

Plant Pathology Seminar Series

Potato virus Y modulates the auxin-signaling pathway to promote disease development

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Abstract:

Potato virus Y (PVY) is one of the most economically important plant pathogens that affects staples such as potato and several other solanaceous plants and is considered as top five economically important viruses in the world. The PVY genome encodes a single polyprotein which is then post-translationally cleaved into P1-pro, HC-pro, P3, CI, VPg, NIa-pro, NIb, and coat protein (CP). In this study, we performed a yeast two-hybrid (Y2H) screen of *Nicotiana benthamiana* cDNA library using PVY-encoded NIa-pro as the bait. The *N. benthamiana* Indole-3-acetic acid-amido synthetase (IAAS) was identified as an interactor of NIa-pro protein. The interaction was confirmed via targeted Y2H and bimolecular fluorescence complementation (BiFC) assays. We have shown the subcellular localization of both NIa-pro and IAAS protein in the nucleus and cytosol. IAAS converts free (active) IAA to the inactive, conjugated form, which plays a crucial regulatory role in auxin signaling. Transient silencing of IAAS in *N. benthamiana* plants interfered with the PVY-mediated symptom induction and virus accumulation. Conversely, overexpression of IAAS enhanced the symptoms induction and virus accumulation in the infected plants. In addition, the expression of several auxin-responsive genes was found to be downregulated during PVY infection. Our findings demonstrate that PVY NIa-pro protein potentially promotes disease development via modulating auxin homeostasis.

References:

Gadhav, K. R., Gautam, S., Rasmussen, D. A. & Srinivasan, R. 2020. Aphid Transmission of Potyvirus: The Largest Plant-Infecting RNA Virus Genus. *Viruses*, 12, 773.

González-Lamothe, R., El Oirdi, M., Brisson, N. & Bouarab, K. 2012. The conjugated auxin indole-3-acetic acid-aspartic acid promotes plant disease development. *The Plant cell*, 24, 762-777.

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