sand or mud. Males will often gather at wet sand patches and mud puddles. This phenomenon, called puddling, provides minerals and other nutrients that the males "gift" to females during mating. Experiment with wet sand patches to see if butterflies will use them.

Finally, many enthusiasts "sugar" their gardens to attract butterflies. They mash together a mixture of overripe fruit and stale beer. After letting the mixture warm in the sun a bit, they either paint it on tree trunks or soak sponges in it and tie the sponges to low-lying branches. The latter procedure has the advantage of not marking the trees, but it does obscure the attractive background of natural tree bark. Though the brew may sound less than delicious, it often is effective in drawing shier butterflies into the garden where the watcher can see them.

Enjoying Butterflies

With the publication of useful field guides, butterfly watching has grown more popular. All the hobby requires is an interest in butterflies, a notebook to record species, place, and time of sighting, and a basic knowledge of where to find butterflies. Low-magnification binoculars are optional, as most butterflies allow observers to get close enough for identification and careful observation. Other pieces of equipment that might come in handy are a hand lens for close scrutiny and a net and forceps for temporary capture and observation.

Unlike bird watching, butterfly watching does not require getting up at dawn. Since the insects must be warm in order to fly, most do not emerge from their overnight shelter until mid-morning, around nine or ten o'clock.

For More Information

Books

Lewis, A., ed. *Butterfly gardens: Luring nature's loveliest pollinators to your yard.* New York: Brooklyn Botanic Garden, 1995. (Features an extensive list of host and nectar plants along with color photos.)

Glassberg, J. *Butterflies through binoculars: The East.* Oxford University Press, 1999. (An excellent field guide for identifying butterflies. Also includes information on butterfly photography.)

Opler, P. A., and Malihai, V. *Eastern butterflies* (Peterson Field Guides). New York: Houghton Mifflin Co., 1998. (Field guide featuring descriptions of 524 butterflies. Includes pictures, drawings, and range maps.)

Xerces Society. *Butterfly gardening.* Sierra Club Books, 1998. (Describes ways to attract butterflies and other beneficial insects to your garden. Includes a "master plant list" of species that attract butterflies; butterfly food plants, seeds, and plant sources; and a bibliography.)

Newsletters

American Butterflies and *Butterfly Garden News* are quarterly publications available through The North American Butterfly Association. For more information, contact the association at NABA, 4 Delaware Road, Morristown, NJ, 07960.

Butterfly Gardeners' Quarterly, PO Box 30931, Seattle, WA 98103

Web sites

The Butterfly Zone (www.butterflies.com) has a great guide to butterfly gardening.

The Butterfly Website (www.butterfly-website.com) includes tips for gardening as well as many links to other butterfly sites.

The National Wildlife Federation (www.nwf.org) has many informative pages about butterflies.

Monarch Watch (www.monarchwatch.org) is maintained by the University of Kansas Department of Entomology and the University of Minnesota Department of Ecology. The site contains a wealth of information about monarchs. Included are curricula for elementary and middle school classes as well as research and conservation projects suitable for classes or individuals.

North American Butterfly Association (www.naba.org) is a membership-based organization dedicated to increasing public enjoyment and conservation of butterflies. Members receive the newsletter *Butterfly Gardener.*

Authors
Judith Mank, graduate research assistant, and Margaret C. Brittingham, associate professor of wildlife resources

Acknowledgments
Partial funding for this fact sheet was provided by Pennsylvania's Wild Resource Conservation Fund.

Illustrations
Jeffery Mathison

PENNSTATE
1855
College of Agricultural Sciences
Agricultural Research and Cooperative Extension

Visit Penn State's College of Agricultural Sciences on the Web: **www.cas.psu.edu**

Penn State College of Agricultural Sciences research, extension, and resident education programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

This publication is available from the Publications Distribution Center, The Pennsylvania State University, 112 Agricultural Administration Building, University Park, PA 16802. For information telephone 814-865-6713.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Cooperative Extension is implied.

This publication is available in alternative media on request.

 Produced by Ag Communications and Marketing

Code #UH139 R7.5M04/08mpc4205

PENNSYLVANIA WILDLIFE NO. 8

Gardening for Butterflies

Butterflies have long fascinated people with their beautiful wings and whimsical flight. They also are extremely important ecologically. Butterflies pollinate flowering plants and serve as food for other organisms, thus forming an important link in the food chain. Populations have declined in recent decades, owing to increased pesticide use (especially herbicides); loss of fencerows; urbanization and other destruction of habitat; and loss of caterpillar host and nectar plants. Managing your garden for butterflies can help conserve butterfly populations as well as greatly enhance a traditional garden.

There are about 750 butterfly and skipper species in North America, and about ten times that number of moths. Butterflies, moths, and skippers combined form the order of insects named Lepidoptera, meaning "scaly winged." The wings are covered with thousands of tiny scales, which form the spots and stripes that we see. Skippers are considered an intermediate form between moths and butterflies. The body shape is similar to a moth's, but skippers are active during the day, like butterflies. One hundred forty-six species of butterflies and skippers have been reported in Pennsylvania. Of these, twenty-four have been documented only a few times and should be considered rare visitors.

Butterfly Life Cycle

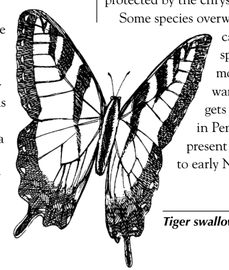
The life of a butterfly is marked by four vastly different stages: egg, caterpillar, pupa, and adult. The egg hatches into a caterpillar, which immediately feeds on the leaf of the plant where it has hatched. In fact, rapid growth is the main objective of the caterpillar stage. You can see this reflected in the caterpillar's body structure—primarily a set of strong jaws for chewing and a digestive tract for processing food.

The caterpillar grows and molts, shedding its exoskeleton when that becomes too small. After four to six molts, the caterpillar pupates, or transforms. The new stage is termed the pupa, and the covering around the caterpillar is called a chrysalis (or cocoon, for moths). Protected inside the chrysalis, many of the caterpillar's body structures dissolve and reform into the distinctive butterfly shape.

Adult butterflies of most species emerge from the chrysalis 10 to 15 days later. They unfold and dry their wings, which must harden before they can fly. Adult butterflies feed on nectar, the sweet liquid in flowers. Adults mate during this stage, and the female deposits her eggs on an appropriate plant.

In temperate regions some butterfly species, such as mourning cloaks and many tortoiseshells, hibernate as adults during the winter. Many more, like checkerspots and fritillaries, overwinter as pupae, protected by the chrysalis from the cold.

Some species overwinter as eggs and caterpillars. A few species, such as monarchs, migrate to warmer areas when it gets too cold for them; in Pennsylvania they are present only from late May to early November.



Tiger swallowtail

Butterflies are cold blooded and must depend on their environment for heat. To fly, their body temperature needs to be greater than 75°F. On cooler days they often bask with outstretched wings on a rock or other flat surface to store up heat energy. The dark patterns on many butterfly wings help the insects absorb solar energy. On cloudy, cool, or windy days, most butterflies remain in protected spots. You are likely to spot them in warm, sunny, calm areas where flowering plants can supply the butterflies with nectar.

Gardening for Butterflies

Because butterflies are attracted to flowers, it is easy to plant a garden that both you and they can enjoy. Some of the species you may attract are listed in the table at right. A butterfly-friendly garden contains both adult nectar plants and caterpillar host plants. A few common vegetables also serve as caterpillar host plants. Many butterfly gardeners plant extra vegetables, enough for them and their caterpillars. As an added bonus, butterfly gardens often attract hummingbirds.

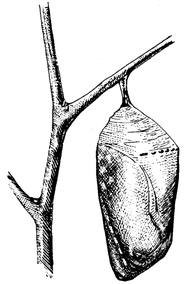
A successful butterfly garden has several basic elements, listed below.

A sunny location

Since butterflies are cold blooded and need to be warm to fly and feed, you should plant your garden in a sunny area sheltered from the wind. Storms and windy days can batter a butterfly to bits. If there is no natural shelter, plant a windscreen such as butterfly bush or another flowering shrub that can provide both food and shelter.

Host and nectar plants

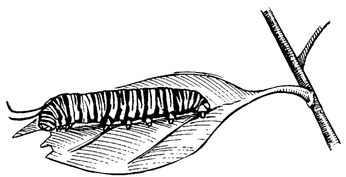
Choose the appropriate plants with a knowledge of butterflies common in your area, as well as their host and nectar plants. Caterpillars often restrict themselves to a single species of host plant or a single group of closely related plants. Caterpillar host plants of some common Pennsylvania butterflies are listed in the table at right.



Monarch chrysalis

Adult butterflies are more flexible in their needs for nectar plants. Generally they prefer purple, red, yellow, orange, or pink blossoms; flat-topped or clustered flowers; and short flower tubes. A well-planned butterfly garden has blooming flowers throughout spring, summer, and early autumn. This provides a continuous food source and plants of varying heights to accommodate large and small butterflies. Examples of adult nectar plants are listed in the table at right. Butterflies also are attracted to weedy areas, so an area left unmowed and allowed to grow will further entice butterflies into your yard.

It is desirable to plant both caterpillar host plants and nectar plants in clusters. Butterflies are more attracted to groupings of flowers than to a single plant with a few blooms. Many cultivated flowers have been selected for their appearance, not for their fragrance or the amount of nectar they contain. Therefore, it is often better to choose common varieties for butterfly gardens instead of fancier hybrids. Common varieties may produce more nectar for the insects.



Monarch caterpillar

Minimal or no pesticide use

Limit your use of insecticides and herbicides, if you use them at all. Insecticides kill beneficial insects as well as those considered a nuisance. Herbicides are damaging to butterflies because they may eliminate sources of food for caterpillars and may poison them. For these reasons, areas managed for butterfly conservation should have minimal or no pesticide or herbicide application.

A particular pest species often is associated with a specific type of plant. By having a variety of plants, you reduce the potential for pest problems and, thus, the need for chemical controls.

Additional enhancements

Several other elements can be added to enhance a butterfly garden. Place a few rocks in sunny areas to give the butterflies a good basking surface. Also provide wet

Continued on page 5

Common Pennsylvania Butterflies That Frequent Gardens

Group	Characteristics	Examples
Whites and sulphurs	White or yellow wings with black borders and spots	Cabbage white, orange sulphur, clouded sulphur
Swallowtails	Tail-like projections from hind wing	Spicebush swallowtail, eastern tiger swallowtail
Satyrs and wood nymphs	Eyespots on upper- and undersides of wings on a brownish field	Little wood satyr, northern pearly-eye
Fritillaries	Orange wings with dark spots and bars on upper wings; pearly spots on undersides	Great spangled fritillary, meadow fritillary
Anglewings and tortoiseshells	Irregularly shaped wing borders; orange upper wings with dark blotches and borders, drab undersides	Green comma, mourning cloak
Coppers	Copper or orange wings	Little copper
Metalmarks	Small metallic-looking spots or lines on wings	Northern metalmark
Hairstreaks and blues	Hairlike tails on hind wings; blue, brown, or whitish upper wings	Coral hairstreak, eastern tailed blue
Skippers	"Skipping" flight pattern; small, stout body; brown, orange, or black in color; hooked antennae	Checkered skipper, silver-spotted skipper
Milkweed butterflies	Orange and black; feed on milkweed	Monarch

Host Plants (Caterpillars)

Common Name	Scientific Name	Growth Type	Caterpillars Attracted
Aster	*Aster* spp.	Perennial	Pearl crescent
Birch	*Betula* spp.	Deciduous tree	Mourning cloak
Black cherry	*Prunus serotina*	Deciduous tree	Red-spotted purple, spring azure
Clover	*Trifolium* spp.	Perennial or biennial	Clouded sulphur, orange sulphur, gray hairstreak
Cottonwood	*Populus* spp.	Deciduous tree	Tiger swallowtail
Dill	*Anethum graveolens*	Annual	Black swallowtail
Dogwood	*Cornus* spp.	Deciduous shrub or tree	Spring azure
Hibiscus	*Hibiscus* spp.	Deciduous shrub or tree; annual and perennial	Gray hairstreak, common checkered skipper
Hollyhock	*Alcea* spp.	Biennial	Painted lady, common checkered skipper
Milkweed	*Asclepias* spp.	Perennial and annual	Monarch
Mustard	*Brassica* spp.	Biennial	Cabbage butterfly
Nettles	*Urtica* spp.	Perennial	Eastern comma, question mark, red admiral
Parsley	*Petroselinum crispum*	Biennial	Black swallowtail
Sassafras	*Sassafras albidum*	Deciduous shrub or tree	Spicebush swallowtail
Snapdragon	*Antirrhinum* spp.	Perennial or annual	Buckeye
Spicebush	*Lindera benzoin*	Deciduous shrub	Spicebush swallowtail
Tulip tree	*Liriodendron tulipifera*	Deciduous tree	Tiger swallowtail
Violet	*Viola* spp.	Perennial	Fritillaries
Willow	*Salix* spp.	Deciduous tree	Mourning cloak, viceroy

Nectar Plants (Adults)

Common Name	Scientific Name	Growth Type	Bloom Period
Aster	*Aster* spp.	Perennial	July—September
Azalea	*Rhododendron* spp.	Evergreen or deciduous shrub or tree	Varies by species
Bee balm, monarda	*Monarda* spp.	Perennial	Varies by variety
Blackberry, raspberry	*Rubus* spp.	Deciduous shrub	May—June
Black-eyed susan	*Rudbeckia hirta*	Perennial	July—August
Blazing star	*Liatris* spp.	Perennial, biennial, or annual	May—June
Butterfly weed	*Asclepia tuberosa*	Perennial	June—September
Buttonbush	*Cephalanthus occidentalis*	Deciduous shrub or tree	July—August
Coreopsis	*Coreopsis lanceolata*	Perennial or annual	Varies by species
Cosmos	*Cosmos* spp.	Perennial or annual	June—frost
Gayfeather, liatris	*Liatris* spp.	Perennial	July—September
Geranium	*Geranium* spp.	Perennial	April—June
Goldenrod	*Solidago* spp.	Perennial	July—September
Ironweed	*Vernonia* spp.	Perennial	June—August
Joe-pye weed	*Eupatorium purpureum*	Perennial	Varies by species
Lantana	*Lantana* spp.	Annual	Varies by species
Lilac	*Syringa vulgaris*	Deciduous shrub	May
Marigold	*Tagetes* spp.	Annual	June—frost
Milkweed	*Asclepias* spp.	Perennial	Varies by species
Phlox	*Phlox drummondi*	Perennial	June—August
Purple coneflower	*Echinacea*	Perennial	July—September
Sunflower	*Helianthus* spp.	Annual	Varies by species
Sweet pepperbush	*Clethra alnifolia*	Deciduous shrub	July—August
Trumpet honeysuckle	*Lonicera sempervirens*	Deciduous vine	Varies by variety
Verbena	*Verbena* spp.	Perennial	June—frost
Zinnia	*Zinnia* spp.	Annual	July—September