NOTES ON TWO RARE MEXICAN *ADELPHA* AND RELATED CENTRAL AMERICAN SPECIES (NYMPHALIDAE)

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Members of the genus *Adelpha* usually are considered to be tropical species and usually must be sought in and around the denser moist forests. The one species that is well known outside the tropics is *A. bredowii* (Geyer) which occurs commonly in the southwestern United States and less abundantly in Mexico and Central America at higher elevations. One does not usually associate *Adelpha* with the largely arid Valle de México, and so we were surprised to find two species rather commonly in the high country of the state of Hidalgo, México, during January and February, 1969. Neither of these species is well known, and information about them, as well as comments about other related species should be informative to other lepidopterists.

Adelpha donysa (Hewitson)

Figs. 1, 2 (♂), 9 (♂ genitalia)

Heterochroa donysa Hewitson, 1847. Ann. Mag. Nat. Hist., 20: 260 (type-locality: "Mexico").

Heterochroa roela Boisduval, 1870. Lep. Guatemala, p. 46 (type-locality: "Mexique").

Adelpha pithys vodena Fruhstorfer, 1915. *In* A. Seitz, Die Gross-schmetterlinge der Erde, 5: 524 (type-locality: Guerrero, Mexico) **New synonymy.**

This species has been rather poorly known since its description. Godman and Salvin (1884, p. 305) give a rather perfunctory description of this butterfly, and Fruhstorfer's (1915, p. 524) description is useless. Indeed, it appears that Fruhstorfer may have been totally ignorant of the true nature of *donysa* and redescribed it under the name of *vodena*, though we have not seen the type of the latter name. *A. pithys vodena* was described from Guerrero, and the British Museum (Natural History) contains no material identified as *vodena* among their huge holdings from that state, although they do have some typical *pithys* (Bates) from there.

The present species bears little resemblance, except in a very general way, to *pithys*, figures of which are given here (Figs. 3, 4, ♂; 10, ♂ genitalia). The two species are in the same general group within the genus, but clearly distinct. The chief superficial characters separating these butterflies are precisely those cited by Fruhstorfer (1915, p. 524) for the separation of *vodena* from *pithys*: the reduced white median bands and the definitely darker under surface in *donysa*.

Figs. 1–4. The *adelpha pithys* group. 1, *A. donysa* (Hewitson), ♂, upper surface, México, Hidalgo, 5 mi. NW Zimapán; 2, same specimen, under surface; 3, *A. pithys* (Bates), ♂, upper surface, Guatemala, Alta Verapaz, Baleu, Mpio. San Cristóbal Verapaz; 4, same specimen, under surface.

We encountered *donysa* in two rather diverse habitats in Hidalgo and obtained a series of nineteen specimens. The butterfly was most common in a dry, very "un-*Adelpha*-like" area five miles northwest of Zimapán, Hildago, at an elevation of about 2000 m. This area was a dry scrub oak-juniper association that resembles similar habitats in the southwestern United States. The "wet" winter landscape is still arid, but the trees are with leaves, and some herbage is evident. During the summer, however, a drier place is hard to imagine; the deciduous trees are leafless, and there is no growth of annuals. The late summer rains are sporadic (in 1967 they never came) so *donysa* may be univoltine in this area. The second area was near the village of El Encarnacion, Hidalgo, at elevations be-

tween 2300 and 2400 m, a more inviting place for butterflies in general. *Eumaeus debora* Hübner, a new *Callophrys* being described by Harry Clench and *Polygonia haroldi* C. and R. Felder were among many species taken there. This locality is something of an oasis in the middle of the arid mountains of Hidalgo with tall (up to 80–100 feet) pines and oaks, apple orchards and rose gardens in the village, comparatively lush under story vegetation and a permanent stream. Fewer specimens of *donysa* were taken there than at the Zimapán locality, however, suggesting that the area was not arid enough for this unusual *Adelpha.*

Specimens of *donysa* were easiest to capture early in the morning, to about 10:00 AM, when they were sunning and flying near the ground. This butterfly will sun on the upper side of a leaf or on the ground with the wings flat and oriented to provide maximum exposure to the sun's rays, obviously a thermoregulatory mechanism (see Clench, 1966, for details). When not sunning, these butterflies will perch on the uppersides of leaves in prominent places with the wings upright or slightly open and are quite aggressive, charging at passing butterflies, birds, and collectors. The flight at this time is a glide with the wings flat until they reach the object of their aggression, then they flutter at the object vigorously and finally break contact and return to their perch. As the day progresses the butterflies move higher and higher into the canopy, and by mid-afternoon they may be seen only near the tops of trees. Oaks are preferred by the adults, and it is probable that the larvae feed on the foliage of these.

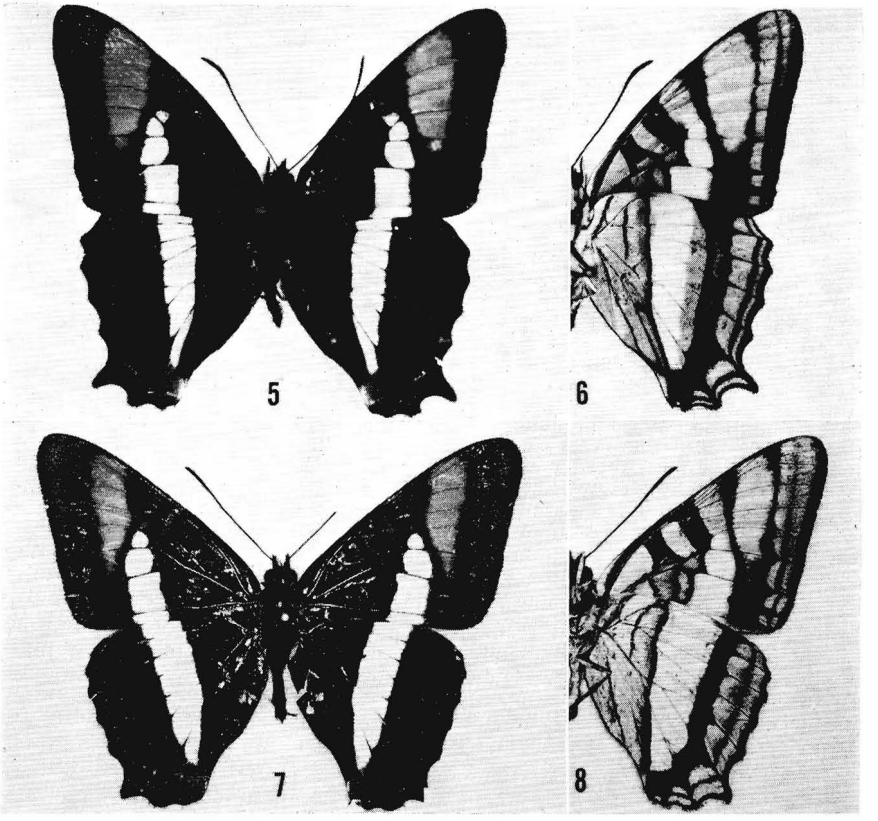
The adults show little sexual dimorphism and more closely resemble the type of *roela* than that of *donysa.* It may be that *roela* is a different, but not too distinct, subspecies; we have insufficient material at hand to make such a decision.

Adelpha creton Godman

Figs. 5, 6 (♂), 11 (♂ genitalia)

Adelpha creton Godman, 1901. *In* Godman and Salvin, 1879–1901, Biologia Centrali-Americana 2: 692 (type-locality: "Jalapa, Mexico").

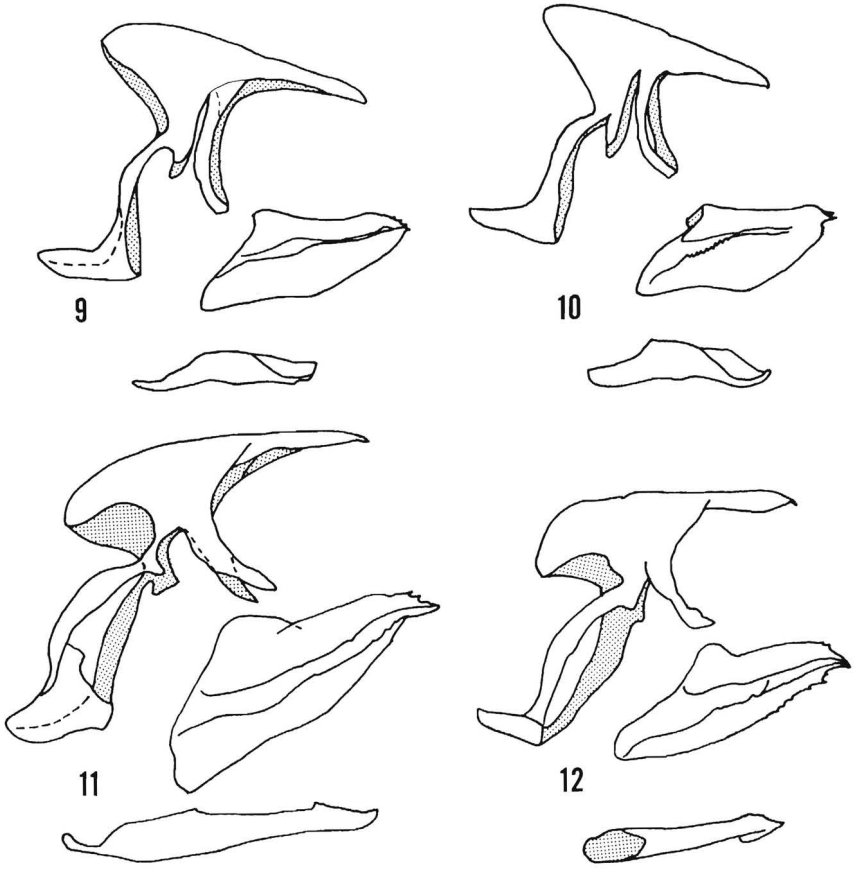
This species was described in the Supplement to the *Biologia* from a single female in the Schaus collection. Apparently the type has remained unique since its description; we have been unable to locate any other specimens in American or British collections other than the type in the U. S. National Museum (Type No. 850). In the original description *creton* was compared with *diocles* Godman and Salvin (1884, p. 303), a very similar insect from the Sierra de Talamanca, Costa Rica, and the Volcán de Chiriquí, Panamá, and it seemed reasonable that *creton* might be a subspecies of *diocles* (Figs. 7, 8, ♂ holotype; 12, ♂ genitalia). The genitalia



Figs. 5–8. The *Adelpha diocles* group. 5, *A. creton* Godman, ♂, upper surface, México, Hidalgo, vic. El Encarnacion; 2, same specimen, under surface; 3, *A. diocles* Godman & Salvin, ♂ holotype, upper surface, Chiriquí, Panamá; 4, same specimen, under surface.

suggest that the two species should be kept separate. It is interesting that Fruhstorfer (1915) completely ignores both *creton* and *diocles*, so it must be assumed that he had seen specimens of neither. Both species show pattern convergence toward the south Brazilian *abyla* complex, but the two groups are apparently derived from different stocks within *Adelpha*.

We encountered *creton* in small numbers in the El Encarnacion area throughout our stay in Hidalgo. Fifteen specimens were taken, but no more than two or three in any one day. Many were seen, but they were high in the oak trees, far out of net range. Occasionally they would glide down to ground level, alight on dirt or at mud with the wings flat and nervously move from place to place. These butterflies, to a far greater



Figs. 9–12. Genitalia of *Adelpha*. 9, *A. donysa* (Hewitson), ♂ genitalia, slide M-2112 (Lee D. Miller), México, Hidalgo, 5 mi. NW Zimapán; 10, *A. pithys* (Bates), ♂ genitalia, slide M-2111 (Lee D. Miller), Guatemala, Alta Verapaz, Baleu, Mpio. San Cristóbal Verapaz; 11, *A. creton* Godman, ♂ genitalia, slide M-2086 (Lee D. Miller), México, Hidalgo, vic. El Encarnacion; 12, *A. diocles* Godman & Salvin, ♂ genitalia, slide TGH 1962-538 (T. G. Howarth, British Mus. (Nat. Hist.), Costa Rica, Cascajal.

extent than *donysa*, were very wary and difficult to approach. The intimate association of the adults with the tall oaks of the area suggests that *creton* is also a *Quercus* feeder as a larva.

It seems unlikely that the type of *creton* actually came from the town of Jalapa, Veracruz, since that place is in a tropical forest at an elevation of about 1000 m. It seems more likely that the type of *creton* came from the flanks of Mt. Orizaba above Jalapa at an elevation in excess of 2000 m.

This is not the first time that material from the highlands west of Jalapa in the Schaus collection has been described as from the city. The scarcity of this species, and for that matter of the Central American *diocles*, may be caused by collectors seeking these butterflies in tropical habitats, more typical for *Adelpha*, rather than in the high, moist montane valley where these species occur.

Acknowledgments

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THE AFFINITIES OF THE ITHOMIINAE AND THE SATYRINAE (NYMPHALIDAE)

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Fox (1956) called into question the classical association of the nymphalid subfamilies Danainae and Ithomiinae, arguing that the Ithomiinae are actually more closely related to the Satyrinae, especially the glossy-winged genera such as *Pierella*. Miller (1968) in his excellent revision of the Satyrinae quoted Fox's view and remarked on the presence of a vestige of vein 3V (3A) as "structural evidence" supporting "the obvious similar tendency of the ithomiids and the satyrines to have hyaline wings" (p. 15). As Miller noted, however, this characteristic is also shared by the danaines. There is, of course, massive morphological evidence clearly showing that ithomiine adults are more similar to danaines than to satyrines (Ehrlich, 1958, Ehrlich and Ehrlich, 1967). In this paper we present further evidence that Fox's judgement was in error.