

## Two New Butterflies (Lepidoptera Lycaenidae) from Cuba

†ALBERT SCHWARTZ<sup>1</sup> AND KURT JOHNSON<sup>2</sup>

<sup>1</sup>10,000 S.W. 84th St., Miami, Florida 33173

<sup>2</sup>American Museum of Natural History, Central Park West  
at 79th St., New York, New York 10024

ABSTRACT. — Two new species of the lycaenid butterfly genera *Leptotes* and *Ministrymon* are described from Cuba.

RESUMEN. — Se describen dos especies nuevas de mariposas diurnas de la familia Lycaenidae (*Leptotes*, *Ministrymon*) en Cuba.

### INTRODUCTION

The lycaenid butterfly genus *Leptotes* Scudder, 1876, is widespread on the continental masses of North and South America. In the West Indies *Leptotes* is known by three species. *Leptotes cassius* (Cramer, 1775) occurs throughout the islands and is represented there by four subspecies: *theonus* (Lucas, 1857) on the Greater Antilles, the Bahamas, and the Cayman Islands, as well as in Florida, *catilina* (Fabricius, 1793) on the Virgin Islands, *chadwicki* Comstock and Huntington, 1943, on some of the Lesser Antilles (Barbuda, Antigua, Saba, Montserrat, Guadeloupe including Les Saintes and Marie-Galante, Dominica, Martinique, St. Lucia), and *striatus* (Edwards, 1878) on the western Caribbean islands of San Andrés and Providencia (Pinchon and Enrico, 1969; Riley, 1975; Smith et al., 1989; Schwartz and Henderson, 1991a). The latter subspecies also occurs on the mainland of Central and South America.

In addition to *L. cassius*, Jamaica also has *L. perkinsae* Kaye, 1931, and Hispaniola the apparently very uncommon *L. idealus* Johnson and Matusik, 1988. *Leptotes perkinsae* is considered (Brown and Heineman, 1972: 249) to be “by no means common, although it is widespread . . . and is found principally in regions of scrub growth.”

*Leptotes idealus*, on the other hand, is known only from two males and one female from the Sierra de Baoruco in the Republics Dominican, where it occurs in “densely wooded understory” at the up-

land type-locality. Johnson and Matusik (1992) included records, photograph, and genitalia of female *L. idealus*. The second male and the female were taken within 10 m of where the holotype was secured. Johnson and Matusik (1988:244) considered *L. idealus* to be the sister species of Jamaican *L. perkinsae*, thereby reinforcing the “tectonic relationship between Jamaica and the southern paleoisland of Hispaniola.”

In summary, there is one widely distributed species (*L. cassius*) throughout the Antilles, and two related species (*L. perkinsae*, *L. idealus*) on Jamaica and Hispaniola.

### SYSTEMATIC

In August 1991, S. Blair Hedges and Alberto Estrada collected butterflies for the senior author in western Cuba's Provincia de Pinar del Río. One of their localities yielded a single female specimen of the following new species of *Leptotes*.

*Leptotes hedgesi*, sp. nov.  
(Figs. 1,2)

*Male*. —Unknown.

*Female*. —FW (forewing) length 13 mm; UPPFW (upper side forewing) disc white with iridescent violet blue (Pl. 43C8; all color codes from Maerz and Paul, 1950) wash, the dark UN (underside) markings showing through; a wide outer marginal dark brown (Pl. 48E5) area extending narrowly along costs; UPHW (upper side hindwing) white, the UNHW pattern showing through, with a faint bluish iri-

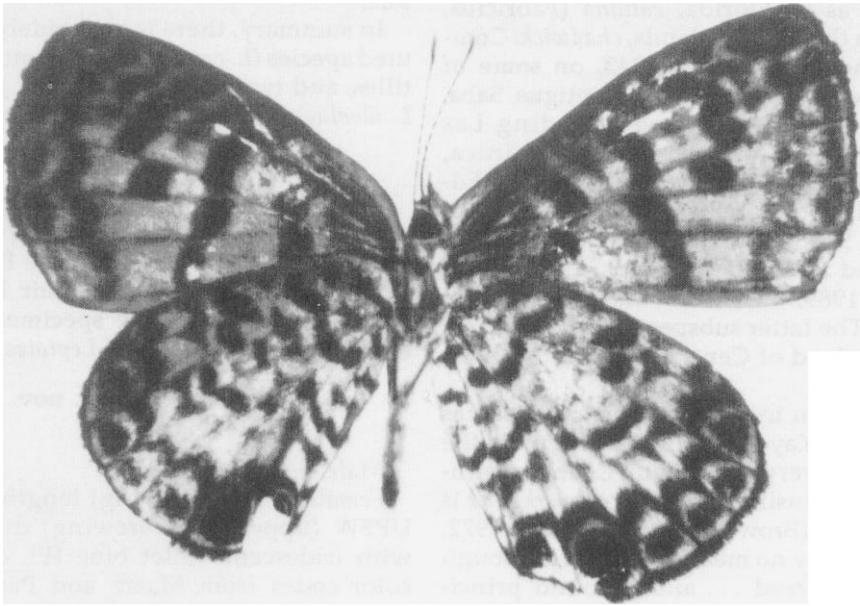
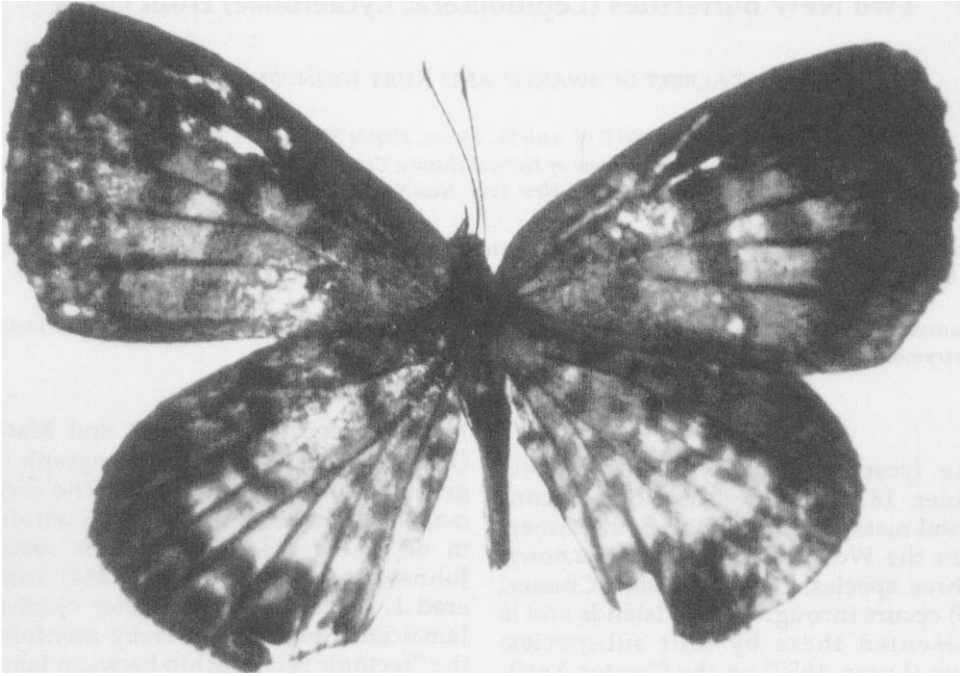


FIG 1. *Leptotes hedgesi*, holotype female; UP above, UN below.

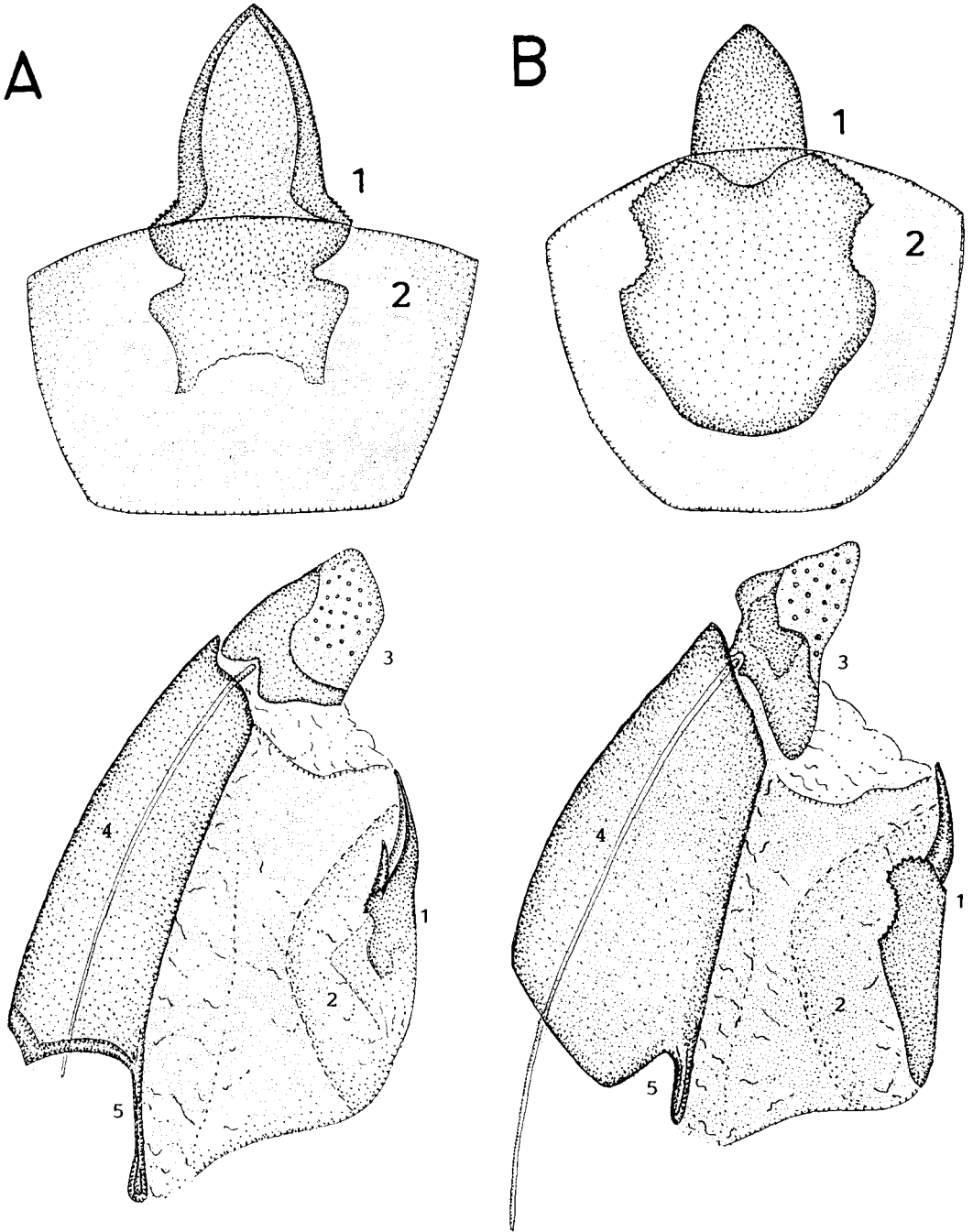


FIG. 2. Female genitalia of *Leptotes hedgesi* and *L. cassius*, A. *L. hedgesi* holotype; above, ventral view of fibula (1) and adjoining henia (2), latter not extruded from terminal sternite; below, lateral view of posterior abdominal segment: 1-2 as above; 3, papillae anales with adjoining apophyses; 4, terminal tergite; 5, apodeme of terminal tergite. B. *L. cassius*: Cuba: Provincia de Holguín: Holguín. American Museum of Natural History (AMNH); same views.

descent; dark brown inner and outer margins, that on the outer margin wider; a spot in Cu2-2A and another spot in 2A-3A, both concolor with outer margin and capped with pale blue (Pl. 36D4); UN white, all markings dark brown on UNFW, consisting of: (1) a series of small submarginal dots, (2) a postdiscal series of concave-outer and convex-inner blocks, (3) an incomplete series of blocks from costa to Cu1, (4) a distal bar from M1 to 2A, slanted slightly toward anal angle, (5) a short basal bar; (6) costal margin with grayish shadow-bars between all elements; UNHW with (1) a series of dark brown crescents, remnants of four or five bars and/or shadow-bars, (2) a dark margin, followed basally by (3) a series of five dark spots, that in Cu2-2A black, capped with pale orange (Pl. 10C6), that in 2A-3A very dark gray (almost black) but not capped with orange; (4) a postdiscal series of black concave outer-concave inner blocks, those in M2-Cu1 to 2A-3A almost crescentic, that in Cu2-2A above and touching orange cap on black spot in Cu2-2A; for genitalic characters, see comments below.

*Holotype*. — Cuba: Provincia de Pinar del Río: 5.5 km NW Niceto Pérez (formerly Rancho Mundito), 450 m, taken 18 August 1991 by S. B. Hedges and A. Estrada. Original number AS (Albert Schwartz collection) 27556, now in the collection of the Museo Nacional de Historia Natural de Cuba (MNHNCU).

*Comparisons*. — *Leptotes hedgesi* is easily distinguished from both *L. perkinsae* and *L. idealus* by the presence of two UNHW dark (black to very dark gray) marginal lunules; the former two species each has only one black lunule in Cu2-2A (see illustrations in Brown and Heineman, 1972, and Riley, 1975 for *L. perkinsae*, and Johnson and Matusik, 1988, for *L. idealus*). From *L. cassius*, *L. hedgesi* differs most strikingly in details of UN pattern, most especially in the condition of the UNHW distal markings (see Riley, 1975:Pl. 12, Fig. 10b; and Johnson and Matusik, 1988).

*Genitalia*. — We use the terminology of Nabokov (1945:Pl. 7). Johnson and Matusik (1992) review the female genitalia of *L. cassius* (pan-Neotropical), Jamaican en-

demic *L. perkinsae*, and southern Hispaniolan endemic *L. idealus*. *Leptotes hedgesi* differs markedly from *L. cassius* (from Cuba; Fig. 2B) in characters of the terminal tergite, henia, fibula, papillae anales, and apophyses papillae anales as follows: (1) the terminal fibula (Fig. 2, A1) is extremely produced compared with the adjacent henia (A2), the latter being diminutive and only lightly sclerotized along its anterior margin; this condition contrasts with that of *L. cassius*, which has a smaller fibula (B1) and large, heavily sclerotized henia (B2). In addition, *L. hedgesi*, in lateral (A1, below) or dorsal view, shows a second, caudoventrally directed lip on the fibula not present in *L. cassius* or any other Antillean *Leptotes*; (2) the terminal tergite (A4) is heavily sclerotized along its anterior margin and shows a greatly elongate, anteriorly directed basal apodeme (A5); this contrasts with a much shorter structure in *L. cassius* (B5); (3) the papillae anales (A3) are spatulate, contrasting with an irregular shape in *L. cassius* (B3); (4) apophyses papillae anales (extending anteriorly from the papillae anales) are nearly completely enclosed by the eighth tergite; in *L. cassius* the former protrude from the tergite for nearly one-third their length.

*Etymology*. — We are pleased to name this species in honor of one of the collectors, S. Blair Hedges, whose diligence in collecting butterflies for the senior author cannot be overstated.

The first record of *Tmolus* Hübner, 1819, in the West Indies is that of Pinchon and Enrico (1969) for the Lesser Antillean island of Grenada. The genus remained unknown elsewhere until it was reported (*Tmolus azia* [Hewitson, 1873]) from Jamaica by Vyhmeister (1980) and from Hispaniola by Beck (1983). *Tmolus azia* is widespread on the Central and South American mainland, and it was generally considered that these Greater Antillean records were due to relatively recent "introductions" to Jamaica and Hispaniola. However, Schwartz (1989) showed that *T. azia* is widespread on the Dominican portion of Hispaniola and occurs as well on one satellite island (Isla Saona) off southeastern Hispaniola and at elevations from sea level

to 2105 m—a distribution that bespeaks long occurrence of these tiny hairstreaks on Hispaniola. Johnson and Matusik (1989) described another Hispaniolan species, *T. victoria*, from the southern Dominican coast; this species has not been collected since 1984, although the allotypic male was collected in the last century.

*Tmolus* was unknown from Cuba and Puerto Rico, and it would have been no surprise if *T. azia* (assuming that it was a vagrant colonizer) occurred at least on Cuba. Neither Bates (1935) nor Alayo and Hernández (1987) noted the occurrence of species of *Tmolus* on Cuba.

Johnson and Miller (1991) reviewed numerous historical *Tmolus* usages and, based on analysis of type-specimens, reassigned many of these taxa to *Ministrymon* Clench, 1961. Johnson and Miller placed *azia* in the "gray" or *azia* Group of *Ministrymon*; members of this complex have the UN with a prominent orange band and the female genitalia with a prominent cephalic antrum. Therefore, the proper names of the two "*Tmolus*" from the Antilles are *Ministrymon azia* and *M. victoria*.

Hedges and Estrada collected a single male *Ministrymon* in Provincia de Pinar del Río in eastern Cuba, establishing the presence of the genus on that island. But the specimen is not the "expected" *M. azia*, but rather the following undescribed, and likely endemic species.

*Ministrymon hernandezii*, sp. nov.  
(Figs. 3, 4)

*Male*. — FW length 10 mm; UP tan (Pl. 15 A10); UPFW without scent pad; long tail at HW Cu2; UN pale tan (Pl. 13A1); UNFW with a short postdiscal series of pale orange dashes from costa to Cu1, bordered marginally by very pale tan; UNHW with similar series of dashes from midcosta almost to anal angle with a very widely opened "W" from M2 to inner margin, lightly bordered with pale tan marginally; a blackish ocellus in 2A-3A at anal angle, capped with pale orange; genitalic characters discussed below.

*Female*. — Unknown.

*Holotype*. — Cuba: Provincia de Pinar del

Río: 5.5 km NW Niceto Perez (formerly Rancho Mundito), 450 m, taken 18 August 1991 by S. B. Hedges and A. Estrada. Original number AS 27553, now in MNHNCU.

*Comparisons*. — *Ministrymon hernandezii* requires comparison with *M. victoria* and *M. azia*. *Ministrymon victoria* has the UPFW completely gray-black except for silver-blue dusting along outer margin, UPHW gray-black anterior to M3, with silver-blue dusting basally; anal lobe predominantly orange. The species also has (see Johnson and Matusik, 1989:Fig. A1, 1-4) a distinctly broken and disjunct postmedian band on both wings, UNHW not "W"-shaped but rather "V"-shaped with a single displacement at 2A, and a large orange spot in 2A-3A. In these features *M. victoria* differs from *M. hernandezii*. The FW of *M. victoria* measures 10 mm.

*Ministrymon hernandezii* resembles *M. azia* in some phenotypic features (see Howe, 1973:Pl. 51, Figs. 23, 24; Johnson and Matusik, 1989:Fig. A-1, 5) but differs in lacking a scent pad on the UPFW, in having the UNFW and UNHW orange pattern elements pale and indistinct, and in lacking an orange spot at the base of the HW tail. Schwartz (1989:238) gave the FW lengths of Hispaniolan male *M. azia* as 9-10 mm.

*Ministrymon hernandezii's* lack of a FW scent pad, dark tan ground color, and orange UNHW medial band cause it to resemble superficially members of the genus *Angulopsis* Johnson, 1991, of which the mainland species *A. autoclea* (Hewitson), 1863-1878 [1877] is a common and familiar insect. Indeed, first examination of *M. hernandezii* required a generic diagnosis from the genitalia, as noted below.

*Genitalia*. — We use the terminology of Johnson and Matusik (1989) and Johnson and Miller (1991). Distinction of *M. hernandezii* from *M. azia* is primary, since *M. azia* occurs on Jamaica and widely on Hispaniola and resembles *M. hernandezii* in some generalized wing characters.

Male genitalia of *M. azia* are quite uniform from the United States southward to Argentina, northern Chile, and in the Antilles. In fact, as a subunit of *Ministrymon*, the pan-Neotropical *azia* Group of Johnson and Miller (1991) would be monotypic ex-

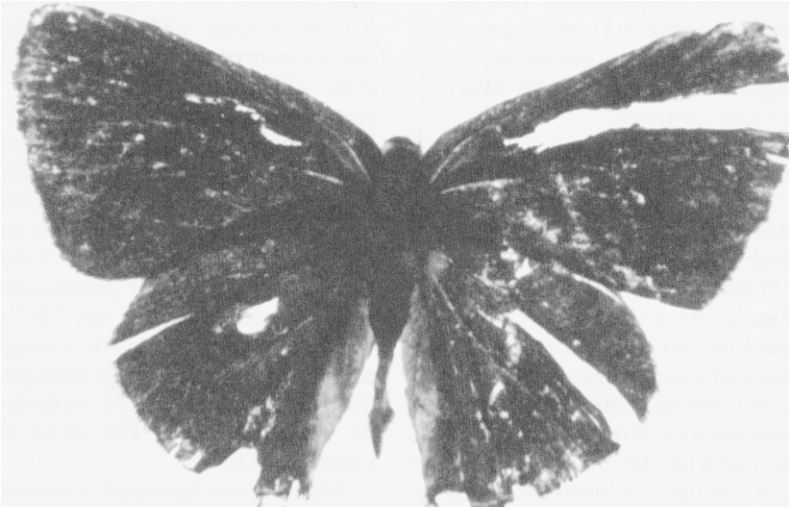


FIG. 3. *Ministrymon hernandezii*, holotype male; UP above, UN below.

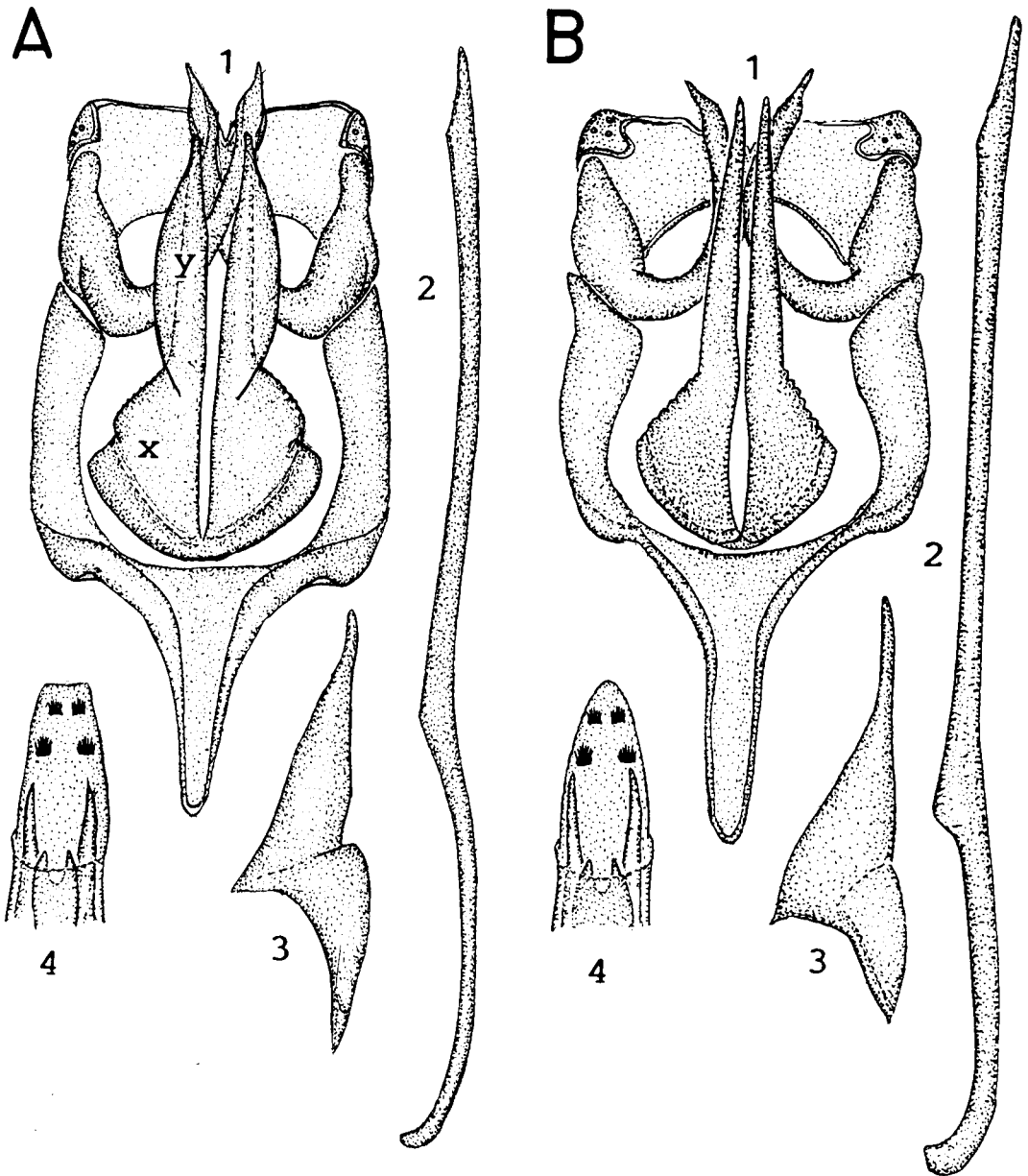


FIG. 4. Male genitalia of *Ministrymon hernandezi* and *M. azia*. A. *Ministrymon hernandezi* holotype: 1, ventral view, genitalia with aedeagus removed (x, valval base of "bilobes"; y, valval terminus or "caudal extension"); 2, lateral view, aedeagus; 3, lateral view, valvae; 4, ventral view, terminus of aedeagus with cornuti and bundles of microtrichia typical of aedeagus of *M. azia* Group. B. *M. azia* (República Dominicana: Provincia de Pedernales: Las Abejas). AMNH; 1-3 as above; 4, generalized terminus of *M. azia* complex (Johnson and Miller, 1991).

cept for the northern Chilean desert population differentiated by them as *M. quebradivaga*. This Chilean taxon and the Hispaniolan endemic *M. victoria* were not-

ed by them as showing characters typical of more than one *Ministrymon* group (namely, the *azia* Group and the six taxon white [or *una*] Group). This evidence was

construed by Johnson and Miller as suggesting that the Chilean and Hispaniolan endemics may be structurally primitive when compared with all other *Ministrymon*.

The above characterization appears to apply to *M. hernandezi*. Some generalized wing and genitalic facies suggest kinship with the *M. azia* group. However, along with the wing facies noted above, the genitalia of *M. hernandezi* differ from those of *M. azia* in: (1) supralimital characters not occurring in other members of the genus (swollen falces termini; Fig. 4, A1), expansive caecum on aedeagus (unique among congeners, equaling length of the genital valves (Fig. 4, A4), and (2) overall valval structure which, like characters in males and females of *M. quebradivaga*, appear more like members of the *Ministrymon una* Group (swollen valval caudal extension; Fig A1, y), laterally expansive valval base (Fig. A1, x). Indeed, in isolation, the valval configuration of *M. hernandezi* would readily place the species with members of the *Ministrymon una* Group, whereas genitalia of *M. azia* typifying Hispaniolan and Jamaican populations (Fig. 4B) differ negligibly from those shown as typical of *M. azia* across its entire range (Johnson and Miller, 1991; Fig. 2). This overall structural assessment, along with the distinctive wing facies of *M. hernandezi*, leads us to conclude that the latter cannot be considered nonspecific with *M. azia*. On the contrary, we suggest that *M. hernandezi* represents yet another primitive element in the far-flung *Ministrymon* complex.

*Etymology.* — We name this species in honor of Luis Roberto Hernández in acknowledgment of his coauthorship of the Atlas of Cuban butterflies, as well as his cooperation with S. B. Hedges in the field.

*Ecology.* — Hedges' field notes state that the specimens were collected in the late morning in bright sun. The type-locality "is in the central portion of the Sierra del Rosario, on an east-west trending ridge . . . along a paved road between Niceto Pérez (formerly Rancho Mundito) and Cinco Pesos. The region is largely deforested, with virtually no forest along the road and only patches of forest in ravines away from the

road (north and south). Vegetation . . . consisted of wildflowers and flowering bushes 1-2 m in height along the road. The *L. hedgesi* was associated with the former, the *M. hernandezi* with the latter."

#### DISCUSSION

The Sierra del Rosario, in which range the type-locality of both *L. hedgesi* and *M. hernandezi* lies, is the eastern portion of a limestone karst region whose western portion is termed the Sierra de los Organos (Marrero, 1951:406-424). The latter is much dissected and typically has dome-shaped "hills" (called *mogotes*) rising from a more or less flat plain. The Sierra del Rosario is less dissected, and its ranges are more even ridges, rather than isolated *mogotes*. The two ranges together extend 180 km in length and 6-14 km in width and form a striking topographic feature of western Cuba, which elsewhere has little relief. The mountains are apparently Lower Cretaceous in origin; the Sierra de los Organos reaches average elevations of 300-700 m, the Sierra del Rosario has its maximum elevation at Pan de Guajabón (728 m). The rainfall in the Sierra de los Organos has a mean of 125-200 cm (maximum 225 cm) annually, whereas that in the Sierra del Rosario averages more than 150 cm.

The mountains support (or supported) broadleaf forest; the flora "is dominated by endemic species" (Marrero, 1951:414). These mountains are the place of occurrence of two endemic species of frogs, two of lizards (both of which also occur in the adjacent lowlands), and one species of snake (Schwartz and Henderson, 1991 b), as well as local subspecies of widely distributed amphibians and reptiles. Schwartz (1970) suggested that the Sierra de los Organos-Sierra del Rosario was, during Miocene inundation, an island refugium for the lizard *Ameiva auberi*, a refugium from which, with the exposed lowland areas, these lizards dispersed and further differentiated subspecifically.

Considering the already documented endemism of the flora and fauna of the Sierra del Rosario, it seems a logical area to encounter undescribed species of butterflies. *Leptotes hedgesi* and *M. hernandezi*



may not be restricted to these mountains, occurring as well in the Pinar del Río lowlands, but it seems doubtful that they are islandwide in distribution.

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## LITERATURE CITED

- Alayo Dalmau, P., and L. R. Hernández. 1987. Atlas de las mariposas diurnas de Cuba (Lepidoptera: Rhopalocera). Editorial Científico-Técnica, La Habana. 148 pp.
- Bates, M. 1935. The butterflies of Cuba. Bull. Mus. Comp. Zool. 58(2):63-258.
- Beck, A. F. 1983. *Tmolus azia* (Lycaenidae) and *Anteos chlorinde* [sic] (Pieridae) in the Dominican Republic. J. Lep. Soc. 37(1):80-90.
- Brown, F. M., and B. Heineman. 1972. Jamaica and its butterflies. E. W. Classey Ltd., London. xv + 478 pp.
- Howe, W. H. (ed.). 1973. The butterflies of North America. Doubleday and Co., Inc., Garden City, New York. xiii + 633 pp.
- Johnson, K., and D. Matusik. 1988. Five new species and one new subspecies of butterflies from the Sierra de Baoruco of Hispaniola. Ann. Carnegie Mus. 57(10):221-254.
- , and ———. 1989. A new species of *Tmolus* (Lycaenidae) from Hispaniola. In A. Schwartz (ed.), The butterflies of Hispaniola, pp. 525-529. Univ. Florida Press, Gainesville.
- , and ———. 1992. Additions to the Hispaniolan Fauna, Pp. 3-5 In Johnson, K. (ed.) Taxonomic additions to recent studies of Neotropical butterflies. Reports of the Museum of Natural History, University of Wisconsin (Stevens Point) 23:1-20.
- , and L. D. Miller. 1991. The genus *Ministrymon* Clench 1961 in Chile and a new species from the Northern Desert Biotic Province (Lepidoptera: Lycaenidae), Acta Entomol. Chilena (16):183-192.
- Maerz, A., and M. R. Paul. 1950. A dictionary of color. McGraw-Hill Book Co., Inc. 1-23 + 137-208 pp., 56 pls.
- Marrero, L. 1951. Geografía de Cuba. Talleres Tipográficos Alfa, La Habana. xvi + 736 pp.
- Nabokov, V. 1945. Notes on Neotropical Plebejinae. Psyche 52:1-61.
- Pinchon, PÈRE R., and P. Enrico. 1969. Les papillons. Faune des Antilles françaises, Caen. 258 pp.
- Riley, N. D. 1975. A field guide to the butterflies of the West Indies. Demeter Press Book, New York Times Book Co. 224 pp.
- Schwartz, A. 1970. A systematic review of *Ameiva auberi* Cocteau (Reptilia, Teiidae) in Cuba and the Bahamas. III. Discussion. Ann. Carnegie Mus. Nat. Hist. 41(4):152-168.
- . 1989. The butterflies of Hispaniola. Univ. Florida Press, Gainesville. xiv + 580 pp.
- , and R. W. Henderson. 1991a. The butterflies of Barbuda. Carib. J. Sci. 26(3-4):98-100.
- , and ———. 1991b. Amphibians and reptiles of the West Indies: descriptions, distributions, and natural history. Univ. Florida Press, Gainesville. xiv + 720 pp.
- Smith, D. S., E. Munroe, and S. J. Ramos. 1989. Biogeographical affinities of the butterflies of the southwest Caribbean islands, San Andrés and Providencia. J. Lep. Soc. 43(4):274-288.
- Vyhmeister, G. 1980. *Tmolus azia* in Jamaica: a new record for the West Indies (Lycaenidae). J. Lep. Soc. 34(1):60.