Shorten the skirts? Whether skirting improves citrus black spot fungicidal management

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Is black spot really a concern?

- Caused by fungus *Phyllosticta citricarpa*
- Citrus black spot can cause up to 60% yield loss (fruit drop) in severe situations with little management
- More commonly, fruit drop levels of 10-20% in a minimally managed block
  - Still a significant number of fruit
- Producing fresh fruit?
  - Export restrictions to certain regions; particularly EU
- Quarantine disease leading to requirements like tarping

Where is black spot now?

- CHRP program and FDACS continue scouting program each year as fruit ripen
  - New blocks identified each year
- Present in 5 southwestern counties
  - Glades County was most recent county with quarantine zones
- Mostly in commercial groves
  - First residential find in 2019 (Lee County)
  - Appears it was present in location for more than a year

Is black spot still spreading?

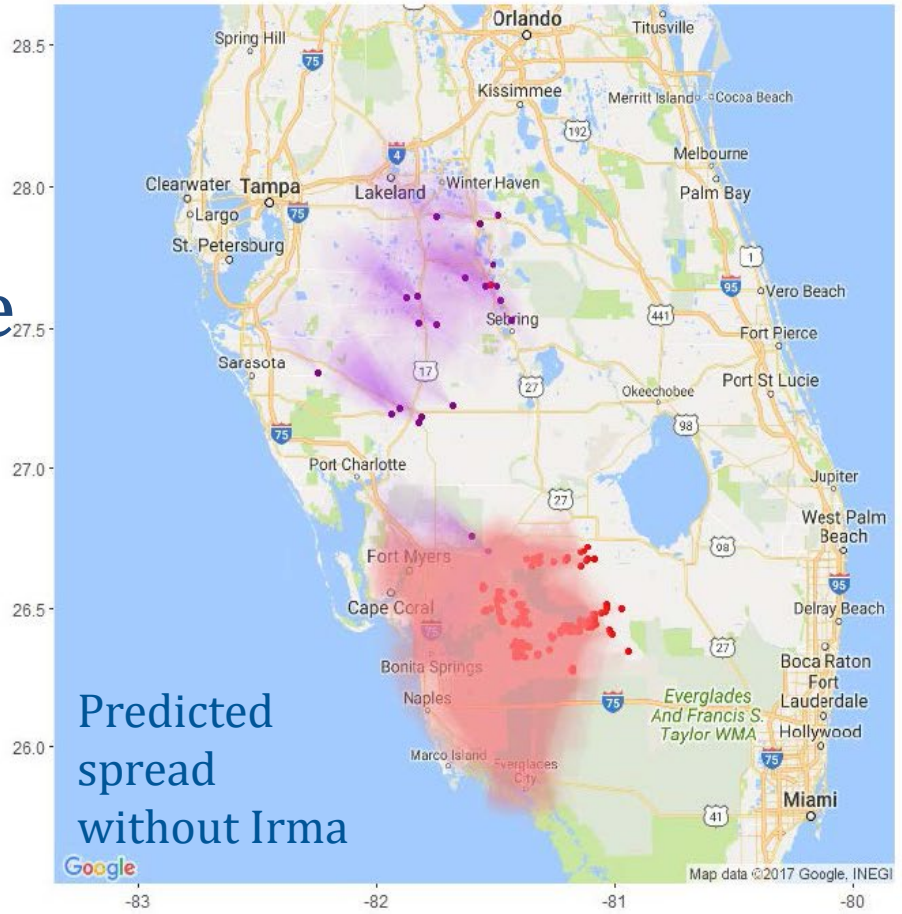
https://phys.org/news/2017-09-nasa-hurricane-irma-eye-cuba.html

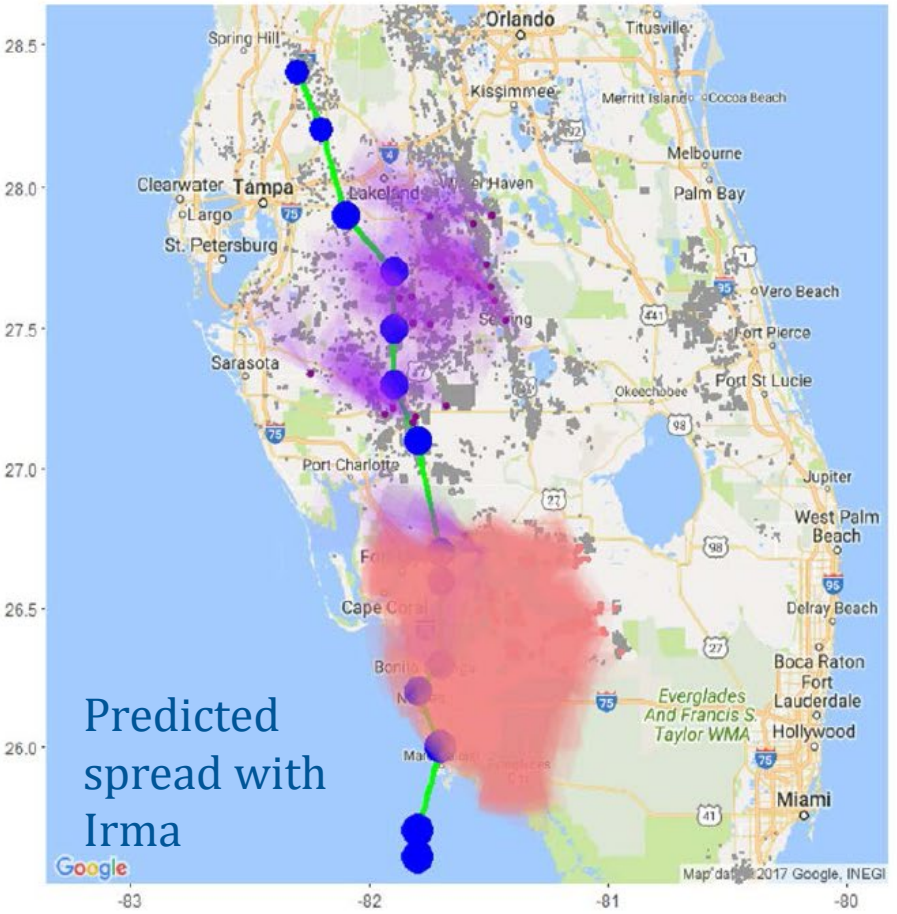
- Irma likely moved black spot to new areas
  - Difficult to determine how far may have moved
  - May not see all spread for at least 5 years post-storm
    - Latent period of disease in groves
- If downwind of black spot groves, at significant risk of outbreak
  - Should be scouting regularly for symptoms
  - Ask for CHRP multipest survey if concerned disease in grove
- This is in addition to spread that would have occurred anyway

Hurricane Irma
Citrus Black Spot dispersal areas

Gottwald et al.

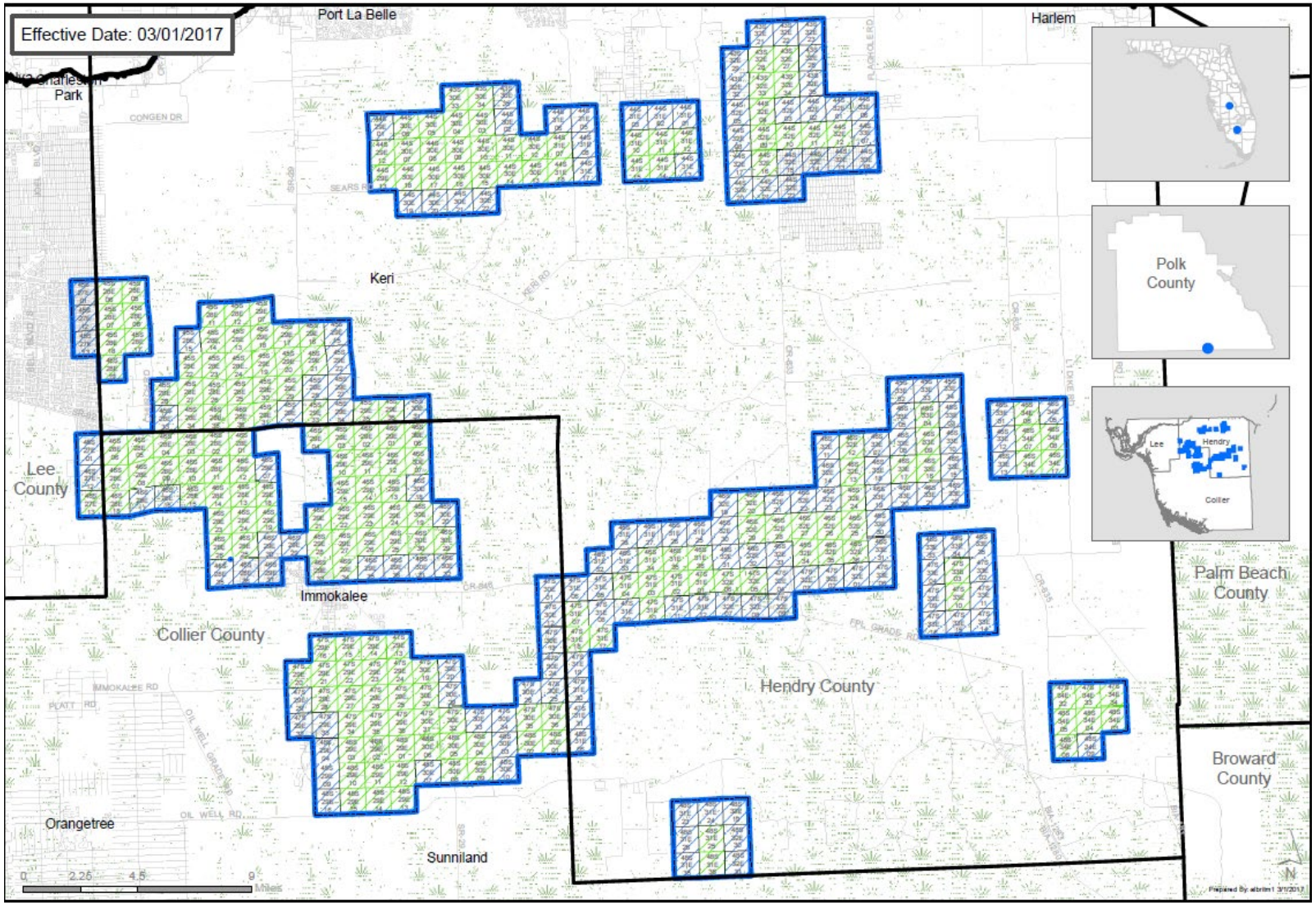
- Predictions from 2018
- Red points are locations where CBS is present
- Purple points are locations where CBS is possible but undetected





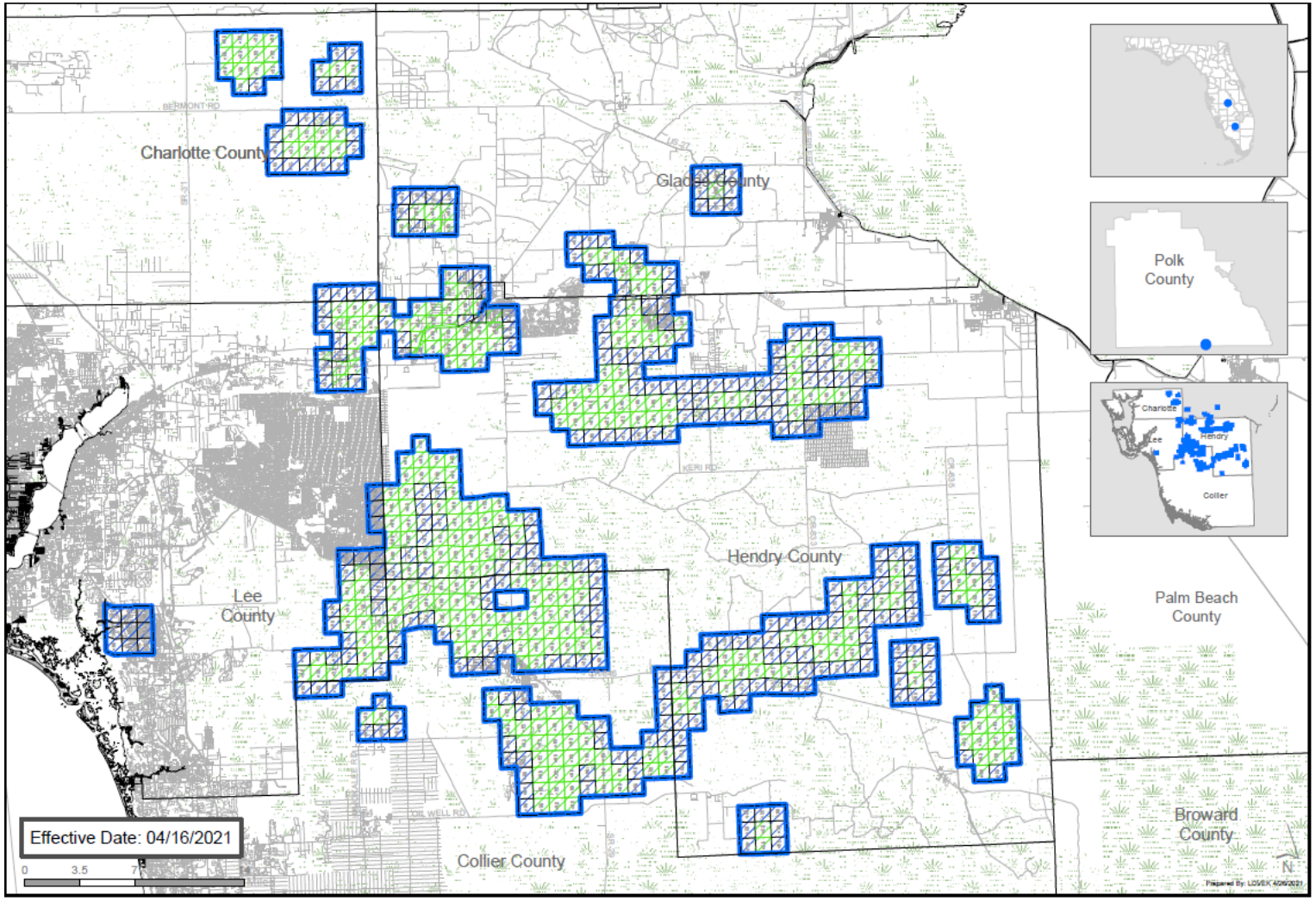
Where black spot was found before Irma 2017

- Restricted to 3 counties but primarily in Collier and Hendry
- Small incursions into the borders of Lee



Current locations in Southwest Florida

- Present in 5 southeastern counties
  - Recent spread mainly in Charlotte and Glades
- Mostly in commercial groves
  - First residential find in 2019



Black spot fungicide program

- Currently recommended products in the 2021-2022 Florida Citrus Production Guide
- Alternate copper (full rate of chosen product) with a strobilurin, a premix, or Enable (DMI)
  - Preferable to alternate among modes of action
  - Strobs are Abound, Gem, Headline
  - Premixes are Pristine (SDHI), Amistar Top (DMI), and Priaxor (SDHI) mixed with a strobilurin
- Coverage is key so at least 125 gal/acre and slow!

Black spot fungicide timing

- All citrus is vulnerable, but late hanging sweet oranges are the most susceptible varieties in Florida
- Goal is to maintain coverage on fruit
- Minimum once a month applications for best control
- Start May if dry in April
  - Otherwise start applications in April

Trial purpose

- Does skirting trees improve the outcome of fungicide programs?

- Does applying fungicide treatments earlier or later than current recommendations improve disease outcomes?

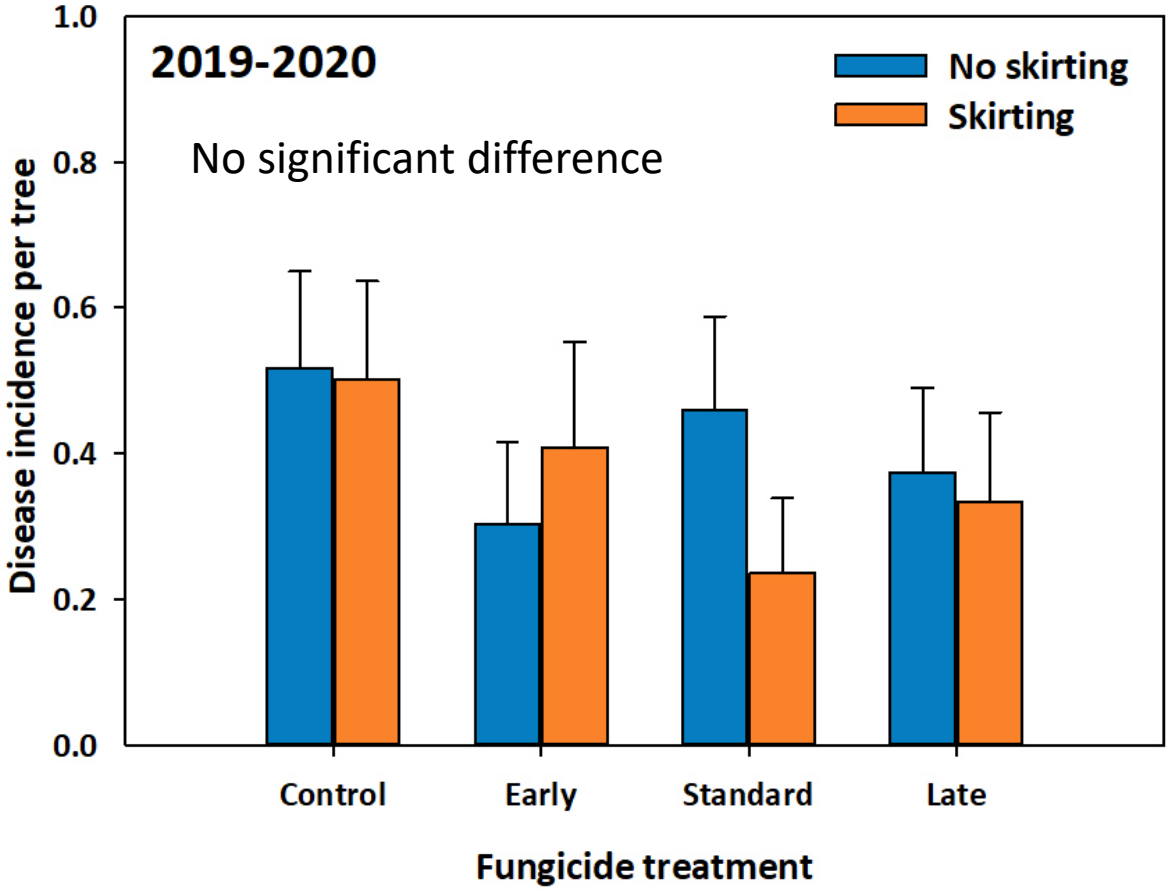
Mongi Zekri

Treatment list

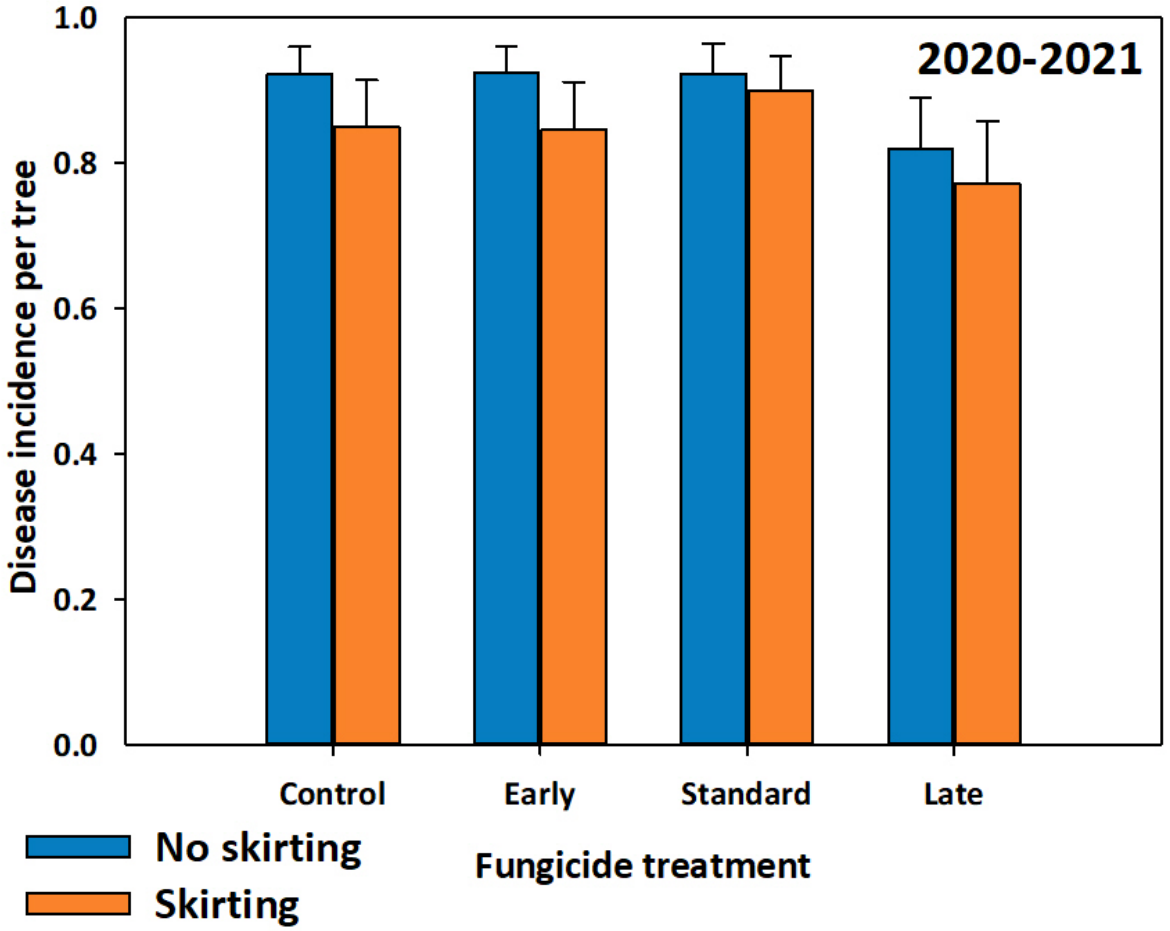
- Skirting done on June 4, 2019
  - Fungicides applied with and without skirting

April 1, 2019/ April 16, 2020	May 1, 2019/ May 18, 2020	May 28, 2019/ June 17, 2020	June 24, 2019/ July 6, 2020	July 15, 2019/ July 27, 2020	Aug 12, 2019/ Aug 28, 2020	Sept 18, 2019/ Sept 29, 2020	Oct 15, 2019/ Oct 29, 2020
Standard CBS fungicide program							
--	Abound (15.0 fl oz)	Kocide 3000 (2.5 lb)	Kocide 3000	Pristine (18.5 oz)	Kocide 3000	Abound	--
Early CBS fungicide program							
Enable (8 fl oz)	Abound	Kocide 3000	Kocide 3000	Pristine	Kocide 3000	Abound	--
Late CBS fungicide program							
--	Abound	Kocide 3000	Kocide 3000	Pristine	Kocide 3000	Abound	Enable
Untreated control							
--	--	--	--	--	--	--	--

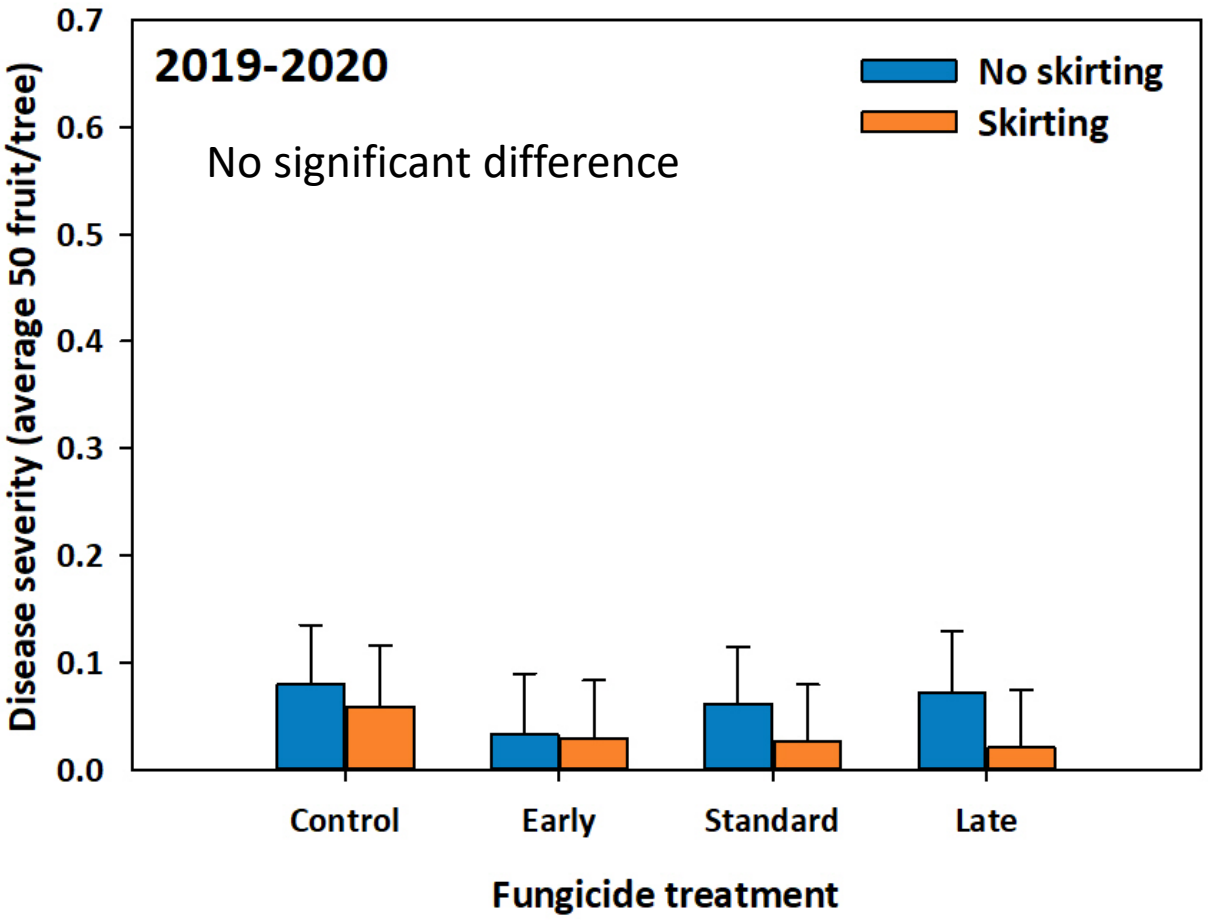
Disease presence per tree

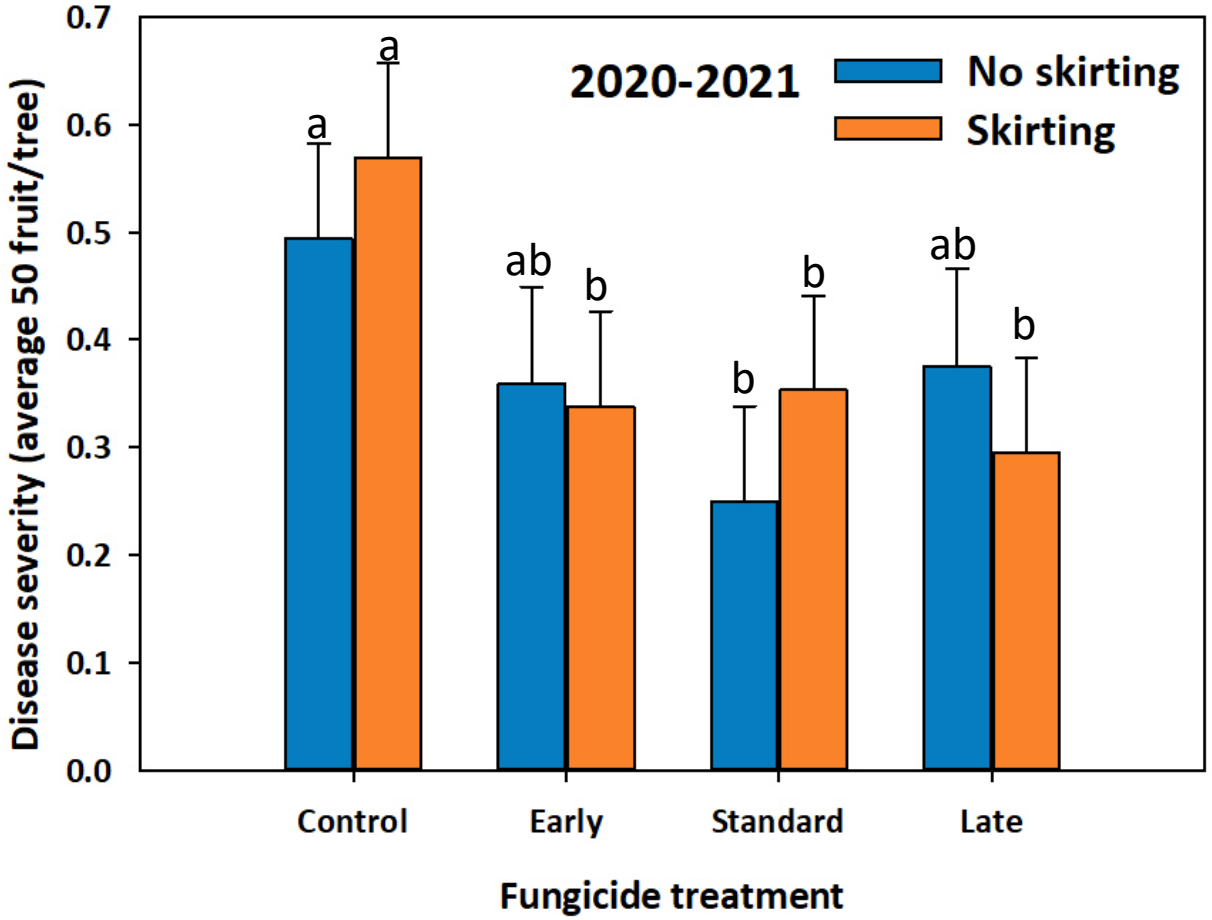


No significant difference



Disease severity





What we learned

- Does skirting trees improve the outcome of fungicide programs?
  - Skirting does not appear to improve fungicide programs
  - There are other good disease management reasons to skirt

- Does applying fungicide treatments earlier or later than current recommendations improve disease outcomes?
  - Fungicide treatments in April or October did not appear to improve disease management
  - With higher disease pressure fungicide use beneficial

What we learned

- Later start to trial in 2020 because of COVID but weather very dry
  - Investigating if there was weather effect on disease
  - Data in 2021 collected 3 weeks later than in 2020
  - Many more severe symptoms like virulent spot in 2021
- Disease has increased in grove over time

Management recommendations

- Determine if black spot is in your area or grove
  - Are your groves near a transport corridor or processing/packing facility?
  - Check quarantine information on www.fdacs.gov for current known locations
  - Scout on your own or contact CHRP for multi-pest survey
- Fungicide program
  - Recommend a multiple mode of action program for resistance management
    - Use copper in the program as an alternation

Management recommendations cont.

- Manage your leaf litter to enhance effect of fungicide program
  - Could use Soil-set or composting
  - Particularly where disease is severe; less need if only a few trees
- Remove as much dead wood as possible and destroy it on site
  - Conidia are formed in dead twigs
- Practice vehicle and equipment decontamination when leaving affected sites
- If you reduce or eliminate CBS management program, disease will return

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