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 compare products and application methods for control of Rhizoctonia root rot and develop recommendations for best management practices.

Methodology

The trial was conducted near Renville to compare fungicide products for control of rhizoctonia and to compare best management practices. The trials were planted on May 8th using Crystal M168. Prior to planting, the site was inoculated by broadcasting 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 can be found in Table 1. Each plot consisted of six rows that were 35ft in length. The first post applications took place on June 18th at the 6-leaf stage and the late post applications took place on July 9th. 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 25th 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.

Results

Significant differences were only observed for the rot ratings taken on the harvester (Table 2). Stand count data and yield data were all nonsignificant. The majority of the treatments with the lowest rot ratings contained Excalia or Elatus. The treatment with the lowest rating contained three applications. This treatment included an in-furrow application followed by two post-emerge applications.

Conclusions

While there were not any significant differences for the quality parameters tested, it is worthwhile to note the lower rot ratings of most of the entries compared to the untreated control. 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 as those treatments generally had the lowest rot ratings. It is a good management practice to use a fungicide to reduce the negative impacts of Rhizoctonia. The late season application made on July 9th did not appear to be beneficial as treatments 10 and 11 had similar ratings to the untreated control.

Table 1. Treatment list and rates.

Entry	Entry Description	Infurrow	Post
1	Untreated Control	-	-
2	Elatus 45 WG	7oz	-
	Prefer 90 NIS	.25% v/v	-
3	AZteroid FC 3.3	5.7oz	-
4	Elatus 45 WG (Banded)	-	7.2oz
	Prefer 90 NIS	-	.25% v/v
5	Quadris (Broadcast)	-	15.5 oz
6	Quadris (Banded)	-	15.5 oz
7	AZteroid FC 3.3	5.7oz	-
	Quadris	-	15.5 oz
8	Excalia (Broadcast)	-	2 oz
9	Excalia (Broadcast)	-	2 oz
	Affiance - First CLS	-	19 oz
	Prefer 90 NIS	-	.25% v/v
10	Affiance - First CLS	-	19 oz
	Prefer 90 NIS	-	.25% v/v
11	Proline - First CLS	-	5.7 oz
	Prefer 90 NIS	-	.25% v/v
12	AZteroid FC 3.3	5.7oz	-
	Excalia (Broadcast)	-	2 oz
	Affiance - First CLS	-	19 oz
	Prefer 90 NIS	-	.25% v/v

Photo 1. Post treatment application using a bike sprayer.

Table 2. Yield, harvester rot rating, and stand count data.

Entry	Treatment	Percent Sugar	Tons per Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Rot Rating (1-7)	28 Day Stand Count 100' row	6 leaf Stand Count 100' row	Final Stand Count 100' row
1	Untreated Control	14.4	25.2	12.2	243.2	6133.4	91.1	2.9 ab	170.0	158.8	162.4
2	Elatus Infurrow	14.8	27.8	12.5	249.2	6919.7	91.2	1.9 cdefg	151.3	162.5	151.7
3	Azteroid Infurrow	14.6	28.1	12.3	245.5	6909.4	91.2	2.4 abcde	148.8	153.8	162.5
4	Elatus Banded	14.3	28.9	12.0	239.0	6920.9	90.4	1.9 cdefg	150.0	162.5	153.1
5	Quadris Broadcast	14.4	28.3	12.1	241.6	6821.3	90.8	2.1 bcdef	168.8	162.5	155.4
6	Quadris Banded	14.4	27.8	12.1	242.4	6736.3	91.0	2.8 abc	162.5	146.3	153.5
7	Azteroid In. fb Quadris	14.4	28.5	12.1	242.5	6905.3	91.1	1.8 defg	141.3	147.5	148.7
8	Excalia Broadcast	14.8	26.1	12.5	249.4	6495.4	91.2	1.4 fg	162.5	155.0	150.6
9	Excalia fb Affiance (1st CLS)	14.6	27.8	12.3	245.8	6817.7	90.9	1.6 efg	157.5	168.8	164.3
10	Affiance (1st CLS)	14.4	27.7	12.1	242.5	6723.1	91.3	2.6 abcd	160.0	160.0	160.0
11	Proline (1st CLS)	14.7	28.0	12.4	247.2	6910.6	91.0	3.1 a	163.8	151.3	151.1
12	Azteroid In. fb Excalia fb Affiance	15.0	27.9	12.8	255.2	7126.9	91.6	1.0 g	180.0	177.5	160.3
	Mean	14.6	27.7	12.3	245.3	6785.0	91.1	2.1	159.7	158.9	156.1
	CV%	2.2	7.8	2.7	2.7	8.4	0.6	29.3	12.5	12.2	8.7
	Pr>F	0.1152	0.5428	0.1025	0.1042	0.6349	0.4417	0.0005	0.3556	0.5982	0.7759
	lsd (0.05)	ns	ns	ns	ns	ns	ns	0.9	ns	ns	ns