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HELICONIUS CYDNO (NYMPHALIDAE)
IN VENEZUELA

WITH DESCRIPTIONS FOR TWO NEW SUBSPECIES

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OF THE *Heliconius*, *Heliconius cydno* Doubleday has one of the most limited ranges but also shows some of the strongest geographical variation. It is truly a montane species having its center of distribution in the Andes of Colombia, although ranging northward, through Central America, to extreme southern Mexico, eastward, in the Andes, to extreme western Venezuela, and southward, on the western cordillera, to Ecuador. The high incidence of geographic subspeciation may be partially due to a restricted elevation requirement for its habitat that renders it unable to traverse high ranges or deep valleys.

In spite of the fact that *H. cydno* is quite diverse in its many geographical forms, they are all readily recognized by a relatively unique appearance (only *Heliconius sapho* Drury and *Heliconius hewitsoni* Staudinger have the same color combinations) and by the consistent appearance of two russet brown bars which form a distinct "U" on the ventral hindwing. Nominate *cydno*, from northern Colombia, is characterized by a deep black (iridescent in fresh specimens) ground color, a yellow bar across the forewings and a large white border on the hindwings. All of the subspecies and forms have this same basic pattern of black, yellow and white, but the variation in the scheme is considerable. The yellow bar of the forewing may be absent (as in *gustavi* Staudinger), divided (as in *cydnides* Staudinger), broken into small spots (as in *hermogenes* Hewitson), or white (as in *chioneus* Bates). The white border of the hindwing may be very small (as in *subcydnides* Stau-

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ding), very large (as in *alitheia* Hewitson), displaced basally, leaving a wide margin (as in *hahneli* Staudinger), in a basal-costal position (as in *weymeri* Staudinger), yellow (as in *hermogenes* Hewitson) or absent (as in *perijaensis* new subspecies Masters). In some cases (e.g. *temerinda* Hewitson) the yellow and white coloration is simply reversed. *Heliconius cydno* is quite uniform and constant in appearance in many localities, while in others it is quite variable. It is no surprise that there are many more names available than actual valid geographic subspecies; many of the names apply to polychromatic forms.

In so far as is known at present, *Heliconius cydno* has a very limited range in Venezuela where it occurs in the Andes east to Barinas and in the Sierra de Perija. Considering the variability in the species and the many distinct geographic populations in Colombia, it is not surprising to find three distinct geographic populations in Venezuela occupying respectively, the east (Barinas) slope of the Venezuelan Andes, the west (Merida) slope of the Venezuelan Andes, and the Sierra de Perija. The three subspecies are remarkably distinct from each other, yet relative uniform in each locale. With the considerable attention that Staudinger and others gave to *H. cydno* in the early part of this century, distinct unnamed populations are not expected; however, two of these are apparently unnamed, undoubtedly due to the fact that the Sierra de Perija and the east slope of the Venezuelan Andes have not received much entomological attention until recent years.

The following key, based on the maculation of the dorsal wings, may be used to separate the three Venezuelan subspecies of *Heliconius cydno*—from each other and from extra-Venezuelan subspecies.

- 1a. White or yellow band, bar or row of spots present on dorsal hindwing 2
- 1b. Dorsal hindwing immaculate (figure 1C); normal to large yellow band on dorsal forewing; apical spots on forewing not normally present *H. cydno perijaensis* new ssp.
- 2a. White band or row of spots present on hindwing 3
- 2b. Yellow band, bar or row of spots on hindwing various non-Venezuelan subspecies
- 3a. White band, or row of spots, on dorsal hindwing located on outer margin of wing, or if in limbal area, the black border on outer is narrower *H. cydno cydno* and other non-Venezuelan ssp.
- 3b. White band or row of spots on dorsal hindwing located in limbal area with black margin being as wide or wider (figure 1A, 1B) 4
- 4a. White band of dorsal hindwing broken into distinct triangular shaped spots with black lines along veins quite pronounced (figure 1A); normal or slightly reduced yellow band on dorsal forewing; apical yellow spots on forewing usually present *H. cydno hahneli* Staudinger

- 4b. White band of dorsal hindwing not broken into distinct triangular shaped spots (figure 1B); normal yellow band on dorsal forewing; apical spots never present on forewing *H. cydno barinasensis*
new ssp.

***Heliconius cydno perijaensis* new subspecies**

Quite recently the Sierra de Perija, an isolated offshoot of the Andes dividing the Venezuelan state of Zulia from Colombia, has been visited by Venezuelan entomologists, who have brought back, among many other interesting Lepidoptera, a strikingly marked new subspecies of *Heliconius cydno*. This new subspecies, hereby named *perijaensis*, is quite distinct from any other subspecies of *H. cydno* because the dorsal hindwings are completely immaculate of any white or yellow coloration. Otherwise the maculation is indistinguishable from nominate *H. c. cydno* or *H. c. barinasensis*.

The subspecies is only known from El Tucuco, Zulia, Venezuela but may be presumed to occur, at suitable elevations, all along the eastern (Venezuelan) slope of the Sierra de Perija and possibly on the Colombian side of the range as well. Just to the west of the Sierra de Perija is Colombia's Magdalena Valley where *H. cydno hermogenes* Hewitson flies. *Hermogenes*, which has a broken yellow band on the hindwing and the forewing band broken into small yellow spots, is accompanied by a variety of polychromatic forms—none of which resemble *perijaensis*.

Heliconius cydno perijaensis is not common at El Tucuco, which is probably at a lower than optimum elevation for the species. El Tucuco is the site of a Yupi Indian Mission and is at the end of the road. Because of the presence of notoriously unfriendly Motilone Indians in the immediate area, nobody has ventured very far from the Mission in search of Lepidoptera.

HOLOTYPE MALE: forewing length, base to tip, 43 mm; collected at El Tucuco, State of Zulia, Venezuela, undated [probably March 9, 1967] by Albert Gadou. To be deposited in Carnegie Museum, Pittsburgh, Pennsylvania.

I have examined additional specimens of *H. c. perijaensis* in the collections of Harold Skinner and Albert Gadou in La Victoria and Caracas, Venezuela respectively. Other specimens are in the collections of Francisco Romero at Maracay, Yuri Budaracey at Caracas and the Central University of Venezuela at Maracay. A total of about 18 specimens of *H. c. perijaensis* have been taken so far; the holotype male is the only one to have left Venezuela.

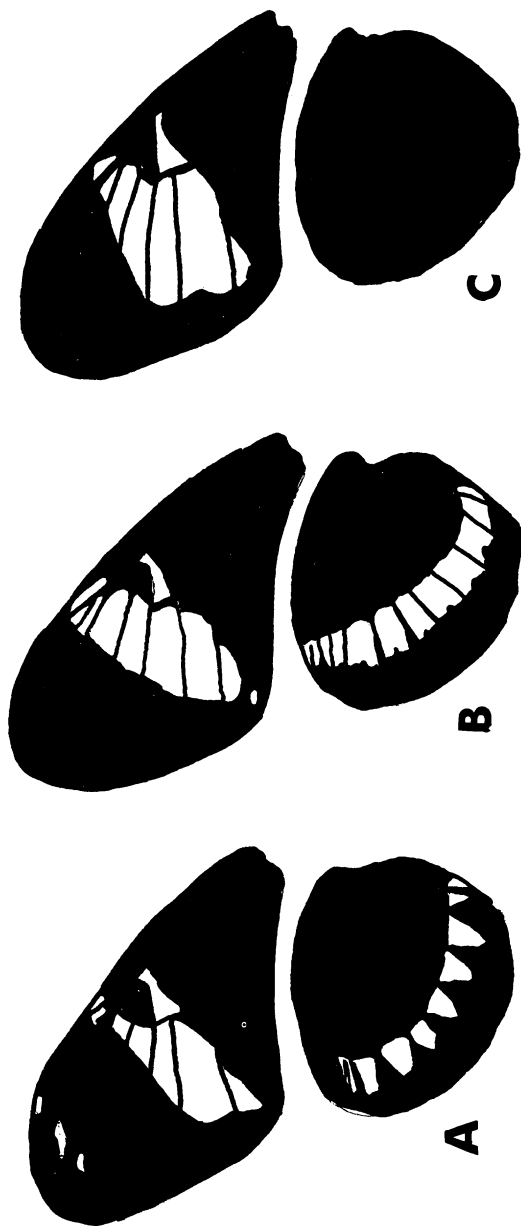


Fig. 1.—Representation of dorsal wing patterns of Venezuelan subspecies of *Heliconius cydno*. A = *H. c. hahneli*, B = *H. c. barinasensis*, C = *H. c. perijaensis*. Colors: forewings black and yellow, hindwings black and white. Approximately $1\frac{1}{2}$ natural size.

Heliconius cydno hahneli Staudinger

This subspecies occurs in the state of Merida, on the western slope of the Venezuelan Andes, and (probably) westward into Colombia. The appearance of the white band on the hind-wing is distinct from that of any other Colombian population. In *hahneli*, this band is white and has been displaced from its normal position (as in nominate *cydno*) basally, leaving a wide black margin (at least as wide as the white band itself) between it and the outer margin. The white band is distinguished further by being broken up into small triangular shaped spots (this occurs to some extent in some yellow banded specimens from the Magdalena Valley of Colombia, e.g. *temerinda*). The yellow band of the forewing is similar to that of nominate *cydno*, however in a few specimens it is broken up into smaller spots, although not as strongly as in *hermogones* from the Magdalena Valley.

Heliconius c. hahneli is quite rare in collections. Emsley (1965) in his study of speciation in *Heliconius* makes no mention of it and, presumably, did not have the opportunity to examine any.

Heliconius cydno barinasensis new subspecies

This subspecies occurs in the state of Barinas, on the eastern slope of the Venezuelan Andes, and, as would be expected, is closely allied to *H. c. hahneli* of the western slope. *Barinasensis* differs from *hahneli* in the following respects: apical spots are never present on the dorsal forewing of *barinasensis* and the yellow forewing band is usually wider; the white band of the dorsal hindwing is fuller and wider and is not broken into triangular shaped spots as in *hahneli*. *Barinasensis* looks very much like nominate *cydno*, but differs in having the position of the white band of the hind wing in the shifted position of *hahneli*. In nominate *cydno*, a wide, full white band, is positioned almost at the outer margin with only a very narrow black border between it and the edge of the wing.

I have heard of, but have not seen, two aberrant specimens of *H. c. barinasensis* captured by Yuri Budaracey at Barinitas. In these two specimens, which are undoubtedly polychromatic forms, the yellow band of the forewing is replaced by a brown band. This is quite unusual because, even with all of the variability that has been reported for *Heliconius cydno*, none

have been reported with brown bands. In fact the only forms which vary from the basic black, yellow and white color pattern (e.g. *wernickei* Weymer and *emilius* Weymer) are presumed to be interspecific hybrids between *Heliconius cydno* and *Heliconius melpomene* Linnaeus.

Heliconius cydno barinasensis is quite common, at elevations between 1000 and 1500 meters, on the Barinitas to Santo Domingo Road in the state of Barinas.

HOLOTYPE MALE: forewing length, base to tip, 43 mm; collected on the Barinitas to Santo Domingo Road at 1000 meters, in the state of Barinas, Venezuela, 5 February 1968, by J. H. Masters. To be deposited in Carnegie Museum, Pittsburgh, Pennsylvania.

ALLOTYPE FEMALE: forewing length, base to tip, 45 mm; collected on the Barinitas to Santo Domingo Road at 1000 meters, in the state of Barinas, Venezuela, 6 February 1968, by J. H. Masters. To be deposited in Carnegie Museum, Pittsburgh, Pennsylvania.

PARATYPES: 26 males, 12 females, all collected on the Barinitas to Santo Domingo Road, 1000 to 1500 meters, various dates 1964 to 1968, by J. H. Masters, Harold Skinner, Albert Gadou, Yuri Budaracey and K. Negishi. Pairs will be deposited in the American Museum of Natural History, New York, the U.S. National Museum, Washington and the British Museum of Natural History, London. The remainder, for the present time, will remain in the author's private collection.

Other specimens of *H. c. barinasensis* abound in Venezuelan collections (i.e. those of Harold Skinner, La Victoria, Albert Gadou, Caracas, Yuri Budaracey, Caracas, Francisco Romero, Maracay, Edwin Saino, Maracay and the Central University of Venezuela, Maracay) and others are in the collection of Dr. K. Negishi, Tokyo, Japan.

ACKNOWLEDGEMENTS

I am particularly indebted to Albert Gadou of Caracas, who accompanied me on the collecting trip to Barinas when the types of *H. c. barinasensis* were collected and who provided me with the type of *H. c. perijaensis*; and to Harold Skinner, Francisco Romero, Yuri Budaracey and my other good friends in Venezuela who have been helpful in many ways in my study of Venezuelan Lepidoptera.

LITERATURE CITED

- EMSLEY, M. G., 1965. Speciation in *Heliconius* (Lep., Nymphalidae): Morphology and Geographic distribution. *Zoology* 50: 191-254.