

Cherry Bay Orchards

Suttons Bay, Michigan



Case Study

Agricultural pollution prevention is defined as source reduction, reuse, or environmentally sound recycling and other prevention activities including nonpoint source approaches.

Cherry Production in Michigan

The production of tart and sweet cherries is a vital part of Michigan's agricultural economy. Responsible for generating 75 percent of the national crop, Michigan is the national leader in tart cherry production. Some of the finest cherry sites in the world are found near the coast of Lake Michigan, where the unique climate necessary for optimum cherry growth is prevalent.

Yet Michigan cherry producers face a constant challenge to control diseases and insects in this perennial crop. Federal regulations and consumer preference demand a zero tolerance for certain pests in harvested fruit. Because agricultural chemicals are the only tools that farmers have to control this problem, they are continually caught between safeguarding the environment and delivering a quality, consumable product.

To meet this challenge, the cherry industry developed and invested in an Integrated Pest Management (IPM) system. This science-based system uses the monitoring and trapping of pests to determine optimal timing of pesticide application in an orchard. This reduces costs, minimizes pesticide use, and results in delivery of a salable crop to the marketplace. Michigan's cherry producers are now recognized nationally as leaders in IPM.



Francis Otto explains IPM as a comprehensive approach to pest management that focuses on disease, insect, weed, and nutrient management alternatives in an effort to reduce the need for inputs.

One such leader is Cherry Bay Orchards, located on Lake Michigan's Leelanau Peninsula. This operation consists of 400 acres of apples, 200 acres of sweet cherries, and 800 acres of tart cherries. It is owned by Bob and Don Gregory, two brothers who grew up on a dairy farm in the "thumb" region of Michigan and started their own fruit farm in 1972.

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Cherry Bay Orchards has been experimenting with IPM techniques since the late 1970s. During the 1980s they contracted with HortSystems, Inc. to receive professional information on climate and pest conditions. In the early 1990s, Cherry Bay participated in a U.S. Department of Agriculture, Integrated Crop Management (ICM) Program designed to encourage farmers to employ consultants for advice on pesticide and fertilizer use. As a result of this program, Cherry Bay hired Francis Otto as a full-time IPM specialist.

Insect Management

Cherry Bay Orchards is concerned about eliminating all insect pests to meet the zero tolerance standards. The majority of their insect problems come from cherry fruit flies and a beetle called plum curculio. Plum curculio is particularly troubling because the larvae hatch inside of the fruit and feed until the cherry drops off the tree. In the past, Cherry Bay Orchards applied the insecticide parathion once every ten to twelve days in the spring and summer. When Francis began working for Cherry Bay, he established an IPM program using “degree day” calculations, alternate row spraying, and orchard border spraying.

The populations of pests such as plum curculio depend greatly on climate conditions. “Degree day” calculations for spraying insecticide use a model that converts temperature into units of heat accumulation. To best utilize these models, accurate weather data is necessary. To meet those needs, Cherry Bay invested in weather stations to collect site-specific information at various locations in their orchards. The orchards are in blocks running 15 miles south and 20 miles north of the main base in Suttons Bay. Francis points out that weather conditions often vary between blocks, so different “degree day” calculations and insecticide applications among blocks is most efficient. Spraying insecticides on “days” when the populations will be at their highest points reduces total insecticide use.

Plum curculio and cherry fruit flies are mobile insects. Francis feels that alternate row spraying of insecticides is sufficient to obtain adequate control of pests. Alternate row spraying means applying insecticide to every other row every seven days during the spraying period instead of applying to every row. This practice reduces insecticide use in some crops up to 50 percent.

Francis uses an orchard border spraying plan to target the heaviest areas of pest concentration. Plum curculio and cherry fruit flies often migrate from wild trees outside the orchard and take residence in the first few rows of trees. By spraying the first few outer rows more than the inner rows, Francis reduces the amount of insecticide spray and attacks the pest problem where it is the worst.

The combination of “degree” day calculation, alternate row spraying, and orchard border spraying results in less insecticide use. By incorporating Francis Otto’s IPM plan, Cherry Bay Orchards has reduced their insecticide use an average of 60 to 70 percent.

Disease Management

The two major diseases that concern Cherry Bay Orchards are the cherry leaf spot and brown rot. Cherry leaf spot affects the health of the trees while brown rot can render crops unmarketable. Temperature and moisture conditions determine the severity of both diseases. The conventional method for protecting against cherry leaf spot and brown rot is the application of fungicide.

In similar fashion to insecticide application, Francis adopted an alternate row spraying program for fungicide application. Instead of spraying the entire orchard every ten days, Francis applies the fungicide to every other row every seven days.

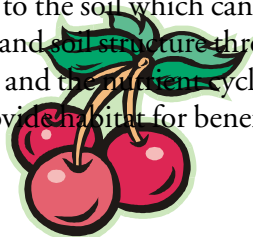
Another reduction method was the purchase of a tower attachment for their sprayer. A conventional sprayer applies most of the spray three-four feet off the ground. The new attachment directs the spray evenly at two different height levels in the tree, thereby reducing the amount of fungicide needed to cover the tree.

Alternate row spraying and the new spray attachment have cut down fungicide application. Compared to the conventional spray program Cherry Bay used in the past, the new techniques result in approximately 45 percent less fungicide use. Now Francis Otto and the Gregorys are considering the purchase of an “Air Curtain” sprayer that may cut fungicide use even further. This type of sprayer uses air and droplet size more efficiently by increasing the uniformity and deposition of fungicide application.

Weed Management

Weeds are a problem that face nearly every fruit producer. Weeds compete directly with the cherry trees for water and nutrients. They can interfere with irrigation, harvesting, thinning, and pruning.

Cherry Bay Orchards has been experimenting with the use of cover crops in the weed spray strip underneath the trees as a means of controlling weeds and improving soil health. Cover crops are various types of plants that are planted in the summer or fall and are expected to die in the winter. The benefits to planting cover crops are numerous. Cover crops can improve water penetration and infiltration by opening up the soil with the root system. They return organic matter to the soil which can improve nutrient status and soil structure through decomposition and the nutrient cycling process. Lastly, they provide habitat for beneficial insects.



Cherry Bay Orchards is hosting two separate ground cover trials. The first trial is conducted by Michigan State University’s Northwest Horticulture Research Station in Traverse City, under the direction of James Nugent. This trial is funded by the North Central Region Sustainable Agriculture Research and Education program, United States Department of Agriculture, Cherry Marketing Institute, and the Michigan Department of Agriculture. The ground covers have been planted for the past five years in a mature section of the orchard.

The second ground cover trial was developed by Francis Otto. Through funding from the Michigan Agricultural Stewardship Association (MASA), Francis has planted ground cover crops on a young section of the orchard annually since 1996. The past three trials have taught him that proper timing and good weather are the two most important factors for success. Francis has determined that the middle of August is the best time to plant the covers. His 1999 trial is underway and he hopes to continue his pattern of improvement over the previous year. When asked why Francis undertakes his own ground cover trials, he states “Traditionally, growers have looked at having a weed-free strip. When I look at the amount of organic matter depletion, I think ‘there has to be a better way.’”

Nutrient Management

Perhaps Francis Otto’s biggest passion is his dedication to soil health. He strives to improve soil health, thereby increasing the vigor of the cherry trees and making them better able to withstand pest pressure.

Composting has received attention in the past several years as a way to increase soil health and reduce waste. Cherry Bay Orchards has been at the forefront of a community-wide composting project whereby Francis collects nearly 400 yards of leaves from the Suttons Bay community. He

combines the leaves with sawdust, wood chips, and horse manure to create a nutrient-rich compost mix that he applies to parts of the orchard. Applying this compost increases the organic matter in soil, and increasing the organic matter enhances cherry tree growth.

From an economic standpoint, Cherry Bay Orchard's production costs have shifted over the past two decades. Today, more money is spent on monitoring and pest management expertise while less is spent on chemicals. Don and Bob Gregory and Francis Otto continue to explore ways to reduce chemical usage in their orchards. As Francis describes, Cherry Bay will continue to "push the envelope" in IPM practices into the next century.

Web Sites:

Cherry Marketing Institute

- <http://www.cherrymkt.org>

Michigan Agricultural Stewardship Association

- <http://www.sustainable-ag.com>

MSU Northwest Horticulture Research Station

- <http://www.maes.msu.edu/nwmihort>



Choose cherry!

Cherry Marketing Institute

The Cherry Marketing Institute (CMI) is a national organization representing growers in New York, Michigan, Utah, and Wisconsin. The CMI is committed to being proactive and invests heavily in new research to push the envelope for IPM adoption in the cherry industry.

This publication was developed in partnership with the Cherry Marketing Institute and the Michigan Department of Environmental Quality (MDEQ) to promote the Pollution Prevention Strategy and Implementation Plan for Michigan Agriculture.

Cherry Marketing
Institute



For further information on Cherry Bay Orchards, contact The Cherry Marketing Institute at 517-699-4264. For further information on the Pollution Prevention Strategy and Implementation Plan, contact the Environmental Assistance Division at 800-662-9278.