Field evaluation of individual protective covers (IPC) for young citrus trees

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Topics for discussion

- Installation and performance issues
- Assessing tree growth, exclusion of ACP, diseases and pests under IPC
- Prediction of economic benefit after removal of the IPC

Installation and performance issues

Creating space for canopy expansion in the IPC

Installation and performance issues

Closure at bottom of IPC with zip ties on outside of the wrap. Tucking inside prevents crawling insects from entering, e.g. Diaprepes adults

Installation and performance issues

Constraint on canopy growth causes twisting of branches

Installation and performance issues

Branches quickly straighten out – season 3 after 2 yrs in IPC

Installation and performance issues

SugarBelle 5 months

Hamlin ~ 1 year

ACP exclusion challenge

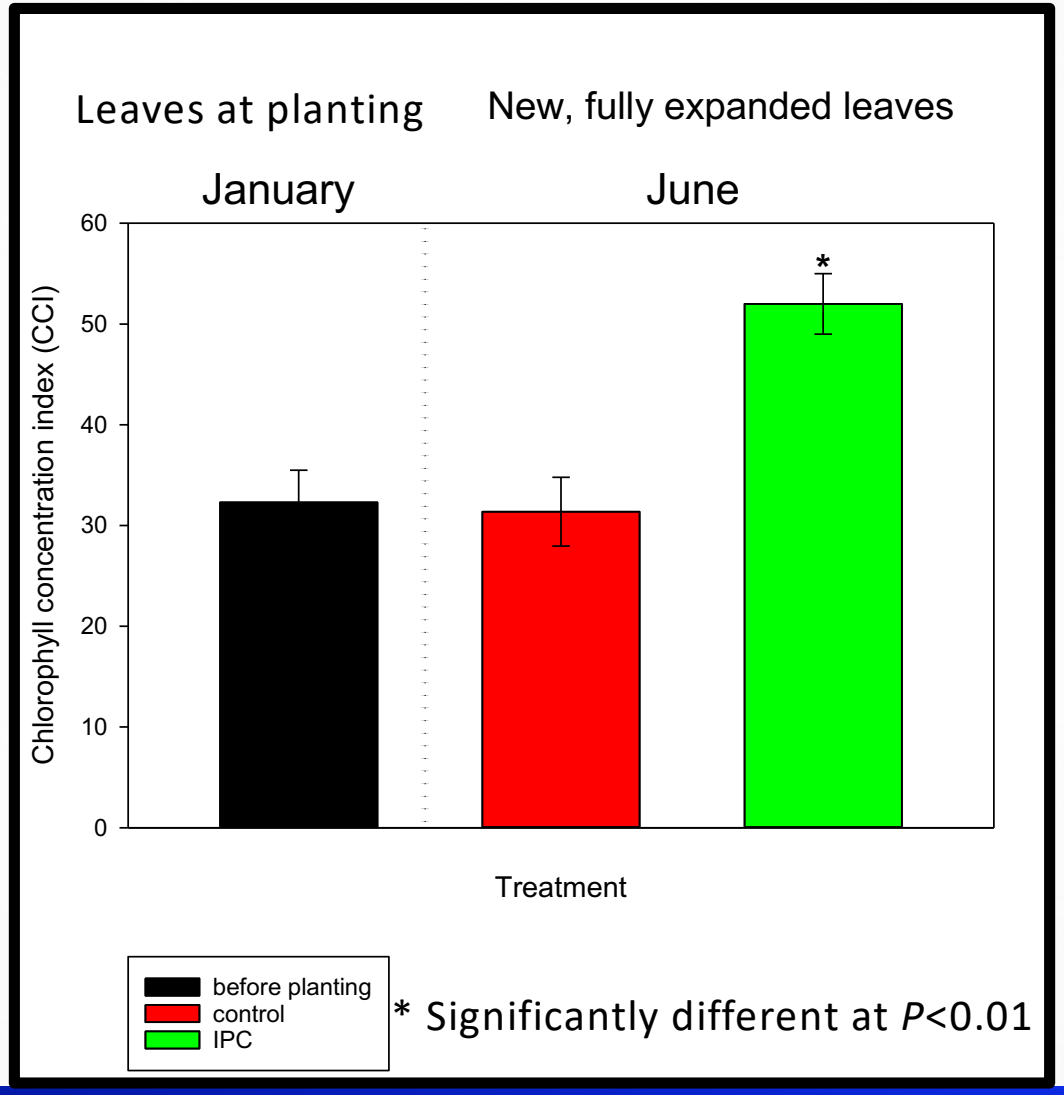
- IPC trees placed in room heavily infested with ACP
- ACP do not move down to enter the IPC from below

IPC conditions may promote some diseases and pests but stimulate growth due to shading

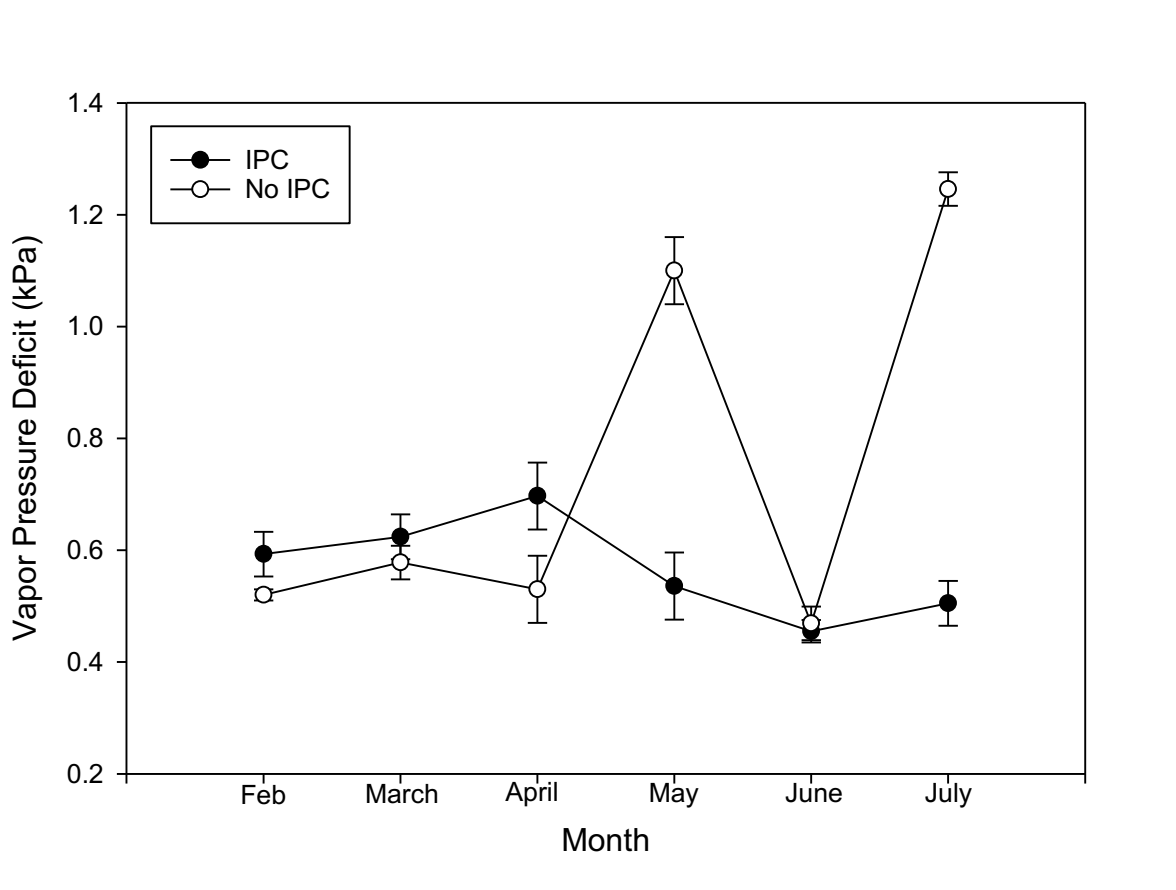
Field trial at SWFREC

TREE IPC TRIAL LAYOUT:			15 trees per treatment, 5 reps		
ROW 1	ROW 2	ROW 3	ROW 4	ROW 5	ROW 6
rep 1 1	rep 2 1	rep 2 1	rep 4 1	rep 4 1	rep 5 1
2	2	2	2	2	2
3	3	3	3	3	3
rep 1 4	rep 2 4	rep 3 4	rep 3 4	rep 4 4	rep 5 4
5	5	5	5	5	5
6	6	6	11	6	6
rep 1 7	rep 2 7	rep 2 7	rep 3 7	rep 5 7	rep 5 7
8	8	8	8	8	8
9	9	9	9	9	9
rep 1 10	rep 2 10	rep 3 10	rep 4 10	rep 4 10	rep 5 10
11	11	11	11	11	11
12	12	12	12	12	12
rep 1 13	rep 1 13	rep 3 13	rep 3 13	rep 4 13	rep 5 13
14	14	14	14	14	14
15	15	15	15	15	15
		N			
	W		E		
		S			
Treatments					
1	Tree defender/no admire				
2	Tree defender/ half rate admire				
3	Tree defender/ full rate admire				
4	NO Tree defender/no admire				
5	NO Tree defender/ half rate admire				
6	NO Tree defender/ full rate admire				

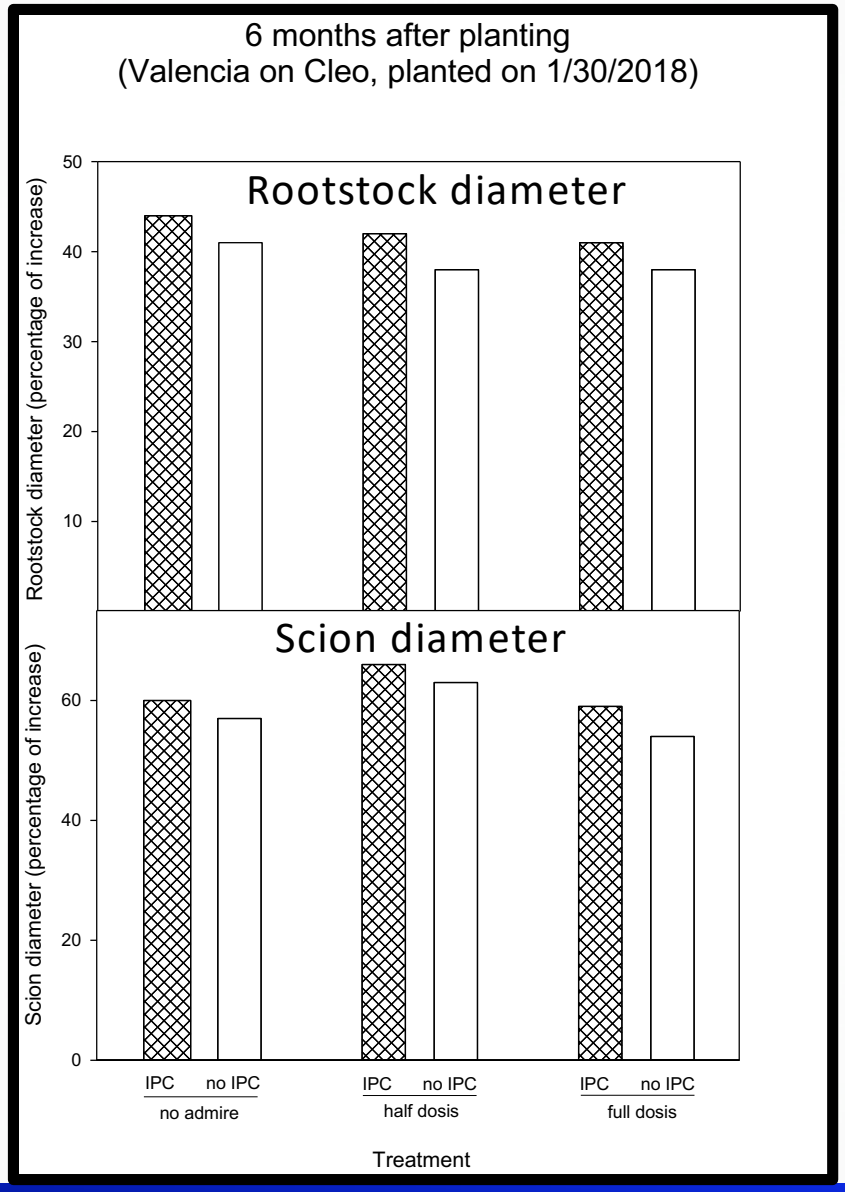
Leaf chlorophyll is increased under IPC



Vapor pressure deficit (VPD) is lower under IPC which enables stomata to stay open and Ps to continue longer each day



Differences not significant yet, but trend is faster growth for IPC trees



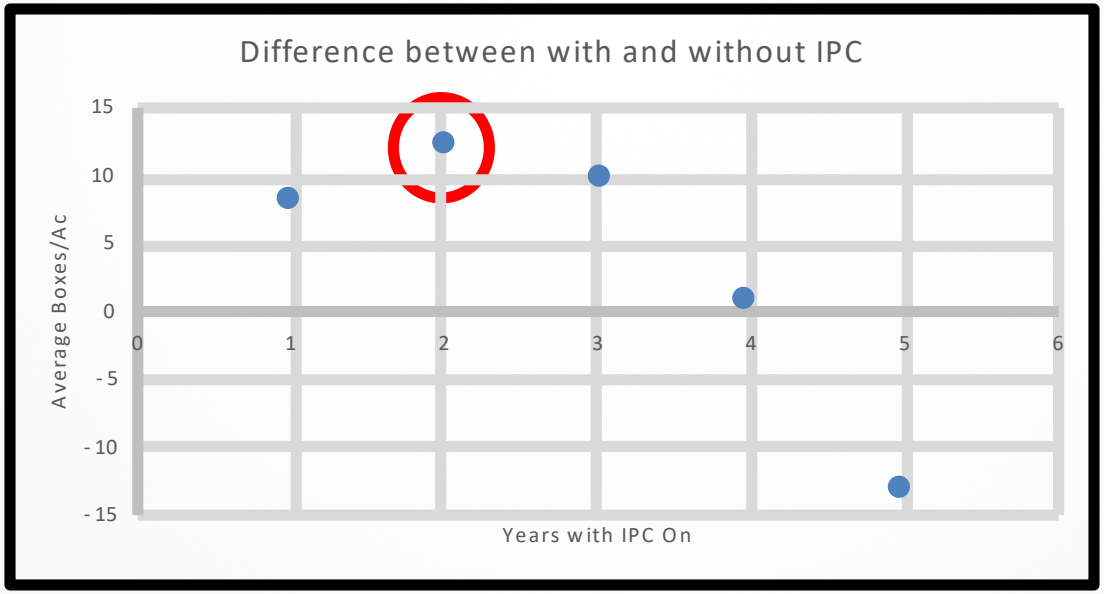
Economic benefit of IPC from prevention of HLB in the early stage of tree development

- Model predicts return based on variety, trees/ac, fruit value, production, cost of control, and rate of HLB increase w/ and w/out IPC

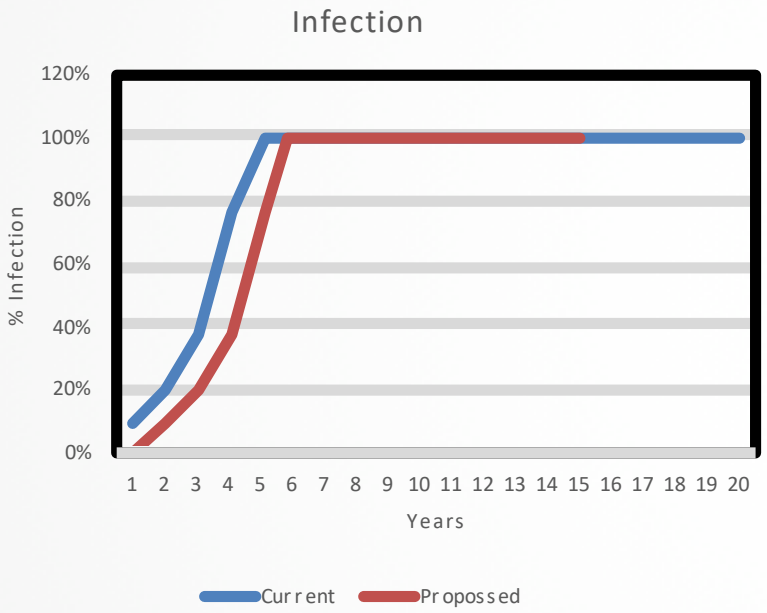
Number of trees/ac	250			Variety	Hamlin		Cost of Tree Defend	$ 8.50		Max loss due to HLB				40%
		$/lb solids Hamlin			$ 2.40		Solids/Box Ham	5.7		Diff in cost of control				$ (375)
		$/lb solids Valencia			$ 2.80		Solids/Box Val	6.4						
		Pick and Haul			$ 2.50		Discount Rate	10%	Percent infection in year 4 of uncovered					75%
							Percent of normal production in 1rst year after pulling off the cover							50%
	Boxes per tree													
Production	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Hamlin	-	-	0.75	1.25	1.75	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Valencia	-	-	0.50	1.00	1.50	1.75	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Production used	-	-	0.75	1.25	1.75	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

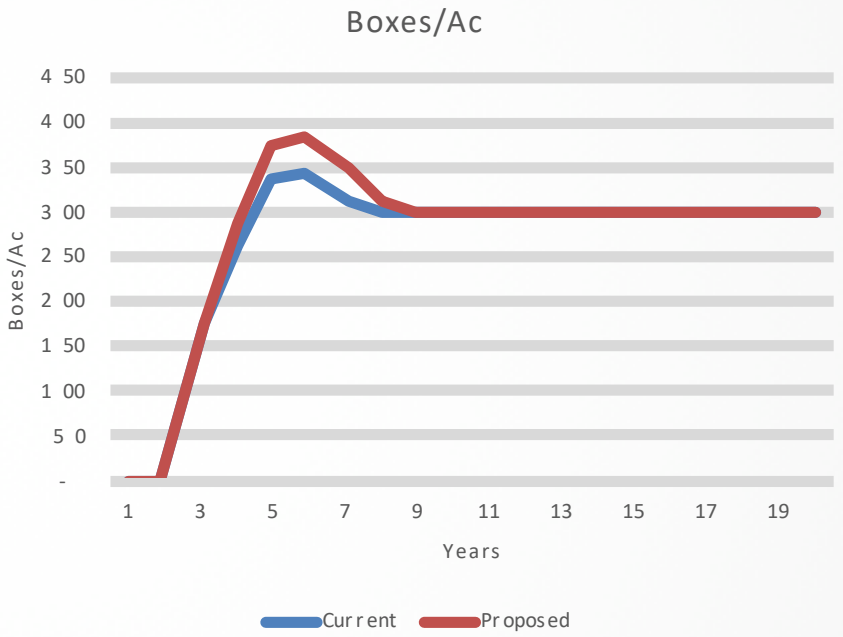
Model predicts 2 years under the IPC provides maximum return

	1 Year			2 Years			3 Years			4 Years			5 Years		
	With TD	Without	Diff	With TD	Without	Diff	With TD	Without	Diff	With TD	Without	Diff	With TD	Without	Diff
Max Boxes/Ac	384	344	41	430	344	86	467	344	124	486	344	142	486	344	142
Avg Boxes/Ac	275	267	8	279	267	12	276	267	9	267	267	0	254	267	-13
Cumulative Boxes/Ac	5490	5336	154	5575	5336	239	5517	5336	181	5340	5336	4	5071	5336	-265
Value of Boxes	$ 1,727			$ 2,676			$ 2,026			$ 43			$ (2,965)		
Net (Cost) Savings	$ (1,375)			$ (1,000)			$ (625)			$ (250)			$ 125		
Net Profit (Loss)	$ 352			$ 1,676			$ 1,401			$ (207)			$ (2,840)		
NPV	($267)			$324			($313)			($1,763)			($3,699)		
IRR	5%			14%			7%			-1%			-7%		



Delay in HLB infection maximizes yield up to Year 9





Conclusions

- IPC prevents ACP transmission and HLB infection
- IPC promotes tree growth and normal canopy development after removal
- IPC promotes some pest and diseases that may require occasional pesticide sprays
- Optimum profitability for use of IPC is 2 years
- IPC may be useable for more than one crop