

Virus Aspect in *Malus* and *Prunus*: Spreading of Viruses in the Field

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INTRODUCTION

When apple (*Malus*), plum (*Prunus*), and sour cherry (*Prunus*) are propagated there is a risk of disease transfer which could in time affect new clones. This is especially a problem with virus diseases. In the past the only way to avoid this problem was to select stockplants that were not infected.

Since the beginning of the 1950s research using heat treatment (thermotherapy) and meristem culture have shown that it is possible to remove viruses from plants. The combination of thermotherapy and meristem culture has proved to be more effective than either method alone. However, treated plants can not be declared virus free until a careful test has been carried out (Thomsen, 1987).

Virus diseases affecting fruit trees have many ways of spreading in nature. The most effective transmitter of these pathogens is the propagator by using virus infected material. In an orchard dissemination occurs by pollen, insect vectors, and natural root grafting.

TRANSMISSION THROUGH SEED AND POLLEN

The embryo cells in a seed can be infected in different ways:

- 1) When egg cells in virus infected plants are fertilized by pollen from non-infected plants.
- 2) When egg cells from non-infected plants are fertilized with pollen from infected plants.
- 3) When egg cells and pollen both originate from infected plants.

All three ways are involved in spreading Prunus necrotic ringspot virus to mazzard rootstocks. In some cases it has been observed that pollen from infected trees has been able to infect non-infected cherry trees. This way is of practical importance in spreading Prunus necrotic ringspot virus from tree to tree in cherry orchards.

TRANSMISSION OF VIRUSES THROUGH VECTORS

Virus vectors (e.g., mites, aphids, leafhoppers, and nematodes) have a prominent role in transmission of viruses in *Prunus*. Vectors for transmission of viruses to *Malus* seem to be more rare in Denmark.

TRANSMISSION THROUGH ROOT GRAFTING

Viruses spread by natural root grafts are found most commonly in rootstock beds and in intensive fruit orchards. Through root-transmission experiments with apple mosaic virus in Denmark it has been confirmed that transmission through root grafting takes place.

CONCLUSIONS

Detection of viruses in fruit trees has been carried out in Denmark using the indexing techniques compiled by the International Committee for Cooperation in Fruit Tree Virus Research (1986). Virus vectors occur more often in *Prunus* than in *Malus*. After a period of 20 years original virus-free plants of *Prunus* and *Malus* are being retested. To date results of the retesting indicate that many *Prunus* clones are reinfected whereas most *Malus* clones are virus free. Seed transmission of Prunus necrotic ringspot virus is often a problem in *P. avium* seedlings used as rootstocks. Therefore, it is strongly recommended to use only seed from virus free *P. avium* populations for the production of rootstocks.

LITERATURE CITED

- International Committee for Cooperation in Fruit Tree Virus Research**, 1986. Detection of virus and virus-like diseases of fruit trees. Acta Hort. 193:383-384.
- Thomsen, A.**, 1987. Termoterapi og vævskultur til bekæmpelse af virussygdomme. Ugeskrift for Jordbrug 132:845-850.