Improving Tree Health With PGRs for Better Tree Productivity

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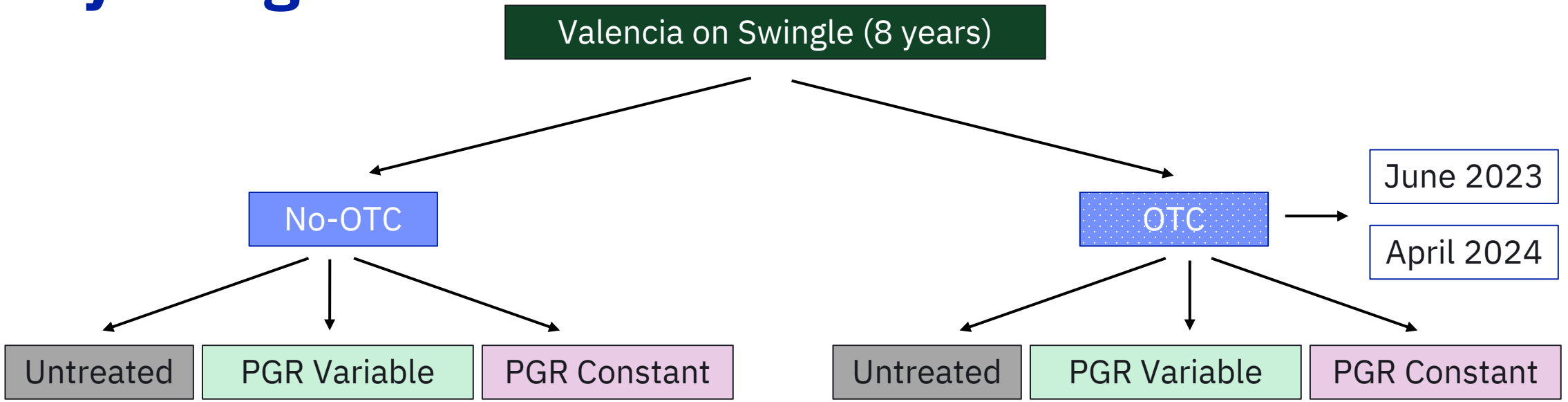
Take home message

- PGRs + antibiotics increase yield more than either strategy alone
- Stacking horticultural strategies can yield faster results than any strategy alone
- The right PGR at the right time can boost productivity
- GA+2,4-D can mitigate fruit drop; it is a useful tool to reduce post-hurricane drop as well

Field Study 1:
Does combining PGRs provide an additive benefit?

- Use of PGRs according to tree phenology is promising, though intricate
- Can I apply the same PGR cocktail throughout the year, or is it better to change it?
- I am already injecting trees; do I still need to apply PGRs?

Study design



PGR Variable (6 sprays):

- April and May-Low auxin + cytokinin
- July-Low cytokinin + GA
- August and October- High GA
- December-High auxin

PGR Constant (6 sprays):

- April, May, July, August, October, and December- Low GA+ auxin + cytokinin

GA (Progibb):
High- 20 oz/acre
Low- 10 oz/acre

Auxin (Citrus fix):
High- 3 oz/acre
Low- 0.5 oz/acre

Cytokinin (Validate):
H- 20 oz/acre
L- 0.5 oz/acre

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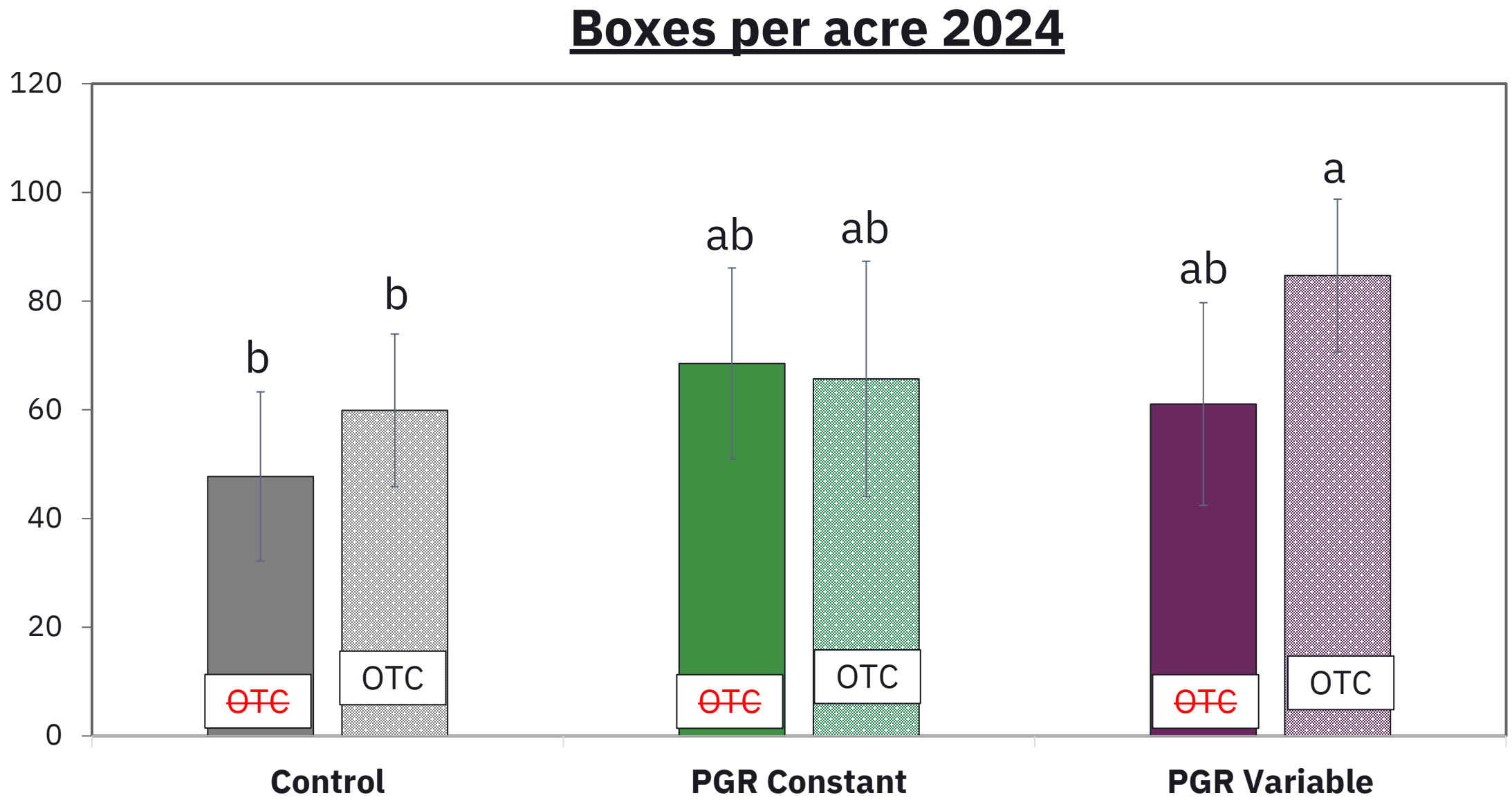
Use of PGRS for one-year improved the yield



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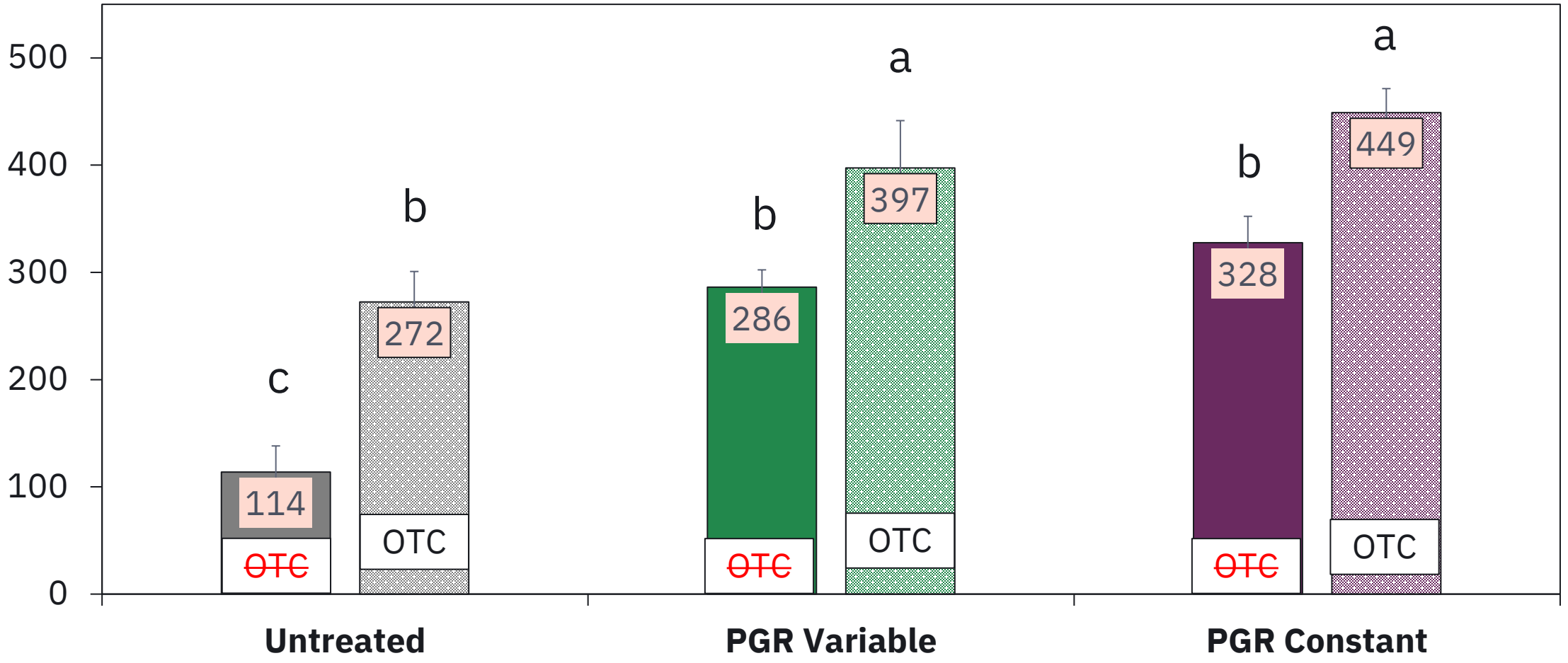
PGRs + OTC increased yield by more than triple

Boxes per acre 2025



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Use of PGRs can be a good alternative to OTC injections to break resistance

Field Study 2:
Combining horticultural strategies to boost production

Can we add multiple horticultural approaches to improve fruit growth, quality, and retention?

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Which horticultural strategies?

Irrigation

Frequent irrigation with small doses of water has been proven to be beneficial

PGRs

Applying PGRs according to tree phenology to boost fruit and leaf growth

Cytokinin can boost cell division

GA helps with fruit growth and drop

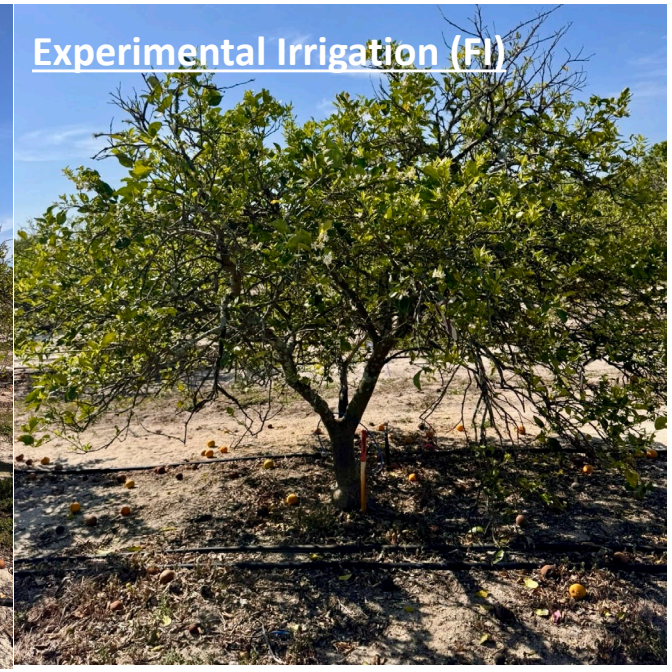
Nutrition

Micronutrients can boost plant metabolism

Potassium and boron can improve fruit quality

Trial details

- 20-year-old ‘Valencia’ on Swingle
- Original irrigation exp started in 2021
- PGRs + Nutrition since 2023



Treatment	Irrigation Schedule	PGR + Nutrition
Control (Standard)	Every other day for 2 hours	-
Irrigation-3 y	Daily, 3×20 min (since 2021)	-
Irrigation-1 y	Daily, 3×20 min (since 2023)	-
Irrigation+PGR+Nut	Daily, 3×20 min (since 2023)	Cytokinin + GA + Nutrients

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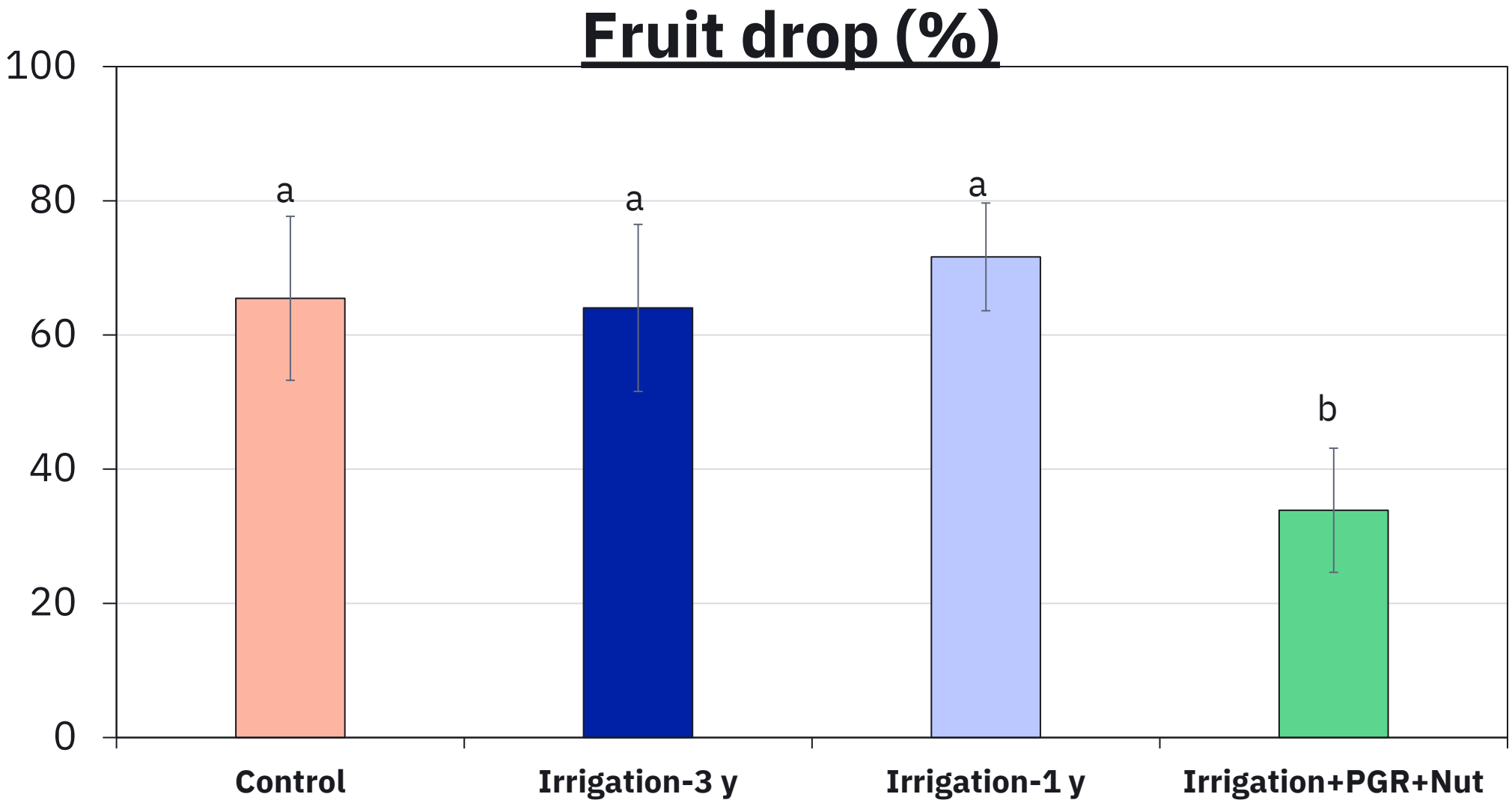
Adding PGRs + Nutritional reduced the fruit drop significantly



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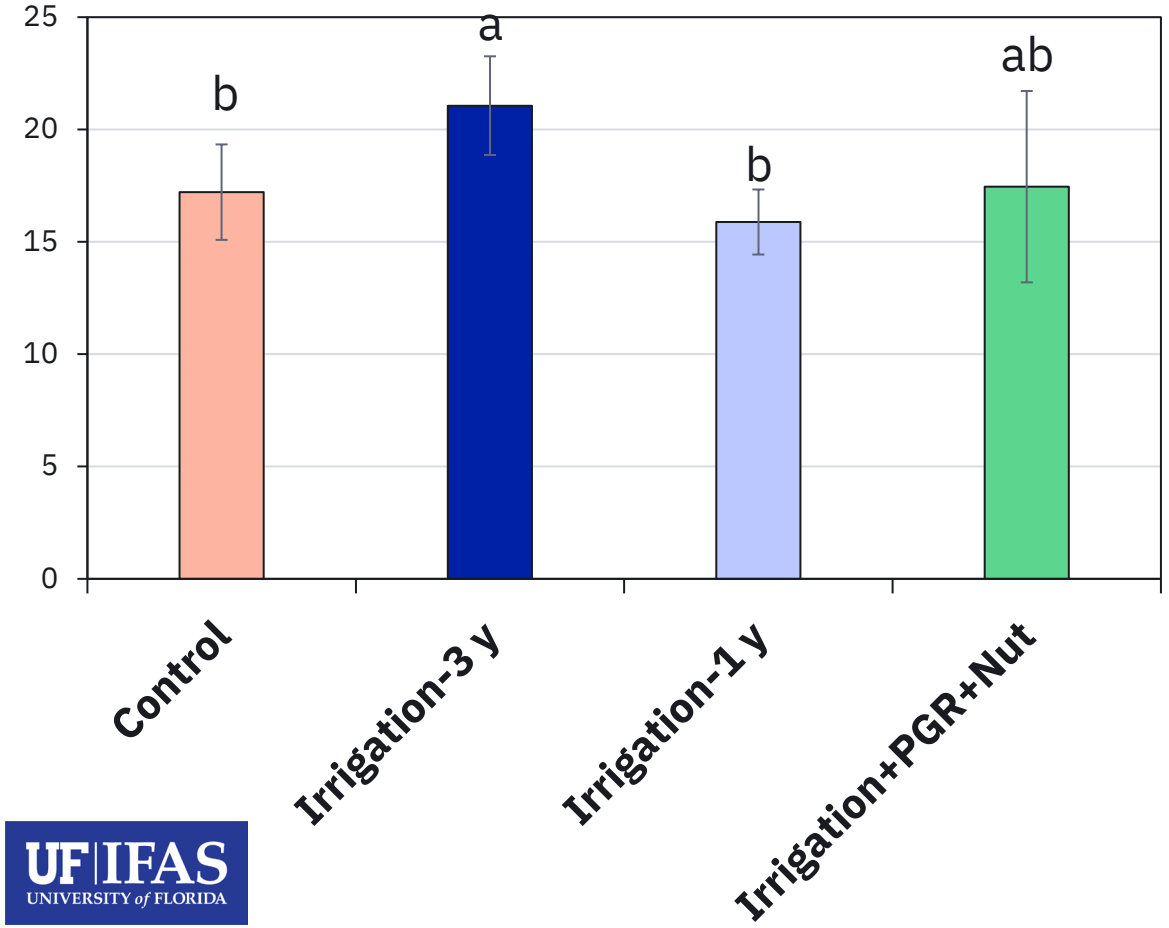
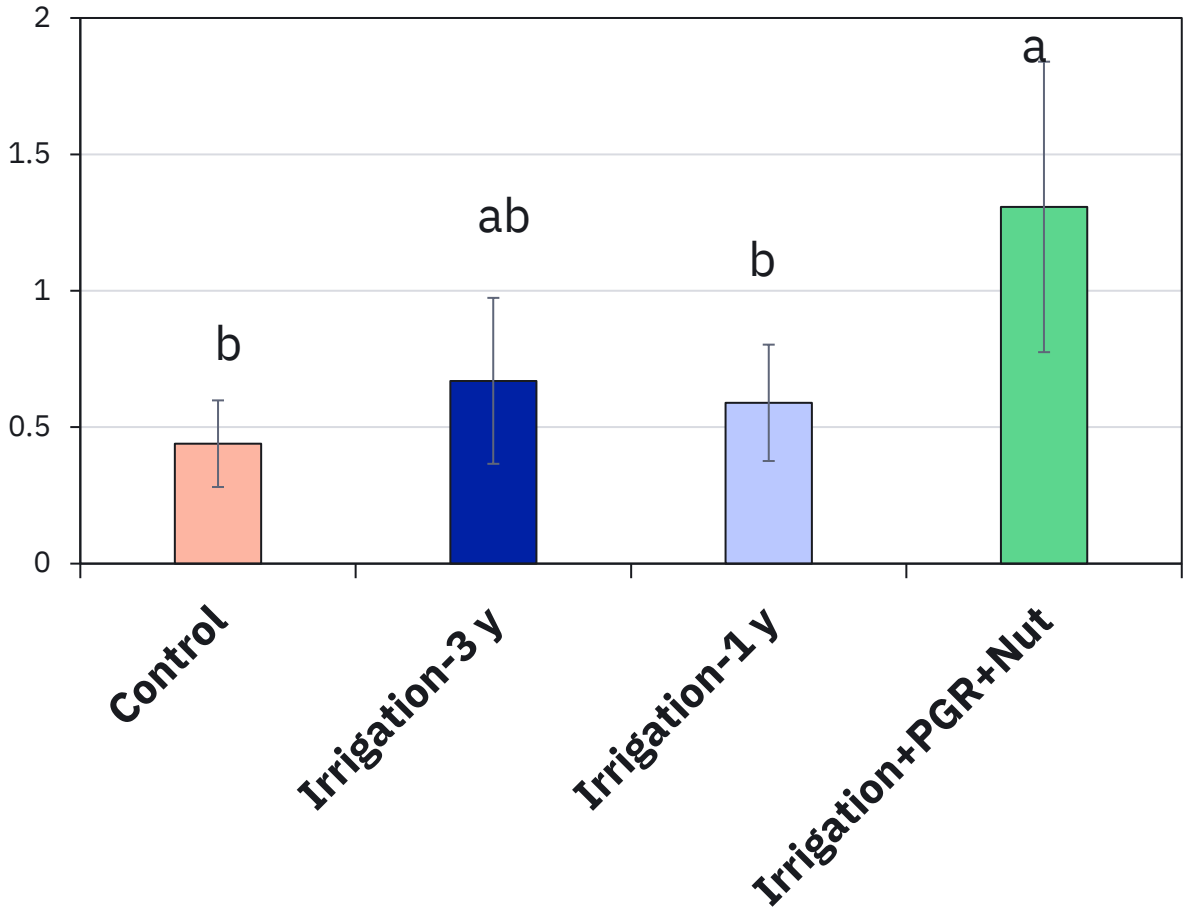
By adding horticultural strategies, the improvement in yield is achieved within a year

Canopy Volume



Yield efficiency



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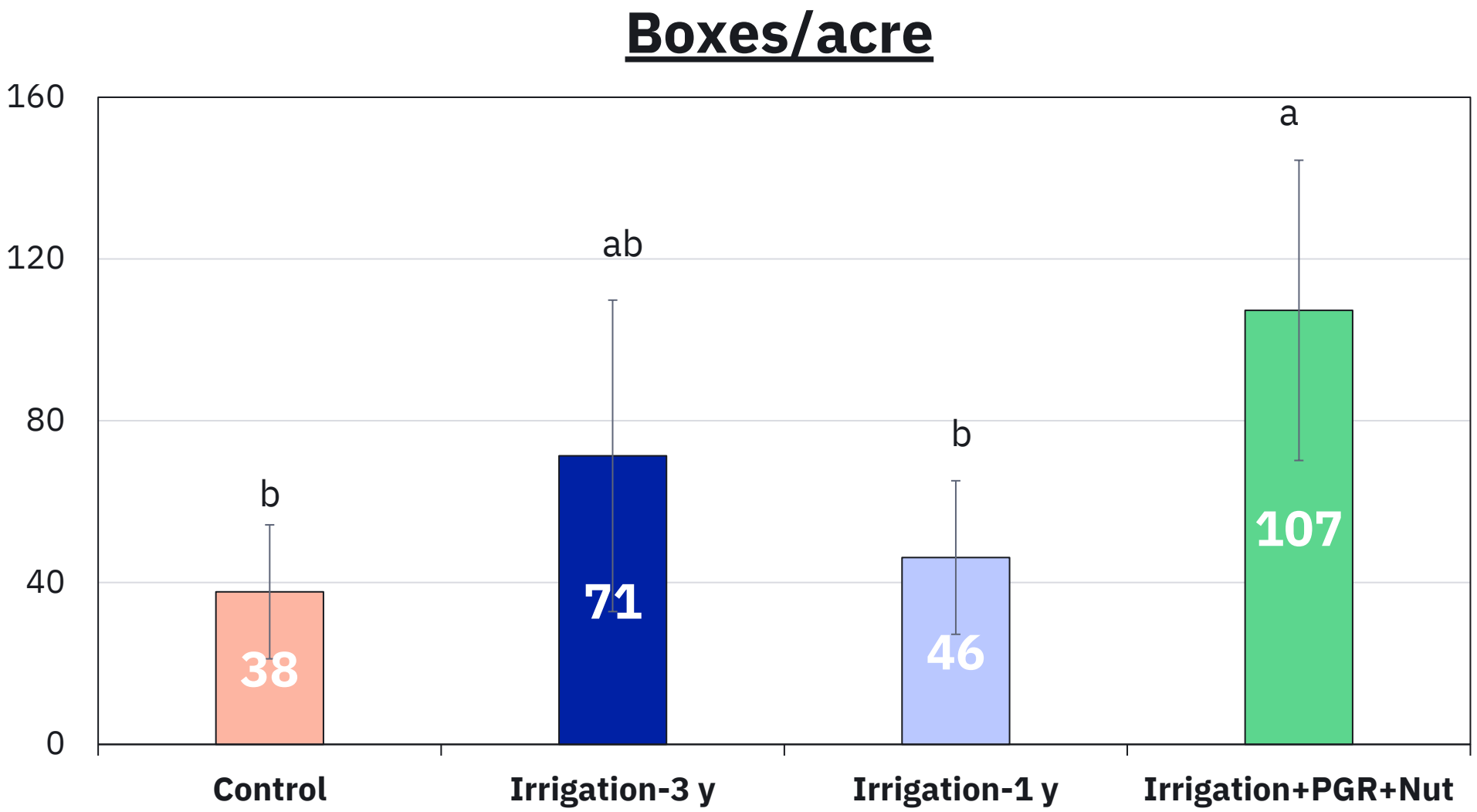
Irrigation + PGRs + Nutritional improves yield



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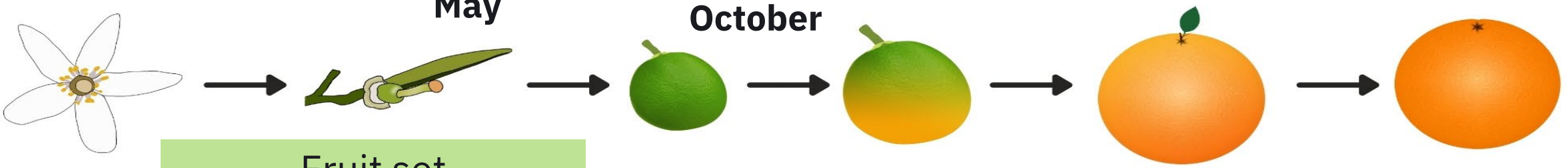
What did we apply?

Sitofex	16oz/acre
CaNO3	7 lbs/acre
Progibb	10oz/acre
KNO3	8 lbs/acre
Brexil	1.7 lbs/acre
Solubor	0.4lbs/acre

Foliar:
Cytokinin+$CaNO_3$
May

Foliar:
GA+KNO_3+Solubor+
Micronutrients
June, August, September, October



Fruit set

Flowering
Spring vegetative flush

Exponential fruit growth
Summer vegetative flush

Fruit maturation
Preharvest fruit drop

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Field Study 3:

How can we reduce fruit drop?

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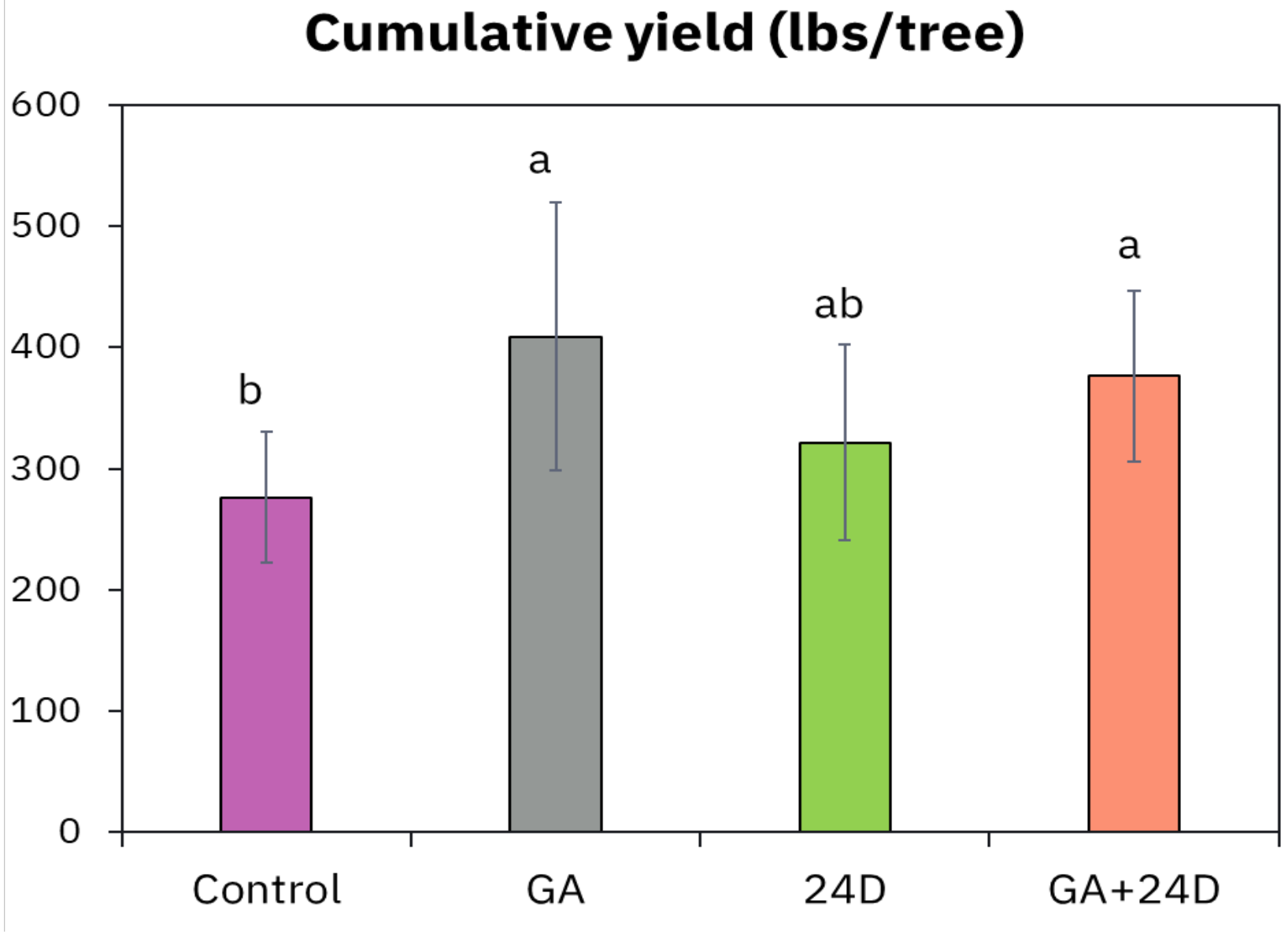
Materials and Methods

- Commercial groves on ridge soil
- ‘Valencia’ on Carrizo
- Replicate trees picked based on uniform canopy density
- Treatments:
  - 1. Untreated control (UTC)
  - 2. GA 10 oz/acre (Progibb LV Plus)
  - 3. 2,4-D 1.2oz/acre (Citrus Fix)
  - 4. GA + 24D (tank mix)
- Spray every 45 days, July-November
- Repeated for 3 years

Significantly higher yield in GA and GA+2,4-D



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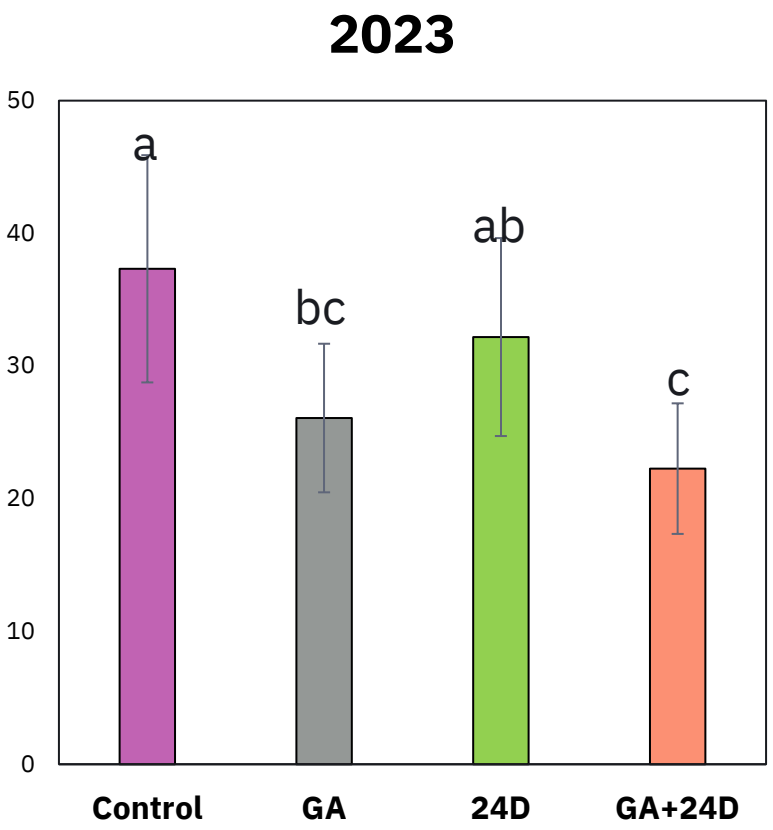
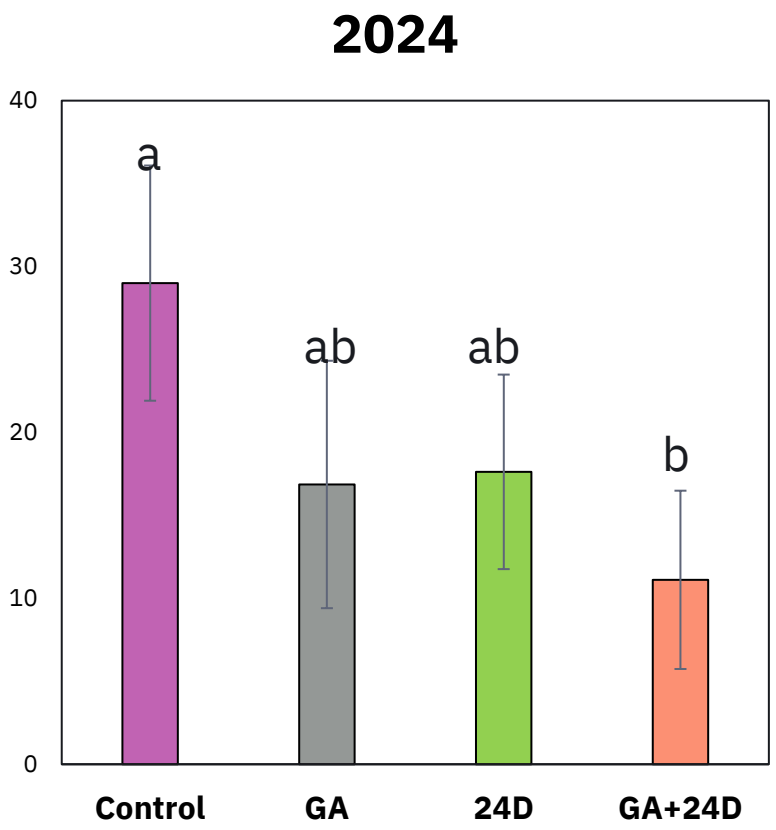
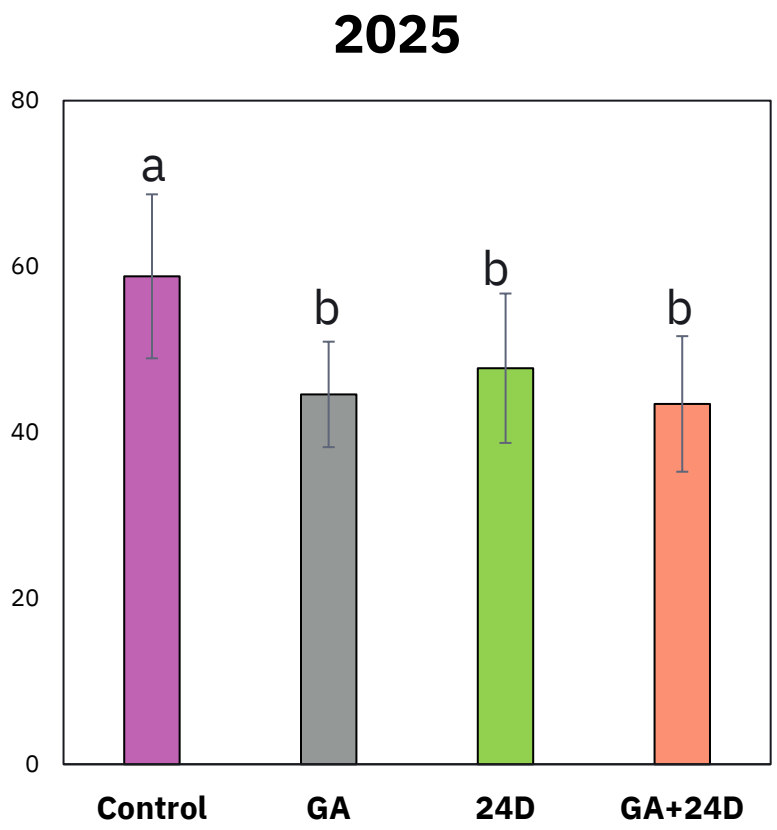
GA + 2, 4- D is consistently effective in reducing fruit drop (%)







Hurricane Ian

Hurricane Milton

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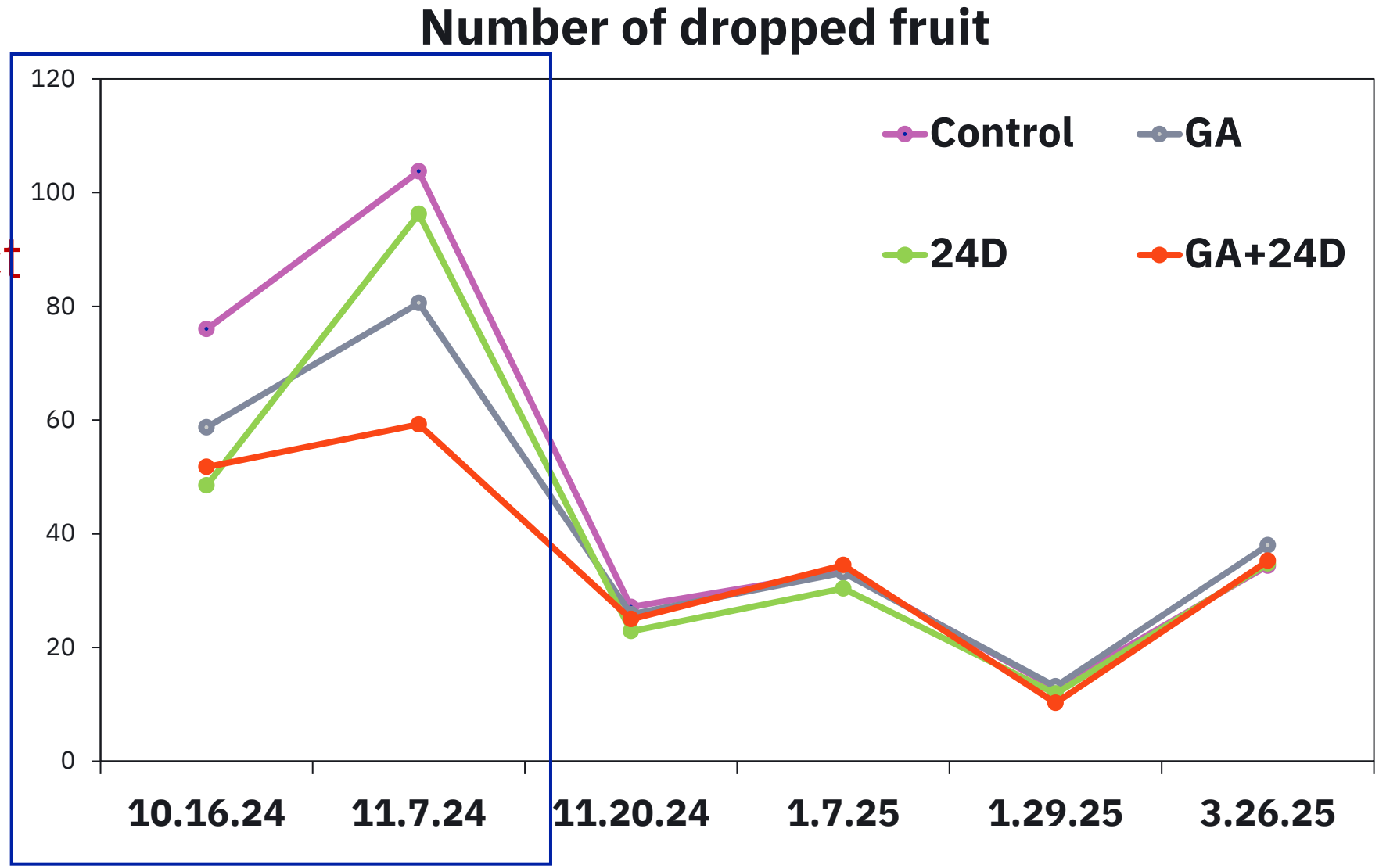
Use of PGRs can reduce hurricane induced fruit drop

PGRs were applied since July, last application on Oct 4th

2,4-D was at a low dose in this study (1 oz per acre)



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Conclusion

- Combining growth-promoting PGRs in a phenology-based approach can help in improving the canopy and productivity
- Combining PGRs with other approaches like irrigation, nutrition, and OTC-trunk injection improves yield
- Use of GA+2,4 D can reduce fruit drop
  - Growers are encouraged to apply GA+2, 4 D in event of a Hurricane

Thank You

Grower Collaborators

Valent USA

Ryan Atwood

Amvac