INTEGRATED PEST MANAGEMENT

Insights

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Integrated Pest Management

Northeastern IPM Center

Insights

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Inside

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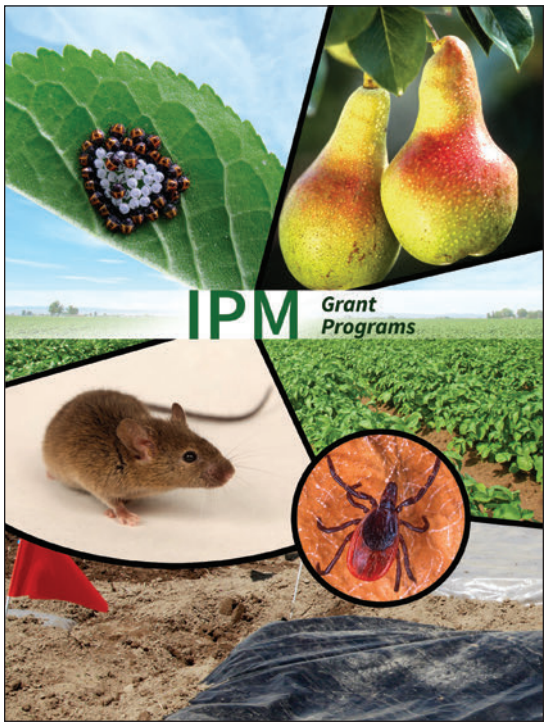
Northeastern IPM Center Announces 2022 Grant Recipients

Funding to be distributed through two grant programs

The Northeastern Integrated Pest Management (IPM) Center has announced its grant recipients for 2022.

Most years, the Center announces a list of projects funded through its Partnership Grants Program. This year, funding is also being awarded through the Center's Pest Management Strategic Plans and Production/Management Profiles Grants Program.



About the Grant Programs

IPM Partnership Grants

Each year, through a competitive request-for-applications (RFA) process, the Center's IPM Partnership Grants Program distributes funding to projects that further the mission of the Center, address or identify IPM priorities for the Northeast, and benefit the region at large.

The total funding distributed under the program this year is roughly $100,000, which is less than usual because the Center is reaching the end of its own current funding cycle. As a result, this year's funded projects are limited to one year.

Each funded project falls under one of three categories: **applied research**, **communications**, and **working groups**.

Supporting Projects Across the Northeast

The Center's remit includes fostering IPM adoption throughout the Northeast, which includes 12 states and the District of Columbia. As such, the Center makes every effort to ensure that the funding it distributes equitably serves the interests of the entire region, and each year, prospective project directors (PDs) throughout the Northeast are encouraged to apply.

The infographic (see Page 2) shows how the Center has awarded Partnership Grant funding, by state, throughout its 2018–2022 funding cycle.

Leveraged Funding: The Indirect Power of Smaller Grants

Projects funded through the Partnership Grant Program often prove highly successful or shine a spotlight on bigger challenges in need of further exploration. PDs and their teams might then use what they have achieved with Center funding to make the case for larger grants that enable them to continue and expand their work.

Through this leveraged-funding approach, between 2018 and 2022, Partnership Grant recipients have used $560,490 in Center funding to leverage $12.7 million in additional funding for the PDs, their partners, and their institutions. That represents a 1-to-23 rate of return.

The power of leveraged funding is perhaps most strongly illustrated by the broader efforts against two

See "Grants" on Page 2

of the most concerning invasive species to proliferate in recent years: the brown marmorated stink bug and the spotted lanternfly. Projects dedicated to combating both pests began as Center-funded working groups that later went on to secure Specialty Crop Research Initiative funding directly from the USDA's National Institute of Food and Agriculture—the same agency that funds the Center—to continue their work.

> The Center's remit includes fostering IPM adoption throughout the Northeast, and it makes every effort to ensure that the funding it distributes equitably serves the interests of the entire region.

Pest Management Strategic Plans and Production/Management Profiles

The Pest Management Strategic Plans (PMSPs) and Production/Management Profiles (PMPs) Grants Program aims to fund new and updated PMSPs and PMPs.

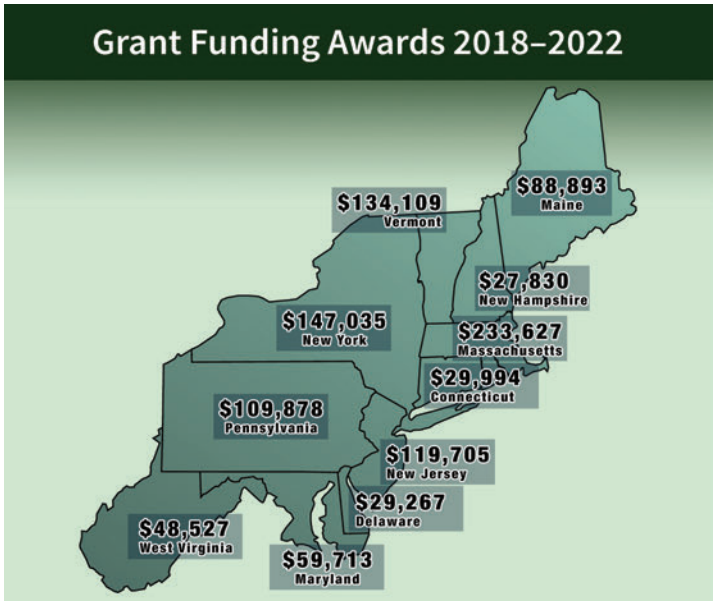
PMSPs and PMPs, Defined

PMSPs are developed with a regional group of growers and other stakeholders in the Northeast to identify the needs and priorities of a particular commodity, system, or setting requiring pest management. The plans document current pest-management practices and those under research-and-demonstration trial development.

PMPs provide the production or management story, including current pest-management practices, for a particular system—such as production of an agricultural commodity—and look at current research activities directed at finding IPM strategies.

Coordinating Funding Opportunities

The Center typically funds PMSPs and PMPs outside the Partnership Grants cycle, but last fall, both were announced concurrently in hopes of eliciting a broad array of suitable applications.



This PMSP/PMP RFA specifically sought plans for crops, livestock, forestry, or other systems that do not have a plan, or for updates to outdated PMSPs or PMPs (those that are more than five years old), and offered a total of $30,000 in funding with a maximum of $15,000 per award.

"This is the first time in a number of years we've had the opportunity to incentivize the development of new or updated PMSPs and PMPs," said Deborah Grantham, Center director. "The plans chosen for funding—along with the new projects selected through our IPM Partnership Grants Program—illustrate both the need and the capacity for IPM-driven solutions in the Northeast."

List of 2022 Grant Recipients

Partnership Grants

This year's funded projects all fall under the **applied research** and **communications** categories.

Applied Research

- **Educating the next generation of extension through experiential learning of applied research through evaluating of efficacy and financial viability of water sprout removal for pear psylla IPM in three New England states** (*Elizabeth Garofalo, UMass Amherst*)
- **Operationalizing eDNA technology for disease vector mosquito surveillance and control** (*Allison Gardner, University of Maine*)
- **A systems approach to developing IPM for cattle producers in the Northeast; social, environmental, and economic analyses** (*Heather Darby, University of Vermont and State Agricultural College*)

Communications

- **IPM is for everyone: Enhancing the reach and impact of a virtual IPM education series** (*Matt Frye, New York State IPM Program, Cornell University*)

Pest Management Strategic Plans

- **Production/management profile for arthropod pests of horses in Maine** (*Allison Gardner, University of Maine*)
- **Hemp production/management profile for New York State** (*Marion Zuefle, New York State IPM Program, Cornell University*)

> "This year's funding recipients illustrate both the need and the capacity for IPM-driven solutions in the Northeast."
> *– Deborah Grantham, director, Northeastern IPM Center*

Future Funding Opportunities

The Center typically releases its annual Partnership Grants RFA sometime in the fall. Stay tuned for further details.

To learn more about the IPM Partnership Grants Program, visit neipmc.org/go/bfgs.

Program Conducts Measurable Outreach Against Spotted Lanternfly

By Megan Pistolese, SLF Spotters Program Coordinator, SLELO PRISM

The St. Lawrence Eastern Lake Ontario Partnership for Regional Invasive Species Management (SLELO PRISM) has developed a targeted and measurable strategy for spotted lanternfly (SLF) outreach in New York State. This program is designed to educate the public about their role in limiting the spread of SLF and, in turn, the damage it can cause.

The invasive SLF is expected to have a significant impact on agricultural and tourism industries. But one of the greatest challenges this pest presents is its capacity to spread, often through unwitting human assistance, and its range has gradually expanded into other northeastern states, even establishing a foothold in the Midwest

With SLF confirmed in multiple New York counties, SLELO PRISM has developed programming to encourage travelers to check their vehicles and any other equipment on which SLF adults and egg masses may hitchhike. It is vital to raise awareness and engage with businesses and other organizations who can help reach travelers and others who may unknowingly spread SLF.

Measured Outreach

Many outreach initiatives throughout the affected area have engaged the public about SLF, but how do we know if these strategies to raise awareness are effective and if target audiences are being reached?

SLELO PRISM's Spotted Lanternfly Spotters Program provides a platform to enhance awareness by engaging businesses and tracking reach. The program webpage (www.sleloinvasives.org/spottedlanternflyspotters/) provides tools to engage with local businesses, links to obtain SLF outreach materials for distribution from state agencies, and a social media toolbox with premade SLF graphics.

To help evaluate the impact of SLF outreach, the program has developed trackable QR code sticker labels that can be printed and placed on outreach materials. The code links to an online survey. The answers to the survey can be used to measure the effectiveness and impact of SLF outreach efforts across the state.

The survey also provides a means to solicit a commitment from recipients of the materials to check their vehicles and other equipment for SLF adults and eggs, to destroy any SLF they find, and to report findings to the New York State Department of Agriculture and Markets at spottedlanternfly@agriculture.ny.gov.

Further Information

Learn more about this program on the SLELO PRISM website at www.sleloinvasives.org/spottedlanternflyspotters/. Or contact the SLF Spotters program coordinators—Megan Pistolese (megan.pistolese@tnc.org) and Brittney Rogers (brittney.rogers@tnc.org) of SLELO PRISM—with any questions.

For more information on the spotted lanternfly, including a frequently updated county-by-county map of confirmed SLF locations, visit StopSLF.org. The website is managed by the Northeastern IPM Center, provides a wealth of information on SLF, and reflects the ongoing work of a USDA-NIFA Specialty Crop Research Initiative project dedicated to combating this invasive pest. The project developed from a working group initially funded by the Center in 2018.

Pest-Mating Disruptors and IPM Lead to Better-Quality Fruit

By Marcia Anderson, PhD, LTE
U.S. EPA-Center for Integrated Pest Management

Taking a spring ride in the country, I pass numerous fruit orchards, whose flower petals fall across my windshield like giant snowflakes.

Photo 1. Apple blossoms in spring bloom. (Photo: Creative Commons)

I am reminded of a time, a generation ago, when growers sprayed pesticides in the spring in orchards and on farms throughout the nation. Farmers would spray for pests, such as codling moths, before the trees' buds broke in the spring, then every 7–10 days thereafter.

The spraying occurred whether the pests were there or not because scouting crops for pest levels was not an established strategy. It eventually became clear that pests don't carry calendars and that their emergence varies from year to year. This validated the need for alternate pest-control methods, including monitoring.

Researchers, in collaboration with farmers, have developed more targeted responses based on differences in pest emergence and life cycles, while calendar spraying has become less prevalent.

> Spraying occurred whether the pests were there or not because scouting crops for pest levels was not an established strategy. It eventually became clear that pests don't carry calendars and that their emergence varies from year to year.

Using Traps to Monitor, Control Pest Populations

Because fruit season approaches with warming weather, it is no news that codling moths (*Cydia pomonella*) and the oriental fruit moth (*Grapholita molesta*) will soon follow. Today's growers monitor certain pests with the aid of traps designed to include a chemical lure to attract the targeted pest. The lures are often synthetic copies of the pheromones that females emit to attract the males for mating.

Photo 2. A red sphere trap hangs in the upper canopy of an apple tree. (Photo: GardensAlive)

In apple orchards, traps such as the one pictured in Photo 2 are hung in the trees. The bottom of the trap is coated with an adhesive to capture the male insects. The normal distribution per full-size tree is six sphere traps. The traps should be hung in the upper third of the canopy and will keep attracting and catching moths for an entire growing season. These are an effective control tactic for apple pests in lieu of pesticide applications.

There are similar sphere traps made for peaches and other trees. Likewise, there are similar mating disruption systems for oriental fruit moths, dogwood borers, peach tree borers, leafrollers, and stink bugs. These pheromone mating disruptor systems come as spirals, ropes, tubes, spray dispensers, clips, and distributors that can be draped or twist-tied onto tree branches. (See Photo 3.)

Photo 3. Sample mating disruptors hung in fruit trees. (Photo: Sentry.com; Gemplers)

Altering Pest Behavior through Pheromones

Did you know that warm temperatures in the orchard can cause codling moths and other pest populations to double in a month by triggering females to lay more and stronger eggs? This behavior is attenuated by EPA-registered pheromones.

The male moths follow the pheromone plume to the dispenser, so by the time the males find the females, the females are older and not as reproductive.

Many of the EPA-registered mating disruptor products contain the behavior-modifying pheromone Dodecadien, which is the mating-disruption pheromone affecting the behavior of codling moth, oriental fruit moths, and more.

There are also a number of EPA-registered behavior-modifying pheromones that disrupt the mating communication between adult male and female codling moths, shuck worms, fruit moths, borers, and seed worms. Traps may also be baited with the scent pheromone for the Asian stink bug (*Plautia stali*), harlequin bug (*Murgantia histrionica*), and brown marmorated stink bug (*Halyomorpha halys*).

These are all good pest-population-monitoring strategies that can be used from emergence to late season.

Monitoring Informs Management Decisions

With regular trap monitoring (Photo 4), growers gain an accurate assessment of how many moths are out in the orchard, which in turn helps them determine if and when further treatment is necessary.

When a moth is caught, growers know that the first generation (the overwintering generation) has flown. Then, they can calculate the number of days for the first-generation eggs to hatch. At that point, growers make a decision for action. More traps provide more information and control and allow growers to make better decisions.

It is best to treat large orchard blocks with a quantity of mating

Photo 4. Pheromone trap. (Photo: Bugwood.org)

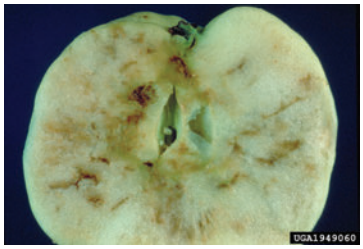


Photo 5. Apple maggot damage. (Photo: E.H. Glass, NYS AES, Bugwood.org)

Photo 6. Apple with a codling moth worm. (Photo: Ward Upham, Kansas State University, Bugwood.org)

Photo 7. Apple scab—a persistent fungi in orchards. (Photo: Cornell.edu)

disruptors and associated traps, hung early in the spring, so pests are caught as they emerge.

Because codling moths like to congregate, they create "hot spots." Monitors can indicate to growers where these "hot spots" are located, thus showing where more mating disruptors and/or other control devices should be deployed.

Incorporating Pesticides into a Plan

Another effective use of pheromones is in conjunction with a small dose of pesticide. This is an extremely effective and low-cost control to disrupt mating behavior of apple maggots, which are small flies that lay their eggs in fruit. The maggots hatch and eat the fruit (Photo 5). Sometimes, you do not see them until you bite into the fruit.

> When an apple maggot lands on the pheromone trap, it ingests the insecticide, which causes the females to cease laying eggs and eventually die. In this way, the amount of insecticide needed is reduced.

Pheromone traps can be used to capture apple maggot flies. A red plastic ball with an apple odor in the center resembles an apple hung on a tree that visually and chemically attracts the adult apple maggot. Growers also use an insecticide on top of the fake apple. When an apple maggot lands on it, it ingests the insecticide, which causes the females to cease laying eggs and eventually die. In this way, the amount of insecticide needed is reduced.

IPM in Orchards

Apple growers have found that scientifically based integrated pest management (IPM) practices have positive, long-term effects on their orchards.

Minimize Risk, Maximize Outcomes

IPM programs in fruit orchards use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information—in combination with available pest control methods—is used to manage pest damage by the most economical means and with the least possible hazard to people, property, and the environment.

IPM takes advantage of all pest management options, including inspection and monitoring for pests, the sanitation and maintenance of the orchard and trees, cultural practices like traps, and the use of reduced-risk pesticides such as pheromone traps. IPM dictates that insecticides be used judiciously as part of an overall pest management program.

There is also an economic impact when growers use IPM. They stand to reduce their two highest bills—chemicals (pesticides and fertilizers) and fuel—when they follow the five components of IPM:

- Pest prevention
- Pest identification
- Setting of economic thresholds for each pest
- Pest population dynamics and damage monitoring
- Using a combination of management tools

> IPM dictates that insecticides be used judiciously as part of an overall pest management program.

Increased IPM Adoption for Tree Fruits

IPM has become increasingly ingrained in apple and other fruit tree pest management plans over the past 30 years because most growers live right on their farms. Apple growers have found that the most effective way to control their pests is by using IPM practices that have positive, long-term effects on their orchards.

Therefore, growers monitor their orchards weekly from the beginning of spring through the entire growing season to determine pest pressures. The growers and crop consultants become intimately familiar with their location and learn about past disease, pest pressures, and the ecology of their orchards.

Keep It Clean

Maintenance and sanitation are key parts of preventing pests in fruit orchards. Every year, growers follow a rigorous routine in the fall by cleaning the orchard floor, cutting suckers off tree trunks, and clearing weeds from under the trees. Fallen leaves, grass clippings, and winter prunings are mulched and returned to the soil.

By chopping the leaves into small bits, they hasten decomposition and reduce overwintering options for the pests. This reduces the pest populations that will be in the orchard in the next spring.

See "Disruptors" on Page 7

Learn about Tarping on Northeast Farms with New Guide

By Stephen Stresow, Cornell Small Farms Program

A version of this article was first published on the Cornell Small Farms Program website at smallfarms.cornell.edu/2022/02/learn-about-tarping-on-northeast-farms-with-new-guide/.

Are you curious about how tarps work? Want to learn from successful practices as well as the challenges and shortcomings? The Cornell Small Farms Program's Reduced Tillage project is happy to share a new publication, "Tarping in the Northeast: A Guide for Small Farms" (extension.umaine.edu/publications/1075e/), that provides comprehensive information on the emerging practice of tarping—applying reusable tarps to the soil surface between crops and then removing them prior to planting—for weed and soil management. This guide is intended for both beginning and experienced farmers.

Tarping Guide Project Origins and Team

The guide is a product of a working group on tarping and soil solarization funded by the Northeastern Integrated Pest Management (IPM) Center through the Partnership Grants Program. The project, led by Sonja Birthisel at the University of Maine, brought together institutions, educators, and farmers across the Northeast to connect the dots on what was happening with tarping in the region, share resources, identify knowledge gaps, and discuss future research directions.

The guide was a collaborative effort authored by Birthisel in conjunction with Natalie Lounsbury at the University of New Hampshire, Jason Lilley at UMaine Extension, and Ryan Maher, our reduced tillage project specialist.

Management Practices, Other Practical Applications

Based on research and farmer experience, the guide covers a range of management practices–including using tarps for weed seed depletion, minimal tillage, and cover-crop-based no-till—and uses case studies to highlight the methods used by farmers across the Northeast.

By combining the details of tarp logistics and management alongside the science of the practice, the guide is designed to support farmers in learning more about tarping and how to implement it to improve soil and weed management on their farms.

Co-author Maher has led tarping research experiments and worked with farmers to learn how they work and how to use them in reduced and no-till vegetable production.

"Tarps are a really multifunctional tool for small farms that help us get past some of the basic challenges using less tillage," Maher said. "When we ask farmers how they work, we come up with a long list, then add a few jabs about the logistics. This guide puts all this practical information into one place, highlights successful farmers, and adds what we are learning through applied research, where we still have a long way to go to understand what's happening under there."

Further Information

The guide is hosted on the UMaine Extension website as a downloadable PDF at extension.umaine.edu/publications/1075e/.

Tarps being used to cover beds and being integrated into field planning at Centurion Farm (Locke, NY). Photo by Nina Saeli, Cornell Small Farms Program.

The Northeastern IPM Center recently hosted a webinar about the guide presented by project director Birthisel. For more information about the webinar or to view the recording, visit neipmc.org/go/fxHS.

Links to the guide and other tarping resources are on the Cornell Small Farms Program's Reduced Tillage project's tarping webpage at smallfarms.cornell.edu/projects/reduced-tillage/tarping/.

About the Author

Stephen Stresow is a junior in the Cornell University College of Agriculture and Life Sciences studying plant sciences with a concentration in organic agriculture in addition to pursuing minors in soil science and crop management. He managed a vegetable garden as a Master Gardener in high school and has now scaled up that passion to sustainable vegetable production on small-scale farms. He is interested in improving agroecological practices and making them more accessible to farmers with the overarching goal of creating a more resilient food system. After a primarily virtual semester, Stephen is excited to get his hands dirty at the research farm this summer!

About the Researcher

Sonja Birthisel, PhD, is a part-time faculty associate in the School of Forest Resources and Ecology and Environmental Sciences Program at the University of Maine.

Disruptors

Continued from Page 5

Fungal Control through Improved Sanitation

Simply by maintaining this degree of sanitation, growers have also been successful in reducing the presence of apple scab, one of the most persistent pest problems in orchards.

Apple scab comes from a fungal spore that overwinters on the ground (Photo 7) and normally requires a sprayed fungicide in order to arrest its development. Those spores go on the fruit and make leathery-brown scabs that blemish the fruit.

Blemished fruit is of lower quality, so its value is reduced, leading to an economic loss to the grower. Apple scab also damages the tree because it creates leaf lesions that spread and interfere with photosynthesis. A bad scab infection can shut down an entire tree and spreads quickly throughout the orchard.

Proper Nutrition, Other Strategies

Other pest-prevention methods include planting pest-resistant varieties and replenishing nutrients.

Just like people, apple trees need specific nutrients to keep them healthy, and those nutrients enable them to produce quality fruit. When hundreds of bushels of apples per acre are removed annually, it means a lot of nutrients are removed from the orchard soil.

Monitoring soil nutrient levels and adding nutrients, as needed to maintain tree health, is another essential component of IPM. Fruit trees need a wide range of macronutrients (those needed in large quantity to provide energy), including nitrogen, phosphorous, and potassium. Nutrients are added either directly to the soil or through spraying on the tree leaves (foliar application).

Fortunately, many soils in the Northeast have high phosphorous and adequate nitrogen levels. But if nitrogen is needed, it is most often applied through foliar application. Potassium is the macronutrient that needs to be replaced on a regular basis.

By running soil tests and recording the number of bushels of apples that were removed, growers can calculate how much potassium must be added back to the soil. Micronutrients, such as calcium, magnesium, zinc, boron, and manganese, also need to be replenished. These are all added through foliar applications.

Photo 8. Fresh, fall apples ready for picking. (Photo: Creative Commons)

Vary Pesticides to Avoid Resistance

There are a few challenges to keep in mind when implementing IPM, not only in fruit orchards, but when controlling any pest.

If pesticides are used, it is important to rotate them. With any pest population, if you use the same pesticide repeatedly, there are always a few pests that survive, creating a resistant population. The resulting resistance erodes the efficacy of overused pesticides.

Apples as a Case Study

So why should we care about pest prevention and the appropriate use of pesticides on our apples in particular? One reason is that apples are very prevalent in the diets of our children. They're used to make juice and sauce and are eaten raw. They're good for us! Utilizing the scientifically based best practices of IPM, apple growers can now provide us with high quality apples at reasonable prices.

> If you use the same pesticide repeatedly, there are always a few pests that survive, creating a resistant pest population.

Widespread Benefits

Over 90 percent of apple and pear orchards are currently treated with mating disruptors. The next time you eat an apple and do not find a worm, think about your local apple growers and how they are using IPM to provide you with quality produce at reasonable prices.

Webinars Continued from Page 8

Combating Slugs as Pests of Soybeans and Corn

David Owens, University of Delaware; Sally Taylor, Tidewater Agricultural Research and Extension Center

Slugs pose a significant pest problem for growers of seedling grain crops in the Mid-Atlantic region. This presentation explores the biology of the two most common slug species and how we're working to control them. It includes a discussion of pesticides and their shortcomings for slug management, cultural control tactics, and new research currently underway.

Taking a Closer Look: How Strawberry Disease Risk Varies with Microclimates at the Canopy Level

Mengjun Hu, University of Maryland

Row covers serve an important purpose in strawberry production, but they introduce a need to be more granular when taking weather measurements. Researchers found that canopy-level weather sensors produced different data when compared to nearby weather stations, and by conducting efficacy trials, they found that these differences play a role in designing effective fungicide treatments.

Spring Webinar Series

Got an integrated pest management (IPM) question? Need to know the latest IPM information? The Northeastern IPM Center has the answers with our ongoing webinar series, the *IPM Toolbox*. We've asked the experts to join us for an hour of dialogue about an effective IPM practice, method, or effort.

Registered attendees who join in real time have the opportunity to engage in Q&A with the presenters. Recordings are made available for others to watch at their convenience.

To learn more about or register for upcoming webinars or to access recordings of past presentations, visit www.northeastipm.org/ipm-in-action/the-ipm-toolbox/.

Spring 2022 Toolbox Webinars

Tarping in the Northeast: A Guide for Small Farms

Sonja Birthisel, University of Maine

An overview of a newly created guide to tarping for the Northeast, the product of a Center-funded working group on tarping and soil solarization. Working group member and presenter Sonja Birthisel, along with her colleagues, sought to create a thorough and application-oriented guide that identifies best practices and fills key knowledge gaps. It covers many uses of tarps, including stale seedbed preparation, cover-crop termination, and application in perennial systems.

Pesticides: Part of the IPM Toolbox

Mary Centrella & Dan Wixted, Cornell Cooperative Extension Pesticide Safety Education Program

A common misconception about integrated pest management is that it is opposed to pesticides. While it's true that IPM encompasses many non-pesticide management tactics, it recognizes the importance of pesticides as part of its arsenal of pest-control measures. For pesticides to serve their purpose, proper use is critical to reduce risks to applicators and the environment.

See "Webinars" on Page 7

Credits
IPM Insights: Deborah G. Grantham, Director; Mike Webb, Editor; Kevin Judd, Designer. **Northeastern IPM Center:** Deborah G. Grantham, Jana Hexter, Kevin Judd, David Lane, Susannah Reese, Mike Webb.

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