

Keystone Plants

By Douglas Tallamy, Professor of Entomology
Wildlife Ecology, University of Delaware

If nearly all terrestrial birds in North America rear their young on insects (96% in fact), and if most of those insects are caterpillars or the adult moths they turn into (recent studies show that they are) then to support our breeding birds we need to use plants that serve as hosts for the most caterpillar species. But which plants are those? Fortunately, we now have an answer to this tough question. We have recently compiled a list of lepidopteran host records for every county in the U.S. (“Native Plant Finder;” National Wildlife Federation www.nwf.org/NativePlantFinder). In addition to providing a valuable resource for people nationwide who are interested in raising the ecosystem viability of their property, these host records have revealed a striking pattern. Wherever one looks — be it in the north, south, east or west; the plains, deserts, forests, or mountains, — just a few plant genera are producing most of Lepidoptera so important to food webs. We knew from our previous work in the mid-Atlantic states that not only were native plants far superior to introduced species in their ability to generate caterpillars, but native plants themselves varied by orders of magnitude in their production of caterpillars. Some genera like oaks, cherries and willows host hundreds of caterpillar species, while for others like yellowwood and crowberry, there are no records at all of caterpillars using them. This is interesting itself, but when we assembled data for each county in the country, we saw that this pattern held everywhere and we could quantify it: wherever we looked, about 5% of the local plant genera hosted 70–75% of the local Lepidoptera species!

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Prunus serotina which hosts the tufted bird dropping moth (inset).



PRESIDENT'S NOTE



Hello,

I Hope everyone had a great summer with lots of flowers, bees and birds!

It has been a very exciting year for PNPS. We are thrilled to welcome two new PA chapters: Lehigh Valley, and Northwest, and look forward to creating additional chapters in the coming months. For more details, please see the Chapter Update article also in this newsletter. Wrapping up my first year as President, I've enjoyed learning more about the inner workings of PNPS, and getting to know many of our wonderful members and volunteers.

Looking ahead to next year, I see several goals:

Get more events on our calendar

We know there are many great organizations in our state. If you promote the use of natives in the landscape, please let us know about your next event or meeting for our calendar.

Contact if you would like us to post something.

Encourage more chapters

More chapters will mean more events throughout the state!

Offer grants for educational gardens

Thanks to a healthy influx of new members we should have funds available in the spring to offer a grant to 2-3 groups who want to start a native plant educational garden.

More details will come this winter, but you can start thinking of ideas.

Keep up communication

- If you are not receiving our e-newsletter and would like to, contact
- Visit our Facebook page.
- If you have ideas or suggestions, please email me at:

Many thanks to everyone who has helped this year, and I look forward to meeting and working with more of you in the coming months!.

Sincerely,

Danielle Lanagan
President

PLANT SALE

2019 Central Pa Native Plant Festival and Sale arrived with great weather and more vendors than ever. This was the second year at the Boal Mansion in Boalsburg and feedback was again positive. With close to 1200 people attending, we are growing every year — which means more people are getting into native plants!



This year we added music to our program which was well received and helped to add to the ambiance of the natural setting at the Mansion. Lots of people took advantage of pre-ordering from our vendors which ensures you won't miss out on that special plant you've been looking for. Our presentations were well attended and lots of plants found new homes.

Mark your calendar for next year — May 2, 2020

This is our biggest fundraiser by far, and as we continue to grow (we had over 14 vendors and 5 information booths) we will continue to need volunteers — both in the planning stages and the day of the event. So let us know if you are interested in helping! You can contact us at Info@PaNativePlantSociety.org

Our members plant table is also quite popular, so remember this fall or next spring as you are dividing plants in your gardens to pot up a few for the sale.

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FEATURED PLANT

Dragon's Mouth Orchid



By Kristi Allen, Program Coordinator,
PA Plant Conservation Network

On a beautiful late spring day, I was lucky enough to join Bureau of Forestry's botanist, Kelly Sitch, Natural Heritage Botanist John Kunsman, and Larry Klotz from Shippensburg University, out in the field to survey the rare *Arethusa bulbosa* — commonly known as “Dragon's Mouth orchid.” He's been working with this charismatic plant since 2011 — Kelly told me that the trek out to monitor these orchids is his favorite part of field season because the plant is so elusive — there's so much that we don't yet know about this plant, and every year it seems like we're discovering a little bit more about it. He also told me that every year he tries to bring a new person along because they seem to have beginners' luck — always seeming to discover a new population that previously hadn't been identified. As we venture into the woods, I cross my fingers that I will continue the streak of good luck.

We bushwhacked along creek beds, through dense mountain

laurel; at times almost on all fours to get through the compact vegetation. But eventually, we emerged into an herbaceous opening — soft, wet sphagnum moss under our feet, red maple and hemlock providing a shady respite from the sun — though we should be grateful to see the sun; it seems like it's been raining for weeks.

Our goal was to monitor the population — Dragon's Mouth orchid is critically imperiled in our state, with just a few populations remaining. Collection, deer browsing, and habitat destruction have contributed to the decline of this beautiful orchid — its elusive pollination habits have also prevented this plant from thriving.

It's suspected that the orchid is pollinated by a species of bumblebee, and indeed, we did see a lone bee, buzzing through the forest near a patch of orchids but it didn't seem to be interested in the magenta-pink blooms.

In recent years, it has become customary to be joined by plant researcher, Dr. Peter Zale, the Associate Director of Conservation, Plant Breeding, and Collections at Longwood Gardens.

Even though the flowers are attractive and fragrant, they offer little to no nectar reward to the pollinator. Luckily, Peter doesn't need a nectar reward to pollinate the orchid — his reward comes from researching best practices in orchid propagation. While the rest of the team searched for and counted the number of individual plants, Peter hand pollinated a small number of flowers. This method of pollination is done by manually transferring pollen from the stamen of one plant

to the pistil of another. Hand pollination is useful when there is a lack of pollinators — a problem that the *Arethusa* seems to be facing. Peter tells me “Hand pollination of those plants has been the only reliable way to ensure seed set in these populations and it is a management technique we are using more and more. Even in the event that we don't need seeds for *ex situ* propagation experiments, hand pollination appears to be a necessary management tool to make sure seeds are dispersed *in situ* to promote seed bank development and seedling recruitment.”

Since active management began back in 2011, the number of flowering and vegetative plants has steadily increased, giving hope that the plant is reproducing more successfully. Peter has been hand pollinating and experimenting with propagation since 2016. Until we know more about the reproductive viability of this plant — we'll continue to hand pollinate and focus of *ex situ* efforts. It is hoped that genetically similar plants that have been grown up at Longwood Gardens, will eventually be out planted with their parent population.

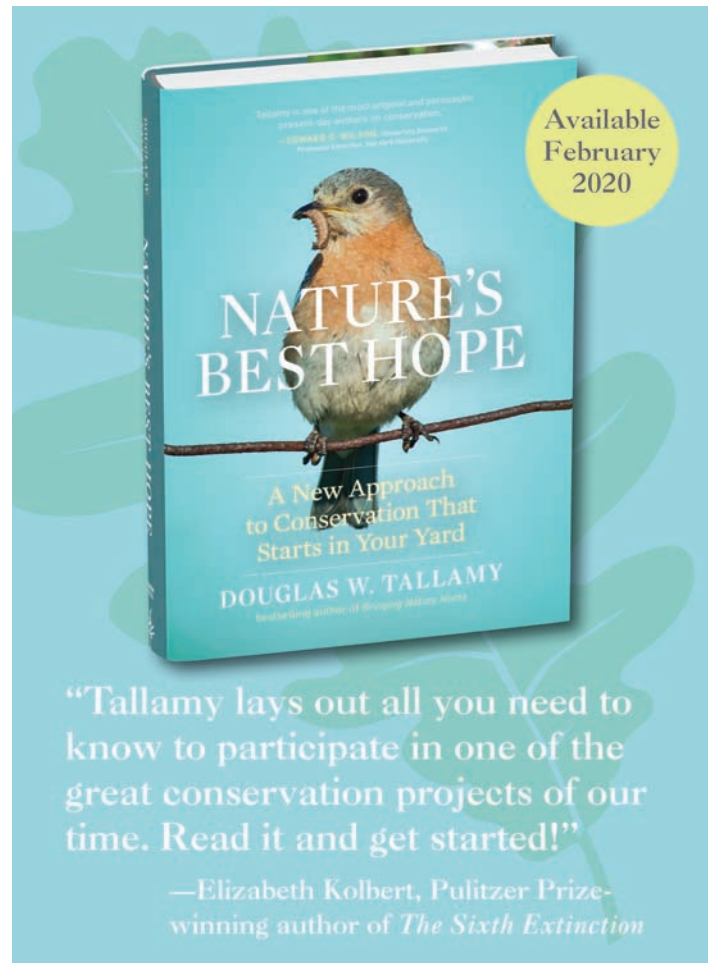
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Keystone Plants

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I like to call such hyper-productive plants “keystone genera” because they so closely fit the meaning of Robert Paine’s classical terminology. While studying predator/prey interactions in west coast tidal pools, Paine found what he called keystone species to have a disproportionately large effect on the abundance and diversity of other species in an ecosystem. He likened such species to keystones, because, like the center stones in ancient Roman arches, they enabled other species in the ecosystem to coexist. Remove the keystone and the arch falls down. Keystone genera function in the same way: as in Roman arches, keystone genera are unique components of local food webs that are essential to the participation of most other taxa in those food webs. Without keystone genera, the food web all but falls apart. And without some minimal number of keystone genera in a landscape, the diversity and abundance of the many insectivores — the birds and bats, for example, that depend on caterpillars and moths for food — are predicted to suffer.

The implications of this phenomenon for homeowners, land managers, restoration ecologists, and conservation biologists are enormous: to create the most productive landscapes possible — that is, landscapes in which the most plant matter is turned into edible insects — we have to include species that belong to keystone genera. This is a nuanced but incredibly important extension of our knowledge about how native plants contribute to ecosystem function. Before discovering the existence of keystone genera, we over-estimated the degree to which most native plants contribute to food webs and assumed that if a plant was native it contributed a lot. We now know that a few native genera contribute so much more than most others that we cannot ignore them if we are to produce complex, stable food webs. A landscape without keystone genera will support 70–75% fewer caterpillar species than a landscape with keystone genera, even though it may contain 95% of the native plant genera in the area. This runs



contrary to the age-old maxim that the more diverse a planting is, the more productive it will be. On one level this is certainly true; a diverse plant community will support more caterpillar species than a monoculture. But now we know that to be richly productive, plant communities must contain at least some keystone plants.



White oaks support more species of caterpillars in Pennsylvania than any other tree, see two examples at the top of the facing page.

EXAMPLES OF KEYSTONE GENERA

Keystone genera have a disproportionately large effect on the abundance and diversity of other species in an ecosystem.



The pink striped oakworm is one of the giant silk moth species that specializes on oaks.



Perhaps the most exquisite caterpillar in Pennsylvania is the spun glass caterpillar, a species found on oaks.



The evening primrose moth is a specialist on evening primrose where it spends the day hiding within primrose flowers.



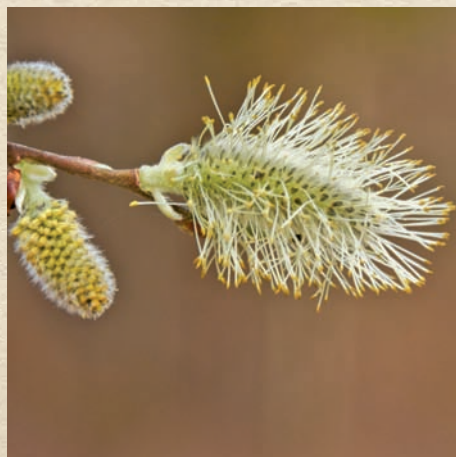
The herald, *Scoliopteryx libatrix*, is one of hundreds of moth species that use willows as larval host plants.



This tufted bird dropping moth is one of hundreds of moth species that develop on native *Prunus*, a keystone plant genus in most parts of the country.



Evening primrose, *Oenothera biennis*, hosts 19 species of caterpillars in eastern Pennsylvania.



Native willows are keystone plants throughout North America.



Black cherry, *Prunus serotina*, is one of the best plants in Pennsylvania for supporting caterpillars.

Dragon Mouth Orchid

continued from page 3

The Pennsylvania Plant Conservation Network is a new program at DCNR that works collaboratively to promote and coordinate the conservation of native plant species through education, outreach, and stewardship. If you're interested in getting involved in learning more about rare native plants, please contact Program Coordinator, Kristi Allen at

If nearly all terrestrial birds in North America rear their young on insects (96% in fact), and if most of those insects are caterpillars or the adult moths they turn into (recent studies show that they are) then to support our breeding birds we need to use plants that serve as hosts for the most caterpillar species. But which plants are those? Fortunately, we now have an answer to this tough question. We have recently compiled a list of lepidopteran host records for every county in the U.S. ("Native Plant Finder;" National Wildlife Federation

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CHAPTER UPDATE

By Danielle Lanagan

Two chapters have been approved by the Board, and have started hosting events in their areas! The Lehigh Valley chapter covers Lehigh, Northampton, Berks, Bucks, Monroe, and Carbon counties. The Northwest chapter covers Crawford, Erie, Mercer, Venango and Warren counties. Their events will be open to all PNPS members, and on our main calendar, but because these new chapters only have contact info for people in their area counties, if you're not in their area and would like notification of their events, please send us a request to have your name added to their list.

Three other areas have people working to organize a group: Philadelphia, Pittsburgh, and Cumberland Valley.

If you are interested in helping to organize a chapter (either in these areas or a new area), please contact and we will connect you with other people in that area.

We will hold our first chapter meeting directly after the annual meeting November 2. All current chapter representatives, and anyone interested in helping to organize a new chapter, are welcome to attend. Come join our discussion around what's working, what still needs help, sharing event ideas, etc. Registration for this new portion of the meeting will be included with the annual meeting registration.



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NATIVE PLANTS AND COMMUNITY ORCHARDS

The Philadelphia Orchard Project

By Phil Forsyth, Executive Director

"As American as Apple Pie" is of course a greatly misleading phrase in that the apples we grow, eat and make pie out of originate in Central Asia! While it's also true that blueberries are the only commonly consumed fruit actually native to the region, a variety of native plants do play an important role in the community-orchards planted by the Philadelphia Orchard Project. These include not only a number of other native fruits (see sidebar), but also diverse companion plantings in pollinator gardens and food forests.

POP is a non-profit whose mission is to plant and support community orchards in the city of Philadelphia. Founded in 2007, POP has helped to plant 49 orchards and currently supports a total of 64 city orchards. Each is planted in collaboration with a community partner group, including schools, churches, community gardens, urban farms and a wide range of non-profits, primarily located in low-wealth neighborhoods with limited access to fresh produce. POP provides services including orchard design, plant sourcing, volunteer recruitment, and ongoing support and training in ecological orchard

care. POP's community partners own, maintain, harvest, and distribute the produce within their neighborhoods.

POP has helped its partners to plant 1,316 fruit and nut trees; 2,893 berry bushes and fruiting vines; and 21,171 perennial flowers, herbs, and groundcovers. Plantings do include many common fruits like peaches, pears, and plums, but many of the more unusual and native fruits have proved easier to maintain due to fewer pest and disease challenges. Native fruits that POP commonly plants include Paw Paw, Serviceberry, American

Persimmon, Blueberry, Elderberry, and Chokeberry.

Every POP orchard site also includes a pollinator garden, as of course nearly all fruiting crops are dependent on insects for pollination. In many cases, native species like mason bees are even more effective than honey bees at pollinating fruits. In addition, pollinator gardens attract other beneficials including predatory and parasitic insects that help control pest populations. Some of POP's favorite native orchard companion plants include aster, goldenrod, yarrow, beebalm, and cone-flowers.

In addition to orchard planting and support, POP has developed other complimentary program areas. POP's school orchard program is focused on developing orchard-based lesson plans and materials; this year the program concentrated on developing content related to pollination and pollinator gardens. The POP Harvest gleaning program harvests and distributes fruit that would otherwise go to waste. POP's 4th annual Juneberry Joy week this spring included 10 events at sites across the city to introduce residents to this bountiful, delicious, and often overlooked native fruit.

You can find out more about POP's work at phillyorchards.org — donations and volunteers always welcome!



Juneberry harvest.
All photos: Philadelphia Orchard Project,
taken by various staff and volunteers.

NATIVE FRUITS FOR YOUR ORCHARD AND LANDSCAPE



Serviceberry/Juneberry
(*Amelanchier spp*)

Commonly planted for its ornamental qualities, this small to medium self-fertile tree features tasty blueberry-like fruit for people and birds.



Paw Paw
(*Asimina triloba*)

This easy to grow native tree with tropical relatives bears large fruit that resemble a mango in appearance and a banana in flavor.



Highbush Blueberries
(*Vaccinium corymbosum*)

This beautiful, well-known shrub is easy to grow but requires acidic soils and bird protection is sometimes necessary.



American Persimmon
(*Diospyros virginiana*)

This large tree has delicious late fall fruit but requires separate male and female trees with the exception of a few cultivars.



American Elder
(*Sambucus Canadensis*)

This large and easy to grow shrub features edible flowers and fruit with high medicinal value.



Chokeberry
(*Aronia spp*)

The fruit of this beautiful native shrub has the highest anti-oxidant levels of any species that can grow in our climate.

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PNPS FACEBOOK GROUP HOW TO JOIN

Our Facebook group has grown into an active community of over 6,300 members over the past few years. We welcome anyone interested in sharing photos or activities related to native plants, or learning more about them. This is a closed group but you can join. Just visit the group and submit a request. You will be prompted to answer a couple of questions before an administrator can approve you. These are the questions: "Do you want to join?" And, "what state do you live in?" Requests will be declined if these are not answered, even if someone sends you an invitation to join. We do this to reduce spam and abuse.

Here is the link:

www.facebook.com/groups/panativeplantsociety

Join us for the 2019 Annual Meeting of the PA Native Plant Society

Date

Saturday, November 2

Time

9:00 am to 12:30 pm

Location

Unitarian Universalist
Fellowship of Centre County
780 Waupelani Drive
State College, PA 1680

Cost

\$10 for members
\$15 for non-members

Registration

Register online visit our website:
www.panativeplantsociety.org

Program Schedule (Tentative)

9:00 – 9:30 am

Coffee Social/Registration

9:30 – 9:45 am

PNPS Business Meeting

9:45 – 10:30 am

Kristi Allen / Program Coordinator of the Pennsylvania Plant Conservation Network Q&A

10:30 – 10:45 pm

Break

10:45 am – 12:15 pm

Larry Weaner, Principal and Founder of Larry Weaner Landscape Associates / Q&A / Book signing

12:15 – 1:00 pm

Breakout Chapter Lunch – Interested in chapter development in your community? Join us for lunch to meet with other Chapter reps and learn how to get started. Reserve your spot in advance by emailing info@panativeplantsociety.org.

The Pennsylvania Plant Conservation Network (PPCN): A New DCNR Initiative for Collaborative Conservation



Kristi Allen / Program Coordinator of the Pennsylvania Plant Conservation Network

Kristi Allen is the Program Coordinator for the Pennsylvania Plant Conservation Network. She holds a Master's Degree in environmental social work from the University of Denver, with a Masters Certificate in Animal Assisted Social Work. Her graduate research focused primarily on social impacts of forest carbon markets and the therapeutic benefits of nature. Prior to joining the PPCN, she co-founded a community garden in Baltimore, Maryland and managed grants for the Baltimore City Health Department.

The Pennsylvania Plant Conservation Network (PPCN), is a new program spearheaded by the Department of Conservation and Natural Resources. Backed by DCNR and Pennsylvania Natural Heritage Program (PNHP) data, the PPCN will leverage statewide partnerships to coordinate on-the-ground stewardship, outreach, and education efforts.

Our goal is to cultivate collaborative projects across the state in ways that build partnerships to meaningfully advance plant conservation in Pennsylvania. Join us in building towards a future where Pennsylvania's native plants are thriving, abundant, and cared for by a vibrant and inclusive community of conservation advocates

Breaking the Rules: Ecological Landscape Design and Traditional



Larry Weaner, Principal and Founder of Larry Weaner Landscape Associates

Using native plants requires more than simply expanding the conventional design palette. Based on observation of how native plants develop in nature, new design, implementation, and management techniques emerge, many of which are diametrically opposed to traditional horticultural practice. This presentation examines how alternative approaches on everything from selecting, arranging, and spacing plants to the simple act of weeding can yield more easily maintained landscapes that express the beauty and ecological richness of our native landscapes.

In 1992 Larry founded Larry Weaner Landscape Associates, combining expertise in horticulture, environmental science, and the traditions of garden design. His design and restoration work spans more than ten states and has been profiled in national publications, including The New York Times and Landscape Architecture Magazine. He coauthored the book, "Garden Revolution: How Our Landscapes Can Be a Source of Environmental Change" with Tom Christopher (Timber Press, 2016) which was the recipient of the 2017 Book Award from the American Horticultural Society.

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- Renewal

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- Organization — \$25/year

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As a 501c-3 non-profit educational organization, PNPS welcomes your contributions in addition to, or instead of, regular membership. Ongoing memberships in PNPS coincide with the calendar year. Please make sure that you inform us of your current email address. Newsletters and event notices are sent electronically. Send email address and change of addresses to Correspondence@PaNativePlantSociety.org. Thank you!

PNPS BOARD OF DIRECTORS • 2020-2021 TERM

CANDIDATES

Heidi Cornwall

State College, PA

Heidi Cornwall found the PA Native Plant Society through plant sales and enthusiastic discussions with current PNPS president Danielle Lanagan. After twice volunteering at the annual spring plant sale and meeting the many wonderful people involved, she decided to run for a board position. Heidi is enjoying increasing her knowledge of native plants and sharing that knowledge with friends and neighbors. She lives in State College.

Prabhani Kuruppumullage

State College, PA

Prabhani Kuruppumullage was introduced to the PA Native Plant Society by the current recording secretary, Merrill David. After volunteering at the Central PA Native Plant Festival and plant sale, she identified the value of the PNPS services and has been enjoying reading more about the native plants. Prabhani agreed to step up to serve on the board for the 2020–21 term so she can actively contribute in promoting the native plants.

BALLOT

Cast your vote for two directors.

- Heidi Cornwall
- Prabhani Kuruppumullage

write in

write in

Please cast your vote
and return your ballot to be counted:

- **By Mail:** PNPS PO Box 807, Boalsburg, PA 16827
- **By Email:** info@panativeplantsociety.org
- **In Person:** Bring your ballot with you to the 2019 Annual Meeting and cast your vote in person.



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Please remember to renew.

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Winner of the PNPS 2019 Facebook Photo Contest:

Photo by Nancy Hornberger

Geranium maculatum also known as wild geranium. Taken May 26, 2019 at High Knob in Sullivan County.

2019/2020 EVENTS

OCT 6

Sunday, October 6, 2019

Penn State Walk-In Penn's Woods

[www.sites.psu.edu/
walkinpennswoods](http://www.sites.psu.edu/walkinpennswoods)

Events throughout the state

NOV 2

Saturday, November 2, 2019

PNPS Annual Meeting

State College, PA

MAY 2

Saturday, May 2, 2020

**Central PA Native Plant Festival
and Sale**

Boalsburg, PA

*For more information on these and
other events please visit our website:*

www.panativeplantsociety.org