Thursday, September 27, 2018
4:15–4:45 p.m.

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Viruses, aphids and next generation control

Almost 40% of global crop loss is due to disease, with losses predicted to increase in the next 50 years as climate change continues. Most viral pathogens depend on insect vectors for transmission among plants and, ultimately, for survival. As a result, vector-plant interactions are critical to virus epidemiology. My lab seeks to determine the molecular mechanisms that underlie this phenomenon and to utilize this knowledge to develop innovative control strategies for more sustainable agricultural systems. Previously, we demonstrated that Turnip mosaic virus (TuMV) increases insect vector attraction to, and reproduction on, infected plants. Changes in host physiology which mediate host-vector interactions were due to the expression of a single viral protein, NIa-Pro. Recently, we determined that NIa-Pro relocalizes from the nucleus of the plant cell in the presence of the insect vector. Importantly, NIa-Pro needs to relocalize in order to inhibit plant defenses during infection. These results suggest that plant viruses respond actively to the presence of insect vectors, promoting insect performance and transmission only when needed. We are currently investigating the role of other viral proteins in this system. This research can be used to develop novel control methods based on preventing recognition of insect vectors by viruses and changes in host physiology that mediate transmission, potentially reducing pesticide use, and leading to more sustainable agriculture systems in the future.