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A NEW SUBSPECIES OF *XYLOPHANES TERSA* (SPHINGIDAE) FROM VENEZUELA

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ABSTRACT. A new sphingid subspecies, ***Xylophanes tersa chaconi,*** is described and illustrated on the basis of 16 males from the State of Amazonas, Venezuela. The new subspecies differs from *X. tersa tersa* (Drury) mainly by its dark ash-brown appearance (including postmedian spots of hindwing). *X. tersa chaconi* is strikingly similar in color pattern to an as yet undescribed species from the neighboring State of Bolivar, but the latter has well-defined, cream-colored postmedian spots on the hindwing and slightly different genitalia. Some general biogeographic aspects of Pantepui are presented.

Additional key words: Pantepui, Guiana Highlands, biogeography.

Recent expeditions to several table-top mountains and other elevated ridges of the Guiana Highlands, also known as "Pantepui" (Mayr & Phelps 1967), have yielded new taxa of Lepidoptera (e.g., Viloria 1994, Viloria & Pyrcz 1994). In this paper we describe a new hawk moth from a mountain system in extreme southern Venezuela. In contrast to most of the other 100 or so species and subspecies currently placed in the American genus *Xylophanes* Hübner (Rothschild & Jordan 1903, D'Abrera 1987), the new subspecies appears to have an extremely limited range, being confined to Mt. Neblina and Mt. Aracamuni, two neighboring mountains at the southern edge of Pantepui. Here the new taxon replaces the nominate form, which is common and widespread in the surrounding lowlands. Additional new taxa can be expected to occur in other as yet unexplored mountainous areas of this region. Indeed, one new species of *Xylophanes* already has been found in the mountains of Jaua-Sarisariñama, a highland complex about 400 km northeast of the Neblina-Aracamuni system (unpubl. data of the authors). A checklist of all sphingid species so far found in the Venezuelan State of Amazonas (including Pantepui) will be presented elsewhere.

Xylophanes tersa chaconi De Marmels, Clavijo & Chacin, new subspecies

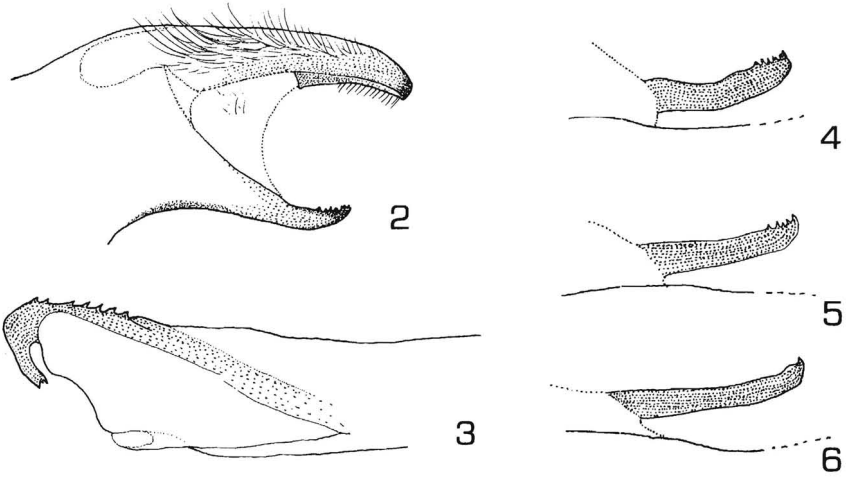
(Figs. 1–7)

Diagnosis. Male general coloration dark ash-brown; head and thorax dark chestnut between the dingy white lateral bands. Base of hindwing dark brown to black, extending distally along veins, intersecting postmedian row of diffuse, ash-brown spots. Underside of wings dark ash-brown, usually with ferruginous or brown postmedian areas of variable extension. *X. tersa chaconi* is similar in color pattern to an as yet undescribed species from the mountains of Jaua-Sarisariñama. These two taxa may be separated by development and coloration of the pale postmedian dorsal hindwing spots: in the undescribed species from Jaua-Sarisariñama these spots are clear-cut and cream-colored, while in *X. tersa cha-*

FIG. 1. Male holotype of *Xylophanes tersa chaconi*. Dorsal surface on right, ventral on left.

coni they are not sharply defined and ash-brown. The uncus is smooth ventrally in the Jaua-Sarisariñama species, but has a more or less triangular process at the end of the anal membrane in both *X. tersa chaconi* and *X. tersa tersa*. The aedeagus is considerably more chitinized in the Jaua-Sarisariñama species than in *X. tersa chaconi*.

Description. *Male. Dorsal surface* (Fig. 1): head and thorax dark chestnut between sharply defined, dingy white lateral bands, the latter paler on tegulae; antenna dingy white; forewing with series of dark, oblique, parallel lines running from anal margin towards tip;



FIGS. 2–6. Male genitalia of *Xylophanes tersa chaconi*. **2**, uncus and gnathos. **3**, aedeagus. **4**, right harpe of a paratype from Mt. Aracamuni (south). **5**, same of a paratype from Mt. Neblina. **6**, same of another paratype from Mt. Neblina. Figs. 2, 5–6 in left lateral view.

FIG. 7. Venezuela, showing known localities of *X. tersa chaconi*. 1 is Mt. Aracamuni (type locality), 2 is Mt. Neblina.

fringe ash brown; base of hindwing dark brown to black, extending distally along veins across postmedian row of diffuse, ash-brown spots, connecting with ash-brown submarginal area; apical area same color; fringe paler than in forewing, cream-colored; abdomen ash-brown with five ill-defined dark longitudinal lines. *Ventral surface* (Fig. 1): first and second segment of palpus pale ferruginous; thorax without collar, ferruginous laterally between wing bases and coxae; forewing ash-brown with an oblique row of minute dark postmedian spots within ferruginous (or brown) postmedian area, or these spots almost absent; hindwing similar, a series of three to four dark parallel stripes running from anal field towards costal margin; outer stripe preceding zigzagging submarginal band, dissolving into row of small spots; entire pattern frequently blurred basally; tibiae grey with dingy white dorsal line; first segment of fore tarsus with external row of small spines; smaller apical spur of hind tibia less than half the length of large spur; abdomen ash-brown with variable amount of ferruginous laterally. *Genitalia* (Figs. 2–6): uncus ventrally with triangular postmedian salient; gnathos chitinized and serrate dorsally in distal portion; aedeagus not strongly chitinized; harpe slightly bulbous subapically and serrate dorsally near tip (slender and parallel-sided in specimens from Mt. Neblina); in one specimen from Mt. Neblina the harpe lacks serrations and terminates in a hook. *Size.* Length from head to tip of abdomen 40–45 mm; fore wing 31.6–35.5 mm; antenna 15–18 mm. *Female and early stages*: unknown.

Types. *Holotype.* Male: VENEZUELA, State of Amazonas, Serranía de La Neblina National Park, Mt. Aracamuni (South), 01°26'N, 65°47'W, 1550 m, 30 Oct.–3 Nov. 1987,

Expedition "Fundación Terramar" (A. Chacón and E. Osuna). *Paratypes*: 9 males, same locality data as holotype; 3 males, Mt. Aracamuni (North), 01°32'N, 65°49'W, 1415 m, 24–30 Oct. 1987, same collectors; 2 males, Mt. Neblina, Camp X, 00°54'N, 60°02'W, 1690 m, 12 Feb. 1985, Expedition "Fudeci" (W. E. Steiner); 1 male, Camp XI, 00°52'N, 65°58'W, 1450 m, 25–28 Feb. 1985, Expedition "Fudeci" (P. J. & P. M. Spangler and R. A. Faitoute); all specimens deposited in Museo del Instituto de Zoología Agrícola (MIZA), Facultad de Agronomía, Universidad Central de Venezuela, Maracay, Venezuela.

Etymology. The new taxon is named in honor of Mr. Aníbal Chacón, technical assistant and staff member of the MIZA. He is the collector of most of the specimens.

Habitat. The specimens from Mt. Neblina, taken by W. E. Steiner, were collected at "black light in mixed scrub forest near stream and canyon rim" (collector's label); those from Mt. Aracamuni in an identical type of habitat (A. Chacón pers. comm.).

DISCUSSION

Xylophanes tersa tersa occurs from Canada to Argentina. The adults exhibit little individual and no definite geographical variation either in hindwing maculation or forewing ground color (Rothschild & Jordan 1903, Hodges 1971). No subspecies of *X. tersa* has so far been described from continental America. Subspecies *X. t. cubensis* Gehlen, from Cuba, differs little from the nominate form. The name *tristis* Closs refers to "an insignificantly darkened form" of *tersa* (Draudt 1939:893).

The Venezuelan specimens closely resemble an example from Florida, USA, figured in Hodges (1971:plate 13, fig. 18), except, perhaps, for the slightly more olivaceous tint of the thoracic dorsum in most Venezuelan specimens, which appears to be chestnut in the figured individual from the USA. However, color differences between *X. tersa tersa* and *X. tersa chaconi* are striking. Allopatry (to parapatry) seems to prevent the two populations from intergrading, and our assigning subspecific rank to *X. t. chaconi* is therefore provisional, following the view that the absence of genitalic differences does not warrant higher rank.

A similar case in dragonflies (Odonata) of a widespread lowland species with an "aberrant" population of probable subspecific status on some Pantepui mountains was recorded by De Marmels (1994). In this case, however, some apparent intergradation in the tepuyan population can be observed, probably due to occasional vagrants from the lowland (but not vice versa). In addition, Mayr & Phelps (1967) list 18 bird species that are widespread in the tropical lowlands, including the proper foot of Pantepui, having endemic subspecies in Pantepui.

The biogeography of Pantepui is usually misunderstood. The presence in Pantepui of animal and plant taxa with, for example, Andean affinity, is persistently explained by "hill-hopping," "small-scale long distance dispersal," "propagules," "colonization flights," or "jumps," from the Andes to Pantepui (e.g., Mayr & Phelps 1967, Viloria & Pyrcz 1994, and references therein). Dispersal origins seem improbable, as the Andes are much younger geologically (their uplifting began in the Eocene, see Schubert & Huber 1989) than Pantepui. Moreover, the fact that the

primitive forms are presently found in Pantepui while the derived taxa thrive in the Andes indicates that the latter probably did not migrate from the Andes to Pantepui (see Viloria & Pyrcz 1994).

The pantepuyan fauna likely originated *in situ* from ancestral forms, some of which populated vast areas of the Guiana shield and part of the sedimentary basins to the north and west, regions which later were "captured" by the uplifting of the Andes (e.g., the "yungas" of Bolivia). Their descendants in the Andes and in Pantepui became disjunct as a consequence of extinction in the intervening lowlands, eventually yielding new taxa (Croizat 1958, 1964, 1976, Heads 1985).

In apparent contrast to birds and butterflies, the pantepuyan damselflies (Odonata, Zygoptera) contain extant taxa that are true relicts of ancient (Mesozoic) origin. The monobasic genus *Rimanella* (Needham) (Amphipterygidae), endemic to Pantepui, lacks South American relatives, being closely related only to *Pentaphlebia* Förster of the highlands on the Nigeria/Cameroon border, not to the only other American amphipterygid genus, *Amphipteryx* Selys, of Central America and Mexico (Lieftinck 1971, Novelo Gutierrez 1995, de Marmels pers. obs.). *Amphipteryx* has obvious affinities (through a "transpacific track," Croizat 1958) with the southeast Asian genus *Devadatta* Kirby. Similarly, the endemic pantepuyan calopterygine genus *Iridictyon* Needham & Fisher is not closely related to the North American Calopteryginae (a subfamily otherwise absent from Central and South America), but to African *Phaon* Selys, and *Umma* Kirby (Needham & Fisher 1940, Fraser 1957) and, probably, to the South Asian *Vestalis* Selys. Such evidence is inconsistent with origin by disperal. More probably, a common ancestor of *Rimanella* + *Pentaphlebia* was already distributed over parts of the African and Guiana shields when Africa and South America and, consequently, the two ancient shields were still linked together in the Jurassic. In the early Cretaceous the ancestral population became split by the opening of the Atlantic Ocean. The ancient dispersal of the common ancestor is manifested by the "transatlantic track," which is not a migration route but a line still tying together the fragments of the once compact area of ancestral distribution (Croizat, 1958, 1964).

It is interesting to note that in 1988 a large swarm of African migratory locusts (*Schistocerca gregaria* Forskal) did in fact cross the Atlantic by flight, probably favored by special meteorological circumstances, and reached several Caribbean islands as well as the whole caribbean coast of Venezuela and Suriname (Cerdá 1989, Ritchie & Pedgley 1989, Stemshorn 1989). However, the species failed to establish itself and soon vanished, despite the existence of potentially suitable tropical desert habitat along the northern coast of Venezuela. Lastly, we wish to emphasize the parallel between the situation described here for *Xylo-*

phanes and that of *Pedaliodes* Butler (Satyridae) in the same geographic area (see Viloria & Pircz 1994). These pronopholine butterflies are sedentary and have low vagility, and the observed endemism and vicariance among their taxa, and their apparent inability even to colonize neighboring mountains within the Andes, renders them equally unlikely candidates for long-distance colonization flights between the Andes and Pantepui, both in the past and the present.

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