

VEGETABLE CROPS HOTLINE

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

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No. 566
May 2, 2013

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CUCURBIT TRANSPLANT DISEASES - (Dan Egel) - Whether one grows or purchases transplants, it is important to the yield and quality of the crop to start with healthy plants. This article will review some of the common cantaloupe and watermelon diseases of transplants.

Gummy Stem Blight - This fungal disease causes dark brown leaf spots, however, the diagnostic feature of this disease is the water soaked lesion that is often formed under one of the seed leaves (cotyledons). Such lesions often start at the point where the seed leaf joins the stem (hypocotyl) and do not extend to the soil line (see Figure 1). In time, these lesions turn a light brown in color and appear 'woody'. If one inspects the woody stem closely, it is possible to see dark specks imbedded in the stem - these are fruiting bodies of the fungus and will exude copious spores when wet. Gummy stem blight affects both cantaloupe and watermelon.



Figure 1: Gummy stem blight of watermelon may cause a water soaked lesion on the stem (hypocotyl). (Photo by Dan Egel)

The fungus that causes gummy stem blight may be seed borne. The fungus may also survive on the residue left on contaminated transplant trays, the greenhouse floor or bench. Gummy stem blight may spread rapidly from plant to plant under warm, wet conditions.

Anthracnose - The leaf lesions caused by this disease tend to be angular and jagged (see Figure 2). Stem lesions are not common but if present, are often long and may be sunken. Lesions may extend to the soil line and may be mistaken for damping-off symptoms. When moist, lesions caused by anthracnose may become an orange or salmon color. Anthracnose affects both cantaloupe and watermelon.

Anthracnose is easily splashed from seedling to seedling. The causal fungus may be seed borne or, like the gummy stem blight fungus, survive on contaminated surfaces.



Figure 2: Anthracnose lesions of watermelon tend to be jagged and irregular in shape. (Photo by Dan Egel)

Bacterial fruit blotch - The primary difference between the lesions caused by this disease and the fungal diseases described above is that BFB causes a water soaked leaf lesion. Early lesions may appear as water soaked spots. Older lesions may be brown with a water soaked margin. Lesions often start on seed leaves. The symptoms of BFB are similar to angular leaf spot. (see article below) It is important to get an official diagnosis since BFB is a significant disease, while ALS is of minor importance. Bacterial fruit blotch affects both cantaloupe and watermelon.

Bacterial fruit blotch thrives under warm, wet conditions. Symptoms of BFB on leaves in the field may

easily be missed until the dark, water soaked lesions on the fruit are observed. The primary method of introduction of BFB to the greenhouse or field is through seed contamination.

Fusarium wilt of watermelon - The first symptom of this disease in transplants is that affected seedlings wilt even though the soil is moist. While Fusarium wilt on older plants is often recognized by a one-sided wilt, seedlings seldom exhibit this symptom. Similarly, while older plants with Fusarium wilt can be recognized by a vascular discoloration inside the lower stem, it can be difficult to recognize this symptom in seedlings.

Fusarium wilt of watermelon may be seed borne. However, the resilient spores survive well in the absence of a watermelon host for many years in the field or on unwashed transplant trays. There is preliminary evidence for a limited spread of Fusarium wilt in the transplant greenhouse.

Damping-off - The classic symptom of damping-off is the constricted, discolored lower stem (see Figure 3). The seedling subsequently collapses and dies. Wilt is another common symptom that results from affected stems and roots. The base of stems may appear red-brown in color. Seedlings may also die before emergence.

There are several fungi which may cause damping-off, all of which have many hosts and survive well in soil. These diseases are not seed borne, but the fungi involved survive well on transplant trays and implements. Damping-off does not spread from plant to plant. Cool, wet conditions favor damping off.



Figure 3: The constricted, discolored stem on this cantaloupe seedling is a symptom of the disease damping-off. (Photo by Dan Egel)

Management - Here are some points to remember for the management of these diseases.

- Purchase seeds tested for seed borne diseases such as gummy stem blight, anthracnose and bacterial fruit blotch.
- Avoid planting diseased transplants in the field. Inspect transplants growing in the greenhouse regularly. If transplants are purchased, inspect them

carefully upon delivery. It may be necessary to obtain an official diagnosis if questionable symptoms are observed.

- Good sanitation is key to plant health. Clean and sanitize greenhouse surfaces between transplant generations. Implements used for planting should also be cleaned and sanitized regularly. For many growers, it may be better to purchase new transplant trays than to try to sanitize old ones. Do not contaminate bags of greenhouse (soiless) mix with dirty implements or surfaces. More information on sanitation may be found here: www.extension.purdue.edu/extmedia/HO/HO-250-W.pdf
- The use of fungicides may reduce the spread of some of the diseases mentioned above from plant to plant, but are no substitute for prevention. If fungicides are used, be sure to check the label for information about rate, Restricted Entry Interval etc. Not all diseases are labeled for greenhouse use. See page 40 in the *Midwest Vegetable Guide for Commercial Growers* (mwveguide.org) for more information on greenhouse fungicides/insecticides.

The list of diseases discussed here is not exhaustive. It is certainly possible to encounter other diseases. For more information contact Dan Egel.



SCOUTING REPORT - (Dan Egel and Shubin K. Saha) - As weather conditions have improved we have received more vegetable samples and requests for visits. See below for some of the issues we have been addressing.

Angular Leaf Spot - This bacterial disease has been observed on cantaloupe and watermelon transplants. The lesions are often light brown, jagged with water soaked borders. (see Figure 4) It is not unusual to see this disease under cool, wet conditions as in a greenhouse. Fortunately, this disease is usually of minor importance. It is important, however, to differentiate this disease from bacterial fruit blotch.



Figure 4: Lesions of angular leaf spot on cucurbits often have jagged edges and yellow halos. (Photo by Dan Egel)

Environmental Stress on Tomato Transplants - In the last issue of VCH, the symptoms of bacterial canker were described as a marginal leaf chlorosis and necrosis. However, we observed tomatoes in a greenhouse where the soil conditions had been allowed to become too dry that had similar symptoms.

Fusarium Wilt of Watermelon - This disease was observed in greenhouse transplants. The article in this issue describes the symptoms and management.

Damping-off - These symptoms, described in this issue, have been observed on both cantaloupe and watermelon. Cool, wet conditions, and soil contamination are conducive to disease development.

Poor Growth in Low Tunnels - Most cucurbit plants currently in the field are under low tunnels due to the weather. Although these plants are protected to some extent by the tunnels, the cool weather has caused some problems. Cool weather slows down the growth of young seedlings; wet conditions favor fungi that can cause root problems. In some instances, these problems may be aggravated by herbicide carry over. Be sure to check herbicide labels for label restriction in rotating to vegetable crops. Table 24 on page 59 of the *Midwest Vegetable Production Guide for Commercial Growers 2013* will help to make such decisions.



BLOSSOM END ROT OF FRUITING VEGETABLES - (*Shubin K. Saha*) - Blossom end rot (BER) of fruiting vegetables is a physiological disorder linked with insufficient uptake of calcium and large variations in soil moisture. BER as the name indicates occurs on the blossom end of the fruit where a malformation occurs frequently appearing dark, water soaked, or necrotic. (see Figure 5) Calcium is critical to plants as it is a component of calcium pectate. Calcium pectate is the glue that holds plant cells together. Without sufficient amount of calcium to produce calcium pectate, the fruit will not develop properly. I liken calcium pectate to mortar used for building a brick wall. Without the mortar, the brick wall will collapse. BER is not a disorder, which can be cured once the symptoms have developed. Once the symptoms are observed, there is only hope to prevent it from occurring on future developing fruit. In addition, the problem is occurring at a very early stage when the fruit is pea-sized and the symptoms are not present at that point.

Calcium is one plant nutrient that is not highly mobile in the plant or the soil and if conditions are not conducive for uptake of calcium at the same rate the plant is growing, BER can be a result. BER can occur in many vegetable crops including tomato, bell pepper, eggplant, watermelon, and other cucurbits. It is probably most commonly encountered in tomatoes; however

management is similar for most vegetables that can be susceptible to this disorder. There are a few tactics one can utilize to minimize the incidence of BER. For example, in tomatoes, larger fruited varieties tend to be more susceptible to BER incidence. Further, within larger fruited varieties based on genetics, some are more prone to develop BER. Another means of avoiding BER is to ensure a soil test has been obtained before planting to ensure that if there is not sufficient levels present in the soil, that it be added as a fertilizer component pre-plant or as an in-season application. Calcium nitrate is one of the better sources for calcium, is soluble, and can easily be injected into the drip irrigation system. Most research indicates that foliar applications of calcium are not adequately absorbed by the plant to avoid BER. Calcium can actually be present in sufficient levels in the soil, but if the irrigation is not properly managed, BER can occur. With respect to irrigation, it is best to maintain consistent soil or media moisture. Try to avoid large fluctuations in the soil moisture status. Instead of watering a large volume a few times a week, it would be best to water daily. Further, it is best to irrigate multiple times per day breaking up the total volume into different events. Ability to manage irrigation volume and frequency will vary depending on your equipment, but can be automated fairly easily with minimal cost using a battery actuated solenoid valve for a little over \$100. To go one step further, it would be beneficial to utilize a flow meter to be able to monitor the volume applied at each irrigation event. Coordinating that with the battery actuated solenoid valve, one can maintain consistency of the soil moisture status. As a general rule, tomatoes with fruit load can utilize roughly ½ gallon of water per day. However, frequency of irrigation needs will be dependent on your system, crop growth stage, soil/media type, and environmental conditions. For any questions regarding BER please contact Shubin Saha, ssaha@purdue.edu, (812) 886-0198.



Figure 5: Necrotic or water soaked tissue is symptomatic of blossom-end rot on tomato. (*Photo by Shubin K. Saha*)



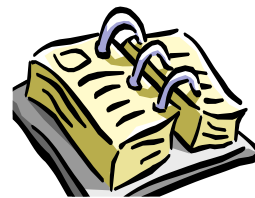
MANAGING PERENNIAL WEEDS IN TOMATOES - The Plant Management Network is sponsoring a webcast by Steve Weller, Ph.D, Purdue University. The presentation will summarize weed types, examples of problem perennial weeds (see Figure 6) and a discussion of techniques available for management. Emphasis will be on site preparation, elimination of perennial weeds before tomato crop planting and methods to manage perennial weeds in the tomato crop. Although cultural methods are available and will be mentioned, emphasis will be on chemical tools for perennial weed management. Discussion will include perennial weeds management in rotation crops, especially agronomic crops, as there are many more tools available for chemical management in agronomic crops. This presentation is open access through July 31, 2013. To view the presentation, click here:

www.plantmanagementnetwork.org/edcenter/seminars/tomato/ManagingPerennialWeeds/



Figure 6: Yellow nutsedge is an example of a weed that is discussed in the 'Managing perennial weeds in tomato' webcast. (Photo by Steve Weller)

FOOD SAFETY WEBINAR - Are you ready for the FDA to inspect your cantaloupe packing house? There will be a webinar on Thursday May 9, 2013 from 1 to 2:15 PM ET that will be a preview of what to expect when the FDA comes to inspect your facilities. The webinar features Michelle Danyluk, Ph.D., University of Florida and is co-sponsored by the Georgia Fruit and Vegetable Growers association and the Eastern Cantaloupe Growers Association. The webinar is free to members of either of the co-sponsoring associations; otherwise the cost is \$50. To register, click here library.constantcontact.com/download/get/file/1102316595112-864/FDA+Cantaloupe+Inspection+-REGISTRATION+FORM.pdf, or call Beth Oleson at (877) 994-3842, bbland@asinfo.net.



UPCOMING EVENTS

Produce Safety Alliance Q & A Sessions with the FDA about Proposed Produce Rule.

May 6: Growing, Harvesting, Packing, & Holding Activities

May 8: Equipment, Tools, Buildings, & Sanitation

May 10: Health, Hygiene, & Training of Workers

May 13: Recordkeeping, Compliance, & Enforcement

All sessions run from 11 a.m. to 12 p.m., EDT. To participate, dial in 5 minutes before the call begins.

Dial toll-free: 866-906-9888. Enter passcode: 8140591.

All session will be recorded and made available at producesafetyalliance.cornell.edu. For more information see the Produce Safety Alliance site or contact Gretchen Wall at 607-255-6806 or glw53@cornell.edu.



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