

# The Net Present Value of New Citrus Plantings

Florida Growers' Institute

April 3, 2018

Avon Park, FL

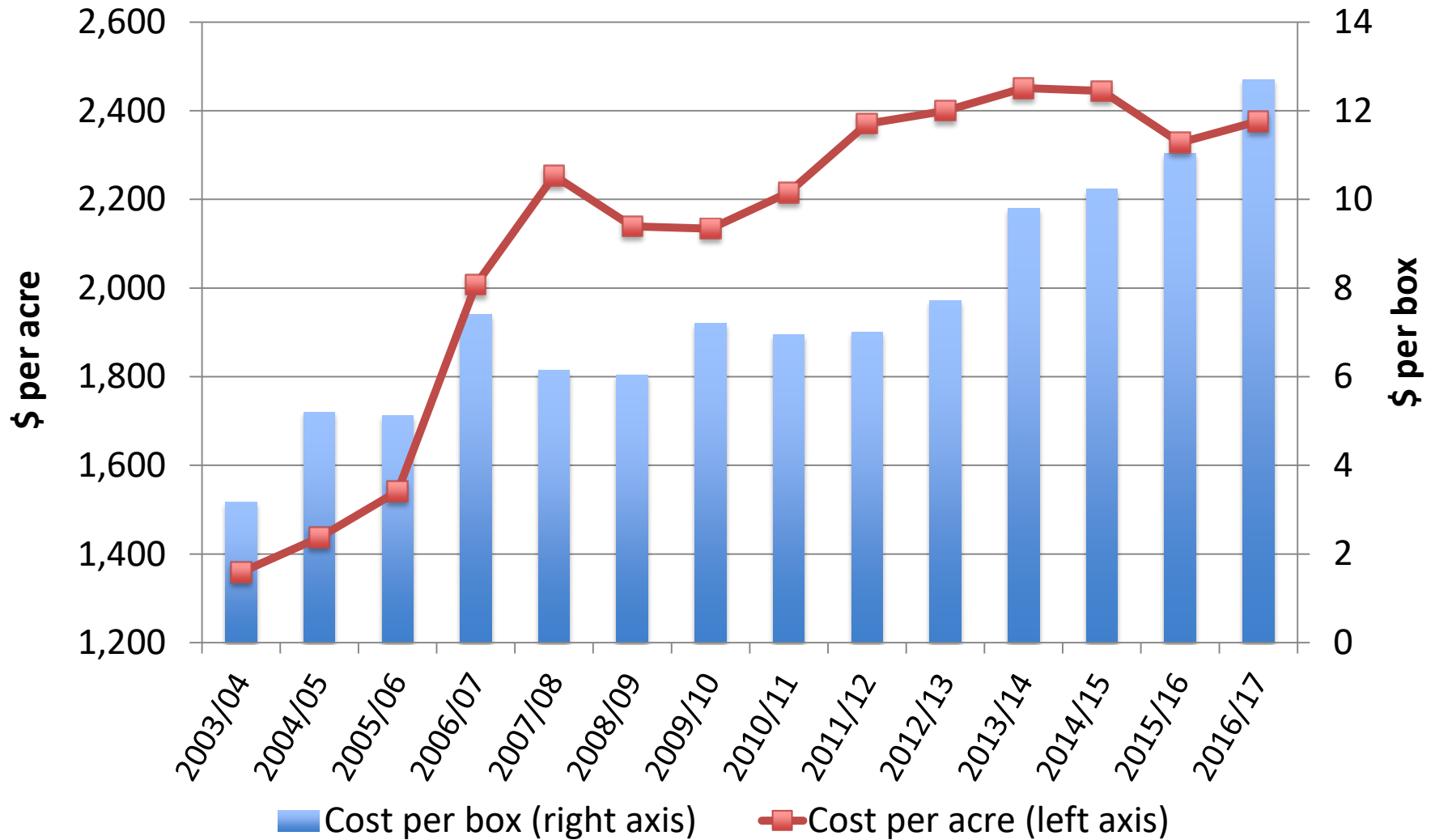
Ariel Singerman

Assistant Professor / Extension Economist  
Citrus Research and Education Center (CREC)

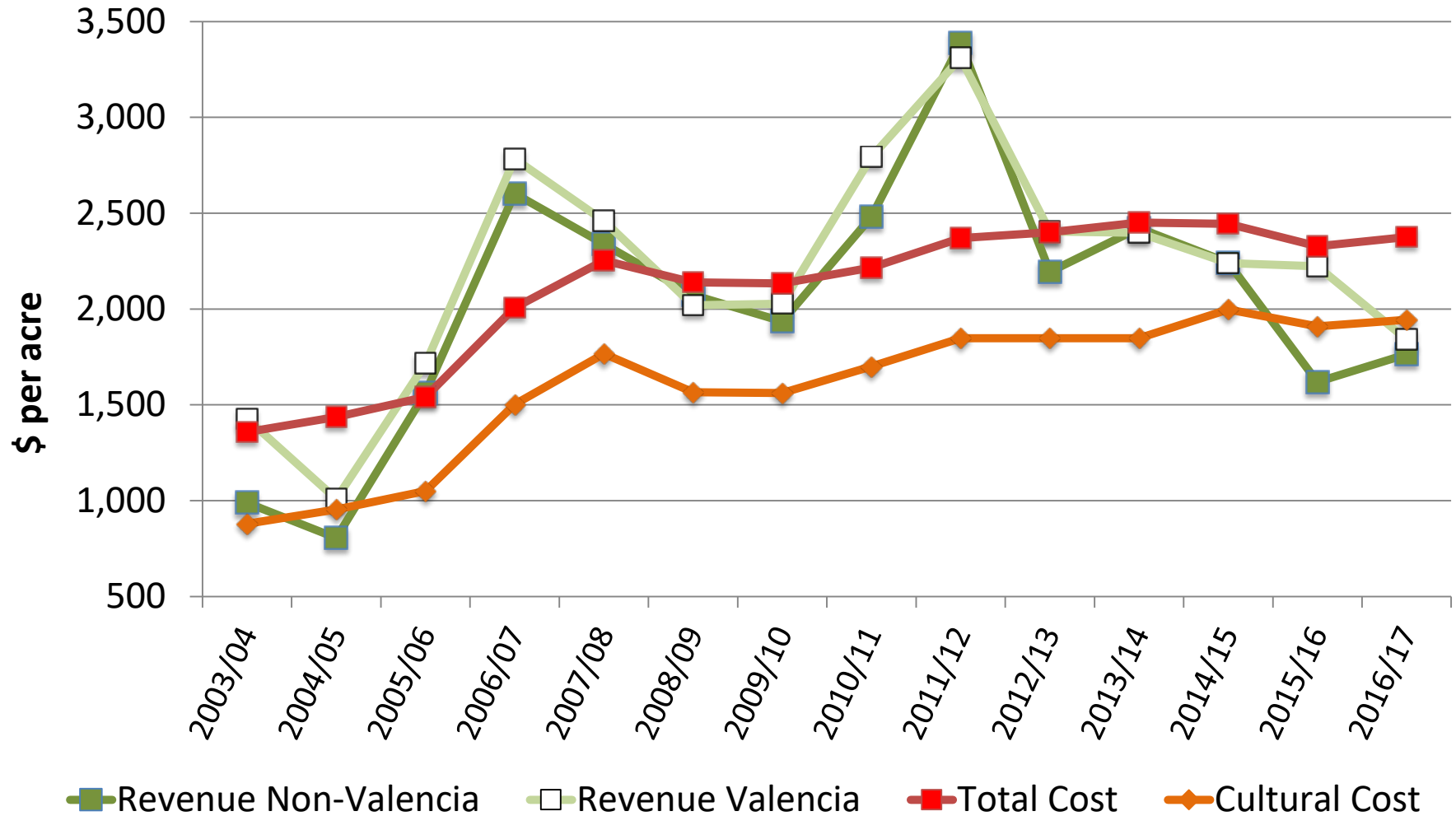
[singerman@ufl.edu](mailto:singerman@ufl.edu)

(863) 956-8870

# Cost of Production of Processed Oranges in Southwest Florida

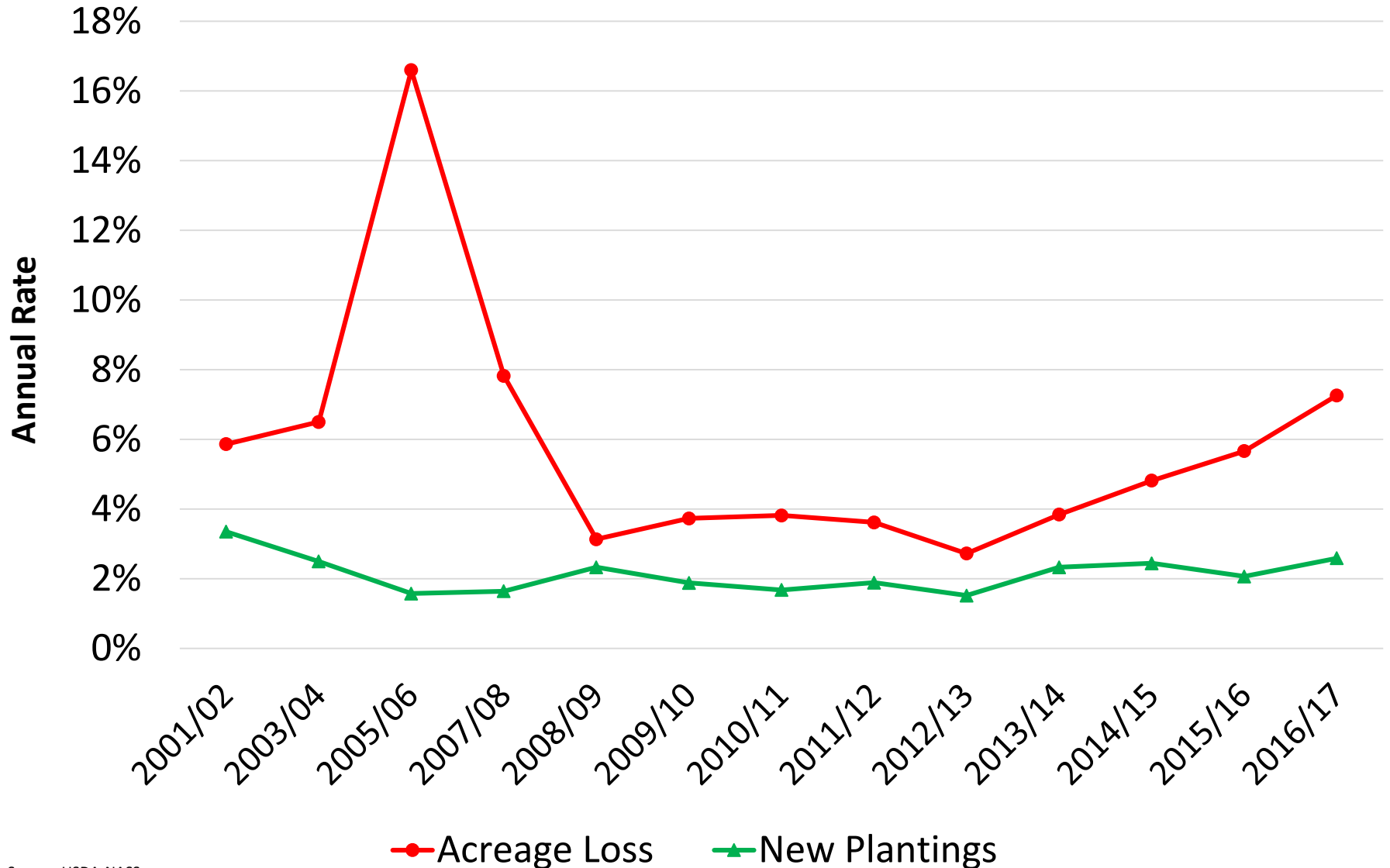


# Revenue and Cost per Acre for Processed Oranges in Southwest Florida

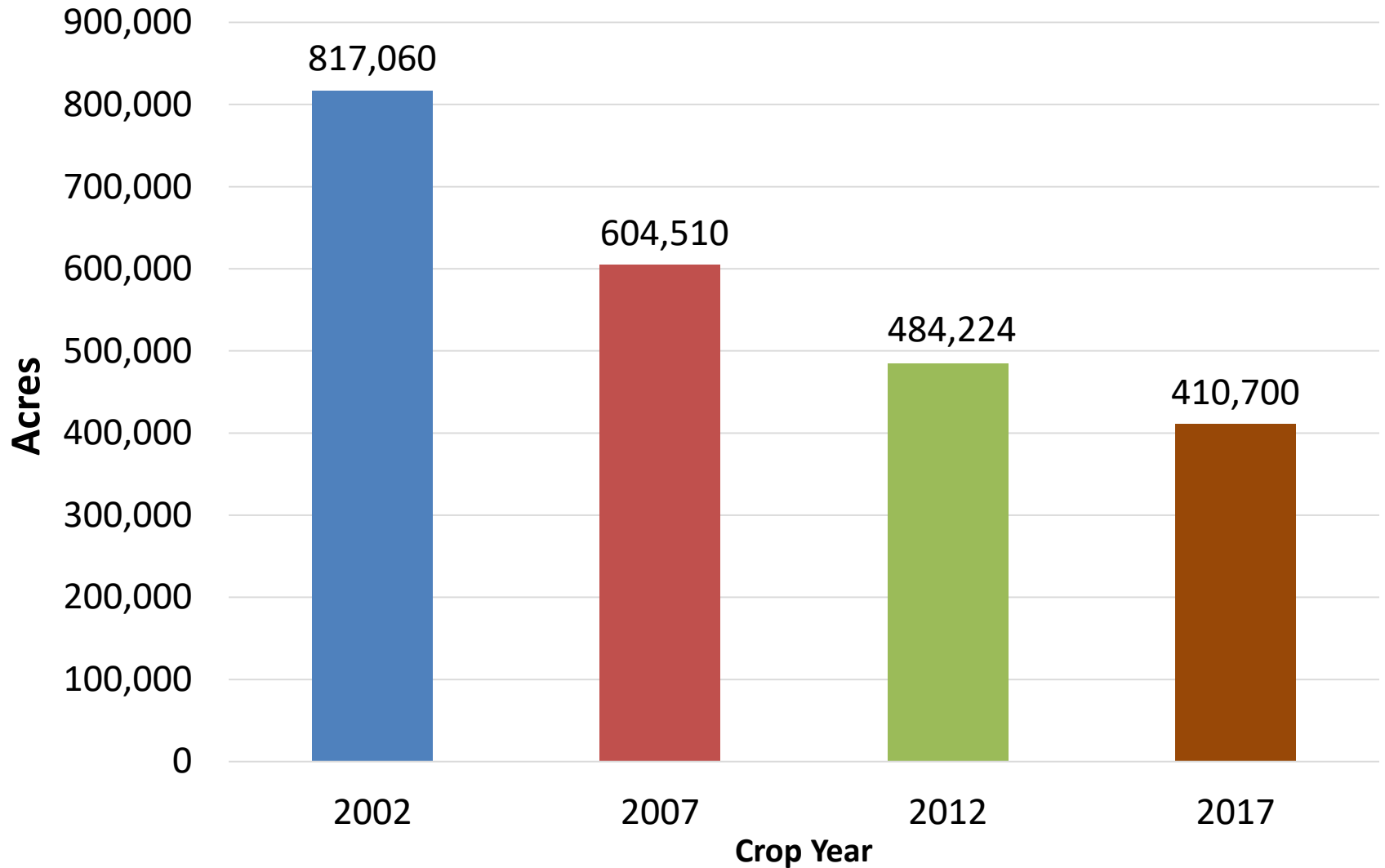


Source: Ariel Singerman, CREC, University of Florida

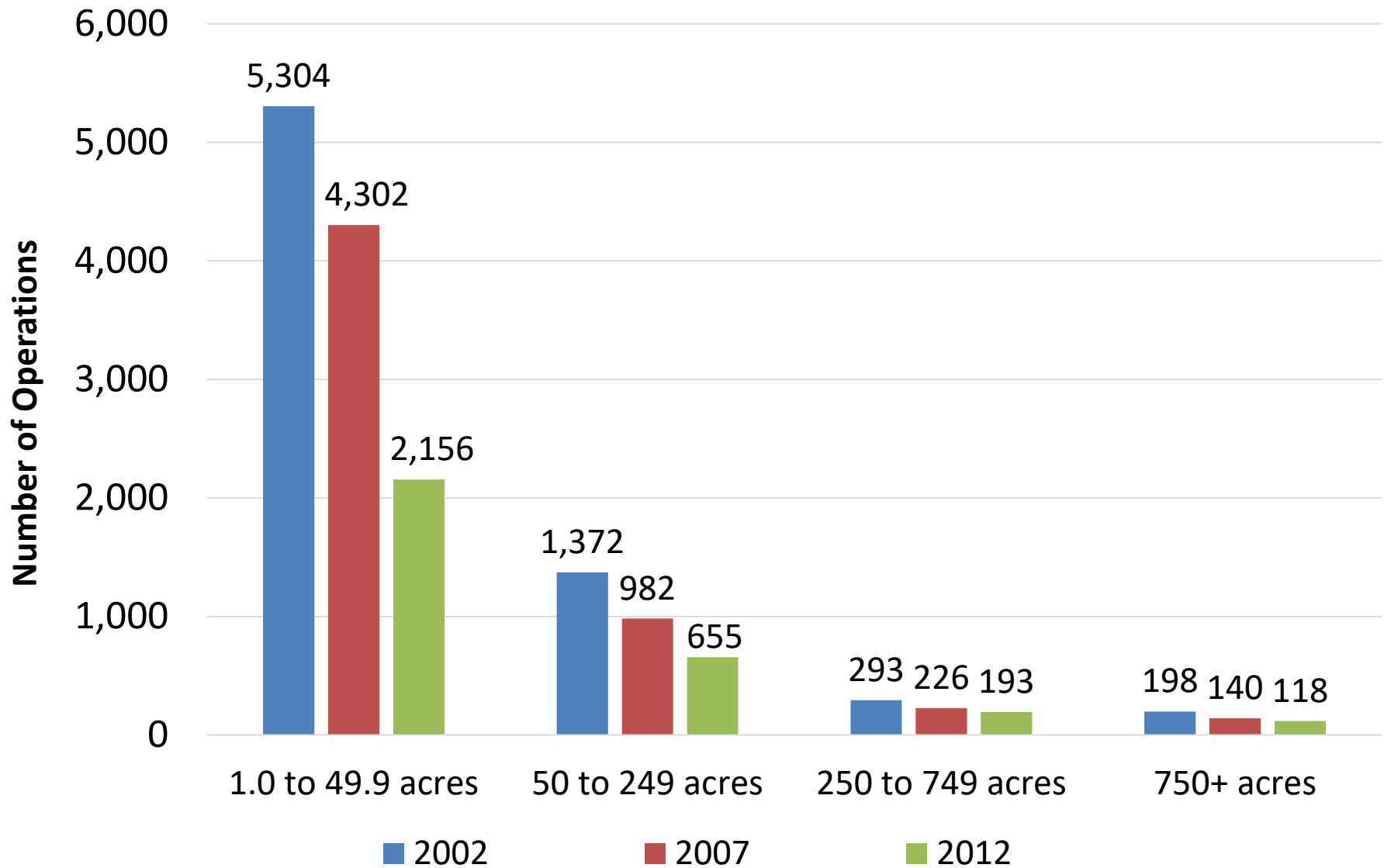
# Annual Acreage Planting and Loss Rates For Oranges in Florida



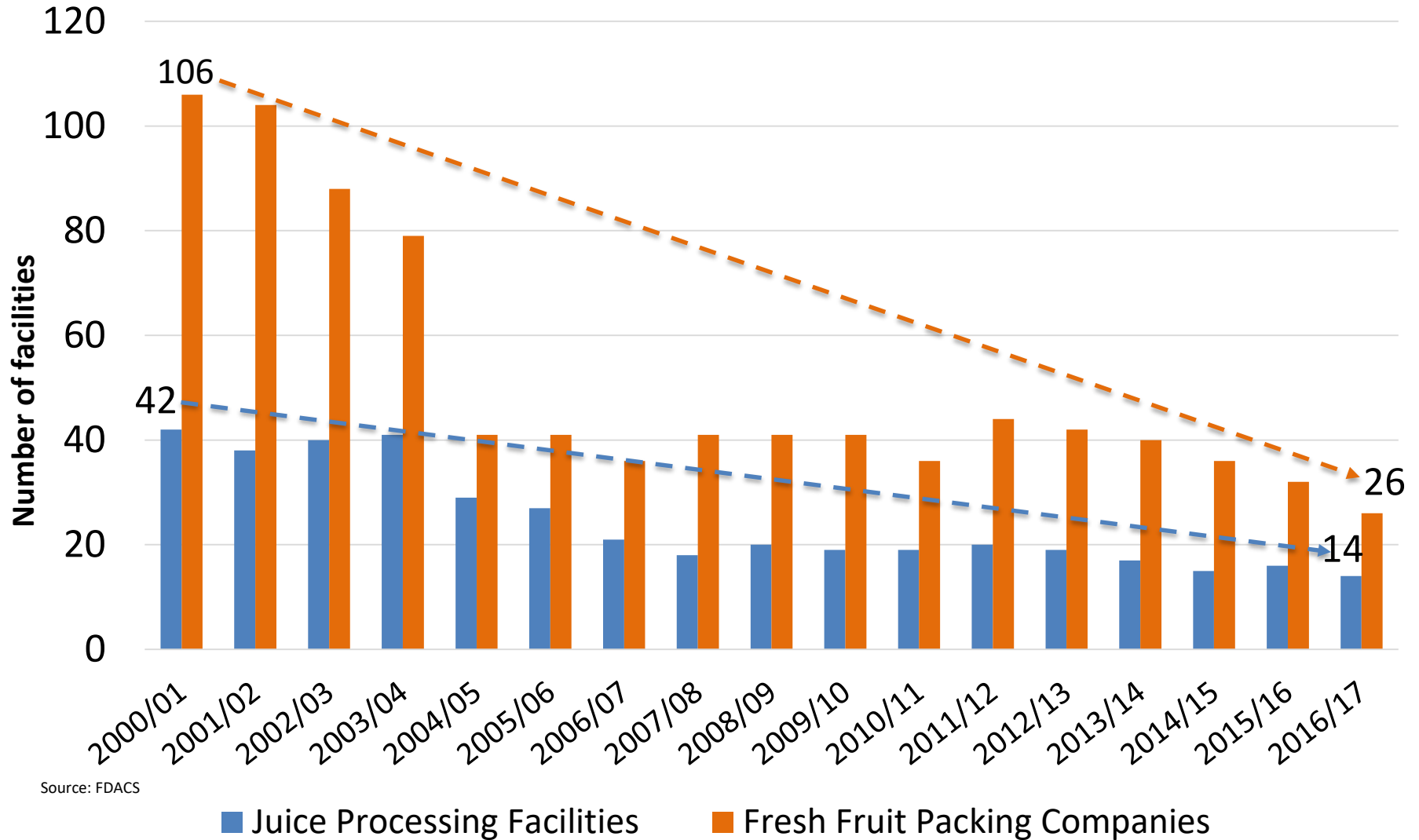
# Total Florida Citrus Bearing Acres



# Number of Florida Citrus Growers by Farm Size (Acreage)



# Number of Citrus Juice Processing Facilities and Fresh Fruit Packers in Florida



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



# 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:** 25% reduction compared to pre-HLB estimates
  - Quality assumption: 6.24 p.s./box (FDOC, 2016/17)
3. Price
  - Constant price throughout investment

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

# Scenario Analysis

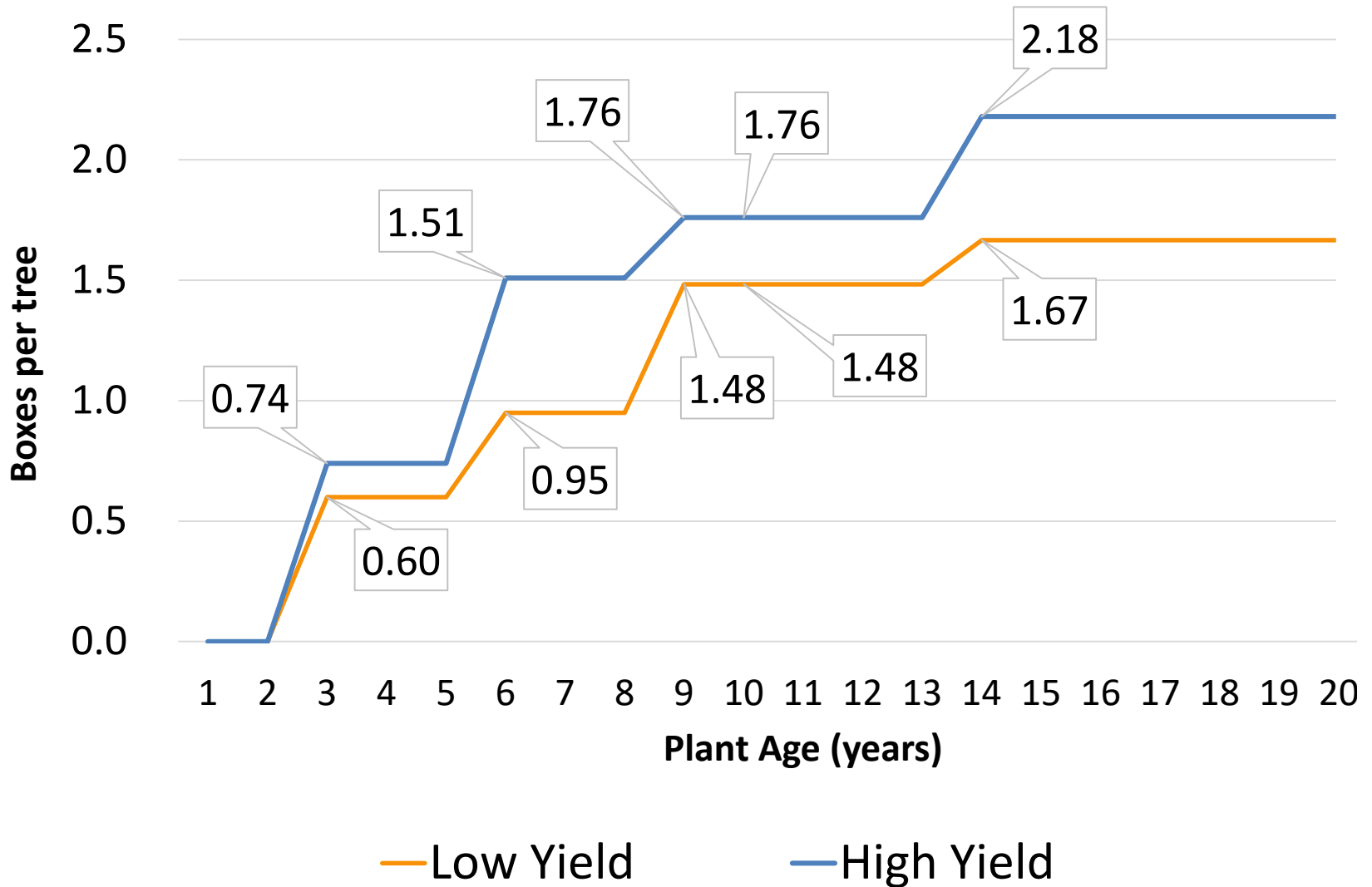
For each tree density, 145, 220, and 303 TPA, computed different scenarios combining Yield, Prices, and Costs to obtain Returns

Yield scenario	Price (\$)		Capital Investment
	Delivered-In		
Low	Low	15.62/box	Full
		2.50/ps	Partial
	Medium	17.78/box	Full
		2.85/ps	Partial
	High	19.23/box	Full
		3.08/ps	Partial
High	Low	15.62/box	Full
		2.50/ps	Partial
	Medium	17.78/box	Full
		2.85/ps	Partial
	High	19.23/box	Full
		3.08/ps	Partial

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

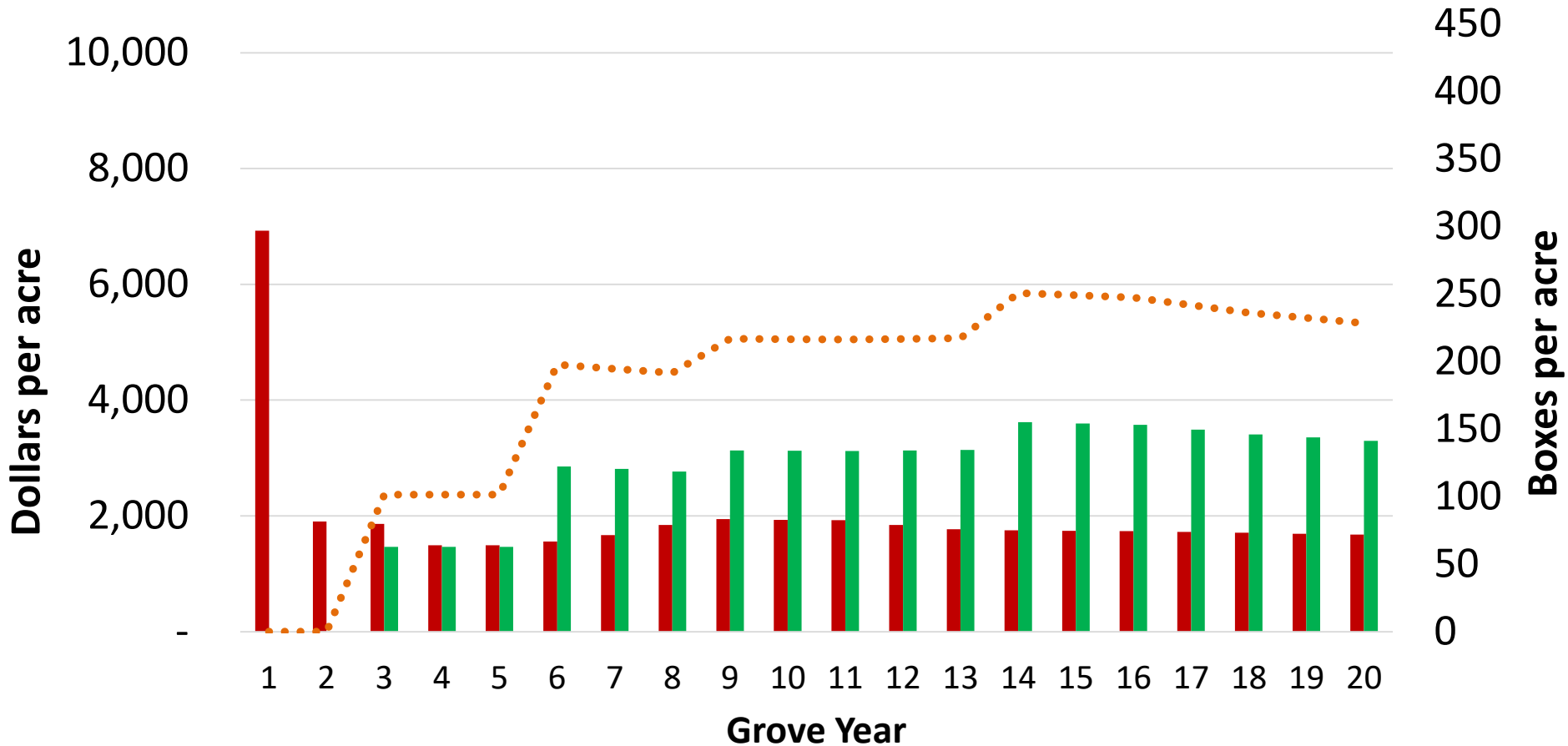
**145 Trees per Acre  
Partial Investment**

# Yield for 145 TPA



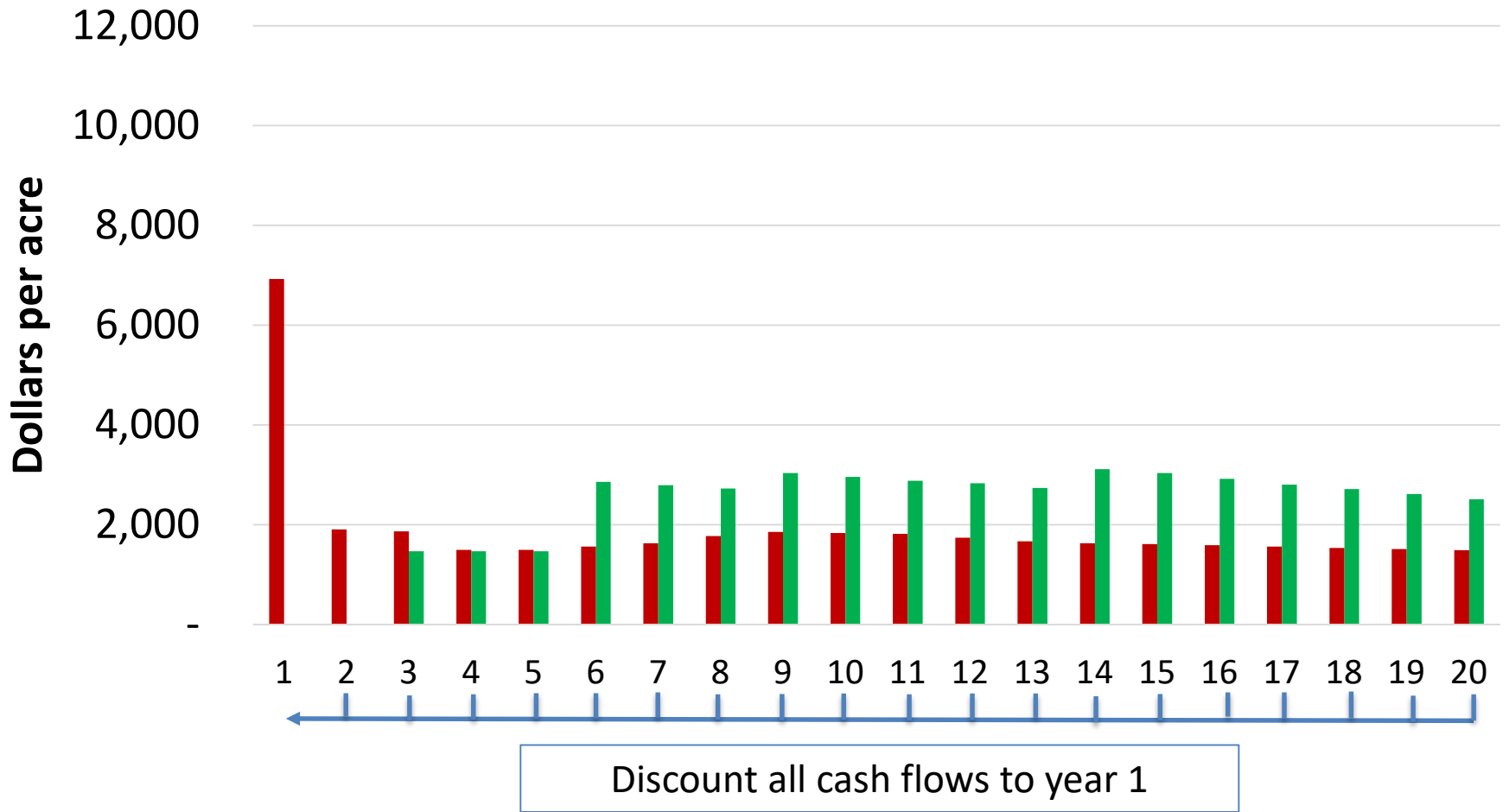
# Cash Receipts, Expenses, and Yield

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 (\$)		Capital Investment	IRR	Payback Period (year)
		Delivered-In				
145	Low	Low	2.50/ps	Full	-8%	Not in 20 years
				Partial	-5%	Not in 20 years
		Medium	2.85/ps	Full	-2%	Not in 20 years
				Partial	0%	20
		High	3.08/ps	Full	0%	20
				Partial	3%	17

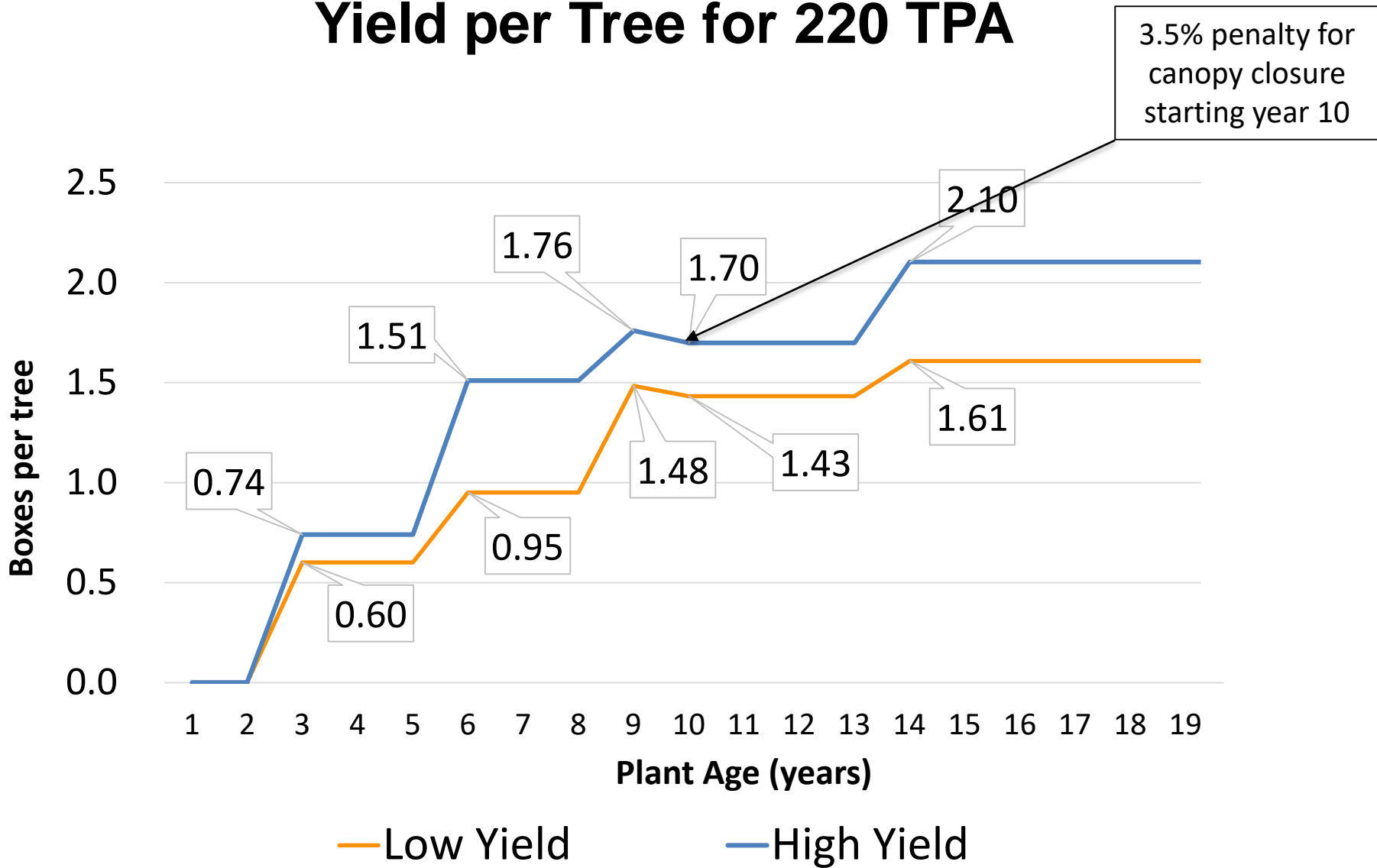
# **Establishment, Production Cost, and Profitability Analysis of a New Grove in the Era of HLB**

**220 Trees per Acre  
Partial Investment**

**Additional assumptions:**

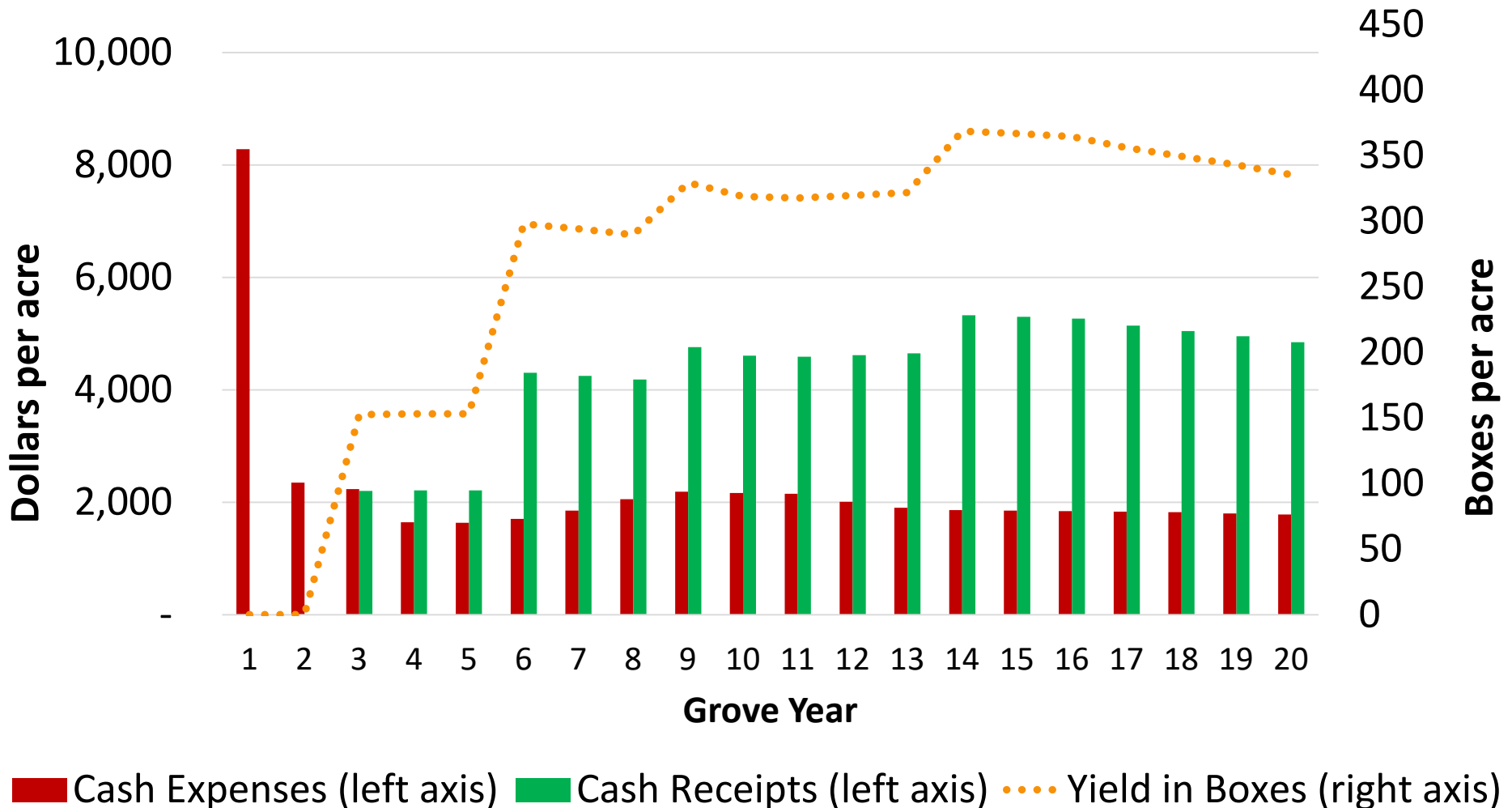
**Changes in machinery, irrigation, and application costs  
to accommodate higher density**

# Yield per Tree for 220 TPA



# Cash Receipts, Expenses, and Yield

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



# Profitability Analysis

Tree density	Yield scenario	Price (\$)		Capital Investment	IRR	Payback Period (year)
		Delivered-In				
220	Low	Low	2.50/ps	Full	1%	19
				Partial	3%	16
		Medium	2.85/ps	Full	5%	15
				Partial	7%	13
		High	3.08/ps	Full	7%	13
				Partial	10%	12

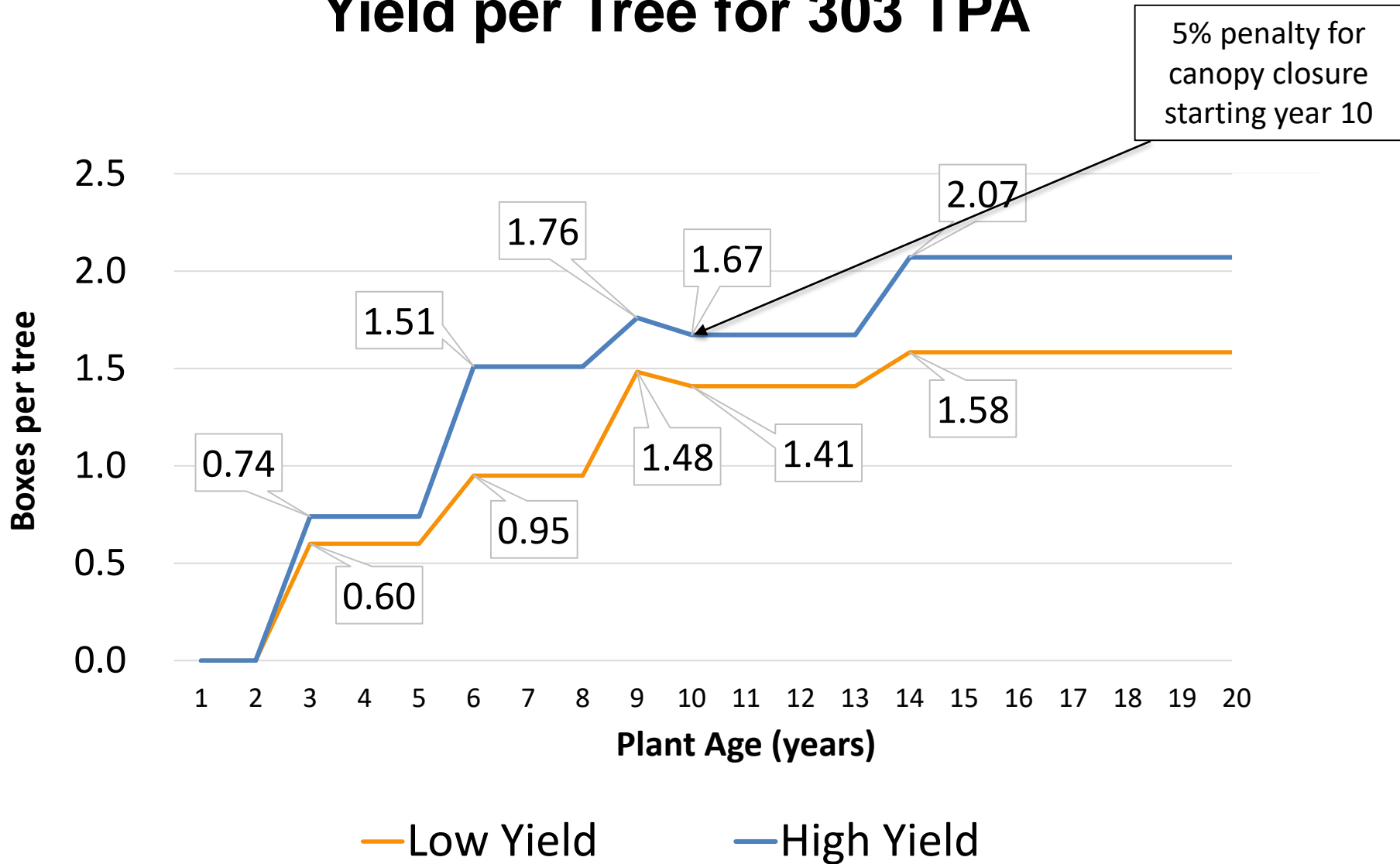
# **Establishment, Production Cost, and Profitability Analysis of a New Grove in the Era of HLB**

**303 Trees per Acre  
Partial Investment**

**Additional assumptions:**

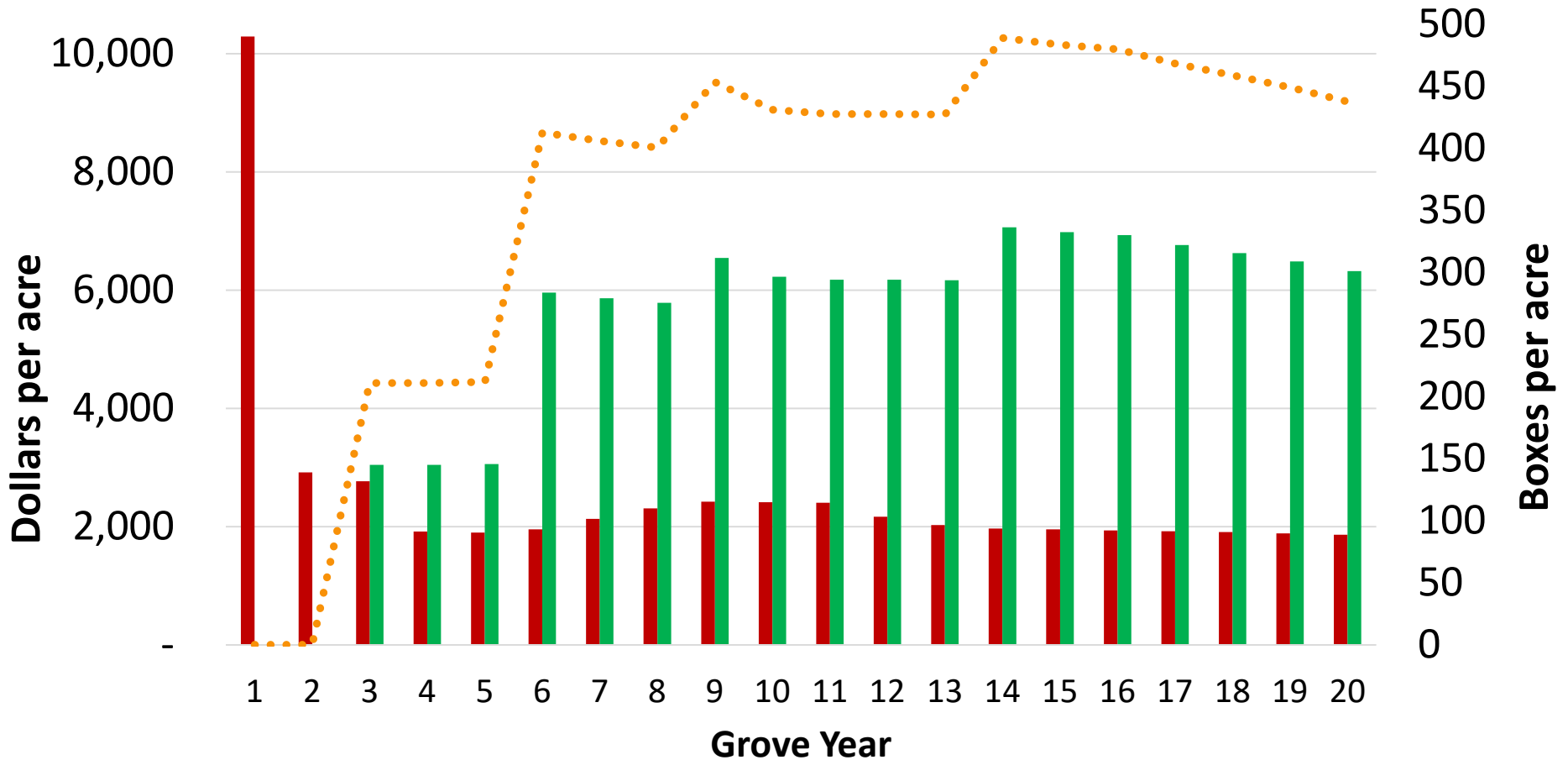
**Changes in machinery, irrigation, and application costs  
to accommodate higher density**

# Yield per Tree for 303 TPA



# 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 (\$)		Capital Investment	IRR	Payback Period (year)
		Delivered-In				
303	Low	Low	2.50/ps	Full	5%	15
				Partial	7%	13
		Medium	2.85/ps	Full	8%	13
				Partial	11%	11
		High	3.08/ps	Full	10%	11
				Partial	13%	10

# Conclusions

Is it profitable to establish a grove under endemic HLB conditions in Florida?

If only a partial investment is needed:

- 145 TPA initial investment: \$7,000 per acre
  - low yield => no profitability with low and medium prices
  - high yield => returns 3% (current mkt conditions); 10% (high price)
- 220 TPA initial investment: \$8,300 per acre (19% more than 145 TPA)
  - low yield => returns 1% (current mkt conditions); 10% (high price)
  - high yield => returns 7% (current mkt conditions); 16% (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 the long-run about yields of high density groves (current plantings <10 years old)
2. Also uncertainty regarding the impact of HLB on 10+ year old trees
3. We did not include any potential impact of weather events (and their effect on prices)

Thank you for attention

My contact info:

Citrus Research and Education Center

[singerman@ufl.edu](mailto:singerman@ufl.edu)

(863) 956-8870

[www.crec.ifas.ufl.edu/extension/economics/](http://www.crec.ifas.ufl.edu/extension/economics/)