



This bulletin from the Cooperative Extension Plant Health Clinic (Plant Disease Clinic) is an electronic update about diseases and other problems observed in our lab each month. Input from everybody interested in plants is welcome and appreciated.

Pepper

Anthrachnose of pepper is occurs wherever peppers are grown. It is caused by several species of *Colletotrichum*, including *C. gloeosporioides*, teleomorph *Glomerella cingulata*, *C. capsici*, *C. coccodes*, and perhaps others. Ripening fruit is the most susceptible, but the disease can occur on fruit, leaves, and stems any time conditions are right for disease development. Lesions on the fruit are circular, and may reach a diameter of more than one inch. The center of the lesion will have tan to orange to black concentric rings. Salmon-colored masses of spores are often evident during extended periods of leaf wetness. The lesions on stems and leaves are irregularly shaped gray brown spots with dark brown edges. Crop rotation of at least three years and the use of pathogen free seed are the best means of control. A 30 minute hot water bath at 52°C water disinfests seed. Deep plowing of crop residue and removal of crop debris limits overwintering inoculum. Fungicides have limited usefulness under heavy inoculum pressure and wet conditions. Quilt, Reason, Maneb, Quadris, and Cabrio are labeled for control of anthracnose on peppers.

Pepper anthracnose-*Colletotrichum* spp.



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Tomato Bacterial Canker by Wei Yang

Bacterial canker, caused by *Clavibacter michiganensis* pv. *michiganensis*, is a serious and destructive bacterial disease of tomato. All grow stages are susceptible to this disease. Infected seedling may die quickly, or produce weak plants. Infected young plants have wilted branches, and yellowed leaves. There are two types of symptoms on mature plants: systemic symptoms and superficial symptoms. Systemically infected plants usually have curling, yellowed, wilted leaves which change to brown and collapse. The vascular tissue becomes discolored, with the stem tissue first becoming streaked with light yellow to brown streaks which later turn reddish brown. This is particularly obvious at the nodes. The superficial symptoms are caused by bacterial secondary infection. Infection usually happens at the margins of leaves. Dark brown to black lesion will occur on the surface of infected plants, and fruit may be



spotted with pale green to creamy-white blister-like leaf spots surrounded by dark rings of dead tissue.

Control:

1. Use only certified disease-free seed from canker-free plants and Plant only certified disease-free transplants.
2. Greenhouse seedbeds and soils must be sterilized to destroy the bacteria. If there are infected plants, symptomatic seedlings should be removed in the greenhouse as quickly as possible and destroy them. Greenhouses should be cleaned and sanitized thoroughly between production cycles; sterilize containers, benches (and other surfaces), and tools with a solution of 1 part bleach to 9 parts water (10 percent). Do not re-use potting media.
3. Crop rotation: Rotate away from tomatoes and other solanaceous crops for at least 3 years.
4. Irrigate early in the morning to minimize the length of time that foliage is wet, whether in the greenhouse or field. Applications of fixed copper plus either maneb or mancozeb may reduce epiphytic (superficial) populations of Cmm before symptoms appear.

Tomato Bacterial canker-
Clavibacter michiganensis pv.
michiganensis



Mary Ann Hansen, Virginia Polytechnic Institute and State University, Bugwood.org.jpg

Tomato Bacterial canker-
Clavibacter michiganensis pv.
michiganensis



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Tomato Spotted Wilt Virus (TSWV) by Blake Burrow

Tomato Spotted Wilt Virus is starting to show up all across the state. This virus is spread by thrips. Thrips that are carrying the virus infect the plants when they feed on the leaves, stems, and fruit. Symptoms of TSWV can be expressed on the leaves, petioles, stems, and fruit, and will vary depending on growth stage at which the plant was infected. Young leaves may show small, dark-brown spots and will eventually die. Brown streaks



will also appear on the stems and leaves. Growing tips are generally the most affected and will be greatly stunted in growth. The tomato plant may also exhibit one-sided growth and/or wilting. Fruit that is produced on infected plants will display lightly colored greenish-yellow rings with raised centers making the fruit unmarketable. There is no chemical control for TSWV, instead infected plants must be pulled up and destroyed to reduce the spread of the virus by thrips. There are cultivars with resistance To TSWV available.

Tomato Spotted Wilt Virus- TSWV



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Cedar Apple Rust by Lu Zhai

Cedar apple rust, caused by the fungus *Gymnosporangium juniper-virginianae*, is one of the most spectacular diseases of apple and crabapple (*Malus sp*) in the eastern part of North America. It can defoliate trees and harms the appearance of ornamental crabapples. On crabapple, symptoms appear in late spring or early summer as bright, green-yellow spots on the upper leaf surface. The spots gradually enlarge and turn orange. Eventually a cup-like fungal structure appears on the lower leaf surface. The hair-like fruiting bodies produced in these cups are called aecia (Figures 1). On the upper leaf surface of the lesions, the fungus produces specialized fruiting bodies called spermagonia (Figures 2). The disease cycle of cedar apple rust is one of the most complex diseases. Two hosts are needed to complete the life cycle of the pathogen. The fungus overwinters on the galls of the cedar tree. During the moist weather, the galls produce orange-colored jelly-like "horns" (Figure 3), which can produce basidiospores that can infect crabapple leaves and cause disease symptoms. In late summer, the aeciospores produced on the aecia are released into the air and land on young leaves of cedar. The aeciospores can germinate, infect, and cause gall formation. Control strategies for cedar apple rust are based on using resistant varieties, fungicides, and removing nearby cedar trees. Fungicides such as Captan should be used at pink bud stage on susceptible ornamental and fruit trees until 30 days after petal fall. Applying fungicide on cedar is not recommended.

Cedar apple rust-*Gymnosporangium juniper-virginianae*



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Cedar apple rust gall on cedar-*Gymnosporangium juniper-virginianae*



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