

Validation of ISF differential sets for Tomato mottle mosaic virus (ToMMV) in tomato and pepper ISF Project

Project Overview

The ISF ToMMV Project was conducted to validate and standardize differential sets for **Tomato mottle mosaic virus (ToMMV)** in **tomato** and **pepper**. The objective was to confirm a consistent reaction pattern across laboratories and to provide fit-for-purpose differential materials and documentation for harmonised use by the seed sector.

Methodology & Participation

- A multi-laboratory **ring test** was performed using established **CPVO technical protocols** (tomato and pepper resistance biotests for tobamoviruses).
- A ToMMV isolate (originating from **tomato, California**) was multiplied centrally (GEVES) and distributed to participating laboratories; differential seed lots were also supplied to support consistency.
- Results were returned by the majority of participants (**8 of 9 expected** datasets for both tomato and pepper were received and analysed).

Key Results

- **Strong inter-laboratory consistency** was observed for the expected resistance/susceptibility patterns in both crops.

Tomato (ToMMV):

- **Susceptible** reactions were confirmed on susceptible controls and Tm1 material.
- **Resistance/HR** reactions were confirmed on Tm2 and Tm2²/Tm22 materials.
- One laboratory noted apparent segregation on a resistant line; follow-up checks indicated the resistance gene was present, suggesting a likely **technical/lab effect** rather than a change in reaction pattern.

Pepper (ToMMV):

- The differential series showed the expected pattern: **L0 susceptible**, while **L1–L4** expressed resistance reactions consistent with ToMMV response in the tested material.
- One laboratory observed segregation on the L4 line; follow-up indicated susceptible plants lacked L4, supporting that this was linked to **line heterogeneity**, not an unexpected virus reaction.

Isolate check:

- An additional ToMMV isolate tested by one participant produced the **same reaction pattern**, suggesting no evident pattern variability in this limited comparison.

Final Outcome

- The project confirmed that the validated reaction patterns supported:
 - a **dedicated ToMMV differential set for tomato**; and
 - inclusion of **ToMMV within the existing pepper tobamovirus differential framework**.
- The differential sets and the final project report were prepared as publication-ready outputs for ISF use and web posting under the Differential Hosts/Differential Sets section.y

Access

The official ToMMV differential sets (tomato and pepper) and the final project report were prepared for publication on the **ISF Disease Resistance page (Differential Sets [Differential Sets - International Seed Federation](#))**.