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O.29 Role of phloem proteins in polerovirus transmission by aphids

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Poleroviruses are phytoviruses strictly transmitted by phloem-feeding aphids in a circulative and non-propagative mode. Virions, acquired by aphids when ingesting sap from infected plants, successively cross the gut epithelium to be transported into the hemolymph and then the accessory salivary glands cells, to be released, together with saliva, into the plant during a subsequent feed. As aphids sample virions in sieve tubes along with sap, any sap protein bound to virions will be acquired by the insects and could potentially be involved in the transmission process. By developing *in vitro* virus-overlay assays on sap proteins collected from cucumber, we observed that about twenty proteins were able to bind to purified particles of *Cucurbit aphid borne yellows virus* (CABYV). Among them, eight proteins were identified by mass spectrometry. The role of two candidates belonging to the PP2-like family (predominant lectins found in cucurbit sap) in aphid transmission was further pursued by using purified orthologous PP2 proteins from *Arabidopsis*. Addition of these proteins to the virus suspension in the aphid artificial diet greatly increased virus transmission rate. This shift was correlated with an increase in the number of viral genomes in insect cells and with an increase of virion stability *in vitro*. Surprisingly, increase of the virus transmission rate was also monitored after addition of unrelated proteins in the aphid diet, suggesting that any soluble protein, at sufficient high concentration in the diet and acquired together with virions could, stimulate virus transmission. Based on these results, a model of the involvement of plant proteins in polerovirus acquisition by aphids will be presented.

- Bencharki et al., (2010) *Mol Plant Microbe Interact.* 23, 799-810
