

IPCs work. What comes next?

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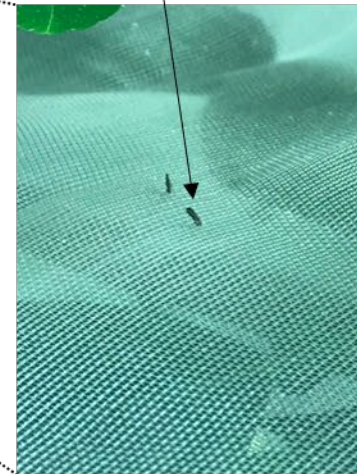
Take Home Messages

- If not protected at planting, citrus trees become infected with HLB in the first year. Most of these trees will never bear fruit.
- IPCs prevent HLB if properly installed and maintained.
- Fruit quality is improved by IPCs even though trees get infected after IPC removal. However, quality appears to start declining after the second year of IPC removal.
- Brassinosteroids (Brs)
 - induce immunity in young plants.
 - increase plant vigor.
 - reduce psyllids in new flushes.
- Undergoing research will show effects of brassinosteroids on fruit yield and quality.

Psyllid exclusion

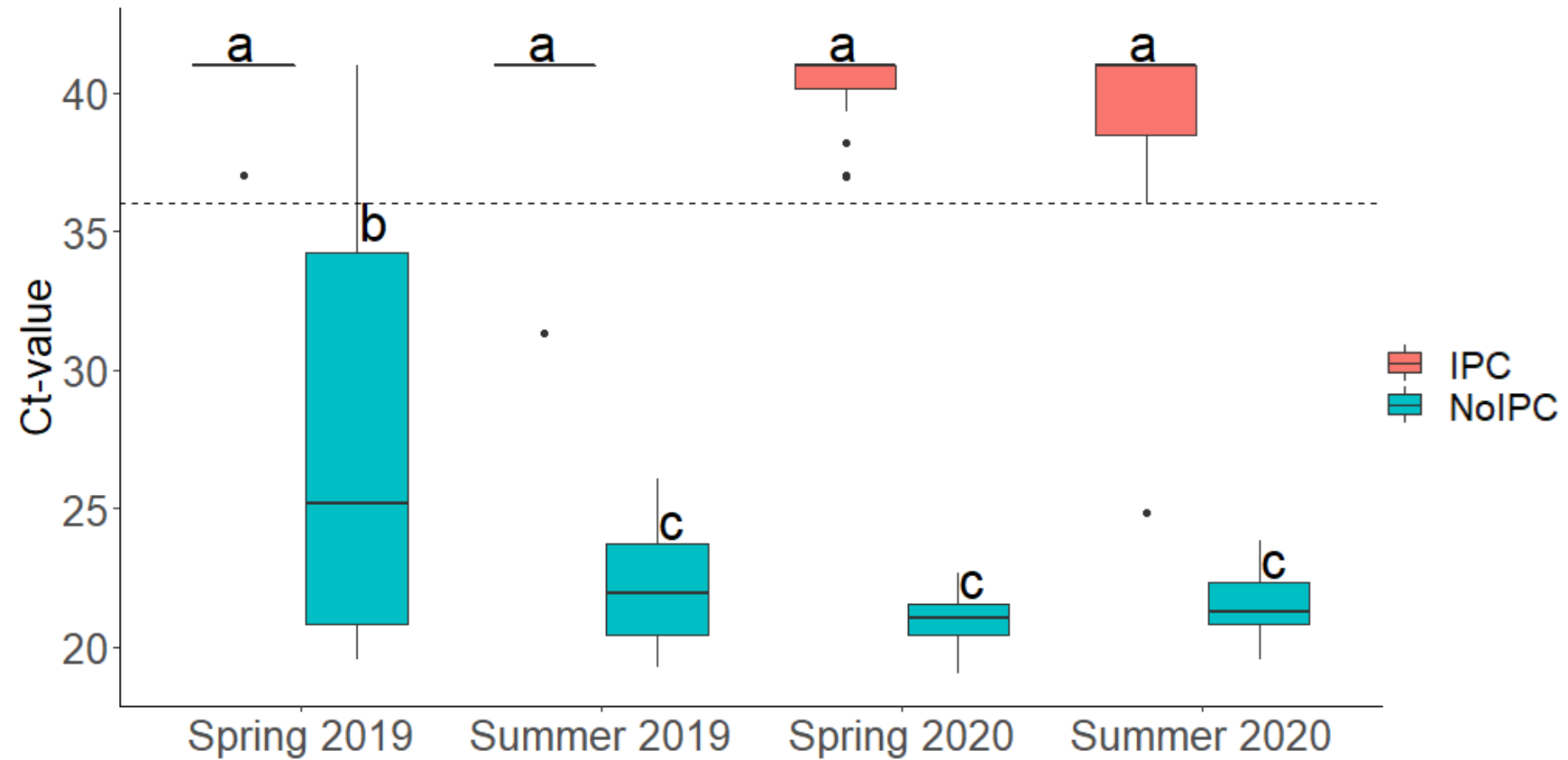


Adult psyllid
0.57 mm width

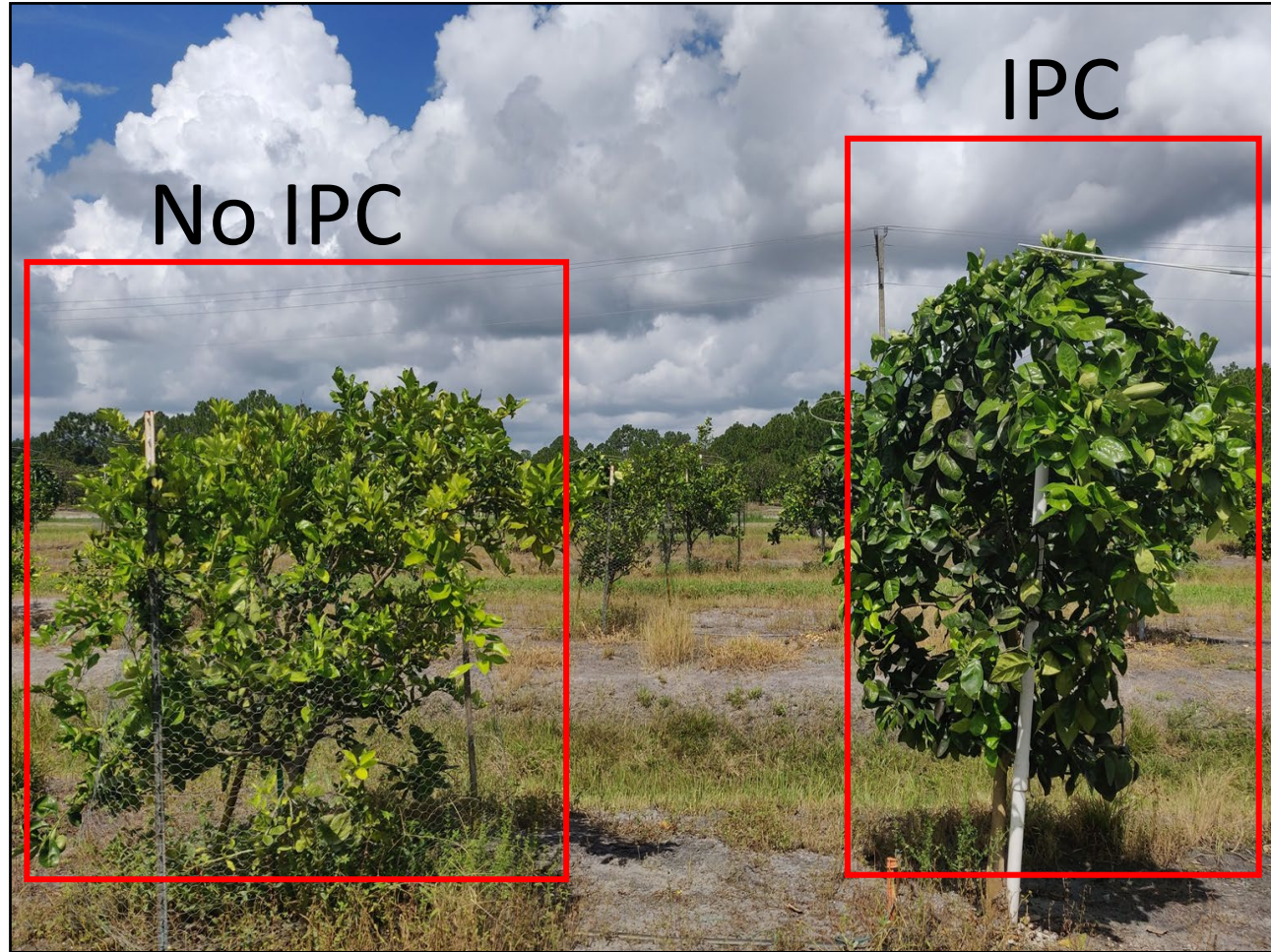


50 mesh screen bags
0.297mm wide

IPCs prevented CLAs infection

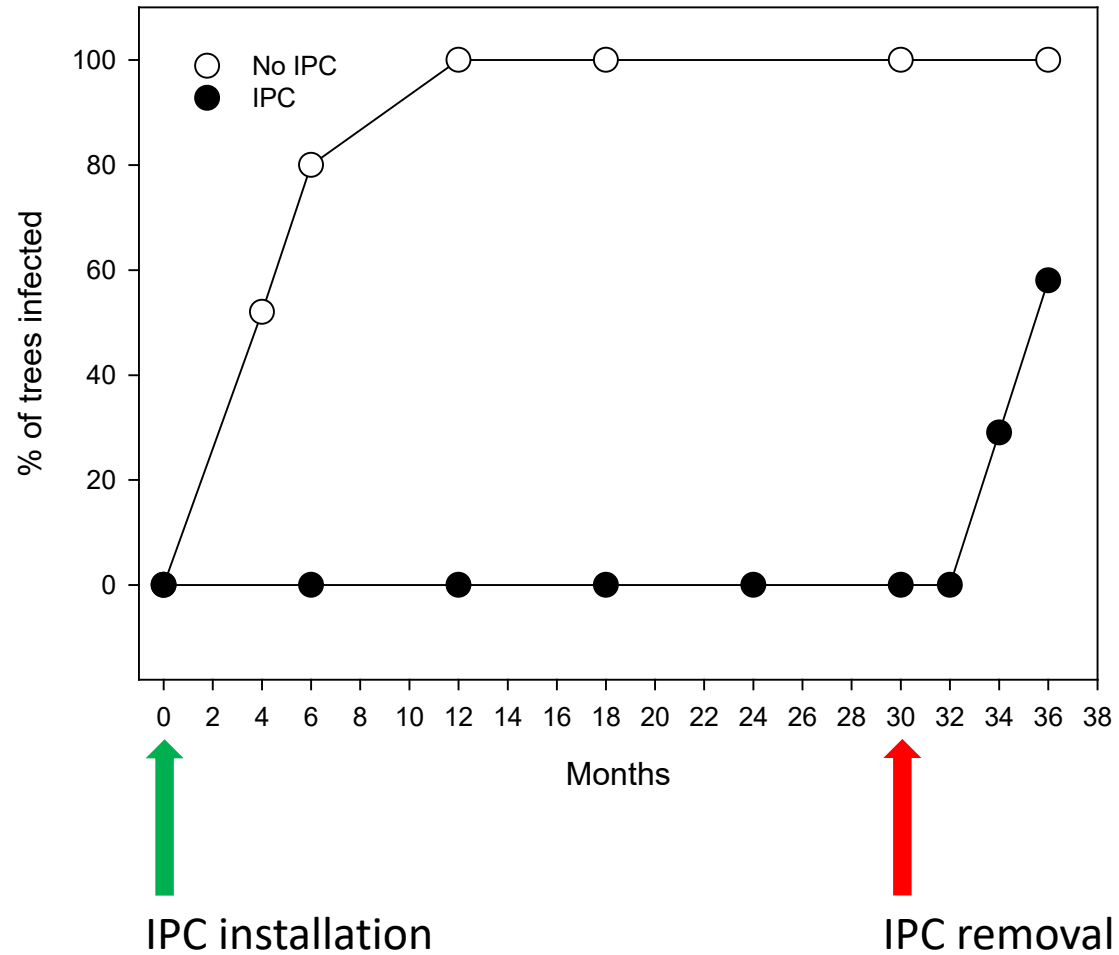


Tree growth improved with IPCs



Trees with and without IPCs after IPC removal
(Summer 2020, 30 months after initial planting)

The rate of HLB infection after IPC removal

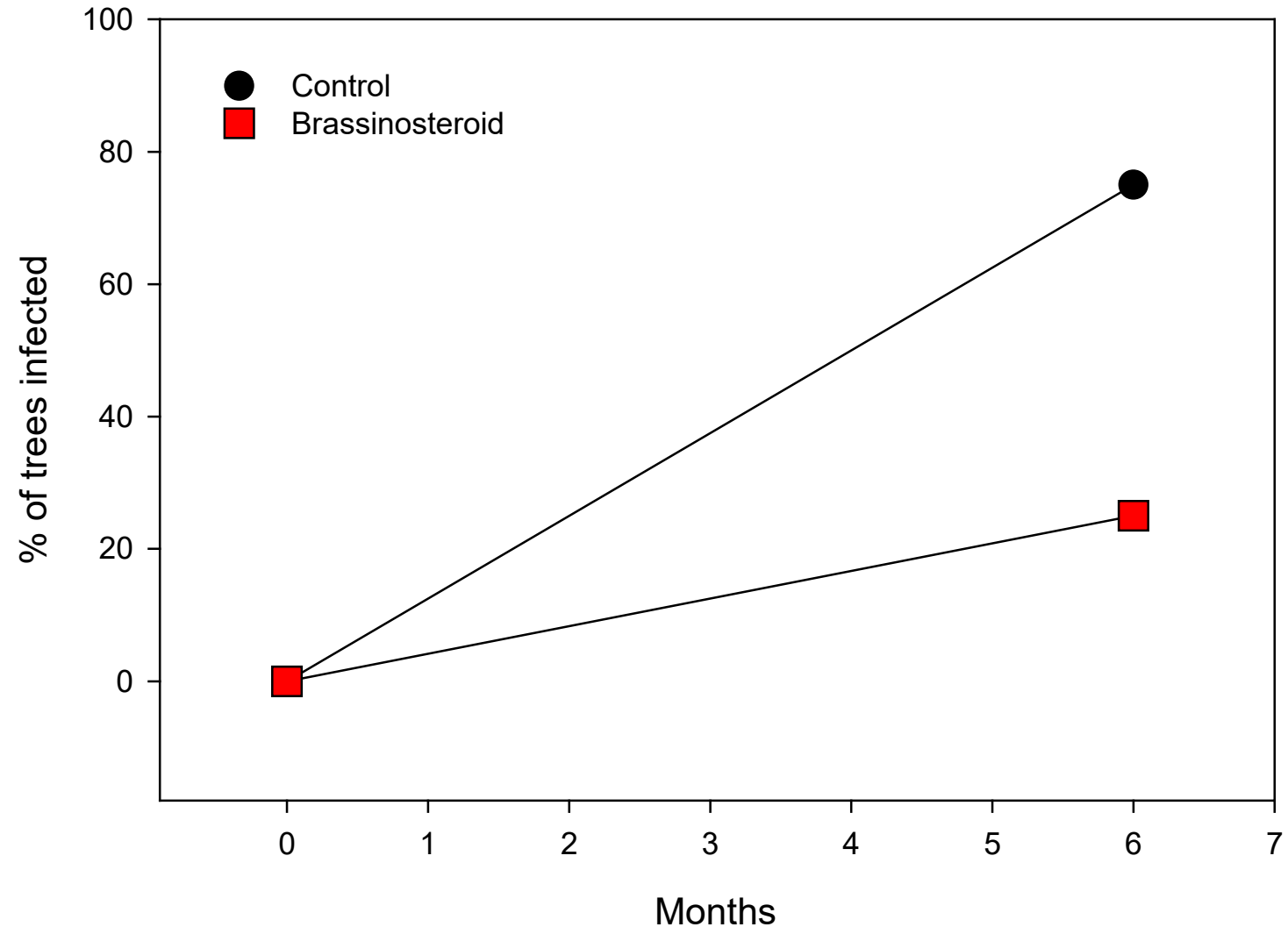




Fruit quality was improved by IPCs

	6 months after IPC removal 2020-2021 SEASON		18 months after IPC removal 2021-2022 SEASON		30 months after IPC removal 2022-2023 SEASON	
Factor	Brix (%)	TA (%)	Brix (%)	TA (%)	Brix (%)	TA (%)
No IPC	7.5 b	0.6	7.0 b	1.1	6.4b	1.1
IPC	10.9 a	0.8	9.6 a	0.84	7.6a	0.9
P-value	0.009* *	0.294	0.01*	0.1	0.01*	0.1

**Brassinosteroids
reduce rate
of HLB infection
by inducing plant
immunity**



Can we combine IPCs and brassinosteroids?



IPC until tree starts
to bear fruit



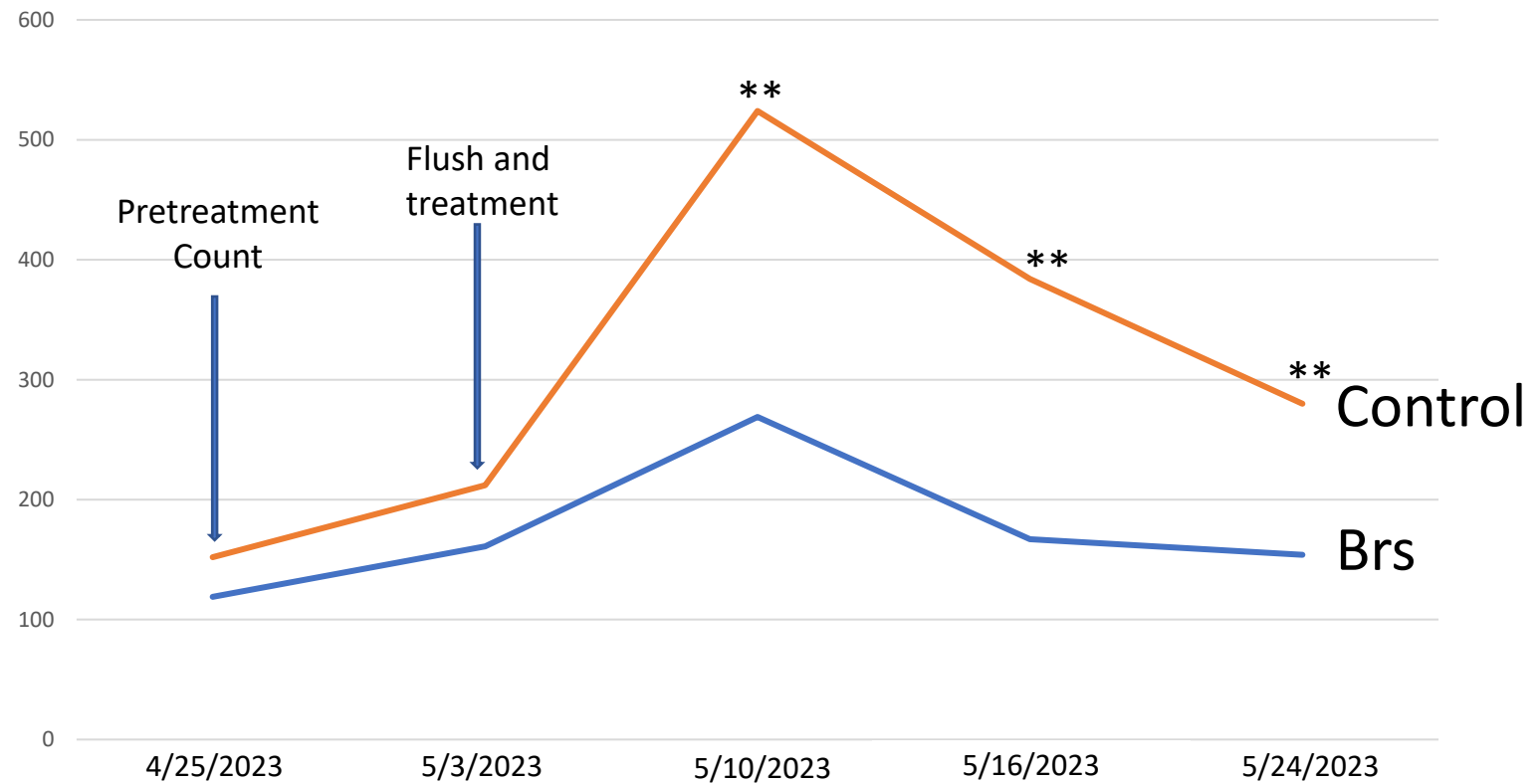
IPC removal



Brassinosteroid treatment
Once per month
@ 6,28 fl oz per 100 gallons water

Number of psyllids per 5-plant replication after 1 month

- Plants started flushing in early May
- Br treatment immediately (once)
- Psyllid count weekly



May 2023

Tango mandarin

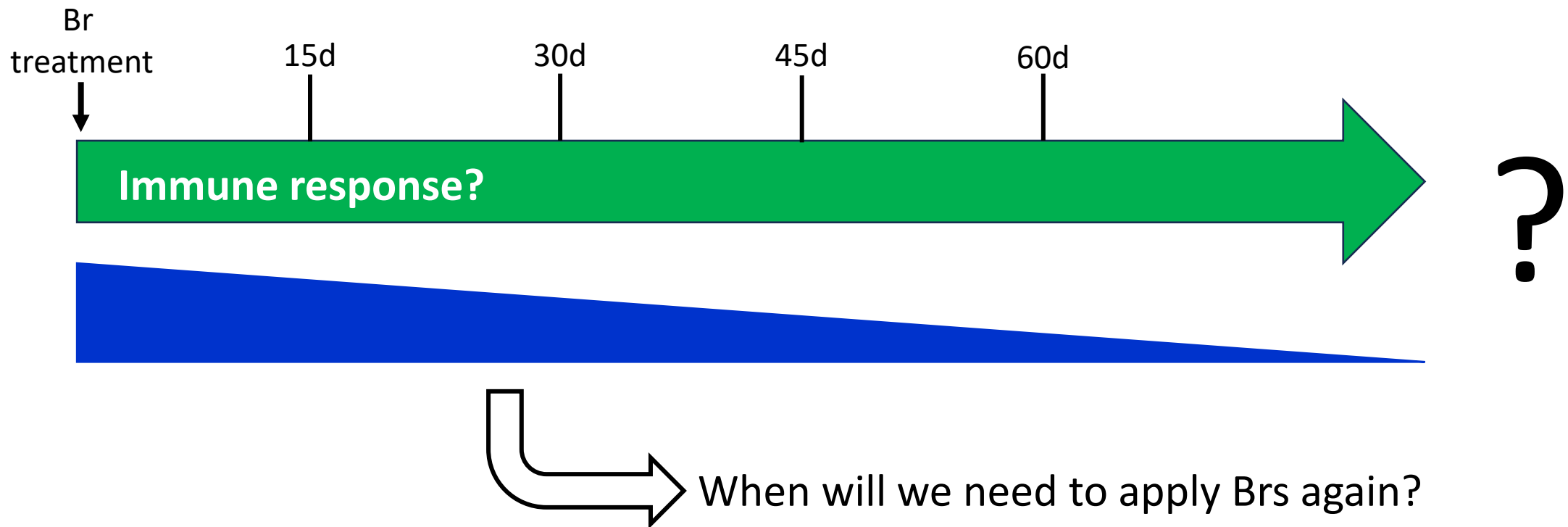


- Trees planted in January 2020
- IPCs removed in December 2022
- Then, monthly applications of Brs

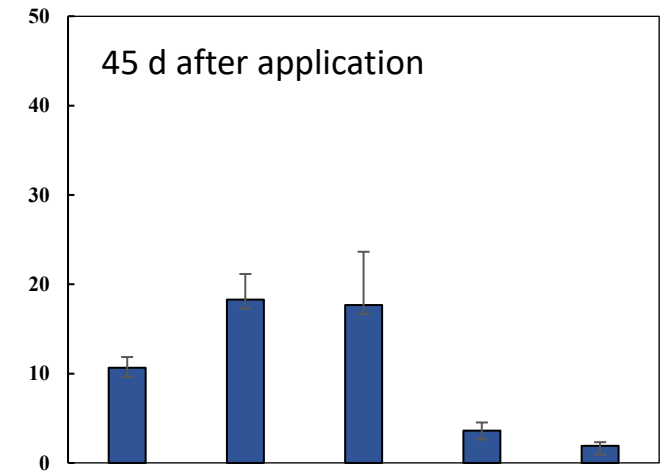
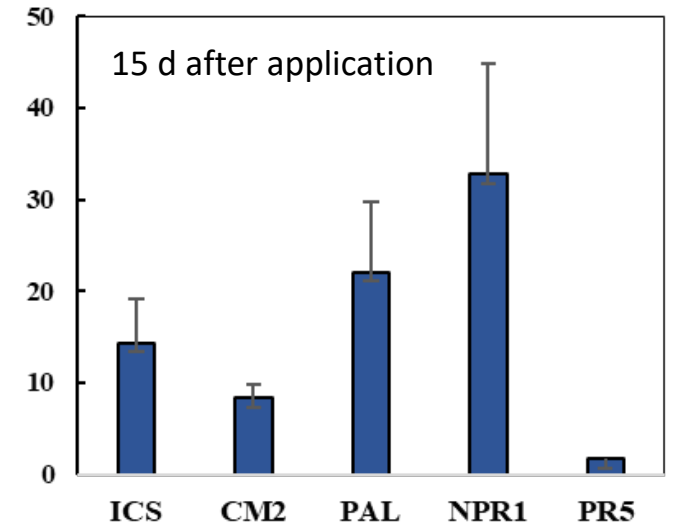
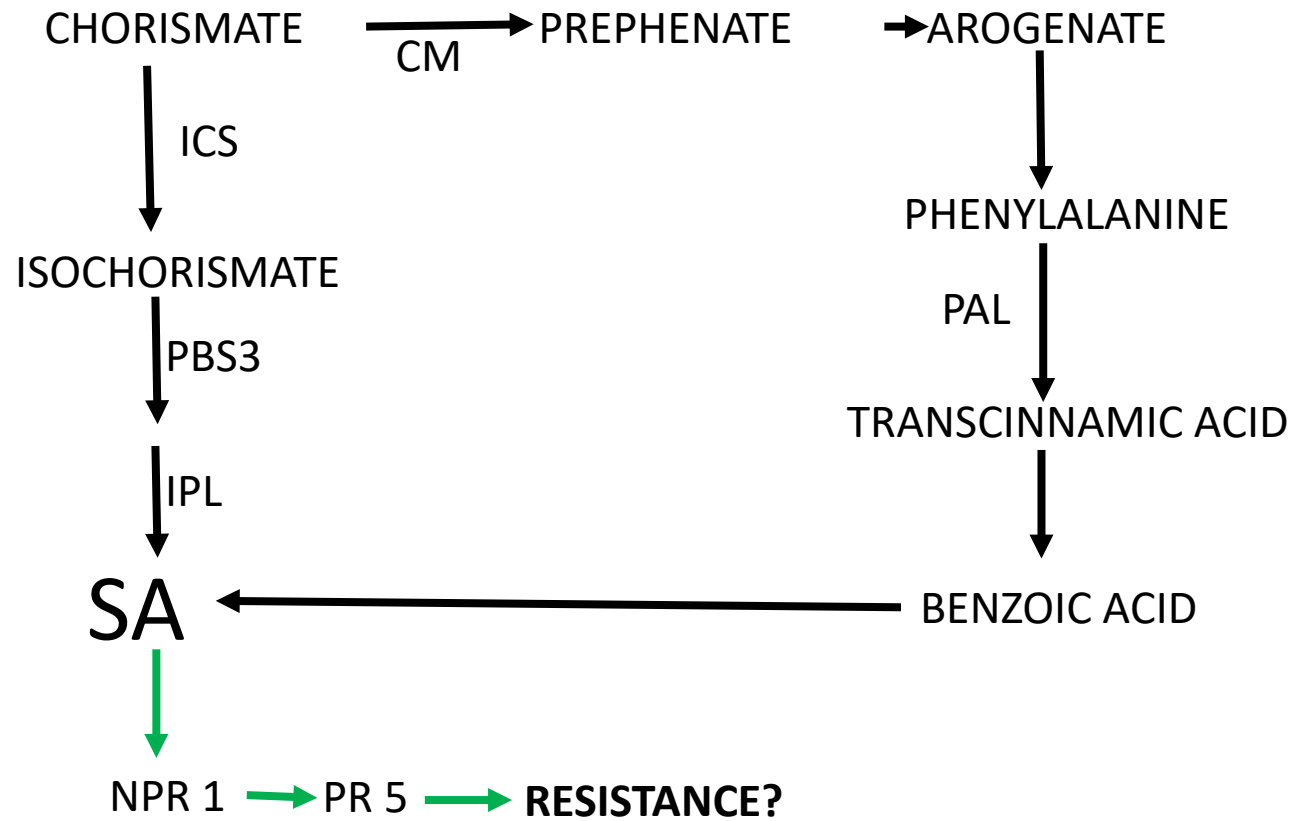
Effects so far

- More flushes, denser canopy, greener leaves
 - More fruit set
 - Most of the trees still HLB-
- **Can we reduce the number of applications without losing beneficial effects?**

Gene expression related to plant immunity



Gene expression



Take Home Messages

- IPCs are effective in protecting young citrus from HLB.
- Once IPCs are removed, trees become exposed to psyllids and eventually get infected.
- Brassinosteroids are a promising treatment to maintain trees healthy once IPCs are removed.
- Undergoing research will show the real impact of the combined use of IPCs and Brassinosteroids.

Special thanks to

2018



2023



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2021



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Any questions?

Thank you!

