

Forests & Gardens

SUMMER 2019



HOLDEN
FORESTS &
GARDENS

Forests & Gardens

SUMMER 2019, V3/3

Forests & Gardens is the member magazine for Holden Forests & Gardens, which includes the Holden Arboretum in Kirtland and the Cleveland Botanical Garden in Cleveland.

Our Mission: Advance and inspire a deeper understanding of plants to enhance life.

Our Vision: Vibrant green communities and diverse native forests of the Great Lakes region will flourish and sustain life.

Editor: Cait Anastis, canastis@holdenfg.org

Art Director: Jackie Klisuric

Photography: Corey Ann Photography, Ethan Johnson, Jackie Klisuric, Ferole Parmelee, Katie Stuble, Kate Williams

BOARD OF DIRECTORS

Bradley E. Turner, <i>Chairman</i>	Verne D. Klunzinger
Constance N. Abbey	Stephen J. Knerly, Jr.
Paul R. Abbey	Joseph J. Mahovic
Thomas D. Anderson	Michael C. Marino
Victoria U. Broer	Cynthia Moore-Hardy
Barbara Brown, Ph.D.	Ellen W. Jones Nordell
Andrew Coleman	Deidrea L. Otts
William E. Conway	Jane Q. Outcalt
Jonathan E. Dick	Gary W. Poth
Paul E. DiCorleto	Erin Kennedy Ryan
Robert Galloway	Robin D. Schachat
Sarah L. Gries	Lynn C. Shiverick
Debra H. Guren	Ruth M. Stafford
Peter S. Hellman	K.K. Sullivan
Joseph P. Keithley	Charles F. Walton

Jill Koski, *President and CEO*



©Holden Forests & Gardens

Forests & Gardens (ISSN 2474-6371) is a class and events magazine published quarterly by Holden Forests & Gardens, 9500 Sperry Road, Kirtland, Ohio 44094-5172.

Periodicals postage paid at Mentor, Ohio and additional offices.

Postmaster: Please send address changes to *Forests & Gardens Magazine*, Holden Forests & Gardens, 9550 Sperry Road, Kirtland, Ohio 44094-5172

ON THE COVER: *Echinacea purpurea* (purple coneflower)



Kalmia latifolia (mountain laurel), at the south end of the Eliot and Linda Paine Rhododendron Discovery Garden.

FEATURES

PRESIDENT'S COLUMN 3

CELEBRATING 20 YEARS IN THE HERSHEY CHILDREN'S GARDEN 4

DIVING RIGHT IN: IMMERSIVE INTERNSHIPS EDUCATE THE NEXT GENERATION OF SCIENTISTS. 6

GIFTS TO THE ANNUAL FUND HAVE A POSITIVE IMPACT ON HOLDEN FORESTS & GARDENS AND THE COMMUNITY 10

PLANTING FOR POLLINATORS: HOW HOLDEN FORESTS & GARDENS IS WORKING TO HELP KEEP BEE AND BUTTERFLY COMMUNITIES ALIVE 12

DEPARTMENTS

BIRD BIO
Scarlet Tanager, *Piranga olivacea* 8

PLANT PROFILE
Clematis 9

IN THE GLASSHOUSE
The Good Roach: Madagascar's Hissing Cockroach 11

VOLUNTEERS
Enjoying Nature with Others, Week After Week 14

NEWS & HIGHLIGHTS 15



Greetings!

PRESIDENT'S COLUMN

Dear Friends of Holden Forests & Gardens,

Earlier this year, I had the opportunity to attend a meeting with directors from more than 40 large gardens and arboreta from across the country. The discussion topics ranged from the role of public gardens in our communities to climate change and sustainability to creative programming that best connects guests to the natural world around them.

As I participated in discussions with these other industry leaders, I was reminded of the valuable impact of organizations like Holden Forests & Gardens. The Holden Arboretum and Cleveland Botanical Garden campuses are far more than pretty places to visit. This issue of *Forests & Gardens* magazine gives us an opportunity to highlight some of the programs that make a difference in our community and to demonstrate how you make a difference as a friend and supporter.

The Hershey Children's Garden at the Botanical Garden is celebrating its 20th anniversary this year. It was a groundbreaking garden at its founding and remains a leading children's garden engaging children in outdoor experiences that foster a lifelong connection to nature. We are excited to offer special programs and events to acknowledge this important milestone. If you haven't visited the Children's Garden lately, please put it on the list for your next trip to the Botanical Garden. With or without young children, it's a magical place.

Summer means a full house at the Long Science Center at the Arboretum. Each year we welcome more than 25 students as interns working across our science, conservation and horticulture programs.

Training the next generation of plant scientists is one of our most important tasks for the future. I encourage you to attend the Symposium on Ecological Research (SEARCH Symposium) planned for Friday, Aug. 2 at the Cleveland Botanical Garden. Our interns would love the chance to share their summer research with you.

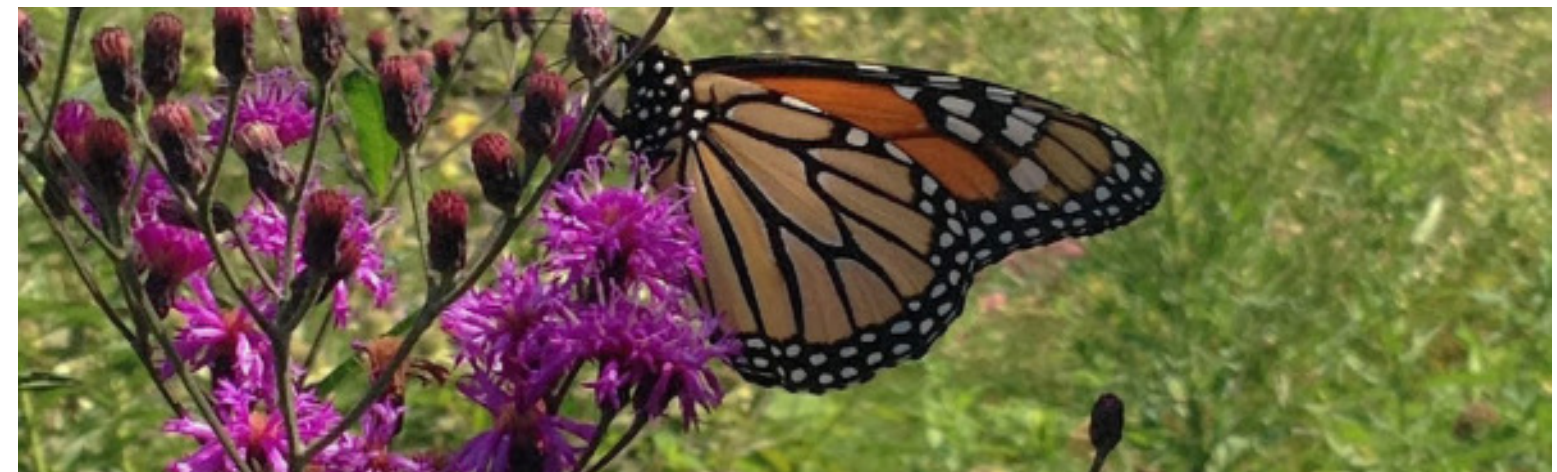
In this issue, we also tell the story of Project Wingspan, a two-year initiative sponsored by a grant from the National Fish and Wildlife Federation to the nonprofit Pollinator Partnership across eight states. We are proud that Ann Rzepka, Arboretum horticulturist, will act as the Ohio state lead. Arboretum horticulture and research staff will be developing pollinator enhancement plots to determine the most effective means for restoration and enhancements to increase habitat for pollinator species at risk. You can see this work in action in the Crabapple Collection adjacent to the Arlene and Arthur S. Holden Jr. Butterfly Garden.

As members, donors and friends, you make our continued work to advance and inspire a deeper understanding of plants to enhance life possible. We are grateful for your commitment and engagement. We look forward to seeing you soon!

Enjoy the summer!

JILL KOSKI

President and CEO



Monarch on giant ironweed (*veronia gigantea*)

Celebrating 20 Years in the Hershey Children's Garden

Innovative Garden Was One of the First of Its Kind in the United States

By Kate Nickley, Hershey Children's Garden Coordinator

More than 20 years ago, a group of children worked with crayons and white paper spread out on the floor of Clark Hall to illustrate a garden meant just for them. They drew apple trees and flowers, ponds and cornstalks. One boy, in a wheelchair, drew an image of himself in a tree house.

The drawings became a source of inspiration for landscape architect Herb Schaal's design for the Hershey Children's Garden (HCG), which opened in the summer of 1999. The iconic garden is filled with the things that the children imagined, including the treehouse where a boy in a wheelchair could play. This design process illustrates one of the things we love most about the HCG: It is a space that was created for and by children. It is a space where children are valued for their creativity, experiences and ideas – for their very essence and being.

From its inception, environmental education has been central to the garden's mission. "Children aren't growing up with nature anymore," said Debbie Hershey Guren, whose gift made the garden possible. "This garden fosters love for the earth, gardening and discovery of nature."

Holden Forests & Gardens believes love for the earth means love for the natural environment and people. We support a humanistic form of environmental education that emphasizes human's connections with their natural environment and with each other. We hope to inspire environmental stewards who actively work to create a positive social impact, and we believe there is no such thing as environmental stewardship without empathy.

Starting with this perspective of environmental education, we educate through two means. The first is by providing spaces for unstructured experiential



outdoor learning, or nature play. Through play, children can gain many insights about the world around them, learn to cooperate with others, test their limits, build physical coordination and develop a sense of resilience. From our pond to our water pumps to our prairie, the garden is ripe for nature-play. We also offer informal programming to facilitate inquiry-based learning. Our crafts, games and garden explorations are designed to spark children's innate curiosity. When children ask questions, we empower them to find the answers. Allowing them to do that might mean providing tools or other resources or encouraging further observation or experimentation.

During its first two decades, the garden has hosted thousands of visits for programs ranging from free, drop-in style programs, such as daily activities and storytime, to registered classes and events such as Fairy Picnic, Boo-tanical Bash and Sensory Mobility Days. In 2018, Hershey Children's Garden served more 4,900 people with drop-in style activities and over 3,700 people with registered events. The children's garden is also a haven for school groups. Many of

the 7,300 children who came to Cleveland Botanical Garden for field trips or camp programs spent time exploring the children's garden. This year, we are excited to offer an array of new programs including our Garden Explorers Program, Garden with Green Corps Days, and English Language Learner Day among others. We are also offering a few special events to commemorate the 20th anniversary including a birthday party and a special opportunity for adults called "Inner Kid Night."

The garden's horticulture cultivates a unique learning environment. Unlike display gardens, there is an open invitation to explore in and among plants. Children are invited to pick, prod, trample and eat the plants. The horticulture style is both unstructured and whimsical – unstructured in that you can find plants that look as if they are naturally occurring and are not overly manicured. For example, you can find plants that topple over, or plants in different stages of their life cycle from fruiting to decomposing. The horticulture style is whimsical in the diversity, scale and themes. You can find native prairie plants, aquatic plants, carnivorous plants, trees and crops all within the same garden. You can gaze up at 15-foot-tall reed grass, or duck under a weeping mulberry tree tunnel. We've created themed gardens ranging from "pizza garden" to "upcycled planter garden." This year, we're excited to plant a "flower pounding" garden, in which children can make art from picked flowers.

The future of the garden is sunny. We will continue to restore and revitalize essential garden elements including the treehouse and upcycled planter garden. We will continue to support diverse plant communities that thrive under changing light conditions as the garden ages. We will work



The garden's fountain offers children the chance to cool off on a warm day.

to expand upon the inclusive nature of our garden, from the design of structures and spaces to programs. As for future goals, we hope to transition the garden to a "four seasons garden," with features that are ripe for discovery and exploration all year round. Imagine crawling under a low tunnel to plant vegetables in the winter. Who knows, you may even be able to see aquaponic gardens, an outdoor classroom or outdoor kitchen in the garden one day.

Although the physical space, programs and horticulture make this garden a treasure, the children's garden is truly special thanks to the countless people who have created memories in it over the years, from visitors to volunteers to donors. We hope you and your family will take delight in the garden during its 20th year. Hope to see you there!

A special thank you to The Hershey Foundation for its generosity and continued support.

You can find more information about this summer's Hershey Children's Garden programs in the class schedule on page 3 or by visiting our website at cbgarden.org



A vintage style pump allows children to fill a watering can and help tend to the garden's plants.



The treehouse is an iconic feature of the garden.



Children create botanical art at the potting bench.

Diving Right In: Immersive Internships Educate the Next Generation of Scientists

By Katie Stuble, Scientist

Benjamin Franklin once said, “Tell me and I forget, teach me and I may remember, involve me and I learn.” In this spirit, Holden Forests & Gardens research intern program moves into its second decade of educating the next generation of scientists, inviting undergraduates from universities across the country to “dive right in” to research. Over the past 10 years, HF&G research staff have mentored more than 50 students, helping them to develop the skills needed to tackle the challenging research questions of the 21st century.

“When I arrived at Holden 12 years ago, there was very little training of undergraduate students in science at the Arboretum,” said David Burke, chief program officer for science, horticulture and conservation. “This seemed like a missed opportunity. There is an excitement among young people for plant biology and ecology, and a real interest in helping to solve some of our pressing environmental and conservation issues, as well as a need for internships to help them develop the skills needed for a career in science. Bringing students into the research department to work with us during the summer seemed like a natural fit for our research and education mission.” During the time interns spend with the HF&G research team, staff scientists also work to engage with students in career development; discussing the diversity of scientific careers, crafting resumes and more. Students attend HF&G events, work with volunteers and tour the Arboretum’s vast gardens and natural areas, giving them a chance to learn about careers at public gardens.

In turn, HF&G interns contribute substantially to research productivity. “Much of the research that takes place here would not be possible without the hard work and dedication of interns,” said staff scientist Juliana Medeiros. The interns also bring a fresh perspective and contagious enthusiasm for plant ecology and the environment.

CONSERVING OUR NATURAL AREAS AND IMPROVING OUR COMMUNITIES

HF&G interns also help advance our vision of creating a greener world. Over the past decade, students have explored ways to increase Cleveland’s tree canopy, investigated how plants respond to rising global temperatures and even tracked the impacts of acid rain on forest plant communities at the Holden Arboretum. These are immersive experiences where students help develop a research project, which they see to conclusion over the summer. These projects enhance our understanding of the ecology of Holden Forests & Gardens, Northeast Ohio and beyond and are woven into the broader framework of ongoing research at Holden Forests & Gardens. Year after year, the students help us build the scaffolding of research required to better understand and care for our natural world. The goal is to learn how to better conserve of our natural areas and improve the health of our human communities, and to share that information with scientists and practitioners, alike. To this end, the Research Department works with many of its summer interns to publish the results of their work in scientific literature.



Research interns visit Stebbins Gulch in 2018.



Madison Proctor takes a closer look at rhododendron roots during her research internship.

VENTURING INTO NEW WATERS AT SEARCH

Four years ago, the Research Department introduced the Symposium for Ecological Research (SEARCH), providing a venue for interns to present posters of their research to the public in a casual and friendly atmosphere. In addition to HF&G interns, undergraduate students from local universities also are invited to share their research. This vital program has grown substantially since its inception, drawing nearly 30 presenters and more than 100 attendees in 2018.

SEARCH provides HF&G’s interns with valuable real-world experience communicating their research to the public and is a key part of our program. Strong communication skills are critically important to

promoting success in all aspects of science, from sharing important findings with the scientific community to making these discoveries accessible to the general public.

“By the end of the summer, the students are incredibly excited to share what they’ve learned. We’d love to invite community members to come and chat with them about all the exciting discoveries they’ve made,” Burke said. The SEARCH Symposium will be held this year on Friday, Aug. 2 from 10am to Noon in Woodland Hall at the Cleveland Botanical Garden.



ANNA PARKER, 2016

I really enjoyed my time as a summer intern at Holden. The internship gave me the opportunity to experience scientific research outside of a purely collegiate context while helping me broaden my field and laboratory skillsets. Beyond that, everyone was so helpful, kind, and dedicated to making our projects fulfilling. Parker is a doctoral student at the University of North Carolina at Chapel Hill.



FIONA DUONG, 2018

I am currently working as a research assistant in a laboratory that studies the physiology of pome fruits, and plan to apply to a graduate program in plant biology. My internship at Holden not only gave me the opportunity to gain research skills and work with an extremely supportive network of scientists, it also helped me become more confident and allowed me to grow as an individual.



SERGIO ANDRES SABAT BONILLA, 2017-2018

As a Puerto Rican, my objective is to gain the tools needed to study and conserve the ecological beauty of Puerto Rico, but also promote the advancement of Latinos in ecology. Currently, I am a master’s student at Georgia Southern University where I am studying the effects of climate change on aquatic invertebrates. During my time at the Holden Arboretum, I worked with Dr. Katie Stuble as a summer intern and later as the Norweb Fellow. This hands-on exposure to the life of a researcher not only provided me with the experience to go into my master’s with the capacity to carry out good science but also made me a better scientific communicator. I will be forever grateful for the opportunity that Dr. Stuble and everyone at Holden has given me.

Scarlet Tanager

Piranga olivacea

By Rebecca Thompson, Manager of Academic Programs



Despite the male's striking color, scarlet tanagers can be difficult to spot in the summer. They spend most of their time in the dense canopy of mature deciduous forests and mixed deciduous-coniferous forests in eastern North America. During the fall and spring, they migrate through similar forest habitats and can be seen in less dense areas, including gardens and parks. They winter in mature forest in northern and western South America.

Scarlet tanagers eat mainly invertebrates including ants, moths, butterflies, beetles, flies, cicadas, leafhoppers, dragonflies, dobsonflies, snails and spiders. They glean insects from trees or catch them in flight, but rarely pick insects from the ground. They swallow small prey whole, but will kill larger prey by squishing them onto hard surfaces such as branches before consuming them. In addition to invertebrates scarlet tanagers will also eat fruit and tender buds off trees depending on the time of year.

In the spring, male scarlet tanagers are the first to arrive to establish breeding territories. They attract females by vocalizing and stretching out on a branch below the females to show off their bright scarlet plumage. Once a pair is established, female scarlet tanagers choose a tree nest site on a horizontal branch away from the trunk in a cluster of leaves, 30 to 50 feet above the ground. They nest in mature deciduous trees such as maple, oak and beech and will on occasion nest in eastern hemlock. Females build a flimsy nest in three to four days. The asymmetrical nest is loosely woven with twigs, grasses, stems, bark strips, roots and pine needles. It's lined with fine plant materials. Females lay three to five pale blue brown speckled eggs, which are incubated for 13 to 14 days. The young are tended to by both parents and leave the nest 15 days after hatching. Both parents feed the fledglings until they are 25 days old.

According to the North American Breeding Bird Survey, scarlet tanager populations have declined by approximately 14 percent between 1966 and 2014. Their estimated global breeding population is 2.2 million. Change in land use and forest fragmentation could be responsible for declining populations over time. Forest fragmentation exposes nests to cowbird parasitization and predation. Preserving and restoring large tracts of mature forest for breeding, migrating and wintering will help the scarlet tanager thrive.

BIRD FACTS

SIZE: 6-7 inches

WINGSPAN: 9-11 inches

DESCRIPTION: **Males:** Bright red with black wings and tail during breeding season. Immature males and adult males during the non breeding season resemble females

Females: Olive-yellow with darker olive wings and tails.

RANGE: Breeds in eastern North America; winters in South America

VOICE/SONG: 4-5 raspy phrases that sound like a robin with a sore throat

Call: chick-burr

BEST LOCATION TO VIEW: The Arboretum's Woodland and Old Valley trails

Clematis

By Ethan Johnson, Plant Records Curator



Clematis 'Jackmanii'

Some of the more striking flowering plants at the Holden Arboretum and Cleveland Botanical Garden are Clematis. A member of the buttercup family (*Ranunculaceae*) along with Anemone, columbine (*Aquilegia*), *Delphinium*, and 52 other genera of temperate and boreal plants, *Clematis* is native to all continents except Antarctica and is the only genus in the family that contains woody vines.

The large deep purple flowers of *Clematis 'Jackmanii'* may be seen in the Hershey Children's Garden of the Cleveland Botanical Garden on the west arbor by the vegetable and herb section in May, June and early July. Jackman clematis is a tried and true cultivar bred in England by George Jackman of Woking in 1858. Nearby on the north arbor is the exotic and more recent (2002) *Clematis Crystal Fountain* with double lilac-blue flowers May-July. If the plant is rejuvenation pruned to remove all stems back near the ground during dormancy to allow for new growth, flowering will be delayed the following year on these spectacular bloomers. At the minimum, selective pruning of dead and weak stems is recommended for any woody plant. We have not taken the trouble to perform high maintenance annual pruning just after flowering and tying of stems to supports. Plants that perform well enough without extraordinary care are preferred.

In the Evans Restorative Garden west of the waterfall wall is *Clematis Josephine*™, with double lilac-pink flowers from May to July, introduced in 1998. These large-flowered clematis do not develop prominent double flowers when growing in our garden, and the resulting blooms are even more beautiful as a result.

In the Arboretum's Myrtle S. Holden Wildflower Garden, *Clematis virginiana*, with small white flowers that bloom in August and September can be found on both the north and south side of the garden, with the southern plants being in more sun and therefore producing more flowers. Closely related eastern Asian sweet autumn clematis (*Clematis terniflora*) and *Clematis apiifolia* have small white flowers and grow prolifically. However these species have been removed from our collection as they seeded in and overgrew other plants in our gardens. This led us to evaluate their invasive potential within natural areas as being too high. We do not recommend sweet autumn clematis or *Clematis apiifolia* for landscape use in Northeast Ohio.

An herbaceous species from Korea and China that is a favorite of volunteers and Lantern Court horticulturist Craig Schrader, *Clematis heracleifolia*, provides pollinators with nectar from July through mid-September; its small, mildly fragrant tubular flowers with recurved violet-blue petals being the subtle yet charming attraction. The plants grow 2-4 feet tall and are not aggressive or long-lived, needing to seed in to remain within a garden bed at the Arboretum.

In the courtyard at Botanical Garden, between the Garden Store and the Western Reserve Herb Society Garden, there are a number of *Clematis* including 'Betty Corning', Crystal Fountain, Ice Blue,

PLANT FACTS

LIGHT: Part shade to ¼ sun, but can take full sun if kept constantly moist

SOIL TYPE: Moist to fairly wet: clay, silt, loam or even sandy soil if enough compost is added: acid to neutral

MATURE SIZE: 4-5 feet tall, spreading slowly by stolons, so width depends on age

BEST LOCATION: USDA Zones 3-9

SOURCE: Local garden centers or mail order



Clematis 'Rooguchi'



Clematis Crystal Fountain



Clematis Josephine

'Rooguchi', 'Royal Velours', and 'Rubromarginata'. The ones with the smaller flowers perform best, while the large flowered trademarked varieties may or may not persist.

North of the formal garden in an island bed at Lantern Court is a showy large, red flowered *Clematis Vino*. Nearby to the east in the perennial border is *Clematis integrifolia*, the solitary clematis from Europe and Asia, a non-vining type with a woody base but otherwise herbaceous. This species is more vigorous than most being adapted to a continental climate such as ours. It sports nodding blue flowers with flamboyantly curved petals from late May to early September, but planted in partial shade as in the Evans Restorative Garden at the Botanical Garden, bloom of this charming plant starts the first week of June.

Gifts to the Annual Fund Have a Positive Impact on Holden Forests & Gardens and the Community

By Cait Anastis, Editor

Holden Forests & Gardens community forestry initiatives, environmental research and nature-based education programs take more than just time and effort, they also require support from the community. While private support comes from a wide range of sources, including corporations and foundations, gifts from individuals are key.

One of the easiest ways for friends of the Holden Arboretum or Cleveland Botanical Garden to make a difference and support vital programs on HF&G's two campuses and in the community is through a gift to the annual fund.

"The annual fund is a very important piece – whether it is our members who are making an additional gift throughout the year, or donor members and leadership donors, who receive member benefits yet make that additional philanthropic gift to help support the operations and growth of Holden Forests & Gardens," said Deborah Miller, vice president of development. "Currently, 25 percent of the annual operating budget is supported through gifts from individuals, corporations and foundations. This includes memberships. Roughly 12 percent of that is support received through the annual fund. Ideally, we need philanthropic support to grow so that our organization can bring new and exciting programs forward for our guests and provide even greater impact for the community."

HF&G's Annual Fund Manager Katie Brickner, who joined the development team in February, strongly believes in the power of

a gift to the annual fund to advance existing programs and help support new initiatives.

"That's the beauty of the annual fund, it's all-encompassing. I think that is why I like working with the annual fund, you can highlight a lot of things that are going on in the community," she said. Brickner considers the annual fund a lifeline for the organization. "These unrestricted gifts can be used for anything, including supporting the creation of new programs. I really feel that this money gets to the mission faster. We can put the donor's gift into action right away, and there is the possibility of an immediate impact."

The impact of an annual fund gift is what makes it so powerful, as the effects ripple out into the community.

"Gifts to the annual fund support every aspect of our organization – from horticulture, to facilities, to exhibits and shows, to education programs in the schools and communities to research," Miller said. "A gift can impact thousands of people who visit the Cleveland Botanical Garden or Holden Arboretum each year. It takes a large community of people to keep our gardens and trees beautiful for our guests, bring in special shows and exhibits, and teach children and adults about plant science or how to care for their gardens and woods."

In order to increase giving to the annual fund, Brickner will be sending out an appeal to members and donors in June, seeking support. To learn more or to contribute to the annual fund, contact Brickner at 216.707.2852 or at kbrickner@holdenfg.org.



Community Forester Courtney Blashka teaches students how to plant a tree.

The Good Roach: Madagascar's Hissing Cockroach

By Mark Bir, Glasshouse Manager

There are nearly 5,000 cockroach species sharing the planet with us. Yet out of that frightening number, a mere half-dozen are pests. The rest are, well, really okay.

I want to introduce you to one of those okay roaches – the hissing cockroach from our Madagascar biome – the good roach.

The hissing cockroach is clean of habit and body. Spending their lives roving forgotten corners of Madagascar forests, eating fallen fruit and detritus from the forest floor, they provide a natural recycling service to their ecosystem. Roaches are only as dirty as their environment, and away from the dingy of dumpsters and dirty domiciles, hissers are as clean as their forest home. They also enlist personal house-keepers in the form of a commensal mite species, which eats the fungus and dirt from their exoskeletons. Look closely with a hand-lens at one of ours, and watch the mites at work. Hissers are also smooth and dry to the touch and have no odor.

The hissing cockroach is capable. They have clawed, multi-surfaced feet that are treaded with thousands of conforming, gripping micro-pads that allow them to form-to and grasp all surfaces, soft and slippery or hard and jagged, and even to climb glass.

Female hissers are also ovoviviparous, or egg-carrying and live-bearing. This adaptive advantage over egg-laying cockroach species provides motherly protection to the helpless young until they emerge, not as helpless eggs, but as ready-to-go first instar cockroaches. The hissing cockroach has behavior. Specifically, hissers display emergent behavior, where local actions absent of social oversight result in functionally organized group behaviors. An example is when a colony of hissers makes a unified retreat from bright light or the threat of a predator. One roach's alarm is a signal to the next roach, that signals



Roaches have a complex array of external mouthparts; notice two pairs of finger-like palps that manipulate food, and a smaller, central pair of smaller mandibles that slice-and-shove morsels into the mouth-proper.

the next, and so-on, and all the roaches run for cover more quickly than if they had acted alone. This is not social in the sense of that of eusocial (division of labor) organisms, it is equivalent to such human social events as traffic jams. Each of our individual driving decisions interacts to make an integrated group behavior. If we all follow the same road rules, that behavior gives everyone an easy drive. If we make our own rules, it's a bad drive for everyone. Based on my drive to work this morning, hissing cockroaches are better drivers.

The hissing cockroach is vocal. Air-breathing arthropods have spiracles, or breathing holes, along the flanks of their abdomens. When hissers have something to say, they grunt and forcefully expel air through a specialized pair of spiracles, making emphatic hissing sounds. Place the tip of your tongue against the back of your upper teeth, and say a hard "s." That's it. Male hissers make four distinct hisses that roughly translate: I'm not from these parts; take a hike; you wanna fight; and hello dear.

Nature may not seem benign to our perceptions, but it reassuringly always is. So when I work to understand the "is" of something repulsive like a hissing cockroach, my mind opens a little window, loses a little fear and sees the necessity and even the beauty of the thing. And that's why I'd like you to give the hisser a fair chance.

You can find your chance for that in the Madagascar biome, where for the duration of this issue we'll offer hissing cockroaches to you to touch at our daily Animal Explorations. Don't be afraid; the Good Roach is not so bad after all.



The two knobs on the thorax, or shoulders, of this roach tell us that this is an old bull male. The thorax has grown forward, making him look almost headless from this view.

Planting for Pollinators: How Holden Forests & Gardens is Working to Help Keep Bee and Butterfly Communities Alive

By Ann Rzepka, Horticulturist

Decreases in pollinator populations throughout the country have sparked a recent influx in pollinator restoration and enhancement projects seeking to increase habitat for species at risk. According to a recent study conducted by the Monarch Conservation Science Partnership, "There is a substantial probability of quasi-extinction of the Eastern monarch butterfly population within 20 years if ambitious habitat restoration and conservation goals are not achieved."

While many factors including habitat loss, climate change, pesticide use and invasive species have had a detrimental effect on the monarch population, loss of milkweed has been the most devastating. Holden Forests & Gardens has partnered with the nonprofit Pollinator Partnership and has committed to establishing high-quality pollinator habitat not just for monarchs, but for the many species of insects and birds that enrich the biological diversity of our landscape.

In 2015, Lori Gogolin, horticulturist for the Arlene and Arthur S. Holden Jr. Butterfly Garden, began participation in Monarch Wings Across Ohio. This project is a collaboration between Holden Forests & Gardens, the Pollinator Partnership and the Kelvin and the Eleanor Smith Foundation, in response to the Presidential directive on supporting the monarch migration. Initial efforts involved the installation of a 900-square-foot research plot. Planted with nectar plants, the plot is monitored weekly by regionally based field researchers who collect data on which plants monarchs prefer to feed on to fuel their migration.

That same year, horticulturists began working with volunteers to collect phenology and pollinator data on behalf of The Ohio State University. With the help of volunteers, 11 native plant species are monitored and data is recorded regarding bloom time and pollinator visitation. This data was entered into the OSU's Ohio Phenology Network database.

These projects led to further opportunities with the Pollinator Partnership and their Monarch Wings Across the Eastern Broadleaf Forest and Wingspan projects, as well as funding from the National Fish and Wildlife Federation. While the project goals are numerous, the overall objective is to give a short-term boost to the habitat needs of monarchs and to increase interest and skill in seed collection. Seed generated from this project is being used to support the development of geographically appropriate native plants for the restoration of

4,688 acres of monarch habitat within the East Broadleaf Forest – Continental Province eco-region.

Holden Forests & Gardens has acted as the lead for the state of Ohio for the Monarch Wings Across the Eastern Broadleaf Forests Project (MWAEBF). In that capacity, HF&G managed the collection effort of teams within the state. Over the past two years, staff and volunteers collected 60 species from the target plant list. To promote monarchs onsite, HF&G has committed to enhancing approximately 86,000 square feet of habitat.

HF&G will continue to act as state lead for Project Wingspan over the next two years. While the project goals are similar to those MWAEBF, Project Wingspan expands the project from five to eight states, targets monarch and rusty patched bumblebee habitat, and increases the goal number of seed collections and plugs produced. Seed generated from this project will be used to support the development of geographically appropriate native plants for the restoration of 10,000 acres of habitat within the Midwest eco-region.

Additionally, a small team of staff has been charged with coming up with a Pollinator Plan to ensure that our practices here at Holden Forests & Gardens benefit pollinators. As part of this process, the staff will assess fields and meadows to determine potential restoration/enhancement areas and conduct plant community and pollinator surveys in select meadows at the Arboretum to gain base-line data to inform future mowing guidelines and restoration projects. These surveys will be used to revise the management of our fields and meadows to optimize conditions for butterflies and pollinators where it is most congruent with our overall land management objectives.

This Pollinator Plan also allows for pollinator enhancement plots to be installed in a grass dominated meadow within the crabapple collection. Horticulturists and researchers will monitor these plots to assess various pre-planting site preparation techniques and seeding and planting methods utilized in habitat enhancements and restorations. The staff will monitor the pollinators that frequent these plots pre- and post-treatment. According to the Xerces Society, "Assessing the effectiveness of different habitat restoration [techniques] is a key component of augmenting floral resources for [pollinators], so that conservation strategies can be [adapted, implemented] and improved." The information obtained from this research will be used to inform the process of restoring future sites at



Swamp milkweed (*Asclepias incarnata*) provides food for butterflies in the caterpillar stage.



Common milkweed (*Asclepias syriaca*) is a host plant for the monarch butterfly caterpillars.

“There is a substantial probability of ‘quasi-extinction’ of the Eastern monarch butterfly population within 20 years if ambitious habitat restoration and conservation goals are not achieved.”

Monarch Conservation Science Partnership

Holden Forests & Gardens and other locally similar habitats.

Helen Keller once said, "Alone we can do so little; together we can do so much." It is our hope that the partnerships within this institution and between other like-minded institutions, such as the Pollinator Partnership, will help to create a world where pollinators flourish and future generations will have the ability to witness the beauty of the Monarch butterfly.

If you would like to be involved in collecting data or seed in an effort to promote pollinators, please contact Sarah Hartley, volunteer coordinator, at 440.602.8003 or shartley@holdenfg.org and volunteer as a phenology/ pollinator monitor.

Ann Rzepka acts as the state lead for Ohio on behalf of the Pollinator Partnership.



Garden phlox (*Phlox paniculata*) is a food source for adult monarch butterflies.

Enjoying Nature with Others, Week After Week

By Sarah Hartley, volunteer coordinator

Meet Linda Lozzi, PhD, Holden Forests & Gardens Tram Tour Guide volunteer at the Holden Arboretum. Lozzi has been volunteering with HF&G for six years, and during that time, she has shared with thousands of visitors the wonder that is the Arboretum.



Q: Why did you start volunteering with Holden Forests & Gardens?

A: Being retired, I am interested in being involved in volunteer opportunities that are fun, meaningful, get me outside and make me happy. I knew a few people who were volunteering at Holden, so I talked to the volunteer manager who, after asking me about my backstory and current volunteer status, suggested that I might be interested in giving tours from a tram. She was so right. She had picked up on my love of transferring knowledge to others.

Q: Out of all the different volunteer positions that we have available, why did you choose to become a tour guide? Did you have prior experience as a guide or docent?

A: I had been guiding hiking groups through the gorge at Penitentiary Glen as a volunteer naturalist doing interpretation on geology and botany, so interpreting nature at the Arboretum definitely appealed to me. Plus, I thought driving a tram would be fun. After attending one training day each season, I used that information as the basic structure for my tour. Since then, I have added to that basic presentation with information from independent research on many other features of the Arboretum that interest me. At the beginning, I wondered how I would fill an hour tour, and now I worry that I can keep the tour to only one hour. So much to share!

Q: What is your favorite area/garden at Holden Arboretum to share on a tour?

A: For the first two years, I filled in shifts where needed, but for the last four years, I have been giving three tours every week for the six-month season. I do 75 tours a season, and my very favorite thing to watch is how things change from week to week. In mid-May, the azaleas and rhodies are in bloom. In July, the perennials

light up in the [Arlene and Arthur S. Holden Jr.] Butterfly Garden and Pennington Beds. In early summer, the bullfrog tadpoles in Blueberry pond are enormous. In August, the tall grass prairie shows off. In September, the asters bloom along Corning Lake. Last fall, migrating monarchs found those asters and refreshed themselves there for several days. One October, we were lucky to see a fox doing her hunting dives into the grass. The palette constantly changes and there is something new to talk about every week.

Q: What has been your most memorable experience as a tour guide?

A: So many guests who take the tram tour are unable to make the entire circuit by walking. They often turn out to be those who loved the outdoors when younger or who were avid gardeners. Other tram guests are families of two and three generations, enjoying themselves as a family. All of our tram guests are very interested in horticulture. Everybody who gets off the tram at the end of a tour is happy and will usually comment that they learned many things; that is very satisfying to me.

On one tour, a guest surprised me when she identified herself as the great granddaughter of Roberta Holden Bole and the granddaughter of Pat Bole Jr. She is also the great grandniece of Albert Holden. I had royalty in my tram! She happily posed next to a copy of a photo of her grandmother, Nancy Adams Bole.

Q: Any advice for someone considering volunteering as a guide?

A: Being a tram tour volunteer is personally very satisfying. I have fun driving the tram, I enjoy watching the changing parade of blooms and critters. In the end, making many people happy is meaningful to me.

You can learn more about volunteer opportunities at Holden Forests & Gardens by coming to our Volunteer Open House. Discover your passion for plants and nature, and how you can be a part of our mission to advance and inspire a deeper understanding of plants to enhance life.

WEDNESDAY, AUG. 28
5:30-7:30PM

CLEVELAND BOTANICAL GARDEN

REGISTER BY CALLING 216.707.2822
or email CBGvolunteer@holdenfg.org

NEW PARTNERSHIP ENCOURAGES MENTOR-AREA RESIDENTS TO CHECK OUT THE WARREN H. CORNING LIBRARY

A new partnership with the Mentor Public Library is giving library patrons a new way to check out the collection of the Holden Arboretum's Corning Library.

Area residents will find a selection of about 40 books from the Arboretum's collection on display and available for checkout at the Mentor Library's main branch on Mentor Avenue. The display highlights the Arboretum as a destination for gardening enthusiasts and nature lovers while showcasing the Arboretum's Corning Library as a resource for Holden Forests & Gardens members and visitors. The collection made its debut in February and was an immediate

hit with library patrons. Within the first week, half the books had been checked out by Mentor residents eager to start planning spring gardens or taking an armchair break from the winter weather. Since then, the collection has continued to resonate with library patrons. Recent statistics from Mentor Library show that each book has circulated at least one time. There have been 64 checkouts, and the items have been renewed for a total of 50 times during the period.

"We have been very pleased with how well the books are circulating," said Judy Schulz, circulation services manager. "People have



Library patrons will discover a bookmark in each book they check out with information on plants found at the Arboretum.

been taking the Holden Forests & Gardens informational brochures, too."

To keep it fresh, we will continue to monitor circulation statistics and remove books that have stopped circulating and bring in new ones.

The collection is just the first stage of the growing partnership with the local library. Sometime this year, Arboretum visitors will find a "Little Free Library" box on the grounds, stocked with books by the Mentor Library. Guests are encouraged to take home a book from the library box or leave a book of their own inside for others to use.



The new collection has proven popular with readers.



The Holden Arboretum display at the Mentor Library.

MASTER RAIN GARDENER COURSE: LEARN HOW TO DESIGN AND INSTALL RAIN GARDENS

Saturday, July 31, Aug. 7, 14, 21, 28.
10am – 1pm

This Master Rain Gardener Program will teach you how to manage rain water in your own yard. Rain gardens naturally manage stormwater by infiltrating precipitation and allowing it to soak into the ground rather than sending it directly to storm

sewers and nearby streams untreated. Experienced instructors will provide customized feedback which will enable you to design and install a rain garden. Topics will include site assessment, soil analysis, design, construction, plant selection, mulching, and maintenance. Residential participants will receive a certificate, Master Rain Gardener T-shirt, and yard sign upon course completion. Professionals will be awarded a Master Rain Gardener Certification.

This five-week course can be taken in-

person or online. The in-person course will be held at the Lakefront Lodge in Willowick at 30525 Lakeshore Blvd. The online course will be offered as five weekly modules, allowing for more flexibility.

Email Laura Bonnell with questions at lbennell@crwp.org or 440.975.3870, ext. 1002.

To register, visit eventbrite.com/o/chagrin-river-watershed-partners-inc-19735567653



HOLDEN
FORESTS &
GARDENS

9500 Sperry Road
Kirtland, Ohio 44094

holdenfg.org



The Woodland Express model train exhibit will be on display June 15 - Sept. 15 at the Holden Arboretum. Learn more at holdenarb.org.

Forests & Gardens is the member magazine for Holden Forests & Gardens, which includes the Holden Arboretum in Kirtland and the Cleveland Botanical Garden in Cleveland.

Our Mission: Advance and inspire a deeper understanding of plants to enhance life.

Our Vision: Vibrant green communities and diverse native forests of the Great Lakes region will flourish and sustain life.

©Holden Forests & Gardens

"Holden Forests & Gardens" and the related logo is a trademark owned by The Holden Arboretum.

HOLDEN
arboretum
HOLDEN FORESTS & GARDENS

9550 SPERRY ROAD, KIRTLAND, OHIO 44094
HOLDENARB.ORG 440.946.4400

HOURS
DAILY: 9AM - 5PM

ADMISSION

ADULTS: \$12
CHILDREN (3 - 12): \$8
MEMBERS: FREE

**CANOPY WALK
& TOWER TICKETS**

\$4
\$2
FREE

The Murch Canopy Walk and Kalberer Emergent Tower are open April 1 - Nov. 1

CLEVELAND
**botanical
garden**

HOLDEN FORESTS & GARDENS

11030 EAST BLVD, CLEVELAND, OHIO 44106
CBGARDEN.ORG 216.721.1600

HOURS

TUES., THURS., FRI. & SAT.: 10AM - 5PM
WEDNESDAY: 10AM - 9PM
SUNDAY: NOON - 5PM
CLOSED MONDAY

ADMISSION

ADULTS: \$12
CHILDREN (3 - 12): \$8
MEMBERS: FREE