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A NEW SUBSPECIES OF *BREPHIDIUM ISOPHTHALMA* (LYCAENIDAE: POLYOMMATINAE) FROM COASTAL SOUTH CAROLINA.

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ABSTRACT. *Brephidium isophthalma pseudofea* was described in 1873 from the Florida Keys. The ventral ground color of the wings in topotypical *pseudofea* is a yellowish brown. The antennal clubs of *pseudofea* have prominent orange red tips. The ventral surface of the abdomen of *pseudofea* is broadly white to very light gray and usually extends halfway around the sides of the light to medium brown abdomen. Specimens of *Brephidium isophthalma* from coastal South Carolina differ greatly from topotypical *pseudofea*. Accordingly, *Brephidium isophthalma insularus* is described as a new subspecies from coastal South Carolina. The antennal clubs of *insularus* are only slightly tipped in red, with many specimens having the antennae completely black. The light area on the ventral abdomen of *insularus* is medium to dark gray and does not extend up the dark brown sides of the abdomen, giving it a very dark appearance. The ventral surface of the wings of *insularus* are medium chocolate brown with prominent white markings. The spring brood of *insularus* is especially unique and was given the name *carolina* (Pavulaan, 1993). The northern and southern limits of *insularus'* range is undetermined. However, we expect *insularus* to be the resident subspecies in at least South Carolina, Georgia, and northern Florida. Its common name is Island Pigmy Blue. It is possible that *insularus* is a distinct species. It is likely that *pseudofea* is conspecific with *B. exilis*.

Additional key words: subtropical species, resident species.

SUBSPECIFIC STATUS OF THE EASTERN PIGMY BLUE

Lycaena pseudofea was described by Morrison in 1873 (without figures) from three specimens collected at Key West, Florida. The Pigmy Blue is a local, but common, butterfly. However, its proper taxonomic status is unsettled. It is in need of a definitive study to determine its true specific/subspecific relationships. Scott (1986) treats *pseudofea* as a subspecies of *Brephidium exilis* (Boisduval). Calhoun (1997) treats *pseudofea* as a subspecies of *isophthalma* Herrich-Schaffer, but states that it may be a subspecies of *exilis*. Opler (1984) treats *B. i. pseudofea* and *B. exilis* as separate species. Our opinion is that all these taxa are probably part of the same species – *exilis*.

One of us, Gatrelle, was a resident of San Diego, California from 1967 - 1969 and is very familiar with *exilis* (Figs. 3-4) in southern California. Occasional specimens of California *exilis* (Fig. 5, collected by David Hawks in Riverside, California) are similar to topotypical *pseudofea*. Morrison referred to the ventral ground of *pseudofea* as being concolorous. However, some specimens of typical *pseudofea* from the Florida Keys tend to have light suffusion at the base of the ventral wings. Specimens like these lend credence to Scott's taxonomic alignment. However, the environmental, biological, and morphological

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differences of the eastern and western US taxa are so great that genetic analysis and/or breeding studies are needed before a nomenclatural shift should be formally adopted.

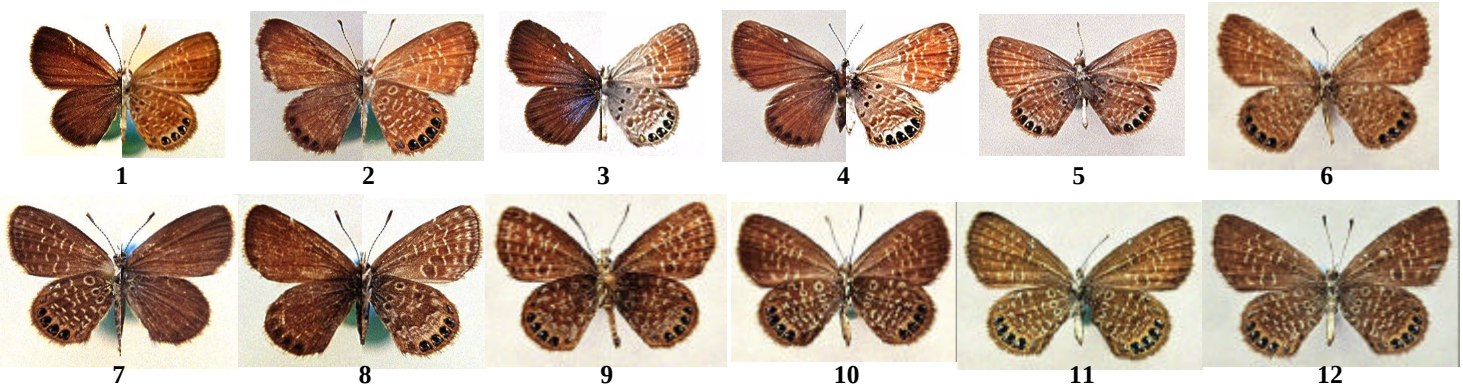
We have not examined the genitalia of our new subspecies or *pseudofea*, but significant differences in their antennal clubs (shape and color), adult size, and morphological characters indicates that they very well may be different species. Thus, not only may the subspecific alignment of our new taxon eventually need to be changed, its specific status may need reconsideration also. We have followed the most conservative course and have placed our new taxon under *isophthalma*.

NORTHERN RESIDENCY AND RANGE OF THE PIGMY BLUE

Populations of *Brephidium* are common along Florida's coasts. In southern Florida *B. i. pseudofea* flies year round (Gerberg, 1989). Up to 1986, specimens of *B. isophthalma* ssp. from the northern area of its range in coastal South Carolina had been collected only sporadically and only in the summer and fall (Harris, 1972 & Gatrelle, 1985). These flight dates had led Gatrelle to assume that *isophthalma*, regardless of its tiny size and weak flight, was only a nonresident summer migrant in south coastal South Carolina.

In March of 1986 Pavulaan found the Pigmy Blue fresh and common on Hunting Island, Beaufort County, South Carolina. The presence of a large number of fresh specimens that early in the year is strong evidence that *isophthalma* is a resident species in coastal South Carolina. This is further supported by log notations (as follows) made by Gatrelle regarding the winter of 1985. These notations indicate that the winter of 1985 was earlier and colder than normal. We also see that the spring of 1986 was only slightly early and was otherwise normal.

Entry of December 20, 1985: "Dec. has been very cold - freezing most nights." This is unusually cold for Charleston at that time of year. Spring appears to have arrived about two weeks early as the entry on February 7, 1986 reads: "has been warm for about a week 60 - 70." The entry on February 23 reads: "weather has been very warm for about a week 70's and 80's." It was also noted that temperatures dipped to freezing the nights of March 20 and 21, then warmed up again. It is typical in Charleston to have extended periods of warm weather from mid-February to mid-March, then one last freeze in March before spring completely sets in. (The freezes of March 20 and 21 are especially significant as Pavulaan found specimens of the Pigmy Blue common and fresh just six days later on March 27th.) Prolonged freezing temperatures in South Carolina are usually threatening to most subtropical wildlife like the Pigmy Blue.



Figures 1-12, *Brephidium* subspecies. **Fig. 1 (d/v),** ♂ *B. i. pseudofea*, 15 May 1978, Big Pine Key, Monroe Co., Fl. **Fig. 2 (d/v),** ♀ *B. i. pseudofea*, same data as 1. **Fig. 3 (d/v),** ♂*B. exilis*, 11 May 1968, Balboa Park, San Diego Co., CA (leg. Gatrelle). **Fig. 4 (d/v),** ♀ *B. exilis*, same data as 3. **Fig. 5 (v),** ♂ *B. exilis*, 25 June 1975, Santa Ana River, Riverside Co., CA (leg. Hawks). **Fig. 6 (v),** ♂ *B. i. insularus*, 9 June 1988, Cedar Key, Levy Co., Fl (leg. Gatrelle). **Fig. 7 (v/d),** ♂ holotype *B. i. insularus*, 3 Oct. 1993, Rt. 21 Nr. Beaufort, Beaufort Co., SC. **Fig. 8 (d/v),** ♀ allotype, *B. i. insularus*, 27 March 1986, Rt. 21 Nr. Beaufort, Beaufort Co., SC. **Fig. 9 (v),** ♂ paratype *B. i. insularus*, same data as 8. **Fig. 10 (v),** ♂ paratype *B. i. insularus*, same data as 7. **Fig. 11 (v),** light ♀ paratype, *B. i. insularus*, 24 Sept. 1972, Hunting Island, Beaufort Co., SC (leg. Gatrelle). **Fig. 12 (v),** ♀ *B. i. insularus*, same data as 6. All specimens leg. Pavulaan except where otherwise noted. (d) = dorsal. (v) = ventral.

Snow, which would help insulate delicate wildlife on the ground, is very unusual in coastal South Carolina. (The most recent snow was ten years ago in 1989.) The climate, flora, and fauna of south coastal South Carolina and Pensacola, Florida is about the same. The authors thus state with certainty that *B. isophthalma* is confirmed to be resident along the immediate coast of South Carolina at least as far north as Fort Johnson in the Charleston harbor and probably up to at least south Myrtle Beach.

B. isophthalma has only been found around salt and brackish marshes on the Islands and immediate coastal mainland in coastal South Carolina. Several other butterfly species inhabit this narrow coastal area which are also primarily subtropical in their range and habitat associations. *Papilio Palamedes* (Drury), *Phoebis sennae eubule* (Linnaeus) (TL Charleston), *Eurema daira* (Godart), *Heliconius charitonius tuckeri* Comstock & Brown, *Agraulis vanillae nigrior* (Riley), *Phyciodes phaon* (W.H. Edwards), *Danaus gillipus* (Cramer), *Heriargus ceranus antibubastus* (Hübner), *Leptotes cassius theonus* (Lucas), *Anartia j. guantanamo* Munroe, *Calpodes ethilus* (Stoll), and *Urbanus dorantes* (Stoll) are common residents or usual summer transients on these coastal islands.

RECOGNITION AND DESCRIPTION OF A NEW SUBSPECIES

The *Brephidium* species/subspecies seem to have been largely ignored taxonomically. Perhaps this is because of their small size. We have placed them under magnification and determined that they deserve much more study. Pavulaan (1993) was the first to note the phenotypic differences between the island population in South Carolina and typical *pseudofea* from the Florida keys. The spring brood from South Carolina is especially distinct and he gave these the form name *carolina*. Further comparison and consideration has now led the authors to conclude that two subspecies, if not two species, exist in the southeastern US.

B. i. pseudofea was described from the Florida Keys (Figs. 1-2). We have examined 6♂ and 3♀ topotypes collected by Richard Anderson from Key West, and 6 specimens from Big Pine Key collected by Pavulaan. The ventral ground color of the wings in *pseudofea* is decidedly yellow brown. *Pseudofea* also exhibits lighter basal shading ventrally and a diminishing of the ventral forewing spots toward the outer margin. The short spoon shaped antennal clubs of *pseudofea* have prominent orange red tips (Morrison mentioned this as a major diagnostic character in his original description). The ventral surface of the abdomen of *pseudofea* is broadly white to very light gray and usually extends halfway around the sides of the light to medium brown abdomen. We have found the *Brephidium* from coastal South Carolina (Figs. 7-11) to differ significantly from topotypical *pseudofea*. Accordingly, *Brephidium isophthalma insularus* Pavulaan and Gatrelle is herein described as a new subspecies from coastal South Carolina.

We do not know how far south the new taxon ranges, but specimens we have from Levy County in northwestern Florida (Figs. 6 & 12) seem to be good *insularus*. They differ from *insularus* only in tending to have the ventral white FW spotting more faded toward the outer margins. It is very possible that the name *pseudofea* properly applies to only the populations in the Florida keys or extreme southern Florida. Populations in the remainder of Florida need to be studied to determine their proper taxonomic status. Lepidopterists need to check their series of Florida Pigmy Blues for sympatric populations.

Brephidium isophthalma insularus **Pavulaan & Gatrelle, new subspecies**

Diagnosis and Description. The male (Fig. 7) and female (Fig. 8) of *insularus* are marked alike. *B. i. pseudofea* and *B. i. insularus* are similar dorsally except that *insularus* averages a darker shade of reddish brown. Ventrally, they are quite distinct. The ventral ground color of *pseudofea* is distinctly yellowish brown and occasionally has the basal third of the wings lightly washed with white. In *insularus*, the ground color is a rich concolorous medium or dark brown in all broods with the basal area always uniformly brown. The white lines which give a spotted appearance to this species are usually faint, and sometimes absent, toward the outer margin of the forewings of *pseudofea*; while in *insularus* they are usually present all the way to the forewing margin. This white marginal spotting is especially strong in the *insularus* spring form *carolina*. In the early brood(s) of *insularus* there is also a considerable amount of whitish clouding in the submarginal band of the ventral HW. The light band along the outer margin of the HW of *insularus* is more orangeish and is more extensive than in *pseudofea*. The antennal clubs of *insularus* are elongate and completely black (most specimens) or only slightly tipped in

orange-red. In *pseudofea* the antennae are shorter and spoon shaped with prominent orange-yellow tips (Fig. 1). The light area running the length of the ventral abdomen of *insularus* is usually medium gray, narrow, and does not extend up the side of the dark brown abdomen, giving it a very dark appearance. We describe the South Carolina population as a new subspecies based on these characters. The geoecological type locality is: coastal tidal flats in Beaufort County, South Carolina.

Types. *Holotype* ♂ (Fig. 7): Rt. 21 near Beaufort, Beaufort County, South Carolina, 3 October 1993, leg. H. Pavulaan. *Allotype* ♀ (Fig. 8): Rt. 21 near Beaufort, Beaufort County, South Carolina, 27 March 1986, leg. H. Pavulaan. *Paratypes*: 12♂♂, 5♀♀: all SOUTH CAROLINA: BEAUFORT COUNTY: Rt. 21 nr. Beaufort, 8♂♂, 2♀♀, 27 March 1986, leg Pavulaan; 2♂♂, 1♀, 3 October 1993, leg. Pavulaan; Hunting Island, 1♂, 1♀, 24 September 1972, leg. Gatrelle; COLLETON COUNTY: Edisto Island, 1♂, 1♀, 9 April 1988, leg. Gatrelle. The holotype and allotype are deposited in the Carnegie MNH, Pittsburgh, PA. Paratypes are in the MOTH, Goose Creek, SC, and Harry Pavulaan, Herndon, Virginia.

Etymology. The name *insularus* means, of the island. Its common name is Island Pigmy Blue.

Remarks. The striking differences in the antennae of *insularus* and *pseudofea* necessitates that their specific status eventually be reevaluated. In *pseudofea* the ¼ to $^1/_3$ orange tipped clubs are short stemmed and spoon shaped. In *insularus* the dark clubs are elongate, narrow, and tapering toward the shaft. These differences can be seen on the CD figures when "zoomed." Glassberg's (1999) figure 1 on plate 22 from Black River, Savannah, GA is of *insularus* not *pseudofea*. Pavulaan has examined 12 specimens of *insularus* in the Robert Gardner collection taken 24 March 1994 on Tybee Island, Chatham Co., GA. Topotypes of *pseudofea* collected in the winter months (December - February) tend to be less yellow brown than those from the summer broods but are still noticeably lighter than *insularus*. Specimens figured are about twice their natural size but are proportionate to each other. All TILS photos are taken outside in natural light which often brings out different hues than one sees in the same specimens viewed indoors in artificial lighting.

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