

NOTES ON THE OCCURRENCE OF *SATYRIUM TITUS* IN NORTHWEST FLORIDA (LEPIDOPTERA: LYCAENIDAE)

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ABSTRACT.— Additional information on the ecology of *Satyrium titus* in Florida is provided, including habitat, hostplants, nectar sources, and flight period. Adult variation and the biogeography of the species in Florida are also briefly discussed.

KEY WORDS: Alabama, Asclepiadaceae, biogeography, distribution, ecology, Fagaceae, flight period, Georgia, habitat, Hemiptera, Hesperidae, hostplants, immatures, larvae, Nearctic, nectar sources, North America, Nymphalidae, Rhamnaceae, Rosaceae, USA.

The coral hairstreak, *Satyrium titus* (Fabricius), is distributed over a large portion of southern Canada and the United States (Scott, 1986). It is generally considered uncommon throughout its range (e.g., Ferris and Brown, 1980; Harris, 1972; Heitzman and Heitzman, 1987; Iftner *et al.*, 1992). The recognized southeastern subspecies is *S. t. mopsus* (Hübner). In the original description, Hübner (1818) attributed *S. t. mopsus* to "Georgien in Florida," prompting Grossbeck (1917) to include the subspecies on the first list of Florida Lepidoptera. Kimball (1965) stated that Holland (1931) had also attributed *S. titus* to Florida on the authority of Hübner, but Holland made no such reference. Nonetheless, Clark (1951) argued that such notations by Hübner refer only to Georgia ("Florida" in Hübner's time included Georgia). Without substantiation, Clench (1961) later inferred that *S. titus* is distributed over most of Florida when he defined its range as "most of North America from southern Canada southward, except southern Florida." Even the range map of *S. titus* in the popular guide by Mitchell and Zim (1962) included nearly all of Florida. Despite these references, Kimball (1965) failed to locate valid Florida records of *S. titus* and did not retain it on his state list of Lepidoptera. The status of *S. titus* in Florida remained uncertain.

The presence of *S. titus* in Florida was confirmed on 15 May 1964 when Howard V. Weems collected a single male in northwest Florida (the Florida Panhandle), at Torreya State Park, Liberty Co. This specimen (in FSCA) was apparently obtained too late for inclusion in Kimball (1965). On 1 June 1969, Leon Neel captured two adults at Shadeville, in southern Wakulla Co. (specimens in the Carnegie Museum of Natural History, Pittsburgh, Pa) (L. Neel, pers. comm.). Additional *S. titus* individuals were subsequently found at Torreya State Park, including a record by Stephen J. Roman in May, 1972, which was incorrectly reported as a Florida state record by Mather (1973). On the ad-

vice of L. Neel, Jeffrey R. Slotten visited Shadeville on 18-19 May 1991 and found two males and three females of *S. titus*, verifying that a population persisted in the area. He returned to Shadeville on 23 May 1992 and recorded one male and two females (voucher specimens in Slotten collection). Nonetheless, due to the paucity of records and restricted range in Florida (Fig. 1), *S. titus* was considered a "rare" species by the Florida Committee on Rare and Endangered Plants and Animals (Deyrup and Franz, 1994). Minno (1994) emphasized the need for more detailed ecological information on Florida populations.

On 24 May 1997, another colony of *S. titus* was discovered by John V. Calhoun near Shadeville, providing a rare opportunity to observe the species in Florida and document additional information on its ecology. Thirteen individuals (4 ♂, 9 ♀) were observed between 1100h and 1430h. Most adults were seen between 1100h and 1230h under partly cloudy skies (skies were cloudy prior to 1030h) and temperatures of 27-29.5°C (80-85°F).

HABITAT

Florida populations of *S. titus* have been found in association with temperate mixed hardwood forests (hammocks). Nearly all adults of *S. titus* have been encountered as they visited flowers along forest margins. The exceptionally diverse hardwood forests of Torreya State Park have been intensely studied and are known to harbor a number of rare and endemic insects and spiders (Deyrup and Franz, 1994). The isolated tract of hardwood forest surrounding Shadeville in Wakulla County is clearly visible on the vegetation map by Davis (1967) (Fig. 1) and is best defined as a mesic hardwood forest (Fig. 2). Overstory deciduous trees include hickories, *Carya* spp. (Juglandaceae), sweetgum, *Liquidambar styraciflua* L. (Hamamelidaceae), sassafras, *Sassafras albidum* (Nutt.) Nees (Lauraceae), oaks, *Quercus* spp. (Fagaceae), basswood, *Tilia americana* L. (Tiliaceae), and black cherry, *Prunus serotina* Ehrh. (Rosaceae). Understory trees include flow-

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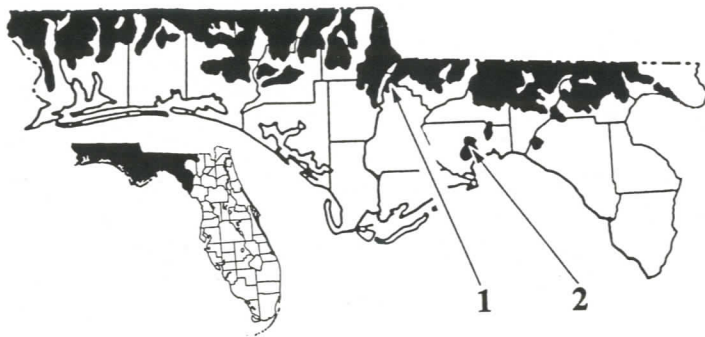


Fig. 1. Known populations of *Satyrium titus* in Florida: 1. Torreya State Park, Liberty Co.; 2. Shadeville, Wakulla Co. (dark areas on large map depict extent of mixed hardwood forests in the Panhandle region) (adapted from Davis (1967). Inset map shows location of northwest Florida (panhandle) (solid black).

ering dogwood, *Cornus florida* L. (Cornaceae), eastern redbud, *Cercis canadensis* L. (Leguminosae), and witch hazel, *Hamamelis virginiana* L. (Hamamelidaceae).

The Shadeville forest is located near Edward Ball Wakulla Springs State Park, one of the world's largest and deepest freshwater springs and the primary source of the Wakulla River. Habitats within the 1158 ha (2860 acre) park include a forest type similar to that of Shadeville, characterized by Clewell (1981) as a mesic hardwood hammock. Other species of Lepidoptera found by Calhoun in association with the hardwood forest at Shadeville

include *Poanes zabulon* (Boisduval & Le Conte [1834]) (Hesperiidae), *Problema byssus* (W. H. Edwards, 1880) (Hesperiidae), *Amblyscirtes aesculapius* (Fabricius, 1793) (Hesperiidae), and *Basilarchia arthemis astyanax* (Fabricius, 1775) (Nymphalidae).

Although the origin of the name "Shadeville" is unknown (Morris, 1995), it probably refers to the lush deciduous forests that provided abundant and welcomed shade to the early inhabitants of the town. Unfortunately, this forest is being developed at a rapid pace. Nectar sources (and adjacent trees) where most *S. titus* were encountered on 24 May 1997 had been removed by 28 June 1997 through residential construction.

HOSTPLANTS

Hostplants of *S. titus* are various species of tree Rosaceae, including black cherry, *P. serotina*, American plum, *Prunus americana* Marsh, and chickasaw plum, *Prunus angustifolia* Marsh. (Scott, 1986). *Prunus serotina* is widely distributed throughout much of northern and central Florida in wooded and semi-wooded habitats and is a characteristic overstory tree of mesic hardwood forests in the panhandle (Clewel, 1981; Nelson, 1994; Wunderlin *et al.*, 1995). *Prunus americana* and *P. angustifolia* occur in forests and along forest edges and fencerows, chiefly in northern Florida (Nelson, 1994, Wunderlin *et al.*, 1995). A single larva was found in April at Torreya State Park on *P. angustifolia* (given in error as southern crabapple, *Malus angustifolia* (Ait.) Michx. (Rosaceae) by Minno, 1994) (R. M.



Fig. 2-4. 2. Hardwood forest habitat of *S. titus* at Shadeville, Wakulla Co., Florida (1997). 3. Adult female *S. titus* taking nectar from *A. tuberosa*. 4. 5th instar larva of *S. titus* reared in 1993, resting on leaf of hostplant, *P. angustifolia*.

Gillmore, pers. comm.). Slotten successfully reared larvae of *S. titus* (Fig. 4) on *P. angustifolia* from ova obtained by confining two females acquired at Shadeville in 1992 in a small screened cage with cuttings of the hostplant. The ova overwintered and the larvae emerged the following spring. It is likely that *S. titus* utilizes more than one host in Florida.

NECTAR SOURCES

Adults of *S. titus* are extremely rapid flyers, but are easily approached, and even touched, when feeding. The adults collected by L. Neel were feeding at the flowers of chinquapin, *Castanea pumila* (L.) Mill. (Fagaceae) (L. Neel, pers. comm.). All the adults encountered by Slotten and three individuals (one male and two females) found by Calhoun were visiting butterfly-weed, *Asclepias tuberosa* L. (Asclepiadaceae) (Fig. 3), which is scattered throughout the area along forest margins. The brilliantly colored *A. tuberosa* is a highly attractive nectar source to *S. titus* throughout its eastern range. The remaining adults encountered in 1997 (except one perching female) were visiting New Jersey Tea, *Ceanothus americanus* L. (Rhamnaceae) that grows along many of the sandy roads traversing the area (Fig. 2). Nearly twice as many females than males were observed feeding by Calhoun and Slotten, suggesting that males may linger near the host plant and/or feed for shorter intervals. Two females collected in 1997 exhibit severe damage to the outer margin of one hindwing. This damage was probably inflicted by a species of wheel bug (*Arilus* sp.) (Reduviidae) that was observed inhabiting numerous *C. americanus* flower heads.

ADULT SIZE AND PHENOLOGY

As noted by Minno (1984) adults of *S. titus* in Florida tend to be relatively large. A male collected at Shadeville in 1997 possesses a forewing length (base to apex) of 18mm and a female measures 20mm. Measurements derived from populations outside Florida provided by Opler and Krizek (1984) do not exceed 16mm for males and 18mm for females. However, throughout its range, adults are highly variable in size. A small female captured at Shadeville in 1997 has a forewing length of only 15mm, which is equal to the smallest female measured by Opler and Krizek (1984).

Extreme dates of capture for known records of *S. titus* in Florida are 15 May and 1 June. Although adults can probably be expected (on average) from about 10 May to 10 June, some females may emerge later and still be present into late June or even early July. A 4-6 week flight period is generally consistent throughout the species' eastern range (Opler and Krizek, 1984).

DISCUSSION

In Florida, *S. titus* may be limited to the Panhandle where populations are far removed from those in Georgia and Alabama, representing possible relicts similar to those of *Chlosyne nycteis* (Doubleday and Hewitson) (Nymphalidae) (Calhoun, 1996). Alternatively, the species may be continuously distributed from central Georgia into Florida, utilizing the forested Apalachicola-Chattahoochee-Flint river system as a dispersal corridor (Calhoun, 1996). This scenario is more plausible, given that *S. titus* has been recorded in south-central Georgia only within the Flint river

basin and hardwood forests of the Florida panhandle were once primarily restricted to riverine habitats (Clewell, 1981; Opler, 1995). Although *S. titus* has not been reported from southern Georgia or southern Alabama (Harris, 1972; Opler, 1995; I. L. Finkelstein, pers. comm.), it may actually be a widespread but extremely localized resident throughout the region southward into northern Florida. Adults of *S. titus* are present only for several weeks each year, greatly increasing the probability that populations are overlooked. Moreover, they may inhabit tree crowns, descending only to feed. Populations of *S. titus* are perhaps most easily located by searching for the triangular shapes of adults resting on the conspicuous orange flowers of *A. tuberosa*. The species should continue to be searched for in northern Florida, especially in areas that support abundant stands of *A. tuberosa* and *C. americanus* in proximity to mixed hardwood forests containing potential host plants.

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LITERATURE CITED

- Calhoun, J. V.**
1996. Possible relict populations of *Chlosyne nycteis* in the Florida Panhandle (Lepidoptera: Nymphalidae). *Holarctic Lepid.* (Gainesville), 3:69-71.
- Clark, A. H.**
1951. Hubner's "Florida". *Lepid. News* (Los Angeles), 4:62.
- Clench, H. K.**
1961. Tribe Theclini. In P. R. Ehrlich and A. H. Ehrlich (eds.), *How to Know the Butterflies*, 177-220. Dubuque: W. C. Brown. 262pp.
- Clewell, A. F.**
1981. *Natural Setting and Vegetation of the Florida Panhandle*. Contract No. DACW01-77-C0104. Mobile: U.S. Army Corps. Eng. 773pp.
1985. *Guide to the Vascular Plants of the Florida Panhandle*. Gainesville: Univ. Pr. Fla. 605pp.
- Davis, J. H.**
1967. *General Map of Natural Vegetation of Florida*. Gainesville: Inst. Food Agric. Sci., Agric. Exp. Sta., Univ. Florida. (Circular S-178).
- Deyrup, M., and R. Franz** (eds.)
1994. *Rare and Endangered Biota of Florida*. Vol. IV. Invertebrates. Gainesville: Univ. Pr. Fla. 798pp.
- Ferris, C. D. and F. M. Brown** (eds.)
1980. *Butterflies of the Rocky Mountain States*. Norman: Univ. Oklahoma Pr. 442pp.
- Grossbeck, J. A.**
1917. Lepidoptera. In F. E. Watson (ed.), *Insects of Florida*. IV. *Bull. Amer. Mus. Nat. Hist.* (New York), 37:1-147.
- Harris, L., Jr.**
1972. *Butterflies of Georgia*. Norman: Univ. Oklahoma Pr. 326pp, 23 pl.
- Heitzman, J. R., and J. E. Heitzman**
1987. *Butterflies and Moths of Missouri*. Jefferson City: Missouri Dept. Conserv. 385pp.

Holland, W. J.

1931. *The Butterfly Book* (rev. ed). Garden City: Doubleday. 424pp, 77 pl.

Hübner, J.

1818. *Zuträge zur Sammlung Exotischer Schmettlinge*. Vol. 1. Augsburg. 40pp.

Iftner, D. C., J. A. Shuey, and J. V. Calhoun

1992. Butterflies and skippers of Ohio. *Ohio Biol. Surv. Bull.* (Columbus), (n.s.) 9:1-212.

Kimball, C. P.

1965. *The Lepidoptera of Florida, an Annotated Checklist*. In *Arthropods of Florida and Neighboring Land Areas*. Vol. 1. Gainesville: Div. Plant Indus., Fla. Dept. Agric. 363pp, 26 pl.

Mather, B.

1973. 1972 season summary. Zone 6. Florida. *News Lepid. Soc.* (Los Angeles), 1973(2):13-14.

Minno, M. C.

1994. Coral Hairstreak, *Harkenclenus titus mopsus* (Hubner). In M. Deyrup and R. Franz (eds.), *Rare and Endangered Biota of Florida. Volume IV. Invertebrates*, 630-632. Gainesville: Univ. Pr. Fla.

Mitchell, R. T., and H. S. Zim

1962. *Butterflies and Moths, a Guide to the More Common American Species*. New York: Golden Pr. 160pp.

Morris, A.

1995. *Florida Place Names*. Sarasota: Pineapple Pr. 291pp.

Opler, P. A.

1995. *Lepidoptera of North America 2. Distribution of the Butterflies (Papilionoidea and Hesperioidea) of the Eastern United States*. Fort Collins: Contr. C. P. Gillette Mus. of Insect Biodiversity. (unnumbered).

Opler, P. A., and G. O. Krizek

1984. *Butterflies East of the Great Plains*. Baltimore: J. Hopkins Univ. Pr. 294pp.

Scott, J. A.

1986. *Butterflies of North America, a Natural History and Field Guide*. Stanford: Stanford Univ. Pr. 583pp.

Wunderlin, R. P., B. F. Hansen, and E. L. Bridges

1995. *Atlas of Florida Vascular Plants: On-line Version*. Tampa: Univ. S. Florida. Inst. Syst. Botany Web Page (Version 28Feb97). <http://www.usf.edu/~isb/projects/atlas/atlas.html>.