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**Research Project Report for the Ohio Vegetable
and Small Fruit Research and Development Program**

Project Title

Resistance of mustard green cultivars to clubroot

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Objectives of the Research

The objective of this research project is to determine the level of resistance of mustard green varieties, to *Plasmodiophora brassicae* on muck soils in Ohio.

Experimental Design and Methods

Five mustard cultivars were evaluated for resistance to clubroot in a field trial at the Ohio Agricultural Research and Development Center Muck Crops Agricultural Research Station in Celeryville, OH. Fertilizer (N-P-K 17-17-17, 500 lb/A) was incorporated into the test field on 13 Apr. Mustard seeds were sown on 11 May into 200-cell plug trays containing Metromix 360 seedling mix. Plots were disked and rolled and raised beds were formed on 21 Jun. Seedlings were transplanted on 23 Jun. Cultivars were arranged in a randomized complete block design with four replications. Each plot consisted of three 15-ft rows with 4 in. plant spacing and 18 in. row spacing. Plots were separated by 6 ft. Transplants were overhead irrigated with 0.7 in. water on 24 Jun and 13 Jul. Mustard plants were harvested from a 10 ft section of the center row of each plot on 2 Aug and evaluated for clubroot disease severity and plant vigor. Data for clubroot disease severity were analyzed by ANOVA and data for plant vigor were analyzed using the Kruskal-Wallis test. Means were separated using Fisher's protected least significant difference test. Data were analyzed using SAS statistical software. Average maximum temperatures for 23-30 Jun, 1-31 Jul and 1-2 Aug were 91.1, 87.0 and 87.5 °F; minimum temperatures were 59.5, 60.6 and 54.5 °F; and rainfall was 0.1, 0.1 and 0.0 in., respectively.

Results and Conclusion

Disease pressure was high for clubroot and no significant differences in disease severity were observed among cultivars. ‘Savanna’ mustard plants were significantly more vigorous than those of the other cultivars evaluated, although they exhibited moderate stunting. The plots used for this study on the Muck Crops Experiment Station are naturally infested with very high populations of the clubroot pathogen, *Plasmodiophora brassicae*. In commercial muck fields the populations are not likely to be as high, on the whole, and there may be more differences in resistance observed, particularly between ‘Savannah’ and other varieties.

Cultivar	Seed Supplier	Clubroot severity ^z	Plant vigor ^y
Florida Broadleaf	Siegers Seed Co.	85.4 a ^x	5.0 a
Green Wave	Siegers Seed Co.	88.0 a	5.0 a
Savanna	Siegers Seed Co.	80.4 a	3.3 b
Southern Giant Curled	Siegers Seed Co.	86.0 a	5.0 a
Tender Green	Rupp Seed Inc.	85.7 a	4.5 a

^zClubroot severity calculated using the number of plants in each of five categories and the midpoint value from the categories: 1 = 0% disease; 2 = 1-25% disease; 3 = 26-50% disease; 4 = 51-75% disease; and 5 = 76-100% disease. Severity = $[\sum(\text{category midpoint} \times \text{number of plants in category})] / n$, where n = number of total plants harvested.

^yPlant vigor rated according to the following scale; 5=severe stunting, few small sized leaves, chlorosis; 4=stunting, few small-medium sized leaves, chlorosis 3=moderate stunting, medium-large leaves, reduced leaf number, chlorosis; 2=slight stunting, slight reduction in leaf number, mild chlorosis, mainly larger leaves; 1=healthy plant, large leaves, no chlorosis.

^xValues are the means of four replicate plots; means followed by the same letter within a column are not significantly different at $p \leq 0.05$.