integrated pest management

Northeastern IPM Center

insights

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Inside

Our Center encourages integrated pest management for reducing risks to human health and the environment. We are funded by the National Institute of Food and Agriculture and are jointly administered by Penn State and Cornell University.

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Growers PIPE up for high-tech tools

Penn State adapts early warning system for key pests, new crops

Pest forecasting models are a powerful IPM tool, but high-tech early-warning systems require significant investment and technical expertise. To save costs, IPM researchers in Pennsylvania have adapted an existing online system that is benefitting growers throughout the state.

The Pennsylvania Pest Information Platform for Extension and Education, or PA PIPE, was developed by Penn State's College of Agricultural Sciences and an IT firm called ZedX, Inc. The system is based on a tool known as *ipm*PIPE, created in 2004 as a national decision support system for managing soybean rust.

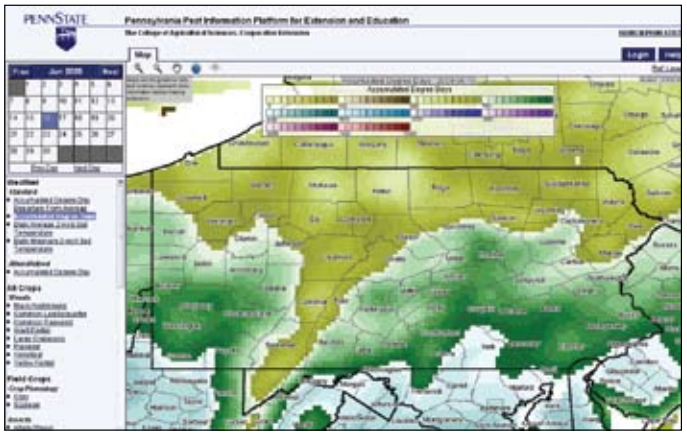
The PA PIPE provides forecasts for diseases, insects, and weeds, including those that affect field crops, grapes, tree fruit, forests, tomatoes, and potatoes.

"Growers in our state are using the system to predict when pest activity will be happening and to focus their scouting efforts," explains entomologist John Tooker, who has helped to adapt the system for field crops.

"Timing is critical when it comes to managing plant diseases," says plant pathologist Beth Gugino, who is fine-tuning models to predict the severity of risk for early blight and late blight. For years, her colleague Alan McNab had issued forecasts to growers throughout the state based on his own network of weather stations. When McNab died in 2006, vegetable growers urged the college to find some way of continuing this crucial service. Their request was the impetus for Penn State's investment in PA PIPE.

ZedX's high-resolution weather data drive the specific forecasts of various models within PA PIPE. Once a particular pest model has been plugged into the system, forecasts can be generated on a fairly automatic basis.

Ground-truthing is important though, so Tooker and Gugino verify the system's predictions and supplement the data with real-world observations. For example, forecasts for the black cutworm depend on the pest's northward movement during a particular growing season, so Tooker monitors the insect's arrival across the state. These observations then allow the models to be set in motion and predict larval activity.



It's easy to identify local conditions with PA PIPE. The system, updated daily during the growing season, shows weather to within 6 km² of a targeted field, plus accumulative ambient degree days, deviation from normal, 2-inch soil degree day accumulations, and deviation from normal for 2-inch soil degree days. Visit the site at ***pa-pipe.zedxinc.com/cgi-bin/index.cgi?.***

Currently there is no cost to growers who use PA PIPE, although additional levels of service might be available for a fee in the future. Growers can log in to the system and save their own data so they can gather crop-, pest-, or location-specific information quickly on their next visits.

"Many states are searching around for different extension models that use information technology," says PA IPM Coordinator Ed Rajotte, who sees potential for other states to adapt the system and expand its utility. Currently the system covers Pennsylvania and portions of southern New York and northern West Virginia.

For more information about PA PIPE, contact John Tooker (jft11@psu.edu, 814-865-7082), Beth Gugino (bkgugino@psu.edu, 814-865-7328), or Joe Russo (russo@zedxinc.com, 814-357-8490).

Seed Treatment Gives Tomatoes a Fresh Start

Five years ago, bacterial canker was a growing threat to New Jersey's fresh market tomato industry, valued at nearly $28 million. The disease had inflicted losses of 50% for some farmers.

Rutgers University's Andrew Wyenandt and Kristian Holmstrom used an IPM Partnership Grant to identify sources of infection and manage the disease. They introduced nine growers to a seed heat treatment that eliminates seed as the primary inoculum source, and found this approach to be successful when combined with adequate field rotation.

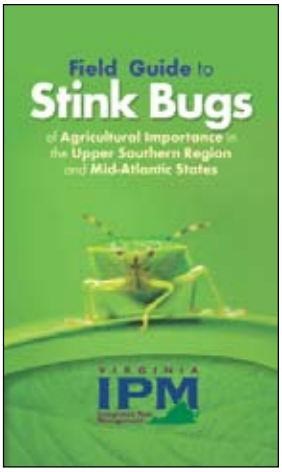
"We've seen a big difference," says Gary Mount of Terhune Orchards, who faced problems with bacterial canker before joining the study. "Now the disease comes on later in the season or not at all," explains Mount, whose tomatoes have been certified organic for 3 years.

In New Jersey, use of the heat seed treatment is becoming widespread, which in turn prevents significant economic loss to growers and helps to reduce the need for antibacterial applications.

Learn more at www.njveg.rutgers.edu/html/cp-intro-controlling-pests.html.

New IPM resources

Books



Pocket-Size Field Guide to Stink Bugs. A new field guide developed by entomologists in Virginia and South Carolina is helping growers identify stink bugs of agricultural importance in southern and mid-Atlantic states. This 33-page, full-color publication includes photos of 11 different species and shows stink bug damage to crops. The laminated, waterproof guide fits in a shirt or jeans pocket. Request hard copies from the Northeastern IPM Center (NortheastIPM@cornell.edu), or download the guide from www.sripmc.org/NewsAlerts/Stink_bug_ad.pdf.

Leafcutter bee. Photo by David Cappaert, Michigan State Univ., Bugwood.org

Managing Alternative Pollinators: A Handbook for Beekeepers, Growers and Conservationists, by Eric Mader, Marla Spivak, and Elaine Evans. This guide includes 135 full-color photos and detailed information on rearing and managing bumble bees, mason bees, leafcutter bees, and other alternatives to honey bee pollinators. Beekeepers will find information about each pollinator's biology and susceptibility to disease, pests, and chemicals; step-by-step instructions on how to rear and manage alternative pollinators; and an appendix on IPM for beekeepers. The guide tells growers how to match pollinators to crops and how best to pollinate for successful agricultural production and pollinator protection. Conservationists will learn what can be done to protect pollinators and our food systems. $23.50; 160 pp. Available in March 2010 at **www.nraes.org/nra_map.html**.

Video and Website

The Tenant's Role in IPM. Residents in multifamily housing are learning how to practice IPM in their homes, thanks to a new video our Center has developed through the IPM Training in Public Housing Authorities project. Property managers share this video with residents at community meetings, during housekeeping training, or when they renew their leases. English and Spanish versions are available at **www.stoppests.org/for-residents.htm**.

Have you seen these ants? People unknowingly introduce European fire ants via potted plants, soil, or other organic materials. Photo courtesy of Drummond & Groden, Univ. of Maine

IPM of European Fire Ants in Urban and Suburban Landscapes. The European fire ant, or European red ant, is the most aggressive invasive ant in the Northeast. These insects thrive in cold climates and can inflict painful stings on people, pets, and other animals. A new website developed by Eleanor Groden (Univ. of Maine) contains basic information about the ant, as well as data from research funded by the Northeast Regional IPM Competitive Grants Program. Groden's team is working to provide additional information for the public and pest management professionals in the use of IPM techniques to manage pestiferous ants. Visit the site at **sbe.umaine.edu/fireant**.

Thriving on IPM

Fresh ideas and strong relationships keep this farm vibrant

Don Dzen has never been happier with his berries and pumpkins. "The quality is the best ever," says the Connecticut grower, whose 300-acre farm has been the family business for three generations.

Last year's cold, wet growing season and sagging economy left many northeastern farmers disappointed, which makes Dzen's satisfying harvest all the more impressive.

"In a year that was abysmal, he came through with better numbers and a higher quality product," observes Michael Rozyne, founder of a nonprofit called Red Tomato, which helps farmers sell their sustainably grown produce to supermarkets, distributors, and other buyers.

Dzen's success may be rooted in relationships that give him an edge in the science and business of farming. For example, Red Tomato's network has been helping him reach new markets for nearly seven years, and Dzen has been influenced by Rozyne's emphasis on innovative, ecological farming practices, as well as on quality.

Cultivating such a partnership isn't easy. It takes time, open minds, and excellent communication. Rozyne says it also requires "the least tangible quality in business, and probably the most important: *trust*." This, Rozyne believes, is Dzen's strength.

During the growing season, the two men talk on the phone early each morning to assess conditions in the market and on the farm. "You put your heart into your farm, so it's hard to hear feedback that might sound like criticism," reflects Dzen. "But you have to listen to new ideas. It makes you a better grower."

Exchanges like these kindled Dzen's interest in new IPM methods. One innovation is found in his greenhouse, where long benches are pitched at an angle, allowing water to flow downhill through plant beds. The sloped benches conserve water and energy, and they eliminate standing water that can increase risk of plant disease. "They make a big difference for botrytis," he explains, "and extra water flows out of the greenhouse, not onto the floor."

The benches were recommended by the Natural Resources Conservation Service (NRCS) through its Environmental Quality Incentives Program (EQIP), which offers training and financial incentives to growers who adopt conservation practices and IPM tactics.

In 2008, Dzen learned about the three-year program through UConn's vegetable IPM coordinator, Jude Boucher. Enrolling in EQIP formalized Dzen's relationships with IPM specialists in the state, including fruit IPM coordinator Lorraine Los.

"I thought the IPM training would help a little, but it's been more effective than I ever thought," says Don Dzen, shown here with NRCS soil conservatist Abbie Cadman (center) and Connecticut IPM Coordinator Ana Legrand.

"I had thought I was doing quite a bit of IPM, but I realize it wasn't much at all," says Dzen. "Now we're doing a whole lot more, and it's not a lot more work."

Los advises him on strategies for protecting his berry crops, including pheromone trapping and scouting for tarnished plant bug and blueberry maggot. Like Rozyne, she is impressed by Dzen's initiative and his receptiveness. "Don is remarkably committed to learning new ways of managing pests, and to connecting with people who can help him expand his knowledge," she says.

Fresh ideas flow both ways in this new set of relationships. After Dzen explored the use of netting to protect his blueberries from hungry birds, NRCS agreed to provide cost sharing for netting based on his request.

Dzen is convinced expanding IPM on the farm was a good decision. "Each year there's been something that paid for itself," he says, "something we were missing before." This year, he plans to incorporate more cultural practices, rotating his pumpkins and strawberries and building up organic matter in the resting fields.

AFRI Commits $800 Million for New Grants

This spring, the National Institute of Food and Agriculture will request applications for the 2010 Agriculture and Food Research Initiative (AFRI).

In 2010, grants will be larger and last longer than in the past. Projects are expected to achieve significant and measurable outcomes and goals in "societal challenge" areas that include keeping U.S. agriculture competitive, improving food safety, securing our energy future through renewable biofuels, and mitigating and adapting agriculture to variations in climate.

IPM projects are highly relevant to many of AFRI's priority areas, which include plant health and production; animal health and production; food safety, nutrition, and health; renewable energy, natural resources, and environment; agriculture systems and technology; and agriculture economics and rural communities.

Up to $5 million will go toward pre- and postdoctoral fellowships aimed at cultivating the next generation of agricultural scientists, educators, and practitioners.

For more information, visit www.nifa.usda.gov.

Beetles v. purple loosestrife

Can these natural enemies slow the invasion?

Galerucella *beetle on a purple loosestrife leaf. Photo by R. Casagrande*

The vivid flower spike of purple loosestrife is common in wetlands across the northern United States, but the colorful flowers belie the destructive power of this invasive plant. As it spreads, purple loosestrife chokes out native foliage, destroying precious wetland habitats. IPM programs in the Northeast have recently enlisted the help of three of the plant's natural enemies to slow the spread of this weed.

Purple loosestrife was accidentally imported from Europe, so researchers looked there for the plant's natural insect predators. In the late 1980s, a multinational team began rigorous screening of 120 insects and ultimately found three to be suitable for release in the United States. These species showed a strong preference for eating purple loosestrife, meaning that other types of plants would be unaffected by their presence.

In Rhode Island, Lisa Tewksbury and Richard Casagrande (Univ. of Rhode Island) have tracked the effects of the three species in a wetland where purple loosestrife had taken over. Two beetle species, *Galerucella calmariensis* and *Galerucella pusilla*, quickly became established at the site. These small beetles reproduce yearly, and the larvae feed on leaves, stems, and buds. Within four years, they had significantly inhibited the growth of the original stand of purple loosestrife.

At the University of Connecticut, Donna Ellis oversees a program through which 700 volunteers raised *Galerucella* beetles for purple loosestrife control. Since 1995, this group has released 1.5 million beetles at more than 100 sites statewide.

Researchers continue to explore the exact benefits of this biological control approach. According to Tewksbury, there may be limitations to the beetles' effectiveness; for example, their impact seems to be more significant in sunny, open areas. Several federal, state, and private groups help to monitor the success of this control strategy.

"This project may provide an important way to tackle the problem of trying to restore a more natural wetland area," explains Tewksbury. With a tool to fight purple loosestrife, researchers hope to give native plant species new opportunities to thrive in wetland areas.

— Written by Danya Glabau

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