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« Forecast Working Group on "TOMATOES" OF THE CIVIL DIALOGUE GROUP ON HORTICULTURE, OLIVES AND SPIRITS»

3. Plant health issues:
b) Tomato Brown Rugose Fruit Virus (TOBRFV)

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Key elements

- ✓ A new viral disease of tomatoes first observed in Israel in 2014 has since been detected in Europe, the Middle-East, and North America.
- ✓ No tomato varieties are known to be resistant to the Tomato Brown Rugose Fruit Virus.
- ✓ Preventing the spread of the virus is currently the best means of managing the disease.

I. Tomato Brown Rugose Fruit Virus (ToBRFV): History of the Disease

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Tomato Brown Rugose Fruit Virus (Tobamovirus, ToBRFV) was first identified on tomato plants in **Israel** in 2014, then the virus was detected on tomatoes in **Jordan** in 2015.

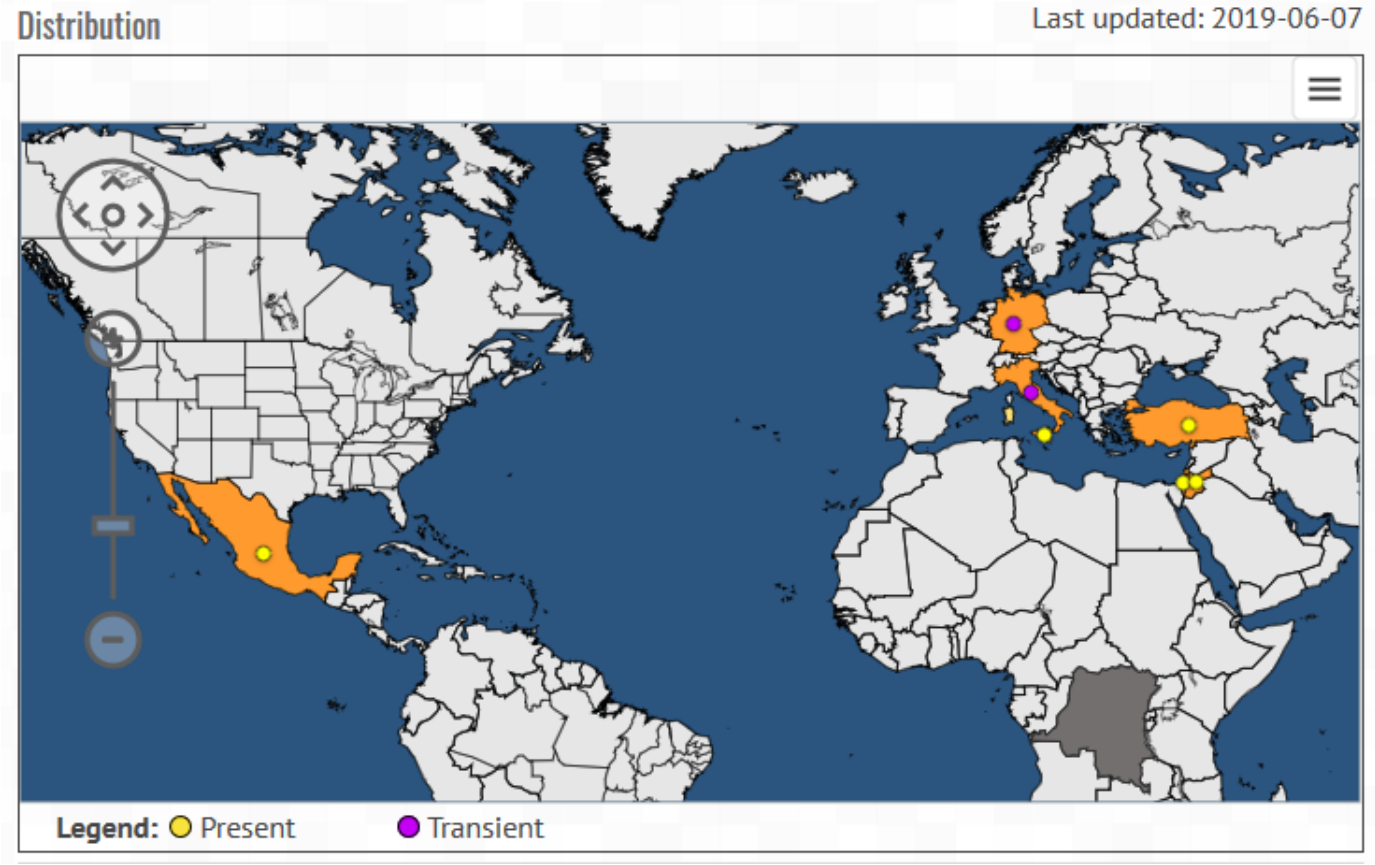
Outbreaks have recently occurred in:

- **Turkey** (New 2019)
- **Germany** (under eradication),
- **Italy** (Sicily)
- **Mexico**

(In Mexico the virus causes major concerns for growers of tomato and capsicum)

- **USA**

(detected in 2018 in 1 tomato greenhouse in California, **eradicated**).



II. ToBRFV in Europe

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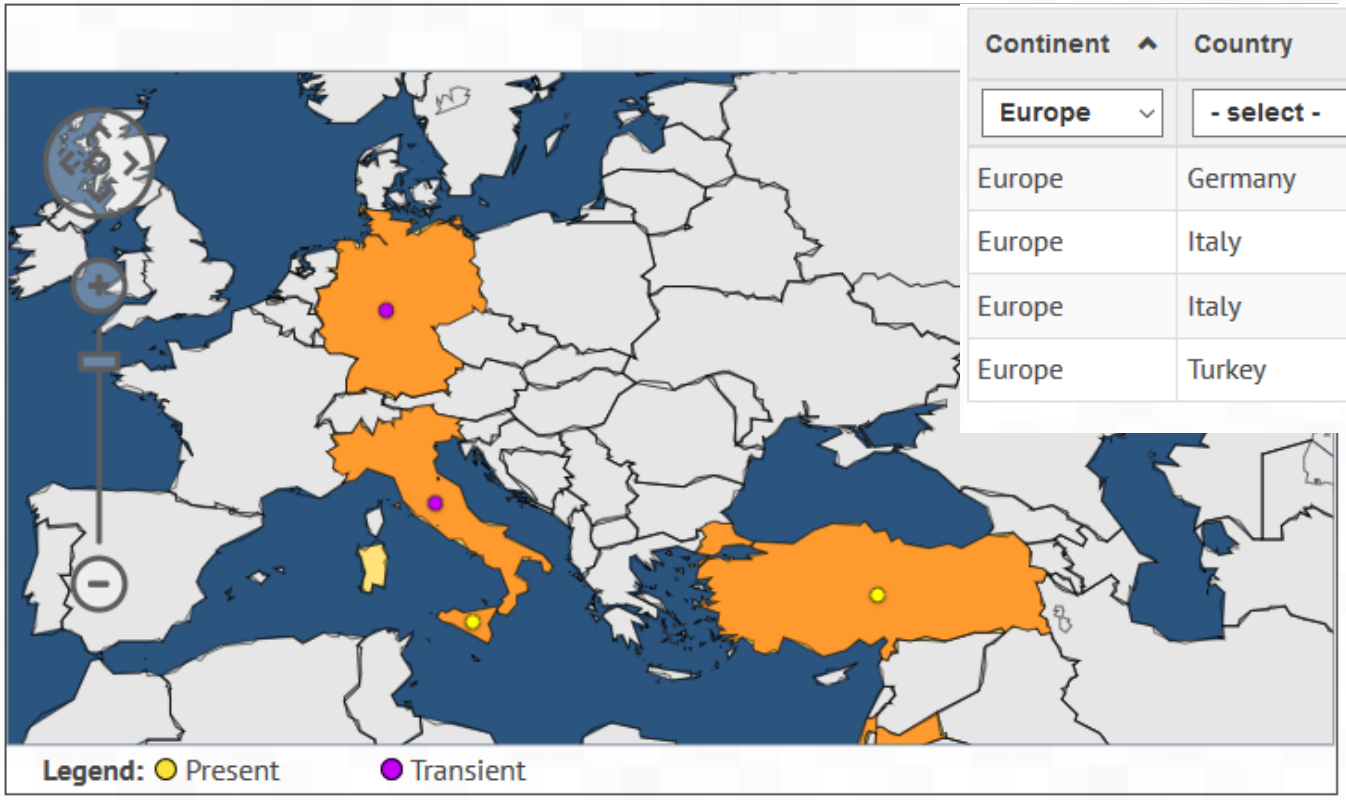
Distribution

Last updated: 2019-06-07



Continent	Country	State	Status
Europe	- select -	- sele	- select -
Europe	Germany		Transient, under eradication
Europe	Italy		Transient, under eradication
Europe	Italy	Sicilia	Present, few occurrences
Europe	Turkey		Present, few occurrences

- **Germany:** First found in **Nordrhein-Westfalen** (in July 2018) in 7 tomato greenhouses. Under eradication.
- **Italy:** First found in 2018 in 1 tomato greenhouse in **Sicilia** (Ispica, Ragusa province). Found in **Piemonte** in a greenhouse in May 2019. Under eradication.
- **Turkey:** first found in **Demre near Antalya** in the Mediterranean region of Turkey in January 2019.

III. Symptoms and damage

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On **tomatoes**, symptoms vary depending on varieties.
Tomato cultivars with the Tm-22 resistance gene (used against other tobamoviruses) are susceptible to ToBRFV.

Foliar symptoms include:

- **Chlorosis, mosaic and mottling with occasional leaf narrowing**.
- **Necrotic spots** may appear on peduncles, calyces and petioles.
- Fruit show **yellow or brown spots**, with **rugose symptoms** rendering the fruits non-marketable.
- Fruits may be deformed and have irregular maturation.

In **Israel**: diseased plants had 10 to 15% symptomatic fruit.
In **Jordan**, in the first reported outbreak, disease incidence reached almost 100%.

On **capsicum**, foliar symptoms include deformation, yellowing and mosaic. Capsicum fruits are deformed, with yellow or brown areas or green stripes.

Symptoms on a tomato

Source: EPPO

IV. Transmission & possible risks

Transmission

ToBRFV is **transmitted by contact** (contaminated tools, hands, clothing, direct plant-to-plant contact) and **propagation material** (grafts, cuttings). Seed transmission of ToBRFV is suspected but needs to be verified.

Tobamoviruses can remain infective in seeds, plant remains and contaminated soil for months. They are found in the seed coat and the endosperm, which could explain why conventional seed disinfection treatments are not fully effective to control them.

Even if transmission from seed to seedling is low, further dissemination by contact (e.g. during transplantation of seedlings or regular handling of the crop) allows a rapid spread within a glasshouse. Recent glasshouse experiments have shown that ToBRFV could be carried by bumblebees (Bombus terrestris) and transmitted to healthy tomato plants during pollination (mechanically).

The disease was first observed in autumn 2014 in Israel and further spread occurred across the entire country within one year, **because of human-assisted spread and trade of infected seeds or seedlings.**

Possible risks

Tomato (*Solanum lycopersicum*) and **capsicum** (*Capsicum sp.)* are the main hosts. Both are important crops grown in the entire EU under protected conditions. Therefore this newly emerging virus poses a potential and significant risk to EU tomato and pepper crops.

Symptoms of the disease makes the **fruit unmarketable**.

Once the virus is introduced in an area, control measures are very limited and mainly rely on elimination of infected plants and strict hygiene measures.

Testing methods (ELISA, RT-PCR) are available to detect the virus in the seed.

It therefore seems crucial to **avoid its further introduction and spread within the EU**.

V. Proposed actions

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The EU sector is asking for:

- ✓ To establish emergency measures to reduce the likelihood of introducing ToBRFV into EU territory.
- ✓ To request *Polymerase chain reaction* (PCR) testing of imported tomatoes and capsicum, and seeds for several pathogens.
- ✓ To consider adjusting this testing regime to include ToBRFV.
- ✓ To identify an appropriate diagnostic protocol and seed testing regime.
- ✓ To develop an implementation plan and schedule for introducing these emergency measures.

VI. Tour de Table with experts

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