

Mosaic Viruses of Cucurbit Crops

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THE VIRUSES

Mosaic viruses of cucurbits can cause severe production losses in the Top End of the Northern Territory. It is not uncommon to have 100% infection of cucurbit crops. Two viruses belonging to the potyvirus group are the cause of mosaic virus diseases in the Top End. The cucurbit strain of papaya ringspot virus (PRSV-W) previously known as watermelon mosaic virus strain 1 (WMV-1) has been known to cause problems to cucurbits since 1977. A second potyvirus, zucchini yellow mosaic virus (ZYMV) has also been the cause of mosaic virus diseases since 1989.



Figure 1. Long melon infected with virus. Note the leaf distortion and typical 'mosaic' pattern of light and dark green on the leaf.

CROPS AFFECTED

Mosaic viruses are known to affect zucchini, squash, cucumber, long melons, smooth luffa, watermelon, rock melon, gramma pumpkins and other pumpkins such as butternut and Japanese.

SYMPTOMS

The diseases are called mosaics because the leaves of infected plants have a mottled or mosaic pattern of light and dark green instead of the normal dark green colour (Figure 1). Leaves of infected plants may also be distorted, bubbled or very narrow (especially in zucchini). Fruit found on green/black zucchini and butternuts after virus infection is often distorted with bubbles and is unmarketable. Golden squash and golden zucchini fruit on infected plants display a colour change where the yellow colour is replaced to some degree by green.

HOW ARE THE VIRUSES SPREAD?

Cucurbit viruses are spread by aphids. These viruses are not spread by mites, leafhoppers, white flies or other insects, by soil or fruit moved from farm to farm, or on equipment. Aphids spread the mosaic viruses in a non-persistent manner. This means that the virus can be picked up by a feeding aphid on its stylet or mouthparts in only a few seconds, and then injected into the next healthy plant it feeds on in a matter of only a few seconds. The virus is retained in the aphid for only a short time, i.e. a matter of minutes to hours. As aphid transmission is non-persistent, spread generally occurs from nearby inoculum sources. Winged aphids are responsible for the bulk of the spread of the viruses up to several kilometres if wind assisted.

Virus vector specificity is low for most of the potyviruses. This means that many species of aphids can transmit cucurbit mosaic viruses. However, in the Top End, the melon aphid, *Aphis gossypii* is the most common aphid on cucurbits, and so is the most important vector of mosaic viruses.

MANAGEMENT

All new growth on a plant infected with the virus disease also becomes infected. Unlike fungal diseases such as powdery mildews, downy mildews, rust and leaf-spots which can be controlled with fungicide sprays, there is no way a virus infected plant can be sprayed to control the disease.

It is important for crops to be kept free of aphids so that winged aphids on infected plants will not take flight and spread the virus to new plants. Systemic insecticides are useful but this does not guarantee the total prevention of spread, since a brief feeding action of only a few seconds is all that is needed for aphids to acquire and spread virus, before a systemic insecticide can take effect. Cucurbit crops should be inspected regularly especially under the leaves for aphids and appropriate control measures taken to lower their population and to prevent winged forms developing which can spread disease.

It is important to constantly monitor cucurbit crops for any plants showing symptoms of mosaic virus, and to then remove them straight away so that they do not become new sources of virus infections. In practice, most of the virus infection seen on farms in recent years has come from within a few hundred metres, from previously infected crops on the farm, infected cucurbits in the house garden or on a neighbour's farm. It is important to remember that mosaic virus infection begins on one or a few plants in a crop; if left unchecked, it will increase with each successive planting of cucurbits. Ideally non-sequential plantings should be made to ensure breaks in virus build-up, along with destroying old crops or infected crops in the farmhouse garden, and cooperating with neighbours to reduce possible sources of inoculum.

WHO TO CONTACT

If you are going to plant cucurbits and are not sure of the mosaic virus risk or if you think that you have a mosaic virus problem on your cucurbits, phone the Plant Pathology Section at Berrimah Farm on (08) 8999 5511.

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