaf	-	2 oz
11	Quadris + Silkin	-	15.5 oz + 0.5% v/v
12	Quadris + Prefer NIS	-	15.5 oz + 0.25% v/v

Table 3. Yield and harvester rot rating data for Trial A.

Entry	Entry Description	Percent Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Harvester Rot Rating
1	Untreated Control	14.6	21.2 b	12.0	239.9	5069.0 c	89.5	3.6 a
2	AZteroid IF	15.0	21.5 b	12.4	247.7	5321.1 bc	89.7	2.5 bc
3	Excalia Broadcast	14.5	21.8 b	11.9	237.3	5184.2 c	89.4	1.8 c
4	Azterknot Broadcast	15.0	21.8 b	12.4	248.3	5407.4 bc	89.8	2.8 ab
5	Aframe Broadcast	15.0	23.8 a	12.5	249.9	5929.5 a	90.1	2.0 bc
6	AZteroid IF fb AZterknot	15.0	23.2 a	12.5	248.9	5770.0 ab	90.0	1.6 c
Mean		14.8	22.2	12.3	245.3	5446.8	89.7	2.4
CV%		2.7	4.1	3.6	3.5	5.8	0.7	27.6
Pr>F		0.2331	0.0100	0.2167	0.2479	0.0152	0.5416	0.0050
lsd (0.05)		ns	1.4	ns	ns	470.8	ns	1.0

Conclusions

While there were not any significant differences for the quality parameters tested, it is worthwhile to note the lower rot ratings of the entries compared to the untreated control. Rhizoctonia root rot can continue to have a negative impact in pile storage due to the compromised beets and secondary infections. It appears that Excalia and Elatus, which contain Group 7 or SDHI products, are a good treatment option for Rhizoctonia to alternate with azoxystrobin products. It is a good management practice to use a fungicide to reduce the negative impacts of Rhizoctonia.

Table 4. Yield and harvester rot rating data for Trial B.

Entry	Entry Description	Percent Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Harvester Rot Rating
1	Untreated Control	14.6	20.2	12.0	238.9	4844.0	89.2	3.9 a
2	Elatus IF	15.0	23.4	12.4	248.3	5815.6	89.8	2.3 cd
3	Azteroid IF	14.7	21.1	12.1	240.7	5073.8	89.4	3.5 ab
4	Elatus Band	15.0	23.1	12.5	249.1	5696.4	89.8	2.3 cd
5	Quadris Broadcast	14.6	22.3	12.0	239.9	5355.8	89.5	2.6 bcd
6	Azteroid IF	14.5	21.4	11.9	237.5	5068.3	89.3	3.4 ab
7	Quadris Band	14.8	23.4	12.3	245.1	5729.5	89.7	2.8 bcd
8	Azteroid IF fb Quadris	14.6	23.0	12.0	240.5	5530.8	89.7	2.3 cd
9	Quadris (reduced volume)	14.6	24.5	12.0	239.7	6032.3	89.4	2.6 bcd
10	Quadris fb Excalia	15.0	23.0	12.5	248.3	5711.1	89.7	2.0 d
11	Quadris + Silkin	15.0	23.5	12.5	249.1	5855.9	90.0	2.8 bcd
12	Quadris + NIS	14.8	23.1	12.2	244.5	5632.4	89.9	3.1 abc
	Mean	14.7	22.4	12.2	242.8	5442.8	89.5	2.9
	CV%	2.7	7.9	3.4	3.5	9.1	0.7	22.6
	Pr>F	0.4188	0.1478	0.3710	0.4058	0.0734	0.4116	0.0027
	lsd (0.05)	ns	ns	ns	ns	ns	ns	0.9