

Fluttering Through Gardening

Creating a Butterfly Habitat



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There are many reasons to start a butterfly garden in your backyard or on your windowsill.

The four main goals of a butterfly garden are:

1. Planting gardens is environmentally sound and helps bring plants and flowers back into populated, urban areas.
2. Bringing native plants back into your local area, as these are often driven out by commercial and foreign varieties in many homes and gardens.
3. Helping to preserve many species of butterflies that are threatened by the ongoing destruction of their habitat.
4. Enjoying some of nature's most beautiful creatures by attracting them and nurturing them around your home.

Butterflies can identify their favorite plants from miles away and travel for hours to taste the nectar of the flowers. They will lay eggs and remain nearby as long as you tend to your garden, keeping it healthy and blooming. In fact, you will be surprised to learn that the butterflies will probably arrive within only a few hours of the season's first flowers! It isn't difficult to make your backyard home to dozens at a time, giving you hours of enjoyment and helping the environment at the same time.

Even a planter attached to the windowsill can bring you several butterflies at a time.

They may live nearby in a park or on a neighborhood tree and use your flower box as their primary source of food, dropping by for a snack several times a day. With the right selection of flowers, you may even be surprised to find a few caterpillars as well!



Butterfly Garden in a Pot

Butterflies are always welcome visitors in the garden. They fly in, sip a little nectar, then fly on. You can encourage them to stay, however, by growing plants that both butterflies and caterpillars like to eat. And now you can invite them onto the deck or patio as well. Make a container garden "restaurant" just for them! Here's how:



Materials:

- A large container or pot at least 18" in diameter (a terra-cotta pot is used here)
- Butterfly bush (*Buddleia*, Zones 5-10)
- Lantana (*Verbenaceae sp.* Zones 3-9)
- Blue fescue (*Festuca ovina* 'Glauca,' Zones 3-9)
- Parsley (Zones 1-11)
- Sweet alyssum (*Lobularia maritime*, Zones 1-11)

Steps:

1. Begin with the buddleia, the largest plant. Tap the bottom of its container to loosen it, and then pull it free.
2. Fluff or scrape the roots to loosen them from the root ball; this will allow them to expand after transplanting instead of continuing to grow in a circle as they did in the pot.
3. Position the buddleia along one edge of the large pot and nestle it into the soil. Pack the soil in firmly around the plant.
4. Continue planting the remaining plants around the edge of the pot, working from largest to smallest. (Be sure to pack soil firmly around each plant.) Angle them outward for a bushy, cascading look.
5. Wait for the plants to bloom, then watch for butterflies!

Patio Gardening for Butterflies

In my butterfly garden, I like to keep some plants in pots on my patio and lining the driveway. These are the ones that I have had the most success in attracting butterflies with:

- Lobelia (*Lobelia siphilitica*)
- Verbena (*Verbena bonariensis*)
- Daisy Fleabane (*Erigeron annuus*)
- Globe Amaranth (*Gomphrena globosa*)
- Heliotrope
- Lantana
- Marigold
- Mint
- Mist Flower (Wild Ageratum) (*Eupatorium coelestinum*):.
- Radishes: These attract cabbage white butterflies and their caterpillars.
- Rue, Parsley, and Fennel: A host plant for black swallowtail butterflies.
- Tickseed Sunflower (*Bidens coronata*)



Butterflies and Veggies

Q. I have a small, urban backyard (approx. 50' x 60'), and I want to develop a small butterfly garden and a small vegetable garden in different areas of the yard. Will the veggie garden become a "restaurant" for the caterpillars?

A. Many gardeners successfully grow a very wide variety of plants in close proximity to a butterfly garden. One easy solution is to plant a few extra of the larvae's favorites. Keep in mind that butterfly gardens do very often include plants that serve as a larval food source (i.e., caterpillar bait) as well as including plants that serve as nectar sources for the butterflies themselves. In general, you might find caterpillars of the more attractive butterflies on, say, parsley, fennel and dill; tomato hornworms turn into sphinx moths; and of course, cabbage butterflies come from cabbage loopers. You can exclude loopers by covering susceptible veggies with lightweight row covers--and you would probably want to do that because loopers are nearly everywhere even without butterfly gardens. Butterflies are very specific in terms of what they eat, and luckily not that many of them eat vegetables on a regular basis. As you research the butterflies in your area and look into butterfly garden plants, you will find that a wide variety of plants can be used.

Creating a Butterfly Garden

In a nutshell the basic design elements are:

- Sunny locations (at least 6-hours per day)
- Shelter from wind
- Nectar-rich blooms
- Host plants where they can lay eggs
- Moist sand or mud for 'puddling'
- Flat rocks or other light colored flat surfaces for basking

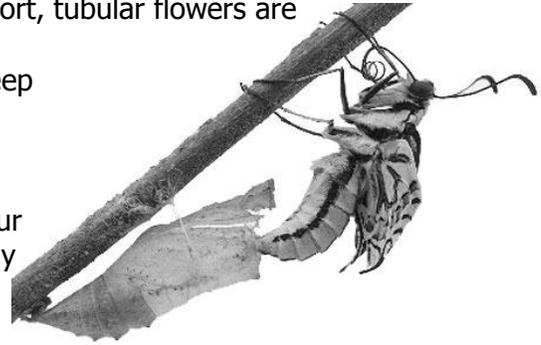
When planning your garden, don't forget a nice observation spot for yourself so you can enjoy the results of your work!

Add plants that will support the various stages in a butterfly's life:

- Egg - two days
- Caterpillar - two weeks
- Pupa (chrysalis applies to the butterfly, cocoon becomes a moth) - two weeks
- Adult - two weeks to two months

Butterfly Gardening Tips

1. Do not use pesticides and herbicides
 - a. Most kill butterflies, caterpillars and beneficial insects.
 - b. Harmful insects quickly become immune.
 - c. Predatory insects and birds will control pests, given time. They may sometimes snack on your butterflies and caterpillars, but you can protect caterpillars by hand-raising them in a cage or enclosed area.
2. Choose a sunny, protected area
 - a. An area receiving at least 5 to 6 hours of sun daily is preferable.
 - b. Most plants favored by butterflies prefer sun to partial shade.
 - c. Butterflies need shelter from strong winds.
3. Plant nectar flowers for adult butterflies
 - a. Choose perennials and annuals so that some butterfly favorite will be blooming from early spring through late fall.
 - b. Plant large areas of one plant species or one color.
 - c. Native plants are usually preferred.
 - d. Choose single or semi-double blooms over highly double flowers; extremely fancy blooms generally have less nectar, and it is more difficult for butterflies to obtain.
 - e. Flat-topped blossoms or clusters of short, tubular flowers are favorites.
 - f. Deadhead (cut off dead blooms) to keep plants flowering abundantly.
4. Plant host plants for butterfly caterpillars
 - a. You'll be able to observe life cycles.
 - b. Female butterflies will be drawn to your garden and encouraged to stay and lay eggs.
 - c. Without plants for caterpillars, there would be no butterflies.
 - d. Larvae do eat leaves and flowers of host plants but don't usually kill the plants, as so few caterpillars survive more than a few days. Chewed foliage may be unsightly, so screen host plants from main viewing area. Be sure you've planted enough to support the growing caterpillars.
 1. A special host plant: The caterpillar of the monarch butterfly eats only the leaves of the butterfly weed, so you'll want to plant some butterfly weeds in your garden to make certain these butterflies have a food source. It takes a year or two for these perennials to establish themselves in a garden. Once they do, they'll form a plant mass about three feet tall and two feet wide, and they'll be covered with bright orange flowers. Adult monarchs and a host of other butterflies are attracted to the flowers for their nectar. (Don't confuse the butterfly weed (*Asclepias tuberosa*) with butterfly bush (*Buddleia* sp.), a completely different plant.)
 2. Another perennial that attracts both adult butterflies and their caterpillars is sedum. The sedum is a primary food source for the caterpillar of the variegated fritillary. There are many varieties of sedum, from low-growing groundcovers to taller plants. 'Autumn



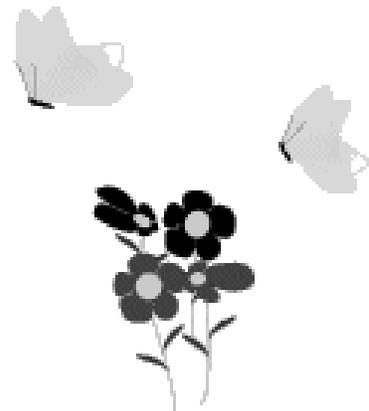
Joy' grows to about two feet tall, and in the late summer it bears clusters of flowers that start out pink and slowly turn coppery-red. This sedum is a drought-tolerant, easy-to-grow plant that's a great addition to any perennial border.

5. Provide water
 - a. Butterflies will drink from shallow puddles and dew on leaves.
 - b. They will also drink and "puddle" on damp or muddy areas.
6. If space is limited, try planting butterfly-attracting flowers in containers, window boxes or hanging baskets.
7. Provide rocks or bare soil to allow butterflies to bask in the sun.
8. Research before planting
 - a. Host plants need to be for larvae of butterflies found in your area.
 - b. Determine if flowers/plants prefer dry or moist conditions, full or partial sun, acid or alkaline soil, etc.
 - c. Plants grow; don't place potentially large shrubs/trees where they will block sunlight from smaller flowers.
 - d. Start with a few of the butterflies' favorite flowers.
 - e. Observe plants in the wild, in gardens of others, in parks and at plant nurseries to find what grows well and attracts butterflies.
9. Butterfly gardens attract other wildlife, primarily birds and bees.
 - a. Bees rarely sting when feeding.
 - b. Use common sense when working in the garden around bees.
 - c. Butterfly gardens do not attract rats; rodents go where they can find food.
10. Be patient! It may take butterflies more than one growing season to find your new garden.

To have a successful butterfly and hummingbird garden, consider several things before planting.

Location

- Most butterflies prefer to rest and feed in full sunshine, so the ideal place would have six or more hours of daily sunlight in June.
- If the site is grassy, remove the grass first. Tilling may work, but some grasses, such as Bermuda and centipede, can sprout by the millions from the chopped-up pieces. You may need to use a contact herbicide.
- Picture how you and others will view the garden and the butterflies. Putting larger plants to the rear and smaller plants up front makes sense. So does putting a butterfly feeding dish or birdbath where you can easily see it.
- Ready access to water will make watering and watching more convenient. A small bench or chair nearby will make the butterfly garden a great morning or evening resting spot.



Soil Preparation

- The single most important thing you can do for your garden is prepare the soil. Use a shovel or tiller to turn it up 12 inches deep over the entire area.
- Add several bushels of compost, rotted pine bark or manure. Then till again until the soil is loose. Your plants will thrive in well-drained soil with lots of organic matter.

Avoid Pesticides

- Anything used to kill bugs won't be good for a butterfly garden.
- One way to control pests is to gently wash the bugs off plants with a pressure nozzle on the garden hose. Many will drown. Insect predators will eat others on the ground.
- Do this in the morning, when bugs are active, to let the foliage dry before night. A few chewed leaves is a small price to pay for your butterflies' health.

Maintenance

- Fertilize your garden the day you plant it or clean it up after winter, around March 15. Evenly sprinkle about 1 pound of 10-10-10 for every 100 square feet of soil surface.
- Fertilize again in late May and again in mid-June. Don't get fertilizer on the flowers and leaves. It will burn them.
- Water thoroughly after fertilizing and often during dry spells. Weed occasionally, and remove spent flowers to keep more flowers coming.

After Frost

- After a killing frost, let your plants dry down naturally. Around Thanksgiving, or Christmas if we have a warm fall, cut your butterfly bush and 'Miss Huff' *Lantana* stems to 6 inches high.
- With your lawn mower blade on high (3 inches or so), mow everything but the butterfly bush, lantana and other woody shrubs. It's best if you use a mulching blade.
- Leave the debris on the ground, and cover it with an inch or two of fresh pine straw. Mound leaves around the *Lantana* and butterfly-bush trunks.

Spring Replanting

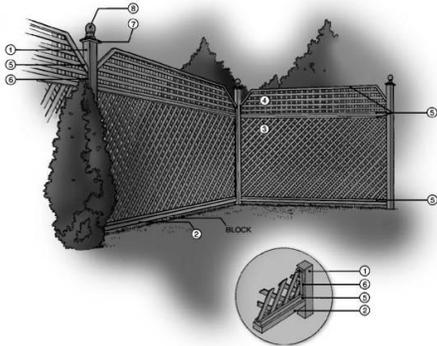
- Around May 1, scrape away mulch where you want new butterfly plants and install them as you did your first planting.
- Return the mulch and pine straw to the freshly planted area, and fertilize your whole garden. Water in the fertilizer thoroughly, and weed occasionally, as needed.
- Fertilize twice more, on May 21 and June 15. Don't fertilize again after July 1. Freshly planted perennials may need extra care.



- Scout your garden daily for problems and to enjoy the myriad of butterflies and other life that will come.

A Privacy Screen

These elements provide a subtle sense of privacy to this landscape:



- Latticework provides a sense of enclosure and partial privacy. You can simply nail the lattice to the outside of the posts, but for a more finished look on both sides, install the lattice between the posts. Parrott uses channeled lumber (made specifically for latticework) to create frames.
- Sweet olive, an evergreen shrub that will eventually reach 20 feet in height, helps anchor each side of the latticework and tie it to the landscape. The shrub gets its name from the fragrant flowers borne in late winter. Sweet olive does best in Zones 7 to 10. In colder climates, you could use evergreen hollies or small conifers to get the same effect.
- To anchor the far corner of the garden, Parrott plants a 'Little Gem' magnolia. 'Little Gem' will top out at 20-25 feet tall and has fragrant white flowers in summer. An evergreen, it keeps its dark green, leathery leaves year-round. 'Nellie R. Stevens' holly or Canadian hemlock would give the same anchoring effect without flowers.
- Wax myrtles also help anchor the planting bed. An excellent screening plant, it can be trained as a tree or a shrub. It does well in full sun or part shade and thrives in almost any soil condition.

Host Plants

Butterfly gardening involves planning your garden to attract, retain, and encourage butterfly populations. (See Figure 1) Flowers of similar colors grouped together are more attractive to both butterflies and the gardener.

You should select a variety of nectar-producing plants with the aim of providing flowers in bloom throughout the season. This will entice a continuous succession of new visitors to a yard. It is especially important to have flowers in mid to late summer, when most butterflies are active. Flowers with multiple florets that produce abundant nectar are ideal.

Annuals are wonderful butterfly plants because they bloom continuously through the season, providing a steady supply of nectar. Butterflies visit perennial plants, such as coneflowers, lilac, butterfly weed, and asters, regularly. Most plants in the mint family are also good nectar sources for butterflies. Avoid double flowers because they are often bred for showiness, not nectar production.

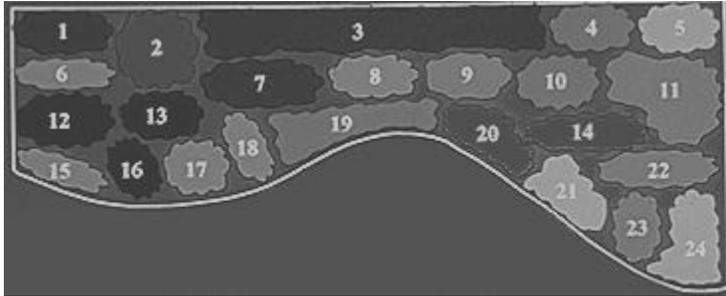
You can supplement the garden's flower nectar with a homemade feeder. Made from an inverted baby food or other small jar, such a feeder can be attractive to butterflies. Drill a small hole in the center of the lid and plug it with cotton. Fill the jar with a solution of one part sugar (not honey) to nine parts water. Attach brightly colored



fabric petals to the lid to make the feeder more appealing to butterflies. Hang your feeder in a tree near your garden.

For successful butterfly gardening, you need to provide food for more than the adult butterflies. You need to provide for their caterpillar forms as well. Butterfly caterpillars have a limited host range. Most caterpillars feed on leaves; although some develop on the reproductive parts of flowers or seeds.

Figure 1. A sample butterfly border garden has a large variety of host plants.



1. Purple coneflower
2. Dill
3. Hollyhock
4. Joe-Pye weed
5. Globe centaurea

6. Peony
7. Turtlehead
8. Swamp milkweed
9. Yarrow
10. Queen Anne's lace

11. Tawny daylily
12. 'Marine' heliotrope
13. Gayfeather
14. Butterfly weed
15. Petunia
16. Mountain bluet
17. Annual aster
18. 'Autumn Joy' sedum
19. Rock cress
20. French marigold
21. 'Happy Returns' daylily
22. Blanket flower
23. Nasturtium
24. Goldenrod

Habitats

Successful butterfly gardening includes more than providing larval host plants and nectar sources. It includes planning appropriate habitats for these useful and beautiful creatures. For instance, shelter is important to butterflies for a number of reasons. Butterflies prefer to feed and lay eggs in sheltered areas, where they will not be cooled by nor have to fight wind gusts.

A row of shrubs or trees can make a dual-purpose windbreak if plants that also provide food for moths or butterflies are selected. Place tall plants at the back and the sides of the butterfly garden for additional protection.

Consider keeping a bowl of wet sand or creating a mud puddle in your garden to encourage butterfly puddling.



Reduced Use of Pesticides

One of the most important conservation decisions we can make is to avoid the use of broad spectrum pesticides sprayed all around the yard. Instead, use more benign spot treatments on plants troubled with pest insects. For pest insects use alternative control methods such as oils, soaps, and microbial insecticides such as *Bacillus thuringiensis* (Bt). Remember that oils and soaps still kill caterpillars if sprayed directly on them and that they also will die if they feed on plants treated with a Bt formulation that is toxic to them.

Most butterfly species, such as the Tiger Swallowtail (*Papilio glaucus*), lay only a few eggs at a time. This low level of insect population will not kill shrubs or trees. However, Black Swallowtail (*Papilionidae: Papilio polyxenes*) larvae, for example, can completely consume herbaceous plants such as dill. To avoid killing a beautiful guest, you should be sure of your identification of an insect as a pest before using any pesticide. A good side effect of the decrease in pesticide use is the increase of natural enemies. These are insects such as spiders, lacewings, ladybird beetles, and ground beetles that actually help to control unwanted pests.

Larval Host Plants

Caterpillar Food Plant

Asters

Beans

Bermuda Grass

Black Locust

Cabbage, Collard

Cane

Cassia sp.
(i.e. Sicklepod, Partridge Pea)

Wild Cherry

Cottonwood

Crab Grass

Dogwood

Elm

Butterfly

Pearl Crescent
Silvery Checkerspot

Long-tailed Skipper

Fiery Skipper
Gemmed Satyr
Whirlabout
Sachem
Southern Skipperling
Common Roadside Skipper

Silver-spotted Skipper
Zarucco Duskywing

Cabbage White
Great Southern White

Carolina Roadside Skipper
Southern Pearly-eye
Creole Pearly-eye

Sleepy Orange
Cloudless Sulphur
Little Yellow

Spring Azure
Eastern Tiger Swallowtail
Striped Hairstreak
Red-spotted Purple
Coral Hairstreak

Viceroy
Mourning Cloak
Red-spotted Purple

Fiery Skipper

Spring Azure

Question Mark

	Eastern Comma Mourning Cloak
Fennel	Black Swallowtail
Hackberry	American Snout Question Mark Hackberry Emperor Tawny Emperor Mourning Cloak
Hickory	Banded Hairstreak
Hollyhock	Gray Hairstreak Common Checkered Skipper Painted Lady
Milkweed & Milkweed Vines	Monarch Queen
Mistletoe	Great Purple Hairstreak
Nettle	Red Admiral Eastern Comma Question Mark
Oaks	Banded Hairstreak Horace's Duskywing Juvenal's Duskywing Southern Hairstreak
Parsley, Dill & Celery	Black Swallowtail
Passion-vine, Maypop	Gulf Fritillary Zebra Variegated Fritillary
Pawpaw	Zebra Swallowtail
Plantain	Common Buckeye Baltimore Checkerspot
Queen Anne's Lace	Black Swallowtail
Redbud	Henry's Elfin
Sassafras	Spicebush Swallowtail
Snapdragon	Common Buckeye
Spicebush	Spicebush Swallowtail
Sunflower	Silvery Checkerspot
Sweet Bay	Eastern Tiger Swallowtail

Tulip Tree

Violets

White Clover

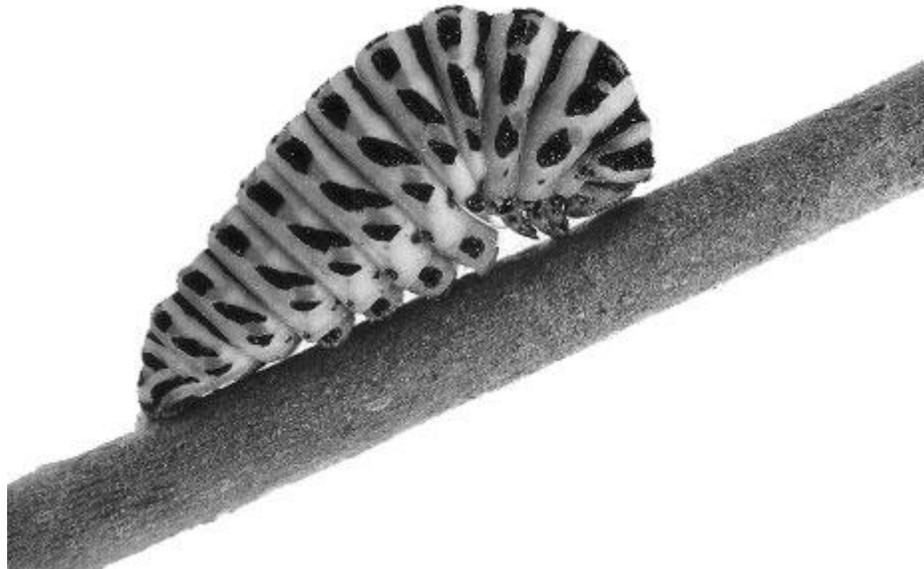
Willow

Eastern Tiger Swallowtail
Spicebush Swallowtail

Variegated Fritillary
Diana Fritillary

Clouded Sulphur
Orange Sulphur

Mourning Cloak
Viceroy



**Black Swallowtail Caterpillar
(Fennel, Dill, Parsley, and Queen's Anne Lace)**

Adult Nectar Plants



****Top 10 Nectar Plants****

- Aster
- Black-eyed Susan
- Butterfly bush
- Butterfly weed
- Coreopsis
- Joe-Pye weed
- Lantana
- Liatris
- Pentas
- Purple coneflower

Trees and Shrubs	Wildflowers and Perennials	Annuals	Vines	Herbs
Butterfly bush (Buddleia)	Dwarf lantana	Pentas	Honeysuckle	Bee balm
Bottlebrush	Queen Anne's Lace	Cosmos	Jasmine	Dill
Dogwood	Purple coneflower	Impatiens	Wisteria	Fennel
Mountain Ash	Hollyhock	Salvia	Passion Vine	Parsley
Hawthorne	Milkweed	Marigold (singles)	Dutchman's Pipe	Meadow rue
Crabapple	Coreopsis	Petunia		Mint
Sumac	Sunflowers	Verbena		Rosemary
Blueberry	Red clover	Zinnia		Chives
Viburnum	Liatris	Black-eyed Susan		Yarrow
Raspberry	Goldenrod	Aster		
Azalea	Phlox	Nasturtiums		
Hibiscus	Joe-Pye Weed	Agertum		
Red Bud	Asters			



Behaviors to Watch

Feeding

Most species of local butterflies use flower nectar as their primary food source. This sugar-rich material is required for energy used in flight. Very long-lived tropical butterflies in Florida, of the family Heliconiidae, also feed on pollen.

Some butterflies, such as the Mourning Cloak (Nymphalidae: *Nymphalis antiopa*) and Hackberry (Apaturidae: *Asterocampa celtis*) feed on rotting fruit, sap that oozes from trees, and even dung.

Not all butterflies feed solely on nectar. Other plant materials may even be preferred. Red admirals, commas, question marks, and redspotted purples are commonly attracted to rotting fruit, carrion, tree sap, urine patches, and dung. While some people may not think of placing such items in their gardens, these materials can serve to increase the diversity of butterfly visitors.

Pieces of apple or banana can be placed on a wooden platform and allowed to ferment. Or, a "sugaring" solution consisting of one can of beer, one pound of brown sugar, one half cup black molasses and one or two mashed, overripe bananas can be prepared. This solution is placed on inexpensive kitchen sponges, which are then hung in strategic locations in the garden, or "painted" on trees. After the sponges have become moldy or soiled they can either be discarded and replaced, or washed and reused. Be aware that this solution will attract many different insects other than just butterflies.

Basking

Butterflies cannot fly until their body temperature is between 75° and 110°F. Butterflies fly best when their bodies are 80° to 100°F. The air temperature must be at least 60° before the butterfly can fly. If the day is cloudy or cold the butterfly must stop periodically to warm up and rest. Basking is when the butterfly absorbs the heat from the sun and the ground. Butterflies will bask on rocks, wood decks, gravel roads, dirt paths, cement patios, and brick. Some butterflies also raise their body temperature by shivering or rapid movement of their wings.

There are three types of basking. Reflectance basking is one form of basking. Butterflies that use reflectance basking have wings that reflect the light. The wings reflect the light into the body. This heats the body up so the butterfly can fly. For this type of basking the lighter in color the scales the better.

The second type of basking is lateral basking. Lateral baskers sit with their wings closed. These butterflies have dark scales underneath their wings that absorb heat, such as the Clouded Sulfur. Because early spring butterflies have darker wings, their bodies will absorb heat more rapidly.

The third type is dorsal basking. Monarchs and Painted Lady's are dorsal baskers and sit with their wings open to get the full benefit of the sun. They will also lie close to the ground so that they can absorb the heat from the ground as well.

Puddling



Puddling is the common behavior of gathering around moist areas (puddle, damp trails, moist tree stump, wet sand) to obtain moisture and the essential nutrients and minerals concentrated at damp sites. Puddling sites are often where water regularly accumulates and then evaporates. When the water evaporates minerals are left behind. Butterflies congregate at the wet edge of mud puddles or wet sandy areas, where they imbibe fluids rich in salts and nutrients. Butterflies require these extra salts and other nutrients to mate successfully. Typically, more males than females puddle. Males pass the nutrients on with their sperm and these nutrients are used by the females for reproduction.

Nutrients gained from puddling also help in producing pheromone. This is the chemical sexual attractant released by males to attract females to mate.

Puddling occurs during the warmest hours of the day, usually between ten A.M. and two P.M. Moths visit the same sites as the butterflies, but at night. Rather than landing directly on the puddle, the butterflies gather at the edge of the puddle to obtain the water without placing itself in danger. Butterflies will continue to visit the sites after the water has dried up. They are able to obtain the minerals by exuding saliva through the proboscis and then sucking it back up with the nutrients.

Sweat Sippers

Human perspiration may seem far away from nectar, but several types of butterflies seek out sweat. The tiny drops of liquid are full of salt, a necessity for butterflies. Being the host of a live butterfly is an unusual experience. If you are working up a sweat in the garden and a Red Admiral, Hackberry Emperor, or other species alights on your bare arm, hold still and watch closely. You may see and feel the butterfly begin to tap its proboscis against your skin with a delicate, tickling touch as it sips your sweat.

Puddle Butterflies

- Most swallowtails
- Most whites and sulphurs
- Most blues
- A few of the true brushfoots, including the Question Mark, Eastern Comma, checkerspots, and crescents
- Many admirals
- A few satyrs
- Many skippers

Patrolling and Perching

For the purpose of mating, male butterflies search out female butterflies in two ways, by *patrolling and perching*. In patrolling, the male butterflies fly over areas where the female butterflies may be feeding or egg-laying. Butterflies do not, however, have sharp vision; so once a patrolling butterfly spots what he perceives to be a likely mate, he swoops down and examines it more closely. If it's indeed a female of his species, he will begin the courting ritual.

Some butterflies that commonly use a patrolling strategy include the Monarch, Sulphurs and Whites. When butterflies fly upward next to one another, they are either males combating one another for territory, or males trying to convince females to mate with them.

Instead of patrolling, butterfly species such as the Mourning Cloak (Nymphalidae: *Nymphalis antiopa*), Black Swallowtail (Papilionidae: *Papilio polyxenes*) and Red Admiral (Nymphalidae: *Vanessa atalanta*) will perch on tall plants in areas along streams or ridges where the females are likely to occur. Once they spot something that might be a female, they will fly in to explore it closely. If they have found a female of the appropriate species, they will begin courtship. If the intruder turns out to be a male, the original male will give chase. Generally they will fly vertically for a few feet after which the original male returns to his perch.

Mating

Flight patterns used in courtship differ among the butterfly species. Typically, a male will fly above or behind the female, fluttering his wings a bit more than usual. He may release pheromones from his body or wings. If the female is interested, she'll alight on plants or on the ground. Sometimes courtship continues with the male touching the female's antennae or legs and with different wing movements. They copulate by joining the tips of their abdomens. Sometimes they even take flight during copulation while still joined.

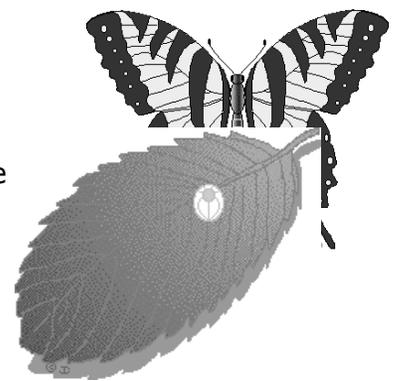
The mated female may try to avoid the advances of other courting males. With many species, the female physically avoids contact either by positioning her abdomen tip or spreading her wings in a manner to make contact impossible, or by releasing antiaphrodisiacs. Still other species, such as Sulphurs, fly upward in a spiral until the male gives up the chase.

Egg-laying

If you notice a butterfly flying over plants, then touching down briefly, you are watching a female searching for egg-laying sites. Female butterflies recognize host plants through visual cues, such as leaf shape and color. Plant scent further identifies a potential host. Female butterflies also often drum on the leaf surface with their feet. Drumming scratches the leaf surface, releasing chemicals enabling the butterfly to identify the correct plant on which to lay her eggs.

Georgia State Butterfly: Tiger Swallowtail Butterfly

The Tiger Swallowtail butterfly (*Papilio glaucas*) is a strong flier with distinctive yellow and black striped markings on its wings and body (some females are brown or black, mimicking the poisonous pipevine



swallowtail). This relatively common butterfly has a wingspan of 3.5-6.5 inches (9-16.5 cm). Southern subspecies are larger than the northern ones. These butterflies are called swallowtails because they have long "tails" on their hindwings which look a bit like the long, pointed tails of swallows (a type of bird).

DESCRIPTION AT EACH STAGE OF THE LIFE-CYCLE

Butterflies and moths undergo complete metamorphosis in which they go through four different life stages. It takes about a month for the egg to mature into an adult.



Egg: A butterfly starts its life as an egg. The female Tiger Swallowtail butterfly lays its spherical, yellow-green eggs on the leaf high in a tulip tree, sweet bay, wild black cherry, ash, lilac, aspen, birch, or choke cherry. When the egg hatches, its meals (the leaves of one of these plant) are easily available.



Caterpillar: The larva (caterpillar) hatches from an egg and eats the eggshell. Then it eats leaves (almost constantly). The newly-hatched larva is brown and white, and looks like bird droppings, but it turns green later. The caterpillar molts (loses its old skin) many times as it grows. The caterpillar is plump, smooth, and green with large yellow eyespots that have black "pupils." There is a yellow and black stripe where its "neck" should be. The larva lives in a nest that it makes high in the trees by folding a leaf over and securing it with silk. It grows to be up to about 2 inches (5 cm) long. Just before pupating, it sometimes turns brown.



Pupa: It turns into a pupa (chrysalis); this is a resting stage. As the body transforms into a butterfly, it neither eats nor drinks.



Male



Some females are dark, mimicking the poisonous Pipevine Swallowtail

Adult: A beautiful, flying adult emerges. There is no growth during this stage, but the butterfly will sip nectar. This adult will continue the cycle by reproducing. Females produce two broods in the north, three in the south.

Wings have distinctive yellow and black stripes. Some females (especially in the south) are much darker, mimicking the poisonous Pipevine butterfly.

DIET

Caterpillar: The caterpillar's first meal is its own eggshell. After that, the caterpillars eat the tulip tree (*Liriodendron*), sweet bay, wild black cherry (*Prunus*), ash (*Fraxinus*), wild poplar (*Populus*), Basswood (*Tilia*), birch (*Betula*), lilac, aspens, or choke cherry.

Butterfly: Butterflies can only sip liquid food using a tube-like proboscis, which is a

long, flexible "tongue." This proboscis uncoils to sip food, and coils up again into a spiral when not in use.

- Tiger Swallowtails drink sweet flower nectar, especially nectar from the pink flowers of the shrub abelia.

PROTECTION FROM PREDATORS

Caterpillar: The caterpillar is camouflaged to look like bird droppings when it is very young. Later, it develops distinctive eyespots, which make it look like a snake, scaring off some predators.

Butterfly: The Tiger Swallowtail butterfly is not a poisonous butterfly, but many females (especially southern subspecies) are much darker, mimicking the poisonous Pipevine butterfly (*Battus philenor*). Animals that eat the poisonous Pipevine butterfly get very sick and vomit (but generally do not die). These animals remember that this brightly-colored butterfly made them very sick and will avoid all butterflies with similar markings (including the Tiger Swallowtail) in the future.

HABITAT AND RANGE

The Tiger Swallowtail butterfly frequents woodlands (including temperate deciduous forests) and grasslands, but is also found in a variety of environments, including cities.

It is found throughout the Eastern USA and Canada.

LIFE SPAN

It takes about a month for the adult to develop (from egg to pupa to adult).

Life History of a Few Other Butterflies

We can learn much about butterfly gardening by examining the life history of some specific butterflies.

- Black Swallowtail (*Papilio polyxenes*) caterpillars feed on dill, parsley and a few related species in the plant family Umbelliferae. Their larvae accumulate toxins

from the host in their body and these chemicals can be found in the adult butterfly as well. Caterpillars and adults are strikingly colored as a way to advertise their toxicity and distastefulness to birds.

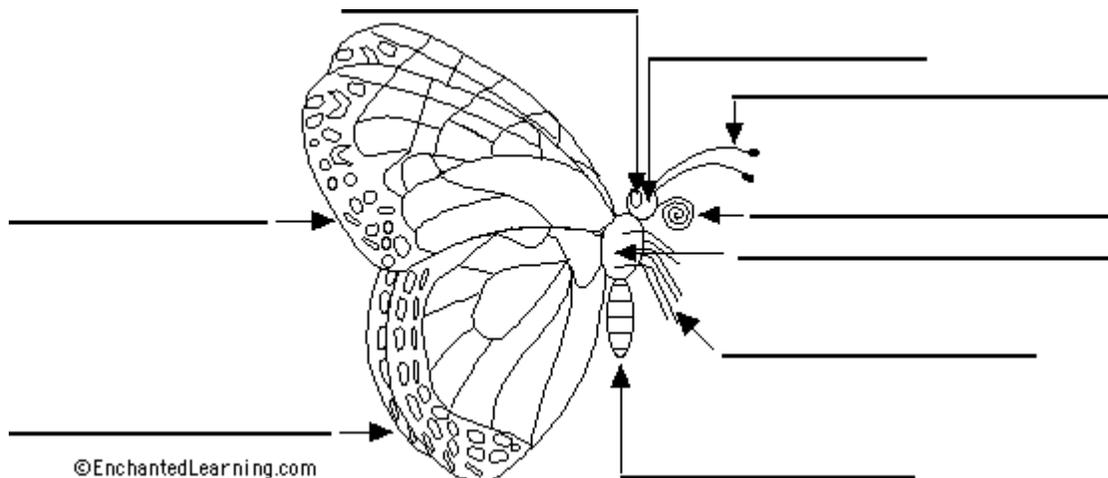
- Some butterflies have only one generation a year. The pupa overwinters and the butterfly emerges in the spring. Only a few, such as Mourning Cloaks (*Nymphalis antiopa*) overwinter as adults. Mourning Cloaks are the first butterflies seen in the spring, feeding on nectar from shrubs such as *Amelanchier*. Their caterpillars feed on a variety of common trees, such as willows, poplars and elm. They overwinter in barns, tree holes or other protected areas.
- The American Painted Lady (*Vanessa virginiensis*) and the Painted Lady (*Vanessa cardui*) overwinter in the south. Painted ladies are attracted to open areas with low vegetation and a variety of flowers. The larvae feed on everlastings (*Anaphalis* spp.) as well as thistles. The adults prefer pussytoes (*Antennaria* spp.) and other composites, such as black-eyed Susan and sunflowers.
- The monarch butterfly (*Danaus plexippus*) is sometimes called the "milkweed butterfly" because its larvae eat the milkweed plant (*Asclepias* spp). In fact, milkweed is the only thing the larvae can eat! If you'd like to attract monarchs to your garden, you can try planting milkweed. In the winter the monarchs east of the Rocky Mountain migrate to 14 known overwintering sites in Mexico.

Label the Butterfly

Read the definitions, and then label the diagram below.

Definitions

- **Abdomen** - The abdomen is the segmented tail area of an insect that contains the heart, Malpighian tubules, reproductive organs, and most of the digestive system.
- **Antenna** - An antenna is a sensory appendage that is attached to the head of adult insects. Antennae are used for the sense of smell and balance. Butterflies have two antennae with clubs at the end.
- **Compound Eye** - Insect compound eyes are made up of many hexagonal lenses.
- **Fore wing** - The fore wings are the two upper wings.
- **Head** - The head is the part of the insect that contains the brain, two compound eyes, the proboscis, and the pharynx (the start of the digestive system). The two antennae are attached to the head.
- **Hind wing** - The hind wings are the two lower wings.
- **Leg** - All adult butterflies have six legs. The two forelegs of some butterfly species are tiny.
- **Proboscis** - Adult butterflies sip nectar and other liquids using a spiral, straw-like proboscis located on their head.
- **Thorax** - The thorax is the body section between the head and the abdomen. The legs and wings attach to the thorax.

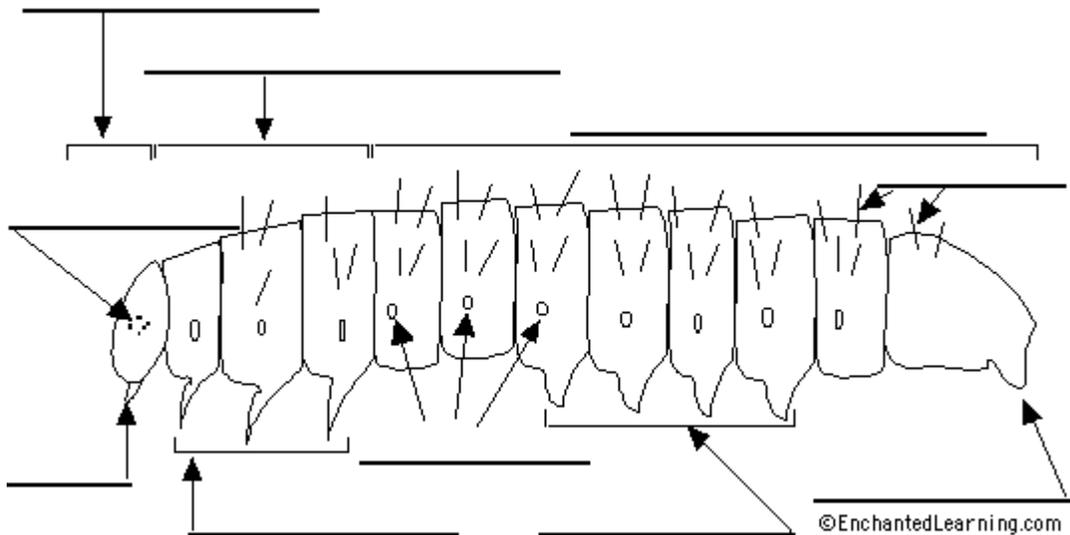


Label the Caterpillar Diagram

Read the definitions, then label the caterpillar diagram below.

Definitions:

- **Abdomen** - the tail area of an caterpillar that contains the heart, Malpighian tubules, reproductive organs, and most of the digestive system
- **Abdominal Prolegs** - stumpy legs located on the abdomen
- **Anal Prolegs** - stumpy legs located at the end of the abdomen
- **Head** - the part of the caterpillar that contains the brain, eyes, mouthparts, etc.
- **Mandibles** - the jaws, located on the head
- **Setae** - hairs along the caterpillar's body that sense touch
- **Simple Eyes** - organs on the head that can detect light and dark
- **Spiracles** - tiny holes along the caterpillar's body that it uses to breathe
- **Thoracic Legs** - six jointed legs on the caterpillar's thorax
- **Thorax** - the body section between the head and the abdomen. The legs and wings attach to the thorax



Interesting facts about Butterflies ' Jewels of the Sky'

- There are 20,000 kinds of butterflies, in the world twice that of birds
- The greatest diversity occurs in Central and South America
- There are 700 species in the USA
- The lifespan of a butterfly is about 2-4 weeks, except that of the Monarch, which migrates to Mexico each winter, is 6 months.
- The butterfly life cycle consists of 4 stages: egg, larva (caterpillar), Pupa (chrysalis) and the adult butterfly
- Certain species require certain flowers for a good attraction match up
- Butterflies get their moisture not so much from 'puddling' in damp sandy soils but from the nectar and dew. Puddling will give them salts and minerals needed.
- Butterflies warm up their bodies by 'basking '(butterflies need 75-110 degrees for flight)
- Hilltopping' is a social activity that butterflies do to mate. The males fly to the highest hilltop in the area in search of a mate
- Territories are also important to the males of the butterflies and they do stake out areas.
- Butterflies like flat flowers and different species. The greater the variety of species, the greater will be the variety of butterflies.



Resources

The University of Kansas Entomology Program

www.monarchwatch.org

Track Monarch Butterfly Migration

www.learner.org/jnorth

Monarchs in the Classroom

www.monarchlab.umn.edu

Butterfly Conservation

www.xerces.org

The Butterfly Website

<http://butterflywebsite.com/>

Butterflies of North America

<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm>

North American Butterfly Association
<http://www.naba.org/>

Field Guides and Gardening Books

Butterflies Through Binoculars: The East
By Jeffrey Glassberg

Butterflies Of Georgia Field Guide
by Jaret C. Daniels

Butterfly Gardening for the South
By Geyata Ajilvsgi

Butterfly Gardening: Creating Summer Magic in Your Garden
By The Xerces Society and The Smithsonian Institution

Ortho's All about Attracting Hummingbirds and Butterflies
By Ortho Books

The Family Butterfly Book
By Rick Mikula

Handbook for Butterfly Watchers
By Robert Michael Pyle.

This book covers many essential topics of interest to butterfly watchers: tips for watching butterflies and their behavior, counting, rearing, gardening, photographing, conserving, and great North American butterfly watching spots.

Stokes Butterfly Book : The Complete Guide to Butterfly Gardening, Identification, and Behavior
By Ernest Williams and Donald Stokes