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Vegetable & Fruit Headline News

The University of Maryland Extension Agriculture and Natural Resources Profitability Impact Team proudly presents this special alert for the commercial vegetable and fruit industry.

Special Alert 2: Wet Weather Prevails Late Blight & Phytophthora Advisory

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Maryland Potato Late Blight Advisory

By Kate Everts, Vegetable Pathologist, University of Delaware and University of Maryland;
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Note: I was informed on June 7th that the WV 'confirmation' of late blight may have been incorrect. Until we have more information, please continue to protect your plants with broad spectrum fungicides that will manage many diseases. Our weather is very conducive for disease development over the state, which is reflected in the reduction of the spray intervals shown below. We have added a table (Table 2) that shows the residual activity of some common fungicides used for potato late blight. Our spray intervals in Table 1, are based on the assumption that chlorothalonil, which has a 5-day spray interval, was used. If you have sprayed something other than chlorothalonil, find the product in the table and adjust your spray interval accordingly.

Late blight forecasts are being generated for eight locations across Maryland based on the programs Blightcast and Simcast. Because all locations have reached the threshold for the initial fungicide spray, the information below indicates the current spray interval that Simcast has recommended. Simcast requires information on specific fungicide applications in a field. Therefore, I am reporting the Simcast spray interval as a guideline only. The table below is based on the assumption that a susceptible cultivar is being grown and that a protectant (chlorothalonil) is being applied. The interval accounts for disease severity values (DSV's) and when the last spray was applied.
There are numerous fungicides now labeled for late blight control. See the 2013 Maryland Commercial Vegetable Production Recommendations: **http://extension.umd.edu/mdvegetables/2013-commercial-vegetable-production-recommendations**

Table 1. Late Blight Disease Severity Value (DSV) Report

Location	Season Accumulation: DSV	Simcast spray interval recommendation*
Dorchester County	61	5-day
Germantown	77	6-day
Clinton	84	5-day
Owings	80	6-day
Severn	84	5-day
White Marsh	31	7-day
Mechanicsville	72	6-day
Oakland	49	5-day

***Spray interval recommendation is based on production of a susceptible cultivar and application of a protectant fungicide such as chlorothalonil. A 50% emergence date of May 1 was estimated for Dorchester Co., Clinton, Owings, Severn, Mechanicsville, and White Marsh. A 50% emergence date of May 5 was estimated for Germantown, and May 10 for Oakland.**

Table 2. Thresholds for recommended fungicides

Product name	Active ingredient	FRAC code	Minimum spray interval
Bravo	Chlorothalonil	M5	5
Ranman 400SC	Cyazofomid	21	7
Gavel 75DF	Zoxamide+ Mancozeb	22+M3	7
Tanos DF	Famoxadone+ cymoxanil	11+27	5
Dithane DF	Mancozeb	M3	3
Curzate	Cymoxanil	27	5
Revus Top	Mandipropamide+ difenoconazole	40+3	7
Revus	Mandipropamide	40	5
Previcur Flex SC	Propamocarb hydrochloride	28	7
Forum SC	Dimethomorph	40	5
Presidio	Fluopicolide	43	7
SuperTin 80WP	Fentin hydroxide	30	7
PolyRam	Metiram	M3	5

Checklist of Cultural Management Practices for Phytophthora capsici in Vegetable Crops

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The following is a checklist of cultural practices to manage Phytophthora crown rot and blight. Also, remember that the pathogen can survive and thrive in surface water. If fields are irrigated with pond water that is infested with Phytophthora capsici, they will become infested. Likewise, under flooding conditions, infested ditch water can spread the disease. Pond water for irrigation can be tested for the presence of Phytophthora capsici, and if infested, filtered. ***Reminder: Never use fungicides as the only means of managing the disease.***

Integrated Management Strategies & Field Preparation:

- ✓ Crop Rotation - minimum of 3 years.
- ✓ Plant only well-drained sites.
- ✓ Avoid planting low areas of fields.
- ✓ Subsoil or V-rip fields prior to planting to break up hardpan.
- ✓ Use dome-shaped beds for peppers and squash. (Raised beds reduce accumulation of high moisture around the bases of plants.)
- ✓ Raised beds should be made with a Kennco-type bed maker to achieve long-lasting beds with a crown.
- ✓ Use a bed-shaper to build stable beds. Do not build a loose ridge! Beds should be a minimum of 9 inches high.
- ✓ Poly mulch will not reduce blight incidence by itself.
- ✓ Use resistant pepper varieties and gourd-type pumpkins with hard rinds (e.g. L'l Ironsides) whenever possible.
- ✓ Avoid over-irrigation.
- ✓ Do not enter fields with wet foliage.
- ✓ Rogue Phytophthora infected plants when found.
- ✓ Promptly till infected debris at the end of the season.
- ✓ Never dump culls or diseased fruit from other fields or farms into production fields. (Once Phytophthora capsici is introduced, it may remain indefinitely.)
- ✓ Pond water can harbor Phytophthora. Test your water and, if P. capsici is present, use a filter and treatment that is effective on Phytophthora.
- ✓ Construct drainage ditches to aid drainage of excess water after heavy rains.

Phytophthora capsici in Early Vegetables with Wet Conditions

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Under wet conditions, another major issue in some vegetable crops is disease caused by the organism Phythophthora capsici. Death of plants in wet or waterlogged soils may be due to this disease organism which can survive in soils for many years. It is most common in fields with a history of production of susceptible vegetables including vine crops (cucurbits), tomatoes, peppers, eggplants, and lima beans.

Phytophthora capsici can cause root or crown rots in peppers, summer squash, winter squash, and pumpkins which will be evidenced by wilting, black or brown colored roots, or blackened stems at the crown area at the soil line. This is most common under warm conditions (above 75°F) in wet soils. Tomatoes and cucumbers are not as susceptible to root and crown rots although they can occur. However, they are susceptible to Phytophthora fruit rots (as are watermelons and cantaloupes). Early plantings of cucumbers and summer squash are at the most risk at this time for fruit infections. ***The following are some recommendations for control from the Mid-Atlantic Commercial Vegetable Production Recommendations:***

Peppers

In peppers, Phytophthora blight typically develops in low-lying areas of fields after rain and can spread quickly throughout the entire field. Planting on a ridge or raised, dome-shaped bed will help provide better soil drainage. Use a minimum 3-year crop rotation with crops other than peppers, cucurbits, lima and snap beans, eggplants, or tomatoes. In fields with low-lying or wet areas, plant only Phytophthora-tolerant cultivars such as 'Paladin', 'Aristotle', or 'Revolution'. In heavily-infested fields with a known history of Phytophthora blight, plant only resistant or tolerant cultivars to help reduce plant losses. The pathogen Phythophthora capsici has developed resistance/insensitivity to mefenoxam in some fields. If mefenoxam-insensitivity is known to exist in a field/farm, plant only tolerant cultivars. Do not apply mefenoxam or metalaxyl in fields where insensitivity is known to exist. Preplant fumigants will also suppress disease.

For control of the crown rot phase of Phytophthora blight, apply one of the following: mefenoxam- (Ridomil Gold or Ultra Flourish), metalaxyl (MetaStar) at transplanting and 30 days later. Other labeled fungicides include Presidio and Ranman. Ranman may be applied via transplant water – see label for restrictions. When using polyethylene mulch, apply Ridomil Gold, Ultra Flourish, Ranman, or Presidio at the above rates and timing by injection through the drip irrigation system. Dilute prior to injecting to prevent damage to injector pump. Only apply Ridomil Gold 4SL at transplanting and 30 days later.

Squash

For squash, again multiple practices should be used to minimize the occurrence of this disease. Rotate away from susceptible crops (as above). Preplant fumigants will also

suppress disease. Fields should be adequately drained to ensure that water does not accumulate around the base of the plant. Mefenoxam (Ridomil Gold or Ultra Flourish) or metalaxyl (MetaStar) should be applied pre-plant for early season control. Once the canopy closes, subsoil between the rows to allow for faster drainage following rainfall. When conditions favor disease development, apply one of the the following with fixed copper at labeled rates (for suppression only): Revus, Ranman, Presidio, Forum, Gavel, or Tanos. Materials with different modes of action (i.e. FRAC codes) should always be alternated to reduce the chances for fungicide resistance development. Presidio may also be applied through the drip irrigation (see label for details). Soil drench followed by drip application has given good results in some trials on crown rot caused by Phytophthora capsici.

Cucumbers

For cucumbers, again practice good rotation and improve field drainange. Fungicides labeled for crown and fruit rots include Revus, Ranman, Presidio, Forum, Gavel, or Tanos which should be applied with a fixed copper fungicide. Materials with different modes of action (i.e. FRAC codes) should always be alternated to reduce the chances for fungicide resistance development. Presidio may also be applied through the drip irrigation (see label for details). Soil drench followed by drip application has given good results in some trials on crown rot caused by Phytophthora capsici.

Excerpted from articles by Dr. Mary Hausbeck, Michigan State University, and the Mid-Atlantic Commercial Vegetable Production Recommendations.

Flooding, Waterlogged Soils and Vegetables

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We have has some flooding in vegetable crops due to heavy rains on June 3 and there is a potential for heavy rains again on June 7. The majority of watermelons and other fresh market vegetables have been planted, peas are being harvested, lima bean planting has started and significant acres of pickles, snap beans, and sweet corn are in the field. Growers may be concerned about the effects of flooding and waterlogging in vegetable fields.

Wet conditions and storms can lead to:

- Damage due to flooded soils in all vegetable crops.
- Increased disease incidence in all vegetable crops.
- Lodging damage in crops like sweet corn.

Flooded and Waterlogged Soils

In flooded soils, the oxygen concentration drops to near zero within 24 hours because water replaces most of air in the soil pore space. Oxygen diffuses much more slowly in water filled pores than in open pores. Roots need oxygen to respire and have normal cell activity. When any remaining oxygen is used up by the roots in flooded or waterlogged soils, they will cease to function normally. Therefore, mineral nutrient uptake and water uptake are reduced or stopped in flooded conditions (plants will often wilt in flooded conditions because roots have shut down). There is also a buildup of ethylene in flooded soils, the plant hormone that in excess amounts can cause leaf drop and premature senescence.

In general, if flooding or waterlogging lasts for less than 48 hours, most vegetable crops can recover. Longer periods will lead to high amounts of root death and lower chances of recovery. **While there has not been much research on flooding effects on vegetables, the following are some physiological effects that have been documented:**

- ✓ Oxygen starvation in root crops such as potatoes will lead to cell death in tubers and storage roots. This will appear as dark or discolored areas in the tubers or roots. In carrots and other crops where the tap root is harvested, the tap root will often die leading to the formation of unmarketable fibrous roots.
- ✓ Lack of root function and movement of water and calcium in the plant will lead to calcium related disorders in plants; most notably you will have a higher incidence of blossom end rot in tomatoes, peppers, watermelons, and several other susceptible crops.
- ✓ Leaching and denitrification losses of nitrogen and limited nitrogen uptake in flooded soils will lead to nitrogen deficiencies across most vegetable crops.
- ✓ In bean crops, flooding or waterlogging has shown to decrease flower production and increase flower and young fruit abscission or abortion.
- ✓ Ethylene buildup in saturated soil conditions can cause leaf drop, flower drop, fruit drop, or early plant decline in many vegetable crops.

Recovering from Flooding or Waterlogging

The most important thing that you can do to aid in vegetable crop recovery after floods or waterlogging is to open up the soil by cultivating (in crops that still small enough to be cultivated) as soon as you can get back into the field. This allows for oxygen to enter the soil more rapidly. To address nitrogen leaching, sidedress with 50 lbs of N where possible.

In fields that are still wet, consider foliar applications of nutrients. Since nitrogen is the key nutrient to supply, spraying with urea ammonium nitrate (28 % N solution) alone can be helpful. These can be sprayed by aerial or ground application. Use 5 to 20 gallons of water per acre. The higher gallons per acre generally provide better coverage. As with all foliar applications, keep total salt concentrations to less than 3% solutions to avoid foliage burn. Research in on flooded vegetables in Florida showed the best response to foliar applications of potassium nitrate.

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