Greasy Green and Its Relationship to Rind Blotch

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Take home message

- Greasy green disorder causes fresh fruit producers significant losses
- Symptoms resemble greasy spot/rind blotch on fruit
  - Start early in the season
  - No symptoms observed on leaves
- Is this greasy spot/rind blotch without leaf symptoms?
- We find surface growth of the fungus on fruit
  - Looks the same as rind blotch

What is greasy green?

- A disorder where fruit remain green despite degreening treatments
  - Particularly grapefruit
  - Occurs early in the season
    - November or December
- Causes losses to fresh fruit growers and packers
  - Between $20,000 and $1.7 million/year
- So far not reported from CUPS
- Growers uncertain of cause

Reduces packout of fresh fruit

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Why isn't greasy green recognized as greasy spot?

Leaf symptoms absent

Specks on the fruit after degreening

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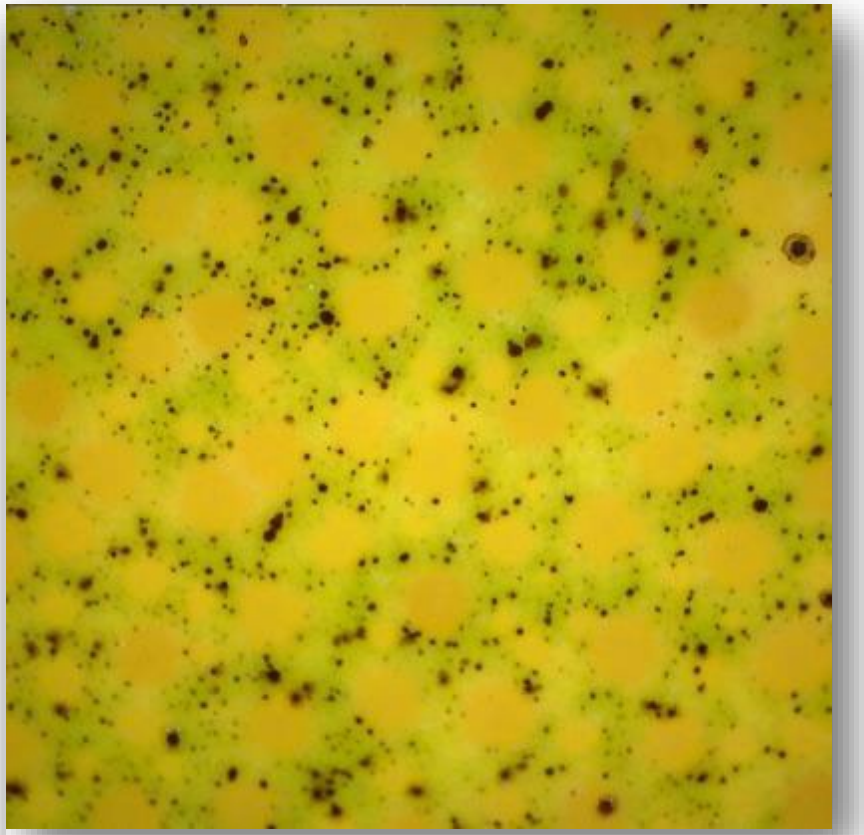
Photo credit: M. M. Dewdney and E. Mulandesa

Symptoms of Rind blotch

Rind blotch



Specks between oil glands

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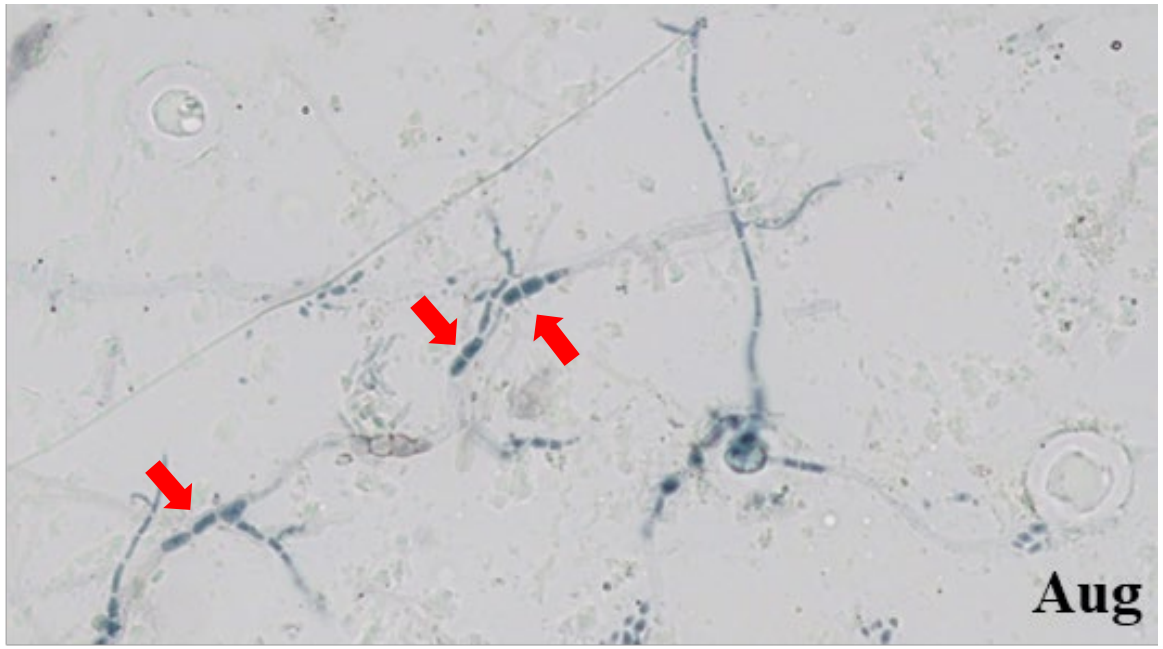
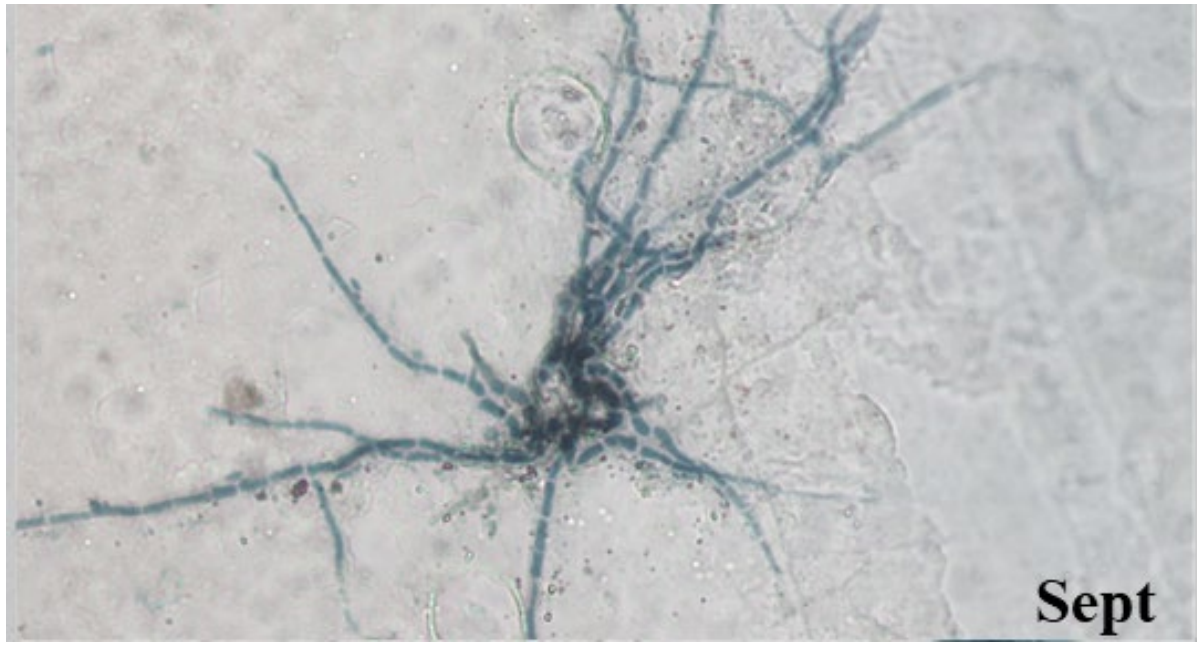
Photo credit: M. M. Dewdney and E. Mulandesa

How to determine the relationship?

- Collected fruit and leaf samples
  - Grapefruit groves in Fort Pierce
  - 2022, 2023, 2024 seasons
- Fruit surface coated with nail polish
  - Peeled off
- Evaluated surface growth of fungus
  - *Zasmidium citri-griseum*

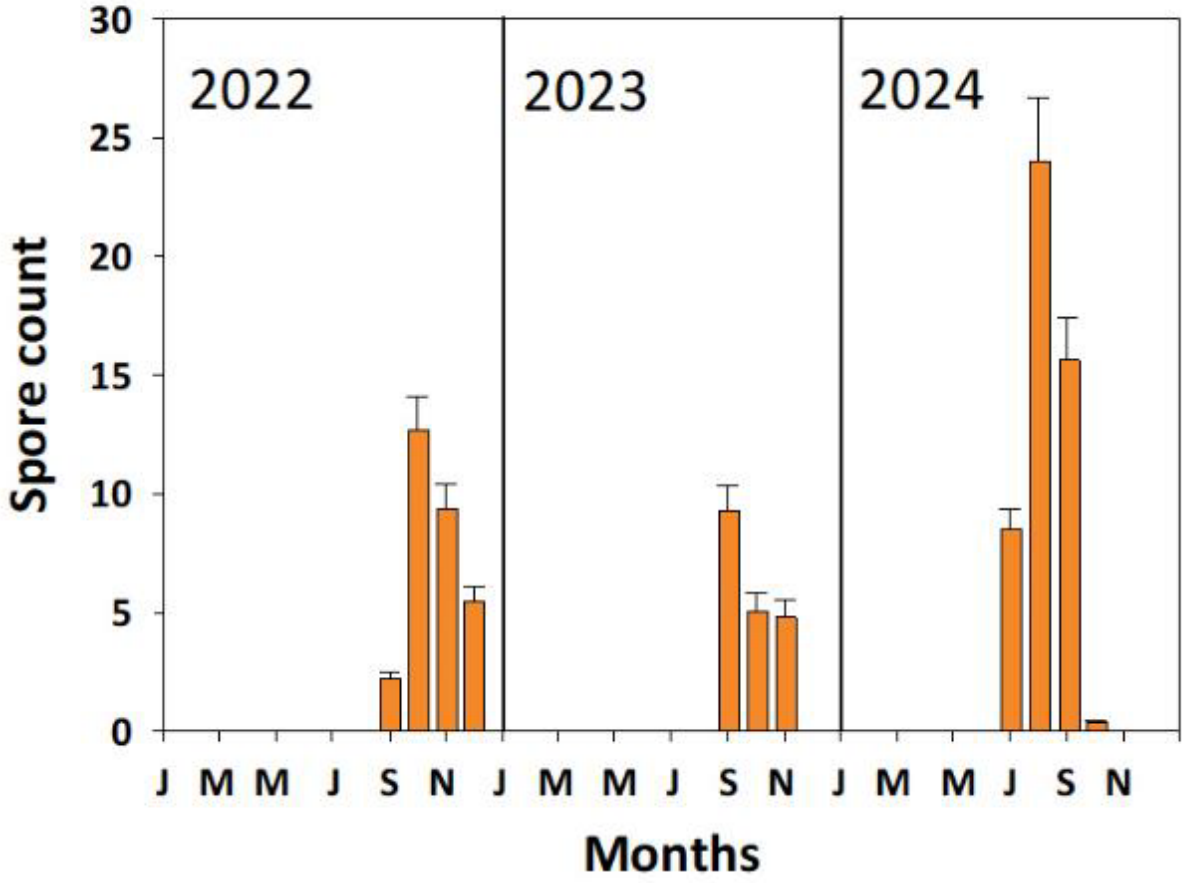
Epiphytic growth on fruit surfaces

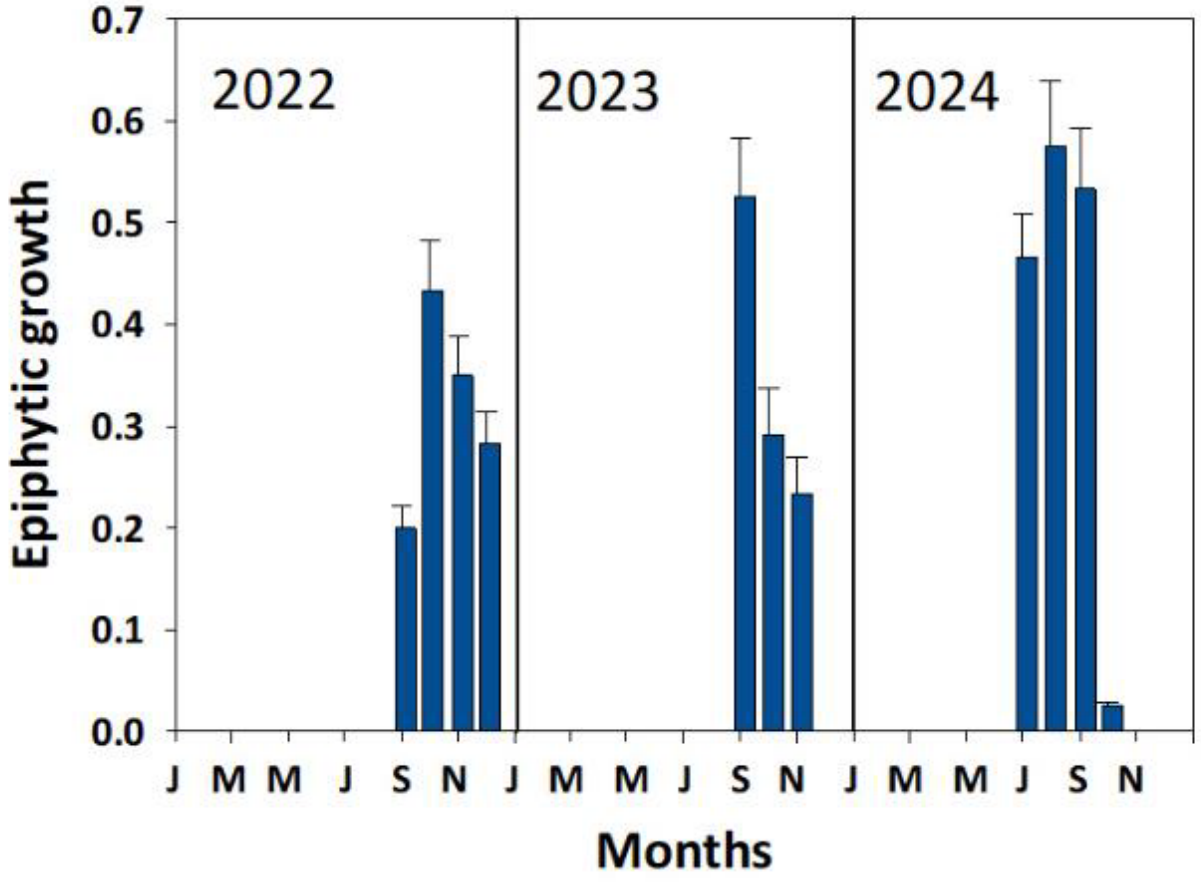




↘ Indicates spores

Surface growth on fruit surfaces by fungi



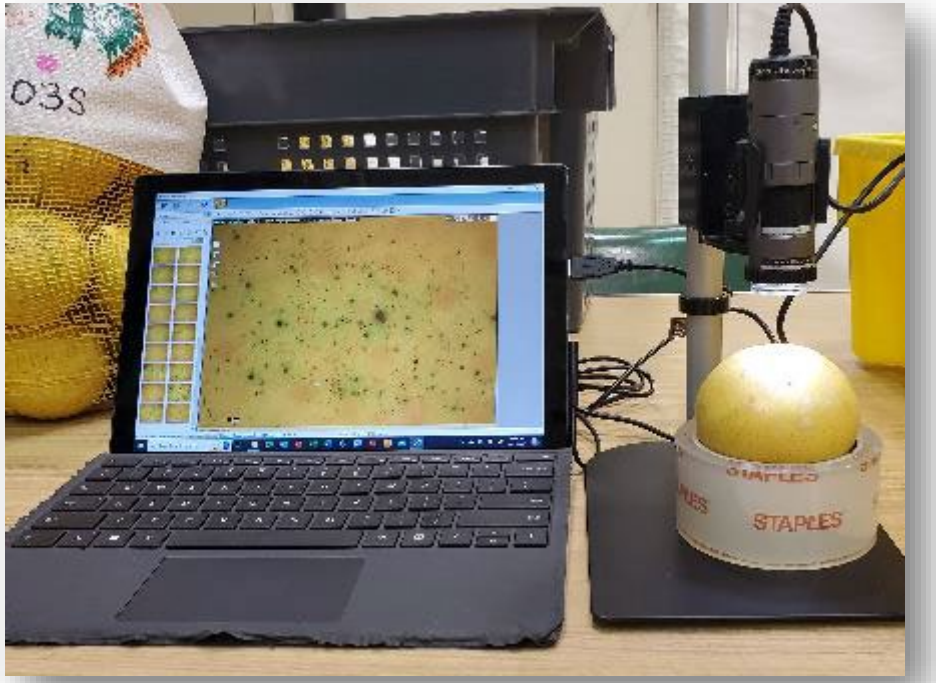


Every second month marked

Degreening process

Degreening process

Symptom assessment



Photos taken

Degreening process conditions:

Temperature: 82.4-84.2°F Ethylene: 5 ppm Relative humidity: 85%

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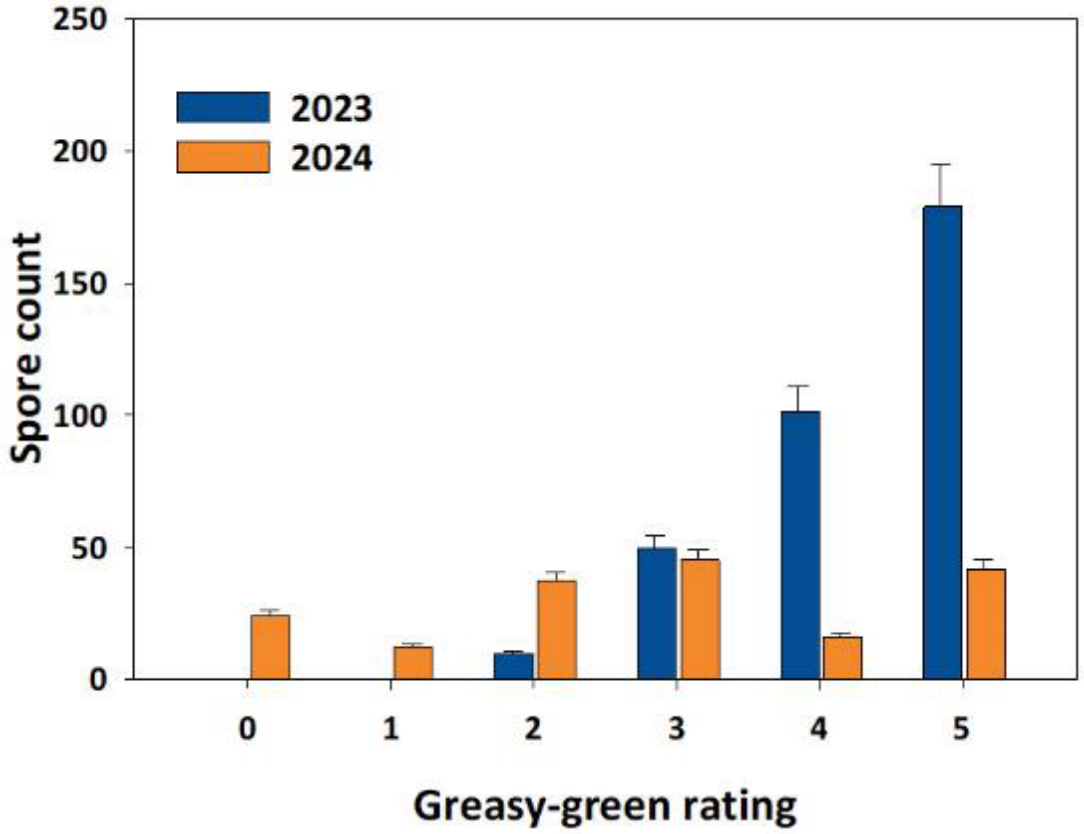
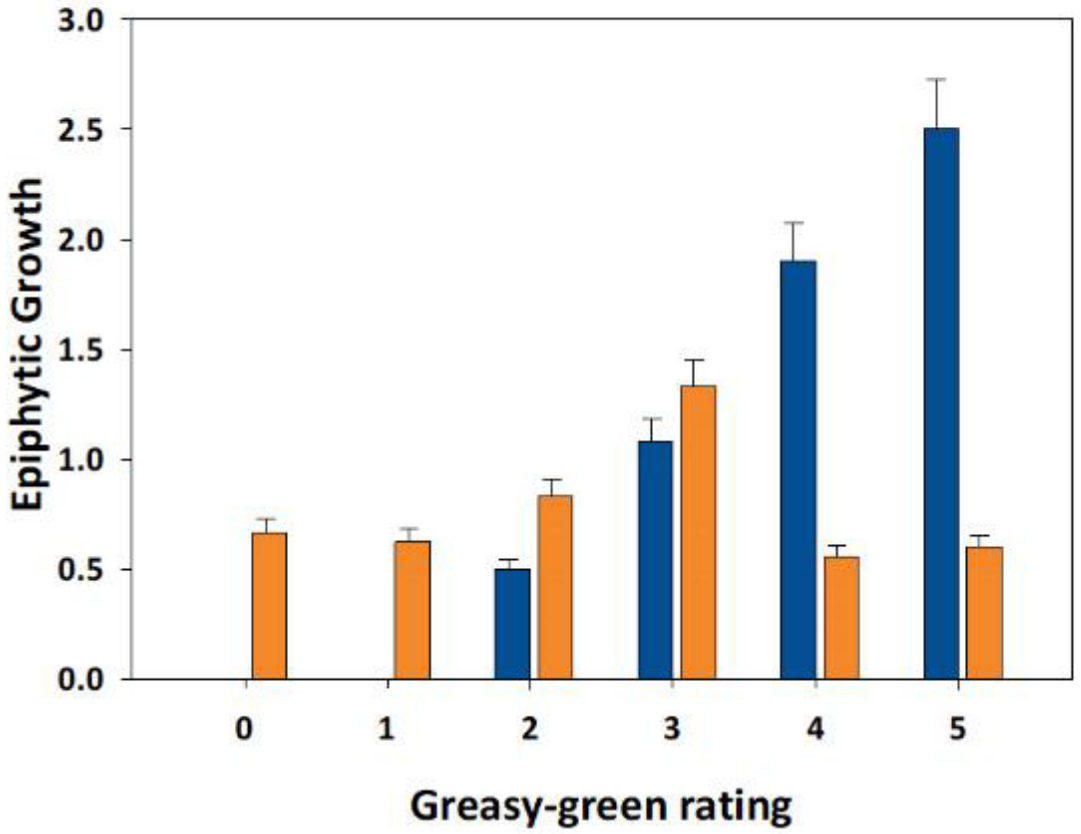
Fruit symptom assessment





- Relationship between fungal structures and symptoms not strong but consistent

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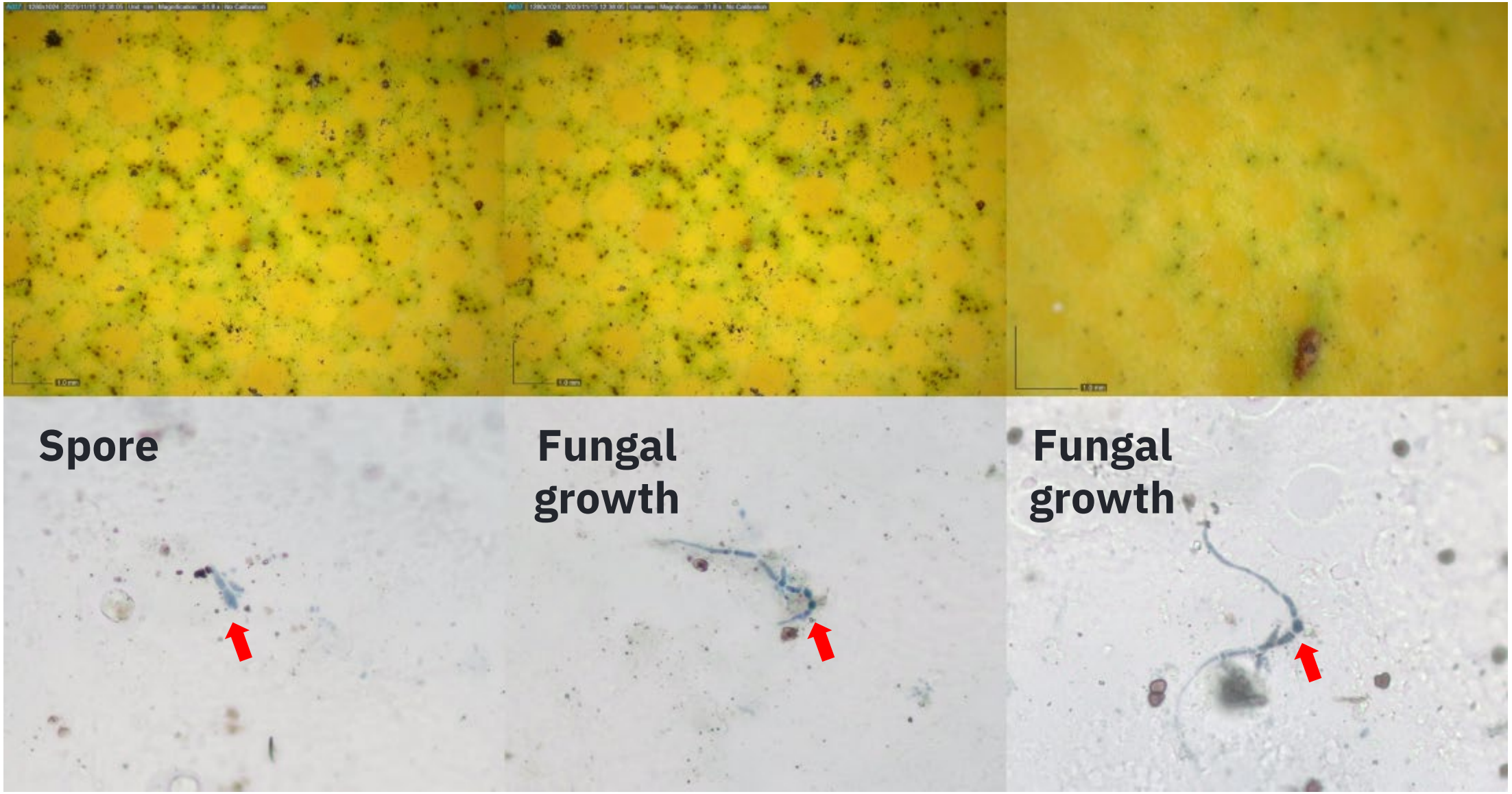
Result of epiphytic growth



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Outcomes of degreening experiments

- Degreening at 84.2°F with 5 ppm ethylene significantly improve peel color
  - Still unacceptably green for fresh market
- Holding at 37.2°F with or without ethylene did not improve
- Pre-treatment of holding fruit at 37.2°F also did not improve
- Never able to achieve suitable peel color

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What does this mean?

- Were able to see *Z. citri-griseum* growth on surface of leaves too
  - Detected fungus in large quantity in leaf litter from affected groves
- Suspect cause of greasy green is the same fungus that causes greasy spot/rind blotch
- Possible causes:
  - Time of year of infection earlier because of warmer weather or erratic flushing
  - Suspected fungicide resistance may contribute to insufficient management
- Problem cannot be resolved with post-harvest measures
  - Need to manage in grove

Future steps

- Need final confirmation that growth on fruit is *Z. citri-griseum*
  - Have developed tools to do this step
- Preliminary data shows fungicide resistance to common mode of action
  - Working on confirmation and extent of problem
- Possibly 1 more season of epiphytic growth compared to greasy green symptoms

Management

- Greasy spot program should be priority
  - Full coverage of canopy important, particularly underside of leaves
  - Slow tractor and increase water
- Copper rates adequate for canker suppression may not be enough for greasy green/greasy spot
  - Increase rates in May and June
    - Copper can cause burn in high May temperatures (> 94°F)
  - Timing may need to shift to earlier in May
- Ensure fungicide programs are not relying on single mode of action
  - Rotation is very important

Conclusions

- Greasy green should be treated as a form of greasy spot
  - Evidence points to link between fungus and disorder
- Management in the grove is key to reducing problem
  - Post-harvest measures are insufficient
- Make sure fungicide coverage sufficient
  - Rotate fungicides and or increase copper concentration
  - Timing is important – May and June are most important months
    - An August application may be needed in difficult blocks

THANK YOU

Co-authors

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Dr. Liliana Cano

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