

CITRUS EXOTIC DISEASE: CITRUS LEPROSIS

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THE PATHOGEN: CITRUS LEPROSIS VIRUS

There are two virus types that cause Leprosis in citrus.
Each virus type contains several viruses.

Cilevirus- Cytoplasmic type:

Caused economic losses in Brazil, Argentina, Paraguay, Uruguay, Venezuela, Costa Rica, Mexico, Panamá and Honduras

Citrus-affecting cytoplasmic type viruses:

- *Cilevirus*
 - Citrus leprosis virus – C (CiLV-C)
 - Citrus leprosis virus – C2 (CiLV-C2)
- *Higrevirus*
 - Hibiscus green spot virus 2 (HGSV-2)



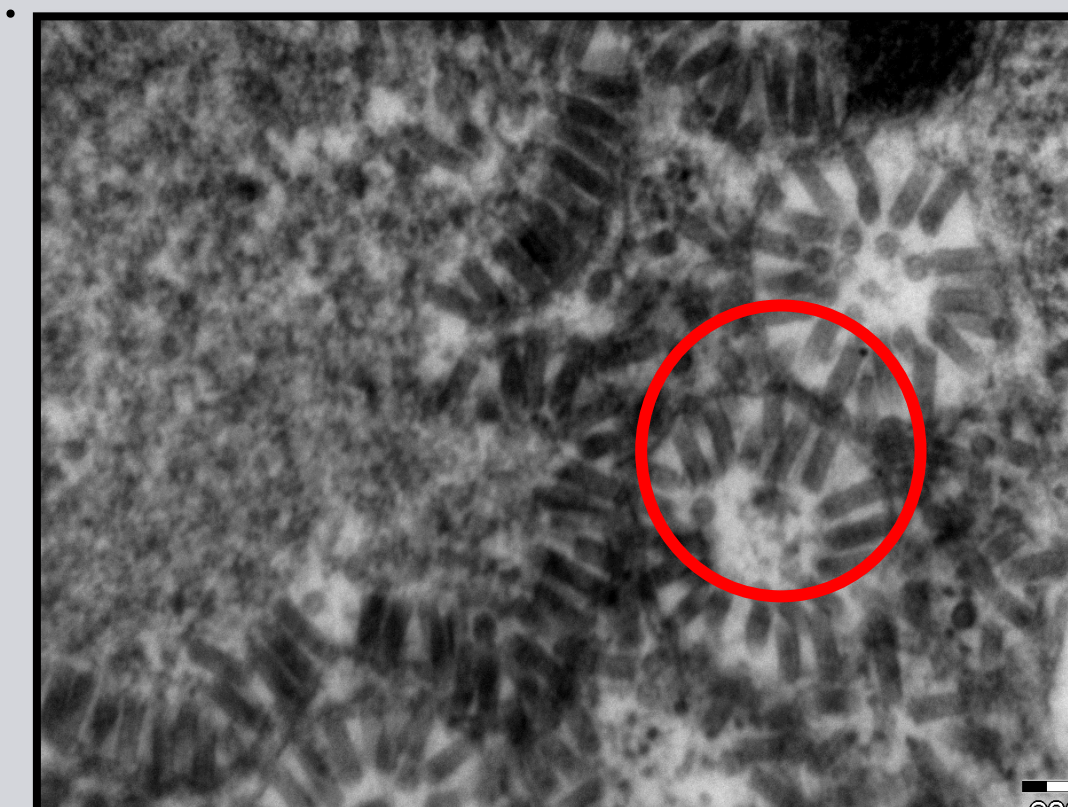
Virus particles in the cytoplasm

Rhabdoviridae- nuclear type:

Was present in Florida from 1860s through 1960s.
OFV present in Florida, but NOT in citrus yet.

Citrus-affecting nuclear type viruses:

- *Orchid fleck virus (OFV)*
- *Citrus leprosis virus N (CiLV-N)*
- *Citrus Chlorotic spot virus (CiCSV)*



Virus particles in the nucleus

2

THE DISEASE: CITRUS LEPROSIS

Citrus leprosis primarily affects sweet oranges, but some grapefruit, mandarin, lime, sour orange, clementine, pummelo, kumquat and sweet lime can also be affected. Resistant genotypes include varieties of sour orange, ‘Meyer’ lemon, ‘Royal’ grapefruit, mandarins, ‘Minneola’ tangelo, and ‘Temple’ tangors.



Early stage, shallow lesions on stem



Early chlorotic leaf lesions



Early chlorotic lesions on fruit



Older lesions, corky and scaly bark



Older leaf lesions with zone pattern



Older lesions gumming cracking, distinct yellow halo

Funding:

CITRUS EXOTIC DISEASE: STEM PITTING

1 THE PATHOGEN: CITRUS TRISTEZA VIRUS (VT isolate)

In addition to the decline of sweet orange or grapefruit trees on sour orange rootstocks, there are other diseases caused by different isolates of citrus tristeza virus (CTV). One important disease is stem pitting caused by the VT isolate.

- Causes severe disease symptoms in Asia, Australia, South Africa, Brazil, and Columbia
- Can be very serious on citrus types and varieties that are grown in Florida
- Currently only mild isolates are found in Florida citrus trees



Virus particles in the cytoplasm

The virus is transmitted by the Asian Citrus Aphid and has the capacity to spread rapidly

- Brown Citrus Aphid present in Florida
- The aphids are capable of periodic outbreaks when conditions are right



Photo Credit: UF/IFAS

2 DISEASE SYMPTOMS

Lime, grapefruit, sweet orange, rough lemon, and Alemow (*Citrus macrophylla*) are highly susceptible to stem pitting. Mandarins are considered tolerant but may show stem pitting under some conditions.



Photo Credit: Donielle Turner

Mild

- Needle-like ingrowth of the bark, causing pits in the stem and branches
- Only a few pits seen; no effect on plant vigor or yield

Severe

- Extensive pitting in the trunk and branches can cause:
 - Bark disruptions
 - Stunting
 - Small and misshapen fruit
 - Chlorotic leaves
 - Yield loss



Photo Credit: Cecile Robertson

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SIX SPOTTED MITE IDENTIFICATION

- Adults are oval and about 3mm long
- Yellow body color with about 6 blotchy spots on abdomen, some have no distinct spots
- Feed along the midrib or larger veins on the underside of leaves
- Webbing around infested areas
- Occasional pest, most abundant after cold winters



SIX SPOTTED MITE FEEDING DAMAGE

- Primarily feed on mature leaves
- Yellow blistering on mature leaves becomes visible between March and May
- Leaf drop



Photo Credit: Tonya Weeks

2

CITRUS RED MITE IDENTIFICATION

- Females are oval, males have a tapered rear end
- Dark red in color
- Approximately 0.5 mm; male is smaller than female and has long legs
- Found on both leaves and fruit
- Common at low populations year-round, populations highest in March and June



Photo Credit: L. Buss, UF

CITRUS RED MITE FEEDING DAMAGE

- Primarily feed on mature leaves
- On leaves, damage is speckled and may have a silvery appearance
- Leaves and fruit may be pale in color
- Severe populations may cause leaf drop



Photo Credit: D. Rosen, University of California

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TEXAS CITRUS MITE IDENTIFICATION

- Females (left) are a broad oval shape, males (right) are slender oval shape
- Males have longer legs than females
- Approximately 0.5 mm long
- Often located on upper side of leaf and move from the inner leaf to the outer leaf
- Common at low populations year-round, populations highest in March and June



Photo Credit: University of Arizona

TEXAS CITRUS MITE FEEDING DAMAGE

- Primarily feed on mature leaves
- Leaves will look speckled (stippling)
- High populations may cause leaf and fruit drop
- When leaves drop, the leaf petiole stays intact on tree
- Damage progresses from top of tree, then downward

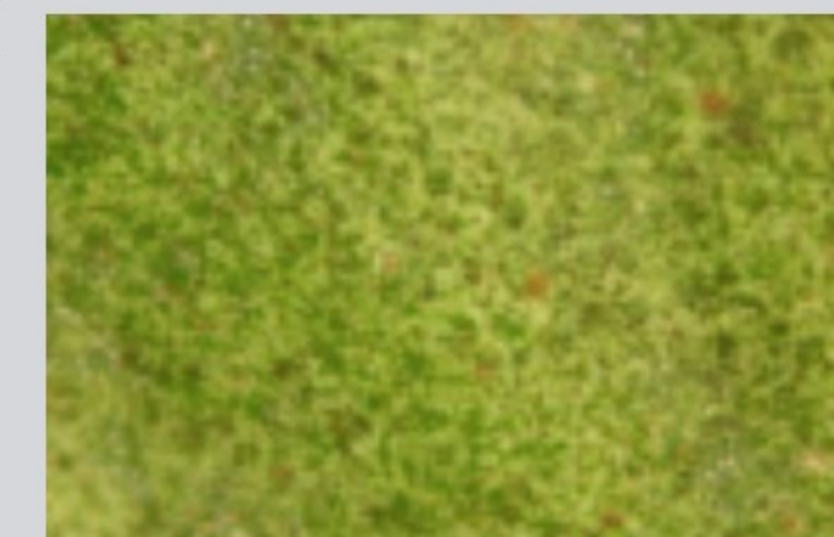


Photo Credit: University of Texas

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BROAD MITE IDENTIFICATION

- Oval shaped
- Light yellow to reddish or brownish yellow, may be green
- Females have a stripe, whereas males do not
- Females are 0.2 mm long and males are 0.11 mm long; males move faster
- Feed on unhardened leaves and fruit

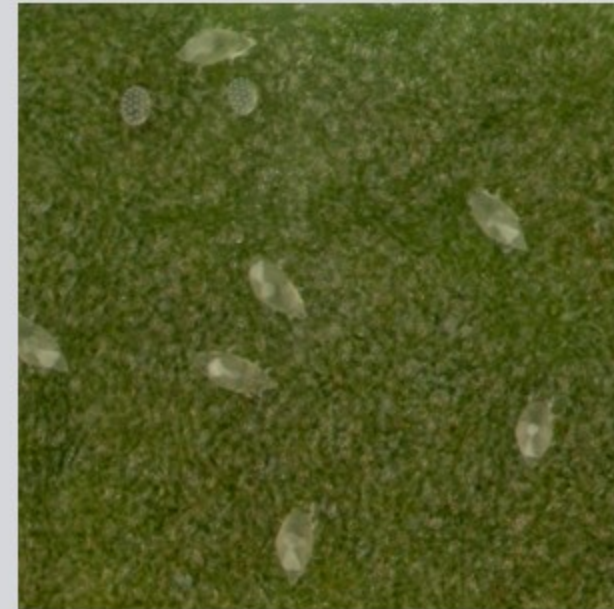


Photo Credit: L. Buss, UF

BROAD MITE FEEDING DAMAGE

- Leaf bronzing
- Leaf curling unevenly distributed on leaf, no pattern
- Feeding damage same on various plants (Dogwood pictured)
- Rind damage on developing fruit



Photo Credit: Tennessee State University

2

FLAT MITE IDENTIFICATION

Most common species in Florida citrus:

Brevipalpus yothersi Brevipalpus californicus

- | | |
|--|--|
| • Flat, wedged shaped | • Oval shaped |
| • Reddish-orange in color | • Reddish-orange in color |
| • Females may have a black 'H' marking with green and dark spots | • Short, stout legs Four legs in the front and 2 on each side |
| • Approximately 0.2 mm; males are smaller than females | • Approximately 0.2 mm |
| • Can be found on both sides of leaf, stems, and fruit | • Often located on under side of leaf near midvein or other veins, also on fruit and stems |

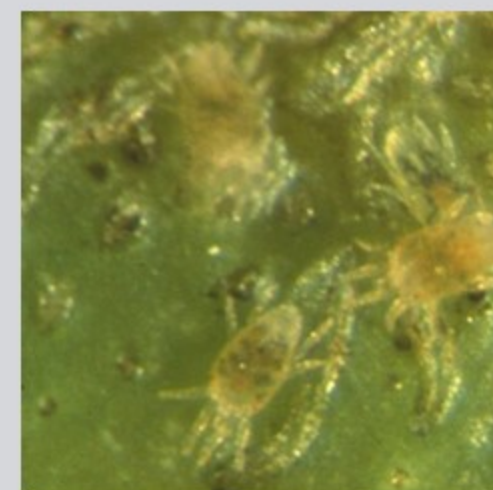


Photo Credit: C. Childers, UF



Photo Credit: R. Lehman, UGA

FLAT MITE FEEDING DAMAGE

- Vectors for citrus leprosis virus
- When populations are very high, leaf damage may occur



3

CITRUS RUST MITE IDENTIFICATION

- Wedge shaped, longer than wide
- Light yellow in color
- 0.15 mm long
- Feed on both fruit and leaves, but prefer fruit
- Often found on outer canopy fruit



Photo Credit: E. Demard, UF

CITRUS RUST MITE FEEDING DAMAGE

- Leaves and fruit have smooth, dark brown spots
- Extreme damage causes bronzing (pictured) on fruit; bronzing also occurs on leaves
- May cause smaller fruit size
- Most often found on outer canopy away from direct sunlight



Photo Credit: J.D. Burrow, UF