



# Great Lakes Fruit, Vegetable & Farm Market EXPO Michigan Greenhouse Growers EXPO

December 5-7, 2017

DeVos Place Convention Center, Grand Rapids, MI



## Blueberry I

**Where:** Grand Gallery (main level) Room A & B

**MI Recertification credits:** 2 (1C, COMM CORE, PRIV CORE)

**OH Recertification credits:** 0.5 (presentations as marked)

**CCA Credits:** PM(1.5)

**Moderator:** Mike DeGrandchamp, MSHS Board, South Haven, MI

- 9:00 am            The Michigan Blueberry Industry: Past, Present and Future
- Mark Longstroth, Small Fruit Educator, MSU Extension, Paw Paw, MI
- 9:30 am            Managing Soil Biology for Improved Blueberry Productivity
- Mark Mazzola, USDA-ARS, Wenatchee, WA
- 10:00 am           Battling Bugs in Blueberries (OH: 2B, 0.5 hr)
- Rufus Isaacs, Entomology Dept., MSU
- 10:30 am           Analyzing Farmer's Pest Management Decision-Making
- Philip Howard, Community Sustainability Dept., MSU
  - Chris Bardenhagen, Horticulture Dept., MSU
- 11:00 am           Session Ends

# Analyzing Farmers' Pest Management Decision-Making

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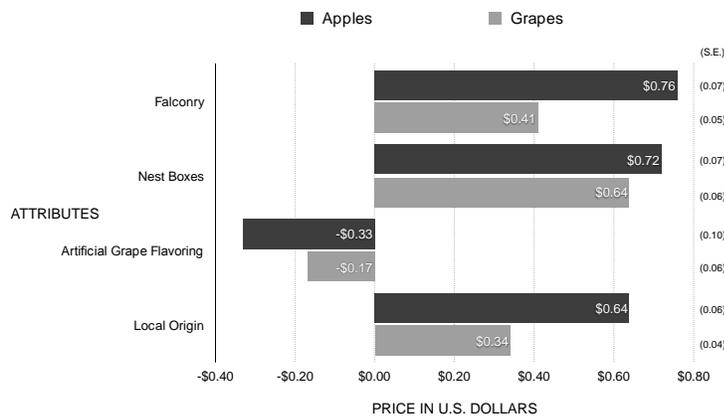
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**Summary:** This presentation describes 1) previous research on consumer interests in pest management practices, and 2) current research on blueberry and cherry farmer decision-making

**1) Previous Consumer Research:** We asked consumers about eight different practices to manage bird pests in fruit crops. In a series of focus groups, we found that most were viewed neutrally (e.g. netting, recorded bird calls), but falconry and nest boxes were viewed as “more natural” and viewed more positively. Live ammunition and methyl anthranilate spray, in contrast, were viewed less positively. We measured willingness to pay for various fruit attributes in a nationally representative survey conducted in May 2013. Figure 1 below shows that most people were willing to pay 22-32% more for falconry and nest boxes, and these amounts were slightly higher than reported for “local” fruit. Although the survey had a realistic choice format, it was still hypothetical, and these amounts are probably higher than people would actually pay. It does, however, suggest that *farmers using nest boxes or falconry may want to inform consumers about their “falcon-friendly” practices*, which may help develop new niche markets.

**Figure 1.** Willingness to pay amounts for attributes compared to reference fruit (i.e., bird management practice of live ammunition, and geographic origin that is non-local), with standard errors in parentheses



From: Oh, Chi-Ok, Zachary Herrnstadt & Philip H. Howard. 2015. Consumer Willingness to Pay for Bird Management in Fruit Crops. *Agroecology and Sustainable Food Systems*, 39(7), 782-797.

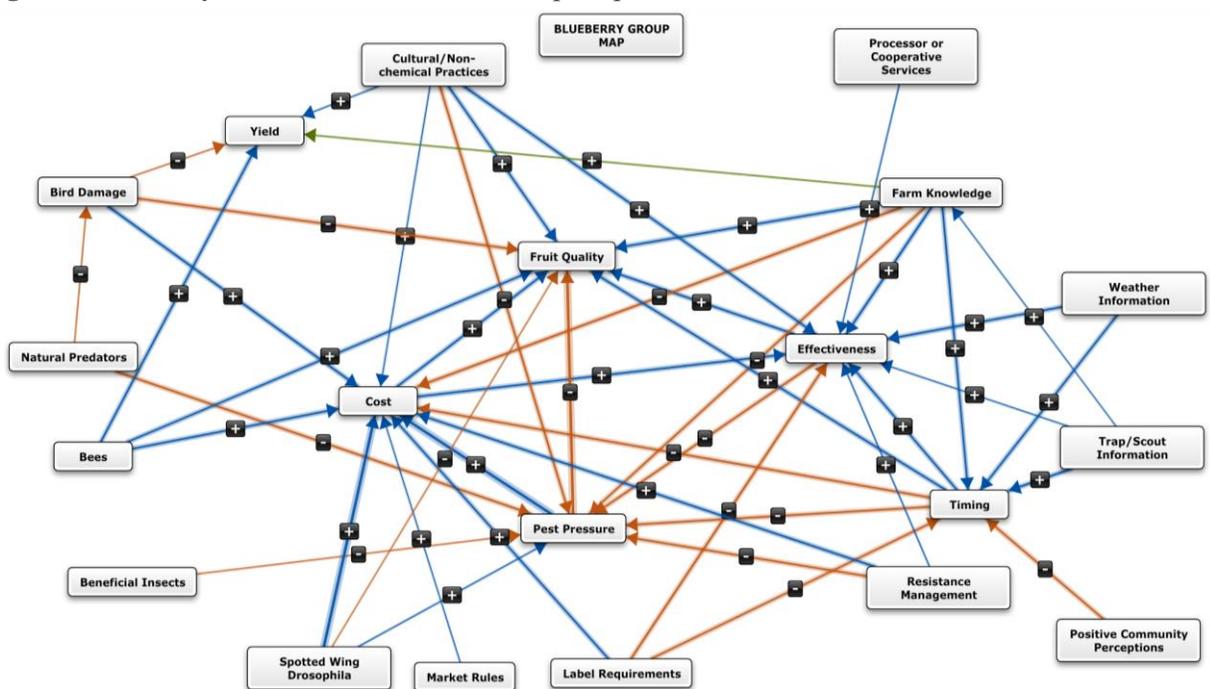
See also: Herrnstadt, Zachary, Philip H. Howard, Chi-Ok Oh & Catherine A. Lindell. 2016. Consumer Preferences for “Natural” Agricultural Practices: Assessing Methods to Manage Bird Pests. *Renewable Agriculture and Food Systems*, 31(6), 516-523.

**2) Farmer Decision-Making Research:** This is part of a larger project to examine interactions between human and natural systems, with a focus on the American kestrel. Preliminary research conducted by Catherine Lindell and Megan Shave has found fruit-eating birds are approximately 80% lower in abundance near active kestrel nest boxes. Kestrels range about a half mile, which equals about 1 box per 20 to 50 acres. Nest boxes can be constructed for less than \$100 in materials, require 1 hour of maintenance per year, and will last about 10 years. Occupancy rates have been about 90% in Leelanau County, but 35% in Van Buren County. The difference may be due to a longer history of nest boxes in Leelanau County through Boy Scout conservation projects and cherry farmers interested in rodent control. As more farmers adopt them over time, the combined effects might increase occupancy rates in blueberry regions.

To better understand how farmers make pest management decisions, and how the use of nest boxes and other conservation practices might fit into that decision-making framework, we have recently interviewed 34 cherry and blueberry farmers in Michigan. We also plan to conduct a national survey this winter.

Mental Modeling. We used a technique called mental modeling during the interviews to develop concept maps with each farmer. The map below combines the models for all blueberry growers. It shows what they view as key components of the system, and their expected interactions. A plus symbol/blue line means that increasing this variable is expected to increase the variable it is pointing to. A minus symbol/orange line means that increasing this variable is expected to decrease the variable it is pointing to. The layout places the most central variables, or those with the most connections to others, in the middle of the map.

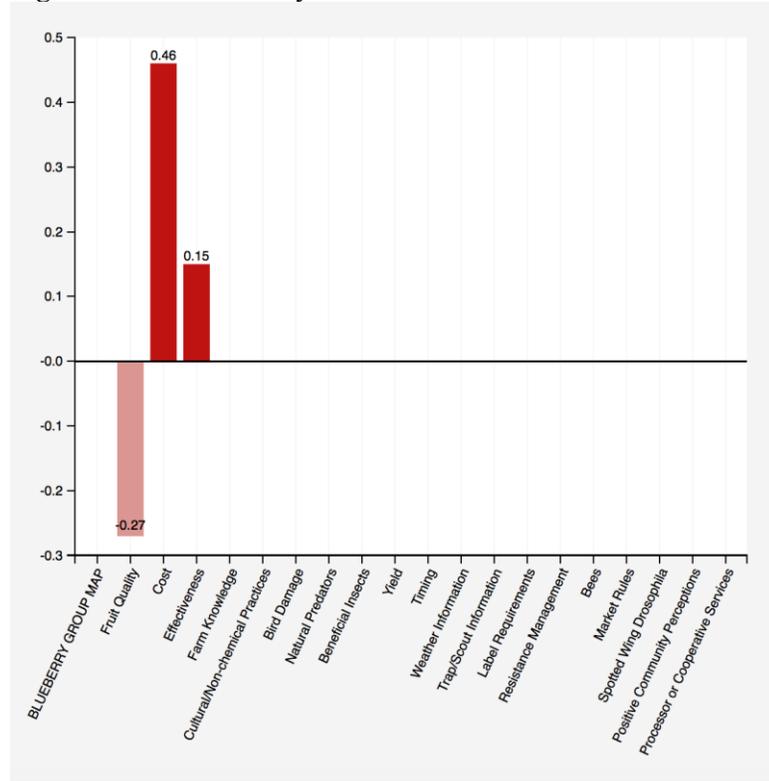
**Figure 2.** Blueberry Grower Mental Model Group Map



The concepts that were most central were fruit quality and cost, followed by effectiveness, and then by pest pressure and timing. The maps did not differ substantially when we compared different farm sizes and production practices (e.g. organic). Timing is particularly interesting because it helps us think about how to make it easier for farmers to adopt a practice they may be interested in, such as ensuring that it fits into the farming calendar.

The models can also be used to explore scenarios, such as: what is the shared expectation if particular variables in the model are increased or decreased? Figure 3 shows one example: the group's expectations of an increase in pest pressure on the system, which is predicted to result in a decrease in fruit quality, and an increase in costs.

**Figure 3.** Scenario Analysis: Increase in Pest Pressure and Predictions for Other Variables



This may seem like common sense, but this method allows us to explore more complex interactions than we are usually able to get at with interview questions. It also helps us see the expectations that most farmers have in common, or where they are different.

Farmer feedback does suggest some limitations to our interviews, such as they did not effectively cover year-to-year events and issues (e.g. taking out old plantings, freeze outs, poor pollination, and outside factors that have major effects on production, including fluctuations in market prices). However, many farmers found creating the mental model to be a valuable process, because it illustrated the complexity of issues that they deal with day-to-day for pest management and related issues.

National Survey. Our next step is a national survey of blueberry and cherry growers (likely Feb. 2018), which will help us better quantify: 1) the expected interactions between key variables in fruit systems, 2) the frequency of pest management practices already being used, and 3) preferred information sources when making decisions. We will also provide information about the cost and effectiveness of nest boxes, and data on consumer interests. Our goal is to increase our understanding of pest management decision-making from the farmer's perspective, and help make it easier to integrate strategies they may be interested in using. Please suggest any feedback you can provide to help make this survey even more useful to fruit growers.

**Acknowledgements:** we appreciate the participation of the consumers and farmers involved in this study, as well as industry partners, MSU Extension, and Catherine Lindell & Megan Shave, Dept. of Zoology at MSU.

**Funding:** USDA, "Limiting bird damage in fruit crops."; National Science Foundation, "Linkages among farmer decision-making, beneficial bird species, and pest management in fruit-growing systems."