

Native Plant

FALL/WINTER 2017

FOR OUR MEMBERS AND SUPPORTERS

NEWS

Who Let the Plants Out?

*When rare species show up
in strange places*

NEW ENGLAND
WILD
FLOWER
SOCIETY





The Garden Shop

FOR EVERYONE ON YOUR LIST

Looking for great gifts for your friends and family?

Locally sourced / fair trade

Books

Gifts

Tools for Gardeners

Whimsy

The Garden Shop has it.

HOLIDAY HOURS

MON-FRI 10-4 THRU DEC 22.

SATURDAY DECEMBER 2,9,16 10-4

visit us online www.newenglandwild.org/store

GIFT CARDS AVAILABLE/ FREE GIFT WRAP/SHIPPING SERVICE



Native Plant News

Volume 4, No. 2, Fall•Winter 2017

Native Plant News is published by New England Wild Flower Society, an independent, nonprofit, member-supported organization whose mission is to conserve and promote the region's native plants to ensure healthy, biologically diverse landscapes. Subscriptions to *Native Plant News* are included in membership dues, which start at \$40/year for individuals.

For membership information, contact: membership@newenglandwild.org.

Design Rachel Wolff Lander

Editorial Jane Roy Brown; jrbrown@newenglandwild.org

Board of Trustees

Chair

Alan E. Smith

Vice Chair

Ralph G. Brown

Treasurer

Janet Ganson

Clerk

Anita Springer

Executive Director

Debbi Edelstein

Trustees

Lalor Burdick

Ruah Donnelly

Pamela B. Durrant

Mary Griffin

Barbara Keller

Virginia McIntyre

Lita Nelsen

Polly Pierce

Kathy Shamberger

Ruth Shelley

Jackie Stone

Mary Ann Streeter

Charles A. Wain

NEW ENGLAND
WILD
FLOWER
SOCIETY



Copyright© 2017 New England Wild Flower Society®. All rights reserved. No material in this publication may be reproduced or used in any way without written consent. For permission, contact Editor, *Native Plant News*, 180 Hemenway Road, Framingham, MA 01701.

JOIN A SOCIETY-SPONSORED TRIP TO

Sri Lanka

February 9-22, 2018

Explore the jewel of the Indian Ocean during this botanical and cultural adventure

Details at

www.newenglandwild.org/learn/srilanka





2



7



12



From the Executive Director

THE POWER OF ONE

Conservation biologists recognize the importance of “keystone species,” those with an outsized impact on the structure and function of their community or ecosystem. The headlining examples are predators, like wolves, but “mutualists”—those engaged in irreplaceable, mutually beneficial interactions—are equally important. With the passing of Elizabeth Farnsworth, our Senior Research Ecologist, the conservation community in New England has lost one of its most charismatic and productive keystones.

It is sad, but too often true, that it’s hard to see the full web of someone’s influence until the tributes pour in. We all recognized Elizabeth’s myriad talents—as a scientist, writer, teacher, illustrator, and musician. What we’ve learned in the last few weeks is how many people and organizations throughout New England benefited as much as the Society did from her generous sharing of intellect, passion, and wit. She is indeed irreplaceable, and our community is forever changed by the loss of this one remarkable woman.

Given her interest in insects, Elizabeth surely knew that German scientists just published a 27-year study documenting a 76 percent decline in flying insects in 63 nature preserves, most of which are embedded in agricultural areas. It reminds us of the power of many: it takes a lot of insects to perform their core ecological functions, from pollinating plants to controlling pests to sustaining birds. Indeed, according to another study, Germany also lost 15 percent of its non-endangered bird population in the last 12 years. The background factors causing across-the-board species loss—over harvesting and shifts in land use, weather, and climate—do not account for the precipitous decline in insects. But the authors think they know what does: “Pesticide usage, year-round tillage, increased use of fertilizers and frequency of agronomic measures... may form a plausible cause.”

The way we manage the planet has consequences. The most recent Living Planet Index suggests that wildlife abundance on Earth decreased by as much as 58 percent between 1970 and 2012. Add to these sobering numbers the data in the latest U.S. National Climate Assessment—which unequivocally states that “the global climate continues to change rapidly compared to the pace of the natural variations in climate that have occurred throughout Earth’s history”—and we seem to be marching toward a tipping point. We must all act to prevent the loss of one more plant, insect, or animal, the keystones on which the edifice of life depends.

Sincerely,

Debbi Edelstein

Contents

2-4 **IN BRIEF**
Endangered species field work, Pollinate New England garden sites, and more

5-12 **FEATURES**
5 *Who Let the Plants Out? When Rare Species Show Up in Strange Places*
By Jane Roy Brown, Writer-Editor

8 *Why Insects Need Plants and Plants Need Insects*
Three Biologists Explain
By Jane Roy Brown

13 **PLANNED GIVING**
Funding the Future

BACK COVER **RARE PLANT SPOTLIGHT**
Euphrasia farlowii

© Dan Jaffe



On the cover: Goldenseal (*Hydrastis canadensis*), a prized medicinal plant, is endangered in three New England states.



Reports from the Field — and Mountain and River and

By Bill Brumback, Director of Conservation

Between May and July, when Astragalus flowers and produces seed, floods can jeopardize reproduction.

Summer Flood Threatens Endangered Plant

For the sixth consecutive year, Conservation staff members augmented populations of the endangered Jesup’s milk vetch (*Astragalus robbinsii* var. *jesupii*) with seedlings grown at Garden in the Woods. In late May, with funding through the U.S. Fish and Wildlife Service and in partnership with the Vermont Natural Heritage Inventory and the New Hampshire Natural Heritage Bureau, we transplanted seedlings at the only three sites in the world where this plant occurs, all on open ledges along the Connecticut River. Then, in the first week of July, a flood inundated all three sites, washing out or burying many transplants in mud. Early spring floods regularly submerge this habitat, but between May and July, when *Astragalus* flowers and produces seed, floods can jeopardize reproduction.

Established plants emerged from the July flood muddied but alive, and we excavated the surviving young transplants. Dehisced (ruptured) seed pods on many of the mature plants indicated that they had produced at least some seed to maintain the populations. Although we had planned to halt some of the augmentation after this season, we decided to continue for at least another year.

Acadia Trials Yield First Results

The summit of Cadillac Mountain in Acadia National Park drew so many visitors during this Fourth of July holiday that park managers closed the access road seven times in two days. Officials expect 2017 visit numbers to top 2016’s estimated 3.3 million. Because 75 percent of visitors head to Cadillac’s 18-acre summit, trampling has damaged native plant communities already struggling in thin, poor soils. This is the chief reason why, in 2015, the National Park Service engaged the Society to develop techniques to restore the summit’s native plants.

Last winter we set up test plots in areas largely off-limits to visitors to test various seed-sowing techniques. This summer we checked the plots, and the results suggest that simply adding seeds to the poor soils may not be enough to support restoration and that they likely will require additional organic matter to grow. In June we transplanted seedlings grown at Nasami Farm from seed collected on Cadillac. As of July, they were thriving. This fall we again will sow seed in experimental plots on site, testing soils with different levels of organic matter. ●

Top: Monitoring *Astragalus* on the Connecticut River



© New England Wild Flower Society

Bottom (L): Bill Brumback atop Cadillac (R): Cadillac summit’s disturbed area



© New England Wild Flower Society

To support conservation action throughout the region, please call our Philanthropy team at 508-877-7630 x3802 or visit www.newengland-wild.org/support.



© New England Wild Flower Society



© Arthur Hannes

Billions of Seeds for Sandy

By Bill Brumback

In 2015, the Society launched its Hurricane Sandy initiative to collect seed from locally adapted native plants on the New England coast. The purpose: to make seed available to public and private landowners who are still restoring coastal habitats damaged by the 2012 storm.

Since starting the initiative, which is allied with the federal Seeds of Success program, the Society team has logged 610 seed collections from 74 locations, covering 124 species. Individual seed counts vary by species but total in the billions.

This July and August alone, Conservation staff members and four interns completed 52 seed collections comprising 30 species from 32 locations. By the end of August, we had shipped seeds from 25 collections to propagators, who will grow them for transplanting at the beaches, riverbanks, and other coastal locations damaged by the storm. We will continue to collect more seed for these and future restoration projects into the fall. 🌱

Society staff and interns collect seed at healthy coastal sites like these in Barnstable (top) and Newbury, MA.



© New England Wild Flower Society



POLLINATE NEW ENGLAND SELECTS WORKSHOP SITES

By Mark Richardson
Director of the Botanic Garden

The Society's Pollinate New England team has chosen 12 sites to host pollinator garden workshops next summer. Each free, hands-on workshop will teach homeowners how to design, install, and maintain a pollinator garden. Home gardeners can help slow the global decline of pollinators by providing this habitat for bees, butterflies, moths, beetles, flies, and birds. Check newenglandwild.org this winter for workshop and registration details for these locations:

CT

Golet Farm Preserve, East Haddam
James L. Goodwin State Forest, Mansfield Center

MA

Wellesley Police Station, Wellesley
South Shore Natural Science Center, Norwell
Springfield Parks Department, Springfield

ME

Wells National Estuarine Research Reserve, Wells

NH

Portsmouth Public Library, Portsmouth
Keene State College, Keene

RI

Wilcox Park, Westerly
Roger Williams Park Zoo, Providence

VT

Jericho Center Green, Jericho
North Branch Nature Center, Montpelier

Pollinate New England is a regional educational outreach program made possible by a generous grant from the Institute of Museum and Library Services and many private donors. We extend thanks to our partnering organizations and workshop hosts. 🌱

Please help match our grant with your private donation. Contact our Philanthropy team at 508-877-7630 x3802 or visit www.newenglandwild.org/support.



Congratulations to Barbara and Charlie Grunden of Falmouth, Maine, recipients of the 2017 Service to the Society award. Dedicated and enthusiastic, the Grundens have served as exemplary Plant Conservation Volunteers for 19 years, completing at least 20 field surveys each season and even discovering populations of rare species.

The Service to the Society Award recognizes leadership, consistent dedication, and effectiveness in furthering the mission and activities of the Society.

To learn about becoming a Plant Conservation Volunteer, contact Laney Widener: 508-877-7630 x 3204; lwidener@newenglandwild.org.

They Came from All Over

By Jane Roy Brown, Writer-Editor

Projects took interns deep into the understory, literally and figuratively.

From Oberlin, Yale, and Humboldt State; from the universities of Maine, Kentucky, North Carolina, and Massachusetts; from Yellowstone National Park and the New York Botanical Garden. And from agriculture, landscape architecture, biology, environmental science, and ecology. This year's interns also brought curiosity and a willingness to dive into new projects, which they presented at the annual Intern Walk at Garden in the Woods in August.

Lovejoy Conservation Intern Georgia Hamer conducted a botanical inventory of Plainfield Wildflower Sanctuary in Plainfield, NH. With the help of sanctuary stewards, she identified native communities and assessed species diversity, from the delicate fringed milkwort (*Polygala paucifolia*) to the less-than-lovely dog vomit slime mold (*Fuligo septica*). Hamer's inventory updated the 2009 botanical list of species at that site with 15 newly discovered plant species.

Other projects also took interns deep into the understory—literally and figuratively. Alex Perry, Atkinson Conservation Intern, created an invasive-species management plan for Quarrybrook, a 245-acre experiential-education center in Windham, NH. Kseniya Verenich, Plant Records Intern at Garden in the Woods, inventoried the plants in the Lily Pond garden, while Horticulture Intern Craig Zeitlin redesigned and replanted a section of that garden display. Everett Conservation Intern Laura Shriver conducted a literature review of the effects of gene flow from horticultural plantings to natural populations, assessing the risks and benefits of outbreeding depression and hybridization.

Laura Tupper-Palches, the Chester B. Allen, Jr., Native Plant Propagation and Horticulture Intern at Nasami Farm, worked in the greenhouses as well as a day a week in the retail shop. Listening to customers' questions about pollinator-friendly plants inspired her final project, a customer information sheet about local native bees. "The goal is to invite people to go beyond choosing a few pollinator-friendly plants and to think about the specific needs of New England native bees," she said. "Even a few minor adjustments to a garden can have a huge benefit for these species." 🌱



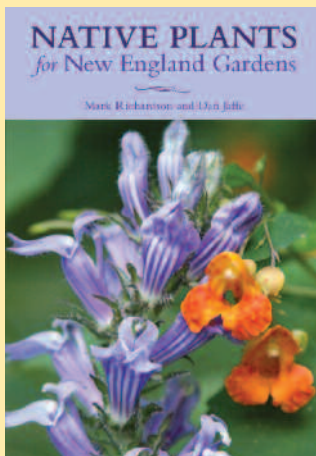
© New England Wild Flower Society

One project was an invasive species management plan for an education center.



© New England Wild Flower Society

An intern updated the botanical inventory of Plainfield Wildflower Sanctuary.



New Gardening Guide for Spring

By Jane Roy Brown

Native Plants for New England Gardens, a new book by Society horticulture gurus Mark Richardson and Dan Jaffe, shares experienced-based advice about how to create hardy gardens that will tolerate drought, resist disease, and strengthen biodiversity. The secret, of course, is to use native plants. This handsomely illustrated guide selects 100 species that will thrive in New England gardens, from flowers and ferns to shrubs, ground covers, and grasses.

Slated for March 2018 release from the Society and Globe Pequot Press, *Native Plants for New England Gardens* is available now for pre-order at a discount from our shop: \$16.50 for Society members, \$18.50 for nonmembers (suggested retail price: \$19.95). Order through the Garden Shop at 508-877-7630 x3601 or gardennatives@newenglandwild.org. 🌱

Who Let the Plants Out?

When Rare Species Show Up in Strange Places

By Jane Roy Brown, Writer-Editor

“Rare plants keep getting rarer, and some are going extinct. With all the threats they’re facing, shouldn’t we be growing and planting them in the wild?”

With the recent uptick in awareness about extinction, people are more frequently posing variations of this question to the Society’s horticulture and conservation staff. “It seems like common sense,” replies Director of Conservation Bill Brumback. “A species is rare or endangered, we know how to grow it, so, why not just plant more? And if the solution were that simple, believe me, we would be doing that.”

What makes the issue so complex? Mary Parkin, the endangered species recovery coordinator in the U.S. Fish and Wildlife Service’s Northeast Region, lists 11 specific risks in her “Reintroducing Native Plants into the Wild,” a document that outlines guiding principles for the 100 botanists and conservation professionals in the Society’s New England Plant Conservation Program (NEPCoP).

The risks, both for the plants being introduced and for existing populations in the wild, include choosing unsuitable habitat for the reintroduced plants, genetic mixing among the introduced and wild populations that potentially weakens one or both, the introduction of disease, and the possibility that even a native rare species may become invasive in its new

location. And, Parkin cautions, “the overall success rate for reintroduction projects is low.” In part, this is because many rare plants got that way by developing specialized adaptations to particular conditions over tens of thousands of years, and they cannot adapt quickly to new environments. Sometimes the unique characteristics or needs that propel a species toward extinction are not evident, even to scientists who have studied the species for years. Her advice to conservation botanists: “It is far better . . . to conserve existing populations and communities than to attempt the difficult and imperfect task of creating new ones.”

To emphasize the point, Brumback cites his multi-year, multi-partner project with the globally endangered Jesup’s milk-vetch (*Astragalus robbinsii* var. *jesupii*), whose only three populations live on flood-scoured ledges along the northern Connecticut River (see “In Brief”). For several years—with permission from landowners and appropriate federal and state permits—he has been augmenting two of the existing *Astragalus* colonies with seedlings grown from seed collected at each of the sites. This has produced some success, despite drought and inopportune flooding. But introducing plants to new areas that appear to be suitable habitat has not been as successful.

“In each year’s transplant group, some of these healthy seedlings do not survive,” Brumback says. “In the new areas, the percentage of failed seedlings is higher, and we don’t know why. It’s really difficult

Goldenseal
(*Hydrastis canadensis*)

WHEN RARE SPECIES SHOW UP IN STRANGE PLACES

to determine what constitutes suitable habitat for this and many other species.”

The Society also carefully documents its work and findings. The data gathered by Society botanists and the NEPCoP network on all the globally and regionally rare plants in New England often constitute the only current scientific documentation of endangered species.

People who are not conservation botanists are unlikely to be aware of the the crucial importance of record keeping in conservation, or of the nuances of plant genetics. Driven by a sense of urgency, and perhaps by the perception that scientists are simply studying species and not doing enough to save them, well-meaning citizens sometimes take matters into their own hands and plant rare species in the wild.

“We consider this not to be wise practice,” Parkin

says. “It can make it difficult to track the populations that constitute the evolutionary history of a species.”

Because botanists and federal biologists regularly visit the field to track plant populations, they tend to recognize illicit reintroductions on sight.

“They show up suddenly, have not been recorded in that place before, and the habitat is often inappropriate for the species’ long-term survival,” says Parkin.

In New England, for example, Parkin and her colleagues believe that someone has illegally transplanted specimens of endangered sandplain gerardia (*Agalinis acuta*) in experimental habitat.

“We’ve come across this plant in places that we wouldn’t have recommended or condoned,” she says, “and there is no previous record of it being there.”

Vermont state botanist Bob Popp reports another case: “We recently discovered a very rare

From *Agalinis* to *Zizia*: Banking Seed from Rare Species

By Elizabeth Farnsworth, Senior Research Ecologist and Co-curator,
Rare Plant Seed Bank

New England Wild Flower Society is a leader in the national effort to bank seeds of rare plants to ensure the preservation of genetic diversity and, potentially, to reintroduce plants and species to the wild. Our goal is to preserve seed from all of the region’s threatened species by 2020, the target date set by the United Nations Convention on Biological Diversity in its “Global Strategy for Plant Conservation.” Meeting this ambitious goal entails collecting from more than 2,000 populations of the 300 of our 388 globally and regionally rare species that can be banked using current techniques.

The challenges become clear when we clarify what is involved. Our pioneering seed-bank project is a true team effort. Many of our seed collectors drive for hours into the wilds of New England and hike miles off the beaten path to locate a rare plant population, timing their visit in the period when the species bears mature seeds. To make sure we don’t deplete a population, we harvest seed from no more than 10 percent of the plants. When we collect seed from multiple populations in different locations, we capture more genetic diversity, which bolsters the species’ capacity to survive in changing conditions.

Since February, staff and volunteers, including enthusiastic students from Smith College, have processed 303 collections totaling more than 2.3 million seeds. An additional 70 collections from 42 plant species (26 of which are new to the seed bank this

year) have already arrived during the current field season, which ended in late October. We add all this to our burgeoning seed bank, which has been operating since 1989. (Before that, the Society contributed seeds to other seed banks.)

At both Garden in the Woods and Nasami Farm, we dry, clean, and count the seeds; store them in air-tight foil packets; and move them into permanent freezer storage at our vault in Framingham. We regularly test samples for viability by germinating them in a climate-controlled chamber, and we replenish collections with fresh seed when necessary. We’re also researching and devising new methods for banking the seed of plants that do not tolerate conventional storage, such as oaks and orchids, thus contributing to the science of seed saving. 🌱

The Society regrets to report that Elizabeth Farnsworth passed away in late October.



© New England Wild Flower Society

alpine plant growing in an area where it had never been known previously, and this area has been botanically well documented. The plant is growing in five discrete patches with some separation between them, making it unlikely it was overlooked.” To further complicate the issue, Popp adds, “another alpine species is present in two of the clumps, and this plant has never before been observed anywhere in Vermont. We are still trying to figure out how they may have gotten there. Initially, our thought was that they had to be purposely planted, but our evidence has been mixed.”

Popp’s concerns focus on the provenance of plants put into the wild by unknown people. “Even if they are grown locally, what is the original source of the seed?” he asks. “These introduced plants could potentially interbreed with our native plants and result in offspring that are less well adapted to the local environment.” Such specimens, which may do well in a garden setting, may not persist in the wild over the long term, he says.

Clandestine plantings can also have unintended consequences for the protected species. “If a rare plant suddenly becomes more abundant, it skews our assessment of its current status,” Popp notes. In such a case, a species could potentially lose its legal protection. Or, a previously undocumented population—even a single plant—can require the agency responsible for protecting the species to conserve it, which diverts already scant government funds and staffing.

In a case that might read as a parable of this conflict, a single specimen of Leedy’s roseroot (*Rhodiola integrifolia* ssp. *leedyi*), a species federally listed as threatened, is growing in a New York state park, a few miles away from the nearest substantial population. John Wiley, fish and wildlife biologist with the U.S. Fish and Wildlife Service’s New York field office, says that the plant is the last survivor of a small population that, for decades, has grown near a public parking lot, in less-than-ideal habitat.

“Because of the location, there has always been some suspicion that someone may have planted the original plants,” says Wiley. “It seems likely, but it has never been confirmed.” The question hangs in the air more heavily than ever, now that a lone Leedy’s roseroot remains standing. “The species recovery plan calls for augmenting the existing populations,” says Wiley, “so, should we invest resources in augmenting this population of one, in marginal habitat?”

The questions are not easily answered, as they mix science, money, and genuine concern for species diversity. What the professional botanists and the advocates

for more reintroductions both want is for populations of rare plants to continue to exist in the wild.

“With climate change and other threats affecting the region,” the Society’s Brumback notes, “habitat for many of these species will be even more limited in the near future. We not only have to protect as much complex and diverse rare-plant habitat as possible, but also have to figure out how to augment existing populations to help them sustain themselves where they are.”

This is why seed banking and keeping clear records of the seeds’ origins are so important (see sidebar). “It’s the backup plan,” says Brumback. “It preserves the genetic variation of these plants and gives us the material from which to do controlled experiments and take appropriate conservation action, without either scrambling the scientific record or causing unintended harm.”



© Dagnouth7



© John Wiley

Above: Leedy’s roseroot (*Rhodiola integrifolia* ssp. *leedyi*)

Left: Sandplain acuta (*Agalinis acuta*)

Seed Needs

Help us fill the Seed Ark! We’re trying to save the seeds of New England’s rare and endangered plants by 2020. Your donation in any amount will support seed collection throughout the region, seed processing, long-term storage, and regular testing of the seed for viability—and it will help us match generous pledges from the Hope Goddard Iselin Foundation and the Bromley Charitable Trust. Please use the donation envelope in this issue, or contact the Philanthropy Department at 508-877-7630 x3502 or gifts@newenglandwild.org.



Karner blue butterfly (*Plebejus melissa samuelis*)
© skeeze@arwelt



Why Insects Need Plants and Plants Need Insects

Three Biologists Explain

By Jane Roy Brown

At some point in your education you probably learned a few facts about insects, such as that they account for more than half of all living things on Earth, making them the planet's most abundant and ubiquitous animals.

Maybe you also studied how bees pollinate flowers, after which your teacher moved on to nematodes. That cursory overview explains why most of us know pitifully little about insects. This knowledge gap comes at a high price, because some insects may be gone before we discover them. Yet insects form the important link in the food chain between plants and the rest of the animal kingdom.

"All animals get their energy directly from plants, or by eating something that has already eaten a plant. The group of animals most responsible for passing energy from plants to the animals that can't eat plants is insects," writes Doug Tallamy, the University of Delaware entomologist and champion of biodiversity. "So many animals depend on insects for food ... that removing insects from an ecosystem spells its doom." His words echo those of another famous biologist, E. O. Wilson: "If insects were to vanish, the environment would collapse into chaos."

WHY INSECTS NEED PLANTS

But vanishing is what some unknown number of the world's approximately 1 million catalogued insect species are doing. The unknown part is especially troubling: According to the International Union for the Conservation of Nature, as many as 4 million species may be undiscovered—and unprotected. In the United States, scientists have documented about 91,000 out of a potential 164,000 or more species, reports a Smithsonian Institution website. Yet, out of the 714 animals on the federal Endangered Species List, only 85 are insects. Entomologists view this number as a mere glimmer of a colossal iceberg.

“More than half the species of animals in New England are insects, more than half of these insects are plant feeders, about 80 percent of those are specialists.”

“If we assume that insects and vertebrates face similar destructive forces at similar levels of intensity, then one should expect to find on the order of 29,000 at-risk insects in the U.S. alone,” write Scott Hoffman Black and D. Mace Vaughan of the Xerces Society for Invertebrate Conservation.

Only six of the current federally listed insects inhabit New England, but state endangered species lists for the region identify a total of 229. Though some species overlap among states, Connecticut alone lists 174. To slow the decline of these native insects, Tallamy urges gardeners to expand insect habitat with native plants. This helps not only specialist insects, such as many butterflies that feed and lay their eggs only on particular plants, he says, but also generalist insects, spiders, and diverse vertebrates.

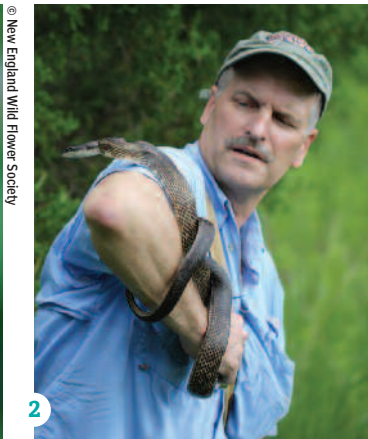
What do other entomologists have to say about the crucial interactions between insects and native plants—and how we can slow the decline of both? *Native Plant News* asked three other experts with relevant research specialties.

DAVID L. WAGNER is professor of ecology and evolutionary biology at University of Connecticut. His research focuses on the importance of early successional habitats to invertebrates, pollinator decline, invasive-species impacts, and climate change threats.

“More than half the species of animals in New England are insects, more than half of these insects are plant feeders, about 80 percent of those are specialists, which ties them to the fate of their host plants. This is one reason why every time we lose a genus of plants there could be an extinction cascade.

“For example, the native sundial lupine [*Lupinus perennis* ssp. *perennis*], one of the most globally threatened plants in New England, supports three of the region's rare or endangered butterflies—the Karner blue [*Lycaeides melissa samuelis*], the Persius dusky-wing [*Erynnis persius* ssp. *persius*], and the frosted elfin [*Callophrys irus*]. Karner blue larvae feed exclusively on the native lupine leaves, and adults lay eggs on or near the plants. Frosted elfins and Persius duskywings have a second host plant, yellow wild indigo [*Baptisia tinctoria*], which is rare in at least two New England states. So, we lose lupine and there go one to three butterfly species.

“All these plants and insects share early successional [open] sand-plain habitat, which is very scarce now in this region because it's so easy to develop. We still have not protected these habitats, yet they contain some of our region's most intriguing biodiversity, including about 300 species of sand-dwelling insects and several important plants, like New Jersey tea [*Ceanothus americanus*] and sandplain gerardia [*Agalinis acuta*]. The loss of New Jersey tea alone could doom more than a dozen species of bees, moths, and butterflies. It's so valuable for biodiversity that it is being considered for protection in New England.”



1. New Jersey tea (*Ceanothus americanus*)
2. David L. Wagner 3. Sundial lupine (*Lupinus perennis* ssp. *perennis*)



JAMES T. COSTA, a biology professor at Western Carolina University and director of the affiliated Highlands Biological Station, studies evolutionary relationships between native plants and invertebrate species, including interdependent, specialized functions among native species of flora and fauna. Costa also researches whether nonnative plants serve equally well as native plants for the habitat needs of less specialized invertebrates, and how invasive plant (or other) species disrupt beneficial invertebrate-plant relationships. He has published popular books about science, most recently *Darwin's Backyard* (W. W. Norton, 2017).

“Entomologists widely share Doug Tallamy’s views, because we understand how large the biomass of invertebrates is and that all of these insect species serve important ecosystem functions. Fireflies [*Photinus* spp.], for instance, are neither pollinators nor herbivores, but their larvae are generalist predators of other insects, including aphids and other garden pests. And their larvae live in the soil. Most people don’t know this, so these insects suffer the cumulative effects of small insults: one more acre developed here, another five acres sprayed there. Before you know it, you’ve undermined a lot of the population. In the Northeast, you have eight to ten firefly species—*Photinus pyralis* is one that’s common in New England. Although none are presently endangered, these persistent threats can change that.

“The decline of many insect species is the byproduct of land disturbance, which destroys the native plants that form their habitat and the larvae of species that live in the soil. Disturbance also invites colonization by invasive plants. Add to that elevated levels of pesticides, herbicides, and fertilizers, and you get a perfect storm that undermines local invertebrate and plant populations, all connected with the ways we use the land. It will reach a critical point past which these species won’t be able to recover. So, yes, we need to plant natives. We also need to re-evaluate our land-use practices.”



James T. Costa

© Terrence D. Fitzgerald

Of Plants and Ants

Spring ephemeral wildflowers rise from the moist floor of New England’s mixed deciduous forests before the trees leaf out. By the time the canopy fills in weeks later, the ephemerals have produced seed in an accelerated life cycle. On the seeds are nutritious, fleshy attachments called elaiosomes, which attract certain ants. The ants carry the seeds back to their nests before eating the elaiosomes, and voilà—a new plant colony takes root in rich, ant-produced soils. The late Senior Research Ecologist Elizabeth Farnsworth, co-author of *A Field Guide to Ants of New England* (Yale, 2012) and author of the Society’s “State of the Plants” report, elaborates on this fascinating mutual relationship, called *myrmecochory*:

NPN: Which New England plant and ant species exchange these services?

EF: Spring ephemerals with ant-dispersed seeds include some violet species, trilliums, bloodroot, columbine, Dutchman’s breeches, and many more woodland wildflowers. Several species of ants are involved, particularly common woodland ants in the genera *Aphaenogaster*, *Tapinoma*, and *Formica*.

NPN: What other plants or animals benefit from this relationship?

EF: As some of our earliest-flowering plants, spring ephemerals provide nectar and pollen to some of the earliest-emerging insects, such as flies and solitary bees. These insects in turn are food for returning migrating birds that are establishing breeding territories and nests. Elaiosomes provide critical carbohydrates, fats, and proteins that enable ants to ramp up their colony activity in the spring. Ants, in turn, are food for foraging animals. Bears emerging from hibernation, for example, visit ant nests for some of their first spring meals.

NPN: Are ants involved in other critical services to plants in our region?

EF: Ants create significant amounts of soil as they build their nests. They also engage in many intricate ecological relationships with other insects, which benefit plants. For example, Lycaenid butterflies, including the endangered Karner blue, benefit from ant protection. Ants tend the butterfly caterpillars, which secrete a substance rich in sugars and amino acids—ambrosia to ants. Ants fend off predators of these caterpillars. Karner blue caterpillars feed on wild lupine (*Lupinus perennis*), but as mature butterflies, they pollinate more than 100 species of plants. So, many other plants benefit from these butterflies, and, by extension, from their protectors, the ants. 🌱



Ants (*Aphaenogaster fulva*) munch an elaiosome on bloodroot (*Sanguinaria canadensis*) seed.

© Alex Wild

“One of the alternative places to foster insects is utility rights-of-way.”

MICHAEL J. RAUPP, *entomology professor and extension specialist, University of Maryland, studies the mechanisms by which plants escape attack from herbivorous insects, in order to create sustainable landscape systems with minimal dependence on synthetic pesticides and to develop integrated pest management (IPM) programs. Also known as “The Bug Guy” from his blog, BugoftheWeek.com, Raupp has appeared on programs including Good Morning America, National Geographic Explorer, the Dr. Oz Show, and the Tonight Show with Jay Leno, whom Raupp challenged to eat a cicada. (Leno did.)*

“As we lose insect habitat to development, one of the alternative places to foster insects is utility rights-of-way, which cover between five and eight million acres in the continental U.S. Many biologists have documented their damaging impacts on plants and animals. But for insects, especially the four thousand species of native bees in the U.S., these areas can be transformed into biodiverse habitats with native plants.

“The reasons are the same ones that make rights-of-way damaging to the original habitats—they are heavily managed to remain in an early stage of succession [open, meadow-like spaces], and they cut through less-managed habitats. But along the edges, a great diversity of plants and animals flourishes. In a study comparing bee communities in rights-of-way and in nearby mowed fields, the rights-of-way supported about 25 percent more bee species. Rare species of bees were more than twice as likely to be found in the rights-of-way. [Russell et al., 2005] It turns out that the nearby fields provided very few flowering plants. But in the rights-of-way, there were all kinds of trees, shrubs, and vines providing a rich smorgasbord of nectars and pollens for the bees.”



1. Tiger Swallowtail and *Eupatorium*
2. Michael J. Raupp 3. *Scolia dubia* on *solidago*





Funding the Future

If you are someone who likes to think ahead, consider making a bequest to the Society. Bequests offer opportunities to support the future success of the conservation, horticulture, and education programs you love today:

- A bequest often enables you to make a larger future gift than your current financial commitments allow.
- As with other kinds of planned giving, you may designate bequests for specific purposes or give without restrictions. If you plan to include restrictions, please always discuss your intentions about these provisions with the Society in advance to ensure that they can be carried out as you desire.
- You can choose the types of asset(s) you wish to bequeath: a dollar amount, other asset(s), or a specific percentage of the value of your estate.

The examples below illustrate different ways in which you can use bequests to support our crucial work in the years ahead:

- “I bequeath 20% of my entire estate to New England Wild Flower Society, Inc., a charitable corporation established by the law at 180 Hemenway Road, Framingham, MA 01701, for its unrestricted use.”
- “I bequeath 10% from the sale of my real estate assets to New England Wild Flower Society, Inc. . . . [as above] to be used to provide funding for its Conservation department.”
- “I bequeath \$50,000 to New England Wild Flower Society, Inc. . . . [as above] to be added to the Society’s general purpose endowment fund.”

When you name the Society in your estate plan, please let us know right away, so that we have the honor of thanking you immediately. We would like to enroll you in our Trillium Society and include you in special events to show our appreciation for your foresight and generosity. For more information about funding our future, please contact Director of Philanthropy Tracey Willmott at 508-877-7630 x3502.

Please note that this article contains only general information and is not presented as specific legal or tax advice. Before making any planned gift, always consult with your attorney or financial planner.

Can you imagine a world without plants?

Every week the headlines announce new reversals of environmental protections— withdrawing from the world climate accord, permitting mine waste to be dumped in streams, clearing protected wilderness to extract coal, and more.

All of these actions threaten native plants—the unsung heroes of our planet.

Without them, we lose the habitat for all animals and insects, plus the base of the food chain that leads to our own dinner tables.

Every aspect of conservation is vulnerable to the stroke of a pen.

But there is a beacon of hope . . . **YOU!** In an era of slashed government support, generous people like you step up to strengthen *nonprofit organizations like ours that are implementing the nation’s crucial environmental programs.*

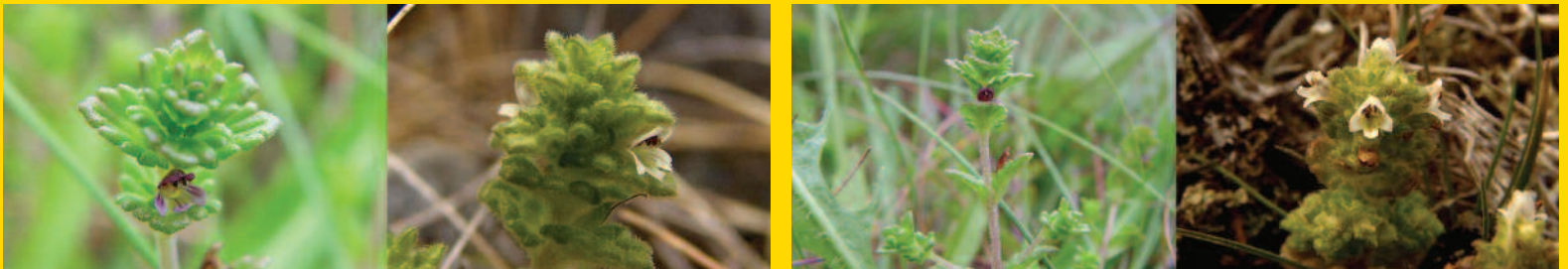
New England’s native plants need you as much as you need them.

We are counting on you to support New England Wild Flower Society at this pivotal time.

Please give as generously as you can.

Please use the envelope provided, donate online at newenglandwild.org/support, or call the Philanthropy team at 508-877-7630 ext. 3802.

Thank you!



Euphrasia randii farlowii bracts compared

© John Maunder

Euphrasia randii farlowii habits compared

© John Maunder

RARE PLANT
SPOTLIGHT

Farlow's eyebright (*Euphrasia farlowii*)

By Arthur Haines

In the entire country, Farlow's eyebright has been found only in open areas on the coastal plain in eastern (Downeast) Maine. This thumb-sized, compact, hairy annual is extremely rare in its numbers and distribution within the United States. It's also unusual in being a hemiparasite: Although it produces chlorophyll, the plant also parasitizes other nearby plants through haustoria, which are invasive connections to the host plant's roots.

This rare plant has a more common dop-pelgänger, Rand's eyebright (*Euphrasia randii*), that shares the same habitat and geography. Until recently, their similarities have compromised the identification and perhaps the conservation of the rarer Farlow's eyebright. In fact, for much of the 20th century, botanists regarded Farlow's eyebright as a variety of Rand's. A 1989 study solidified the opinion that none of its varieties differed enough from *E. randii* to merit separate species status.

Recent research, however, reveals that these two coastal eyebrights can be reliably distinguished, by the distance on the stem

between each leaf pair (the internode length), and the length and kinds of hairs found on the vegetative organs. Recognizing *E. farlowii* as a species will raise its conservation status, because it has been collected in New England with certainty only once, in 1909. (In fact, this is the only known collection from the United States—all others were from maritime Canada.) Now that a reliable way to distinguish these two species is available, botanists working in Downeast Maine can be on the lookout for Farlow's eyebright and help to reassess its conservation status. 🍀

—Arthur Haines is the Society's research botanist and author of *Flora Novae Angliae*. Visit www.newenglandwild.org/blog to learn more about how to tell these two eyebrights apart and how eyebrights got their common name.

We rely on your generous support to
sustain this research.