



# Vegetable Crop Update

A newsletter for commercial potato and vegetable growers prepared by the University of Wisconsin-Madison vegetable research and extension specialists

No. 18 – July 13, 2016

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## Calendar of Events

**July 14, 2016** – UW-Rhineland Agricultural Research Station Field Day  
**July 21, 2016** – UWEX Langlade County –Antigo Research Station Field Day  
**July 28, 2016** – UW-Hancock Agricultural Research Station Field Day  
**February 7-9, 2017** – UWEX/WPVGGA Grower Ed. Conf., Stevens Point, WI

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**Please consider attending one of our several Agricultural Research Station field days upcoming this month.** Agendas can be found in previous newsletters (linked below).

**July 14, 2016** – UW-Rhineland Agricultural Research Station Field Day  
<http://www.plantpath.wisc.edu/wivegdis/pdf/2016/July%201,%202016.pdf>

**July 21, 2016** – UWEX Langlade County –Antigo Research Station Field Day  
<http://wisconsinpotatoes.com/admin/wp-content/uploads/2016/07/July-8-2016.pdf>

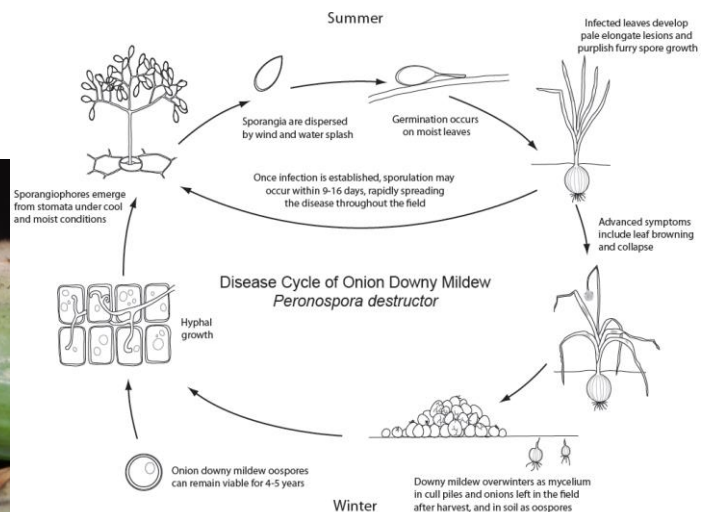
**July 28, 2016** – UW-Hancock Agricultural Research Station Field Day  
<http://www.plantpath.wisc.edu/wivegdis/pdf/2016/July%201,%202016.pdf>

**Onion Downy Mildew** was confirmed on a sample from Rock County, Wisconsin earlier this week by Dr. Brian Hudelson in our UWEX Plant Disease Diagnostic Clinic. Onion downy mildew can be very problematic in onion fields. This foliar disease is caused by a fungus-like pathogen called *Peronospora destructor*. Infection is favored by temperatures less than 72°F and high humidity and leaf wetness. The pathogen can overwinter in volunteer onion, culls, and wild Allium weed species if the pathogen was present in your location in previous years. Symptoms include pale or white elongated patches on leaves that start off small and can elongate and produce a purple-gray sporulation which appears “downy.” Leaves can bend over and eventually die due to severe downy mildew infection. Please refer to picture below. This disease can impact bulb size, quality, and storability. Management recommendations include practicing a 3+ year rotation to non-hosts such as small grains and corn, eliminating culls and volunteers, avoiding dense planting, avoiding excess N and overhead irrigation, and orienting rows parallel to prevailing wind to avoid prolonged leaf wetness.

Effective fungicides for onion downy mildew control include:

ametoctradin+dimethomorph (**Zampro**)  
azoxystrobin (**Quadris, Amistar, others**)  
azoxystrobin + propiconazole (**Quilt Excel**)  
copper hydroxide (**Kocide, Champ, others**)  
cymoxanil + chlorothalonil (**Ariston**)  
cymoxanil + famoxadone (**Tanos**)  
dimethomorph (**Forum**)  
fenamidone (**Reason**)  
fluazinam (**Omega**)  
fosetyl-aluminum (**Aliette**)  
mancozeb (**Dithane, Manzate, others**)  
mandipropamid (**Revus**)  
mefenoxam (**Ridomil Gold**)  
oxathiapiprolin+chlorothalonil (**Orondis Opti**)  
oxathiapiprolin+mandipropamid (**Orondis Ultra**)  
pyraclostrobin (**Cabrio**)  
pyraclostrobin & boscalid (**Pristine**)  
zoxamide+chlorothalonil (**Zing!**)  
zoxamide+mancozeb (**Gavel**)

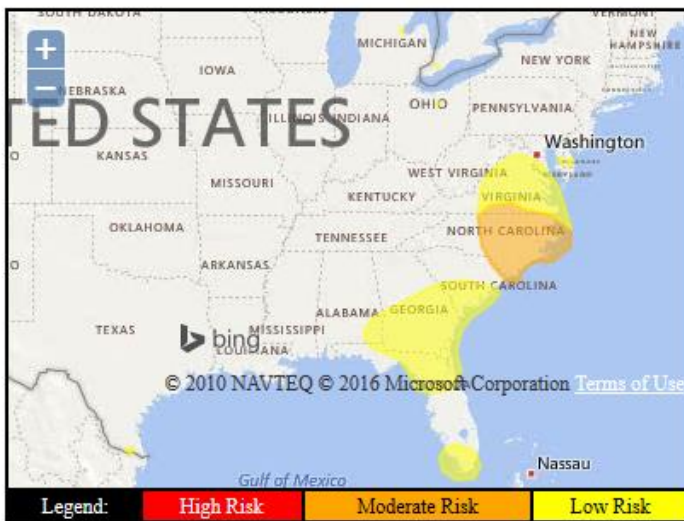
Although labeled for onion downy mildew, coppers and chlorothalonil are not very effective for downy mildew control, and coppers can be phytotoxic to onions. Please see the 2016 Wisconsin Vegetable Production Guide A3422 for further details on application rates and specifications. If you suspect you have Downy mildew in your onions, please get a sample and contact your county agent, our disease diagnostic clinic, or myself for confirmation.



**Cucurbit Downy Mildew Updates (<http://cdm.ipmpipe.org/>).** In the past week there were 5 states reporting new confirmations of cucurbit downy mildew in addition to Ontario Canada: DE, MI, NC, NJ, and OH. Typically, we have seen downy mildew show up on cucurbits in years when incidence has occurred in southwestern Michigan. I provided a link below to Dr. Mary Hausbeck's recent information release on cucurbit downy mildew detection in Bay County and management results from Michigan. Because it is likely that the pathogen we may experience here in WI is similar to that of MI, the fungicide efficacy results can be useful in building programs here in our state. Previous confirmations were made in AL, FL, GA, MD, NC, SC, and TX. No risk of movement of the pathogen to Wisconsin production region at this time, rather to the north and east of current field confirmations (figure below from <http://cdm.ipmpipe.org/current-forecast>).

### [MSU Extension Cucurbit Downy Mildew Report and Management](#)

**Risk prediction map for Day 2: Tuesday, July 12**



**Moderate Risk in east-central and eastern NC. Low risk for cucurbits in far southern FL, northern FL, southeast AL, central and southern GA, southern SC, and VA except the southwest and far southwest. Minimal Risk to cucurbits elsewhere.**

**Forecaster: TK at NCSU for the Cucurbit ipmPIPE - 2016**

***Preventive fungicides for cucurbits, particularly in cucumbers, should be considered for protection against both downy mildew*** (now that we know inoculum is in the region) and Phytophthora crown and fruit rot. Because both diseases are caused by oomycete, water-mold type pathogens, some of the same fungicides work in managing the two diseases.

Based on replicated research conducted by Dr. Mary Hausbeck of Michigan State University, a 7-day interval fungicide program is recommended for cucumber crops before disease is confirmed. The program should tighten up to a 5-day program after disease is confirmed. In other vine crops (cantaloupe, melon, zucchini, squash, pumpkin, and gourd), a 7 to 10 day program is recommended before disease, with a tightening up of the program to a 7-day interval after disease is confirmed. Fungicide selections should include Gavel 75WG (5 day PHI), Tanos 50WG (3 day PHI), Zampro 4.4SC (0 day PHI), Ranman 3.6SC (0 day PHI), and Zing! (0 day PHI). Previcur Flex 6SC (2 day PHI) and Presidio 4FL (2 day PHI) have also demonstrated efficacy in past years in trials. The previously listed fungicides should be alternated and tank-

mixed with either mancozeb or chlorothalonil (unless one of these protectants is in a pre-mix formulation such as Zing! or Gavel).

Growers and researchers in the southeastern US, as well as in Michigan (in 2014 trials) have noted some resistance in the downy mildew pathogen population to Presidio and Previcur fungicides. As such, these fungicides should be tank-mixed with another downy mildew-specific fungicide as well as a base protectant of mancozeb or chlorothalonil. The cucurbit downy mildew that has been in MI over the past several years has also shown resistance to mefenoxam (ie: Ridomil), strobilurins (ie: Quadris, Cabrio), and mandipropamid (Revus).

For more information on symptoms, disease cycle, and general management, please visit:

<http://learningstore.uwex.edu/Assets/pdfs/A3978.pdf>

**Phytophthora in Cucurbits, Peppers, and Tomatoes:** During wet and warm production years, many Wisconsin producers battle *Phytophthora* crown and fruit rot in vegetable crops. The disease is favored with current weather conditions. This potentially aggressive disease, caused by the soilborne water mold *Phytophthora capsici*, can infect a broad range of crops including summer squash, zucchini, winter squash, pumpkins, melons, cucumbers, peppers, tomatoes, and eggplant. Reports of this pathogen have also been made on snap and lima beans in commercial fields in the Midwest and Mid-Atlantic regions of the U.S. in the past decade. Symptoms of *Phytophthora* include water-soaking of lower stem or crown of a plant resulting in complete wilting of plants, and water-soaking on fruit often associated with white talcum-like pathogen sporulation on surfaces (see pictures below). Breakdown of plant tissues by this pathogen can be rapid and can occur on fruit post-harvest.

To avoid *Phytophthora*, the following measures should be taken:

- 1) do not plant susceptible crops on fields with recent history of this disease
- 2) provide good drainage (raised beds are beneficial)
- 3) avoid planting in low-lying areas of fields
- 4) practice good irrigation management to avoid standing water and extended periods of leaf wetness
- 5) apply effective protectant fungicides when conditions favor infection in known infested fields

Coming off of such a wet week, it is critical that growers of susceptible crops scout their vegetable fields for *Phytophthora*. Roguing of infected plants from the production field when disease is identified early can aid in limiting spread of disease. Do not allow infected fruit to sporulate and persist in production fields. Culls can continue to provide inoculum for remaining plants. Because *Phytophthora* is soilborne, soil from infested fields remaining on equipment should be removed prior to moving to a new or 'clean' field. Every effort should be made to avoid introducing this pathogen into non-infested fields.

Fungicides can be effective in managing *Phytophthora* when environmental conditions favor disease. The keys to making fungicides work best for you are:

- 1) select most effective fungicides with no known resistance in your field/area

- 2) make a thorough application particularly if fruit are to be protected and are beneath a dense foliar canopy
- 3) make frequent applications when conditions favor disease and crop growth is rapid

We have documented *Phytophthora capsici* resistance to the fungicide mefenoxam (active ingredient in Ridomil Gold, Ultra Flourish) in a few Wisconsin vegetable production fields during the past 6 years. However, there are still many fields in which the pathogen is very sensitive to Ridomil fungicides. This means that use of mefenoxam will likely control Phytophthora in that field. If your farm has no history of Ridomil use, it is likely that the fungicide will be effective for disease control. Please contact me if you have questions on resistance or need assistance in determining this status.

Fungicides with activity against Phytophthora crown and fruit rot include: Ridomil (mefenoxam, *for fruiting vegetables not cucurbits*), Ranman (cyazofamid), Forum (dimethomorph), Tanos (fanoxadone + cymoxanil), Presidio (fluopicolide), Aliette (fosetyl-al), Revus (mandipropamid), Zampro (ametoctradin+dimethomorph), Gavel (zoxamide + mancozeb), and Orondis Ultra/Opti (oxathiapiprolin+either chlorothalonil or mandipropamid). Fungicides should be tank-mixed with multi-site protectant such as chlorothalonil (ie: Bravo) or mancozeb (ie: Dithane). Tank-mixes of Presidio (fluopicolide) or Revus (mandipropamid) with copper hydroxide (ie: Kocide) have also been effective in trials on picking cucumber in Michigan (see link below).

<http://www.veggies.msu.edu/Research/GLpickle2010.pdf>

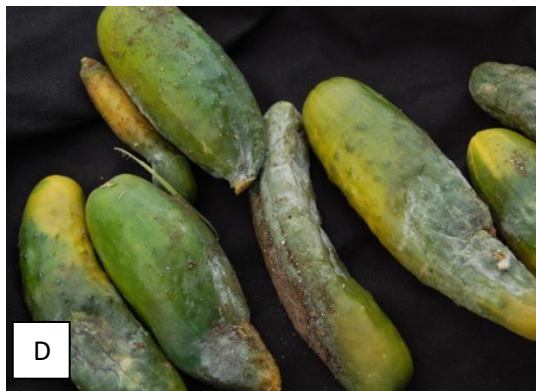
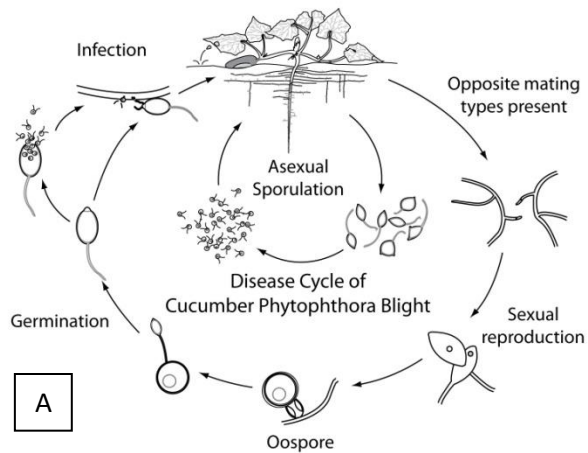
And, more recent information from Michigan on use of biopesticides as well as Revus and Presidio used in drip irrigation system for Phytophthora crown and fruit rot management in cucurbit crops is offered below.

[http://msue.anr.msu.edu/news/watch\\_for\\_phytophthora\\_on\\_vine\\_crops](http://msue.anr.msu.edu/news/watch_for_phytophthora_on_vine_crops)

If you have any questions on symptoms, control, or fungicide resistance, please contact your county agent, crop consultant, the diagnostic clinic, or myself at UW-Plant Pathology. For further information on any fungicides that may be mentioned in this newsletter, please see the 2016 Commercial Vegetable Production in Wisconsin Guide A3422. An online pdf can be found at the link below or a hard copy can be ordered through the UWEX Learning Store.

<http://learningstore.uwex.edu/Assets/pdfs/A3422.pdf>





Phytophthora crown and fruit rot pictures include A: disease cycle on cucumber, B: symptoms on winter squash fruit, C: wilting symptom on winter squash plants, and D: fruit rot and sporulation on cucumber fruit.