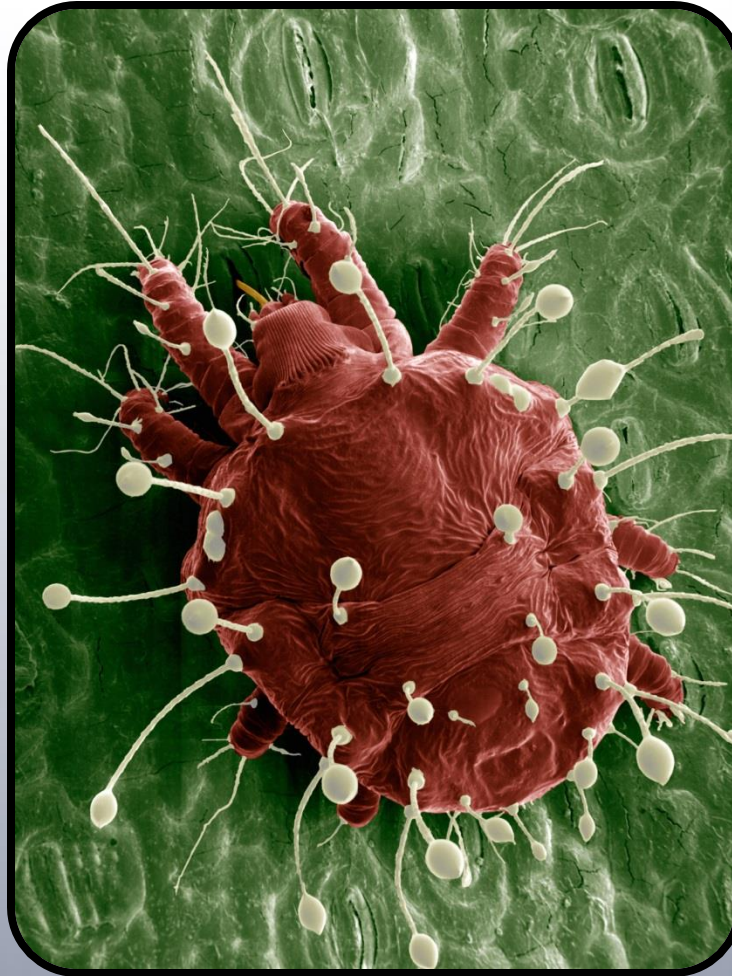


Plant-feeding mite pests



SEM of adult red palm mite, *Raoiella indica*

Photo credit:
Gary R. Bauman, USDA-ARS Electron & Confocal Microscopy Unit



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What are mites?

- Very small arthropods usually with **eight** legs
- Usually live in very specialized habitats
- Live on plants, animals, stored products, soil and water
- Some plant-dwelling mites are beneficial, others cause no visible injury to plants, but some are serious plant pests



Predatory *Mexeches aztercorum* mite eating a phytoseiid mite nymph

Photo credit:
Lyle Buss, Department of Entomology and Nematology, University of Florida



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Generalized mite anatomy

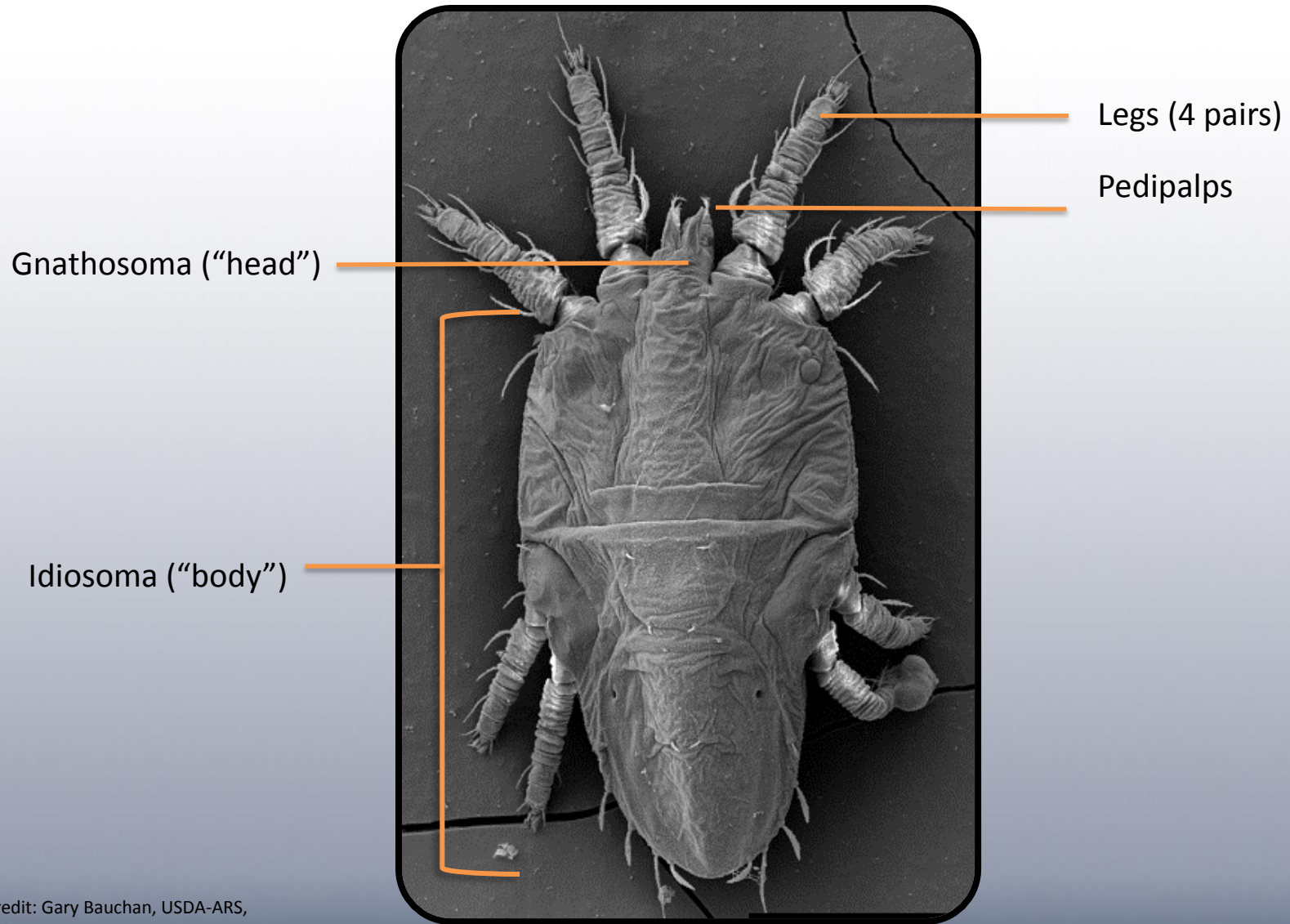


Photo credit: Gary Bauchan, USDA-ARS,
bugwood.org, #5504732



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How mites damage plants

- Break cuticle with mouthparts or suck out plant juice
- Transmit pathogens
- Induce malformed plant parts



Citrus leprosis virus damage



Shriveled and dead leaves



Malformed leaves

Photo credit: shriveled and dead leaves – Wikimedia Commons; malformed leaves - Petr Kapitola, State Phytosanitary Administration, Bugwood.org , #4449059; Citrus leprosis - Carlos Amadeu Leite de Oliveira, Universidade Estadual Paulista, Bugwood.org , #0746010



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Mite damage to plants



Leaf stippling caused by two-spotted spider mite feeding



Bronzing on citrus rind caused by citrus rust mite feeding

Photo credits: [Left] Whitney Cranshaw, Colorado State University, bugwood.org , #5369738; [Right] Don Ferrin, Louisiana State University Agricultural Center, bugwood.org, #5473733



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Mite damage to plants



The false spider mite *Brevipalpus phoenicis* transmits *Citrus leprosis virus*, the cause of citrus leprosis disease

Photo credit: [Left] Eric Erbe, USDA Agricultural Research Service, bugwood.org, #1355019; [Right] Florida Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services, bugwood.org, #5260041

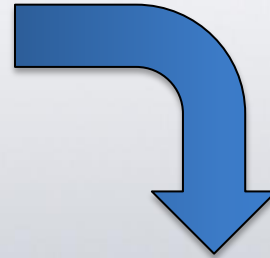


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Mite damage to plants

Erineum mites cause grape leaves to make galls



Tiny erineum mites live within these galls



Photo credits: [Left] Lesley Ingram, bugwood.org, #5401675; [Right] Jody Fetzer, Hillwood Estate, Museum & Gardens, bugwood.org, #5026068



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Generalized mite life cycle

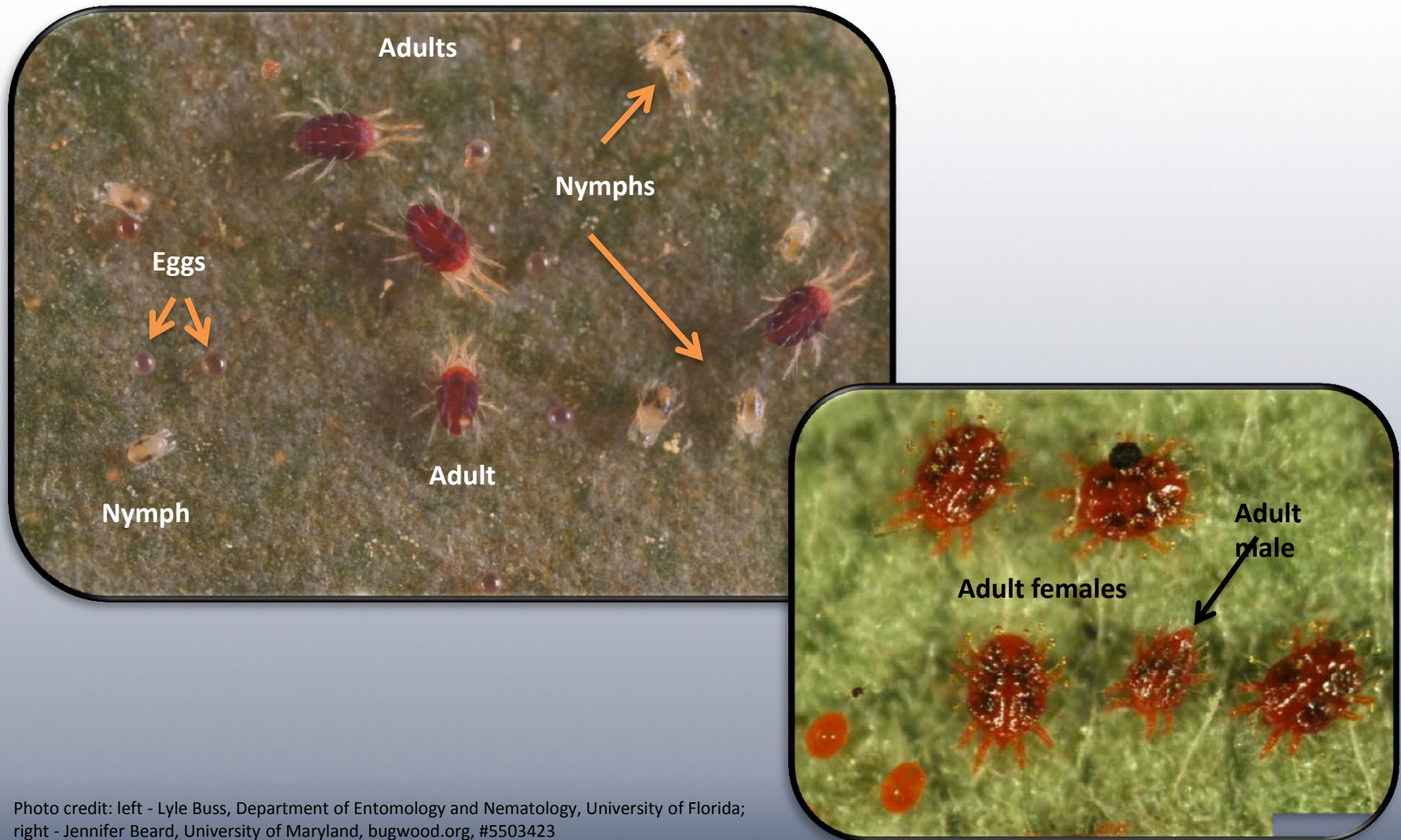


Photo credit: left - Lyle Buss, Department of Entomology and Nematology, University of Florida;
right - Jennifer Beard, University of Maryland, bugwood.org, #5503423



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Examples of invasive mite pests

- Citrus Hindu mite, *Schizotetranychus hindustanicus*
- Citrus brown mite, *Eutetranychus orientalis*
- Red palm mite, *Raoiella indica*



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Citrus Hindu mite

Schizotetranychus hindustanicus

- Originally from India, has been reported in Venezuela and Brazil
- Hosts include citrus, sorghum, coconut and neem
- Research on control methods, means of dispersal, and the full host range is ongoing



Photo credit: Barbara Nienstaedt, Instituto de Zoología Agrícola de la Facultad de Agronomía de la Universidad Central de Venezuela, 2007



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Citrus Hindu mite

Schizotetranychus hindustanicus

- Causes silvery uniform splotches and covers underside of leaf with webbing

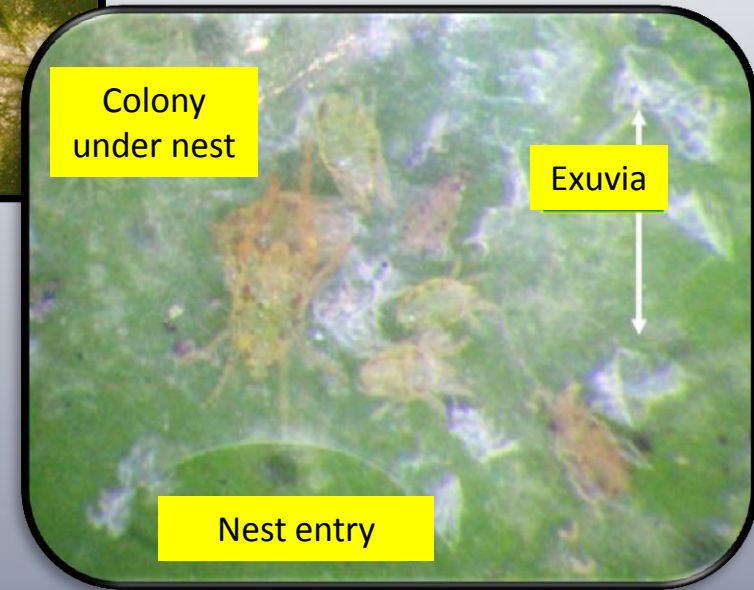
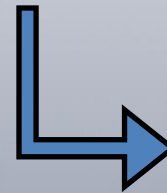


Photo credit: (top left) Navia, D., and Marsaro Jr., A. L. 2010. First report of the citrus Hindu mite, *Schizotetranychus hindustanicus* (Hirst) (Prostigmata: Tetranychidae) in Brazil. Neotrop. Entomol. 39 (1): 140-143. (Bottom right) Barbara Nienstaedt, Instituto de Zoología Agrícola de la Facultad de Agronomía de la Universidad Central de Venezuela.



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Citrus brown mite

Eutetranychus orientalis

- Origin not known but major citrus pest in Africa, Europe, Middle East, Asia, and Australia
- Males are triangular and slender, while females are broadly oval



Photo credit: Ferragut et al. "New mite invasions in citrus in the early years of the 21st century", Exp Appl Acarol (2013) 59:145–164



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Citrus brown mite

Eutetranychus orientalis

- Usually feed on the upperside of the leaf along the midrib then spreading to side veins
- At least 216 hosts, with preference to members of Rutaceae and Fabaceae
- Hosts include:
 - Lemons, mandarins, oranges
 - Pears, peaches, olives, and almonds



Citrus brown mite feeding injury on citrus leaves

Photo credit: Queensland Department of Agriculture, Fisheries and Forestry



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Red palm mite

Raoiella indica

- Spread to the Caribbean in 2004 and to Florida in 2007
- Feeding on leaves causes severe yellowing, reduced fruit yield
- Dispersed by wind or on infested plant material
- Pest on palms, especially coconut as well as bananas, plantains, gingers, and heliconias

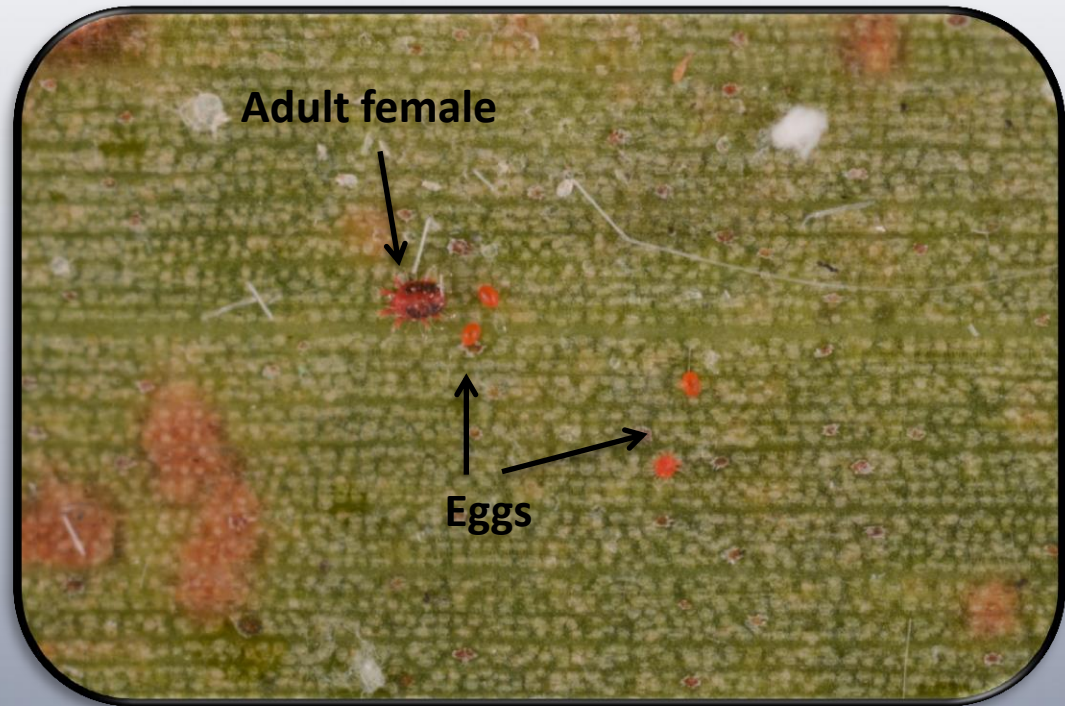


Photo credit: Lyle Buss, Department of Entomology and Nematology, University of Florida



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Red palm mite

Raoiella indica



Close-up of adult red palm mites



Early (top) and advanced (bottom) feeding damage on palm



Feeding damage on banana



SEM of adult feeding through stomate



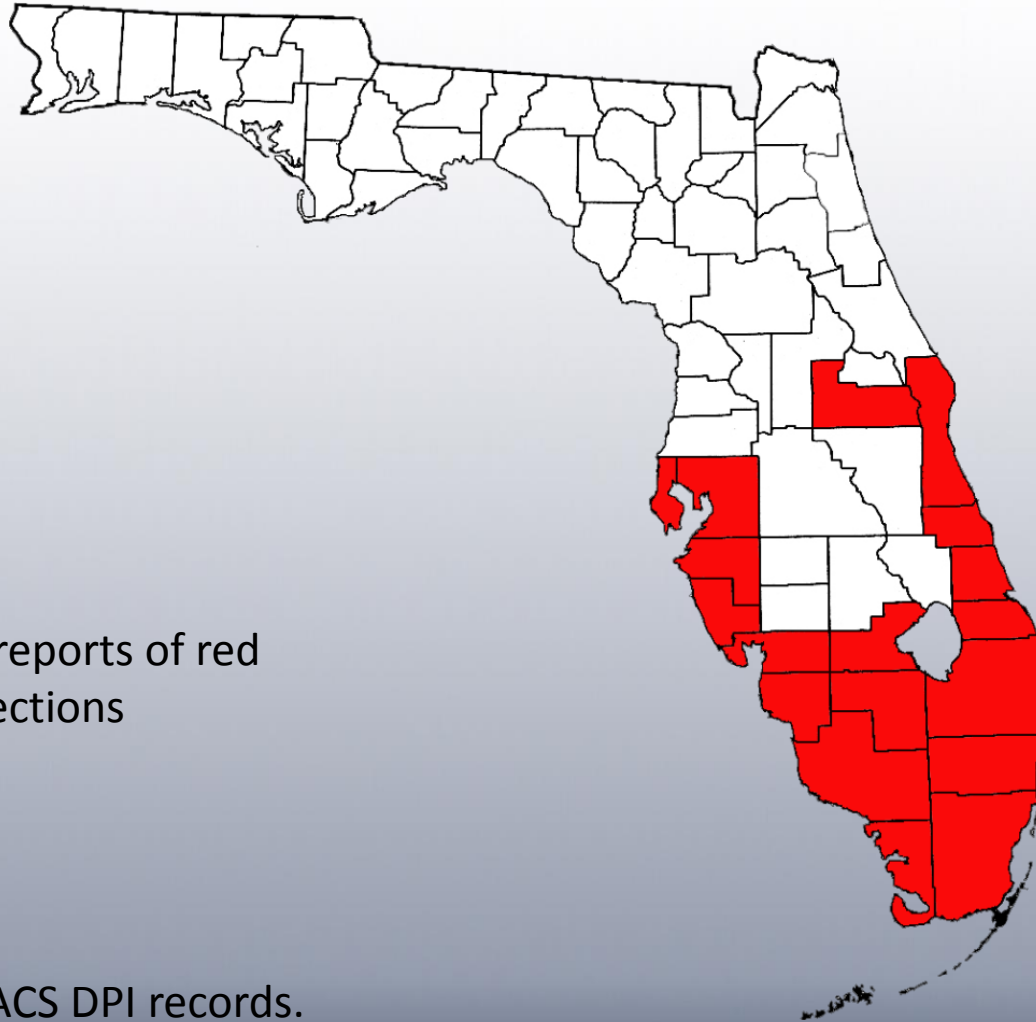
Photo credit: Close-up of adult red palm mites: Rita Duncan, University of Florida, entnemdept.ufl.edu; SEM of adult feeding: Gary Baughan, USDA-ARS Electron & Confocal Microscopy Unit; Early feeding damage on palm: Wikimedia Commons; Advanced feeding damage on palm: Jorge Peña, University of Florida, entnemdept.ufl.edu; Feeding damage on banana: Wikimedia Commons.



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Distribution of red palm mite in Florida



■ Counties with reports of red palm mite detections

Map based on FDACS DPI records.



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Translators

- Lanette Sobel, Doctor of Plant Medicine student, Department of Entomology and Nematology, University of Florida
 - Nienstaedt, B. and Marcano, R. 2009. Estudio de la biología del acaro hindu de los cítricos *Schizotetranychus hindustanicus* (Hirst, 1924) (Acari: Tetranychidae), en tres tipos de alimentos. Entomotropica 24: 51-56.
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