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Poleroviruses: New insights into the mystery of phloem restriction

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Poleroviruses, a genus belonging to the *Luteoviridae* family, occupy a special place among plant viruses. Unlike most viruses that are able to infect almost all cell types, poleroviruses are restricted to the vascular system of their hosts. The identification of the mechanisms responsible for this phenomenon has been the aim of many studies over the past decade. The prevailing hypotheses are the inability of those viruses to neutralize host defenses outside of the phloem and the possible lack of a functional movement protein.

In transgenic tobacco and potato plants containing cDNA encoding the full-length genome of *Potato leafroll virus* (PLRV), viral antigenes have been found in phloem cells and outside of the phloem, in a limited number of mesophyll and epidermal cells (1). It has further been reported that PLRV is able to overcome its phloem limitation in a potyvirus-PLRV mixed infection scenario. However, the expression of the Hc-Pro protein (silencing suppressor and movement protein of potyviruses) in transgenic plants is insufficient to alter PLRV tropism (2). A recent study showed an implication of the C-terminal domain of the PLRV read-through protein in phloem restriction, suggesting that this feature might be self-imposed in order to keep the deleterious effect of the infection on host plants under control (3). Thus, the mechanisms of phloem restriction are very complex and seem to involve the suppression of host defenses like gene silencing as well as the function of movement proteins that act in a host specific manner.

In this presentation I will show the results of similar experiments realized in transgenic *Arabidopsis thaliana* plants containing a wild-type or a replication deficient cDNA copy of the *Turnip yellows virus* (TuYV) genome. Our study focuses on the expression and localization of viral proteins and RNA but also on the analysis of host defense reactions, thus giving new insights into the mechanism of phloem limitation.

1. Franco-Lara *et al*., *J. Gen. Virol.* 1999
2. Savenkov *et al.*, *Virology* 2001
3. Peter *et al.*, *J. Virol.* 2009