

VEGETABLE CROPS HOTLINE

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

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BACTERIAL CANKER OF TOMATOES - (Dan Egel) - This disease has been observed both in fresh market and processing tomato fields recently. This article describes the symptoms of the disease and a few management suggestions. Note that there are few management options for this disease in the late season. Therefore, the management options presented here are, for the most part, for next season.

Bacterial canker causes a wilt and dieback of tomato plants (Figure 1). Oldest leaves often wilt first. The outside of individual leaves will be yellow in color (marginal chlorosis) with a brown (necrotic) tissue immediately inside the yellow tissue (Figure 2). Eventually, large portions of affected plants will become necrotic. Vascular discoloration may be observed in the stem (Figure 3) In some cases, fruit will have "birdseye spot".



Figure 1: The shoot dieback seen here is one symptom of bacterial canker of tomato. (Photo by Dan Egel)

These lesions are white with a dark center (Figure 4). It is possible that not all these symptoms will be observed in each disease outbreak.

Bacterial canker moves into a field primarily through contaminated seed or diseased transplants. Control of this disease centers on preventing transplants with bacterial canker from reaching the field. It is critical to carefully monitor the source of seed and transplants. Growers should buy only seed that has been tested for the presence of the bacterium that causes bacterial can-



Figure 2: The firing or marginal necrosis observed above is typical of bacterial canker. (Photo by Dan Egel)



Figure 3: Bacterial canker may cause vascular discoloration in the lower stem. (Photo by Dan Egel)



Figure 4: “Birdseye” spots may be observed on tomato fruit with bacterial canker. (Photo by Dan Egel)

ker. If the transplants are “home-grown” from seed, the seedlings should be inspected frequently. Transplants that are purchased should be carefully inspected for bacterial canker symptoms at delivery.

Whoever or wherever the seedlings are grown, greenhouse sanitation (BP-61) <www.btny.purdue.edu/Pubs/#vegetables> and a regular bactericide program should be followed. Chemicals that are labeled for use on tomatoes in the greenhouse include several copper, Streptomycin (e.g., Agri-mycin 17®) and mancozeb (e.g., Dithane®, Manzate®) products. The effectiveness of copper products may be enhanced by mixing with mancozeb products before application. Apply bactericides at the first true leaf and at 7-day intervals until set in the field. Although copper products are important in keeping tomatoes free of bacterial spot and bacterial speck problems, field applications of copper will not greatly reduce bacterial canker problems. Read and follow the label carefully!

Cultural controls are necessary for managing bacterial canker of tomato in the field. Rotate away from tomatoes for at least 2 to 3 years before planting tomatoes again. Fall tillage will help to speed up the decay of tomato residue in the fall. Clean and disinfect all tomato cages or stakes before use next year.

Bacterial canker is an important disease of tomatoes in the Midwest. If the problem appears in your fields this year, take the above steps to make sure the problem is reduced next year.



ANGULAR LEAF SPOT ON CUCUMBER - (Dan Egel) - This disease has been reported in northern Indiana on pickling cucumber. This article describes the disease on cucumber, management options and the symptom difference between the symptoms of angular leaf spot and downy mildew on cucumber.

The first symptoms that one is likely to notice in cucumbers are the irregular water-soaked or gray lesions on leaves. These lesions may appear angular since the leaf vein limits the expansion of the lesions (Figure 1). Older lesions may appear brown and the center may

fall out giving the leaves a shot-hole appearance (Figure 2). The oval to circular lesions that appear on the fruit may later turn brown. Downy mildew of cucumbers also produces angular lesions on leaves. However, the production of spores on the underside of the leaf for downy mildew distinguishes the two diseases (Figure 3). Downy mildew does not produce lesions on the fruit.



Figure 1: Lesions of angular leaf spot on the upper and lower surfaces of cucumber. (Photo by Tom Zitter)



Figure 2: Cucumber leaves with angular leaf spot may have a shot-hole appearance. (Photo by APS Press)



Figure 3: Downy mildew on cucumber may resemble angular leaf spot, however, the former disease can be distinguished by the ‘fuzzy’ appearance of the spores on the underside of lesions. (Photo by Dan Egel)

Angular leaf spot is caused by a bacterium that may survive in seed or crop residue. Therefore, only seed tested for the presence of the angular leaf spot bacterium should be purchased. Transplants should be inspected regularly or upon delivery. Rotations of at least two years without cucurbit crops should help to reduce the amount of bacteria that survives in a field.

The temperatures that favor disease development are from 75 to 82°F. Rainy humid weather and heavy dews encourage spread of angular leaf spot. Applications of fixed copper products during such periods should slow the progress of the disease. Mancozeb products (e.g., Dithane®, Manzate®, Penncozeb®) may increase the effectiveness of the copper products in a tank mix.

Pumpkins may also exhibit symptoms of angular leaf spot. Angular leaf spot may spread from one crop to the other in nearby plantings.



ANTHRACNOSE OF MUSKMELON AND WATERMELON -

(Dan Egel) - As harvest of these crops proceeds several reports of anthracnose have been received. Although this disease is not as common in Indiana as, say, gummy stem blight, the presence of lesions on fruit make this an important disease to control.

At this time of year, growers may see the sunken, circular lesions on fruit (Figure 1). In wet weather, the lesions may appear a salmon-orange color due to the presence of the spores of the causal fungus. These lesions are more common on the underside of the fruit. On the foliage around such fruit, it will be possible to see jagged lesions on the leaves (Figure 2). Tan lesions on the stem may also be observed. It is my experience that anthracnose is more common on watermelon than muskmelon in Indiana (Figure 3). I have not observed this disease on pumpkins.

It is critical that fruit with lesions not be shipped. Even small lesions can cause fruit to deteriorate in shipment.

Management starts with transplant production. Purchase seed that has been tested for the presence of the anthracnose fungus. Transplant facilities should be clean and sanitized after every transplant generation. Transplants should be inspected regularly or at delivery.

Crop rotations of 3 or more years and fall tillage are both important steps to anthracnose management. Regular fungicide applications during the season will help to lessen the impact of this disease. The weather-based disease forecasting system MELCAST can be used to time fungicide applications for anthracnose.

All of these management methods may be found in the *Midwest Vegetable Production Guide for Commercial Growers 2008* (ID-56) <www.btny.purdue.edu/Pubs/ID/ID-56/> and in BP-134-W <www.btny.purdue.edu/Pubs/#vegetables>.



Figure 1: Anthracnose lesions on watermelon tend to be sunken and salmon-orange in appearance. (Photo by Dan Egel)



Figure 2: Leaf lesions of anthracnose on watermelon are often jagged in appearance. (Photo by Dan Egel)



Figure 3: Anthracnose may also be observed on muskmelon leaves. (Photo by Dan Egel)



DOWNY MILDEW OF CUCURBITS UPDATE - (Dan Egel) -
Downy mildew of cucurbits is still restricted to cucumbers in Hancock County. The outbreak of downy mildew in Hancock County happened to occur in an experimental plot with five cucurbit species. The experiment is part of a USDA grant Purdue University has obtained to keep track of downy mildew nationally and determine more about races of the downy mildew fungus. So far, only the susceptible cucumber variety has any significant infection while the resistant cucumber variety in the same location has only minor symptoms of downy mildew. Please report any suspected outbreaks of downy mildew to the Plant and Pest Diagnostic Laboratory or to Dan Egel.

Growers may follow the downy mildew epidemic at the North Carolina State University Cucurbit downy mildew webpage <www.ces.ncsu.edu/depts/pp/cucurbit/>, which is updated twice a week.



EMERGENCY FLOOD ASSISTANCE AVAILABLE - (Announcement) - *\$17,500 in new emergency flood assistance available to Hoosier farm families*. The Indiana State Department of Agriculture (ISDA) encourages all farm families affected by the June 2008 flood to apply for new funds available through Hoosier Organic Marketing

Education (HOME), an Indiana-based non-profit organization. HOME received a \$17,500 grant from Farm Aid and OpUSA for emergency flood relief, and these funds are only for Indiana farm families living in the declared disaster counties as a result of the June 2008 flood.

Each eligible farm household may receive up to \$300 for food, clothing, utilities and/or health care needs. The deadline for applications is February 1, 2009. HOME will distribute the funds on a first come, first served basis.

To be eligible, the farm family applicant must meet the following:

- * Be a farmer in an Indiana county that was declared a disaster due to the June floods

- * Agree that the funds will be used solely for food, clothing, utilities or health care needs related to the Indiana floods of June 2008.

HOME will distribute the funds in a cash payment of \$300. Potential farm family applicants should contact HOME immediately at farmassistance@earthlink.net for an application or go to their website at <www.indianacertifiedorganic.com/farmassistance>. For more information on other flooding disaster assistance, please visit the state's agricultural flood disaster recovery Web page at <www.emergency.in.gov/agriculture>.

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