

Research reveals variability

Pepino mosaic virus spreads very easily. For this reason the tomato strain of this plant virus firmly established itself in Europe in a very short time. It remains to be seen, however, whether the same virus strain is involved on all infected tomato cultivation sites.

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The original pepino mosaic virus (PepMV), first found in 1974 in Peru on pepino plants (*Solanum muricatum*) could in experiments also infect tomatoes. This remained unnoticed for a long time until the virus suddenly manifested itself in 1999 on tomato crops in the Netherlands and the UK. It remains unclear where the virus had hidden itself since 1974 although recent research has shown that wild *Lycopersicon* species in South-America are infected with the virus. In most cases these wild plants do not show any symptoms when infected with the virus.

Large distances

Fruits harvested from infected commercial tomato plants contain a high concentration of the virus. In this way the virus can spread quickly and unnoticed over large distances. Although it cannot be proven, this seems the most likely route the virus followed to Europe. Fruits showing distinct symptoms in supermarkets during the wintertime strongly support this theory.

One of the most important reasons why the virus so quickly established itself in certain parts of Europe is that it spreads easily. Once attached to hands or clothes through contact with infected plants, plant parts or fruits, the virus remains infectious for a long time. It can spread unnoticed to for instance doorknobs and then uninfected tomato crops.

Viruses can change

Viruses are opportunistic pathogens which can easily adapt to new circumstances. This occurs naturally when they produce off-

spring. During every cycle, new virus particles are formed and genetic variation is introduced. Viruses that have the correct genetic make-up for a given situation will multiply more quickly. During this process new and possibly more severe variants of the virus are formed. Under the right circumstances these can quickly become a problem. Remember that the SARS virus became a worldwide epidemic in only a matter of weeks.

PepMV is reported in a growing number of countries worldwide (Spain, North-America, Canada and even China). Most of these reports are based on serological tests. But also isolates of PepMV are described that are genetically distinct from the common 'tomato-strain'. Such a deviant isolate was already described in Spain in 2002. Also in North-America PepMV isolates occur that not only differ from the European isolate but also from each other. This could mean that the virus has taken different routes from Peru, not only to Europe but also to North-America.

Variations in symptoms

Different opinions on the dangers of PepMV exist. Some countries report serious damage and economic losses resulting from PepMV in tomatoes. In other countries the damage reported is minimal. From Canada serious symptoms on infected plants like necrosis on leaves and stems are reported, especially on plants that receive more shade. Light apparently plays a role in symptom expression. Whether the diverse symptoms reported from different countries or even different cultivation sites are due to different variants or strains of the virus is not yet known.

The combined research of Plant Research International in Wageningen¹ and Applied Plant Research in Naaldwijk² focuses on the genetic variability of the virus. The main aim is to determine if and how the virus can adapt and what variants of the virus occur in Europe and the rest of the world. □



Pepino mosaic virus damage on the leaves, and stems of tomato plants.

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