

Powdery Mildew Management with Biopesticides on Greenhouse Grown Plants

Brian Eshenaur and Elizabeth Lamb New York State Integrated Pest Management Program, Cornell University Extension, Geneva & Ithaca NY

Background

Greenhouse production of vegetables and herbs is a growth industry in New York State. There were 123 operations and 2,568 acres in production listed (USDA's 2014 Census of Horticultural Specialties). The total acreage of high tunnel, hydroponic, and traditional greenhouses growing food crops to harvest increased by 58% since 2009. There is also a trend in floriculture greenhouses to increase vegetable transplant production due to the increased interest in home vegetable gardening, and to add vegetable production during the ornamental off-season.

Disease issues differ in field and greenhouse vegetable production, and conventional pesticides registered for ornamentals are rarely labeled for food crops in greenhouses. Growers request information about an integrated approach to pest management, including cultural methods and biopesticides. Our objectives for this ongoing project are to gain first hand experience with biopesticides and to develop efficacy data.

Procedures

All trials were conducted in greenhouse maintained at 18-24° C. Susceptible cultivars of zucchini ('Zephyr' and 'Raven') and zinnia ('Envy') were grown in 3 qt pots in peat based media in a randomized complete block design. After powdery mildew first appeared treatments began at weekly intervals. Products were applied at labeled rates until foliage was wet. Ratings were taken 21 days after weekly treatments began. The fourth and fifth leaves from the growing point were evaluated for the percentage of the leaf area symptomatic.

Results & Discussion

In the first series five biofungicides were trialed (figs 1 & 2). The top performers for suppressing powdery mildew: Regalia and Cease & Milstop were carried through for later series. In the next series Cease and Milstop were evaluated individually as well as a combination and Suffoil X was added (figs 3 & 4). A third series repeated the same products with powdery mildew on zinnia, ('Envy') (figure 5.)

The most effective products were SuffoilX and Milstop. Regalia and the Cease & Milstop combination provided statistically significant suppression over the water control. In these studies there were no statistically significant synergistic effects with the combination of Cease and Milstop. Cease alone did not always provide suppression that was statistically different than the water control.

This information is a foundation for further study and may be useful to growers who plan to integrate biopesticides into their powdery mildew management regime.

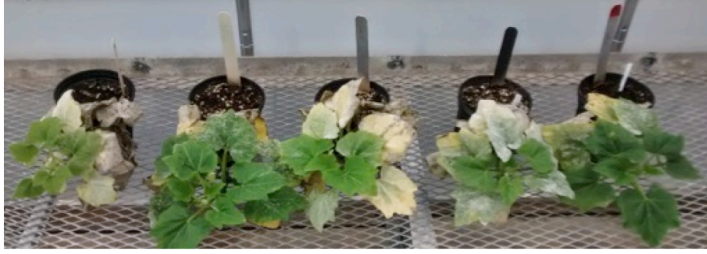


Figure 1. 'Zephyr' zucchini treatments from left to right: Water (Control), Regalia, Sonata, Actinovate, Cease & Milstop.

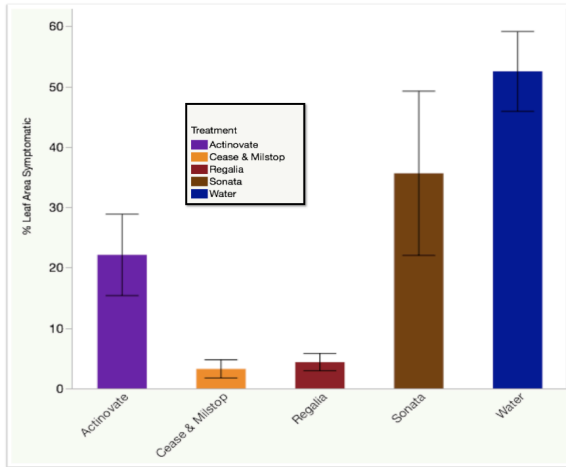


Figure 2. First series of treatments zucchini cultivars 'Zepyr' and 'Raven'. Each error bar is constructed using 1 standard error from the mean.

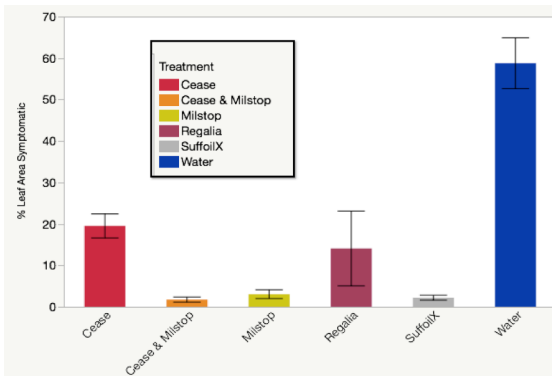


Figure 3. Second series of treatments zucchini cultivars 'Zepyr' and 'Raven'. Each error bar is constructed using 1 standard error from the mean.



Figure 4. 'Zephyr' zucchini treatments from left to right: Milstop, Regalia, Cease & Milstop, Cease, Water (Control) SuffoilX from treatments above in second series.

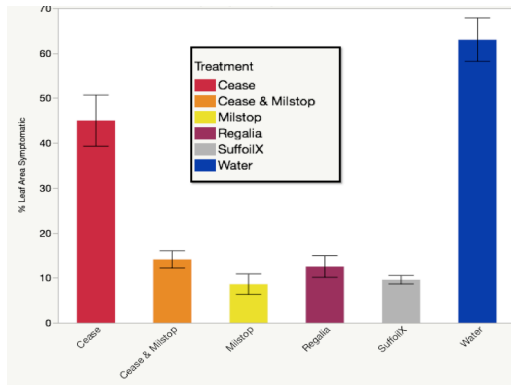


Figure 5. Final series of treatments zinnia cultivar 'Envy'. Each error bar is constructed using 1 standard error from the mean.