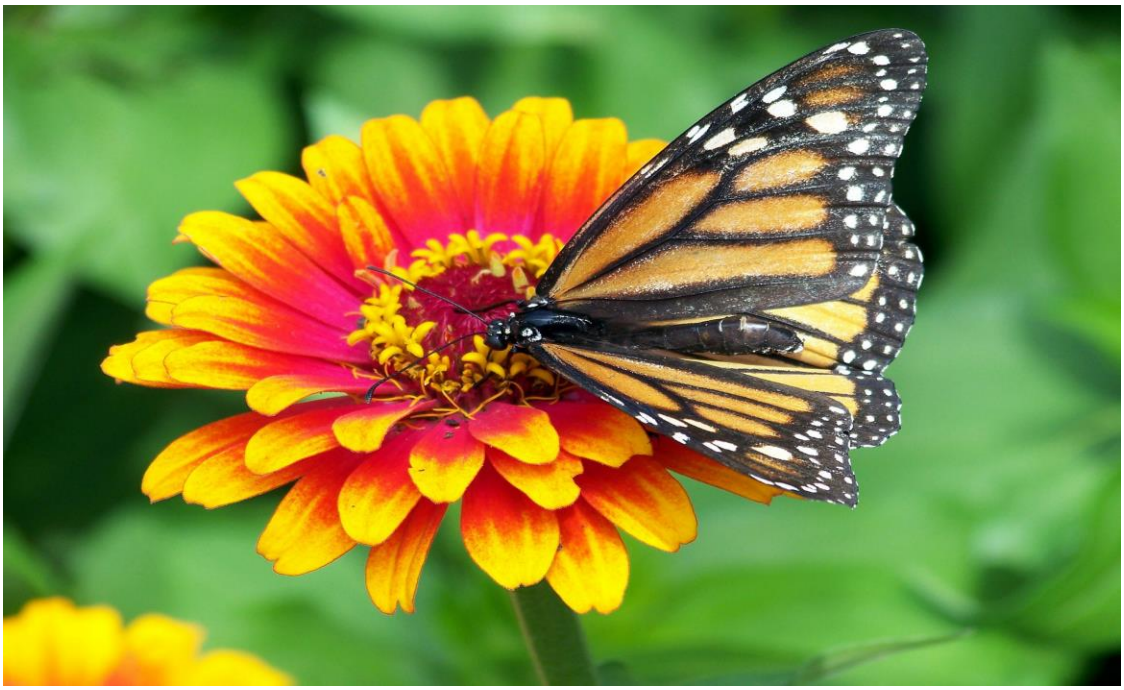
HOUSTON WILDERNESS
It's Our Nature

Texas Monarch Flyway Strategy

Step by Step Guide to Pollinator Habitat Creation in Texas



August 2022
Revised Edition

www.HoustonWilderness.org/MFS

HOUSTON WILDERNESS
It's Our Nature

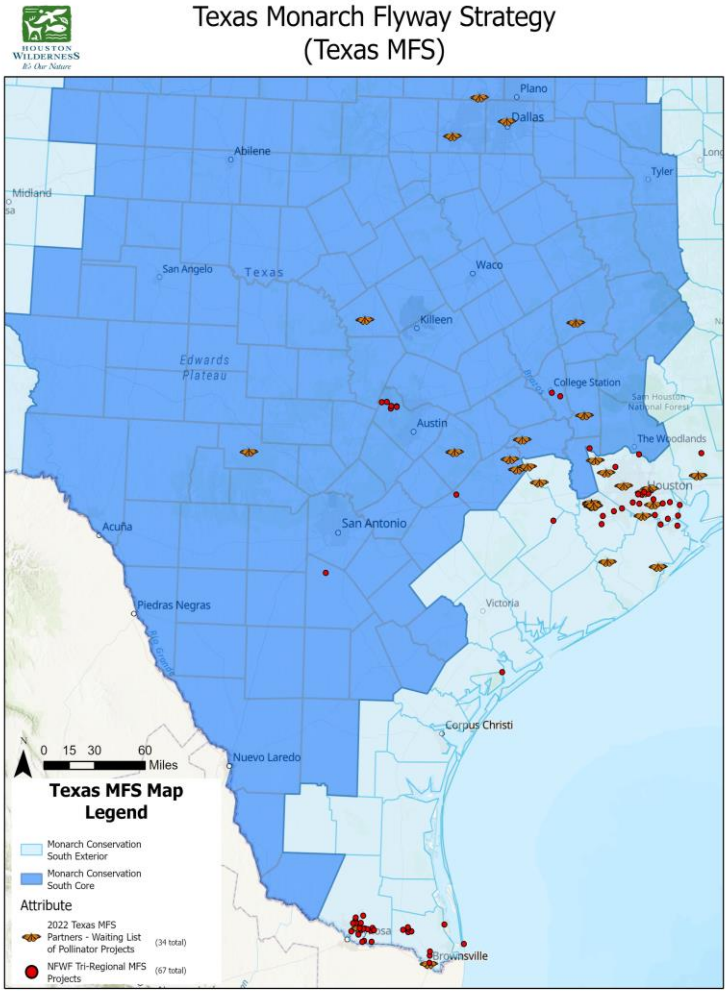
Houston Wilderness created the *Texas Monarch Flyway Strategy* (TX MFS) with over 100 landowner partners in response to a strong interest in all four major regions of the Central Migratory Flyway in Texas - Gulf Coast, South Texas, Hill Country and North Texas – to have a coordinated strategy to facilitate, create and maintain pollinator habitat throughout the entire route of the Monarch's bi-annual migration to/from Mexico and Canada every year.

These various landowners – private, public and nonprofit – requested also a step-by-step guide to be created to help them build and maintain a pollinator habitat through a consistent, easily replicated process. This MFS Pollinator Step-by-Step Guide is designed to provide users with an easy to use pollinator process and resource guide based on regional locations for targeted pollinator habitat in Texas.

NOTE: As of July 21, 2022, the Monarch Butterfly has been classified as endangered by the International Union for Conservation of Nature. **(See pages 49-50)**

Authors: Deborah January-Bevers, Jose Alducin, & Karla Gorostieta

Texas Monarch Flyway Strategy (Texas MFS)



The *Texas Monarch Flyway Strategy* (Texas MFS) was created in conjunction with the Texas Parks & Wildlife's Department's Monarch Conservation Plan in April, 2016. The Texas MFS concentrates on substantial increases in Monarch populations by working with partners around the state to (1) increase pollinator habitat, (2) provide education and outreach, (3) collaborate with other stakeholders and (4) coordinate pollinator research to assist interested people/partners (see more at houstonwilderness.org/mfs).

With the assistance of NFWF Monarch Conservation grant funds and other private funding, the Texas MFS seen success in all four targeted areas, helping to restore, increase and enhance Monarch habitat across four major regions in the state – which all serve as critical links in the Monarch butterfly's journey along the Central Flyway from Canada to Mexico and back every year.

By facilitating collaborative funding from various federal, state and regional sources, Houston Wilderness is working with federal and state agencies, biologists, multiple municipalities, private and public land owners, schools and nonprofits to enhance or restore thousands of acres of habitat for Monarch butterflies and other pollinators throughout Texas.

Gulf-Houston Monarch Flyway Pollinator Garden

This pollinator garden is a contributing member of pollinator habitats in the 8-county Gulf-Houston MFS Region!

HOUSTON WILDERNESS
It's Our Nature

GulfHoustonRCP.org/mfs

With multiple completed and ongoing projects along the Texas MFS, partners are currently collecting various native milkweed and pollinator plant seeds and plugs for distribution to collaborative partners around the state. Current and future partners are also focused on increasing the supply of milkweed seeds and the variety of native pollinator species across all types of property in the state.

Texas MFS Pollinator Guide available at houstonwilderness.org/mfs

Regional MFS Signage (order free sign at info@houstonwilderness.org

The Texas MFS metrics/measurables, to date, with over 50 partners:

Project Metrics	Total Acres	Total Patches	Total # Sites	Total Pollinator Seeds (Lbs)	Total Nectar (Lbs)	Total Milkweed (Lbs)	Total Live Plants	Total Live Nectar	Total Live Milkweed
Gulf-Houston MFP Metrics Total:	290.19	7	20	35	31.5	3.95	263,572	263,188	384
Tri-Regional MFS Metrics Total:	216.05	32	47	154.232	196	2.477	44,405	26,165	18,610
Additional Project Sites - Metrics Total:	1.2	4	3	2.1	0.1	2	20	14	5
Texas MFS Metrics Total:	128.25	0	16	110.25	0	4.95	0	0	140

WAYS TO GET INVOLVED WITH TEXAS MFS

By planting a Texas native pollinator garden, you are supporting a network of ecosystem services provided by the Monarch Butterfly. Around 90% of available milkweed and monarch habitats occur in the agricultural landscape. Many of these areas have been compromised due to mowing, use of pesticide/herbicide and natural occurrences like fires. Urban gardens are ways in which you can get involved with the Texas Monarch Flyway Strategy.

If you build a pollinator garden with nectar species and/or milkweed, please make sure to submit your project! You will be able to participate as we record the number of Monarch habitat statewide.

Visit HoustonWilderness.org/mfs to submit your Monarch garden project!

Guidelines to submitting a successful Monarch Project

Select a suitable site: Depending on the species that you plant, given your region, generally the ideal place is an area where your plants can get full to partial sunlight throughout the day and well-drained areas. There are no size requirements, but please do record how big your garden is when submitting a project to our website.

Locate your garden: It is wise to obtain the Latitude/Longitude location of your garden. This helps ensure that you are selecting adequate native species to your region and it also helps locate your garden on a map.

Selecting native pollinator species: Please review our step-by-step guide and plants list to make sure you are selecting the best species for your area. This will also ensure the success of your plants as they will be under their required climate conditions.

Upkeeping: Although management requirements may be needed as your garden establishes, it is a good idea to regularly check for invasive weeds, soil moisture, and signs of pests. We discourage the use of harsh pesticides/herbicides as these plants do not tolerate them. Generally, once these plants establish, maintenance is minimum. Reseeding may take place once a year if some of the species you selected are not doing well the first time around. Do keep in mind that these types of plants have a die-back period each year, so it is not uncommon to see these plants dry up and shrink through some seasons. Do not be alarmed. This is part of their natural cycle; the roots remain in the ground and they will come back during their respective blooming season!

Name your garden! Although this is not necessary, we take pride in our work and often name our projects so that we can refer to them more easily, particularly in larger areas.

Describe your garden: Please describe the species that you planted and their quantity. This helps us get a better understanding of the species being used and helps us verify which plants do particularly well in an area.

Take pictures! "A picture is worth a thousand words." We love to showcase pollinator gardens, particularly during National Pollinator Week every year! Please send pictures of your garden to info@houstonwilderness.org.

Table of Contents

Note: This guide is meant to provide a general guidance for most types of pollinator habitats in Texas. Some habitat locations may not apply.

Step by Step Guide – Ranch, Farm, Residential

A. Identify Site Location:

(Consider these location characteristics)

I. Drainage
II. Quality of area
III. Invasives
IV. Type of soil
V. Current conditions of landscape
VI. Current and former uses of land
VII. Slopes if any

B. Timing of Site Preparation for Pollinator Garden

I. Fall Start - Begin September with fall pollinator (add Milkweed at same time)
II. Spring Start - Begin in December/January with pollinators (April with Milkweed)
III. Summer Start - Begin with Milkweed
IV. Please refer to attached '*Planting Tip Sheet*' for further details

C. Condition of Landscape (Soil)

I. If natives already exist
II. No need to add nutrients to the soil
III. Slight tilling of the soil but necessarily needed, particularly if pollinator (stems) are added in addition to seeds
IV. If Invasives exist – see "Beware of Invasives" on page 41 & 42.
V. If lawn grasses (St. Augustine/Bermuda), cover the area.
VI. If bare soil or major erosion – add soil and use bricks or media that will deter and mitigate erosion

D. Design / Layout of Pollinator Area

I. If located in a large landscape, more rural area - a border around the pollinator area may or may not be desired, and a mowed trail or gravel trail through the pollinator area may also be desired.
II. If located in a urban/suburban area – TBD

E. Choosing Native Pollinator Plants And Seeds For Your Ecoregion Area

I. Texas based native pollinator plants list (see attached two lists: (1) Fall vs. Spring, and (2) larger Texas native plant list)
II. Texas native milkweed plant (see attached milkweed list)
III. Plants vs. Seed: for large acreage, it is best to do seed planting as it is more economical. For residential and smaller projects, individual plants may be used from a local nursery. There is a higher success rate when using live plants vs. seeds.
IV. Size of plant: Coordinate height and width of adult plant size with desired planting area
V. Growth Patterns: Growth patterns may vary by species, so make sure to space plants evenly to prevent plant crowding
VI. Perennials vs. Annuals: It is helpful to pay attention to bloom time for maintenance purposes
VII. Perennials Definition: Plants that persist for many growing seasons.
VIII. Annuals Definition: Plants that perform their entire life cycle from seed to flower to seed within a single growing season

F. Creating a one-pager to coordinate your habitat project (The "Big Picture")

I. Creating a one pager helps create an overview of your project once you have determined the site location and all the variables associated with building the pollinator habitat. The table below may help you determine all the variables in your project and help you better assess a true cost.

Step by Step Guide – Commercial Locations

A. Identify Site Location:

(Consider these location characteristics)

I. Drainage
II. Quality of area
III. Invasives
IV. Type of soil
V. Current conditions of landscape
VI. Slopes if any

B. Timing of Site Preparation for Pollinator Garden

I. Fall Start - Begin September with fall pollinator (add Milkweed at same time)
II. Spring Start - Begin in December/January with pollinators (April with Milkweed)
III. Summer Start - Begin with Milkweed
IV. Please refer to attached '*Planting Tip Sheet'* for further details

C. Design / Layout of Pollinator Area

I. Create a design of how you would like your pollinator area to look
II. Mark or outline the designated area where your pollinator garden will be installed

D. Condition of Landscape (Soil)

I. Determine what is in your planting area
II. If Invasives exist – see "Beware of Invasives" on page 42 & 43.
III. If lawn grasses are present (St. Augustine/Bermuda), cover the designated planting area to kill existing grass
IV. Removing existing grass or vegetation from designated planting area can also be done
V. If bare soil or major erosion – add soil and use bricks or media that will deter and mitigate erosion
VI. Some nutrients additives may be needed for the new planting area such as topsoil with compost
VII. Slight tilling of the soil but necessarily needed, particularly if pollinator (stems) are added in addition to seeds

E. Choosing Native Pollinator Plants And Seeds For Your Ecoregion Area

I. Texas based native pollinator plants list (see attached two lists: (1) Fall vs. Spring, and (2) larger Texas native plant list)
II. Texas native milkweed plant (see attached milkweed list)
III. Plants vs. Seed: for large acreage, it is best to do seed planting as it is more economical. For residential and smaller projects, individual plants may be used from a local nursery. There is a higher success rate when using live plants vs. seeds.
IV. Size of plant: Coordinate height and width of adult plant size with desired planting area
V. Growth Patterns: Growth patterns may vary by species, so make sure to space plants evenly to prevent plant crowding
VI. Perennial vs. Annuals: It is helpful to pay attention to bloom time for maintenance purposes
VII. Perennials Definition: Plants that persist for many growing seasons.
VIII. Annuals Definition: Plants that perform their entire life cycle from seed to flower to seed within a single growing season.

Adopting a Monarch Pollinator Garden May Be Good for Business!

Increasing the number of urban pollinator habitat helps the Monarch Butterfly immensely. These areas are critical resting sanctuaries and feeding grounds for the Monarch Butterfly and other pollinators as they make their way through North America each year. Not only are these landscaping options easy to install, they also have great benefits for those who decide to adopt a native pollinator habitat!

Native Milkweed, Nectar and Grass species are hardy to their native region and thus very resilient to extreme weather. Not only will you conserve the amount of water, you will be able to cut down on maintenance cost to a minimum. Native species need low to no maintenance once established, as these species die back each year.

These native species combined with Low-Impact Development (rain gardens, bioswales, detention basins, etc.) can help reduce flooding during high rain events due to their ability to absorb water through their extensive deep root system.

Benefits of Adopting a Pollinator Garden

1. **Supporting a local, statewide, and nationwide effort to help increase the Monarch Butterfly population**
2. **Supporting the use of Texas native species**
3. **Getting signage to display your support for the Texas Monarch Flyway Strategy**
3. **Savings on water consumption**
4. **Savings on landscape maintenance**
5. **Helping reduce flooding during high-rain events**
6. **Beautifying your place of business**
7. **Standing out from other businesses and setting an example**

More than 5,000 species of wildflowers along with native grasses flourish along our state's roadsides, thanks to nature and attention from TxDOT.

TxDOT's wildflower program not only helps our highways look good but also reduces the cost of maintenance and labor by encouraging the growth of native species that need less mowing and care.

Wildflower Resources (Wildflower Facts)

- There are over 5,000 species of wildflowers in the state of Texas.
- All species of the Bluebonnet are considered the State Flower. There are also white bonnets and pink bonnets. These will not necessarily bloom the next year true to color if they are mixed among bluebonnets. This is due to their being pollinated by bees and if the bee goes from a bluebonnet to a white bonnet and pollinates the white bonnet, then it could come back as a bluebonnet.
- More than 20% of wildflowers are in the Sunflower family.
- Indian Paintbrush comes in colors ranging from orange to yellow to purple.
- Goldenrod is often confused with ragweed which causes hayfever. However, the goldenrod is not a wind pollinated plant. It is pollinated by bees.
- Yucca plants are often found in West Texas and items such as soap and baskets can be made from them.
- Prickly poppies have branched, prickly stems and are an abundant supplier of pollen for insects. They come in white, red and pink colors.
- Horsemint is in the Mint Family and tea can be made from its leaves. It also attracts bees, butterflies and hummingbirds who are seeking nectar. It blooms from May to September.
- Sideoats Grama is the State Grass of Texas. It is a warm season grass growing from July to September.
- Little Bluestem has an extensive root system.
- Buffalograss is excellent for erosion control and can survive short mowings.
- Sand Lovegrass is sometimes called "Ice Cream Grass" because livestock love to eat it and the tops of it look like ice cream.

- Planting Wildflowers – see https://www.txdot.gov/inside-txdot/division/maintenance/wildflower-program/planting-wildflowers.html
- Planting Bluebonnets – see https://www.txdot.gov/inside-txdot/division/maintenance/wildflower-program/planting-bluebonnets.html

Environmental Benefits

As with grasses, Wildflower Program initiatives strive to establish roadsides that blend into their surroundings. The grasses and wildflowers also help to conserve water, control erosion and provide a habitat for wildlife. **History**

Maintenance techniques used to encourage wildflower growth include safety, or strip mowing which allows the wildflowers to bloom and native grasses to emerge.

TxDOT buys and sows about 30,000 pounds of wildflower seed each year. The peak wildflower blooming season draws tourists from all across the nation to see the color unfold each spring.

The wildflower program is part of good stewardship. Today, TxDOT not only plants and enhances wildflower areas, but more importantly protects and maintains the investment made in years past.

NOTE ON NON-USE OF TROPICAL MILKWEED UNDER THE TxMFS: HW's approach to tropical milkweed has been influenced by recent research done by the Xerces Society (Pg 42-45). TxMFS partners have never planted tropical milkweed seeds or plants and HW discourages its use.

Texas Monarch Flyway Strategy (MFS) – Budget Worksheet For Retail Locations

The below chart provides general budget information for creation of pollinator habitat on retail locations where landscaping takes place along the perimeter edges of the facility. The budget is based on a ¼ acre pollinator area but could apply to various sizes. There are sources noted below that helped provide a basis for estimated costs. These types of pollinator habitats can support Monarch butterflies, bees, and other insect species throughout Texas, and could be applied to other states in the Central Migratory Flyway.

Average Cost for Pollinator Plants and Supplies (Based on ¼ acre)		Cost (Per Site)
Cost of Pollinator Plants	Based on the average cost of pollinator forbs in 1 gallon containers (plants/small shrubs) in various regions of Texas, the cost is generally between $6 and $12 per 1 gal container. To cover a ¼ acre area will require approx. 105 plants (based on 12 in. between each plant/small shrub). The cost per site listed here is based on an average of $10 per 1 gal container plant/shrub.	$_____
Cost of Native/ Milkweed	Based on the average cost of Texas native milkweed species and the compatible but non-native Milkweed (which is generally available in wholesale nurseries around Texas), the cost is approx.. $10 per 1 gal. container. Planting multiple milkweed species is preferred but availability may only allow for one species. If that is the case, Swamp or Aquatic Milkweed species are preferred by many Monarchs as they migrate through Texas. To cover ¼ acre will generally require 25-40 1 gal. milkweed plants (based on 18 in. between each plant). The cost per site listed here is calculated based on $12 per 1 gal container.	$_____
Irrigation/ Water	Based on general practice of irrigation already existing on retail sites, no additional cost is added for irrigation.	$_____
Cost of Mulch	Based on the average cost of mulch in Texas, the average cost is approx. $40 per yard. To cover ¼ acre site at ½" depth will require about 18 yards. Note: Retail contractors may have lower cost options with mulch wholesalers if the mulch is bought in bulk.	$_____
Cost of Soil	Based on the average cost of topsoil in Texas, the cost is approx. $38 per yard depending on the soil type. To cover ¼ acre at 1 in. depth will require about 33 yards. Note: Retail contractors may have lower cost options with soil wholesalers if the soil is bought in bulk.	$_____
TOTAL		$_____

Example of Retail Gas Wholesaler Location – For Potential Pollinator Habitat

Sources:

1. Plant Container Cost – A. Wrights Nursery (Briggs, TX); B. Houston Garden Center
2. Milkweed Container Cost – Far South Wholesale Nursery (Austin, TX)
3. Mulch and Soil – Living Earth (Houston, TX)

Sample Cost Estimator Sheet for MFS Partners

HOUSTON WILDERNESS
It's Our Nature

Texas Monarch Flyway Strategy (MFS) – Gulf-Houston Region
Partner Location Information (PLI) Sheet

To get on "waiting list" to receive funds when funds are available for a pollinator garden contact: info@houstonwilderness.org

Partner targeted area in City of Stafford

Thank you for your interest and participation in the Texas MFS – implementing pollinator habitat for Monarch butterflies, bees, hummingbirds, and other pollinator species. Per our discussions, below is GIS-based location information, details and grant-related budget for pollinator habitat project implementation in the City of Stafford.

CURRENT STEPS:

A. **Project Location(s): 1.** The two highlighted sections across First Street Park totaling 0.25 acres.

2. Rail Road rights of way along US 90, totaling to 8 miles of Monarch and pollinator habitat.

B. **Budget**: Below is the NFWF grant funds budget and an estimate of materials and supplies costs for the 2-location project, in addition to the City of Stafford's in-kind contributions to the project

C. **Plant/seed availability: HW's MFS Step-by-Step Guide (found here:** http://houstonwilderness.org/mfs) provides a list of plant/seed providers by region that allow for direct purchase milkweed and native pollinator plants, and information on pollinator habitats

Monarch Garden in front of First Street Park

NEXT STEPS:

D. Choose forb & and Milkweed species for planting and set planting date(s) with volunteers

E. Ensure tools and delivery of supplies on planting date(s).

Monarch Pollinator Habitat along Rail Road Tracks on Main St., Stafford, TX

Average Cost for Pollinator Plant Materials and Supplies		
Soil & Gravel	Soil for the habitat area, and crushed granite for a small trail	**$ _____**
Site Preparation	Prepare soil for planting, removing any existing weeds	**$_____**
Irrigation /Water	Initial manual watering via local water source	**$_____**
Seeds	Native Pollinator and wildflower seed mixture + Delivery	**$_____**
	Native Milkweed seed mixture + Delivery	**$_____**
Native/ Pollinator Plants	Native pollinator plants and milkweeds (in containers) + Delivery	**$_____**
Paver/ Border	Pavers to border the habitat garden	**$_____**
Habitat Tools	Shovels, gloves, tiller rental, hand-spades and hoses	**$_____**
Labor	Volunteers for initial habitat creation (water, snacks, sunscreen)	**$_____**
TOTAL	**Note: Cost of materials/supplies may vary slightly**	**$_____**

Pre-Planting Consideration for All Types of Areas

1) Pre-Ordering Pollinator Seeds

- Seeds are available from multiple sources (see pages 17-19)
- An estimated budget for plant and seed materials is helpful to complete a pollinator habitat project.
- Depending on the layout of your pollinator area, it is helpful to have an estimated budget for other materials and supplies as well. (See example of a budget for an urban-based pollinator garden that includes a brick border and crushed granite trail)
- Houston Wilderness' facilitation of current Gulf-Houston MFS funds may allow for some funding assistance with the cost of native pollinator plants and milkweed.

2) Watering - See pages 12-13, *'Planting Tips Sheet'*

3) Seed Propagation

- Do not mow dying wildflowers too early. Seed production for next year should be encouraged. Most of the seeds must be allowed to mature before mowing.
- Once seeds from dying wildflowers have opened and released from the flowers, most non-woody wildflowers will decompose quickly and do not need to be cut down or pruned. Woody stem pollinator plants often do need to be pruned (see attached plant information list for more details)
- Milkweed seed also spread and release from pods of dying milkweed. The same approach as native wildflowers applies to native milkweed seeds.

4) Maintenance and On-site Observations

A. Quarterly
- Check pollinator site and document pollinator plants that have sprouted and established. This allows an opportunity to see what types of plants like the area better than others, and where additional plants and seeds need to be supplemented.
- If unwanted weeds or invasives begin to grow up in the area, try to hand or tool remove as much as possible before it spreads and overtakes your habitat area.
- During the quarterly maintenance, consider whether additional seed distribution for the upcoming season is needed. (refer to B, C and E above, Page 6)

B. Annually by season
- Depending on the number of pollinator plants that establish at the beginning of your habitat creation, consider following steps similar to 3 and 4 above for the upcoming season.
- If weather patterns have been particularly dry for the previous year, see page 12-13 '*Planting Tips Sheet*' for additional watering options.

5) Other Helpful Tips

A. Fertilizer / Herbicides (Consider using organic products)
B. Sun vs. Shade Plants (Consider species that are appropriate to their sun requirements)

Planting Tips:
Native Milkweed, Wildflowers and Grasses

Ideal Planting Time: Fall (September 1st – November 30th)
Spring (March 20th – June 21st)

Preparing Planting Site Area for Planting

Mow planting area as to have a smooth, clump-free, weeded soil bed.
[1](***Soil samples***: for more information on soil content, you may consult with your local county extension agent to see if your soil needs to be enhanced (amended) with soil additives before planting the seeds.)

If unwanted vegetation is present in the planting site area, a tiller can be used to remove vegetation. Soil should not be worked on if wet conditions are present as to reduce soil clumping. The soil should be tilled to a fine consistency to promote a good soil to seed contact.

Seed to soil contact is the MOST important aspect of this process. If working on a small area, a rake can be used to expose the soil. For larger areas, site preparation can be accomplished with a tractor (discs or harrows).

If Invasives Exist:

After tilling, allow two to three weeks preferably and notice if any dormant weeds or grasses come up again. If this occurs, till area again. If grass growth persists, herbicides may be used. This will allow for native milkweed and native wildflowers to outcompete any weeds that may persist. Higher seeding rates also promote better establishment of the species you are trying to introduce.

NOTE: ***the least amount of soil disturbance will have the most favorable results.***

Spreading Seeds

Achieve good seed to soil contact. Spread seed by hand over the area. A broadcast spreader or a seed drill is good for larger areas. Mix fluffy or small seeds with a "carrier" for even distribution. Carriers such as coarse sand, perlite, rice hulls or other extenders aid in keeping seeds in suspension. This seed-carrier mix creates a "free flowing" characteristic as needed to broadcast the seed. Take half the seed mixture and spread it evenly over the whole area. Then cross back in opposite directions and spread the rest.

***If possible a roller, packer or a light drag or rake should follow the seeding to press the seed into the soil or lightly cover the soil. Most seeds should never be buried more than twice their diameter. Do not bury small seeds! Water requirements will vary per species. See soil moisture requirements for every species.

[1] http://www.seedsource.com/downloads/NAScatalog_Howtogrownativeseed.pdf
[2] http://www.seedsource.com/garden/planting.asp

Watering

Nature allows seeds to lie dormant in the soil until rain falls. If you choose to irrigate, keep up with your watering until plants are established. For germination, water lightly and frequently to prevent top of soil from drying out. Rain gauges placed throughout the seeded areas can help you monitor daily watering. When wildflower seedlings are about 1 inch tall or grass seedlings have 3 to 5 blades per sprout, reduce the frequency of watering to 2 or 3 times weekly.

Increase water per application to achieve greater soaking depths for development of healthy root systems. Alternate soil moisture from good deep soakings to moderately dry in between watering. Roots need a balance of oxygen. Reduce frequency of watering over time as plants become established. Supplemental water may be discontinued as seasonal rains return.

Timing

Most annual spring blooming wildflowers are cool season plants. They sprout and grow during the fall-winter. They bloom, go to seed and then die back in late spring-summer. Plant these types of wildflower seeds in early fall. August through November are the best dates, the earlier the better.

The perennial wildflowers can be planted in spring or fall. Many perennials develop strong, deep tuberous roots the first year before producing blooms. Exotic cool season grasses and clovers are not compatible with wildflowers.

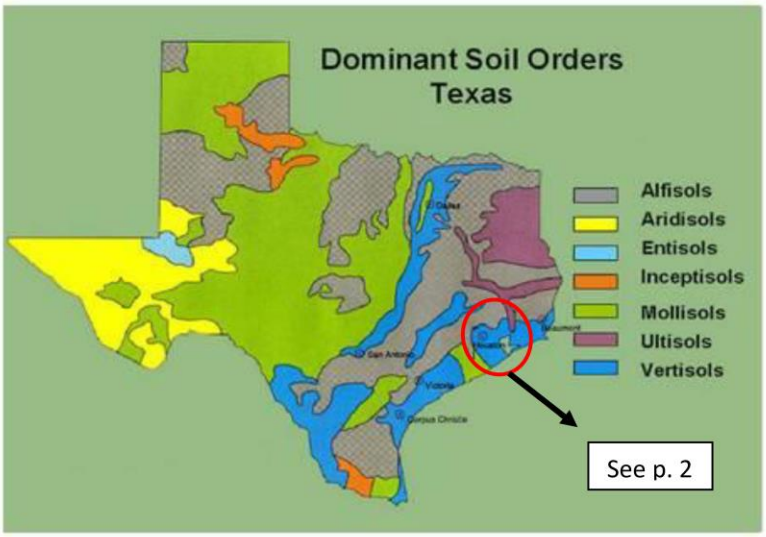
Warm season native grass seeds germinate when soil temps are above 65º F. Regarding the best time to plant native grasses, it is true that late spring gives the best chances of success in normal rainfall years. However, successful plantings may be made up until 90 days before frost. The tradeoff is the daily passing of this year's growing season which translates into lighter top growth. Sprouting is triggered by soil temperature, moisture, and daylight hours. And of course, there are always exceptions.

[3] http://www.seedsource.com/downloads/NAScatalog_Howtogrownativeseed.pdf

Understanding the Soil Content of the 8-County Gulf-Houston Region

In working to enhance protected/preserved land (nature-based infrastructure) from 10% to 24% by 2040, our region's unique soils play a critical role. The National Resources Conservation Service (NRCS) classifies dominant soil types for the 8-County region as ***Gulf Coast Prairie Soils.*** The U.S. Dept. of Agriculture identifies twelve soil orders, with Texas containing seven of those twelve orders (see below). From those seven orders, four major urban regions of Texas all contain either **Vertisols** or **Alfisols** as their dominant soil orders.

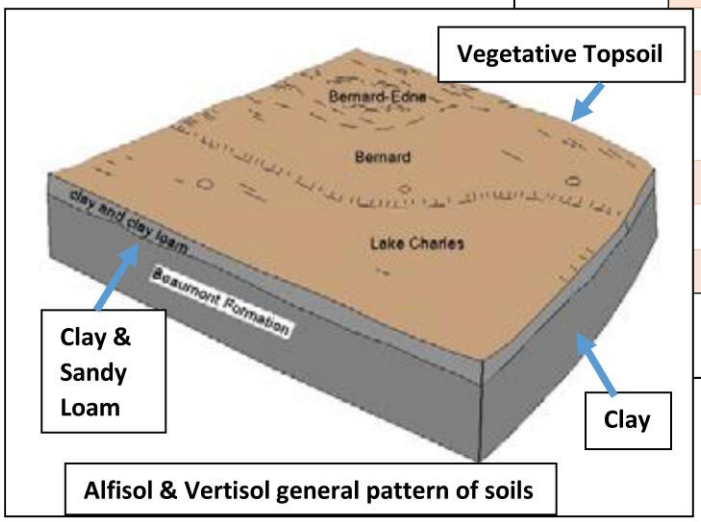
	Global (ice-free) Coverage Area
1. Alfisols: Mod. weathered (clay/sand)	**10.1%**[i]
2. **Andisols:** Volcanic ash	1.0 %
3. **Aridisols:** Very dry	12.0%
4. **Entisols:** Newly formed	18.0%
5. **Gelisols:** Frozen	9.1%
6. **Histosols:** Organic, wet	1.2%
7. **Inceptisols:** Slightly developed	15.3%
8. **Mollisols:** Deep, fertile	7.0%
9. **Oxisols:** Very weathered	7.5%
10. **Spodosols:** Sandy, acidic	4.0%
11. **Ultisols:** Weathered	8.1%
12. Vertisols: Shrink/swell (mainly clay)	**2.7%**



NRCS: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/tx/home/?cid=nrcs144p2_003094

Texas Soil Is Rare in the World

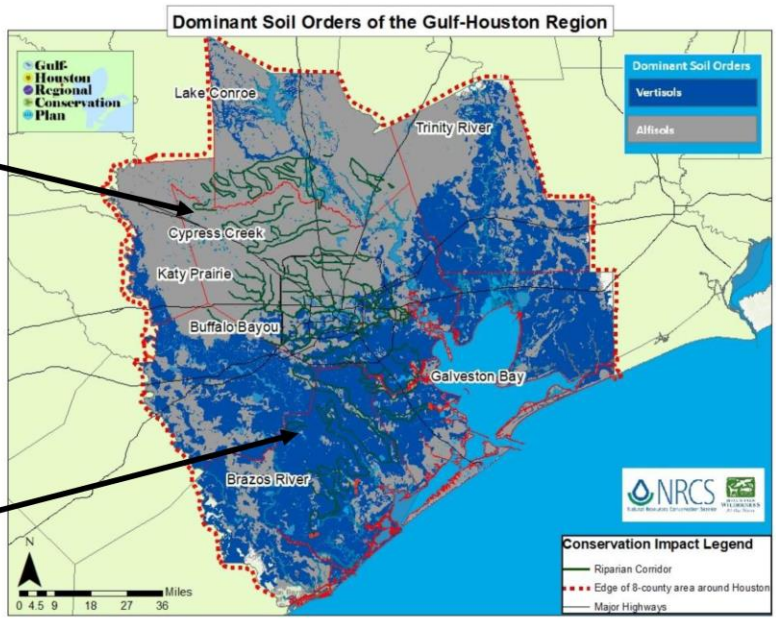
Vertisols are very unique soils and only occupy less than 3 percent of the continental land area on Earth, mainly in the Deccan Plateau of India, the Al-Jazīrah region of Africa, eastern Australia, Texas in the United States, Paraná basin of South America, and Mexico/Central America.[ii] Estimated global vertisols soil coverage area totals 300 million hectares (mh), equaling 741,316,144 acres or just 2.7% of continental land.[iii]



Alfisol & Vertisol general pattern of soils

Major Areas of Vertisol	Vertisol Cover (hectares)	Percent Cover of 2.7%
USA (Texas)	6.5 million	2.1%
Turkey	600,000	0.2%
South America	6 million (est)	2.1% (est)
Mexico/Central America	12 million (est)	5% (est)
India	70 million	23%
Africa	100 million	33%
Australia	70.5 million	23%

Vertisols and Alfisols in the 8-County Region



Alfisols contain topsoil and up to 20-40 inches of sandy loam (sand mixed with clay) before reaching a clay pan. These soils typically form under grassland vegetation.[iv] Surface runoff is slow to very slow, permeability is very slow, and the available water holding capacity is high[7] due to high clay content at depth.

Vertisols are clay-rich soils (40-75% clay content) that shrink when dry, swell when wet, and consist of topsoil sitting atop a deep clay pan. When dry, vertisols form large cracks that may be more than three feet deep and several inches wide.[v] These cracks greatly influence the infiltration and runoff behavior particularly during rain events, and are responsible for many building foundation and road repairs.[vi] Vertisols typically form under grassland vegetation and are self-mulching, highly fertile soils due to their high clay content.[vii] The vertisol's self-mulching allows for unique surface features called **gilgai**, which consists of subtle topographic changes of microhighs surrounding circular microlows (mounds & depressions)[viii] – see image below. The subsurface clays become saturated quickly during rain events, causing runoff to pool on the surface. Depressions associated with gilgais allow the excess runoff to be detained until evaporation or drainage to a waterway. Historically these depressions were used as temporary watering holes and habitat for wildlife and as a natural farming irrigation system.[ix]

Soil Considerations for Key Goals of Gulf-Houston RCP

As thousands of local and regional projects continue to be funded to increase ecosystem services, particularly related to storm-resilience, the ***Gulf-Houston Regional Conservation Plan*** (RCP) two key goals: 1) Increasing the current 12.3% in protected/ preserved land in the eight-county region to 24% of land coverage by 2040, and 2) providing research and advocacy for an increase of 0.4% annually in air quality offsets through carbon absorption in native soils, plants, trees, and oyster reefs throughout the eight county region. Knowledge and understanding of our region's unique Vertisols and Alfisols can help guide the discussion on the importance of (1) the need to "spread out" protected land to naturally hold water necessary to mitigate downstream flooding, (2) create and maintain additional detention basins throughout targeted parts of our region that allow for additional storage of water during large rain events, (3) encourage increased native plants and trees on all available lands in our region, and (4) target measureable carbon sequestration as a major factor in restoration/enhancement efforts. For more information, see **www.GulfHoustonRCP.org**

---

[i] https://globalrangelands.org/topics/rangeland-ecology/twelve-soil-orders
[ii] www.britannica.com/science/Vertisol-FAO-soil-group
[iii] www.fao.org/Wairdocs/ILRI/x5493E/x5493e04.htm
[iv] https://www.soils.org/discover-soils/soil-basics/soil-types/alfisols
[v] www.fao.org/Wairdocs/ILRI/x5493E/x5493e04.htm
[vi] Pathak et al. 2012. Hydrological behavior of Alfisols and Vertisols in the semi-arid zone: Implications for soil and water management. Agricultural Water Management.Vol 118. 12-21.
[vii] www.soils.org/discover-soils/soil-basics/soil-types/vertisols
[viii] www.soils4teachers.org/files/s4t/k12outreach/tx-state-soil-booklet.pdf
[ix] www.revolvy.com/page/Vertisol

Gulf-Houston Region Pollinator Forbs & Milkweed Information

Small Monarch Garden at Jefferson Elementary – Houston, TX

Pollinator Habitat Esplanade in Houston, TX

Aquatic Milkweed Garden – City of League City, TX

HPARD: ETC Jester Wildflowers – Houston, TX

Wildflower Bloom Period

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	**Color Chart- Bloom Color and Time Period of selected species**																		
2	Species	March		April		May		June		July		August		September		Ocotober		November	
3	Bundleflower					White													
4	Black-eyed Susan							Yellow											
5	Bluebonnets	Blue																	
6	Clasping Coneflower					Yellow													
7	Crownseed Coreopsis		Yellow																
8	Englemann Daisy	Yellow																	
9	Evening Primrose			Yellow															
10	Firewheels					Red													
11	Gayfeather						Purple												
12	Greenthread			Yellow															
13	Indian Blanket							Red											
14	Illinois Bundleflower					White													
15	Lemon Mint						Purple												
16	Maximillian Sunflower											Yellow							
17	Mexican Hat					Red/Yellow													
18	Partridge Pea								Yellow										
19	Phiox	Purple																	
20	Plains Coreopsis				Yellow														
21	Prairie Coneflower						Purple												
22	Purple Prairie Clover					Purple													
23	Rose Vervain	Purple																	
24	Standing Cypress							Red											
25	Tahoka Daisy					White													
26	Texas Paintbrush		Red																
27	White Pricklepoppy	White																	
28	Yellow Groundsel	Yellow																	

Source: Texas Parks & Wildlife

https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_1813.pdf

Pollinator Plant List

Gulf Coast Prairies and Marshes Native Plant List

Species	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Mexican plum (*Prunus mexicana*)												
Chickasaw plum (*Prunus angustifolia*)												
Pink evening primrose (*Oenothera speciosa*)												
Giant spiderwort (*Tradescantia gigantea*)												
Green hawthorn (*Crataegus viridis*)												
New Jersey tea (*Ceanothus americanus*)												
Oklahoma plum (*Prunus gracilis*)												
Possumhaw (*Ilex decidua*)												
Black cherry (*Prunus serotina*)												
Gulf Coast penstemon (*Penstemon tenuis*)												
Lyreleaf sage (*Salvia lyrata*)												
Mexican pricklypoppy (*Argemone mexicana*)												
Winecup (*Callirhoe involucrata*)												
Ohio spiderwort (*Tradescantia ohiensis*)												
Texas lignum-vitae (*Guajacum angustifolium*)												
Zizotes milkweed (*Asclepias oenotheroides*)												
Salt heliotrope (*Heliotropium curassavicum*)												
Spicebush (*Lindera benzoin*)												
Prairie penstemon (*Penstemon cobaea*)												
Berlandier's sundrops (*Calylophus berlandieri* ssp. *pinifolius*)												
Fragrant sumac (*Rhus aromatica*)												
Indigo bush (*Amorpha fruticosa*)												
Plains coreopsis (*Coreopsis tinctoria*)												
Roughleaf dogwood (*Cornus drummondii*)												
White Barbara's-buttons (*Marshallia caespitosa*)												
Clasping coneflower (*Dracopis amplexicaulis*)												
Prickly pear (*Opuntia engelmannii* var. *engelmannii*)												
Rose gentian (*Sabatia campestris*)												
Green milkweed (*Asclepias viridis*)												
Lindheimer's hoarypea (*Tephrosia lindheimeri*)												
Longleaf milkweed (*Asclepias longifolia*)												
Shore milkweed (*Asclepias perennis*)												
Slim milkweed (*Asclepias linearis*)												
American basket-flower (*Centaurea americana*)												
Common prickly pear (*Opuntia macrorhiza*)												
Dwarf palmetto (*Sabal minor*)												
Purple horsemint (*Monarda citriodora*)												
Firewheel (*Gaillardia pulchella*)												
Rattlesnake master (*Eryngium yuccifolium*)												
Tenaza (*Havardia pallens*)												
Texas thistle (*Cirsium texanum*)												
Partridge pea (*Chamaecrista fasciculata* var. *fasciculata*)												
Mexican hat (*Ratibida columnifera*)												
Halberdleaf hibiscus (*Hibiscus laevis*)												
Slim milkweed (*Asclepias linearis*)												
Zexmenia (*Wedelia texana*)												
Green milkweek (*Asclepias viridiflora*)												
Wooly ironweed (*Vernonia lindheimeri*)												
Black-eyed susan (*Rudbeckia hirta*)												
Sand palafox (*Palafoxia hookeriana*)												
Compass plant (*Silphium laciniatum*)												
Common sunflower (*Helianthus annuus*)												
Narrow-leaf gayfeather (*Liatris mucronata*)												
Pink-scale gayfeather (*Liatris elegans*)												
Prairie blazing star (*Liatris pycnostachya*)												
Maximilian sunflower (*Helianthus maximiliani*)												
Silverleaf sunflower (*Helianthus argophyllus*)												
Big blue sage (*Salvia azurea*)												
Frostweed (*Verbesina virginica*)												
White boneset (*Eupatorium serotinum*)												
Swamp sunflower (*Helianthus angustifolius*)												

Source: Texas Parks & Wildlife

List of Houston-Regional Native Seeds/Plants Suppliers

Locations to Purchase Native Seeds/Plants in the Greater Houston Region

The nurseries listed below carry a variety of plants, including some native species. The availability of native plants will vary from nursery to nursery and by season.
Please call ahead for availability, hours and directions.
***Note**: Some nurseries are willing to order specific plants if requested*

Alspaugh's Ace Hardware 2720 West Lake Houston Pkwy Kingwood, TX 77339
281-360-2231
http://alspaughs.com/services/

Anderson Landscape
2222 Pech Road - Houston 77055
713-984-1342

The Arbor Gate
15635 FM 2920
Tomball, TX 77375
281-351-8851
www.arborgate.com

Backyard Gardener
5117 N. Main – Houston, TX 713-880-8004
www.backyardgardenerhouston.com

Bamert Seed Company
1897 County Road 1018
Muleshoe, TX 79347
https://www.bamertseed.com/

Bill Bownds Tree Nursery
10519 FM 1464 – Richmond 77469
281-277-2033
http://billbowndsnursery.com/

Browning Seed Inc.
2 miles South of Plainview on I-27
Plainview, Texas 79073-1836
Office: (806) 293-5271
http://www.browningseed.com/

Buchanan's Native Plants 611 East 11th Street Houston 77008
713-861-5702
www.buchanansplants.com

Caldwell Nursery
2436 Band Rd. Rosenberg 77471
281-342-4016
http://www.caldwellhort.com/

Cornelius Nursery
2233 S. Voss Rd –
Houston corneliusnurseries.com

Doremus Wholesale Nursery
2167-CR 1550 Warren, Texas 77664
409-547-3536 (wholesale only)
edoremus@aol.com

Douglas King Seeds
4627 Emil Street
San Antonio, Texas 78219 210-661-4191 https://www.dkseeds.com/

Enchanted Gardens Nursery
6420 FM 359
Richmond 77469
281-341-1206
http://myenchanted.com

The Enchanted Forest
10611 FM 2759
Richmond 77469
281-937-9449
www.visitourforest.com

Galveston Bay Foundation Cedar Bayou EcoCenter Baytown, Texas
https://www.facebook.com/pages/Nrg-Cedar- Bayou-Ecocenter/429908237112752

Hannah Native Grasses Inc.
Flo Hannah
713 956-6303
fhannah@wt.net
fflhannah@gmail.com

Heep's Native Plant Nursery 1714 S. Palm Court Drive Harlingen, Texas 78552
956-457-6834 Mobile
http://www.heepsnursery.com/

Houston Audubon's Natives Nursery
440 Wilchester Blvd.
Houston, TX 77079 713-932-1639 (by apt only) fhannah@houstonaudubon.org-

Joshua's Native Plants 502 West 18th Street Houston, TX 77008
713-862-7444
www.Joshuasnativeplants.com

Kingwood Garden Center
1216 Stonehollow Dr.
Kingwood, TX 77339
281-358-1805
www.kingwoodgardencenter.com

Maas Nursery
5511 Todville Road
Seabrook, TX 77586
281-474-2488
www.maasnursery.com

Diane Cabiness Native Plant Nursery 16889 Rabon Chapel Road, Montgomery, TX 77316
936-447-1886
www.gardenstops.com
dianecabinessplants@consolidated.net

Morning Star Prairie Plants
21107 Pecan Bend Damon, TX
77430 713-446-2509 by apt only
morgy@consolidated.net
Native American Seed
Junction, Texas 1-800 728-
4043 www.seedsource.com

Native Enhancements
5800 Ranchester Suite 156
Houston, TX 77036
713-988-8911 (wholesale and
retail)
www.nativeenhancements.com

Natives of Texas
4256 Medina Hwy
Kerrville, TX 78028
(830) 896-2169 office
http://www.nativesoftexas.com/
Nature's Way Resources
101 Sherbrook Cir,
Conroe, TX 77385
(936) 321- 6990
www.natureswayresources.com

Nelson Water Gardens & Nursery
1502 Katy Fort Bend Road Katy, TX
77493 281-391-4769
www.nelsonwatergardens.com

Newton Nurseries Central
846 West 27th Street Houston 77008
Phone: 713-868-9030
www.newnurseries.com/

New World Botanical
2701 Lone Star Pkwy Montgomery, TX 77356
936-
689-8751
martinsimonton@gmail.com

Peckerwood Garden
20559 FM 359 Road
Hempstead, TX 77445
976-826-3232
On open days or by apt only
http://www.peckerwoodgarden.
org/

The Pineywoods Nursery 12437 Sleepy
Hollow Road Conroe, TX 77385
281-681-2889 jasonmckenzie@flex.net

RCW Nurseries
15809 State Highway 249
Houston 77086
281-440-5161 www.rcwnurseries.com

Spring Nursery & Landscape, Inc.
25252 FM 2978
Tomball, Texas 77375
281-357-1800
SNandL@aol.com

Treesearch Farms
7625 Alabonson Road Houston 77088
713-937-9811 (wholesale only)
http://www.treesearchfarms.c
om/

Turner Seed
P.O. Box 791, 211 County Road 151
Breckenridge,
Texas 76424
(800) 722-8616
https://www.turnerseed.com/home.html

Wasbash Feed & Garden 4537 N. Shepherd
Drive 713-863-8322
https://www.wabashfeed.com

SOURCES OF *NATIVE PLANTS* IN THE HOUSTON AREA

The nurseries listed below carry a variety of plants, including some native species. The availability of native plants will vary from nursery to nursery and by season. ***Please call ahead for availability, hours and directions*.** Some nurseries are willing to order specific plants if requested.

Alspaugh's Ace Hardware 2720 West Lake Houston Pkwy – Kingwood, TX 77339
281-360-2231
http://alspaughs.com/services

The Arbor Gate
15635 FM 2920 – Tomball, TX 77375
281-351-8851
www.arborgate.com

Bill Bownds Tree Nursery
10519 FM 1464 – Richmond 77469
281-277-2033
http://billbowndsnursery.com

Buchanan's Native Plants
611 East 11th Street Houston 77008
713-861-5702
www.buchanansplants.com

Caldwell Nursery
2436 Band Rd. - Rosenberg 77471
281-342-4016 www.caldwellhort.com

Doremus Wholesale Nursery
2167-CR 1550 Warren, Texas 77664
409-547-3536 (wholesale only)
edoremus@aol.com

The Enchanted Forest
10611 FM 2759 – Richmond 77469
281-937-9449 http://myenchanted.com

Enchanted Gardens Nursery
6420 FM 359 Richmond 77469
281-341-1206
http://myenchanted.com

Houston Audubon's Natives Nursery
440 Wilchester Blvd. – Houston, TX 77079
713-932-1639

Joshua's Native Plants
502 West 18th Street Houston 77008
713-869-6911
www.Joshuasnativeplants.com

Kingwood Garden Center
1216 Stonehollow Dr.
Kingwood, TX 77339
281-358-1805
www.kingwoodgardencenter.com

Maas Nursery
5511 Todville Road Seabrook, Texas 77586 281-474-2488
www.maasnursery.c0m

MD Native Plants
713-628-7575
Ktart2001@yahoo.com – by appointment only

Morning Star Prairie Plants
21107 Pecan Bend - Damon, TX 77430
713- 446-2509
morgy@consolidated.net
–by appointment only

Native American Seed
Junction, Texas 1-800 728-4043
info@seedsource.com
www.seedsource.com

Nelson Water Gardens & Nursery
281-391-4769
1502 Katy Fort Bend Road – Katy 77493
www.nelsonwatergardens.com

New World Botanical 2701 Lone Star Pkwy
Montgomery, Tx 77356
936-689-8751
martinsimonton@gmail.com

Peckerwood Garden
20559 FM 359 Road – Hempstead, TX 77445
976-826-3232 – on open days or by apt only
www.peckerwoodgarden.org

RCW Nurseries
15809 State Highway 249
Houston 77086
281-440-5161
www.rcwnurseries.com

TreesearchFarms
(wholesale only)
7625 Alabonson Road
Houston 77088 713-937-9811
www.treesearchfarms.com

This information sheet was prepared by the Native Plant Society of Texas – Houston Chapter. The nurseries listed above are provided for your information only. The list does not imply endorsement by the Native Plant Society of Texas. If you would like more information about Texas natives, we offer monthly speaker/slide programs, field trips, member newsletter, and books. We meet on the third Thursday of most months.

Contact DKnowlesPE@aol.com for corrections, additions, deletions.

www.npsot.org\Houston

For North, Hill Country, and South Texas please see your regional suppliers for information on plants and seeds availability for your area.

South Texas Region Pollinator Forbs & Milkweed Information

PSJA Jefferson HS Butterfly Garden

Santa Ana NWR Butterfly Demo Gardens

PSJA Bear HS Butterfly Seed Plots and Milkweed Garden

South Texas Region

Your Guide to Butterfly Gardening in the Lower Rio Grande Valley (LRGV)

Plant three nectar plants and three caterpillar food plants that are native to your region. Your garden will then qualifyto join the growing number of NABA Certified Butterfly Gardens, helping to promote and increase butterfly habitat across the country.

Nestled between the Chihuahuan Desert on the west and the Gulf of Mexico on the east in the USDA climate zone 9, the Lower Rio Grande Valley is an area of constraining climatic and biotic influences. Including Starr, Hidalgo, Willacy, and Cameron counties, this area experiences annual rainfall ranges from about 26 inches along the Gulf coast to 17 inches on the western edge of the region.

With an average mean temperature of about 72 degrees and nearly 325 days of sun, the Lower Rio Grande Valley enjoys the longest season in the United States. Temperate and tropic climates meet here, as do the major Mississippi and Central bird flyways.

Annual and Perennial Plants of the LRGV

The following table lists the growing group of plants that have been suggested and reviewed by butterfly gardeners in the LRGV. Check back often, the LRGV Garden Guide is currently under construction. More annuals and perennials will be added to the table below in the coming months.

ENGLISH NAME	SCIENTIFIC NAME	PLANT TYPE	CATERPILLAR FOOD PLANT FOR:
Butterfly Mistflower	*Chromolaena odorata*	perennial	Not a caterpillar food plant
Firewheel	*Gaillarida pulchella*	annual	Not a caterpillar food plant
Heartleaf Hibiscus	*Hibiscus martianus*	perennial	Yojoa Scrub-hairstreak, Mallow Scrub-hairstreak, Gray Hairstreak
Partridge Pe	*Chamaecri sta fasciculata*	annual	Cloudless Sulphur, Sleepy Orange, Little Yellow, Ceraunus Blue, Gray Hairstreak
Texas Toadflax	*Nuttallanthus texanus*	perennial	Common Buckeye
Turkey Tangle Fogfruit	*Phyla nodiflora*	perennial	Common Buckeye, Phaon Crescent, White Peacock

[4] https://www.nationalbutterflycenter.org/butterflies-garden-guide/9-national-butterfly-center/130-naba-s-butterfly-garden-certification-program
[5] https://nationalbutterflycenter.org/butterflies/butterfly-garden-guide/9-national-butterfly-center/121-annual-and-perennial-plants-of-the-lrgv

North Texas Region Pollinator Forbs & Milkweed Information

Myers Park Pollinator Garden – McKinney, TX

UTD Native Garden – University of Texas - Dallas, TX

Gailon Hardin's Pollinator Garden – Arlington, TX

North Texas Region

"Many years ago this site would have been a breathtaking Texas prairie. Today the park is planted once again with native habitat for birds, butterflies and other wildlife. Visitors can experience this state's beautiful natural environment in the center of Dallas."

– Mrs. Laura W. Bush

Sideoats grama
Bouteloua curtipendula

Big Bluestem
Andropogon gerardii

Indian Grass
Sorghastrum nutans

Inland Sea Oats
Chasmanthium latifolium

More plant and Park information can be found in "The Landscapes of the George W. Bush Presidential Center" in the Bookstore.

Silver Bluestem
Bothruichloa *saccharoides*

Switchgrass
Panicum virgatum

Bushy Bluestem
Andropogon glomeratus

NOTES:

Thank you for visiting the Native Texas Park

For more information, or to schedule a group tour call 214-346-1650 or email: bush43visitors@nara.gov

The Park is open 365 days a year, from sunrise to sunset.

Native Texas Park

A native Texas landscape in a 15-acre urban park, the grounds of the Bush Center reflect President George W. Bush and Mrs. Laura Bush's longstanding commitment to environmental conservation and restoration.

Texas Bluebonnet
Lupinus texansis

Scrambled Eggs
Corydalis curvisiliqua

Indian Paintbrush
Castilleja

Pink Evening Primrose
Oenthera speciosa

Information about the ***Monarch Wrangler Program*** *found at texanbynature.org*

Englemann Daisy
Engelmannia peristenia

Clasping Coneflower
Dracopis amplexicaulis

All Photos taken onsite

Indian Blanket
Gaillardia

Welcome to the George W. Bush Presidential Library

The Native Texas Park features:

- Native Blackland Prairie grasses Seasonal wildflowers
- Clearings that provide native habitats for butterflies, birds, and other species
- Tree-shaded lawns
- Amphitheater

A one mile network of paths will take you through native Texas environments such as Blackland Prairie, Post Oak Savannah and Cross Timbers Forest.

North Texas Region

American Basketflower
Centaureaamericana drummondii

Antelope Horns
Asclepias asperula

Turks Cap
Malvaviscus

Bush Sunflower
Simsia calva

Widows Tears
Commelina

Butterfly Weed
Ascelpias

Purple Passionvine
Passiflora

Prairie Parsley
Polytaenia

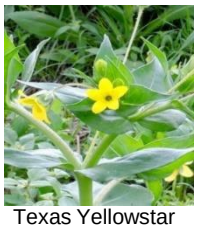
White Prairie Clover
Petalostemon

American Beautyberry
Callicarpa Americana

Prairie Spiderwort
Tradescantia

Foxglove
Penstemon

A few examples of the over 53 varieties of wild-flowers, 36 varieties of grasses, 32 varieties of trees and over 1900 shrubs, trees and plant life in the 22 acres of the Bush Center



Texas Yellowstar
Lindheimera texan

Tall Winecup
Callirhoe leicarpa

Tall Goldenrod
Solidago altissima

Greggs Mistflower
Conclunium

Horsemint
Monarda Citriodora

Standing Cypress
Ipomopsis rubra

Maximillian Sunflower
Helianthus maximiliani

Obedient Plant
Physostegia intermedia

Purple Coneflower
Echinacea purpurea

Spider Lily
Hymenocallis liriosme

Fall Aster
Symphyotrichumoblongifolium

Mealy Blue Sage
Salvia farinacea

Entrance to the Park is on Bush Avenue, please stay on pathways and if you bring 4 legged friends, please pick up after them.[6]

[6] https://www.georgewbushlibrary.smu.edu/Home/Visit/Plan-Your-Museum-Visit/-/media/CAAB7EA9A5804214A70587A91F5E6840.ashx

North Texas Region

A. Pollinator Plants List

Cross Timbers Native Plant List

Species	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Creek plum (*Prunus rivularis*)		■	■									
Mexican plum (*Prunus mexicana*)		■	■	■								
Chickasaw plum (*Prunus angustifolia*)		■	■	■	■							
Pink evening primrose (*Oenothera speciosa*)		■	■	■	■	■	■					
Giant spiderwort (*Tradescantia gigantea*)			■	■								
Green hawthorn (*Crataegus viridis*)			■	■								
New Jersey tea (*Ceanothus americanus*)			■	■								
Sandyland bluebonnet (*Lupinus subcarnosus*)			■	■								
Texas redbud (*Cercis canadensis* var. *texensis*)			■	■								
Blue curls (*Phacelia congesta*)			■	■	■							
Fragrant gaillardia (*Gaillardia suavis*)			■	■	■							
Oklahoma plum (*Prunus gracilis*)			■	■	■							
Possumhaw (*Ilex decidua*)			■	■	■							
Texas bluebonnet (*Lupinus texensis*)			■	■	■							
Texas sage (*Salvia texana*)			■	■	■							
Wild hyacinth (*Camassia scilloides*)			■	■	■							
Huisache daisy (*Amblyolepis setigera*)			■	■	■	■						
Lyreleaf sage (*Salvia lyrata*)			■	■	■	■						
Mexican buckeye (*Ungnadia speciosa*)			■	■	■	■						
Texas verbena (*Verbena halei*)			■	■	■	■						
Winecup (*Callirhoe involucrata*)			■	■	■	■						
Ohio spiderwort (*Tradescantia ohiensis*)			■	■	■	■	■	■				
Zizotes milkweed (*Asclepias oenotheroides*)			■	■	■	■	■	■	■			
Spider milkweed (*Ascelpias asperula*)			■	■	■	■	■	■	■	■		
Engelmann's sage (*Salvia engelmannii*)				■	■							
Prairie penstemon (*Penstemon cobaea*)				■	■							
Berlandier's sundrops (*Calylophus berlandieri* ssp. *pinifolius*)				■	■	■						
Fragrant sumac (*Rhus aromatica*)				■	■	■						
Golden tickseed (*Coreopsis tinctoria*)				■	■	■						
Indigo bush (*Amorpha fruticosa*)				■	■	■						
Lanceleaf coreopsis (*Coreopsis lanceolata*)				■	■	■						
Roughleaf dogwood (*Cornus drummondii*)				■	■	■						
White Barbara's-buttons (*Marshallia caespitosa*)				■	■	■						
Chokecherry (*Prunus virginiana*)				■	■	■	■					
Prickly pear (*Opuntia engelmannii* var. *engelmannii*)				■	■	■	■					
Rose gentian (*Sabatia campestris*)				■	■	■	■					
Green milkweed (*Asclepias viridis*)				■	■	■	■	■				
Missouri evening-primrose (*Oenothera macrocarpa*)				■	■	■	■	■				
Spotted beebalm (*Monarda punctata*)				■	■	■	■	■				
Standing winecup (*Callirhoe digitata*)				■	■	■	■	■				
Texas thistle (*Cirsium texanum*)				■	■	■	■	■				
Desert willow (*Chilopsis linearis*)				■	■	■	■	■	■			
Mealy blue sage (*Salvia farinacea*)				■	■	■	■	■	■	■		
American basket-flower (*Centaurea americana*)					■	■						
Cockspur hawthorn (*Crataegus crus-galli*)					■	■						
Common prickly pear (*Opuntia macrorhiza*)					■	■						
Narrow-leaf coneflower (*Echinacea angustifolia*)					■	■	■					
Purple horsemint (*Monarda citriodora*)					■	■	■					
Firewheel (*Gaillardia pulchella*)					■	■	■	■				
Mexican hat (*Ratibida columnifera*)					■	■	■	■				
Rattlesnake master (*Eryngium yuccifolium*)					■	■	■	■				
Smooth sumac (*Rhus glabra*)					■	■	■	■				
Partridge pea (*Chamaecrista fasciculata* var. *fasciculata*)					■	■	■	■	■			
Halberdleaf hibiscus (*Hibiscus laevis*)					■	■	■	■	■	■		
Texas kidneywood (*Eysenhardtia texana*)					■	■	■	■	■	■		
Leadplant (*Amorpha canescens*)						■	■					
Prairie spiderwort (*Tradescantia occidentalis*)						■	■					
Buttonbush (*Cephalanthus occidentalis*)						■	■	■				
Green milkweed (*Asclepias viridiflora*)						■	■	■	■			
Illinois bundleflower (*Desmanthus illinoensis*)						■	■	■	■			
Prairie sunflower (*Helianthus petiolaris*)						■	■	■	■			
Wooly ironweed (*Vernonia lindheimeri*)						■	■	■	■			
Black-eyed susan (*Rudbeckia hirta*)						■	■	■	■	■		
Gray-golden aster (*Heterotheca canescens*)							■	■	■			
Compass plant (*Silphium laciniatum*)							■	■	■			
Black prairie clover (*Dalea frutescens*)							■	■	■	■		
Common sunflower (*Helianthus annuus*)							■	■	■	■		
Camphorweed (Heterotheca subaxillaris)							■	■	■	■	■	
Narrow-leaf gayfeather (*Liatris mucronata*)								■	■	■		
Pink-scale gayfeather (*Liatris elegans*)								■	■	■		
Frostweed (*Verbesina virginica*)								■	■	■	■	
Hairy sunflower (*Helianthus hirsutus*)								■	■	■	■	
Maximilian sunflower (*Helianthus maximiliani*)								■	■	■	■	
Big blue sage (*Salvia azurea*)									■	■	■	
White boneset (*Eupatorium serotinum*)									■	■	■	

Source: Texas Parks & Wildlife

Hill Country Region Pollinator Forbs & Milkweed Information

Bee Creek Park Butterfly Garden
College Station, TX

Zilker Butterfly Garden
Austin, TX

Downton Butterfly Garden
San Antonio, TX

George H.W. Bush Pollinator Garden – College Station, TX

THE ANN and O.J. WEBER BUTTERFLY GARDEN

Diversity of Plants and Habitats

The Ann and O.J. Weber Butterfly Garden at the Lady Bird Johnson Wildflower Center is designed as a native butterfly habitat to attract and sustain butterflies and other invertebrates. A diversity of plants is used to create a variety of habitat types, including a pond, a marsh, seeps, streambeds, thickets, meadows, woodlands, woodland edges and a rocky knoll.

Paths and Benches

Meandering paths include nine different seating areas where you can sit and quietly observe the activity of pollinators, other invertebrates, birds and occasionally other animals. Additional educational information is available at each bench.

Observing and Learning

Looking for invertebrates can sometimes be easy, as they buzz around the garden. But don't forget to look under leaves, low to the ground, and in pools of water, where many insects are busy aerating soil, nourishing plants with their droppings, or eating dead plant and animal material. Observation can reveal a complex web of life.

Pickerelweed	Pontederiaceae	An excellent nectar source for longer-tongued butterflies.
Plane-Tree	Platanaceae	A minor larval food plant for one of the **FLUTED SWALLOWTAILS**.
Plantain	Plantaginaceae	In the larval menu of some **CHECKERSPOTS**.
Plumbago	Plumbaginaceae	In the larval menu of one of our **BLUES**.
Pokeweed	Phytolaccaceae	Not a major nectar source for butterflies.
Purslane	Portulaceae	A common larval food plant for several butterflies and moths. Not a major nectar source for butterflies.
Rose	Rosaceae	Nectar source for larger butterflies. In the larval menu of some **HAIRSTREAKS, FLUTED SWALLOWTAILS, BRUSHFEET** and **ADMIRALS**.
Rush	Juncaceae	Not a nectar source for butterflies.
Sapodilla	Sapotaceae	Nectar source for small butterflies. Larval food for some moths.
Sedge	Cyperaceae	In the larval menu of many **BRANDED SKIPPERS**.
Soapberry	Sapindaceae	Abundant nectar source for many butterflies. Essential larval food for one **HAIRSTREAK**.
Spiderwort	Commelinaceae	Not a great nectar source for butterflies.
Spurge	Euphorbiaceae	Essential larval food for many **EMPERORS, ADMIRALS**, and **HAIRSTREAKS**.
Sumac	Anacardiaceae	In the larval menu of some **HAIRSTREAKS** and **BLUES**.
True Fern	Polypodiaceae	Spoor producer, so doesn't produce nectar. A few **Geometrid Moths** (inch worms) can handle the toxins and feed on the leaves.
Unicorn-Plant	Martyniaceae	Nectar source for long-tongued butterflies and moths.
Verbena	Verbenaceae	In the larval menu of **CHECKERSPOTS** and other **BRUSHFEET**, some **FLATS**, and **HAIRSTREAKS**. Abundant nectar source for all butterflies.
Violet	Violaceae	In the larval menu of some **FRITILLARIES** and other **BRUSHFEET**.
Walnut	Juglandaceae	In the larval menu of some **HAIRSTREAKS**.
Water plantain	Alismataceae	Not a great nectar producer for butterflies.
Waterleaf	Hydrophyllaceae	A seasonal nectar source for small and medium size butterflies.
Willow	Salicaceae	In the larval menu of some **FLUTED SWALLOWTAILS, ADMIRALS, BRUSHFEET** and **HAIRSTREAKS**.
Wood-Sorrel	Oxalidaceae	In the larval menu of one of our **BLUES**.

Can Flowers Live Without Pollinators?

Pollination is the process where pollen grains (male sex cells) are moved from one flower to another flower's stigma (female sex cell), where seeds will be produced. Some flowers can actually self-pollinate, but this is not too common. Since plants are not able to move, they have evolved two ways to pollinate. Some plants rely on wind to blow their pollen from flower to flower. Most plants rely on animals, who can carry pollen while travelling from plant to plant. This relationship is mutually beneficial to animal and plant. The animal gets protein from eating pollen and the plant is assured of survival. Without pollination, most plants, as well as many of the pollinating animals, would cease to exist.

The most important pollinators are flies, bees, beetles, butterflies and moths. To a much lesser extent, some birds, mammals and reptiles also pollinate many plant species.
Pollination of flowers is essential to keeping an ecosystem healthy and functioning.

Bees

Leafcutter Bee
(*Coelioxys octodentata)*

There are over 200 species of bees in Travis County. The majority are solitary bees that nest by burrowing into soil.
Some are more communal, with several females sharing a nest. Pollen provides the protein that bees need. Bees supplement pollen with nectar, which they often turn into honey. Some bees collect pollen from a wide range of flowers, while others visit specific host plants. Wild bees are generally lumped into two groups: short-tongued and long-tongued. The length of the tongue will have an effect on a bee's choice of flower.

Cactus	Cactaceae	Not a great nectar producer, but visited by many beetles, bees and wasps for pollen.
Caltrop	Zygophyllaceae	Essential larval food for one of our **SULPHURS** and one of our **BLUES**.
Canna	Cannaceae	Essential larval food for some **BRANDED SKIPPERS**.
Caper	Capparidaceae	Essential larval food for some tropical **WHITES**.
Catalpa	Bignoniaceae	Attractive nectar source for larger butterflies.
Citrus	Rutaceae	Essential larval food of some **FLATS** and **FLUTED SWALLOWTAILS**. Nectar source for larger butterflies.
Crowfoot	Ranunculaceae	In the larval menu of one of our common **METALMARKS**.
Cypress	Cupressaceae	Essential larval food for some **HAIRSTREAKS**.
Dogbane	Apocynaceae	Fantastic nectar source for most butterflies. Larval food of some tropical **MILKWEED** butterflies.
Dogwood	Cornaceae	Not a nectar source for butterflies.
Ebony	Ebenaceae	In the larval menu of a few **HAIRSTREAKS** and **BLUES**. Nectar source for small butterflies.
Elm	Ulmaceae	Essential larval food for many **EMPERORS**, all **SNOUTS** and some **BRUSHFEET**.
Evening Primrose	Onagraceae	A minor nectar source mostly for moths at night.
Figwort	Scrophulariaceae	Essential larval food for many **CHECKERSPOTS**. Nectar source for long-tongued butterflies.
Flax	Linaceae	In the larval menu of some **BUCKEYES** and other **BRUSHFEET**.
Gentian	Gentianaceae	A minor nectar source for small butterflies.
Goosefoot	Chenopodiaceae	Larval food for some **FLATS** and **HAIRSTREAKS**.
Gourd	Cucurbitaceae	Not a nectar source for butterflies. Mainly pollinated by beetles.
Grape	Vitaceae	Abundant nectar source for all butterflies. Larval food for some day flying moths.
Grass	Poaceae	Essential larval food for most **BRANDED SKIPPERS** and most of the **SATYRS**.
Holly	Aquifoliaceae	Spring nectar source of small butterflies. In the larval menu of some **FLATS** and moth-like **SKIPPERS** and **HAIRSTREAKS**.
Honeysuckle	Caprifoliaceae	A great nectar source for moths with long tongues and a few **SKIPPERS** and **SWALLOWTAILS**.
Iris	Iridaceae	Not a major nectar source for butterflies. Beetles and wasps eat the pollen.

San Antonio Water System GVST Gardening Volunteers of South Texas

PLANT A BUTTERFLY GARDEN!

By Charles Bartlett, GVST Volunteer

Plant your butterfly garden and help save a butterfly species! A butterfly garden can be a wonderful part of your landscape and will make a meaningful difference by creating habitat for our imperiled butterfly friends. Gardening for butterflies is something anyone who loves growing plants and flowers can do. A garden that is good for butterflies also is good for other pollinators such as bees and hummingbirds who often share the same nectar plants and habitat.

THE FOUR BASIC ELEMENTS OF A BUTTERFLY GARDEN

Monarch butterfly

Butterfly gardening is easy and, like any horticultural endeavor that creates habitat, depends on providing four basic elements.

Flowers and food: Plant a mix of flowers that bloom from the start of spring through fall, and food plants for caterpillars.

Shelter: Leave bare patches of ground, have small brush piles (in unused corners of the yard), and leave the herbaceous plants standing over the winter to protect overwintering eggs and caterpillar pupae waiting to emerge.

Water: A mud puddle is ideal for butterflies providing them with a source of water and salt.

A safe, pesticide-free environment: Don't use chemical insecticides (especially systemic ones), use caution when applying organic pesticides, and use herbicides only for a weed emergency.

A LITTLE BUTTERFLY BIOLOGY

Butterflies and moths have three stages in their life cycles before becoming the flying adult insects we recognize. The mother butterfly lays eggs on preferred food plants.

- The eggs hatch into caterpillars that feed on their food plants. These caterpillars grow to their full size before going dormant as a chrysalis (butterfly) or a cocoon (moth), in preparation for adulthood.
- Then caterpillars go through metamorphosis and emerge as flying adults.
- The adults immediately mate, lay eggs, feed, and die leaving behind the next generation.

Tiger swallowtail, the largest butterfly in North

WHAT'S SO SPECIAL ABOUT MONARCH BUTTERFLIES?

Monarch butterflies (danaus plexippus) populate most of the US and southern Canada. They exist west of the Rocky Mountains, but in smaller numbers. Sightings of Monarchs occur in almost every state.

A monarch's life is intrinsically woven with the milkweed plant, a once common native perennial plant.

Its life begins when a female lays an egg on the underside of the leaf or other part of a milkweed plant.

In three to five days, a very tiny, hungry caterpillar emerges and begins feasting on the milkweed plant.

As the caterpillar grows to full size, it goes through five molts (stages of life) that are each a large step to becoming a butterfly. Each time the caterpillar literally sheds its skin and reforms a larger one. **At the final molt, in about 10-14 days, the caterpillar is a beautiful yellow- green-black striped color about 1 ¾ inches long**. Now the caterpillar wanders from the milkweed plant and finds just the right spot. It spins a pad of silk, and attaches itself, hanging upside down. After many hours, its skin will split to reveal **its translucent green chrysalis that is its home for the next 11-15 days as it takes its final form as a monarch butterfly.**

Once emerging, and after drying its beautiful orange wings, it takes flight to find nectar, its new food. **The monarch butterfly will live from two to six weeks,** during which time it will mate, and begin the cycle again. This cycle may happen from four to five times per summer, four to five generations, and **on the final generation of the summer, called the Super Generation, something really amazing happens. These butterflies, with more densely scaled and slightly larger wings, will live from seven to eight months**.

WHAT TO PLANT?

Often the flowering plants that feed the adult moths and butterflies are different from the plants on which their caterpillars feed. For a butterfly garden, the gardener must plant both types of plants. Most flowers that attract moths and butterflies will feed a wide range of species. When it comes to feeding their caterpillars, butterflies and moths can either have a need for very specific food plants, or have a taste for a wider range of host plants. This depends on the species of each moth and butterfly as they will have different requirements.

- To attract and feed adult butterflies, we need a garden that supplies many months of nectar-rich flowers for a wide range of butterflies.
- Flower shapes that attract butterflies are generally either flat-topped flower spikes with lots of tiny flowers, or cone-type flowers.
- Food plans for caterpillars vary, but widely fed-upon plants include oak, willow, cherry, poplar, apple, dandelions, clover, and dill.
- For widespread migrating species of butterflies like the Monarch, various species of milkweed (Asclepias species) provide both larval food and nectar for adults.

SAWS-RECOMMENDED SPECIAL BUTTERFLY PLANTS

1. **Pride of Barbados**. Heat-loving, drought-resistant shrub to 6' fall. Long blooming season April to December. Butterfly favorite. Deer resistant.
2. **Thryallis**. Drought-resistant, deer-resistant, spectacular yellow flowers for many months. Sun or part shade, 8' tall.
3. **Dwarf Firebush.** Loves summer heat, stands dry conditions, a hummingbird favorite.
4. **Blackfoot Daisy.** Loves hot, dry, well-drained locations. Tends to be evergreen, 1' tall, long-blooming season.

Pride of Barbados

5. **Almond Verbena.** Butterfly magnet, sweet, white flower clusters, good fragrance, tolerates dry conditions well, everygreen, 6'-8' tall, very long blooming season March to December.

Fall-Blooming Aster

6. **Fall-Blooming Aster**. Low-growing evergreen plants, beautiful, lavender flowers. Very drought-resistant, no insect or disease problems. Good nectar source for many butterflies, deer-resistant with very aromatic foliage. Up to 24" tall, the only Aster variety for Texas and the Southwest. Will live for many years in the garden.
7. **Blue Mist Flower**. A butterfly favorite, blooms March to December. Tolerates all soil types, will slowly spread in the garden, prefers full sun locations, drought resistant. A must-have for every butterfly garden.
8. **Frogfruit**. Low, evergreen spreading groundcover, prefers full sun locations. Small white flowers are an excellent nectar source for many butterflies. Leaves are the host plant for several types of butterflies.

9. **Goldenrod**. A fall butterfly magnet, evergreen foliage, dies down to the ground in winter, with a rosette of green foliage, huge clusters of golden flowers in the fall. Loves wet or dry conditions, will slowly spread in the garden, likes all soil types. Cut back by ½ in July to keep plant shorter, with more flowers. Blooms September to December, deer-resistant, a must-have for the butterfly garden. Pollen does not cause allergies.
10. **Damianita**. Loves heat and dry conditions, deer resistant, very long blooming season with tiny yellow flowers, 1 foot tall.
11. **Cowpen Daisy**. Long-blooming yellow composite with beautiful daisy-like flowers, drought-resistant, butterfly nectar source, 4 feet tall, beautiful blue-green foliage.

Green milkweed

12. **Milkweeds**. Many long-lasting varieties, deep-rooted plants tolerate dry conditions well, larvae food hosts for monarchs, a great nectar source for many butterflies, 3-4' tall. Will naturalize in the garden.
13. **Salvia.** Many varieties, excellent nectar source for many types of butterflies, tend to be evergreen in the winter months, very long blooming season March to December, tolerates dry conditions well.
14. **Red Yucca**. Great nectar source for hummingbirds, evergreen plant, very drought-resistant, long blooming season June to December, both pink and yellow flowering forms.
15. **Rosemary**. Evergreen, greatest bloom period in cool seasons and winter, good nectar source for many butterflies, fragrant foliage.
16. **Turk's Cap**. Evergreen shrub, good nectar force for hummingbirds, drought-tolerant, edible red fruit, very long blooming season.
17. **Dwarf Barbados Cherry.** Select dwarf form of plant, edible red fruit, extremely drought tolerant, beautiful pink flowers over a very long blooming season from April to December.
18. **Flame Acanthus.** Favorite nectar source for butterflies and hummingbirds, may lose leaves in a severe winter, tolerates very dry conditions well, a must-have plant for the butterfly garden.
19. **Yaupon Holly.** Beautiful evergreen shrub, male and female plants, choose fruiting type such as "Pride of Houston" for excellent fruit set and colorful berries in the fall and winter, showy white flowers in the spring, drought-tolerant, an excellent specimen plant or hedge.

Yaupon Holly

20. **Redbud Tree.** Early spring bloom, drought-resistant, both pink and white blooming types, excellent early nectar source in the spring.
21. **Texas Persimmon.** Male and female trees, edible black fruit in late summer, drought-resistant, evergreen small tree/bush, very deer-resistant.
22. **Anacacho Orchid Tree.** Long blooming season, tolerates drought, white flowers, distinctive leaves, evergreen with some winter protection. A truly beautiful small flowering tree for every garden site and soil type.[7]

[7] https://texasbutterflyranch.com/wp-content/uploads/2018/05/PLANT-A-BUTTERFLY-GARDEN.pdf

STATEWIDE

Suggested Native Texas Plants for

Habitat Gardens

Wildflowers

Cardinal Flower- likes moisture
Coneflowers
Coreopsis (Tickseed & Lanceleaf)
Spiderwort
Gaillardia
Salvia Azurea, S. Coccinea
Sunflowers
Ratibida (Mexican Hat)
Thistles (Centaura)
Turk's Cap

Medium to Large Size Trees

American Holly
American Sycamore
Cherry Laurel
Drummond Red Maple
Eastern Red Cedar
Hackberry or Sugarberry
Live Oak
Loblolly Pine
Native Pecan (small nuts)
Post Oak
Southern Red Oak
Sweetgum
Water Oak
Willow Oak
White Oak
Magnolia

Small Trees

American Hop Hornbeam (Ironwood)
Carolina Buckthorn
Elderberry
Flowering Dogwood
Farkleberry
Fragrant Sumac
Green Hawthorn
Gum Bumelia (Chittamwood)
Mexican Plum
Possumhaw (Deciduous Yaupon Holly)
Parsley Hawthorn
Pignut Hickory
Rough Leaf Dogwood
Southern Wax Myrtle
Shining Sumac
Black Willow
Yaupon Holly

Shrubs

American beautyberry
Blackberry
Rusty Blackhaw Viburnu
Arrowwood Viburnum
Southern Wax Myrtle (dwarf form available)
Yaupon Holly (dwarf form available)

Vines

Coral Honeysuckle
Crossvine- vigorous growth, bright flowers
Mustang Grape
Riverbank Grape
Carolina Jessamine- yellow
flowers Yellow Passionflower
Maypop Passionflower
Trumpet Creeper- vigorous growth, orange flowers
Virginia Creeper

Grasses

Gulf Coast Muhly Grass- beautiful low grass
Buffalo Grass- turf grass, low water requirements
Indian Grass- tall attractive grass
Inland Sea Oats (does well in shade)
Virginia Wildrye (does well in shade)
Brown seed Paspalum
Eastern Gama Grass- wide and tall

These plants provide great food and habitat for birds, butterflies and other wildlife.
www.npsot.org/houston

STATEWIDE

NATIVE HOST PLANTS FOR SOUTHEAST TEXAS

BUTTERFLIES

Butterfly	Plants
Giant Swallowtail…….	Lime Prickley Ash, Hercules Club, Common Hop Tree
Pipevine Swallowtail……..	Aristolochia species (pipevines) A.erecta, A. reticulata, A. tomentosa
Zebra Swallowtail……	Paw Paw (Asimina triloba, A. parviflora)
Black Swallowtail…….	Apiaceae (Prairie Parsley)
Tiger Swallowtail…….	Ash species, Black Cherry
Spicebush Swallowtail……	Spicebush, Sassafras, Sweetbay Magnolia
Palamedes Swallowtail……..	Red Bay, Sassafras, Sweetbay Magnolia
Cloudless Sulphur, Sleepy Orange	Senna, Partridge Pea
Little Sulphur……	Senna, Partridge Pea, Powderpuff
Soapberry Hairstreak…….	Western Soapberry
Banded Hairstreak……..	Oaks, Hickories, Walnuts
Northern Hairstreak, Horace's Hairstreak	Oak species (Bur, Willow, Water, Swamp Chestnut,
Red Banded Hairstreak……..	Sumacs, Southern Wax Myrtle, Croton, Oaks
Cedar Hairstreak…….	Eastern Red Cedar
Henry's Elfin……	Redbud, Vaccinium, Hollies, Viburnum, Mexican Buckeye
E. Pine Elfin……	Loblolly Pine, Longleaf Pine
Cassius Blue, Marine Blue……	Rattlebox, various legumes
Snout Butterfly…….	Hackberry species
Gulf Fritillary and Variegated Fritillary.	Passion flower (Passiflora incarnata, P. foetida, P.lutea)
Texas Crescent……...	Flame Acanthus, Ruellia, Water Willow
Phaon Crescent……..	Frog Fruit (Phyla incisa)
American Painted Lady, Pearl Crescent	Asteraceae:Asters,Sunflowers,Echinacea,Coreopsis,Eupatorium,Liatris,Rudbeckia
Question Mark…….	Elm, Hackberry species, nettle
Red Admiral…….	Nettle (Urtica), False Nettle (Boemeria)
Painted Lady……	Thistle, Mallows (Malvaceae), Hibiscus, Sida
Buckeye……	Toadflax, Plantain (Plantago), Ruellia
Red Spotted Purple……	Black Cherry, Cottonwood, Hawthorns
Viceroy……..	Willows, Cottonwood, Cherry trees
Hackberry Emperor & Tawny Emporer..	Hackberry species
Little Wood Satyr…….	Various grasses
Monarch and Queen ……..	Asclepiadaceae, Milkweed species
Long Tailed and Spotted Skippers..	Legumes(Acacia,Baptisia,Mimosa,Sesbania,Senna,Sophora,Amorpha)
Dorantes Longtail……	Legumes(Acacia,Baptisia,Mimosa,Sesbania,Senna,Sophora,Amorpha)
Wild Indigo and Funeral Duskywings.	Baptisia, Lupines, Louisiana Vetch, Rattlebush
Common Checkered Skipper……	Sidas, Globe-mallows, other Mallows
Swarthy Skipper……..	Little Bluestem
Clouded and Fiery Skippers…….	Grasses
Broad Winged (Marsh) Skipper…	Sedges, Marsh Millet
Dun Skipper (Sedge Skipper)…...	Sedges Grasses
Eufala and Common Roadside Skippers	

Native Plant Society of Texas – Houston Chapter www.npsot.org/houston

Prepared by Glenn Olsen from these References: Butterflies of Houston: John & Gloria Tveten; Checklist Of The Vascular Plants Of Texas: Hatch, Gandhi, Brown; Butterflies Of North America: John Feltwell; The Milkweed And Its World Of Animals: Ada and Frank Graham; A Textbook Of Entomology: Herbert H. Ross; Manual of Cultivated Plants: L.H. Bailey *This is a partial list; many more native plants are food sources for butterflies & moths.*

STATEWIDE

C: Growing Texas Native Milkweed for the Monarch butterfly

Arizona Milkweed
Asclepias angustifolia
Riparian areas and canyons.

Planting Time: Late Spring - Fall | **Bloom Time:** Year Round (Evergreen)
Flower Color: Cream Pink,White | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" hole | **Light Requirements:** Full-Partial Sun, Half Sun / Half Shade
Soil Type: Dry Rocky Soils | **Soil Moisture:** Drought Tolerant, Low-Water
Ideal Regions: AZ | **Advantages:** Attracts Butterflies

TEXAS POPULAR

Antelopehorns Milkweed
Asclepias asperula
Desert and sandy areas.

Planting Time: Late Spring - Fall | **Bloom Time:** Early Spring - Late Summer (Perennial)
Flower Color: Green, White | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" finger hole | **Light Requirements:** Full Sun
Soil Type: Sandy or Rocky Calcareous Soils | **Soil Moisture:** Well-drained Soil (Dry or Moist Soil)
Ideal Regions: AZ, CA, CO, ID, NE, NM, NV, TX, UT | **Advantages:** Attracts Butterflies

California Milkweed
Asclepias californica
Grassy areas.

Planting Time: Late Spring - Fall | **Bloom Time:** Mid Spring-Mid Summer (Perennial)
Flower Color: Lavender, Pink, White | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Light (Sandy) Soils | **Soil Moisture:** Well-drained soil and can grow in nutritionally poor soil
Ideal Regions: CA | **Advantages:** Bee Friendly, Attracts Butterflies & Birds

Heartleaf Milkweed
Asclepias cordifolia
Rocky slopes.

Planting Time: Fall - Winter | **Bloom Time:** Late Spring - Mid summer (Perennial)
Flower Color: Purple, Lavender, Red | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun, Half Sun / Half Shade
Soil Type: Decomposed Granite, and Rocky Soils | **Soil Moisture:** Drought Tolerant, Low-Water
Ideal Regions: CA, NV, OR | **Advantages:** Deer Resistant, Attracts Butterflies & Birds

Woolly Pod Milkweed
Asclepias eriocarpa
Clay soils and dry areas.

Planting Time: Late summer - Early Winter | **Bloom Time:** Late Spring - Mid Fall (Perennial)
Flower Color: Pink, White, Cream | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Clay Soils | **Soil Moisture:** Drought Tolerant, Low-Water
Ideal Regions: CA | **Advantages:** Attracts Butterflies

Desert Milkweed
Asclepias erosa
Desert regions.

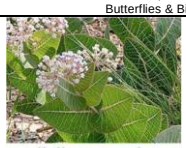
Planting Time: Late Spring - Fall | **Bloom Time:** Mid Spring - Mid Fall (Perennial)
Flower Color: Cream, White-Yellow | **Mature Plant Size:** Up to 48" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Dry granite, sand, or clay soils with low organic content | **Soil Moisture:** Drought Tolerant, Low-Water
Ideal Regions: AZ, CA, NV, UT | **Advantages:** Attracts Butterflies

Poke Milkweed
Asclepias exaltata
Woodland areas (except in NE, KS, MO, ND & SD).

Planting Time: Late Spring - Fall | **Bloom Time:** Late Spring - Late Summer (Perennial)
Flower Color: White | **Mature Plant Size:** Up to 72" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun, Half Sun / Half Shade
Soil Type: Clay Soil, Drought/Dry Soil, Moist/Wet Soil | **Soil Moisture:** Dry, Average, Moist/Wet, Well Draining
Ideal Regions: AL, CT, DE, GA, IA, IL, IN, KY, MA, MD, ME, MI, MN, MS, NC, NH, NJ, NY, OH, PA, RI, SC, TN, VA, VT, WI, WV | **Advantages:** Deer Resistant, Attract Butterflies, Bee Friendly, Native

Mexican Whorled Milkweed
Asclepias fascicularis
Dry climates and plains.

Planting Time: Late Spring - Fall | **Bloom Time:** Late Spring - Mid Fall (Perennial)
Flower Color: White, Pink, Green, Purple | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Clay Soils | **Soil Moisture:** Dry, Moist (Drought Resistant)
Ideal Regions: CA, ID, NV, OR, UT, WA | **Advantages:** Attracts Butterflies, Bee Friendly



Sandhill/Pinewoods Milkweed
Asclepias humistrata
For use in some regions of FL.
Dry sandy areas and soils.

Planting Time: Late Spring - Fall | **Bloom Time:** Mid Spring - Mid Summer (Perennial)
Flower Color: White, Pink | **Mature Plant Size:** Up to 18" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Dry, Sand Soils | **Soil Moisture:** Dry (Tolerates Hot Temperaturea)
Ideal Regions: AL, FL, GA, LA, MS, NC, SC | **Advantages:** Attracts Butterflies, Bee Friendly

TEXAS POPULAR

Swamp Milkweed
Asclepias incarnata
Damp, marshy areas.

Planting Time: Early Spring | **Bloom Time:** Late Spring - Early Fall (Perennial)
Flower Color: Pink | **Mature Plant Size:** Up to 60" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun, Half Sun / Half Shade
Soil Type: Clay Soil, Sandy Soil, Loamy Soil, Moist/Wet Soil | **Soil Moisture:** Average, Moist/Wet
Ideal Regions: AL, AR, CO, CT, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MT, NC, ND, NE, NH, NJ, NM, NV, NY, OH, OK, PA, SD, TN, TX, UT, VA, VT, WI, WV, WY | **Advantages:** Deer Resistant, Hummingbirds & Butterflies, Native

Zizotes Milkweed
Asclepias oenotheroides
Sandy/rocky prairies and fields.

Planting Time: Late Spring - Fall | **Bloom Time:** Late Winter - Mid Fall (Perennial)
Flower Color: Green | **Mature Plant Size:** Up to 48" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Sandy, dry soils | **Soil Moisture:** Dry
Ideal Regions: AZ, CO, LA, NM, OK, TX | **Advantages:** Attracts Butterflies

TEXAS POPULAR

Aquatic Milkweed
Asclepias perennis
Hydrated soils.

Planting Time: Late Spring - Fall | **Bloom Time:** Mid Spring - Early Fall (Perennial)
Flower Color: White, Some Cream Pink | **Mature Plant Size:** Up to 24" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun, Part Shade
Soil Type: Moist , Wet | **Soil Moisture:** Consistent Moist Soil
Ideal Regions: AL, AR, FL, GA, IL, IN, KY, LA, MO, MS, SC, TN, TX | **Advantages:** Attracts Birds& Butterflies, Bee Friendly,

Showy Milkweed
Asclepias speciosa
Savannahs and prairies.

Planting Time: Late Spring - Fall | **Bloom Time:** Late Spring - Early Fall (Perennial)
Flower Color: Pink, White | **Mature Plant Size:** Up to 48" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Clay Soil, Sandy Soil, Loamy Soil, Moist/Wet Soil | **Soil Moisture:** Average, Well Draining
Ideal Regions: AZ, CA, CO, IA, ID, IL, KS, MI, MN, MT, ND, NE, NM, NV, OK, OR, SD, TX, UT, WA, WI, WY | **Advantages:** Attract Butterflies, Bee Friendly, Native

Rush Milkweed
Asclepias subulata
Desert areas.

Planting Time: Late Spring - Fall | **Bloom Time:** Year Round (Evergreen)
Flower Color: Cream-White, Cream-Yellow | **Mature Plant Size:** Up to 72" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun / Part Sun
Soil Type: Sandy, Rocky and Dry | **Soil Moisture:** Low Water Needs, Drought resistant
Ideal Regions: AZ, CA, NV | **Advantages:** Attracts Butterflies

Common Milkweed
Asclepias syriaca
Well drained soils.

Planting Time: Late Spring - Fall | **Bloom Time:** Early to Late Summer (Perennial)
Flower Color: Pink | **Mature Plant Size:** Up to 72" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Loamy Soil, Moist/Wet Soil | **Soil Moisture:** Average, Moist/Wet
Ideal Regions: AL, AR, CT, DC, DE GA, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NY, OH, OK, OR, PA, RI, SC, SD, TN, TX, VA, VT, WI, WV | **Advantages:** Deer Resistant, Attract Butterflies, Attract Birds, Bee Friendly, Rabbit Resistant, Fragrant, Native, Multiplies / Naturalizes

TEXAS POPULAR

Butterfly Weed
Asclepias tuberosa
Well drained soils.

Planting Time: Late Spring - Fall | **Bloom Time:** Mid Spring - Early Fall (Perennial)
Flower Color: Yellow | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Sandy Soil, Loamy Soil, Drought/Dry Soil | **Soil Moisture:** Dry, Average, Well Draining
Ideal Regions: AL, CT, DC, DE, FL, GA, IL, IN, KY, MA, MD, ME, MS, NC, NH, NJ, NY, OH, PA, RI, SC, TN, VA, VT, WV | **Advantages:** Deer Resistant, Attract Butterflies, Attract Hummingbirds, Attract Birds, Bee Friendly, Rabbit Resistant, Native

White Milkweed
Asclepias variegata
Thickets and Woodlands.

Planting Time: Late Spring - Fall | **Bloom Time:** Late Spring - Mid Summer (Perennial)
Flower Color: White, Purple | **Mature Plant Size:** Up to 48" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun / Part Shade
Soil Type: Sandy to Rock | **Soil Moisture:** Dry
Ideal Regions: AL, AR, CT, DC, DE GA, IL, IN, KY, LA, MD, MO, MS, NC, NY, OH, OK, PA, SC, TN, TX, VA, WV | **Advantages:** Attracts Butterflies

Whorled Milkweed
Asclepias verticillata
Prairies and open areas.

Planting Time: Late Spring - Fall | **Bloom Time:** Mid Spring - Late Summer (Perennial)
Flower Color: White | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun, Half Sun / Half Shade
Soil Type: Clay Soil, Drought/Dry Soil | **Soil Moisture:** Dry, Average, Well Draining
Ideal Regions: AL, AR, AZ, CT, DC, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, MI, MN, MO, MS, MT, NC, ND, NE, NJ, NM, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, WV, WY | **Advantages:** Deer Resistant, Hummingbirds & Butterflies, Native

Woolly Milkweed
Asclepias vestita
Dry deserts and plains.

Planting Time: Late Spring - Fall | **Bloom Time:** Mid Spring - Mid Summer (Perennial)
Flower Color: Cream, Yellow | **Mature Plant Size:** Up to 36" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun
Soil Type: Mountain, Desert, or Valley | **Soil Moisture:** Dry (Summer-Fall), Moist (Winter-Spring)
Ideal Regions: CA | **Advantages:** Bee Friendly, Attracts Butterflies, Deer Resistant

TEXAS POPULAR

Green Antelopehorn Milkweed
Asclepias viridis
Dry areas and prairies. Also known as green milkweed.

Planting Time: Late Spring - Fall | **Bloom Time:** Mid Spring - Late Summer (Perennial)
Flower Color: Pink, Green | **Mature Plant Size:** Up to 24" Tall
Planting Depth: 1/4" to 3/4" Hole | **Light Requirements:** Full Sun, Half Sun / Half Shade
Soil Type: Clay Soil, Drought/Dry Soil, Moist/Wet Soil | **Soil Moisture:** Dry, Average, Moist/Wet, Well Draining
Ideal Regions: AL, AR, FL, GA, IL, IN, KS, KY, LA, MO, MS, NE, OH, OK, SC, TN, TX WV | **Advantages:** Deer Resistant, Attract Butterflies, Bee Friendly, Native

STATEWIDE

D. How to Plant Milkweed Guide

Stems

Butterfly Weed, Whorled Milkweed and Common Milkweed should all be spaced about 18” apart. However, Swamp Milkweed eventually forms clumps up to 3’ across. So, plant Swamp Milkweed and its cultivars between 30” and 36” apart.

Planting Milkweed:

1. Loosen the soil where you will be planting (about two feet in diameter).
2. Make a planting hole that is twice the diameter of the pot.
3. Place your milkweed in the hole without disturbing the roots and tamp soil around the root ball.

Note: Water well.

Seeds

In the wild, milkweed plants scatter their seeds quite late in the season—at a time when the coming cold would kill any seedlings that germinated right away. But the seeds of milkweeds (and other plants that flower late in the season) are cleverly programmed to delay their germination until after they have been exposed to winter’s cold followed by gradually rising temperatures in springtime—an adaptation known as stratification. When Milkweed seed is direct-sown in the fall, stratification will happen naturally over the winter.

Copy this technique at home by scratching your milkweed seed directly into the soil in the fall. Then, next year in early summer, keep a sharp lookout for those newly emerging seedlings and water them regularly until they are well established.

However, if you really need to start your seeds in the spring, first you must break their dormancy by mimicking nature’s stratification. So, before planting, wrap the seeds in a damp paper towel, seal inside a plastic bag, and leave it in the refrigerator for several weeks. Then plant the seeds in regular potting soil.

Planting Milkweed:

1. Seed should be sown as soon as possible in loose soil after shallow cultivation.
2. Lightly cover with soil and water well.
3. Seeds should sprout in 1-2 weeks.

STATEWIDE

Monarch Watch: Plant List

Common Name	Latin Name		N	P	A	B	BF	BFh	HB	M-A IN	M-A C	MW	GL	NE
Butterfly Host Plants for small to medium sized landscapes		**Host Plant for**												
Asters	*Aster spp. & Symphyotrichum spp.*	Pearl crescent	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Bearberry (Kinnikinnick)	*Arctostaphylos uva-ursi*	Hoary elfin	✓	✓		✓		✓	✓			✓	✓	✓
Bronze fennel	*Foeniculum vulgare*	Black swallowtail		✓				✓		✓	✓	✓	✓	✓
Bulbous bittercress	*Cardamine bulbosa* (Spring cress)	Falcate orange-tip	✓	✓		✓		✓		✓	✓	✓	✓	✓
Butterfly weed	*Asclepias tuberosa*	Monarch	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Clovers	*Trifolium spp.*	Eastern tailed blue, Gray hairstreak, sulphur spp.		✓		✓	✓	✓		✓	✓	✓	✓	✓
Common milkweed	*Asclepias syriaca*	Monarch	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
False nettle	*Boehmeria cylindrica*	Red admiral	✓	✓				✓		✓	✓	✓	✓	✓
Flat-topped white aster	*Doellingeria umbellata*	Harris' checkerspot	✓	✓		✓	✓	✓		✓		✓	✓	✓
Globe thistle	*Echinops ritro* (not a true thistle)	Painted lady		✓		✓	✓	✓		✓	✓	✓	✓	✓
Golden alexanders	*Zizia aurea*	Black swallowtail	✓	✓		✓		✓		✓	✓	✓	✓	✓
Narrow-leaved plantain	*Plantago lanceolata*	Baltimore checkerspot		✓				✓		✓	✓	✓	✓	✓
Passion vine	*Passiflora incarnata*	Variegated fritillary	✓	✓		✓		✓		✓	✓	✓		
Pearly everlasting	*Anaphalis margaritacea*	American painted lady	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Pipevines	*Aristolochia spp.*(incl. VA snakeroot)	Pipevine swallowtail	✓	✓				✓		✓	✓	✓	✓	✓
Prairie milkweed	*Asclepias sullivantii*	Monarch	✓	✓		✓	✓	✓	✓			✓	✓	
Purple false foxglove	*Agalinis purpurea*	Common buckeye	✓	✓		✓		✓		✓	✓	✓	✓	✓
Purple milkweed	*Asclepias purpurascens*	Monarch	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Pussytoes	*Antennaria spp.*	American painted lady	✓	✓		✓		✓		✓	✓	✓	✓	✓
Saltmarsh false foxglove	*Agalinis maritima* (Seaside gerardia)	Common buckeye	✓	✓				✓			✓			✓
Sheep sorrel	*Rumex acetosella*	American copper		✓				✓		✓	✓	✓	✓	✓
Spicebush	*Lindera benzoin*	Spicebush swallowtail	✓	✓		✓		✓		✓	✓	✓	✓	✓
Sundial lupine	*Lupinus perennis*	Frosted elfin, Karner blue	✓	✓		✓		✓	✓		✓		✓	✓
Swamp milkweed	*Asclepias incarnata*	Monarch	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
T														✓
Violets	*Viola spp.*	Great spangled fritillary	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
White turtlehead	*Chelone glabra*	Baltimore checkerspot	✓	✓		✓		✓		✓	✓	✓	✓	✓
Wild blue indigo	*Baptisia australis*	Wild indigo duskywing	✓	✓		✓		✓		✓	✓	✓	✓	✓
Wild senna	*Senna hebecarpa*	Sulphur species (several)	✓	✓		✓		✓		✓	✓		✓	✓
Wingstem	*Verbesina alternifolora*	Summer azure	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Woodland sunflower	*Helianthus divaricata*	Silvery checkerspot	✓	✓		✓	✓	✓		✓	✓		✓	✓
Woody Butterfly Host Plants for larger areas		**Host Plant for**												
American holly	*Ilex opaca*	Henry's elfin	✓	✓		✓		✓			✓			
Atlantic white cedar	*Chamaecyparis thyoides*	Hessel's hairstreak	✓	✓				✓			✓			✓

Key: N=native, P=perennial, A=annual, B=attracts bees, BF=attracts butterflies, BFh=butterfly host, HB=attracts hummingbirds, M-A= Mid-Atlantic region (IN=Inland/C=Coastal Plain), MW=Midwest region, GL=Great Lakes region, NE=New England region. Common plant names that are in **bold type** are "must-haves" for beginner gardeners-- they are easy to find and grow and are all-round good pollinator plants.
Please note: The plants that are considered average garden plants, annuals, or non-native species are generally checked in all regions, even though they may not be native to them, since they will typically grow anywhere if planted in a garden situation.

[8] https://www.monarchwatch.org/garden/plant-list-monarchwatch.pdf

Monarch Watch: Plant List Cont.

Common Name	Latin Name		N	P	A	B	BF	BFh	HB	M-A		MW	GL	NE
										IN	C			
Beach plum	*Prunus maritima*	Red-spotted purple, Coral hairstreak	✓	✓		✓	✓	✓			✓			✓
Birch	*Betula spp.*	White admiral, Compton's tortoiseshell, Tig. swallowtail	✓	✓				✓				✓	✓	✓
Black Locust	*Robina pseudoacacia*	Silver-spotted skipper	✓	✓		✓		✓		✓	✓	✓	✓	✓
Black willow	*Salix nigra*	Viceroy, Mourning cloak	✓	✓				✓		✓	✓	✓	✓	✓
Blueberry	*Vaccinium spp.*	Brown elfin	✓	✓		✓		✓		✓	✓		✓	✓
Dogwood	*Cornus spp.*	Spring azure, Summer azure	✓	✓		✓		✓		✓	✓	✓	✓	✓
Eastern redbud	*Cercis canadensis*	Henry's elfin	✓	✓		✓		✓		✓		✓	✓	
Eastern red-cedar	*Juniperus virginiana*	Olive Juniper hairstreak	✓	✓				✓		✓	✓	✓	✓	✓
Elm	*Ulmus spp.*	Question marks and Commas	✓	✓				✓		✓	✓	✓	✓	✓
Hackberry	*Celtis occidentalis*	American snout, Tawny and Hackberry emperors	✓	✓				✓		✓	✓	✓	✓	
Pawpaw	*Asimina triloba*	Zebra swallowtail	✓	✓				✓		✓	✓	✓	✓	
Pines	*Pinus strobus, P.taeda, P.virginiana*	Eastern pine elfin	✓	✓				✓		✓	✓			✓
Sassafras	*Sassafras albidum*	Spicebush swallowtail	✓	✓		✓		✓		✓	✓	✓		
Tulip poplar	*Liriodendron tulipifera*	Eastern tiger swallowtail	✓	✓		✓		✓		✓	✓		✓	
Wild black cherry	*Prunus serotina*	Red-spotted purple, Coral hairstreak	✓	✓		✓		✓		✓	✓	✓	✓	✓
Nectar Plants for Butterflies & Other Pollinators														
Spring to early Summer:		**Comments**												
Allegheny monkeyflower	Mimulus ringens		✓	✓		✓			✓	✓	✓	✓	✓	✓
Bride's feathers	*Aruncus dioicus* (Goat's beard)		✓	✓		✓				✓	✓		✓	✓
Candytuft	*Iberis amara, I. umbellata*				✓	✓	✓			✓	✓	✓	✓	✓
Chives	*Allium schoenoprasum*	attracts cabbage whites		✓		✓	✓			✓	✓	✓	✓	✓
Coastal sweet pepperbush	*Clethra alnifolia*		✓	✓		✓	✓		✓		✓			✓
Coral bells	*Heuchera sanguinea*		✓	✓					✓	✓	✓	✓	✓	✓
Cranesbill	*Geranium spp.*	also biennial species	✓	✓	✓	✓				✓	✓	✓	✓	✓
Early saxifrage	*Saxifraga virginiensis*		✓	✓		✓	✓			✓	✓		✓	✓
Eastern red columbine	*Aquilegia canadensis*		✓	✓		✓			✓	✓	✓	✓	✓	✓
Foamflower	*Tiarella cordifolia*		✓	✓		✓	✓			✓	✓		✓	✓
Foxglove beardtongue	*Penstemon digitalis*		✓	✓		✓			✓	✓	✓	✓	✓	✓
Golden Alexanders	*Zizia aurea*		✓	✓		✓				✓	✓	✓	✓	✓
Lilac	*Syringa spp.*	shrub		✓		✓	✓		✓	✓	✓	✓	✓	✓
Lyreleaf sage	*Salvia lyrata*		✓	✓		✓	✓		✓	✓	✓	✓		
Pincushion flower	*Scabiosa spp.*			✓		✓	✓		✓	✓	✓	✓	✓	✓
Pinks (Sweet William)	*Dianthus spp.*	biennial				✓	✓		✓	✓	✓	✓	✓	✓
Siberian wallflower	*Cheiranthus allionii*	also biennial species		✓		✓	✓			✓	✓	✓	✓	✓

[9] https://www.monarchwatch.org/garden/plant-list-monarchwatch.pdf

Monarch Watch: Plant List Cont.

Common Name	Latin Name		N	P	A	B	BF	BFh	HB	M-A		MW	GL	NE
										IN	C			
Spring beauty	*Claytonia virginica*		✓	✓		✓	✓			✓	✓	✓	✓	✓
Trailing arbutus	*Epigaea repens*		✓	✓		✓	✓			✓	✓		✓	✓
Viburnum	*Viburnum spp.*	shrub	✓	✓		✓				✓	✓	✓	✓	✓
Virginia bluebells	*Mertensia virginica*		✓	✓		✓	✓		✓	✓	✓		✓	✓
White wild indigo	*Baptisia alba*		✓	✓		✓						✓	✓	
Wild bleeding heart	*Dicentra eximia*		✓	✓		✓			✓	✓	✓		✓	
Wild blue phlox	*Phlox divaricata*		✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Wild petunia	*Ruellia humilis*		✓	✓		✓	✓		✓	✓	✓	✓	✓	
Summer to early Autumn:		**Comments**												
Ageratum	*Ageratum houstonium 'Blue Horizon'*				✓	✓	✓			✓	✓	✓	✓	✓
Anise hyssop	*Agastache rugosa or feniculum*	exceptional bee plant	✓	✓		✓	✓			✓	✓	✓	✓	✓
Azure blue sage	*Salvia azurea*		✓	✓		✓	✓					✓	✓	
Bigfruit Evening Primrose	*Oenothera macrocarpa*		✓	✓		✓			✓			✓		
Blue mistflower	*Conoclinium coelestinum*	spreads quickly	✓	✓		✓	✓			✓	✓	✓	✓	
Blue salvia	*Salvia farinacea*				✓	✓	✓		✓	✓	✓	✓	✓	✓
Blue vervain	*Verbena hastata*	tolerates soggy soil	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Borage	*Borago officinalis*	exceptional bee plant			✓					✓	✓	✓	✓	✓
Brazilian verbena	*Verbena bonariensis*	succumbs to powdery mildew			✓	✓	✓			✓	✓	✓	✓	✓
Butterfly bush	*Buddleia davidii Flutterby series –only plant male sterile varieties*	shrub; non-sterile varieties can be invasive		✓		✓	✓		✓	✓	✓	✓	✓	✓
Calico beardtongue	*Penstemon calycosus*		✓	✓		✓			✓			✓	✓	✓
Cardinalflower	*Lobelia cardinalis*		✓	✓			✓		✓	✓	✓	✓	✓	✓
Catmint	*Nepeta siberica*			✓	✓	✓	✓			✓	✓	✓	✓	✓
Cobaea beardtongue	*Penstemon cobaea*		✓	✓		✓			✓			✓		
Common boneset	*Eupatorium perfoliatum*		✓	✓		✓	✓			✓	✓	✓	✓	✓
Common buttonbush	*Cephalanthus occidentalis*	shrub	✓	✓		✓	✓			✓	✓	✓	✓	✓
Cosmos	*Cosmos sulphureus 'Cosmic Red' 'Cosmic orange'*	use single-flowered varieties			✓	✓	✓			✓	✓	✓	✓	✓
Culver's root	*Veronicastrum virginicum*		✓	✓		✓	✓			✓	✓	✓	✓	✓
Egyptian starclusters	*Pentas lanceolata 'Ruby Glow'*	some cultivars lack nectar			✓		✓		✓	✓	✓	✓	✓	✓
Fewleaf sunflower	*Helianthus occidentalis*		✓	✓		✓	✓			✓		✓	✓	
Globe amaranth	*Gomphrena haageana 'QIS Orange'*	orange and hot pink best			✓	✓	✓			✓	✓	✓	✓	✓
Great blue lobelia	*Lobelia siphilitica*		✓			✓			✓	✓	✓	✓	✓	✓
Hairy beardtongue	*Penstemon hirsutus*		✓			✓			✓	✓	✓		✓	✓
Indian blanket	*Gaillardia aristata* (Blanket flower)		✓			✓	✓			✓	✓	✓	✓	✓
Joe-Pye weed	*Eutrochium spp.*	short cultivars have nectar	✓	✓		✓	✓			✓	✓	✓	✓	✓
Lanceleaf Tickseed	*Coreopsis lanceolata*		✓			✓	✓			✓	✓	✓	✓	✓
Lantana	*Lantana camara*	any color works			✓	✓	✓		✓	✓	✓	✓	✓	✓

[10] https://www.monarchwatch.org/garden/plant-list-monarchwatch.pdf

Monarch Watch: Plant List Cont.

Common Name	Latin Name		N	P	A	B	BF	BFh	HB	M-A		MW	GL	NE
										IN	C			
Larkspur	*Delphinium spp.*	both native and non-native	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
Lavender	*Lavandula spp.*	attracts cabbage whites		✓		✓	✓			✓	✓	✓	✓	✓
Meadowsweet	*Spirea latifolia*	shrub	✓	✓		✓	✓			✓	✓		✓	✓
Mexican blue sage	*Salvia chamaedryoides*				✓	✓	✓		✓	✓	✓	✓	✓	✓
Mexican flame vine	*Senecio confuses 'Sau Paulo'*	tropical vine, long growing season requried for bloom			✓	✓	✓			✓	✓	✓		
Mexican sunflower	*Tithonia rotundifolia 'Torch', 'Fiesta Del Sol'*				✓	✓	✓			✓	✓	✓	✓	✓
Mexican zinnia	*Zinna angustifolia 'Crystal Orange'*	resistant to powdery mildew			✓	✓	✓			✓	✓	✓	✓	✓
Michigan lily	*Lilium michiganense*		✓	✓		✓	✓		✓			✓	✓	
Milkweed	*Asclepias spp.*	a must-have!	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Mountainmint	*Pycnanthemum spp.*	spreads quickly	✓	✓		✓	✓			✓	✓	✓	✓	✓
New Jersey tea	*Ceanothus americanus*	shrub	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
New York ironweed	*Vernonia novaboracensis*		✓	✓		✓	✓			✓	✓			✓
Pale purple coneflower	*Echinacea pallida*		✓	✓		✓	✓					✓	✓	
Pinnate prairie coneflower	*Ratibida pinnata*		✓	✓		✓	✓					✓	✓	
Prairie blazing star	*Liatris pycnostachya*		✓	✓		✓	✓					✓	✓	
Prairie Ironweed	*Vernonia fasciculata*		✓	✓		✓	✓					✓	✓	
Purple coneflower	*Echinacea purpurea*		✓	✓		✓	✓			✓	✓	✓	✓	
Red salvia	*Salvia splendens*	also called Scarlet sage			✓				✓	✓	✓	✓	✓	✓
Rose mock vervain	*Glandularia canadensis*		✓	✓		✓	✓					✓	✓	
Saliva 'Indigo spires'	*Saliva longispicata x farinacea*	exceptional bee plant			✓	✓	✓		✓	✓	✓	✓	✓	✓
Scarlet beebalm	*Monarda didyma* (Oswego tea)		✓	✓			✓		✓	✓	✓	✓	✓	✓
Spider flower	*Cleome hassleriana*				✓		✓	✓	✓	✓	✓	✓	✓	✓
Spotted beebalm	*Monarda punctata* (Horsemint)	exceptional bee plant	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Stiff goldenrod	*Oligoneuron rigidum*		✓	✓		✓	✓			✓	✓	✓	✓	
Tall blazing star	*Liatris aspera*		✓	✓		✓	✓					✓	✓	
Texas sage	*Salvia coccinea*				✓		✓		✓	✓	✓	✓	✓	✓
Tickseed	*Coreopsis spp.*		✓	✓		✓	✓			✓	✓	✓	✓	✓
Trumpet (coral) honeysuckle	*Lonicera sempervirens*	Not invasive; can train on arbor; can prune to shape	✓	✓					✓	✓	✓	✓	✓	✓
White doll's daisy	*Boltonia asteroides* (False aster)	Gets big; give lots of space	✓	✓		✓	✓			✓	✓	✓	✓	✓
White wood aster	*Eurybia divaricata*		✓	✓		✓	✓			✓	✓			✓
Wild bergamot	*Monarda fistulosa*	spreads quickly	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
Wild petunia	*Ruellia humilis*		✓			✓	✓		✓	✓	✓	✓	✓	
Wild rose	*Rosa virginiana, R. maritima*	plant native species only; shrub	✓	✓		✓				✓	✓	✓	✓	✓
Zinnia	*Zinna elegans 'Profusion Orange, Fire, Apricot'*	resistant to powdery mildew; use any single-flowered var.			✓	✓	✓			✓	✓	✓	✓	✓
Autumn Plants:		**Comments**												
Autum sage	*Salvia greggii*			✓		✓	✓		✓	✓	✓	✓	✓	✓

[11] https://www.monarchwatch.org/garden/plant-list-monarchwatch.pdf

Monarch Watch: Plant List Cont.

Common Name	Latin Name		N	P	A	B	BF	BFh	HB	M-A		MW	GL	NE
										IN	C			
Blue mist spirea	*Caryopteris 'Dark Knight'*	shrub		✓		✓			✓	✓	✓	✓	✓	✓
Calamint	*Calamintha grandiflora*	can be invasive		✓		✓	✓			✓	✓	✓	✓	✓
Chrysanthemums	*C. leucanthemum 'Sheffield Pink' and 'Bolero'*	very late-blooming for late migrating monarchs		✓		✓	✓			✓	✓	✓	✓	✓
Cigar plant	*Cuphea ignea*				✓				✓	✓	✓	✓	✓	✓
Climbing hempweed	*Mikania scandens*	vine; coastal migrant monarchs	✓	✓		✓	✓				✓			✓
Common sneezeweed	*Helenium autumnale*		✓	✓		✓	✓			✓	✓	✓	✓	✓
Crowned beggarticks	*Bidens coronata*	any cultivar will work	✓		✓	✓	✓			✓	✓	✓	✓	✓
Eastern baccharis	*Baccharis halimifolia* (Groundsel tree)	shrub; excellent for coastal migrating monarchs	✓	✓		✓	✓				✓			
New England aster	*Symphyotrichum novae-angliae*	good monarch attractant	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Purple-stemmed aster	*Symphyotrichum puniceum*		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Salt marsh fleabane	*Pluchea purpurascens*	coastal migrant monarchs	✓	✓		✓	✓				✓			
Seaside goldenrod	*Solidago sempervirens*	A must-have; fuels coastal migrant monarchs	✓	✓		✓	✓				✓		✓	✓
Sedum	*Sedum 'Autumn Joy', 'Autumn fire'*			✓		✓	✓			✓	✓	✓	✓	✓
Smooth beggartick	*Bidens laevis*	coastal migrant monarchs	✓		✓	✓	✓			✓	✓	✓	✓	✓
Smooth blue aster	*Symphyotrichum laeve*		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓
Tartarian aster	*Aster tartaricus 'Jindal'*	late bloom for monarchs		✓		✓	✓	✓		✓	✓	✓	✓	✓
White heath aster	*Symphyotrichum ericoides*		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓

I wish to thank Denise Gibbs and Ilse Gebhard (Monarch Conservation Specialists) for providing lists of plants for their regions, and Margarete Johnson (Master Gardener) and Elliott Duemler (Applied Ecological Services) for providing useful insights on the value of these plants to monarchs, other butterflies and pollinators.

[12] https://www.monarchwatch.org/garden/plant-list-monarchwatch.pdf

Tropical Milkweed—A No-Grow

By Justin Wheeler on 19. April 2018

Milkweed is in demand, and that demand has been filled in recent years by tropical milkweed, a non-native species. But is planting tropical milkweed potentially doing more harm than good?

Tropical milkweed (*Asclepias curassavica*) is a non-native milkweed that has exploded in popularity in response to the demand for milkweed. It is simple to propagate, allowing growers to rapidly produce the plant for quick sale. The plant is also attractive, both to humans and monarchs, providing flowers and lush green foliage throughout the growing season – and that's a problem.

Tropical milkweed becomes a problem when planted in temperate areas where it does not die back in winter. A protozoan parasite of monarch butterflies*Ophryocystis elektroscirrha*or OE for short, can travel with monarchs visiting the plants and become deposited on leaves. When caterpillars hatch and start eating the plant, they ingest the OE. High OE levels in adult monarchs have been linked to lower migration success in the eastern monarch population, as well as reductions in body mass, lifespan, mating success, and flight ability.

When native milkweeds die back after blooming, the parasite dies along with them so that each summer's monarch population feeds on fresh, parasite-free foliage. In contrast, tropical milkweed that remains evergreen through winter allows for OE levels to build up on the plant over time, meaning successive generations of monarch caterpillars feeding on the plant can be exposed to dangerous levels of OE.

Tropical milkweed can also interfere with monarch migration and reproduction. When grown in northern areas, where it can grow later in the year than native species, the presence of tropical milkweed may confuse monarchs into breeding at a time when they should be migrating. In California, where this milkweed is widely planted, it can be growing near overwintering sites along the coast and may spur monarchs to breed when they should be overwintering.

With tropical milkweed so readily available, what's a gardener to do? Some advice has suggested plants can be cut back to the ground twice during the growing season to limit the spread of disease, and that plants should be removed late in summer so as not to interfere with migration. In practice however, we've found it's been a hard-sell to get anyone to cut back plants that are actively supporting monarch eggs or caterpillars, or remove lush plants in full flower.

Climate Change Could Make Matters Worse

In addition to the concerns over OE and disruption of migration behavior, emerging research suggests that tropical milkweed may actually become toxic to monarch caterpillars when the plants are exposed to the warmer temperatures associated with climate change. Under these conditions, tropical milkweed produces higher cardenolide concentrations. Monarch caterpillars are tolerant of these chemicals in fact, cardenolides are the very compound that protects the monarch from predation. But when the cardenolide concentrations are high enough, not even monarch caterpillars can withstand them. In contrast, native swamp milkweed (*A. incarnata*) has naturally lower cardenolide levels, and when used as a control in the study mentioned above, it did not exhibit the same radical changes in toxicity as tropical milkweed.

Another climate change consideration is that tropical milkweed is often sold as an annual in places where it is expected to die back in winter. With climate change warming our winters, tropical milkweed may begin sailing through winter in places it wouldn't have in years past, carrying OE along with it.

While milkweed is needed in large numbers to support and expand the monarch butterfly population, we do not recommend planting tropical milkweed, and further suggest milkweed of any species not be planted within 5–10 miles of monarch overwintering sites in California.

How You Can Help

1. Use our regional milkweed guides to identify milkweed native to your area, or if you live in the west, visit the Western Monarch Milkweed Mapper to identify the milkweed that's best for the west.
2. Use our milkweed seed finder to locate plants and seed, and visit our project milkweed page to learn more about growing milkweed.
3. As an alternative to tropical milkweed, consider planting orange butterflyweed (*Asclepias tuberosa*) if it is native to your area. It has a similar habit as tropical milkweed and the same bright orange colors.

4. Share this fact sheet from Monarch Joint Venture with your garden club, local nursery, friends, and neighbors to spread the word about the dangers of planting tropical milkweed.
5. While several varieties of milkweed have become more available to the nursery trade in recent years, native milkweed can still be hard to find. Share this fact sheet with local growers, farmers, and nurseries to encourage them to grow and sell native milkweed.

Tropical milkweed (*A. curassavica*, left) can be difficult to distinguish from orange butterflyweed (*A. tuberosa*, right). Orange butterflyweed is also a low-growing milkweed with bright orange flowers that is native across much of North America. (Photo, Left: Justin Lebar / Wikimedia Creative Commons; Photo, Right: Joshua Mayer / Flickr Creative Commons)

Resources

Q&A about tropical milkweed – From Monarch Joint Venture.

Tropical Milkweed Fact Sheet – From Monarch Joint Venture – this is a great resource to share with nurseries and gardening friends that covers the issues of planting tropical milkweed.

Growing and Selling Native Milkweed Fact Sheet – Also from Monarch Joint Venture, this approachable fact sheet that introduces the reasons and resources for growing native milkweed.

Milkweed: A Conservation Practitioner's Guide – A comprehensive guide to farming milkweed. Contains extensive information about propagation, pests, diseas control, and other considerations.

Regional Milkweed Guides – A series of regional guides to the native milkweeds of North America, developed in cooperation with the USDA Natural Resources Conservation Service.

Western Monarch Milkweed Mapper, milkweed directory – A community science effort tracking monarch breeding habitat across the west, the site has a comprehensive list of milkweeds found in western states.

Harvesting Milkweed Seed: a Pod and a Plan – Information about harvesting your own milkweed seed.

The 2017 Perennial Plant of the Year, and Other Milkweeds You Should Know – get to know orange butterflyweed, and other milkweeds commonly available.

Loss of migratory behaviour increases infection risk for a butterfly host (Satterfield et al., 2015).

Climate change and an invasive, tropical milkweed: an ecological trap for monarch butterflies (Faldyn et al., 2018).

Authors

Justin Wheeler

Xerces Contributor

Justin was formerly the Xerces Society's Web and Communications Coordinator, managing the website, blogs, and social media. As a Penn State Extension Master Gardener, Justin provides education and outreach to his community on a range of gardening-related subjects such as sustainable and pollinator-friendly gardening practices. He lives in State College, Pennsylvania.

Tel: (855) 232-6639

Main Office: 628 NE Broadway, Ste. 200, Portland, OR 97232 USA • Mailing Address for Donations: P.O. Box 97387, Washington, D.C. 20090-7387

BEWARE:

There May Be Invasive Plants in Your Backyard

Help Stop the Spread of America's Worst Weeds

The Nature Conservancy is asking Americans to check their yards and gardens for plants that can escape cultivation and cause tremendous
damage to the natural environment and the local economy.
Plants such as privet, Japanese honeysuckle, pittosporum, eleagnus, ligustrum, nandina, Chinese tallow, kudzu and Chinese wisteria have been used widely in horticulture and landscaping and can be found in backyards and business lots across the region. At first glance these plants may look pretty, but their beauty is deceptive. Known as invasive species, plants like these are typically transplants from distant places. Once free from the natural checks and balances in their native habitats, these alien invaders establish themselves in new areas and quickly spread out of control. They hoard light, water and nutrients, and can alter entire ecosystems by displacing native species, altering fire regimes and changing soil chemistry.

With intentional and unintentional assistance from people, these problematic plants are spreading at an alarming rate, infecting natural areas across the United States.
"Keeping invasive plants out of America's backyards helps the environment and the economy," said Steve McCormick, president of The Nature Conservancy. "Taking the time to remove invasive plants and replace them with non-invasive varieties is a great example of bringing new energy to the old adage: think globally, act locally."
Because many invasive plants are spread by unsuspecting gardeners, it is important to learn about invasives before shopping at local nurseries. Check websites such as www.invasive.org for the latest on invasives. This site lists the worst invasive plants for each region of the country. If you see one of these plants at your local nursery, do not buy it, and talk to the nursery owner about discontinuing its sale. It is important to control invasives and prevent them from destroying natural ecosystems.

Texas has many beautiful native trees and flowers that look stunning in a garden setting and do not add to the invasives problem. Information about many natives can be found at www.npsot.org. and http://aggie-horticulture.tamu.edu/ornamentals/natives/tamuhort.html. Native plants are right at home in Texas' soils and climate, so they require less watering and fertilization to thrive.On the national level, The Nature Conservancy is working with nursery and horticulture groups to identify invasives that might voluntarily be removed from the market. "Nursery growers, landscape designers and others who make their career in horticulture have become increasingly concerned with the problems related to invasive plants," said Wayne Mezitt, board member and past president of the American Nursery & Landscape Association (ANLA), and owner of Weston Nurseries in Massachusetts. "We see our role as educators, helping our customers and the public, as well as fellow nursery folk across the country, understand how invasive plants impact them."

The threat posed by invasive species – both plant and animal – to the survival of native species is exceeded only by the threat of habitat loss. *The cost to the national economy is estimated as high as $137 billion per year, due primarily to losses in agriculture, forestry and fisheries, as well as the cost of clearing invasive-clogged waterways and fighting invasive-fueled fires.*

You can help stop the introduction and spread of invasive species. Help protect native plants and animals by following these six easy guidelines:

1. **Verify** that the plants you are buying for your yard or garden are **not invasive**. Replace invasive plants in your garden with non-invasive alternatives. Nonnative plants that reproduce can become invasive.
2. When boating, **clean** your boat thoroughly before transporting it to a different body of water.
3. Clean your boots before you hike in a new area to get rid of **hitchhiking weed** seeds and pathogens.
4. Don't "**pack a pest**" when traveling. Fruits and vegetables, plants, insects and animals can carry pests or become invasive themselves.
5. **Don't release** aquarium fish and plants, live bait or other exotic animals into the wild.
6. Volunteer at your local park, refuge or other wildlife area to help **remove invasive species**. Help **educate** others about the threat.

This page has been prepared from Nature Conservancy publications and is presented by the Native Plant Society of Texas-Houston Chapter. www.npsot.org\houston

INVASIVES Q&A

Native Plant Society of Texas- Houston Chapter
www.npsot.org
Information from http://www.nature.org/wherewework/northamerica/states/arkansas/files/invasivesqa.pdf

QUESTION: What is an invasive species?
ANSWER: Invasive species are those plants, animals and other organisms that are introduced into new areas, where, free from their natural competitors, they are able to proliferate and persist to the detriment of the native environment. Impacts from invasive species may include widespread harm to the environment, the economy and human health.

QUESTION: What is a non-native plant?
ANSWER: This depends on where you are. In the USA, we usually define non-native plants as those which have arrived since the time of European contact. But on closer inspection, the issue is actually much more complicated. For example, humans may transplant USA species to regions outside of their native range, but which are still within the USA. For example, a California poppy growing in Alabama would be considered a non-native plant.

QUESTION: Are all invasive species non-native?
ANSWER: Not always. Occasionally a native plant may start acting like an invasive species. Usually this is because of some human-caused habitat change. One example would be a change in water quality because of agricultural runoff; another might be the abnormal suppression of fire. In these situations, fixing the underlying environmental problem would be the best solution.

QUESTION: Why not just let them be?
ANSWER: If the weeds do not harm the native biodiversity, we do not expend our precious resources of money, staff, and volunteers in fighting them. But if the non-native plants harm native plants and animals, we are compelled to take action. If we did nothing, we would decrease the effectiveness of our work.

QUESTION: How do weeds harm native plants and animals?
ANSWER: Thick growths of non-native weeds can displace the native plants that once provided food and shelter for the native animals. As weed populations rise, native species populations fall. The worst weeds even change the character of the entire habitat by changing important processes like fire, nutrient flow, flooding, etc.

QUESTION: How do invasive species behave in their native lands?
ANSWER: In their native habitats, these species are quite often found in small, well-behaved populations. This is because they occur with other organisms that keep the plant populations in balance. It is not until the species are removed from their habitat that their invasive characters emerge.

QUESTION: Are all invasive species plants?
ANSWER: No. In fact, some of the worst invasive species are animals. The effects of zebra mussels, feral pigs, and many other non-plant invaders are devastating to native biodiversity.

QUESTION: Why do these invasive plant species explode in population?
ANSWER: Recall that the invaders are usually non-native species. Free from the herbivores and parasites which keep them in check in their native range, they reproduce rapidly. They increase their numbers, unfettered by natural controls. They displace the native plants. When the populations of native plants are reduced, the animals that depend upon them may perish. The functions of the entire ecosystem are disrupted. Invasive species are truly a form of biological pollution.

QUESTION: Doesn't the addition of a non-native species increase biodiversity (i.e. species diversity)?
ANSWER: Yes, if you are only concerned about the number of species in the short term. No, if you want to maintain the natural array species unique to an area. Consider, for example, the rosy wolfsnail of the southeastern USA. This was introduced by humans to Hawai'i, Mauritius, and other islands in the Pacific and Indian Oceans.

Global biodiversity did not benefit by this introduction. The rosy wolfsnail began killing native snails. Ultimately, it was responsible for driving to extinction dozens of snail species. Both local and global biodiversity suffered.
Invasive species are usually existing perfectly well in their native lands. Introducing them to new habitats does them no good, and risks the integrity of native ecosystems.

QUESTION: Plants move around naturally---isn't the arrival of new plants a natural process? ANSWER: It is true that plants do change their ranges, usually over periods of thousands of years. We are not concerned with these slow changes. The invasions we are worried about are the ones that humans have caused, and which are resulting in the suffering in our native biodiversity.

QUESTION: What is the solution the problem of invasive plants, particularly those that can be found in yards in gardens?
ANSWER: The solution is a combination of removing invasive plants, preventing new introductions, and restoring native habitats. The survival of native species depends upon our actions.[13]

[13] https://www.wildflower.org/archive/TWC_Brochures/butterfly_booklet.pdf

The New York Times https://www.nytimes.com/2022/07/21/climate/monarch-butterflies-endangered-iucn.html

Monarch Butterflies Are Endangered, Leading Wildlife Monitor Says

Researchers cited climate change and habitat loss. But they also said the public can help give the insects a boost.

By Catrin Einhorn

July 21, 2022

North America's monarch butterfly, whose showy looks and extraordinary migration have made it one of the continent's most beloved insects, has been classified as endangered by the International Union for Conservation of Nature, the world's most comprehensive scientific authority on the status of species.

The decision comes after decades of falling populations driven by losses in the plants they need as caterpillars and in the forests where adults spend the winter, combined with climate change, the assessment found. The authors reviewed about 100 studies, interviewed experts and applied criteria from the group's Red List of Threatened Species to come up with their decision.

"It's been so sad to watch their numbers decline so much, so anything that might help them makes me happy, and I think that this designation might help them," said Karen Oberhauser, a conservation biologist at the University of Wisconsin who has studied monarchs for more than 35 years and contributed to the assessment. "Although it's sad that they need that help, that they've reached the point where this designation is warranted."

The numbers of Western monarchs, which live west of the Rocky Mountains, plummeted by an estimated 99.9 percent between the 1980s and 2021. While they rebounded somewhat this year, they remain in great peril. Eastern monarchs, which make up most of the population in North America, dropped by 84 percent from 1996 to 2014. The new designation of endangered covers both populations.

In 2020, U.S. wildlife officials found that monarchs were threatened with extinction but declined to add them to the endangered species list because they said conservation of other species took priority.

Monarch caterpillars depend on milkweed, the only plants they can eat. After leaving their overwintering grounds, which for most monarchs are concentrated in just a few hectares of forest in central Mexico, females deposit eggs on milkweed plants from Texas to as far north as Canada in a multigenerational journey.

Habitat destruction in those Mexican forests was an early threat, said Anna Walker, an entomologist with the New Mexico BioPark Society who led the assessment. The Mexican government stepped in, creating a reserve in 1986 and expanding it in 2000. While concerns remain over illegal logging and disease, that conservation work has helped, she said, stemming the loss of overwintering habitat quite effectively.

But a new problem came along, the assessment noted: American farmers turned to crops that were genetically modified to withstand glyphosate, a herbicide that is used in the weed killer Roundup.

"Glyphosate was suddenly sprayed over vast acreage of farm in the Midwest," Ms. Walker said. "That took out a lot of the milkweed plants that the monarch caterpillars rely on."

Then there's climate change, which worsens storms, droughts and other such events that can be catastrophic for the already vulnerable populations. Hot dry spring seasons in the south are of special concern to monarch experts. Add to that broader questions about climate change disrupting ancient cycles, such as when plants sprout.

"We're starting to see this kind of mismatch between when insects are ready to start the spring and when plants are ready," Ms. Walker said. "There are a ton of unknowns."

A recent study complicated the picture, finding that summer monarch abundance had declined in some areas while increasing in others, perhaps in part because warmer weather in northern areas were actually helping monarchs thrive in those regions. But even those authors indicated that any silver lining could be short-lived, warning that "accelerating climate change may bring growing threats."

The Red List decision limits the endangered listing to migratory monarchs, which applies to those in North America. It came out of the group's first assessment of these butterflies. The broader species includes a nonmigratory variety in the Caribbean and from southern Mexico into northern South America.

The North American monarchs' migration is considered one of the natural world's wonders: tiny insects flying thousands of miles north over the course of a few generations and back in just one generation, with single butterflies flying perhaps more than 2,500 miles.

Monarch experts are eager to enlist the public's help in saving the species. Their message: Plant milkweed that's native to your region, which probably means avoiding tropical milkweed (it can do more harm than good, especially in the South). Swamp milkweed is an attractive, easy-to-grow variety native to all but the most western areas of the contiguous United States. That's for the egg-laying and

caterpillars. The butterflies need nectar, so plant native flowers that bloom when monarchs are in your area.

Dr. Oberhauser credits such interventions with helping stabilize population numbers in recent years.

“We’re holding our own at a number that’s not quite sustainable,” she said. “But if we didn’t have all of these efforts on the part of a lot of different organizations and individuals, I think the numbers would be even lower.”

The latest I.U.C.N. Red List update also held bad news for sturgeons: All surviving species are now at risk of extinction, up from 85 percent of species in 2009. The Yangtze sturgeon, a fish from China, has gone from critically endangered to extinct in the wild.

Tiger numbers, on the other hand, showed a 40 percent increase since the previous assessment, which the organization attributes to better counting combined with stabilized or increasing numbers.

Emily Anthes contributed reporting.

Visit our site

For more information visit:
http://houstonwilderness.org/mfs

Houston Wilderness
1334 Brittmoore Rd, Suite 2084
Houston, TX 77043
Phone: 713-524-7330
Email: info@houstonwilderness.org

Other HW Facilitated Websites

Gulf-Houston Regional Conservation Plan
www.GulfHoustonRCP.org

The Great Green Quest
http://houstonwilderness.org/ggq

Facebook: ***https://www.facebook.com/HoustonWilderness/***
Twitter: ***www.twitter.com/houwilderness***