

# A Review of CBB Economic Decision Models

A. John Woodill<sup>1,2</sup>, Stuart T. Nakamoto<sup>3</sup>,  
Andrea M. Kawabata<sup>4</sup>, PingSun Leung<sup>1</sup>

1. Department of Natural Resources and Environmental Management,  
University of Hawai'i at Mānoa College of Tropical Agriculture and  
Human Resources
2. Department of Economics, UHM College of Arts and Sciences
3. Department of Human Nutrition, Food and Animal Sciences, UHM  
CTAHR
4. Department of Tropical Plant and Soil Sciences, UHM CTAHR

# Objectives

1. Briefly review economic models
2. Review findings and implications

Results that were presented  
in previous CBB conferences

Goal of economic models: Assess benefits and costs of CBB management

Spray/no spray -- only decision made by grower every month, over entire year/season

Compare:

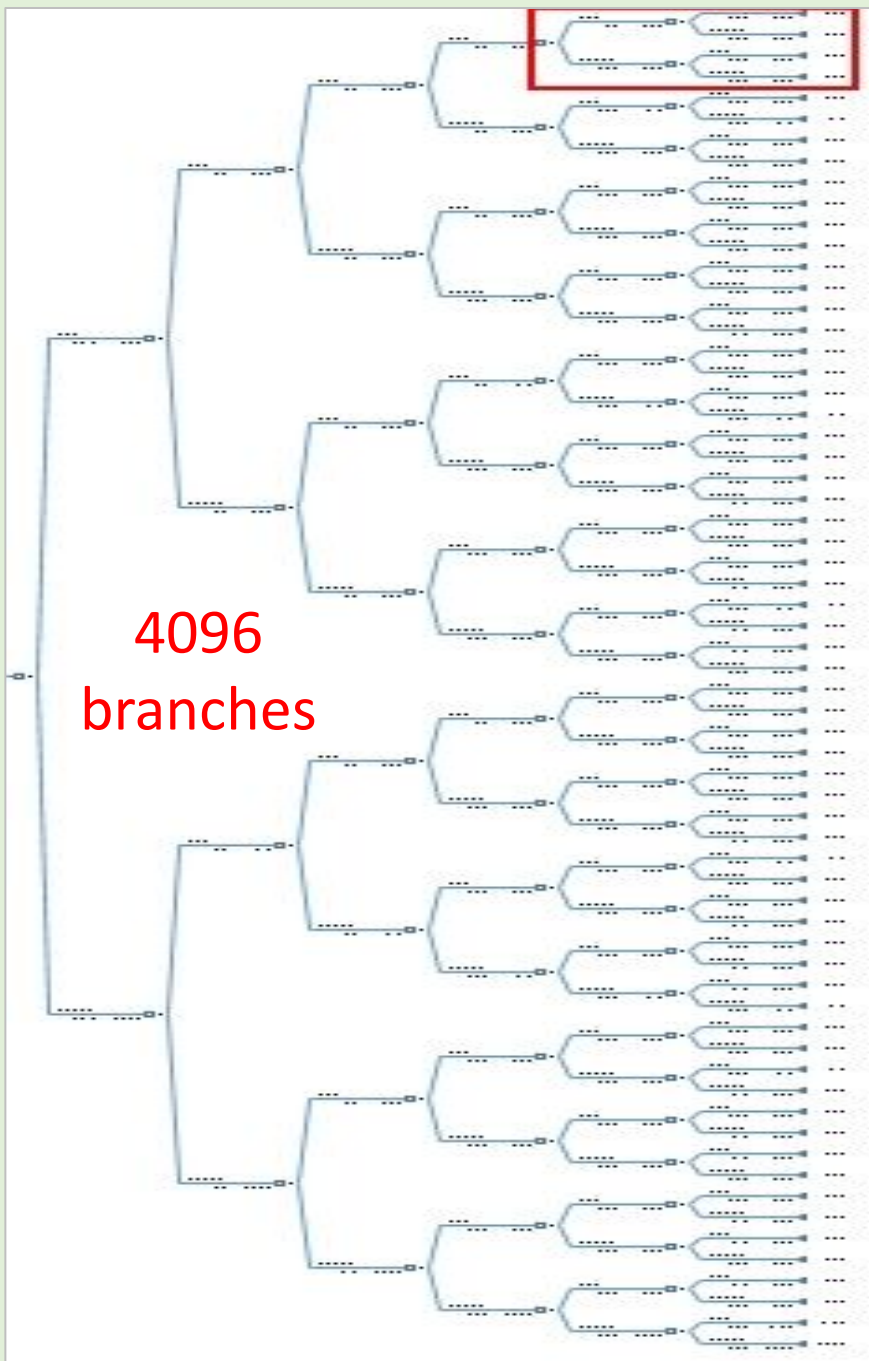
- Benefit of spraying – value of crop saved from CBB damage (in current and future periods)
- Cost of spraying – chemical, equipment, labor (in current period)

Decision Rule:

Spray if benefit is more than cost

# **Models:**

1. Decision Tree
2. Markov-chain and Dynamic Programming



1. Decision Tree  
(64 branches for 6 periods)

2. Markov-chain &  
Dynamic Programming

-- Refined model (4096  
branches for 12 periods)

Data requirements:

- Weather effects
- Coffee biology
- CBB behavior
- Impact of CBB mgt activities

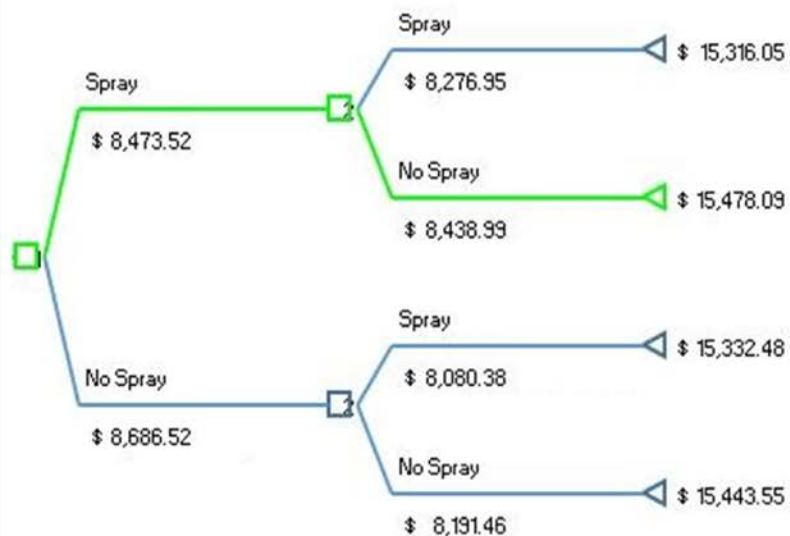
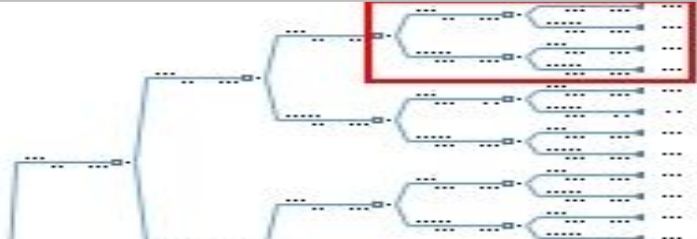
Models evaluate costs and benefits of all combinations of spray-no spray decisions, and finds path with highest net benefit.

Problem is insufficient information.

Able to still use models.

## **Findings & Implications**

- Key to successful CBB management is low initial infestation levels



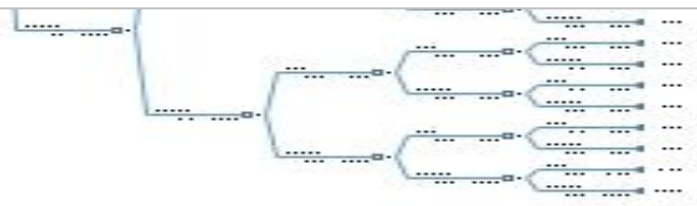
### Low Initial Infestation Level

- Initial Infestation: 1 %
- Final Infestation: 7.6 %
- Net Benefit: \$15,478.09



### High Initial Infestation Level

- Initial Infestation: 6%
- Final Infestation: 45.7 %
- Net Benefit: \$8,716.95



Results (net benefits) will vary with yield



# Findings & Implications

- Key: low initial infestation levels
- Window of opportunity to start spraying closes early in season
- Results suggest certain IPM recommendations are not cost effective
- Estimated immediate and long term impacts of the subsidy program

# Impact of Subsidy Program

Change in pesticide cost due to subsidy (1.67 ac farm)			
	No subsidy	Subsidy	Difference
Monthly Pesticide Cost per acre	\$70	\$15	\$55
Pest Control Cost (per month)	\$117	\$25	\$92
Total Net Benefit (Optimal)	\$15,478	\$16,425	\$947

Results vary with yield; higher yield has higher benefit (cost to treat an acre does not change with yield)

## **Findings & Implications**

- Key: low initial infestation levels
- Window of opportunity to start spraying closes early in season
- Certain IPM recommendations not cost effective
- estimated immediate and long term impacts of the subsidy program

Individual farm results will vary with yield

## Some comments on yield.

- Important to have records to track your farm performance.
- Historical expectation is 100 bags (10,000 lbs) of cherry per acre. Or with around 650 trees, 15-16# per tree
- Current average seems to be 30-50 bags or 3,000-5,000 #/ac
- We suspect the reason to be root knot nematode; estimates are that at least 85-90% of Kona is infested.

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