

2009 IPM successes and transitions

I hope you enjoy reading about the accomplishments and impacts of our capable staff and collaborators. This was another successful year for the IPM Program as it continues to survive and thrive in these very trying budgetary times. Our work would not succeed without our partners in the departments of MSU's College of Agriculture and Natural Resources along with growers, consultants, industry, agencies and MSUE/MAES personnel. I would also like to acknowledge our base funding from MSU Extension, the Michigan Agricultural Experiment Station, Project GREEN, and USDA-National Institute of Agriculture and Food. You will notice these groups serve as the foundation of the pyramid on the cover of this report. We also depend on critical support provided by many Michigan commodity groups. We thank these supporters and refer you to the pie chart below for more information about funding.

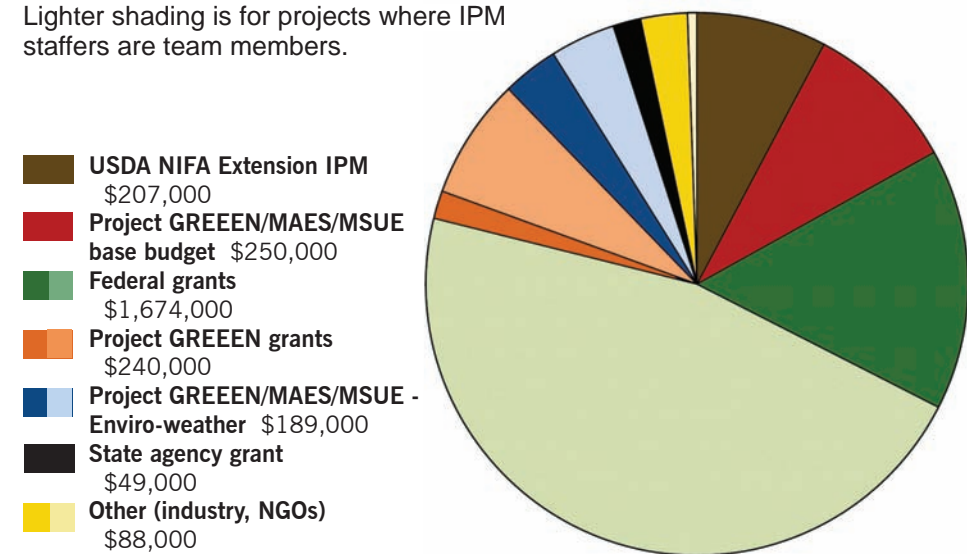


You can also view this annual report on the Internet and links to additional information at <http://www.ipm.msu.edu/annual.htm>. In particular, please note our list of over 50 projects in a full range of crops and landscape applications that are underway with the partners noted.

I would also like to note that Mike Brewer departed from the Program last September and began work as a researcher at Texas A&M University. You can see just some of Mike's leadership at MSU in the projects described here and we wish him well in his new career. As a result of his departure, I've been asked to serve as interim IPM Coordinator. I have previously served as IPM Coordinator and left the position a few years ago to serve as MSU Extension's State Agriculture Leader. MSUE is restructuring and so the timing was right for me to accept new roles as Interim IPM and Pesticide Safety Education Coordinator and Associate Chair of the Department of Entomology. I look forward to interacting with you in these capacities. — Larry G. Olsen, Interim IPM Coordinator.

Funding and leveraging our IPM Program

The IPM Program is a successful contributor to proposal development teams at MSU. The resulting grants provide critical leverage to the base funding. Darker shading in the pie chart indicates projects with IPM staff as project leader. Lighter shading is for projects where IPM staff are team members.



MSU collaborates with NRCS to enhance agency knowledge of organic farming

In the summer of 2009 state employees of the Natural Resources Conservation Service (NRCS) approached the Field Crops IPM Program to develop an organic training program for district conservationists. The new Farm Bill has designated support for organic farmers or individuals who want to transition to organic production. Recognizing that IPM's Dale Mutch has worked extensively with the state's organic growers, NRCS asked him to design an introductory organic pest and crop management course for its employees.



Organic farmers helping NRCS district conservationists develop a crop rotation with cover crops as part of an organic pest/crop management program.

Mutch organized a team to develop the course including professors Karen Renner (Crop and Soil Sciences), John Biernbaum (Horticulture), and MSUE educator Dan Rossman. The team worked closely with NRCS water quality specialist Ruth Shaffer and state resource conservationist Vicki Anderson.

In December 2009, the new course was held for NRCS district conservationists in two Michigan locations – 47 were trained in East Lansing and 17 in Ithaca. During the training, a panel of organic farmers answered questions from the participants.

At the end of the day, participants left with a packet of popular publications developed by various groups within USDA: MSU Extension's popular books on weed management and ecologically based farming systems (E-3065, E-2931, E2983); the Sustainable Agriculture Network's *Managing Cover Crops Profitably*; and nine organic farming system fact sheets developed by the New Agriculture Network with funding from NCR-SARE.

Evaluations from the training indicate each participant's knowledge about organic farming was increased. Thirty-five stated they would share the information with up to five people and 14 said they would share the information with six to 10 individuals. Twenty-five district conservationists want to participate in advanced organic training programs. Weed management (chosen by 14 people) and insect and disease management (13 people) were ranked highest for future advanced training programs. Twenty-two participants rated the program as excellent and 29 rated it as good. No one rated the programs below good. The team intends to work with the NRCS state program to develop an advanced organic pest and crop management training program for the future.

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

Michigan State University
Integrated Pest Management Program
B18 Food Safety & Toxicology Bldg.
East Lansing, MI 48824-1302

2009 Annual Report Michigan State University IPM Program



How much rain is too much rain?

Determining when a pesticide application is needed is a common question for many farmers. Michigan fruit growers often rely on weather-based models to forecast pest events such as insect egg laying and emergence, spore dispersal and a variety of other factors to make their IPM decisions. Along with these models, each farmer incorporates farm-specific factors into decisions such as site history, weather forecasts, pesticide use and rainfall. However, one important factor is not well defined and can lead to false assumptions – how do previously applied pesticides behave over time when exposed to rainfall and environmental factors?

Growers use rules of thumb like “an inch of rain for a pound of Guthion,” but more clearly defining pesticide response to rainfall is key to a sound IPM program. Entomologist John Wise, MSU Trevor Nichols Research Complex (TNRC), initiated a study looking at rainfast characteristics of many insecticides and implications of those characteristics on efficacy. To complement Wise’s work and develop a broader picture of how rainfall affects management strategies, Erin Lizotte, IFP/IPM district educator, and station director Nikki Rothwell set up a similar study to evaluate fungicide rainfast characteristics at the Northwest Michigan Horticultural Research Station. The study will help determine potency and quantity of common cherry leaf spot fungicides on leaf tissue after a wetting event to help growers identify whether another fungicide application is needed.



Fungicide-treated montmorency cherry shoots are exposed to rainfall in the rain simulator at TNRC.

Lizotte and Rothwell’s hypothesis was that fungicide residues are variable after a wetting event based on chemistry and that this rate of residue wash-off influences leaf tissue susceptibility to *Blumeriella jaapii*, the causal agent of cherry leaf spot. With so many modes of action and scopes of redistribution – translaminar, locally systemic, systemic and surface – the response to rain was variable and surprising. With this data, the team will develop pesticide-specific rainfall thresholds that ensure protection of vulnerable plant tissue when necessary and prevent application of unnecessary pesticides.

Funding Partner: Michigan Cherry Committee.

Taking IPM from campus to farm to web and beyond

MSU has talented faculty researching many aspects of IPM in one of the widest range of cropping systems in the country. These scientists’ expertise extends beyond food crops to include the many facets of the “green industry” as well as natural settings. The IPM Program’s communications team of Joy Landis and Andrea Gooch are charged to find the most effective methods to deliver this expertise to farmers and other pest managers. Sometimes this means simply making information accessible to MSU Extension educators for their delivery. Other times it means partnering with faculty to develop web sites, publications and news articles for the *Crop Advisory Team Alerts*. Increasingly, people are delving into social media and IPM now has a presence there, too. Here is a sampling of our communication efforts in 2009:

- Editing and layout of *An IPM Pocket Guide for Weed Identification in Field Crops* (E-3081) by weed scientists MSU’s Wes Everman and Christy Sprague along

New IPM strategies for managing wood-boring insects in apples, cherries and peaches

Any apple, cherry or peach farmer can tell you managing borers, specifically, the peachtree, lesser peachtree, American plum and dogwood borer is becoming a greater challenge as growers increasingly adopt contemporary horticultural practices. These pests’ larvae feed on the tree’s inner bark and cambial or vascular tissue, reducing the tree’s vigor, potentially killing young trees.

For the past half century in this region of the country, the most effective tool growers had to contain these pests was organophosphorus insecticides. However, that option is changing significantly with passage of the U.S. Food Quality Protection Act of 1996. Over time, registrations of many of these pesticides have been cancelled or restricted. This re-registration process is driving the development of alternative methods for managing borer pests.

With funding from the US EPA Region 5 Strategic Agriculture Initiative and MSU’s Project GREEN, a team of MSU entomologists is working to develop and deliver the next generation of alternative management tools and tactics. Some options being explored are pheromone-based mating disruption, “attract and remove,” entomopathogenic nematodes, and a reduced-risk insecticide (acetamiprid). Mating disruption uses species-specific synthetic sex pheromone to interfere with communication between males and females to prevent mating. “Attract and remove” uses synthetic female sex pheromone to attract male moths to pheromone sources where they are either trapped or exposed to a toxicant. Entomopathogenic nematodes are microscopic animals that enter into and consume borer larvae.

David Epstein, MSU IPM’s tree fruit integrator, says the solution may likely lie in a combination of strategies. By the end of the 2010 growing season, the research team hopes to have new IPM recommendations for growers and identify what the next focus of research should be to increase efficacy in controlling these borers.

Funding partners: US EPA Region 5 Strategic Agriculture Initiative and MSU’s Project GREEN.



A borer at work under peach tree bark.

with Steve Gower and Rob Richardson.

- Launching of a web site for apple growers at www.apples.msu.edu with the fruit area of expertise team.
- Updating web delivery of the *Crop Advisory Team (CAT) Alerts*. See our new web interface like the landscape edition at <http://ipmnews.msu.edu/landscape/>
- Partnering with MSU’s gardening expertise to bring IPM tips and plant care advice at the new web site: www.migarden.msu.edu
- Drawing attention to IPM topics and related news on Twitter through <http://twitter.com/landisj>



IPM Communications specialist Andrea Gooch.

The Grape*A*Syst program: Improving the sustainability of Michigan’s grape industries



Grape growers in Michigan recognize the need to use sustainable farming practices that are environmentally sound, economically viable and socially equitable. As responsible stewards of the land, grape growers and all agricultural producers play important roles in preserving Michigan’s natural resources. The Grape*A*Syst program is a direct response to the initiative of Michigan’s grape producers to develop and implement sustainable practices. MSU small fruit education coordinator Paul Jenkins leads this collaborative effort between MSU, the Michigan Department of Agriculture (MDA), and the grape industry.

The Grape*A*Syst program is an on-farm assessment that helps grape growers evaluate the level of sustainability of their farm. Farmers respond to a series of questions that are scored to indicate the sustainability of specific production practices. As growers adopt new sustainable practices in their vineyards, they can use the program to measure their progress. The assessment is broken up into different sections, including soil and nutrient management, pest management, vineyard management, pesticide storage and handling, and conservation. Each section contains a series of questions with four possible answers, ranging from most sustainable to least sustainable. The program’s format also provides ideas for IPM and sustainable production strategies that are best suited to address these risks while maintaining production of high quality grapes.

To avoid duplication, requirements to become verified by the Michigan Agriculture Environmental Assurance Program (MAEAP, www.maeap.org) have been integrated into Grape*A*Syst. MAEAP is a proactive program by MDA that helps farms voluntarily prevent or minimize agricultural pollution risks.

The Grape*A*Syst program started off with considerable success in 2009 as many grape growers started going through the program. Technicians in the MDA Groundwater Stewardship Program are working with growers to complete the workbook, and hope to get 50 percent of Michigan grape producers through the program in 2010. Data from workbook scores will enable our industries to promote and market sustainable production as a cornerstone of grape production in Michigan.

Funding partners: Project GREEN, MAES, MSUE, EPA Pesticide Environmental Stewardship Prog., USDA CSREES National Extension IPM Special Projects Prog., MDA Specialty Crop Block Grants, and Michigan Grape & Wine Industry Council.

Another year of growth for Enviro-weather

The MSU IPM Program continues its collaboration with the MSU Climatological Resources Program to deliver weather-based IPM information to Michigan’s farmers and pest managers through Enviro-weather. During 2009, many new tools were developed and launched with MSU specialists and Extension educators. These included a tool for estimating water use by corn and soybeans to help growers determine irrigation needs and a gypsy moth treatment window map for nursery owners and Christmas tree growers. New tools and services can require several years to develop, test and launch.

During 2010, we look forward to introducing six vegetable insect pest models, ten ornamentals insect pest models, five field crop insect pest models, two grape disease models, a tussock moth prediction model and a potential evapotranspiration table for fruit growers. Also during winter 2009 in consultation with our work groups and users, Enviro-weather launched a new interface with clearer organization and ease of use. Visit Enviro-weather and take it for a test drive:

www.enviroweather.msu.edu



Helping tart cherry growers develop tomorrow’s alternative pest management strategies

Cherry growers have faced significant challenges in responding to pesticide registration changes brought on by the 1996 passage of the Food Quality Protection Act (FQPA). The Act caused some pesticide registrations to be withdrawn while others have been phased-out or registered for more limited use. Manufacturers have also introduced entirely new classes of chemicals not used before the enactment of the FQPA. Cherry growers have had to learn how to shift management tactics effectively while managing pests at the mandated “zero tolerance” level – no insect larvae in fruit at harvest. In addition, they have to devise a means to use these new pesticides that are often priced two to four times more expensive than the materials being replaced.

MSU has spearheaded two consecutive cherry USDA Risk Avoidance and Mitigation Projects (RAMP) with \$3.1 million during 2004-2010 to address some of these challenges for tart cherry growers. The project brings together researchers, farmers and extension personnel in Michigan, Wisconsin and Utah to develop reduced-risk and alternatives to organophosphate (OP) use for key pests. Their work has yielded positive results in identifying protocols for effective in-season use of new insecticides, but has also raised serious concerns. The insecticide costs for RAMP orchard plots managed with reduced-risk and OP-alternatives averages 1.6 to 2.3 times higher than insecticide input costs for on-farm comparison plots managed with OP’s.

The project is working to enhance this industry’s productivity, profitability and competitiveness in the global marketplace and minimize risk to workers, consumers and the environment. Strategies being developed include:

- In-season controls for insects and disease.
- Post-harvest tactics managing previously ignored life stages of key internal fruit feeders.
- Resistance management to preserve currently available fungicides.
- Tools to measure orchard ecosystem health in response to management tactics, particularly those related to shifting away from OP-based pest management systems toward OP-alternative and reduced-risk pesticides. Project manager David Epstein reports project activities will continue through the 2010 season.

MSU IPM Program staff

- Larry G. Olsen - interim IPM coordinator.
- Joy Landis - Assistant IPM coordinator and communications manager.
- Andrea Gooch - 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.

Our offices are located on MSU’s south campus at B18 Food Safety & Toxicology Building. We are administered through the Department of Entomology.

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, and Aaron Pollyea.

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