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A new species of *Wahydra* from Ecuador (Hesperiidae, Hesperiinae, Anthoptini)

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Abstract

Recent taxonomic studies on the genus *Wahydra* Steinhauser, 1991, have described five new species in the past two years, from high elevations in the Andes Mountains. A markedly distinct species of *Wahydra* is herein described and illustrated based on a single male specimen from Ecuadorian Andes, *Wahydra graslieae* A. Warren, Carneiro & Dolibaina, **sp. nov.** The new species is compared with other species of *Wahydra,* as well as with the somewhat similar species *Lerema viridis* (Bell, 1942) and *Tigasis viridenex* (Weeks, 1901).

Key words: Andean, biodiversity, male genitalia, skipper, taxonomy

Introduction

The genus *Wahydra* was erected by Steinhauser (1991) for nine species of Andean skippers previously placed by Evans (1955) in the genus *Zalomes* Bell, 1947. Distributed throughout the Andes from Venezuela to Argentina, species of *Wahydra* occur at moderate to high elevations, usually above 2200m (Steinhauser 1991). Recent taxonomic studies of the genus have described five additional species, suggesting that the overall diversity of the genus remains poorly documented (Henao *et al.* 2015, 2017). While a few species of *Wahydra* are known from many specimens, most species are known from just a few specimens, and the genus is very poorly represented in most collections. Although it is desirable to describe new species using long series of specimens, when possible, the morphological characters exhibited by different species of *Wahydra* are remarkably distinct, facilitating their recognition as species-level taxa. Therefore, considering the probability that many species of *Wahydra* remain to be discovered, we here describe a remarkably distinct new species from Ecuador, expanding the morphological limits of this genus, and contributing to the knowledge of the rich Andean fauna of Hesperiidae.

Methods

Recently prepared unidentified specimens of Hesperiidae collected in Ecuador by Harold Greeney were examined in June, 2016, when the specimen upon which this study is based was identified as being unique and undescribed. The genitalia of this male specimen were dissected and illustrated using standardized methods, as described by Dolibaina *et al.* (2014). Comparative specimens examined in this study are deposited at the MGCL (McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, Florida, USA) and the DZUP (Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Paraná, Brazil).

A single leg was used to extract genomic DNA from the unique specimen with the Macherey-Nagel (MN)

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NucleoSpin® tissue kit. The details of experimental procedures were described in Cong & Grishin (2014). The following pairs of primers we used to amplify the barcode in two overlapping segments: sCOIF (forward, 5'-ATTCAACCAATCATAAAGATATTGG-3'), smCOIR (reverse, 5'- CCTGTTCCAGCTCCATTTTC-3'), and Meg- mCOIF2 (forward, 5'-CCTCGWATAAATAAYATAAGATTTTG-3')—sCOIR (reverse, 5'-TAAACTTCTGGATGTCCAAAAAATCA-3').

Abbreviations used throughout the text are: DFW—dorsal forewing; DHW—dorsal hindwing; VFW—ventral forewing; VHW—ventral hindwing.

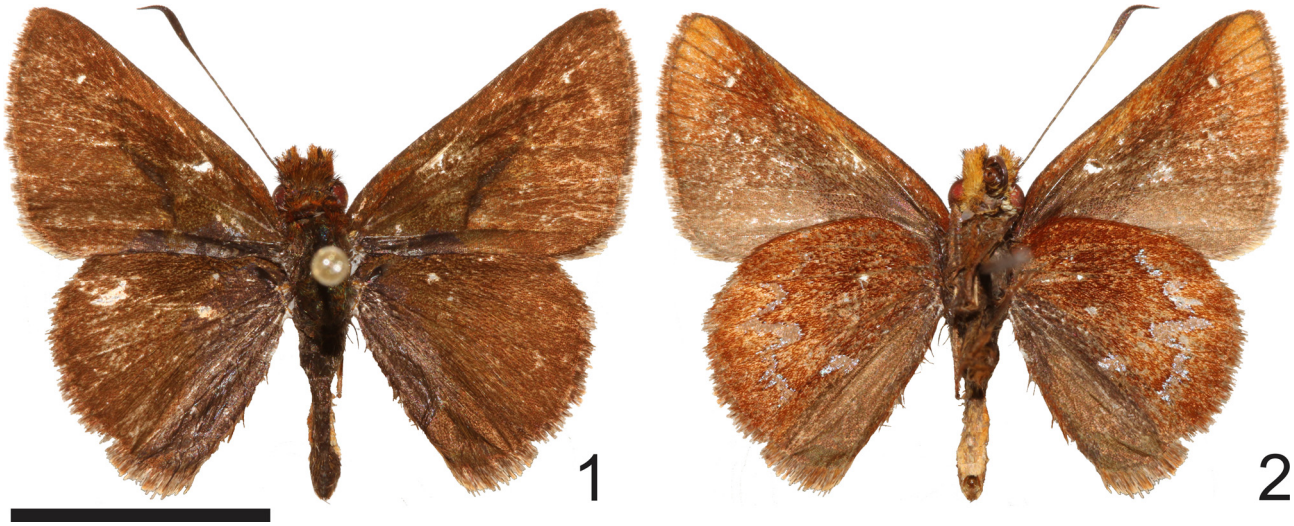
Results

Wahydra graslieae A. Warren, Carneiro & Dolibaina, sp. nov.

(Figs 1–4)

Diagnosis. DFW uniformly brown with a thin tripartite stigma between CuA_1–2A. All other species of *Wahydra* have orange spots on DFW, though reduced in *W. ekka* (Evans, 1955) and *W. obscura* Steinhauser, 1991. The VHW ground color is ferruginous red, with a metallic silver discal spot and postdiscal band. These features immediately identify *W. graslieae*, **sp. nov.** as unique both among the species of *Wahydra* and all other known members of Anthoptini. Two potentially sympatric species belonging to Moncini, *Tigasis viridenex* (Weeks, 1901) and *Lerema viridis* (Bell, 1942) have a somewhat similar VHW, however, they are easily distinguished from *W. graslieae*, **sp. nov.** by their greenish ground color and the highly reduced metallic silver markings. In addition, the bifurcated median apophysis of the tegumen of *W. graslieae* **sp. nov.** is not found in any known species of *Wahydra* nor in the somewhat similar *T. viridenex* and *L. viridis*. *Wahydra nieblensis* Steinhauser, 1991 also has a large median apophysis of the tegumen, but without developed bifurcated arms.

Description. Male. *Head*: Eyes red. Vertex dark brown scattered with red ferruginous scales. Antennae longer than 2/3 length of forewing costa; antennal club short (1/4 shaft), ventral shaft yellowish in basal portion, dark brownish in apical portion; nudum of 14 segments, covering all the apiculus and extended to the club. Palpus quadrate (inner edge equal to transverse width), first and second segments ventrally yellowish, third segment of medium length (around half the length of second segment), cylindrical, dark brown.



FIGURES 1–2. *Wahydra graslieae* A. Warren, Carneiro, & Dolibaina **sp. nov.**, male holotype. 1—dorsal; 2—ventral. Scale bar = 1 cm.

Thorax: dorsally and ventrally covered by long brown and red ferruginous scales; midtibiae spined; hindtibiae with two pairs of spurs. Forewing length 13.3 mm. DFW homogeneous brown, with sparse red ferruginous scales on costal area. Stigma black, thin and tripartite, consisting of an elongate portion in CuA_1–CuA_2, following CuA, slightly angled towards CuA_2, and two smaller spots in CuA_2–2A, the anterior quadrate, surrounding CuA_2, the

posterior reduced, drop-shaped, below the anal fold; one subapical hyaline spot in R_5–M_1; fringe brown. DHW homogeneous brown; fringe brown. VFW ground color dark brown; costal and outer area ferruginous red; CuA_2-2A area paler; subapical hyaline spot as on DFW; fringe as on DFW. VHW ground color red ferruginous, with a metallic silver spot in the inferior half of the discal cell; a postdiscal metallic silver band from $Sc+R_1$ to CuA_2, zig-zag patterned, and a circular postdiscal spot in CuA_2-2A proximally displaced; fringe as on DHW.

Abdomen: dorsally brown; ventrally ferruginous.

Male genitalia: tegumen rectangular, about twice as wide as long, distally narrowed; median apophysis of tegumen bifurcated, longer than fenestra, larger than half of fenestra; lateral apophysis of tegumen symmetrically pointed. Fenestra rectangular longer than wide. Saccus shorter than tegumen, lobed. Uncus as long as tegumen (including its median apophysis), distally narrowed, shallowly bifid, with two short, divergent arms. Gnathos divided and narrow. Valva somewhat ovoid, narrowed distally; harpe triangular, broad, with a narrow, curved and upturned projection, distally serrated and partially covered by several small spines; sacculus, costa and ampulla narrow. Aedeagus longer than valva; coecum short and undifferentiated, distal opening of aedeagus dorsal, anteriorly contiguous with the opening of the ejaculatory bulb; dorsal triangular lateral projections on distal part of aedeagus; no cornutus.

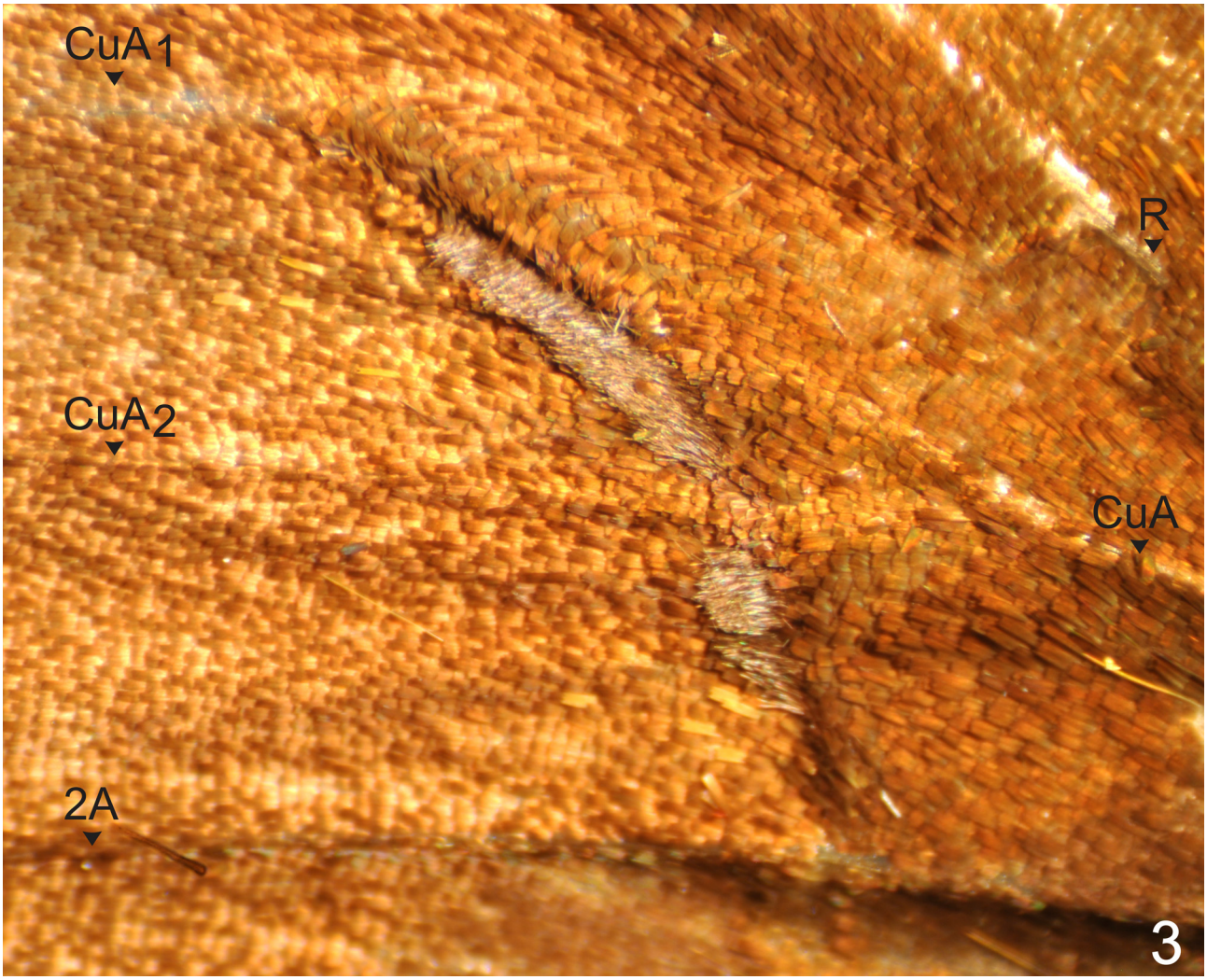


FIGURE 3. Left forewing of *Wahydra graslieae* A. Warren, Carneiro, & Dolibaina **sp. nov.** (holotype), showing general aspect of brand, with positions of wing veins indicated.

Female. unknown.

DNA barcode.

ACTTTATATTTTATTTTTGGTATTTGAGCAGGAATATTAGGAACTTCCCTAAGTTTATTAATTCGTAC
AGAATTAGGTAATCCAGGATCTTTAATTGGAGATGATCAAATTTATAATACTATTGTTACAGCTCATGCT

TTTATTATAATTTTTTTTATAGTTATACCTATTATAATTGGAGGATTCGGAAATTGATTAATTCCTTTAATAC
TAGGTGCTCCTGATATAGCTTTCCCTCGAATAAATAATATAAGATTTTGAATATTACCCCCTTCTTTAATA
TTACTAGTCTCTAGAAGAATTGTAGAAAATGGTGCAGGAACTGGTTGAACAGTTTACCCCCCCCTTTC
ATCTAATATTGCTCATCAAGGATCCTCTGTTGATTTAGCAATCTTTTCTCTTCATTTAGCTGGAATTTCCT
CTATTTTAGGAGCTATTAATTTTATTACTACAATTATTAATATACGAATTAAAAACATATCATTTGATCAAA
TACCTTTATTTGTATGATCAGTAGGAATTACAGCTTTACTTTTACTTTTATCATTACCAGTACTAGCTGGA
GCCATCACTATACTTTTAACTGATCGAAATTTAAATACATCTTTTTTTGATCCTGCAGGAGGAGGAGATC
CAATCTTATATCAACATTTA

Type material. The male holotype of *W. graslieae* **sp. nov.** has the following labels: white, handprinted: / ECUADOR: NAPO: / 14 km E of Yanayacu / Biological Station / along Cosanga River / 2400m, 17-June-2004 / Harold Greeney [*leg.*] / H09-2030, 11:30 hrs. /; white, printed and handprinted: / EC022 / *Wahydra* / E. Carneiro det. 2015 /; white, printed: / DNA sample ID: / NVG-5287 / c/o Nick Grishin /; red, printed: / HOLOTYPE / *Wahydra graslieae* / A. Warren, Carneiro & Dolibaina /. The holotype is deposited at MGCL.

Type locality. The holotype of *W. graslieae* **sp. nov.** was collected along the edge of secondary flood plain forest dominated by *Alnus* Mill. and *Piper* L.

Etymology. We are delighted to name this species in honor of Emily Graslie, Chief Curiosity Correspondent at the Field Museum (Chicago, Illinois, USA), in recognition of her efforts to promote natural history collections through her YouTube channel The Brain Scoop (https://www.youtube.com/user/thebrainscoop).

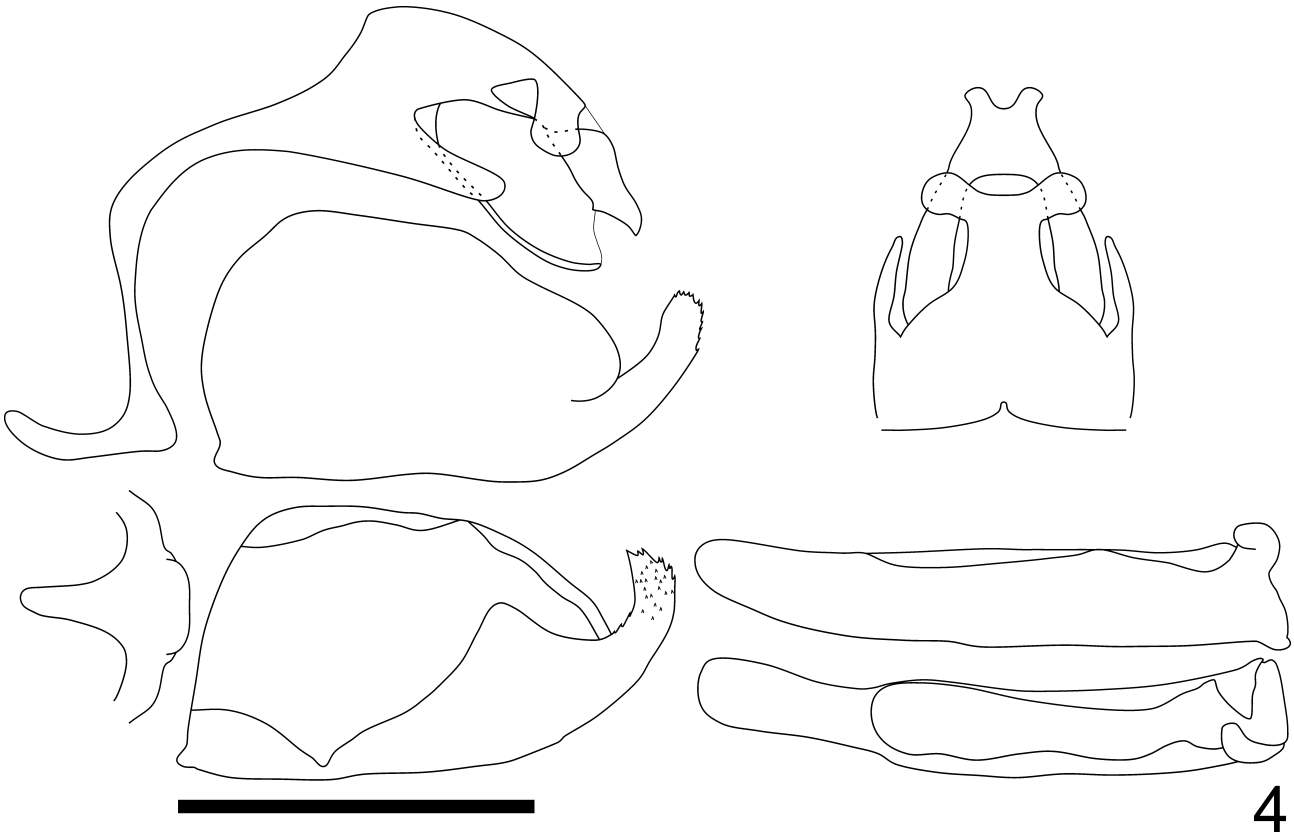


FIGURE 4. Male genitalia of *Wahydra graslieae* A. Warren, Carneiro & Dolibaina **sp. nov.** (holotype). Scale bar = 1 mm.

Discussion

With the description of *W. graslieae*, *Wahydra* now includes 15 species (Steinhauser 1991; Henao *et al.* 2015). The genus, however, remains easily recognizable, despite the stigma morphology resembling that of *Moeris* Godman, 1900 (Carneiro *et al.* 2015) and *Psoralis* Mabille, 1904 (Siewert et al. 2014). Male genitalia of *Wahydra* species share numerous characters, such as the well-developed median and lateral apophysis of the tegumen, which is diagnostic of the genus (Steinhauser 1991; Henao *et al.* 2015). However, it should be emphasized that most

Wahydra species are known from just one or a few male specimens, and females of many species remain unknown. The paucity of *Wahydra* specimens in South American collections is likely a result of insufficient sampling at high elevations, and failure of many Lepidoptera researchers to include Hesperiidae in their sampling efforts (Shapiro 1992). Additionally, meteorological conditions in high-elevation habitats favored by *Wahydra* species tend to restrict butterfly activity, making them difficult to collect. Therefore, the geographical distribution of most *Wahydra* species still remains to be circumscribed, and we can only speculate what the true diversity of the genus may actually be. Much more collecting of Hesperiidae at moderate and high-elevations in the Andes is needed to improve our knowledge of the distribution and diversity of the genus *Wahydra*.

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