

THE BUTTERFLIES AND SKIPPERS OF THE BAYS MOUNTAIN AREA OF NORTHEASTERN TENNESSEE

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ABSTRACT

This paper gives the results of a ten-year survey of the butterfly and skipper fauna of the Bays Mountain region of Sullivan, Hawkins, and Washington counties in northeastern Tennessee. Four distinct study sites were collected in the March–November periods of 1976–1986. A total of 78 species have been found at the four sites; the butterfly fauna is characterized by the presence of several typically more northern species, and the absence of species seen at lower elevations in more western parts of the state. Two species [*Clossiana bellona toddi* (Holland) and *Artogeia virginiensis* (Edwards)] appear to have become recently established in the area. The study site at Laurel Run in Hawkins county held the greatest diversity of species (86% of the total number found); this site has been seriously disturbed in recent years and may provide information on the resilience of certain non-migrating species to habitat disturbance in years to come.

INTRODUCTION

Faunal study of the butterflies and skippers of Tennessee has been an area of considerable neglect. Osburn (1895a, b) reported finding 70 species in the vicinity of Nashville; Durden (1986) increased the Davidson County list to 87 species. Richards (1932) gives some Tennessee records, Snyder (1957) included some butterflies in his checklist of Smoky Mountain insects, and Watson (1946) published a list of some skippers occurring in the Smoky Mountains. The study of eastern North American species by Opler (1983) includes some Tennessee data as well. By comparison, the butterfly and skipper fauna of Kentucky, Virginia, and Georgia have been much more exhaustively studied (Clark and Clark 1951, Harris 1972, Covell and Straley 1973, and Covell 1974). We have collected extensively in northeastern Tennessee during the past ten years and

herein present data on the butterfly and skipper species found at four sites in the vicinity of Bays Mountain.

STUDY AREA

The four study sites are in or adjacent to the group of ridges collectively called Bays Mountain. The sites are all within the Ridge and Valley physiographic province and include parts of Hawkins, Washington, and Sullivan Counties. The vegetation of this region has been described by Braun (1950) and the physical geography and climatology have also been reported (Fenneman, 1938; USDA, 1953, 1958, and 1979). The study sites are described below:

Bays Mountain Nature Preserve (BMP). This site was established as a preserve in 1968 by the city of Kingsport in Sullivan County. It is identified as the "Kingsport Reservoir" on the Kingsport quadrangle (188–SE of the Department of the Interior Geological Survey 7.5 min series). The elevation is approximately 670m and the collecting sites are dirt roads and trails through forest. The vegetation of the preserve has been described in detail by Kleppner (1970). *Laurel Run (LRN)*. This site, at 400 m, is at the foot of a north-facing ridge of Bays Mountain near the outlet of Laurel Run creek into the Holston River in Hawkins County (Lovelace quadrangle, 189–NW). The collecting area is a 3 km dirt road separating the steep north-facing forested ridge from low, wet abandoned pasture along the Holston River. Bentley (1984) has surveyed the vascular flora and vegetation types of this site.

Double Branch Trail (DBG). This Hawkins County site is a trail along the top of Bays Mountain at 630 m, about 4 km southwest of the Laurel Run location (Lovelace quadrangle, 189–NW). The trail alternately traverses thick rhododendron forest and small overgrown fields lined by typical oak–hickory (formerly oak–chestnut) forest.

Teazel Hill (THL). This site is a very dry south-facing hillside of abandoned pasture, located 1 km NW of Fall Branch in Washington County (Lovelace quadrangle, 189 NW). The ground cover comprises grasses, low shrubs, and

eastern red cedars.

METHODS AND MATERIALS

Each of the study sites was visited several times between March and November each year (1976–1986). Butterflies collected at these sites are deposited in the collections of the authors, the U.S. National Museum of Natural History (Washington, D.C.), or the Florida State Collection of Arthropods (Gainesville, FL). Determinations were done by the authors and were confirmed for certain lycaenids and hesperids by C. V. Covell Jr. and J. M. Burns. A search of the National Museum of Natural History, Florida State Collection of Arthropods, and Carnegie Museum collections for material from the study areas disclosed no pertinent specimens. The nomenclature followed is that of Hodges (1983), with the exception of *Celastrina neglectamajor* Tutt which we treat as a distinct species (Wagner 1985).

RESULTS AND DISCUSSION

We list the species collected in the four study areas in Table 1. All of the species noted are represented by multiple records. Of the 78 species of butterflies and skippers listed in this paper, 63 (80%) were noted by Osburn (1895a and b) and Durden (1986) in their reports on the butterflies of the Nashville area. Thus we find that the butterfly fauna of the Bays Mountain region includes a group of typically more northern insects [*Euchloe olympia* (W. H. Edwards), *Erora laeta* (W. H. Edwards), *Euphydryas phaeton* (Drury), and *Lycaena phlaeas americana* (Harris)] absent from the warmer lowland sections of the state, but lacks a number of insects found in lower areas west of the study area [*Atlides halesus* (Cramer), *Pontia protodice* (Boisduval and Leconte), *Nathalis iole* Boisduval, *Papilio cresphontes* (Cramer) and *Zerene caesonia* (Stoll)]. It should also be noted that a few species not found in the Bays Mountain vicinity do occur at other, similar sites in northeastern Tennessee and southwest Virginia (Watson and Hyatt 1988). These include *Speyeria aphrodite* (Fabricius), *Polygonia progne* (Cramer), *Polygonia faunus smythi* A. H. Clark, *Incisalia augustus croesiodes* (Scudder), *Satyrrium caryaevorum* (McDunnough), and *Staphylus hayhurstii* (W. H. Edwards).

Further comments are in order regarding a few of the Bays Mountain species:

Artogeia virginiensis (W. H. Edwards) is seen in forested areas throughout the study areas. It is particularly common at the LRN site, where mud-puddle aggregations of up to 70 individuals have been photographed in April and May. Clark and Clark (1951) reported that this northern species was known from Virginia from a single

specimen, but was more common in West Virginia. It therefore appears likely that *A. virginiensis* has undergone a considerable southerly range extension in the intervening decades.

Erora laeta (W. H. Edwards) was collected at LRN in April and May 1977, 1978, and 1980; a total of five individuals were taken. This extremely rare taxon (Scott 1986) has not been seen at LRN since 1980, and, despite extensive searches, no summer brood individuals were ever found. It should be noted that we have seen this species nowhere else in Tennessee, and that the 1977–1980 period corresponds to a time when the summer brood of *E. laeta* was unusually common at the well-known Big Black Mountain, KY site (about 80 km NW of LRN) (Hyatt 1980). Thus the late 1970's may have been a period of unusually high population levels for this seldom-seen hairstreak.

Clossiana bellona toddi (Holland) has also exhibited interesting population fluctuations within the study period. This species was not seen in the area prior to 1977, when a few specimens were seen in July at Roan Mountain along the TN–NC border. In 1978 and 1979 *B. bellona* was abundant at LRN and throughout other areas in southwest Virginia and northeast Tennessee. Since 1980 we have collected the insect at LRN, but never have numbers been so great as in 1978–79. The absence of older records prevents us from conclusively establishing that *B. bellona* is, like *A. virginiensis*, a relative newcomer to the study area.

The Laurel Run site emerges as a particularly diverse habitat, containing more than 80% of the species present in the four study areas. LRN hosts several species not seen at the other nearby study sites. These are *Pyrgus communis* (Grote), *Pholisora catullus* (Fabricius), *Euphyes ruricola* (Boisduval), *Amblyscirtes aesculapius* (Fabricius), *Eurema nicippe* (Cramer), *Feniseca tarquinus* (Fabricius), *Lycaena phlaeas americanus* Harris, *Erora laeta* (Skinner), *Celastrina ebenina* Clench, *Libytheana bachmanii* (Kirtland), *Euptoieta claudia* (Cramer), *Basilarchia archippus* (Cramer), and *Enodia creola* (Skinner). Except for *P. communis*, *E. nicippe* and *E. claudia*, these species are generally considered to be non-migratory (Scott 1986). The LRN collecting site was the subject of extensive disturbance in 1984, when the area was used as the location for filming a motion picture ("The River"). The dirt road was "improved" and subjected to heavy traffic loads, several buildings were erected and then demolished on the site, and the course of the Holston River was altered in order to temporarily flood the lowland pasture. After this period the location was made a public park by Hawkins County and the subsequent presence on the land of numerous visitors, cars, and off-road vehicles makes a dire contrast with the time in the 1970's when the site was remote and seldom visited. Study of the butterfly fauna of this disturbed site in years to come may

Table 1. Butterflies of Bays Mountain and Vicinity: Occurrence by Study Site From the Period 1976–1986.*

Species	BMP	LRN	DBG	THL	Species, cont.	BMP	LRN	DBG	THL
HESPERIIDAE					<i>Satyrrium liparops strigosum</i>		X		
<i>Epargyreus clarus</i>	X	X	X	X	<i>Calycopis cecrops</i>		X		
<i>Autochton cellus</i>			X		<i>Incisalia henrici</i>	X	X	X	X
<i>Achalarus lyciades</i>	X	X	X		<i>Incisalia niphon</i>	X	X		X
<i>Thorybes bathyllus</i>		X	X		<i>Parrhasius m-album</i>	X	X		
<i>Thorbyes pylades</i>	X	X			<i>Strymon melinus</i>	X	X	X	X
<i>Erynnis juvenalis</i>	X	X	X	X	<i>Erora laeta</i>		X		
<i>Erynnis icelus</i>	X	X	X	X	<i>Everes comyntas</i>	X	X	X	X
<i>Erynnis baptisiae</i>	X				<i>Celastrina ladon</i>	X	X	X	X
<i>Pyrgus communis</i>		X			<i>Celastrina neglectamajor</i>	X	X	X	
<i>Pholisora catullus</i>		X			<i>Celastrina ebenina</i>		X		
<i>Ancyloxipha numitor</i>		X	X		LIBYTHEIDAE				
<i>Polites coras</i>	X	X			<i>Libytheana bachmanii</i>		X		
<i>Polites themistocles</i>	X	X	X	X	NYMPHALIDAE				
<i>Wallengrenia egeremet</i>	X	X	X		<i>Polygonia interrogationis</i>	X	X	X	X
<i>Pompeius verna</i>	X	X			<i>Polygonia comma</i>	X	X	X	X
<i>Atalopedes campestris</i>	X	X			<i>Nymphalis antiopa</i>	X	X		X
<i>Atrytone logan</i>	X				<i>Vanessa virginienis</i>	X	X	X	X
<i>Poanes hobomok</i>	X				<i>Vanessa cardui</i>		X		
<i>Poanes zabulon</i>	X	X			<i>Vanessa atalanta</i>	X	X	X	X
<i>Euphyes ruricola</i>		X			<i>Junonia evarete</i>		X	X	X
<i>Amblyscirtes hegon</i>	X				<i>Euptoieta claudia</i>		X		
<i>Amblyscirtes aesculapius</i>		X			<i>Speyeria diana</i>	X	X		
<i>Amblyscirtes vialis</i>	X		X		<i>Speyeria cybele</i>	X	X	X	X
PAPILIONIDAE					<i>Clossiana bellona toddi</i>		X	X	X
<i>Battus philenor</i>	X	X	X	X	<i>Phyciodes tharos</i>	X	X	X	X
<i>Eurytides marcellus</i>	X	X	X	X	<i>Charidryas nycteis</i>	X	X	X	X
<i>Papilio polyxenes</i>		X		X	<i>Euphydryas phaeton</i>	X	X		
<i>Papilio glaucus</i>	X	X	X	X	<i>Basilarchia arthemis astyanax</i>	X	X	X	X
<i>Papilio troilus</i>	X	X	X	X	<i>Basilarchia archippus</i>		X		
PIERIDAE					APATURIDAE				
<i>Artogeia virginienis</i>	X	X	X	X	<i>Asterocampa celtis</i>	X	X		
<i>Artogeia rapae</i>	X	X	X	X	<i>Asterocampa clyton</i>	X	X		
<i>Euchloe olympia</i>	X			X	SATYRIDAE				
<i>Falcapica midea</i>	X	X	X	X	<i>Enodia anthedon</i>	X	X		
<i>Colias philodice</i>	X	X	X	X	<i>Enodia creola</i>		X		
<i>Colias eurytheme</i>	X	X	X	X	<i>Cyllopsis gemma</i>	X	X		
<i>Phoebis sennae eubule</i>				X	<i>Hermeuptychia sosybius</i>	X			
<i>Eurema lisa</i>		X		X	<i>Megisto cymela</i>	X	X	X	X
<i>Eurema nicippe</i>		X			<i>Cercyonis pegala</i>	X			X
LYCAENIDAE					DANAIDAE				
<i>Feniseca tarquinius</i>		X			<i>Danaus plexippus</i>	X	X	X	X
<i>Lycaena phlaeas americana</i>		X							
<i>Harknclenus titus mopsus</i>				X					
<i>Satyrrium calanus falacer</i>	X	X							

*Abbreviations: BMP, Bays Mountain Nature Preserve; LRN, Laurel Run; DBG, Double Branch Trail; THL, Teazel Hill. Species are listed in phylogenetic order according to Hodges (1983).

afford useful data on the resilience of a number of non-migratory butterfly species to habitat disturbance.

SUMMARY

Seventy-eight species of butterflies and skippers have been shown to inhabit four study sites in the Bays Mountain area of northeast Tennessee. The butterfly fauna of these sites was shown to contain a number of species typically more northern in distribution; two species (*Clossiana bellona toddi* and *Artogeia virginiensis*) are postulated as having become resident in the study area within recent decades. One of the study sites, LRN, has been subjected to considerable disturbance in recent years; since this site held the greatest diversity of butterfly and skipper species during the study period, further sampling of its population in coming years may provide interesting data on the response of certain butterfly species to changes in land use.

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