

EFFECT OF BLENDING SUSCEPTIBLE AND RESISTANT RHIZOMANIA VARIETIES ON SUGAR PRODUCTION

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In sugarbeet growing areas or fields infected with rhizomania root disease, it is recommended that tolerant sugarbeet varieties be grown to maximize sugar production in the Red River Valley of Minnesota and North Dakota. Limited data evaluating the idea of blending rhizomania tolerant and susceptible varieties together at different rates at planting is currently available. With the relatively fast increase of rhizomania root disease in the acreage of the Red River Valley, an experiment was initiated to determine if the blending of resistant and susceptible variety seed together would increase recoverable sugar production above that of using susceptible and tolerant varieties alone.

Materials and Methods

Field experiment was established on Glyndon silt loam (Coarse-silty, mixed, superactive, frigid Aeric Calciaquoll) at the Rhizomania research site near Glyndon, MN. Planting was arranged in a randomized complete block design with four replications. Individual treatment plots measured 11 feet wide and 30 feet long. Soil nitrogen levels were adjusted with fertilizer to approximately 130 lbs/acre of available residual soil test plus added fertilizer N.

Sugarbeet, Beta 3820 (susceptible) and Beta 4811 (resistant) blended at: 25% Beta3820/75% Beta4811, 50% Beta3820/50% Beta4811, 75% Beta3820/25% Beta4811, 100% Beta3820 and 100% Beta4811, was planted on April 28, 2004 with a John Deere MaxEmerge 2. Sugarbeet was placed 1.25 inches deep with 4 15/16-inch in-row spacing. A 22-inch row spacing was used. Counter was surface band applied at 11.9 lbs/a and incorporated with chain at planting. Post emergence micro-rate herbicides, cultivation and hand labor was used as needed for weed control. Three fungicide applications, Eminent, Headline and Eminent were applied for Cercospora leafspot control.

Sugarbeet were harvested October 5. The middle two rows of each 6 row plot were harvested. Yield determinations were made and quality analysis performed at American Crystal Sugar Quality Tare Lab, East Grand Forks, MN.

Results and Discussion

Yield data indicate that under moderate rhizomania disease pressure, blending a resistant tonnage sugarbeet variety (Beta 4811) with a susceptible sugar variety (Beta 3820) provided a yield increase over either resistant or susceptible variety alone. The 25% Beta 3820/75% Beta 4811 combination was significantly lower than the other treatments in net sucrose. The net sucrose percent of the 100% resistant treatment was explainable high, even greater than any of the blended treatments. No significant increase in recoverable sugar per acre occurred with the treatments; however the susceptible variety produced over a thousand pounds per acre recoverable sugar less than the highest yielding blended treatment. The number of harvested beets in the 100% susceptible treatment was significantly lower than the other treatments with the best treatment being the resistant 100%, suggesting loss of stand during the growing season with the susceptible variety. Gross revenue per acre also was not significant but again the lowest treatment was that of the susceptible variety.

This experiment, although only one year of data, suggest that by blending rhizomania susceptible and rhizomania resistant varieties together can result in increased sugar production and gross revenue \$ per acre.

Table 1. Effect of blending susceptible and resistant rhizomania varieties on root yield, sucrose percentage, recoverable sugar production, harvest population, and gross return. Glyndon, MN, 2004.

TREATMENT	ROOT YIELD Tons/A	NET SUCROSE Percent	RECOVERABLE SUGAR Lbs/Acre	REC SUGAR Lbs/T	HARVEST BEETS /100 FT	GROSS RETURN (\$/A)
25% susc + 75% res	20.4	14.0	5704	280	200	583
50% susc + 50% res	19.3	14.5	5579	289	199	593
75% susc + 25% res	18.5	14.6	5415	292	188	584
Res 100 %	18.2	14.7	5348	294	210	577
Susc 100 %	15.9	14.6	4636	292	177	497
LSD (.05)	ns	0.6	ns	11	21	ns