

**DISCOVERED AT LAST: *LETHE CREOLA*
(NYMPHALIDAE: SATYRINAE)
IS A RESIDENT OF FLORIDA**

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Around the year 1815, the English naturalist John Abbot (1751-c.1840) illustrated a pair of pearly-eye butterflies that he had collected in southeastern Georgia (Calhoun 2004). Although he illustrated other pearly-eyes during his residence in Georgia (see Heitzman & dos Passos 1974; Calhoun 2004, 2007), the male in this particular watercolor (Fig. 1) differs from all the others. It would be another six decades before a comparable male specimen, collected in Texas by Ludolph Heiligbrodt, was described by Strecker (1878) as “ab. a,” an aberration of the species now known as *Lethe portlandia* (F.). A few other specimens were collected during the late 19th century, including three from Georgia that Herman Strecker received in 1879 from A. W. Latimer. In 1897, a male from Louisiana, collected by George R. Pilate, was recognized by Skinner (1897) as a new species, which he described as *Debis creola*. We now know this species as *Lethe creola*, the Creole Pearly-eye. The generic assignment of this species, and the closely related Southern Pearly-eye, *L. portlandia* (F.), remains controversial, with some authors using the genus *Enodia* Hübner. We follow Pelham (2014) in placing these species in the genus *Lethe* Hübner.

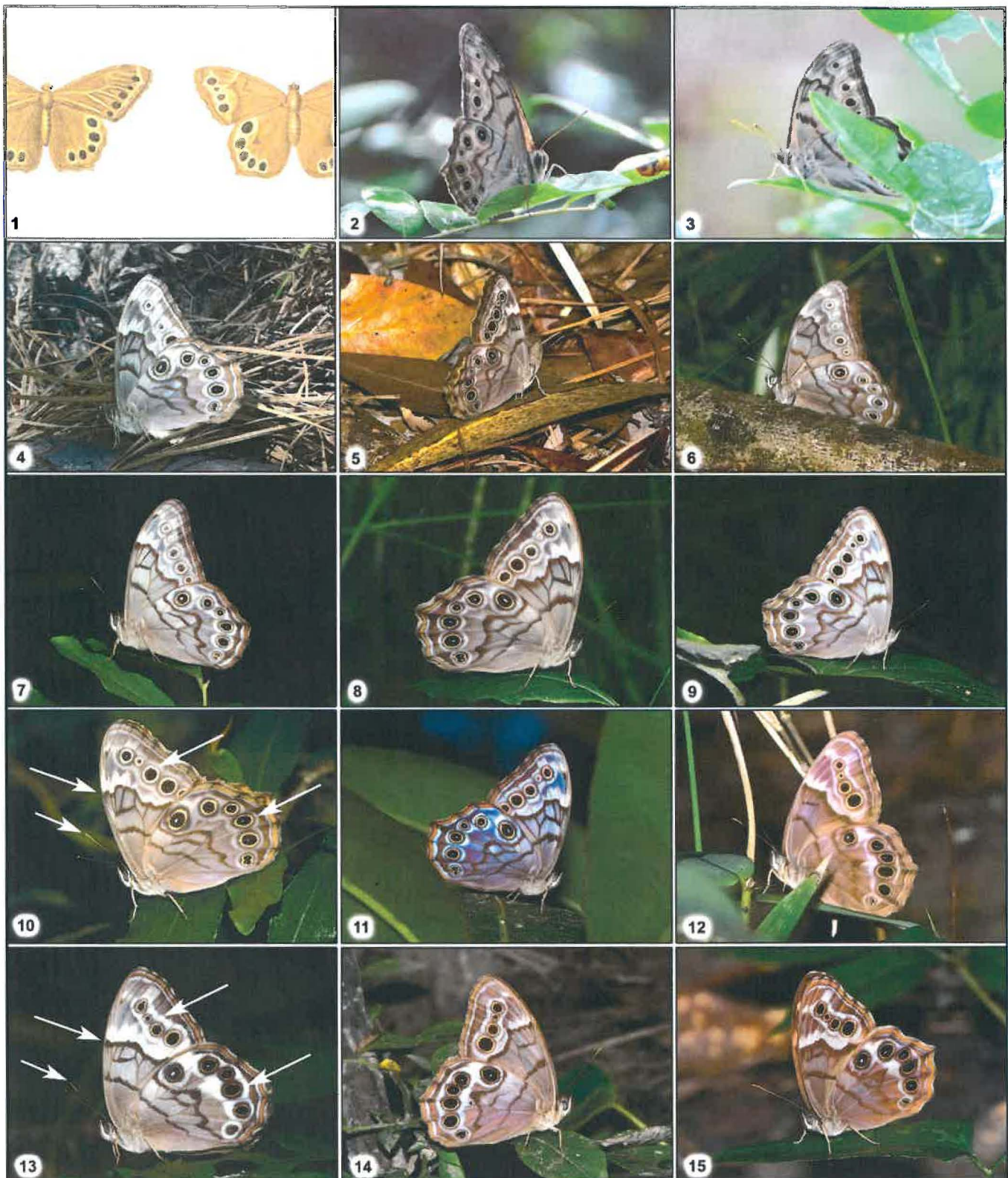
Shortly after *creola* was described, Holland (1898) attributed the species to Florida and later repeated this claim (Holland 1915, 1931). Either directly or indirectly, this prompted Weymer (1910) and Grossbeck (1917) to include Florida within the range of *creola*. Dozier (1920) reported *creola* to be an “inhabitant of rather dense hammocks” around Gainesville (Alachua Co.), Florida, but he did not list *portlandia*, which is known to occur in that area. Based primarily on his personal collection, Murrill (1938, 1945) listed both *creola* and *portlandia* as “frequent” in Gainesville. Klots (1951) popularized the notion that *creola* was “rare” in Florida, and this was repeated by Ehrlich and Ehrlich (1961). In his comprehensive treatment of Florida Lepidoptera, Kimball (1965) listed *creola* on the authority of Dozier (1920) and Skinner (1926), as well as purported specimens from Gainesville and Port Orange (Volusia Co.). However, Skinner (1926) clearly stated that the Florida specimens he had examined were not referable to this species.

Irwin (1970) reviewed numerous specimens of *creola* in museums and personal collections, but located none from Florida. He found that lepidopterists sometimes made the mistake of associating southern examples of

portlandia with *creola*. During most of the 20th century, populations of the more northern *Lethe anthedon* A. Clark were also identified as *portlandia*, which contributed to the confusion. These taxa were not recognized as sibling species until the study by Heitzman and dos Passos (1974). Decades of field work in Florida failed to produce any valid records of *creola*, leading Emmel (1975) to pronounce that “there are no authenticated records as yet from Florida.” Opler and Krizek (1984) and Opler and Malikul (1992) restated this conclusion. Calhoun (1997) considered all previous records of *creola* in Florida to be erroneous, prompting Heppner (2003, 2011) to do the same. Echoing the sentiments of Florida lepidopterists, Cech and Tudor (2005) called the absence of *creola* in Florida “peculiar.” After recently curating the holdings of *creola* and *portlandia* at the McGuire Center for Lepidoptera and Biodiversity (Florida Museum of Natural History, Gainesville; MGCL), Warren counted an impressive 382 spread specimens of *creola* (243 males and 139 females) from 13 states, but none are from Florida. Calhoun (1997) asserted that the species probably occurs in Florida. Kons and Borth (2006) remarked that it “might turn up in the panhandle.”

On 22 April 2015, while conducting a routine monthly review of Florida records that had been submitted to the Butterflies and Moths of North America (BAMONA) website (Lotts & Naberhaus 2015), Calhoun encountered a sobering image: a male *creola* from Nassau County, Florida, which had been photographed two days earlier (Fig. 2). Calhoun soon received an email from Pat Leary, who had submitted the photograph. Leary confirmed that he and his wife, Doris, had found the butterfly in Ralph E. Simmons Memorial State Forest. The only individual observed was encountered within the sparse understory adjoining a heavily wooded bottomland swamp forest. The butterfly was extremely wary and several efforts were required before it could be approached closely enough to photograph. Only two photos were possible (Figs. 2, 3), but they were enough to finally confirm the existence of this species in Florida.

Ralph E. Simmons Memorial State Forest (RSMSF), 3,638 acres in size, supports twelve types of natural communities. The four primary habitats are sandhill, wet flatwoods, upland pine, and bottomland hardwood forest. Acquired by the state of Florida in 1992, the



Figs. 1-15. Pearly-eye species. 1) Drawing of male *L. creola* (left) and female *L. portlandia* from Georgia by John Abbot (c. 1815) (Univ. South Carolina). 2) Male *creola*, 20.iv.2015, RSMSF locality 1 (PRL). 3) Same individual as no. 2 (PRL). 4) Female *creola*, 24.iv.2015, RSMSF locality 1 (JVC). 5) Female *creola*, 24.iv.2015, RSMSF locality 1 (BB). 6) Male *creola*, 25.iv.2015, RSMSF locality 1 (BB). 7) Male *creola*, 26.iv.2015, RSMSF locality 2 (ADW). 8) Female *creola*, 26.iv.2015, RSMSF locality 2 (ADW). 9) Female *creola*, 26.iv.2015, RSMSF locality 2 (ADW). 10) Female *creola*, 1.v.2015, RSMSF locality 2 (BB). Arrows denote key diagnostic features (see text). 11) Female *creola*, 1.v.2015, RSMSF locality 2 (BB). 12) Male *portlandia*, 24.iv.2015, RSMSF locality 1 (BB). 13) Female *portlandia*, 26.iv.2015, RSMSF locality 2 (ADW). Arrows denote key diagnostic features (see text). 14) Male *portlandia*, 1.v.2015, RSMSF locality 2 (BB). 15) Male *portlandia*, 1.v.2015, RSMSF locality 2 (BB).

forest borders Georgia along the St. Marys River in the extreme northeastern corner of Florida, about 36 air miles northwest of downtown Jacksonville (Fig. 16). The butterfly fauna of RSMSF is relatively well documented (Glassberg *et al.*, 2000, Berthet pers. obs. 2015). Among the 96 butterfly species recorded to date are several of rare occurrence in Florida, including *Callophrys irus* (Godart), *Celastrina ladon* (Cramer), and *Erynnis baptisiae* (W. Forbes). The closest known record of *creola* in Georgia is from 23 July 2010 at Paulks Pasture Wildlife Management Area, Glynn County, Georgia, about 40 air miles to the northeast (Flynn 2014, Lotts & Naberhaus 2015) (Fig. 16). This species surely occurs within suitable habitats across the intervening area.

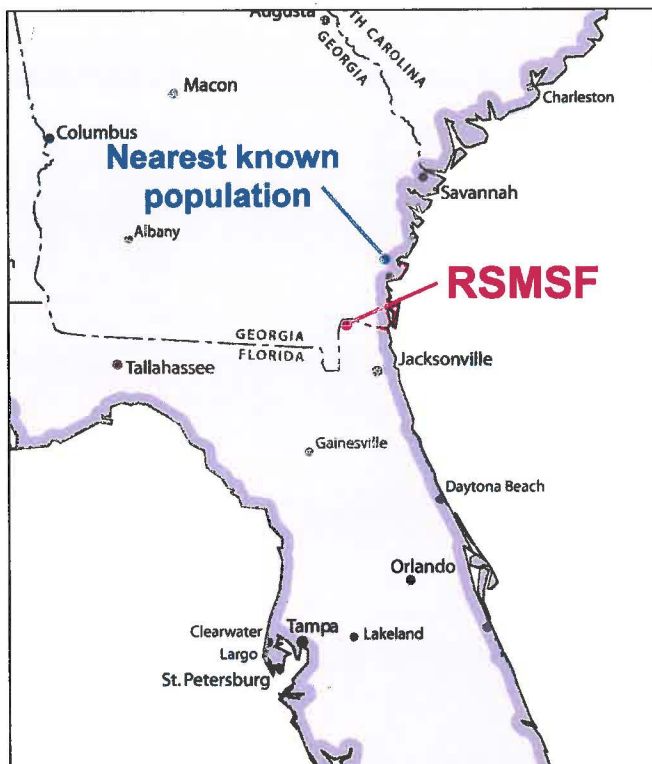


Fig. 2. Map showing location of RSMSF and nearest known population of *L. creola* in Georgia.

On 24 April, Calhoun and Berthet visited RSMSF in an attempt to determine the status of *creola*. The larvae of this butterfly feed exclusively on cane, a native species of perennial bamboo. Most authors report the hostplant of *creola* to be switch cane, *Arundinaria tecta* (Walter) Muhl., but this plant is now generally treated as a developmental stage of giant cane *Arundinaria gigantea* (Walter) Muhl. (Ward 2009). Leary did not notice much cane growing where he photographed the first butterfly, but an extensive canebrake was found in the forest a short distance to the south (Fig. 17). Canebrakes of various sizes extend for nearly a mile southward, paralleling the wettest portion of the swamp forest. To a much lesser extent, cane also grows in the forest to the north. Between 1000 and 1500 hrs, 14 *creola* (eight males and six females) and twelve

portlandia were observed (Figs. 4, 5, 12). Other pearly-eyes were seen, but they did not settle and could not be positively identified. In addition to *creola* and *portlandia*, four other species of satyrs were observed in the area: *Lethe appalachia* R. Chermock, *Megistocymela viola* (Maynard), *Hermeuptychia sosybius* (F.), and *Cyllopsis gemma* (Hübner).

On 25 April, Calhoun and Berthet were joined by Warren. Under mostly overcast skies, we positively identified seven male *creola* (Fig. 6) and at least six *portlandia*. A single male *creola* was observed visiting damp soil along a sandy access road near where the first male was photographed. The arrival of thunderstorms at around 1300 hrs. curtailed field work for the day. Before the weather deteriorated, however, Calhoun explored another forested wetland within RSMSF, about 2.5 mi southwest of the original locality. Cane grows commonly in the understory (Fig. 19), where five males and one female *creola* and several *portlandia* were observed. This area also supports a population of *L. appalachia* and these butterflies were found flying within the forest around extensive growths of low-growing sedges (*Carex* sp.).

Continuing the survey on 26 April, Warren visited the first locality and positively identified three males and two females of *creola*, and about an equal number of *portlandia*. At the second locality, he observed two males and three females of *creola* and four males and four females of *portlandia* (Figs. 7-9, 13). He also recorded yet another satyrid: a worn male of the recently described *Hermeuptychia intricata* Grishin. Visiting RSMSF on 1 May, Berthet found three *creola* and eight *portlandia* at the first locality, and four *creola* and four *portlandia* at the second locality (Figs. 10, 11, 14, 15).

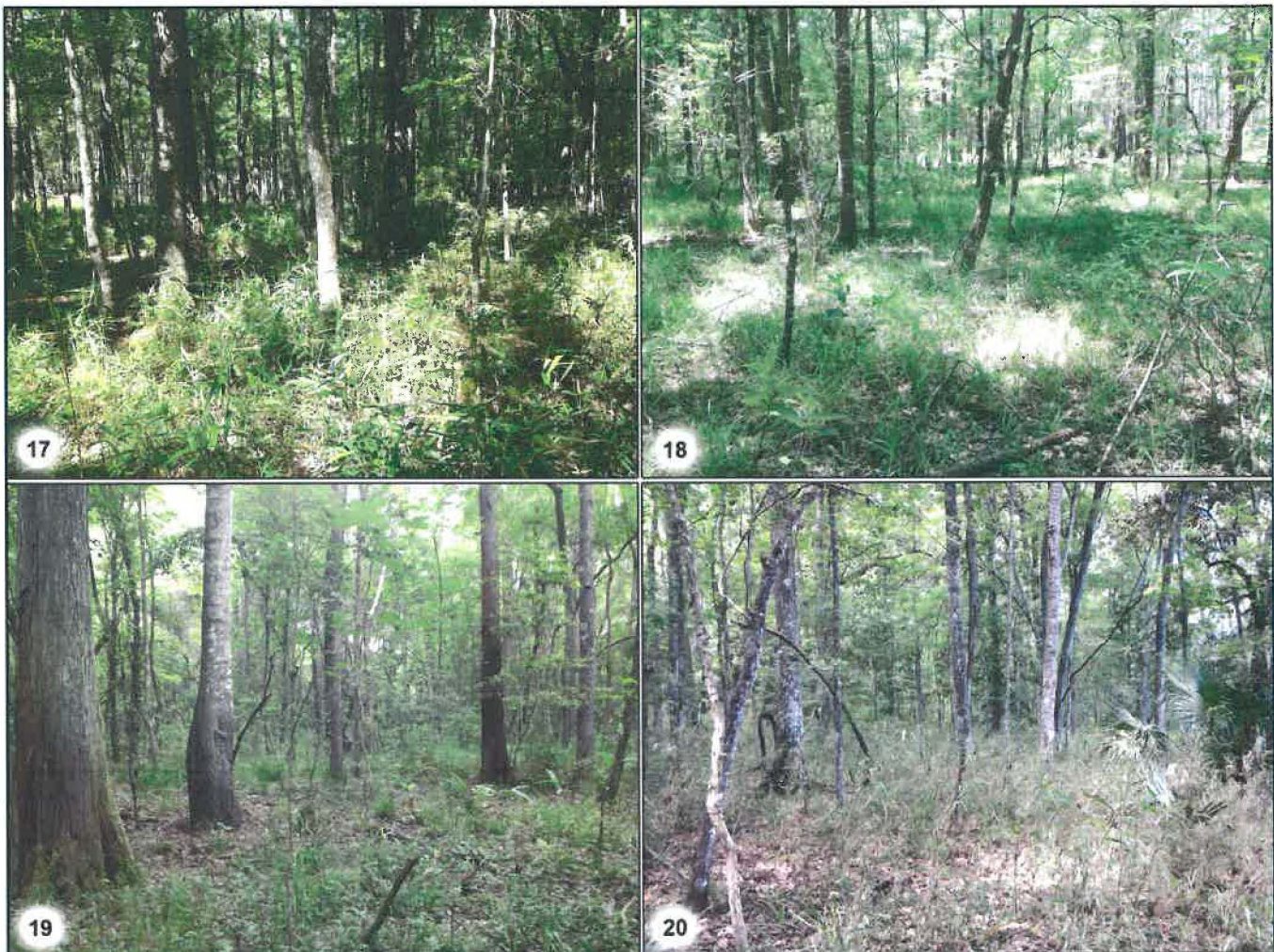
On 3 May, Warren returned to RSMSF and continued to investigate similar habitats. In a previously unexplored bottomland forest along the St. Marys River, approximately 0.8 miles northeast of the first locality, he counted 16 males and seven females of *creola* in 1.5 hrs. Only six *portlandia* were seen. Cane is abundant in the area (Fig. 20) and *creola* was more frequent here than at the other two localities.

The bottomland forests where *creola* was found are located within the St. Marys River Basin and are part of a complex mosaic of forested coastal wetlands that extend from Georgia into northeastern Florida. Less than 15 miles to the west is the extensive Okefenokee Swamp, which straddles the Florida-Georgia state line and serves as the headwaters of the St. Marys, a blackwater river that winds its way eastward for 130 miles to the Atlantic Ocean. It is likely that cane is widely distributed across this region and *creola* occurs within many of these habitats. The fact that this

butterfly maintains localized populations in inhospitable environments has contributed to its being overlooked in Florida for so long, even within Ralph E. Simmons State Forest, which is a well-known butterfly destination. This species has possibly always been present, but in very low numbers. Its abundance this year may be unusual, potentially due to a drop in parasitic activity. In Texas, tachinid flies were found to take a heavy toll on a population of *portlandia* (Tveten & Tveten 1996), and this may be the case with *creola* as well. It is also plausible that *creola* only recently become established at RSMSF. While conducting hydrologic studies during the late 1990s, Marc C. Minno visited RSMSF every week for several years. He unsuccessfully searched for *creola* around various canebrakes, including those at the third locality where we found the species to be common. If the species subsequently colonized RSMSF, its widespread occurrence there suggests that it has been

present for some time.

Additional forested wetlands should be examined in northeastern Florida to determine the extent of the species' distribution, especially southward and westward within the drainages of the Nassau and Suwannee rivers. Several other areas were identified near RSMSF that may support populations of the butterfly, but they are on private property and difficult to access. Unfortunately, mosquitoes and ticks are plentiful in *creola* habitat. Ticks can be especially troublesome during the spring when the very small, red nymphs of the deer tick (blacklegged tick, *Ixodes scapularis* Say) are most active. Their primary adult host is white-tailed deer, which often occur in the same habitats as the butterflies. Because these pests are a vector of Lyme disease, precautions must be taken to prevent tick bites and to quickly remove any that become imbedded in the skin.



Figs. 17-20. Habitats of *L. creola* at RSMSF. 17) Locality 1: bottomland forest with cane in understory, 24.iv.2015 (JVC). 18) Locality 1: grassy open forest, 24.iv.2015 (JVC). 19) Locality 2: bottomland forest with scattered cane in understory, 25.iv.2015 (JVC). 20) Locality 3: bottomland forest near St. Marys River with abundance of cane in understory, 3.v.2015 (ADW).

Although it is sometimes reported that adults of *creola* are most active in the early morning and late afternoon (Bouseman & Sternburg 2001), peak activity on warm,

sunny days at these localities was from 1130 to 1300 hrs. This is generally consistent with the activity of other butterfly species in the area. Nearly all the *creola*

were flushed from the understory, where they favored resting on the ground or on low vegetation. Despite reports that adults remain within dense stands of cane (Jeffords *et al.* 2014), virtually all the *creola* we encountered at the three RSMSF localities were within more sparsely vegetated areas in the proximity of canebrakes (Figs. 18, 19). Few were flushed from the canebrakes themselves, except at the third locality, where cane is much more abundant. There, several *creola* were found resting on cane plants or on the ground within canebrakes. At this locality, they were mostly found at the base of slopes in open bottomland forest not far from the hostplant. In one section of this site adults were also seen resting in trees overlooking a canebrake.

Males of *creola* were sometimes seen perching on tree trunks (either head-up or head-down) and on tree leaves between six and ten feet above the ground (especially when the trees were growing within canebrakes). Females were mostly seen perching on low vegetation or on the ground, but three were observed on leaves at heights of 10 to 17 feet. When flushed, adults fly erratically, but often only for a short distance before settling. If repeatedly disturbed, they disappear deeper into the forest or fly upwards into the canopy. Males of *creola* and *portlandia* fly similarly, but *creola* has a slightly more "purposeful" flight, aptly described by Clark (1936) as "resembling vanessids" [e.g., *Vanessa atalanta* (L.)]. Also, males of *creola* look grayer in flight than *portlandia*. Based on our observations in the early morning and prior to a rain storm, we suspect that most adults of *creola* roost in trees when they are inactive, not within canebrakes or elsewhere near the ground.

It is usually stated that *creola* is much less common than *portlandia* where the two species occur together (Harris 1972, Bright & Ogard 2010, Legrand & Howard 2015), and that *creola* seldom flies during the day, instead becoming most active just before dusk (Clark & Clark 1951, Gatrell 1985). Our surveys indicate that *creola* is as common, or slightly more common, than *portlandia* at RSMSF, and adults are quite active during the day. To determine if *creola* becomes more active later in the day, Berthet visited RSMSF in the late afternoon and early evening of 7 May. He explored the second locality between 1700 to 1745 hrs., but encountered only three *creola*, all of which were flushed and not actively flying. He walked through the first locality from 1800 to 1930 hrs., again flushing only three *creola*. He arrived at the third locality at 1930 hrs. and departed at almost 2000 hrs, but no butterflies were seen. On that date, adults were starting to become worn, evidence that the first brood was beginning to wane. In common with populations in Texas and Alabama (Neck 1996, Howell & Charney 2010), *creola* is expected to produce two or

three potentially overlapping broods in northern Florida, with adults flying from mid-April to September or early October. As with *portlandia*, adults of *creola* are most common locally when they are emerging in numbers during the peak of the flight period. Within days, fewer adults are encountered, suggesting that they disperse through the habitat or spend more time in the forest canopy. Interestingly, we witnessed no mating pairs, perhaps supporting the idea that this behavior usually takes place in the canopy.

It is not difficult to understand why these species were misidentified for so long. Males of *creola* are easily differentiated from *portlandia* by their elongated forewings that display patches of androconial (scent) scales along the dorsal veins. Females, however, are much more similar. The confusion between these butterflies dates back to the early 19th century, when John Abbot illustrated as the same species a male *creola* with a female *portlandia* (Fig. 1). Surprisingly, Skinner (1897) made the same mistake when he described *creola*, associating a female *portlandia* with a male *creola* (Gillham & Ehrlich 1954, Irwin 1970). In his popular book on North American butterflies, Holland (1898) wrote of *creola*, "The female has more yellow upon the upper side of the fore wings than *D. portlandia*." To W. J. Holland, the concept of *portlandia* also included what we recognize today as *L. anhedon*, and his brief analysis was obviously insufficient to accurately differentiate females of *creola*. Klots (1951) offered more useful diagnostic features, including the presence of five aligned eyespots on the ventral forewing of *creola* (Fig. 10), as opposed to a curving row of four eyespots in *portlandia* (Fig. 13). Although this character is helpful, it is not foolproof. Warren found that 10-15% of Florida *portlandia* at MGCL possess five forewing eyespots (in a few cases, there are five spots on one forewing and four on the other). Klots (1951) also emphasized the shape of the dark postmedian line near the costa of the ventral forewing. It irregularly protrudes in *creola*, resembling the knuckles of a clenched fist (Fig. 10), whereas in *portlandia* it is straight or slightly concave (Fig. 13). Another helpful character is the color of the antennal club. It is ordinarily black with a yellow-orange tip in *creola*, though a few individuals have an entirely black club. If viewed from below, the yellow-orange antenna appears to have a black band encircling the base of the club. Even when the dark band is less evident, the ground color of the club is yellow-orange (Fig. 10). Although clubs of *portlandia* can sometimes resemble those of *creola*, most are more vivid orange without a dark band (Fig. 13). A more variable trait is the amount of white surrounding the eyespots on the ventral hindwing. It tends to be more extensive in *portlandia*, usually surrounding all the spots as a group (Fig. 10). In *creola*, the white scaling is usually confined to rings

around individual eyespots (Fig. 10).

In comparing specimens at MGCL, Warren found that *creola* from North Carolina and Virginia west to Arkansas are smaller on average than those distributed from South Carolina to Louisiana. In addition, adults

from South Carolina to Louisiana are slightly brighter in coloration. Those found in Florida are among the largest and most beautifully marked.

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Desert Cloudywing (*Achalarus casica*)



Sheep Skipper (*Atrytonopsis edwardsii*)

These two skippers, the Desert Cloudywing (*Achalarus casica*) and the Sheep Skipper (*Atrytonopsis edwardsii*), were collected in the Davis Mountains State Park on May 7, 2015 (Texas State Park Scientific Study Permit, no. 01-05).

Thanks to Ed Knudson for helping with the identifications. Ed states that “Both are fairly common in the Davis Mountains.”

J. Barry Lombardini

