High-throughput phenotyping citrus by drone: UF/IFAS field trials update

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Take-home message

1. Drones were flown over ongoing trials, plantings, and germplasm material for inventory and potential candidates for industry

2. There appear to be selections in evaluation trails and germplasm blocks that stand out for **plant health as measured by drone**

3. Differences in cultivar performance from site to site and within site results from unknown factors

The immediate need for more data

- Stakeholders wanted to know if there was promising material in ongoing trials or germplasm
- Growers desired an inventory of what is planted and a list of top performers
- Intention was to find winners for industry and help with breeding efforts.

What was done?

Drones were flown over:

- 164,810 citrus trees
- 1336.98 acres (original proposal was 25 acres)
- 91 sites composed of scion and rootstock trials, plantings, commercial groves and germplasm repositories
- GMOs/transgenics were included

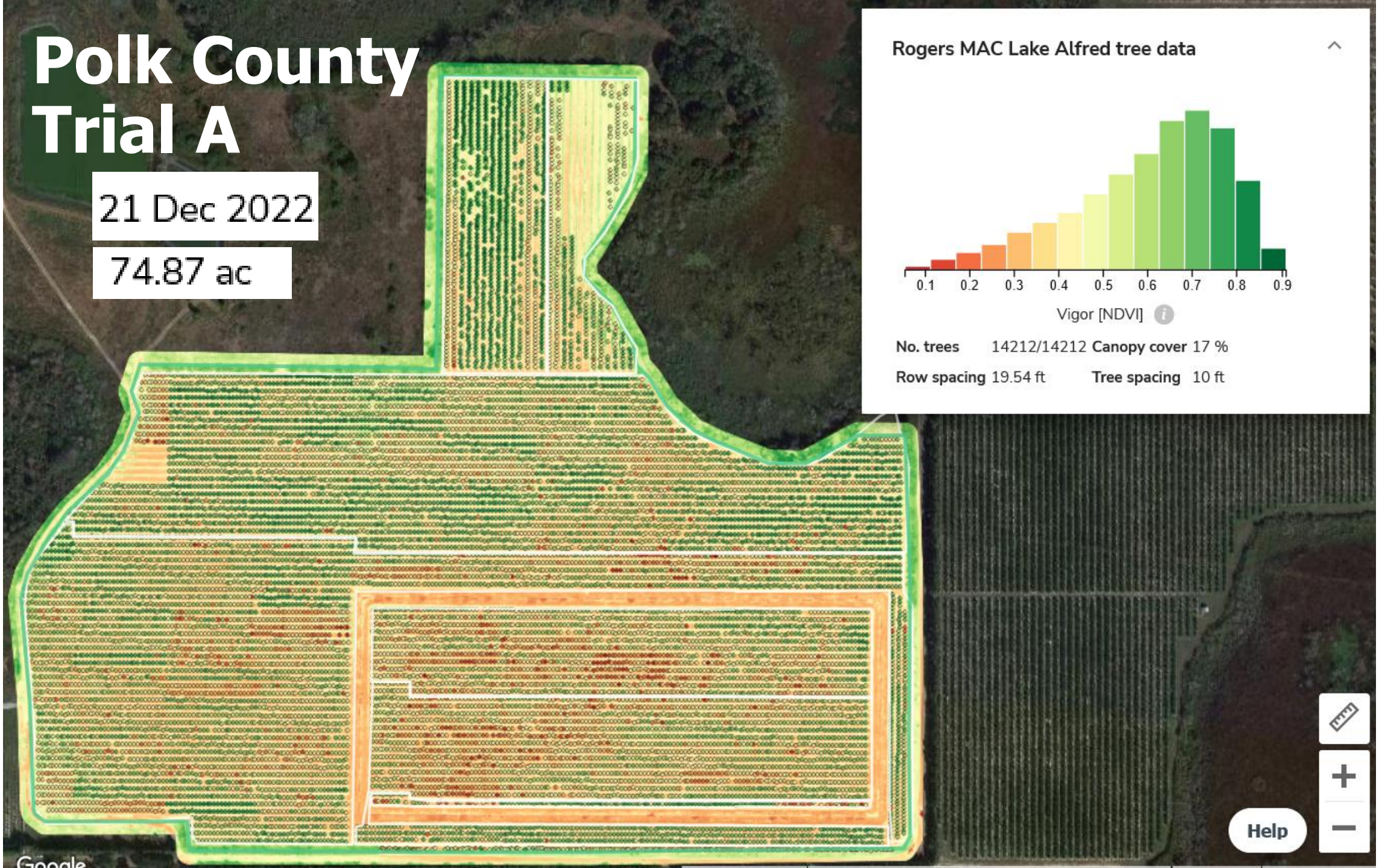
What was found?

- There were “good” and “bad” sites.
- Sites include those planted with juice orange and fresh market selections; many sites had both
- Several commercially successful citrus groves from South Africa were used to develop cutoffs for drone metrics with assistance from Aerobotics (50+ ft^2; NDVI value > 0.85)
- Several “bad” sites had no healthy trees per these metrics

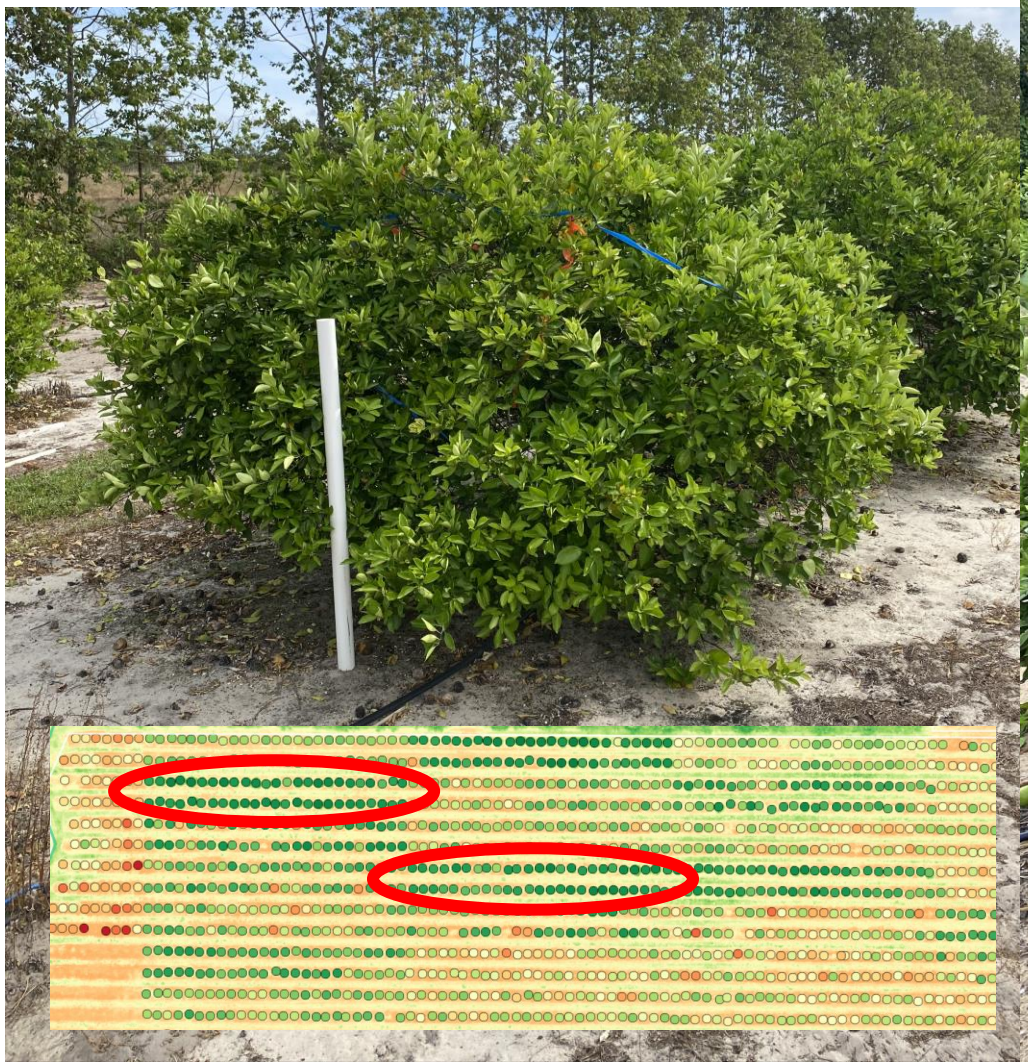
Polk County Trial A

21 Dec 2022

74.87 ac



Shining stars: N13-32 on UFR-4 and other RS



Shining stars: N13-32 on UFR-4

Shining stars: The OLL lines

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Shining stars: OLL-8

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From the drone metrics: NDVI and ft²

- C7-12-19/US 942
- C4-14-15/UFR-17
- 1420/Sour Orange
- RBA 22-29 Valencia
- 56-11
- DPI 434-81/US 942
- UF4.15.19/Swingle
- Bingo/US897
- 914/X639
- Glen Navel F-56-11/US 802
- C. latipes X Clementine mandarin
- OLL-5, OLL-27
- OLL DC series
- OLL-8/UFR-5 /X639 /US-897 /802
- Sugar Belle on UFR-5
- Hamlin 13-32 on UFR-4
- 950/UFR-17
- 1424/Sour Orange
- Seedless Snack/US897
- UF900/US897
- US 1-83-179/X-639

FLORIDA GROWER Citrus SHOW
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Shining stars: healthy exotic hybrid populations

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What was found

- Often tree health for a selection was not consistent within and/or across sites
- These drone data are bird's-eye view sometimes gathered before or after solar noon (follow up)
- These data will take time to fully analyze; working with IFAS statisticians for final report; interim report due to CRDF

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“The beat goes on” –Bill Castle

FLORIDA GROWER Citrus SHOW

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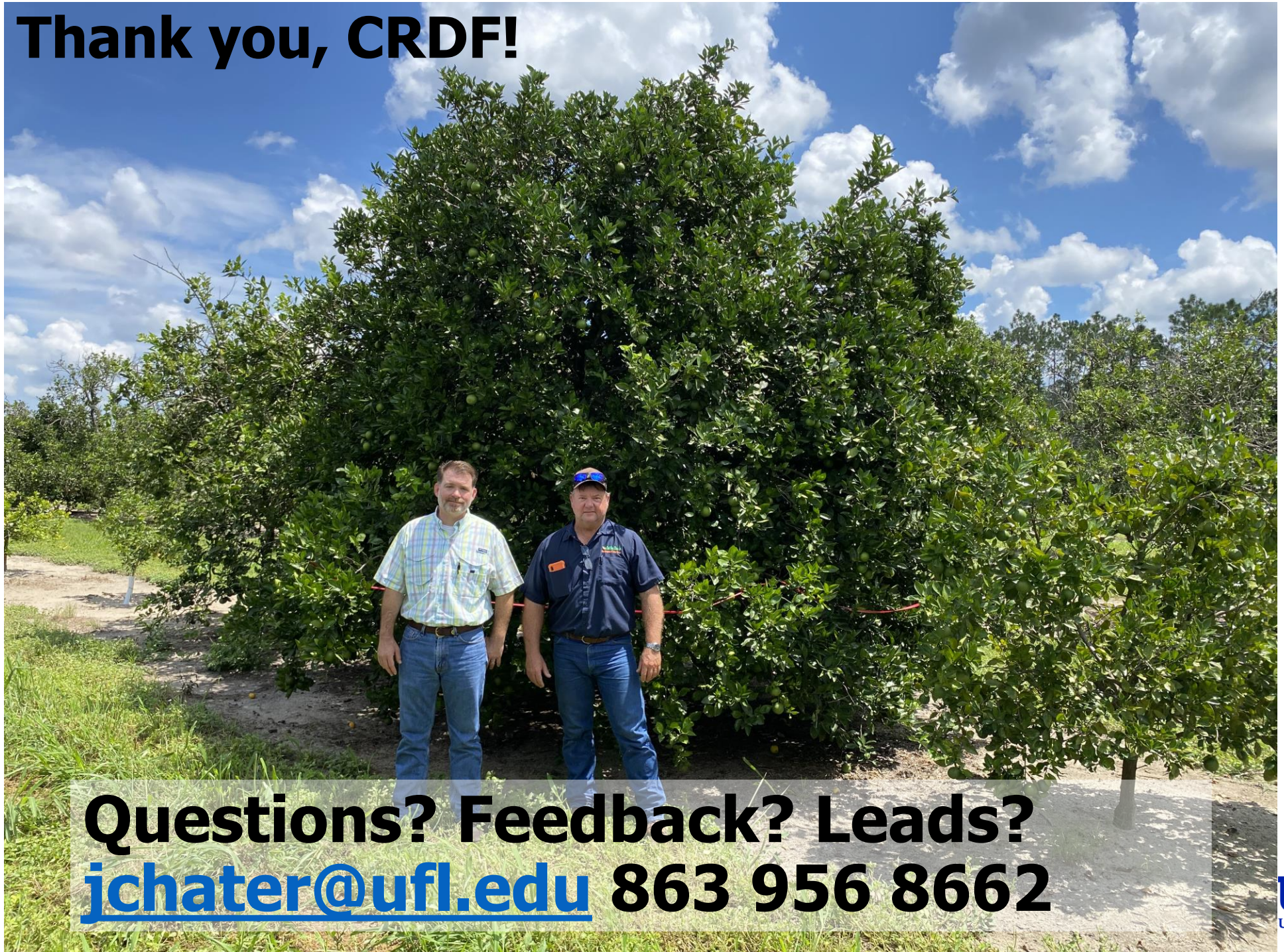
Thank you, CRDF!



Questions? Feedback? Leads?

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