

INTEGRATED PEST MANAGEMENT

Insights

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Photo by Ryan Young/Cornell University



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Community-Engaged Science Helps Shed Light on Tick Distribution in New York State

By Emily Mader, Laura Harrington, and Aine Lehane
Northeast Regional Center for Excellence in Vector-Borne Diseases

Ticks and tickborne diseases are a constant threat to the health and well-being of people, animals, and communities across the Northeast.

The primary culprit behind tickborne illness in our region is the blacklegged tick (or deer tick), *Ixodes scapularis*. This tick is able to transmit several bacteria that can cause well-known illnesses like Lyme disease, anaplasmosis, and babesiosis.

Emerging Tick Threats

In recent years, additional ticks of public health concern have appeared in our region. Two ticks in particular are having an increased public health impact on communities in the Northeast: the lone star tick (*Amblyomma americanum*) and the Asian longhorned tick (*Haemaphysalis longicornis*).

Lone Star Tick

The lone star tick is native to the United States but has been uncommon in the Northeast. However, populations of this tick are now found in coastal regions of the mid-Atlantic and broader Northeast regions, including New Jersey, New York, and Connecticut.

The primary culprit behind tickborne illness in the Northeast is the blacklegged tick, able to transmit well-known illnesses like Lyme disease, anaplasmosis, and babesiosis. However, in recent years, additional ticks of concern have appeared in our region.

The lone star tick is able to transmit several bacteria and viruses that can make people sick, and its bite has also been associated with alpha-gal syndrome, or what is commonly referred to as a



Adult female lone star tick. (Photo: CDC)

red meat allergy. Lone star ticks are aggressive biters and can be a real nuisance to people enjoying outdoor recreation or whose employment requires working in tick habitat.

Asian Longhorned Tick

The Asian longhorned tick is an invasive species in the United States. It was first detected in New Jersey in 2017 and is spreading to new areas. As of May 2023, it has been found in 19 states.

This tick is an important vector of human pathogens in other parts of the world but is mostly considered a problem for the agricultural sector in the United States, as it can cause significant infestations on livestock.

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Contact Us

607-255-8815

northeastipm@cornell.edu

Ticks

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The Asian longhorned tick commonly feeds on domestic pets, like dogs. Luckily for humans, it tends not to feed on us. However, public health officials continue to monitor the tick for endemic and exotic pathogens, as we do not fully know its human health impact in the United States.

Tick Surveillance Challenges

Currently, vector-surveillance public health units are struggling with how to monitor these invasive ticks in our communities. Most public programs in the Northeast focus their efforts on the blacklegged tick due to its well-known and significant health threat. This leaves a gap in our understanding of other tick species distributions and the risk they pose to human and animal health.

Creative strategies, like community-engaged science, can offer opportunities to help shed light on these public health threats.

New York State Tick Blitz Program: Leveraging Community Engagement

The Harrington lab, based in the Cornell University Department of Entomology, implemented a novel program to learn more about the lone star tick and Asian longhorned tick in New York State through a community-engaged approach.

With support from a USDA National Institute of Food and Agriculture (USDA-NIFA) Hatch Grant and the Northeast Regional Center for Excellence in Vector-Borne Diseases (NEVBD), we established the New York State Tick Blitz program.

Creative strategies, like community-engaged science, can help shed light on emerging public health threats.

Mission and Methods

The goal of the Tick Blitz program is to engage community volunteers in active tick sampling, educating them on tickborne diseases and tick bite prevention, and to create a model for engaging community members in entomological science.

Tick Blitz volunteers sample for ticks during a two-week period in June (when nymphal tick populations are abundant) using materials and supplies in kits provided by the Harrington lab team. Prior to collecting ticks, all volunteers participate in an in-depth training program that covers the essentials of tick ecology and habitat, methods for standardized tick surveillance, and—most importantly—best practices for field safety and tick bite prevention.

This program has been offered annually since 2021, engaging a growing number of volunteers across New York State in counties where entomologists suspect lone star tick and Asian longhorned tick populations might be expanding.



TICK BLITZ

Community-Based Science

Covering More Ground, Empowering Participants

A major benefit to the Tick Blitz's community-scientist-based model is the wide geographical area that can be covered. Each year, Tick Blitz volunteers have sampled in locations across more than 15 New York counties—an area too large to cover by a small research team in such a short time.

Another benefit of the Tick Blitz is the empowerment of volunteers to understand tick risk and take steps to protect themselves from tick bites.

Post-event surveys have consistently shown that volunteers value participating in meaningful science and learning new information about tick biology and habitat associations.

Latest Tick Blitz and Results

For the 2023 New York State Tick Blitz, the Harrington lab team incorporated a pre/post-event survey to better measure how volunteering in the Tick Blitz changes people's knowledge, beliefs, and practices about tickborne disease risk and tick bite prevention.

The third iteration of the New York State Tick Blitz took place from June 12 to June 23, 2023, across the Hudson Valley and Central regions of New York State. Reference materials and Tick Blitz results are available through the NEVBD website at www.neregionalvectorcenter.com/new-york-state-tick-blitz.php.

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Further Reading

Efforts from this project have been highlighted in *Entomology Today* (entomologytoday.org/2023/05/11/tick-blitz-community-science-new-york/) and published in the *Journal of Medical Entomology* (doi.org/10.1093/jme/tjad039).

About NEVBD

The Northeast Regional Center for Excellence in Vector-Borne Diseases (NEVBD) was established in December 2016 through funding provided by the Centers for Disease Control and Prevention and is based out of the Cornell University Department of Entomology, Harrington lab.

NEVBD's network of researchers, public health experts, and vector-borne disease professionals collaborate on applied research projects, professional training programs, and making connections to share knowledge, resources, and expertise across Northeast communities. The end goal of this work is to improve the lives of those living in our



communities through the prevention of exposure to ticks and mosquitoes and the diseases they carry.

NEVBD serves communities in 13 mid-Atlantic and New England states as well as the District of Columbia.

About the Authors

Laura Harrington is a professor of entomology at Cornell University and director of the NEVBD program. Emily Mader is an extension associate in the Cornell Department of Entomology and serves as the NEVBD program manager. Aine Lehane is a research support specialist in the department and leads targeted NEVBD-supported projects focused on mosquito control and community engagement.



Left to right: Laura Harrington, Emily Mader, and Aine Lehane.

Center-Funded Tick Projects

Since 2007, the Northeastern Integrated Pest Management (IPM) Center has funded approximately nine tick-related projects, recognizing that ticks are a significant pest of humans, pets, and livestock, capable of transmitting a number of pathogens.

Two of these projects have been funded in the last few years:

2022: Production/management profile (PMP) grant awarded to Allison Gardner, associate professor at the University of Maine: *Production/management profile for arthropod pests of horses in Maine.* Gardner sought to develop Maine's first equine PMP, focusing on arthropod pests. Maine has one of the largest horse populations per capita in the region, underscoring the relevance of this work, although Gardner pointed out that the results of the project would likely prove useful throughout the region, given similarities of pests and pathogens.

2023: Partnership Grant awarded to Thomas Mather, professor at the University of Rhode Island: *#BeReadyForTicks: A digital media tick-bite prevention education campaign with just-in-time learning tools,* based on the premise that the most effective way to help people avoid

tick bites and tick-borne disease is to provide actionable knowledge at the moment they're most likely to need it—for instance, when starting a hike in areas known to be tick habitats. The project aimed to develop a #BeReadyForTicks digital media campaign, partnering with organizations throughout the region to post QR-code-enabled signage to warn visitors of the presence of ticks and provide convenient access to up-to-date detailed information.

The Center has also produced impact statements on some of the other tick-related projects we've funded, along with a separate impact statement on tick IPM as a whole. Visit neipmc.org/go/impacts to peruse all current impact statements, which are designed as downloadable, printable PDF documents.

A key portion of the Center's remit is funding projects that address critical and emerging pest-related issues in the Northeast. Visit neipmc.org/go/grants for more information about the grants we award, including how and when to apply, and follow Center news for announcements about grant opportunities.

Unlikely Coincidence Blooms as Classic Weed Guide Gets Updated

By David Nutt, *Cornell Chronicle*

A version of this article was first published in the *Cornell Chronicle* at news.cornell.edu/stories/2023/05/unlikely-coincidence-blooms-classic-weed-guide-gets-updated and is reprinted with permission.

The wild parsnip is finally getting its due. When *Weeds of the Northeast*, a comprehensive identification guide authored by a trio of Cornell researchers, was first published by Cornell University Press (CUP) in 1997, it quickly became a classic of the field—and for the field—helping legions of botanists, home gardeners, green thumbs, landscape managers, pest control specialists, and allergists spot invasive plant life across the region.

The creation of the new edition hinges upon an extraordinary coincidence. You could call it a tale of two DiTommasos. Or, more accurately, a DiTommaso and a DiTomaso.

Over the last 25 years, the book sold nearly 100,000 copies, making it one of the press's top sellers. But times change, and so does the flora. In March, CUP published a second edition of *Weeds of the Northeast* that adds more than 200 new species—such as waterhemp, Japanese stiltgrass, and garlic mustard—that have been slowly encroaching into the Northeast, as well as various weeds that, for one reason or another, were omitted from the first guide (apologies to the wild parsnip). The book also updates terminology and expands its footprint to include more species from the mid-Atlantic states and upper Midwest.

The creation of the new edition hinges upon an extraordinary coincidence. You could call it a tale of two DiTommasos. Or, more accurately, a DiTommaso and a DiTomaso.

The original *Weeds of the Northeast* took root as the master's thesis of Richard Uva, PhD, who developed the manuscript with a pair of faculty members from different departments in the Cornell University College of Agriculture and Life Sciences: the Department of Horticulture, and the Department of Crop, Soil, and Atmospheric Sciences (now the School of Integrative Plant Science (SIPS) Horticulture Section and Soil and Crop Sciences Section): associate professor Joseph Neal and weed science professor Joseph DiTomaso.

After the book was published, the team scattered. Uva eventually settled in Maryland, where he is co-owner of Seaberry Farm. Neal went to North Carolina State University.

DiTomaso left Cornell for the University of California, Davis, and his exit was followed by the arrival, in 1999, of a weed scientist from McGill University in Montreal named, improbably enough, Antonio DiTommaso—an event that caused confusion for pretty much everyone.

The original researchers decided it might be time to update the book to correct oversights, modernize terminology, and incorporate new species that have been driven northward by climate change or migrated on farming equipment transported from afar.

“When I got to Cornell, students taking my class were all like, ‘Dr. DiTommaso, I love your book.’ I knew what they were talking about. I said, ‘I’m not that guy,’” said DiTommaso, who is now professor and chair in soil and crop sciences at SIPS. “What are the chances that two people with this last name of Italian origin would be in weed science, in the same department, teaching this course? It’s insane.”

The coincidence has become something of a legend in the North American weed science community.

“We’ve had postdocs that have been in both of our labs,” DiTommaso said. “They would always say something like ‘I survived both these guys.’”

Roughly five years ago, the original researchers decided it might be time to update the book to correct oversights, modernize terminology,

and incorporate new species that have been driven northward by climate change or migrated on farming equipment transported from afar. The team tapped DiTommaso to assist in the effort, since he was a well-established authority on Northeast agriculture and weed flora.

There was also a sentimental connection.

“They thought that me being at Cornell, where it all started, would be great,” he said. “And of course, I agreed.”

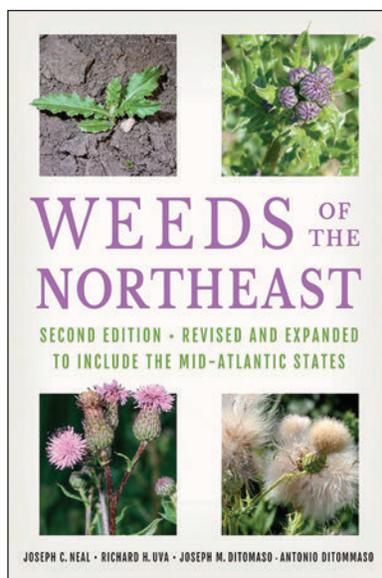
And so DiTommaso found himself working on the very book that, for decades, people had wrongly credited him with co-authoring.

He and the team reached out to a network of researchers throughout the Northeast for suggestions of weeds to include, as well as color images of their flowers, fruits, collars, sheaths, seeds, stems, and the like. For years, the team wrestled with including as much information as possible while also keeping the book a reasonable—and portable—size, for ease of use in the field. There were a lot of difficult choices to make, DiTommaso said, but very few disagreements among the team. (After all, at the end of the day, “you’re fighting over weeds,” he said.)

Antonio DiTommaso found himself working on the very book that, for decades, people had wrongly credited him with co-authoring.

DiTommaso, for one, was thrilled to include wild parsnip. He’d always been surprised that, as a common weed, it hadn’t garnered a single mention in the first edition. He wasn’t the only person who noticed.

“Especially in our region, come July, you look along the roadsides, and it’s this Queen Anne’s lace-looking thing with yellow flowers,” he said. “It causes photodermatitis, so if you get the sap on your skin on a



Weeds of the Northeast.



Professor Antonio DiTommaso, pictured here at the Cornell Weed Science Teaching Garden, is co-author of the second edition of *Weeds of the Northeast*. Photo: Ryan Young/Cornell University

sunny day, like many of our Department of Transportation guys, or even homeowners who are whipper snipping this stuff, it can really burn. If animals eat it, too, it's problematic. I was constantly asked, 'where is it in your book?' So I couldn't wait for that species to be in there."

Other additions include palmer amaranth (*Amaranthus palmeri*), i.e., pigweed, a most troublesome, summer annual weed often resistant to herbicide, and lesser celandine (*Ranunculus ficaria*), a fast-spreading perennial weed of turfgrass and wet areas with showy yellow flowers, which is visible for only a few weeks at the start of spring each year. And of course, the book contains familiar culprits such as swallowwort, kudzu, and common ragweed.

"The Center was very pleased to offer copies of the second edition of *Weeds of the Northeast* to state IPM programs in the northeastern region that we serve. This comprehensive compendium of weeds in agriculture and natural areas also addresses the ecology of the weeds as a critical aspect of management."

– Deborah G. Grantham, director, Northeastern IPM Center

While these weeds are clear-cut nuisances for gardeners, DiTommaso hopes *Weeds of the Northeast* also helps cultivate an appreciation for them, too.

"What a weed is really depends on who you're talking to, right?" DiTommaso said. "I mean, to my dad, dandelions in the lawn are the worst thing that can happen. But I have beekeeper friends who say that's what the bees are going after and depend on. They love this stuff. So I guess that's the message, too. An appreciation for a diversity."

Interest in the book is already sprouting among extension specialists, according to Deborah G. Grantham, director of the Cornell-based Northeastern Integrated Pest Management (IPM) Center, which has provided more than 50 copies of the new edition to state IPM programs.

"The Center was very pleased to offer copies of the second edition of *Weeds of the Northeast* to state IPM programs in the northeastern region that we serve," said Grantham. "This comprehensive compendium of weeds in agriculture and natural areas also addresses the ecology of the weeds as a critical aspect of management. The importance of the new edition is illustrated by how many copies

the state IPM programs quickly ordered for research and extension faculty in their programs."

"What a weed is really depends on who you're talking to," DiTommaso said. "To my dad, dandelions in the lawn are the worst thing that can happen. But I have beekeeper friends who say that's what the bees are going after and depend on."

For readers who seek more than an identification book and want to take matters, and weeds, into their own hands, DiTommaso recently co-authored a separate book, *Manage Weeds on Your Farm: A Guide to Ecological Strategies*, available free in PDF form.

DiTommaso uses both books in his fall semester Weed Biology and Management course, which is fitting, given that *Weeds of the Northeast* was his go-to text when he was an undergraduate and graduate student in Canada.

"Now everybody I see here, it's like, oh, yeah, this is my book," he said. "I've signed so many copies. Now I know what it feels like to be like a star."

This past April, Cornell University Library hosted a "Chat in the Stacks" book talk with Antonio DiTommaso, during which he provided an overview of the new edition of Weeds of the Northeast. The presentation is available to view on YouTube at youtu.be/Y7EM8hqwVkl.

On September 21, DiTommaso will present a webinar about the book and answer audience questions as part of the Northeastern IPM Center's IPM Toolbox series. For more information or to register, visit neipmc.org/go/eKtD.

Getting to Know John Tooker, Pennsylvania State IPM Coordinator

Among the many partners and stakeholders the Northeastern Integrated Pest Management (IPM) Center works with are the state IPM programs and coordinators throughout the Northeast region.

Based at the states' land-grant universities, the IPM coordinators are members of the USDA Multistate Project NEERA-2104, which serves as the Northeast Region Technical Committee on IPM, and are responsible for developing and implementing IPM programming within their states.

For more information about NEERA-2104, see www.nimss.org/projects/view/mrp/outline/18859.

Diversity of Responsibilities

John Tooker is relatively new to the Pennsylvania state IPM coordinator role, having taken over in late 2022. He is a professor of entomology and extension specialist in the Department of Entomology in the College of Agricultural Sciences at The Pennsylvania State University, but like many state IPM coordinators, he holds a number of roles. Tooker is also director of graduate studies, coordinator of the entomology minor, and director of his own research lab.

That breadth of responsibilities can be an asset because it helps Tooker stay abreast of what's going on in, or related to, IPM in Pennsylvania and beyond. It also means no two days are the same. "In addition to fulfilling my extension and administrative responsibilities, I try to help my students with whatever they need, also finding time to work on papers and funding proposals and think about new collaborations," he says.

"The field season brings additional tasks, many of which are fun—going to the farm, working in the greenhouse. A typical day varies a lot, but few are boring."

As a researcher, Tooker is credited on a long list of publications reflecting many areas of interest and expertise. "In the agricultural realm, I am most interested in leveraging the conservation benefits of no-till, cover crops, and IPM for insect and slug control in field crops," he says.

Path to the Present

John Tooker's responsibilities are the current culmination of a career at Penn State dating back to 2003, when he joined as a postdoc. Several years later, a faculty position fortuitously opened and he was asked to apply. "In 2008, I moved my office down the hallway and got started," he says. "Fifteen years later, I am still plugging away."

Tooker has long been a proponent of IPM. "I like IPM because it just makes sense," he says. "It makes sense to do all you can to prevent a problem from developing in the first place, and then having a backup plan should the preventative measures not work out."

This philosophy led him to cross paths extensively with Ed Rajotte, his predecessor at Penn State as the IPM coordinator. "Ed knows that I preach IPM to folks in the agricultural community dealing with field crops. When he started thinking about retirement, he saw that I was among the most active in IPM in our department, so he asked if I would be interested in being coordinator."



John Tooker, Pennsylvania state IPM coordinator.

Interests and Priorities

Tooker recognizes that stepping into Ed Rajotte's former role means he has big shoes to fill, but also opportunities to further develop what was already in place. "My initial goals are to keep alive, and try to expand on, the programs that Ed and the incomparable Dion Lerman [environmental health programs specialist at Penn State Extension] have built in Philadelphia and Pennsylvania more broadly," he says.

"Dion has some great, unique programs on urban IPM for folks confined to their homes, and he is working to train urban residents in IPM so they can then get jobs practicing IPM in their own communities."

Once Tooker has moved forward with the programs he's inherited, he has some new ideas to explore. "I also hope to reinvigorate school IPM in PA. Once I solidify our commitment to these areas, I am interested in working to implement more IPM in field crops, veggies, and perhaps some other crops where we can make a difference."

State IPM Coordinators and the Center

IPM is a dynamic field because pest threats are always evolving, and so

Continued on next page

Call for Nominations: 2023 Outstanding Achievements in Integrated Pest Management Award

Submission deadline: Friday, October 27, 2023

The Northeastern Integrated Pest Management (IPM) Center launched an *Outstanding Achievements in IPM Award* in 2019 and is opening nominations for the 2023 award, which will recognize professionals and/or students based on their efforts and accomplishments in IPM.

The Center seeks nominations of growers, consultants, researchers, educators, managers, and college/university students in the Northeast region who are working in:

- Agricultural IPM (fruit, vegetables, ornamentals, and livestock and field crops)
- Affordable housing
- Homes
- Schools and institutions
- Natural-areas/water-resources IPM
- Invasive species

Criteria for Nomination

Candidates for an *Outstanding Achievements in IPM Award* are individuals or organizations whose work on IPM in the Northeast deserves special recognition. *Outstanding Achievements in IPM Awards* recognize effort in

- developing new IPM tools;
- implementing or evaluating IPM methods in their operations, businesses, or organizations;
- encouraging demonstrations and adoption of IPM;
- promoting IPM and bolstering the adoption of IPM practices;
- educating others about IPM;
- collaborative efforts.

Undergraduate, master's, or PhD students showing outstanding interest and accomplishments in IPM are eligible for nomination. Accomplishments might include impressive research results, technical

presentations, posters, reviewed publications, extension publications, or exemplary work with stakeholders such as growers or building managers.

Qualifications to Nominate

To submit a nomination, you must be a grower, consultant, researcher, educator, or manager working in IPM. Alternatively, you may co-nominate with someone who meets the above criteria.

To nominate a student, you must be a member of the research or extension faculty at the student's university.

No self-nominations will be accepted. Students may not make nominations.

Deadline

Nominations must be received by Friday, October 27, 2023.

Determination of Award Winners

The Northeastern IPM Center staff will work with our advisory council and the Northeast state IPM coordinators to review nominations and select winners, based on criteria listed above.

Awards

Students and qualified professionals are eligible. Winners will receive \$500 each. Winners must provide a story (for the Northeastern IPM Center website and/or newsletter, and social media outlets) and/or present a webinar hosted by the Northeastern IPM Center before receiving the financial award.

For more information on how to submit a nomination, see the full announcement on the Center's website at neipmc.org/go/FdNt.

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must the management methods that are developed, refined, and implemented in response. The state IPM coordinators play a pivotal role in part because their purviews often straddle academia and extension—combining current research with efforts to put it into practical use, getting actionable knowledge into the hands of those who need it throughout their state.

This makes them critical partners to the Northeastern IPM Center and the other regional IPM centers in our efforts to coordinate and foster IPM throughout our regions.

The Center welcomes John Tooker as Pennsylvania state IPM coor-

dinator, and we look forward to future collaboration in support of our shared goals.

Learn More

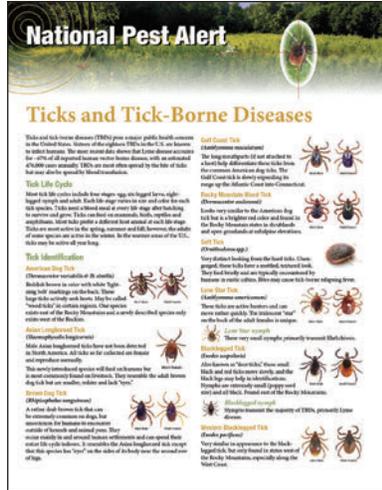
For more information about John Tooker, visit his faculty profile and other web pages:

- Penn State Department of Entomology: ento.psu.edu/directory/jft11
- Penn State Extension: extension.psu.edu/john-tooker
- Tooker Lab: ento.psu.edu/research/labs/john-tooker

Pest Alert on Ticks, Tick-Borne Diseases

An updated pest alert on ticks and tick-borne diseases is now available, courtesy of the North Central Integrated Pest Management (IPM) Center—one of the other three regional IPM centers funded by the United States Department of Agriculture’s National Institute of Food and Agriculture (USDA-NIFA).

According to the pest alert:



“Ticks and tick-borne diseases (TBDs) pose a major public health concern in the United States. Sixteen of the eighteen TBDs in the U.S. are known to infect humans. The most recent data shows that Lyme disease accounts for approximately 67 percent of all reported human vector-borne disease, with an estimated 476,000 cases annually.”

The pest alert contains information on tick life cycles, ranges of various tick species and identification guides (with photos), disease symptoms and prevention, and proper, effective removal of attached ticks.

The document is available on the North Central IPM Center’s website in web page and PDF formats. The PDF is designed as a two-page hand-out and free printed copies are available upon request.

Visit www.ncipmc.org/projects/pest-alerts/ticks-and-tick-borne-diseases/ for more information.

This pest alert was created by the Public Tick IPM Working Group in collaboration with the IPM Institute and the regional IPM centers with funding from USDA-NIFA.

Credits

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



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**Northeastern
IPM
Center**

340 Tower Road
Cornell University
Ithaca, NY 14853



Ground ivy (*Glechoma hederacea*), also known as creeping Charlie, is a perennial weed in the Lamiaceae family commonly found in turfgrass. It is one of the more than 500 species featured in *Weeds of the Northeast*.

Photo: Ryan Young/Cornell University