



Extension

UNIVERSITY OF WISCONSIN-MADISON

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Tobacco Mosaic

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What is tobacco mosaic? Tobacco mosaic is a common viral disease of worldwide distribution that affects over 200 species of herbaceous and, to a lesser extent, woody plants. Common hosts include tobacco, solanaceous vegetables (e.g., pepper, tomato) and vining vegetables (e.g., cucumber, melon, squash), as well as a wide range of ornamentals



Tobacco mosaic causing a blotchy light and dark coloring (mosaic) of tobacco leaves

(e.g., begonia, coleus, geranium, impatiens, million bells, petunia). The disease has its biggest impact on vegetables, where it can reduce yield and affect quality to the point that commercial crops cannot be marketed.

What does tobacco mosaic look like?

Symptoms of tobacco mosaic vary in type and severity depending on the plant infected, plant age, the variant of the virus involved, and environmental conditions. On leaves, typical symptoms include blotchy light and dark areas (called mosaic); cupping, curling, elongation (strapping), roughening, wrinkling and other growth distortions; and smaller than normal size. Fruits may have a blotchy color, ripen unevenly, be malformed or have an off flavor. Entire infected plants are often stunted. Other viral diseases like cucumber mosaic (see University of Wisconsin Garden Facts XHT1255,

Cucumber Mosaic) can cause symptoms similar to tobacco mosaic. Often, multiple viral diseases can simultaneously affect a single plant. Certain herbicide exposures (see University of Wisconsin Garden Facts XHT1004, *Herbicide Damage*), nutrient deficiencies or toxicities, high temperature and even insect feeding can also cause similar symptoms. Proper diagnosis of tobacco mosaic requires lab testing.

Where does tobacco mosaic come from? Tobacco mosaic is caused by *Tobacco mosaic virus* (TMV), the first virus ever identified. Numerous variants (strains) of the virus have subsequently been described. TMV survives in infected plants (including viable seeds), as well as in debris from these plants. Plant-based products (most notoriously tobacco products) can harbor the virus. TMV is very stable and can survive for long periods of time; there are reports of TMV surviving and remaining infectious after 50 years in storage at 40°F. Because of its stability, TMV can survive on and be picked up from hands, clothing, gardening tools, work surfaces and any other object (e.g., door knobs) that gardeners may handle.

TMV is highly transmissible and is commonly spread by handling infected plants, then healthy plants. Spread via gardening tools is also very common. No specific insects spread TMV (the way that aphids spread *Cucumber mosaic virus*). However, bees and chewing insects (e.g., grasshoppers) can transmit TMV through casual contact or their feeding as they move from plant to plant.



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How do I save a plant with tobacco mosaic? There is no cure for tobacco mosaic. Once infected, plants remain infected for life, and typically the virus spreads throughout the plant from the point of infection. Infected plants and any associated debris



Leaf growth distortions caused by tobacco mosaic.

should be burned (where allowed) or double-bagged and disposed of in a landfill. DO NOT compost plants with this disease. Thoroughly decontaminate any items that have come into contact with infected plants or their debris by treating them for a minimum of one minute with:

- 9 cups of Carnation® nonfat dry milk plus 0.75 teaspoons polysorbate 20 in one gallon of water, or
- 2.75 tablespoons Alconox® (a lab detergent) plus 2.5 tablespoons sodium lauryl sulfate (SLS), also known as sodium dodecyl sulfate (SDS), in one gallon of water, or
- 14 dry ounces of trisodium phosphate in one gallon of water.

These ingredients can be ordered on the internet. If you decide to use SLS (SDS), be sure to wear gloves and safety goggles, and

mix the solution in a well-ventilated area as SLS (SDS) is a known skin and eye irritant. Once treated, rinse items with sufficient water to remove any residues. Also, thoroughly wash your hands with soap and water, and launder any clothing that you wore while disposing of infected plants and debris.

How do I avoid problems with tobacco mosaic virus in the future? Inspect plants prior to purchase for any symptoms of tobacco mosaic, and DO NOT buy symptomatic plants. Purchase seed from a reputable supplier that routinely inspects their seed-producing plants for symptoms of viral (and other) diseases. If you use tobacco products, DO NOT use them around plants. Also, wash your hands thoroughly with soap and water prior to handling plants and consider wearing freshly laundered clothing when gardening. Finally, decontaminate (as described above) any items that might harbor TMV to help prevent spread. Even if you do not use tobacco products, routine handwashing and decontamination of gardening tools and other items can help prevent tobacco mosaic from being a problem.

For more information on tobacco mosaic: Contact your county Extension agent.

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Thanks to Brenda Dahlfors, Tom German, Jenna LaChance and Diane Lorenz for reviewing this document.

A complete inventory of University of Wisconsin Garden Facts is available at the University of Wisconsin-Madison Division of Extension Plant Disease Diagnostics Clinic website: <https://pddc.wisc.edu>.