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 having 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

A trial was conducted near Renville to screen products for control of rhizoctonia and to compare best management practices. The trial was planted on May 23rd using Beta 9098. Prior to planting, the site was broadcast with whole barley 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 and 13 treatments (Table 1). Each plot consisted of six rows that were 35ft in length. Post applications were broadcast using a custom-made bike sprayer on June 14th when the beets were at the 4-6 leaf stage. 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 14th 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. 1 being free of disease and 7 being severely rotten beets. The data was analyzed for significance using SAS GLM version 9.4.

Photo 1. Post treatment being banded across a plot using a bike sprayer.

Table 1. Treatment list and rates.

Entry	Entry Description	Infurrow	Post
1	Control	n/a	n/a
2	4-6 leaf Quadris	n/a	14.3oz
3	Azteroid Infurrow	5.7oz	n/a
4	4-6 leaf Azterknot	n/a	16.5oz
5	Azteroid Infurrow fb 4-6 leaf Azterknot	5.7oz	16.5oz
6	4-6 leaf Howler EVO	n/a	1.25lbs
7	4-6 leaf Howler EVO	n/a	2.5lbs
8	Azteroid + Howler EVO Infurrow	5.7oz + 1lb	n/a
9	Azteroid Infurrow fb 4-6 leaf Proline	5.7oz	5.7oz
10	Azteroid+Minuet Infurrow fb 4-6 leaf Proline	5.7oz+12oz	5.7oz
11	Zironar Infurrow	9 oz	n/a
12	Zironar Infurrow	12 oz	n/a
13	Zironar Infurrow fb 4-6 leaf Quadris	12 oz	14.3oz

Table 2. Yield and harvester rot rating data.

Entry	Percent Sugar	Root Yield Tons/Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity	Harvester Rot Rating
1	16.7	23.5 bcd	13.5	270.2	6352.5 de	87.9	3.4 abc
2	16.9	26.7 a	13.7	274.4	7320.7 abc	88.1	3.3 abc
3	16.7	23.5 bcd	13.6	271.2	6381.6 cde	87.9	2.9 bcd
4	17.3	26.1 ab	14.1	281.6	7343.0 ab	88.1	2.6 cd
5	17.4	26.6 a	14.1	282.4	7523.2 a	87.9	2.1 d
6	16.9	23.9 abcd	13.8	275.0	6582.8 bcde	88.1	4.0 a
7	16.8	23.5 bcd	13.7	273.4	6420.8 bcde	88.1	3.5 abc
8	17.3	24.4 abcd	14.1	282.6	6897.6 abcd	88.3	2.8 bcd
9	17.2	25.1 abc	14.0	279.4	7026.5 abcd	88.0	2.9 bcd
10	17.4	24.3 abcd	14.2	284.0	6892.8 abcd	88.2	2.3 d
11	17.1	22.4 cd	13.9	278.8	6239.5 de	88.2	3.6 ab
12	16.9	21.6 d	13.8	275.6	5940.5 e	88.3	3.5 abc
13	17.4	23.0 bcd	14.1	282.2	6482.4 bcde	87.7	3.0 bcd
Mean	17.1	24.2	13.9	277.7	6723.4	88.1	3.1
CV%	3.7	8.9	4.0	4.0	9.8	0.6	22.6
Pr>F	0.7113	0.0385	0.7206	0.7207	0.036	0.9246	0.0162
lsd (0.05)	ns	3.1	ns	ns	940.2	ns	1.0

Results

Significant differences were observed for root yield but not quality (Tables 2). Stand count data was nonsignificant (data not shown). The main significant difference was the harvester rot rating. Treatments using biological type products had similar rot ratings to the control. Treatments that used Azteroid infurrow had a lower rot rating, but the treatments that combined Azteroid infurrow with a post application had the lowest rot ratings.

Conclusions

While there were not any significant differences for the quality parameters tested, it is worthwhile to note the lower rot ratings of the treatments that utilized both infurrow and foliar applications. This was a later planting that occurred when the soil temperature and moisture conditions were ideal for rhizoctonia development. The infurrow+foliar worked well in this environment compared to a single application. None of the biological type products tested performed better than products currently being used as industry standards.