

# Pest Alert

Florida Department of Agriculture and Consumer Services,  
Division of Plant Industry

## ***Cucumber Green Mottle Mosaic Virus (CGMMV) found in the United States (California) in Melon***

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**INTRODUCTION:** *Cucumber green mottle mosaic virus* (CGMMV) (ICTVdb Management 2006) is an important seed-borne virus which has been found to be responsible for devastating losses of cucurbitaceous crops throughout Europe and Asia. On July 24, 2013, Cucumber green mottle mosaic virus was diagnosed from a melon seed field in Yolo County, California. This virus has been known since 1935. It was first found in the United Kingdom, but it has since been identified in other European countries, in India, Japan (Anonymous 2009), China (Zhang *et. al.* 2009), Greece (Varveri *et.al.* 2002), Korea (Yoon *et.al.* 2008), Myanmar (Kim *et.al.* 2010), and in the Ukraine (Budzanivska *et.al.* 2007). The 2013 find in California is the first time it has been found in the United States.

**BIOLOGY:** CGMMV belongs to the virus Genus, *Tobamovirus*. This is the group that includes *Tobacco mosaic virus*, the first virus known to science (*contagium vivum fluidum*) and they are known for their long-term survivability. These viruses are transmitted mechanically by wounds made with cutting tools, farming equipment, or chewing insects such as beetles. They can also be passed to other plants by root grafting or any handling of the crop. Sucking insects (e.g., aphids, mites, whiteflies) do not transmit these viruses. Once the virus infects a plant, there is no known cure.

A study in India (Vani *et.al.* 1993) has isolated CGMMV from river and irrigation water, indicating the virus can spread under natural conditions once plants in the field or greenhouse become infected. A study in Greece found that the virus retained its infectivity in naturally contaminated soil after storage at 4°C for at least 10 months (Varveri *et.al.* 2002). Overall, CGMMV is very hard to eradicate once it is found in an area. In addition, CGMMV has been shown to be transmitted by seed and pollen (Liu *et. al.* 2013). Contaminated seeds are probably the major means of movement of this virus to new countries and continents (Anonymous 2013).

The virus infects members of the Cucurbitaceae including *Cucumis melo* (cantaloupe), *Cucumis sativus* (cucumber) and *Citrullus lanatus* (watermelon) (Anonymous 2009). It also was found to infect the weeds *Amaranthus blitoides*, *Amaranthus retroflexus*, *Heliotropium europaeum*, *Portulaca oleracea* and *Solanum nigrum* (Boubourakas *et.al.*, 2004).

**SYMPTOMS:** The symptoms found on an infected plant will vary with the genus, species and cultivar of the plant and the strain of the virus. Symptoms described for this virus in the literature range from light yellow green spots and vein clearing on young leaves to chlorotic mottling, plant stunting, and necrosis at later stages of growth. Mature leaves can become bleached. Fruit drop is common and yield is reduced by up to 25% for the remaining small fruits. In addition, young leaves can be deformed. (Figs. 1. and 2.)

**MANAGEMENT AND CONTROL:** The best management and control for this virus in Florida is the prevention of its entrance into the state. Cucumber seed should be heat treated before they are sent to the state. Research has shown that cucumber seeds heat treated at 70°C for up to three days were free from active virus particles and were still able to germinate (Fletcher *et.al.* 1969). Transplants and grafted cucurbits should be tested for the virus before being sold to Florida growers. If the virus is found in Florida, all infected plant and plant debris must be removed and destroyed, and the facilities cleaned.

**SUMMARY:** *Tobamoviruses* in general can be difficult to deal with because of their stability and ease of mechanical transmission. CGMMV has the added problem of seed transmission. All cucurbit growers should be aware of this and be extra careful with cucurbit seeds coming from Europe or Asia, and now possibly California.



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**Fig. 1.** Symptoms of Cucumber green mottle mosaic tobamovirus on young cucurbit leaves. Available at <http://aggie-horticulture.tamu.edu/vegetable/problem-solvers/cucurbit-problem-solver/leaf-disorders/cucumber-green-mottle-mosaic/>



**Fig. 2.** Symptoms of Cucumber green mottle mosaic tobamovirus on older cucurbit leaves. Available at <http://www.wageningenur.nl/en/show/Research-into-the-survival-of-Cucumber-Green-Mottle-Mosaic-Virus.htm>