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Interactions between phytovirus and aphids vectors can be modulated depending on vector transmission efficiency.

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Vector-borne viruses can induce changes in the phenotype of their host plants that may in turn influence the frequency and nature of host–vector interactions. Manipulation of vector behaviour by phytoviruses usually facilitates their propagation and seems to converge according to the virus transmission mode. However, to our knowledge, this convergence has never been related to the vector transmission efficiency. We investigated the effects of infection of *Camelina sativa* by the persistent *Turnip Yellow Virus* and the semi-persistent *Cauliflower Mosaic Virus* on (i) arrestment and dispersal, (ii) feeding behaviour (using electropenetrography) and (iii) physiology of two aphid species: the polyphagous *Myzus persicae* and the Brassicaceae specialist *Brevicoryne brassicae*. Results showed TuYV-infected camelina induced positive effects on the feeding behaviour and physiology of *Myzus persicae*, a vector with high transmission efficiency; but induced negative effects on *Brevicoryne brassicae*, a poor vector of TuYV. CaMV-infected plants had similar effects on both aphid species showing equivalent transmission efficiency for this virus. In conclusion, viral manipulation of vector behaviour is likely to depend not only on the virus mode of transmission, which is generally considered as a common assumption, but also on the aphid transmission efficiency.