

Welcome to our 2008 report

I hope you enjoy reading the briefs here in print and with more detail at our website at:

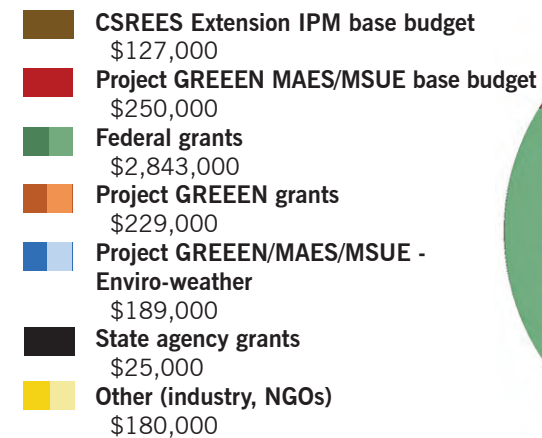
www.ipm.msu.edu/annual.htm. This reporting reflects our philosophy to work together to address critical IPM issues facing Michigan's agriculture and natural resources. We continue to expand our capacity to address the array of IPM challenges through working in strong teams. Please take a look on-line at the partner boxes that list our collaborators for the projects reported here. I would like to make special mention of our long-standing ties to the organizations which form our base budget: **Michigan State University Extension, Michigan Agricultural Experiment Station, Project GREEN** and **USDA CSREES**. Their contributions form a critical foundation for our efforts to do relevant, productive and forward-thinking collaborative work in integrated pest management. These base funds provide important leverage for securing sponsored projects that expand the depth of our work.



Visit the on-line version of this report (www.ipm.msu.edu/annual.htm) to view the list of our over 50 sponsored projects with partners. The work supports IPM practices in a wide variety of settings such as production of grapes, cover crops, organic apples and landscape plants. We are pleased to collaborate in this work with farmers, scientists, Extension educators, crop consultants, and representatives of state agencies and crop associations. Thanks to all of our collaborators! – *Michael J. Brewer, MSU IPM Coordinator.*

Funding and leveraging our IPM Program

Darker shading in the pie chart indicates projects with IPM staff as project leader. Lighter shading is for projects where IPM staffers are team members.



Enviro-weather brings together MSU weather and IPM resources

The MSU IPM Program continues work with the MSU Climatological Resources Program to produce high quality weather-based IPM information delivery in Michigan. In just over two years, achievements include adding 19 more automated weather stations to total 61; revising nine pest models and testing and validating 20 more; and launching four new pest models in 2009. We've also added three plant growth models along with links to services at nine partnering websites. Equally important, these achievements reflect a coming together of a fine staff, excellent collaborators (six MSU departments, MSU Extension and MAES station staff, two colleges, two state agencies, and many in the private sector), and users interested in pest, plant production, and natural resource management. We have recently launched a donation site for users. Visit the home page for links to donate or read Enviro-weather's annual report: www.enviroweather.msu.edu.

Apple growers successfully controlling codling moth with area-wide mating disruption

Starting in 2004, Michigan apple growers have been very successfully implementing whole-farm, or area-wide, codling moth management using pheromone-based mating disruption as the centerpiece of their control programs. This advanced IPM technology is based on interfering with this pest's normal mating process in which female moths emit a sex pheromone to attract male mates. Mating disruption uses a synthetic version of the female codling moth's pheromone to disrupt male moths' abilities to locate females, and ultimately curtail mating. Pheromone is typically dispensed in individual dispensers and placed in tree canopies throughout an orchard.

Growers across the lower peninsula of the state have been working with MSU researchers and Extension personnel to better understand how to incorporate mating disruption into their control programs in ways that are both effective at controlling codling moth and economical. Not only are cooperating growers keeping fruit injury levels low on their farms, but those deploying pheromone disruption for four years have reduced the overall number of companion insecticide applications targeting codling moth, helping to lower spray bills and recoup product and application costs of mating disruption.



A pheromone dispenser

Starting with eight growers on 800 acres in 2004 in Kent and Ottawa counties, IPM integrator David Epstein, the project's manager, reports the project has grown to approximately 3,000 acres on over 30 farms by expanding into Berrien, Cass, Monroe and Grand Traverse counties. The project has served as a catalyst to promote adoption of pheromone mating disruption in the wider Michigan apple industry. Over 8,000 acres of Michigan apple orchards were treated with mating disruption in 2007, up from about 4,000 treated acres prior to the start of the project. Growers have learned that it works and can be cost effective.

The cost of mating disruption deployment and biological monitoring ranged from \$125-\$170 per acre, depending on the number of dispensers per acre and type of dispenser chosen. The additional returns for reduced insecticide use and increased pack-out of non-damaged fruit on farms using disruption for four years ranged from \$210-\$305 per acre per year. Thus, net returns exceeded net costs at about a 1.75:1 ratio for the 20 farms studied in this analysis, strongly indicating that area-wide deployment of mating disruption for codling moth is a very worthwhile management approach.

MSU IPM Program:
Generating partnerships for better pest management in Michigan.

Who we serve

We work with growers, consultants and their commodity groups to solve pest management problems in fruit, landscape, nursery, field crops, vegetable and forestry-related plant production systems.

Agency partners

To serve stakeholders, we collaborate with state and federal agencies such as the Michigan departments of Agriculture and Environmental Quality; the USDA Cooperative State Research, Education and Extension Service; the Natural Resources Conservation Service; and the Environmental Protection Agency. We are allied with the North Central Region IR-4 Program, North Central IPM Center and MSU Pesticide Safety Education Program.

MSU partners

We work with MSU field staff and campus faculty within the departments of Plant Pathology, Entomology, Crop & Soil Sciences, Geography, Horticulture, Forestry, MSU Diagnostic Services, MSU Extension and the Michigan Agricultural Experiment Station. Our home department is Entomology.

How we collaborate

We work with specialists and educators in research, demonstration and educational projects and help deliver their findings to IPM practitioners. This work is often coordinated through MSU's Area of Expertise teams.



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Michigan State University
Integrated Pest Management Program
B18 Food Safety & Toxicology Bldg
East Lansing, MI 48824

2008 Annual Report Michigan State University IPM Program



IPM Advisory Board members

- Specialty crops: John Bakker, IPM Alliance, Michigan Asparagus Advisory Board; and Dave Smith, IPM Alliance, Michigan Vegetable Council.
- Field crops: Keith Reinholt, Michigan Soybean Association; and Jody Pollok-Newsom, Michigan Corn Marketing Program.
- Michigan Department of Agriculture: Gina Davis and Ken Rauscher.
- Michigan Department of Environmental Quality: Terri Novak.
- MSU Department of Entomology: Del Delfosse.
- MSU Department of Plant Pathology: Ray Hammerschmidt.
- MSU Department of Crop & Soil Sciences: Jim Kells.
- MSU Extension: Don Lehman and Larry Olsen.

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Integrating organic pork and apple production

Grazing hogs in fruit orchards for pest and weed management has a long history that includes Thomas Jefferson foraging hogs in his Monticello orchards. The practice nearly disappeared with the advent of modern chemical farming in the late 20th century. During 2008, the project team continued its work to rediscover and scientifically evaluate benefits of integrated apple and pork production practices. The team, organized by IPM integrator David Epstein, is excited about highly promising results showing hogs can help organic growers control critical pests that are currently difficult to manage organically. Addressing these problems can help to widen the bottleneck blocking further expansion of organic production. So far the project has documented that flash grazing hogs in apple orchards significantly reduced the incidence of injury to fruit from the two most economically important insect pests of organic apples in Michigan, plum curculio and codling moth. Grazing hogs also significantly reduced weed cover within tree rows. The orchard-reared hogs demonstrated adequate reproductive, growth and health characteristics and have not required any use of antibiotics. Visit our annual report on-line for information about the team's future research and extension plans.

Farmer Jim Koan with the orchard-grazing hogs.



Web sites and publications continue IPM delivery

The MSU IPM Program continues an important part of its mission: delivering research findings and basic knowledge of IPM to the citizens of Michigan through publications and web sites. IPM communications manager Joy Landis along with Andrea Buchholz partnered with many specialists including others on the IPM staff in these efforts this year:

- IPM scouting guides for blueberries and grapes were translated into Spanish and published.
- A web site for cherry growers was launched (www.cherries.msu.edu) and another for apple growers is progressing for introduction in 2009 (www.apples.msu.edu).
- The IPM Resources web site averaged 180,000 hits and over 16,000 unique visits per week during the growing season.
- The IPM Program's crop and pest newsletters reached approximately 12,000 people throughout the Great Lakes.
- Enviro-weather's 2007-08 activities were reported in a colorful report (www.enviroweather.msu.edu/report.asp).

Collaborations help farmers with government programs for implementing IPM

Farmers are being encouraged to adopt IPM techniques that help preserve the quality of our natural resources. These techniques tend to be more complex and costly at least during initial adoption than traditional approaches. Well implemented, they provide community-wide benefits in resource conservation. We are working to link the research and extension IPM work at MSU with state and federal programs that support growers in adopting IPM for both plant protection and natural resource conservation value. Here are a few examples in joining forces with our government agency partners. Thanks for the collaborative spirit!

Grower incentives for IPM. Mike Brewer and Joy Landis (MSU IPM) along with Hannah Stevens, Amy Irish-Brown (MSU Extension) and Mark Whalon, John Wise, and David Mota-Sanchez (Entomology) continue to work with local, state and federal staff of the USDA Natural Resources Conservation Service in assisting farmers to adopt IPM strategies. Supported by local training and direct grower assistance, farmers have really responded to this opportunity by choosing to participate in the Environmental Quality Incentive Program (EQIP). With financial incentives from EQIP, growers are adopting IPM practices that range from scouting to using reduced-risk pesticides or non-pesticide management methods. Support from EQIP to implement IPM tactics in Michigan was about \$1 million in 2008. The opportunity is being expanded in the new Farm Bill. For more information on how to get involved, visit our IPM web site: www.ipm.msu.edu/farmbill.htm. We also contribute to regional and national activities to better align IPM with resources available in these programs. This effort will be given a team IPM Recognition Award at the 2009 International IPM Symposium.

More support for beginning or socially disadvantaged farmers. Beginning and socially disadvantaged farmers may not be aware of long-standing government agricultural programs or know how to become involved with them. In southwest Michigan, the number of Hispanic farmers producing specialty crops such as blueberries on small to medium-sized farms is on the rise. Specialty crop growers need specific knowledge and skills in pest and nutrition management to maintain quality production while adhering to practices encouraged by government to protect the land. For this project, Mike Brewer, David Mota-Sanchez, and Filiberto Villa-Gomez (MSU Extension) worked with partners in MSU Departments of Entomology and Horticulture, Michigan Food and Farming Systems, USDA-NRCS and FSA, and the Michigan Department of Agriculture's Michigan Agriculture Environmental Assurance Program (MAEAP) and Pesticide Training Program. The result was an introductory pest and nutrient management workshop in fall 2008. This series of training was attended by about 45 Latino growers. The program included a farm walk demonstrating the services available to growers by federal and state agricultural services. In follow up, growers are working on voluntary farm risk assessments of MAEAP and investigating voluntary FSA and NRCS programs.

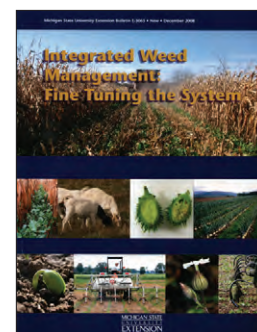
Mike Brewer (MSU IPM), Maria Josefa Santos, Pedro Bautista and David Mota-Sanchez (MSU Entomology) at the training series "IPM and Nutrient Management Planning: Addressing Farm Production and Resource Conservation." Dr. Santos is a collaborator and cultural anthropologist at National Autonomous University of Mexico and Mr. Bautista hosted some of the training at his farm.



More details on these and other IPM projects at:
www.ipm.msu.edu/annual.htm

Farmers increase success of new weed management publications

We have become firm believers in the success that results when farmers participate in publication development. In 2005 a group of 13 farmers, four weed scientists, and four county Extension educators met with a professional facilitator for four day-long working sessions to create and write a 112-page MSU bulletin titled *Integrated Weed Management... "One Year's Seeding"* (E-2931). All of the initial 4,000 copies were sold and minor revisions were made in the 2007 reprint. As a follow-up, an intensive survey (21 pages) was sent to 100 farmers across the state and north central United States to evaluate the bulletin. Fifty farmers responded to the survey indicating they liked the publication and wanted more in-depth information on several of its topics.



With input from the survey, in 2007 a team of Extension specialists lead by Erin Taylor, Karen Renner and Christy Sprague (MSU Crop and Soil Sciences) started a new bulletin titled *Integrated Weed Management: Fine Tuning the System* (E-3065). This 136-page, full-color publication was released in December 2008. The chapters in the new bulletin include complex crop rotations, cover crops systems, manure and compost, flaming, grazing and other biological controls, weed thresholds, on-farm weed management trials and 14 new weed profiles. The new book's goal was to compile information on each of these topics from researchers, Extension educators and experienced farmers to create

easily digestible information regarding sustainable weed management systems. An extensive Extension education program throughout Michigan, the north central United States and Canada is scheduled in 2009 to promote the content of the new publication. MSU IPM/cover crops specialist Dale Mutch was editor of the publication and provided research data for chapters on cover crops and flaming. He is also part of the team teaching more than six programs across Michigan and Canada.

Grape growers gain tool for measuring on-farm sustainability and IPM planning

The demand for sustainable agricultural products is on the rise due to increased interest by consumers and major retail outlets. MSU is collaborating with the Michigan Agriculture Environmental Assurance Program (MAEAP) of the Michigan Department of Agriculture and the National Grape Cooperative to produce an on-farm sustainability assessment and IPM planning tool for Michigan grape growers. MAEAP is a voluntary program for helping farmers assess agricultural risks and plan strategies to reduce these risks. This tool, led by Paul Jenkins and Mike Brewer, (MSU IPM), and Allen Krizek and Josh Appleby (MAEAP), will allow growers to evaluate their level of sustainability and IPM implementation and track progress as they initiate new practices recommended by collaborating MSU scientists.

The project is in direct response to National Grape's initiative to develop and implement sustainable vineyard practices for their grower members. National Grape is an agricultural cooperative with approximately 325 members in Michigan, farming over 12,000 acres of Concord and Niagara grapes. Welch's is the cooperative's wholly-owned processing and marketing subsidiary with production facilities in Michigan and three other states. This assessment tool is also supported by Michigan's wine grape industry, netting a potential impact on Michigan's 14,000-plus acres of vineyards.

The new assessment tool is a series of risk questions that score the sustainability level for specific production practices, and is being fully integrated into MAEAP's risk assessment tools. Growers develop a customized sustainability and IPM plan for their farm from a list of research-based options. Stakeholders will be able to benchmark increases in sustainability as growers adopt new sustainable practices. A print version of the new tool is scheduled to be available April 2009 and an online version by the end of the year.

Feedback helps fruit growers tackle fungicide resistance

American brown rot is caused by the fungi *Monilinia fructicola*, and is an important pathogen on apricots, peaches, nectarines, plums and cherries (particularly sweet cherry varieties). The fungus attacks fruit, blossoms, spurs and shoots with ideal infection conditions initiating epidemic inoculum levels in as little as 24 hours. The most notable characteristic of brown rot is the fruit rot it causes, which greatly reduces the quality and quantity of yield.



During the 2008 growing season, all 30 days preceding sweet cherry harvest provided ideal conditions for *M. fructicola* germination, spore production and infection. Brown rot infections reached epidemic levels in some orchards, causing growers to abandon whole blocks of sweet cherries and to question the efficacy of our most commonly utilized brown rot fungicides, sterol inhibitors. Sterol inhibitors are the most effective class of fungicides used against brown rot, but are highly prone to resistance development.

In response to grower concerns about sterol inhibitor efficacy, Nikki Rothwell and Erin Lizotte (Northwest Michigan Horticultural Research Station and IPM) worked collaboratively with George Sundin (MSU Plant Pathology) to determine the in vitro fungicide sensitivity levels of *M. fructicola* and to evaluate the efficacy of traditional and novel fungicides in field work supported by the Michigan Cherry Committee. With the help of grower collaborators, the team was able to test samples from 30 Michigan orchards during 2008. The growers received information regarding the sensitivity of isolates collected on their individual farms and were able to compare their population's sensitivity to both regional data and resistance guidelines determined in states with documented resistance. This timely and specific feedback is highly valued by growers for evaluating their success in managing brown rot and utilizing resistance management strategies. Additionally, field trials continued to show excellent brown rot control with sterol inhibitors, alleviating grower concern over sterol inhibitor field resistance. In coming years, fungicide efficacy testing will continue on a variety of tree fruit pathogens. Rothwell and Lizotte will also expand the station's technical capacity to provide individual and timely feedback to growers.



Michigan has over 14,000 acres of commercial vineyards that could benefit from the new IPM planning and assessment tool.

MSU IPM Program staff

- Michael J. Brewer - IPM coordinator.
- Joy Landis - Assistant IPM coordinator and communications manager.
- Andrea Buchholz - Communications specialist.
- Dale Mutch - Cover crops/ IPM specialist.
- David Epstein - Tree fruit IPM integrator.
- Paul Jenkins - Small fruit education coordinator.
- Erin Lizotte - Integrated fruit practices and pest management educator.

Affiliates

Integrated Crop Management (ICM) educators: Amy Irish-Brown, Mira Danilovich, and Jill O'Donnell. Enviro-weather staff: Beth Bishop, Jeff Andresen, Tracy Aichele, Jim Brown, Steve Marquie, Aaron Pollyea.

We're award winning

David Epstein and Joy Landis were awarded All-University Distinguished Academic Staff awards by President Lou Anna Simon this winter. The Grower Incentives for IPM Project, spearheaded by Mike Brewer, will receive an IPM Recognition Award at the 6th International IPM Symposium in March 2009.



J. Landis and D. Epstein.

