

**Evaluation of fungicides for the management of clubroot in mustard greens, 2004.**

The experiment was conducted 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 27 Apr. “Southern Giant Curled” mustard seeds were sown on 6 May into 200-cell plug trays containing Metromix 360 seedling mix. Plots were disked, rolled and leveled and seedlings were transplanted on 7 Jun. Treatments 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. Dual Magnum (1.5 pt/A) was applied on 7 Jun for weed control and Sevin (1 qt/A) was applied on 25 Jun for insect control. Transplants were overhead irrigated with 0.7 in. water on 8 Jun. Pre-planting treatments of Ranman 400SC were applied to seedlings in the greenhouse on 4 Jun. Post-planting treatments were applied as a drench to the base of transplants immediately after planting. Mustard plants were harvested from a 10 ft section of the center row for each treatment on 13 Jul and evaluated for clubroot disease severity and plant vigor. Data for clubroot disease severity were analyzed by ANOVA and means were separated using Fisher’s protected least significant difference test. Data for plant vigor were analyzed by Kruskal-Wallis test and rank means were separated using Fisher’s protected least significant difference test. Data were analyzed using SAS statistical software. Average maximum temperatures for 7-30 Jun and 1-13 Jul were 78.4 and 85.1 °F; minimum temperatures were 57.6 and 62.6 °F; and rainfall was 6.7 and 0.3 in., respectively.

Clubroot disease pressure was high. All three rates of Ranman 400SC significantly reduced clubroot disease severity compared to the untreated control when applied as a drench immediately after transplanting. A pre-plant application of Ranman 400SC followed by a post-plant drench with the product did not improve disease control compared to the post-plant drench of Ranman 400SC alone. Pre-plant application of Ranman 400SC alone did not reduce clubroot severity, nor did Omega 500 applied alone post-plant or following a pre-plant application of Ranman 400SC. All the treatments except Ranman 400SC (pre-plant) significantly increased plant vigor compared to the untreated control.

Treatment	Rate	Clubroot severity <sup>z</sup>	Plant vigor <sup>y</sup>
Omega 500F (post-plant)	1.7 fl oz/1000 plants .....	75.2 ab <sup>x</sup>	2.5 b
Ranman 400SC (post-plant)	1.7 fl oz /1000 plants .....	67.0 c	3.0 ab
Ranman 400SC (post-plant)	3.4 fl oz /1000 plants .....	66.6 c	3.0 ab
Ranman 400SC (post-plant)	6.8 fl oz /1000 plants .....	57.4 d	3.3 a
Ranman 400SC (pre-plant)	0.06 fl oz/flat.....	78.9 a	1.8 c
Ranman 400SC (pre-plant) + Omega 500F (post-plant)	0.06 fl oz /flat + 1.7 fl oz /1000 plants.....	74.4 ab	2.5 b
Ranman 400SC (pre-plant) + Ranman 400SC (post-plant)	0.06 fl oz /flat + 1.7 fl oz /1000 plants.....	69.3 bc	3.0 ab
Control		78.0 a	1.5 c

<sup>z</sup>Clubroot severity calculated using the number of plants in each of five categories and the midpoint value from the categories: 1 = 0% disease; 2 = 1-20% disease; 3 = 21-40% disease; 4 = 41-60% disease; and 5 = 61-100% disease. Severity =  $\frac{\sum(\text{category midpoint} \times \text{number of plants in category})}{n}$ , where n = number of total plants harvested.

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

<sup>x</sup>Values are the means of four replicate plots; means followed by the same letter within a column are not significantly different at p<0.05.