



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.

## Bean

There are several bacterial blights found on beans. Halo blight caused by *Pseudomonas syringae* pv *phaseolicola* is a widespread problem in both green and dry beans. First symptoms appear as greasy-looking, water-soaked angular spots on leaves. The lesions expand with age and coalesce into large spots 2–3 cm in diameter. Older lesions become dry and cracked. Lesions are usually, but not always, surrounded by a distinct yellow halo, which gives the disease its common name. Interveinal tissue and veins may take on a reddened appearance. Infected seedlings may be stunted and die. Pods develop water-soaked, round-to-oval lesions and elongated lesions running along sutures.

Bean bacterial brown spot causes very similar symptoms and is also caused by a *Pseudomonas* species. Common bacterial blight is caused by *Xanthomonas campestris* pv *phaseoli*. Symptoms are water-soaked, angular leaf lesions that coalesce into larger lesions that are gray-brown and are usually surrounded by a yellow halo.



Sherrie Smith/University of Arkansas Cooperative Extension



Bryce Blackman/University of Arkansas Cooperative Extension

A copper fungicide such as Kocide is the fungicide of choice, although good results are often not achieved. Crop rotation, avoidance of overhead irrigation, the use of clean seed, and cleanup of crop residue are the keys to good control of bacterial blights.

## Hawthorn

Hawthorns are widely used as hedges and specimen trees and shrubs. They are a favorite for plantings designed to attract songbirds as they provide safe nesting sites among their thorny branches. Most have attractive fall colors of yellow and purple and pretty flowers in the spring followed by showy red fruits.

It is unfortunate that hawthorns are susceptible to a rust disease aptly named hawthorn rust. It is also called cedar-hawthorn rust and is very similar to cedar-apple rust, both caused by fungi from the genus *Gymnosporangium*. The life cycle of the rust requires two hosts, a cedar or juniper and a hawthorn.

Symptoms on hawthorn start as small, yellow spots on leaves, sometimes with a red border. In late summer, tube-like structures called aecia develop on the underneath of the leaves. The spores from these structures infect cedar trees, which produce galls the following season that produce the spores that infect apples, quince, and hawthorns.



Severe infections can cause premature leaf drop and weaken the plant. Fruit infections cause fruit distortion and premature fruit drop. Fruit infection is more common with cedar-quince rust but does occur with both cedar-apple and hawthorn rust.

Fruit tree sprays containing captan applied at bud swell in the spring and continued until new leaves harden provide good protection. There are also some resistant varieties available. Chemical control is usually not used on cedars, but the galls may be cut out and destroyed where practical to reduce inoculum levels.



**Hawthorn rust of fruit**

Sherrie Smith/University of Arkansas Cooperative Extension



Robert L. Anderson, USDA Forest Service,  
[www.forestryimages.org](http://www.forestryimages.org)

## **Squash**

Blossom end rot is a physiological disorder of tomatoes, peppers, and cucurbits caused by a calcium imbalance within the plant. Excessively wet or dry soil, too much nitrogen fertilizer, roots damaged by cultivation, very high or low pH, or soils high in salts can prevent the roots from taking up enough calcium. The result is a water-soaked spot at the blossom end of the plant that enlarges, turning dark brown and leathery. Rot may set in at the spot as saprophytic fungi colonize the decaying tissue.

Blossom end rot is common when plants grow rapidly in the beginning of the season, then set fruit during dry weather. Fluctuating levels of soil moisture are usually the culprit. As little as 30 minutes of water deficiency at any time can cause blossom end rot. Garden soils should be tested yearly for pH and nutrient levels. Vegetables tomatoes, pepper, and squash do best at a pH of 6.5. Good mulching practices help maintain even soil moisture. A quick fix for blossom end rot is a liquid calcium supplement applied to the foliage and as a soil drench. Most garden supply stores carry such products under names such as "tomato saver" and "end rot."



**Blossom end rot of squash**

Sherrie Smith/University of Arkansas Cooperative Extension



### **Blossom end rot on tomatoes**



David B. Langston, University of Georgia, [www.forestryimages.org](http://www.forestryimages.org)

### **Tomatoes**

We have been receiving tomato samples with virus. So far we are seeing more tomato mosaic virus (TMV) and cucumber mosaic virus (CMV) this year than tomato spotted wilt virus (TSWV).

Tomato mosaic virus is also known as tobacco mosaic virus. The virus is transmitted mechanically from infected crops or weeds. It can be transmitted via unwashed hands or clothing that has come in contact with infected plants or tobacco products. Smokers are often the means of transmission. It can also be transmitted by chewing insects or tools. Additionally, the virus can persist in the soil on root debris for at least two years.

Leaf symptoms are light- and dark-green mottling to bright-yellow mottling. Leaves often have puckered areas, and leaflets may be narrowed, giving the plant a ferny appearance. Infected fruit may have green and yellowish-red rings or mottling and dark brown spots. Internal browning of fruit can also occur. Severely infected plants are stunted, and affected fruit is not marketable. There are good varieties resistant to this virus.

Cucumber mosaic virus infects more than 750 plant species and can be found wherever tomatoes are grown. CMV is usually transmitted by aphids.

Infected plants are stunted and bushy, with distorted and malformed leaves. Leaves may also show green or yellow mottling. The most classic symptom is extreme shoestringing of leaf blades. This symptom is sometimes confused with herbicide injury. Infected plants sometimes produce no fruit or small fruit.

We've also seen a few samples with tomato spotted wilt virus. The most prominent symptoms are leaf bronzing, black spots, and necrosis of growing tips. Plants start wilting from the top down. Immature fruit have light green rings with raised centers; ripe fruit will have distinct orange-and-red patterns.

Unfortunately, this virus has a large host range with 176 plant species found to be capable of carrying TSWV. Field crops that are susceptible to TSWV include tobacco, peanut, tomato, pepper, potato, eggplant, lettuce, endive, celery, bean, cowpea, spinach, cucumber, and cauliflower.

Most flowering annuals and many herbaceous perennials are also hosts to the virus. Common weeds such as amaranth, chickweed, lamb's quarters, burdock, morning glory, shepherd's purse, yellow clover, and many others serve as reservoirs for the disease. It is spread from plant to plant by the western flower thrip.

**Virus cannot be cured. The best prevention is to plant resistant varieties and practice good sanitation and insect control.**



A.S. Costa, APS Images



### Tomato Spotted Wilt Virus



Sherrie Smith/University of Arkansas Cooperative Extension

### Tomato Spotted Wilt Virus



Whitney Cranshaw, <http://www.forestryimages.org/>

### Cucumber Mosaic Virus



S. K. Green, APS Images