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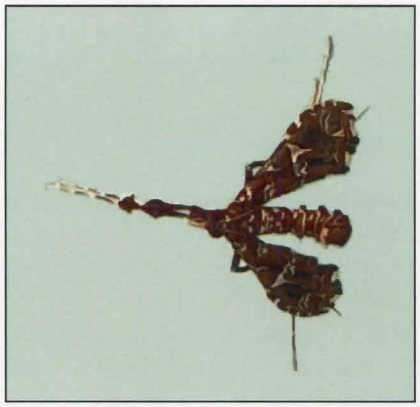
THE OFFICIAL PUBLICATION OF THE SOUTHERN LEPIDOPTERISTS' SOCIETY ORGANIZED TO PROMOTE SCIENTIFIC INTEREST AND KNOWLEDGE RELATED TO UNDERSTANDING THE LEPIDOPTERA FAUNA OF THE SOUTHERN REGION OF THE UNITED STATES (WEBSITE: www.southernlepsoc.org/)

J. BARRY LOMBARDINI: EDITOR

LINEODES VULNIFICA – WIMBERLEY, TEXAS

BY

ROBERT B. SKIPPER



Robert Skipper sent these photos to me (Barry Lombardini) via my son Richard for identification. I sent a photo to a number of Southern Lepidopterists' Society members who had suggestions but were not sure of the identification. Eventually Brian Scholtens was contacted and he identified the specimen as *Lineodes vulnifica* which is found in Texas and South America.

Robert Skipper said that he photographed the specimens in Wimberley, Texas, on December 22, 2022. "Its larva had been feeding on either a red bell pepper, yellow bell pepper, or an eggplant – not sure which, because we brought all four pots inside. It seems to eat most everything in the garden."

I asked if he had the specimen(s) that are in the photos and Robert stated: "No, I don't, but there are about ten of them flying around the room where we had taken the plants for shelter. The plants are still inside (as of January 2, 2023), so I wouldn't be surprised if a new generation will be hatching soon."

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Website: www.southernlepsoc.org/

"Cover illustrations: First known drawing of a North American butterfly from the Modern Age: Eastern Tiger Swallowtail *(Papilio glaucus)* by John White, North Carolina, 1587 (original design by J.V. Calhoun, 1996)."

2023 COMBINED ANNUAL MEETING OF THE SOUTHERN LEPIDOPTERISTS' SOCIETY AND THE ASSOCIATION FOR TROPICAL LEPIDOPTERA

Please join us for the combined in-person annual meetings in Gainesville, Florida, **13-15 October 2023**. A call for papers and registration forms will be distributed by August, or you may contact Deborah Matthews in advance by e-mail (dlott@flmnh.ufl.edu). Events will begin with a Friday evening reception hosted by Bob and Becky Belmont at their new home bordering Gainesville's Split Rock Conservation Area. Bob will have a moth sheet set up for collecting at his home Friday night and collecting opportunities within the Conservation Area may be arranged in advance by contacting Bob directly (bbelmont@ufl.edu). McGuire Center Collections access will be available before and after the meetings by contacting Andrei Sourakov (asourakov@flmnh.ufl.edu). Talks will take place in the McGuire Center Conference Room Saturday morning and afternoon, as well as Sunday morning. The Saturday evening banquet will be held at the Gainesville Women's Club, 2809 W. University Ave. We look forward to seeing you here again at the McGuire Center!

Meeting Committee:

Keith Willmott – Editor, Tropical Lepidoptera Research, McGuire Center Director
Deborah Matthews – Program Coordinator
Bob Belmont – Reception & Split Rock Collecting Coordinator
John Douglass – Banquet coordinator & Secretary, Association for Tropical Lepidoptera
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P.S. Please check out the link below to see all of the species Bob has been finding at the Split Rock Conservation Area! https://www.floridamuseum.ufl.edu/mcguire/lepidoptera-of-split-rock-conservation-area-alachua-county-florida/

Best wishes,

Debbie

Deborah Matthews, PhD
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McGuire Center for Lepidoptera & Biodiversity
Florida Museum of Natural History..
P.O. Box 112710
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WARNING – FRAUD ALERT

Several Southern Lepidopterists' Society members have been contacted via email or social media by individuals pretending to be other members. These contacts are either a direct attempt to solicit funds or a phishing scam designed to get you to provide personal information or click on a link, leading to malicious downloads on your computer or having your accounts hacked. With Facebook, for example, your contacts are harvested, and a similar message is sent to all of them. Below are two recent email examples.

1) Subject line – "Pictures from ____" where the blank will contain the name of a member with whom you're acquainted but the actual email address is completely different. The body of the message is usually obscure such as "So now I'm feeling I should have sent them to you a little bit earlier – these two pictures #13 and 18" followed by a clickable link.

2) An email message appearing to be from someone you know asking you to make a donation to friends needing medical assistance by purchasing online gift cards.

Past examples have also included someone indicating that they are traveling, had everything stolen and need you to wire funds.

Please DO NOT REPLY OR CLICK ON LINKS in emails or social media you are not expecting. Call the person on the phone to confirm that they sent the message. In most cases, the person from whom you think the message was sent is unaware that their account has been hacked or that their name is being used in association with a different email address.

As we get older it is difficult to keep up with technology and all of us have been tempted to click or reply when we shouldn't. Please be careful and don't take the bait!

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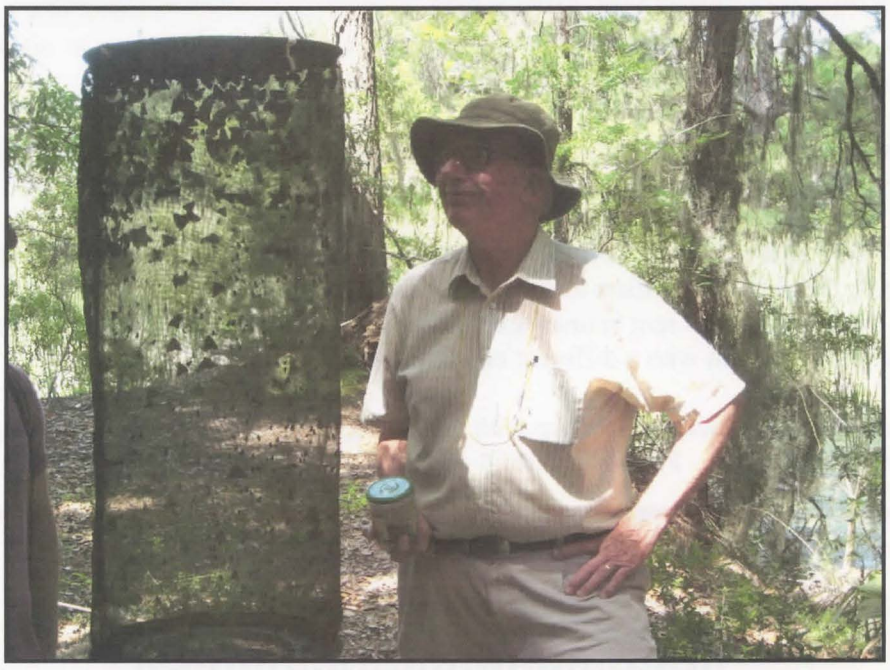
COLLECTING .....

BY

JOHN HYATT



John Hyatt sends in the 2 photos and comments:

Top photo, the one called "Morning After" is a daylight photo of my moth sheet after a night's collecting on the SW coast of Costa Rica a few years ago.

And the bait trap photo was taken on Sapelo Island, McIntosh Co., Georgia. In the photo I'm trying to decide where to start. Most of the *Catocalas* turned out to be *C. muliercula*, but careful sorting yielded a specimen or two of the much rarer *C. delilah*.

SWARMS OF BUTTERFLIES AND NONE

BY
J. B. HEPPNER

When first coming back East from California in early August 1972 to do graduate studies at the University of Florida, I went straight to Key Largo the following week to find the tropical butterflies of the Florida Keys that I had read about. I found some of those tropical butterflies, but was disappointed not to find the more exotic West Indian species that had been recorded there.

The following May and June, 1973, I returned to Key Largo and found species like the Schaus Swallowtail (*Papilio aristodemus ponceanus*). At that time, it was still common in the northern Key Largo woods, and I collected about half a dozen, now all preserved in McGuire Center. If one collected exhaustively all day long, I suppose one could have taken dozens of them. Many were taken every year by butterfly collectors who went after this prized species. Even so, the Schaus swallowtail remained common in its season (Covell, 1974; Emmel, 1997; Gerberg and Arnett, 1989; Klots, 1951; Rutkowski, 1971; Tyler, 1975). However, up to 1945 there were actually few specimens in museum collections and the butterfly was considered very rare (Grimshawe, 1940; Henderson, 1945, 1946).

The Schaus swallowtail (or Schaus' swallowtail) (Fig. 1) was first discovered in Miami in 1898 by William Schaus (1858-1942), of the Smithsonian Institution. After getting a few more specimens during a 1900 trip to Miami (probably Brickell Hammock), he finally named the species in a 1911 paper. It is kind of incongruous that Schaus was the one who named this now famous butterfly, since he worked almost exclusively on moths throughout his career. In those years before 1912 (the year the railroad was extended to Key West), visitors going south of Palm Beach mostly went only as far as Miami, since there was no easy way to get to Key Largo (no bridge). From Miami back then, it was a long boat ride to get to Key Largo, much longer to Key West.

Fig. 1. A Schaus swallowtail, *Papilio aristodemus ponceanus*, basking on a flower (photo by T. C. Emmel).

The Schaus swallowtail is now classified as the Florida subspecies of the widespread *Papilio aristodemus* Esper, which was originally described from Haiti in 1794. There are other subspecies in the Bahamas, Cuba, and other islands of the Caribbean (Bates, 1935; Clench, 1978; Schwarz, 1989; Scott, 1972; Smith *et al.*, 1994). Detailed descriptions of the Schaus swallowtail are given by Baggett (1982), Collins and Morris (1985), and Smith *et al.* (1994). In the Florida Keys, the butterflies are found from late April to early July, but fly mostly during May and June. A smaller second brood can occur from late August to September in Florida, but not always every year (BrownCH, 1976). The sister subspecies in the Caribbean fly more during October and November. On Hispaniola (Dominican Republic and Haiti), it prefers drier habitat (Schwarz, 1989; Smith *et al.* 1994). The main hostplant in Florida is torchwood (*Amyris elemifera*), and secondarily wild lime tree (*Zanthoxylum fagara*), both in Rutaceae (Long and Lakela, 1971). Biological notes for the Florida subspecies are given by BrownLN (1973), Covell (1976), Emmel (1994), Grimshawe (1940), and Rutkowski (1971).

The swallowtails were considered rare in the 1930s when the first resident collectors, Marguerite S. Forsyth (1889-1952) and Florence M. Grimshawe (1897-1983), began collecting them for sale in the United States and abroad (some of their specimens are now conserved in McGuire Center and other museums) (Henderson, 1945; Heppner, 2003; Kimball, 1965; Klots, 1952). In those years, the species could still be found in other areas besides Key Largo, like further south in the Matecumbe Keys. Most specimens then came from Lower Matecumbe Key (Grimshawe, 1940; Henderson, 1945, 1946). Oddly enough, even after Grimshawe discovered the hostplant on Lower Matecumbe Key, she could not

find any Schaus swallowtails on Upper Matecumbe Key or Key Largo (Grimshawe, 1940).

But rarity is a relative term, since sometimes it is just not known what habitat a species is to be found in, or in what season. Or, it may be a matter of how diligently they are pursued. In the case of the Schaus swallowtail, there were no resident collectors in southern Florida before 1920, and few visitors looking for butterflies. Collectors and entomologists who went to South Florida between 1880 and 1900 went mostly to Palm Beach (formerly called "Lake Worth" and now West Palm Beach, on the mainland). Travelers went first by horse carriage (or boat) and later by train when the railroad terminated in Palm Beach in 1894. Miami then was a sleepy fishing village with some orange groves, and the old army Fort Dallas, but few facilities for any daring visitors. No Schaus swallowtails were ever found north of Miami, although its hostplants do grow along the coast as far north as Cape Canaveral.

Grossbeck (1917) reported on the Lepidoptera of the 1911-12 expeditions to southern Florida by staff of the American Museum of Natural History, but no Schaus swallowtails were found. Mrs. Forsyth moved to the Miami area in 1923 (Klots, 1952), but she seems not to have found any Schaus swallowtails before 1930. Marston Bates (1906-1974), later a well-known tropical biologist, lived in Miami (Matheson Hammock, Coconut Grove) as a youth in the 1920s, but he also did not find any of the swallowtails (Bates, 1934). In the thirty years between 1900, when Schaus collected a few specimens, and 1930, only a single additional specimen is known to exist, collected in Miami in 1924, in Matheson Hammock at Coconut Grove, by then 18-year-old G. B. Fairchild (1906-1994). He was a friend of Bates and grandson of Alexander Graham Bell, inventor of the telephone. This 1924 specimen is the last Schaus swallowtail recorded from mainland South Florida.

The Schaus swallowtail became even rarer after the famous 1935 hurricane hit the Florida Keys, especially the Matecumbe Keys. Before the massive 1935 hurricane, the swallowtails probably were still present in the Coconut Grove area of Miami. Even today, there remains a small remnant of the forest because of the Fairchild Tropical Botanical Garden and the city's Matheson Hammock Park, but the swallowtail hostplants are rare there. Originally, the tropical hardwood forest stretched several miles on the Miami Ridge, from Brickell Hammock (Fig. 2) by the Miami River (now downtown Miami) to Matheson Hammock at Coconut Grove (Craighead, 1971).

Fig. 2. Brickell Hammock, Miami, in 1898 (what is now Brickell Avenue, with 50-story buildings downtown along the route) (after Fairchild, 1938).

The Brickell name comes from William Brickell, who bought all the forested land from the Miami River south to Coconut Grove in 1868. He opened a trading post at the river in 1871. William Matheson, another early settler, donated 85 acres of forest land at Coconut Grove in 1930, which is today preserved with added acreage as Matheson Hammock Park (now totaling 630 acres). Most of the Miami Ridge pinelands and tropical hammocks were cut during WWII for lumber (Craighead, 1971). Some of the pineland and hammock forest remains in Everglades National Park, southwest of Homestead, but the Schaus swallowtail was never recorded in that area.

In 1935, Mrs. Grimshawe was the first to rear the species, as she noted in her 1940 paper. She collected most of her specimens on Lower Matecumbe Key before the 1935 hurricane (Henderson, 1945). Rutkowski (1971) gives further behavior and life history notes. The

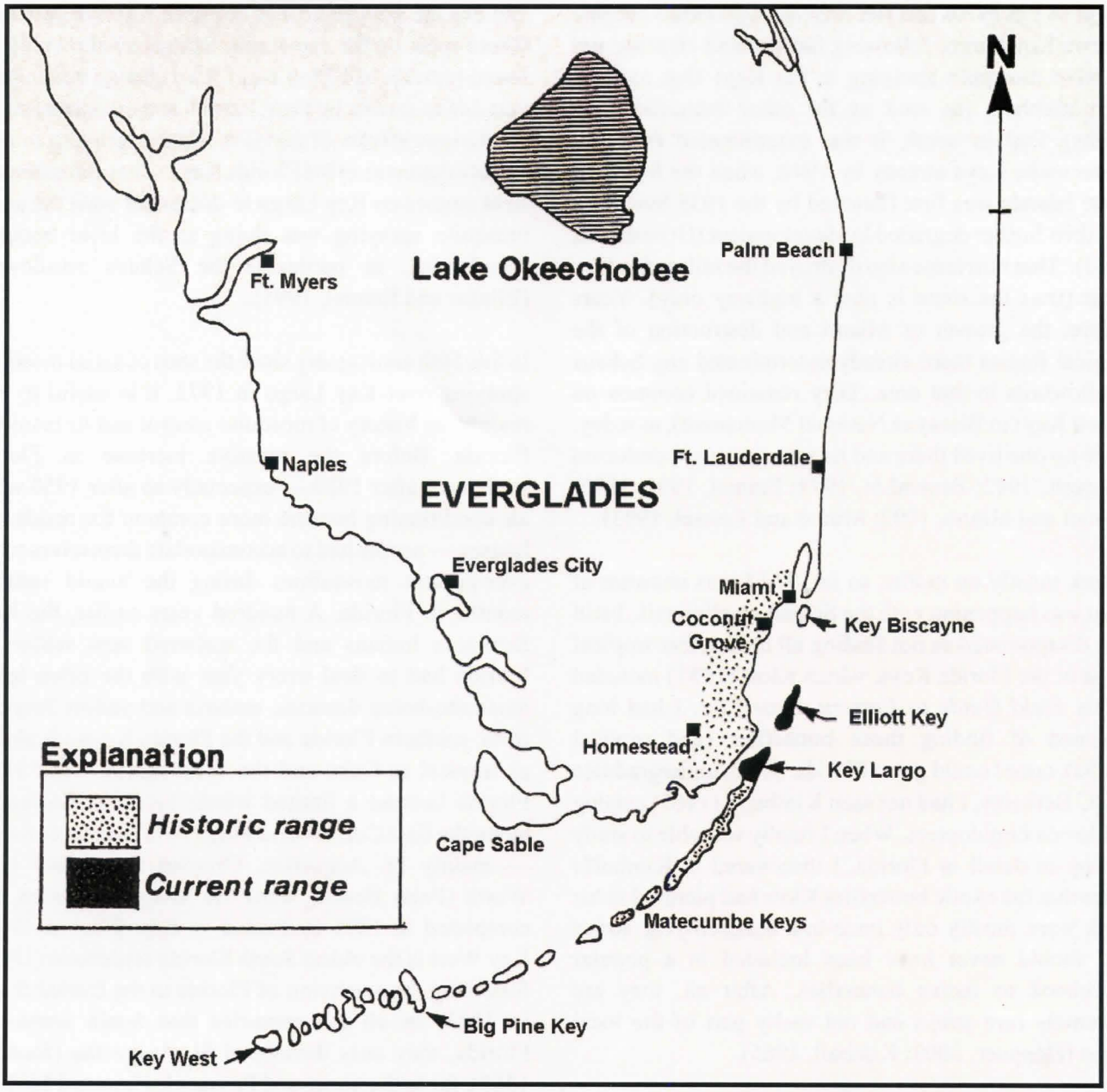


Fig. 3. Distribution map of former and present Schaus swallowtail distributions in Florida (modified from Emmel, 1994). Dates of settlement: Coconut Grove (1873), Everglades City (1886), Ft. Lauderdale (1838, settled 1863 as "New River"), Ft. Myers (1841), Homestead (1898), Key Biscayne (1826), Key Largo (1870), Key West (1822), Miami (1836, Fort Dallas), Naples (1886), Palm Beach (1872, as "Lake Worth").

Schaus swallowtail was later found on Key Largo only after 1945. Elliott Key presumably always had them present since the forest there remained largely inaccessible and intact. Virtually no lepidopterist visited Elliott Key before the 1970s (BrownLN, 1973). The map (Fig. 3) shows the presumed original distribution of the Schaus swallowtail in the tropical hardwood forests of Florida, from the Matecumbe Keys north to Miami, and the few currently much restricted colonies on Key Largo and Elliott Key.

The Schaus swallowtail populations appear to have greatly increased in numbers on Key Largo during the 1950s and 1960s, and then were fairly common until 1973. As long as the tropical hardwood forest habitat was intact, the butterflies thrived wherever the hostplants grew. Officials like to blame collectors as the easy scapegoat for decreasing butterfly numbers, but collecting was never really a problem for the Schaus swallowtail — as for most butterflies around the world — as long as enough habitat remained (Miller, 1975).

It was in the 1970s that the Schaus swallowtail became rare on Key Largo, following further land clearing and massive mosquito spraying in the Keys that reduced their numbers (as well as for other butterflies and moths). Further south, it was exterminated from the Matecumbe Keys already by 1940, when the forest on those islands was first flattened by the 1935 hurricane and then further degraded by development (Grimshawe, 1940). That hurricane also destroyed the railroad to Key West (thus the route is now a highway only). Years before, the growth of Miami and destruction of the tropical forests there already exterminated any Schaus swallowtails in that area. They remained common on Elliott Key (in Biscayne National Monument), as today, since no one lived there and no spraying was conducted (Baggett, 1982; BrownLN, 1973; Emmel, 1991, 1995; Emmel and Minno, 1992; Minno and Emmel, 1993).

I work mostly on moths, so in 1973 I was unaware of what was happening with the Schaus swallowtail. I still was disappointed in not finding all those other tropical gems in the Florida Keys, which Klots (1951) included in his *Field Guide to Eastern Butterflies*. I had long dreamed of finding those butterflies (and tropical moths), once I could get to Florida. As an undergraduate at UC Berkeley, I had not seen Kimball's (1965) catalog of Florida Lepidoptera. When I finally was able to study a copy in detail in Florida, I discovered in Kimball's notes that the exotic butterflies Klots had pictured in his book were mostly only once-in-a-hundred-year strays and should never have been included in a popular guidebook to native butterflies. After all, they are extremely rare strays and not really part of the local fauna (Heppner, 2003; Kimball, 1965).

In 1972, the mass aerial spraying of Dibrom ('Naled') and Baytex ('Fenthion'), two organophosphate insecticides highly lethal to butterflies, moths and other insects, was begun to combat malarial mosquitoes in the Florida Keys, including Key Largo (Emmel, 1991). Shortly thereafter, the local butterfly and moth populations crashed. Prof. Covell and others reported on the Key Largo population decline of the Schaus swallowtail (BrownCH, 1976; Covell, 1976, 1977; Covell and Rawson, 1973).

Although aerial spraying has been halted since 1990, an even more toxic insecticide, Scourge, has been used since then (NOTE: Scourge is a very toxic pyrethroid, with a synergist added to make it even more lethal for insects). The new chemical is sprayed only at local sites and not the now protected northern Key Largo woods where most of the remaining Schaus swallowtails are found (outside of Elliott Key). This change was in large part due to studies by Prof. Emmel and associates on the deleterious effects of aerial mosquito spraying to non-target organisms in the Florida Keys. They did extensive field studies on Key Largo to document what the aerial mosquito spraying was doing to the local butterfly populations, in particular the Schaus swallowtail (Eliazar and Emmel, 1991).

In this 50th anniversary since the start of aerial mosquito spraying over Key Largo in 1972, it is useful to also review the history of mosquito control and its results in Florida. Before the massive increase in Florida settlement after 1920 — especially so after 1950 when air conditioning became more common for residential houses — people had to accommodate themselves to the ever-present mosquitoes during the humid summer months in Florida. A hundred years earlier, the local Seminole Indians and the scattered new settlers in Florida had to deal every year with the often lethal mosquito-borne diseases, malaria and yellow fever. In truth, southern Florida and the Florida Keys are almost as tropical as Cuba and the West Indies. After 1885, Florida became a limited winter vacation destination along the East Coast where Flagler's railroad was routed — mainly St. Augustine, Ormond Beach and Lake Worth (Palm Beach), until the Miami extension was completed in 1896 (extended to Key West in 1912). Key West is the oldest South Florida settlement (1822), following the accession of Florida to the United States in 1821. In all the centuries that Spain controlled Florida, they only developed St. Augustine (founded 1565), far to the north, and Pensacola (founded 1698) in western Florida. Miami and the Florida Keys were largely deserted, except for a few Indian villages and the occasional Bahamian or Cuban fishing camps (and some salvage pirates on Key West).

The plagues of mosquitoes kept visitors away during the summer months. Once many more settlers arrived after 1920, mosquito control was imperative in order to increase development of towns (especially Miami), and to allow Florida to become a tourist mecca all year. By 1945, increasingly lethal chemicals were sprayed, and finally the highly toxic DDT was used, but pesticide resistance soon made even DDT useless against the newly resistant strains of mosquitoes. More lethal insecticides were needed, thus the use of Dibrom and Baytex in 1972.

After the studies of Prof. Emmel and associates, the 'blunderbuss' aerial spraying campaign on Key Largo finally stopped and better site-specific control methods were adopted. The effective use of larvicides in water pools harboring mosquito larvae (a method proven to be much more effective and economical than mass aerial spraying), was begun and did no harm to non-target organisms (Emmel, 1995). Since then, the Schaus swallowtail has also come under Federal protection (1984) and is making a come back on Key Largo. It is a prideful bureaucrat delusion, however, that the Schaus swallowtail was saved by Federal protection keeping collectors away. It is the halt to aerial insecticide spraying and conservationist efforts to protect the north Key Largo woods that saved the butterflies there.

In Gainesville (in northern Florida), there also were swarms of butterflies in woodland wildflower meadows during spring and summer in the 1970s. Buckeyes, red admirals, Gulf fritillaries, hairstreaks, blues, small whites, sulphurs, zebra and woodland swallowtails, and long-tailed skippers were all common, as in many of the Southern states (Daniels, 2003; Emmel, 1997; Gerberg and Arnett, 1989; Klots, 1951; Scott, 1986). Along the forest edges, one could find many zebra heliconians (as also moths).

I recall searching for an apartment in Gainesville in August 1972 at dusk and running into a mosquito control truck coming toward me on a city street, spraying its chemical brew in a 30-foot arc of fogging — a deluge of toxic fog that I luckily just had time enough to roll my car window up to avoid being gassed (am not sure what this chemical fog did to the paint finishes on cars, but it could not have been good). Since 1990, Gainesville also has been using the Scourge insecticide against mosquitoes. Now, the butterfly numbers are much reduced and one typically only sees a few small whites and sulphurs, smaller skippers, and an occasional Gulf Fritillary (*Agraulis vanillae nigrior*), in still intact meadows. The moths and subtropical heliconians remain in protected forest areas, and are only reduced in numbers after too cold a winter in northern Florida.

Usually, it is excessive land clearing without leaving small reserves of native plants, in addition to the pervasive use of pesticides and herbicides, that is to blame for fewer butterflies in Florida, in my opinion. The mosquito spraying has gradually increased since the 1970s, but less conspicuously, since now fine mists of pesticides are used so the residents do not notice it like in 1972. Herbicide spraying is then added onto the environment by city workers and home owners. This mindless chemical usage continues day after day, yet scientific studies have already verified that the chemicals seep into the ground water and into our drinking water aquifers. Also, they are sucked up by the plants. The result is that local habitats cannot support enough food-plant and nectaring sources now for large numbers of butterflies and moths.

Gainesville — the local so-called 'tree city' — has less trees every year as the city officials have 'forgotten' about their mandate to maintain the larger trees in town. Instead, local officials approve nearly every development scheme that comes along, in their never-ending quest to garner more tax revenues — not unlike what is happening throughout most of the nation. Thus, less and less natural habitat remains for butterflies and moths, as well as other creatures. Pesticides and herbicides are used more every year (most wildflowers are considered 'weeds' by many homeowners), and the residues eventually all go into the ground water. I drink mostly bottled spring water from high mountain areas to hopefully mitigate some of the intrusion of chemical runoff. In Gainesville, we even have (or had) our own local clean spring water. It was pristine 100 years ago, but now has chlorine added for 'safety' and fluoride added for 'children's teeth.' Consequently, the local tap water is as tainted as elsewhere (the chemical industry has been pushing this onto communities for decades, but fluoride should only be as a mouthwash and not in the drinking water, and chlorine added only in swimming pools). The native plants absorb the tainted groundwater, the chemicals getting into the leaves the caterpillars feed on. The resultant adult butterflies surely become less virulent with the females laying fewer eggs as a consequence, and so on and so on as this cycle repeats and worsens every year.

When I was a youngster in New York in the 1950s, my family and I would go for a week or two in summers to the nearby Catskill Mountains for a short break from the city. There were swarms of butterflies in wildflower meadows. I especially recall the dozens of fritillaries — the really big ones like the Great Spangled Fritillary (*Speyeria cybele*) — on the wildflowers, likely hundreds per acre. They were so common then that each larger wildflower plant would have several of the butterflies nectaring together. I never saw a Regal Fritillary (*Speyeria idalia*) in New York in the 1950s (even as a 7-year-old I would have noticed a Regal), but they were

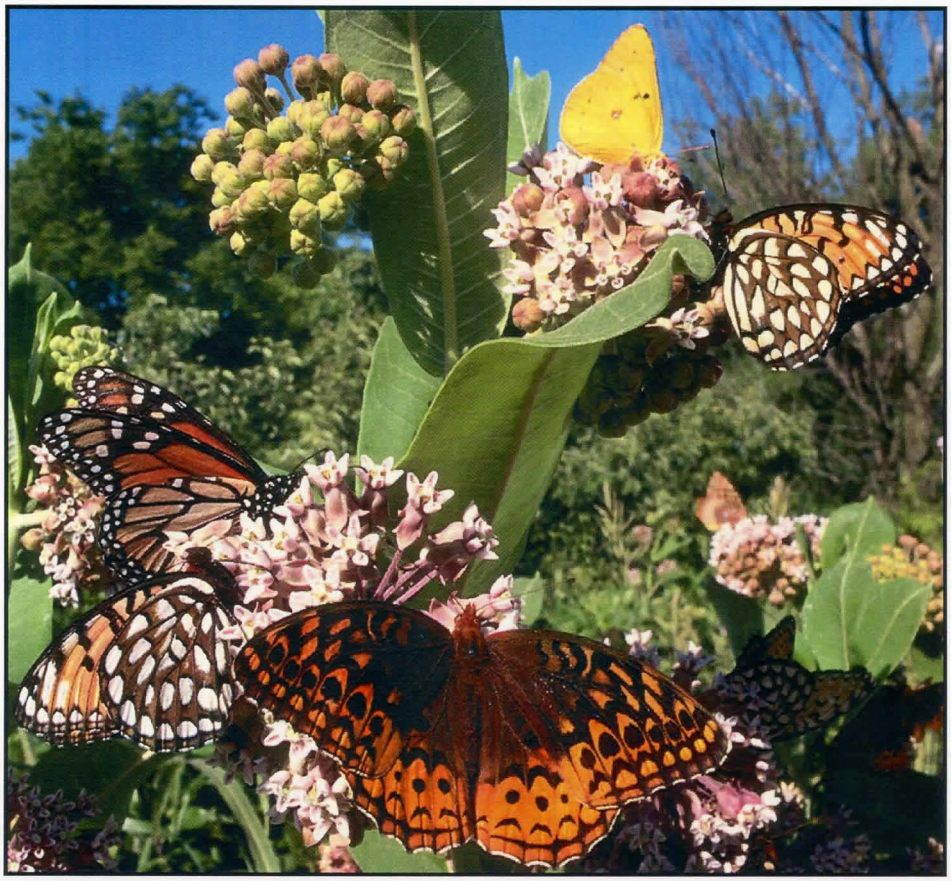


Fig. 4. Butterflies nectaring on milkweed in a Missouri prairie: *Speyeria cybele* (lower center), *Speyeria idalia* (upper right and lower left), plus a monarch and a sulphur (photo by G. N. Ross).

present there in the 1850s. Regals were known then as far north as Maine, before they were extirpated from the Northeast (except for one remaining colony in Pennsylvania) (Glassberg, 2000; Opler and Krizek, 1984; Scott, 1986). Klots (1951) still had the Regal distributed to Maine in his butterfly guidebook, but the species must have been fairly rare by 1955.

Farther west, in the tallgrass prairies of Kansas, Nebraska, and Missouri, the Regals remain common in good habitat (Fig. 4) (Ross, 2005, 2023a,b). Most of the other speyeria's are still common in the East, except for the Diana Fritillary (*Speyeria diana*) of the Appalachians, Ouachitas, and Ozarks, a species that has always been rather scarce, or hard to find. I have read that butterfly numbers in the Northeast are now greatly reduced. Again, excessive land clearing, pesticides, and herbicides are likely the main reasons (Ross, 2022). Global warming may be a factor as well, but in the southern states warming effects seem less evident, except for milder winters and higher tides along the coasts.

Likewise, when I lived in San Diego in the 1960s, the local Hermes Copper (*Lycaena hermes*) was very common in certain locations where its hostplant bushes grew. This butterfly is very restricted in habitat, like the Schaus swallowtail, and is only found where its hostplant grows in the chaparral woodlands of San Diego County and south into northern Baja California (Garth and Tilden, 1985; Scott, 1986). Mission Gorge was one such place, about 12 miles east of the city, near to the Spanish mission built after San Diego was founded in 1769 and where the San Diego River passes through some low mountains on its way west to the coast. This area had not been developed, except for a small dam on the river built in 1816, so the hostplants thrived there, and the coppers were common in their season. I never saw the coppers in real 'swarms' but at their peak season one could find dozens flying close by the hostplant bushes, spiny redberry (*Thamnus crocea*, Rhamnaceae). Today, the numbers of both plants and coppers are greatly reduced in the county, mainly due to habitat loss as San Diego has grown from 575,000 people in 1960 to nearly 3 million today. There is no mosquito problem in San Diego, so insecticide spraying has not been a major issue there for native insects. In response to habitat loss, local conservationists lobbied the county to make the Mission Gorge area a nature reserve and protected habitat. Thus, the gorge area

today remains about the same as it was 200 years ago because of these efforts. The U.S. Fish & Wildlife Service also has the butterfly under greater protection. As a result, the coppers thrive there again and in other remaining colonies in the county, wherever the hostplant grows.

The diversity of species in Florida and elsewhere in the United States has not decreased over the past half-century (except for a few rare cases like the now extinct Xerces Blue of San Francisco), but the numbers of individuals have decreased. Nature reserves, like in San Diego and Key Largo, help to mitigate habitat loss. However, the chemical onslaught all over the country remains pervasive and difficult to alter. Regrettably, swarms of butterflies (and moths) become less every year, as does clean drinking water, except in the most remote wilderness areas. Preserving even small patches of natural habitat is the key to keeping the hostplants and butterfly caterpillars thriving, and thus, keeping butterfly colonies vibrant.

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REVIEW OF REGAL FRITILLARY (*SPEYERIA IDALIA*) ON THE WAH'KON-TAH PRAIRIE PRESERVE OF MISSOURI

BY
GARY NOEL ROSS

INTRODUCTION

In 2005 (issue date, 2001) I published SURVEY OF THE BUTTERFLIES OF THE WAH'KON-TAH PRAIRE in *Holarctic Lepidoptera* (details at end). Regrettably, the association had a limited circulation—about 300—and ceased publication shortly thereafter. At the time of distribution (summer 2005), hurricanes in the Atlantic Basin were at a record high; seven major hurricanes (including catastrophic *Katrina)* impacted the Gulf coast. Mail service throughout the southeastern U.S. was interrupted. As a result, a substantial number of subscribers failed to receive copies of the recent issue.

Below is the ABSTRACT from the 2005 article

> "The Wah'Kon-Tah Prairie Preserve is located in southwestern Missouri and is a remnant of the once extensive Tallgrass Prairie Ecosystem. The preserve consists of 2,332 acres (944 hectares) within the Osage Plains-Flint Hills Ecoregion of Missouri. The preserve is owned by The Nature Conservancy (Missouri Office) but managed by both the Conservancy and the Missouri Department of Conservation, El Dorado Springs Division. Between May and October 1998, the author lived on the newly acquired Thoreson Ranch that linked the original Wah'Kon-Tah Prairie Preserve and Mo-Ko Prairie Preserve. Daily butterfly inventories were conducted and recorded weekly. The cumulative total of species observed was 74 (71 during this survey, 2 by others, and 1 by the author in 2002). Tallgrass Prairie management involving haying, burning, and tree removal as they affect butterflies in general and the regal fritillary (*Speyeria idalia*) in particular are discussed. The possible role of micronutrients and/or phytochemicals procured through nectaring by regal fritillary butterflies is discussed. Selected photographs of habitat and the regal fritillary are included."

Because (1) there was a low circulation of the original publication, (2) populations of *S. idalia* have experienced a serious decline over the last several decades, (3) *S. idalia* is closely related (congeneric) with *S. diana* (Diana fritillary), a species I have chronicled recently (see SLS NEWS, Winter 2022), I decided to address the subject again.

DESCRIPTION OF PRAIRIES

Prairies are classified by biogeographers as "Grassland Biome." This unique ecosystem can be found on all continents except Antarctica. Other than the term "prairie," common local names include steppes, veldt, pampas, and plains. Historically, all were treeless except for narrow ribbons of stunted trees flanking bodies of water such as streams, lakes, ponds, and seeps. Other than such riparian communities, vegetation consisted of grasses punctuated with a color-dot matrix of seasonal wildflowers. The land usually undulated across an open plain beneath a domed heaven. The horizon encircled, but was always just beyond reach. This pastoral terra firma was derived from a timeless interplay between moderate rainfall, nutrient-rich black soil, diversified deep-rooted warm-season grasses, large and small herbivorous mammals, and amplified by fires—generated sporadically by either lightning or native peoples.

In North America, native grasslands historically were the dominion of what is now the heartland of Canada and the United States. [NOTE: An ecosystem termed "Tropical Thorn Grassland" and composed of grasses and a diverse number of short woody and thorny species as well as succulent cacti exists throughout the American Southwest and much of Mexico.] In fact, grasslands seem to have remained ice-free during the last Glacial Period ("Ice Age"), aka Pleistocene Epoch, from 115,000 to 11,700 years ago. Authorities divide the principle North American grasslands into three contiguous bands. Beginning in south-central Canada and then southward to central Texas and New Mexico, these are: Tallgrass Prairie, Mixed Grass Prairie, and Short Grass Prairie (Great Plains); all are based on a decreasing gradient of rainfall from east to west. Anecdotal reports indicate that within the most eastern division, Tallgrass Prairie, the bladed plants grew "taller than a horse and rider." This wealth of renewable greenery supported massive herds of grazers and browsers: bison (American buffalo), elk, deer, antelope

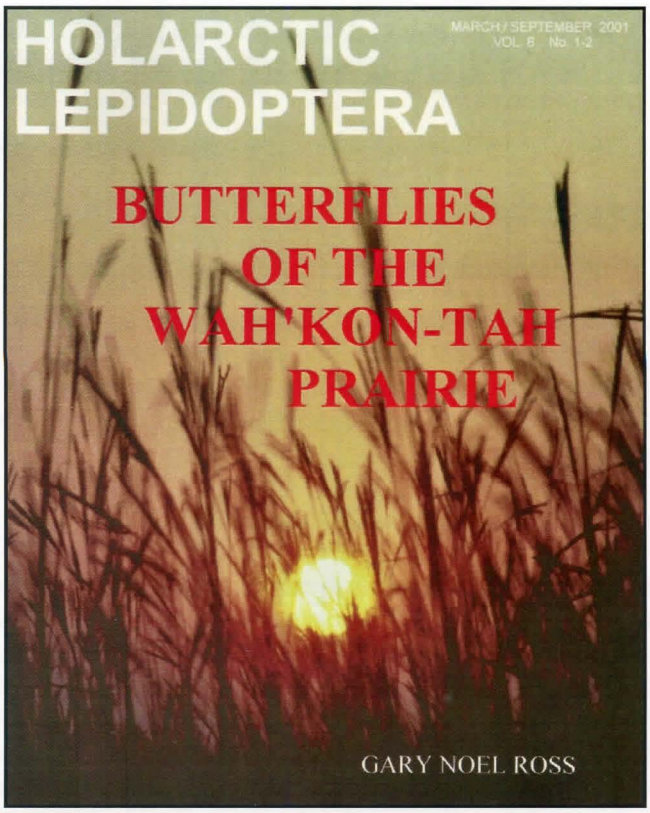

Fig. 1. Cover of original publication in *Holarctic Lepidoptera*, 2001 (2005). Image: Sunset on the Wah'Kon-Tah Prairie Preserve, El Dorado Springs, Missouri. September 1997.

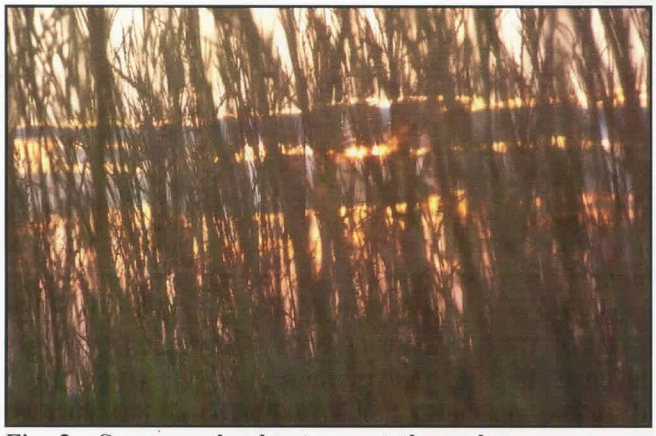

Fig. 2. Summer clouds at sunset through warm-season grasses on the Wah'Kon-Tah (back cover of original publication).

Fig. 3. Warm-season grasses in autumn. Big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switch grass (*Panicum virgatum*), and Indiangrass (*Sorghastrum mutans*) dominate.

(pronghorn), grouse, prairie dog, ground squirrel, jackrabbit, and rodents (especially voles and mice). In turn, herbivores and omnivores were preyed upon by an array of carnivores such as wolves, grizzly and black bear, mountain lion, coyote, fox, and black-footed ferret. The air was alive with birds, and periodic population eruptions of locusts and cicadas. The grasslands were "Americana" at its best.

But that was before Man's folly. Beginning in the early 1800s, the fledgling United States adopted an expansion policy to acquire all land westward to the Pacific Ocean, essentially, to conquer the wilderness. To encourage adventurous Easterners to relocate, the government often gifted families with sizable tracts of land west of the Mississippi River. The new homesteaders viewed what for the most part were prairie lands as indestructible, "manna from heaven." Corn, wheat, and sorghum (milo)—all domesticated grasses—soon became bountiful agricultural staples. Horses, cattle, goats, sheep, and chickens adapted, too, and in addition, furnished meat and/or transportation. Absent trees, prairie soil innervated with deep-rooted grasses ("sod") proved to be excellent construction material. After native peoples were either removed or restricted to reservations, the incidence of fires declined. By 1930, the majority of the North American grasslands had been transformed into croplands and pastures.

The Tallgrass Prairie, the least extensive of the three zones, has been the most exploited. Tall grasses originally occupied an irregular swath of land from south central Canada to southeastern Oklahoma. At its widest, the ecosystem extended eastward into what is now considered the Upper Midwest. Biologists agree that 99.9 percent of the original Tallgrass Prairie has been altered. The remaining 0.1 percent of the native landscape consists of small parcels of fenced-in lands that continue to be assaulted by incursions from seeds of forest species blown in or introduced by settlers. In truth, the Tallgrass Prairie is no more. Nonetheless, there is a positive corollary: the native ecosystem has been replaced by what is acknowledged internationally as the "Breadbasket of the World." Economists regard this as not a bad trade-off.

Fig. 4. Rider on horse within towering big bluestem grass on the Wah'Kon-Tah.

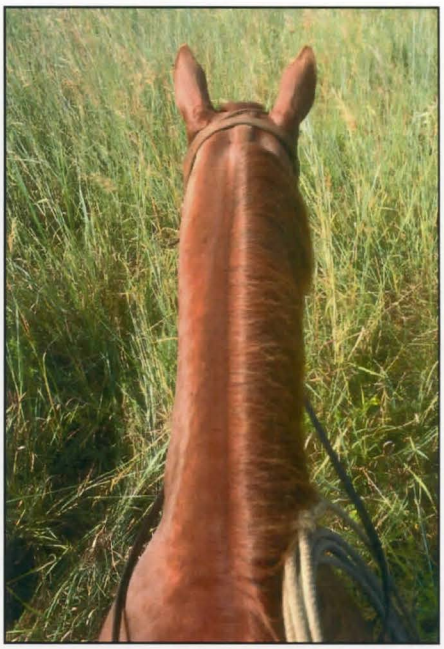

Fig. 5. Rider's view from atop horse walking through big bluestem grass.

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Prior to 1800, roughly one-fourth (12-15 million acres) in Missouri was classified as Tallgrass Prairie. Today that has been reduced to 40,000 acres—less than one-third of one percent of the original. Virtually all such lands are managed by the Missouri Department of Conservation, Missouri Department of Natural Resources, Missouri Prairie Foundation, The Nature Conservancy of Missouri, and the University of Missouri (Botany Department).

DESCRIPTION OF THE WAH'KON-TAH PRAIRIE PRESERVE

The Wah'Kon-Tah Prairie Preserve is a remnant of the Tallgrass Prairie. Located at 37.52 N latitude and 94.01 W Longitude, the preserve is immediately east/northeast of the community of El Dorado Springs (2022 population, 3,473, elevation 850 feet) and approximately 22 miles east of Nevada (2022 population, 8,178). The protected/managed land straddles the southwest counties of Cedar and St. Clair. The current preserve is composed of three previous units: Wah'Kon-Tah, Mo-Ko, and Thoreson Ranch. The total acreage is 4,040, of which approximately half consists of virgin prairie (unbroken sod). The preserve is accessed by paved state highway 82, county highway H, and Lake Hills Road; state highway 82 bisects the preserve. All tracts continue to be managed by The Nature Conservancy (TNC) and the Missouri Department of Conservation (MDC). In the past, the geography was the homeland to the Osage Tribe of Native Americans. ["Osage" also refers to a common native tree, osage-orange (*Maclura pomifera*) a species locally known as "Bois d'arc" and "hedge bush." The tree's wood is orange in color, extremely hard, and commonly used for constructing fences and furniture. The fruit is green, baseball in size, and relished by cattle.] Wah'Kon-Tah in the Osage dialect translates as "Giant Spirit" or "Great Mystery." Today the Wah'Kon-Tah Prairie Preserve is Missouri's largest tract of Tallgrass Prairie—Prairie State Park (Barton County), 15 miles west of Lamar, logs in for second place. Currently, native grasses attain heights of only 3-4 feet, markedly shorter than their predecessor; the lesser height is attributed to reduced soil fertility. Daytime visitation is encouraged and free, but no permanent hiking trails exist, and overnight camping is prohibited. During the cold war of the 1960s, several Minuteman II missile silos were constructed on the Wah'Kon-Tah. These were later imploded leaving behind remnant mounds. In 2012, the threatened American burying beetle (*Nicrophorus americanus*) was introduced for possible re-establishment.

Temperatures range from an average high in June of 84.7 degrees F. to an average low in December of 21.3 degrees F. Annual precipitation is 42.59 inches with moderate snowfall each winter. The prairie is classified as "mesic" because it is well drained and receives adequate moisture throughout the growing season. Soils are cherty silt loam derived from limestone and sandstone. Topography is rolling with elevations between 850 and 950 feet. Because the ground is relatively rocky, the native sod in many venues was never broken by original settlers. In time, though, commercial developers did disturb some of these non-arable venues with large scale cattle grazing and even spotty agriculture facilitated by modern machinery. Some acreage was even developed into a golf course. Currently, limited virgin acreage is grazed by local livestock (to simulate grazing by original bison), and mowing and burning (to discourage the invasion of woody species).

Fig. 6. Fencerow with prairie wildflowers. Pale purple coneflower (*Echinacea pallida*) dominates and is an important source of nectar for many pollinators, especially regal fritillaries.

Fig. 7. Author seated within a summer colony of black-eyed Susan (*Rudbeckia hirta*). The bright colors attract bees, not butterflies.

Fig. 8. Wind-tossed ashy sunflower (*Helianthus mollis*), a short, colonial, perennial forb, provides nocturnal roosts for butterflies and other small animals.

Fig. 9. Butterfly milkweed/butterfly weed (*Asclepias tuberosa*) and pale purple coneflower are alpha nectar plants for most butterflies, including regal fritillaries.

Floral diversity is high at about 220 species. This includes Mead's milkweed (*Aslepias meadii*), listed as federally endangered. Major grasses include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrum scoparium*), Indiangrass (*Sorghastrum nutans*), and switch grass (*Panicum virgatum*). All are commonly called warm-season bunch grasses because they grow in clumps, are green throughout the spring and summer, take on a patina of bronze during autumn, brown, and desiccate during winter—only to re-grow each spring from viable root stock. Seasonal eruptions of forbs ("wildflowers") often create a kaleidoscopic, fantasy-like tableau. Celebrity species include pale purple coneflower (*Echinacea pallida*), butterfly milkweed (*Asclepias tuberosa*), black-eyed Susan (*Rudbeckia hirta*), scarlet Indian paint brush (*Castilleja coccinea*), blazing star (*Liatris* spp.), and ashy sunflower (*Helianthus mollis*). In particularly productive years, seeds of native species are harvested for sowing elsewhere and for marketing to commercial enterprises.

Fig. 10. Arrowleaf violet (*Viola sagittata*), and scarlet Indian paintbrush (*Castilleji coccinea*) often carpet ground during spring and early summer. The violet is probably the local host for *S. idalia*.

Fig. 11. Pinnate prairie coneflower (*Ratibida pinnata*) adds a dramatic accent to the prairie landscape. The species is not as attractive to pollinators as pale purple coneflower.

Fig. 12. Mead's milkweed (*Asclepias meadii*) is listed as "federally endangered" and rare on the Wah'Kon-Tah. As a milkweed, the plants can serve as a host for the monarch butterfly (*Danaus plexippus*).

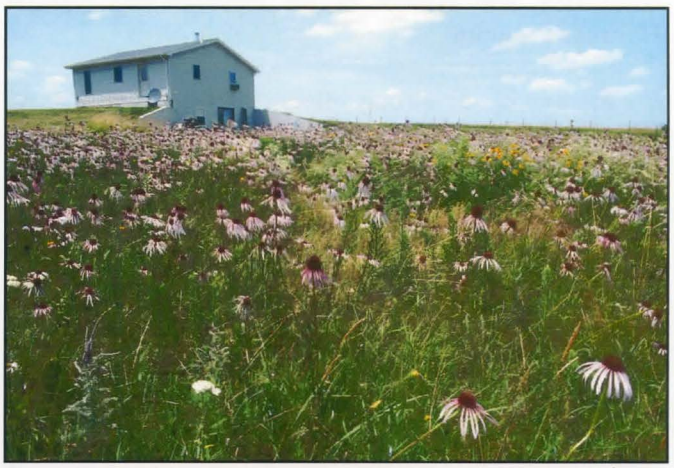


Fig. 13. Modern house near the Wah'Kon-Tah Prairie Preserve. Pale purple coneflowers constitute the natural "lawn." The plants reproduce through seeds and roots.

Animal diversity is high, too. Henslow's sparrow (*Ammodramus henslowii*) and greater prairie chicken (*Tympanuchus cupido*) are of particular concern. Wild turkey (*Meleagris gallopavo*) and white tailed deer (*Odocoileus virginianus*) can be common and hunted as game with special permit. Night air is often filled with the high-pitched whines of crickets and katydids, Historically, American bison/buffalo (*Bison bison*), American elk (*Cervus canadensis*), and gray wolf (*Canis lupus*) were abundant, but are now extirpated. There is, nonetheless, debate about reintroducing bison (the kingpin species) as has been successful in nearby Prairie State Park (Barton Co.), 50 miles to the south. But because the burly, shaggy beasts can be cranky and aggressive, the debate remains indecisive.

I was introduced to the prairies of southwest Missouri in September 1996. My goal was to compare the behavior of the Diana fritillary (*Speyeria diana*), a woodland species I had been studying on Mt. Magazine in Arkansas, with the behavior of *S. idalia*, a congeneric prairie specialist. During 1996 and 1997, I documented my sightings in Prairie State Park. In 1998 I accepted a contract from the conservancy to become their "Lepidopterist in Residence" between May 2 and October 4, 1998. I resided at the recently vacated home of Ted and Sue Thoreson on their 872-acre multi-generation homesite known as "Thoreson Ranch." The original prairie had been plowed and seeded primarily with fescue grass (*Festuca* spp.)—a European perennial turf grass that remains green all winter, can tolerate summer heat, and is low maintenance—ideal for grazing livestock. The conservancy planned to restore the majority of the ranch to secondary prairie. My responsibilities were to (1) conduct weekly surveys of the butterflies of the ranch and adjacent Wah'Kon-Tah Prairie, (2) to record details on the life history of the regal fritillary, and (3) to serve as the liaison between the conservancy and the adjacent community of El Dorado Springs.

SPEYERIA IDALIA: TAXONOMY AND DISTRIBUTION

Speyeria idalia (Drury, 1773) is classified in the lepidopteran family Nymphalidae; subfamily Heliconiinae; tribe, Argynnini; subtribe Argynnina. Etymology: *Speyeria* is named after the German lepidopterist Adolph Speyer (1812-1892); *idalia* is named after Idalium, an ancient town in Cyprus—a center for copper trading (referencing the coppery tones of the butterfly's ground color). The butterfly is popularly alluded to as the "regal fritillary" or simply "regal." Individuals are decidedly elegant, charismatic. Locally, individuals are often described as a "monarch butterfly dipped in chocolate." In recent times, the regal fritillary has become emblematic: the "Hallmark Species" for North America's Tallgrass Prairie ecosystem, and symbol of the Pennsylvania Natural Heritage Program.

S. idalia is a strong flyer, but non-migratory. Historically, *S. idalia* inhabited a wide swath of open/meadow-type landscapes across central and eastern United Sates as well as a small part of southeastern Canada (33 states, 5 Canadian provinces). There are reports dated 1836 from "New Jersey, nearly opposite the City of Philadelphia" (recorded by Titan Ramsay Peale, unpublished manuscript), and even within the city limits of Washington, D.C. as late as 1932 (A.H. Clark), and within the capital's suburb of Vienna, Virginia in 1959 (yours truly). Today all cohorts east of Indiana have been extirpated—all, that is except for one remnant colony in Pennsylvania: Fort Indiantown Gap Military Reservation (FIG), 40°26'13"N, 76°34'34"W, Lebanon/Dauphin County—near the community of Annville. (See CONSERVATION.)

Today the epicenter of distribution is the nation's heartland west of the Mississippi River, specifically, the Tallgrass Prairie and Mixed Grass Prairie provinces of the Central Midwest. The butterfly can be abundant during summer months on prairie lands that are relatively moist, and that are routinely managed with one or more of the following: haying (mowing), seasonal burning, and grazing and browsing by herbivores (native and domestic livestock). During one-day annual butterfly counts on the Wah'Kon-Tah prairie between 1993 and 1999 by Ann B. Swengel and associates documented numbers between 413 and 1,289, ranking *S. idalia* as the most numerous lepidopteran of the day. Those numbers have been surpassed only in prairie preserves in nearby Iowa and Nebraska: 1,292 in Northern Loess Hills, IA (1995) and 1,422 in Crane Meadows, NE (1996). Typical numbers for *S. idalia* in NABA Butterfly Counts range from a handful to a few hundred.

Fig. 14. Small group of re-introduced American bison/buffalo (*Bison bison*) at sunset. Prairie State Park near Lamar. In time, the burly, shaggy, and oftentimes grumpy mammals may be re-introduced to the Wah'Kon-Tah. The bison is the kingpin species for prairies.

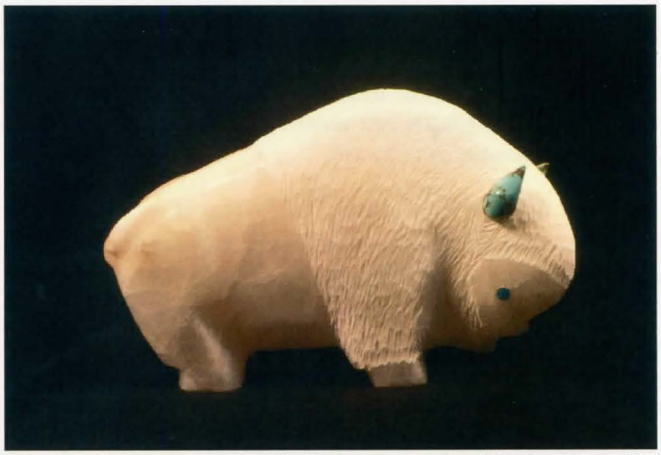


Fig. 15. Stone carving (fetish) of a rare white buffalo (6" x 4" of white marble with turquoise insets). An albino was sacred to indigenous peoples. Artist: Lynn Quam (Zuni Tribe, northwestern Arizona). From the author's collection. 1999.

I never was privy to a butterfly blitz. One-day surveys that I conducted on the Wah'Kon-Tah (actually, one took place on the same day as that conducted by the Swengels) consistently produced between 200-400 individuals; never did I log more than 400. Such discrepancy might be explained by differences in methods of sampling: the transect method of Pollard and Yates (1993) for the Swengels, and direct observation by yours truly. Of course, both paradigms can generate false numbers due to repeat individuals. Nevertheless, because male regals in early summer tend to patrol for females by repeatedly crisscrossing a broad swath of prairie, the transect method seems to be less reliable than careful, direct observation. Consequently, I theorize that my lower numbers are more realistic.

Fig. 16. Greater prairie chicken (*Tympanuchus cupido*), The edible grouse, once abundant, today numbers only a few hundred in Missouri, and now extinct on the Wah'Kon-Tah. Mounted specimens.

Fig. 17. Wild turkey (*Meleagris gallopavo*) amidst tall blazing star (*Liatris aspera*), a common summer perennial. Turkeys can be hunted with permit. Mounted specimen.

Fig. 18. Pink katydid (*Amblycorypha oblongifolia*), an unusual gene mutant of the normal green morph. The petals of pale purple coneflower were favored for food.

Fig. 19. Red-eyed cicadas or 17-year locust, "Brood X" (*Megicicada septendecim*). This periodic cicada can emerge in massive numbers. Their biomass is ideal food for many birds and mammals, and their dead bodies and excreta help enrich soil.

Fig. 20. Disking of prairie sod converted the native grasslands in the early 1800s into fertile agricultural lands. These landscapes are now the enviable "Bread Basket of the World."

Fig. 21. Harvesting wheat, one of the major commercial crops that replaced much of the native warm-season grasses in the Tallgrass Prairie ecosystem.

Fig. 22. Corn is a major crop throughout the original Tallgrass Prairie. Post-harvest remnants provide fodder for native wildlife.

Fig. 23. Milo, a type of grain sorghum, is an important crop. The common sunflower (*Helianthus annuus*), a prairie annual, often invades croplands as a "weed."

Fig. 24. Mowing or "Haying" is a contemporary method of managing prairies. The periodic removal of grasses is meant to replace the action of extirpated native herbivores such as bison.

Fig. 25. Bales of hay against an autumn sunset. The dried grass is marketed to ranchers for cattle fodder during winter.

Fig. 26. Disparity between mowed (left) and un-mowed (right) prairie. Wildflowers are typically considered "weeds" by most locals.

Fig. 27. Cattle feeding on supplemented grain on a ranch with exotic fescue (*Festuca* spp.). Virtually 99.9 percent of the native Tallgrass Prairie today is used for livestock and agriculture.

Fig. 28. Osage-orange/Bois d'arc (*Maclura pomifera*) is a native small hardwood tree that grows in moist areas in Midwest prairies. Wood is durable, used in construction and heating/cooking. Named for the indigenous Osage Tribe. INSET: Close-up of orange-size fruit exploited by wildlife.

Fig. 29. Tractor bulldozing invading trees. Seeds are commonly blown or carried in by animals and people.

Fig. 30. Herbicide spraying targeting tree saplings to terminate growth.

Fig. 31. A controlled burn to remove invading trees. In the past fires resulted from natural lightning strikes or by deliberate torching by indigenous cultures.

Fig. 32. Fire spreading across a section of late summer prairie. Periodic controlled burns are frequently used to deter invasions by trees. Burns are often frowned upon by nearby communities because of safety and health concerns.

Fig. 33. Sign for the Wah'Kon-Tah Prairie Preserve, a 4,040 acre sanctuary administered and maintained by The Nature Conservancy of Missouri and Missouri Department of Conservation. Courtesy of Bill Neale.

Fig. 34. Sign on a fence identifying the limit to the Wah'Kon-Tah Prairie Preserve. Courtesy of Bill Neale.

Fig. 35. Sign for the original Thoreson Ranch, a two-generation family-owned ranch of Ted and Sue Thoreson. In 1997 the family sold 872 acres to The Nature Conservancy of Missouri for prairie restoration. Author was "Lepidopterist in Residence" May - October 1997.

Fig. 36. Thoreson Ranch site, spring 1997. Pale purple coneflower is in foreground. Original Thoreson home is the reddish building in upper right that is partially concealed by several trees.

Fig. 37. Thoreson Ranch site, autumn 1997. Tall blazing star is in foreground.

Fig. 38. Shed near original Thoreson house currently used for storing seeds harvested from prairie grasses and wildflowers. Courtesy of Bill Neale.

Fig. 39. Interior of shed and cleaning of harvested prairie seeds. Courtesy of Bill Neale.

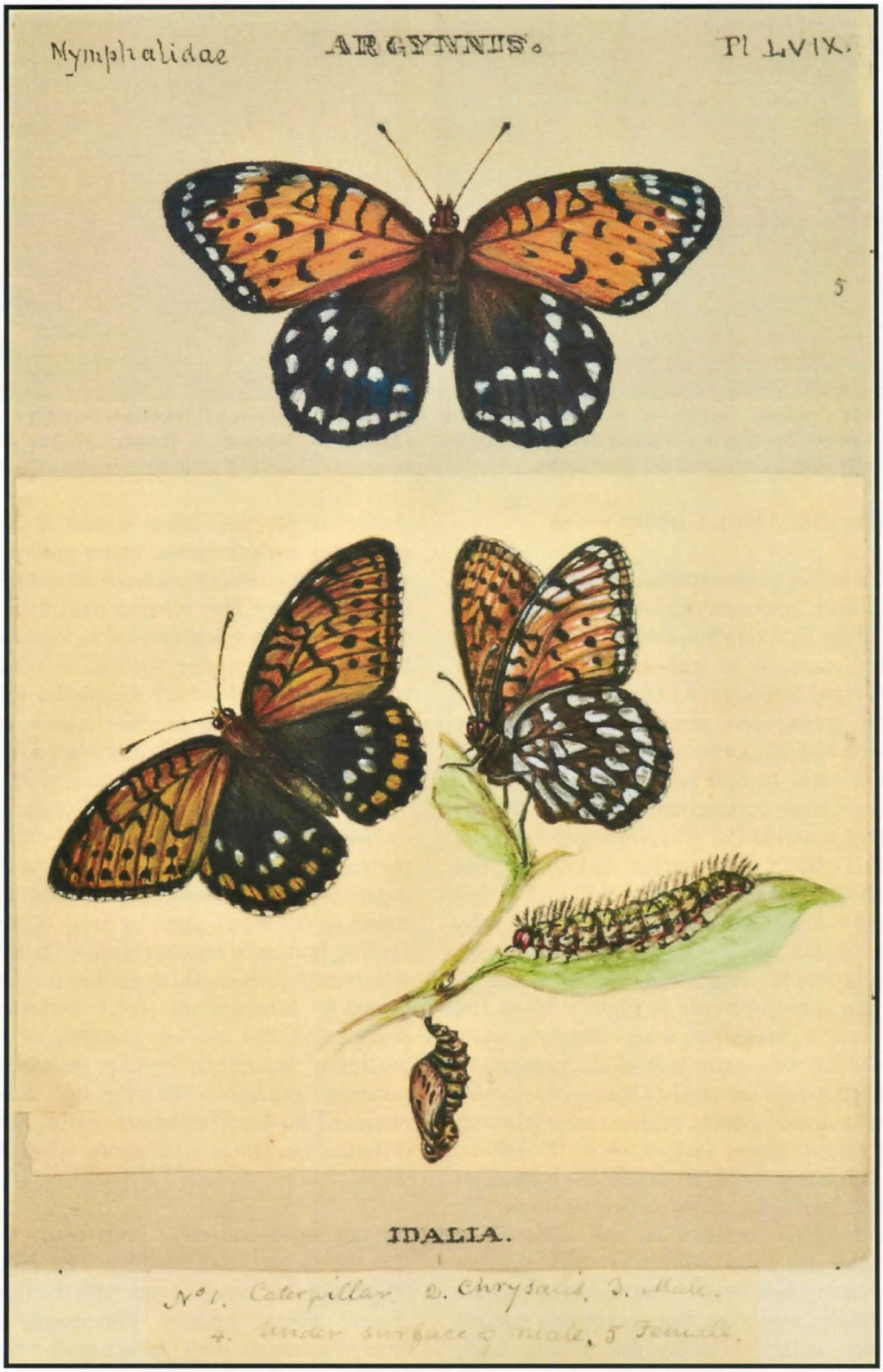


Fig. 40. Portraits of *Speyeria idalia*. Plate LIX (LVIX), page 92, in *The Butterflies of North America: Titian Peale's Lost Manuscript* (2015) published by American Museum of Natural History and Abrams. Based on unpublished watercolors and texts by Titian Ramsay Peale (1799-1885), "America's First Lepidopterist." Peale was a contemporary of John James Audubon (1785-1851), the revered naturalist-painter most noted for his life-size watercolor paintings of "Birds of America." Both artists depicted their subjects within natural settings and in life-like poses. Peale has been endearingly described as "The John James Audubon of Lepidoptera." Top, female; bottom, two males. The painting is considered the first professional depiction of the species. Courtesy of the publishers.

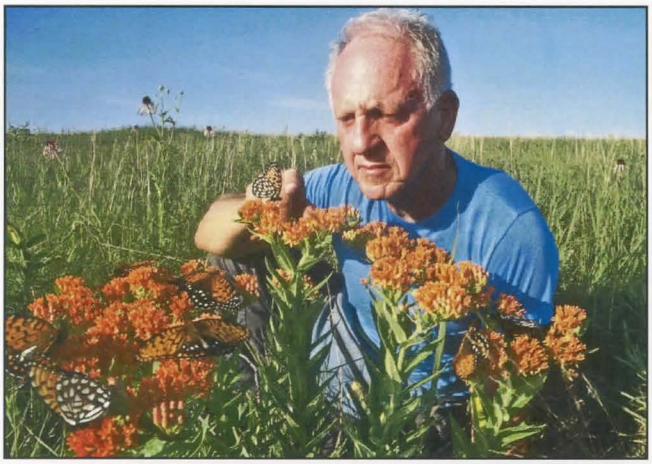


Fig. 41. Author resting beside a healthy clump of butterfly milkweed. Species is a favorite nectar source for regal (pictured) and a hostplant for monarchs.

Fig. 42. Female regal (ventral) feeding on wild bergamot (*Monarda fistulosa*), a favored source of nectar during summer. INSET: Close-up of scales on a lower hindwing.

SPEYERIA IDALIA: ADULT BEHAVIOR

Speyeria idalia is the quintessential prairie specialist: ectothermic and heliophylic—the metaphoric reincarnation of the Egyptian Sun God "Ra." Both sexes have an abject aversion to tree-shaded haunts. For example, male regal fritillaries habitually do not eclose (emerge) until spring-time temperatures flood the landscape. There usually is a noticeable eruption within a day or two in early to mid June. Flights consist of patrols over vegetation, commencing only after the sun has significantly warmed the grassy domain—usually between 10:00-11:00 CDST. Earlier, individuals can easily be flushed from their perches within 1-2 feet above the ground on stems of grasses and ashy sunflower (*Helianthus mollis*). Flight is usually strong, direct, and just above vegetation. When courting, individuals often spiral upwards as high as 50 to 100 feet. Often, males combine wing flapping with soaring—a behavior similar to that of the paragon of American butterflies, the monarch (*Danaus plexippus*). By mid afternoon, males usually begin to associate with their favored nectar plants (see below). If ambient temperature is high and sunlight intense, the butterflies keep their wings tightly closed in a vertical position. The distinctive silver-white patches on the underwings theoretically act as solar reflectors that prevent overheating. During less severe conditions, wings are spread horizontally, a posture that maximizes surface area to capture solar radiation for raising body temperature.

Females, by contrast, are exceptionally long-lived. Eclosion begins two to three weeks behind males—usually early to late July—although there is significant overlap. Initially, females do not take to the wing until midday on sunny days; when overcast, much later, when they then fly directly to favored flowers to feed. After a brief hour or so, they then return to protected perches, often within thickets of bushes, especially smooth sumac (*Rhus glabra*) and roughleaf dogwood (*Cornus drumondii*) where they remain until the next sunny day. When a patrolling male locates a female, the two spiral upward as high as 50-100 feet. If the female is receptive, the two will descend, pair, and rest in a patch of woody vegetation for 2-3 hours. As summer progresses, females spend increasing hours nectaring on their favorite late season flowers, although the butterflies do not vacate their dark perches before 1000 CDST or noon. On autumn days when temperatures are particularly chilly and skies particularly cloudy, females may not fly at all. On sunny days when temperatures are warm, both sexes will spend many hours perched atop flower heads, often feeding into early evening (approximately 6:45 CDST). Whereas the silver-white patches on the ventral wings probably function as solar reflectors (as stated previously), the over-all mottling of the underwings creates a disruptive, cryptic appearance that deters potential predators. During my entire research I observed no bird predation; I did, however, on two different occasions spot males trapped within spider webs.

As penned previously, adult regal fritillaries savor specific flowers for feeding. The regal's phenology (flight time) is synchronous with the flowering of these diverse nectar sources. For example, male regals emerge precisely with the late spring flowering of pale purple coneflower and butterfly milkweed; both are alpha sources of nectar. Females emerge at the height of the mid summer bloom for narrowleaf mountain mint (*Pycnanthemum tenuifolium*) and prairie blazing star (*Liatris pycnostachya*); butterfly milkweed, though, usually continues throughout the summer season. As summer segues into autumn, tall blazing star (*L. aspera*), wild bergamot (*Monarda fistulosa*) and ironweed (*Vernonia* spp.) don center stage. Finally, field

thistle/tall thistle (*Cirsium discolor* and *C. altissimum,* respectively) appear and remain viable until the first killing frost—usually mid to late September. Because of overlapping bloom periods, the prairie always provides an appropriate nectar source.

Fig. 43. Male regals congregating on coyote scat. The butterflies extract minerals to synthesize sperm.

Modern advances in technology have allowed organic chemists to assay plants for pharmacophagy—the synthesis of miscellaneous substances that have little or noting to do with the plants' inherent nutrition. Referred to as phytochemicals, phytonutrients, and secondary plant substances, these complex compounds are theorized to be involved with defense against predators and parasitoids, as antioxidants, anti microbial, and anti inflammatory "drugs." All nectar plants preferred by adult *S. idalia* have been documented to synthesize one or more such compounds. I find it reasonable to hypothesize that by boosting metabolism, phytochemicals can contribute significantly to a female's inordinate fecundity and longevity. In a challenging environment, any metabolic asset would prove to be of Darwinian significance, that is, a selective advantage. [We humans have exploited many species of plants for their phytochemicals. Examples include the following: culinary/aromatic spices and herbs; medicinal/psychoactive drugs such as alcohol, aspirin, caffeine, nicotine, opium and derivatives, kava, chamomile, LSD, psilocybin, and cannabinoids; food pigments/enhancers/antioxidants such as vitamin C, polyphenols, flavonoids, carotenoids, terpenes, omega fatty acids. And so on, and so on. At the beginning of the current millennium, the Chemical Heritage Foundation affirmed that more than 100,000 phytochemicals had been isolated and identified. Laboratories, furthermore, have documented that such compounds work their magic first on the cellular level, but in turn promote responses in tissues, organs, and organ systems, and eventually, the entire organism.]

Logic suggests that if *Homo sapiens* can benefit from such health-enhancing chemicals, then other biota—*S. idalia* for example—can benefit, also. (Incidentally, my earlier research on *S. diana* in Arkansas produced identical data.) And in addition, other researchers such as David Wagner, who have investigated *S. idalia* reproduction, have come to this same conclusion. Simply put, specific flower nectar provides not only high energy sugar compounds, but *in addition* an amalgam of complex micronutrients that are as vital as hostplants for determining habitat and geographical range. But while plant-based chemicals aren't a guarantee for reproductive success, the butterflies "haute cuisine" is vital for the completion of a lengthy life cycle. Phytochemicals are another example of the adage: "We are what we eat."

Both sexes frequently congregate on a single plant—even a single flower head—in what I best describe as "social feeding." I have codified up to 10 individuals, sometimes accompanied by other species, on a solitary *A. tuberosa* or *A. syriaca* (the latter a common milkweed often prevalent along roadsides and fencerows) where the butterflies will jostle for a particular position. Too, males will visit scat from carnivores such as coyotes and foxes, and "puddle" on damp, mineral-rich soil. Finally, both sexes will imbibe morning dew coating ground debris in autumn. Although the phenology for males is typically through early August, some individuals remain active through early autumn (early September). At this late date, males are usually tattered, weak. Females, on the other hand, remain viable until their thistle food source is browned by frost (mid to late September); then they become easy prey.

Figs. 44-52. PORTRAIT GALLERY. Assorted male and female regal fritillaries nectaring on preferred flowers.

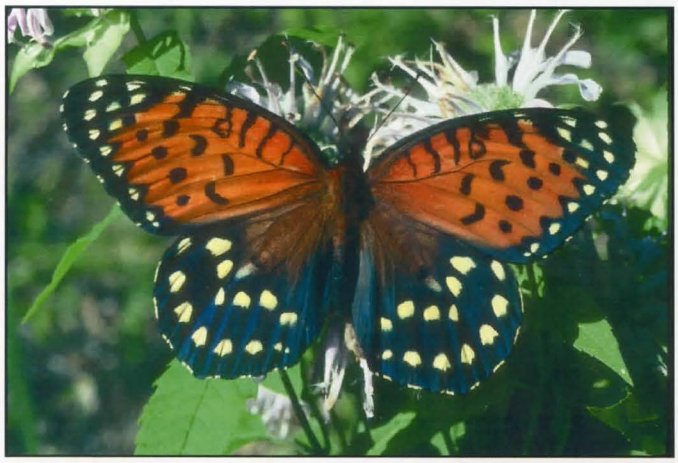
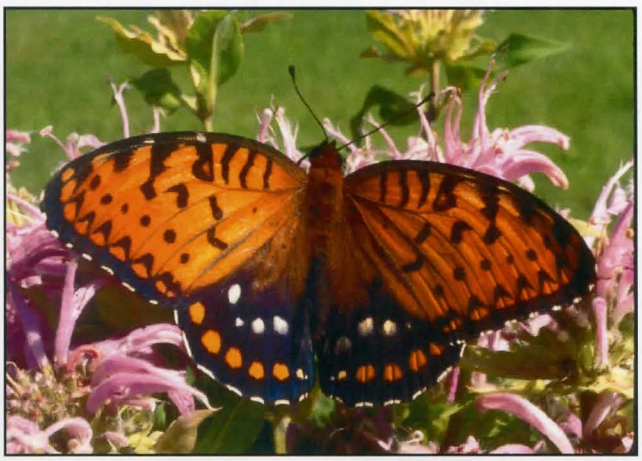


Fig. 44.



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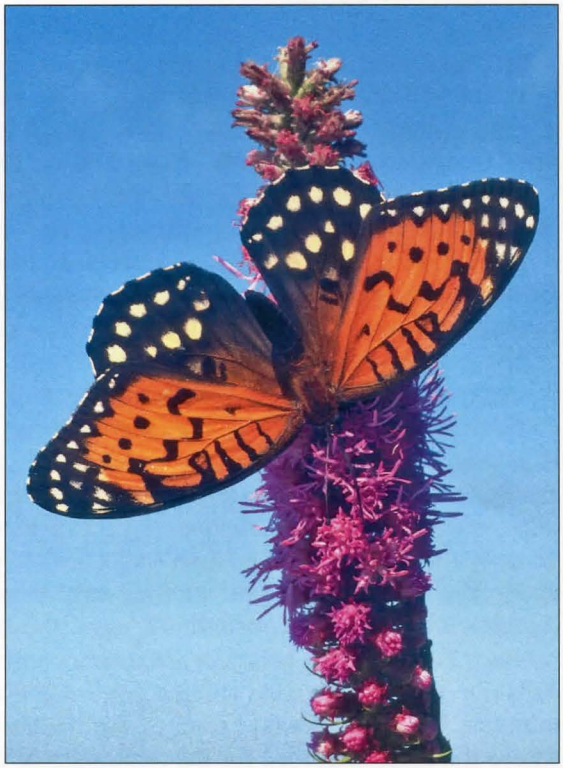

Fig. 48.

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Fig. 50.

Fig. 51.

Fig. 52.

***SPEYERIA IDALIA*: LIFE CYCLE** (Measurements for later instars and pupae are from laboratory-reared specimens reported in Edwards, 1879. In the wild, durations would probably be slightly shorter.)

Speyeria idalia, as with its fifteen American congeners, has a life cycle that is so complex and secretive that early entomologists were sometimes inclined to view the various taxa as genetically flawed. Detailed field work, however, has affirmed that what appears to be a trick of nature is instead a life strategy finely tuned to a unique hostile environment. To begin. All *Speyeria* are univoltine, that is, there is only one generation (brood) each year. Subsequent to courting on the wing and mating on vegetation near the ground, a female *S. idalia* forestalls egg-laying. Instead, the female engages in "reproductive diapause," a condition in which no eggs are laid and activity is reduced to a minimum. At this same time, males fade rapidly and soon succumb to predators. Resting sites for both sexes are often clusters of non-grassy woody species such as lead plant (*Amorpha canescens*), New Jersey tea (*Ceanothus americanus*), roughleaf dogwood, and smooth sumac. The female's reproductive hiatus continues until autumn ushers in cool temperatures. Females then become active, beginning by patrolling above prairie vegetation in search of fall blooming thistle flowers for nectaring. A female may spend several hours from slightly before noon to mid afternoon on a lone thistle head. Later, she will take flight from 3-5 feet above the ground. When woody vegetation such as smooth sumac and roughleaf dogwood are encountered, the female will drop to the ground and begin walking atop the surrounding thatch (unndecomposed, straw-like plant material—primarily spent grasses). [During autumn, the regal's hosts (violets, see below), are usually desiccated, hence, difficult to distinguish in the surrounding clutter. However, females most likely can detect chemical signatures from the violets.] The female then deposits one egg—in what seems an indiscriminate manner—thatch or soil. She then walks farther, pausing every few feet to deposit another egg. After 5-10 minutes, and having deposited 4-8 eggs, the butterfly resumes flight. When a similar site is encountered, the behavior is repeated. This routine continues for 45-50 minutes. Later, the female forages for thistle flowers where she often will feed for the remainder of the day.

Fig. 53. Feeding frenzy on common milkweed (*Asclepias syriaca*). Conspicuous butterflies are regal fritillaries, great spangled fritillary (*Speyeria cybele*), monarch, and orange sulphur (*Colias eurytheme*). Plant often grows along roadsides throughout the Midwest. Tall statue provides abundant flowers for pollinators and greenery for monarch larvae.

Fig. 54. Arrowleaf violet in flower. Although birdfoot violet (*Viola pedata*) is also common, *V. sagittata* has more mass, and therefore the more likely hostplant for regals on the Wah'Kon-Tah.

Thatch adjacent to woody shrubs makes ideal oviposition sites for regal females. For example, my previous work on the woodland Diana fritillary (*S. diana*) in Arkansas documented that leaf detritus and periodic annual snow cover provide crucial insulation for fasting, ground-dwelling first-instar larvae. In the prairie environment, however, deciduous perennials are uncommon, and therefore, assets for providing sanctuary. Additionally, the defoliated/naked stems of woody species easily slow air movement enabling snow to accumulate in mini-drifts. Come spring, the drifts melt more slowly than that in open venues. This delay probably is significant: retards both dehydration and renewed metabolic activity, thus extending the protected period until ambient warmth is fully established for peak growth, and violet plants display massive numbers of leaves and flowers for voracious larvae.

On the Wah'Kon-Tah, there is sufficient land for a female regal to deposit her barrage of eggs: hundreds to over three thousand. To quote David Wagner (1995) and colleagues, researchers who experimented with rearing

larvae noted: "We had one female lay more than 2,450 eggs over her 12-week adult life—a number that few if any other butterflies can even begin to approach." (Researchers in Pennsylvania have recorded a whooping 3,700 eggs from a single female.) Such fecundity is compelling evidence of an extraordinarily difficult environment.

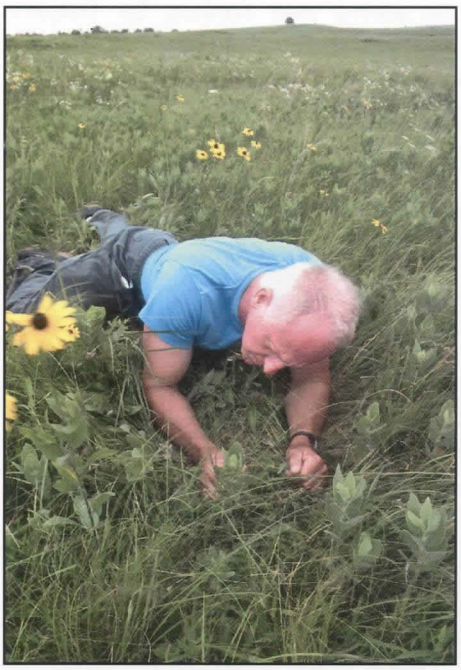

Fig. 55. Author on ground searching violet plants for regal caterpillars; none discovered.

Fig. 56. Author with his makeshift "bug light"—a wide-beam flashlight wrapped in red cellophane—searching for regal larvae.

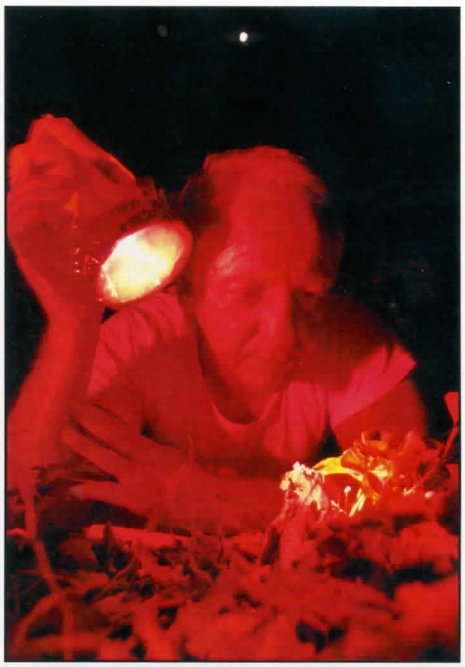

Fig. 57. Author on prairie at sunset with Coleman lantern preparing for a nocturnal search for regal larvae.

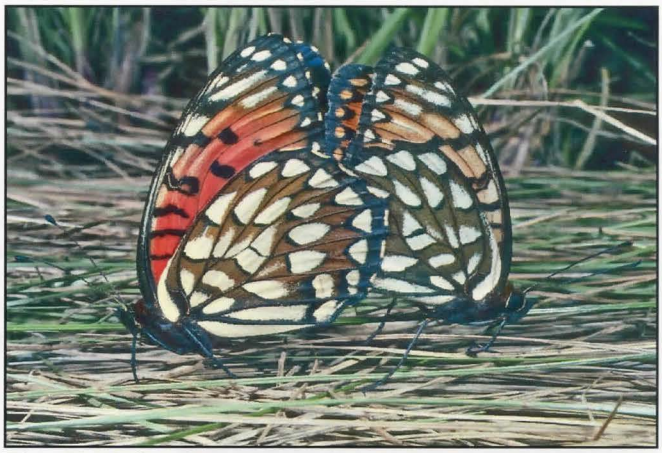

Fig. 58. Pair of regals mating on ground thatch after descending from a spiraling courtship behavior that may ascend 50-100 feet above the ground.

Hostplants: *S. idalia* larvae are monophagus—they reproduce on only a single host: *Viola* spp. (family Violaceae). The exact species depends upon specific geography as well as the degree of leaf "hairiness" (the fewer the hairs, the more acceptable). Assorted references affirm the following as acceptable hosts for *S. idalia*: common blue violet (*V. sororia*), prairie violet (*V. pedatifida*), birdfoot violet (*V. pedata*), northern bog violet (*V. nephrophylla*), bog violet (*V. lanceolata*), and arrowleaf violet (*V. sagittata*). [NOTE: Several species have one or more synonyms.] On the Wah'Kon-Tah, *V. pedata* and *V. sagittata* dominated—and were abundant usually as pioneer plants on disturbed soils. Within a laboratory, horticultural varieties of pansies (also in the family Violaceae) have proven moderately acceptable.

Egg: Tiny. Cream when first deposited (similar to eggs of other species of *Speyeria*), turning medium brown after 3-4 days—reflecting the developing larval body inside. Height: 810-840 micrometers; 840-860 micrometers at widest. Eggs are deposited as described earlier. Incubation time indoors: 32-36 days.

First Instar Larva (Caterpillar): Tiny. Medium brown, head black. Length when resting: 1,900-2,100 micrometers; width 290-340 micrometers. Body and head are covered with numerous, translucent setae (most with bulbous apexes) 100-140 micrometers in length. In theory, the setae deter predators and slow dehydration during the bone-chilling months of winter. To cope, metabolism shuts down, forcing larvae to enter a state of diapause, i.e., suspended animation/hibernation. The metabolic hiatus lasts for 5-6 months. (In the laboratory, hatchlings can be coxed into feeding by frequent irritation.) With renewed metabolism in spring, feeding commences on the tender leaves of re-emerging violet plants. Duration: 21-23 days.

Fig. 59. Smooth sumac (*Rhus glabra*) in autumn tones. Clumps of the short invasive hardwood are ubiquitous. Leaves provide shelter for perching regals and other insects. In winter, snow accumulates at bases and helps insulate first-instar larval regals.

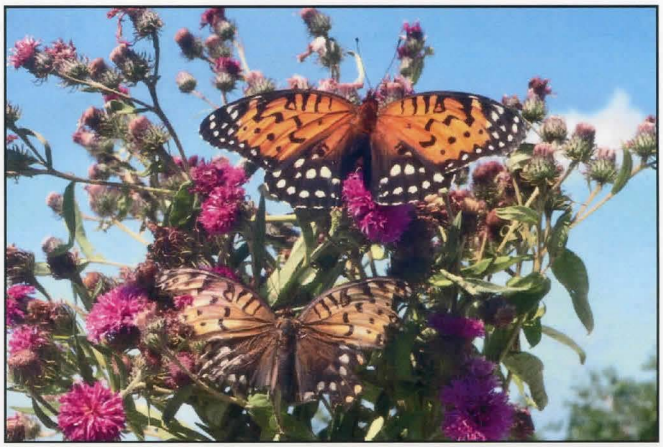

Fig. 60. Pair of regals (male tattered) nectaring on ironweed (*Vernonia* sp.), an important fall blooming source of nectar. Males typically do not survive beyond late summer.

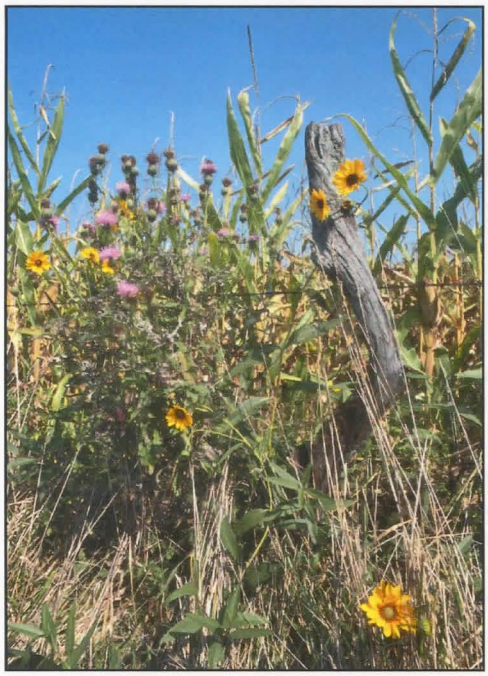

Fig. 61. Fence row with common sunflower and tall thistle (*Cirsium altissimum*). Thistle is abundant, and critical for nourishing female regals and any males still alive.

Fig. 62. Tattered male regal nectaring on a fall-blooming tall thistle.

Fig. 63. Tattered male regal nectaring on prairie blazing star (*Liatris pycnostachya*), in mid summer.

Fig. 64. Male regal trapped in the web of an orb weaver spider on an autumn flowering thistle plant shedding seed fluff.

Fig. 65. Female regal walking on thatch, searching for an appropriate oviposition site. Although violets are desiccated, volatile chemicals probably trigger the response of egg-laying.

Fig. 66. Female regal depositing an egg in ground thatch. Females typically deposit 2,000-3,000 eggs during a period of approximately 4-6 weeks in autumn.

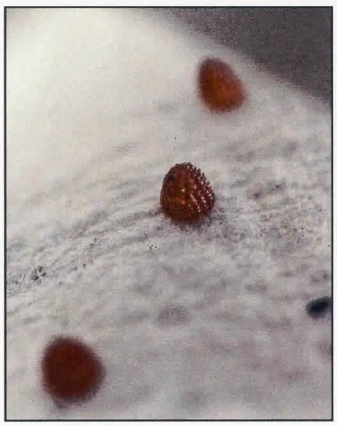

Fig. 67. Egg of S *idalia* in laboratory. Courtesy of David L. Wagner.

Fig. 68. Close-up of female ovipositing in thatch.

Late Instar Larvae: Six instars. Maximum length 30.48-44.45 mm, width 7.5-8.0 mm. Each stage 12-20 days; 102 days for all six instars (post hibernation). Cinnamon ground color highlighted with black and orange dots, black and white lateral stripes with a yellow mid-dorsal stripe, and red head. The sprinkling of colors creates a mottled appearance. Six rows of dark-bristly spines, fleshy at base cover the dorsal and lateral surfaces. In 2021, Paulette Haywood Ogard reported that both *S. diana* and *S. cybele* older larvae are endowed with prosternal glands—bulb-shaped structures that can be extruded from a slit behind and below the head—similar to glands reported in several *Speyeria* native to the Pacific Northwest. The glands are theorized to be a defense mechanism. To my knowledge, *S. idalia* has not been investigated for such glands; I presume they are present however. I did not observe any post-hibernating larvae. David L. Wagner (University of Connecticut) was gracious enough to share his photographs of laboratory reared specimens.

Fig. 69. First instar larva of *S. idalia* from an egg collected on the Wah'Kon-Tah in October. First-instar larvae don't feed but hibernate in thatch throughout the winter. Feeding commences with the return of March warmth. Laboratory reared.

Fig. 70. Dorsal view of late instar larva. Dorsal yellow stripe resembles a strand of straw. Laboratory reared. Courtesy of David L. Wagner.

Fig. 71. Teased thatch to reveal a "mouse run," a transportation system for rodents and invertebrates, presumably including regal larvae. Young violets in "run" could nourish early instar larvae moving about in spring.

Fig. 72. Late-instar larva feeding on violet plant. Larva is conspicuous against the greenery Spring. Laboratory reared. Courtesy of David L. Wagner.

Larval Feeding

Several authors in the past have reported that larvae of *Speyeria* are probably nocturnal feeders. That statement is most likely anecdotal, that is, a repeat of an observation reported as far back as the late 1800s. Data from research conducted on Kansas Tallgrass Prairie (see Kopper, et al, 2001b) repudiate earlier claims. The Kansas-based research documented that larvae of *S. idalia*—both in the field and in the laboratory—forage primarily during daylight hours. When not feeding, larvae were observed to spend their time, resting at the bases of their host, resting in nearby thatch, or walking about thatch—presumably to locate other hosts. Conclusion? Larval activity was probably regulated by the intensity of light.

During my residence on the Wah'Kon-Tah, I failed to discover a single larva—either at night or during the day. I did observe during a nighttime foray that ground litter, at least in the vicinity of woody vegetation where female regals typically oviposit, is definitely not a "dead zone." To detail: I relied on a Coleman Lantern for walking. Upon reaching my destination, I switched to an LUMILITE 4600 Krypton 4" all-weather flashlight that I had wrapped in red cellophane (most insects are insensitive to the color red). Dropping to my knees, I teased away some of the top thatch. In so doing, I discovered that the thatch was innervated with a network of interconnected tunnels about three inches in diameter. The labyrinth formed distinct passageways within the layers of debris. From prior work elsewhere, I concluded that these were virtual "highways" constructed by small rodents—in Missouri, probably meadow mice/voles (*Microtus* spp.). As a double surprise, I learned that these passageways were active. Within an hour or so of close observation, I documented the following: assorted ground-dwelling arthropods such as ants, crickets, small grasshoppers, spiders, pill bugs, centipedes, and millipedes. In my mind's eye, I could imagine that regal caterpillars would have no problem joining the traffic. The network was so extensive that I was unable to trace any route to a destination. Plus, I never was privy to a prairie mouse en transit (on one occasion I did first hear and then see a small unidentified short-tailed mouse-like rodent atop thatch in the vicinity of a run). And for a third surprise, several arrowleaf violets were sprouting in the midst of the runs—another asset to caterpillars in search of nascent foliage after exhausting an original host. Infatuated, I coined the term "thatch mouse runs."

The implication was inescapable: modern-day prairie thatch is not necessarily an impediment to small terrestrial residents. The seeming tangle of debris is often channeled by small rodents, and serendipitously, by Lilliputian invertebrates. In fact, housekeeping within runs is most likely facilitated by the myriad feet of invertebrate "guests." While such a conclusion is circumstantial, it is compelling.

The discovery of a novel micro-site that could benefit immature stages of *S. idalia* is germane to the understanding of the life cycle of the butterfly. Take violets. These showy low herbaceous perennials are common in most prairies. However, a sole plant is too diminutive to support a fritillary larva through its six instars. Conclusion? A larva is obligated to feed on more than one hostplant. Sub-surface tunnels offer a solution by providing easy access—both during day and night—to fresh, virgin hosts. There may be other benefits, too. By providing shade from sun and warmth from nighttime chill, runs can serve as de facto temporary sanctuaries—"mini refugia." Collectively, I am convinced that rodent runs are key evidence that explains what I and other field researches for years have considered a paradox: commonplace violet herbivory but the absences of larvae and pupae.

Next, larval armature and coloring. Taken together, these characteristics suggest adaptations not to life atop the greenery of a violet plant during the day. The combination of longitudinal stripes interrupted by irregular shapes of bristles creates an image that is highly reminiscent of strands of dried grass peppered with bits of debris. A morphology that imitates thatch implies an evolution to live on the ground, *not* on the hostplant. The armature probably deters potential predators encountered in the "runs."

The theory that suggests that the success of *S. idalia* may be dependent upon environmental factors in addition to the presence and abundance of hostplants is not new science. The idea was promulgated widely by B. J. Kopper, R.E. Charlton, and D.C. Margolies back in 2000. The authors then stated: "We speculate that environmental stresses such as high temperatures and intense solar insolation during the egg stage or harsh overwintering conditions experienced by first-instar larvae impact survival and influence choice of oviposition sites." The discovery of a strategy by which regal larvae may gain access to multiple hostplants, *is* a first, however. Thus, my fanfare for *S. idalia* is resolute: The insect has evolved multiple survival adaptations (several unique) to what is a difficult, even hostile, habitat—both past and present.

I planned to continue my nocturnal investigations. But on Day Two, fate intervened. Having spent much of the previous evening on a section of prairie convenient to my base, I opted to spend this new morning observing the newly discovered "thatch mouse runways." As I returned to my parked vehicle for a quick lunch, a local El Dorado Springs police vehicle pulled up beside me.

The officer, a young amicable local, informed me that his headquarters had received a telephone call from a resident who described "suspicious white and red lights moving on the prairie during the previous evening." Of course, I explained my project—especially the red from my improvised "bug light." His response was unexpected. Because the region was heavy into drug trafficking, the officer declared that local police could not guarantee my safety when I was alone on the prairie after dark. His final advice was that I should cease my nocturnal ventures. Sadly, I agreed. And so my nocturnal research was foiled.

Fig. 73. Chrysalis; ground color is often variable. Males emerge in late spring, several weeks before females. Laboratory reared. Courtesy of David L. Wagner.

Pupa (Chrysalis): 27.94 mm in length. Smooth and pendulous, attached to new grass or thatch near ground level. Color slightly variable. Most often ground tone is light/medium tan with a hint of yellow, and with pinkish-brown wing cases. A speckling of black/dark brown patches throughout. Duration dependent upon sex: male 15-17 days, female 28-32 days.

Fig. 74. Close-up of laboratory reared fresh regal pupa at ZooAmerica. Males emerge 2weeks prior to females. Courtesy of Fort Indiantown Gap Conservation Section.

Adult: Male forewing: 3.6-4.3 cm; female forewing: 4.2-5.0 cm. (Slightly smaller than *S. diana* and slightly larger than *S. cybele.*). Dorsal forewings reddish orange, dorsal hind wings basically black. Minor sexual dimorphism: males a bit smaller and with more greenish-purplish iridescence on their dorsal wings. Ventral hindwings punctuated with silvery white spots (not metallic). Eclosion: males in late May to early June, females in early to late July. Males die off in early August, females in late September to early October.

SPEYERIA IDALIA: CONSERVATION

All species within the genus *Speyeria* are among the most sensitive organisms in native ecosystems; hence, they usually are the first to be exterminated by environmental alterations. As with its congeners, *S. idalia* suffers from extreme habitat loss and fragmentation. Because the zone of the original Tallgrass Prairie is currently almost totally manipulated by man (99.9 percent), *S. idalia* is in a particularly tenuous position. As with all univoltine and monophagous butterflies, the regal fritillary has only one chance each year for successful reproduction, that is, species survival. Consider: *S. idalia* encompasses a life cycle in which *all* developmental stages are subject to major habitat/environmental disturbances. To date, *S. idalia* has no formal protection in either the United States or Canada. Nonetheless, several states have conferred a status of "Endangered" (5 states), "Threatened" (1 state), or "Special Concern" (4 states). (See Selby, 2007 for details.)

Fig. 75-80. Snow on the Wah'Kon-Tah Prairie Preserve. Periodic winter snow storms are vital to regal reproduction because snow cover helps insulate hibernating first-instar regal larvae from sub-freezing temperatures. December 2022. Courtesy of Bill Neale.

Fig. 75.

Fig. 76.

Fig. 77.

Fig. 78.

Fig. 79.

Fig. 80.

A theory known as "ecosystem approach" promulgated in 1994 by R.E. Grumbine is often employed by conservation biologists. The paradigm focuses on managing entire landscapes rather than individual species. Other terms for the concept are "habitat restoration" and "ecological restoration." By managing habitats, all species can interact in as natural a setting as possible. For grasslands the concept centers on pyric herbivory. For instance, prior to settlement by European descendents, woodland vegetation was the natural climax community for a Tallgrass Prairie. Grasses were continually held at bay by: (1) grazing and browsing large numbers of assorted herbivores—large and small; (2) periodic burns by lightning-caused fires or fires set by indigenous peoples; (3) soil fertility renewed from the excrement and dead bodies of vertebrates (including Both terrestrial herbivores and carnivores, as well as massive flocks of seed-eating and insect-eating passerine birds (song birds) and near-passerine birds (doves and pigeons), and not to be downplayed, myriad invertebrates such as cyclical population explosions (tending toward Biblical proportions) of the Rocky Mountain locust, and to a lesser degree, periodic cicadas; (4) soil was aerated (increases fertility) through "ecosystem engineering" such as the impact of hoofs and wallowing from American bison, and by the extensive burrowing of communal prairie dogs (a colony or "town" in the Texas Panhandled in the early 1900s covered 25,000 square miles and was the home of an estimated 400,000 individuals); and finally (5) seeds of prairie grasses and forbs were spread by the seasonal migrations or movements of herbivores and omnivores.

Fig. 81. Field laboratory on the Neal Smith National Wildlife Refuge, Des Moines, Iowa. Cage served as a rearing chamber for a research project (2002-2005) aimed at re-introducing the butterfly to nearby prairie preserves. Courtesy of Stephanie Shepherd and Diane M. Debinski.

Fig. 82. Laboratory for rearing regals at ZooAmerica North American Wildlife Park (Hershey, Pennsylvana) partner with Fort Indiantown Gap Military Reservation (FIG)/Pennsylvania National Guard Training Center, Annville, Pennsylvania. The military base (17,000 acres) is the site of the last known breeding colony of *S. idalia* in the East. Courtesy of Fort Indiantown Gap Conservation Section.

Fig. 83. Feeding late instar regals in laboratory at ZooAmerica. Arrowleaf violet (*Viola sagittata*) is the most common species at FIG. Courtesy of Fort Indiantown Gap Conservation Section.

Fig. 84. Feeding an adult regal in laboratory at ZooAmerica. Captive-reared adults are returned to FIG site or nearby sites with viable prairie ecosystems. Courtesy of Fort Indiantown Gap Conservation Section.

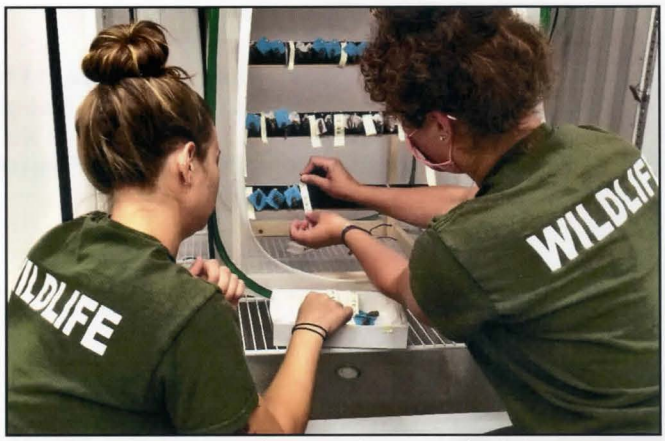

Fig. 85. Enclosure for regal pupae in laboratory at ZooAmerica. Stadium is 2-4 weeks. Courtesy of Fort Indiantown Gap Conservation Section.

Fig. 87. Educational sign for *S. idalia* on grounds of ZooAmerica. Courtesy of Pennsylvania National Guard, FIG.

Fig. 86. Releasing regal larvae into a patch of violets on nearly 300 acres of land dedicated to research on *S. idalia* at FIG. Courtesy of Fort Indiantown Gap Conservation Section.

To try and duplicate these parameters, conservations have experimented with annual haying (mowing) with mechanized equipment, controlled periodic burns, grazing by domesticated livestock (cattle, goats, sheep and, horses), removal of invasive woody species (manually or by spraying with herbicides), and by broadcasting chemical fertilizers to enrich soils. Because of financial considerations, the entire acreage is usually targeted. As of 2022, there have been only limited successes. In respone, no single protocol has been advocated.

For *S. idalia,* the ecosystem approach to management has been particularly disappointing. [A 25-year project of prairie restoration (Efroymson Restoration of 8,400 acres), which includes the re-introduction of American bison, in northwest Indiana on The Nature Conservancy's Kankakee Sands Project is showing promise (Shuey and Edmonson, 2022.)] Because the regal has such a prolonged life cycle, timing of any intervention is critical. Consider: (1) controlled burns are the safest and most effective when vegetation is dry (autumn or early winter). But fires are risky. Residents and even entire communities often border prairies, and therefore are vulnerable to run-away burns. And during late summer, fall, and winter, eggs and or young larvae of regals are secreted away in that very same ground litter that is incinerated so that burns can be devastating; (2) haying is best initiated in late summer when the grasses are tall and mature. Usually huge swaths of land are mowed at a time to minimize expenses. But adult female regals rely on specific fall forbs for critical nutrients, and personnel usually view wildflowers as "weeds,"—plants that need to be vanquished; (3) enrichment of soils with synthetic chemical supplements to mitigate absence of animal organics encourages the germination of seeds of non-native species (such as exotic fescue grass) over those of natives—thus compromising prairie integrity; (4) large-scale haying increases sizable acreage to intense solar heating, a condition that affects seed germination, flowering, and seed reproduction—all of which then affect animals; and (5) because prairie lands are now fragmented and separated by urban/agricultural developments, there can be no passage (re-colonization) between various remnants; in truth, each prairie segment is isolated, insular, and inadequately small.

Fig. 88. Tour group in regal site at FIG. On two weekends in July, wildlife biologists at FIG conduct free public tours to the regal breeding site. Courtesy of Pennsylvania National Guard, FIG.

Fig. 89. Front of invitation for "Festival of Butterflies '99." Design by renowned British botanic illustrator Beth Phillip. Original water color is in author's collection.

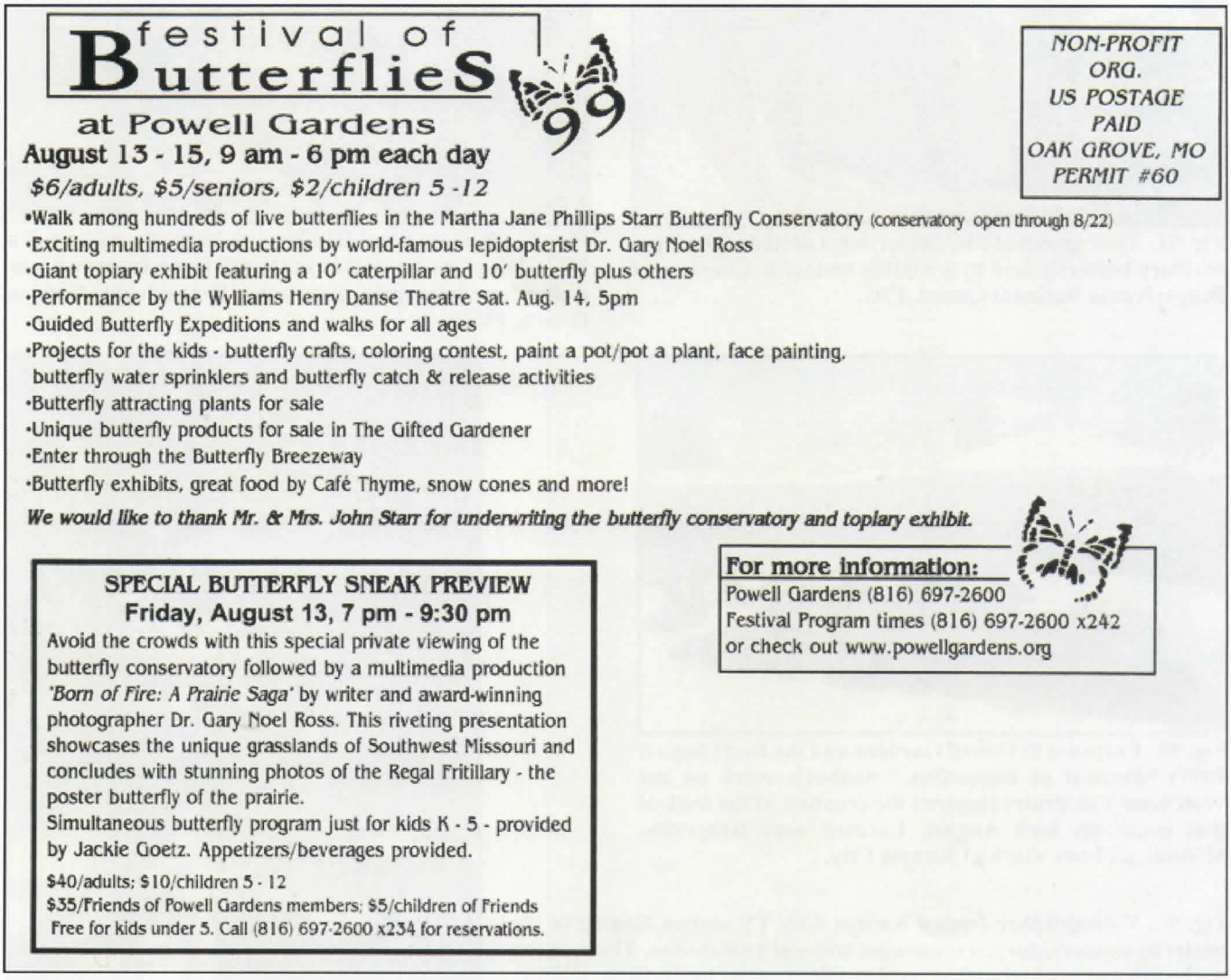

Fig. 90. Back of invitation in previous image.

(Continue to next page.)

Fig. 91. Tour group at FIG inspecting a netted adult regal fritillary butterfly held by a wildlife biologist. Courtesy of Pennsylvania National Guard, FIG.

Fig. 92. Female regal fritillary on butterfly milkweed at FIG. The plant is common at the site and a favorite nectar source for adult regals. Courtesy of Pennsylvania National Guard. FIG.

Fig. 93. Entrance to Powell Gardens and the first (August 1997) "Festival of Butterflies." Author's work on the Wah'Kon-Tah Praire inspired the creation of the festival that continues each August. Located near Kingsville, Missoui, an hour south of Kansas City.

Fig. 94. Videographer from a Kansas City TV station filming in the butterfly conservatory, a renovated tropical greenhouse. The modern enclosure was stocked with several hundred native butterflies. INSET: Close-up of white peacock (*Anartia jatrophae*).

Bottom line: there is no "one fix"—or so it seems. Even captive breeding programs in which eggs, larvae, and even adults have been reintroduced into the field, have had mixed rates of success (some with as much as 90-100% failure)—another indication that contemporary prairies are no longer suitable for the regal fritillary. Patently, today's prairies have to be managed on a timely scale if they are to persist; otherwise, ecological succession will replace the grasses with forests of deciduous hardwoods. Additionally, the butterfly's hostplants and nectar plants are pioneer species, that is, plants that invade and thrive best on sun-bathed soils that are periodically disturbed.

This has been dramatically documented within the single extant eastern population of regals at Fort Indiantown Gap National Guard Training Center (FIG) in southcentral Pennsylvania (as referenced earlier). The installation, which became functional in 1940 just prior to World War II, is a live-ammunition military training base managed by the Pennsylvania Department of Military and Veterans Affairs and Pennsylvania National Guard. The base sprawls across 17,000 rural acres (3,000 in native grassland with approximately 300 acres set aside for research on S. *idalia*). Since monitoring of the butterfly began in 1998, the population of regals has remained stable at approximately 1,000 individuals. During that same year, the North American Butterfly Association (NABA) sued the U.S. Army in federal court to prompt officials at the base to enact a formal plan for regal conservation.

Fig. 95. Restored "mini-prairie" at Powell Gardens. Pavilion (and all other buildings) was designed by E. Faye Jones, protégé of renowned architect Frank Lloyd Wright. (Incidentally, E. Fay Jones designed the pavilion at Crosby Arboretum in Picayune, MS.)

Figs. 96-100. BUTTERFLY TOPIARIES, a temporary garden exhibit for "Festival of Butterflies '99."

Fig. 96. Introduction.

Fig. 97. Egg (ovum).

Fig. 98. Larva (caterpillar).

Fig. 99. Pupa (chrysalis).

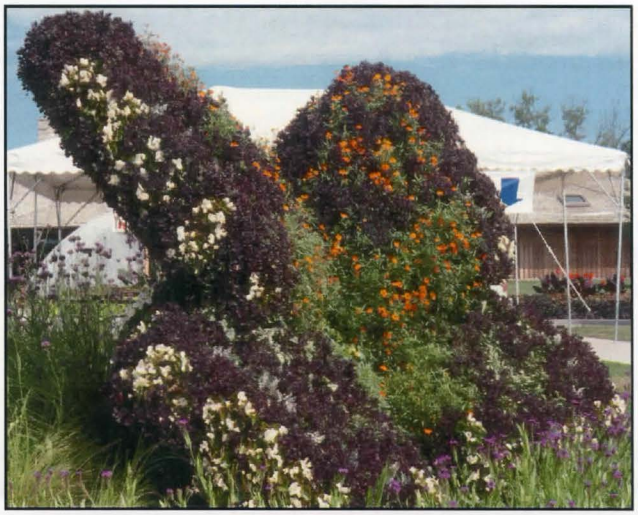

Fig. 100. Adult (butterfly).

NABA won! Data from on-going field and laboratory research by FIG and their nearby research associate ZooAmerica North American Wildlife Park in Hershey (Dauphin Co.) indicate that at least 5,000 violet plants (*Viola sagittata*) per acre are required for a healthy population of regals, and that "violets increase 4-fold after tracked military vehicle activity and 8x after a fire for about 3-5 years after the disturbance." The findings proved a surprise to the researchers! Data have also confirmed that adult nectar sources (milkweeds and thistles) increased with periodic disturbances of the ground. According to a Fact Sheet promulgated by the Pennsylvania Department of Military and Veterans Affairs: "Regals LOVE Ranges!!" To quote Lt. Col. Robert Hepner, former commander of Fort Indiantown Gap: "The restoration of native grassland and the repatriation of the regal fritillary butterfly at Fort Indiantown Gap is a great example of how military installations can both successfully accomplish their mission and safeguard plant and wildlife."

Since 2006 (except for 2020 and 2021 due to the COVID pandemic) on two weekends in July, the base advertises and conducts free educational tours for the public to view the regal population. The tours are conducted by employees trained in wildlife conservation and ecological consciousness. To quote Mark Swartz, one of the wildlife biologists on the base: "Once on site and out of the vehicles, we proceed on a guided tour through the grassland habitat as we watch butterflies with an emphasis on regals. It's really more of a nature tour than a regal tour since there are so many other things to highlight—plants, birds, herps, deer and the occasional F16 or A10 jet that might fly overhead." Continuing, Swartz notes: "Tours last about 1 hour and cover about 1 mile of terrain. We run multiple groups in a staggered fashion to maximize the time we have." So popular, the tours are now conducted over two-weekends in July and require an online registration system that allows one to get a ticket for a tour group at a specific time. Again, to quote Lt. Col. Hepner: "The annual butterfly tours provide our greater community an excellent opportunity to visit the regal fritillary butterfly environment and understand our dedication to the sustainability of the natural resources of Fort Indiantown Gap."

Without a doubt, regal conservation presents a distinct challenge. So far, almost every approach to prairie restoration on a *large* scale has proven both unreliable and inordinately costly. But the methodology employed on the FIG project in Pennsylvania seems to be succeeding. To the point, the FIG mantra is as follows: *S. idalia* needs habitat that is periodically disturbed while at the same time provides adjoining short-term safe havens, sanctuaries for adults and/or immature stages. Furthermore, the design must be on a strict rotational regime over several years to ensure long-term survival as well as ecosystem integrity. Should the FIG model or something similar be adopted elsewhere?

My original work in 1996 and 1997 in southwest Missouri inspired the premier of "Festival of Butterflies" at Powell Gardens. The exquisite private facility includes 970 acres of botanic gardens and educational facilities. Located in Kingsville (Johnson Co.), the gardens are 30 miles southeast of Kansas City, the largest metropolis in the state. Co-sponsored by The Nature Conservancy of Missouri, the two-day event (August 16-17, 1997) was highly publicized in Kansas City; I was interviewed by radio, television, and newspaper reporters. As a result, the festival attracted approximately 14,000 paying visitors, (The official two-day count was logged as 12,000. This was because at least 500 vehicles were waved through the gates without a ticket purchase to accommodate the Missouri State Troopers who complained that long backups at gates were causing highways to become too congested.) That 1997 festival was the top-ranking butterfly festival anywhere.

The Powell Gardens festival continues each August; in some years, the event takes place over two weekends. Between 1997 and 2002, I was a featured guest, providing lectures, walks, and several different multi-media presentations. (The highlight was my 45-minute "Born of Fire: A Prairie Saga." This was a multimedia presentation that centered on images from the Wah'Kon-Tah Prairie Preserve choreographed to music by Philip Glass and Katrina and the Waves.) Also, in conjunction with the festivals, since 2002 annual NABA Fourth of July Butterfly Counts have been conducted at the gardens and adjacent neighborhoods; on several counts, one or two regals have been recorded, but no breeding opportunity to learn about butterfly biology. In the future, perhaps one of the new devotees to butterfly conservation will craft a comprehensive prairie management plan in which the regal fritillary will maintain its legendary aerial sovereignty over Missouri's Tallgrass Prairie ecosystem. Perhaps, just perhaps.

In conclusion, I again quote from my 2005 article:

> "If *S. idalia* is to be sustained for future generations of mankind, preserve or sections of preserves will have to be managed in accordance with the specific requirements of that butterfly species. Simply setting aside land as preserves will surely fail. Likewise, ecosystem management that does to consider the specific feeding and reproductive requirements of this particular butterfly will fail. We have too little land; it is that simple. As professed stewards of the environment, we would be very wise not be lulled into a sense of complacency based on what some might regard as recent stories of success. Clearly, *S. idalia* walks the proverbial tight rope, constantly teetering between survival and extinction in a microenvironment that by and large is now totally man-managed. What a pity to lose *Speyeria idalia*, the resplendent insect we endearingly refer to as the regal fritillary, at the very time the species is emerging as the 'poster child' for North America's unique Tallgrass Prairie."

Fig. 101. Portraits of *Speyeria idalia* (Drury, 1773), the regal fritilary. Left, male. Right, female.

PHOTO GALLERY

Unless stated otherwise, all images are credited to the author. The majority of these were taken originally with a Canon AE-1, 35 mm SLR camera loaded with Kodachrome 64 film (slide). The images were recently digitized on a Nikon Super Coolscan 5000 ED. Minor adjustments (cropping, lighting) were facilitated with Adobe Photoshop Elements 15 Editor. Five photos of *S. idalia* appeared as "fillers" elsewhere (Ross, 2022a).

TAXONOMY

Butterfly taxonomy follows Pelham (2008). Plant taxonomy follows USDA Plants Database.

ORIGINAL PUBLICATION

As stated in the INTRODUCTION, this narrative is based on an article that first appeared in HOLARCTIC LEPIDOPTERA, a semi-annual glossy periodical that was a companion of TROPICAL LEPIDOPTERA. Both were semi-annual peer-reviewed publications of the Association of Tropical Lepidoptera (ATL) headquartered in Gainesville, FL. The article was titled "Butterflies of the Wah'Kon-Tah Prairie," Gary Noel Ross. The entire issue (March/September 2001 (2005), Vol. 8, No. 1-2) was devoted to the single article: 30 glossy pages with 50 photographs (including inside/outside front cover, inside/outside back cover, frontispiece, and centerfold). Sadly, HOLARCTIC LEPIDOPTERA ceased publication in 2004. Volume 8 is still available at $25.00/copy (including S&H) from the author.

ACKOWLEDGEMENTS

During the course of this research, many individuals and organizations have contributed their time and expertise. A more or less complete list of these original folks was included in my 2005 publication. More recently, others have contributed photographs. I owe all a special "Thank You." Nonetheless, I again must single out the following: The Nature Conservancy of Missouri and the Missouri Department of Conservation. For this work, I am particularly indebted to the following: Retired Lt. Col. Robert Hepner, Deputy for Facilities and Engineering, Pennsylvania Department of Military and Veterans Affairs, Fort Indiantown Gap (FIG), PA, Travis K. Mueller (Pennsylvania National Guard), FIG, and Mr. Mark Swartz (Pennsylvania Department of Military and Veterans Affairs, Conservation Division, FIG for sharing information and photographs on the last remaining colony of regals in the East); Dr. Bill Neale and his wife, Jan (El Dorado Springs, MO), for telephone/electronic communications and for contributing photographs of the present-day Wah'Kon-Tah Prairie Preserve; Dr. Stephanie Shepherd (Department of Natural Resources, Des Moines, IA) and Diane M. Debinski (Montana State University, Bozeman, MT), for contributing one photo; Dr. David L. Wagner (University of Connecticut, Storrs, CT) for contributing four photos of immature regals; and not to be overlooked, Dr. J. Barry Lombardini, editor of this publication, for his patience during the formatting of this lengthy manuscript.

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https://www.youtube.com/watch?v=6b8HuV9y9Es

(Gary Noel Ross, E-Mail: gnross40@yahoo.com)

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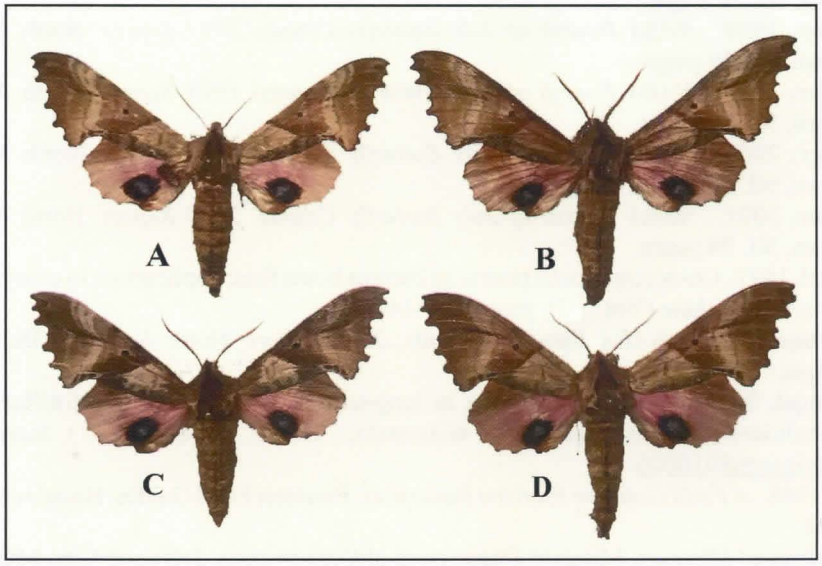
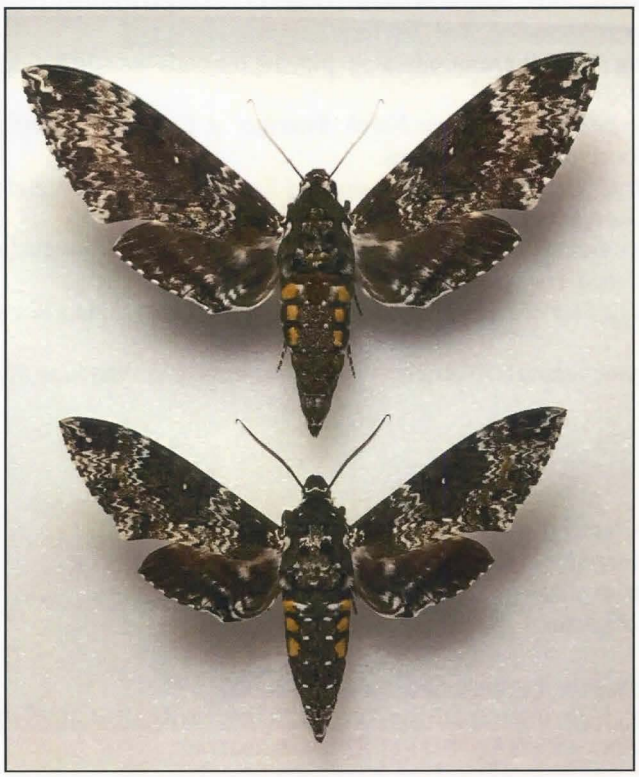
PHOTOS
BY
J. BARRY LOMBARDINI



A,B,C: Blue Haven Camp, nr. Las Vegas, New Mexico 24-VI-2007

D: Blue Haven Camp, nr. Las Vegas, New Mexico 26-VI-1993



Rustic Sphinx (*Manduca rustica*)

Davis Mountains State Park nr. Fort Davis, Texas, 17-VI-2007

Neal's Lodge, Concan, Texas, Uvalde County, 22-V-2004

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THE GENUS *TOLYPE* HÜBNER [1820](LEPIDOPTERA: LASIOCAMPIDAE) IN LOUISIANA

BY

VERNON ANTOINE BROU JR. AND CHARLOTTE DOZAR BROU

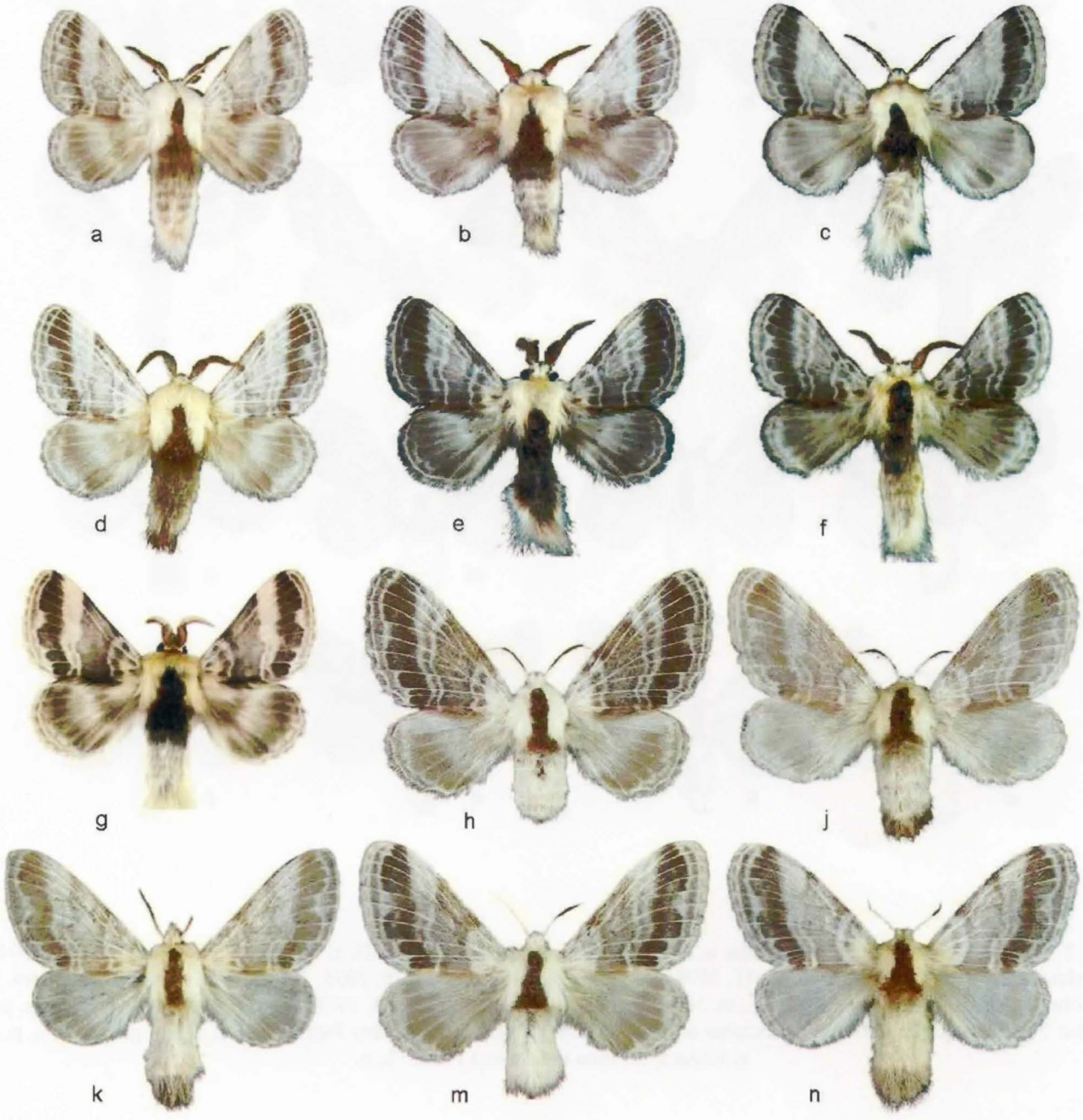

Fig. 1. ***Tolype velleda*** phenotypes: **males. a.** November 22, 2008, **b**. November 4, 2008, **c.** October 27, 1983, **d.** November 4, 1982, **e.** October 26, xxxx, f. October 21, 1983, **g.** November 3, 2017, **females. h**. October 31, 1996, **j.** October 22, 1984, **k.** October 23, 1985, **m.** November 4, 1984, **n.** October 19, 1980. Abita Springs, St. Tammany Parish: **a, b, c, e, f, j, k, h, m, g,** Edgard, St. John the Baptist Parish: **d,** Weyanoke, West Feliciana Parish: **n.**

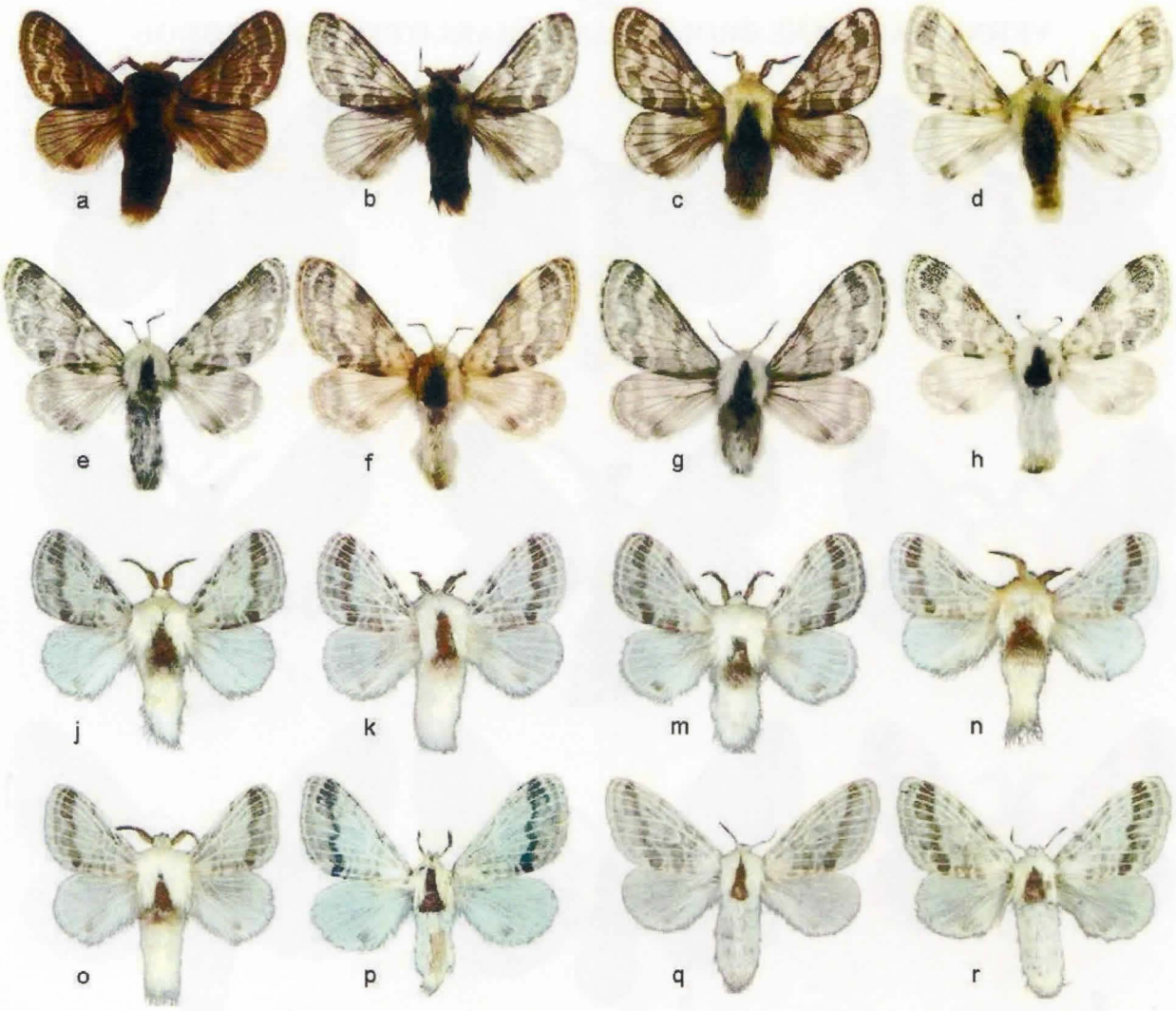

Fig. 2. ***Tolype notialis*** phenotypes: **males. a.** April 10, 1983, **b.** February 10, 2003, **c.** October 21, 2009, **d**. June 13, 2004, **females. e.** October 4, 2013, **f.** October 11, 1999, **g.** March 23, 2003, **h**. June 16, 2005. ***Tolype minta*** phenotypes: **males. j.** October 6, 2009, **k.** November 21, 1976, **m.** November 20, 2008, **n.** September 8, 1978, **o.** November 8, 1984. **females. p**. October 29, 2004 **q.** May 18,1989, **r.** October 6, 2009. Abita Springs, St. Tammany Parish: **a, b, c, d, e, f, g, h, j, m, o, p, q, r,** Edgard, St. John the Baptist Parish: **k, n.**

(Continue to next page.)

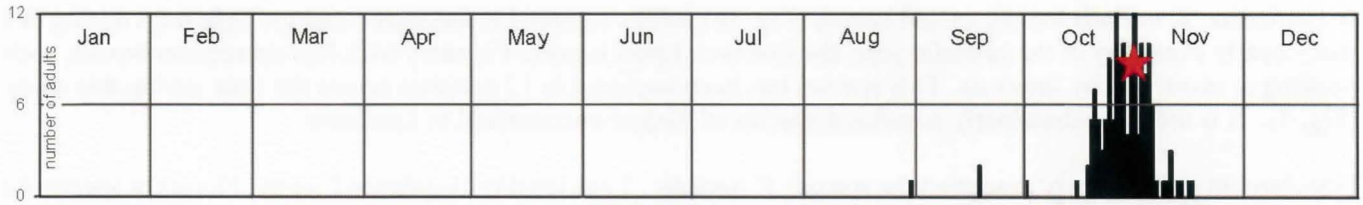

Fig. 3a. Adult ***Tolype velleda*** captured in Louisiana. n = 153

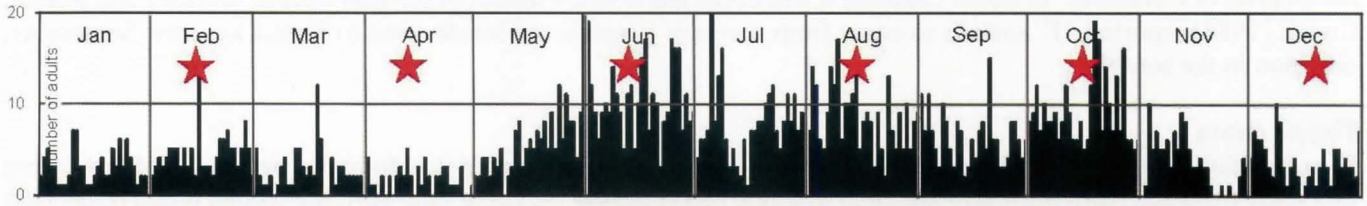

Fig. 3b. Adult ***Tolype notialis*** captured in Louisiana. n = 2,053

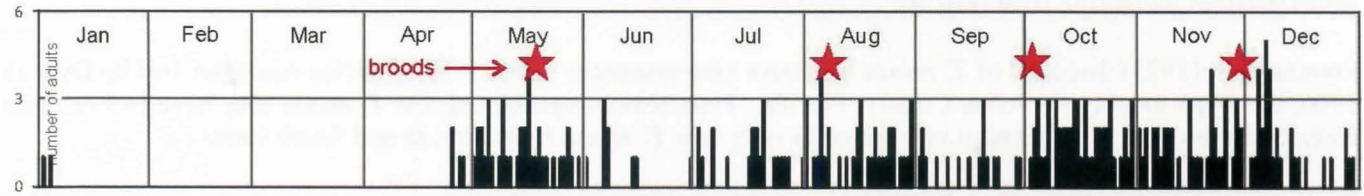

Fig. 3c. Adult ***Tolype minta*** captured in Louisiana. n = 257

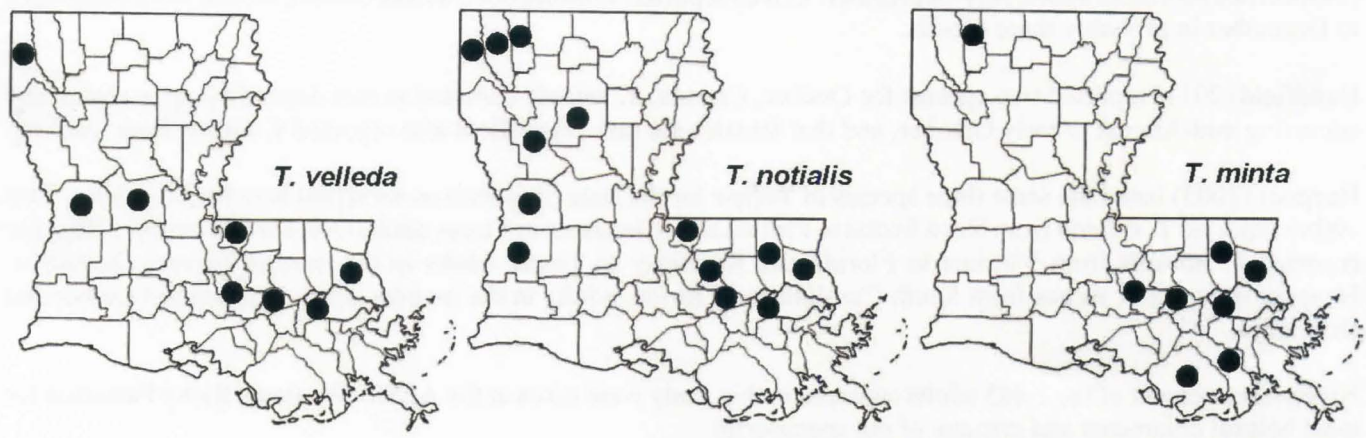

Fig. 4. Parish records for ***Tolype velleda, Tolype notialis*** and ***Tolype minta.***

Within Louisiana the moth genus ***Tolype*** Hübner [1820] is represented by three species: ***Tolype velleda*** (Fig. 1), ***Tolype notialis*** (Fig. 2a-h), and ***Tolype minta*** (Fig. 2 j-r).

Tolype velleda

In Louisiana, ***T. velleda*** is univoltine (Fig. 3a), adults captured in automatic-capture light traps during this study from mid-September to mid-November, the brood peak occurs at the end of October-beginning of November. This species has been captured in eight parishes across the state during this study (Fig. 4).

Franclemont (1973) addressed ***T. velleda*** (Stoll, 1791) in three paragraphs of text. This same author stated ***T. velleda*** ranges from southern Canada to central Florida, west to Minnesota, Nebraska and Texas. Franclemont synonymized ***Tolype candidatus*** Cassino, 1928 as being the west Texas phenotypes from the Davis Mountains of ***T. velleda***. Franclemont mentions Texas specimens from Andre Blanchard's collection have capture dates during September and October.

Covell (1984) reported "***T. velleda*** to be common, occuring Nova Scotia to central Florida, west to Minnesota, Nebraska and Texas in September-October".

Tolype notialis

In Louisiana, ***T. notialis*** has six annual broods (Fig. 3b), adults captured in automatic-capture light traps during this study nearly every day of the calendar year, the first brood peaking mid-February with five subsequent broods, each peaking at about 63-day intervals. This species has been captured in 12 parishes across the state during this study (Fig. 4). It is the most abundantly populated species of ***Tolype*** encountered in Louisiana.

Franclemont (1973) newly described the species ***T. notialis*** , Type locality Highlands County, Florida, a species he characterized as a gray species. Franclemont stated the range of ***T. notialis*** includes Florida north to the vicinity of the District of Columbia. In South Carolina it was collected in every month of the year except February and March. Covell (1984) reported "***T. notialis*** to occur from northern Virginia to Florida, west to Kentucky, June-September, common in the south".

Tolype minta

In Louisiana, ***Tolype minta*** has four annual broods (Fig. 3c), adults captured in automatic-capture light traps during this study from late April into early January. The first brood peak occurs near mid-May, the second brood peaks near early August, with subsequent broods at about 59-day intervals. This species has been captured during this study in seven parishes across the state (Fig. 4).

Franclemont (1973) disposed of ***T. minta*** in a mere nine sentences of text. This species was described by Dyar in 1906, the Type locality St. Johns County, Florida. Franclemont speculated that ***T. minta*** may have two or three consecutive broods. Franclemont mentioned he only saw ***T. minta*** from Florida and South Carolina.

For the eastern United States Covell (1984) reported on the same three species we report here for Louisiana, and also ***Tolype laricis*** (Fitch) which this author reported occurs Nova Scotia to New York, west across Canada, south into (unspecified) northern states, July-September. Covell reported ***T. minta*** occurs from South Carolina to Florida, April to December in probably three broods.

Handfield (2011) reported two species for Québec, Canada, ***T. velleda*** common to rare depending upon region and occurring mid-August to early October, and that females are rare. Handfield also reported ***T. laricis*** from Québec.

Heppner (2003) listed the same three species of ***Tolype*** for the state of Florida as we report here for Louisiana. This author reported ***T. velleda*** from Nova Scotia to Florida and Minnesota to Texas, adults October-November. Heppner reported ***T. notialis*** from Virginia to Florida and Kentucky to Texas, adults in the months January-December. Heppner reported ***T. minta*** from South Carolina and Florida, adults in the months April, September-October and December.

Ninety-five percent of the 2,463 adults captured in this study were taken at the AESS. We thank Ricky Patterson for most helpful comments and critique of our manuscript.

**Abita Entomological Study Site (AESS): sec.24,T6S,R12E, 4.2 miles northeast of Abita Springs, St. Tammany Parish, Louisiana USA.*

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A SURVEY OF THE BUTTERFLIES OF THE OAKMULGEE RANGER DISTRICT, TALLADEGA NATIONAL FOREST, ALABAMA

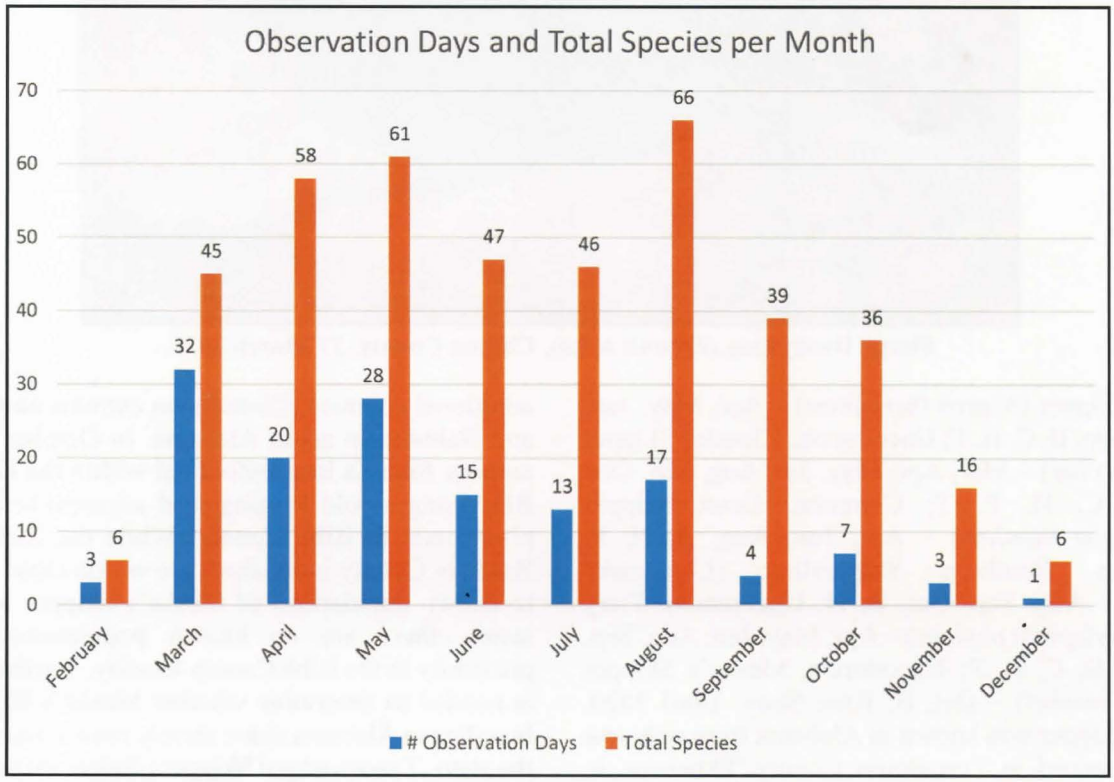
BY

MARY JANE KROTZER AND STEVE KROTZER

The Oakmulgee Ranger District (RD) of the Talladega National Forest comprises 157,000 acres located in Bibb, Chilton, Dallas, Hale, Perry, and Tuscaloosa counties, Alabama. The Oakmulgee RD is situated within Fall Line Hills of the East Gulf Coastal Plain physiographic region and is bisected by the Cahaba River. Habitats within the Oakmulgee RD include seepage areas, small to large creeks and rivers, manmade fishing lakes, beaver swamps, mesic hardwood forest, mixed pine-hardwood forest, and coniferous forest, including some of the highest quality longleaf pine (*Pinus palustris*) forest in Alabama. The area is crisscrossed with both paved roads and Forest Service dirt roads, allowing for easy access to most butterfly habitat.

A total of 158 butterfly and skipper species have been documented in Alabama (Butterflies and Moths of North America website, Howell & Vitaly (2010), and Alabama Butterfly Atlas website); eighteen (18) of these species are regarded as strays, accidentals, or historical records, with the remaining 140 species considered by us to be the number of resident species of butterflies and skippers found in Alabama. The data presented here, based on 143 days of observations covering eleven months of the year (Figure 1), document that during this survey of the Oakmulgee RD, a total of 95 (94 resident and 1 stray) species were seen, representing 67% of the resident Alabama fauna. The Oakmulgee RD, which occupies less than 1% of the state, clearly appears to serve as an important butterfly refugium in Alabama.

Species diversity within the Oakmulgee RD reflects a bimodal distribution, with species diversity peaking in May with 61 species, dropping to 47 and 46 species in June and July respectively, peaking again in August with 66 species, and then gradually dropping off during September and October. This distribution is influenced by the number of early spring single brood species occurring in the Oakmulgee RD, such as Juvenal's Duskywing, Sleepy Duskywing, Yucca Giant-Skipper, Coral Hairstreak, Eastern Pine Elfin, and Henry's Elfin, combined with a number of double brood skipper species such as Byssus Skipper, Crossline Skipper, Dun Skipper, Lace-winged Roadside-Skipper, Little Glassywing, Tawny-edged Skipper, and Twin-spot Skipper.



The following is a list of the butterfly species that have been observed in the Oakmulgee RD. The months observed, the county/counties observed ("B" for Bibb, "C" for Chilton, "H" for Hale, "P" for Perry, and "T" for Tuscaloosa), and an index of abundance (Rare; Rare Stray; Uncommon; Common; or Abundant) are provided for each species. The indices of abundance are loosely defined as follows: Rare species are unlikely to be seen even in the right habitat at the right time of the year; Rare Stray species are unlikely to be seen and unlikely to be breeding in the area; Uncommon species are likely to be seen in low numbers (0 – 3 individuals) in the right habitat at the right time of the year; Common species are likely to be seen in moderate numbers (3 – 20 individuals) in the right habitat at the right time of the year; and Abundant species are likely to be seen in high numbers (more than 20 individuals) in the right habitat at the right time of the year. For some species additional details are provided.

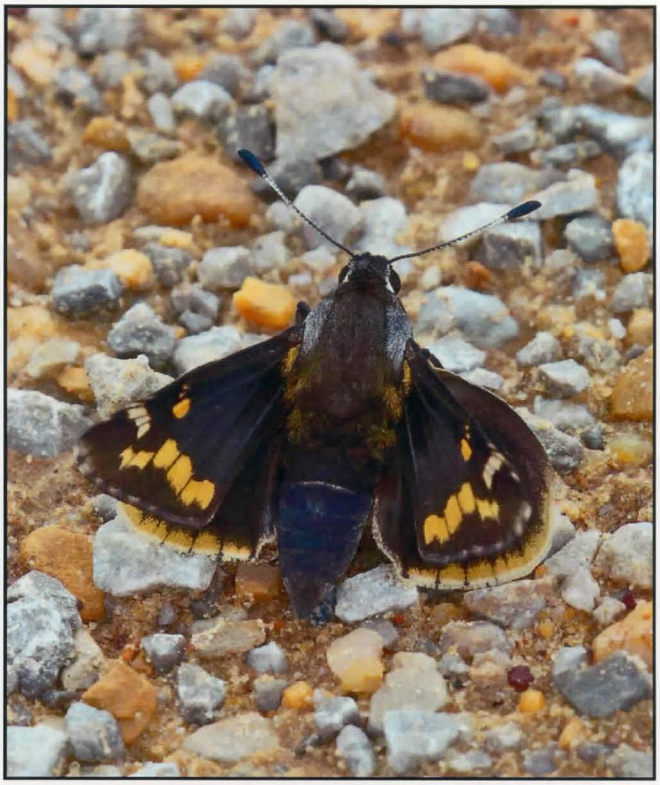
Silver-spotted Skipper (*Epargyreus clarus*) – Mar, Apr, May, Jul, Aug, Sep; B, H, P, T; Uncommon. Long-tailed Skipper (*Urbanus proteus*) – May, Aug; B, C, H; Uncommon. Hoary Edge (*Achalarus lyciades*) – Apr, May, Jun, Jul, Aug; B, C, H, P; Common. Southern Cloudywing (*Thorybes bathyllus*) – Mar, Apr, May, Jun, Jul, Aug, Sep; B, C, H, P, T; Uncommon. Northern Cloudywing (*Thorybes pylades*) – Mar, Apr, May, Jun, Jul, Aug; B, C, H, P; Uncommon. Confused Cloudywing (*Thorybes confusis*) – Apr, May, Jul, Aug; B, C, P; Uncommon. Sleepy Duskywing (*Erynnis brizo*) – Mar, Apr; B, C, P; Common. Juvenal's Duskywing (*Erynnis juvenalis*) – Feb, Mar, Apr; B, C, H, P; Abundant. Horace's Duskywing (*Erynnis horatius*) – Feb, Mar, Apr, May, Jun, Jul, Aug, Sep; B, C, H, P, T; Common. Zarucco Duskywing (*Erynnis zarucco*) – Mar, May, Jun, Jul, Aug; B, C, H, P; Uncommon. Wild Indigo Duskywing (*Erynnis baptisiae*) – Mar, Apr, May, Jun, Jul, Aug; B, C, H, P; Common. Common Checkered-Skipper (*Pyrgus communis*) – Mar, Jul, Aug, Sep, Oct, Nov; B, H, P, T; Uncommon. Tropical Checkered-Skipper (*Pyrgus oileus*) – Jul, Aug, Sep, Oct; B, C, H, P; Uncommon.

Sleepy Duskywing (*Erynnis brizo*), Chilton County, 21 March 2021.

Swarthy Skipper (*Nastra lherminier*) – Apr, May, Jun, Jul, Aug, Sep; B, C, H, T; Uncommon. Clouded Skipper (*Lerema accius*) – Mar, Apr, May, Jul, Aug, Sep, Oct, Nov; B, C, H, P, T; Common. Least Skipper (*Ancyloxypha numitor*) – Apr, Jun, Aug; B, H, P; Uncommon. Southern Skipperling (*Copaeodes minimus*) – Aug, Sep, Oct; B, H; Uncommon. Fiery Skipper (*Hylephila phyleus*) – Apr, May, Jun, Aug, Sep, Oct, Nov; B, C, H, P; Uncommon. Meske's Skipper (*Hesperia meskei*) – Oct; B; Rare Stray. Until 2020, Meske's Skipper was known in Alabama from only one historical record in Tuscaloosa County. However, in 2020 single individuals were documented from two additional counties (Cleburne in extreme east Alabama and Baldwin in south Alabama. In October 2022, the authors found a lone individual within the Oakmulgee RD, along an old logging road adjacent to a longleaf pine forest in Bibb County. While the Cleburne and Baldwin County individuals are within close proximity to known populations of Meske's Skipper in adjacent states, there are no known populations in close proximity to the Bibb County locality. Further research is needed to determine whether Meske's Skippers are breeding in Alabama or are merely occasional strays into the state. Tawny-edged Skipper (*Polites themistocles*) – Apr, May, Aug, Oct; B, C, H, P; Uncommon. Crossline

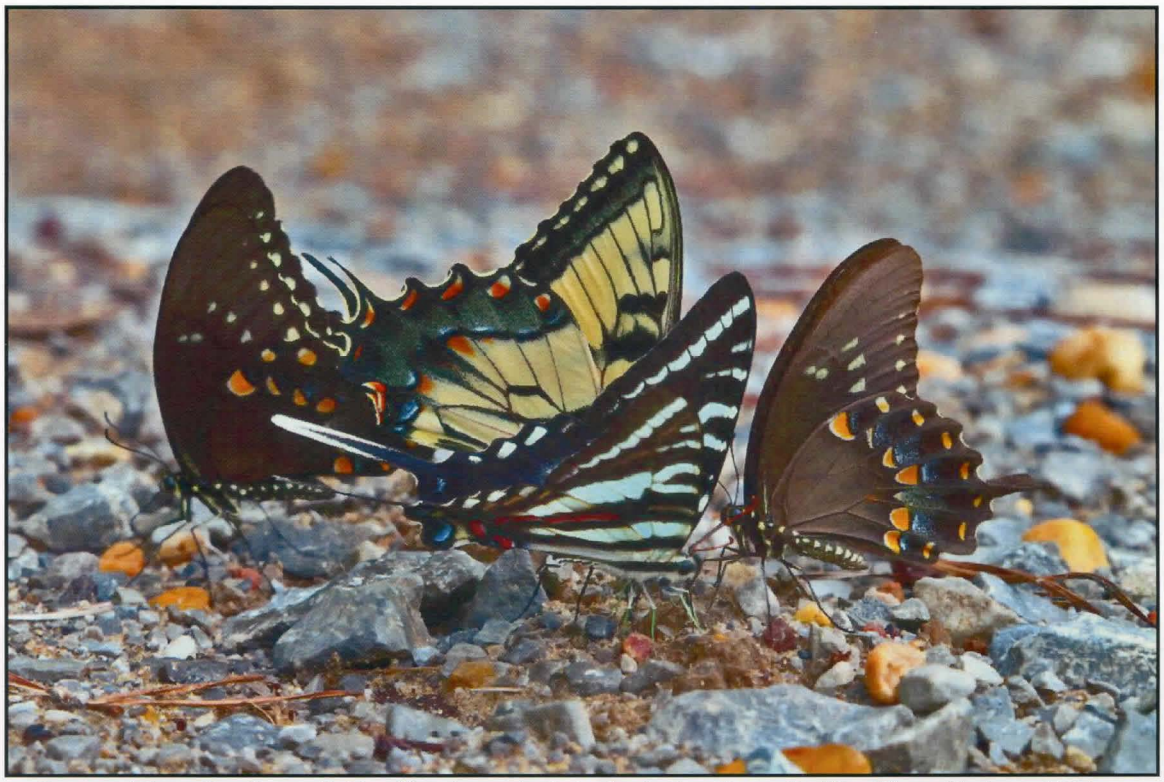
Skipper (*Polites origenes*) – May, Jun, Aug, Sep; B, C, T; Common. Whirlabout (*Polites vibex*) – Apr, May, Jul, Aug, Sep, Oct; B, C, H, P, T; Uncommon. Southern Broken-Dash (*Wallengrenia otho*) – Apr, May, Jun, Jul, Aug, Sep; B, C, H, P, T; Common. Northern Broken-Dash (*Wallengrenia egeremet*) – Aug; B, H; Uncommon. Little Glassywing (*Pompeius verna*) – Apr, May, Jul, Aug, Sep; B, H, P, T; Uncommon. Sachem (*Atalopedes campestris*) – Aug; H; Rare. Byssus Skipper (*Problema byssus*) – May, Jun, Jul, Aug, Sep; B, H, P, T; Common. Zabulon Skipper (*Poanes zabulon*) – Apr, May, Jun, Jul, Aug; B, H; Uncommon. Yehl Skipper (*Poanes yehl*) – Oct; B; Rare. Dun Skipper (*Euphyes vestris*) – Apr, May, Jul, Aug, Sep, Oct; B, C, H, P, T; Uncommon. Pepper and Salt Skipper (*Amblyscirtes hegon*) – Mar, Apr; B, C, P; Uncommon. Lace-winged Roadside-Skipper (*Amblyscirtes aesculapius*) – Apr, May, Jul, Aug, Sep, Oct; B, C, H, P, T; Uncommon. Dusky Roadside-Skipper (*Amblyscirtes alternata*) – Apr; B; Rare. Eufala Skipper (*Lerodea eufala*) – Apr, Aug, Sep; B; Uncommon. Twin-spot Skipper (*Oligoria maculata*) – May, Aug, Sep; B, H, P, T; Common. Brazilian Skipper (*Calpodes ethlius*) – Oct; B; Rare. Brazilian Skippers are a resident species in the southern counties of Alabama and colonize northward during the late summer and fall, often using Garden Canna (*Canna* x *generalis*) as a host plant. While it is possible that Brazilian Skippers are breeding residents in the Oakmulgee Ranger District, we feel it is more likely that the single individual documented was a stray. Ocola Skipper (*Panoquina ocola*) – Aug, Sep, Oct, Nov; B, C, H, P, T; Common. Yucca Giant-Skipper (*Megathymus yuccae*) – Mar, Apr; B, C, H; Uncommon.

Meske's Skipper (*Hesperia meskei*), Bibb County, 15 October 2022.



Yucca Giant-Skipper (*Megathymus yuccae*), Bibb County, 17 March 2018.

Pipevine Swallowtail (*Battus philenor*) – Mar, Apr, May, Jun, Jul, Aug; B, C, H, P; Common. Zebra Swallowtail (*Eurytides marcellus*) – Mar, Apr, May, Jun, Jul, Aug, Sep; B, C, H, P, T; Common. Black Swallowtail (*Papilio polyxenes*) – Mar, Jul; B, C; Uncommon. Giant Swallowtail (*Papilio cresphontes*) – Mar, Apr, Jun; B, P; Uncommon. Eastern Tiger Swallowtail (*Papilio glaucus*) – Mar, Apr, May, Jun, Jul, Aug, Sep, Oct; B, C, H, P, T; Abundant. Spicebush Swallowtail (*Papilio troilus*) – Mar, Apr, May, Jun, Jul, Aug, Sep; B, C, H, P, T; Common. Palamedes Swallowtail (*Papilio palamedes*) – Mâr, Apr, May, Aug; B, C, H; Uncommon.



Eastern Tiger Swallowtail (*Papilio glaucus*), Spicebush Swallowtails (*Papilio troilus*), and Zebra Swallowtail (*Eurytides marcellus*), Bibb County, 25 July 2022.

Barred Yellow (*Eurema daira*) mating pair, Bibb County, 26 August 2017.

Cabbage White (*Pieris rapae*) – May, Sep; B, P, T; Uncommon. Orange Sulphur (*Colias eurytheme*) – Oct; P; Rare. Southern Dogface (*Colias cesonia*) – Aug; P; Rare. Cloudless Sulphur (*Phoebis sennae*) – Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec; B, C, H, P, T; Common. Barred Yellow (*Eurema daira*) – Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov; B, C, H, P, T; Common. Little Yellow (*Eurema lisa*) – Jun, Jul, Aug, Sep, Oct, Nov, Dec; B, C, H, P, T; Common. Sleepy Orange (*Eurema nicippe*) – Mar, Apr, May, Jul, Aug, Sep, Oct, Nov, Dec; B, C, H, P, T; Uncommon. Dainty Sulphur (*Nathalis iole*) – Oct; B; Rare.

Harvester (*Feniseca tarquinius*), Perry County, 31 August 2022.

King's Hairstreak (*Satyrium kingi*), Bibb County, 27 May 2018.

Harvester (*Feniseca tarquinius*) – Mar, Aug; B, P; Uncommon. Great Purple Hairstreak (*Atlides halesus*) – Mar, Aug; B, C; Uncommon. Coral Hairstreak (*Satyrium titus*) – May; C; Uncommon. Banded Hairstreak (*Satyrium calanus*) – Apr, May, Jun; B, C; Uncommon. King's Hairstreak (*Satyrium kingi*) – May, Jun; B, C; Uncommon. Striped Hairstreak (*Satyrium liparops*) – May, Jun; B; Uncommon. Oak Hairstreak (*Satyrium favonius*) – Apr, May; B, C; Uncommon. Henry's Elfin (*Callophrys henrici*) – Mar, Apr; B; Uncommon. Eastern Pine Elfin (*Callophrys niphon*) – Mar, Apr; B, C; Uncommon. Juniper Hairstreak (*Callophrys gryneus*) – Mar, Apr; B, C; Uncommon. White M Hairstreak (*Parrhasius m-album*) – Mar, Apr, May, Nov; B, C; Uncommon. Gray Hairstreak (*Strymon melinus*) – Mar, May, Jun, Aug, Sep; B, C, H, P, T; Uncommon. Red-banded Hairstreak (*Calycopis cecrops*) – Mar, Apr, May, Jun, Jul, Aug, Sep, Oct; B, C, H, P, T; Common. Eastern Tailed-Blue (*Everes comyntas*) – Mar, Apr, May, Jun, Jul, Aug, Sep, Oct; B, C, H, P, T; Common. Spring Azure (*Celastrina ladon*) – Feb, Mar, Apr; B, C, H; Common. Summer Azure (*Celastrina neglecta*) – Apr, May, Jun, Jul, Aug, Sep; B, C, H, P, T; Abundant.

Eastern Pine Elfin (*Callophrys niphon*), Chilton County, 21 March 2021

American Snout (*Libytheana carinenta*) – Feb, Mar, May, Jun, Jul, Aug, Oct, Dec; B, C, P, T; Uncommon. Gulf Fritillary (*Agraulis vanillae*) – May, Jun, Jul, Aug, Sep, Oct; B, C, H, P, T; Common. Variegated Fritillary (*Euptoieta claudia*) – May, Oct; B, H, P; Uncommon. Phaon Crescent (*Phyciodes phaon*) – Oct; P; Rare. Pearl Crescent (*Phyciodes tharos*) – Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov; B, C, H, P, T; Common. Question Mark (*Polygonia interrogationis*) – Feb, Mar, Apr, May, Jun, Aug, Oct, Nov, Dec; B, H, P; Common. Eastern Comma (*Polygonia comma*) – Mar, May; B, C; Uncommon. American Lady (*Vanessa virginiensis*) – Mar, Apr, May, Jun, Jul, Aug; B, C, H, P; Common. Painted Lady (*Vanessa cardui*) – Aug; H; Rare. Red Admiral (*Vanessa atalanta*) – Mar, Apr, May, Jun, Jul, Aug, Nov; B, C, H, P; Uncommon. Common Buckeye (*Junonia coenia*) – Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec; B, C, H, P, T; Common. Red-spotted Purple (*Limenitis arthemis astyanax*) – Mar, Apr, May, Jun, Jul, Aug, Sep; B, C, H, P, T; Common.

Viceroy (*Limenitis archippus*) – Apr, Jul, Aug, Oct; B, H, P; Uncommon. Goatweed Leafwing (*Anaea andria*) – Mar, Apr, May, Jun, Nov; B, C, H; Common. Hackberry Emperor (*Asterocampa celtis*) – May, Jul, Aug; B, C, P; Uncommon. Southern Pearly-eye (*Enodia portlandia*) – Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov; B, C, H, P, T; Uncommon. Northern Pearly-eye (Enodia anthedon) – Apr, May, Jul; B, C; Uncommon. Creole Pearly-eye (*Enodia creola*) – Apr, May, Jun, Jul, Aug, Sep; B, C, H, P; Uncommon. Appalachian Brown (*Satyrodes appalachia*) – May, Jun, Jul, Aug, Sep; B, H, P, T; Uncommon. Gemmed Satyr (*Cyllopsis gemma*) – Mar, Apr, May, Jun, Jul, Aug, Sep, Oct; B, C, H, P, T; Uncommon. Carolina Satyr (*Hermeuptychia sosybius*) – Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov; B, C, H, P, T; Abundant. Intricate Satyr (*Hermeuptychia intricata*) – Jun, Aug; H; Uncommon. Mitchell's Satyr (*Neonympha mitchellii*) – Jun, Aug; B, H; Common. Mitchell's Satyr is a federally endangered species and in Alabama is currently only known from the Oakmulgee RD in Bibb and Hale counties. The host plants documented for Alabama include *Carex* sedges and two species of grasses, all wetland obligates. The adults can be seen flying in dappled shade in or near wetland habitat. While the number of individuals observed by the authors during this survey led to an abundance index of "Common", it should be noted that the authors concentrated their observations at a few relatively large populations. Little Wood-Satyr (*Megisto cymela*) – Apr, May, Jun; B, C, H, P; Uncommon. Common Wood-Nymph (*Cercyonis pegala*) – Aug, Sep; B, C; Uncommon. Monarch (*Danaus plexippus*) – Mar, Apr, May, Jun, Aug, Oct; B, C, H, P; Uncommon.

Creole Pearly-eye (*Enodia creola*), Bibb County, 30 April 2022.

There are a few species that were not observed during this survey that we believe have the potential to show up in the future. These species include Dion Skipper (*Euphyes dion*), Falcate Orangetip (*Anthocharis midea*), Brown Elfin (*Callophrys augustinus*), Silvery Checkerspot (*Chlosyne nycteis*), Mourning Cloak (*Nymphalis antiopa*), and Tawny Emperor (*Asterocampa clyton*). These species, or their hostplants, are known to occur in one or more of the six counties encompassing the Oakmulgee Ranger District.

Acknowledgements

The authors wish to thank Vitaly Charny for sharing his species records from the Oakmulgee Ranger District and for his collegial assistance over the years.

Mitchell's Satyr (*Neonympha mitchellii*), Hale County, 12 June 2020.

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https://www.butterfliesandmoths.org/

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(Mary Jane Krotzer, Steve Krotzer; E-mail: mjkrotzer@gmail.com)

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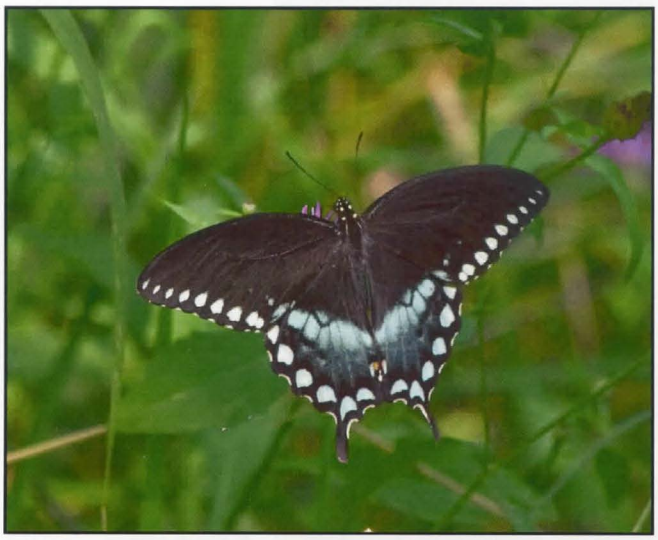
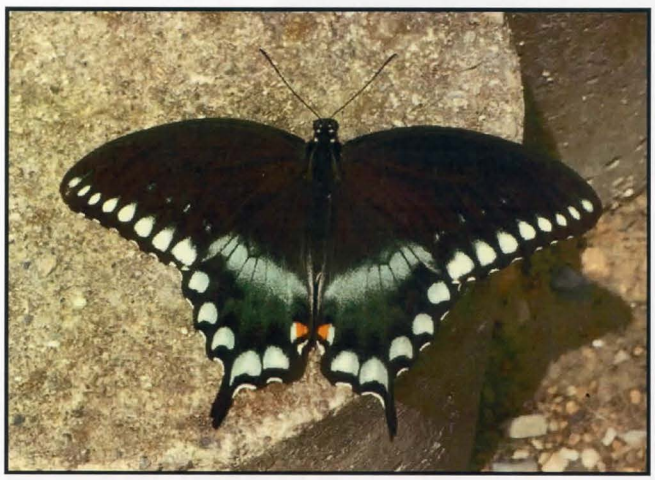
SPICEBUSH BURGERS

BY
LINDA BARBER AULD, NOLA BUGLADY

My good friend Dorothea Munchow once described her garden as "the oasis in the sea of St. Augustine grass and concrete where birds eat filet of hackberry and spicebush burgers." She was providing nature's grocery store for birds by purposely planting caterpillar host plants. Throughout the last 45 years as we studied the life cycles of our local New Orleans swallowtails, we discovered that the spicebush caterpillar (*Papilio troilus*) faces many obstacles. Even though the female butterfly can lay over 250 eggs during her adulthood, only around ten percent actually achieve completing their life cycle and become butterflies. Predator attacks force this adorable caterpillar to fight back by utilizing several different self-preservation techniques.



The female's coloration is predominately blue.



The male's coloration is predominately green.

The early instar caterpillar uses bird-dropping mimicry, being predominately black with a white saddle mark. Most predators would not attack a bird dropping. The mature larva is dark green with large eyespots which totally change its appearance, this time mimicking a lizard or snake. Hidden at the base of these spots are the osmeteria, or "secret horns" which the frightened or angry larva flips out as a warning. When slightly upset, it shows only a small orange tip whereas a fully extended display indicates extreme irritation. The surprisingly stinky spray which accompanies this behavior also demands the predator's attention.

Self-defense techniques

Bird dropping mimicry

Large eyespots mimicking lizard or snake

Spicebush caterpillar with extended osmeteria

Many times, these techniques save the caterpillars and they become beautiful butterflies. However, as it attempts to complete its stages, the caterpillar begins fighting the encounters with its predator hunters, the potter wasp as well as ichneumon.

Once the spicebush caterpillar emerges from its egg, it crawls to the edge of the camphor leaf then chews, cutting a straight line from edge to the mid rib. The leaf is pulled over, folded in half, and sewn into a tent shelter. Periodically the larva explores its host plant to consume nearby leaves but quickly returns to its haven. However, it isn't always safe as Dorothea and I both observed that sometimes a hole had been chewed in the middle of the folded leaf. Unfolding to look inside the curled leaf, we see webbing which indicates that a caterpillar had been present at one time but not anymore.

Predator number one is the potter wasp. Although many wasps construct mud nests, their jug-like pots are not easily confused with those of other species. Interestingly, the potter wasp species does not gather mud for its nest, but first collects water, and then mixes it with dry soil. Mud pellets are transported in the wasp's mandibles with the aid of its forelegs. It is estimated that several hundred trips are required to build a mud pot, taking one to two hours for the entire building process. The female then inserts her abdomen and lays an egg suspended by a filament from the upper surface of the mud cell. The female next gathers lepidopterous larvae which she stings and places in the pot. Personal note: I have raised nearly 150 species of butterflies (and moths) and have not seen any other species of caterpillars attacked in this manner. Only immature wasps inhabit the mud nests and there is no danger of a wasp sting to humans.

Leaf shelter created by caterpillar.

Hole in camphor leaf chewed by potter wasp.

Potter wasp

Potter wasp nests

Predator number two is *Trogus,* a parasitoid wasp usually found in the Holarctic and Neotropics regions. It is placed in the subfamily *Ichneumonidae. Trogus* species are parasites of larvae and pupae of the swallowtail butterfly family, Papilionidae. The genus consists of twelve species. These wasps can seek and recognize not only the chemical signature of the host plant but also the odor that a host leaf emits when it is damaged by grazing caterpillars. Once they locate the caterpillars, the wasp injects eggs, its young develop inside the caterpillar then emerges from the chrysalis as the adult. A round hole in the empty pupa casing would be evidence of wasp emergence.

Ichneumon wasp

Ichneumon wasp is exiting pupa

Spicebush caterpillars – two different instars

Spicebush swallowtail pupa

In attempts to match the color of its location, the pupa can choose to be green or brown.

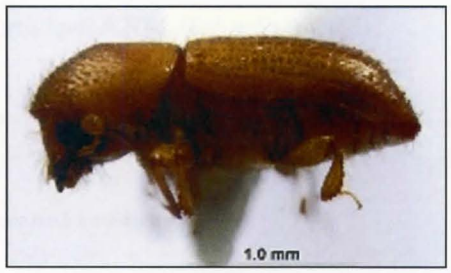
Predator number three was discovered by Dorothea Munchow in November 1997, but the insect was not identified until recently. She had gathered some spicebush eggs and placed them in a clear styrene box. Deciding to sketch the life cycle, she slid the egg attached to the camphor leaf under the microscope and witnessed the creature emerging from the egg. At that time, she believed it was another type of wasp. Throughout the years, these parasites would appear in the months of September, October, and November and its identity has remained a mystery. All along I believed that only one parasite was emerging per each butterfly egg however, in October 2022 twenty-one parasites emerged from 7 eggs that I had collected in my garden then had placed them in a clear box. Eager to finally solve this, I sent specimens to Dr. Chris Carlton* LSU entomologist who reports they are not a wasp at all but member of the True Bug family. It is in the genus Anthocorids and classified as an egg predator. He explained that there were 500-600 different species in that family order, and it would be difficult and take some time to pinpoint it further.

Anthocorid predators are recognized as potential biocontrol agents in different parts of the world. Natural populations of several potential anthocorids have been successful in maintaining pest populations at low levels. In countries like France, the United Kingdom, the Netherlands, Germany, etc., anthocorid predators are mass produced commercially then released in greenhouses and fields for the management of several insect pests. They feed on small lepidopteran larvae, small grubs, psocids, mites, thrips, aphids, and some storage pests.

Online a variety of garden predator insects such as praying mantids, lady bugs, and lacewings are available for purchase and use in home and/or commercial growing situations to control specific insect pests. Specific insects feed on other specific bugs, however, some are more general feeders as we are determining with predator three's diet selections. Well intentioned actions can sometimes yield different results that are not expected. As an example, it makes sense to me that possibly a local citrus grower could have released specific egg predators to control aphids that were attacking his crops but somehow, the true bug also attacked spicebush eggs. With everything we do, we learn something.

In summarizing the spicebush swallowtail must defend itself against a true bug that attacks the egg, a potter wasp that feeds it to their young, and an ichneumon whose young live inside the poor caterpillar then emerges from its pupa. Now the fourth challenge to this species and the cherry on top that hopefully doesn't tip the balance too far, driving this beautiful creature into extinction. Its host plants are in decline due to another insect.

The ambrosia beetle, *Xyleborus affinis* is naturally found in moist, fallen logs on the ground of natural forests and rarely interferes with human activities. In large trees, the beetles colonize dead phloem first, followed by the xylem, where the majority of eggs are laid. The females inoculate the interior of the tunnels they create with the fungal symbiont, which is stored in a specialized pouch called the mycangium inside the beetle's mouth. The larvae feed on the fruiting bodies of the fungi until adulthood. Tunneling systems are



Ambrosia beetle, magnified.

Ambrosia beetle damage

Ambrosia beetle frass tunnels

found throughout the sapwood of the tree, but rarely in the heartwood. Depending on moisture conditions, trees could have numerous superficial tunnels that can be viewed upon pulling back the bark and many tunnels inside the xylem that become apparent when the wood is cut. The presence of *Xyleborus affinis* can hasten the decline of weak and injured trees, but

normally does not cause it. Even though this is not an aggressive ambrosia beetle, it has recently become important from the phytosanitary perspective. This is due to the capacity of this species to vector pathogenic ambrosia fungi such as the causal agent of laurel wilt. The list of the Spicebush swallowtail's documented host plants is:

red bay, *Persea borbonia*
swamp bay, *Persea palustris*
sassafras, *Sassafras albidum*
spicebush, *Lindera benzoin*
camphor tree, *Cinnamomum camphora*

All these trees grow in my New Orleans garden located south of Lake Ponchartrain but I have only found spicebush caterpillars using the camphor trees. My gardening advice is always try to choose native plants, however using both native and non-native provides the opportunity to watch the insect activity. Witnessing which plants these insects will select to use stimulates my curiosity.

*Chris Carlton, PhD. Entomology Diagnostician, LSU AgCenter, Director Emeritus, Louisiana State Arthropod Museum, Department of Entomology, Louisiana State University, Baton Rouge, LA USA 70803.

(Linda Barber Auld, NOLA BugLady, E-Mail: this auldhouse@bellsouth.net)

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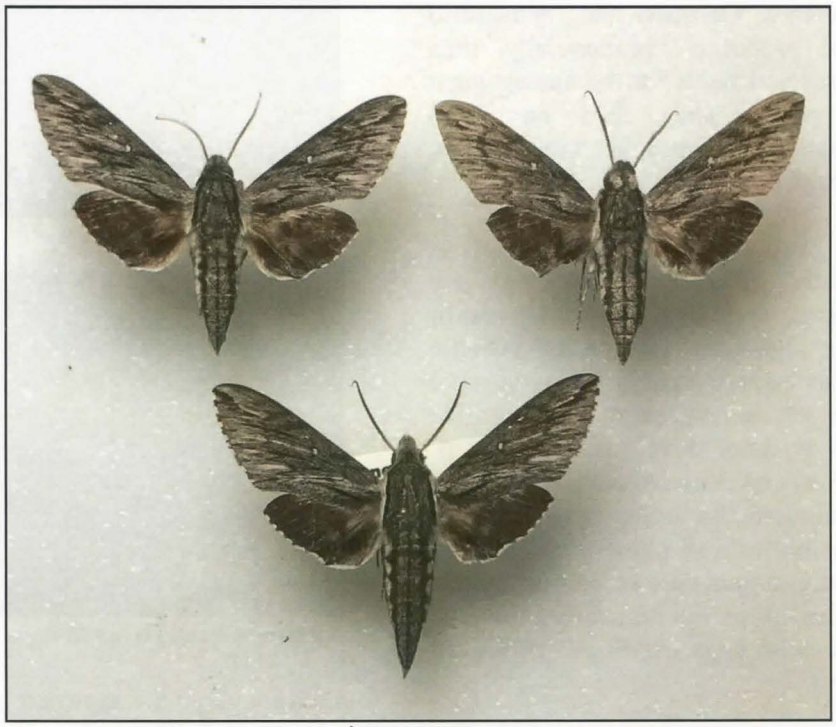
PHOTO
BY
J. BARRY LOMBARDINI

Quitaque, Texas
8-IX-1996

Abilene, Texas
12-IV-2014
***leg.* Marianne Kwiecinski**



Fritch, Texas
29-VIII-2010

Plebeian Sphinx, Trumphet Vine Sphinx (*Paratrea plebeja*)

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PRIONOXYSTUS MACMURTREI (BOISDUVAL, 1829) (LEPIDOPTERA: COSSIDAE) IN LOUISIANA

BY

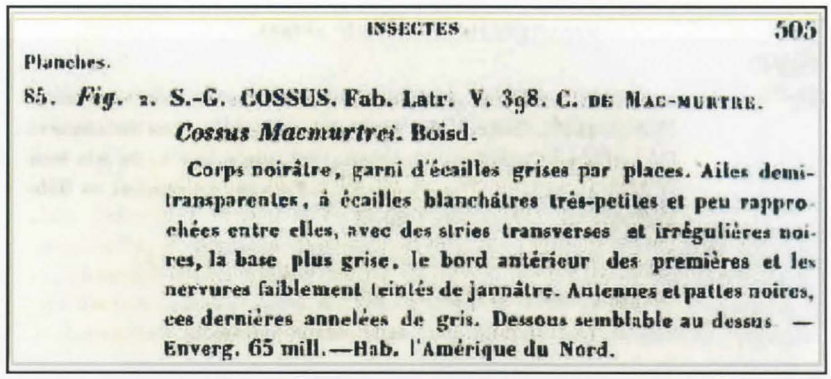
VERNON ANTOINE BROU JR., RICKY PATTERSON, AND ROYAL TYLER

Fig. 1. ***Prionoxystus macmurtrei***, male.

A single male ***Prionoxystus macmurtrei*** (Boisduval) (Fig. 1) was captured in an automatic capture ultraviolet light trap (February 16 to April 5, 2020) at Vivian, Caddo Parish, Louisiana (Fig. 2). This species appears to be a new state record. Brou (2009) reported on the very abundantly populated much largers in size species ***Prionoxystus robiniae*** (Peck) which occurs statewide in Louisiana.

P. macmurtrei was originally described as ***Cossus macmurtrei*** Boisduval, in Guérin-Méneville, 1829. I have provided the original description in Fig. 3. Type locality is listed as North America. Holland (1903) stated ***P. macmurtrei*** "is a rather rare species".

Fig. 2. Parish records in Louisiana for ***Prionoxystus macmurtrei***.



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Planches.

85. *Fig.* 2. S.-G. COSSUS. Fab. Latr. V. 398. C. DE MAC-MURTRE.

Cossus Macmurtrei. Boisd.

Corps noirâtre, garni d'écailles grises par places. Ailes demi-transparentes, à écailles blanchâtres très-petites et peu rapprochées entre elles, avec des stries transverses et irrégulières noires, la base plus grise, le bord antérieur des premières et les nervures faiblement teintés de jaunâtre. Antennes et pattes noires, ces dernières annelées de gris. Dessous semblable au dessus — Enverg. 65 mill.—Hab. l'Amérique du Nord.

Fig. 3. Original 1829 description of ***Prionoxystus macmurtrei.***

Covell (1984) reported ***P. macmurtrei*** ranges from Québecto Florida, west to Minnesota and Texas in the months April to July. Heppner (2003) stated ***P. macmurtrei*** ranges from Québec to Florida and Handfield (2011) reported ***P. macmurtrei*** rare in Québec, records for adults in May, June and July. Powell and Opler (2009) discussed ***P. robiniae***, but did not mention ***P. macmurtrei***. Neither von Reizenstein (1863), nor Heitzman and Heitzman (1987) reported on ***P. macmurtrei***.

Quite a number of publications in current entomological literature records for ***P. macmurtrei*** list the author as Guérin-Méneville. While the entire original description appears on page 505 of the large 567 page publication by Guérin-Méneville, F.-É., - Cuvier, G.B. (1829-1838), as illustrated on page 505 (Fig. 3.), clearly Boisduval is the author, while the name Guérin-Méneville is not mentioned.

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von Reizenstein, L., 1863. *Catalogue of the Lepidoptera of New Orleans and its vicinity.* Isaac T. Hinton. New Orleans, 8pp.

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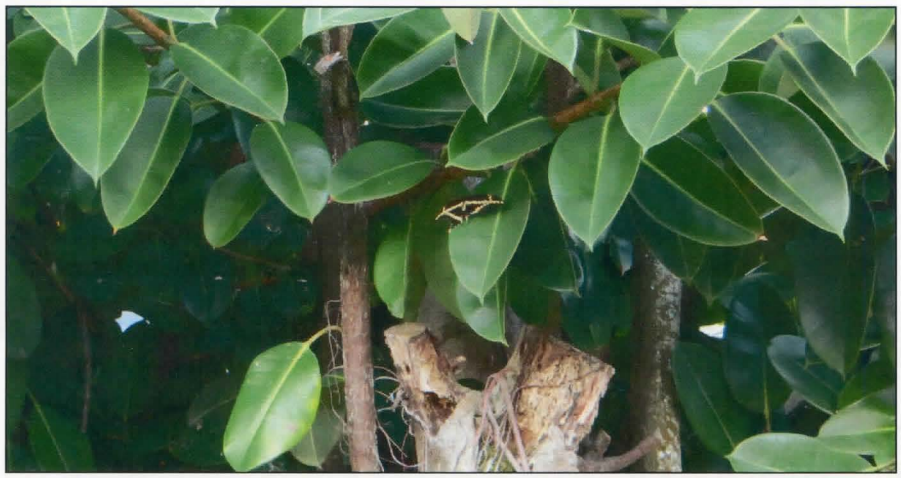
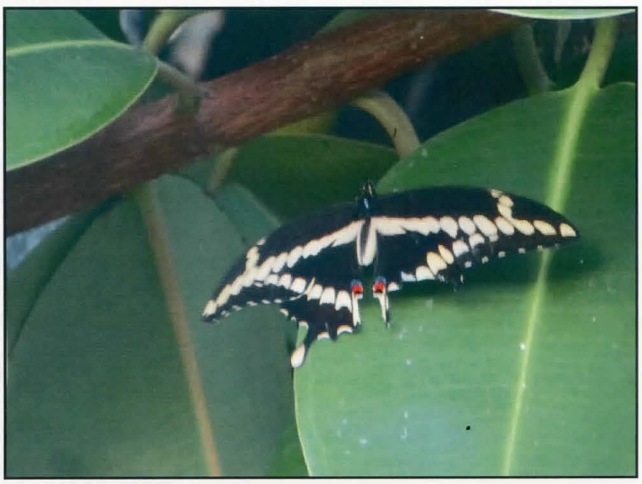
PHOTOS BY MATT BLAINE AND COMMENTS



Black Swallowtail (*Papilio polyxenes*) male on rubber tree.



This photograph was taken near dusk in Melbourne, Florida, on January 22, 2023. The butterfly was slowly fluttering around rubber tree leaves about 10 feet above the ground. This unfamiliar activity caught my attention. It eventually flew up under a couple large leaves and landed high up on a leaf under them. This location may have provided it with some protection from rain or predators. I got my camera and went out to photograph it. The swallowtail had not moved and remained still. I was able to take several pictures using my zoom feature without disturbing it. First I took a photography showing how it was situated in the leaves. I was afraid that I might scare it away but it did not move. I was then able to take my time and use more zoom to get a few close up images. It stayed in that spot until I got dark and I could no longer see it. The next morning when I looked it was gone. I have never seen this kind of activity before on rubber trees and I have been able to observe the trees for 20 years now.

HALYSIDOTA TESSELLARIS (SMITH, 1797) (LEPIDOPTERA: ARCTIIDAE) IN LOUISIANA

BY

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Watson (1980) reported about 200 species currently placed in the genus ***Halysidota Hübner*** (1819), but he considered only about 28 species monophyletic and congeneric with ***Halysidota tessellaris*** Smith (Figs. 1 and 2). ***H. tessellaris*** was originally described as ***Phalaena tessellaris*** Smith in 1797. This same author listed useful characteristics reportedly distinguishing ***H. tessellaris*** to include: head yellow, clypeofrons without markings, tegulae pale yellow and bordered medially and posteriorly with greenish blue; and in heavily marked specimens a black spot at anterolateral corner.

Watson (1980) wrote concerning ***Halysidota cinctipes*** Grote, lectotype from Cuba, that there is considerable individual variation in the patterns of wing markings on five species of ***Halysidota***, one of which is ***H. cinctipes***. According to Watson ***H. cinctipes*** is represented in Florida as well as neighboring Cuba and the Bahamas. Characteristics reportedly distinguishing ***H. cinctipes*** is a blue-green patch on thorax ventral to base of forewing and another ventral to eye.

Regarding ***Halysidota harrisii*** Walsh, Watson (1980) stated it is probably not possible to distinguish male ***H. harrisii*** from ***H. tessellaris*** based on external characteristics (color pattern and color), but examination of the valve apex is diagnostic. Walsh described ***H. harrisii*** in 1864 and Watson (1980) stated that the Type-material is lost. I make note that over the centuries various authors have spelled the genus name as: ***Halisidota, Halesidota***, and ***Halysidota.*** Watson (1864) experimented with breeding ***H. tessellaris*** and differently colored larvae and different foodplants in what resulted ultimately in the description of the species ***H. harrisii***. Forbes (1960) illustrated and compared the shape of the valves of ***H. tessellaris*** and ***H. harrisii***, and about ***H. harrisii*** stated "the male valve (Fig. 13) distinctive", but he did not expound upon what he felt the main distinctions between the two were. I see this as any meaningful differences is in the eye of the viewer, because the limits of any naturally occurring genitalic variations concerning each of these species names has yet to be studied, documented or proven.

For the species ***H. tessellaris*** and ***H. harrisii***, it is reported the color of the larvae is more useful diagnostically than the adult color-pattern. Watson indicated both ***H. tessellaris*** and ***H. harrisii*** are minor pests of forest and shade trees in North America. Watson wrote the larva of ***H. tessellaris*** (the Pale Tussock or Banded Tussock) is a minor pest of various broadleaved forest and roadside trees in eastern United States and southern Canada. ***H. harrisii*** (the Sycamore Tussock) is common in north-eastern states of the U.S. on American Sycamore (***Platanus occidentalis***) and only two species, ***H. tessellaris*** and ***H. harrisii***, occur in the northern states of the U.S. and in Canada. Watson (1980) stated the geographical range of ***H. tessellaris*** to include Canada to Florida west to Texas and Arizona.

Dyar (1891) described the ova of ***H. harrisii***, and the larva, pupa and cocoon of both ***H. harrisii*** and ***H. tessellaris***. This same author (1896) addressed the partial life-history of a larva found in the state of Florida of ***Halisidota cinctipes*** which was described in 1865.

Covell (1984) anecdotally stated ***H. tessellaris*** has two broods in eastern North America and stated ***H. cinctipes*** is confined to central and southern Florida in the USA. This same author did not address nor mention ***H. harrisii***. More recently Vincent & Laguerre (2017) described an additional new species and subspecies of ***Halysidota*** Hübner [1819] from Mexico and Guadeloupe respectively: ***Halysidota witti*** sp. nov. and ***Halysidota leda guadulpensis*** ssp. nov.

What was not addressed by Watson (1980) or any other researcher are the innumerable phenotype variations of ***H. tessellaris*** among populations in eastern United States and southern Canada, or within local populations e.g., as we illustrate here providing some adult examples composed of ***H. tessellaris***, both males (Fig.1) and females (Fig. 2) occurring at the *Abita Entomological Study Site **(AESS)** in Louisiana.

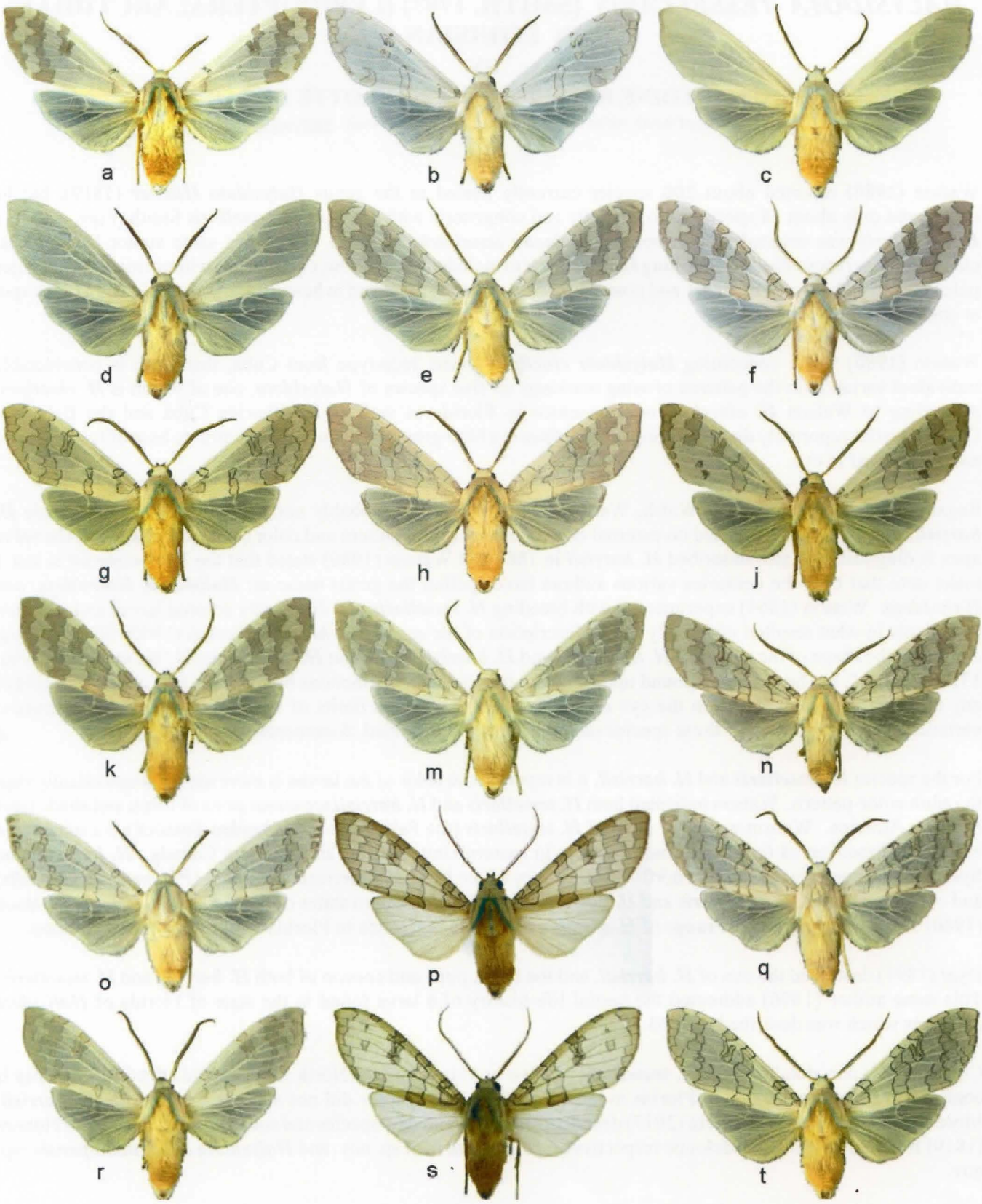

Fig. 1. Male phenotype variations of ***Halysidota tessellaris*** found in Louisiana. Pin label data on Table 1.

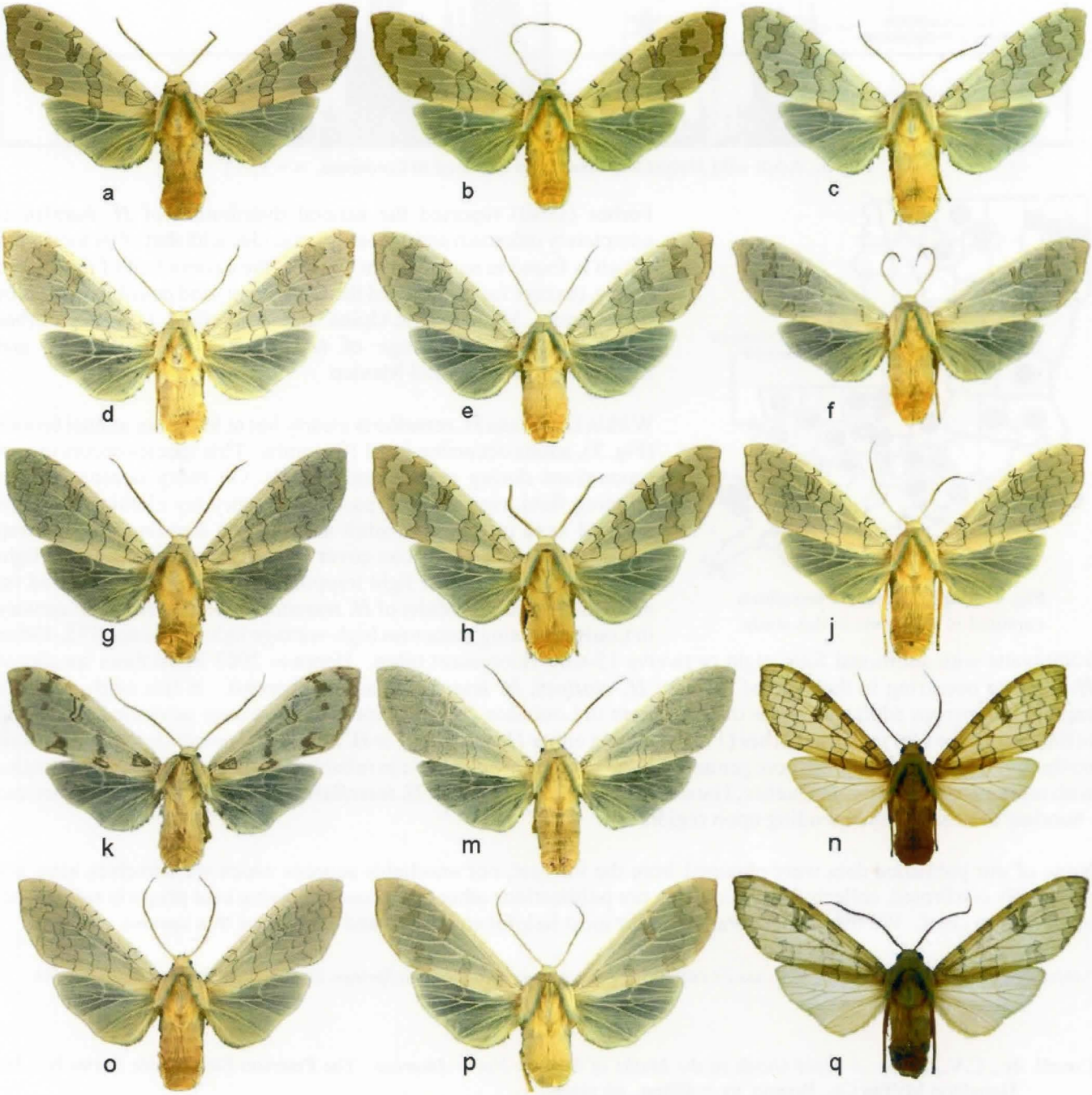

Fig. 2. Female phenotypes of ***Halysidota tessellaris*** found in Louisiana. Pin label data on Table 1.

Table 1. Pin label data: All from **AESS, Abita Springs, St. Tammany Parish, Louisiana.**

Fig. 1. a. 2015 May 17, **b**. 2006 September 6, **c.** 2018 May 21,**d.** 2008 April 20, **e.** 2008 August 16, **f.** 2015 May 3, **g.** 2019 June 23, **h**. 2007 July 20, **j**. 2009 August 16, **k**. 2009 July 30, **m.** 1992 July 19, **n.** 1990 July 16, **o.** 2014 April 20, **p.** 2008 August 8, **q.** 2014 April 12, **r.** 1996 April 4, **s.** 2003 August 31, **t.** 2008 June 21.

Fig. 2. a. 2019 August 23, **b.** 2003 August 26, **c.** 2010 September 23, **d.** 2009 August 14, **e.** 2009 August 21, **f.** 2015 May 3, **g.** 2008 August 22, **h.** 2009 August 21, **j.** 2008 July 26, **k.** 1988 September 16, **m.** 2006 August 1, **n.** 2007 July 31, **o.** 2007 July 14, **p.** 2002 April 1, **q.** 2019 September 2.

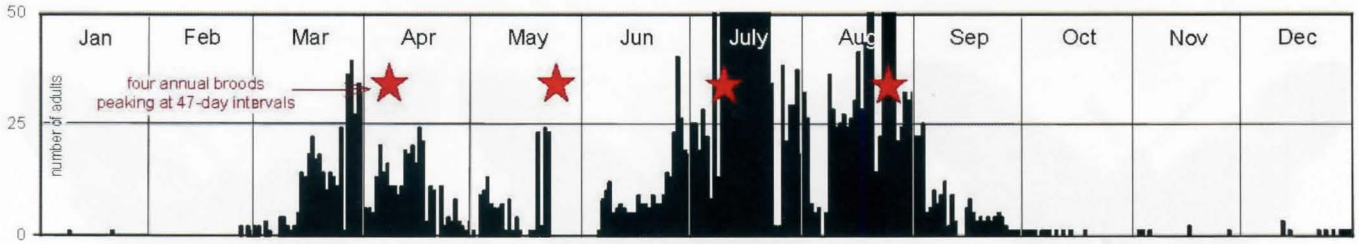

Fig. 3. Adult wild ***Halysidota tessellaris*** captured in Louisiana. n = 3,711

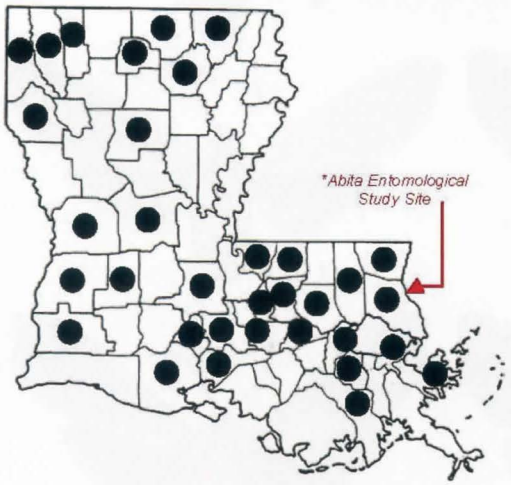

Fig. 4. Adult ***Halysidota tessellaris*** captured in Louisiana in this study.

Forbes (1960) reported the general distribution of ***H. harrisii*** is completely unknown and probably coincides with that of its food plant which is found in southeastern Canada, the eastern half of the United States, (except for Florida and the Gulf Coast) and possibly in parts of northeastern Mexico (McAlpine and Applefield (1973). Forbes (1960) reported the range of ***tessellaris*** includes Quebec and Minnesota to Florida and Mexico

Within Louisiana ***H. tessellaris*** clearly has at least four annual broods (Fig. 3), adults occurring in all 12 months. This species occurs in pest proportions during peak brood periods. On many dozens of light trapping field trips over the past half century my clothing has been covered head to toes with adult moths when standing near the trap lights. And adult moths can cover the ground surrounding the light trap after many hours of light trapping. We have easily captured far more than a million adults of ***H. tessellaris*** over the past half century in Louisiana using numerous high-wattage light traps each 175, 400 or 1000 watts with additional four, eight or twelve 15-watt fluorescent tubes. Heppner 2003 listed three species of ***Halysidota*** occurring in the state of Florida: ***H. cintipes, H. tessellaris***, and ***H. harrisii***. In this study we have captured numerous adult specimens of ***Halysidota*** in Louisiana (Fig. 4). Some of these have genitalia conforming to the illustrations for males in Forbes (1960) as being either ***H. tessellaris*** or ***H. harrisii***. Apparently there have been no thorough studies indicating these genitalia characteristics are infallible in reliably distinguishing these two species with reproducable results. In Québec, Handfield (2011) reported adult ***H. tessellaris*** in the months May-October and abundant to occasional depending upon region.

None of our published data were obtained from the internet, nor unreliable sources which we ourselves have not personally confirmed, collected or discovered, nor publications other than those appearing here properly referenced in Literature cited. We thank Ricky Patterson for most helpful comments and critique of this species account.

**Abita Entomological Study Site (AESS): sec.24,T6S,R12E, 4.2 miles northeast of Abita Springs, St. Tammany Parish, Louisiana USA.*

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CISSEPS FULVICOLLIS (HÜBNER, [1818])(LEPIDOPTERA: EREBIDAE) IN LOUISIANA

BY

VERNON ANTOINE BROU JR. AND CHARLOTTE D. BROU

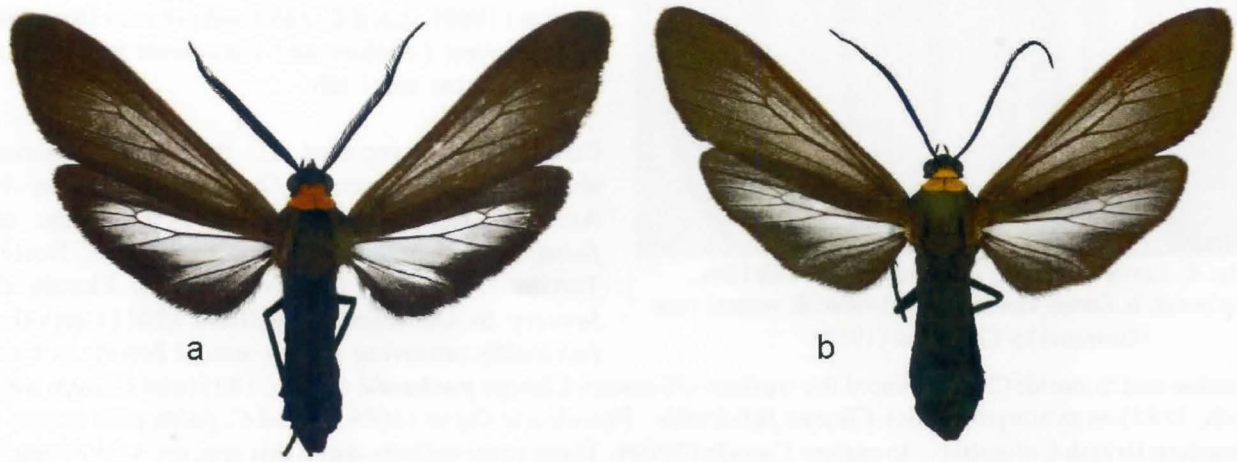

Fig. 1. ***Cisseps fulvicollis*:** male **a.** April 7, 2003. female **b.** January 31, 2002, both from AESS.

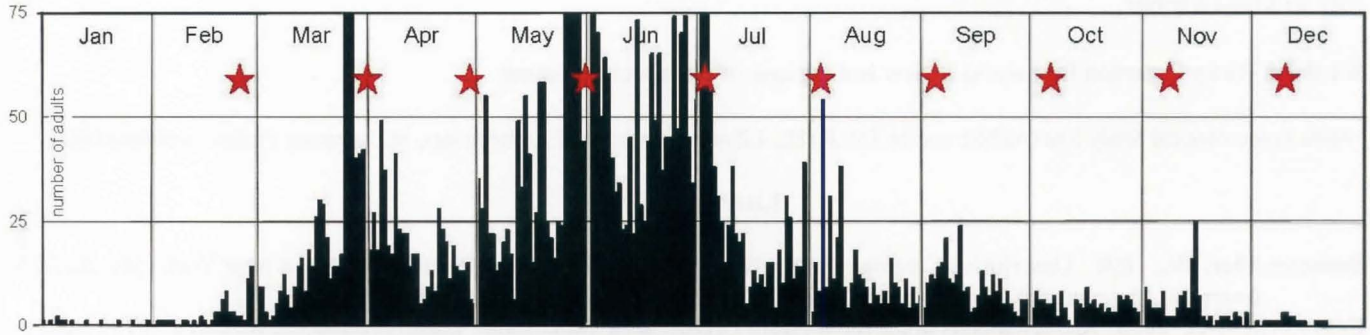

Fig. 2. Adult ***Cisseps fulvicollis*** captured in Louisiana. n = 6,084

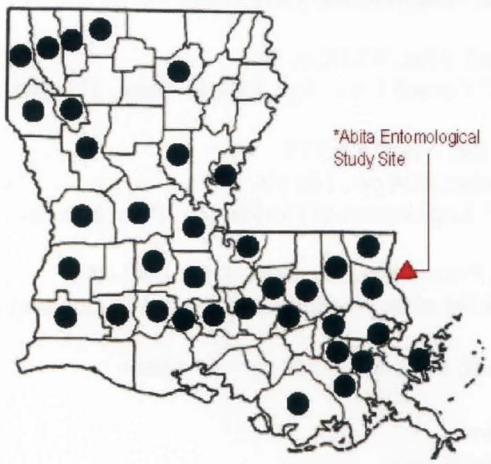

Fig. 3. Parish records for ***Cisseps fulvicollis*** in Louisiana.

Franclemont (1936) proposed the replacement name ***Cisseps*** to replace ***Scepsis*** Walker 1854 which was preoccupied for a genus of Tabanid flies, ***Scepsis*** Walker, 1850, Insecta Saundersiana, I, pt. 1, 71 (Diptera, Tabanidae). This same author again used ***Scepsis*** when he erected a new genus for ***Ctenucha fulvicollis*** Hübner.

C. fulvicollis is known by the common name 'Yellow Collared Scape Moth' but the majority of the specimens in Louisiana actually have an orange collar. According to Covell the collar is "yellow in Midwest."

C. fulvicollis (Hübner) (Fig. 1) is an extremely abundant and wide spread species reported in all 48 contiguous states and southern locals of all Canadian provinces. Beutenmüller (1898) reported ***C. fulvicollis*** is double brooded around New York City. In Louisiana, there are at least 10 annual broods of ***C. fulvicollis*** peaking at approximate 33-day intervals, though only about six broods (two through seven) are well populated in this small-sized study sample Fig. (2). We captured many hundreds of thousands of adults in Louisiana in all 12 months over 54 years in automatic-capture high wattage ultraviolet light traps beginning in 1969 and continuing into 2023. Our light traps were operated continuously 10-12 hours nightly, every day of every year and adult capture dates were logged daily for several years (Fig. 2). In Louisiana, Jung (1950) stated ***C. fulvicollis*** was common in Orleans Parish. The 36 parish records for ***C. fulvicollis*** in Louisiana documented during this study are illustrated in Fig. 3. Adults of ***C. fulvicollis*** are also commonly encountered in daylight hours nectaring upon flowering plants.

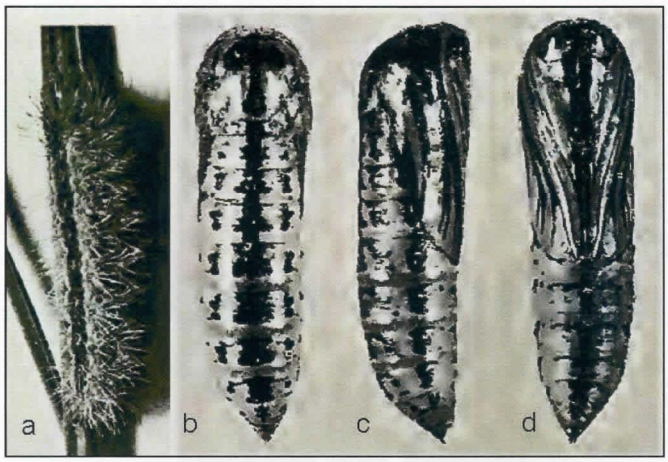

Fig. 4. Larva and pupae of ***Cisseps fulvicollis*** Hbn., **a.** last instar, **b.** dorsal view, **c.** lateral view, **d.** ventral view illustrated by Comstock (1938).

Comstock (1938) reported the larva of this species was briefly described by Coquillett (1880). Dyar (1901) recorded a complete analysis of the life history. Comstock (1938) illustrated for the first time the larvae and pupae of ***C. fulvicollis*** (Fig. 4).

Forbes (1960) stated ***C. fulvicollis*** occurs from Quebec to Northwest Territory and Vancouver Island, south to Florida, Texas and Utah.

Covell (1984) reported ***C. fulvicollis*** common to abundant May through October in eastern North America. Heppner (2003) listed the range of ***C. fulvicollis*** to include Québec to Florida, Northwest Territories to Utah to Texas, and in Florida flying January to December. Handfield (2011) reported ***C. fulvicollis*** occurring in two annual broods in Québec. Lafontaine and Schmidt (2015) treated the western US names ***Cisseps packardii*** (Grote, 1865) and ***Cisseps wrightii*** (Stretch, 1885) as synonyms under ***Cisseps fulvicollis***. Powell and Opler (2009) stated ***C. fulvicollis*** occurs from southeastern British Columbia ... to eastern Canada (2009). These same authors stated this species is found sparingly throughout the west, absent from much of Nevada, southern Utah, and Arizona, and occurs as a single flight from July to mid-October.

We thank Ricky Patterson for helpful review and critique of this species account.

*Abita Entomological Study Site (AESS): sec.24,T6S,R12E, 4.2 miles northeast of AbitaSprings, St. Tammany Parish, Louisiana USA.

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DAHANA ATRIPENNIS GROTE, 1875 (LEPIDOPTERA: EREBIDAE) IN LOUISIANA

BY

VERNON ANTOINE BROU JR. AND CHARLOTTE DOZAR BROU

Fig. 1. Adult ***Dahana atripennis*: a.** male December 13,1932 coll. H.J. Roberts, **b.** male December 18, 1932 coll. H.J. Roberts, **c**. female July 25,1955 coll. J.H. Roberts. All from Baton Rouge, Louisiana.

Fig. 2. Parish record for ***Dahana atripennis*** in Louisiana.

Among the holdings at the Louisiana State Arthropod Museum (LSAM) are three adults of ***Dahana atripennis*** Grote (Fig. 1). These are the only known specimens of this species to be captured in Louisiana. Two males were captured in 1932 by H.J. Roberts and a female captured in 1955 by J.H. Roberts all in Baton Rouge, East Baton Rouge Parish (Fig. 2). John Harvey Roberts (collector on the 1955 specimen label) was a professor of zoology and entomology at Louisiana State University Baton Rouge from 1929-? The two specimens from "H. J. Roberts" in 1932 remains unclear but in all probability is the same collector. J.H. Roberts considered one of the highlights of his career at LSU was a rare sighting of four Ivory-billed Woodpeckers (***Campephilus principalis***) on the Singer Preserve near Tallulah, Louisiana on a cold, wet Christmas Day in 1935 (Soderbergh, 1986).

The larvae of ***D. atripennis*** feeds upon Spanish moss, ***Tillandsia usneoides*** (L.) L., 1762. Holland (1903) stated this ***D. atripennis*** occurs in southern Florida. Covell (1984) stated this species occurs in all months in Florida. Heppner (2003) reported adults of ***D. atripennis*** January to December in Florida, and ranges from Georgia/Florida to Texas. We have reproduced the original descriptions of both the genus ***Dahana*** Grote (1875) and the species ***Dahana atripennis*** Grote (1875) (Fig. 3).

Dahana, n. g.*

A form between the clear-winged Glaucopid genera and *Ctenucha*. The narrow primaries are one-third longer than the entire body. Both pair of wings are closely scaled, cyaneous black terminally, but mostly dead black. Antennae long, plumosely pectinate in the male, serrate in the female. Abdomen rounded terminally, without anal tufts in the male, short in both sexes and plump. Ocelli near the margin of the narrowed naked eyes. Palpi exceeding the front.

Dahana atripennis, n. s.

Face mixed cyaneous and yellow; orbits of the eyes, palpi at base, sides of the thorax in front dark yellow; terminally the palpi are black. Thorax beneath cyaneous, brilliant; above black with yellow edges to the patagia at base and streaked with cyaneous. Abdomen brilliant blue laterally at base, else orange above in the male, yellow in the female. Fore wings dull black, slightly blue outwardly in male, with a yellow fleck above internal angle. Hind wings cyaneous black above, with short pale fringes. Beneath fore wings more blue at base, with the yellow streaky shade at internal margin more diffuse. Hind wings immaculate beneath. Abdomen dusky along the venter.

Length of primary 18, of the body 12 m. m.

Enterprise, Fla., May 28.

The male is the more gaily colored, and has the blue reflections more noticeable.

Fig. 3. Original description of ***Dahana atripennis*** Grote (1875).

This species was not covered by Forbes (1960), nor Heitzman and Heitzman (1987). We thank Ricky Patterson for helpful critique of this species account and Nathan P. Lord and Victoria M. Bayless for access to, and most helpful information about the origins of this uncommonly encountered species located in the Louisiana State Arthropod Museum (LSAM).

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SPRING BEAUTIES #1

BY

GARY NOEL ROSS

Fig. 1. Composite of opium poppy, larkspur, and foxglove.

Fig. 2. Shirley poppy (red) and California poppy (yellow/orange).

Fig. 3. Opium poppy, single red.

Fig. 4. Opium poppy, double pink, double rose.

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CTENUCHA VENOSA WALKER, 1854 (LEPIDOPTERA: EREBIDAE) IN LOUISIANA

BY

VERNON ANTOINE BROU JR. AND CHARLOTTE DOZAR BROU

Fig. 1. ***Ctenucha venosa*** Walker, male, June 6, 1989 at the AESS.

Fig. 2. Parish record for ***Ctenucha venosa***.

Ctenucha venosa Walker (Fig. 1) was captured one time in Louisiana. This single male was taken in an automatic-capture high-wattage mercury-vapor self-designed light trap and this specimen appears to be the most eastern record in North America for this species. This specimen was captured at the **Abita Entomological Study Site* (AESS): *sec.24,T6S,R12E, 4.2 miles northeast of Abita Springs, St. Tammany Parish, Louisiana USA* (Fig. 2), where nearly 500 insect traps of all types and purposes were operated every minute of every day for 42 consecutive years, including the non-stop operation of five to seven or more high-wattage light traps. Despite collecting 24 hours daily/nightly throughout the state of Louisiana for more than 19,345 days/nights (53) continuous years (1969-2023) expending 51,000,000 insect trap hours, involving self-dispatching automatic-capture MV light traps, fermenting fruit bait traps, semiochemical lure traps, flight traps, beetle traps, on and on....., no additional ***C. venosa*** have been encountered.

Holland (1903) reported ***C. venosa*** occurs from Colorado to Mexico. This species ranges primarily in the southwestern US, Louisiana to California, and southward Mexico to Venezuela. Powell and Opler (2009) stated that ***C. venosa*** is both nocturnal and diurnal, and ranges from southern Nevada, Arizona, and New Mexico to Oklahoma and Texas, south well into Mexico. Powell and Opler stated ***C. venosa*** has several generations, and is on the wing April to mid-November in southeastern Arizona. This species was not covered by Forbes (1960), Covell (1984), Heitzman and Heitzman (1987), nor Heppner (2003). We thank Ricky Patterson for critiquing this species account and to Nathan P. Lord and Victoria M. Bayless for access to the holdings of the Louisiana State Arthropod Museum (LSAM).

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SPRING BEAUTIES #2

BY

GARY NOEL ROSS

Fig. 1. Indica azalea, variety "Red Formosa."

Fig. 2. Rocky Mountain columbine, blue cultivar.

Fig. 3. Iceland poppy.

Fig. 4. Louisiana iris, cultivar.

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URODUS PARVULA (EDWARDS, 1881)(LEPIDOPTERA: URODIDAE) IN LOUISIANA

BY

VERNON ANTOINE BROU JR. AND CHARLOTTE DOZAR BROU

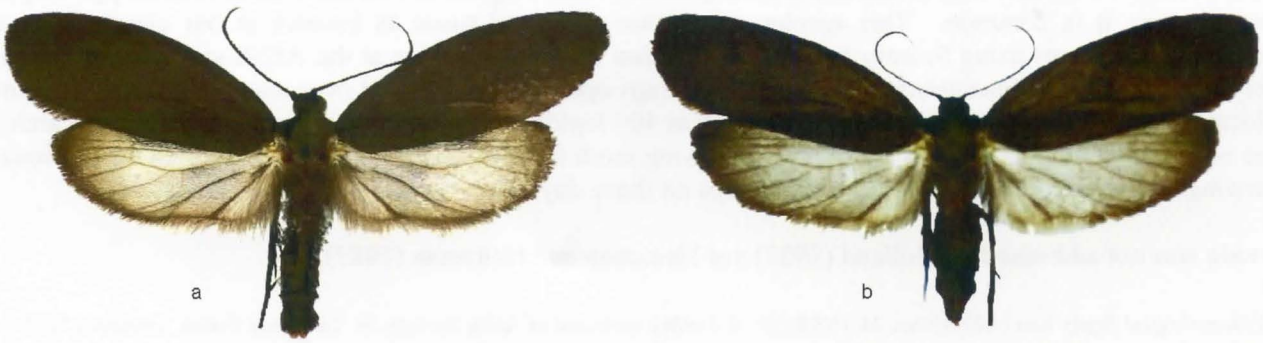

Fig. 1. ***Urodus parvula*** **a.** male April 25, 1984 AESS, **b.** female May 1, 1982 Edgard, St. John the Baptist Parish.

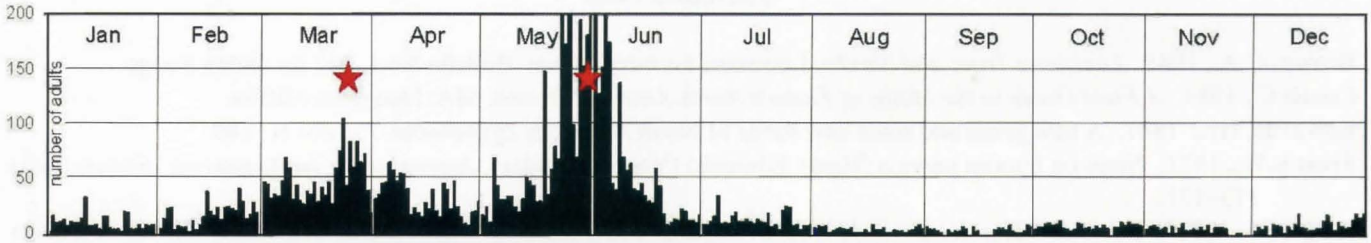

Fig. 2. Adult ***Urodus parvula*** captured at the AESS in Louisiana n = 8,748

The moth ***Urodus parvula*** (Edwards) (Fig. 1) was originally described as ***Penthetria parvula*** Edwards, 1881. This species was captured during this study hundreds of thousands of times over the past half century using automatic-capture high-wattage UV light traps in Louisiana. Despite capturing wild adults just about any day of the calendar year in Louisiana, ***U. parvula*** has only two significantly populated annual broods, first brood peaking third week of March, second brood peaking around 66-days later at the end of May/beginning of June (Fig. 2). This species is known for its net-like single-pupa cocoon attached to the foodplant or nearby vegetation by a strong filament. ***Urodus parvula*** is recorded in past literature from a variety of host plants including: ***Quercus sp., Persea borbonia*** (Linnaeus) Spreng., ***Bumelia sp., Hibiscus sp.*** Hall (2018), Covell (1984), Frost (1972) and others.

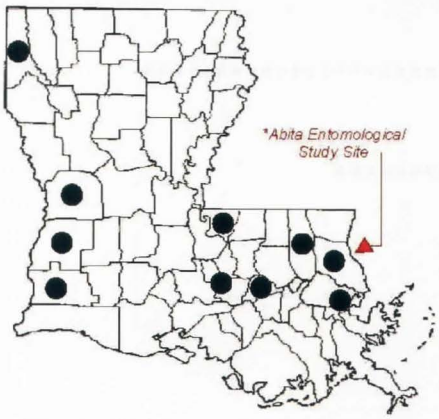

Fig. 3. Parish records in Louisiana for ***Urodus parvula.***

A new genus and some new forms of North American Zygaenidae
by Hy. Edwards

Penthetria Hy. Edw. Nov. gen.

Penthetria parvula Hy. Edw. n. sp.
Primaries smoky black, with purplish reflections, rather darker about the margins. Secondaries smoky semitransparent. Thorax, abdomen, legs, and antennae concolorous. Underside similar to upper.
Expanse wings 0.60 inches

1 ♂Indian River, Florida

1 ♀ Georgia
Types coll. Hy. Edwards, F. Tepper.

Fig. 4. Original description of ***Penthetria parvula*** Henry Edwards 1881.

Heppner (2003) stated the range of ***U. parvula*** to include Maryland to Florida and Arkansas to Texas, and on the wing in Florida January to July, October to December. This same author reported the larval foodplants to include ***Persea sp, Persea americana*** Mill. (avocado), ***Persea borbonia*** (redbay), ***Bumelia reclinata*** (Michx.), ***Camellia japonica*** Linnaeus) and ***Quercus sp.*** Brown (1945) reported there are four species of ***Bumelia*** in Louisiana,

including ***Bumelia lanuginosa*** (Michx.) Pers. and ***Persea palustris*** (Raf.) (swamp bay) and ***Persea borbonia***, all three known from the AESS in St. Tammany Parish. The parish records for ***U. parvula*** in Louisiana during this study are illustrated in Fig. 3. The original description of ***Urodus (Penthetria) parvula*** by Henry Edwards (1881) is illustrated in Fig. 4.

Frost (1972) stated ***U. parvula*** occurs also in Central America and South America. Covell (1984) reported the range for ***U. parvula*** in the eastern U.S. to include Washington D.C. and Virginia to Florida, west to Mississippi, all year southward where it is common. This species was captured several times as bycatch in our clearwing moth semiochemical lure traps using Scentry brand ***Synanthedon bibiopennis*** lures at the AESS and elsewhere, most probably due to the high concentration of hundreds of traps operating year-round over many decades at the same study locations. It was not uncommon to find as many as 40+ lepidoptera adults of numerous families as bycatch in just one of our clearwing moth traps containing clearwing moth lures in daily trap rounds, yet often no specimens of clearwing moths were captured in these same traps on those days.

U. parvula was not addressed by Holland (1903) nor Heitzman and Heitzman (1987).

*Abita Entomological Study Site (AESS): sec.24,T6S,R12E, 4.2 miles northeast of Abita Springs, St. Tammany Parish, Louisiana USA.

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SIDE TO SIDE HEAD MOVEMENT BY AN ADULT *Diaphania hyalinata* (LEPIDOPTERA: CRAMBIDAE: PYRAUSTINAE) MOTH

BY

MARC C. MINNO

While visiting John Stretch Memorial Park in Lake Harbor, Palm Beach County, Florida on September 8, 2022, I observed and photographed an adult of the Melonworm Moth, *Diaphania hyalinata* (L., 1767) as it was feeding at a flower of Beggarticks [*Bidens alba* (L.) de Candolle, 1836]. Its body remained stationary while perched except for the tip of the abdomen and the head. This individual was able to move its head to the right and then to the left to reach various flowers in the capitulum (Figure 1).

I took several photos of the moth as it was feeding using a hand-held Canon 7D digital camera with a 100 mm macro lens. Later at home I edited the photos using Adobe Photoshop and noticed how much movement had occurred. I imported two photos representing the greatest movement into PowerPoint and added blue lines to show orientation of the head. Then I copied and joined the lines together to form the angle of divergence. Using a protractor I measured the angle to be about 130 degrees. I also measured divergence to the right and to the left relative to the longitudinal axis of the body to be about 65 degrees each.

I have not found much published about the ability of adult Lepidoptera to move their heads to the side. Dombrowski *et al.* (1990) describe head movements of tethered Carolina Sphinx Moth [*Manduca sexta* (L.)] adults in flight. They measured head movement to the side of 25-35 degrees from the longitudinal axis of the body (or a total divergence of 70 degrees from side to side). The cervix (the mostly membranous neck connecting the head and thorax) allows for movement of the head. The *D. hyalinata* that I observed showed a remarkable ability to move its head from one side to the other.

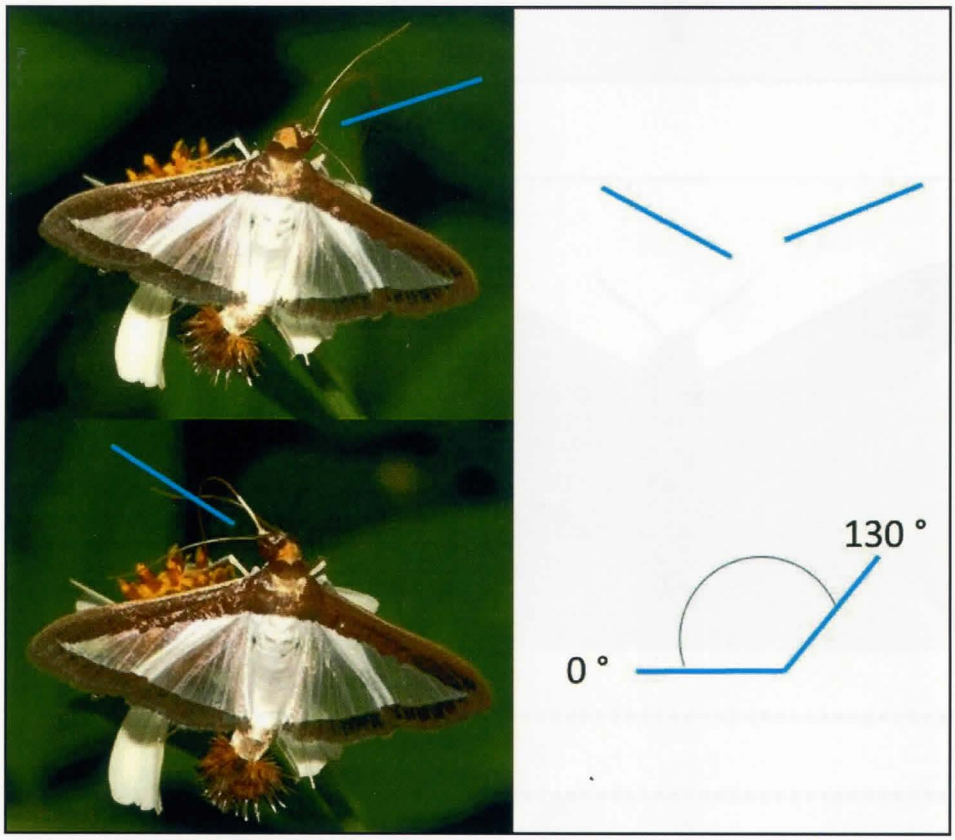

Fig. 1. Two views of the same adult *Diaphania hyalinata* feeding at *Bidens alba* (Asteraceae) in a field. Blue lines indicate head orientation and approximate degree of movement.

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(Marc C. Minno, E-Mail: marccminno@gmail.com)

PHOTOS
BY
J. BARRY LOMBARDINI

Caprock Canyons State Park
nr. Quitaque, Texas
30-VIII-1996

Lake Brownwood
nr. Brownwood, Texas
4-X-2021

Pandorus Sphinx
(*Eumorpha pandorus*)

Caprock Canyons
State Park
Quitaque, Texas
19-V-2001

Wild Cherry Sphinx
(*Sphinx drupiferum*)

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THE RESILIENCY OF BUTTERFLIES AFTER A HURRICANE AND FLOODING, SLEEPING TURTLES NORTH, SARASOTA COUNTY, FLORIDA PART 1

BY

SCOTT D. ANDERSON

Half of Sleeping Turtles Preserve has officially reopened since Hurricane Ian tore through it on September 28, 2022. After 8 hours of hurricane force winds, 4 holding steady above 90 mph, the Preserve still shows many signs of damage. Not only did the wind cause damage but so did more than 2 weeks of heavy flooding. The necessary cleanup of the Preserve also caused significant distress on the landscape since heavy equipment was brought in to make the area safe for visitors. So, now that visitors may reenter the Preserve for hiking and other recreation, are there any butterflies?

At its worst, the Myakka River was 12 feet above flood stage. It is nice to see the river return to normal and well within its banks.

Sights like this are now common in Sleeping Turtles North. The winds were so severe for so long that many trees were badly damaged or completely toppled.

This is an all too common sight – blown over trees cut and hauled away. The stumps will likely be visible for many years but new emerging shoots might make a good home for caterpillars.

It's a common sight to see bare ground where heavy equipment was used to clear debris and make the preserve safe for visitors again.

Despite the heavy flooding last October, new grasses and plants are starting to emerge through the rotted vegetation left behind.

The sparkleberry flowers are blooming early here. Hopefully they will continue into April when the Southern Oak Hairstreaks emerge. These flowers are one of the easiest ways to find the oak hairstreaks which only fly here for a few weeks.

Using baseline data for the same Preserve collected in 2020, I am able to make comparisons to both then and now. In 2020, in January and February, I completed 8 field trips and repeated them again this year. Two months does not a study make, so I will continue both the effort and the comparison throughout the coming calender year. However, year-to-date and as preliminary as they are, here are my findings.

Total butterfly species in 2020:	31
Total butterfly species in 2023:	24
Total butterfly individuals in 2020:	631
Total butterfly individuals in 2023:	395

It is far too early to draw conclusions about the data learned. Clearly there is a downward trend for both species and individuals and in some cases, species are present but only barely. A few, which I would expect to find (Whirlabout and Three-spotted Skipper) are absent. On the positive side, Phaon Crescents and White Peacocks seem unaffected and Fiery Skippers are more abundant by a factor of 2. This is strange given the Fiery is a grass skipper and the Preserve was flooded for so long. Also, I found a new species not found at all during full-year 2020. The American Lady is a common butterfly in many areas of the country but in Sleeping Turtles North, I had never seen one until this January.

Horace's Duskywing

Long-tailed Skipper

Monk Skipper

Great Southern White

Phaon Crescent

Species	2020	2023	Result
Dainty Sulphur	132	89	Down
Barred Yellow	126	62	Down
Ceraunus Blue	77	36	Down
Phaon Crescent	74	70	Same
White Peacock	32	35	Same
Horace's Duskywing	31	19	Down
Little Yellow	22	4	Down
Common Buckeye	21	3	Down
Fiery Skipper	17	34	Up
Dorantes Longtail	14	1	Down

Here is a 2020 vs. 2023 comparison chart for the top 10 butterflies species and number of individuals I found in 2020.

My plan is to visit Sleeping Turtles North an average of 3 times per month for the rest of the year using the same frequency as my field trips in 2020. More data will give me a much clearer picture about the impact on butterflies when exposed to such extreme weather and flooding. Look for Part 2 in the next issue.

(Scott D. Anderson; E-Mail: scottdanderson53@gmail.com)

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SPRING BEAUTIES #3

BY
GARY NOEL ROSS

Fig. 1. Petunias, variety "Silver Wave."

Fig. 2. Monarch nectaring on lantana, variety "New Gold."

Fig. 3. Nasturtium, bicolar variety.

Fig. 4. Nicotiana (ornamental tobacco), red variety).

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BEGINNING A TULE ELK STATE NATURAL RESERVE STUDY (20 MILES WEST OF BAKERSFIELD, CALIFORNIA)

BY

KELLY RICHERS

Most articles I have viewed (and written) are done after a study is completed. This study will be introduced from a different perspective, as no sampling has been done as of the time this is penned. Continuous reports will be given as the study continues.

The Tule Elk State Natural Reserve, in Kern County, has a small herd remnant of what was once a half million elk that lived in the Central Valley, coastal areas and the southern San Joaquin Valley, extending up before European settlement all the way to near the Oregon border. With the introduction of European settlers in the 1700's, the herds were hunted severely until by 1849 the remainder existed only from south of the Bay area through the Central Valley to the great Buena Vista Lake near Taft. Since each elk requires several acres to forage, each elk weighing up to 500 pounds, the Central Valley with its rich swampy vegetation was ideal for the small herds to roam. Herds generally form in units of about 50 animals.

Entrance to the Tule Elk Reserve

With the introduction of the gold rush in California, the situation changed radically. The demand for elk meat was such that by the year 1873 the Central Valley elk, called Tule Elk by that time and a separate subspecies (one of three in the United States) was believed extinct. Elk hunting was banned that year, but with no elk left, it seemed a futile gesture. Cattle rancher Henry Miller, who raised hundreds of thousands of cattle on the land he drained west of Bakersfield, reserved 600 acres of land in the event any had survived in the undrained marshes. In 1874 he discovered one pair still hiding in the Tule reeds near Buena Vista Lake.

These were protected, and by 1895 the herd had grown to 28, and the herd kept growing until Miller requested the herd be moved due to damage to his crops. The elk were moved to near Tupman and the herd grew to 140 elk, but when the Kern River had a dam constructed in 1952, the riparian habitat they needed to live disappeared, and by 1954 only 41 elk survived.

The current reserve was developed on 953 acres, with water piped in, artificial ponds built and food provided the elk. The herd has proliferated in this environment. Now, whenever the herd exceeds the supportable level of 30 to 35 animals, the excess are relocated to other open spaces and protected. These include the Carrizo Plain National Monument, the San Luis NWR, and the Wind Wolves Reserve, as well as Cache Creek in Lake County. These locations now have sustainable herds of their own.

Elk at the Reserve

The author contacted the authorities managing the Reserve to see if moth sampling could be done, as no known records exist of any moths taken in the Reserve. The authorities, after ascertaining that traps would not unduly disturb the elk, approved, and the permit was issued for one year, beginning in February of 2023.

A preliminary tour of the area was disappointing. The author expected to see original habitat, with lush tule reeds lining a riparian location. These do not exist, after the droughts of the past three years, and instead there were dry shallow ravines and close cropped grasslands, with hay dropped to feed the elk.

One of the small arroyos that used to be full of water prior to the drought

The pond at the north end of the Reserve

However, a little digging found a pond at the north end of the reserve, covering maybe a half acre, surrounded by reeds, and some trees at the south end indicating more permanent underground water. An artificial pond with reeds also is in the center of the reserve.

It appears that about eight traps, two at the northern pond, two in the grasslands, one at the artificial pond and three in the arroyo areas might provide a good sampling of the nocturnal moth population. At each end there are a couple of trees for sesiid traps, but the area is oddly vacant of trees. The reason is that the elk rub trees with their antlers and kill any trees by completely removing the outer layers of bark. Another lesson learned.

The best time for collecting across the course of a year in the Central Valley would be the spring (February, March, April) and the fall (October, November). The rest of the year it is either very hot (it can get to 110 degrees as early as May) or too blustery [windy and below freezing sometimes (December, January)]. Naturally, since I am eager to go this year, it has rained every weekend in February, and March looks similar. It did not rain at all last February or March, so there will be vegetation this year, at least.

Over 1100 species of moths are known from Kern County, so the fauna will not be poor, but it might be more common species than was originally expected. On the other hand, 900+ acres of uncollected terrain might hold pleasant surprises, as the east side of the Temblor Range, where this is located, is under collected in and of itself.

Further updates will be given as collecting ensues!

(Kelly Richers; E-Mail: kerichers@wuesd.org)

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XYLOPHANES LIBYA IN SOUTH FLORIDA

BY

DAVID FINE

In April of 2019 I received a phone call from my good friend Eric Purtic informing me that he "had a moth for me." As a Lepidopterist, we all have those well-intentioned friends that have a heart to bless you by bringing the "beautiful" butterfly or moth that they had found and put in a jar. Ninety-nine % of the time, these unfortunate specimens endure the royal treatment of being handled by people who have no idea how to care for a live butterfly or moth specimen and it is under extremely unusual circumstances that your friend has the heart to euthanize the specimen for you in a way that the specimen is preserved intact with all of its scales. I have actually begun telling most of my buddies; "No. It's ok. You can leave the butterfly/moth as it is." I will ask for them to snap a picture for me and text me the photo and in the rare occasion, that the species is a desirable one, I will make the time to drive to them to photograph, video and sometimes obtain the specimen myself to ensure the quality of the specimen is preserved.

In this case however, my friend Eric told me that he had found what he believed to be a moth in his garage and that it was already dead and completely "rigamortified" so I agreed to meet up with him to see what he had. When I looked in the Tupperware container, my little skeptical heart skipped a beat as I looked at the sphinx moth that I initially believed to be a *tersa* sphinx and realized that the forewing markings were a little bit different. The hind wing was covered by the forewings and stiff as a board. The ventral side also seemed to have a different coloration than the extremely common *tersa* sphinx. The specimen was missing its share of scales on its head and abdomen. The scales on the head were likely removed due to the fact that the specimen was trapped in my friend's garage. While trying to get out of the closed window, I'm sure he rubbed all of those scales off. The missing scales on the body were likely from either ants or roaches that began to consume the body of the dead moth. But even with all of the missing scales, the specimen was still salvageable.

***Xylophanes libya* collected on No Name Key, Florida, in June 2019.**

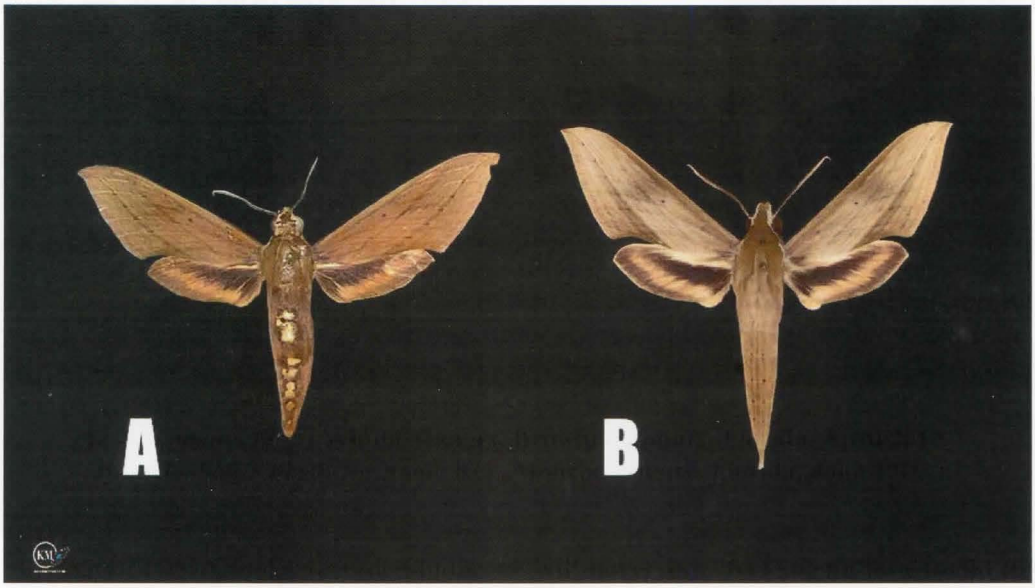
Before attempting to view the hind wings, I decided to take it home and place it in my rehydration chamber to soften the wing and body muscles. After 24 hours or so, the specimen was ready to mount and upon stretching out the wings, I realized that I definitely did not have a *tersa* sphinx in front of me. The hind wing coloration was completely different. I began looking up what *Xylophanes* species have been recorded in Florida and was amazed to find that there had been several records of *Xylophanes libya* recorded in Broward County Parks including Tree Tops Park and others. Furthermore, the beautiful website Sphingidae of the US lists wild coffee (*Psychotria*) as the larval host plant for *X. libya* and claims that it is likely not breeding in the United States but is rather likely a stray. Well, that may be, but I will be paying more close attention to the wild coffee plants in my area for larvae. My friends' house in Wilton Manors is in an area that has lots of small pockets of hammock foliage in between houses and wild coffee is certainly in the area.

https://www.sphingidae.us/sphingidae-index.html

A few months later in the month of June, I was down on No Name Key with mercury vapor lights out and found a very fresh specimen of *Xylophanes libya* at the light sheet. This marks what I believe is the first record

of *Xylophanes libya* in Monroe county and is certainly the first live specimen I have recorded in the state of Florida. I have not seen another individual since 2019 however some of the staff at Tree Tops Park in Broward county have recorded *X. libya* photographically several times in their public programs using artificial UV lights.

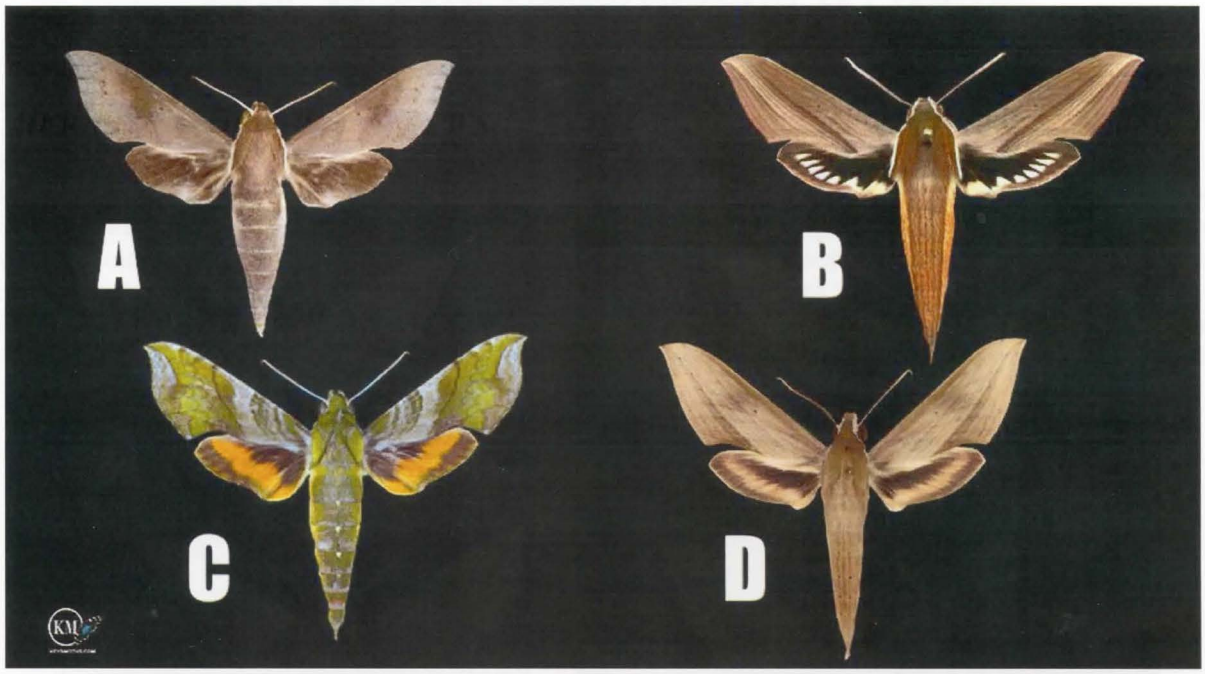
Xylophanes libya collected on No Name Key, Florida, in June 2019.



A. _Xylophanes libya_; Wilton Manors, Broward County, Florida, April 2019
B. _Xylophanes libya_; No Name Key, Monroe County, Florida, June 2019

There are now 4 species of *Xylophanes* recorded in the state of Florida. The two regular and common residents are *X. tersa* and *X. pluto*. *X. porcus* has been recorded a hand full of times on the western part of the state and *Xylophanes libya* now seems to be recorded somewhat regularly in Broward County. I personally suspect that this species is now a breeding resident. We will be on the lookout for more tropical surprises like *Xylophanes libya* in adventures to come! And I will never say "NO" again to a friend that has a moth for me!!! You never know what you are going to get!

For more information on our research on the butterflies and moths of South Florida and the Florida Keys, visit our website: www.keysmoths.com and check out our YouTube videos on the KEYS MOTHS YouTube channel.



A. ***Xylophanes porcus*** **B.** ***Xylophanes tersa*** **C.** ***Xylophanes pluto*** **D.** ***Xylophanes libya***

(David Fine, E-mail: davidf@calvaryftl.org)

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SPRING BEAUTIES #4

BY

GARY NOEL ROSS

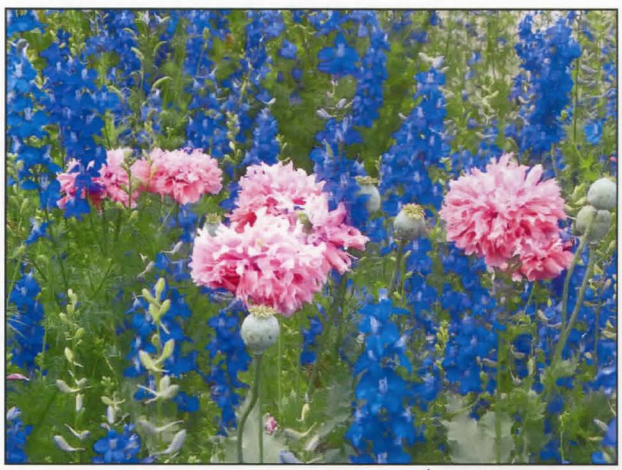


Fig. 1. Opium Poppy (double pink) and larkspur.

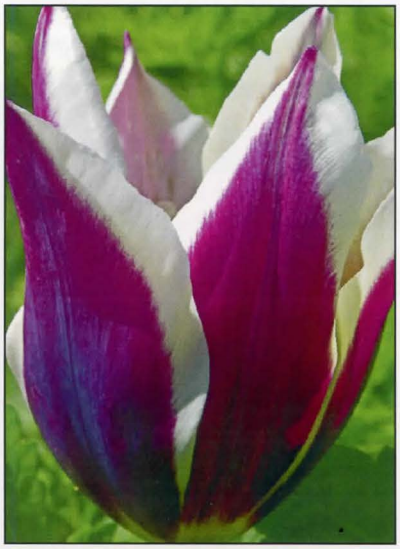


Fig. 2. Tulip, variety "Chansonnette."

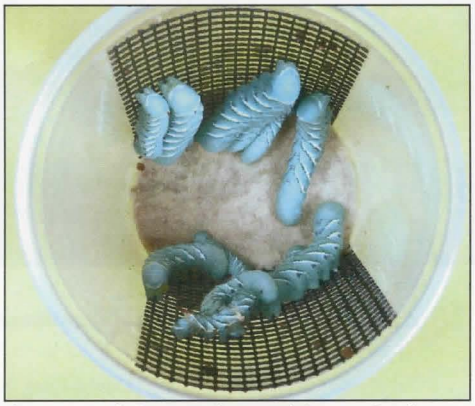
(Gary Noel Ross, 6095 Stratford Ave. Baton Rouge, LA 70808; E-Mail: GNRoss40@yahoo.com)

TOBACCO HORNWORMS: GREEN VS. BLUE

BY
GARY NOEL ROSS

The tobacco hornworm—larva of the Carolina sphinx moth (*Manduca sexta*)—is the most common pest of tomato plants. The caterpillar is a staple in the commercial exotic pet industry as food for reptiles, especially lizards such as the docile bearded dragon (*Pogona vitticeps*). Unfortunately, the natural hornworms are toxic to reptiles because of chemicals sequestered from feeding on solanaceous plants such as the tomato. Researchers, however, have developed a synthetic food that is safe and convenient. And a byproduct of the food makeover is that absent plant pigments (green chlorophyll and yellow xanthophyll), the natural blue blood of the larvae shows through their skins to produce attractive "Blue Hornworms" – food for reptiles and eye-candy for pet-lovers.

Adult Carolina sphinx moth (*Manduca sexta*)



Commercial container with synthetic food and blue larvae

Commercial "Blue Hornworm" with frass

Natural green tobacco hornworm

Bearded dragon (*Pogona vitticeps*) attacking a "Blue Hornworm"

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E-Mail: GNRoss40@yahoo.com)

PASSING THE BUCK(MOTH)

BY
CRAIG W. MARKS

The initial draft of my book on the Butterflies of Louisiana included a section on day-flying moths that I have encountered while butterflying around the State. Although ultimately eliminated as part of the editing process, that section included discussions of the Buckmoth, *Hemileuca maia.* This univoltine, diurnal moth is unique in that it flies late in our season, primarily from mid-November into mid-December (one source suggested they are called "Buckmoths" because they fly during deer season). I have seen it within the Lafayette City limits and in St. Landry Parish at Thistlethwaite WMA. The first time I saw one (actually several) was in the backyard of a house in Lafayette I had recently purchased. The second time was a male flying in a Lafayette city street that ran along the Vermilion River. At Thistlethwaite, several were flying in the back of the WMA, in an area through which a slough runs. This is an area where White M Hairstreaks, Southern Pearly-eyes, Gemmed Satyrs, Yehl Skippers and Delaware Skippers have also been seen. All three locations were associated with old growths of Oak trees. My observations on those occasions were that the males fly swiftly, with rapid wingbeats, about 4-5 feet off the ground. The males appear to patrol, moving in and out of the trees. Mating is accomplished through pheromones. Males are easily differentiated from the females by a bright red abdomen tip (see below photo). My initial impression, later substantiated by Linda Auld, was that neither of the adult sexes stop to feed while on the wing (as they lack functional mouth parts).

Buckmoth (*hemileuca maia*), dorsal male, Lafayette Parish, 12/10/2000.

Buckmoth (*Hemileuca maia*), dorsal female, Thistlethwaite WMA, 11/15/2009.

Vernon Brou wrote an article about this moth in 2002 for the Southern Lep News. As part of that article, he identified 8 parishes in which he had previously recorded it. Lafayette and St. Landry were not included within those 8 parishes. Recent research (iNaturalist, Bugguide and BAMONA) has identified 16 additional parishes in which adults were reported with supporting dates and locations (Jeff Davis, Allen, Grant, Rapides, Ouachita, St. Martin, Evangeline, St. Helena, Livingston, St. Charles, Tangipahoa, Vernon, Caddo, Jackson, LaSalle and Vermilion). As the adults are distinctive in both their markings and coloring and cannot be confused with any other moth or butterfly flying at that time, I have accepted those sightings that were supported by a photo (or photos) and which clearly reflected an adult Buckmoth.

Within Brou's article, he reported a single adult flight period from "November into January", peaking "in early December." His flight period was primarily based on records gathered between 1990-2000 in the Abita Springs area at his ultra violet (uv) light traps. The iNaturalist, Bugguide and BAMONA records were from as early as November 20 and as late as December 26, primarily during the first ten days of December (with one record on January 9).

As noted by Brou (and several other sources), Buckmoth caterpillars are possibly more well-known than adults. Those caterpillars can be found in large masses on tree trunks in the spring, with egg eclosure

occurring in late February into early March, coinciding with host tree bud break. The most commonly identified larval food sources are oak species, including *Quercus virginiana* (live oak), *Q. alba* (White oak) and *Q. velutina* (Black oak), very ommon trees in Louisiana. Other verified trees on which the caterpillars can survive include black willow (*Salix nigra*), and black cherry (*Prunus serotina*). I would further note that an LSU AgCenter brochure suggests the caterpillars are "abundant between April and May," and "major infestations are common in urban areas." For example, there have been multiple reports of outbreaks in the New Orleans area.

The female oviposits her eggs in masses of 300 or more on host tree twigs (see photo below). During early instars, the caterpillars are gregarious, feeding together in large groups, even to the extent that they have been seen to move from one food source to another in tandem. Later instars are reported to be more solitary. Pupation occurs in May, in the leaf litter around the bases of the host trees, with the pupa entering a summer diapause.

Buckmoth eggs and pupa, photo by Linda Auld (the NOLA BugLady)

The main reason these caterpillars attract such attention is that they have numerous branched spines along their body which possess venom glands. Per the LSU brochure, "(w)hen stung, pain is immediate, with radiation to local lymphatic groups followed by localized itching, swelling and redness. Welts raised on the skin can remain visible for 24 hours to a week after a sting." As an aside, Linda Auld has advsed one trick to minimize the pain is to use a piece of tape to pull the venomous spines out of the skin.

There were numerous reports across Louisiana of Buck Moth caterpillar sightings (with dates, locations and photos) in iNaturalist, Bugguide and BAMONA. Sources describe several distinctive caterpillar characteristics. The earliest instars are dull black with reddish-brown heads. Later instars develop small round white spots over the body and can almost become completely white (see picture on next page). The black dots on the parish map below reflect confirmed adult sightings as described previously in this article, while the red dots reflect records (supported by photos) that have been identified as Buckmoth caterpillars. These additional 11 parishes include Calcasieu, Beauregard, Natchitoches, DeSoto, Lincoln, Claiborne, Union, W. Carroll, Madison, Concordia and Iberville.

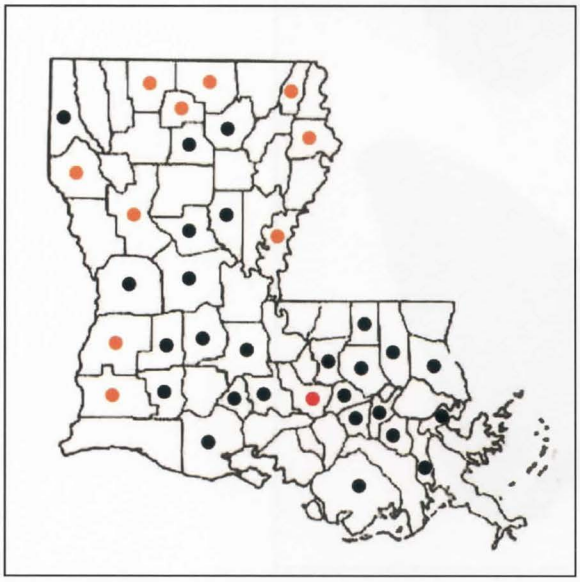
In 2020, Harry Pavulaan wrote an article comparing regional Buckmoth populations and identifying new subspecies. One new subspecies was *H. m. sandra*, the Eastern Buckmoth. Another was *H. m. orleans*, the Gulf Coast Buckmoth. His subspecies range map showed the former as present in northern Louisiana, and the latter present in the toe of Louisiana's boot, or extreme southeast Louisiana. That map also suggested the *sandra* subspecies is present in east Texas along the Louisiana border ("East Texas records … may not be ssp *orleans"*).

Per Pavulaan, the Gulf Coast Buckmoth "represents Louisiana populations, mainly around New Orleans and the Mississippi River delta," reflected by a "unique phenotype with a variable brownish-black ground color;" however, "some individuals are black". Also, *orleans* was described as the largest of all subspecies with a flight period from November 15 to January 9.

The Eastern Buckmoth "represents the interior continental (inland) populations." Pavulaan stated that, "insufficient published or available collected material makes it difficult to ascertain the full extent of its distribution," generally characterized as "Throughout the interior eastern" U.S. including north and central

Mississippi, northern Alabama and southern Arkansas (along with northern Louisiana and extreme eastern Texas). "Specimens from northern Alabama and northern Mississippi are deep black, matching northeastern populations, and do not possess the bownish-black color of the nearby Gulf Coast population."

Buckmoth caterpillars, photo by Linda Auld (the NOLA BugLady)



Louisiana parish map. The black dots on the parish map reflect confirmed adult sightings while the red dots reflect records supported by photos) that have been identified as Buckmoth caterpillars.

Based on that map, I would anticipate the Cen-La records identified above (Vernon, Rapides, Natchitoches, Bienville, Grant and Allen) would be the *sandra* subspecies although I have not personally seen any from those parishes. The specimens I have seen in Lafayette and St. Landry Parishes do not, to my eyes, appear to be brownish black. The ones from Lafayette Parish are distinctly black. The ones from St. Landry Parish were not as boldly black, but appeared more gray-black, possibly a reflection of wear/age. So, I cannot say which subspecies is present in those two parishes (or the two others in the Acadiana region, Iberville and St. Martin), nor can I make any comment on the records from the parishes in between, such as Evangeline, Calcasieu, Jeff Davis and/or Vermilion.

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http://www.inaturalist.org

(Craig W. Marks; E-Mail: cmarks@landcoast.com)

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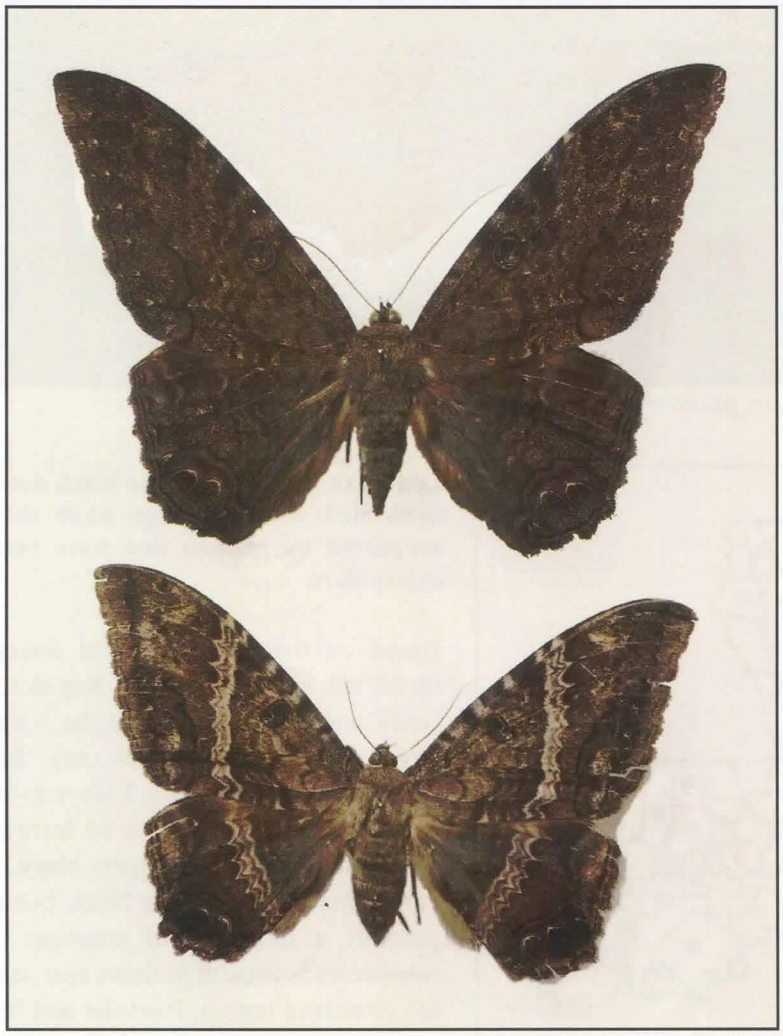
Male, Davis Mountains State Park, nr. Fort Davis, Texas (8-VI-2008)

Female, Boy Scout Camp, nr. Post, Texas (15-VI-2004)



Black Witch (*Asclapha ordorata*)

REPORTS OF STATE COORDINATORS

Alabama: C. Howard Grisham, 573 Ohatchee Road, Huntsville, AL 35811, E-Mail: chgrisham@Comcast.net

Arkansas: Mack Shotts, 514 W. Main Street, Paragould, AR 72450, E-Mail: cshotts@grnco.net

Mack sends in the following report of David Rupe:

David states: I observed the following species on March 25, 2023, in the Ozark National Forest (generally near White Rock/Bidville) in Crawford County, Arkansas. Temperatures were a little cool (low 60s), but there were still several species on the wing.

Papilio glaucus
Eurytides marcellus
Colias eurytheme
Anthocharis midea
Celastrina ladon
Parrhasius m-album (one individual nectaring on Mexican plum)
Vanessa atalanta
Polygonia interrogationis
Erynnis juvenalis (numerous individuals)

Florida:

Charles V. Covell Jr., sends in the following report for the last segment of 2022 (E-Mail: covell@louisville.edu)

Sept. 10. I saw the following while driving between The Village and the Duckpond Neighborhood: *P. glaucus, P. sennae, A. vanillae,* and *D. plexippus.*

Sept. 14. *P. philea* and 2 *P. sennae* along 16th Ave, while driving.

Sept. 19. several *P. sennae* and one *A. vanillae* in Gainesville.

Sept. 20. *A. jatrophae* and *A. vanillae* in Gainesville while driving.

Sept. 25 a *A. jatrophae* at The Village and a *Papilio troilus*.

Sept. 27. *H. cresphontes* and *L. cassius* at The Village.

Oct. 1. *P. sennae* and *A. vanillae* today in Gainesville.

Oct. 8. *P. sennae* and *A. vanillae* in Gainesville and another *A. vanillae* in our back yard at 207 NE 9th Ave.

Oct. 9. *P. sennae* and *A. vanillae* in Gainesville.

Oct. 10. *P. sennae, A. jatrophae* and *A. vanillae* at the Village in Gainesville.

Oct.13. a fresh *Battus polydamas* behind the McGuire Center.

Oct. 14. several *P. sennae*, an *Anartia jatrophae* and *A. vanillae* along 16th Ave.

Oct. 15. *P. sennae* and *A. vanillae* in Gainesville.

Oct. 19. In Gainesville I saw *L. cassius* (at McG.), *P. sennae, A. jatrophae, D. plexippus*, and *Phyciodes* sp.

No records kept in remainder of 2022. We moved to The Village at 2474 NW 77th Blvd., Gainesville, Alachua Co., FL. Butterfly numbers seemed to increase in late summer and fall in Gainesville.

First identifications of butterflies for 2022 in Covell yard, 209 NE 9th Ave., Gainesville, Alachua Co., FL, 2022:

1. *Phoebis sennae* January 3, flying in back yard
2. *Heliconius charithonia* March 16, flying in back yard
3. *Libytheana carinenta* March 28, nectaring on Viburnum
4. *Danaus plexippus* April 14, flying over driveway
5. *Asterocampa celtis`* April 29, on bush in front yard
6. *Papillio cresphontes* July 7, in our back yard
7. *Agraulis vanillae* Sept. 8, in our back yard

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Jeff Slotten states the following:

I can give you a small report for my activities on the night of January 20-21, 2023. With a permit to collect moths, I set out a few bucket traps in San Felasco Hammock Preserve State Park a few nights ago. The habitat was mixed sandhill and upland pine/deciduous woods. The daytime temperature reached about 75 degrees Fahrenheit and a low of 50 degrees Fahrenheit. Few moths came to the traps but I did collect the following:

1 male *Ceratonyx satanaria*
2 male and 1 female *Xystopeplus rufago*
2 *Psaphida grandis*
several worn *Chaetaglaea tremula*
2 male *Lysia ypsilon*

Blister beetles are beginning to show up – oh no! They pack a powerful punch if one is night collecting with a sheet and they land on your neck!

>>

Jeff Pippen reports the following butterflies observed on January 25th, 2023, at Fakahatchee Strand in Collier County, Florida:

In terms of nectar, there wasn't much – only found a couple small patches of pickerel weed and only a couple patches of Bidens. And some purple flower I haven't ID'd yet that the zebra heliconians were enjoying.

Anyway, here's the full list, representing probably 3.5 hours or so:

P. sennae, 1
E. daira, 2
A. monuste, 1 (distant flyby)
H. charithonia, 8
D. incarnata, 4
M. petreus, 1 quick flyby
A. jatrophae, 3
D. plexippus, 1
U. proteus, 3
C. tripunctus, 10
P. ocola, 3

Georgia: James K. Adams, 346 Sunset Drive SE, Calhoun, GA 30701, E-Mail: jadams@daltonstate.edu (Please check out the GA leps website at: http://www.galelps.org/

James sends in the following report:

Most records are from James Adams. Other contributors are spelled out with the records. Most records are of first of

the year specimens, uncommon species, county records, and records for new locations. Records are from 2022 or 2023 (indicated with the records).

346 Sunset Drive SE (James Adams residence), Calhoun, Gordon Co.:
GEOMETRIDAE: *Erranis tiliaria* (the last late fall macro before true winter moths), Nov. 26 – Dec. 6, 2022.
NOCTUIDAE: *Iodopepla u-album*, Nov. 28, 2022 (LATE).

Carbondale, Whitfield Co., I-75 exit 326:
NOCTUIDAE: *Lithophane viridipallens*, Feb. 22, 2023.

1314 Plainview Rd., Adairsville, Gordon Co.:
NYMPHALIDAE: *Dione incarnata* (Gulf Fritillary), Nov. 26, 2022 (LATE). **SATURNIIDAE**: *Hemileuca maia* (abundant); Nov.24, 26 and 27, 2022.

Taylor's Ridge, 5 miles W Villanow, north of Hwy 136, Walker Co.:
June 18-20, 2022 (Hugh McGuinness): Several of these are likely to be STATE records.
PRODOXIDAE: *Lampronia russatella.* **TISCHERIIDAE**: *Coptotriche zelleriella.* **TINEIDAE**: *Tinea mandarinella.* **GRACILLARIIDAE**: *Phyllonorycter propinquinella.* **OECOPHORIDAE**: *Fabiola edithella.* **GELECHIIDAE**: *Aristotelia lespedezae, Symmetrischema striatella.* **TORTRICIDAE**: *Aethes razowskii, Cenopis chambersana, Cenopis saracana, Gretchena concitatricana.* **PYRALIDAE**: *Aphomia fulminalis, Pococera aplastella, Acrobasis elyi, Acrobasis caryae, Acrobasis stigmella, Acrobasis exsulella, Acrobasis palliolella, Acrobasis caryalbella, Acrobasis tumidulella, Acrobasis minimella, Acrobasis cunulae, Immyrla nigrovittella, Baphala pallida, Goya stictella.* **CRAMBIDAE**: *Stegea eripalis, Palpita aenescentalis,* **EREBIDAE**: *Idia denticulalis,* **NOCTUIDAE**: *"Oligia" chlorostigma.*
Nov. 23, 2022:
SATURNIIDAE: *Hemileuca maia.*
Feb. 26, 2023:
GEOMETRIDAE: *Ceratonyx satanaria, Cladara limitaria.* **NOCTUIDAE**: *Psaphida electilis, P. styracis.*
Mar. 23-24, 2023:
GEOMETRIDAE: *Macaria quadrinotaria, Selenia kentaria* (abundant), *Eupithecia peckorum.* **NOCTUIDAE**: *Acronicta fallax* (EARLY), *Elaphria georgei* (most abundant I have ever seen it), *Lithophane quernaria* (LATE).

Pigeon Mountain, Walker Co., March 5, 2023:
PIERIDAE: *Pieris virginiensis* (EARLY).

Serenbe, Fulton Co., Sept. 21, 2022, Giff Beaton:
NOCTUIDAE: *Papaipema inquaesita* (see image, Fig. 1)

Statesboro, Bulloch Co., Lance Durden:
TORTRICIDAE: *Gretchena bolliana*, Jan. 7, 2023. **NOCTUIDAE**: *Meropleon cosmion*, Nov. 26, 2022.

Brunswick, Glynn Co., Mike Chapman:
TORTRICIDAE: *Phaecasiophora inspersa*, Feb. 24, 2023 (likely STATE record, see image, Fig. 2). **EREBIDAE**: *Sigela sordes*, Dec. 6, 2022 (COUNTY, second confirmed record for GA, see image, Fig. 3); *Antiblemma perva*, Nov. 5, 2022 (second for this location). **NOCTUIDAE**: *Tarache terminimaculata*, Feb. 24, 2023 (STATE record, see image, Fig. 4); *Papaipema duovata*, Nov. 22, 2022 (COUNTY, see image, Fig. 5).

(See images on next page.)

Fig. 1. ***Papaipema inquaesita*** **(Photo by Giff Beaton)**

Fig, 2. ***Phaecasiophora inspersa*** **(Photo by Mike Chapman)**

Fig. 3. ***Sigela sordes*** **(Photo by Mike Chapman)** ←

Fig. 4. ***Tarache terminimaculata*** **(Photo by Mike Chapman)** →

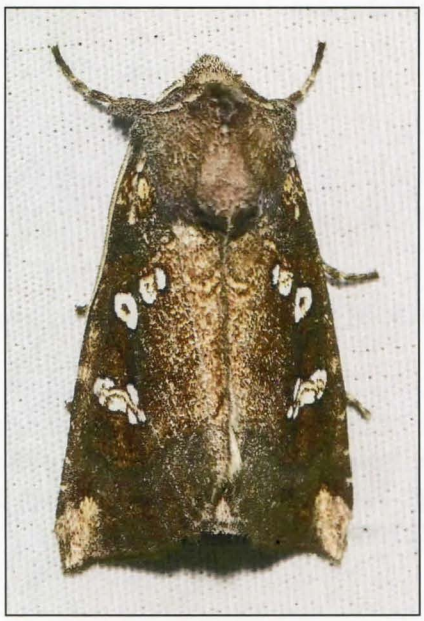

Fig. 5. ***Papaipema duvoata*** **(Photo by Mike Chapman)**

Louisiana: Michael Lockwood, 215 Hialeah Avenue, Houma, LA 70363, E-Mail: mikelock34@hotmail.com

Mississippi: Ricky Patterson, 400 Winona Rd., Vicksburg, MS 39180, E-Mail: rpatte42@aol.com

Records by Ricky unless otherwise specified:

15 February 2023, Vicksburg, Warren county, MS: *Zerene cesonia* ♀, county record, early record for state. Locality was wooded area, not normal for this species.

10 March 2023, Sky Lake WMA, Humphreys county,MS: *Papilio glaucus glaucus* ♀ (dark form), *Erynnis horatius*

North Carolina: Harry LeGrand, 1109 Nichols Drive, Raleigh, NC 27605, E-Mail: hlegrandjr@gmail.com

Harry sends in the following report: WINTER BUTTERFLY RECORDS FOR NORTH CAROLINA – 2022-23.

Records are from November 16, 2022, through February 2023. Names in parentheses are counties:

The winter season was highlighted by a record warm February in most places in the state. There were numerous sunny days with high temperatures in the 60s and 70s, instead of the usual lower to middle 50s; and adult butterflies started emerging at least two weeks earlier than normal, if not three weeks earlier! Thus, a good handful of record state early dates were made. Of course, with such a warm February, there were many more sightings than usual of overwintering species – i.e., numerous pierids, *Libytheana carinenta*, *Danaus plexippus, Dione incarnata,* Euptoieta *claudia, Nymphalis antiopa*, *P. interrogationis*, *Polygonia comma, Vanessa virginiensis, V. atalanta*, etc.

PAPILIONIDAE:

Eurytides marcellus, Pete Dixon saw two in Madison County on the record early date of February 22, besting the previous state early date of February 25. Though this locale is in the mountains, the elevation is barely 1200 feet, probably the warmest microclimate anywhere in this province.

Papilio polyxenes, three adults were early on February 23, as noted by Bob Cavanaugh in Newport (Carteret), as were two on February 24, as noted by John Taggart north of Wilmington (New Hanover).

Pterourus troilus, there were no previous state records prior to March 4; however, not surprisingly in 2023 the state had a record early date. Will Stuart saw one in the Sandhills Game Land (Richmond) on February 28.

PIERIDAE:

Pyrisitia lisa, seldom seen in the state before early summer, one noted by John Taggart near Wilmington (New Hanover) was quite notable on February 24; this appears to be just the second ever state record for that month.

LYCAENIDAE:

Parrhasius m-album, the previous state early date of March 2 was shattered in 2023, as Jeff Pippen saw one in the Mebane (Alamance) area on February 22. Marie Poteat also observed two in her yard at Jamestown (Guilford) on February 28, a known site for this uncommon species.

Callophrys gryneus, the previous early state date of March 11 was smashed by John Taggart observing two at Fort Fisher (New Hanover) on February 28. There is a known sizable population at this coastal site.

Callophrys henrici, perhaps not a surprise as a record state early date was John Taggart finding two at Fort Fisher on February 28; the previous earliest date was one day later on March 1.

Celastrina neglecta, one seen by Lenny Lampel at Reedy Creek Nature Preserve (Mecklenburg) on February 7 was the earlier state record ever, by a single day. Another photographed – on iNaturalist – in Rutherford County

on February 10 was very early, just two days off the record earliest state date. By two weeks later the species was quite numerous, as witnessed by tallies of 11 each on February 24, at Chapel Hill (Orange) as noted by Matthew Shaynak and in Jamestown (Guilford) by Marie Poteat.

NYMPHALIDAE:

Vanessa cardui, John Taggart saw two near Wilmington on February 24, presumably overwintering individuals from the fall season.

HESPERIIDAE:

Epargyreus clarus, one of just a few ever records for February were two seen by John Taggart north of Wilmington on February 24.

Burnsius sp., another of John Taggart's many quite early sightings near Wilmington on February 24 was five of these skippers, only three days later than the previous state early record (for B. communis). Note that these individuals could be B. albezens, poorly known in the state but for which specimens have been recently collected in nearby Brunswick County and farther north in Carteret County. Nearly all records from the South Carolina coastal plain appear to also be of P. albezens.

Erynnis zarucco, obliterating the state's previous early record of March 22 was one photographed by Will Stuart on February 28 at the Sandhills Game Land (Richmond).

Panoquina ocola, nearly a record state latest date was one seen by Bob Cavanaugh in his Newport (Carteret) yard on December 6; the record latest date is December 7.

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Moths for Trinity River National Wildlife Refuge
Liberty County, TX
Nov 1, 2022 through Jan 31, 2023
Stuart J. Marcus

The following moths were seen at least once during the month indicated on sheets using black and mercury vapor lights at Trinity River National Wildlife Refuge. If you would like any photographs or phenology data dating back to 2012, please let me know at stuart.marcus13@gmail.com.

ATTEVIDAE
Atteva aurea Nov, Dec

BLASTOBASIDAE
Hypatopa punctiferella Nov, Dec, Jan

COLEOPHORIDAE
Coleophora sp. Nov

CRAMBIDAE
Anageshna primordialis Nov
Argyria lacteella Nov, Dec
Condylorrhiza vestigialis Dec
Crambus satrapellus Nov
Diatraea lisetta Nov
Dicymolomia julianalis Nov
Donacaula sp. Jan
Elophila gyralis Nov
Elophila obliteralis Nov, Dec, Jan
Elophila tinealis Nov, Dec
Eoreuma densellus Dec
Euchromius ocellea Nov
Fissicrambus sp. Nov, Dec, Jan
Herpetogramma phaeopteralis Nov, Dec
Hyalorista taeniolalis Dec
Hymenia perspectalis Nov, Dec
Lineodes integra Nov
Lineodes interrupta Jan

Nomophila nearctica Nov, Dec, Jan
Oenobotys vinotinctalis Nov, Jan
Palpita atrisquamalis Jan
Palpita magniferalis Jan
Palpita quadristigmalis Nov
Parapediasia teterrellus Nov
Parapoynx allionealis Nov
Parapoynx diminutalis Nov
Patania silicalis Nov
Pilocrocis ramentalis Nov
Pyrausta acrionalis Jan
Samea ecclesialis Nov, Dec
Samea multiplicalis Nov, Dec
Spoladea recurvalis Nov, Dec
Udea rubigalis Nov, Dec, Jan

EREBIDAE
Caenurgia chloropha Nov, Dec, Jan
Catocala maestosa Nov
Cisseps fulvicollis Nov, Dec
Cisthene packardii Nov
Cisthene plumbea Dec
Eublemma recta Dec
Hemeroplanis sp. Dec
Hypena scabra Nov, Dec, Jan
Hypercompe scribonia Nov
Idia aemula Nov
Idia americalis Nov, Dec
Lascoria ambigualis Nov, Dec
Orgyia leucostigma Nov
Pagara simplex Jan
Palthis asopialis Dec
Pyrrharctia isabella Nov, Jan
Schrankia macula Nov
Simplicia cornicalis Nov
Tetanolita mynesalis Nov, Dec, Jan
Zale lunata Nov, Dec, Jan
Zanclognatha theralis complex Nov

GELECHIIDAE
Anacampsis fullonella Nov, Dec
Aristotelia corallina complex Dec
Aristotelia sp. Nov
Chionodes discoocellella Nov
Dichomeris juncidella Nov
Gnorimoschema sp. Dec
Symmetrischema striatella Dec

GEOMETRIDAE
Cyclophora myrtaria Nov
Disclisioprocta stellata Dec
Eulithis diversilineata Complex Nov
Eupithecia miserulata Nov, Dec
Glenoides texanaria Nov
Idaea tacturata Nov
Iridopsis defectaria Dec, Jan
Leptostales pannaria Nov, Dec, Jan
Lobocleta ossularia Nov, Dec
Macaria sp. Dec
Nemoria elfa Nov, Dec
Orthonama obstipata Nov, Dec, Jan
Patalene olyzonaria Nov
Pero zalissaria Dec, Jan
Phigalia strigataria Jan
Prochoerodes lineola Nov
Psamatodes trientata Dec
Scopula compensata Nov
Scopula lautaria Jan
Tornos scolopacinaria Nov, Dec
Tornos sp. Jan

LACTURIDAE
Enaemia subfervens Jan

LASIOCAMPIDAE
Artace cribrarius Nov, Dec

MOMPHIDAE
Mompha rufocristatella Nov, Dec

NOCTUIDAE
Acronicta insularis Jan
Acronicta longa Dec
Amyna stricta Dec
Anicla simplicius Dec
Argyrogramma verruca Dec
Bagisara repanda Nov
Choephora fungorum Nov
Condica sutor Nov
Condica videns Nov
Ctenoplusia oxygramma Dec
Elaphria chalcedonia Nov
Elaphria nucicolora Jan
Elaphria versicolor Jan
Galgula partita Nov, Dec, Jan
Leucania adjuta Nov
Leucania incognita Nov, Dec, Jan
Magusa divaricata Sept, Nov
Mythimna unipuncta Nov, Dec, Jan
Ozarba aeria Dec
Ozarba nebula Nov
Peridroma saucia Dec
Rachiplusia ou Dec
Spodoptera eridania Nov
Spodoptera frugiperda Nov, Dec
Spodoptera ornithogalli Dec, Jan

NOLIDAE
Afrida ydatodes Nov, Dec, Jan
Garella nilotica Nov

PLUTELLIDAE
Plutella xylostella Nov, Dec, Jan

PTEROPHORIDAE
Adaina ambrosiae Nov, Dec
Exelastis montischristi Nov
Lioptilodes albistriolatus Jan
Pselnophorus belfragei Nov, Dec
Stenoptilia sp. Dec
Stenoptilodes sp. Nov

PYRALIDAE
Ancylostomia stercorea Nov
Eulogia ochrifrontella Nov, Dec
Homoeosoma electella Jan
Hypsopygia nostralis Nov, Dec
Macrorrhinia endonephele Nov
Phycitodes reliquellum Dec

SPHINGIDAE
Enyo lugubris Nov, Dec

TINEIDAE
Homostinea curviliniella Nov, Dec
Phaeoses sabinella Nov
Tinea apicimaculella Nov
Tiquadra inscitella Nov

TORTRICIDAE
Aethes seriatana Jan
Aethes sp. Nov
Argyrotaenia tabulana Dec
Bactra verutana Nov, Dec. Jan
Clepsis peritana Nov, Dec
Crocidosema plebejana Nov, Jan
Cydia latiferreana Nov
Eumarozia malachitana Nov, Dec
Platynota flavedana Nov
Platynota idaeusalis Jan
Platynota rostrana Nov
Sparganothis sulfureana Dec
Sparganothoides lentiginosana Nov

YPSOLOPHIDAE
Ypsolopha unicipunctella Jan

Virginia: Harry Pavulaan, 606 Hunton Place, Leesburg, VA. 20176, E-Mail: Pavulaan@aol.com

Harry sends in the following two 2023 winter reports:

1) Butterflies:

Aglais milberti – HARRISONBURG city (STATE record): 1/27/2023 (Jim Clemens – photograph via NABA – Butterflies Facebook group).

Celastrina neglecta winter form – Loudoun Co.: Leesburg, 2/14/2023 [state EARLY] (H. Pavulaan, photograph posted to NABA – Butterflies Facebook group).

Pieris rapae – Loudoun Co.: Leesburg, 2/14/2023 (H. Pavulaan, sighted).

2) Butterflies:

County/City records are indicated in all CAPITALS:

Eurytides marcellus – Loudoun Co.: Leesburg, 3/6/2023(H. Pavulaan, sight). Williamsburg City:2/24/2023 (Gail Peterson, sight report posted to Virginia Butterflies Facebook group).

Pterourus glaucus – Mecklenburg Co.:Chase City, 2/23/2023 (Marcus Gray, sight report posted to Virginia Butterflies Facebook group).

Pieris rapae – Loudoun Co.: Leesburg, 2/14/2023 (H. Pavulaan, sighted).

Anthocharis midea – Loudoun Co.:Leesburg), 3/1/2023 (H. Pavulaan, sighted); 3/6/2023 (H. Pavulaan, net/release).

Colias eurytheme – Loudoun Co.: Leesburg, 2/23/2023 (H. Pavulaan, sighted).

Abaeis nicippe – Richmond Co., Warsaw, 2/19/2023 (Henry Day – photograph via Virginia Butterflies Facebook group).

Celastrina neglecta winter form – Augusta Co.: (no location), 2/22/2023 (Al Wolf, sight report posted to Virginia Butterflies Facebook group). Chesterfield Co.: Pocahontas State Park, 2/19/2023 (James Shelton, reported as "Spring Azure"via NABA Sightings). Loudoun Co.:Leesburg, 2/14/2023 [state EARLY] (H. Pavulaan, photograph posted to NABA – Butterflies Facebook group); 2/23/2023 (H. Pavulaan, sighted); 3/1/2023 (H. Pavulaan, sighted); 3/6/2023 (H. Pavulaan, 4 confirmed via net). Pittsylvania Co.: Spring Garden, 2/22/2023 (Marcus Gray, reported as "Spring Azure"via NABA Sightings). Wise Co.: Big Stone Gap, 2/23/2023 (Chris Allgyer, sight report posted to Butterflies of the Eastern United States Facebook group). NOTE: "Spring Azure"winter reports in Virginia are certainly attributed to *Celastrina neglecta*, which periodically emerges during late winter in Virginia. *C. ladon*, on the other hand, reliably emerges around April 1 statewide, regardless of spring conditions.

Libytheana carinenta – Richmond Co., Warsaw, 2/19/2023 (Henry Day–photograph via Virginia Butterflies Facebook group). Mecklenburg Co., Chase City, 2/23/2023 (Marcus Gray, sight report posted to Virginia Butterflies Facebook group).

Aglais milberti – HARRISONBURG city (STATE record): 1/27/2023 (Jim Clemen – photograph via NABA – Butterflies Facebook group).

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Please Note: there is a mistake in the Heading on pages 99 to 104 and page 105 in a few Newsletters. The mistake is that the Heading reads "Volume 44 and should read Volume 45".

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The Southern Lepidopterists' News is published four times annually. Membership dues are $30.00 annually. The organization is open to anyone, especially those with an interest in the Lepidoptera of the southern United States. Information about the Society may be obtained from Marc Minno, Membership Coordinator, 600 NW 34 Terrace, Gainesville, FL 32607, E-Mail: marccminno@gmail.com, and dues may be sent to Jeffrey R. Slotten, Treasurer, 5421 NW 69th Lane, Gainesville, FL 32653.

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