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**First report of *Phyllocoptes fructiphilus* the vector of the Rose rosette virus in Florida**

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*Phyllocoptes fructiphilus* is a microscopic plant-feeding eriophyid mite. Eriophyoid mites are very host specific (Oldfield 1996, Skoracka et al. 2009) and *P. fructiphilus* only feeds on plants in the genus *Rosa* (Amrine 1996). *Phyllocoptes fructiphilus* is the vector of the Rose Rosette Virus (RRV). RRV infection is commonly associated with the following symptoms: witches’ brooms/rosetting, deformed flowers, increased prickle density, elongated shoots, reddened leaves and stems, and increased dieback which ultimately kills the rose host (Amrine 1996). This disease is known as Rose Rosette Disease (RRD) and is the most serious disease of roses, creating millions of dollars of losses for growers. Rose Rosette Disease and the mite have invaded the southeastern United States as they followed the range expansion of the non-native *Rosa multiflora* (Thunb) towards the coast (Amrine Jr 2002, Otero-Colina et al. 2018).

RRD has been detected in Florida in 2014 on 15 plants; however, the plants were destroyed and *P. fructiphilus* were not detected on the roses at that time. (Babu et al. 2014). In 2018, we began a series of surveys along the borders of northern Florida and southern Georgia. Rose tissue samples were taken from the periphery of various ornamental of wild roses (Knockout roses, Cherokee roses, respectively) throughout Leon and Gadsden counties as well as surrounding Georgia counties. Rose tissues sampled included a mixture of flowers, fruits, buds and short lengths of rose cane, trimmed with bypass pruners and stored in quart sized plastic baggies. Pruners were sanitized with 70% ethanol between cuts. Rose species and coordinates were recorded to map out sites, which had predatory mites, *P. fructiphilus*, or possibly RRD.

On February 14, 2019, we found a total of 42 eriophyid mites from six samples obtained while surveying knockout roses in Leon County, Florida. (Fig. 1A) The mites were sent to the Florida Department of Agriculture and Consumer Services - Department of Plant Industry (FDACS-DPI) and were all identified as *P. fructiphilus* . The roses did not show signs or symptoms of RDD. These roses were tested for RRV with RT-qPCR and Reverse Transcription Recombinase Polymerase Amplification (RT-RPA) (Babu et al., 2016, 2017). However, none of the plants infested with *P. fructiphilus* were positive for RRV.

On July 16th we conducted an additional survey of 33 roses near the initial site of discovery, including the rose sites where *P. fructiphilus* were originally detected. (Fig. 1B), Each sample contained more than 50 eriophyid mites, with some samples containing over 300 mites. We compared the samples collected in February and July with a paired t-test and we found a significant increase in *P. fructiphilus* population between the two sampling dates (p-value = 0.001, α = 0.05, df = 4). These mites were all individually slide mounted and subsequently confirmed as *P. fructiphilus*. Additional rose samples were tested for RRV by RT-qPCR, but no virus was detected.

This is the first record for *P. fructiphilus* in Florida. More importantly, RRV is currently not established in Florida. None of the mite-infested roses had symptoms of RRD and none were positive for RRV. However, the presence of *P. fructiphilus*, along with past detections of RRV in Florida warrants increased monitoring for the mite and virus in Florida. There is a critical need to develop methods to manage *P. fructiphilus* and RRV, or the US rose industry stands to lose millions on mite control.

Summary

The invasive mite *Phyllocoptes fructiphilus* (Acari: Trombidiformes, Eriophyidae) feeds on plants in the genus *Rosa* and is known as the primary vector of Rose Rosette Disease (Bunyavirales: Emaraviridae). *Phyllocoptes fructiphilus* is reported for the first time in Florida, USA. No roses showed signs or symptoms of viral infection, and no virus was detected using molecular methods. *Phyllocoptes fructiphilus* represents a potential threat to Florida roses if Rose Rosette Disease becomes introduced.

Key Words: Rose Rosette Disease; Rose Rosette Virus; Emaravirus

Resumen

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**References Cited**

**Amrine, Jr, J. 1996.***Phyllocoptes fructiphilus* and biological control of multiflora rose, pp. 741–749. *In* Helle, W., Lundquist, E.E., Sabelis, M.W., Bruin, J. (eds.), Eriophyoid Mites. Their Biology, Natural Enemies, and Control, World Crop Pests. Elsevier.

**Amrine Jr, J. W.** **2002**. Rosa multiflora. Biological control of invasive plants in the Eastern United States. 265–292.

**Babu, B., H. Dankers, E. Newberry, C. Baker, T. Schubert, G. Knox, and M. Paret**. **2014**. First report of rose rosette virus associated with rose rosette disease infecting knockout roses in Florida. Plant Disease. 98: 1449–1449.

**Babu, B., A. Jeyaprakash, D. Jones, T. S. Schubert, C. Baker, B. K. Washburn, S. H. Miller, K. Poduch, G. W. Knox, F. M. Ochoa-Corona, and M. L. Paret**. **2016**. Development of a rapid, sensitive TaqMan real-time RT-PCR assay for the detection of rose rosette virus using multiple gene targets. Journal of Virological Methods. 235: 41–50.

**Babu, B., B. K. Washburn, T. S. Ertek, S. H. Miller, C. B. Riddle, G. W. Knox, F. M. Ochoa-Corona, J. Olson, Y. Z. Katırcıoğlu, and M. L. Paret**. **2017**. A field based detection method for rose rosette virus using isothermal probe-based reverse transcription-recombinase polymerase amplification assay. Journal of Virological Methods. 247: 81–90.

**Oldfield, G. N.** **1996**. Diversity and host plant specificity. In Helle, W., Lundquist, E.E., Sabelis, M.W., Bruin, J. (eds.), Eriophyoid Mites. Their Biology, Natural Enemies, and Control, World Crop Pests. Elsevier.

**Otero-Colina, G., R. Ochoa, J. W. Amrine Jr, J. Hammond, R. Jordan, and G. R. Bauchan**. **2018**. Eriophyoid mites found on healthy and rose rosette diseased roses in the United States. Journal of Environmental Horticulture. 36: 146–153.

**Skoracka, A., L. Smith, G. Oldfield, M. Cristofaro, and J. W. Amrine**. **2009**. Host-plant specificity and specialization in eriophyoid mites and their importance for the use of eriophyoid mites as biocontrol agents of weeds. Experimental and Applied Acarology. 51: 93–113.

Figure captions

Figure 1: Presence of *Phyllocoptes fructiphilus* in Leon County, Florida in (A) February 2019 and (B) July 2019. Orange dots indicate sites sampled which had *P. fructiphilus*. Gray areas indicate previously surveyed areas where no *P. fructiphilus* were found.

Figure 2: Log number of *Phyllocoptes fructiphilus* per rose sample. Samples were taken from sites in Leon County, Florida on February 14 and July 16th, 2019. Asterisks represent significant differences as calculated by pairwise t-tests of the 5 sites tested for *P. fructiphilus* during both months, α = 0.05.

A close up of a map

Description automatically generated

**B**

**A**

Fig. 1

A screenshot of a cell phone

Description automatically generated

Fig. 2