SWFREC Research Trials

Economic Analysis of HLB Foliar Management with the application of nutritionals and SARs

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Objectives of Economic Analysis:

1. Estimate the added production costs associated with enhanced nutritional and SAR treatments;
2. Determine the annual HLB tree loss threshold that equates the "Standard" HLB management strategy with the alternative enhanced foliar treatment strategy.

Goals of the Standard HLB management strategy:

1. control psyllid populations;
2. scout the entire grove at least 4 times per year to identify and mark trees with HLB symptoms;
3. remove symptomatic trees, preferably within 24 hours of HLB identification.

Goals of the HLB Foliar management strategy:

1. control psyllid populations;
2. maintain production of infected trees by:
    a. addressing visibility nutritional deficiencies through foliar application of deficient nutrients;
    b. activating a tree's defense system through SAR products.

Cost of the two strategies:

Standard: future revenues from removed infected trees zero.

HLB Foliar: higher annual production budget (i.e. more inputs being supplied).

Benefit of each strategy:

Standard: reduction of inoculum may slow spread of HLB to non-infected trees.

HLB Foliar: continued fruit production from infected trees.

Economic analysis to determine the threshold tree loss percentage

1. Estimate the net increase in annual production costs from the HLB Foliar management strategy.
2. Set up a model to calculate annual net returns for a given set of prices, tree yield, and annual tree loss percentage. Six combinations of prices and production will be considered: delivered-in prices of $1.10, $1.25, and $1.40 per p.s. and production of 3.0 and 3.5 box/tree with p.s/box constant at 6.2.
3. For each price-production combination, run the model for 10 years while reducing tree numbers by a constant tree loss percentage. The HLB Foliar strategy assumes a constant tree loss of 2%/yr to account for "normal" losses. Tree loss under the Standard strategy will be higher to reflect tree losses from removal of HLB infected trees.
4. The present value of annual net returns from the HLB Foliar strategy will be calculated using an interest rate of 10% and summed over the 10 year period.
5. The annual tree loss percentage for the Standard strategy will be adjusted until the 10-year cumulative net present value (NPV) equals the cumulative net present value (NPV) of the HLB Foliar strategy. The tree loss percentage that equates the NPV of both strategies will be called the "Threshold tree loss percentage."
6. If actual tree losses under the Standard program are ***less*** than the Threshold, the NPV of the Standard program will be higher. If actual tree losses under the Standard program are ***more*** than the Threshold, the HLB Foliar program will achieve a higher NPV.

Which products are being tested, at what rates, and for how much?

Table 1. Annual HLB Foliar Nutrient Programs – Materials, rates and cost estimates.

Material	Unit Cost	Rate	Cost
Liquid fertilizer (14-8-7 with K-Phite @ 1pt/gal)	$8.00/gal	8.0 gal	$64.00
Liquid fertilizer (3-18-20 with K-Phite @ 1pt/gal)	$8.00/gal	16.0 gal	$128.00
K-Phite	(inc with liquid fert)	12 qts	
Spray grade fertilizer (13-0-44)	$0.78/lb	17.0 lbs	$13.33
magnesium SO_4 (Epson salts)	$0.30/lb	25.5 lbs	$7.65
Manganese $S0_4$ (Tecmangam)	$0.79/lb	25.5 lbs	$20.15
sodium molybdate	$1.31/oz	2.5 oz	$3.34
zinc SO_4	$0.70/lb	5.6 lbs	$3.92
Total costs ($/ac-yr)			**$240.38**

Notes:

1. Materials split over 3 applications.
2. Products and application rates correspond to treatments being analyzed in the SWFREC field trials (Drs. Rouse and Stansly).
3. Prices collected in 2008.

Table 2. SAR Program – Materials, rates and cost estimates.

Material	Product Price (2008)	Unit Cost	Rate	Cost
SAver	$19.60 per gal	$4.80/qt	3 qts	$14.40
Serenade	$134 per 12 lb bag	$11.20/lb	6.75 lbs	$75.60
Total Costs ($/ac-yr)				**$90.00**

Notes:

1. Materials split over 3 applications.
2. Products and application rates correspond to treatments being analyzed in the SWFREC field trials (Drs. Rouse and Stansly).
3. SAR materials incorporated with foliar nutritional sprays.

Table 3. Other products used – Materials, rates and cost estimates.

Material	Product Price (2008)	Unit Cost	Rate	Cost
Hydrogen peroxide (Di-Oxy Solv)	$32.00 per gal	$8.00/qt	6.0 qts	$48.00
435 oil	$5.94 per gal (bulk)	$5.94/gal	15.0 gal	$89.10
Total costs ($/ac-yr)				**$137.10**

Note:

1. Materials split over 3 applications.
2. Products and application rates correspond to treatments being analyzed in the SWFREC field trials (Drs. Rouse and Stansly).
3. Other products incorporated with foliar nutritional materials.

To what extent does the HLB Foliar management program change overall production costs?

Table 4. Cost Comparison between the Standard Production Program and the Foliar HLB Management Program.

Activity	Standard Program $/ac	Foliar HLB Program $/ac
Weed management	$201	$201
Spray/Pest management with canker & HLB	$423	$423
Dolomite	$15	$15
Tree pruning/hedging	$35	$35
Irrigation	$263	$263
Canker decontamination	$32	$32
HLB Field Inspections	$104	$ -
Dry Fertilizer (material & spreading) STD Program: 220 #N/ac HLB Program: 180 #N/ac	$414	$344
Sub Total:	***$1,487***	***$1,313***
HLB Foliar Nutrient Program (Table 1) HLB Program: 20 #N/ac	$ -	$240
SAR + hydrogen peroxide (Tables 2&3)	$ -	$138
Micro nutrient package	$24	$ -
Total Production Costs ($/ac-yr)	**$1,511**	**$1,691**
Added Costs with Foliar HLB program:		**$180**

Notes on Table 4:

1. “Standard” program defined as aggressive psyllid control, field inspection of trees for HLB, and removal of HLB infected trees. Costs presented by Muraro, Southwest Florida Production Costs per acre for Processed Oranges, Sep 2008.

2. “Foliar HLB” program defined as the same pest management practices as in the “Standard” program, increase application of major and minor nutrients through foliar sprays, incorporation of SAR products, and NOT removing HLB infected trees.

3. Since HLB infected trees are not removed, Foliar HLB program does not incur the costs of “Field Inspections.” Scouting for psyllids and other pests continues through the standard pest management practices.

4. Application and oil costs associated with Foliar HLB Program included as part of standard Spray/Pest Management costs.

5. Micro nutrient package added to “Standard” program to account for a common practice.

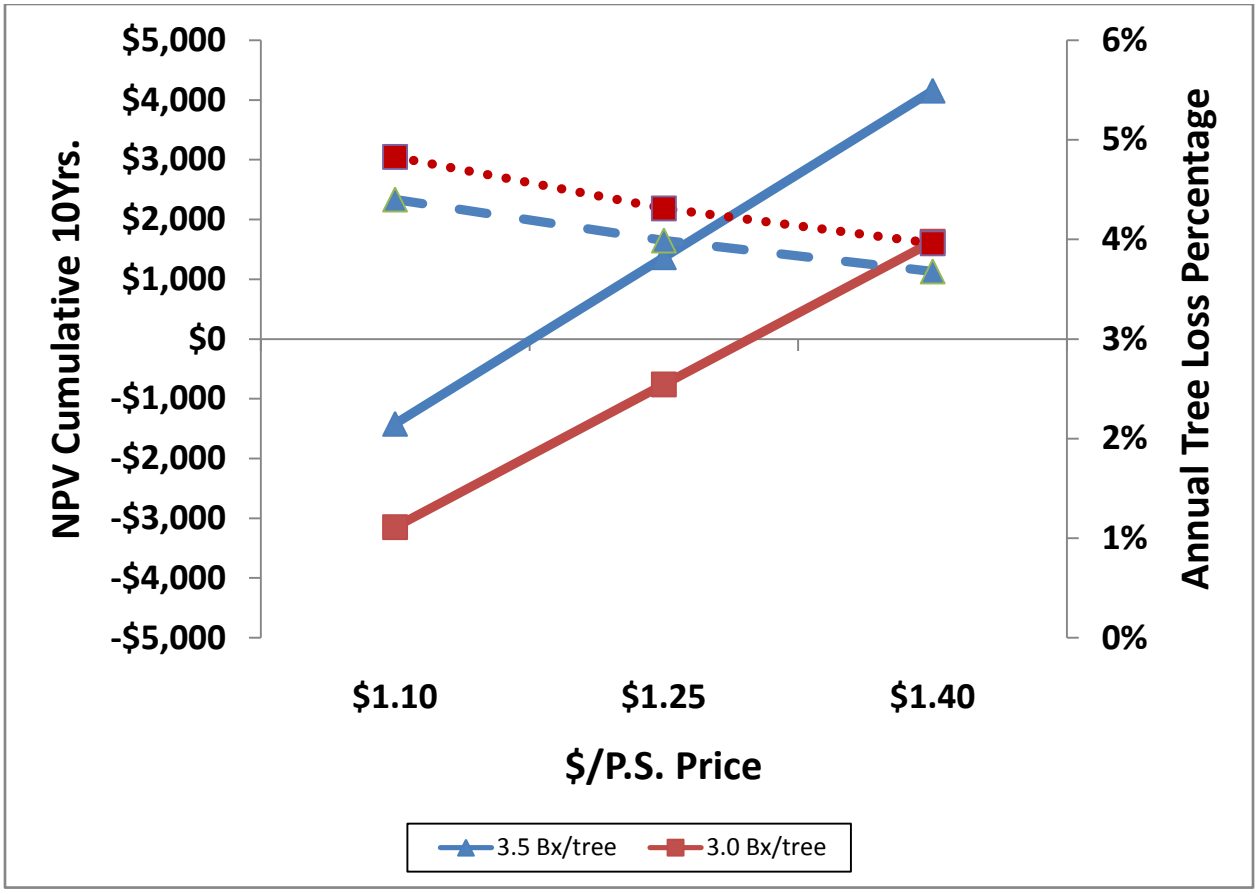
Table 5. 10-year cumulative net present value (NPV) of HLB Foliar Management Strategy and annual tree loss threshold to equate “Standard” with HLB Foliar NPV by delivered-in price and production level.

Production: 3.5 bx/tree * 6.2 ps/bx	**Delivered-in Prices**		
	$1.10/p.s.	**$1.25/p.s.**	**$1.40/p.s.**
10-yr NPV	$(1,416)	$1,371	$4,158
Annual tree loss threshold	4.44%	3.99%	3.68%

Production: 3.0 bx/tree * 6.2 ps/bx	**Delivered-in Prices**		
	$1.10	**$1.25**	**$1.40**
10-yr NPV	$(3,150)	$(761)	$1,628
Annual tree loss threshold	4.83%	4.31%	3.96%

Points:

1. Tree loss thresholds decrease with higher prices and higher production. In other words, the financial outcome of the HLB Foliar program improves relative to the Standard program as prices and average tree yields increase.
2. Under the lowest price and production considered, HLB infections need to increase by more than 2.83% per year before the HLB Foliar management strategy returns more net income to a grower than a strategy of tree removal. Threshold tree loss rate (4.83%) less the natural tree loss rate (2.0%) means the remaining 2.83% tree loss rate is from HLB infections.
3. Alternatively, if rate of infection can be held to less than the threshold percentage, following the Standard program and removing infected trees would return more income.
4. Adequate fruit prices a necessary condition for any consideration of any HLB management strategies.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NPV Cumulative 10Yrs.
6%
5%
4%
3%
2%
1%
0%
Annual Tree Loss Percentage
$1.10
$1.25
$1.40
$/P.S. Price
3.5 Bx/tree
3.0 Bx/tree