Dr. Stefan Vidal

Editor-in-Chief

Journal of Applied Entomology

Dr. Robert Clark

Affiliate Faculty

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Dear Dr. Vidal,

On behalf of my co-authors, it is my pleasure to submit our manuscript titled “**Risk assessment for non-crop hosts of Pea Enation Mosaic Virus and the aphid vector *Acyrothosiphon pisum***.” The pea aphid (*Acryrothosiphon pisum*) is one of the most economically important insect pests in legume cropping systems. Pea aphids are responsible for transmitting a large number of viruses to pulse crops, vegetable crops, and forage crops. Consequently, this insect creates pest management challenges in many production regions of the world. In the Pacific Northwestern U.S., pea aphids are a periodically outbreaking catastrophic pest of dry peas and lentil crops, where they transmit the devastating Pea Enation Mosaic Virus (PEMV). During outbreak years in which aphids infect young pulse plants with PEMV, growers can experience significant yield losses. Despite the massive economic impacts on this critical rotational crop, the pathogen reservoir that allows PEMV to persist in these landscapes is still unknown.

In 2018 we took advantage of a pea aphid and PEMV outbreak year in pulse crops to identify the source of viral pathogens in the Palouse region of eastern Washington and northern Idaho, USA. Our team performed a large-scale survey of plant communities near pulse crop fields and other natural areas dominated by weedy legumes. Using a combination of aphid sampling and rt-PCR testing of plant tissue, we identified fifteen species of non-crop legumes harboring pea aphids and tested 1076 plant samples for PEMV. Using these molecular detection methods, only one species of host plant was found with PEMV: Hairy vetch (*Vicia villosa*). Notably, hairy vetch also had the highest densities of pea aphids in non-crop habitats. As a common invasive weed and forage plant in the Pacific Northwestern US, hairy vetch is an ideal reservoir for PEMV and likely a key non-crop sources of aphid-borne viruses in the region.

We appreciate having this manuscript considered for publication in *Journal of Applied Entomology* because although pea aphids have been widely studied as economic pests, there is work identifying the non-crop reservoirs of viruses they carry. This work sets a foundation for future monitoring and control efforts, and the empirical approach has applications in other cropping systems in which aphids with a wide diet-breath transmit RNA viruses to crops.

Thank you for your consideration.

Sincerely,

Robert Clark