A newsletter for commercial vegetable growers prepared by the Purdue University Cooperative Extension Service

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**TOMATO SCOUTING REPORT** - (*Dan Egel and Scott Monroe*) - Since the last *Vegetable Crops Hotline* several tomato diseases have been reported. This report briefly discusses these diseases. For more details, see the *Midwest Vegetable Production Guide for Commercial Growers* 2011 (ID-56) http://www.btny.purdue.edu/Pubs/ID/ID-56/ or call (812) 886-0198 and ask for Dan Egel. All of the diseases discussed were found in a high tunnel or greenhouse.

Botrytis Gray Mold: Tomatoes with this disease can be recognized by the gray, brown lesions on leaves, stems or fruit (see Figure 1). The lesions are usually covered with the gray growth of the fungus. Conditions that favor gray mold are high humidity and cool temperatures. These conditions are often found in greenhouse/high tunnel-produced tomatoes. Gray mold may be managed by venting the greenhouse to reduce humidity, spacing and pruning tomatoes to improve aeration (don't leave short branches that can become colonized with the gray mold fungus) and sanitize the greenhouse between generations. It's most important to vent the greenhouse just before nightfall to get rid of humid air before the lower night temperatures lead to an increase in relative humidity in the greenhouse. Even if it is humid outside or the greenhouse doesn't need to be vented for temperature control at that time, it is helpful to exchange the air to reduce humidity. Fungicides that may be used in the greenhouse for gray mold include Botran 70 WP® and Scala SC®.

**Tomato pith necrosis** is often first observed as chlorosis (yellowing) of young leaves. This may be associated with a dark brown necrosis of the lower stem (see Figure 2). Low night temperatures, high nitrogen levels



**Figure 1:** The lesions of Botrytis gray mold on tomato leaves often appear brown and wedge shaped, and are often covered with the gray fungus. (*Photo by Dan Egel*)

and high humidity favor the bacterium that causes pith necrosis. Therefore, it is usually seen in a greenhouse situation. The only management recommendation is to avoid high nitrogen levels in tomato plants as well as high humidity. Pith necrosis is relatively uncommon to Indiana. Thanks to Gail Ruhl of the Plant Pest and Diagnostic Clinic for helping to diagnosis tomato pith necrosis.



**Figure 2:** Tomato pith necrosis often causes dark necrotic stems. (*Photo by Dan Egel*)

**Zipper scars** are caused when the flower petal parts adhere to the developing tomato fruit and cause a line to form in the fruit. Sometimes the fruit opens up to reveal the locule (see Figure 3). This malady is usually associated with cool weather. Specific cultivars appear to be associated with the zipper scars. For future production, consider different cultivars for plantings that are likely to experience cool conditions.



**Figure 3:** Zipper scars on tomatoes appear as a line running from the blossom to the stem end of the tomato, occasionally opening up to the interior of the fruit. (*Photo by Dan Egel*)

**Southern blight** causes a gray necrotic area at the base of plants that girdles and kills the plants. Round, brown fungal bodies about the size of George Washington's eye on a quarter are often observed in the necrotic tissues (see Figure 4). Southern blight is often associated with southern climates. In 2010, this disease was observed in Indiana, perhaps because of the warm weather. Southern blight has already been observed in 2011. Manage southern blight by using long crop rotations with small grains and deep plowing the soil after harvest. At transplant, the fungicide Terraclor 75 WP<sup>®</sup> (greenhouse labeled) may help lessen the severity of this disease in areas with a history of Southern blight.



**Figure 4:** Southern blight on tomatoes causes a girdling of the stem at soil level in which small, round fungal bodies appear. (*Photo by Dan Egel*)

**CROP NUTRIENT STATUS FOR FIELD AND SOILLESS PRODUCTION IN PROTECTED STRUCTURES** - (Shubin K. Saha) - In-season management of nutrients in a vegetable plasticulture system relies on obtaining information from the crop. Although vegetable crops can give you a visual indicator to the crop nutrient status, it is not the best approach to management as you have likely already lost some of your production potential at the time deficiency symptoms arise. There are current technologies available that one can utilize on site or send off to a designated private laboratory for analysis. Portable technologies are available to be utilized by growers for rapid testing onsite, such as Cardy meters. There are two types of analyses that are discussed here: foliar nutrient analysis (nitrogen and potassium) and nutrient solution (pH and EC).



**Figure 5**: Cardy nutrient concentration meters for nitrate and potassium determination. (*Photo by Shubin K. Saha*)

Foliar nutrient analysis: Currently there are two meters available from Horiba that can be used to determine concentration of nitrate-nitrogen and potassium in the plant sap extracted from leaf petioles (see Figure 5). Based on the value detected by the sensors the plant nutrient status for nitrogen and potassium can be designated high, low, or sufficient based on ranges identified with research that are available through extension publications. Portable devices are good tools since the results can be obtained rapidly on site to be able to make management decisions in a timely fashion. The negative thing about these devices is that one must feel comfortable with and have a good understanding of how to utilize and calibrate these types of portable devices. Additionally these portable meters are currently only available for 2 of the 13 essential elements (nitrogen and

potassium). The alternative to portable devices such as this is to send samples to a specialized laboratory to provide analysis. The benefits of sending leaf samples to a specialized laboratory is that 1) all essential elements can be tested for instead of the two that can be tested for with portable meters and 2) specialized laboratories frequently provide fertilizer recommendations. The negative aspect of using specialized laboratories is that one has to wait for results usually a minimum of travel time plus one or two days for analysis. Additionally there is a fee for each sample where the portable devices will eventually pay for themselves. However maintaining sufficient yields could offset the cost of sending samples to private labs. Cost per sample can vary based on the lab chosen and on which components are tested. Two examples of facilities that provide these types of services are A&L Great Lakes Laboratories (3505 Conestoga Drive, Ft. Wayne, IN, 46808, 260-483-4759) and Waters Ag Laboratories (2101 Calhoun Rd, Highway 81, Owensboro, KY, 42301, 270-685-4039). There are other labs that provide the same or similar services. Check with each lab for their desired sample collection method. Both field producers and soilless greenhouse producers can utilize these test results to make management decisions regarding in-season fertilizer application.

Nutrient Solution Analysis (Soilless Culture): Soilless culture is commonly used in a greenhouse and is similar to hydroponics as all nutrients are provided via irrigation, however it also includes the use of a substrate such as perlite, pine bark, coconut coir, or a peat based mix. The Cardy meters mentioned previously can also be utilized to determine nitrate and potassium content in the nutrient solution. In addition, there are two other portable devices that can be beneficial for soilless culture, the pH and E.C. (electrical conductivity) meters (see Figure 6). The pH is important for soilless culture as the substrate is typically much less buffered than soil and also because it is directly linked to nutrient availability for plant uptake. In soilless culture in particular it is extremely important to maintain the appropriate pH of the nutrient solution. E.C. meters provide a general concentration of salts/fertilizers present in the nutrient solution. This can indicate a general need to increase or reduce fertilization rate. As with plant tissue testing, one can send nutrient solution samples to private laboratories for analysis. However due to the nature and inherent need for an immediate change if either pH or E.C. are significantly out of range, it is in your best interest as a producer to have at least these two types of portable meters on hand. If you have specific questions on where to obtain or how to use these portable devices for nutrient monitoring, please feel free to contact me, Dr. Shubin K. Saha, D.P.M., Ph.D., at 812-886-0198, or ssaha@purdue. edu, for help or demonstration if desired.



**Figure 6**: pH and E.C. combination meter. (*Photo by Shubin K. Saha*)

**CORN EARWORMS** - (*Rick Foster*) - Corn earworms moths are flying throughout the state. The pheromone trap catches are relatively low, ranging from 1 to 18 moths per night but those numbers are sufficient to cause serious damage if you have early silking sweet corn. If you have early sweet corn and have not yet put your pheromone trap up, it would be a good idea to get it up as soon as possible. Our recent experiences and research have shown that the usual earworm threshold of 10 moths per night is too high for early silking sweet corn when the field corn in the vicinity is not very mature. To see the most recent data on pheromone trap catches around the state, please visit my website at http://extension.entm.purdue.edu/topics/vegetable.php.

Growers should also remember that the corn earworm is also known as the tomato fruitworm. Growers who are producing tomatoes or peppers in high tunnels should watch for possible damage from the tomato fruitworm. Our research last year showed that moths are very capable of flying and laying eggs in high tunnels. We have not specifically seen problems with tomato fruitworm, but a number of other moths have caused serious damage to our crops grown in tunnels. I don't recommend that you immediately start spraying insecticides for fruitworms in your tunnels, but you should be watching for possible damage to the fruit. For the latest listing of insecticides available for use in high tunnels or greenhouses, see http://www.btny.purdue.edu/Pubs/ID/ ID-56/GreenhouseTunnel.pdf.

**EUROPEAN CORN BORERS** - (*Rick Foster*) - We have caught European corn borer moths in our blacklight traps around the state. The catches in the traps are the highest that we have seen for a number of years. Since the adoption of Bt corn by most field corn growers, the population of corn borers has dropped dramatically. For some reason, the populations are higher this year than they have been in recent years. First generation corn borers generally like to lay their eggs on the most mature corn in the neighborhood. If your sweet corn is ahead of most of the field corn in your region, then it is likely to be very attractive to corn borer moths. Growers should start scouting their whorl stage corn in the next two weeks or so. Scouting simply involves walking the field and looking for the characteristic windowpane type feeding that your corn borer larvae do. Usually, the damage they do to the whorl stage corn will not affect plant growth or ear size, but as the ears start to form, the larvae will migrate to the ear and make the ear unmarketable. The proper time for treatment is when the tassels first begin to emerge from the whorl. Pyrethroid insecticides provide excellent control of corn borers. Like earworms, corn borers can also be pests of peppers and tomatoes. If you are growing those crops in high tunnels, there is potential for damage from corn borers. Again, don't spray until you start to see some damage. See the Midwest Vegetable Production Guide for Commercial Growers 2011 (ID-56) http://www.btny.purdue.edu/Pubs/ ID/ID-56/GreenhouseTunnel.pdf for pesticide choices for use in high tunnels.



**BROWN MARMORATED STINK BUG** - (*Rick Foster*) - (*Editor's note: A photo of the Brown Marmorated Stink Bug is included in the photographs of pests and diseases in the ID-56 at this link http://www.btny.purdue.edu/Pubs/ID/ID-56/photos.pdf*). We have begun trapping for brown marmorated stink bugs in 8 locations scattered around the state. So far we have not caught any stink bugs. Our goal is to determine how widespread this new pest is and to provide early warning to growers about its presence. If you think that you have found a brown marmorated stink bug, please capture it, put it in a container and kill it in a freezer, and either contact me at (765) 494-9572 or fosterre@purdue.edu or your local county Extension educator about getting it properly identified. Thanks for your help.

**PHYTOPHTHORA BLIGHT** - (*Dan Egel*) - Infection and spread of this disease is favored by rainy weather. Recently, our weather has been very dry - far from perfect conditions for Phytophthora blight (pronounced fy-tópthor-a). Since many growers complained about this disease last year, however, I have included an update about Phytophthora blight below. A detailed article about Phytophthora blight appeared in the *Vegetable Crops Hotline* last July http://www.btny.purdue.edu/pubs/vegcrop/ VCH2010/VCH526.pdf. If you don't have access to this article, call (812) 886-0198 and ask for Dan Egel. Tips for this year:

Learn to recognize the symptoms - An important part of managing Phytophthora blight is recognizing the symptoms. Affected produce tends to be brown, watersoaked and have a white mold growing on it (see Figure 7). See the article from last July or call the above number for more details. Most importantly, contact the Plant Pest and Diagnostic Laboratory at Purdue University for an accurate diagnosis if you are unsure.

Limit overhead irrigation - While overhead irrigation may be necessary, limit the amounts to just what is needed. Overhead irrigation may favor the spread of disease. This is especially true in fields with a history of Phytophthora blight.

**Be careful about using surface water for irrigation** - Reservoirs or rivers can be contaminated with Phytophthora from the run-off of nearby fields. If such waters are used for overhead irrigation, Phytophthora blight may result.

**Manage your culls** - Do not leave culled produce in the field where production is ongoing or place such produce in a field that will be used for vegetable production in the future. Whether the vegetable looks diseased or not, it may contaminate production elsewhere. Similarly, place cuttings in a spot far from production.

Consider specialized fungicides - The fungicides which are the most effective against Phytophthora blight are relatively expensive and are not generally effective against most other diseases. Contact fungicides may offer moderate protection if used as part of a season long program against Phytophthora blight and other diseases. Contact fungicides include chlorothalonil (e.g., Bravo<sup>®</sup>, Echo<sup>®</sup>, Equus<sup>®</sup>). However, systemic fungicides will have more impact against this disease. Systemic fungicides include dimethomorph (e.g., Acrobat<sup>®</sup>, Forum<sup>®</sup>), cyazofamid (Ranman<sup>®</sup>) and fluopicolide (Presidio<sup>®</sup>). Tanos<sup>®</sup> is labeled for suppression of Phytophthora blight as well as anthracnose of watermelon. No fungicide will provide adequate control without also using the cultural controls discussed below. When deciding to use fungicides to combat Phytophthora blight, remember that fungicides will only protect healthy plants. Fungicides are best used at the start of an epidemic.

## Advice for next year:

Avoid poorly drained fields, especially those with a history of the disease. The use of raised beds can help control this disease in some crops.

Fumigation has been effective in some cases.

**Use crop rotations** of at least 4 years without crops in the pepper or cucurbit families. Only crops in the grass family such as wheat or corn are truly resistant.



**Figure 7:** A squash fruit infected with Phytophthora blight has a water-soaked appearance and has a white mold growing on it. (*Photo by Dan Egel*)

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NATURAL DISASTER AREAS - Several counties in the Midwest were designated Natural Disaster Areas following the storms April 17 and shortly after. While no Indiana counties had such a designation, farmers and ranchers in the following counties in Indiana qualify for natural disaster assistance because their counties are contiguous to disaster counties: Jefferson, Perry, Posey, Spencer, Warrick and Vanderburgh. All counties listed above were designated natural disaster areas June 4, 2011, making all qualified farm operators in the designated areas eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity. See this website http://www.fsa.usda.gov or call (202) 690-4585.



THE AGRICULTURAL MARKETING SERVICE (AMS) has announced the availability of approximately \$10 million in competitive grant funds in fiscal year (FY) 2011 to be awarded through the Famers Market Promotion Program (FMPP). The FMPP competitive program is administered by the Marketing Grants and Technical Services Branch (MGTSB), Marketing Services Division (MSD) of AMS and is designed to promote the domestic consumption of agricultural commodities by expanding direct producer-to-consumer marketing opportunities. The minimum FY2011 FMPP award per grant is \$5,000 and the maximum is \$100,000. An applicant is limited to no more than one grant in a grant-funding year. FMPP funding will be available for use beginning in October 2011. Project work should begin in October 2011 and end not later than October 2013. Matching funds are not required. Must follow the 2011 FMPP Guidelines for application instructions and requirements found on the FMPP website at http://www.ams.usda.gov/FMPP or phone 202-720-8317.



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