Great Lakes Fruit, Vegetable & Farm Market EXPO
December 5-7, 2006
DeVos Place Convention Center, Grand Rapids, MI

Vine Crops

Wednesday morning 9:00 am

Where: Ballroom Room D

Recertification credits: 1 (1A, 1B, Comm CORE, Priv CORE)

CCA Credits: PM(1.5) CM(0.5)

Moderator: Phil Tocco, Agriculture & Natural Resources Educator, Jackson Co. MSU Extension

9:00 a.m. Perimeter Trap Cropping for Squash & Cucumbers

Jude Boucher, University of Connecticut

9:25 a.m. Controlling Beetles Using Precision Banded Admire

Jim Jasinski, The Ohio State University Extension

9:50 a.m. Pollinization Issues in Seedless Watermelon

Stephen Olson, University of Florida

10:15 a.m. Rye Cover Crops for Pumpkin Production

Dale Mutch, W. K. Kellogg Biological Station, MSU

10:30 a.m. Downy Mildew and Phytophthora in Vine Crops

Amanda Gevens, Plant Pathology Dept., MSU
Mary Hausbeck, Plant Pathology Dept., MSU

Downy mildew and Phytophthora in Vine Crops

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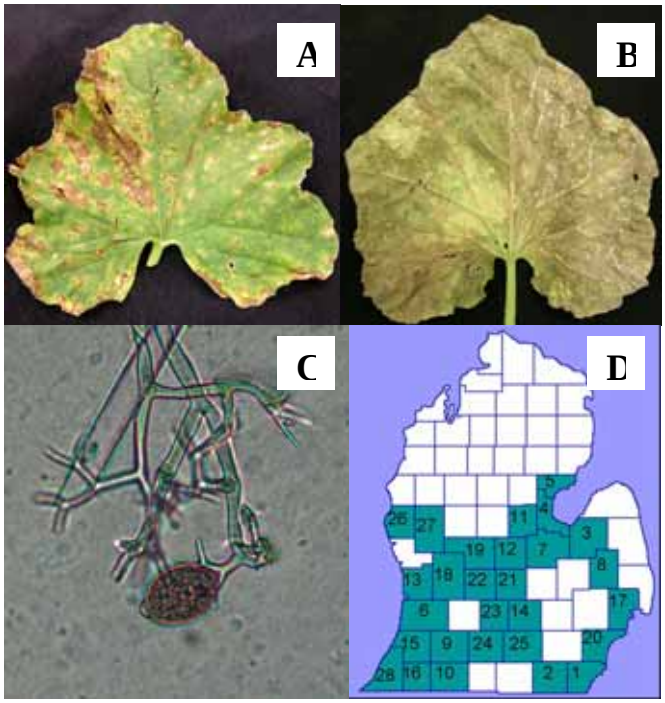
Michigan State University, Department of Plant Pathology

Downy mildew on vine crops

Downy mildew causes symptoms on the leaves of vine crops (such as cucumber, squash, and melon) similar to a mosaic or angular leaf spot (Fig. 1A). The tell-tale symptom of downy mildew is the purplish/gray fuzz on the underside of the leaf that gives a somewhat "dirty" or "velvet" appearance (Fig. 1B). This fuzz is made up of thousands of spores (Fig. 1C) and may be most evident in the morning. Downy mildew is well-known for causing catastrophic losses in a brief period of time. When the conditions are favorable, unprotected foliage can become completely infected and appear to be frosted within 10 days of initial infection. Downy mildew is not known to produce over-wintering spores and will not persist in soil and field debris in Michigan from year to year. Downy mildew was first reported in Michigan in 2005 and appeared again in 2006 in early June. As of September 5, 2006, 28 Michigan counties had confirmed reports of downy mildew (Fig. 1D). In both 2005 and 2006, downy mildew primarily caused disease on cucumber, however, there were reports on summer squash in 2005 and winter squash and cantaloupe in 2006.



Currently, there are few cultivars with adequate resistance to downy mildew and chemical control is the most effective tool. Products should be used in alternation with each other and applied at short intervals. Results from our 2006 downy mildew research indicated that the most effective spray programs, when applied before disease, were: Gavel 75WG (2 lb), Previcur Flex 6SC (1.2 pt), Ranman 3.6 SC (0.18 pt), and Tanos 50 WG (0.5 lb), each tank mixed with either Dithane DF Rainshield (3 lb) or Bravo Weather Stik 6SC (1.5 pt). After disease is identified in the field, the most effective products were: Previcur Flex 6SC (1.2 pt), Ranman 3.6 SC (0.18 pt), and Tanos (50 WG (0.5 lb), each tank mixed with either Dithane DF Rainshield (3 lb) or Bravo Weather Stik 6SC (1.5 pt).

Figure 1 (left). A. Downy mildew symptoms on the surface of a cantaloupe leaf and B. the underside of a squash leaf. C. Downy mildew spore. D. Confirmed downy mildew reports in Michigan as of Sept. 5, 2006.

In addition to fungicides, it is recommended that any infected vines remaining after harvest be killed with a contact herbicide or plowed under immediately so that they do not serve as a source of downy mildew for nearby crops.

***Phytophthora capsici* on vine crops**

Michigan growers producing vine crops have reported significant losses due to Phytophthora blight in recent years. The pathogen responsible is *Phytophthora capsici*. Recognizing disease due to *P. capsici* is not always easy as the disease often occurs in the low areas of a field where water accumulates. Many growers assume that when plant stunting occurs in these sites, it is due to the 'water logging' of the roots, but infection by *P. capsici* may be to blame. Under conditions of standing water, *P. capsici* produces swimming spores (zoospores) (Fig. 2A) which can move about in water and cause infection of nearby plants. Squash and pumpkin plants often have obvious symptoms of plants wilting or collapsing prior to dying. Such plants often have brown to black discolored roots and crowns. The disease is easily seen on infected fruit (Fig. 2B-D), initially as dark, water-soaked lesions which then develop a distinctive white 'powdered sugar' layer of spores on the surface of the fruit. Fruit infection is especially troublesome because the infection may occur days before the symptoms become visible. As a result, healthy-appearing fruit may be harvested and then shipped. Fruit then break down during transit or on grocers' shelves resulting in disposal cost.

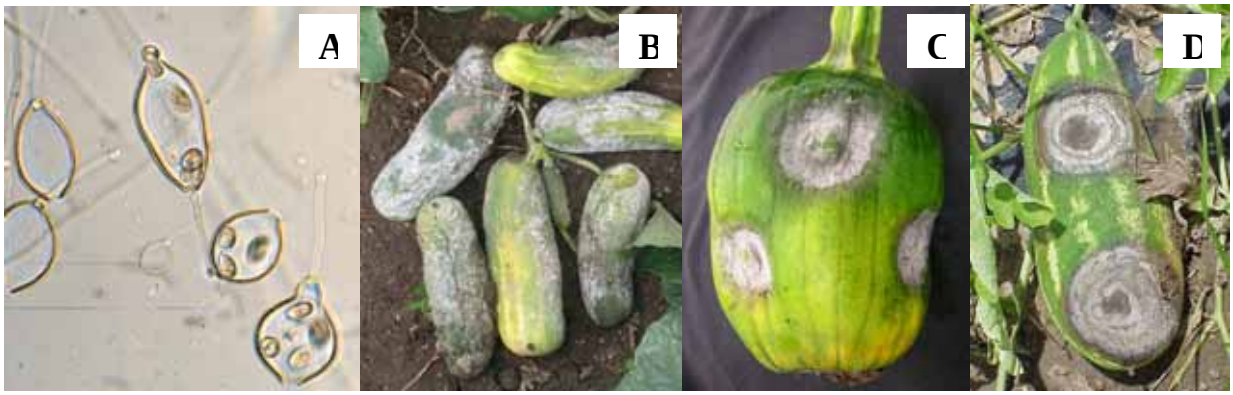


Figure 2. A. Swimming spores of *Phytophthora capsici* released under wet conditions. B-D. Fruit of pickling cucumber, pumpkin and watermelon infected with *Phytophthora capsici*

To control *P. capsici* several control measures need to be implemented. Good drainage is important in managing this disease. However, even plants growing on well-drained fields on raised beds may have severe disease if rainfall is heavy. Crop rotation may reduce the number of *P. capsici* spores remaining in a field. A minimum of 3 years crop rotation to hosts other than those listed in Table 1 is recommended to avoid build-up of *P. capsici*. Growers should avoid relying on a single fungicide for disease control in order to delay development of fungicide resistance with *P. capsici*. There are many fields in Michigan where the *P. capsici* has become resistant to the commonly used fungicide, Ridomil Gold (mefenoxam). Fungicide programs including the following may provide disease management: Acrobat 50 WP (6.4 oz), Gavel 75 DF 1.5-2.0 lb, Tanos 50 WG (8-10 oz). Fields heavily infested with *P. capsici* may require the use of pre-plant fumigation for disease control. Fumigants that are most effective include: Telone C35, Vapam HL, and Sectagon 42. Trial results from 2006 indicate that V-10161 (fluopicolide) and V-10162 appear promising and may complement a spray program that includes other oomycete fungicides.

Control of Phytophthora is complicated by its broad host range, long-term persistence in agricultural soils, presence in irrigation water sources, and ability to develop resistance to fungicides. Only an integrated production system combining optimized cultural methods and cultivars, effective fungicides and use of uncontaminated irrigation sources.

Table 1. Common vegetable hosts affected by *Phytophthora capsici*.

Cucumber	Bell Pepper	Pumpkin
Hot Pepper	Summer squash	Tomato
Winter squash	Gourds	Eggplant
Zucchini	Watermelon	Lima beans
Snap beans	Yellow wax beans	