

Research Progress and Impact

Phytophthora Research, MI
Controlling *Phytophthora* Disease

Summary of Research Accomplishments

- Developed new techniques to prevent *Phytophthora* contamination of irrigation sources (the disease can spread through water).
- Identified and developed *Phytophthora*-resistant varieties.
- Developed new techniques for *Phytophthora* control, including soil additives, mulches, crop rotation and water management.
- Tested fungicides, biological controls and other new agents that might control *Phytophthora*.
- Conducted on-farm research trials and hands-on grower workshops.

Mary Hausbeck/MSU



MAES scientists found *Phytophthora* in the Pentwater River, which is used to irrigate almost 4,000 acres of vegetable crops. To protect the crops, six new wells were dug.

Research for your future.

For questions about this or other MAES publications, contact Val Osowski (osowskiv@msu.edu; 517-355-0123).

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All USDA project reports are peer-reviewed.

Developed new techniques to prevent *Phytophthora* contamination of irrigation sources (the disease can spread through water). When five water sources used to irrigate vegetable crops around the state were monitored for *Phytophthora*, the fungus was found at all five sites. *Phytophthora* was found for the first time in the Pentwater River, which is used heavily for irrigation. Nearly 4,000 acres of vegetable production were affected. To provide clean irrigation water and keep *Phytophthora* from spreading to clean fields, six new wells have been dug.

Identified and developed *Phytophthora*-resistant varieties. MAES researchers found six types of cucumbers that had some resistance to *Phytophthora*, though none of the 31 plants screened were completely resistant to the fungus. The researchers have also found that growers can

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Michigan is the No. 1 producer of pickling cucumbers and the No. 4 producer of fresh cucumbers in the country. The state is also a top producer of many other vegetables. These nearly 86,000 acres are worth \$146 million. All of these crops are susceptible to *Phytophthora capsici*, a devastating fungal disease. *Phytophthora* outbreaks have been occurring annually for the past 10 years, and vegetable growers in Michigan and 15 other states are losing about 25 percent of their crop value per year to the disease. In addition, *Phytophthora capsici* was isolated in the lab from Fraser fir trees in Michigan for the first time in 2006. Researchers in the Michigan Agricultural Experiment Station are cooperating with scientists in Georgia to fight *Phytophthora*.

SUMMARY OF RESEARCH ACCOMPLISHMENTS

best protect cucumber plants by timing fungicide applications on the basis of the development of the cucumber fruit. Traditionally, growers have been concerned about protecting plants before the fruit forms, but this research shows that growers would better protect their crop by starting fungicide applications when the cucumbers are about 1 inch long. As cucumbers develop, they are less susceptible to *Phytophthora*. So by applying fungicides when the cucumbers are most susceptible, growers can protect their crop and eliminate unnecessary sprays, saving money and time and reducing environmental impacts. Zucchini, squash and other crops don't become less susceptible as they mature, so this strategy can't be used with them.

Developed new techniques for *Phytophthora* control, including soil additives, mulches, crop rotation and water management. Conducting experiments on a commercial farm, MAES researchers found that using cover crops such as brown mustard and Oriental mustard helped control *Phytophthora* somewhat, but this strategy would need to be combined with other management tools. MAES scientists also found that *Phytophthora capsici* could cause disease on Fraser fir trees. Historically,

Phytophthora capsici has infected only vegetable crops. In areas of Michigan where vegetables and Fraser fir Christmas trees are grown in close proximity, growers will need to be aware of the pathogen's ability to infect both crops.

Tested fungicides, biological controls and other new agents that might control *Phytophthora*. A new product from Valent, V-10161 4FL, showed promise in managing *Phytophthora* in research trials. Only about 30 percent of acorn squash plants treated with V-10161 4FL died, compared with more than 60 percent of untreated plants. About 8 percent of the fruit on treated cucumber plants was diseased, compared with 22 percent in untreated plants. Another experimental product applied to bell peppers reduced plant death by 65 percent and increased yield by 75 percent compared with untreated plants.

Conducted on-farm research trials and hands-on grower workshops. A full-day grower workshop was held Jan. 24, 2007, that featured a hands-on lab so that growers could learn about the *Phytophthora* pathogen and ways to control it. Also, a new series of *Phytophthora* fact sheets aimed at growers illustrate and explain the effects of *Phytophthora* on various vegetable crops.

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