CONNECTICUT BOTANICAL SOCIETY
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How a Native Predator Can Undermine the Success of an Invasive Plant

BY LAUREN M. SMITH-RAMESH

PLANT ECOLOGISTS tend to focus primarily on direct interactions between invasive and native plant species when evaluating the impact of invasive plants. When we think beyond the plant community, we generally focus on the herbivores that consume plants or the soil pathogens and mutualists that colonize them. However, to fully understand the implications of plant invasions for native communities, we need to broaden our focus to consider the complete invaded food web, including predators.

A key example of the importance of considering a broad food web context is the case of garlic mustard (*Alliaria petiolata*), a well-known invader of deciduous forests throughout Connecticut. We know from decades of past research that garlic mustard produces allelochemicals that make it unpalatable to herbivores and that harm native plants by disrupting their association with beneficial mycorrhizal fungi. This research indicates that garlic mustard should be a high-impact invader that threatens native plant diversity. However, this view only takes a small subset of the native food web into account: the relationship between plants, herbivores, and mutualists.

Spider web on immature garlic mustard siliques in North Branford, CT. Photo: L. Smith-Ramesh

Predators are conspicuously missing from this story.

Failure to consider the role of predators in garlic mustard invasion is a significant oversight because garlic mustard has a special relationship with predatory spiders. Web-building spiders (especially *Theridiosoma gemmosum*) preferentially use garlic mustard's mature fruit structures (siliques) as web-sites, resulting in up to a 14-fold increase in the spider density in garlic mustard-invaded areas compared to areas dominated by native vegetation. In an experiment that I recently conducted across several nature preserves in southern Connecticut, I found that garlic mustard initiates a trophic cascade by promoting web-building spiders. This means that spiders have effects that ripple throughout the food web all the way to plants and soil nutrients. By promoting spiders, garlic mustard suppresses the abundance of aerial insect herbivores, promoting the growth of certain native plant species. Amazingly, it also increases the availability of phosphorus in

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Connecticut Botanical Society

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The CBS web site, created by webmaster Janet Novak, is visited by more than 1,000 people each day. The site provides an introduction to CBS and its activities, including field trips and meetings. The site also contains photo galleries, a guide to landscaping with native plants, and *Newsletter* articles.

We thank Janet Novak, Eleanor Saulys, Arieh Tal, and others for the excellent photos on the web site. CBS members are encouraged to submit web materials to: webmaster@ct-botanical-society.org.

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From the President

AT THE FEBRUARY MEETING of the CBS board and committee chairs, we discussed and voted on a policy to honor long-serving volunteers who have died. This was precipitated by the passing of Penni Sharp in late 2014. After discussing what we might do as a particular memorial for Penni, we realized that we should first formulate a policy that would apply to similar situations in the future. The policy is:

CBS will contribute $1,000 in memory of deceased members who meet the criteria of having volunteered as an officer, a director-at-large and/or committee chairperson for a total of at least 10 years. The contribution will be made to the former member's local land trust, or to another appropriate conservation organization whose goals relate to botanical preservation and education, as determined by the president. The contribution will be accompanied by a summary of the person's service to CBS with a request that the information be shared with the receiving organization's membership.

The policy serves both to honor our most devoted members and helps to fund land conservation projects. The first contribution under this policy was made on March 14, 2016 to the North Branford Land Conservation Trust, Inc. in memory of Penelope Sharp of Northford. I received a thank-you letter from the Trust's secretary that indicated my letter that accompanied the gift, which detailed Penni's service to CBS, was read at a monthly meeting of the organization.

At the February meeting the board also voted to contribute $5,000 to the Groton Open Space Association toward the cost of preserving what may well be the largest pitch pine/scrub oak woodland in the state. This plant community is considered one of the most threatened terrestrial habitats in Connecticut. We originally were considering this contribution in relation to a Penni Sharp gift, but after crystalizing a policy on memorials, the board decided CBS should make a separate contribution to preserve this site in Groton with about 44 acres of the pitch pine community. Finalization of the land acquisition is expected shortly. A quick check of our most recent CBS yearbook should convince members that we can afford such contributions, and that they are consistent with our bylaws.

On a personal note, this is my last year as CBS President, and it has been an honor to help guide a now 113-year-old botanical organization that is still as relevant today as the day it was founded. I have accomplished the goals I had in mind when I became president in 2011: publishing a new checklist of the Connecticut flora, upgrading the content and design of our newsletter, and increasing the visibility of the Society within our state. Family obligations make it impossible for me to continue in a leadership role, but I hope to remain on as a director-at-large and co-chair of the Notable Trees Committee for some time to come. CBS is really lucky to have a large number of intelligent and dedicated volunteers who take on big chunks of work year after year to keep our publications, websites, fieldtrips, and meetings top notch. Thanks to all of you for making my job as president easy and rewarding.

— *Glenn Dreyer*

Spider webs on mature garlic mustard siliques in Wallingford, CT. Photo: L. Smith-Ramesh

Native Predator

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the soil, when spiders deposit prey carcasses below their webs. Second-year garlic mustard reaches the end of its life cycle in early summer as these changes take place, and because garlic mustard generations tend to synchronize so that first-year rosettes do not tend to co-occur with second-year plants, garlic mustard may be unable to take advantage of increased phosphorus. However, many native species are in their prime when spider activity on garlic mustard occurs, so this trophic cascade appears to benefit native species in a way that might undermine the long-term impact of garlic mustard.

While the experiment I conducted was not designed to test the effect of urbanization or habitat fragmentation, I did observe a pattern in my results that suggests that native spiders may be more effective in buffering the impact of garlic mustard in larger, less disturbed preserves. My experiment included six sites, two of which were very large forest preserves, and four of which were smaller fragments. While garlic mustard elevated spider density at all sites, this pattern was stronger in the two large, intact preserves. This suggests what most conservationists may find intuitive — that larger habitat fragments may be better equipped to resist anthropogenic change, in part because they are likely to have more-intact food webs that can buffer the impacts of invasive species.

Lauren M. Smith-Ramesh, PhD., is a Donnelley Postdoctoral Associate at the Yale Institute for Biospheric Studies in the Yale School of Forestry and Environmental Studies.

For additional information see:

Rodgers, V. L.; K. A. Stinson; and A. C. Finzi. 2008. Ready or not, garlic mustard is moving in: *Alliaria petiolata* as a member of eastern North American forests. *Bioscience* 58(5)

Smith, L. M. and O. J. Schmitz. 2015. Invasive plants may promote predator-mediated feedback that inhibits further invasion. *Ecology and Evolution* 5(12)

UConn to Host Invasive Plant Conference

THE CONNECTICUT Invasive Plant Working Group (CIPWG) will present a symposium on Tuesday, October 11, 2016 at the Student Union, University of Connecticut in Storrs, CT. The symposium will take place from 8 a.m. – 4:30 p.m. The symposium theme is Invasive Plants in Our Changing World: Learn from the Past, Prepare for the Future. This 8th biennial conference features national, regional, and local experts as well as citizen volunteers sharing practical solutions for invasive plant management and actions needed to promote native species and improve wildlife habitat. People with all levels of interest and experience are invited to attend. Attendees are advised to register early, as the last symposium had record attendance and sold out. For complete program and registration information, please visit the CIPWG website at http://cipwg.uconn.edu/2016-symposium.

Plants and Mycorrhizae (Part 3)
Food, Poison, and Intelligence Gathering: Mycorrhizal Networks in Action

BY DAVID YIH

CAN TREES NURSE THEIR YOUNG? Do plants send signals underground to warn each other of the arrival of herbivores? Can they cripple competitors by shuttling noxious chemicals through fungal networks? Lately, questions like these are getting surprising answers from a new breed of scientists: mycorrhizologists.

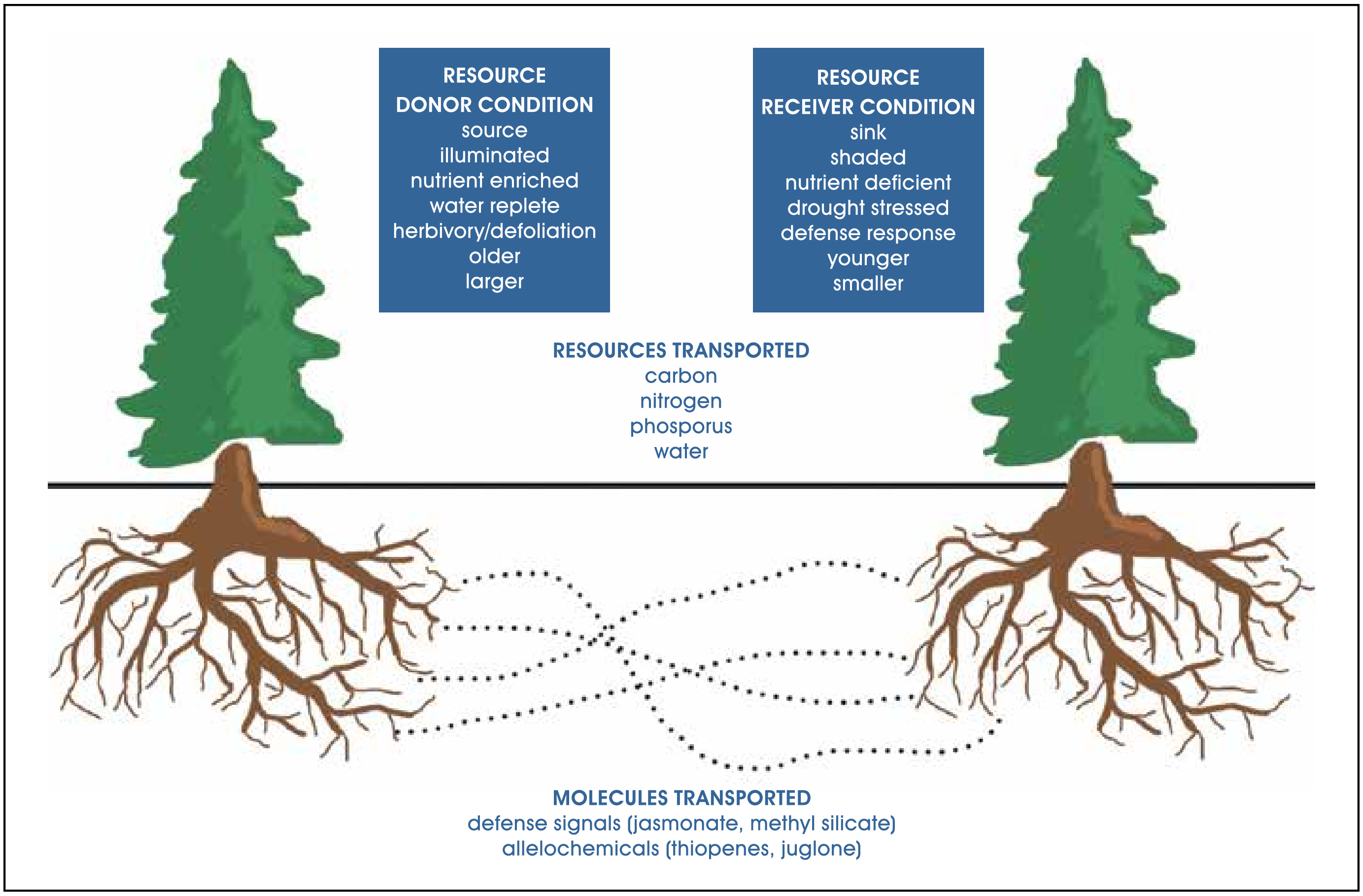
The great majority of plant species around the world host symbiotic relationships called mycorrhizae in their roots. Their symbiotic partners (symbionts) are soil fungi whose threadlike hyphae radiate out from the roots into the surrounding soil, bringing back water and nutrients to the roots in exchange for carbohydrates the plants produce through photosynthesis. We can visualize a mycorrhiza as a simple one-to-one relationship between an individual fungus and an individual plant. But in nature the picture is more complex. As the threadlike hypha of a mycorrhizal fungus extends outward from a plant's roots, it frequently encounters the roots of other plants of the same or different species. Often, it forms mycorrhizae with these new partners, while still maintaining its connection with the first plant. As it proliferates in new directions, the hypha branches and fuses repeatedly, weaving a fine net through the surrounding soil and even fusing with the hyphae of other fungal species. Meanwhile, the original plant may be approached by fungi of the same or different species. If they're compatible, the plant is apt to form mycorrhizae with them, too. Soon a diverse association appears, composed of various plant species, big and small, and various fungi, all connected into a sizeable mycorrhizal network (MN). "The scale of the MN is at least on the order of tens of meters … and potentially much larger," write Gorzelak et al., "with single fungi sometimes spanning hundreds of hectares of forest."[1]

The rarely seen fruiting bodies of the mycorrhizal fungus *Wilcoxina rehmii*, a symbiont of both Douglas-fir and ponderosa pine.
Photo © Oluna & Adolf Ceska (used by permission).

From above ground, we see a jumble of plants, with an occasional mushroom popping up to release spores. But below ground the intertwined roots and fungal mycelia have more than a nodding acquaintance. Researchers are discovering that besides their role in transporting resources, MNs make efficient communication networks. Philosophical questions lurk in the background, as scientists struggle to clarify the behavior of the various organisms, falling back on anthropomorphic verbs like "warn," or "eavesdrop" to describe the interactions they observe. The findings are intriguing in themselves. They also have game-changing implications for ecology and conservation, forestry and agriculture — even evolutionary theory.

It's long been known that certain nonphotosynthetic plants called "mycoheterotrophs" receive carbon from photosynthesizing plants via mycorrhizal fungi.[2] But in recent years investigators have discovered that MNs can distribute resources in much more flexible ways than previously thought, sending them in the direction of greatest need in response to changing conditions, in a seasonal tide-like flux. In 2002 researchers at Laval University in Quebec found evidence that carbon moved via MNs from trout lilies (*Erythronium americanum*) to young sugar maples (*Acer saccharum*), as the maples' leaves unfurled in spring, and then back to the trout lilies in the fall during rapid trout lily root growth.[3] In 2006, Leanne Philip, in her University of British Columbia doctoral thesis, reported that the flow of carbon changed direction not once but twice in the course of a growing season, traveling "(1) from rapidly growing Douglas-fir to bud-bursting paper birch in the spring, (2) then reversing, from nutrient and photosynthate-enriched paper birch to stressed understory Douglas-fir in summer; and (3) reversing yet again, from still-photosynthesizing Douglas-fir to … paper birch in the fall … through multiple belowground pathways, including MNs."[4]

Other resources can change direction too. Though water typically flows from mycorrhizal fungi into the roots of their plant symbionts, under extreme conditions it may go the other way. In a 2003 greenhouse experiment, investigators found that "oaks accessed water through their taproots and redistributed it to their mycorrhizal symbionts during severe soil drying, thus maintaining the mycelium of [their]



Summary of the substances transferred via mycorrhizal networks and the conditions that stimulate resource transfers (based on Gorzelak et al. 2015). Art by Zoe Kaputa.

fungal partners."[5] Plants may also protect their fungal partners from fungivores. A recent study found evidence that when springtails browse on mycorrhizal fungi, plants can help by sending protective chemicals into the hyphae.[6]

What about the extraordinary idea that plants might be subsidizing their progeny — essentially nursing them — through MNs? Though there is no clear evidence that plants can detect their kin through MNs and shuttle nutrients preferentially to offspring, there are hints in that direction. In 2007, Winther and Friedman looked at species of the fern genus *Botrychium* and discovered that strains of *Glomus* (a genus of arbuscular mycorrhizal fungi) "were capable of forming mycorrhizas simultaneously with the achlorophyllous gametophyte and the leafy sporophyte generations of both *Botrychium* species, indicating a potential for the direct supply of assimilates from the [photosynthetic] to the mycoheterotrophic stages of the life cycle."[7] Since then, a number of studies have shown that tree seedlings benefit from resources received from mature trees of the same species via MNs, though not necessarily to a greater degree than other plants in the network.

The hustle and bustle of mycorrhizal networks becomes even more intriguing as we look beyond resource sharing to the communication aspect of MNs. In the early 1980s, David Rhoades, a zoologist interested in the interactions between insect herbivores and plants, proposed a novel idea. In the course of his research with *Salix sitchensis*, he noticed that defensive changes in the leaf chemistry of willows that had been chewed on by tent caterpillars also showed up in the leaves of nearby plants, even though they had not been attacked. He speculated that airborne molecules emanating from either the attacked plants or the tent caterpillars must have been detected by the neighboring plants, prompting them to deploy protective chemicals preemptively. Subsequent research confirmed that plants that are under attack from herbivores can release volatile organic compounds into the air that induce defensive responses in nearby plants. Recent experiments are showing that such "stress signals" can also be transmitted through MNs.

Researchers at South China Agricultural University inoculated tomato plants (*Lycopersicon esculentum*) with the fungal pathogen *Alternaria solani,* the cause of early blight disease in tomatoes and potatoes, and published their results in 2010. They found that the uninfected tomato plants (stress-signal receivers) in the MN showed "increases in disease resistance and activities of the putative defensive enzymes … The uninfected 'receiver' plants also activated six defence-related genes."[8] They found that changes in the "receiver" plants began within 18 hours of "donor" plant inoculation. "To our knowledge," they stated, "this study is the first to show that [MNs] may function as a defence communication conduit between infected and healthy plants."[9]

In 2013, a group of scientists working in the U.K. provided the first experimental evidence "that herbivore-induced signalling molecules can be transferred from plants infested with aphids to uninfested neighbours via a common mycelial network."[10] Within 24 hours of the arrival of pea aphids (*Acyrthosiphon pisum*), signals traveling through MNs from infested broad bean plants (*Vicia faba*) caused uninfested broad beans to give off volatile compounds that not only repelled the aphids but attracted their natural enemy, the parasitoid wasp (*Aphidius ervi*). This interaction appears to benefit all three groups in the network. The uninfested beans get to deploy their protective volatiles preemptively. The fungi avoid a potentially catastrophic reduction in their symbionts' capacity to supply them with carbon. Even the infested plants may benefit. Barto et al. speculate that such communications may ensure that signal-donor plants will be engulfed in a large, aboveground plume of protective volatiles created collectively by surrounding plants in the network.[11]

Attacks on plants can simultaneously stimulate both stress signals and nutrient transfers. Just last year, a collaboration between Chinese and Canadian researchers investigated the flow of carbon and stress signals in an MN involving a four-month-old interior Douglas-fir (*Pseudotsuga menziesii* var. *glauca*), a ponderosa pine (*Pinus ponderosae*), and the ectomycorrhizal fungus, *Wilcoxina rehmii.* They found that manual defoliation of the young Douglas-fir resulted in a transfer of both defense signals and carbon via MN to the ponderosa pine.[12] Some mycorrhizologists ascribe this result to the fungus throwing in its lot with the healthy pine rather than throwing good money after bad, as it were, by propping up the struggling Douglas-fir. "Here, the networking fungus may have acted to protect its net carbon source, by allocating carbon and signals to the healthy, more reliable ponderosa pine."[13]

Besides tranferring resources and signals, MNs can extend the reach of the allelochemicals that some plants produce — toxic substances that inhibit the development of nearby competitors. As Gorzelak et al. put it, "MNs can serve as couriers for biochemical warfare."[14] In 2014 a group of German and American investigators did a study of the effect of MNs in the transport of the allelochemical juglone, a product of *Juglans* species (walnuts). (Especially susceptible to the ill effects of juglone are "garden plants including tomato, potato, pea, apple, cucumber, watermelon, bean, garden cress, corn and ornamental ericaceous species such as rhododendron and azalea.")[15] The study's results unequivocally implicated MNs in the dispersal of juglone into the soil.

In at least one case, instead of helping to spread noxious allelochemicals, mycorrhizal fungi themselves become the victims. Garlic mustard (*Alliaria petiolata*), a European plant well-known as an invasive in eastern North America, is a non-mycorrhizal plant that produces fungicidal allelochemicals. Callaway et al. found that garlic mustard drastically reduced the ability of North American arbuscular mycorrhizal (AM) fungi to germinate and form mycorrhizae. As a result, American mycorrhizal plants had reduced seed-germination and increased mortality, while non-mycorrhizal plants were unaffected. European AM fungi and poants were also relatively unaffected, presumably due to their long evolutionary exposure to garlic mustard's allelochemicals.[16]

Another peculiar relationship between invasives and MNs involves spotted knapweed (*Centaurea stoebe,* formerly *C. maculosa*), which is invasive in many areas, including Connecticut, and covers over seven million acres in the U.S. It's of particular concern in the West, where a common native grass is Idaho fescue (*Festuca idahoensis*). In 2004, researchers from the University of Montana "estimated that carbon transferred from *Festuca* by mycorrhizae contributed up to 15% of the aboveground carbon in *Centaurea* plants."[17] They concluded that "carbon parasitism via AM soil fungi may be an important mechanism by which invasive plants out compete their neighbors."[18]

Understanding mycorrhizal networks is evidently important for effective conservation of many species. This is particularly true of mycoheterotrophs, which cannot survive without MNs. According to Martin Bidartondo of the Royal Botanic Gardens at Kew, "Field botanists … are the first to point out that myco-heterotrophic plants are excellent indicators of undisturbed forests and forests with old-growth characteristics."[19] It follows that "species that appear to be at the greatest risk of local extirpation from clearcutting are mycotrophs (e.g., *Monotropa uniflora*)" among others. [20] Mycoheterotrophs are extreme specialists, so their conservation must involve both their fungal hosts and the nearby green plants that supply carbohydrates, as essential habitat components.

With the resistance to diseases and pests and the better access to water and nutrients that MNs offer, there is increasing recognition of the potential for a new "Green Revolution" based on using mycorrhizae in crop fields and forests. Much of the world's agriculture depends upon fertilizer derived from mined rock phosphate, a non-renewable resource that is steadily dwindling. Phosphorus is a crucial plant nutrient that mycorrhizal fungi are particularly good at locating in ordinary soil and funneling back to their plant symbionts. We can lessen our dependence on rock phosphate by finding ways to work with mycorrhizae. Techniques proposed include sowing fallow fields with appropriate mycorrhizal plants to maintain the level of inoculum in the soil between crop rotations, using tilling patterns that minimize disturbance of mycorrhizal fungi, and avoiding the indiscriminate use of fungicides in the soil.

In perusing the reports mentioned in this article, I was struck by the various ways investigators conceptualized what they saw happening in MNs. There are large gaps in what is understood about how mycorrhizae operate, and scientists must often use human metaphors as stand-ins to bridge the gaps. One implicit question that kept surfacing was: Who were the doers of the actions taking place in MNs, and what were their "motives"? Were plants "nursing" their progeny to keep their species going, or were fungi redistributing resources to the young plants with an eye to their own future wellbeing? Were Douglas-firs helping paper birches so as to later receive reciprocal benefits in their hour of need, or were fungi orchestrating the flux of resources, minimizing their risk by diversifying across multiple partner species? Were stress-signal donors "warning" receiver plants, or were the receivers "eavesdropping" on donors, on the alert for potential trouble? Or were mycorrhizal fungi acting like savvy farmers, apportioning fertilizer and coordinating pest management to maximize long-term yield? Perhaps the answer is "all of the above," because ultimately the organisms involved tend to strengthen and perpetuate their mutually beneficial networks. Indeed, when all the participants' roles are considered, the network as a whole emerges as a kind of higher-order organism in its own right, fitter than the sum of its parts, a well-ordered social entity capable of surviving the death of any of its individual members.

Some scientists argue that the groupings of species involved in MNs are examples of natural selection at the level of the group.[21] For others, the interesting question is: which is the true driver of evolution — competition or cooperation? The ground-breaking evolutionary theorist Lynn Margulis passionately insisted on the predominant role of symbiosis in evolution. For evolutionary biologist and author Frank Ryan, the discovery of mycorrhizae was a missed opportunity. He wrote, "The intimate cooperation between wholly different life forms — plants and fungi — is not only an amazing biological phenomenon but also a vitally important factor in the diversity of plant life on earth. It should have been of enormous interest to evolutionary theorists, but few scientists were paying attention. In those formative years at the end of the nineteenth century, as the fundamental principles of biology were being hammered into place in laboratories around the world, Darwinian evolution took center stage. And as Darwinism, with its emphasis on competitive struggle, thrived, [mutualistic] symbiosis, its cooperative alter ego, languished in the shadows, derided or dismissed as a novelty."[22] Perhaps its time is still to come. In the meantime, plants and their mycorrhizae offer a fascinating and fruitful field of inquiry on many different levels.

David Yih is CBS vice president.

Notes

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Protecting Connecticut Plants from Exotic Pests

BY JUDE HSIANG

IN RECENT YEARS Connecticut residents have learned of the arrival of the emerald ash borer *(Agrilus planipennis)* and the potential invasion of the Asian longhorned beetle **(***Anoplophora glabripennis***)**. We have also become more aware of the harm caused by invasive pathogens, some of which have been present in the state for a century or more. Boxwood blight is a recently confirmed disease that attacks North American native *Pachysandra procumbens* as well as the commonly planted Japanese species, in addition to several boxwood (*Buxus*) species. Ramorum blight (*Phytophthora ramorum*), also known as sudden oak death, a disease that attacks a wide variety of plants, has been found on several occasions on plants transported from the West Coast, where it has caused widespread devastation.

Our first line of defense against such threats is the Cooperative Agricultural Pest Survey (CAPS) which is a combined effort of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) and the Connecticut Agricultural Experiment Station (CAES). Each year, surveys are conducted to detect exotic insects, weeds and diseases that are not known to occur in the U.S. The University of Connecticut and the Connecticut Department of Energy and Environmental Protection assist in these efforts.

Among the insect targets of CAPS surveys are two beetles native to northern Eurasia that could devastate our conifer forests and green industry: the black spruce beetle *(Tetropium casteneum)* and the brown spruce longhorn beetle *(Tetropium fuscum)*. Black spruce beetle larvae attack the lower trunks of fir, spruce, pine, and larch (*Abies, Picea, Pinus,* and *Larix*). The larvae of the brown spruce longhorned beetle bore into tips of the same four conifer genera, causing heavy resin flow and dieback of branches that may severely injure or kill trees. Brown spruce longhorn beetle has been reported in Nova Scotia; therefore all spruce logs entering the United States from the province must be heat treated and accompanied by a treatment certificate.

The possibility of one or both of these beetles entering the U.S. — and some have been intercepted in the past — has led the Connecticut Nursery & Landscape Association, and the Connecticut Christmas Tree Growers Association to urge their members to cooperate with the CAPS surveys. Each year, traps are positioned in Christmas-tree fields around the state in June and monitored bi-weekly through August. The traps are equipped with three baits, one of which is impregnated with a pheromone specific to the target insects. Ethanol and a spruce-scented liquid are packaged in permeable plastic bags allowing slow release on the summer breezes.

Above: brown spruce longhorn beetle (*Tetropium fuscum*). Below: black spruce beetle (*Tetropium castaneum*). *Photos: Steven Valley, Oregon Department of Agriculture, Bugwood.org*

A trap used by the Cooperative Agricultural Pest Survey for monitoring the occurrence of insect pests such as the *Tetropium* spp.
Photo: Judith Chute Hsiang

(Workers' vehicles can be identified by their Christmassy aroma.) Any suspect beetles are examined by CAES entomologists. Since the inception of these surveys in 2013, no exotic *Tetropium* have been found, but the concern remains.

In addition to the two spruce beetles, yearly surveys for other exotic insects, plants, and diseases continue. Among the insect targets are two species of ambrosia beetles and several moth species, each with a wide host range including forest, food and ornamental plants.

Beyond the surveys, CAPS funding supports efforts to contain pests already found in Connecticut. Emerald ash borer is now found in all of our counties. Towns in the western part of the state are removing dead and dying trees along roadsides, and even residents who do not have ash (*Fraxinus* spp.) on their property are realizing that they share the burden through their taxes. Mile-a-minute vine (*Persicaria perfoliata*) is one of the more recent invasive plant arrivals in Connecticut and is being monitored, removed, and tested for biocontrol measures as well. Lily leaf beetle (*Lilioceris lilii*) research is supported by CAPS in Connecticut and Rhode Island with some success in biocontrol measures reported.

International business and travel increases the potential for stowaways that can harm our native and domesticated plants and animals, and our own health and well-being. Climate change creates new niches for exotic pests as well as those from other parts of our continent. Programs such as CAPS, together with personal vigilance, can limit the spread of these threats. Research has shown that the Asian longhorned beetle was in Worcester, Massachusetts, for a dozen years before a curious homeowner first reported one. "If you see something, say something."

Jude Hsiang is a CBS board member.

CBS Participates in the International Festival of Arts and Ideas

THIS YEAR, CBS members led two field trips as part of the 2016 International Festival of Arts and Ideas in New Haven. Frank Kaputa, co-chair of the Notable Trees Committee, led a walking tour of some of the city's notable trees. Author and veteran CBS trip leader Lauren Brown led participants on a botanizing tour of East Rock Park. Both tours were filled to capacity with enthusiastic participants. Thanks are due to Lauren and Frank for generously sharing their expertise with festival-goers, to CBS board member Susan Robinson for making the initial contact, and to CBS vice president David Yih for acting as liaison.

CBS Annual Meeting, November 5, 2016

All CBS members and guests are invited to the fall meeting, which will take place at Sessions Woods Wildlife Management Area in Burlington. The featured speaker will be Dr. Bryan Connolly, whose talk is entitled "The Amazing Antioxidant, Apogamous, and Amorous Genus Aronia." Aronia (the chokeberries) is a taxonomically vexed genus of shrubs in the rose family. Traditionally, either three species or two species and a hybrid have been recognized. Dr. Connolly will speak about the attempt to establish the true number of chokeberry species using clues from geography, morphology, and genetics. In addition to the taxonomy of the genus, he will discuss the high-antioxidant fruit biochemistry, as well as the propensity for the chokeberries to form intergeneric hybrids with mountain-ash (Sorbus) and other relatives in the Rosaceae.

Dr. Connolly holds a B.A. from the University of Vermont, and a M.S. and Ph.D. from the University of Connecticut. Previous to his appointment as Assistant Professor at Framingham State University, he served as the Massachusetts State Botanist for the MA Division of Fisheries and Wildlife and was the volunteer coordinator for the Invasive Plant Atlas of New England (IPANE). He has also taught botany, plant science, and environmental studies at Connecticut College and the University of Connecticut. He currently serves as president of the New England Botanical Club.

SCHEDULE
9:00 AM – Light Refreshments and Used Natural History Book Sale
9:30 AM – Walk in Sessions Woods with Peter Picone, DEEP Wildlife Biologist
10:15 AM – Annual Meeting and Elections
11:00 AM – Guest Lecture
12 noon – Potluck lunch

ADDRESS
Sessions Woods Wildlife Management Area
341 Milford St. (Rt. 69)
Burlington, CT 06013

DIRECTIONS
Sessions Woods WMA and Conservation Education Center is located on Route 69, about three miles south of Route 4 in Burlington and three miles north of Route 6 in Bristo

CONNECTICUT
BOTANICAL SOCIETY

P.O. Box 9004
New Haven, CT 06532
USA

Become a Plant Conservation Volunteer!

The New England Wild Flower Society is seeking enthusiastic people interested in plant conservation and protecting natural habitats, to participate in their Plant Conservation Volunteer (PCV) program. The work mainly focuses on rare plant monitoring, but there are also opportunities to assist with invasive species removal, habitat management projects and botanical surveys that benefit rare plants. The Society also offers free field trips and learning opportunities to PCVs. It's an excellent opportunity to develop your botanical skills and put them to work, learn more about the flora of New England, meet others with similar interests, and help preserve your state's natural heritage.

Good candidates have some skill in plant identification and are adventurous. Some computer proficiency is required, along with physical ability to hike at moderate levels, and the ability to work independently or with a team of other volunteers.

All applications to become a PCV must be submitted via the online application by February 1st, 2017. To apply, visit our website: http://newenglandwild.org/conserve/saving-imperiled-plants/plant-conservation.html/

For more information, please contact:
Laney Widener, Botanical Coordinator
New England Wild Flower Society
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