**Cucumber mosaic virus Y satellite turns tobacco yellow to attract aphids in favour of its survival**

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Y satellite RNA (Y-sat) is a satRNA which depends on cucumber mosaic virus (CMV) for its replication and encapsidation (1). The presence of Y-sat in CMV-infected *Nicotiana* plants (CMV+Y-sat) modifies the mosaic symptoms turning leaves bright yellow. Y-sat specifically down-regulates the *ChlI* mRNA, impairing the chlorophyll biosynthesis in *Nicotiana* plants (1) and thus causing bright yellow symptoms. We tested the effect of yellow colour on the epidemiology of CMV+Y-sat. A pairwise aphid attraction bioassay and Y-tube olfactory bioassay were conducted using healthy, CMV-infected and [CMV+Y-sat]-infected *Nicotiana* plants to observe the colour-dependent and odour-dependent aphid attraction, respectively. The CMV accumulation levels in CMV-infected and [CMV+Y-sat]-infected *Nicotiana* plants were determined by RT-q-PCR. The ability of the aphid to transmit the virus from either CMV-infected or [CMV+Y-sat]-infected *Nicotiana* plants was tested using *Myzus persicae* (green peach aphid), a natural vector of CMV. The results showed a significantly higher number of aphids was attracted by intense yellow of [CMV+Y-sat]-infected plants (27.63%) compared to that of CMV-infected plants (12.5%). The olfactory bioassay showed that there was no significant difference in aphid attraction among all plant types, showing that neither CMV infection nor Y-sat infection can induce odour-dependent attraction of aphids. Our RT-q-PCR results revealed that the level of CMV in CMV-infected plants was nearly 13x higher than that in [CMV+Y-sat]-infected plants. The transmission experiments resulted in 85% infection when aphids were transferred from CMV-infected to healthy plants, whereas we obtained 55% infection for [CMV+Y-sat]-infected plants. Therefore we found that the CMV transmission rate was not strongly affected by the CMV level in [CMV+Y-sat]-infected plants although Y-sat normally reduces the CMV level down to less than 1/10 of the level in CMV-infected plants. It is thus evident that the Y-sat-mediated yellow symptom specifically attracts aphids. Taken together, we concluded that Y-sat dominates the epidemiology of the helper virus by attracting a significantly higher number of aphids ensuring Y-sat survival in nature.

**Reference**

(1) Shimura, H. *et al.,* (2011). PLoS Pathog. 7: e1002021.