Background

Cucumber green mottle mosaic virus (CGMMV) is a plant disease which is exotic to Australia. CGMMV occurs in Europe, Asia, the Middle East, some parts of the USA, and Canada.

The virus infects watermelon, cucumber, melons, zucchini, pumpkin, squash, bitter gourd, and bottle gourd.

There are at least five strains of the virus, whose symptoms can vary between hosts. Other mosaic diseases, caused by potyviruses, are known to occur in northern Australia and express somewhat similar symptoms. This makes it difficult to visually identify CGMMV, which can be conclusively established by laboratory testing.

Infected watermelon plants can have a bleached appearance, leaves with mosaic-like mottling, and—possibly—stunting. Affected plants may also wilt and then runners, or the whole plant, may die prematurely. Symptoms on fruit can include fruit abortion, yellowing, breakdown of the flesh, and possibly a dirty red discolouration. Infection may also cause fruit malformation. The combined effects of CGMMV can result in substantial crop losses.

Transmission

CGMMV can be easily spread. It may remain viable for an extended period in plant debris and soil, or on vehicles, equipment and tools.

The virus can be transferred by sap or infected seeds. It can remain dormant within the seed coat. Entry of the virus into plant cells is primarily through plant wounds.

Transfer of the virus may be advanced by regular handling of plants, especially in growing systems where plants are regularly pruned, staked or handled. Even a tiny injury caused by contact between plants may be sufficient to transfer CGMMV between plants.

The virus can be introduced into a crop in many ways, but contaminated seed and soil are among the most common. It can readily infect plants and survive and spread by several means, including:

- infection of roots in soil that is contaminated with infected plant debris. The virus can spread through root-to-root contact
- in water or in nutrient solutions in soilless culture
- by mechanical transfer, especially in protected or high-input culture systems where plants are frequently pruned, staked, handled or touched. This can occur via contaminated machinery, clothing, or even the hands of persons who have come in contact with infected plants
- packaging materials such as bins used for harvesting, storage or marketing fruit. Recycling of packaging materials should be avoided
- in field production by machinery, pickers, and possibly by birds and other wildlife in the crop
- infected rootstock plants and grafts
- seed harvested from infected plants
• there are a limited number of overseas reports of spread by some types of chewing insects—beetles in particular. There is an indication of spread by artificial pollination under greenhouse conditions, but it has yet to be established whether spread can occur via pollen naturally in the field. There are no published reports of transmission by bees under natural conditions
• no sucking insects have been proven to vector CGMMV.

Symptoms

Seedlings
Typical CGMMV symptoms can be mistaken for similar symptoms caused by other cucurbit viruses. This renders unreliable the visual identification of CGMMV.

Symptoms on young seedlings may be indistinct or difficult to recognize as being caused by a virus. In severe infections embryonic leaves may become yellow, but symptoms may not be apparent until more mature leaves emerge.

Leaf
On young leaves, vein clearing and crumpling may be apparent, while mature leaves may display mottling or mosaic patterns, or be pale, yellow, or yellow-white.

Fruit
Fruit may be symptomless—at least externally—or can become severely spotted or streaked and distorted, especially during high temperatures. In some cases, fruit showing no external symptoms may be internally discoloured or necrotic. This can be especially pronounced in watermelon.

Biosecurity
If you suspect the presence of CGMMV call the hotline number listed below.

Farm biosecurity measures should be strictly enforced. These include restricting farm visitor access, using footbaths, and cleaning and disinfecting tools and machinery. Other biosecurity practices that will help limit the spread of CGMMV include:
• sterilization of vehicles, equipment, plant trays, tools and footwear with potassium peroxymonosulfate or freshly prepared 0.5% sodium hypochlorite (NaOCl) bleach
• disposal on site of suspect plants and crop residues by burning or deep burial
• removal of weeds that may harbour viruses in and around cucurbit crops
• developing a biosecurity kit for your farm via www.farmbiosecurity.com.au

More information
Growers who have not been contacted by the Northern Territory Department of Primary Industry and Fisheries please phone the Hotline on 1800 466 722. Early reporting increases the possibility of cost-effective control and eradication.

www.dpif.nt.gov.au/cucumbervirus


Thank you to the Australian Government Department of Agriculture, American Seed Trade Association, California Seed Association, Monsanto Seeds, Dr Kai Shu Ling of the US Department of Agriculture, Dr Bryce Falk of the University of California-Davis, HM CLAUSE Inc.