

BUTTERFLIES OF THE SERPENTINE BARRENS OF PENNSYLVANIA¹

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The Philadelphia area is characterized by considerable diversity of butterfly species because the juxtaposition of two major ecological subdivisions of the United States produces a variety of habitats. These physiographic areas (the Atlantic Coastal Plain and the Piedmont region of the Appalachians) are divided by the Fall Line lying just South of the serpentine barrens which are found in certain parts of Delaware and Chester Counties, Pennsylvania. Four years of field work in these areas in Lima and Media, and particularly in the John J. Tyler (Painter) Arboretum in Lima, form the basis of this report. The barrens occur locally and are named for the underlying formations of serpentine or soil derived from this rock. The soil, for the most part, does not support the growth of trees except for occasional Willows and clumps of Sassafras. Various grasses cover the area as well as heavy growths of Ground Pink (*Phlox subulata*) and patches of Highbush Blackberry (*Rubus allegheniensis*), Choke Cherry (*Prunus virginiana*) and various ferns. The edges of the barrens, especially near streams, are characterized by the presence of Milkweed (*Asclepias syriaca*) and Joe-Pye-Weed (*Eupatorium purpureum*). Many species of butterflies are attracted to the open terrain of the barrens and visit wild flowers or maintain definite territorial areas within the area. Woodland species are often found at the periphery; many strong fliers follow prescribed routes which are retraced throughout the day.

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The food plants of many of the butterflies seen in the serpentine barrens are to be found in the surrounding wooded areas, old fields, roadsides, and waste places; however, all the species described herein were observed regularly within the barrens.

Family SATYRIDAE (The Meadow Browns)

Euptychia cymela Cramer (Little Wood Satyr)

A fairly common insect near the wooded borders of barrens, as well as in low brush. The flight is typically fluttering and erratic; the flight pattern is low, punctuated with many periods of rest. *E. cymela* is single brooded, feeding on grasses and overwintering as a partly grown larva. The adults may be found from mid May until early August.

Cercyonis alope Fabricius (Common Wood Nymph)

Very common, having weak flight similar to *E. cymela*, but easily distinguished by its larger size. It is found in the open areas of the barrens as well as near and in the woodlands. This butterfly is morphologically variable, individuals differ markedly as to shade of brown and size of ocelli on the wings. These forms partially reflect climatic and seasonal changes, also there is probably some overlap with a Southern species, *C. pegala*. *Alope* is single brooded in this region, where it is a breeding resident. The larvae feed on grasses after hibernation; adults fly from June to early September.

Family DANAIIDAE (The Monarchs)

Danaus plexippus Linnaeus (Monarch)

The larvae feed on Milkweeds (*Asclepias* spp.) in the serpentine barrens. Noxious substances contained in the Milkweed are assimilated protecting both larvae and adults from predation. The Monarch is bivoltine with adults flying from June to October; however, it is most common in the late fall. This strong and tireless flier is strongly attracted to Milkweed and Butterfly Weed (*A. tuberosa*). The migratory habits of this familiar species are well known. Northern migration in the spring is made individually or in small groups, in the fall great swarms of Monarchs move South.

Family NYMPHALIDAE (The Nymphs)

Subfamily NYMPHALINAE

Speyeria cybele Fabricius (Great Spangled Fritillary)

Often seen flying rapidly and high, frequently over a prescribed route. This Fritillary freely visits flowers such as Milkweed and Joe-Pye-Weed. The openness of the barrens is attractive to *S. cybele* whose food plant (*Viola* spp.) is found in the nearby wooded areas. It is on the wing from June to September.

Speyeria aphrodite Fabricius (Aphrodite Fritillary)

Much rarer than *S. cybele*, which it strongly resembles in flight. Its habits and food plants are the same as *S. cybele*.

Phyciodes tharos Drury (Pearl Crescent)

P. tharos is very common in this area, usually very active resting frequently on rocks, leaves, bare soil, or at mud puddles. A very pugnacious insect, it vigorously pursues any passing butterfly regardless of size, as well as dragonflies and grasshoppers. It is triple brooded with the eclosion of broods overlapping so that adults fly from late April to November. The larvae feed on *Aster* spp. found in abundance in the woods.

Polygonia interrogationis Fabricius (Question Mark)

Rather rare in the serpentine barrens, although generally common in Pennsylvania. It may be encountered from July to September flying swiftly along paths, stopping occasionally to rest on leaves in the sun. Nettle (*Urtica* spp.) and Elm (*Ulmus* spp.) are the local food plants.

Polygonia comma Harris (Comma)

Characteristics much as *P. interrogationis* but *P. comma* is more rarely seen.

Nymphalis antiopa Linnaeus (Mourning Cloak)

Frequently one of the first butterflies seen in spring as faded and torn hibernators appear on sunny days in February and March. It often flies in clumps of trees alighting on trunks. The first new brood emerges in June or July, the second brood is rarely seen since individuals hibernate immediately upon emerging in August or September. Adults are rarely attracted to flowers; larvae feed on Willow (*Salix* spp.).

Vanessa atalanta Linnaeus (Red Admiral)

A swift flier addicted to flowers especially Thistles (*Cirsium* spp.). Frequents open, sunny areas in the barrens, but also found in the surrounding woods. Adult hibernators are seen in April, hibernating pupae emerge in May. One brood flies in June and July, a second smaller brood is seen in August or September. The food plant is Stinging Nettle (*Urtica* spp.).

Vanessa virginiensis Drury (American Painted Lady)

This active, flower-loving species flies from June to October with 2-3 broods. Considerable individual variation may be found, wet weather forms are larger and more brightly colored than the "dry" forms. The larvae feed on Everlastings (species of *Gnaphalium*, *Antennaria*, and *Anaphalis*), Ironweed (*Vernonia* spp.), and Burdock (*Arctium* spp.).

Vanessa cardui Linnaeus (Painted Lady or Cosmopolite)

A wide-ranging, international butterfly preferring open fields in which it is an avid flower visitor. The numbers of *V. cardui* and *V. virginiensis* may fluctuate greatly from year to year. In Europe, *V. cardui* is noted for its migratory habits;

however, it is apparently not migratory in this area. It shows great seasonal and individual variation. There are 3-4 broods with adults flying from May to October. Thistles (*Cardus* spp. and *Cirsium* spp.) are the principle larval food.

Subfamily LIMENITINAE

Limenitis arthemis astyanax Fabricius (Red-Spotted Purple)

Although the Red-Spotted Purple is a strong and graceful flier, it is fond of sunning with partially spread wings. It is seen rarely at flowers. While it may be seen as early as June, it is more common from August to October. The food plants are Wild and Choke Cherry (*Prunus serotina* and *P. virginiana*).

Family LYCAENIDAE (The Gossamer-Winged Butterflies)

Subfamily THECLINAE (Hairstreaks)

Calycopis cecrops Fabricius (Red-Banded Hairstreak)

C. cecrops is not common in the barrens, but may be seen visiting flowers from August until October. The local food plant is Dwarf Sumac (*Rhus copallina*).

Strymon melinus Hubner (Gray Hairstreak)

This fast-flying Hairstreak is seen frequently at flowers. It is bivoltine, adults fly from May to October. Its habit of grinding its hind wings together when at rest is shared by most other Hairstreaks. Larvae feed on a variety of plants including Hops (*Humulus* sp.), Mallow (*Malva* sp.), Knotweed (*Polygonum* sp.), St. John's Wort (*Hypericum* sp.), and Cultivated Beans (*Phascolus* sp.).

Strymon titus Fabricius (Coral Hairstreak)

Regularly found in the open areas of the serpentine barrens at flowers in July and August. The food plants are Cherry (*Prunus serotina* and *P. virginiana*).

Satyrium falacer Godart (Banded Hairstreak)

Morphologically variable and frequently difficult to differentiate from *Satyrium caryaevorus*. Usually seen in open glades in woods at the edge of the barrens. Oak (*Quercus* spp.), Hickory (*Carya* spp.), and Butternut (*Juglans cinerea*) are the larval food plants. Adults fly in June and July.

Satyrium caryaevorus McDunnough (Hickory Hairstreak)

Adults in July, habits and food are similar to *S. falacer*.

Subfamily LYCAENINAE (Coppers)

Lycaena phlaeas Linnaeus (American Copper)

This locally common species is as pugnacious as the Pearl Crescent. It stays in open fields, pausing at flowers between swift and erratic flights. There are at least three overlapping broods with adults from June to October. The food plant is Sheep Sorrel (*Rumex acetosella*).

Subfamily PLEBEIINAE (Blues)

Everes comyntas Godart (Eastern Tailed Blue)

This Blue may be seen in the barrens and the near-by woodland. There is much seasonal, individual, and sexual variation; females are often quite darkly pigmented. The food plants are Tick Trefoils (*Desmodium* spp.) and Clovers (species of *Trifolium*, *Melilotus*, and *Lespedeza*). Adults from May to October.

Lycaenopsis argiolus Linnaeus (Spring Azure)

The Spring Azure can be seen as early as March, and is common until early October. This butterfly is more restricted to the woods than the Tailed Blue. Dogwood (*Cornus florida*), Sumac (*Rhus* sp.), Blueberry (*Vaccinium corymbosum*), and many other food plants are abundant.

Family PAPILIONIDAE (Swallowtails)

Papilio polyxenes Fabricius (Black Swallowtail)

P. polyxenes was seen more frequently in 1969 and 1970 than in previous years. It stays in the open areas of the barrens, flying swiftly when not visiting flowers. Adults have been seen from May to October. The larvae feed on members of the Carrot family (*Umbelliferae*).

Papilio glaucus Linnaeus (Tiger Swallowtail)

P. glaucus is seen in fields and woods, a strong flier given to avid flower-visiting. The female shows sexual dimorphism with a dark form in addition to the familiar yellow phase. Dark females have been more numerous in recent years and are always more frequently seen in the latter portion of the summer. The Tiger Swallowtail flies from May to August. The larvae feed on various trees including Wild Cherry (*Prunus serotina*), Tulip Tree (*Liriodendron* sp.), and Birch (*Betula* sp.).

Papilio troilus Linnaeus (Spicebush Swallowtail)

Aside from *P. glaucus*, this is the most common Swallowtail in the serpentine barrens. It occurs with equal regularity in woods and open fields. It flies from June to mid-October and is not seen as frequently at flowers as other Papilionidae. Summer forms are larger and brighter than spring specimens. The food plants are Spicebush (*Lindera* sp.) and Sassafras.

Family PIERIDAE (Whites and Sulphurs)

Anthocharis genutia Fabricius (Falcate Orange Tip)

While rare in Pennsylvania, the Falcate Orange Tip is locally common in the woods near the barrens in April. It is usually associated with Cat-Brier (*Smilax glauca*) thickets. It flies rather weakly and visits Bluets (*Houstonia caerulea*) blooming in clearings. There is only one brood with adults emerging from overwintering pupae in the early spring. Females lack the characteristic orange tip and are seldom seen on the wing. Larvae feed on Rock Cress (*Arabis per-*

foliatum), Bitter Cress (*Cardamine* sp.), Winter Cress (*Barbarea vulgaris*), and Shepherd's Purse (*Capsella bursapastoris*).

Colias eurytheme Boisduval (Alfalfa Butterfly)

A very common insect seen in grasses and on flowers of the serpentine barrens. It is subject to great individual variation. One quarter to one half of the females are white. Spring forms are often small with orange and yellow markings and reduced black borders. To further complicate the situation, it readily hybridizes with *Colias philodice* and probably 10-20% of the specimens taken are hybrids. This butterfly has extended its range northeastwards following the planting of Alfalfa; it was uncommon in Pennsylvania before 1935, but is now firmly established. Adults are seen from April until November or December as a result of at least four overlapping broods. The food plants are Alfalfa (*Medicago* sp.), White Clover (*Trifolium repens*), Sweet Clover (*Melilotus* sp.), and Crown Vetch (*Coronilla* sp.).

Colias philodice Latreille (Common, Clouded, or Yellow Sulphur)

Extremely common with habits and seasons similar to the Alfalfa Butterfly. Many females are white, and both sexes are subject to much individual, seasonal, and local variation, as well as hybridization with *C. eurytheme*. The food plant is primarily Clover (*Trifolium* sp.).

Eurema lisa Boisduval and Leconte (Little Sulphur)

Small and low flying, the Little Sulphur is not usually seen at flowers. Individuals vary from yellow-orange to white. *E. lisa* is noted for its migratory habits in the southern part of its range, but not in this area. Adults fly from May to November, but are most common in the fall. Larvae feed on False Sensitive Plant (*Cassia nictitans*) and Clover (*Trifolium* sp.).

Pieris rapae Linneaus (Cabbage Butterfly)

This extremely common butterfly is seen everywhere in the area. Usually observed in the company of Sulphurs from March until mid-October. The larvae feed on many kinds of wild and cultivated *Cruciferae* with a preference for Yellow Rocket (*Barbarea* sp.).

Family HESPERIIDAE (Skippers)

Subfamily PYRGINAE (Larger Skippers)

Epargyreus clarus Cramer (Silver-Spotted Skipper)

A common skipper seen at flowers and sunning on the leaves of bushes and low trees. Flying from May to September with larvae on Locust (*Robinia pseudoacacia*).

Achalarus lycidas Geyer (Hoary Edge)

Frequently observed in the serpentine barrens. Its habits are similar to the

Silver-Spotted Skipper; however, its flight is somewhat less energetic. Adults fly in June and July. The food plant is Tick Trefoil (*Desmodium* sp.).

Thorybes bathyllus Abbot and Smith (Southern Cloudy Wing)

Visits flowers in open fields from June to September. Larvae feed on a number of Legumes.

Pyrgus communis Godart (Checkered Skipper)

This distinctive Skipper may be seen on low vegetation from July to September. When not alarmed, its flight is not as fast and erratic as other Skippers. Food plants are Mallows (Malvaceae).

Pholisora catullus Fabricius (Sooty Wing)

Infrequently seen visiting flowers, but generally common in the area. Usually rests on low objects in the sun with open wings. Flying from late May to October, the larvae feed on Pigweed (*Amaranthus* sp.) and Ragweed (*Ambrosia* sp.) in the serpentine barrens.

Erynnis icelus Scudder and Burgess (Dreamy Dusky Wing)

Habits similar to the previous species. Found only in June in open areas and at mud puddles. Food plants are Birch (*Betula* spp.).

Subfamily HESPERIINAE (Smaller Skippers)

Ancyloxipha numitor Fabricius (Least Skipper)

Usually quite common but frequently overlooked because of its small size and very low flying habits. It may be seen resting on grasses and often chases larger butterflies. Feeding on a number of grasses, adults fly from June to early November.

Hesperia metea Scudder (Cobweb Skipper)

Rare, irregularly seen in late May. Probably feeding on grass.

Hesperia sassacus Harris (Indian Skipper)

A showy skipper not often seen at flowers, but often sits in sun on low objects. Seasons and food preference similar to *H. metea*.

Polites coras Cramer (Yellow-Spotted Skipper)

This common Skipper is often observed on a number of wild flowers. It is seen in all parts of the barrens, particularly along paths and on roadsides. Flying from May to September, it is most common in the fall. Grasses make up the larval food.

Polites themistocles Latreille (Tawny-Edged Skipper)

A common, flower-loving butterfly flying from May to October. Feeds on grasses.

Polites peckius Kirby (Peck's Skipper)

Very similar in seasons and habits to *P. themistocles*.

Atrytone logan Edwards (Delaware or Yellow Skipper)

Common butterfly of midsummer (July and early August) which is known for its pugnacious behavior. It, like many of the skippers of the serpentine barrens, feeds on grasses.

Atrytonopsis hianna Scudder (Dusted Skipper)

Uncommon to rare and variable in numbers from year to year. The food plants are grasses.

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ABSTRACT.—The serpentine barrens, occurring in several counties in Pennsylvania, are typified by open, rolling grassy fields growing on a substratum of serpentine. Vegetation higher than low brush is not supported by such soil. The barrens are sufficiently different from the surrounding regions to modify species distribution and to encourage local abundance of some species rarely encountered elsewhere in the area.

The butterfly population of the serpentine barrens is composed of at least 43 species: 2 Satyrids, 1 Danaid, 10 Nymphalids, 8 Lycaenids, 3 Papilionids, 5 Pierids, and 14 Hesperiid. Butterflies locally common in the barrens are *Strymon titus*, *Lycaena phlaeas*, *Papilio polyxenes*, *Anthocharis genutia*, *Epargyreus clarus*, and *Achalarus lycidas*—ROBERT S. ANDERSON, *Variety Club Heart Hospital, Department of Pediatrics, University of Minnesota, Minneapolis, MN 55455*.

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