

## Symptomatologic Characterization and Transmission Studies of Zucchini Yellow Mosaic Virus in Muskmelon (*Cucumis melo* L.)

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Cucurbits belong to the family *Cucurbitaceae* and form an important and large group of vegetables. They are grown mainly in summer and rainy seasons in India and even in winter in some parts of southern and western India as annual and perennial crops. It includes cucumbers, pumpkins, summer/winter squash, watermelons, muskmelons and Gourds. Among them, muskmelon is one of the major consumed cucurbits fresh as a desert. Muskmelon (*Cucumis melo* L.), known for truck and home garden vegetable crops and suitable for well-drained loamy soil, requires an optimum temperature for germination of about 23-25°C. Sowing is done in late February. It is infected by downy mildew, anthracnose, viruses *etc.* but viral disease like Zucchini mosaic virus (ZYMV) causes enormous losses in terms of quality point of view. The main symptoms are leaf becomes severely distorted, mosaic, yellowing as well as “shoestring” symptoms also observed. The fruits are reduced in size, develop dark green blisters, serrated edges and other deformations as well as poorly formed surface netting. Host for this virus are zucchini and other cucurbits, including melon, pumpkin, watermelon and the species of *Luffa* and *Momordica*. It is transmitted through seed, mechanically and is vectored by aphids. This disease can be managed by sowing resistant varieties, collection and destruction of virus affected leaves, use plastic mulches (transparent or silver) as they have been shown to repel aphids and delay virus spread.

### Introduction

Muskmelon (*Cucumis melo*) is a warm season cucurbit belongs to family *Cucurbitaceae*. It known as truck as well as home garden vegetable crop and suitable for well drained loamy soil. Zucchini yellow mosaic virus (ZYMV) is an ‘emerging’ plant virus affecting muskmelon. Infected plants exhibited severe stunting and yellowing symptoms, with leaf and fruit deformations. Lisa *et al.* (1981) identified the causal agent as a new potyvirus that they named Zucchini yellow mosaic virus (ZYMV).

### Symptomatology

ZYMV causes enormous losses in term of quality point of view. The main symptoms are leaf become severely distorted, mosaic, yellowing, vein clearing as well as ‘shoestring’ symptoms also observed. The fruits are reduced in size, develop dark green blisters, serrated edges. Discolouration's and raised patches are seen. Occasionally associated with internal marbling and hardening of the flesh or superficial cracks with corky edges (Nameth *et al.*, 1985, Huet *et al.*, 1994).

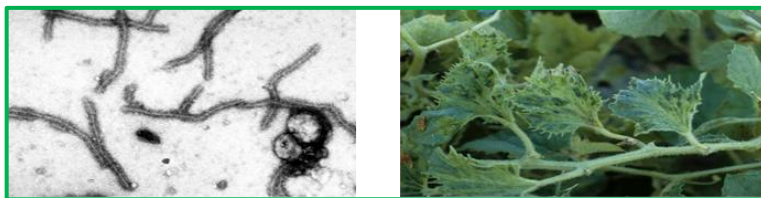


## Etiology

A single stranded RNA virus, ZYMV is efficiently transmitted by aphids in a nonpersistent manner (Lisa *et al.*, 1981).

Specifically *Aphis gossypii* and

*Myzus persicae*. These aphids feed on infected plants and then transmit the virus to healthy plants while feeding. Once a plant is infected, secondary spread can occur through various means, such as mechanical transmission through contaminated tools, equipment, or hands. However, aphids remain the primary vector for the natural spread of ZYMV in agricultural settings.

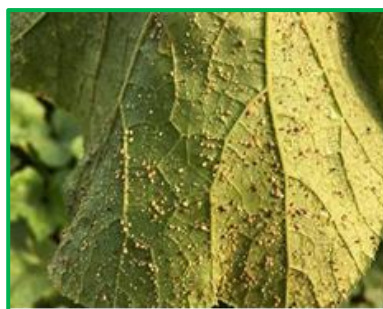


## Host Range

The virus has a narrow host range, mainly affecting plants of the Cucurbitaceae family such as cucumber, squash, watermelon, bottle guard, pumpkin, *etc.* Different cultivars may exhibit varying degrees of susceptibility to ZYMV. Additionally, the virus is primarily transmitted by aphids, which play a crucial role in the natural spread of the virus among susceptible plant hosts. Farmers and researchers often focus on developing resistant cultivars and implementing control measures to manage ZYMV in cucurbit crops.



Cucumber



Pumpkin



Watermelon

## Favourable Conditions

- Warm between 25-30 °C for replication of virus
- High humidity as this can favour multiplication of aphids
- High aphid population

## Management

- Resistant varieties of melons should be grown
- Collect and destroy virus affected plant
- Use plastic mulches (transparent or silver) as they have been shown to repel aphids and delay virus spread
- Crop rotation to disrupt virus's life cycle
- Controls weeds, especially those belonging to same family (*Cucurbitaceae*)
- Adjust planting dates to avoid peak aphid activity

## References

1. Huet, H., Gal-On, A., Meir, E., Lecoq, H., & Raccach, B. (1994). Mutations in the helper component protease gene of *Zucchini yellow mosaic virus* affect its ability to mediate aphid transmissibility. *Journal of General Virology*, 75 (6), 1407-1414.
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3. Nameth, S., Laemmlen, F., & Dodds, J. (1985). Viruses cause heavy melon losses in desert valleys. *California Agriculture*, 39 (7), 28-29