

Control of Rhizoctonia Crown and Root Rot with Fungicides, 2008.

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Sugar beet (*Beta vulgaris* L., cv. 5534N) was PAT-treated and planted at the Michigan State University Bean and Beet Farm, Saginaw, MI on 21 Apr. Seed was planted at 1" depth into four-row by 50-ft plots (ca. 4.375 in. between plants to give a target population of 275 plants/100ft. row) with 30" between rows replicated four times in a randomized complete block design. Fertilizer was drilled into plots immediately before planting, formulated according to results of soil tests (125 lb 46-0-0/A). No additional nitrogen was applied. All fungicides were applied with a hand held R&D spray boom delivering 10 gal/A (50 p.s.i.) and using one XR8003 nozzle per row in a 6" band at planting or at GS 2-4 and 4-6. Fungicides were applied broadcast with a hand-held R&D spray boom delivering 25 gal/A (80 p.s.i.) and using three XR11003VS nozzles per row for Proline treatments (except the in-furrow at planting treatment). Applications were made at planting (A); and banded applications on 6 and 14 May at GS 2-4 (B) and 4-6 (C), respectively and the broadcast application on 25 May equivalent to GS 6-8 (D). *Cercospora* leaf spot was controlled with an application of Eminent 125SL (13 fl oz) on 28 Jun. Weeds were controlled by cultivation and Pyramin DF at 5 lb/A plus Nortron at 4 pt/A applied at planting. Insects were controlled as necessary. Plant stand was rated 15, 25 and 39 days after planting (DAP) and relative rate of emergence was calculated as the Relative Area Under the Emergence Progress Curve [RAUEPC from 0 – 38 DAP, maximum value = 100]. Plots were inoculated on 30 May [35 days after planting (DAP)] by spreading *R. solani* Anastomoses Group 2.2 (IIIB) infested barley across all plants in each plot. Plants with signs and symptoms of *Rhizoctonia* crown and root rot were counted 126 DAP on 25 Aug and expressed as the percentage of dead-beets. Samples of 20 beets per plot were harvested 126 DAP (10 ft from start of each plot from two center rows) and assessed for crown and root rot (*R. solani*) incidence (%) and severity. Severity of crown and root rot was measured as an index calculated by counting the number of roots (n = 20) falling in class 0 = 0%; 1 = 1 - 5%; 2 = 6 - 10%; 3 = 11 - 15%; 4 = 15 - 25%; 5 = 25 - 50%; 6 = 50 - 100% surface area of root affected by lesions; and 7 = dead and/or extensively decayed root. The number in each class is multiplied by the class number and summed. The sum is multiplied by a constant to express as a percentage. Increasing index values indicated the degree of severity. The trial was not harvested due to the high incidence and severity of crown and root rot.

Average daily soil temperature at 4" depth did not exceed 70°F until 5 Jun, 46 DAP. Average soil temperature was 52.8 (Apr), 52.6 (May), 67.1 (Jun), 71.5 (Jul) and 71.2 (Aug). Soil moisture was above 71.0 % soil moisture capacity throughout the experiment. These conditions enhanced development of crown and root rot. There were no significant differences among treatments in terms of plant stand up to 15 DAP but Quadris applied in furrow at planting had significantly lower plant stand 25 DAP in comparison to the non-treated control. No treatments had significantly greater plant stand in comparison to the non-treated control 39 DAP although Moncut applied at planting had significantly lower plant stand. This may be an indication of phytotoxicity rather than lack of efficacy at this stage. Both Moncut treatments applied at planting had significantly lower RAUEPC values than the non-treated control, indicating that this treatment had held back crop development (the Moncut treatment applied later had no effect on plant development metrics). Proline applied at GS 4-6 also had significantly lower RAUEPC. The mean percentage of dead and dying sugarbeets 127 DAP in the non-treated plots was 72.8%. Some treatments such as Quadris applied at GS 6-8 gave outstanding control of crown and root. Proline and Quadris applied at GS 4-6 also significantly reduced crown and rot in

comparison to the non-treated control. No other treatments were effective. Quadris applied at GS 2-4 and 6-8 and Proline applied at GS 4-6 reduced incidence of crown and root rot of surviving plants in comparison to the non-treated control. Quadris applied at GS 4-6 and 6-8 reduced severity of crown and root rot of surviving plants in comparison to the non-treated control.

Treatment and 1000 ft.row or rate/acre	Plant stand ^z DAP ^y (%)			RAUEPC ^x 0 – 39 DAP	Dead beets (%) ^w		Crown and root rot Incidence (%) ^v		Severity ^u			
	15	25	39									
Quadris 2.08FL 0.6oz/1000 row-ft (A) ^t ...	24. 6	64. 8	81. 5	abc	42.5	def	47.8	bcd	98.3	ab	67.0	a-d
Quadris 2.08FL 0.6oz/1000 row-ft (B)....	30. 6	78. 8	84. 0	abc	49.1	ab	46.3	bcd	77.5	cd	41.6	cde
Quadris 2.08FL 0.6oz/1000 row-ft (C)....	29. 3	78. 4	89. 5	a	49.6	ab	20.2	de	85.0	a-d	40.0	de
Quadris 2.08FL 0.6oz/1000 row-ft (D)....	22. 6	75. 1	77. 9	ab	44.3	cde	12.7	e	70.8	d	24.8	e
Proline 480SC 0.33 fl oz/1000 row ft + Induce 0.125% (A).....	25. 9	68. 9	80. 0	bcd	43.9	def	55.3	abc	88.3	abc	66.8	a-d
Proline 480SC 5.7 fl oz/A + Induce 0.125% (B).....	28. 2	78. 9	83. 1	a	48.2	abc	44.5	b-e	83.3	bcd	50.5	b-e
Proline 480SC 5.7 fl oz/A + Induce 0.125% (C).....	25. 1	65. 3	78. 4	cd	42.2	ef	48.8	bcd	85.8	a-d	57.3	b-e
Proline 480SC 5.7 fl oz/A + Induce 0.125% (D).....	28. 6	82. 1	87. 8	a	50.2	a	30.5	cde	93.3	ab	61.3	bcd
Moncut 70DF 0.98 oz/1000 row-ft (A)....	22. 4	66. 7	68. 1	bcd	39.9	f	83.8	a	92.5	abc	79.6	ab
Moncut 70DF 0.98 oz/1000 row-ft (A,B).	22. 9	74. 0	67. 0	abc	42.1	ef	74.0	ab	92.5	abc	74.1	abc
Moncut 70DF 0.98 oz/1000 row-ft (B)....	25. 5	74. 5	79. 9	abc	45.4	b-e	76.2	ab	100.0	a	95.2	a
Untreated.....	28. 6	74. 4	81. 3	ab	46.6	a-d	72.8	ab	99.2	a	74.1	abc
...	6.6	8.9	8.6								32.9	
LSD _{0,10}	8	4	4		4.24		33.28		15.34		4	

^a Plant stand expressed as a percentage of the target population of 275 plants/100ft. row from a sample of 2 x 50 ft rows per plot.

^y DAP = days after planting on 21 Apr.

^x Relative area under the emergence progress curve from planting to 39 days after planting.

^w Dead and dying sugar beets (%) 127 DAP on 25 Aug.

^v Percent crown and root incidence on sample of 20 beets on 25 Aug (percentage falling into category 0, see below).

^u Severity of crown and root rot was measured as an index calculated as described in the text.

^t Application dates; A= 21 Apr; B= 6 May; C= 14 May; D= 25 May.

^s Means followed by same letter are not significantly different at P = 0.10 (Tukey HSD).