



CMV and ToMV Virus

Why in News?

Tomato growers in Maharashtra attribute crop decline to the **Cucumber Mosaic Virus (CMV)**, while growers in Karnataka and other **South Indian states blame the Tomato Mosaic Virus (ToMV)** for their crop losses.

- Over the last three years, **growers of tomato have complained of increased infestation with these two viruses**, leading to **partial to complete crop losses**.

What are ToMV and CMV?

- **ToMV:**
 - **About:**
 - ToMV belongs to the **Virgaviridae family** and is closely related to the **Tobacco Mosaic Virus (TMV)**. It infects **tomato, tobacco, peppers**, and certain ornamental plants.
 - It was first identified in **tomato in 1935**.
 - **Transmission:**
 - ToMV mainly spreads through **infected seeds, saplings, agricultural tools, and human contact**.
 - It can also be transmitted by some insect vectors, such as **thrips and whiteflies**.
 - **Effects on Crops:**
 - ToMV causes **green mottling and yellowing of leaves**, which often appear as blisters or fern-like patterns.
 - The **leaves may also curl downwards** or upwards and become distorted.
 - Younger plants are **dwarfed**, and fruit setting is affected.
 - **Control Measures:**
 - Emphasize **biosafety standards in nurseries** and implementing compulsory seed treatment.
 - Farmers should **inspect saplings before planting** and discard any infected material.
- **CMV:**
 - **About:**
 - CMV belongs to the **Bromoviridae family** and is one of the most widespread plant viruses. It has a broader host range, affecting **cucumber, melon, eggplant, tomato, carrot, lettuce, celery, cucurbits**, and some ornamentals.
 - It was first identified in **cucumber in 1934**.
 - **Transmission:**
 - CMV mainly spreads through **aphids**, which are **sap-sucking insects that can acquire and transmit the virus within minutes**.
 - It can also be transmitted by seeds, mechanical inoculation, and grafting.
 - **Effect on Crops:**
 - Distorts leaves, primarily at the top and bottom while leaving the middle relatively unaffected.
 - In cucumber, it causes a **mosaic-like pattern of yellow and green spots**.
 - **Affects fruit formation** and leads to stunting and reduced production.

- **Control Measures:**
 - Focus on **preventing aphids** by using **quick-acting insecticides or mineral oils**.
 - Care should be taken to avoid **aphid migration** and spread of the virus to other fields.
- **Similarity:**
 - Both viruses have a **single-stranded RNA genome** that is encapsidated in a **rod-shaped protein coat**. **Both viruses enter the plant cells through wounds** or natural openings and replicate in the cytoplasm.
 - They then move systemically throughout the plant via the **phloem**.
 - Also, Both viruses can cause almost **100% crop loss unless properly treated on time**.

Note:

- **Phloem** is a complex tissue found in vascular plants, responsible for the **transport of organic nutrients, primarily sugars**, throughout the plant.
- **Cytoplasm** is the gel-like substance that fills the interior of cells. It is a semifluid medium composed **of water, salts, proteins, and other molecules**.
- **RNA** is a genetic material composed of ribonucleic acid (RNA). It carries genetic information in the form of **single-stranded nucleotide sequences**.

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