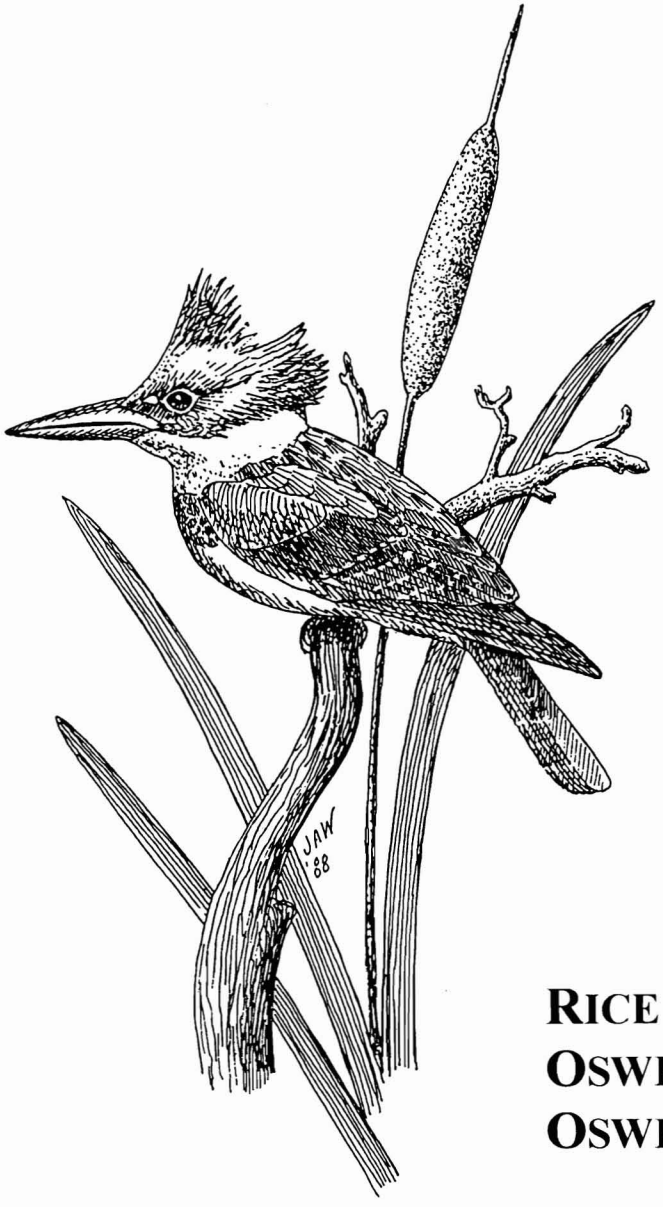
RICE CREEK RESEARCH REPORTS

1996



RICE CREEK FIELD STATION
OSWEGO STATE UNIVERSITY
OSWEGO, NEW YORK 13126

JUNE 22, 1997

Rice Creek Research Reports

1996

In the summer of 1996, Rice Creek Field Station, with financial support from Rice Creek Associates and the Division of Continuing Education at Oswego State University, established a small grants program to stimulate research at the Field Station site. Two projects were supported during the 1996 season. Both involved the initial steps in what should become long term efforts to study and monitor natural populations of organisms resident on the Field Station properties; an important type of study which is difficult to maintain without the kind of ongoing institutional commitment that established field stations can provide. As I reviewed the results of this last year's projects it seemed that it might be an appropriate time to launch a new series of contributions which would provide an annual progress report of research activities at the Field Station. This first issue of *Rice Creek Research Reports* consists of progress reports from Diane Chepko-Sade and Peter and Nicholas Weber, the principal investigators for the projects supported in 1996, and brief summaries of long term projects being pursued by Peter Rosenbaum and myself. I am also including an index of occasional bulletins which have been produced at Rice Creek Field Station over the past twenty years. Many of these are still available and can be obtained directly from Rice Creek Field Station. Further information on the small grants program and on other activities at the Field Station can be found on the Rice Creek web page at <http://www.oswego.edu/~rcreek>.

Andrew P. Nelson, Director
Rice Creek Field Station
August 26, 1997

Contents

Butterfly Populations at Rice Creek Field Station: A Progress Report[1]

Nicholas F. A. Weber, LaFayette College, Easton, PA
Peter G. Weber, Professor of Biology, Oswego State University

Purpose and Scope of Project:

Since the arrival of European colonists, North American butterflies have been in a steady decline (Pyle, 1976). This decline, part of a general world-wide loss of biodiversity due to human-caused environmental changes, is now drawing increasing attention (e.g. Soulé, 1991; Wilson, 1992). Along with birds, butterflies are indicators of environmental change (Erhardt & Thomas, 1991). In populated parts of the world, it is important to characterize and regularly monitor species populations in protected habitats which serve as reservoirs of species (e.g. Peachey, 1979).

Rice Creek Field Station (RCFS) is a 130 ha preserve in North Central New York State. It contains wooded patches in various stages of succession, several maintained fields, conifer plantations, abandoned orchards and a variety of wetlands. Rice Creek, which has been impounded to create a 10.4 ha pond, flows through the preserve. The details of the species composition and population numbers of RCFS butterfly communities have not previously been described. Indeed, to the best of our knowledge, little is known of Oswego County butterflies aside from range maps given in Shapiro (1974).

In 1996 we began a population study of the butterflies at RCFS. Our short term purpose was to create a checklist of RCFS butterflies which could be made available to naturalists and teachers to promote interest in butterfly preservation.[2] In the long term we intend to create an annotated monograph characterizing the butterflies of the RCFS grounds, similar to that which exists for Oswego County birds (Fosdick, 1996). The monograph will characterize, over several seasons, the Station's butterfly community in terms of relative population abundance for each species over a season and in each habitat. This progress report describes the results of the 1996 data collection effort.

Materials and Methods:

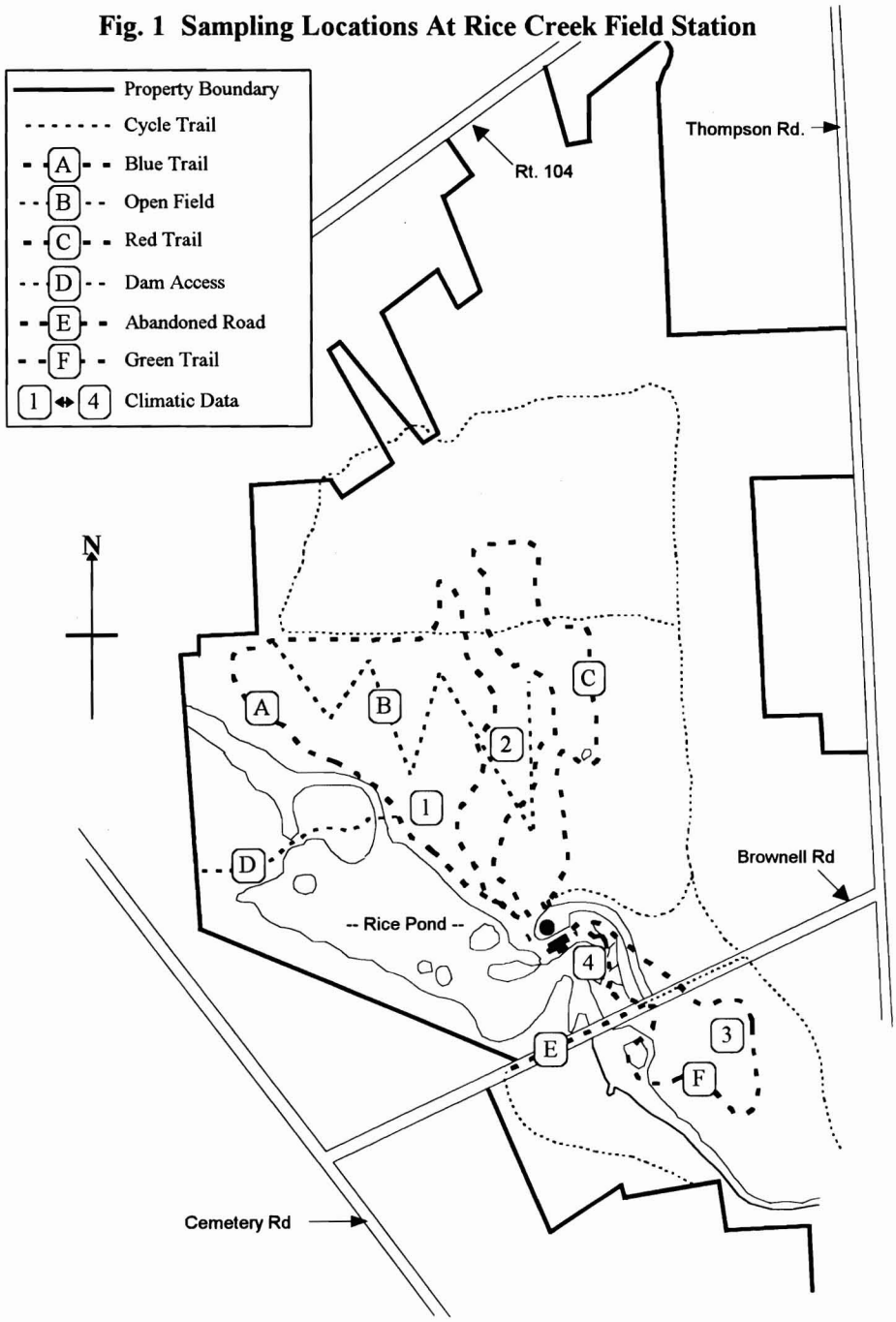
Sampling commenced on May 18, 1996, from which time on we sampled once per week until June 23 when we began sampling twice per week. Twice per week sampling continued until August 15 when we again reverted to once per week sampling until October 31, when weather conditions for butterfly activity deteriorated.

We estimated the relative population abundance of each butterfly species by means of transect sampling (Pollard, Elias, Skelton, & Thomas, 1975; Pollard, 1977; Pollard, 1979). We used the existing RCFS trails as transects, counting each butterfly encountered within 5m on either side of

[1] This investigation was carried out at Rice Creek Field Station with financial support by Rice Creek Associates and the Division of Continuing Education, Oswego State University.
[2] Available from Rice Creek Field Station. Information also available at <http://www.oswego.edu/~rcreek>.

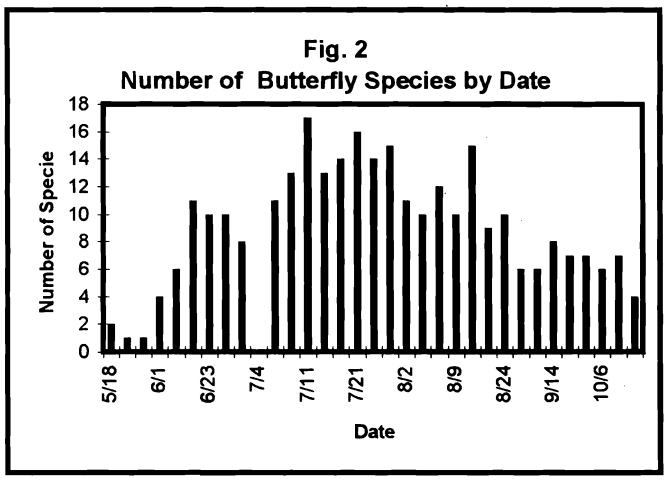
the transect. Fields were sampled by fixed zig-zag transects (Fig. 1). This technique provides an index of relative abundance for each species in each habitat on a given date. We tried to ensure that the same butterfly individual was not counted twice, by not counting those individuals we were unsure of in adjacent parts of a transect. In addition to recording the number of individual butterflies, we also recorded the number of herb and shrub species in bloom along the transects.

Fig. 1 Sampling Locations At Rice Creek Field Station



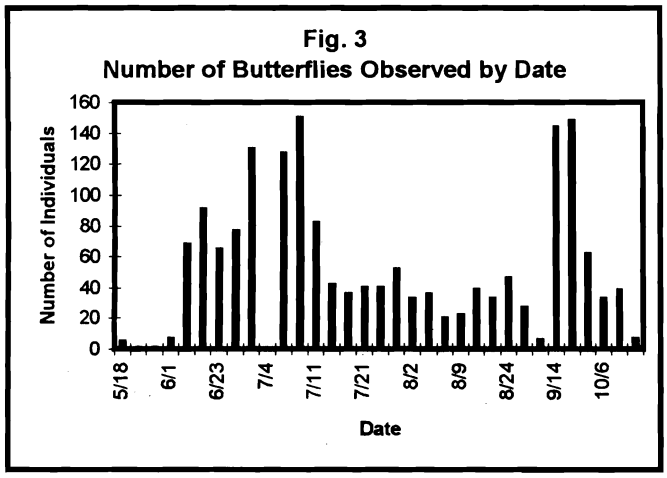
Unusual, new, or difficult to identify species were captured, cooled in an ice chest, photographed, and released. This provided a permanent visual record of the butterfly for identification and verification without removing it from the population.

We allocated butterflies to the following broad habitat categories: *Field* (mainly open area with grasses, forbs and few shrubs), *Field With Shrubs* (open area with grasses and forbs but many tall shrubs), *Woodland Opening* (an area of less than 0.5 ha surrounded by woods), *Gardens* (mowed lawns interspersed with planted herbs, flowers or shrubs), *Marsh* (lowland open areas, waterlogged for part of year), *Swamp* (lowland forest or shrub areas, waterlogged for part of the year), *Abandoned Road*, *Successional Wood* (young upland forest), *Oldgrowth Wood* (upland forest dominated by American beech [*Fagus*



grandifolia], American basswood [*Tilia americana*] and sugar maple [*Acer saccharum*]), Spruce plantation (monoculture of spruce [*Picea glauca or P. abies*]).

To determine whether butterfly abundance is related to microclimatic conditions, air temperature was taken with an Atkins thermocouple thermometer (model 39658-K), wind speed measured with an Anemo Deuta hand-held anemometer, relative humidity taken with a Taylor sling psychrometer and insolation measured with an A.W. Sperry digital light meter (model SLM-110). These measurements were taken in two lowland locations in the vicinity of Rice Creek, in a wooded upland and in an upland field location (Fig. 1). We expect to further build up this environmental data base before attempting to analyze it.

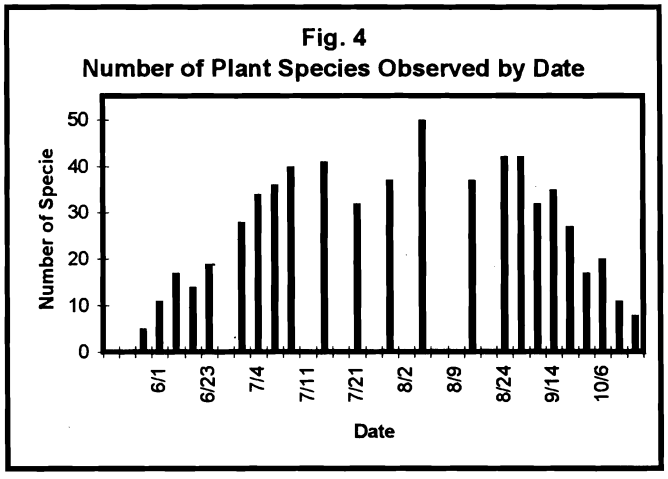


Results:

Overall Description of the RCFS Butterfly Community:

As Figure 2 shows, the number of butterfly *species* increased sharply in June, peaked in early July when we recorded 17 species, and remained constant until the end of August, when the number of species flying again declined.

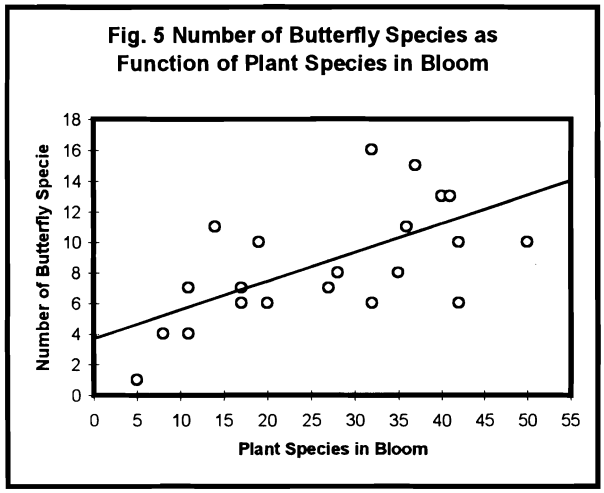
In contrast, the number of butterfly *individuals* of all species showed two peaks: one in early July, when the number of species also peaked, and a second in mid August, the result of monarch migration and a concomitant increase in Pierids (Fig. 3).

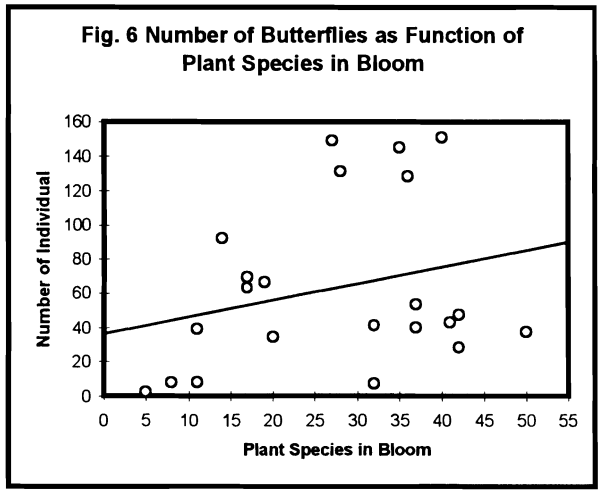


The number of herb and shrub species in bloom showed the same inverted U shape as the number of butterfly species flying, except the peak occurred in early August (Fig. 4).

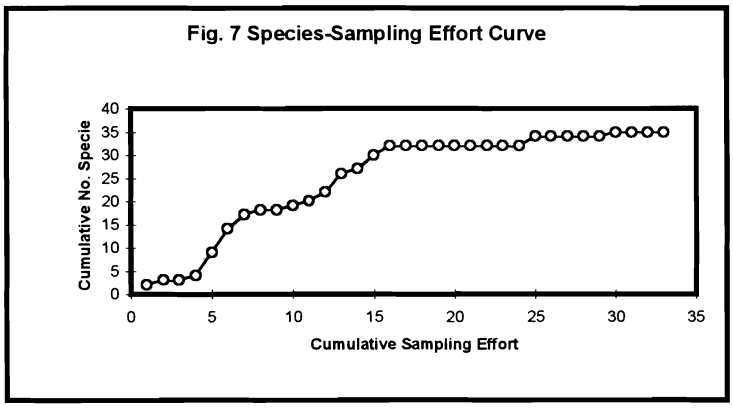
We sought to determine if there was a relationship between either the number of butterfly species flying, or the total number

of individuals in flight and the number of plant species in bloom. Figure 5 shows a significant increase in the number of butterfly species as the number of plants in flower increased ($F_{(1,21)} = 8.696$, $p < 0.008$) and a moderate ($r = 0.541$, n=23), but significant ($z = 2.709$, $p < 0.007$), correlation between the number of butterfly species in flight and the number of plant species in bloom. In contrast, Figure 6 shows that the number of butterfly individuals in flight did not increase significantly with plant species in flower ($F_{(1,21)} = 1.17$, N.S.), and showed a low correlation ($r = 0.225$, n=23) which was not significant ($z = 1.022$, N.S.).





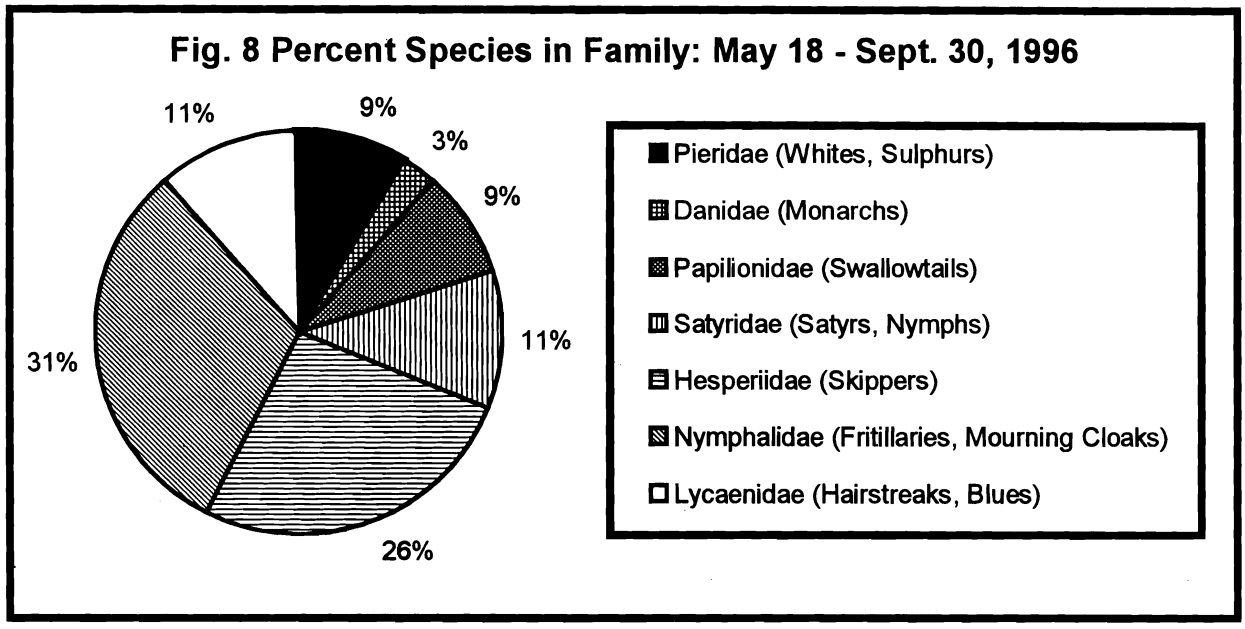
We are confident that our sampling adequately characterized the butterfly fauna on the RCFS grounds in 1996 in terms of the number of species. This contention is supported by the species-sampling effort curve given in Figure 7. The number of butterfly species inhabiting the Station grounds in any given season may well be around 36 as Figure 7 implies, although more years of sampling will be required to determine this.

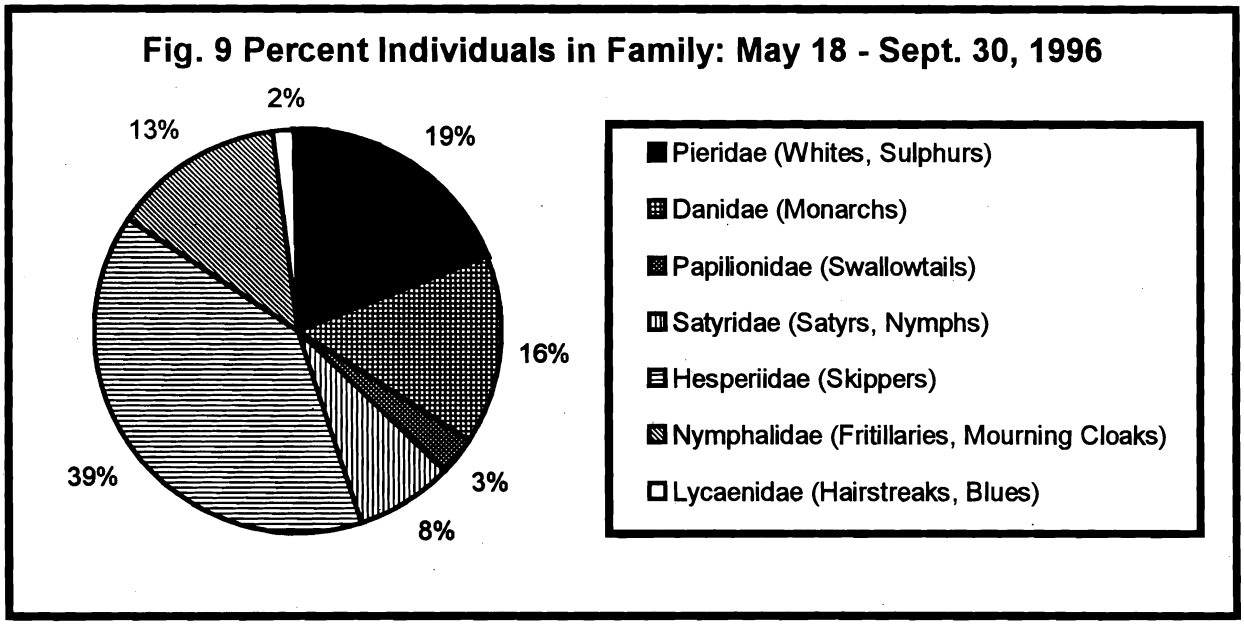


As Figure 8 shows, the Station's butterfly fauna, in terms of the number of *species*, was dominated by members of the skipper family, Hesperiidae (25.7% of total species), and the brushfoot family, Nymphalidae (31.4% of total species).

In terms of number of *individuals*, the fauna was dominated by skippers (39.7 % of all individuals) with brushfoots (13.5 %), whites and sulphurs (Pieridae) (19%), and monarchs (Danaidae) (15.6%) following with about equal dominance in individuals (Fig. 9).

The Station's butterfly fauna, then, may generally be characterized as dominated by the Hesperiidae (skippers) and the Nymphalidae (brushfoots). This is not surprising since the former are largely inhabitants of woodland openings and fields, the latter of early to mid-successional woodlands and woodland-edges. These kinds of habitats abound on the RCFS grounds.





Detailed Description of the RCFS Butterfly Fauna:[3]

We recorded nine species of skippers (Hesperioidea) three of which, according to range maps given in Shapiro (1974), are new to Oswego Co. If we assume, with our three added species, that the county contains 21 skipper species, we recorded 43% of the possible Oswego County skipper species at the Station in the 1996 season.

We recorded 23 true butterfly species (Papilionoidea) from six families, three of which were new to Oswego Co. according to Shapiro. Again, if we assume, with our three added species,

[3] To insure consistency, all common and scientific names are after Miller (1992).

that the county contains 46 species of true butterflies, we recorded 57% of the possible species found in the county on the RCFS grounds in 1996.

Butterfly Population Estimates Over Time and in Habitats:

Figure 10 shows population estimates for each of the true butterfly species we recorded on Station grounds. Eight species were only encountered on one or two occasions as singles or twos, including ringlet (*Coenonympha tullia*), baltimore (*Euphydryas phaeton*), American painted lady (*Vanessa virginiensis*), red admiral (*Vanessa atalanta*), Compton tortoise shell (*Nymphalis vaualbum*), white admiral (*Basilarchia arthemis*), black swallowtail (*Papilio polyxenes*), and spicebush swallowtail (*Pterourus troilus*). These were not included in the figure. Among the highest estimates were those for monarchs (*Danaus plexippus*) in early to mid September. Figure 11 gives similar population estimates, arranged in phenological order, for each of the nine skipper species on the Station grounds during 1996. Some of the highest counts of any butterfly species on the RCFS grounds were attained by the European skipper (*Thymelicus lineola*) in early to mid July.

Fig. 10 Population Estimates for Papilionoidea (True Butterfly) Species over Time for 1996

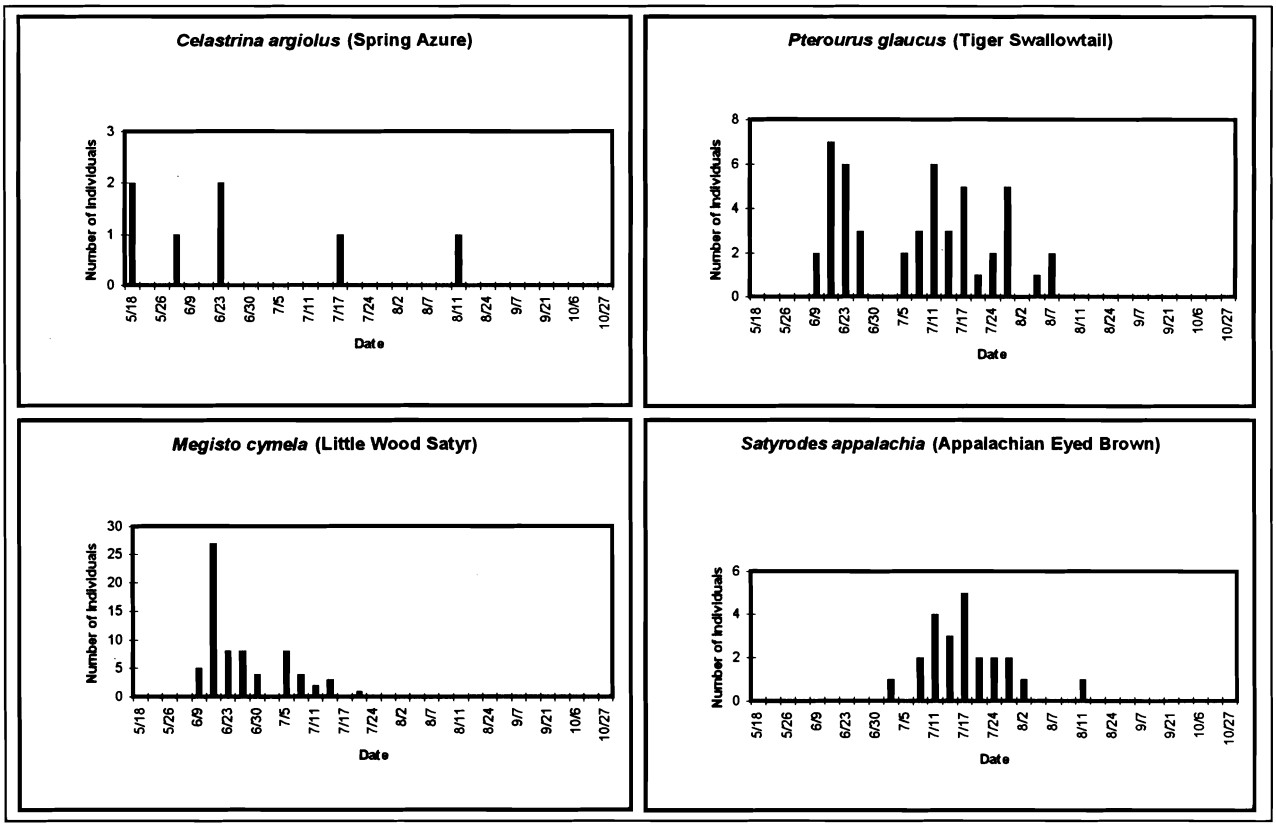


Fig. 10 Con't

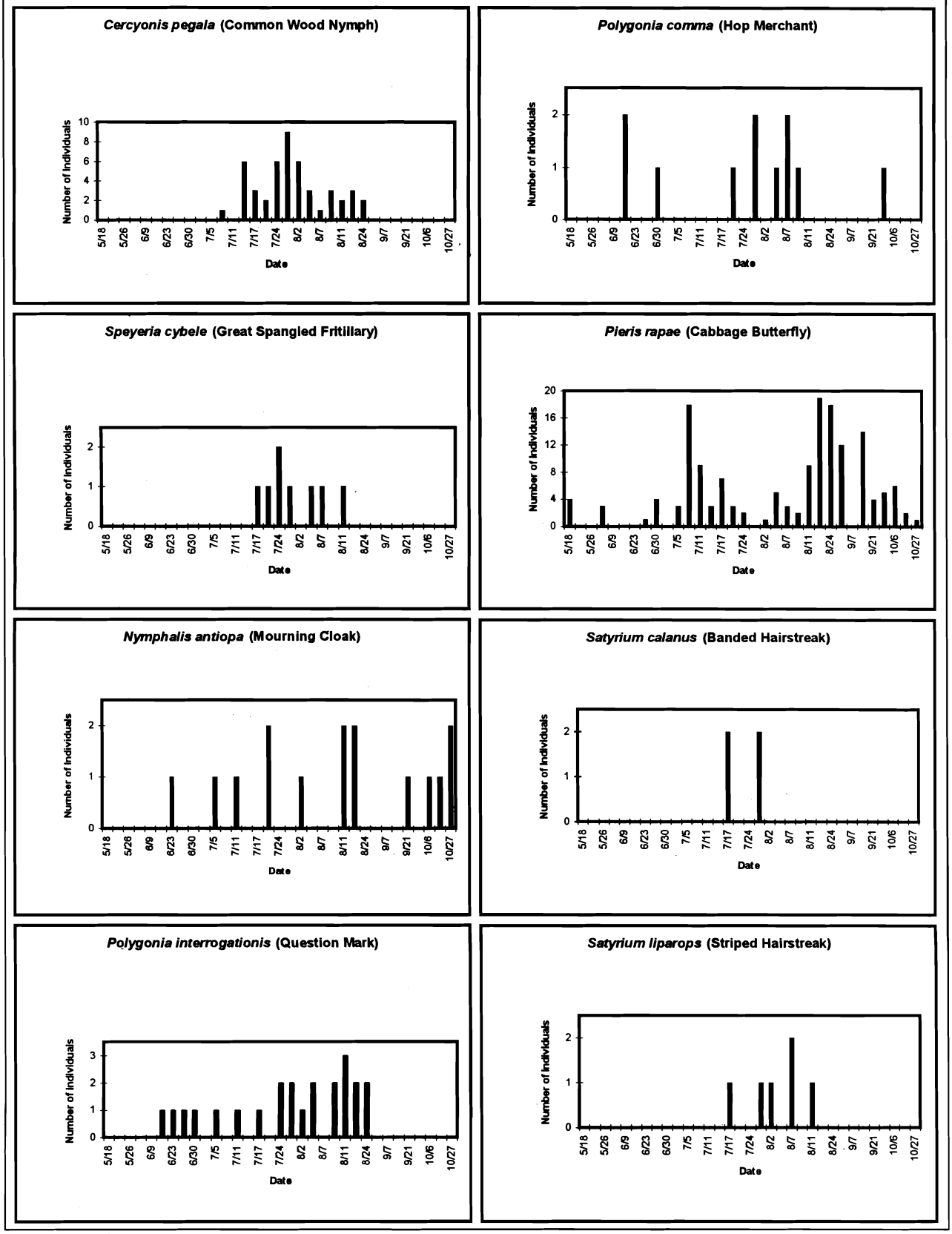

Cercyonis pegala (Common Wood Nymph)
Polygonia comma (Hop Merchant)
Speyeria cybele (Great Spangled Fritillary)
Pieris rapae (Cabbage Butterfly)
Nymphalis antiopa (Mourning Cloak)
Satyrium calanus (Banded Hairstreak)
Polygonia interrogationis (Question Mark)
Satyrium liparops (Striped Hairstreak)
Number of Individuals
Date
5/18
5/26
6/9
6/23
6/30
7/5
7/11
7/17
7/24
8/2
8/7
8/11
8/24
9/7
9/21
10/6
10/27

Fig. 10 Con't

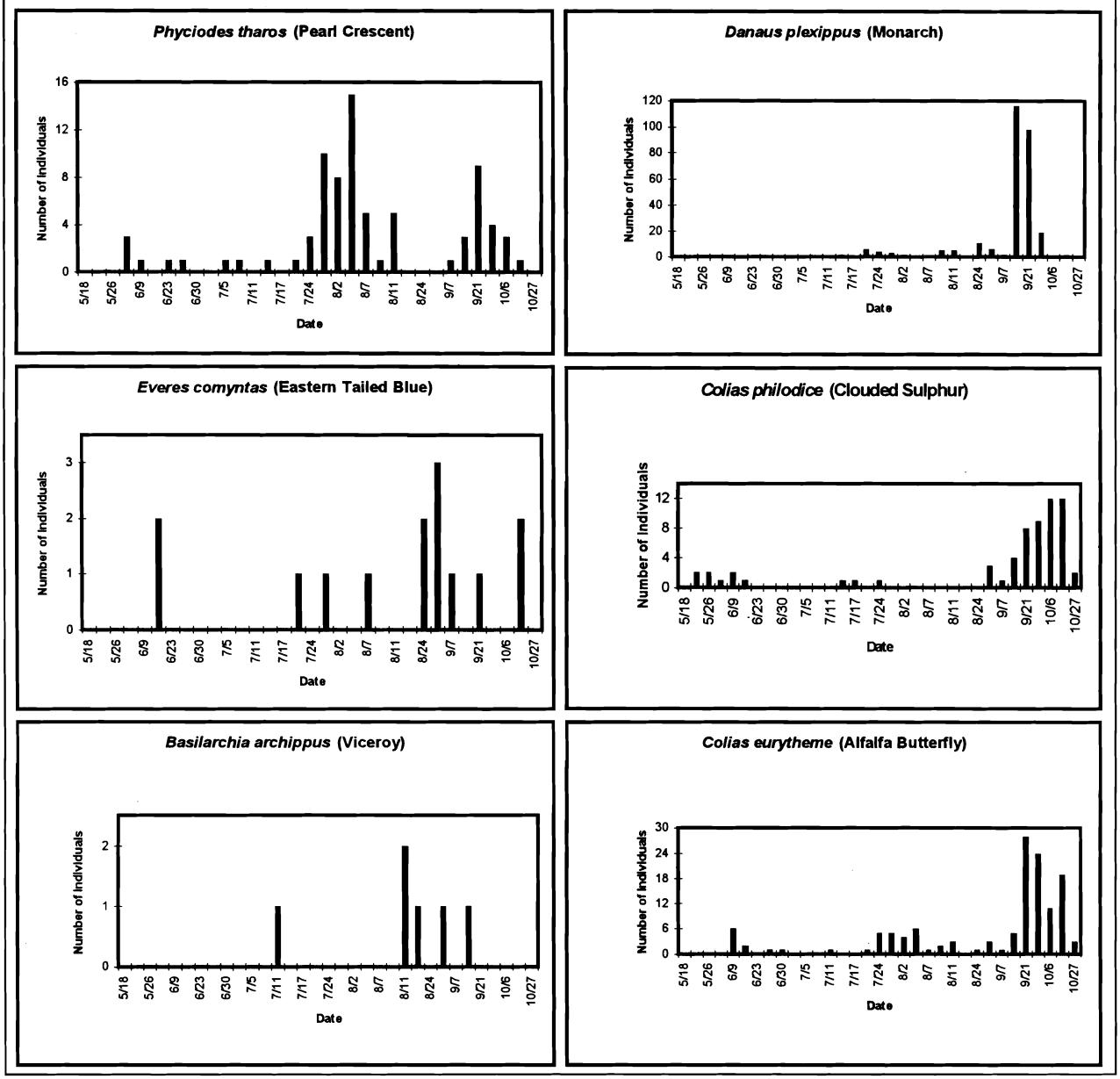
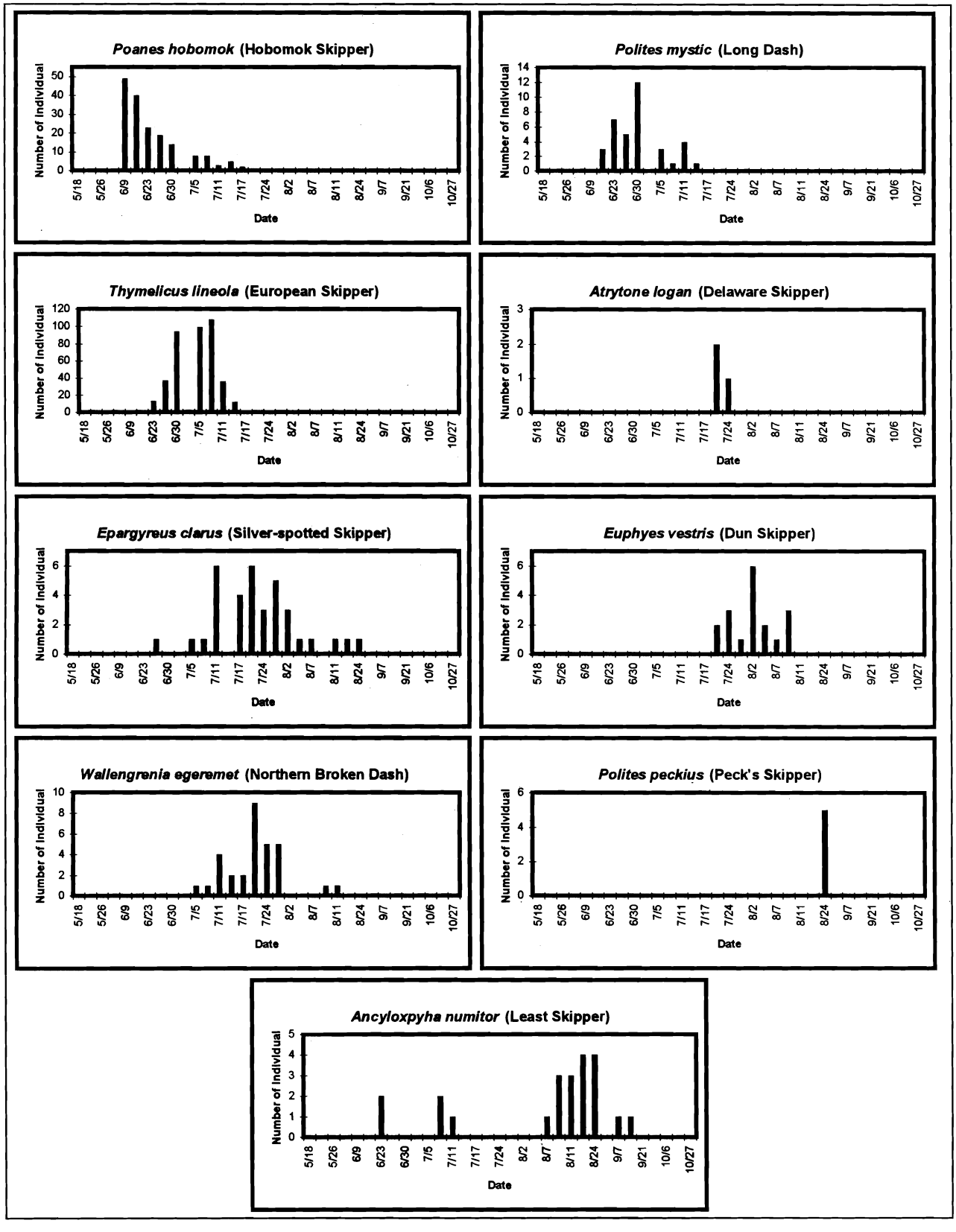

Phyciodes tharos (Pearl Crescent)
Number of Individuals
0
4
8
12
16
5/18 5/26 6/9 6/23 6/30 7/5 7/11 7/17 7/24 8/2 8/7 8/11 8/24 9/7 9/21 10/6 10/27
Date
Danaus plexippus (Monarch)
Number of Individuals
0
20
40
60
80
100
120
5/18 5/26 6/9 6/23 6/30 7/5 7/11 7/17 7/24 8/2 8/7 8/11 8/24 9/7 9/21 10/6 10/27
Date
Everes comyntas (Eastern Tailed Blue)
Number of Individuals
0
1
2
3
5/18 5/26 6/9 6/23 6/30 7/5 7/11 7/17 7/24 8/2 8/7 8/11 8/24 9/7 9/21 10/6 10/27
Date
Colias philodice (Clouded Sulphur)
Number of Individuals
0
4
8
12
5/18 5/26 6/9 6/23 6/30 7/5 7/11 7/17 7/24 8/2 8/7 8/11 8/24 9/7 9/21 10/6 10/27
Date
Basilarchia archippus (Viceroy)
Number of Individuals
0
1
2
5/18 5/26 6/9 6/23 6/30 7/5 7/11 7/17 7/24 8/2 8/7 8/11 8/24 9/7 9/21 10/6 10/27
Date
Colias eurytheme (Alfalfa Butterfly)
Number of Individuals
0
6
12
18
24
30
5/18 5/26 6/9 6/23 6/30 7/5 7/11 7/17 7/24 8/2 8/7 8/11 8/24 9/7 9/21 10/6 10/27
Date

Fig. 11 Population Estimates for Hesperioidea (Skipper) Species over Time for 1996



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Survey of Small Mammal Populations at Rice Creek Field Station[1]

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Oswego State University

During the spring, summer, and fall of 1996, I conducted a preliminary survey of small mammals at Rice Creek Field Station. I will eventually assess population densities and compare these populations with other small mammal populations in similar environments mentioned in the literature and at two other locations in northern New York, Fort Drum and Cranberry Lake Biological Station, where annual surveys are also in progress. I conducted the survey with repeated captures of marked individuals over a five month period to follow individuals through at least one breeding season, and to begin to develop an estimate of age structure, reproductive rates, mortality, and turnover rates of the populations. Such basic background information will be useful in designing future research projects and in designing field exercises for undergraduate courses.

Previous small mammal trapping at Rice Creek Field Station had indicated the presence of Eastern chipmunks (*Tamias striatus*), Red Squirrels (*Tamiasciurus hudsonicus*), White-footed mice (*Peromyscus leucopus*), and Shorttailed shrews (*Blarina brevicauda*) but we knew little of the abundance of any of these species.

A report by John Weeks (1988) indicated dramatic changes in the vegetation cover and land use at the station between 1962 and 1986. Those changes have continued up to the present, 10 years since the last cover map of the station was made, with many areas undergoing succession, and reverting to mixed deciduous woodland. As the vegetation matures, we can expect to see different species of small mammals in the different habitats present at the station. The major vegetation types indicated on the Land Use map for the station drawn up in 1986 (Weeks, 1988) are grassland, mature woodland, shrubland and conifer plantation. A part of the grassland area has been maintained by mowing through the present, but much of the shrubland has grown up to young deciduous woodland.

The changes in land use patterns at Rice Creek Field Station mirror those seen in much of Oswego County, and in much of the Northeastern United States, as small farms have been abandoned and allowed to undergo succession back to deciduous woodland. Bird species that were common in rural farmlands, such as bobolinks, bluebirds, and meadowlarks, are becoming rarer, not because of destruction of habitat, but because of natural succession back toward a climax vegetation. Many grasslands formerly maintained by farmers to grow hay for farm animals are reverting to woodlands, providing more habitat for woodland birds, but less for birds of open meadows. These changes can also be expected to affect small mammal species. Open grasslands favor meadow voles, white-footed mice, and meadow jumping mice, but as grasslands give way to woodlands, the cooler moister environment will favor red-backed voles, deer mice, and woodland jumping mice instead. It will be interesting to monitor the small mammal population from year to

[1] This investigation was carried out at Rice Creek Field Station with financial support by Rice Creek Associates and the Division of Continuing Education, Oswego State University.
[2] Dr. Chepko-Sade was assisted in this investigation by undergraduate research assistant Luke Tarbox.

year as these changes take place, and track succession in the small mammal population as a function of plant succession.

The small mammals that might be found in the field, shrubland, and woodland habitats at Rice Creek Field Station include:

Northern short-tailed shrew (*Blarina brevicauda*)
Masked shrew (*Sorex cinereus*)
Pigmy shrew (*Sorex hoyi*)
Smokey shrew (*Sorex fumeus*)
Water shrew (*Sorex palustris*)
Star-nosed mole (*Condylura cristata*)
Hairy-tailed mole (*Parascalops breweri*)
Meadow jumping mouse (*Zapus hudsonius*)
Woodland jumping mouse (*Napaeozapus insignis*)
Meadow vole (*Microtus pennsylvanicus*)
Southern red-backed vole (*Clethrionomys gapperi*)
Southern bog lemming (*Synaptomys cooperi*)
House mouse (*Mus musculus*)
White-footed mouse (*Peromyscus leucopus*)
Woodland Deer mouse (*Peromyscus maniculatus gracilis*)
Southern flying squirrel (*Glaucomys volans*)
Eastern chipmunks (*Tamias striatus*)
Red squirrel (*Tamiasciurus hudsonicus*)
Eastern Gray Squirrel (*Sciurus carolinensis*)
Short-tailed weasel (*Mustela erminea*)
Long-tailed weasel (*Mustela frenata*)

Having a small mammal survey in progress at the Field Station also provides an opportunity for teaching students some of the methods used in field research on small mammals. Biology student volunteers recruited from the Biology Club and from my fall term classes helped with the trapping during September and were enthusiastic about the opportunity for hands-on experience in biological field research.

Objectives of the 1996 Small Mammal Survey:

The objective of the 1996 survey was to conduct an initial survey of small mammals occurring at Rice Creek Field Station in each of the major upland habitats represented there. This survey will serve as a baseline for future work such as monitoring species diversity and the effect of habitat changes on mammalian populations at the station. It will provide future investigators with information on the presence, size, and distribution of various species populations.

Methods Used:

Trapping grids were set up in four areas: 1) mature forest, 2) open field and adjacent shrubland/pioneer woodland, 3) conifer plantation, and 4) large open field. Grids are 70 meters by 70 meters, each set with 64 traps placed 10 meters apart. The traps were medium sized

Sherman live traps (3"x3"x9") baited with sunflower seeds. They were originally scheduled to be set for approximately one trapping during the night and one trapping during the day on each grid each week between May and October of 1996. In fact, the amount of time required to set up and survey the grids, a bad case of poison ivy contracted by the field assistant, and commitments at another field station limited trapping to a fraction of this time. Nevertheless, we did manage to survey all of the grids and mark them with relatively durable wooden markers and survey flags, and we did manage to trap at each site for part of the summer and fall. Our data are less complete than hoped, but will serve as a starting point for further systematic survey in the same sites.

Small mammals trapped were weighed and measured, age was estimated (adult or juvenile) based on weight and reproductive condition, and reproductive condition was recorded (Larson and Taber, 1980). Where possible, animals were marked with aluminum ear tags. Animals were then released at the site of capture.

Results:

A total of 131 small mammals were trapped during ten trapping periods between 3 June and 29 September 1996:

Frequency of Individuals Trapped by Date
Split by Nocturnal/Diurnal

	Total Count	Nocturnal Count	Diurnal Count
Jun 3, 1996	1	0	1
Jun 4, 1996	2	1	1
Jul 1, 1996	6	0	6
Jul 2, 1996	5	5	0
Jul 8, 1996	7	0	7
Jul 9, 1996	6	2	4
Jul 16, 1996	12	9	0
Jul 17, 1996	7	7	0
Sep 17, 1996	44	40	4
Sep 29, 1996	41	0	18
TOTAL	131	64	41

Disparity between totals is due to missing values for split variables.

Observed Species Frequencies by Site

	Forest	Field/Shrubland	Pine Wood	Open Field	Totals
Blarina brevicauda	25	6	11	26	68
Peromyscus leucopus	1	1	2	0	4
Sciurus carolinensis	0	0	3	0	3
Sorex cinereus	0	0	1	0	1
Tamias striatus	29	3	5	2	39
Tamiasciurus hudsonicus	1	1	0	0	2
Zapus hudsonius	0	5	1	8	14
Totals	56	16	23	36	131

Proposed Small Mammal Survey for 1997:

The four areas surveyed in 1996 will be trapped at weekly intervals from May 15th through October. Powder tracking of some individuals will be carried out to obtain estimates of home range size. Some trapping of wetland areas around the pond will be conducted if time permits. Population size will be calculated for each species in each grid, using the Lincoln-Peterson index where data are scant, and the Schumacher-Eschmeyer procedure where data are adequate (Davis and Winstead, 1980).

Floristic information on the four trapping grids will be collected in conjunction with the ongoing floristic survey of the Field Station property discussed on page 15 of this report.

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Flora of Rice Creek Field Station

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SUNY Oswego

Rice Creek Field Station at Oswego State University occupies an area of approximately 130 ha (325 acres) situated on the southeast lake plain of Lake Ontario. Vegetation on the property includes old growth farm woodlot, second growth forest, brush lots, abandoned orchards, mown fields, conifer plantations, ponds, and marshes. The site is approximately 2.4 km (1.5 miles) directly southwest from the Lake Ontario shore. Most of the second growth vegetation on the property is now nearly thirty years old. An herb garden, some ornamental landscape plantings, and an area of mown lawn have been established near the field station's buildings. Some native woodland and wetland plants and a few exotics have been introduced into a wildflower display area.

The mature forest in the immediate area includes beech-maple and hemlock-northern hardwood communities which are widespread in New York State plus maple-basswood forests which contain a mixture of species with both northern and southern affinities. The landscape in the vicinity of the city of Oswego contains small patches of mature woods intermixed with successional woodlands, shrublands, and fields, agricultural properties, and rural and suburban residential areas. Oswego itself is a port city located on Lake Ontario at the mouth of the Oswego River.

J. T. Hickey (1971) listed 344 species of vascular plants from the field station properties. A concerted effort to update and expand upon Hickey's work was begun in 1994. In early 1996 this undertaking was expanded to include the mosses and liverworts. A list of the known flora of Rice Creek Field Station, current to December 1996, is included in the Field Station's world wide web site at <http://www.oswego.edu/~rcreek>. The list includes 534 species with 3 liverworts, 18 mosses, 1 horsetail, 9 ferns, 14 conifers, 381 dicots, and 108 monocots. It is annotated to indicate which species are:

1) Vouchered by a specimen in the Field Station herbarium.
2) Positively identified and documented on the property subsequent to September, 1994.
3) Found in the Wildflower Display Area.
4) Cultivated in the Herb Garden.
5) Cultivated in landscape plantings.

The content of this list, including annotations, will be updated annually near the beginning of the calendar year.

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Overview of Recent Herpetological Research at RCFS

Peter A. Rosenbaum, Associate Professor of Biology, Oswego State University

Rice Creek Field Station (RCFS) is the study site for several herpetological research projects. All projects were conceived and designed by faculty and integrate undergraduate students in one way or another. Some projects are more appropriately called "student research projects" as the primary responsibility for data collection and analysis is delegated to students. In "faculty research projects," data collection and analysis is directly carried out or supervised by faculty members; students actively participate in this work as field and/or laboratory assistants. Students earn academic credit for these research experiences via either Independent Study in Biology (Biology 399/499), Problems in Biology -- Field Herpetology (Biology 392/592), Field Herpetology (Biology 388) or Problems in Zoology (Zoology 497).

Student Research Projects:

Turtle Census:

Observations of the resident turtles in Rice Pond began in 1986. To date, only snapping turtles (*Chelydra serpentina serpentina*) and midland painted turtles (*Chysemys picta marginata*) have been found to inhabit Rice Pond. Initially, nesting behavior was the focus of observations. In 1991, a census of the nesting turtles in Rice Pond was initiated as a student research project. In 1992, census data was expanded by the addition of live trapping along with observations of nesting females. In 1995, census data was transferred to a computer database integrating previously collected census data. During the past three field seasons (1995-1997), student research projects that focused on turtle nesting and turtle trapping were conducted. At this writing, over 70 snappers and 120 painted turtles have been documented.

Nesting Turtles:

Intimately tied to the turtle census is the study of nesting female turtles. RCFS has an eruption of terrestrial turtle activity that begins in late May - early June and lasts into early July. During this time, female aquatic turtles boldly venture upon terra firma to locate nest sites, dig nests and deposit eggs.

As noted above, observation of nesting turtles was initiated in 1986. Student projects on nesting turtles occurred during the 1991, 1992, 1995, 1996 & 1997 field seasons.

Monitoring Snapping Turtles & Painted Turtles by Radio Telemetry:

In June, 1995, five adult female snapping turtles from Rice Pond were outfitted with radio transmitters. Thereafter, their movements and behaviors were monitored, primarily by students. Four of these five snappers are part of a toxicology study (see below); the fifth turtle was the subject of a student research project in the summer of 1995. All five turtles were monitored by Independent Study students during the Fall, 1995, and Spring, 1996, semesters.

During the summer of 1996, these female snapping turtles were again monitored by student researchers. Also, the movements and behaviors of two adult male painted turtles were the subjects of student projects.

In 1997, two "naive" snapping turtles reared in captivity for 22 months from egg (1995 hatchlings) were outfitted with radio transmitters and released. Two students are currently monitoring the movements and behaviors of these turtles. We plan to monitor these turtles for at least the next year.

Amphibian Vocalization Survey:

The systematic monitoring of the calling amphibians at RCFS utilizing a modified version of the Long Point Bird Observatory's Marsh Monitoring Protocol (Chabot, 1995) was initiated in 1995. Six (6) observation stations were established at RCFS. This season will mark the third year of data collection from these stations. In 1996, Oswego High School students under the supervision of science teacher Janet Mallon learned the amphibian portion of the Marsh Monitoring Protocol and collected data on calling amphibians during April, May and early June. This data was integrated with data generated by college students who made observations later in 1996. In 1997, early season observations were made by one member of last year's college marsh monitoring team. A new team of SUNY Oswego students is presently collecting late season data.

"Herp" Atlas:

The New York State Department of Environmental Conservation is currently collecting data on the distribution of reptiles and amphibians in New York State (Breisch, 1997). Data on the herpetofauna (i.e., reptiles and amphibians) at and around RCFS has been submitted to the New York State Amphibian & Reptile Atlas Project. This work is ongoing and has expanded to include student projects at sites outside of Oswego County.

Faculty Research Projects:

Snapping Turtles As Biomonitors:

The snapping turtle has been suggested as an ecosystem bioindicator by numerous investigators although it has not yet been extensively employed. The International Joint Commission has recently selected the snapping turtle as an ecosystem health indicator for the Great Lakes.

Numerous facets of the snapping turtle's natural history make it an especially desirable species for Great Lakes pollution research. This turtle species is common throughout the Great Lakes system and has a cosmopolitan distribution from Nova Scotia to Saskatchewan in southern Canada south to the Gulf of Mexico and from the Atlantic Ocean west to the Rocky mountains. Within this extensive range, snappers are potentially found in any freshwater habitat but are primarily associated with permanent bodies of fresh water such as streams, lakes and ponds.

Snappers are non-migratory, have limited home ranges (for individual snapping turtles it may be only 3-4 hectares) and most animals are believed to remain in the same home range in consecutive years. Snapping turtles are the largest fresh water turtle species found within the Great Lakes basin. Turtles are long lived species and snappers have a documented captive life expectancy of at least 57 years. As maximum life span in captivity correlates with natural life expectancies, wild snappers may reach or exceed this captive record.

Snapping turtles are relatively easy to collect from the field, and they directly interact with many components of their ecosystem. Snappers are omnivorous and occupy the upper trophic levels of the food chain. Snapper's diverse diet consists of significant fractions of fish (mostly smaller forage fish), vegetation, carrion, and a variety of animals including amphibians, reptiles, birds and bird eggs, crustacea, and other invertebrates. As adults, snappers have no predators, except for humans.

Among wildlife species used as environmental monitors, the snapping turtle's position in the food chain, diet, and longevity is most analogous to humans. Along with their long, sedentary life span, snappers have the capability of concentrating both organic and inorganic contaminants. Snappers have high tolerance for organochlorine compounds. Humans continue to consume snapping turtles throughout most of their range.

In 1993, a collaborative research project was initiated between myself, James J. Pagano and Richard N. Roberts of the SUNY Oswego Environmental Research Center (ERC), and Patrick W. O'Keefe of SUNY Albany. The goals of this research are (1) to determine if snapping turtles are reliable indicators of environmental contamination, and (2) to determine if a congener specific relationship exists between the polychlorinated biphenyls (PCB's) found in snapping turtle eggs and parental fat. Snappers at RCFS were utilized as relatively clean controls and compared to turtles and eggs from industrial polluted sites associated with Lake Ontario. This work was supported by a grant from the Great Lakes Research Consortium.

In 1995, an experiment designed to measure the metabolism, storage, excretion and transfer of toxic substances in snapping turtles was initiated at RCFS. This is collaborative research between myself and James J. Pagano and Richard N. Roberts of SUNY Oswego ERC. Some tissue samples have been analyzed by James Olsen at SUNY Buffalo. This work is ongoing. Students assist in this research as field assistants and as lab assistants at ERC. This work was supported by a grant from the SUNY Oswego Scholarly and Creative Activities Committee.

In 1996 and 1997, blood samples from some RCFS turtles were analyzed for glucose levels by David A. Gapp, of Hamilton College, who is investigating whether a diabetes-like syndrome he has observed in snapping turtles is another kind of bioindicator of exposure to one or more environmental contaminants.

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* Publication is out of print. Photocopies may be available on request. A fee will be charged.