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Can Hydrogen Peroxide (or Dioxide H_2O_2) Control Plant Disease? By Sally Miller

When I was a child and had an earache, my mother got the little brown bottle of hydrogen peroxide out of the medicine cabinet and poured some into my ear. It crackled and bubbled but I don't ever remember my earache going away after this treatment. It took a trip to the pediatrician and a prescription for an antibiotic to do that. Hydrogen peroxide continues to be used today as a folk remedy, with all kinds of proponents claiming it as a cure for everything from stuffy noses to cancer. While hydrogen peroxide in high concentrations is a known bleaching agent and disinfectant, its ability to prevent or cure the vast majority of ailments for which it is touted is strongly disputed.

In the past few years, claims have been made that hydrogen dioxide can be used to prevent and cure plant diseases. These claims are just as controversial as those in the medical arena. Hydrogen dioxide is purported to control plant diseases by killing bacteria or fungi on contact, including those that have invaded the tissue. But can these claims be true? A search of scientific literature quickly showed that where H₂O₂ treatments have been tested directly against plant, animal and human pathogens, at rates up to 5%, it was not effective in reducing bacterial or fungal spore populations. (Labeled rates for foliar application of a hydrogen dioxide product currently marketed for plant disease control range from 0.09 0.27%.) I am not aware of any independent, replicated tests of any H₂O₂ product that have shown significant disease control in vegetable crops. Our own studies with such products in both conventional and organic systems have consistently failed to demonstrate any efficacy in bacterial or fungal disease management.

H₂O₂ at low concentrations is not harmful to humans, animals or the environment and does not leave residues. So what harm can there be in using it? First, H₂O₂ can burn leaves if the concentration exceeds 0.27%. Secondly, even if one gives the product the benefit of the doubt and assumes it kills at least some spores and bacteria on leaf surfaces, since it has no residual activity, protection is limited to the brief time during which it comes into contact

with the plant surface. The rest of the time plants are exposed to the many bacterial cells and fungal spores on the leaf surface, splashing about in raindrops or irrigation water or moving on air currents. Relying on this tiny window of activity can lead to a false sense of security, especially if one forgoes the use of proven products. Further, there is no evidence that mixing H₂O₂ with a fungicide enhances the fungicides activity. Recent studies at Clemson University showed that muskmelons treated with chlorothalanil mixed with hydrogen dioxide had the same amount of downy mildew as those treated with chlorothalanil alone. Finally, hydrogen peroxide applications put another dent in the pocketbook that in my opinion is just not justified.

Bacterial Canker in Peppers by Sally Miller

Bacterial canker was found this week in hot peppers in Geauga County, Ohio. The pepper field was within 30 ft of a field of tomatoes heavily infected with the disease. Bacterial canker is a devastating disease of tomatoes; however in our experience, although it may look bad in peppers it doesnt do much harm to the plant. The leaves show marginal necrosis and spots (Figure 1) and blister-like symptoms on the lower surface that resemble edema (Figure 2). The disease does not appear to be systemic in pepper and significant defoliation has not been observed. I am not aware of studies done to test products for control of this disease, but copper-containing products may help.

Infected peppers may serve as a source of bacterial canker inoculum for tomatoes, so movement between pepper fields with bacterial canker and tomato fields should be avoided. Tomatoes should not be produced in a field where canker was abundant in peppers for 4–5 years.



Figure 1. Marginal necrosis and leaf spots in pepper leaves infected with bacterial canker (caused by *Clavibacter michiganensis* subsp. *michiganensis*).



Figure 2. Blister-like symptoms on the underside of a pepper leaf with bacterial canker.

Section 18 Emergency Exemption For Quintec
Use on Cucurbits Denied by Sally Miller

The Ohio Department of Agriculture received word this week that the Section 18 emergency exemption requested for the use of Quintec to manage powdery mildew in cucurbits was denied by the U.S. Environmental Protection Agency (EPA). The EPA based its decision on published efficacy data that show that other products, including Procure and Nova, which are registered for cucurbits in Ohio, and other combinations of registered alternatives, provide sufficient control of powdery mildew. Thus, in the opinion of EPA, cucurbit growers in Ohio are highly unlikely to experience significant losses without the use of quinoxyfen [Quintec]. A Section 18 emergency exemption was granted in New York in 2004 because at that time Procure was not labeled in the state. Growers will be notified through VegNet when a standard label is obtained for Quintec use on cucurbits.

Crop Reports by Ron Becker

Wayne County Report (8/23/06): Downy and powdery mildew were significantly worse in many of the pumpkin fields this week. Vines are also starting to go down as a result of the dry conditions in many of the fields. We have also started seeing some nearly ripe pumpkins starting to melt down. After examining a sample we took to her, Sally Miller said that there was no fungus present and that the melt down was likely a result of bacterial soft rot. Two spotted spider mites have become heavy in several

plantings of watermelon and eggplants. We have also found them in high tunnels on tomatoes. In one high tunnel, there were also many lacewings and eggs present. As these are listed in the production guide as being a bio-control for mites, the grower has decided to forgo any miticide to see what the lacewings can do. Strawberries are also showing infestations of spider mite. Many sweet corn growers are at a lull in their harvest due to not being able to plant during the wet periods this spring. They expect to start picking again towards the end of this week. We are continuing to find fall armyworm and corn borer in the sweet corn fields. At Wooster, the earworm trap went up from 2 last week to 9 this week. The ECB trap count went up from 4 to 9 and the moths are easily seen while walking the fields.