NOTES ON *LETHE CREOLA* (SATYRIDAE), WITH DESIGNATION OF LECTOTYPE

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Despite its occurrence in populous and long-settled parts of the United States, *Lethe creola* (Skinner) remains a comparatively obscure and little-known butterfly, poorly represented in most collections. Several factors may share responsibility for this. *L. creola* is very local, and of crepuscular and retiring habits, so that it may well be overlooked where it occurs. There has been much confusion of *creola* with its congener *L. portlandia* (Fabr.) which it closely resembles in the female sex. In fact, Gillham and Ehrlich (1954) found that the female paratype of *creola* was itself actually *portlandia*. The conflicting and erroneous records of the species and descriptions of its range which have appeared in the literature have contributed their share to the problems which surround it. Further, the lack of an adequate figure of the female *creola* in the popular literature has probably resulted in the inability of many collectors to recognize it.

During the preparation of a forthcoming checklist of the butterflies of Illinois, it became desirable to verify the reported occurrence of *L. creola* in that state. This investigation quickly developed into a much more extensive study of the species as a whole, taking into account its taxonomy, characters and distribution. It is hoped that this paper may clear up some of the problems above outlined.

Taxonomy

Skinner (1897) described *Debis creola* from specimens sent to him "by Mr. G. R. Pilate, who captured them at Opelousas, Louisiana, on July 3rd, present year." The number of specimens comprising the type series is not stated, nor are holotype, allotype or paratypes designated. In 1926, however, Skinner referred to the "type" and "allotype" of *creola* as being the only examples of the species which he had actually seen, thus clearly indicating that they were the only specimens before him when he wrote his description of *creola*. Mr. Harry Clench, with whom I have discussed the taxonomy of *creola* at length, believes that Skinner's statement (1926), in conjunction with the labels of these two specimens, might be considered a lectotype designation. He suggested the propriety, however, of making a formal selection of a lectotype for *creola* in order to remove any ambiguity which might still exist from Skinner's actions.

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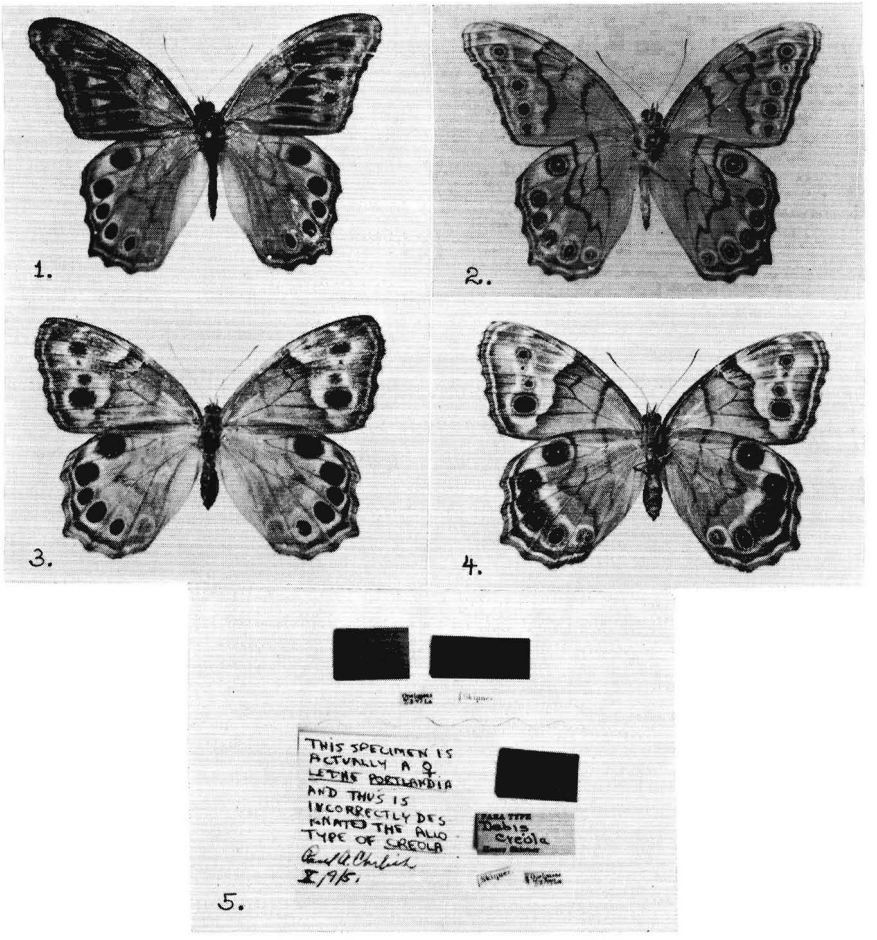
The two members of the type series are in the Skinner Collection in the Carnegie Museum. These are a male, labelled "type" but which has not been so designated in accordance with the Code, and a female, which is actually a specimen of *L. portlandia*. I designate the male specimen, labelled "Skinner" (white paper, letterpress; "Opelousas/7/3/97 La" (white paper, letterpress; date in black pen); "TYPE NO. 7039/Debis/creola/Henry Skinner" (red card; letterpress with species name in black pen) as the lectotype of *Debis creola* Skinner. I have placed an appropriate label, reading "LECTOTYPE/Debis creola/♂ Skinner/Designated by/R.R. Irwin '69" (red card; black pen) on the pin of this specimen.

The taxonomy of this species is complicated by the fact that Skinner's female "type" of *creola* has been found by Gillham and Ehrlich (1954) to be a female of *L. portlandia*. Mather and Mather (1958) discuss this finding in detail.

In addition to the type specimens, the two examples which Holland used as models for his figures of *creola* in the "Butterfly Book" are in the Carnegie Museum. They are apparently members of the "type lot," but cannot be considered syntypes since there is no evidence that they were ever before Skinner, most probably having been transmitted directly by Pilate to Holland. It may be assumed, in fact, from Skinner (1926) that he saw only the illustrations of Holland's specimens. The case of these two specimens is analogous to that of the types with respect to specific identity. Clench (*in litt.*) has found that the specimen which Holland used to illustrate the female of *creola* is, like the female paratype, actually *L. portlandia*.

Characters

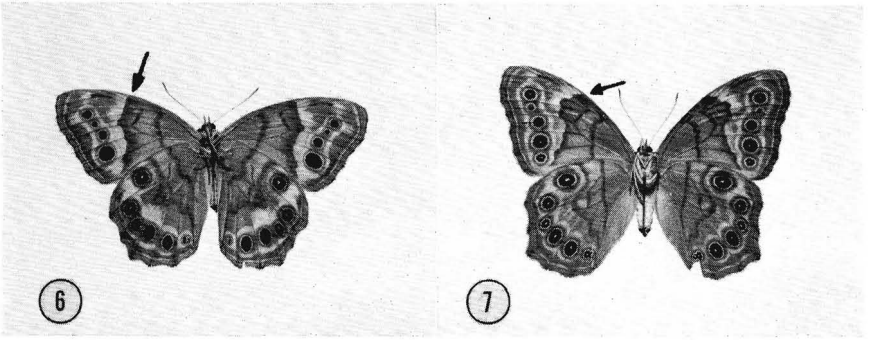
The recognition of male *creola* presents no difficulty; the apically produced forewing and patches of dark, raised androconial scales between the veins are unmistakable. It is in the opposite sex that identification problems arise. In wing shape and other respects, female *creola* strongly resembles the female of typical *L. portlandia portlandia*, the subspecies of the southeastern states. Most authors mention characters based upon the relative size and number of the ocelli on the ventral forewing. A study of long series of both species has convinced me that these are of little value. They hold true for the majority of examples of both species, but enough individual variation occurs to reduce sharply the usefulness of such characters. For example, I have seen specimens of *L. portlandia anthedon* (Clark) exhibiting five well-developed ocelli, the number also possessed by *creola*; in these, the ocellus below vein Cu_2 was fully equal in development to the others. Forbes (1960) ignores characters based on the ocelli and mentions only the single character which appears to hold



Figs. 1–5. 1, Lectotype of *Debis creola* Skinner, upper side; 2, same, lower side; 3, ♀ paratype of *Debis creola* Skinner, upper side (actually a ♀ of *L. portlandia*; see text); 4, same, lower side; 5, labels of the above specimens. Those above the wavy line are of the lectotype; those below it, of the paratype.

All photos by Mr. Allan Watson, Department of Entomology, British Museum (Natural History); specimens in Carnegie Museum collection.

constant in the female sex: the shape of the postmedian line on the underside of the primaries. In *creola*, this line is irregular and protrudes strongly outward in cell M_1, while in *portlandia* it is relatively straight. This character is even more pronounced in the female than in the male, as shown by comparison of the underside of the male (Fig. 2) with that of the female (Fig. 7).



Figs. 6, 7. 6, *Lethe portlandia portlandia* (Fabr.) ♀ New Berne, N. C., leg. S. Strecker (Strecker Collection), lower side; 7, *L. creola* (Skinner) ♀ Stewart County, Georgia (Strecker Collection), lower side.

Arrows locate the postmedian line which is the most reliable character for the separation of *portlandia* and *creola* in the female sex; see text. (Photos by Field Museum of Natural History.)

Distribution

This study was inspired not only by the need to verify the occurrence of *creola* in Illinois, but by the memory of my years of fruitless search for the butterfly in well-collected areas from which it had been reported, principally Palos Park, Illinois, and southern Michigan. The results of my investigation indicate that not only is the actual range of *creola* considerably less extensive than most present-day butterfly manuals suggest, but that it is very probably limited by host plant association. It is apparent, too, that it possesses a continuous range, rather than a disjunct one as indicated by published reports. The range of *creola* given by Klots (1951) is typical of these: "Manitoba, Illinois, Michigan, eastern Virginia s. to Texas, Louisiana, Florida (rare)." Again, Forbes (1960) seems to have had a more nearly correct concept of its distribution when he described it as "In the Mississippi Valley north to Illinois, in the east not seen beyond the Dismal Swamp in Virginia."

While so far as I have been able to determine, the life history of *creola* has not been worked out, all available evidence indicates that the host plants are species of Cane (*Arundinaria*), particularly Switch Cane (*A. tecta*). Canes are restricted to the southeastern and south central portions of the United States, south of approximate latitude 39°, and west to eastern Texas, Oklahoma, and possibly extreme southeastern Kansas. Records of *creola* from outside this area were critically examined; most were found to be erroneous. These include the widely quoted records from Manitoba, Michigan, and Palos Park, Illinois. (The Illinois state record may be retained, however, as recently true *creola* has turned up in

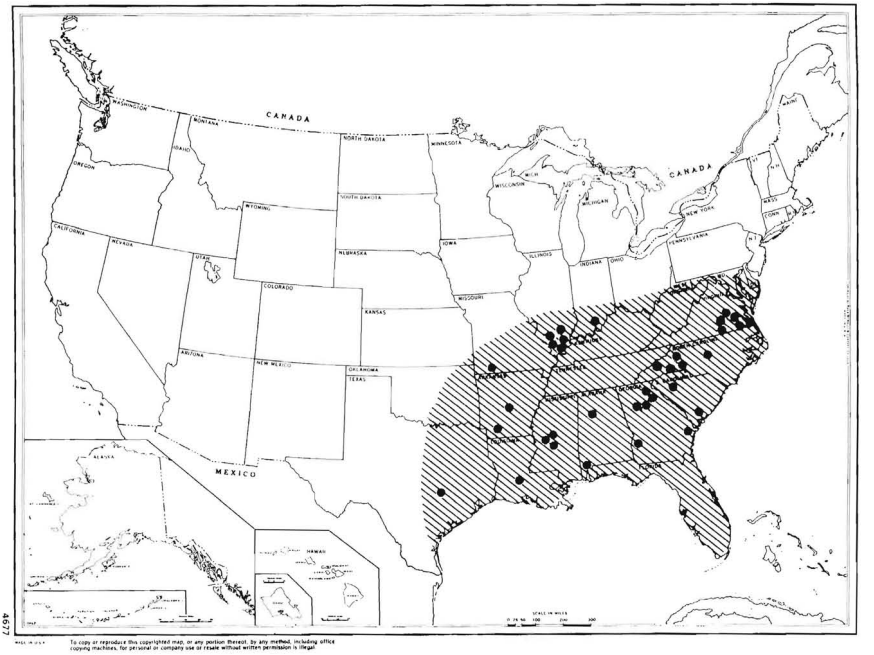


Fig. 8. The distribution of *Lethe creola* as compared to that of its putative foodplant, *Arundinaria* species. Shaded area represents the range of *Arundinaria* in the United States; the dots represent localities from which *Lethe creola* has been authentically recorded. In Virginia, each dot represents a county from which *creola* has been recorded; elsewhere, each separate locality is shown, except for additional records received too late for inclusion on the map; see text.

several localities in extreme southern Illinois.) Records from Kansas (Randolph, 1929) and Florida (summarized by Kimball, 1965) remain in doubt because it was not possible to locate and verify the identity of all specimens referred to in these papers.

Dr. C. L. Remington (*in litt.*) makes the following very interesting statement, which does much to explain the confusion of *creola* and *portlandia*: "There is a general myth around that far-southern specimens which look quite different from the usual more northern *portlandia* must be *creola*. The great Louisiana collector for many years was F. R. Arnhold, and he was under this misunderstanding and sent large numbers of Louisiana *portlandia* to collectors all over the country under the *creola* label. We in fact have many of these in the Arnhold collection, now at Yale, and my father [P. Sheldon Remington] had some." In view of Remington's statement, therefore, all Arnhold "*creola*" from Louisiana ought to be viewed with suspicion, and their determinations rechecked

by whomever may possess them in their collections. Ross and Lambremont (1954) mention these Arnhold "*creola*" from Louisiana, which are now known to be *portlandia*. The types and the Holland specimens remained the only Louisiana records until recently, when Mr. Gayle T. Strickland of Baton Rouge took several specimens in West Feliciana and East Baton Rouge parishes. His records, unfortunately received too late for inclusion on the distribution map, were authenticated by Messrs. Richard Heitzman and Bryant Mather.

With the elimination of the definitely and probably erroneous records of *creola* discussed above, all other localities known to me for the species are seen to fall well within the range of the species of *Arundinaria*. These are indicated in the map (Fig. 8), and are based either upon material which I have examined, or records which I consider entirely reliable. These localities are summarized below. In addition to Strickland's Louisiana records, that from Fayetteville, in northwestern Arkansas, was received too late for inclusion on the distribution map. Heitzman and Dr. Leo J. Paulissen have just informed me (*in litt.*) that *creola* is well established near that city.

The stronghold of the species would appear to be the Dismal Swamp area of southeastern Virginia (Clark and Clark, 1939; 1951), but positive differentiation of the species from *portlandia* may well prove it to be commoner elsewhere in its range than previously suspected. This range may be defined as follows: from eastern Virginia and southern Illinois south and west, to and including eastern Texas, Louisiana, Arkansas and southern Missouri. The species is thus seen to be of Lower Austral affinities, as is its probable host plant, and its occurrence beyond the limits of that subregion, or outside the range of *Arundinaria*, must be regarded as unlikely or accidental.

Summary of Distributional Records for *Lethe creola*

I list below, by state and county, all localities known to me from which *Lethe creola* has been authentically recorded. All are shown on the map (Fig. 8), with the exception of those marked *. Virginia records are indicated on the map by county only because of the number and closeness of localities in that state. Abbreviations used are as follows: AMNH = American Museum of Natural History; FMB = F. M. Brown; CNC = Canadian National Collection; RLC = R. L. Chermock; AHC = A. H. Clark; CFdP = C. F. dos Passos; DE = Donald Eff; FMNH = Field Museum of Natural History; FDPI = Florida Division of Plant Industry; HAF = H. A. Freeman; LH = Lucien Harris, Jr.; RH = Richard Heitzman; INHS = Illinois Natural History Survey; MCN = M. C. Nielsen; LJP

= L. J. Paulissen; GWR = G. W. Rawson; SIU = Southern Illinois University; GTS = Gayle T. Strickland; USNM = United States National Museum; Yale = Yale University.

ALABAMA: Mobile, Mobile County; Tuscaloosa, Tuscaloosa County (RLC).

ARKANSAS: Magnolia, Columbia County (RH); North Little Rock, Pulaski County (HAF); west of Little Rock, Pulaski County (LJP); Fayetteville, Washington County (RH)*.

GEORGIA: Savannah, Chatham County (DE); Athens, Clarke County; Stone Mountain, De Kalb County; Atlanta, Fulton County (LH); Stewart County (Strecker Collection, FMNH); Yonah Mountain, White County (LH).

ILLINOIS: Benton, Franklin County; Murphysboro, Jackson County; Lusk Creek near Eddyville, Pope County; Stonefort, Saline County (SIU); Pine Hills, Union County (INHS, SIU).

INDIANA: Patoka River near Valeene, Orange County (Masters and Masters, 1969).

LOUISIANA: Baton Rouge, East Baton Rouge Parish (GTS)*; Opelousas, St. Landry Parish (type locality); Weyanoke, Retreat, West Feliciana Parish (GTS)*.

MISSISSIPPI: Clinton, Brownsville, Hinds County; Natchez Trace Cypress Swamp, Madison County (Mather and Mather, 1958).

MISSOURI: Hollister, Taney County (Kite, 1934).

NORTH CAROLINA: Gastonia, Gaston County (RLC, USNM); Fontana Village, Graham County (MCN); Hendersonville, Henderson County (FDPI); Southern Pines, Moore County (FMB); Wilkesboro, Wilkes County (AMNH).

SOUTH CAROLINA: Greenville, Greenville County (AMNH); Coosawhatchie, Jasper County (CFdP, AMNH, Yale).

TEXAS: "Texas" collected by L. Heiligbrodt (Strecker Collection, FMNH). This may be the "aberration a" of *L. portlandia* described by Strecker (1878); probably from Bastrop, Bastrop County, where Heiligbrodt lived and collected (Brown, 1964).

VIRGINIA: Bog near Petersburg, Dinwiddie County (AHC); near Emporia, Greensville County (AHC); Zuni, Isle of Wight County (AHC); near Adam's Swamp (AHC), Dismal Swamp near Suffolk (AHC, AMNH, CNC, CFdP), Nansemond Escarpment (AHC), Suffolk (GWR, CFdP, FMB, FMNH), and Raly Pocoson (USNM, FMNH), all in Nansemond County; New Bohemia, Prince George County (GWR, AHC); Creeds, Princess Anne County (AHC).

Acknowledgments

A great many persons gave me assistance in my efforts to evaluate the authenticity of the various published records of *L. creola*; space does not allow me to list them individually, but to all of them I am very grateful. For their assistance in providing the illustrations, I am indebted to Dr. Rupert Wenzel and Mr. Michael Prokop of the Field Museum of Natural History; to Mr. Harry Clench of the Carnegie Museum, and to Mr. Allan Watson of the British Museum (Natural History). I am additionally grateful to Mr. Clench, to Mr. F. M. Brown, and to Dr. Robert W. Poole of the Illinois Natural History Survey, for their very helpful criticism of early drafts of this paper.

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THE LIFE HISTORY OF *EUTRICOPIS NEXILIS* (NOCTUIDAE)

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Eutricopis nexilis Morrison (1875, p. 102) feeds in the larval stage on the heads of species of *Antennaria*, a complex genus of the Compositae, that is widespread in temperate North America. The insect itself is also widespread. In Canada, it is distributed from Nova Scotia to south-central Ontario, and from southern Saskatchewan to southern British Columbia. There is an apparent hiatus in its distribution through western Ontario and southern Manitoba. In western North America, the species is distributed southward at least as far as Colorado. In western Quebec, *nexilis* flies during May; with increasing elevation in the west, however, the period of adult activity is progressively retarded, and at an altitude of 6,000 feet in southern British Columbia, the flight period may be protracted into the first part of August.

Eastern and western populations differ in both adult and larval characteristics. Eastern adults are distinguished from western adults by a less patchy appearance of the dark areas of the forewing and by a reduction in the extent of the white areas on both fore- and hind wings. Moreover, representatives of eastern populations are significantly smaller at the one percent level than their western counterparts, the mean expanse for eastern material being 16.2 ± 1.1 mm[1] (24 specimens) in

[1] Standard deviation