DO ALL NONCIRCULATIVE APHID-TRANSMITTED VIRUSES SHARE THE SAME RETENTION SITES?

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Non-circulative (NC) aphid-transmitted viruses are known to be retained in a specialized anatomical structure of the common duct of the maxillary stylets and inoculated during successive intracellular stylet punctures (pd) in the epidermal and mesophyll cells. Different molecular virus-vector interactions mediate the retention and relationships between NC viruses and their specific receptors in the vector stylet cuticle. Some NC viruses, use the capsid protein (CP) to bind directly to the receptor in the aphid's stylets (Cucumoviruses), while others need virus encoded proteins that act as a bridge between the CP and the aphid's receptor. This is the case of Potyviruses, where the presence of the Helper component protein (HC-Pro) is mandatory for transmission and of the Caulimoviruses which require two additional proteins (P2 and P3). However, there is no evidence that all the above-mentioned NC viruses share the same retention sites in its aphid vectors causing competition or interference between each other when acquired together or one after the other. The possible competition for aphid's retention sites between different types of NC viruses was evaluated in a series of sequential transmission assays conducted with three types of NC viruses that follow different transmission strategies: *Turnip mosaic virus* (TuMV, *Potyvirus*) versus *Cauliflower mosaic virus* (CaMV, *Caulimovirus*), and *Cucumber mosaic virus* (CMV, *Cucumovirus*) versus *Zucchini yellows mosaic virus* (ZYMV, *Potyvirus*). The experiments were conducted on turnip plants and *Brevicoryne brassicae* L. as a vector of the TuMV-CaMV combination and on melon plants and *Aphis gossypii* Glover as a vector of the CMV-ZYMV combination. Results showed that a short acquisition access time of CaMV does not interfere with the subsequent acquisition and retention of TuMV, and both viruses are acquired, retained and transmitted concurrently by the same aphid. However, after long CaMV acquisition access periods the probability of retention and subsequent transmission of TuMV as well as the number of co-infected plant was remarkably reduced. On the other hand, no reduction of ZYMV transmission rate is observed when CMV is acquired previously. However, when ZYMV is acquired first, there is a significant reduction in the retention and subsequent transmission of CMV. We will discuss on the basis of our findings how a precise anatomical structure of the common duct of the aphid's maxillary stylets may host the same retention sites for different groups of NC-viruses.