

Butterfly Gardening



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and Sustainability*

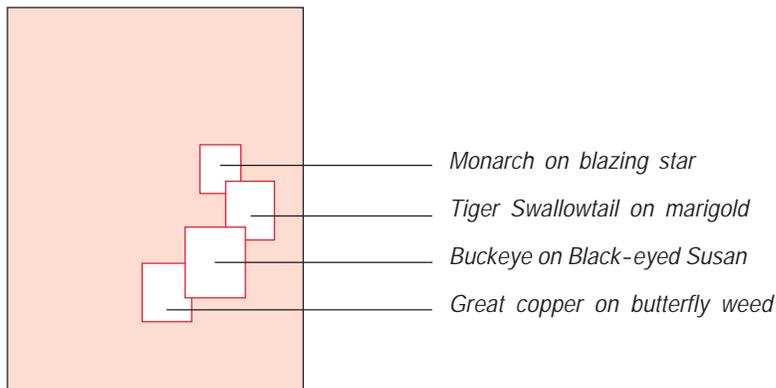
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Residential and commercial development is destroying natural wildlife habitat. Whenever possible, we need to encourage habitat restoration in order to encourage butterfly and songbird populations. Butterfly gardening can be one positive step in that direction.

Butterfly gardening can be easy. It can be as simple as providing the appropriate variety of host plants for larval growth and adult feeding. Plants used in butterfly gardening include native plants as well as horticultural cultivars of annuals and perennials. Different species of butterflies sip nectar from flowers on specific types of plants. They also search for specific species of plants upon which to lay their eggs. Caterpillars feed on these host plants for their entire life cycle.

By choosing certain plants for adult and larval feeding, we encourage the establishment of butterfly populations which return year after year. As we manage our urban landscapes, our efforts in environmental stewardship assure the presence of butterflies and the sharing of our personal backyard Edens with these beautiful, colorful, soaring insects.

What a Butterfly Is

The insect order Lepidoptera consists of butterflies and moths. The name refers to the tiny scales covering the adult insect's wings. Their wings are used in flight and in various behaviors associated with their life history, such as searching for specific hosts for egg-laying and searching for flowers with nectar for adult feeding.

Butterflies account for only eight percent of the lepidopteran insect species. Moths are far more common, accounting for 92 percent of lepidopteran species.

Butterflies visit plants for several reasons. Butterflies need nectar to provide energy for flying and reproduction. It is in the process of drinking nectar that they pollinate plants. In fact, the evolution of flowers is considered to be a result of a mutualism between pollinators and plants. Plants provide nectar in flowers and butterflies transport pollen to ensure reproduction with unrelated individuals.

Insect feeding results in pollen transportation and is more reliable than the alternative form of pollen transport, wind. Look closely at a butterfly and you will notice large eyes for finding flowers and larval host plants and a coiled mouthpart called a proboscis used for probing and sucking nectar from flowers.

Butterflies are brightly colored as a way to advertise their distastefulness to predators. Throughout evolution, butterfly species evolved mechanisms to isolate and concentrate noxious host plant chemicals in their caterpillar bodies.

Female butterflies, searching for host plants upon which to lay their eggs, are attracted to plants which provide these specifically noxious chemicals to their caterpillars. This is why caterpillars of a butterfly species only feed on specific plants providing the correct chemical for storage or sequestration. During pupation, when caterpillars reorganize their bodies and metamorphose (change into adults), these chemicals are conserved and distributed into the body and wings of the butterflies. These chemicals then make the butterflies distasteful to birds.

Moths, by contrast, are often dull colored and lack functional mouthparts. Many moth species feed on a wide range of hosts since sequestration of chemicals is not usually done. Consequently, most moths are not distinctive. They tend to be cryptic, meaning they match and blend into the background colors of their native habitat.



The long proboscis of the Sphinx moth (Sphinxidae) is used to reach nectar of deep-lobed flowers.



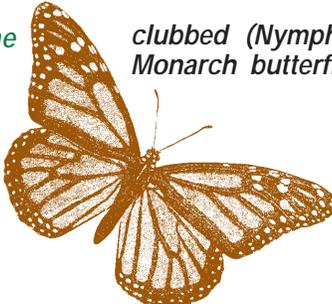
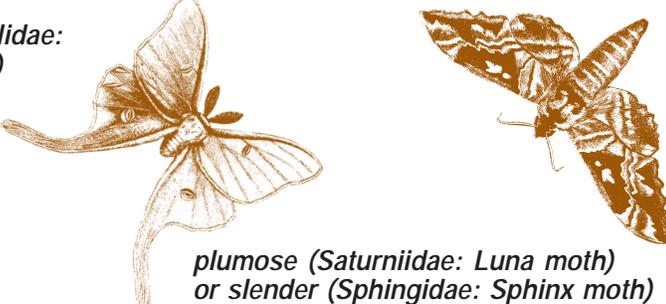
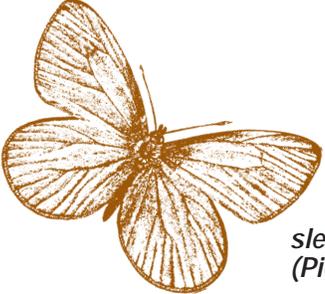
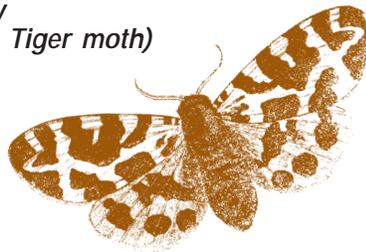
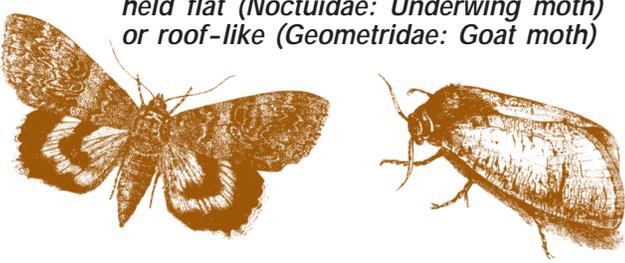
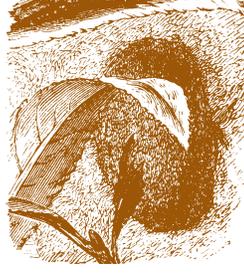
As a consequence of not having the plant chemical protection of butterflies, moths are highly palatable to birds. This is why they usually fly at night, to avoid bird predation. A few moth species are large and showy, but it is difficult to garden for their benefit. Most moth species lack mouthparts as adults, but the Tomato Hornworm (Sphinxidae: *Manduca sexta*) is an example of the exceptions.



Cryptic coloration typical to moths lets them blend into their surroundings, lessening exposure to predators.

The Tomato Hornworm is a species of Sphinx moth. Active at dusk, they are often mistaken for hummingbirds. Sphinx moths prefer to feed on deep-lobed flowers such as trumpetvine and nasturtium. Other large moths, such as the Luna moth (*Saturniidae: Actias luna*), Cecropia moth (*Hyalophora cecropia*), and Prometheus moth (*Callosamia promethea*), are very beautiful, but lack mouthparts as adults. They cannot be lured to feed or reproduce in the garden as can butterflies. Saturniid moths also have specific host plants.

Table 1. Although exceptions exist, several key characteristics or traits typically used to separate and identify butterflies from moths are illustrated in these drawings.

<p>Antennae</p>  <p><i>clubbed (Nymphalidae: Monarch butterfly)</i></p>	 <p><i>plumose (Saturniidae: Luna moth) or slender (Sphingidae: Sphinx moth)</i></p>
<p>Body</p>  <p><i>slender, smooth (Pieridae: Sulphur butterfly)</i></p>	 <p><i>thick, furry (Arctiidae: Tiger moth)</i></p>
<p>Wings at rest</p>  <p><i>usually held upright (Lycaenidae: Hairstreak butterfly)</i></p>	 <p><i>held flat (Noctuidae: Underwing moth) or roof-like (Geometridae: Goat moth)</i></p>
<p>Transformational stage</p>  <p><i>butterfly: chrysalis</i></p>	 <p><i>moth: pupa naked or cocoon</i></p>

Most butterfly species lay their eggs singly, one egg per leaf. Eggs hatch in a week or two. Newly hatched caterpillars are small and can grow for days unnoticed. Most caterpillars are selective about what they eat. They feed on only one or two host plant species. Throughout their development, almost all butterfly caterpillars remain on the plant where their eggs were laid, or move only short distances to feed on other suitable host plants.

Caterpillars increase in size as they develop. Larger, more visible caterpillars also may display characteristics designed to protect them from birds and other enemies. Monarch larvae feed heavily on milkweed and accumulate toxins called cardiac glycosides in their wings and bodies. The bright and distinctive markings of these colorful butterflies tell potential predators that their taste is bitter and the predator would be better off leaving them alone. Predators quickly learn this message.



*Butterfly caterpillars grow substantially in size as they mature, shedding skin in a process called molting (Nymphalidae: *Danaus plexippus*).*

Caterpillars shed their skins four or five times as they grow, in a process called molting. You may notice their shed skins on the host plant. After the caterpillar has molted a predetermined number of times, it wanders from the feeding site and searches for a place to dangle from and pupate. After attaching its posterior end to an object, the caterpillar molts again, revealing a different skin that hardens into a pupa. It reorganizes its body plan inside the pupa, called a chrysalis, then emerges as a butterfly. Generally, butterflies that overwinter in Minnesota do so in the pupal stage and emerge in spring as adult butterflies.

Life History of a Few Butterflies

We can learn much about butterfly gardening by examining the life history of some specific butterflies. More details on caterpillar host plants of common butterflies found in Minnesota are given in Table 2.

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 bodies and these chemicals are 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*) over-



Black Swallowtail (Papilionidae: Papilio polyxenes): larva feeding on parsley (left); larvae feeding on another host, dill (center); and an adult feeding on zinnia nectar (right).

winter 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 elms. They overwinter in barns, tree holes or other protected areas.

The Tiger Swallowtail (left) and Zebra Swallowtail (right), in the same family (Papilionidae) as the Black Swallowtail, are similarly characterized by a tail on each hind wing which is reminiscent of a swallow's feathers.



The American Painted Lady (*Vanessa virginiensis*) and the Painted Lady (*Vanessa cardui*) do not overwinter in Minnesota, but migrate from the south in the spring. 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 Susans and sunflowers.



An adult Mourning Cloak (Nymphalidae: Nymphalis antiopa) feeds on the nectar of spring flowering plants such as this Amelanchier.

The Monarch (*Danaus plexippus*) migrates south for the winter. After overwintering in the highlands of Mexico, the overwintering generation flies north to the latitude of Texas and lays eggs. These eggs hatch and the larvae feed. The pupae turn into adult Monarchs in 10 to 14 days, and it's this generation that arrives in Minnesota in May and June. During the summer, the migrant adults lay eggs that produce the generation of Monarchs that return to Mexico in the fall.

Table 2. Some common butterflies and their caterpillar food plants.

<i>Butterfly Species</i>	<i>Caterpillar Food Plant</i>
Swallowtail Family (Papilionidae)	
Black Swallowtail	Parsley family - both wild and cultivated: carrot, dill, parsley, and parsnip
Spicebush Swallowtail	Spicebush, sassafras
Tiger Swallowtail	Aspen, cherry, birch
Snout Butterfly (Libytheidae)	
Common Snout Butterfly	Hackberry
Brush-footed Family (Nymphalidae)	
Great Spangled and Idalia Fritillary	Violets
Buckeye	Plantains, gerardias, toadflax, snapdragons, false loosestrifes
Painted Lady	Thistles
Red Admiral	Nettles, false nettle
Viceroy and Red-Spotted Purple	Willows, especially black willow, pussy willow, poplars, plums, cherries
Hackberry Butterfly	Hackberry
Monarch Butterfly	Milkweeds, butterfly weed
Mourning Cloak	Willow, birch, aspen, maple, elm
Sulphur Family (Pieridae)	
Common (clouded) Sulphur	Clover, alfalfa
Dogface Butterfly	Lead plant, false indigo, prairie clover
Coppers, Blues, Harvesters, Metalmarks Families (Lycaenidae, Riodinidae)	
American Copper	Sorrel
Sylvan Hairstreak	Willow
Common Hairstreak	Mallow family, rose & marsh mallows, hollyhock
Gray Hairstreak	Hawthorn
Skipper Family (Hesperiidae)	
Blazing Star Skipper	Grasses

Source: University of Minnesota James Ford Bell Museum of Natural History. Used with permission.





These nineteenth century woodcuts illustrate portions of the life cycles of butterflies and moths.

In the top illustration, "A" is an adult butterfly nectar feeding. "B" shows females ovipositing (egg-laying). "C" represents several instars, or stages, of larval feeding and growth. "D" is the pupa (chrysalis of a butterfly). "E" is a newly emerged butterfly adult drying its wings.



In the bottom illustration, of moths, "A" is an adult resting with its wings folded. "B" and "C" represent two larval instars. "D" is the hairy cocoon of the moth.

Behaviors to Watch

Feeding

Most species of local northern butterflies use flower nectar as their primary food source (Table 3). 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.

The Leonard's skipper (Hesperiidae: Hesperia leonardus) extends its proboscis into flowers to obtain nectar.



Painted Lady butterflies (Nymphalidae: Vanessa cardui) prefer composit family flowers such as zinnia for feeding.

Monarchs (Nymphalidae: Danaus plexippus) will stop to feed on nectar from plants such as this blazing star.



Weidemeyer's Admiral (Nymphalidae: Limenitis weidemeyerii) is one butterfly species that will feed on dung, in this instance coyote dung.

Basking

Butterflies are cold-blooded creatures. They may need the sun to warm their wing muscles so they can fly. They fly best when air temperatures range from 75-90 degrees; so when it's cooler, they bask, using the sun's heat to warm their bodies. A large, flat rock in the butterfly garden provides a warm spot for basking when the temperatures are cool. When temperatures get too warm, butterflies seek shade.

Table 3. Some suggested nectar plants for adult butterflies.

Shrubs

Azalea, blueberries, butterfly bush, buttonbush, lilac, privets, and sumacs

Cultivated Flowers: Annuals

Coneflowers, flowering tobacco, impatiens, marigolds, phlox, sunflower, and verbena

Cultivated Flowers: Perennials

Asters, bee balm, butterfly weed, chrysanthemums, daisies, live forever, purple cone-flower, sedum, and yarrow

Wildflowers

New England aster, bergamots or horsemints, black-eyed Susan, blazing stars, boneset, butterfly flower, coreopsis, ox-eye daisy, and purple agertum

Some weedy wildflowers are not appropriate for formal garden settings, but could be used in a wild patch: common milkweeds, dogbane, goldenrods, ironweeds, Joe-Pye weed, nettles, and thistles

Source: University of Minnesota James Ford Bell Museum of Natural History. Used with permission.

The most common basking position is with the wings positioned flat, facing the sun. Butterflies that bask this way often have black bodies and dark colored areas on their wings. Most common among Satyrs (Satyridae) and Sulphurs (Pieridae) is lateral basking with wings folded and facing the sun. This is because the undersides of their wings are darker than the topsides, or the bases of the wings are darker than the edges. In a third type of basking, called reflectance, the wings are used to reflect the sunlight to the butterfly's body rather than absorb it. Butterflies that use reflectance basking, such as whites, have lighter colored wing ends.

This Checkered skipper (Hesperiidae: Pyrgus communis) shows the most common basking position, with wings flat and facing the sun to maximize capture of the sun's rays on its dark wing surfaces.



Puddling

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.



*Some butterflies drink fluid from the soil to obtain needed salts and nutrients (Nymphalidae: *Limenitis arthemis*).*

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.

*With some butterflies, males perching on tall plants may be on the lookout for mates (Nymphalidae: *Vanessa cardui*).*

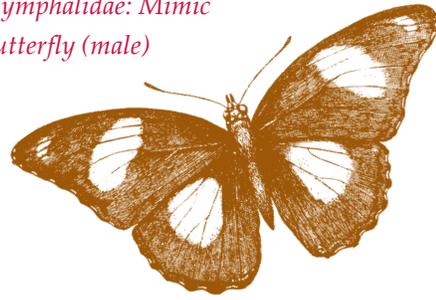
Mating

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.

Nymphalidae: Mimic butterfly (male)



Nymphalidae: Mimic butterfly (female)



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. Table 2 is a list of host plants for common butterflies.

The Monarch (Nymphalidae: Danaus plexippus) female lays her eggs on milkweed, a larval host for the species.

Creating a Butterfly Garden

Host Plants

Butterfly gardening involves planning your garden to attract, retain, and encourage butterfly populations. A sample garden plan is shown in Figure 1, and a list of host plants

is given in Tables 3 and 4. 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.

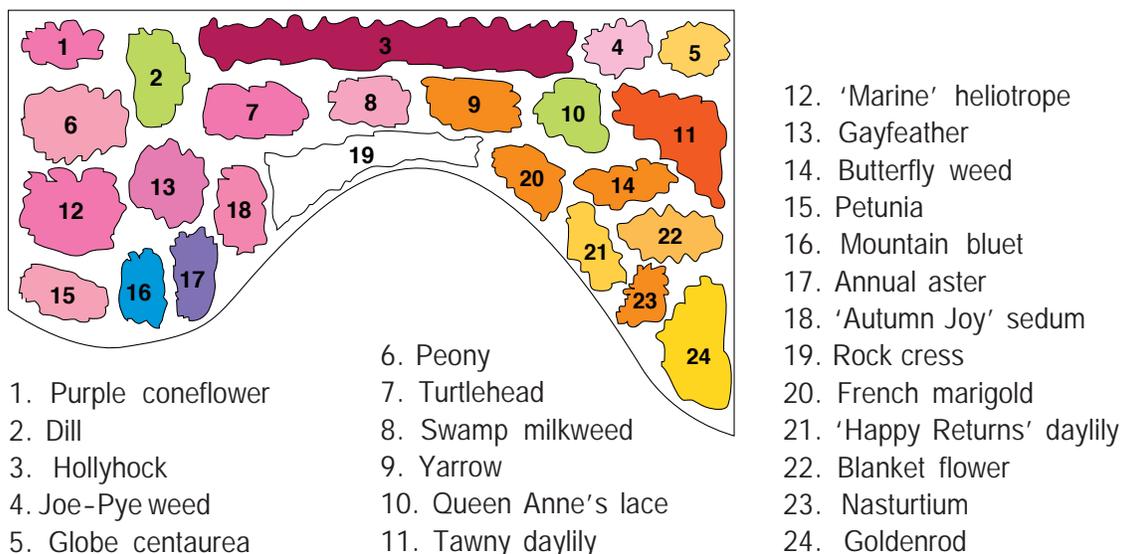
Annuals are wonderful butterfly plants because they bloom continuously through the season, providing a steady supply of nectar. Perennial plants, such as coneflowers, lilac, butterfly weed, and asters, are visited regularly by butterflies. Most plants in the mint family are also good nectar sources for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

You can supplement the garden's flower nectar with a home-made 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 (See Table 2). Most caterpillars feed on leaves; although some develop on the reproductive parts of flowers or seeds.

Some supposedly good butterfly plants might not attract butterflies in your garden. It may be that a particular plant is not the preferred larval food of local butterflies (see Table 2 for preferred plants).

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



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 wind-break 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.



Plantings of host plants preferred by butterflies does not require any sacrifice of flowers and colors. Plants such as (first column) yellow sunflower, pink Joe-Pye weed, purple coneflower, and (second column) purple verbena, yellow Black-eyed Susan, red bee balm/bergamot, and purple wild asters provide plentiful color.

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.



An undesirable garden guest would be a borer moth (Sessidae: Clearwing borer).



The caterpillar of a desirable butterfly such as the Mourning Cloak (Nymphalidae: Nymphalis antiopa) can, with only casual inspection, be mistaken for less desirable or more destructive relatives such as the gypsy moth (Lymantriidae: Lymantria dispar).

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.

Enjoy Your Garden

With a pair of binoculars and a butterfly field guide, your garden is sure to bring you many rewarding hours of butterfly watching. Their daily activities are interesting to watch. Keep a written or photographic record of these special visitors to your garden. A checklist of Minnesota butterflies is included in Table 5. Creating your personal Eden is within your grasp.

References and Resources

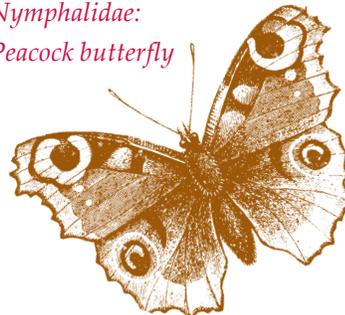
There are many good sources for readers interested in obtaining more information on butterflies and butterfly gardening:

Slide Set

A companion *CUES for Butterfly Gardening* slide set is available. Contact the Minnesota Extension Service Distribution Center (800/876-8636 or 612/625-8173) for ordering information on item SS-6712.

Nymphalidae:

Peacock butterfly



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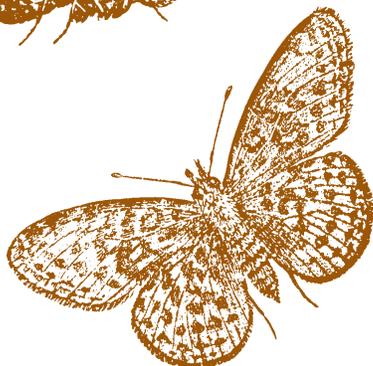
Saturniidae:

Atlas moth



Nymphalidae:

Lesser Fritillaries



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Organizations

Butterfly Lovers International, 210 Columbus Ave., San Francisco, CA 94133, (415) 864-1169.

Entomological Society of America, 9301 Annapolis Rd., Lanham MD 20706-3115, (301) 731-4535.

Lepidoptera Research Foundation, % Santa Barbara Museum of Natural History, 2559 Puesta Del Sol, Santa Barbara CA 93105-2936, (803) 682-4711.

Lepidopterists' Society, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles CA 90007-4057, (213) 744-3364.

National Wildlife Federation, Urban Wildlife Programs, 1400 16th St. NW, Washington DC 20036-2217, (202) 797-6800.

North American Butterfly Association, 4 Delaware Rd., Morristown NJ, 07960-5725, (201) 285-0890.

Xerces Society, 10 Southwest Ash St., Portland OR 97204-3516, (503) 222-2788.

Young Entomologists' Society, International Headquarters, 1915 Peggy Pl., Lansing MI 48910-2553, (517) 887-0499.



*The national insect of the United States, the Monarch (*Nymphalidae: Danaus plexippus*) annually migrates by the millions to overwinter in Mexico.*

Table 4. Butterfly and moth garden plants.

This table is based on a listing of plants rated excellent by Carrol L. Henderson in *Landscaping for Wildlife*, available through Minnesota's Bookstore at the Minnesota Department of Natural Resources (612-297-3000 or 1-800-652-9747; ask for Minnesota's Bookstore). Used with permission.

Key: **Sun:** F=full, FP=full to partial, PS=partial to shade, A=all light conditions; **Comments:** Hardy in MN zones 3-4, except where noted; **Cat**=caterpillars; **AB**=adult butterflies; **AM**=adult moths.

<i>Scientific name</i>	<i>Common name</i>	<i>Height</i>	<i>Sun</i>	<i>Comments</i>	<i>Cat</i>	<i>AB</i>	<i>AM</i>
Annuals							
<i>Anethum graveolens</i>	dill	3'	F		X		
<i>Calendula officinalis</i>	calendula, pot marigold	1'	FP			X	
<i>Heliotropium arborescens</i>	heliotrope	1-2'	FP			X	X
<i>Mirabilis jalapa</i>	four o'clocks	1.5-2'	FP				X
<i>Nicotiana glauca</i>	flowering tobacco	1.5-3'	FP				X
<i>Petroselinum crispum</i>	parsley	1'	FP		X		
<i>Petunia x hybrida</i>	petunia	1'	FP			X	X
<i>Pimpinella anisum</i>	anise	1.5'	F		X		
<i>Rosemarinus officinalis</i>	rosemary	2-3'	F			X	
<i>Tagetes erecta</i>	American or African marigold	1.5-3'	F		X	X	
<i>Tagetes patula</i>	French marigold	1'	F		X	X	
<i>Tithonia rotundifolia</i>	Mexican sunflower	2.5'	F			X	
<i>Tropaeolum majus</i>	nasturtium	1'	FP			X	
<i>Verbena</i> spp.	verbena	8-14"	F			X	
<i>Zinnia elegans</i>	zinnia	1-3'	FP			X	
Biennials/perennials							
<i>Achillea millefolium</i>	yarrow	2'	F			X	
<i>Alcea rosea</i>	hollyhock	6'	F		X	X	
<i>Amorpha canescens</i>	leadplant	2'	F			X	
<i>Anaphalis margaritacea</i>	pearly everlasting	2'	F		X		
<i>Arabis</i> spp.	rock cress	.5-1'	FP		X		
<i>Asclepias incarnata</i>	swamp milkweed	4'	FP		X	X	
<i>Asclepias speciosa</i>	showy milkweed	3'	FP		X	X	
<i>Asclepias syriaca</i>	common milkweed	3'	FP		X	X	
<i>Asclepias tuberosa</i>	butterflyweed	3'	FP			X	
<i>Aster ericoides</i>	heath heather	3'	F		X	X	
<i>Aster</i> spp.	aster	3-5'	FP		X	X	
<i>Bidens aristosa</i>	tickseed sunflower	3-4'	F			X	
<i>Carex</i> spp.	sedge	1'	F		X		
<i>Centaurea dealbata</i>	Persian centaurea	2'	FP			X	
<i>Centaurea macrocephala</i>	globe centaurea	3'	F	zones 4-5		X	
<i>Centaurea montana</i>	mountain bluet	2'	F	zone 4		X	
<i>Chelone glabra</i>	turtlehead	2'	F	zone 4		X	
<i>Cirsium flodmanii</i>	prairie thistle	1-2'	F			X	
<i>Daucus carota</i>	Queen Anne's Lace	2'	FP		X	X	

Table 4 (continued). Butterfly and moth garden plants.

Scientific name	Common name	Height	Sun	Comments	Cat	AB	AM
Biennials/perennials							
<i>Dianthus barbatus</i>	sweet William	1.5'	FP		X		
<i>Echinacea purpurea</i>	purple coneflower	4'	FP			X	
<i>Echinops</i> spp.	globe thistle	4'	FP			X	
<i>Epilobium angustifolium</i>	fireweed	4'	FP				X
<i>Erigeron</i> spp.	fleabane	2'	F			X	
<i>Eupatorium maculatum</i>	Joe-Pye weed	5'	FP			X	
<i>Eupatorium perfoliatum</i>	boneset	3'	FP			X	
<i>Euthamia graminifolia</i>	lance leaved goldenrod	2'	F			X	
<i>Gaillardia</i> x <i>grandiflora</i>	blanketflower	2–3'	F			X	
<i>Gentiana septemfida</i> var. <i>lagondechiana</i>	dwarf blue gentian	1'	A	zones 4–5			X
<i>Helianthus laetiflorus</i>	showy sunflower	2–4'	F			X	
<i>Helianthus maximiliani</i>	narrow leaved sunflower	3–5'	F			X	
<i>Helianthus occidentalis</i>	western sunflower	3'	F			X	
<i>Heliopsis helianthoides</i>	oxeye daisy	3'	F			X	
<i>Hemerocallis</i> spp.	daylily	3–6'	F			X	
<i>Hesperis matronalis</i>	dame's rocket	3'	PS				X
<i>Houstonia</i> spp.	houstonia	8"	F			X	
<i>Hyssopus officinalis</i>	hyssop	2'	F			X	
<i>Liatris aspera</i>	rough blazing star	2–3'	FP			X	
<i>Liatris cylindracea</i>	dwarf blazing star	2'	FP			X	
<i>Liatris ligulistylus</i>	meadow blazing star	1–1.5'	FP			X	
<i>Liatris punctata</i>	dotted gayfeather	1'	FP			X	
<i>Liatris pycnostachya</i>	prairie blazing star	5'	FP			X	
<i>Liatris spicata</i>	gayfeather, blazing star	3'	F			X	
<i>Lilium candidum</i>	Madonna lily	6'	FP				X
<i>Lupinus perennis</i>	lupine	2'	A		X	X	
<i>Lupinus</i> 'Russell Hybrids'	Russell lupine	5'	A		X	X	
<i>Mentha piperita</i>	peppermint	2'	FP			X	
<i>Mentha spicata</i>	spearmint	2'	PS	zones 4–5		X	
<i>Monarda didyma</i>	scarlet bergamot	3'	A			X	X
<i>Monarda fistulosa</i>	wild bergamot	2'	F			X	X
<i>Oenothera biennis</i>	common evening primrose	3–4'	F				X
<i>Paeonia</i> spp.	peony	3'	FP			X	
<i>Prunella vulgaris</i>	selfheal	1'	FP	zones 4–5		X	
<i>Rudbeckia fulgida</i> 'Goldsturm'	Goldsturm black-eyed Susan	2'	FP		X	X	
<i>Rudbeckia hirta</i> 'Gloriosa'	gloriosa daisy	3'	FP		X	X	
<i>Rumex</i> spp.	docks	2'	FP		X		
<i>Sedum albo-roseum</i>	pink live forever	2'	A		X	X	
<i>Sedum spectabile</i>	sedum	2'	A		X	X	
<i>Solidago nemoralis</i>	gray goldenrod	2'	F			X	
<i>Solidago rigida</i>	stiff goldenrod	4'	F			X	

Table 4 (continued). Butterfly and moth garden plants.

Scientific name	Common name	Height	Sun	Comments	Cat	AB	AM
Biennials/perennials							
<i>Solidago rugosa</i>	rough stemmed goldenrod	1–7'	F			X	
<i>Solidago speciosa</i>	showy goldenrod	3'	F			X	
<i>Thymus vulgaris</i>	thyme	1'	F	zone 5		X	
<i>Trifolium pratense</i>	red clover	1.5'	F			X	
<i>Vicia</i> spp.	vetch	3'	F			X	
<i>Viola</i> spp.	violets	1'	A		X		
Trees, shrubs, vines							
<i>Acer negundo</i>	boxelder	75'	FP		X		
<i>Aristolochia durior</i>	Dutchman's pipe	30'	FP	zones 4–5	X		
<i>Betula</i> spp.	birch	—	FP		X		
<i>Ceanothus americanus</i>	New Jersey tea	3'	FP			X	
<i>Cephalanthus occidentalis</i>	buttonbush	12'	FP	zones 4–5		X	
<i>Clethra alnifolia</i>	sweet pepperbush	6'	FP	zones 4–5		X	
<i>Ledum groenlandicum</i>	Labrador tea	3'	FP			X	
<i>Lindera benzoin</i>	spicebush	15'	A	zones 4–5	X		
<i>Philadelphus coronarius</i>	sweet mockorange	9'	FP			X	
<i>Populus</i> spp.	poplar	—	A		X		
<i>Prunus</i> spp.	stone fruits (e.g., plum, cherry)	—	F			X	
<i>Quercus</i> spp.	oak	—	F		X		
<i>Rubus allegheniensis</i>	wild blackberry	6'	FP			X	
<i>Salix discolor</i>	pussy willow	10–20'	F			X	
<i>Salix humilis</i> var. <i>microphylla</i>	prairie willow	4'	F		X		
<i>Salix nigra</i>	black willow	50'	FP	zones 4–5	X	X	
<i>Salix pentandra</i>	laurel willow	36'	FP		X	X	
<i>Spirea alba</i>	narrowleaf meadowsweet	4'	F			X	
<i>Spirea latifolia</i>	broadleaf meadowsweet	6'	A			X	
<i>Spirea tomentosa</i>	hard hack	4'	A			X	
<i>Symphoricarpos occidentalis</i>	wolfberry	6'	A		X		
<i>Symphoricarpos orbiculatus</i>	coralberry	3'	A		X		
<i>Syringa</i> x <i>hyacinthiflora</i>	Canadian lilac	16'	FP	zones 4–5		X	
<i>Syringa josiflexa</i>	Chinese/Hungarian lilac	15'	FP	zones 4–5		X	
<i>Syringa meyeri</i>	dwarf Korean lilac	5'	FP	zones 4–5		X	
<i>Syringa patula</i> 'Miss Kim'	Miss Kim Korean lilac	4'	FP	zones 4–5		X	
<i>Syringa</i> x <i>prestoniae</i>	Preston lilac	10'	FP			X	
<i>Weigelia florida</i>	weigelia	9'	F	zones 4–5			X

Table 5. Checklist of Minnesota butterflies. (Based upon Ronald L. Huber's list, originally published September, 1981. Nomenclature updated 9/95.)

Superfamily HESPERIOIDEA	<input type="checkbox"/> Common Banded Skipper <i>Hesperia comma assiniboia</i>	<input type="checkbox"/> Dusted Skipper <i>Atrytonopsis bianna</i>	<input type="checkbox"/> Pink-edged Sulphur <i>Colias interior</i>
Family HesperIIDae	<input type="checkbox"/> Laurentian Skipper <i>Hesperia comma laurentina</i>	<input type="checkbox"/> Pepper and Salt Skipper <i>Amblyscirtes hegona</i>	<input type="checkbox"/> Dogface <i>Colias cesonia</i>
<u>Subfamily Pyrginae</u>	<input type="checkbox"/> Ottoo Skipper <i>Hesperia ottoo</i>	<input type="checkbox"/> Roadside Skipper <i>Amblyscirtes vialis</i>	<input type="checkbox"/> Cloudless Sulphur <i>Phoebis sennae</i>
<input type="checkbox"/> Silver-spotted Skipper <i>Epargyreus clarus</i>	<input type="checkbox"/> Leonard's Skipper <i>Hesperia leonardus</i>	<input type="checkbox"/> Eufala Skipper <i>Lerodea eufala</i>	<input type="checkbox"/> Orange-barred Sulphur <i>Phoebis philea</i>
<input type="checkbox"/> Hoary Edge <i>Achalarus lyciades</i>	<input type="checkbox"/> Pawnee Skipper <i>Hesperia leonardus pawnee</i>		<input type="checkbox"/> Mexican Sulphur <i>Eurema mexicana</i>
<input type="checkbox"/> Southern Cloudy Wing <i>Thorybes bathyllus</i>	<input type="checkbox"/> Pahaska Skipper <i>Hesperia pahaska</i>	Superfamily PAPILIONOIDEA	<input type="checkbox"/> Little Sulphur <i>Eurema lisa</i>
<input type="checkbox"/> Northern Cloudy Wing <i>Thorybes pylades</i>	<input type="checkbox"/> Cobweb Skipper <i>Hesperia metea</i>	Family Papilionidae	<input type="checkbox"/> Dainty Sulphur <i>Nathalis iole</i>
<input type="checkbox"/> Dreamy Dusky Wing <i>Erynnis icelus</i>	<input type="checkbox"/> Dakota Skipper <i>Hesperia dacotae</i>	<u>Subfamily Papilioninae</u>	
<input type="checkbox"/> Sleepy Dusky Wing <i>Erynnis brizo</i>	<input type="checkbox"/> Indian Skipper <i>Hesperia sassacus</i>	<input type="checkbox"/> Pipevine Swallowtail <i>Battus philenor</i>	<input type="checkbox"/> Family Lycaenidae
<input type="checkbox"/> Juvenal's Dusky Wing <i>Erynnis juvenalis</i>	<input type="checkbox"/> Peck's Skipper <i>Polites peckius</i>	<input type="checkbox"/> Zebra Swallowtail <i>Eurytides marcellus</i>	<u>Subfamily Miletinae</u>
<input type="checkbox"/> Horace's Dusky Wing <i>Erynnis boratius</i>	<input type="checkbox"/> Tawny-edged Skipper <i>Polites themistocles</i>	<input type="checkbox"/> Black Swallowtail <i>Papilio polyxenes</i>	<input type="checkbox"/> Harvester <i>Feiseca tarquinius</i>
<input type="checkbox"/> Mottled Dusky Wing <i>Erynnis martialis</i>	<input type="checkbox"/> Crossline Skipper <i>Polites origenes origenes</i>	<input type="checkbox"/> Giant Swallowtail <i>Papilio cresphontes</i>	<u>Subfamily Lycaeninae</u>
<input type="checkbox"/> Columbine Dusky Wing <i>Erynnis lucilius</i>	<input type="checkbox"/> Long Dash <i>Polites mystic</i>	<input type="checkbox"/> Tiger Swallowtail <i>Papilio glaucus</i>	<input type="checkbox"/> American Copper <i>Lycaena phlaeas</i>
<input type="checkbox"/> Wild Indigo Dusky Wing <i>Erynnis baptisiae</i>	<input type="checkbox"/> Northern Broken Dash <i>Wallengrenia egeremet</i>	<input type="checkbox"/> Spicebush Swallowtail <i>Papilio troilus</i>	<input type="checkbox"/> Great Copper <i>Lycaena dione</i>
<input type="checkbox"/> Persius Dusky Wing <i>Erynnis persius</i>	<input type="checkbox"/> Little Glassywing <i>Pompeius verna</i>	Family Pieridae	<input type="checkbox"/> Bronze Copper <i>Lycaena hyllus</i>
<input type="checkbox"/> Grizzled Skipper <i>Pyrgus centaureae</i>	<input type="checkbox"/> Sachem <i>Atalopedes campestris</i>	<u>Subfamily Pierinae</u>	<input type="checkbox"/> Bog Copper <i>Lycaena epixanthe</i>
<input type="checkbox"/> Checkered Skipper <i>Pyrgus communis</i>	<input type="checkbox"/> Arogos Skipper <i>Atrytone arogos</i>	<input type="checkbox"/> Pine White <i>Neophasia menapia</i>	<input type="checkbox"/> Dorcas Copper <i>Lycaena dorcas</i>
<input type="checkbox"/> Common Sooty Wing <i>Pholisora catullus</i>	<input type="checkbox"/> Delaware Skipper <i>Atrytone logan</i>	<input type="checkbox"/> Checkered White <i>Pontia protodice</i>	<input type="checkbox"/> Purplish Copper <i>Lycaena belloides</i>
<u>Subfamily Heteropterinae</u>	<input type="checkbox"/> Mulberry Wing <i>Poanes massasoit</i>	<input type="checkbox"/> Western Checkered White <i>Pontia occidentalis</i>	<u>Subfamily Theclinae</u>
<input type="checkbox"/> Arctic Skipper <i>Carterocephalus palaemon</i>	<input type="checkbox"/> Hobomok Skipper <i>Poanes hobomok</i>	<input type="checkbox"/> Mustard White <i>Pieris napi</i>	<input type="checkbox"/> Coral Hairstreak <i>Satyrium titus</i>
<u>Subfamily Hesperiiinae</u>	<input type="checkbox"/> Broad-winged Skipper <i>Poanes viator</i>	<input type="checkbox"/> European Cabbage Butterfly <i>Pieris rapae</i>	<input type="checkbox"/> Acadian Hairstreak <i>Satyrium acadicum</i>
<input type="checkbox"/> Least Skipper <i>Ancyloxypha numitor</i>	<input type="checkbox"/> Dion Skipper <i>Euphyes dion</i>	<u>Subfamily Anthocharinae</u>	<input type="checkbox"/> Edwards' Hairstreak <i>Satyrium edwardsii</i>
<input type="checkbox"/> Poweshiek Skipperling <i>Oarisma poweshiek</i>	<input type="checkbox"/> Black Dash <i>Euphyes conspicuus</i>	<input type="checkbox"/> Large Marble <i>Euchloe ausonides</i>	<input type="checkbox"/> Banded Hairstreak <i>Satyrium calanus</i>
<input type="checkbox"/> Garita Skipperling <i>Oarisma garita</i>	<input type="checkbox"/> Two-spotted Skipper <i>Euphyes bimacula</i>	<input type="checkbox"/> Olympian Marble <i>Euchloe olympia</i>	<input type="checkbox"/> Hickory Hairstreak <i>Satyrium caryaevorum</i>
<input type="checkbox"/> European Skipper <i>Thymelicus lineola</i>	<input type="checkbox"/> Dun Skipper <i>Euphyes vestris</i>	<u>Subfamily Coliadinae</u>	<input type="checkbox"/> Striped Hairstreak <i>Satyrium liparops</i>
<input type="checkbox"/> Fiery Skipper <i>Hylephila phylenus</i>		<input type="checkbox"/> Common (clouded) Sulphur <i>Colias philodice</i>	<input type="checkbox"/> Olive Hairstreak <i>Mitoura grynea</i>
<input type="checkbox"/> Uncas Skipper <i>Hesperia uncas</i>		<input type="checkbox"/> Alfalfa Butterfly <i>Colias eurytheme</i>	<input type="checkbox"/> Brown Elfin <i>Incisalia augustinus</i>
		<input type="checkbox"/> Giant Sulphur <i>Colias gigantea</i>	

Family Lycaenidae (cont'd.)

Subfamily Theclinae (cont'd.)

- Hoary Elfin
Incisalia polia
- Frosted Elfin
Incisalia irus
- Henry's Elfin
Incisalia henrici
- Eastern Pine Elfin
Incisalia nippon
- Western Pine Elfin
Incisalia eryphon
- Gray Hairstreak
Strymon melinus

Subfamily Polyommatainae

- Marine Blue
Leptotes marina
- Reakirt's Blue
Hemiargus isola
- Eastern Tailed Blue
Everes comyntas
- Western Tailed Blue
Everes amyntula
- Spring Azure
Celastrina argiolus
- Silvery Blue
Glaucopsyche lygdamus
- Northern Blue
Lycæides idas
- Karner Blue
Lycæides melissa samuelis
- Melissa Blue
Lycæides melissa melissa
- Greenish Blue
Plebejus saepiolus
- Acmon Blue
Plebejus acmon

Family Riodinidae

Subfamily Riodininae

- Swamp Metalmark
Calephelis mutica

Family Libytheidae

- Snout Butterfly
Libytheana carinenta

Family Heliconiidae

Subfamily Heliconiinae

- Gulf Fritillary
Agraulis vanillae

Family Nymphalidae

Subfamily Argynninae

- Variegated Fritillary
Euphieta claudia

- Great Spangled Fritillary
Speyeria cybele

- Aphrodite
Speyeria aphrodite

- Regal Fritillary
Speyeria idalia

- Atlantis Fritillary
Speyeria atlantis

- Mormon Fritillary
Speyeria mormonia

- Bog Fritillary
Boloria eunomia

- Silver-bordered Fritillary
Boloria selene

- Meadow Fritillary
Boloria bellona

- Frigga Fritillary
Boloria frigga

- Freija Fritillary
Boloria freija

- Titania Fritillary
Boloria titania

Subfamily Melitaeinae

- Bordered Patch
Chlosyne lacinia adjustrix

- Gorgone Checkerspot
Chlosyne gorgone

- Silvery Checkerspot
Chlosyne nycteis

- Harris' Checkerspot
Chlosyne harrisi

- Texas Crescent
Phyciodes texana

- Pearl Crescent
Phyciodes tharos

- Tawny Crescent
Phyciodes batesii

- Northern Crescent
Phyciodes cocyta

- Anicia Checkerspot
Euphydryas anicia

- Baltimore Checkerspot
Euphydryas phaeton

Subfamily Nymphalinae

- Question Mark
Polygonia interrogationis

- Hop Merchant or Comma
Polygonia comma

- Satyr Anglewing
Polygonia satyrus

- Green Comma
Polygonia faunus

- Hoary Comma
Polygonia gracilis

- Gray Comma
Polygonia progne

- Compton's Tortoise Shell
Nymphalis vaau-album

- Mourning Cloak
Nymphalis antiopa

- Milbert's Tortoise Shell
Nymphalis milberti

- American Painted Lady
Vanessa virginiensis

- Painted Lady
Vanessa cardui

- Red Admiral
Vanessa atalanta

- Buckeye
Junonia coenia

Subfamily Limenitidinae

- White Admiral
Limenitis arthemis arthemis

- Banded Purple
Limenitis arthemis X proserpinus

- Red-spotted Purple
Limenitis arthemis astynax

- Viceroy
Limenitis archippus

- Amymone
Mestra amymone

Subfamily Danainae

- Monarch
Danaus plexippus

Family Apaturidae

Subfamily Apaturinae

- Hackberry Emperor
Asterocampa celtis

- Tawny Emperor
Asterocampa clyton

Family Satyridae

Subfamily Elymninae

- Northern Pearly Eye
Enodia anthedon

- Eyed Brown
Satyroides eurydice

- Appalachian Eyed Brown
Satyroides appalachia

Subfamily Satyrinae

- Little Wood Satyr
Megisto cymela

- Common Ringlet
Coenonympha tullia

- Common Wood Nymph
Ceryonis pegala

- Disa Alpine
Erebia disa

- Red-disked Alpine
Erebia discoidalis

- Macoun's Arctic
Oeneis macouni

- Uhler's Arctic
Oeneis ubleri

- Jutta Arctic
Oeneis jutta

Date _____

Time _____

Conditions _____

Location _____

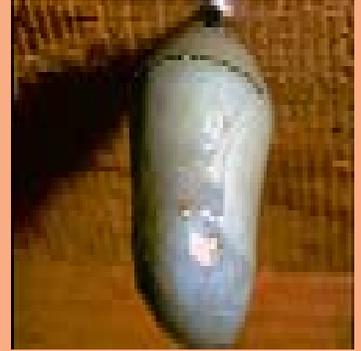
Observers _____

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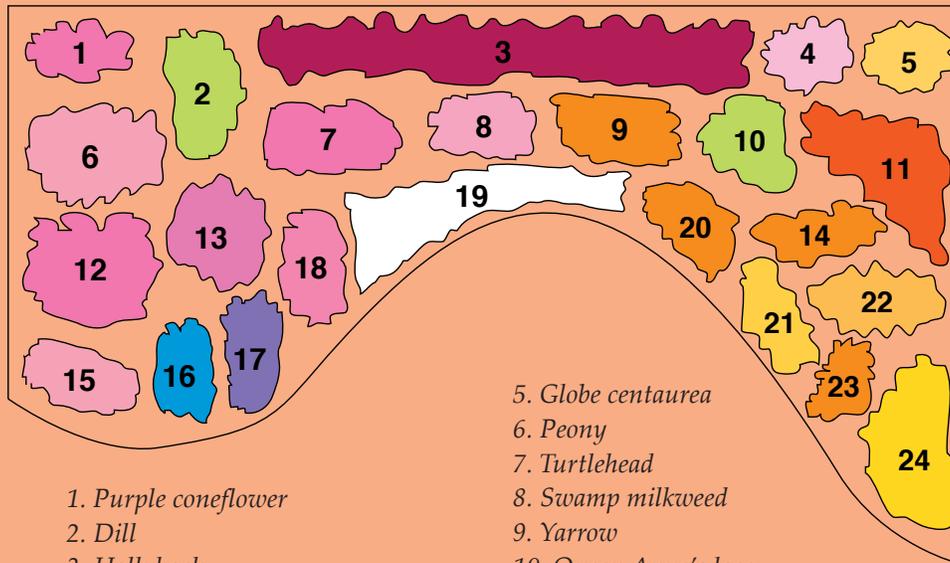


**James Ford
Bell Museum of
Natural History**

Monarch Butterfly Life Cycle: Adult feeds on nectar to supply nutrients and energy for flight and reproduction; female lays single eggs on an appropriate host plant; larval caterpillar forms grow through several molting stages; chrysalis is formed by the caterpillar, in which its metamorphosis into the adult butterfly form occurs.



Butterfly border gardens should have a large variety of plants to provide the specific larval hosts needed by butterflies. Adult butterflies feed on the nectar of a wide variety of flowers.



- 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



Butterflies and Caterpillars: It is important to be able to identify the appropriate caterpillars that will grow into the butterflies you want in your garden, and distinguish them from pests you should remove (left to right: Nymphalidae: Variegated Fritillary, Nymphalidae: Mourning Cloak, Nymphalidae: Monarch, Papilionidae: Tiger Swallowtail, Pieridae: Sulphur.

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