Disease Management Post Hurricane

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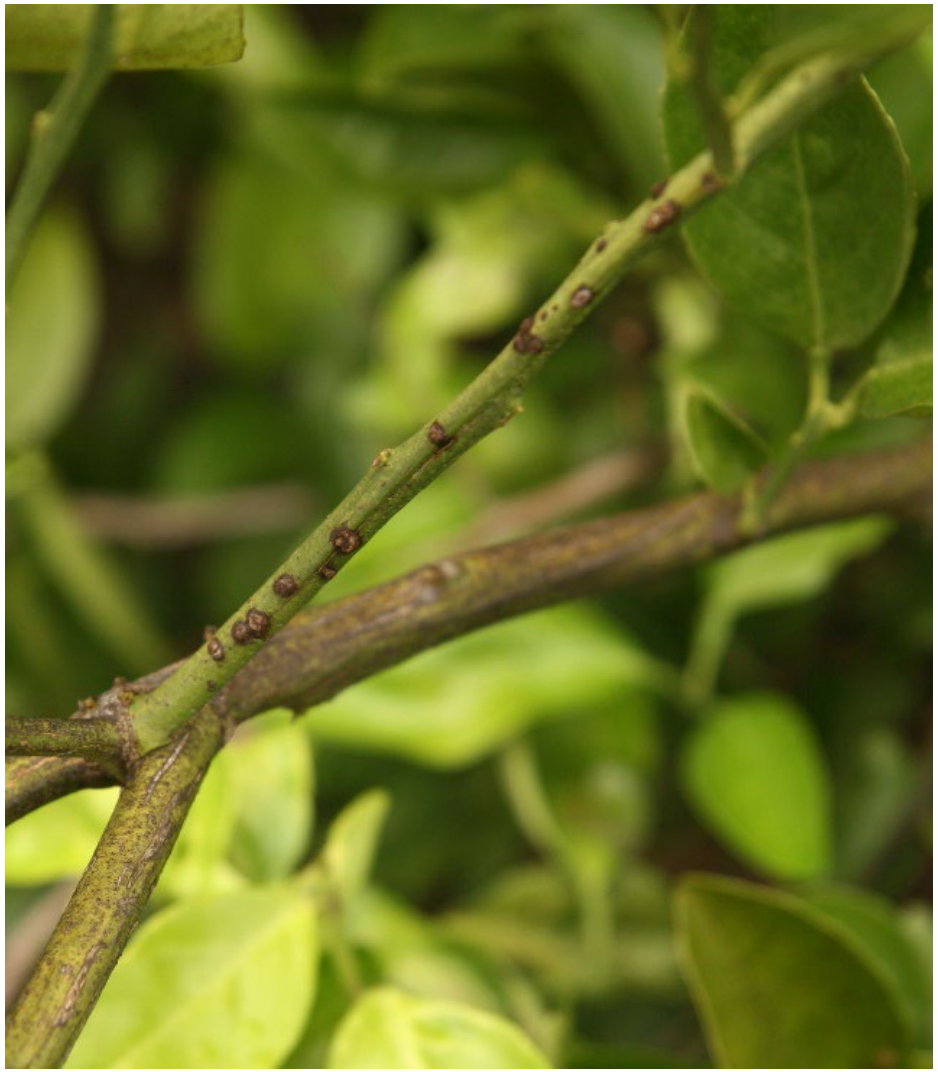
Citrus Canker



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High winds and rain move canker-causing bacteria

- Winds cause wounds in the canopy that are vulnerable to infection
  - Ragged leaves
  - Thorn punctures
  - Scoring of leaf surfaces
- High winds (> 18 mph) push *Xanthomonas citri* subsp. *citri* cells past any protective coating
  - Bacteria ooze out of lesions and are enveloped into rain drops
  - Rain drops forced into wounds and natural openings
  - Tissues become water-logged, favoring bacterial growth
- Tissues that otherwise might not be susceptible can become infected under these conditions
- Too soon to see infections yet

Fresh fruit concerns

- Most fruit types have reached developmental stage that is immune to canker infections
- Grapefruit may be an exception
  - It will depend on the grove site and growers should scout carefully if worried
- Copper protection on fruit will have been broken by high winds
- If there were damage to a CUPS house, canker could enter through rips
  - Likely to emerge in areas in line with rips
  - Also, could be dripped to small numbers of trees from roof

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Individual Protective Covers (IPCs) and canker

- IPCs protect young trees from canker normally
  - Wind is slowed by netting
  - Rain droplets become smaller and have less force behind them
- After Ian, observed more canker on the windward side
  - Forced in by wind
  - Mostly affected foliage

Actions to take

- Badly affected leaves are likely to drop in spring
  - New flush will need to be supported
  - If concerned about defoliation, a copper application can be undertaken
    - Not likely to be useful in a processing orange block
- Greatest concern is for stem lesions in young trees
  - Stem lesions can ooze bacteria for up to 4 years
    - Provide inoculum for future seasons
    - Leads to fruit drop
  - Can be very difficult to see
  - Can be pruned out if trees are small

Plant immune system stimulators

- Used to minimize affect of stem lesions
  - Can significantly reduce leaf lesions in young trees
  - Reduces inoculum for following seasons
- Not recommended to use without copper applications
- Two products available
  - Actigard (formerly Blockade)
    - Drench based on number of applications and tree age
      - See Citrus Production Guide Citrus Canker chapter (https://edis.ifas.ufl.edu/publication/CG040)
  - Aura Citrus
    - Foliar application of 26.5 fl oz/100 gal with NIS and copper product
    - Apply during major flushes up to 4 times per season
    - Can start applications in the fall

Phytophthora diseases

Tree health post-hurricane

- Root deterioration is acute after being in standing water for >72 hours
- Toppled trees can be stood up
  - Caution needed when scion bark has touched soil or water
  - Phytophthora lesions are not uncommon on limbs and trunks
- Phytophthora can be problematic in groves with flooding or saturated soil if blocks have a history of disease
  - Root, foot, and crown rot are related diseases
  - Caused by *Phytophthora nicotianae* (most common) and *P. palmivora*
  - Generally, not a problem unless propagule count is above 10-20 propagules/cm^3
- Brown rot could potentially be a problem on early season fruit where dropped fruit attract zoospores and increase inoculum

Treatment options

- If already using treatment program, continue planned rotations
- For foot, root, and collar rot
  - Phosphite salts (only labeled as a fungicide) or Alliette (FRAC MOA P 07)
  - Mefenoxam products (FRAC MOA 4)
  - Fluopicolide (FRAC MOA 43)
  - Oxathiapiprolin (FRAC MOA 49)
- Some of these products require irrigation following application
  - Read the label!

Brown rot treatments

- If there are sufficient fruit remaining on trees
- It is late for phosphite salts or Alliette treatments (FRAC MOA P 07)
  - Optimal timing is in August
- Copper can help with active infections and a good choice for late season applications
- Newer products recommended for brown rot
  - Revus (mandipropamid; FRAC MOA 40)
  - Orondis Ultra (mandipropamid and oxathiapiprolin; FRAC MOA 40 and 49)

Other diseases

- If you are near quarantine areas for citrus black spot, should scout for disease in the next 4 years
  - Disease possibly moves with hurricanes
- In CUPS houses
  - Rips allow psyllids to enter houses
  - Provided tears are repaired as quickly as possible, HLB may be isolated
  - Need to watch carefully for symptoms and eliminate psyllids
    - Without psyllids disease movement should be slow or stopped
    - Rogueing infected trees also possibility
- IPCs should be inspected for tears
  - We observed some trees becoming infected with HLB after Hurricane Ian because psyllids could enter nets

Thank You

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