

Evaluation of in-furrow and banded fungicide applications to manage *Rhizoctonia* root and crown rot of sugar beet in Michigan, 2021.

A trial was established at the Saginaw Valley Research and Extension Center in Frankenmuth, MI to investigate the efficacy of fungicides at managing *Rhizoctonia solani* in sugar beets. Sugar beet variety SX-2283 was planted at a rate of 50,000 seed/a in loam soil on 11 May. Plots were set up in a randomized complete block design, with four replicates. Plot dimensions were four rows wide (30-in row spacing) by 30 ft long. In-furrow applications were made at planting using a tractor mounted CO₂ backpack sprayer equipped with four TJ 2502E nozzles and applying fungicides at a spray volume of 0.60 gal/1,000 row-ft (32 PSI). The trial was inoculated with *R. solani* (anastomosis group 2-2) infested barley on 16 Jun at a rate of 1.4 g/row-ft placed atop rows. Banded applications were made 22 Jun, when plants were at the 6-8 leaf stage. Treatments were applied in an 8-in. band at 15 gal/A (TJ4001E; 19 PSI) using a CO₂ powered backpack sprayer. Asymptomatic and symptomatic beet counts were collected throughout the summer to monitor disease progression. The center two rows of plots were harvested 1 Sep; weights were collected to estimate yield and a target of 20 beets in each yield row were arbitrarily selected to rate disease, using a 0-7 scale. The severity scale is based on the area of root infected: 0=0%, 1=0-2.5%, 2=2.5-5%, 3=5-25%, 4=25-50%, 5=50-75%, 6=95% (only tip not rotten), 7=100% (plant dead). The disease incidence and severity were combined into a single disease index (DX) to assess disease pressure among treatments. The disease index was calculated by multiplying the *Rhizoctonia* root rot incidence from the total rated roots (0-100%) by the mean symptomatic root severity divided by seven. A generalized linear mixed model procedure was used to conduct the ANOVA and mean separations at an $\alpha=0.05$ significance level (SAS version 9.4).

Significant *Rhizoctonia* root rot pressure was observed uniformly throughout the study. Treatments significantly impacted percent stand loss ($P < 0.0001$), and all fungicide programs had significantly lower stand loss than the inoculated control. Significant differences were also observed among root disease index ratings ($P < 0.01$). All tested programs, except for program 8, had significantly lower root disease ratings than the non-treated, inoculated control. Differences were also observed among yield values ($P < 0.05$). Programs 5, 6, 7, 8, 10, and 11 had values between 10.7 and 17.9 t/A, and were not significantly different from the non-treated, non-inoculated control but significantly greater than the non-treated, inoculated control.

No.	Treatment, Rate ^z	Application Type ^y	Stand Loss (%) ^x	Root Disease Index (%) ^w	Yield (t/A)
7	Elatus, 7.1 oz	In-Furrow	6.1 d	7.9 c	11.1 a-c
	Elatus, 7.1 oz	Banded			
10	Excalia, 2.0 fl oz	Banded	6.7 d	9.8 c	13.0 a-c
5	Quadris, 13.9 fl oz	In-Furrow	7.6 cd	7.3 c	16.7 a
	Quadris, 13.9 fl oz	Banded			
6	Quadris, 13.9 fl oz	In-Furrow	8.3 cd	12.4 c	17.9 a
	Elatus, 7.1 oz	Banded			
1	Non-Inoculated Control ^v	-	9.8 cd	21.1 bc	14.8 ab
11	Quadris, 13.9 fl oz	In-Furrow	21.6 b-d	15.8 c	12.8 a-c
	Growthful, 1.0 pt	In-Furrow			
	Quadris, 13.9 fl oz	Banded			
	Growthful Post, 12.8 fl oz	Banded			
9	Quadris, 12.0 fl oz	Banded	31.8 bc	30.3 c	7.1 b-d
4	Minuet, 12.8 fl oz	In-Furrow	37.6 b	17.0 bc	6.1 cd
	Quadris, 9.2 fl oz	In-Furrow			
	Proline, 5.7 fl oz	Banded			
8	Quadris, 13.9 fl oz	In-Furrow	41.3 b	40.4 ab	10.7 a-c
	Proline, 5.7 fl oz	Banded			
3	Quadris, 9.2 fl oz	In-Furrow	42.6 b	22.3 bc	6.3 b-d
	Proline, 5.7 fl oz	Banded			
2	Inoculated Control ^v	-	75.1 a	56.6 a	1.1 d

^z All rates are listed as measure of a product per acre.

^y In-furrow treatments were applied at planting (11 May), banded applications were applied at the 6-8 leaf stage (22 Jun).

^x Stand loss percentages calculated from initial stand counts collected Jul 20 and final dead beet counts collected Aug 17. Column values followed by the same letter were not significantly different based on Fisher's Protected LSD ($\alpha=0.05$).

^w Disease index was calculated by multiplying the Rhizoctonia root rot incidence (0-100%) by the mean symptomatic root severity (1-7) and dividing by 7.

^v Non-treated control.