

of RM by a simple heat treatment program. Florida Southern College is engaged in such a program, and will offer virus-free material to commercial nurseries, to the extent that time and facilities will permit. Since RM is believed never to spread by natural means, there is no legitimate excuse for its continued existence in American rose nurseries and gardens. Improved growth and more flowers of higher quality may be expected from disease-free plants.

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BUTTERFLIES IN THE GARDEN

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Abstract. The numbers of butterflies can be increased by providing suitable nectar plants for the adults and food plants for the caterpillars. Some of the better nectar plants are Spanish needle, lantana, thistle, zinnia, butterfly bush, and butterfly weed. Two useful host plants are passion-flower vines *Passiflora* spp. and *Cassia* spp. Butterfly gardening can help reverse the decline of numbers due to loss of native hosts.

A beautiful butterfly slowly fluttering by is a sight that most of us treasure. Butterflies are often mere transients in our lives appearing only briefly before disappearing into someone else's yard. What can we do to make our contacts with butterflies more frequent and longer?

Bird lovers have had information for years on how to attract and keep birds in their yard. Basically, the advice can be grouped into two categories: 1) providing food and 2) providing suitable habitat for nesting. The same factors have been shown to be effective in attracting and keeping butterflies in butterfly gardens in Great Britain (9,15). In recent years, several articles have appeared containing information on butterfly gardening in the United States (2,10,11,13) and in Florida (5,6,7,14).

There has been no agreement on the number of butterfly species occurring in Florida since some lists include all records and others exclude strays. Emmel (3) reported 144, Emmel and Nation (4) reported 160+ and Kimball (8) recorded about 170 species. Baggett (1) estimated that nearly twenty percent of the butterflies recorded from Florida are infrequent strays and that another 5% may be recently introduced and/or temporary residents.

While butterflies are beneficial as pollinators and generally pleasing aesthetically, the caterpillars of a few species

are economically important. Some of the more important injurious species are the cabbage butterfly *Pieris rapae* L. which feeds on cabbage, broccoli, cauliflower, and other crucifers; the bean leaf roller (also known as the long tailed skipper) *Urbanus proteus* L. which feeds on beans and other legumes; the black swallowtail *Papilio polyxenes* F. feeds on carrots, dill, parsley, and some other Umbelliferae; the greater canna leaf roller (also known as Brazilian skipper) *Calpodex ethlius* Stoll feeds on canna; and the fiery skipper *Hylephila phyleus* Drury feeds on lawn grasses. There are others which are occasional pests such as the giant swallowtail (orange dog) *Papilio cresphontes* Cramer which feeds on citrus foliage.

Butterflies are attracted to flowers with nectar. Since butterflies cannot hover in flight like hawkmoths (Sphingidae) and hummingbirds, there must be room on the flower for the butterfly to perch. The length of the butterfly's proboscis will also determine which flowers are suitable for feeding. A list of preferred nectar sources would vary greatly depending upon the butterfly species, season of the year, and the proximity of other flowers. While some plant species flower throughout the year, others bloom for only a few weeks. Flower characteristics such as color, height from the ground, relative abundance, position and shape on the plant may influence preference (12).

A partial list of butterfly nectar plants is shown in Table 1. The list is incomplete and could be expanded many fold. It is a mixture of wild and cultivated plants some native, some introduced, a few trees and many herbs. Two plants, butterfly bush and butterfly weed, are well known as favorites of butterflies. Butterfly bush is an introduced plant not commonly planted but which deserves more attention from butterfly gardeners. The flowers resemble lilac and can be white, pink, red, purple or shades in between. In Great Britain butterflies prefer the purple varieties (9,15) but in north central Florida, white varieties attract more butterflies (G. Buckingham, personal communication). Butterfly weed in a native milkweed that grows in dry sandy areas. The orange flowers are very attractive to butterflies. Spanish needle is a common widespread weed with seeds that stick to clothing. Most people do not want it in their yard, but it is one of the best butterfly plants. It blooms throughout the year and attracts a wide variety of

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Table 1. A selected list of flowers attractive to butterflies in Florida.

Common Name	Scientific Name	Native
Alyssum	<i>Lobularia</i> spp.	no
Annual Phlox	<i>Phlox drummondii</i>	yes
Blazing Star	<i>Liatris</i> spp.	yes
Butterfly Bush	<i>Buddleja</i> spp.	no
Butterfly Weed	<i>Asclepias tuberosa</i>	yes
Candytuft	<i>Iberis</i> spp.	no
Catnip	<i>Neptia</i> spp.	no
Gaillardia	<i>Gaillardia pulchellus</i>	yes?
Glossy Abelia	<i>Abelia grandiflora</i>	no
Goldenrod	<i>Solidago</i> spp.	yes
Honeysuckle	<i>Lonicera</i> spp.	yes
Horsesugar	<i>Symplocos tinctoria</i>	yes
Ironweed	<i>Vernonia</i> spp.	yes
Lantana	<i>Lantana camara</i>	yes
Mimosa	<i>Albizzia</i> spp.	no
New Jersey tea	<i>Ceanothus americanum</i>	yes
Pennyroyal	<i>Piloblethus rigida</i>	yes
Pickereel Weed	<i>Pontederia</i> spp.	yes
Scabiosa	<i>Scabiosa</i> spp.	no
Spanish Needle	<i>Bidens pilosa</i>	yes
Thistles	<i>Cardus</i> sp. <i>Cirsium</i> spp.	yes
Tick Seeds	<i>Coreopsis</i> spp.	yes
Tithonia	<i>Tithonia grandiflora</i>	no
Verbena	<i>Verbena</i> spp.	some
Zinnia	<i>Zinnia elegans</i>	no

butterflies. Lantana is another highly favored plant that blooms throughout the season. The multicolored flowers are very attractive, but the plant is poisonous and should be used with caution. Thistles are also excellent plants for butterflies, but they bloom for only a short period and the prickly leaves and flowers make them unacceptable in most yards. Mimosa and horse sugar flowers are very attractive to swallowtail butterflies. In the garden, zinnias, alyssum, tithonia, scabiosa, catnip, candytuft, verbena, and single marigolds (*Tagetes* spp.) are all good butterfly plants. Ironweed and goldenrod are excellent fall blooming plants that are perennial.

Observe the butterflies in your area to see which flowers they utilize. This can be done in your yard, your neighborhood, parks, plant nurseries, and along roadsides. Side by side comparisons of some of the plants in Table 1 will reveal which flowers are most attractive to butterflies. A lot of observations must be made in all parts of Florida before we really know all the plants that butterflies prefer.

Butterflies also need host plants on which to lay eggs. It is more difficult to provide food plants than nectar plants since most species have a rather narrow range of plants on which they can reproduce. Except for a few species with wide host ranges, generally only native plants are utilized for reproduction. The hosts vary from grasses to trees. Willow *Salix* spp. serves as a host for the viceroy *Limenitis archippus* Cramer. Monarch *Danaus plexippus* L. and queen *Danaus gillippus* Cramer butterflies develop on milkweeds *Asclepias* spp. Hackberry *Celtis occidentalis* L. and sugarberry *Celtis laevigata* Willd. are hosts of the hackberry butterfly *Asterocampa celtis* Boisduval & LeConte. *Ficus* spp. are hosts for ruddy dagger wings *Marpesia petreus* Cramer. Some of the trees and shrubs on which swallowtail larvae feed include: prickly ash *Xanthoxylum* spp., wild cherry *Prunus serotina* Ehrh., tulip tree *Liriodendron tulipifera* L. sassafras. *Sassafras albidum* (Nutt.) Nees, sweet bay *Magnolia*

virginiana L. camphor *Cinnamomum* spp., spicebush *Lindera* spp., and pawpaw *Asimina* spp.

Passion-flower vines *Passiflora* spp. serve as hosts for four butterfly species. These include: the gulf fritillary *Agraulis vanillae* L. the zebra *Heliconius charitonius* L., the Julia *Dryas iulia* L., and the variegated fritillary *Euptoieta claudia* Cramer. Passion-flower vine has very attractive flowers and will grow on a trellis or fence and occupy very little space. *Cassia* spp. are good host plants for several of the sulphur butterflies.

The environment of Florida is rapidly changing as the population continues to increase at a rapid pace. Urbanization is claiming more and more land for subdivisions, shopping centers, office buildings, cemeteries, and golf courses. Most of these areas are being landscaped with grasses and ornamentals that are primarily exotic. Meanwhile, agriculture while losing land to urbanization, is also expanding clearing existing woodlands and grasslands, draining low areas and generally changing diverse natural systems into monocultures of generally exotic species. Also, the multiplication and spread of paperbark *Melaleuca quinquerivna* (Cav.) S. T. Blake, Brazilian pepper *Schinus terebinthifolius* Raddi., Australian pine *Casuarina* sp. and many other weedy species have crowded out and replaced many of the native plants. As a result, the number of native plants has decreased greatly and more and more of our state is occupied by exotic plant species.

With the loss of native plants and the widespread use of pesticides, the numbers of many plant and animal species has declined. This decline will likely continue. The cultivation and preservation of nectar and food plants for butterflies is one small way in which this trend could be reversed.

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