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Monitoring aphid population dynamics to better understand virus epidemics in melon crops

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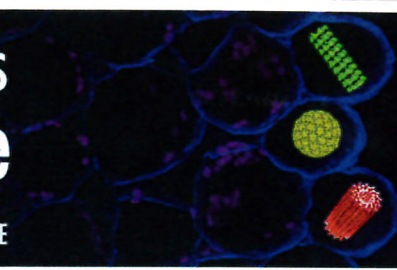
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The temporal dynamics of alate aphids and viruses were established in eight field trials conducted between 2010 and 2014. Alate aphids visiting melon crops were sampled daily using suction traps and frequently encountered aphid species (*Aphis craccivora*, *Aphis fabae*, *Aphis gossypii*, *Myzus persicae*) were identified. Persistent *Cucurbit Aphid-Borne Yellow Virus* (CABYV) and non-persistent *Cucumber Mosaic Virus* (CMV), *Watermelon Mosaic Virus* (WMV) and *Zucchini Yellow Mosaic Virus* (ZYMV) were monitored weekly by DAS-ELISA. Gompertz model was fitted to each incidence data set by nonlinear regression and AUDPCs (Area Under the Disease Progress Curve) were calculated. A statistical analysis was performed to explore the relationships existing between several “aphid” variables (cumulative abundances over different periods of time, per species or globally) and several “virus” variables (cumulative numbers of infected plants over different periods of time, newly infected plants per week, AUDPCs, disease onset day, Gompertz model parameter estimates). No relationship was highlighted between aphids and non-persistent viruses. More interestingly a predictive relationship was established between *Aphis gossypii* population dynamics and CABYV epidemics. Indeed, the number of *Aphis gossypii* trapped between the 14 first days of the crop explained 80% of the variability of the CABYV total AUDPC. This result suggests that controlling precociously the population of *Aphis gossypii* could impact favourably the epidemic onset and progress of this virus in melon crops.



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