INTEGRATED PEST MANAGEMENT

Insights

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Integrated Pest Management

Northeastern IPM Center

Insights

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Inside

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Center Awards 2020 Grants Supporting IPM in the Northeast

The Northeastern IPM Center has announced the recipients of its IPM Partnership Grants for 2020.

This year's funded projects run the gamut from novel methods for detecting and managing specific pests to ways of better informing the public on the use of IPM methods, helping them to make informed decisions when dealing with pests.

The Program

The IPM Partnership Grants Program provides resources to individuals and organizations proposing projects that further the mission of the Northeastern IPM Center, address or identify IPM priorities for the Northeast, and benefit the region at large. This competitive grants program, begun in 2004, is a key component of how the Center fulfills its obligations to foster greater awareness and adoption of IPM in the Northeast.

Each year's grant cycle starts the previous fall with a request for applications (RFA) disseminated throughout the region. Applicants have included public and private institutions and organizations, businesses, commodity groups, and private individuals.

Project Types

Projects fall under one of three categories: **applied research**, **communications**, and **working groups**, reflecting the multi-pronged strategy key to IPM: managing pests in a way that is effective while also maximizing environmental, human health, and economic benefits.

> "The consistent quality of the applicant pool demonstrates the wealth of expertise and dedication for furthering the field of IPM."
> *– Deborah G. Grantham, director, Northeastern IPM Center*

Center Resources Facilitate Project Success

Funded project leaders partner with Center staff to coordinate ongoing evaluation and communication about their work, its importance, and its results and benefits to stakeholders. In some cases, Partnership Grants function as seed money that project leaders later use to leverage additional funding sources, greatly expanding the scope of their work.

"This year's Partnership Grant applicants represented an impressive array of proposals," said Deborah G. Grantham, Center director. "It's never an easy process to determine which submitted projects will receive funding. But the consistent quality of the applicant pool demon-

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Carpet Beetles in Kindergarten

By Marcia Anderson, PhD; U.S. EPA

A few weeks into the school year, some preschool and kindergarten students went to the school nurse with red welts on their legs. The welts were large and itchy, with a burning sensation. This told the nurse they weren't mosquito bites.

In the coming days, the problem escalated until students from different classrooms were also getting similar welts on their legs. Some students seemed to be affected daily while others in the same classrooms had no welts at all. Students would recover over weekends, only to get worse when they came back to school. This continued for two months.

> Carpet beetles are like bed bugs in that they are very tiny and hard to find. The difference is, bed bugs bite. Carpet beetles do not.

An Elusive Culprit

Mosquitoes, lice, fleas, spiders, bed bugs? The usual suspects were eliminated one by one. The nurse reported the problem and a pest-management professional (PMP) came to investigate.

The PMP suspected carpet beetles because only some children were being affected. Almost everyone has some sensitivity to bed bug bites, but only some people are allergic to carpet beetles. And carpet beetles were just what the PMP found!

Carpet Beetle Basics

Carpet beetles are like bed bugs in that they are very tiny and hard to find; they harbor in bedding, carpets, and piles of clothes, and prefer to feed in dark, undisturbed, protected places.

Bed bug compared with a carpet beetle larva (left). Photo by Dr. Gale E. Ridge, The Connecticut Agricultural Experiment Station.

The difference is, bed bugs bite. Carpet beetles do not.

Carpet beetles regularly invade homes, where their larvae eat a variety of natural fibers like wool, leather, and feathers. Carpet beetle larvae are small, hairy caterpillars that shed their skins as they feed to keep growing.

Inadvertently Inviting the Pest

Through further investigation, the nurse discovered that the reading areas in the affected classrooms had new, natural-fiber carpets installed the preceding summer.

A typical kindergarten classroom. Photo by woodleywonderworks: flic.kr/p/5kUqG8 (CC BY 2.0).

> Vacuuming is the best way to remove the animal hair and lint that serve as food for carpet beetle larvae.

When the children moved around on the new carpets, especially on dry days, there was a buildup of static electricity that caused fine hairs of the carpet beetle larvae to pass though all but the finest weaves of clothes and make contact with the children's skin. This created pin-prick wounds that looked similar to insect bites.

Treat the Problem at the Source

Chemical controls were not needed, as adult carpet beetles do not cause allergic reactions. The prickly hairs of the shed larvae skins do. The solution was simple: remove the allergens (shed skins) and any remaining larvae from the carpets.

The school had the carpets vacuumed and then steam cleaned, and the problem was solved. Placing carpet beetle traps in the classrooms to catch any remaining adults—so there would be no more larvae in the carpets—completed the treatment.

A varied carpet beetle larva. Photo by Ashley Bradford, Maryland Biodiversity Project.

In school or at home, the best way to avoid carpet beetle larvae is through prevention. Vacuuming is the best way to remove the animal hair and lint that serve as food for carpet beetle larvae. Animal-based fabrics should be dry-cleaned or laundered before being stored for long periods. Cleaning not only removes perspiration odors that attract the beetles, it also kills any eggs or larvae.

Safe, Effective Management

A comprehensive integrated pest management (IPM) program includes prevention, sanitation, pest identification, and monitoring, and can be followed by carpet beetle traps. IPM favors cost-effective methods that protect human health and the environment.

The traps use a pheromone to attract and capture the adult male carpet beetles. Traps can be placed on the floor or on a windowsill, or hung in a pantry or closet. The traps are non-toxic and easy to use, and they should be replaced every two months or when they are filled with insects, whichever comes first.

If necessary, there are several pesticides, both synthetic and natural, labeled for use against carpet beetles. When using off-the-shelf products, be sure to read the label carefully and follow directions.

Know the Pests and What Attracts Them

Remember that carpet beetle larvae will eat anything at your school or home that is made of natural fibers—from rugs to clothes to furniture.

If you see a tiny beetle crawling or flying around, examine it closely or get a professional to determine whether it's a carpet beetle. Always contact your facility maintenance staff to determine the most effective means for resolving the problem.

Awards

Continued from Cover Page

strates the wealth of expertise and dedication for furthering the field of IPM. We look forward to working with this year's grant recipients and seeing where their work leads."

Newly Funded Projects by Type

Following is each project receiving Partnership Grant funding for 2020 along with its project director and their host institution.

Applied Research

Early detection of potato leafhopper damage using unmanned aerial systems (*Chandi Witharana, University of Connecticut*)

Necessity is the mother of invention: innovative approaches to northeastern hemp disease management (*Heather Darby, University of Vermont and State Agricultural College*)

Slug and natural enemy phenology in Mid-Atlantic field crops (*David Owens, University of Delaware*)

Communications

Developing multimedia materials to educate health care providers on bed bug IPM (*Changlu Wang, Rutgers University*)

Knowing is half the battle: Increasing awareness of biocontrol as part of IPM through digital outreach (*Amara Dunn, Cornell University*)

Working Groups

A working group on tarping and soil solarization (*Sonja Birthisel, University of Maine*)

For more information on the IPM Partnership Grants Program, visit www.northeastipm.org/rfa/partnership.

For those interested in seeking funding through this program, the Center has just released an RFA for the 2021 round of grants. A quick summary of the program is shown in the table below.

IPM Partnership Grants Program (2021)

Mission	To foster the development and adoption of integrated pest management, a science-based approach to managing pests in ways that generate economic, environmental, and human health benefits.
Total Amount Available	Approximately $200,000
Range of Awards	Max. $50,000. ($60,000 if includes an 1890 institution)
Application Deadline	5:00 p.m. eastern time, Thursday, November 12, 2020
Start Date and Length	March 1, 2021; projects may be 12–24 months
Narrative Length	8 pages plus budget, references, and required forms
For More Information	Visit www.northeastipm.org/rfa/partnership

The Fungus Among Us: Restoring Ecosystems and Controlling Pests

By Marcia Anderson, PhD; U.S. EPA

Remember walking through the forest and seeing mushrooms—the reproductive structures of fungi—growing on rotting tree trunks or decaying woodchips?

One of the main and most well-known benefits of fungi is that they help break down and recycle organic material, making nutrients available for new life. But that is just one part of their multifaceted role in the broader ecosystem.

Familiar Yet Mysterious

I recently received a call from a Head Start program director in the Pacific Northwest asking about mushrooms growing in the woodchips on their playground. She was concerned because toddlers tend to put everything in their mouths, including mushrooms. They roped off the area until the local cooperative extension service identified the mushrooms as being non-toxic.

> Fungi have been around for 1.3 billion years, but we are just beginning to discover many of their benefits.

This interaction served as a reminder of how little most people know about fungi. There is, however, much to discover.

An Invaluable Ecological Role

Fungi have been around for 1.3 billion years, but we are just beginning to discover many of their benefits. Aside from being a culinary treat, certain fungi are key elements in restoring ecosystems and allies in helping farmers protect valuable agricultural crops.

Removing Pollution and Toxins

Although relatively unrecognized, fungi can be powerful tools in pollution remediation through a process known as mycoremediation, which is the use of fungi to break down or remove a range of contaminants, including oils and toxic chemicals, from the environment. This form of biological remediation can filter toxins from stormwater runoff and help clean up industrial oil spills.

These fungi can help us remove or detoxify chemicals, such as polycyclic aromatic hydrocarbons, polychlorinated biphenyls, petroleum compounds, and heavy metals like mercury and lead. How do they remove these chemicals? The fungal mycelium, or vegetative part of the fungus, absorbs and converts the hydrocarbons in these contaminants into carbohydrates.

Research using oyster mushrooms has shown significant pollutant removal from both soil and water in remediation areas. Once used for bio-remediation, the mushrooms are destroyed as toxic waste.

Similarly, turkey tail mushrooms are suitable for mercury remediation, and garden giant mushrooms can be used for *E. coli* removal. Mycobooms, straw rafts containing mushroom mycelium, can absorb oil from water.

Controlling Pests

Fungi are also used as biological pesticides, or biopesticides, that target specific insect pests and plant diseases. Biopesticides are considered less toxic than their chemical counterparts and are comparatively safer, environmentally.

Termed mycoinsecticides, some fungi act as parasites of insects and can protect plants from certain infections and diseases, thereby enhancing crop production.

Plant Pathogens

For example, one biological pesticide used in agriculture is *Trichoderma* spp., a beneficial fungus that colonizes plant roots and outcompetes disease-causing fungi. *Trichoderma* protects plants from soil-borne pathogens in non-food crops, fruiting vegetables, cole crops, legumes, herbs, cucurbits, berries, and small fruits.

A side benefit is that, over time, it stimulates plant growth and increases plant defenses.

Another fungal biopesticide, *Pythium oligandrum*, protects crops and turf from roughly 20 soil-borne pathogens. *Muscodor albus* is a fungal biopesticide that is an alternative to the fumigant methyl bromide. It is used to protect food commodities from post-harvest decay. It is also used on ornamental plants, seeds, and seedlings to protect against soil-borne diseases.

A look at a fungus's mycelial phase. Photo by M. Anderson.

Turkey tail fungus (*Trametes versicolor*) helping to break down a fallen tree. Photo by Francis Gwyn Jones, Bugwood.org.

Destructive and Disease-Vector Insects

Another commercially used biopesticide, *Beauveria bassiana*, is a fungus that acts on insects including aphids, whiteflies, thrips, fire ants, and bed bugs.

The fungal bodies adhere to the insect's exoskeleton and slowly dissolve a hole in the insect's body. The fungus penetrates the body, proliferates, and produces spores that subsequently liquefy the insect's internal organs.

Its slow action allows time for the target insect to pick up the fungal spores and infect the rest of the colony. The best news is that it does not affect non-target organisms.

In tropical countries, manufacturers have combined the use of entomopathogenic biopesticides and insecticide-treated bed nets to control the mosquitoes that carry malaria.

> The growth of the biopesticide market comes in response to the increasing demand for more natural pest control tools.

Sprays of some fungal spores are pathogenic to mosquitoes during specific stages of their life cycle and affect their metabolic and reproduction rates. Fungal infection consequently reduces the mosquito's ability to transmit diseases.

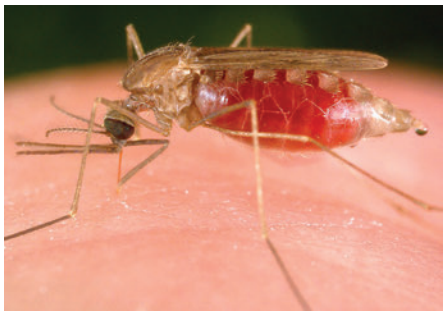
The World Health Organization has been testing the biopesticide *Beauveria bassiana* to reduce malarial transmission. It results in high mosquito mortality and rapid reductions in feeding and flight capability.

Meeting Demand for Pesticide Alternatives

The growth of the biopesticide market, including these fungal-based controls, comes in response to the increasing demand for more natural pest control tools. Biopesticides can complement conventional chemical pesticides and are cost-effective and eco-friendly.

Carpenter ants are the target of a biological pesticide. Photo by David Cappaert, Bugwood.org.

Biopesticides can be incorporated into any integrated pest management (IPM) program, contributing to sustainable pest control and creating a safer, more healthful environment. They embody the IPM principle of dealing with pests in ways that protect human health and the environment through means that are both effective and *cost*-effective.



An *Anopheles freeborni* mosquito pumping blood. Photo: CDC.

Further Information

For more information on biopesticides, visit the EPA biopesticide webpage (www.epa.gov/ingredients-used-pesticide-products/what-are-biopesticides).

In addition, Paul Stamets's TED lecture on mushrooms discusses how mushrooms can save the world (www.ted.com/talks/paul_stamets_6_ways_mushrooms_can_save_the_world).

Call for Submissions and Photos

Do you have IPM-related news or an IPM story to tell? We value the perspectives of growers, implementers, policymakers, and others on the front lines of pest management, and we welcome guest submissions for future newsletter editions.

Whether you'd like to write something new for us or submit something you've already had published elsewhere—given reprint permission from that publication—we want to hear from you!

Do you have high-quality photos of pests, pest damage, pest-management methods, or people demonstrating IPM practices? Your images could help us tell the story—and promote awareness—of current and emerging pest- and pest-management issues.

If we use your photos, they could appear in any of our channels or collateral, including newsletters, brochures, websites, and social media, and you'll be credited as the photographer.

Please visit neipmc.org/go/ncfs for more information.

Katydid on camera lens. Photo by Judy Gallagher, flic.kr/p/ookii1q, CC BY 2.0.

New English & Spanish Resources for Multifamily Housing Residents Available at StopPests.org

By Susannah Reese, program coordinator, StopPests in Housing Program

StopPests in Housing has released three pest-specific resources to help share the IPM message with multifamily housing residents.

Through IPM training and consultation delivered by StopPests to HUD-supported housing, it became clear from participants' feedback that appropriate resident materials were a needed resource.

In response, StopPests created these guides to help housing professionals engage residents in understanding their role in preventing and managing **bed bugs**, **mice**, and **cockroaches** in their homes.

Practical, Accessible Information for a Broader Audience

Often, extension publications have good IPM information for residents but a great deal of text on the biology and natural history of the pests. To low-literacy audiences and non-English speakers, this can be off-putting.

The new picture-based guides were created to show just the basics: how to identify, prevent, and address a pest infestation with safe and effective tools. They visually illustrate what *not* to do—including self-treating—and what you *should* do—such as reporting signs of pests to management—to prevent and control pests.

Since lack of reporting is a major obstacle to effective IPM programs, there is a placeholder for property managers to include contact information to encourage residents to report signs of pests to management.

View or Download Guides

English and Spanish versions of these guides are available for download on the StopPests website as PDF files.

Visit stoppests.org/go/residentguides to view or download the guides.

To peruse more of our information on IPM in multifamily housing, visit StopPests.org.

New York State IPM Program Welcomes New Director

By Melissa Jo Hill, communications specialist and writer, Cornell Cooperative Extension (CCE). A version of this article first appeared on the CCE website and in the Cornell Chronicle.

Alejandro Calixto, formerly head of the Florida Research Center for Corteva Agriscience, is the new director of the New York State Integrated Pest Management Program (NYSIPM). Calixto officially took the reins May 16, following the retirement of Jennifer Grant.

Calixto brings experience with the land-grant system and mission, from extension and research appointments in the Texas A&M University System focused on ecology and management of urban and agricultural insect pests. He received his PhD in entomology from Texas A&M.

> "This is a tremendous opportunity and responsibility for me to contribute to the state of New York and the land-grant university system."
> *– Alejandro Calixto, recently appointed director, New York State IPM Program*

"Dr. Calixto will be a welcome addition to the New York State IPM team, as we continue to reduce risk in agriculture and communities," Grant said. "He brings experience from both academia and industry, including pest prediction systems and invasive species management. He will help lead our efforts in protecting pollinators, pesticide risk assessment, and providing IPM tools to farms, schools, and homes across the state."

NYSIPM and other state IPM programs address pest management issues throughout their respective states, providing research and education to individuals, businesses, and institutions. The New York program is based at Cornell AgriTech in Geneva, New York.

"I am delighted to be joining the integrated pest management team and the Cornell AgriTech family," Calixto said. "This is a tremendous opportunity and responsibility for me to contribute to the state of New York and the land-grant university system, to work towards the adoption of ecologically based principles, and to educate the next generation of citizens on IPM practices."

State IPM Programs and Regional IPM Centers: Localized Expertise and Multistate Coordination

While there is geographic and subject-matter overlap between the state IPM programs and the regional IPM centers, the centers focus more on coordinating and sharing knowledge and resources throughout their multistate regions. Given the state programs' more on-the-ground, extension-focused responsibilities, they are vital partners in the centers' work.

"I am pleased to join New York State IPM in welcoming Alejandro Calixto," said Deborah G. Grantham, director of the Northeastern IPM Center. "The program has consistently distinguished itself as a highly effective advocate and instrument of IPM throughout New York, and under Dr. Calixto's leadership, it is well positioned to build on that legacy. I look forward to collaborating with him."

Learn more about NYSIPM at nysipm.cornell.edu.

Paraquat Label Changes, Training Requirements

By Michael Helms, extension support specialist, Pesticide Management Education Program (PMEP), Cornell University

Users of herbicides containing paraquat—the active ingredient in Gramoxone® and Firestorm® herbicides—need to be aware of recent label changes and new training requirements.

These changes are the result of EPA's 2016 paraquat human-health risk-mitigation strategy.

The newest paraquat labels

- limit use to certified applicators only;
- require certified applicators who use paraquat to successfully complete specialized training every three years;
- require the use of a closed transfer system to dispense concentrate from non-bulk (less than 120-gallon) containers (note: it is estimated this requirement will become fully effective in the fall of 2020);
- prohibit jar testing.

Phased Implementation, Grandfathered Approvals

The new label requirements were implemented in two phases over the past few years. Because multiple labels now exist, EPA is allowing paraquat products with previously approved labels to be used according to label directions until their supplies have been used up.

This means applicators must be sure to read and follow the label directions on the container of the product they are using, including any use limitations and training requirements. Applicators must also make sure the product and label on the product are approved for use in their state.

Training Guidelines

Applicators using paraquat products with a label requiring paraquat-specific training must successfully complete the training before the first use of the product. The training covers paraquat toxicity, the new label requirements and restrictions, and the results of paraquat misuse.

This training is valid for three years and then must be retaken.

Product labels requiring the training will list a website where you can find online training. In-person training for those who cannot use online training may be available through distributors or other organizations.

More information on paraquat training can be found online from the EPA at www.epa.gov/pesticide-worker-safety/paraquat-dichloride-training-certified-applicators.

Pesticide Use Guidance for New York During COVID-19

The following is provided courtesy of Cornell University's Pesticide Management Education Program

Along with the increased use of disinfectants and sanitizers during the COVID-19 pandemic, there has been an increase in adverse health effects from the misuse of these products.

There have also been several fraudulent products produced during this time that potential applicators should be aware of. Please read and share the following warnings and guidelines from Cornell's Pesticide Management Education Program (psep.cce.cornell.edu).

Beware of Fraudulent Pesticide Claims Related to SARS-CoV-2 (the COVID-19 Coronavirus)

Please beware that unregistered disinfectants claiming to protect against the virus are being marketed in the U.S. The efficacy and safety of these products is unsubstantiated and their use is illegal.

Regulators are taking steps to prevent such products from reaching the market, but it is the responsibility of those using these products in New York to use *only* those products designated by the New York State Department of Environmental Conservation for use against SARS-CoV-2, listed at www.dec.ny.gov/docs/materials_minerals_pdf/covid19.pdf. Please check this list frequently, as content is subject to change.

Be Safe Disinfecting Your Home

Disinfectants are pesticides and you may use them only as directed by the label. Therefore:

- **Never** mix different disinfectant products together. Doing so is dangerous. For example, mixing bleach with acids (such as vinegar) or ammonia releases life-threatening toxic fumes.
- **Never** use disinfectants or disinfectant wipes on your skin. Instead, wash with soap and water; you can also use hand sanitizer on your hands.
- **Never** wash fruits and vegetables with soap, sanitizers, or disinfectants, as this could also result in poisoning. Wash produce only in clean water.

For more information on disinfecting your home and how to handle food during this crisis, visit www.cdc.gov/coronavirus/2019-ncov/downloads/disinfecting-your-home.pdf and instituteforfoodsafety.cornell.edu/coronavirus-covid-19/food-safety-recommendation-consumer/.

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

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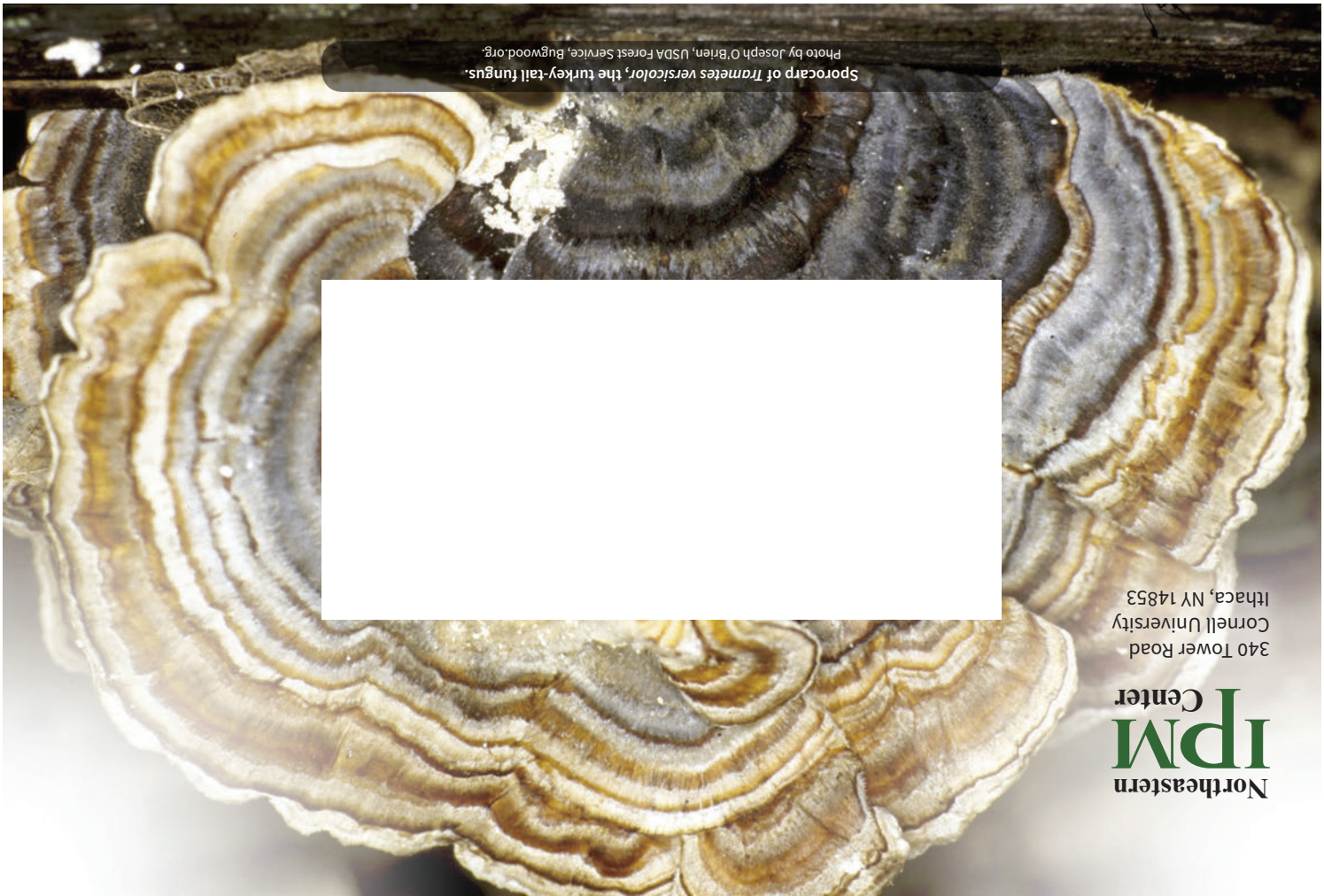

Sporocarp of *Trametes versicolor*, the turkey-tail fungus.
Photo by Joseph O'Brien, USDA Forest Service, Bugwood.org.

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