Economics of High-Density Citrus Plantings in Florida

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Cultural Cost of Production per Acre for Processed Oranges in Southwest Florida, 2017/18

Costs represent a mature grove (10+ years old) including resets

	Cost per
	acre (\$)
Weed Management	194.67
Foliar Sprays	640.11
CHMAs Sprays	44.48
Fertilizer	496.43
Pruning (topping, hedging, chop/mow Brush)	30.42
Irrigation ¹	214.32
Total Cultural Costs without Tree Replacement	1620.41
Tree Replacement (7 trees)	254.38
Total Cultural Costs with Tree Replacement	1874.79

Cultural Cost of Production per Acre for Processed Oranges in Southwest Florida by Program



Total Cost of Production per Acre for Processed Oranges in Southwest Florida, 2017/18

		Cost per acre (\$)
Total Cultural Costs		1874.79
Other Costs	Interest on Operating (Cultural) Costs	93.74
	Management Cost	141.12
	Property Tax/Water Management Assessment	28.73
	Interest on Average Capital Investment	196.35
Total Other C	Costs	459.93
Total Costs		2334.72

Source: University of Florida, IFAS, CREC

Summary

Total costs are down marginally compared to last season (by \$42 per acre).

The main changes in cultural practices compared to previous season are:

- 1. Increase of \$84 per acre in fertilizer -> switch from dry to liquid
- 2. Reduction in tree replacement spending by approximately \$10 per tree
- 3. Reduction in streptomycin and oxytetracycline spending; on average, \$51 per acre, down from \$94 last season

Establishment, Production Cost, and Profitability Analysis of a New Grove in the Era of HLB

Link for downloading Excel files: <u>www.crec.ifas.ufl.edu/extension/economics/</u>



Allows user to modify the analysis by changing variables such as yield and price

Assumptions

- Operation located in SW Florida
- Land previously owned and clear of trees
- Valencia orange grove for processing
- Grove lifespan: 20 years
- Services contracted
 - Land preparation and bedding
 - Fertilization with Tree See Technology
 - Hedging and Topping
 - Tree Removal
 - Tree Replacement

Assumptions (continued)

Tree Density

Trees per Net Acre	145	220	303
Between Rows (ft.)	25	22	18
Between Trees (ft.)	12	9	8

Tree Mortality and Removal

Year	1 thru 5	6 thru 20
Annual Rate (%)	3	5

Tree Replacement

Varies for each density (based on highest return)

Assumptions (continued)

Made different assumptions to represent different scenarios:

- 1. Initial Investment in Machinery, Irrigation & Frost Protection
- 2. Yield
 - Low: USDA-NASS (~40% reduction compared to pre-HLB)
 - **High**: Based on growers' feedback
 - Quality assumption: 6.24 p.s./box (FDOC, 2016/17)
- 3. Price
 - Constant price throughout investment

Delivered-In Price Scenarios						
Low Medium High					gh	
\$15.62/box	\$2.50/ps	\$17.78/box	\$2.85/ps	\$19.23/box	\$3.08/ps	

Scenario Analysis

For each tree density, 145, 220, and 303 TPA, computed different scenarios combining Yield, Prices, and Costs to obtain Returns

Yield	Pr	Capital	
scenario	Deli	Investment	
	Low	15.62/box	Full
	LOW	2.50/ps	Partial
	Madium	17.78/box	Full
LOW	weulum	2.85/ps	Partial
	High	19.23/box	Full
		3.08/ps	Partial
High	Low	15.62/box	Full
		2.50/ps	Partial
		17.78/box	Full
	weaturn	2.85/ps	Partial
	High	19.23/box	Full
	півіі	3.08/ps	Partial

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145 Trees per Acre Partial Investment

Yield for 145 TPA



Cash Receipts, Expenses, and Yield

145 TPA; High Yield; \$2.85/ps Delivered-in



Cash Expenses (left axis) Cash Receipts (left axis) ·····Yield in Boxes (right axis)

Discounting Cash Flows: illustration



Profitability Analysis

Tree density	Yield scenario	Price (\$) Delivered-In		Capital Investment	IRR	Payback Period (year)	
			2 EO/pc	Full	-7%	Not in 20 years	
	Low	LOW	2.50/ps	Partial	-5%	Not in 20 years	
		Medium	2.85/ps	Full	-2%	Not in 20 years	
				Partial	1%	20	
		High	3.08/ps	Full	1%	20	
1/5				Partial	3%	17	
145	High			250/mc	Full	1%	19
		LOW	2.50/ps	Partial	4%	16	
		Medium	2.85/ps	Full	5%	15	
				Partial	8%	13	
		High 3.08/ps		Full	7%	14	
			Partial	10%	12		

Establishment, Production Cost, and Profitability Analysis of a New Grove in the Era of HLB

220 Trees per Acre Partial Investment

Additional assumptions: Changes in machinery, irrigation, and application costs to accommodate higher density



Cash Receipts, Expenses, and Yield

220 TPA; High Yield; \$2.85/ps Delivered-in



Cash Expenses (left axis) Cash Receipts (left axis) ···· Yield in Boxes (right axis)

Profitability Analysis

Tree density	Yield scenario	Price (\$) Delivered-In		Capital Investment	IRR	Payback Period (year)
			2 5 0 /	Full	2%	18
		LOW	2.50/ps	Partial	4%	16
	1	Madium	2.85/ps	Full	5%	15
	LOW	Iviedium		Partial	8%	13
		High	3.08/ps	Full	7%	13
				Partial	10%	12
	High	Low	2.50/ps	Full	8%	13
				Partial	11%	11
		Medium	2.85/ps	Full	11%	11
				Partial	15%	9
		High 3.08/ps	2.00/ma	Full	13%	10
			Partial	17%	8	

Establishment, Production Cost, and Profitability Analysis of a New Grove in the Era of HLB

> **303 Trees per Acre Partial Investment**

Additional assumptions:

Changes in machinery, irrigation, and application costs to accommodate higher density



Cash Receipts, Expenses, and Yield

303 TPA; High Yield; \$2.85/ps Delivered-in



Cash Expenses (left axis) Cash Receipts (left axis) ···· Yield in Boxes (right axis)

Profitability Analysis

Tree density	Yield scenario	Price (\$) Delivered-In		Capital Investment	IRR	Payback Period (year)
				Full	5%	15
		LOW	2.50/ps	Partial	8%	13
		Medium	2.85/ps	Full	8%	12
	LOW			Partial	11%	11
		High	3.08/ps	Full	10%	11
202				Partial	13%	10
303	High	Low	2.50/ps	Full	11%	11
				Partial	14%	9
		Medium	2.85/ps	Full	14%	9
				Partial	18%	8
			2 2 2 1	Full	16%	9
		High	3.08/ps	Partial	20%	8

Conclusions

Is it profitable to establish a new grove in Florida in the era of HLB? Under assumptions made and scenarios analyzed:

- Average yield grove with state's average tree density
 Not profitable under current market conditions
- Despite higher investment for planting 220 and 303 trees per acre
 positive returns. If only partial investment is needed:

220 TPA initial investment: \$8,300 per acre (19% more than 145 TPA)

- low yield => returns 2% (current mkt conditions); 10% (high price)
- high yield => returns 8% (current mkt conditions); 17% (high price)

303 TPA initial investment: \$10,300 per acre (47% more than 145 TPA)

- low yield => returns 5% (current mkt conditions); 13% (high price)
- high yield => returns 11% (current mkt conditions); 20% (high price)

Caveats of the Analysis

- 1. Uncertainty in long-run about yields of high density groves
 - > Not yet clear how trees will be affected by HLB in the future
 - Yield of trees 13 years old and older is a projection based on current data
- We did not include any potential impact of freezes or hurricanes (and their effect on prices and yield)
- 3. Potential future management strategies or solutions to HLB could involve planting (new) trees with resistant or tolerant traits to HLB
 - > Could make groves with trees without such traits obsolete

Thank you for attention

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