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(P2-16) Is glycosylation of viral structural proteins involved in CABYV aphid transmission?

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Cucurbit aphid borne yellows virus (CABYV, genus *Polerovirus*, family *Luteoviridae*) is a plant virus, localized in phloem cells and obligatory transmitted by aphids. Previous studies have shown that post-translational modifications such as N-linked glycosylation can affect polerovirus transmission by aphids. We analyzed the glycosylation status of the 2 structural proteins of CABYV (Coat Protein-CP: major capsid protein, ReadThrough-RT: minor capsid protein) by using different approaches to determine more precisely how this modification may affect aphid transmission.

We first constructed four CABYV mutants modified in potential N-linked glycosylation sites (named Ngly-1, -2, -3, -4). Two of them (Ngly-1 and -2) contained a mutation in the major CP, whereas the two others were affected in the RT. When electroporated to plant protoplasts, the four mutants replicated as efficiently as the wild-type virus suggesting that the mutations introduced did not affect virus replication. When introduced in plants, the mutant Ngly-2 was almost totally impeded in long-distance movement whereas Ngly-1, -3, -4 showed a viral accumulation similar to the wild-type virus in systemic leaves. Analysis of the viral progeny in infected plants showed that mutations are maintained and no reverse nor compensatory mutation appeared. Aphid transmission of Ngly-1, -3, -4 mutants was assessed using infected plants as virus source. We observed a reduction in aphid transmission of the 3 mutants using either *Aphis gossypii* or *Myzus persicae*, two species known to be efficient vectors of CABYV. In order to conclude if the reduction in transmission efficiency of these viruses was due to a reduction in viral accumulation in plants or to a direct effect in vector interactions, aphid transmission experiments are being performed using purified virus particles as virus source. However, at this stage, we cannot correlate the effects on systemic movement or aphid transmission to modifications of the glycosylation status of the virion.

We then analyzed by Mass-Spectrometry if post-translational modifications are present on the two structural proteins of CABYV. So far, our results showed that no glycosylated peptide is present on the viral structural proteins. Glycosylation of virions was also assessed by immunodetection with antibodies specific to complex plants glycanes, and by using the lectin Concanavalin A. No N-glycane could be identified on the viral structural proteins. However, a 90kDa protein, an α-glucosidase, that co-purify with polerovirus was identified and shown to be modified by oligomannosidic and complex N-glycanes.The role in aphid transmission of this plant protein is currently being investigated.