

### Evaluation of the efficacy of Quadris fungicide to control white mold/stolon decay on peppermint, 2000-2001

Stolon decay and white mold symptoms continue to be problems on peppermint as the ground is thawing in the spring. In past studies, a complex of fungi including *Sclerotinia* spp., *Rhizoctonia* spp., *Fusarium* spp and *Pythium* spp. have been isolated from affected stolons. Isolates from all of these species showed some ability to infect stolon pieces in the lab, recreating symptoms typical of those observed in the field. Effective control procedures do not exist at present. Quadris is a new fungicide, effective at low rates and with a wide spectrum of activity against fungi. In a preliminary study where Quadris was applied to a peppermint field in the fall of 1999, strong differences were not noted between Quadris-treated plot areas and untreated areas, but there was a slight decrease in severity of decay symptoms on the stolons in early spring and a slight increase in stand in early summer in areas which had received Quadris treatment. The fungicide needs to be translocated through the plant to the roots for optimum efficacy and our application date in 1999 may have been late enough that the plants had become dormant, thus minimizing transport to the roots. The purpose of this study was to establish a trial similar to that done in 1999-2000 with earlier fungicide application to see if Quadris treatment resulted in any detectable control of white mold/stolon decay with accompanying improvement in stands and yield

The trial was conducted on a field of Black Mitcham peppermint at Jack's Pride Farms at Randolph, WI. An experiment was designed with commercial application of the fungicide at 0.76 pt/A to a 36-foot wide strip in the field (using one half of the boom on the grower's sprayer). The sprayer was turned on and off at 25-foot intervals, resulting in four untreated areas and four treated areas, with each plot 25' x 36'. Fungicide was applied on 20 Oct 2000 at 20 GPA, using Lurmark 04F80 flat fan nozzles at 20" spacing and 35 psi, approximately 18" above the foliage. The field was plowed on 10 Nov.

Stolons were evaluated on 18 Apr 2001 by digging an approximately 2' x 2' area at seven locations (in a zigzag pattern) in each plot. Stolon density, root health and type of symptoms observed were recorded for each location. Samples from each location were brought to the lab see what organisms could be isolated from affected tissue.

Percent stand was estimated on 30 May and 10 Aug (eight 1-meter square areas distributed across each plot were observed) and the plots were rated for incidence of Verticillium wilt on 10 Aug. The grower cut a 10-foot-wide swath across each plot on 10 Aug and total fresh weight of mint hay for a 10'-long area of this swath was recorded for each plot.

There was an indication from initial observation of stolons in the spring that fungicide treatment might be beneficial with slightly lower symptom severity and higher root density in Quadris treated areas. However, as the growing season progressed, stand was highly variable across the area of the trial and there were no significant differences in stand, Verticillium wilt or yield.

We have now evaluated, after several years of field trials, a wide range of fungicides, nutrient amendments and cultural methods for management of white mold on peppermint. With the exception of spring tillage to disrupt the soil freeze line and aid soil warming, none of the other treatments have succeeded in reducing the incidence or severity of this fungus-incited problem.

Treatment	Stolon Symptoms 4/18 <sup>1</sup>				Root Density 4/18 <sup>1</sup>	Stand (% Coverage of Ground)		Incidence of Verticillium Wilt <sup>4</sup>	Avg. Fresh Weight of Mint Hay (tons/A) <sup>5</sup>
	Severity	% of samples with				5/30 <sup>2</sup>	8/10 <sup>3</sup>		
		Brown lesions	Black lesions	White lesions					
Untreated	72.5	100	96.4	50.0	1.5	7.3	96.0	1.6	18.6
Quadris, 0.76 pt/A	63.5	100	96.4	42.9	2.0	6.8	96.0	1.1	17.8
Pr > F <sup>6</sup>	0.20	---	---	0.73	0.21	0.58	0.95	0.16	0.50
LSD <sup>6</sup>	NS	---	---	NS	NS	NS	NS	NS	NS

1 Stolons in an area approximately 2' x 2' were dug and rated for root density (1=low, 2=medium, 3=high) and severity of symptoms. Severity was rated on a Horsfall-Barratt scale of 0 (no infection) to 11 (completely dead). Ratings were converted to percentages. Presence of brown or black lesions and white mold symptoms was recorded for each sample.

2 A 1-m<sup>2</sup> wooden frame was dropped at eight locations across the plot and % stand (coverage of the ground) was estimated for the four quarters of this area. A Horsfall-Barratt scale of 0 (no growth) to 11 (100% stand) was used. Ratings were converted to %. Data are averages of all stand estimates.

3 Percent stand was estimated for eight sections of each plot on a Horsfall-Barratt scale of 0 (no growth) to 11 (100% stand). Ratings were converted to percentages.

4 Incidence of Verticillium was estimated on a Horsfall-Barratt scale of 0 (no symptoms) to 11 (100% of shoots showing symptoms). Ratings were converted to percentages

5 Yield from a 100 ft<sup>2</sup> area, converted to ton/A.

6 Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at P = 0.10.

