integrated pest management

Northeastern IPM Center

insights

Fall 2009

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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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Advancing on Apple Pests

In a $390 million industry...

Apples, a quintessential symbol of the harvest, are the most valuable and widely grown tree crop in the Northeast. Thanks to a long, productive history of apple IPM research and education, most of the region's apple growers use some form of IPM tactics. Even so, reductions in the use of toxic chemical products have plateaued in recent years.

Now momentum is gathering to take apple IPM to the next level. With Northeast IPM funds, researchers, educators, and growers are partnering to synthesize current knowledge and create an advanced IPM system that would enhance profits and sustainability.

"Now take the apple, dearie!" Apple maggots can't resist these toxin-coated traps, which protect fruit without the use of sprays. Photo by Starker Wright.

We know the priorities

Apples are vulnerable to dozens of insects and diseases, but a few in particular account for most of the pesticide use in orchards. The plum curculio and apple maggot fly are still often managed with multiple treatments of organophosphates (OPs) each season (sprays targeting apple maggot are the most prevalent source of OP residues on fruit). Sooty blotch and flyspeck (SBFS), one of the most damaging apple disease complexes in this region, is usually managed with fungicides that may pose health risks.

We have the technology

In 2008, entomologist Tracy Leskey (Appalachian Fruit Research Station, WV) worked with New England growers to evaluate attract-and-kill strategies for managing plum curculio and apple maggot fly, building on the work of IPM pioneer Ron Prokopy. Leskey's odor-baited plum curculio lures drew insects to specific trees at the orchard's edge, which were then treated with insecticide. This approach reduced the number of trees sprayed by 93% compared with full-block sprays and by 70% compared with perimeter row sprays. Spherical apple maggot traps (designed by support entomologist Starker Wright) attracted flies and then killed them with a toxic coating, allowing the growers to eliminate insecticide treatments for that pest while protecting fruit as effectively as standard insecticide sprays.

Meanwhile, plant pathologist Daniel Cooley (Univ. of Massachusetts) formed a multiregional working group of SBFS experts, who collaborated to develop a shared understanding of the complex and identify an optimal management approach.

Some growers, like members of the Eco Apple program, have worked closely with Cooley and Leskey and already use many of these sustainable strategies.

More effective. More sustainable. Better.

This year Cooley, Leskey, and colleagues from Cornell are launching a new project, drawing from several studies to bring together the most promising apple IPM tactics in a single management system. With collaborators from seven states, they hope to develop a system of advanced IPM tactics that could end the use of OPs for apple pests, minimize pesticide use in general, and move the region toward practical biointensive alternatives. The system would target the pests discussed above, as well as apple scab, leafrollers, and internal Lepidoptera. A key goal is to expand commercial use of successful tactics through web-based outreach, farm demonstrations, and grower meetings. This unified system of proven strategies and effective tools would empower growers to meet consumer demands for high quality fruit that is grown sustainably in our own region.

IPM Grants: Apply by December!

The Northeastern IPM Center is pleased to announce the availability of $450,000 in funding for 2010 through the IPM Partnership Grants program, which is supported by the National Institute of Food and Agriculture. Applications are due Monday, December 14.

IPM Partnership Grants fund projects that foster the development and adoption of integrated pest management. There are five project types:

- **IPM Working Groups**
- **IPM Issues**
- **Regional Publications**
- **IPM Planning and Assessment Documents**
- **IPM Minigrants**

Anyone in the Northeast may apply. We encourage submissions from private individuals, public and private institutions or organizations, businesses, and commodity groups. The primary project director must be from the northeastern region.

A full Request for Applications is linked from NortheastIPM.org. If you have questions about the program, please contact grants manager John Ayers, Co-director of the Northeastern IPM Center, Pennsylvania State University (phone 814-235-0688; email jea@psu.edu).

Late Blight Q&A

Planning for next year

The 2009 gardening and farming season will be remembered for its widespread outbreak of late blight, *Phytophthora infestans*, in tomato and potatoes. Home gardeners and farmers can take steps to prevent this disease from surviving the winter and prepare for a healthy crop next year.

Why was late blight such a serious problem this year? The late blight fungus spreads fast, rapidly producing spores that travel on wind currents to infect other plants and nearby fields. This year, the disease was reported over a broad portion of the country very early in the season. Infected plants may have been distributed to large local retail stores throughout the Northeast. To make matters worse, cool, damp weather conditions in much of the region were ideal for development and spread of the disease for a period of 6–7 weeks from early June until late July.

Late blight brought heartache to many a northeastern gardener and tomato lover in 2009. Photo by Ruth Hazzard.

How can I prevent late blight from surviving the winter? The late blight fungus needs live plant tissue to survive. Tomatoes will not carry late blight over the winter because freezing kills the whole plant. Even seeds from fruit that was infected will not carry the pathogen, so you can still use your own seed to start next year's crop. Late blight will not survive on tomato stakes and cages. Even so, other tomato plant diseases (such as *Septoria* leaf spot) *can* overwinter on dead tissue or stakes, so it's wise to do thorough cleanup of all tomato plant debris.

Potatoes are trickier because infected tubers can carry the pathogen into the next spring if the tubers don't freeze or decay during the winter (e.g., if left several inches down in the soil at harvest, or in a compost pile that doesn't fully decompose or freeze). Try to do a thorough job harvesting potatoes, and incorporate any remaining vines and leaves into the soil (the soil environment speeds decay). Composting also works, but be sure to keep the pile heating till plant material is fully decomposed.

What should I do next spring? Select disease-resistant tomato varieties for at least some of your crop, and use disease-free seed. "Mountain Magic," "Plum Regal," and "Legend" are three varieties with resistance or tolerance to late blight. Grow your own tomato transplants or purchase from a reputable grower to ensure a healthy start next season. Inspect all transplants for stem, petiole cankers, or leaf blight before planting.

Don't save potato tubers as seed to be planted next spring if you had late blight symptoms in your garden this year. Instead, purchase certified disease-free seed from a reputable source (ask your supplier whether their source was inspected for late blight). Check last year's potato plot and any compost piles for "volunteer" potato plants that might come up. If you do find plants and buried tubers, dig them up and destroy them.

During the growing season, pay attention to weather conditions and pest alerts to find out whether late blight has been observed in your area, and what actions you need to take to protect your crop.

More on late blight prevention and management

- Comprehensive fact sheet: www.nysipm.cornell.edu/publications/blight/files/late_blight.pdf
- Gardener's checklist: www.umassvegetable.org/LateBlightAlertforTomatoandPotato.html
- Tomato disease key: vegetablemdonline.ppath.cornell.edu/DiagnosticKeys/TomKey.html
- Organic management: www.umassvegetable.org/documents/OrganicLateblightMgtAug09.pdf
- Alerts/forecasts for your area (check local Extension offices): www.csrees.usda.gov/Extension

Adapted from "Late blight management for fall, winter and spring," Ruth Hazzard, UMass Extension Vegetable Program

Rice Is Nice

Especially When Locally Grown

by Carrie Koplinka-Loehr

Rice paddies in Vermont? At 900 feet above sea level? More than 40 skeptics and believers from New England and New York flocked to Earthbridge Farm last July to see, touch, and learn about cold-tolerant varieties at the Sustainable Rice Production for the Northeast workshop.

Rice, a grass known botanically as *Oryza sativa*, is a tropical plant that has been adapted to temperate areas of the world, such as northern China, northern Italy, Poland, Russia, and Hokkaido, Japan. Until two years ago, paddy rice hadn't been successfully grown in parts of New England where the last frost occurs in May and the first frost in mid-September. So why the interest now?

To construct a 6-inch deep paddy, Takeshi Akaogi removed the topsoil to the hardpan, graded the land, and returned the soil. He applies composted chicken manure for nitrogen, which is essential to growth.

Rice production is alluring both to locavores and to growers seeking ways to get production from marginal lands. The paddies diversify the landscape, attracting amphibians, water birds, and beneficial insects, and they buffer nearby wetlands. Most of all, a one-acre paddy will typically yield 2–4 tons of rice, more than twice the average yield of nonirrigated wheat.

So what do you need to grow rice? Sunshine, a reliable source of water, and a soil that will hold it. Takeshi and Linda Akoagi had all three.

In 2006, with assistance from the Natural Resources Conservation Service (NRCS), the Akaogis constructed a small rice paddy at their diversified farm in Putney, VT. The first year the plants grew well but didn't produce seed. In 2007 they added two paddies (increasing production to 1/10 of an acre) and received a grant from NE-SARE to determine if rice could be grown commercially. They identified 25 temperate varieties, many from Hokkaido, that produced seed. In 2008 they planted and studied three varieties, which yielded an average of 5,847 pounds of rice per acre.

The Akaogis evaluated 31 rice varieties for lodging, sterility, shattering, and overall suitability. So far they have no pest problems, but they are careful. To prevent the spread of insects, they freeze the rice for three days before germinating it.

Now the Akaogis are spreading the word. In the past two years they've hosted a series of workshops showcasing their rice paddies and their partners, such as rice breeders from Cornell, NRCS personnel, and Extension educators. Growers from surrounding states come to see the proof that rice can be grown productively in the Northeast and has the potential to become a commercial crop.

For more information: www.sare.org/reporting/report_viewer.asp?pn=FNE08-624&ry=2009&rf=1

Although rice can be grown without a paddy, controlled flooding discourages weeds and extends the growing season. The Akaogis warm the water in a solar pond. When temperatures drop toward freezing, they raise the water level to protect the rice.

National Institute of Food and Agriculture

This fall saw the dawn of a new era at USDA as the National Institute of Food and Agriculture (NIFA) replaced the 15-year-old Cooperative State Research, Education, and Extension Service.

NIFA's creation, mandated by the 2008 Farm Bill, is intended to invigorate and strengthen support for food and agricultural science in this country. The Institute's first director is presidential appointee Dr. Roger Beachy, founding president of the Donald Danforth Plant Science Center.

NIFA's unique mission is to advance knowledge for agriculture, the environment, human health and well-being, and communities. NIFA provides program leadership in these areas and helps to fund research, education, and extension at land grant universities and partner organizations at the state and local level.

An important aspect of NIFA's work is to promote a public understanding and appreciation of science, assuring that knowledge is available in the public sector to sustain food, agricultural, and natural resource systems.

Learn more about NIFA at www.nifa.usda.gov.

Six new IPM projects launched in 2009

Northeastern researchers take on invasive vines, fruit fungi, root rot, and more

Each year, the Northeast Regional IPM Competitive Grants Program funds research, extension, and education projects that help to put our best scientific knowledge to use in the real world. Funding for this program comes from the National Institute of Food and Agriculture. In 2009, the program awarded $595,000 to support six projects:

- Combined resistance to late blight, early blight, and *Septoria* leaf spot in tomato, and complementary fungicides for northeastern and other temperate U.S. production zones (Martha Mutschler, Cornell Univ.)
- Biological control of swallow-worts in the Northeast (Richard Casagrande, Univ. of Rhode Island)
- Prioritizing cover crops for improving root health and yield of vegetables in the Northeast (George Abawi, Cornell Univ.)
- Improving the control of mummy berry disease while decreasing the use of fungicides in wild blueberry production of Northern New England (Seanna Annis, Univ. of Maine)
- Development of advanced IPM for northeastern apples (Daniel Cooley, Univ. of Massachusetts)
- Using webcast training to advance interdisciplinary approaches to small fruit pest management (Marvin Pritts, Cornell Univ.)

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Late summer flowers at Coonamessett Farms, E. Falmouth, MA