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A plant virus causes symptoms through the deployment of a host-mimicking protein domain to attract the insect vector

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During compatible plant-virus interactions, viruses can interfere with the normal developmental program of their hosts, leading to the appearance of phenotypes that we usually identify as ''symptoms of infection'' (leaf curling and yellowing, stunting, dwarfism, necrosis). Despite their relevance, the molecular mechanisms underlying symptom induction and their biological meaning, if any, remain poorly understood. By using tomato yellow leaf curl virus (TYLCV, *Geminivirus*) as model, we have isolated C4 as the main protein responsible for the induction of TYLCV-associated symptoms in tomato. C4, by mimicking a host protein domain, the Conserved C-termini in LAZY1 protein family (CCL) domain, physically interacts with the RCC1-like domain-containing plant

proteins (RLDs). By interacting with the RLDs through the CCL-like domain, C4 displaces one endogenous interactor, LAZY (LZY), interfering with RLD functions in processes such as auxin signaling and endomembrane trafficking, which correlates with the manifestation of symptoms. Surprisingly, we observed that appearance of C4-mediated symptoms in tomato plants plays no major role in viral replication nor movement, but they serve as attractants for the insect vector, the whitefly *Bemisia tabaci*, which preferentially feeds on tomato plants exhibiting strong symptoms of viral infection. These results suggest that, during plant-virus co-evolution, symptoms may have appeared as a strategy to promote viral transmission by the insect vector, at least in some specific plant-virus-vector pathosystems[1].

References

1. Gao, Aguilar et al., 2022, A plant virus causes symptoms through the deployment of a host-mimicking protein domain to attract the insect vector. *bioRxiv*. doi.org/10.1101/2022.12.16.520777

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