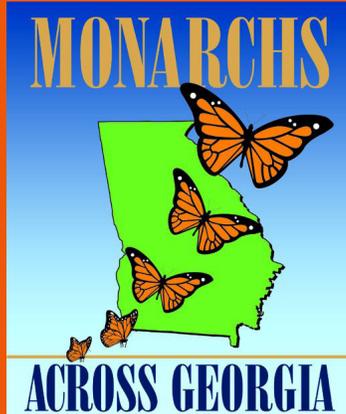


The Chrysalis

Emerging News from Monarchs Across Georgia

A COMMITTEE OF THE ENVIRONMENTAL EDUCATION ALLIANCE OF GEORGIA



Upcoming Events

MAG Plant Sale

Friday & Saturday, April 17-18
[Cobb County Master Gardeners Plant Sale & Expo](#)
 Jim Miller Park
 Marietta, GA

Rosalynn Carter Butterfly Trail [Spring Symposium and Plant Sale](#)

Friday, May 1
 Pre-registration required - \$45
 Plains Community Center
 Plains, GA

National Pollinator Week June 22-28

Check <http://pollinator.org/pollinator-week> for U.S. events.
 Check [MAG Events](#) page for Georgia events.

[Great Georgia Pollinator Census](#) Friday & Saturday, August 21-22

Pollinator Symposium Saturday, October 3

\$60 member / \$85 non-member
 Keynote: Brannen Basham of Spriggly's Beescaping
 Short Sessions: Monarch Health, BEE Smart Eat Smart, Children's Garden Tour, Pocket Pollinator Gardens
 Field Walks: Pollinators, Nature Photography, Prairie Restoration
 Athens, GA

Register or learn more about these events at <http://www.eealliance.org/mag-events>.

Pollinator Plants of the Year

A new program in Georgia brings about a collaboration of state, university, and industry efforts to increase native plant usage in pollinator habitat

The University of Georgia Cooperative Extension (UGA Extension) has partnered with the State Botanical Garden at the University of Georgia, the Georgia Green Industry Association, and the Georgia Department of Agriculture to launch the state's first "[Pollinator Plants of the Year](#)" program.

The program seeks to encourage green industry professionals to suggest that businesses, parks, schools, city and county governments, and home gardeners add pollinator-friendly native plants to their landscapes. The first list of Georgia Pollinator Plants of the Year was announced at the Georgia Green Industry Association Wintergreen conference (see page 13).

The plants were selected by a committee of horticulturists, ecologists, entomologists, and industry professionals. Each plant had to be aesthetically pleasing, marketable, and most importantly, provide shelter and food for a number of native Georgia pollinators. These plants should be available in Georgia garden centers in late 2020 and early 2021.

The Pollinator Plants of the Year program is part of a large-scale



Asclepias tuberosa, or butterfly weed, is one of the 2021 Pollinator Plants of the Year.

partnership between the State Botanical Garden and UGA Extension, which aims to build a stronger movement for pollinator protection across the state. Georgia Grown's "Pollen Nation," a program from the state Department of Agriculture, is also joining the effort. This program's goal is to encourage the creation of pollinator gardens and the propagation of native plants, and to help support the green industry through increased plant sales of pollinator-friendly species.

Starting this spring, Pollen Nation will provide green industry professionals with marketing and educational materials and a website with consumer tips on the best pollinators for their landscapes, including the Georgia Pollinator Plants of the Year.

The collaboration between the State Botanical Garden, UGA Extension, the

Continued on page 13

Monarchs and Climate Change

Monarchs, with their wide geographic range, short generation time and high reproductive rate, are considered to have a high potential of adapting to longer term changes in climate. However, they are highly sensitive to weather and climate, evident from their dependence on environmental cues to trigger reproduction, migration, and hibernation.

The monarchs that live east of the Rocky Mountains are known as the eastern monarchs. They spend summer in the northern United States and Canada, breed in the southern U.S. during fall and spring, and overwinter in Central Mexico (in a few groves of Mexican oyamel fir trees). Their life cycle is closely associated with the prevailing conditions during that time. They need plenty of milkweed when breeding, temperatures between 55° and 70° F during migration, and some rain in the winter months. These characteristics show a dependence on habitat, food sources, and the occurrence of relatively consistent weather patterns. However, the consistency of weather patterns is being affected by climate change.

Monarchs now face an increasing frequency of extreme weather events, such as drought and severe storms, as well as extremes in hot and cold temperatures. The conditions they rely on are changing. Summer temperatures are rising, milkweed on their path back from overwintering is declining rapidly, and winter storms are increasingly common in central Mexico. Since the eastern monarchs make up more than 90 percent of the North American monarchs, a single storm or extreme heat event could even wipe out the population.

A similar event occurred in 2002, when a winter storm killed about 75 percent of monarchs, and again in 2012, when a heat wave in the Midwest killed tens of thousands. After these events, the population rebounded by a small number. The population grew in 2018, when a cold front in North Texas forced the butterflies to stay in South Texas longer, thereby causing an increase in their breeding season. However, 2019 proved to be a year with soaring temperatures in Oklahoma and Kansas (the second hottest September in 125 years), the impact of which has not yet been calculated.

In a recent [Washington Post](#) article, scientists studying monarchs expressed concerns on the impact of climate change. “The question we’re asking is ‘Can one of the world’s most adaptive insects adapt to climate change?’” said Karen Oberhauser, who studies monarchs at the University of Wisconsin at Madison. “We are changing the conditions and just waiting to see,” she said.

“If you’re talking 20, 30, 40 years out, we’re not going to be talking about monarchs any more,” said Chip Taylor, the founder of Monarch Watch and a professor at the University of Kansas. “The migration will disappear unless we solve climate change,” Taylor said.

If you’re talking 20, 30, 40 years out, we’re not going to be talking about monarchs any more.

— Chip Taylor,
Monarch Watch

In 2019, the [United Nations reported](#) that around 1 million species of plants and animals are facing possible extinction, many within decades. The report identifies five drivers of change in nature, in descending order, are: (1) changes in land and sea use; (2) direct exploitation of organisms; (3) **climate change**; (4) pollution; and (5) invasive alien species.

One species that was recognized in 2015 to have become extinct as a result of climate change is the [Bramble Cay melomys](#), a small rodent that lived on an island in the Great Barrier Reef. While the melomys, with its glassy eyes and tiny rat-like mouth is unlikely to create a sense of fondness in humans, we can hope that the tiny monarch’s incredible migration and awe-inspiring images of thousands of them overwintering in the Mexican forest will drive initiatives to prevent its extinction.

It is essential to take steps to solve climate change in order to preserve the monarch migration and populations, and efforts are also needed to restore and increase the habitat area with appropriate native milkweed species and nectar plants. Land-use changes need to be addressed, and the use of herbicides and pesticides need to be reduced. There is also a need for increased monitoring of populations, along with the maintenance and restoration of the overwintering habitat in Mexico.

2019-20 Pollinator Habitat Grants Awarded

Monarchs Across Georgia (MAG) is proud to award 2019-20 [Pollinator Habitat Grants](#) to Arcado Elementary School in Lilburn, Lavonia Elementary School in Lavonia, Marietta High School in Marietta, and the Southern Conservation Trust in Fayetteville. It is notable that grant monies for 2019-20 have come exclusively from MAG's native plant sales.

Arcado Elementary School, Lilburn

Arcado Elementary School has been awarded the grant to launch a "Save the Monarchs" campaign by teacher Ms. Kyonghae Shin to raise awareness on the declining habitat and population of the monarchs.

The first step of this campaign will be to educate the students with facts and data about the monarch butterflies, and the negative impact that humans have caused to their habitats and food source.

The next step will be to have milkweed available for purchase by students to plant at their homes or at the school. Finally, Ms. Shin and her students will establish a Monarch Waystation by planting various host and nectar plants in the school's existing pollinator garden.

Lavonia Elementary School, Lavonia

Lavonia Elementary School has been awarded the grant to establish the Betty Vandiver Butterfly Garden to serve as an outdoor classroom. This will also act as a memorial to Lavonia's beloved former First Lady, after whom it is being named. The garden will serve as a demonstration site for educating residents and businesses on how they can participate in monarch and pollinator conservation.

Goals for this project include – building capacity for sustainability, training teachers and volunteers in new curricula and citizen science activities, developing a strong support system for teachers, installing an outdoor classroom with native plants, and delivering instruction to students, families and the community. The school also plans to register and certify with Monarch Watch, MAG, and The Rosalynn Carter Butterfly Trail.

Marietta High School, Marietta

Marietta High School has been awarded the grant to work on creating and building a pollinator garden with the students from various science classes and clubs. The school currently has raised garden beds, and green space around the beds is where the teachers and students will establish a pollinator garden.



This project will engage students in a conservation effort, and provide a space for lessons about coevolution, adaptations, biodiversity, conservation efforts, animal behavior, etc.

Southern Conservation Trust, Fayetteville

Southern Conservation Trust has been awarded the grant to establish The Bennett Butterfly Garden at its new office and nature center in historic downtown Fayetteville. The office is in a home built in 1830 that was subsequently bought by William Bennett in 1850. The home hosts many native Georgia species and has a currently overgrown flower bed area that will be replanted with plants that will be useful for pollinators.

The grant will be used to purchase new plants for the garden, which will be used to educate the public, particularly children, about the benefits of gardening, pollinators and the use of native plants. Programs

will include plant and insect identification, butterfly lifecycles, and plant education.

Volunteers and students will be involved in all stages of The Bennett Butterfly Garden, including cultivating soil readiness, removing invasive species, and planting pollinating plants. Children will also be involved in the recycling of resources to create plant markers, and areas for basking and puddling.



MONARCHS ACROSS GEORGIA POLLINATOR HABITAT GRANT

Georgia DNR Issues New License Plate Featuring the Monarch Butterfly

Show your support for the conservation of Georgia's native species with a license plate featuring the monarch butterfly on a Georgia aster

Wildlife license plates from the Georgia Department of Natural Resources (DNR) cost only \$45 a year, which is broken down as \$25 for the wildlife tag, plus the standard \$20 registration fee and applicable ad-valorem taxes.

Buying this license plate supports Georgia's Wildlife Conservation Fund. This fund, established by state law, benefits rare native plants, and endangered and other wildlife not hunted or fished. The money from the fund is used for conservation, education, land acquisition, and recreation projects. Renewing Georgia DNR wildlife plates also supports this work.

Funds from the purchase and renewal of these plates make up more than half of all contributions to the Wildlife Conservation Fund, which has been providing vital resources for the conservation of animals such as gopher tortoises and bald eagles.

How to Buy a Wildlife Tag—It's Easy!

At your county tag office:

1. Ask for a wildlife plate—an eagle, hummingbird, quail-and-deer or trout design
2. Pay the fee; wildlife plates cost only \$25 more than a standard peach plate
3. Receive a temporary tag from the county (specialty plates are usually not stocked)
4. Watch the mail for your wildlife tag; it can arrive as soon as within a week!



When buying a car:

Many Georgia car dealers offer the option to purchase a tag when you buy a vehicle. Simply ask them to upgrade you to a wildlife tag when you're asked what kind of tag you want!

Renewing Your Wildlife Tag

Wildlife plates can be [renewed online](#) in most counties or at your local tag office. Renewing a wildlife tag costs only \$25 a year, plus the standard \$20 registration fee and applicable ad-valorem taxes.

Can I keep my current tag?

Yes. You can renew it every year, as usual. If you want to change to another wildlife plate, you can buy the design of your choice for \$25. The annual renewal will be the same.

Monarch Butterfly Fund to Support Beyond the Mexico Book Project

Monarchs Across Georgia is pleased to announce that the Monarch Butterfly Fund has agreed to support a \$2,500 Request for Proposal made through its Small Grants Program. The "Beyond the Mexico Book Project" designates the monies to be used to purchase books for and support the environmental education efforts in the schools surrounding the Mexican monarch sanctuaries during the 2020-21 migration season.

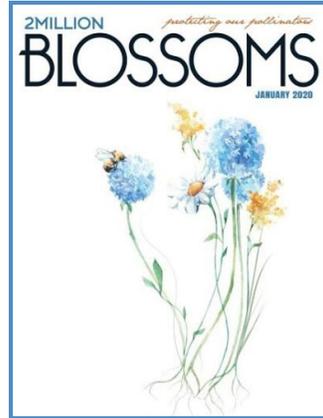


RECOMMENDED RESOURCE

2 Million Blossoms

A new quarterly publication dedicated to protecting our pollinators

Over the course of our existence on this planet, humans have enjoyed a delectable variety of foods, most of which are attributed to the presence of pollinators of various shapes and sizes. We also delight in the beauty and immense capability of these creatures. However, they often face a dearth of food and habitat – caused by our modern, human-oriented, and fragmented landscape. Pollinators have to contend with a warming world, with increasingly erratic weather and habitat loss across the globe.



no experience of wiping down bugs splattered on car windshields during road trips, which was a regular occurrence in the 1980s and 1990s. This is likely an indication of the loss of insect populations.

The magazine offers both short- and long-form articles exploring how bees, birds, butterflies, and bats enhance our planet. The first issue in January 2020 featured 17 informative articles, including those from notable contributors Dr. Marla Spivak, Dr. Dave Goulson,

The new magazine, “2 Million Blossoms,” aims to “awaken readers to the vast diversity of pollinating insects and animals. To delight, entertain and name those well-adapted creatures buzzing through our world, because the more we know about pollinators, the better we can provide habitat.”

Dr. Mark Winston, and Craig Childs, author of “The Secret Knowledge of Water.” Regular columns include “Digging It,” aimed at providing advice on gardening for pollinators, and “Beyond the Hive” by Rusty Burlew of [Honeybee Suite](#).

A publication dedicated to pollinators is the need of the hour. We live in a time when the insect biodiversity that forms the foundation of our food chain is disappearing fast. This is evident from the “Windshield Effect.” Children and young adults of today probably have

For a sneak peek at some of the articles in the inaugural issue, visit <https://www.2millionblossoms.com/sneakpeak>. A [PDF](#) is also available with the table of contents, guest editorial by Mark Winston, and the piece by Craig Childs, along with a brief companion story on the original scientific research.

Call for Committee Volunteers

If you are interested in volunteering with the Monarchs Across Georgia (MAG) committee, please email mag@eealliance.org and let us know what volunteer opportunities interest you.

Here are a few ways that you could help:

- Write newsletter articles
- Become a MAG workshop facilitator and co-facilitate workshops
- Review grant applications
- Become part of our Speakers Bureau
- Post information on our web pages
- Gather news for our Facebook page
- Help with an event (children’s craft or answering questions)

You could also coordinate or assist with:

- Grant administration
- Newsletter editing
- Symbolic Migration
- Mexico Book Project
- Plant sales
- Pollinator habitat certification
- Volunteer coordination
- E-blasts via email list

Symbolic Migration by the Numbers

This is the second year the Monarchs Across Georgia committee has partnered with [Journey North](#) to handle the logistics and funding for the Symbolic Migration project. Five hundred and sixty-three (563) schools and organizations submitted 1,362 Class Ambassadors and more than 28,000 life-sized paper butterflies.

Forty-five U.S. states (Hawaii, Idaho, Louisiana, North Dakota and South Dakota were absent) and the District of Columbia, three Canadian provinces (Alberta, Ontario, and Saskatchewan), and one international school in South Korea participated. The top five states, based on the number of classrooms/groups participating, were Georgia (185), Texas (130), North Carolina (106), New Jersey (64) and Pennsylvania (64).

From mid-November 2019 through late February 2020, Estela Romero visited 33 schools near the Mexican overwintering monarch sanctuaries of El Rosario, Sierra Chincua and Cerro Pelon. She delivered Class Ambassador Butterflies, books donated through our [Mexico Book Project](#), and an environmental lesson about the plants and animals that live in the forest with the monarchs. You can read her blog at <https://symbolicmigration.org>.



Students in Mexico display their butterflies.

We would like to thank the volunteers in Georgia who worked nearly 1,000 hours in 2019-20 to make this program successful. Contact us at symbolic-migration@eealliance.org if you would like to be involved.

An updated Teacher Packet announcing the 2020-21 Symbolic Migration season will be available at <https://www.eealliance.org/symbolic-migration> in early August 2020 with a postmark deadline of Friday, October 9, 2020.

United by the monarch butterfly, children across North America (and beyond) learn authentic lessons of conservation, cooperation, and ambassadorship. Join us!

Rosalynn Carter Butterfly Trail

The Rosalynn Carter Butterfly Trail began in 2013 with a pollinator garden that was established at President and Mrs. Jimmy Carter's home garden. Mrs. Carter is especially interested in establishing milkweed for Monarch butterflies. Since 2013, hundreds of people have joined the trail by providing nectar and host plants for pollinators common in their area.

We encourage you to invite friends, businesses, and schools to join our efforts in establishing pollinator gardens and joining the trail. Gardens can be in containers or in the ground. Each garden helps provide food and habitat Monarchs need to survive. To find out more about the trail, or to register, go to <https://rosalynncarterbutterflytrail.org/>.



MAG Committee member Trecia Neal hands a tagged monarch to Mrs. Carter to release for fall migration.

The Great Georgia Pollinator Census

The second Great Georgia Pollinator Census is set to take place August 21-22, 2020. The census is designed for citizens of all ages to participate, including school groups, garden groups, families, and individuals. The pollinator inventory resulting from the census provides current population numbers, along with data that can be used as a baseline for future research.

The first census in 2019 was a community science initiative led by the University of Georgia Extension (UGA Extension). More than 4,000 Georgians submitted around 4,600 counts and reported more than 133,000 insect interactions. It was hailed as the nation's first statewide pollinator census, which proved to be a landmark effort in citizen science.

Since the census is an appropriate project for educational institutions doing STEM work, UGA Extension will have lesson plans and other [resources for educators](#), as well as full support for participating schools. UGA Extension also hosts a [webpage](#) that will list events throughout the state around the time of the census in August.

Download the [insect counting guide](#) for details on insect identification and how to count for the census. Check out the Georgia Pollinator Census [Facebook Group](#) for tips

to get ready for the count. If you have questions, contact Becky Griffin, University of Georgia Extension Urban Ag Center, at beckygri@uga.edu.

How to Participate

1. Choose a favorite pollinator plant; it can be any blooming plant that shows insect activity
2. Count and categorize the insects that land on your plant for 15 minutes. The categories are:
 - Bumble Bees
 - Honey Bees
 - Small Bees
 - Carpenter Bees
 - Wasps
 - Flies
 - Butterflies/Moths
 - Other insects
3. Record your observations on the counting sheet
4. Upload your counts to <https://GGaPC.org>
5. Handy hint: Your cell phone camera makes a great magnifier!
6. Can you participate more than once during the two-day counting period? Absolutely!

AUGUST

21-22

FRI & SAT

Pollinator Habitat Certification

Do you enjoy watching and studying caterpillars on their host plants, searching for chrysalides hidden from predators, or observing butterflies and hummingbirds flitting from flower to flower? Does your schoolyard, workplace, or backyard have bushes, trees and flowers that provide host plants; nectar; and protection for butterflies, bees, hummingbirds, and other pollinators? Is there a source of water/puddling areas for thirsty butterflies? Are there places for them to roost at night?

If so, why not register your backyard/schoolyard/workplace habitat with Monarchs Across Georgia's Pollinator Habitat Program? No garden is too big or too small! For more details, and to download the form, visit the [Pollinator Habitat Certification webpage](#).

Congratulations to the latest gardens to be certified!

- Cody Mullins Luedtke – Tucker, GA
- The Dahlonaga Butterfly Farm – Dawsonville, GA
- St. Clare's Episcopal Church – Blairsville, GA



Sustained Action Needed to Save Western Monarch Migration

Status of the Western Monarch Butterfly Population

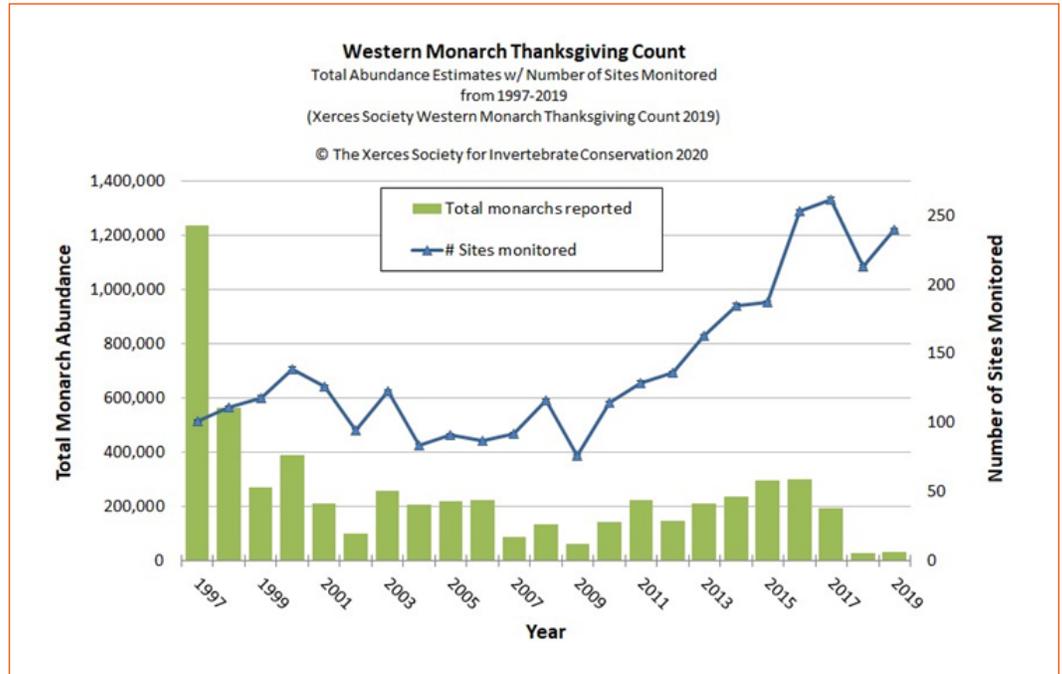
2019 population shows no meaningful improvement from 2018's all-time low

The monarchs of North America that breed west of the Rocky Mountains are known as the Western Monarchs. They primarily overwinter at more than 200 sites along the Pacific Coast in California. During the spring, these monarchs leave the overwintering habitat and disperse across the West. They breed continuously across the West during the summer, and return to the overwintering grounds in the fall.

Since 1997, volunteers have observed the coastal groves to estimate the overwintering population in California. This volunteer effort occurs during three weeks around the Thanksgiving holiday, and has come to be known as the Western Monarch Thanksgiving Count. Since January 2017, The Xerces Society and volunteers of the Western Monarch Thanksgiving Count have added a second monitoring period around the New Year's holiday.

Combining data from the New Year and Thanksgiving monitoring events provides a better understanding of site-wide and range-wide population changes. The count conducted at more than 200 overwintering sites during Thanksgiving 2018 yielded a population of 28,429 monarchs. The population varied between 200,000 and 300,000 just a few years ago, between 2013 and 2017. The count at 240 sites during Thanksgiving 2019 reported 29,418 monarchs, identical to 2018's all-time low.

The 2018-19 and 2019-20 populations represent less than 1% of the monarch population in the 1980s, and are below the 30,000 monarchs - the threshold estimate below which the population may collapse. The monarch population has been declining since the 1980s, and it was 1.2 million in 1997, which was the first year of monitoring.



A population below the threshold of 30,000 has raised alarms, and there has been a [“Call to Action”](#) to help save the western monarchs. Check out The Xerces Society’s [“This Is How You Can Help”](#) [handout](#) to learn more about how to support western monarchs during this crucial time.

WESTERN MONARCHS ARE IN TROUBLE
This Is How You Can Help

Western Monarchs are in Jeopardy

Imagine that the city of Los Angeles had shrunk to the size of the town of Monterey, Calif. In 2018, the population of western monarchs hit a record low of less than 30,000 monarchs. In 2019, the number of monarchs was 29,418 monarchs. In 1997, the year we first started to count monarchs in California, the total number of monarchs in California was estimated to have been 1.2 million. For every 100 monarchs there were 30 years ago, there are only 100 monarchs today.

The significant problem affecting western monarchs is habitat loss (overwintering and breeding areas), pesticide use (herbicides and insecticides), and climate change (including increased drought severity and frequency). Research into monarch issues is active and ongoing to help us understand the depth and complexity of the monarch decline and to see what we can do to help them recover. The Xerces Society is taking action to help monarchs in California by working with farmers, natural area managers, California cities, and others to create and restore habitat across the Central Valley—a key breeding and migration area for monarchs. Additionally, and other habitat restoration projects provide essential nesting areas, refueling for breeding, and important stopovers. Xerces is also pushing for protection for overwintering and breeding with partners to ensure overwintering habitat.

What you can do to help:

The actions described in this fact sheet are based on our current understanding of reasons that impact the monarch population, as well as scientific research generally, and also on the precautionary principle. It is better to err on the side of caution to help monarchs than to do nothing while we are working to better understand these risks.

XERCES SOCIETY
 for Invertebrate Conservation

savewesternmonarchs.org

Two of the best strategies that have been identified by researchers to improve the chances of western monarch population recovery are: (1) protection and restoration of overwintering habitat, and (2) increasing the availability of early emerging native milkweeds, especially in California.

Source: <https://www.westernmonarchcount.org/data>

2019 Monarchs Across Georgia Service Award

Rose Barton, Hall County Master Gardener

The Monarchs Across Georgia committee is delighted to award Rose Barton the Monarchs Across Georgia Service Award for 2019. As a former educator, Rose brought monarchs into the classroom in 2010 to motivate her students to learn to read. The students became excited and wanted to learn more about the butterfly lifecycle. She and her husband created a monarch garden at their home and began raising monarchs to share with their students.



Rose and her husband continue to raise monarchs for educational purposes. They tag the butterflies and sample for the OE virus prior to letting the children release them. Rose lives on six acres and has planted wildflower plots in addition to her butterfly gardens. She has helped maintain the butterfly gardens at Gardens on Green/Hall County Board of Education and Mt. Vernon Elementary School. Her yard is a continuous project to create more pollinator environments. She and her husband plant many new milkweed plants annually.

In 2016, Rose became a Master Gardener and started volunteering at Gardens on Green at the Hall County Board of Education. As a volunteer, Rose, along with many local Master Gardeners, serves more than 1,000 students each school year who visit Gardens on Green. She teaches in the pollinator garden and usually has a live Monarch display to share with the students.

The enthusiasm with which she talks about pollinators and plants always delights her audience, whether young or old, and encourages them to begin gardening themselves and looking for Monarchs. She is the "go-to" resource for educating the public about the importance of Monarchs in the area.

Spotlights: For Your Pollinator Garden

Yucca (*Yucca filamentosa*) and the Yucca Moth (*Tegeticula* sp.)

Yes, Yucca is considered to be native in Georgia. While these spikey plants may bring to mind deserts of the southwest, *Yucca filamentosa* can be found from New York to Texas. According to the University of Tennessee's AgResearch Center it "was most likely originally found along coastal areas of the southeast, but has become naturalized inland to the west and north."

This evergreen perennial with its rosette of large, sharp-pointed leaves provides year-round interest in the garden. The edges of the plant's large leaves may look frayed with loose threads, which is where the species name is derived. The tall stalks of creamy white flowers that bloom May-June are pollinated by a small, white moth.

The yucca moth (*Tegeticula* sp.) and the yucca plant have a mutually beneficial relationship and cannot live without each other. Pollination by the moth ensures that the plant can reproduce and the larvae of the moth, which arise from eggs laid in the ovary of the flower,



Yucca moths on a yucca flower.
Photo: Alan Cressler.

feed on the seeds contained within the fruit of the plant. The yucca produces enough seed to feed the developing moth, as well as ensure its own reproduction.

Source: https://www.fs.fed.us/wildflowers/pollinators/pollinator-of-the-month/yucca_moths.shtml

SMARTER PEST MANAGEMENT

Protecting Pollinators at Home



Towns and cities are home to numerous pollinators, including the gulf fritillary (left) and the endangered rusty patched bumble bee (middle). By creating healthy, diverse, pesticide-free habitat in your yard, not only are you enriching your own life, but you are helping prevent insect declines—and potentially, extinction. (Photos: (l) Dennis Krusac; (m) Xerces Society / Sarina Jepsen; (r) Matthew Shepherd.)

Making Your Yard a Safe Place for Pollinators

Making your home pollinator-friendly is easy and rewarding. Most of North America's native bee species only forage over a distance of a few hundred yards, so with a little planning, your yard can provide a safe space for bees and other pollinators to thrive. All you need to give them are flowering plants throughout the growing season, undisturbed places to nest, and protection from pesticides. This guide will help you with the last item, managing yard pests in a pollinator-friendly way.

Urban Settings Provide Key Habitat for At-Risk Pollinators

Around the world, bee and butterfly populations are experiencing declines. Twenty-eight percent of North American bumble bees and 19 percent of butterfly species in the United States are at risk of extinction. Residential areas provide important food and shelter for many of our threatened and endangered pollinators. By establishing pollinator habitat in your yard, you will be an active part of restoring species on the brink.

Provide for All the Needs of Pollinators

To ensure you can support the entire life cycle of bees and butterflies, consider the following ideas for your yard:

1. **Select a range of native and regionally adapted plants with bloom times that overlap throughout the growing season** to provide food for pollinators. Be sure to include plants that bloom early and late in the season.
2. **Include butterfly larval host species** for caterpillars to feed on. Consult Xerces' regional plant lists (available from xerces.org) to find recommendations for your area. For more detailed information, see *Gardening for Butterflies* (Timber Press, 2016).
3. **Limit planting cultivated plant varieties, especially those bred for showy blooms.** While often selected for

their eye catching beauty, these plants may not produce much pollen or nectar.

4. **Grow pithy-stemmed plants that provide nesting sites for tunnel-nesting bees.** Examples of plants that make good nesting habitat for bees can be found through the web site of the Lady Bird Johnson Wildflower Center.
5. **Leave some downed branches, stems of pithy plants, and patches of bare ground for nesting sites.** It may seem counterintuitive to leave patches of bare ground in the garden, but areas of sunny well-drained soil provide nesting habitat for ground-nesting bees. Leaving leaves and other trimmings in your yard through the winter and into late spring provides shelter for over-wintering pollinators, especially butterflies, moths, and bumble bees.

Pesticides and Their Impacts

Pesticides, which include insecticides, fungicides, and herbicides, are part of the reason our pollinators are struggling. Avoiding their use helps reduce stress on already vulnerable bees, butterflies, and other insects. Below you'll find a brief overview of the risk various pesticide types present for pollinators.

- ⇒ **Insecticides:** Designed to kill insects, these pesticides are the most likely to kill or otherwise harm pollinators. Broad-spectrum insecticides, which lack selectivity for pests, would harm bees if applied on or near where bees are foraging. Neonicotinoids and other systemic insecticides pose the additional risk of delayed exposure since they can persist in plants and the environment for months to years after an application.
- ⇒ **Herbicides:** The greatest risk herbicides pose to pollinators is reducing nectar or pollen sources by killing flowering plants. Large-scale herbicide use can remove already scarce forage plants from the landscape and make it harder for pollinators to find food. There is also research showing that exposure to some herbicides can directly harm bees. For example, the commonly used herbicide glyphosate has been shown to harm navigation in honey bees and can interfere with microbes in their gut, making them more susceptible to harmful pathogens.
- ⇒ **Fungicides:** Once considered low risk for pollinators, new research is showing that products designed to control fungi can weaken pollinators, making them more vulnerable to disease. In some cases, fungicides can also increase the toxicity of other products, especially certain insecticides.

Vegetable Gardens and Pollinators

Vegetable gardens can provide valuable forage sites for pollinators. However, our delectable fruits and vegetables can also draw in pests. With vegetable quality and quantity at stake, most people have a lower tolerance for pests on their fruits and vegetables compared to ornamental plants.

While all the same actions to create resilience in your yard work to combat pests in a vegetable garden, there are a few other steps you can take to protect your crops without using pesticides. Start by choosing plant varieties that are resistant to common pests and diseases. Companion planting, cover cropping, and crop rotation are also strategies that can minimize pest problems.

- ⇒ **Companion planting** is the purposeful placement of plants together that help each other, like planting radishes or nasturtiums around your cucumber and squash plants to repel cucumber beetles. There are many great resources on companion planting, including the book *Carrots Love Tomatoes* (Storey Publishing, 1998).
- ⇒ **Cover cropping** is a great way to enrich your soil, suppress weeds, and break pest cycles. After fall harvest and about four weeks before you expect a killing frost, sow seeds such as field peas, fava beans, clover, hairy vetch, or buckwheat. Before they set seed, cut them back and turn them under. Wait about three weeks before planting fruits or vegetables. Sustainable Agriculture Research and Education offers more information on cover cropping.
- ⇒ **Crop rotation**—growing different families of crops in succession on the same land—helps to break the cycles of pests and diseases that affect specific plants. A common rule of thumb is to rotate yearly on a three-year cycle. Crop rotation has proven effective at preventing soil-borne diseases as well as soil pests, including nematodes and wireworms. You can learn more from the University of Wisconsin Extension publication, *Using Crop Rotation in Home Vegetable Garden*.



Leafcutter bees are one example of a solitary bee that you may see signs of in your yard. As their name suggests, these excellent pollinators create the cells in their nests with neatly cut pieces of leaves. They will nest in wooden bee blocks or bundles of hollow stems such as bamboo, sharing them with mason bees and other species. (Photo: Xerces Society / Mace Vaughan.)



Not all wasps are aggressive and many are valuable predators of garden pests. Paper wasps eat a variety of garden insects and spiders. Their nests are frequently found under the eaves of a house. While they can sting if provoked, these wasps are docile and people can live right alongside them without disturbance. (Photo: Xerces Society / Sarah Foltz Jordan.)

An Ounce of Prevention is Worth a Pound of Cure

The best way to avoid pest issues is to have healthy, resilient plants that don't attract many pests and are able to survive damage caused by feeding by any pests that may arrive. Here are a few things to consider as you work to create or enhance your garden for pollinators:

1. **Go native!** Learn which native and regionally adapted plants are pollinator-attractive. Native plants, when placed in areas that mimic where they come from, are oftentimes less likely to suffer from pests and more attractive to native pollinators. Consult Xerces' regional plant lists (available from xerces.org) to find recommendations for your area. For more detailed information, see *Attracting Native Pollinators* (Storey Publishing, 2011) and *100 Plants to Feed the Bees* (Storey Publishing, 2016).
2. **Get the dirt on your soil.** Learning your soil's characteristics (sandy, clay, or silty) will help you select plants that are best adapted to your soils. Testing your soil will also help you understand the strategies—such as adding organic matter or adapting the pH—that can help your garden plants thrive. You can learn more from Penn State Extension's *Soil Management in Home Gardens and Landscapes*.
3. **Put the right plant in the right place.** If a plant is stressed, it is less able to defend itself from pests. Know what plants prefer—are they shade or sun plants? Do they thrive in dry or wet areas?—and place them in your garden according to their needs.
4. **Source plants carefully or propagate your own.** Pesticide use in ornamental plant production is common. When possible, buy plants grown organically. Although there are organic-approved pesticides, risk from these natural products can be lower relative to conventional products. If you can't find organic plants, at least avoid plants that were treated with neonicotinoids. Unfortunately, many nurseries don't know what their plants were treated with. If you shop at a nursery that grows their own plants, they will be able to answer your pesticide use questions. Another way to ensure your plants are grown with little to no pesticide use is by propagating them yourself. Plus, it can be really fun to trade plants and seed with friends and neighbors.

The rest of this article will appear in a future issue. - Eds.

Pollinator Plants of the Year

Continued from page one

Georgia Green Industry Association, and the Georgia Department of Agriculture aims to connect Georgia's robust greenhouse industry with experts in native plant cultivation and pollinator health to produce more ready-to-plant native species, and to encourage Georgians to convert part of their home landscape into pollinator habitat.

This year, the groups will be reaching out to greenhouse growers to encourage them to produce specially selected landscape plants. Next year, the focus will be on teaching gardeners how to incorporate and maintain the pollinator-friendly plants. Programs and partnerships like the Georgia Pollinator Plants of the Year program and Pollen Nation not only benefit members of the green industry, but also consumers, and the environment.



Clockwise from top left: *Conradina canescens* (conradina), *Solidago petiolaris* (downy goldenrod), and *Clethra alnifolia* (sweet pepperbush).

2021 Pollinator Plants of the Year

Spring Bloomer

Conradina — *Conradina canescens*

Also known as wild rosemary, this fine-textured, evergreen, woody shrub in the mint family has aromatic, needle-like leaves. In spring, the plant is covered in small lavender flowers with purple-spotted throats. It supports many native bees and other pollinators, and it is ideal for container gardening or garden walls.

Summer Bloomer

Sweet Pepperbush — *Clethra alnifolia*

This small, deciduous, densely branched shrub is ideal for rain gardens. Panicles of white flowers give off an intoxicating fragrance in the heat of summer and support many native bees.

Fall Bloomer

Downy Goldenrod — *Solidago petiolaris*

Not to be confused with ragweed, Downy is one of the shorter goldenrods, standing between one- and three-feet tall. From August to October, the flowers bloom in dense, spiky clusters, creating a gorgeous yellow plume. This is an excellent plant for bees, wasps, and at least 112 species of butterflies and moths.

Georgia Native

Butterfly Weed — *Asclepias tuberosa*

This drought-tolerant, herbaceous perennial wildflower reaches one- to two-feet tall and is excellent for sunny borders, meadows, and containers. This plant serves as the larval host for the Monarch Butterfly, Queen Butterfly and Milkweed Tussock Moth and provides abundant nectar for many insects and hummingbirds.