Generate Some Buzz

Your Backyard Pollinator Garden Handbook

Bee The Solution

TENNESSEE ENVIRONMENTAL COUNCIL

OUR MISSION

Helping People and Communities Improve Our Environment

VISION

Thriving Habitats, a Circular Economy, & Climate Balance in Tennessee

WWW.TECTN.ORG
TEC@TECTN.ORG

TENNESSEE ENVIRONMENTAL COUNCIL

AN INTRODUCTION TO POLLINATORS

What Are Pollinators?

Pollinators are any species of animal that carries pollen from flower to flower. Some pollinators include butterflies, bees, beetles, flies, wasps, moths, birds, and small mammals like bats. They visit and rely on flowering plants for food, shelter, and mating opportunities. The nectar they gather is sweet-tasting and has a high amount of carbohydrates. In contrast, pollen has proteins, fats, and other essential nutrients.

What Do Pollinators Do?

When pollinators land on a flower, they pick up pollen - either on purpose or by accident. For flowers to reproduce, they need pollen moved from the male part of one flower to the female part of a second flower. This movement of pollen is essential for our plants!

TENNESSEE'S POLLINATORS

Native Bees

There are over 350 species of native bees in Tennessee; these are just a few of them. Native bees have evolved alongside native flowers and are uniquely equipped to pollinate them. Based on their behavior, there are two main sets of bees: solitary and social. Most of our native bees are solitary—they live alone and create solitary nests—for example, leafcutter bees and mason bees. Social bees are gregarious and form colonies with hundreds of other bees, for example, bumble bees form colonies of 50-400 individuals. Honey bees are not native to North America; they are an introduced species but have become an essential part of modern agriculture.

Carpenter Bee

Carpenter Bees nest by burrowing into wood

Bumble Bee

Bumble Bees carry pollen with special pouches located behind their legs.

Sweat Bee

Sweat Bees build nests in the dirt and are attracted to sweat.

Mason Bee

Mason Bees use mud to make their nests in cracks or other cavities.

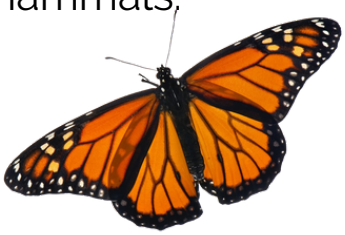
Bees collect and feed on nectar and pollen—the nectar provides energy and the pollen provides protein and other nutrients. Bees use most pollen as larvae food. About 25% of native bees are pollen specialists and rely on collecting pollen only from specific native plants.

Butterflies and Moths

Most butterfly and moth species require native plants to complete their lifecycle. Caterpillars, the larval stage of butterflies and moths, can often only feed on specific native plants. This is called host plant specialization. Caterpillars are essential building blocks of our ecosystem as they are a major food source for amphibians, reptiles, terrestrial birds, and mammals.

Monarch Butterfly

Monarch butterflies pollinate many wildflowers but need milkweed plants for their larvae to survive.



Hawk Moth Species

Many moth species are nocturnal and pollinate wildflowers in the dark. Native plants with long flowers favor hawk moths with similarly long tongue-like proboscises.

Other Pollinators

Insects, beetles, wasps, flies, hummingbirds, and bats perform pollination services too. Tennessee is home to many pollinators!

Soldier Beetle

Soldier Beetles pollinate many wildflowers and feed on plant material and other insects.

Paper Wasp

The Paper Wasp feeds on pollen and insects such as flies and beetle larvae.

Ruby-Throated Hummingbird

When slurping up nectar, hummingbirds move pollen from flower to flower. They also feed on aphids, gnats, small spiders, and mosquitoes.

NATIVE PLANTS

Why Are Native Plants Important?

Native plants are specifically adapted to the environment of Tennessee. They can withstand the extremes of our state's climate and have coevolved with our native wildlife. Some native plants are endemic to specific areas in Tennessee, meaning they only occur in one spot and nowhere else.

It's important to note that certain plants rely on native bees, like bumblebees, to perform buzz pollination to release their pollen fully. This is necessary for several key food crops, such as tomatoes, eggplants, kiwis, and blueberries, which all require buzz pollination. It's worth noting that honey bees cannot perform buzz pollination.

Tennessee was once covered with a mosaic of woodlands, prairies, and wetlands. Many of these ecosystems have disappeared and have been replaced by farms, residential lawns, and urban areas. Unfortunately, these new environments provide little refuge for pollinators, causing their populations to decline.

But you can make a difference by planting your pollinator garden!

TENNESSEE'S NATIVE WILDFLOWERS

Our Native Plants

The species listed below are just a few of the many native forbs, or herbaceous flowering plants in Tennessee.

Common yarrow
- Achillea millefolium

Swamp milkweed
- *Asclepias incarnata*

Butterfly-weed
- *Asclepias tuberosa*

Common milkweed
- *Asclepias syriaca*

New England aster
- *Aster novae-angliae*

Aromatic aster
- *Aster oblongifolius*

Blue wild indigo
- *Baptisia australis*

Partridge Pea
- *Cassia fasciculata*

Lanceleaf coreopsis
- *Coreopsis lanceolata*

Showy Tick Trefoil
- *Desmodium canadense*

Purple coneflower
- *Echinacea purpurea*

Rattlesnake-master
- *Eryngium yuccifolium*

Joe-Pye-weed
- *Eupatorium fistulosum*

Sneezeweed
- *Helenium autumnale*

Narrow-leaved sunflower
- Helianthus angustifolius

Blazing star
- *Liatris spicata*

Wild bergamot
- Monarda fistulosa

Evening primrose
- Oenothera biennis

Beard-tongue
- Penstemon calycosus

Slender mountain mint
- Pycanthemum tenuifolium

Black-eyed Susan
- *Rudbeckia hirta*

Cup-plant
- Silphium perfoliatum

Wrinkle-leaved goldenrod
- Solidago rugosa

Iron Weed
- Vernonia altissima

PHOTO EXAMPLES

Butterfly Milkweed

Black Eyed Susan

Sweet Joe-Pye Weed

Lanceleaf Coreopsis

Common Milkweed

Swamp Milkweed

Bergamot

Common Yarrow

False Sunflower

Purple Coneflower

Rattlesnake Master

Lemon Beebalm

OUR SEED MIXES

Southern Pollinator Conservation Mix

This is a reliable drought tolerant seed mix. Height: 3-4 feet
Contains: False sunflower, Purple coneflower, Partridge pea, Showy ticktrefoil, Rattlesnake master, Lanceleaf coreopsis, Blue false indigo, Prairie blazing star, Common milkweed, White wild indigo, Black-eyed Susan, Iron weed, Butterfly milkweed, White wingstem, Greyheaded coneflower, Smooth aster, Rigid goldenrod, Bergamot, Large coreopsis, Sweet Joe Pye weed, Common yarrow, Spotted bee balm, Slender mountain mint, Indian grass, Switchgrass, Little bluestem, Tall dropseed

Southern Butterfly and Hummingbird Mix

This seed mix is suitable for dry to wet soil. Height: 3-6 feet
Contains: False sunflower, Purple coneflower, Common milkweed, Butterfly milkweed, Swamp milkweed, Black-eyed Susan, Spiked blazing star, Lemon mint, Evening primrose, Smooth aster, Rigid goldenrod, Large coreopsis, New England aster, Yellow wild indigo, Bergamot, Sweet Joe Pye weed, Smooth beardtongue, Cardinal flower, Virginia wild rye, Indian grass, Switchgrass, Little bluestem

Southern Monarch Habitat Mix

This seed mix contain a higher milkweed seed ratio. Height: 3-6 feet
Contains: Butterfly milkweed, Common milkweed, Swamp milkweed, Smooth beardtongue, Lance leaved coreopsis, Black-eyed Susan, Spotted beebalm, Slender mountain mint, Early goldenrod, Bergamot, Spiked blazing star, Greyheaded coneflower, Purple coneflower, False sunflower, Brown-eyed Susan, Cup plant, Joe-Pye weed, Iron weed, Sneezeweed, Smooth aster, Little bluestem, Big bluestem, Indian grass

Curb Appeal Pollinator Mix - for sidewalk strips & street side planting

This is a low growing, drought tolerant seed mix. Height: 2.5-3 feet
Contains: Lance-leaved coreopsis, Common yarrow, Butterfly milkweed, Indian blanket, Spotted bee-balm, Spiked blazing star, Black-eyed Susan, Smooth blue aster, Purple coneflower, Lemon mint, Grey goldenrod, Purple love grass

GARDEN TIPS

Important Tips to Remember

No matter the size of your pollinator garden, there are a handful of tips to consider. Like all animals, pollinators need access to food, water and shelter.

Plant a Diverse Garden

Native plants have different blooming periods. This means that nectar and pollen will be available at other times of the year. Plant diverse species to ensure a consistent food source from spring to fall.

We recommend a pollinator garden with over 15 different species. Gardens with a higher number of native plants will attract a higher number of native pollinators! Check out and order our seed mixes: tectn.org/generatesomebuzz.html

Provide Shelter and Water

Shelter looks different for all animals. Some insect species require open dirt to nest, while others need dead trees or branches. You can ensure shelter is provided by resisting your urge to clear your garden of brush or decomposing leaves. Pollinators do not disappear during winter but find safe hibernation sites among dead plant materials. Leave your pollinator garden standing in the fall and winter. In the spring cut back dead stems to 12-24 inches to provide spring habitat for stem-nesting bees.

Your pollinator garden is only complete with a water source. A small water dish or depression in the ground will do just fine! Water will then collect and provide hydration for the pollinators present. Some plants, like the Cup Plant, can hold water as well.

Avoid Pesticides

Pesticides, insecticides, and herbicides can accumulate in the environment, contaminate waterways, and disrupt and damage the balance of the ecosystem. In a naturally balanced ecosystem, single-species overpopulation is contained by a predator-controlled food web.

GETTING STARTED

Pick Your Site

Pollinator gardens, both big and small, can significantly impact the health of your local ecosystem. You can establish an extensive pollinator garden of many square feet if you have a large yard. Suppose you have just a tiny yard or a balcony - in that case, your pollinator garden will look slightly different using flower pots or a raised bed.

TEC's four seed mixes grow and flower best when exposed to full or partial sun. We recommend establishing your pollinator garden in an area with 6-8 hours of direct sun.

Soil conditions: Native wildflowers of this ecoregion are adapted to the soil conditions and have long taproots to reach deep, moist soil, sequester water, and stabilize soil. In the case of very rocky or poor soil, amendment might be recommended but is optional.

Prepare Your Site

To establish your pollinator garden, you should clear the area of vegetation to minimize competition and weed pressure.
You can prepare the site by removing vegetation and roots using a shovel, hoe, or sod cutter. Smothering or tilling* can be used alone or in addition to other techniques.

*Tilling is not recommended in areas of Bermuda grass. Bermuda spreads by stolons and rhizomes which when you till or cut will split and produce even more plants.

Get Your Seeds or Plants

We recommend starting a pollinator garden from seed by ordering one of the TEC seed mixes. You can also buy native plants or seeds from local native plant nurseries.

PLANTING YOUR GARDEN

When to Plant

When you grow your garden will depend on whether you are planting seeds or plants. If you are planting seeds, you should plant between late fall and early spring, as native wildflower seeds must be exposed to cold dormancy. Many native wildflower seeds require cold stratification for an increased rate of germination. If you are planting seedlings or mature plants, you can do so anytime during the year, but they will require watering until they are established.

Many native forbs are perennials, meaning the roots will stay alive during winter, and new foliage will grow in the spring in the same spot year after year.

How to Plant

After removing all existing vegetation, loosen or amend the soil with compost. "Broadcast" or toss the seeds throughout the garden and lightly push them down to contact the soil directly. You do not need to cover the seeds with soil, as most wildflower seeds need light for germination.
Our seed mixes include enough for a 20-square-foot garden.

Caring For Your Garden

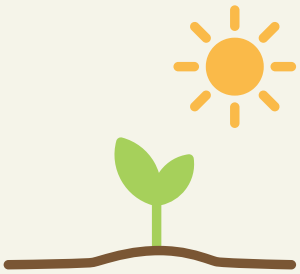
During the first year, it's important to remove any invasive plants that might be competing with your native plants. You only need to water your garden during its early stages or in the event of a drought.

Smartphone apps such as Picture This, Seek, or iNaturalist can help you identify plants in your garden. Additionally, you can join TEC's Generate Some Buzz Facebook Group to share photos and ask questions.

Planting native plants in your garden will help create a pollinator oasis and attract other species, such as terrestrial birds, who can find food sources and habitats throughout the year.

PLANTING YOUR GARDEN

SITE SELECTION



Find an area that gets at least 6 hours of sunlight a day.

To cold stratify your seeds, plant them from late fall to early spring.

SITE PREP

Remove all existing vegetation, roots, and debris to reduce competition.

We recommend using a shovel or sod cutter.

AMEND

Spread about 2 inches of soil or compost on the area.

We recommend buying from local composting companies.

SOW SEEDS

Spread the seeds evenly and lightly compress them to ensure direct contact with the soil. Don't bury the seeds, as they need light for germination.

MAINTAIN

Sit back and wait! Sprouts will begin germinating in the late winter or spring.

Continue to remove returning invasive species from the garden.

WHERE TO BUY NATIVE?

Straight Species and Cutivars

IIf you're visiting nurseries to purchase native plants, always seek the help of an employee to locate straight native plant species that occur in the wild. Shop for plants using their Latin binomial to ensure correct selection, as some plants have many common names. For instance, purple coneflower's Latin binomial is Echinacea purpurea.

It's important to understand that native plant cultivars, also known as nativars, have been developed to alter specific characteristics like color, flower size, and leaf shape or to extend the flowering period. However, these changes often come at a cost. Cultivars may have reduced nutritional benefits for pollinators, as they could be sterile, have lower pollen/nectar value, or even be unrecognizable to insects as their host plant. Therefore, it's generally better to choose straight native plant species whenever possible.

- Reflection Riding Nature Center
- Wonder Gift and Garden
- GroWild Nursery
- Wild Ones Plant Sales
- Tennessee Naturescapes
- Izel Plants (mail order only)
- Bates Nursery
- Overhill Gardens
- Nashville Natives
- Native Plant Rescue Squad
- Roundstone Native Seed

RESOURCES

The Biota of North America Program- (BONAP) offers comprehensive range maps for all of the native and naturalized plants in the United States

Homegrown National Parks- co-founder of HNP Douglas Tallamy is a professor in the Department of Entomology and Wildlife Ecology at the University of Delaware

USDA NRCS Plant Database- helps America's farmers, ranchers and forest landowners conserve the nation's soil, water, air and other natural resources

The Xerces Society- nonprofit organization that protects wildlife through the conservation of invertebrates and their habitats

Tennessee Native Plant Society- nonprofit focusing on the preservation and education about the native flora of Tennessee including the Great Smoky Mountains

The National Wildlife Federation- the United States' largest private, nonprofit conservation education and advocacy organization

US Fish and Wildlife Service Guide- provides a great guidebook to help you through the steps

Wild Ones- promotes native landscapes through education, advocacy, and collaborative action

PROGRAM PARTNERS

THANK YOU TO NRCS AND TVA FOR THEIR GENEROUS SUPPORT!

USDA NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service

TVA

This material is based upon work supported by the U.S. Department of Agriculture, under agreement number NR204741XXXXG003. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Agriculture. In addition, any reference to specific brands or types of products or services does not constitute or imply an endorsement by the U.S. Department of Agriculture for those products or services.