

Pepino Mosaic Virus in Greenhouse Tomatoes

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Virus Description and Distribution

Pepino mosaic virus (PepMV) is a member of genus Potexvirus which infects mainly solanaceous plants, including tomato, potato and tobacco. It was originally detected on pepino plants (*Solanum muricatum*) in Peru in 1974. Since then, the virus was first reported on greenhouse tomato (*Lycopersicon esculentum*) in the Netherlands and United Kingdom in 1999. Subsequently, PepMV was detected in several other European countries and North America. In British Columbia, PepMV was first reported on greenhouse tomatoes in 2003. Artificial inoculation studies have shown that PepMV can also infect potato (*Solanum tuberosum*) and eggplant (*Solanum melongena*) but no evidence of infection has been seen on pepper (*Capsicum annuum*). Based on the PepMV genomic RNA analysis, the North American strains (US genotypes), PepMV-US1 and PepMV-US2, are closely related to each other but they differ from the European (EU tomato genotype), Chilean (CH2 genotype) and Peruvian (LP genotype) strains. PepMV is considered as a highly infectious and readily transmittable and it systemically infects tomato.



Figure 1: Leaf symptoms on tomato plants infected with Pepino mosaic virus.



Figure 2: Leaf symptoms on tomato plants infected with Pepino mosaic virus.

Symptoms

PepMV can cause various symptoms in tomato. Reports on the disease severity of infected plants vary from minor to severe depending on the type of PepMV strain, age, vigour and variety of tomato plant and climatic/growing conditions. Symptoms are often expressed during fall and winter months when temperatures and light levels (daylight) are minimal. Initial symptoms usually appear 2-3 weeks after infection. Early symptoms are noticeable on the growing terminals (heads) of infected plants with light-green, thin or needle-like leaves and stunted growth. On leaves (figures 1 & 2), symptoms appear as yellow angular spots and bubbly areas, mild interveinal chlorosis (yellowing) and leaf distortions such as spindly leaves. Streaks of browning may appear on stems and flowering clusters that may affect the development of flowers and fruits. Fruits sometimes show discoloration of yellow-red mosaic patterns, called marbling (figures 3 & 4), and may lead to uneven fruit ripening. Severely affected plants become stunted and distorted. Recent studies conducted in the United Kingdom showed that PepMV was not found to reduce the bulk yield but the quality of tomato fruit was reduced significantly. Loss of quality was mainly due to reduced fruit size, blotchy ripening, marbling, and spotting.



Figure 3: Fruit symptoms on tomato plant infected with Pepino mosaic virus.



Figure 4: Fruit symptoms on tomato plant infected with Pepino mosaic virus

Spread

PepMV is transmitted mechanically, particularly by contact. PepMV appears to spread at a much faster rate than the other known potex viruses such as Tomato mosaic virus (ToMV) and Potato virus X (PVX). PepMV is readily transmitted by contaminated tools, workers' hands and clothing. Direct plant-to-plant contact and propagation by grafting can also spread the virus. PepMV can also be transmitted by seeds derived from infected tomato plants (<http://apsjournals.apsnet.org/doi/pdf/10.1094/PDIS-92-12-1701>). However, the rate of transmission of PepMV from seed to growing embryo is low (0.005 – 0.057%), depending on the harvest interval of seeds obtained from infected mother plants. A similar study in 2005 suggested that PepMV may be seed-borne, but it could only be detected in the seed coat

and not in the embryo. A report from the Netherlands claims that PepMV can only be detected in poorly cleaned fresh seed and the virus was never detected in well cleaned seed. Its ability to spread through recirculating irrigation systems is unknown.

Control

Since PepMV is spread chiefly by contact, control strategies for PepMV are strictly focused on sanitation and overall biosecurity measures. Plant removal, restricted access to affected rows, sanitation of workers (particularly hands and clothing) and tools are all critical. Dipping hands and tools in skim milk prior to and after working with each plant has been reported to reduce transmission of the virus. For details on control measures, greenhouse sanitation and biosecurity please refer the factsheets on [“Management of Pepino Mosaic Virus in Greenhouse Tomatoes”](#) (Ontario), [“On-Farm and Greenhouse Sanitation and Disinfection Practices”](#) and [“Biosecurity Guidelines”](#) respectively.

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