

WATERMELON MOSAIC

Watermelon mosaic, caused by *Watermelon mosaic virus* (WMV), is a very important virus diseases of cucurbits. This virus was recognized in the 1030s in Europe and North America and was initially characterized from symptomatic squash in Florida. WMV infects most members of the family Cucurbitaceae as well as many members of legumes (family Fabaceae) and malvaceous plants (family Malvaceae).

WMV has been reported from cucurbit-growing areas in temperate and tropical regions in the world. This disease can cause more than 50% yield losses in cantaloupe, cucumber, pumpkin, squash, and watermelon. It has been reported that WMV can infects 170 species in 26 plant families



Figure 1. Distortion of summer squash foliage caused by Watermelon mosaic virus. (Courtesy R. Provvidenti – APS)

Symptoms

Symptoms can appear on all parts of the plant. The severity of symptoms depends on the age at which the plants are infected, the cucurbit species and cultivar, the viral strain, and environmental factors. Foliar symptoms include green mosaic (Figure 1), green vein banding and elongated or filiform leaf growth. Plants infected at a young age may be severely stunted and distorted, whereas those infected late in development often show considerably less severe symptoms. Leaves of infected plants also may exhibit blistering and deformation.

It is not possible to identify WMV on the basis of symptoms. Other cucurbit-infecting viruses induce similar symptoms. WMV and other cucurbit viruses can be detected by either ELISA or RT-PCR and sequencing.

Disease Cycle

The most important primary inoculum sources for WMV are annual and perennial reservoir host, including both crop and weed species such as alfalfa, clover, peas, vetch, and mallow. The virus

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University of Illinois provides equal opportunities in programs and employment. WMV is spread

is transmitted in a nonpersistent (stylet-borne) manner by as many as 38 species of aphids in 19 genera. WMV is spread over long distances by the movement of infected transplants and fruits. The virus is also mechanically (sap) transmissible; however, no plant-to-plant transmission has been reported. There are no reports of seed transmission of WMV in cucurbits.

Initially infected plants in cucurbit fields provide inoculum for infection of other plants in the field. Disease symptoms appear in infected plants in 7-14 days. Development of disease epidemics depends on aphid populations (resident or migratory insects) and proximity of inoculum sources, especially established cucurbit fields with WMV-infected plants. Some viruliferous aphids move back to virus reservoir host plants and transmit WMV, allowing for overwintering or survival of the virus in the absence of cucurbit hosts.

Disease Management

Like other cucurbit-infecting viruses transmitted by aphids in a nonpersistent manner, management of WMV requires an integrated management approach involving reduction in reservoir hosts, use of resistant cultivars, and suppression of aphid populations. The following practices can minimize crop losses to WMV.

- New cucurbit fields should not be adjacent to or near established fields with WMV-infected plants. Similarly, new fields should not be planted downwind of established fields with WMV-infected plants.
- If transplants are used, plant virus- and aphid-free plants.
- Plant resistant cultivars to WMV wherever available.
- Eliminate potential reservoir hosts. Some of the reservoir hosts are symptomless, but could carry the virus.
- Since the greatest losses occur when plants are infected in early development, efforts should be made to delay WMV infection during early season by controlling weeds, rogueing diseased plants early in the season, and preventing aphids from landing on plants (i.e., by using reflective mulches).
- Applications of mineral oils and insecticides can slow the spread of viruses in cucurbit fields. The application of chemicals may be combined with a program of rogueing infected plants early in the growing season. Application of systemic insecticides are more effective than contact insecticides for management of virus diseases.
- After the crop is harvested, old plants should be removed and destroyed to prevent old plants serving as sources of inoculum for other plants.