VegNet

Vol. 16, No. 20. July 29, 2009 The Ohio State University Extension Vegetable Crops
On the WEB at: http://vegnet.osu.edu

In This Issue

Cucumber Downy Mildew Marching Through Northern Ohio

Sally Miller, Department of Plant Pathology

During the week of July 20, downy mildew was confirmed in commercial and/or garden cucumbers in Medina and Wayne counties. Downy mildew is now present in many of our northern counties (Geauga, Ashtabula, Sandusky, Huron, Ottawa and Henry counties reported previously). Downy mildew was confirmed on unsprayed garden cantaloupes in Wayne County this weekend as well. Please see VegNet Vol. 16 No. 18 (July 15) (http://vegnet.osu.edu/news/currentvn1809.htm) or our downy mildew fact sheet (http://ohioline.osu.edu/hyg-fact/3000/index.html) for pictures of downy mildew on cucumbers, melons and other vine crops. Fungicide recommendations are also provided in the July 15 issue of VegNet.

According to the Cucurbit Downy Mildew Forecasting website (http://www.ces.ncsu.edu/depts/pp/cucurbit/) epidemic spread from known sources was very likely over the weekend, so disease outbreaks can be expected in new locations this week. The Saturday rainstorms moved primarily from west to east, angling northward. The rainfall, overcast skies and cool temperatures experienced recently are highly favorable for downy mildew infection, disease development and spread. Commercial cucumber growers in northern counties should use an aggressive fungicide program, as should those in counties adjacent to this northern line of the epidemic. Growers in central and southern Ohio should continue to apply protectant fungicides. Remember that downy mildew is very difficult to control once it is present in a field, and even with the more effective fungicides control may not be a good as desired if the disease has established a foothold.

Septoria Leaf Spot in Tomatoes. Sally Miller, Department of Plant Pathology

Septoria leaf spot has been reported throughout the state on tomatoes from home gardens to commercial farms. The disease causes discrete spots (1/16 inch in diameter) on the leaves (Fig. 1) and defoliation can be significant. Spots on fruit are never observed. Septoria leaf spot is caused by the plant pathogenic fungus *Septoria lycopersici*. Tiny dark brown or black fruiting bodies of Septoria, which appear in the dead tissue in the middle of a lesion (Fig. 2), can be seen sometimes with the naked eye but usually with a hand lens. These fruiting bodies are diagnostic for Septoria leaf spot and produce the spores (Fig. 3) that spread the disease. Under high moisture conditions, spores ooze out of the fruiting bodies in a gelatinous mass and are spread by rainsplash and overhead irrigation to other sites.

Fig. 1. Septoria leaf spot on tomato

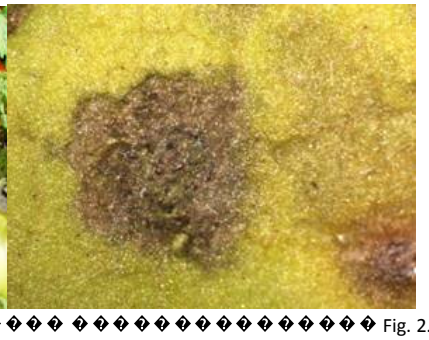

Fig. 2. Fruiting bodies of Septoria (dark dots in center of lesion

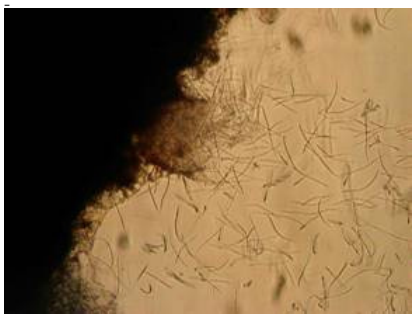

Fig. 3. Cross section (microscopic image) of

tomato leaf lesion with fruiting body of
Septoria releasing long cylindrical spores

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Managing Septoria leaf spot. Organic farmers and gardeners rely primarily on cultural practices to manage this disease. Since the fruiting bodies can last some time in soil, a rotation of at least 4 years away from tomato is necessary. Septoria is a seedborne pathogen so clean seeds are important. See OSU seed treatment Fact Sheet HYG-3085-05 (http://ohioline.osu.edu/hyg-fact/3000/3085.html) for seed sanitation methods. Plants can be mulched with straw to reduce splash dispersion of the spores. Tomatoes should be staked and lower leaves pruned to increase air movement through the canopy and hasten drying. Diseased tomato tissues should be removed and discarded during the season and heavily infected plants should be removed from the site. Deep plowing at the end of the season will encourage tissue breakdown and shorten the length of survival of the pathogen.

Copper fungicides have some efficacy against Septoria leaf spot and several formulations are OMRI approved. Copper fungicides are also available in garden centers/stores, e.g. Bonide products, but these may or may not be approved for certified organic tomatoes. Conventional farmers can manage Septoria well using strobilurin fungicides such as Quadris, Flint, Tanos, or Cabrio alternated with chlorothalanil products such as Bravo or Equus. Garden products containing chlorothalanil such as Daconil are sold in some garden centers and big box stores.

Late Blight Occurrence and Management in Potatoes and Tomatoes in the Northeastern United States

By Margaret Tuttle McGrath
Department of Plant Pathology and Plant-Microbe Biology, Cornell University

On Long Island, NY, symptoms of late blight were confirmed on June 23 in a commercial field of potatoes and on June 24 on tomatoes in a near-by home garden. Appearance of symptoms in the garden suggested they were the result of inoculum spread from the commercial field. It also appeared that spread occurred in the commercial field. Based on these observations late blight likely had been on Long Island for about two weeks. Prior to this there had been a few reports of late blight from states to the south and west of Long Island. Then came a report of late blight on tomato plants at a retail store in Ithaca, NY, on June 24. This was followed by a flood of findings from Ohio to Maine as extension specialists started looking in stores. Then came more findings in home gardens, including on plants purchased up to two weeks earlier, and in plantings on farms. So far in 2009 late blight has been detected in South Carolina, North Carolina, Virginia, West Virginia, Ohio, Maryland, Delaware, New Jersey, Pennsylvania, New York, Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont, and Maine. Occurrence of late blight this year is unprecedented. There is no record of it being this widespread in the eastern U.S. this early in the growing season. And it has never been seen on tomato plants for sale in garden center stores.

This is an extremely destructive disease when not managed, quickly killing foliage and rotting tomato fruit and potato tubers. Late blight was the cause of the Irish Potato Famine.

Rainy, cloudy conditions have been providing favorable conditions for the pathogen to successfully be dispersed, including long distances and for infection. Clouds protect spores being dispersed in wind from the killing effect of ultraviolet radiation.

All tomato and potato crops are at high risk of developing late blight this season, especially if the rainy weather continues. All growers should assume their crops eventually will be affected and thus should be on a weekly schedule to both thoroughly inspect their potato and tomato plantings and apply fungicides. Late blight is considered unmanageable with fungicides applied after symptoms are seen.

Classic symptoms are large (at least nickel sized) olive green to brown spots on leaves with slightly fuzzy white fungal growth on the underside when conditions have been humid (early morning or after rain). Sometimes the lesion border is yellow or has a water-soaked appearance. Leaf lesions begin as tiny, irregularly-shaped brown spots. Brown to blackish lesions also develop on upper stems. Firm, brown spots develop on tomato fruit. Photographs are posted on the web at:
http://www.hort.cornell.edu/department/Facilities/lihrec/vegpath/photos/lateblight_tomato.htm
http://vegetablemdonline.ppath.cornell.edu/factsheets/Potato_LateBlt.htm

When late blight is found in a localized spot in a field, promptly destroy all symptomatic plants plus a border of surrounding plants to eliminate this source of inoculum. Physically pull and drop affected plants, spray with herbicide, or disk. The herbicides diquat and paraquat are good choices for applying with a hand sprayer. Gramoxone is effective but dangerous; there is no antidote in the event of accidental exposure. When disking is used the crop should first be sprayed with fungicide because of the potential to move spores on equipment especially while driving out of the field, and the equipment should be pressure washed afterwards.

Conventional Fungicides
Begin a fungicide program with products specifically for late blight in this field and other fields near by. These products have translaminar activity and thus provide better coverage than contact, protectant fungicides. A five- to seven-day spray interval is recommended when weather conditions are wet and cool. It can be extended to 10 days under hot, dry conditions.

Alternate among fungicides in different chemical groups (as indicated by FRAC Code) to manage resistance. The late blight pathogen has demonstrated ability to develop resistance; Ridomil fungicides are no longer recommended because of resistance. Include in each application a protectant fungicide like maneb, mancozeb or chlorothalonil, or triphenyltin hydroxide for potatoes. This is important for resistance management and ensuring effective control, and is specified on the label and thus is a requirement. A spray program with just protectant fungicides applied regularly starting before late blight begins to develop can provide adequate control, but this is challenging to achieve when plants are actively growing and conditions are very favorable for disease development, as has been occurring this spring to summer.

Curzate (FRAC Group 27 fungicide) or Tanos (also contains cymoxanil, active ingredient in Curzate) can be a good choice for the first application because these fungicides have some kickback activity, thus they can suppress some new lesions. The maximum kickback is about two days when it is cool, declining with increasing temperatures to about zero above 80 degrees F. Cymoxanil has little residual activity, therefore, five days later apply another fungicide.

Previcur Flex (Group 28) has some systemic activity, which is an important attribute even though it is not as systemic as Ridomil. It was the only fungicide rated good for symptoms on stems and also for protecting new growth in a bulletin from the University of Maine; it is not known how effective many of the other products are on new growth that develops after the application. The product was not rated as highly as other late blight fungicides for leaf symptoms (good versus excellent). It is considered a good choice for an application made right before rain, as the product is rainfast in 30 minutes. According to the manufacturer, Previcur Flex provides best control when applied in blocks of two applications alternated with two applications of other

fungicides.

Revus Top (Group 40 + 3) is a new fungicide that has excellent activity for late blight. It gets into plants fast, in about 30 minutes, then slowly moves in the plant providing good residual. It has some kickback activity. It does not need to be applied with a protectant fungicide. Unfortunately, the U.S. inventory of this product has been used up. However, the manufacturer has responded to the situation and prepared a supplemental label for another fungicide, Revus (Group 40), which was not labeled at the time of the outbreak for use on tomatoes and potatoes. EPA approved it promptly. These fungicides, especially when mixed with other products, should not be left in the spray tank as irreversible settling can occur.

Other fungicides to consider including in the fungicide program are Gavel (Group 22), Forum (Group 40), and Ranman (Group 21) plus Presidio (Group 43) for tomatoes and Omega (Group 29) for potatoes. Gavel is the only late blight fungicide formulated with a protectant.

Group 11 fungicides (Headline, Quadris, Reason, etc) and Group 33 (phosphorous acid) fungicides are not considered as effective for late blight as the other products.

Good fungicide coverage is critical. Pathogen spores can be moved on equipment and workers, therefore spray and work in affected fields last and clean equipment between fields.

As soon as harvest is complete or the field is abandoned, apply an herbicide like diquat to kill plants and/or disk down the field. Disk on a sunny day when foliage is dry to minimize the quantity of spores dislodged and able to survive wind dispersal to another crop.

Late blight can develop in high tunnels and greenhouses. Fungicides that can be used include Curzate, Revus, Revus Top, and several mancozeb and copper fungicides. Previcur Flex is labeled for use in greenhouses applied to soil for root rot and damping-off.

Information from Labels for Late Blight Fungicides:

Curzate 60DF (Group 27). 3.2-5 ounces per acre (3.2 ounces for potatoes). 5 oz on 5-day interval when late blight present. 30 oz/A seasonal max. 3 d PHI.
 EPA Reg No. 352-592. Active ingredient is Cymoxanil. 12 h REI. Must be tank-mixed with a protectant fungicide.

Forum (Group 40). 6 fluid ounces. 30 fl oz/A seasonal max. 2 consecutive spray max. 4 d PHI.
 EPA Reg No. 241-427. Dimethomorph. 12 h REI. Must be applied with another fungicide.

Gavel (Group 22). 1.5-2 pounds. 16 lb or 8 application seasonal max. 5 d PHI tomato; 3 d PHI for potato (14 d in some states). Latron surfactant recommended.
 EPA Reg No. 62719-441. Zoxamide + mancozeb. 48 h REI.

Omega 500F (Group 29). 5.5 fl oz for potatoes. 3.5 pts/A seasonal max. 14 d PHI.
 EPA Reg No. 71512-1-100. Fluazinam. 48 h REI.

Presidio (Group 43). 3-4 fl oz for tomatoes. 12 fl oz/A seasonal max. 2 consecutive spray max.
 EPA Reg No. 59639-140. Flupicolide. 12 h REI. 2 d PHI. Not registered in NYS yet.

Previcur Flex (Group 28). 0.7-1.5 pint (1.2 pints max for potatoes). 7.5 pts/A seasonal max for tomatoes; 6 pts/A for potatoes. 5 d PHI for tomato; 14 d PHI for potato.
 EPA Reg No. 264-678. Propamocarb hydrochloride. 12 h REI.

Ranman (Group 21). 1.4 2.75 fluid ounces (2.1-2.75 for tomato). 16.5 fl oz or 6 application seasonal max for tomatoes; 27.5 fl oz or 10 applications for potatoes. 0 d PHI for tomatoes; 7 d for potatoes.
 EPA Reg No. 71512-3-279. Cyazofamid. 12 h REI.

Revus (Group 40). 5.5 to 8 fluid ounces. 2 consecutive spray max. 32 fl oz/A seasonal max. 1 d PHI for tomato; 14 d PHI for potato.
 EPA Reg No. 100-1254. Mandipropamid. 12 h REI.

Management in organic crops.
Apply fungicides preventatively and use a regular schedule when conditions are favorable. There is limited data from replicated experiments on efficacy for late blight of products approved for organic production. Copper has provided some control where other products have failed in efficacy experiments. However, copper is not considered very effective because it has provided poor control in efficacy experiments where excellent control was achieved with conventional fungicides. Other OMRI-listed fungicides labeled for late blight include Sporatec, Sonata, Serenade Max, and Oxidate, plus Companion which is not presently on the OMRI list. Copper has been found to be ineffective when used as the sole practice for controlling late blight once it has started to develop. It is important to scout regularly and promptly destroy affected plants when found to reduce the amount of inoculum in a field. It is recommended that plants with symptoms be physically pulled up plus a few border plants, preferably on a bright sunny day when possible, then tarp the plants; spores will be killed by sunlight and also heat under the tarp. Scout daily thereafter for a few days to see if more plants develop symptoms. Clean after working in infested fields to avoid moving spores on equipment and workers. As soon as harvest is complete or the field is abandoned disk down field.

The specific directions on fungicide labels must be adhered to. They supersede these recommendations (above), if there is a conflict. Check state registration and organic approval before using a product. Any reference to commercial products, trade or brand names is for information only; no endorsement is intended.

Some of this information on management was provided by Dr. Steve Johnson, University of Maine Cooperative Extension, and Dr. Tom Zitter, Cornell University.

Pumpkin Self-Directed Field Day at Western Agricultural Research Station Jim Jasinski, Bob Precheur

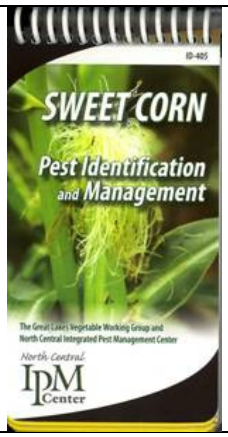
The OSU Extension Vegetable Team wants to invite growers to attend a self-directed field day at the Western Ag Research Station in South Charleston on Tuesday, September 1, from 3-7 PM. Growers can stop in or leave any time during the four hour window to talk to state vegetable specialists from the departments of Entomology, Plant Pathology, Horticulture and Crop Science, Piketon Research Station, and the IPM Program about disease, insect, and weed management or general horticulture, pollination, micro irrigation, fertility, and variety selection questions. Growers are encouraged to bring plant

and fruit samples for the specialists to diagnose, and maps will be provided so growers can walk around the variety and research plots.

Signs will be used to direct growers to the plots where the specialists will be waiting under a tent or at a table to answer any crop production or pest management questions. This should allow growers to get individual questions answered during a four hour window.

There will be a several small presentations by the specialists only from 5-6 PM out in the field which will cover current topics in disease, insect, and weed management, or other key topics.

There will be no pre-registration for this event, no charge for attending, and no CCA or PAT credits offered. Refreshments (water and soft drinks) will be on hand. In case of rain, we will have the field day in the conference room at the new main building on the research station. The research station is located on S.R. 41 between South Charleston and I-70; complete directions to WARS including a map can be found online at http://oardc.osu.edu/branches/branchinfo.asp?id=9.
For more information, contact Jim Jasinski (Jasinski.4@osu.edu), Bob Precheur (precheur.1@osu.edu), or the research station at 937-462-8016.



Sweet corn pocket guide, still available Jim Jasinski, IPM Program

If you grow sweet corn and occasionally have questions about pest management or crop production, you need to get a copy of the *Sweet Corn Pest Identification and Management* pocket guide. This 3 x 5 pocket guide is a quick, colorful, and handy reference published in 2008 by the Great Lakes Vegetable Working Group and the North Central IPM Center for sweet corn growers, extension educators, crop consultants, and industry field representatives who work in the North Central Region and Ontario, Canada. This guide contains pictures, basic descriptions, and management tips of economically important weeds, diseases, pest insects, and vertebrates. It also includes sections that describe beneficial insects, common types of herbicide injury, and general horticultural practices.

The information presented here is brief and cannot include every possible pest or management option in fresh market or processing sweet corn production in these areas but focuses on the most critical pests and management options.

How can you get a copy? You can either buy it for $15 at http://extension.purdue.edu/store/ (item ID-405) or be one of the first 30 Ohio growers to complete an online sweet corn IPM survey and receive a free copy in the mail. Only basic pest management questions are asked and there are no questions about annual sales, profitability, or other economic data. There is a code at the end of the survey that you will need to qualify for the free pocket guide. After completing the online survey, write down the code on the last screen. Contact Sheila Callicoat (937-484-1526) at Ohio State University Extension and give her the code; she will then mail the pocket guide to you. This offer is good only to Sep. 30, 2009.

The survey data will be used to guide future IPM research and Extension program delivery. Any public reports of study findings will be based on grouped data and will not reveal individual responses. Results of this study may be used for publications, presentations, or shared with grower groups, industry, or agri-business.

Here is the link to the Sweet Corn Pest Management Survey:
http://www.surveymonkey.com/s.aspx?sm=NeTTF3Q19u2AAYGy3K5Xdw_3d_3d
We expect to have the results of this survey summarized by the fall of 2009, and posted on the VegNet newsletter and on the Great Lakes Vegetable Working Group website at http://glvwg.ag.ohio-state.edu/.

If you would like more information about the survey, please contact Jim Jasinski, OSU Extension, IPM Program, 937-484-1526 or Jasinski.4@osu.edu
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