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## Revalidation of an endemic Cuban Skipper, *Chiomara gundlachi* (Lepidoptera: Hesperiidae)

RAYNER NÚÑEZ<sup>1,4</sup>, TIM NORRISS<sup>2</sup>, DOUGLAS M. FERNÁNDEZ<sup>3</sup> & AXEL HAUSMANN<sup>1</sup>

<sup>1</sup>SNSB—Zoologische Staatssammlung Muenchen, Section Lepidoptera, Munich, Germany.

<sup>2</sup>40 Taskers Drive, Anna Valley, Andover, Hampshire, England SP11 7SA. E-mail: [tim@kitsmail.com](mailto:tim@kitsmail.com), [www.butterfliesofcuba.com](http://www.butterfliesofcuba.com)

<sup>3</sup>B No. 61 e/ 2da y 3ra, Caridad de Méndez, Camagüey 71100, Cuba

<sup>4</sup>Corresponding author. E-mail: [raynernunez75@gmail.com](mailto:raynernunez75@gmail.com)

In the present work we reassess the taxonomic status of one species of Hesperiidae, subfamily Pyrginae, originally described from Cuba. As part of a larger project on the Greater Antillean butterflies, we obtained COI barcode sequences for Cuban specimens of *Chiomara mithrax* (Möschler, 1879). The comparison of these sequences revealed deep divergences from others belonging to continental specimens. Inspired by these results we performed morphological comparisons including genitalia structures, which revealed correlating differences between specimens from Cuba and the continent. Therefore, we propose the necessary changes in its taxonomy.

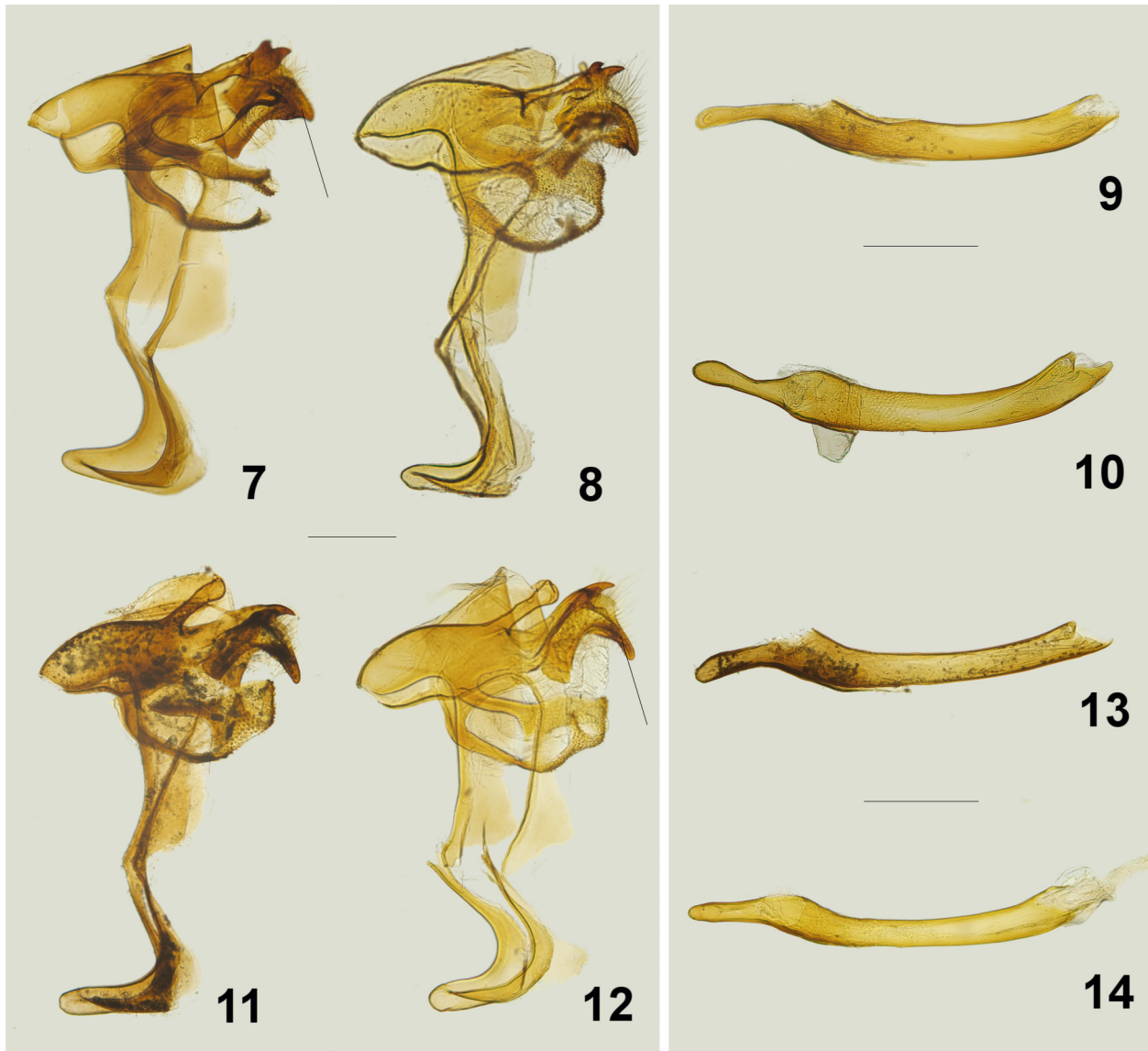
DNA extraction, PCR amplification, and sequencing of the COI barcode region were performed by the Canadian Centre for DNA Barcoding (CCDB). Polymerase chain reactions used the primer pair LepF1—ATTCAACCAATCATAAAGATATTGG and LepR1—TAAACTTCTGGATGTCCAAAAAATCA (Hebert *et al.* 2004) which recovers a 658 bp region near the 5' end of COI including the 648 bp barcode region for the animal kingdom (Hebert *et al.* 2003). Our two new sequences were submitted to GenBank: MK253654–55. COI barcode sequences of continental *C. mithrax* were downloaded from GenBank: JF777766, GU658613–14, GU658617–20, GU658246.. We examined adult specimens deposited at the Zoologische Staatssammlung München (ZSM), Munich, Germany and the Institute of Ecology and Systematics (CZACC) in Havana, Cuba. Genitalia dissections were made using standard techniques. Abdomens were soaked in hot 10% potassium hydroxide for one hour before dissection. The structures were then dehydrated in an alcoholic series and mounted on slides using Euparal.



**FIGURES 1–3.** Adults of *Chiomara gundlachi* **stat. rev.** 1—Outskirts of Vallecito village, Pinar del Río, Cuba. 2—same data, road kill. 3—La Movida, outskirts of Santa Clara city, Villa Clara Cuba. Photos: Tim Norriss.



**FIGURES 4–6.** Adults of *Chiomara mithrax*. 4—Chiriqui, Panama. 5—Sinaloa, Mexico. 6—Rio Grande do Sul, Brazil. Scale bar 10 mm.



**FIGURES 7–14.** Male genitalia of *Chiomara* species: genitalic ring and aedeagus. *C. mithrax*: genitalic ring, 7—Mexico, 8—Argentina; aedeagus, 9—Mexico, 10—Argentina. *C. gundlachi* **stat. rev.**: genitalic ring, 11–12 Western Cuba; aedeagus, 13–14 Western Cuba. Lateral view, scale bar 0.5 mm.

***Chiomara gundlachi* (Skinner and Ramsden, 1924), stat. rev.**

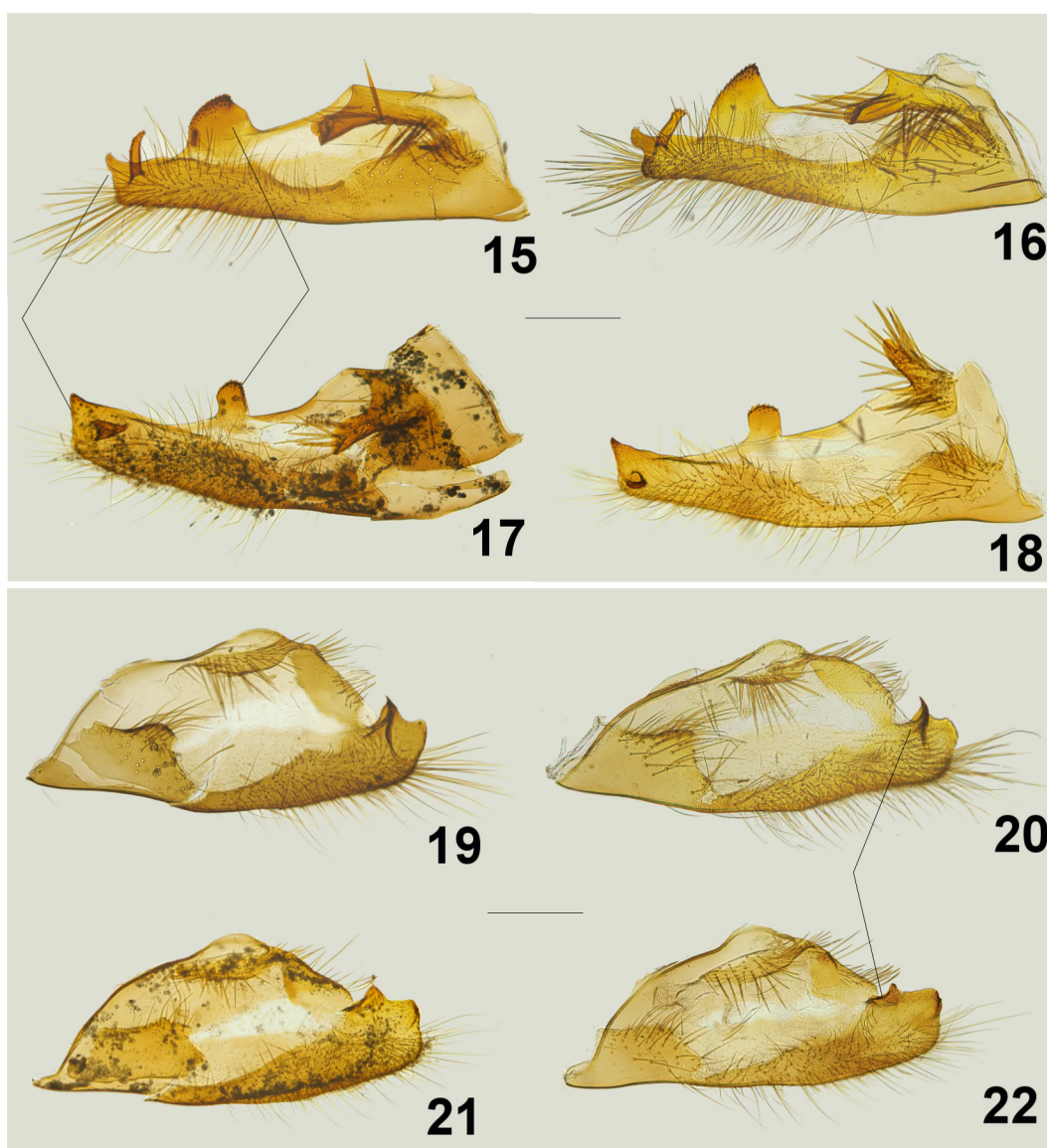
*Cyclogypha* [sic] *gundlachi* Skinner and Ramsden, 1924 was described from a single female taken at Río Seco, Guantánamo, Cuba. The species was not mentioned by Draudt in Seitz (1924) but Cuba was included within the range inhabited by *Chiomara mithrax* (Möschler, 1879), a very similar species. We do not know if the latter author examined Cuban specimens or if he just followed Godman & Salvin (1899) who described the genus *Chiomara* and recorded *C. mithrax* from Cuba. The first formal mention of *C. gundlachi* as a synonym of *C. mithrax* was made by Williams (1931). In either case, all authors after Draudt continued using *C. mithrax* when referring to the Cuban population (Torre 1954; Alayo & Hernández 1987; Smith *et al.* 1994; Mielke 2004, Hernández 2004). Among them, Bates (1935) recognized some differences between the type of *C. gundlachi* and North American specimens but with the type specimen as the only available material he was unable to recognize the Cuban population as a distinct species.

Besides the type, there are only three other known Cuban specimens of the species, all recorded as *Chiomara mithrax*. Alayo & Hernández (1987) mentioned one specimen from Siboney, near Santiago de Cuba, Eastern Cuba, collected in 1945. The same authors inspected another from Laguna de Piedra, 900 km to the West, in the Pinar del Río province (Hernández 2004). The last known Cuban record dates from 1992 and was taken at Cuba's western extreme in the forest of the Guanahacabibes Peninsula (Hernández *et al.*, 1994).

Here we report the fifth and sixth Cuban records: two males collected at Vallecito, Pinar del Rio, in June 2014, at the base of the Guanahacabibes Peninsula (Figs 1–2), and one photographed on the outskirts of Santa Clara, Villa Clara in central Cuba in March 2017 (Fig. 3). This latest record is the first from the central region, and was not unexpected though all previous ones were from the two ends of the island.

We obtained COI barcode sequences for both Vallecito specimens. The minimum pairwise distance between them and continental *C. mithrax* is 4.6%, being assigned to their own BIN in the Barcode of Life Data System (BOLD, www.boldsystems.org).

We reviewed two more Cuban specimens of *C. gundlachi*: the type and another deposited at the CZACC. All four specimens exhibit enlarged dark brown spots at the discal and post-discal bands on the forewing upper side (Figs 1–3). At the discal band, the spots are fused forming a solid band. We reviewed 36 continental specimens of *C. mithrax*, 13 deposited at the ZSM and 27 illustrated on BOLD and on the Butterflies of America (BoA) website including two syntypes of *C. mithrax* and one of its synonyms, *C. noctula* Plötz, 1884. In all continental specimens both bands have the spots reduced in size (Figs 4–6). The only exception is a Panamanian specimen at BoA, a female deposited in the United States National Museum, with a solid discal band, although it is narrower than in Cuban specimens. However, that specimen has a post-discal band formed from smaller spots as in other continental conspecifics.



**FIGURES 15–22.** Male genitalia of *Chiomara* species: left and right valvae. Left valvae, *C. mithrax*: 15—Mexico, 16—Argentina; *C. gundlachi* **stat. rev.**: 17, 18—Western Cuba. Right valvae, *C. mithrax*: 19—Mexico, 20—Argentina; *C. gundlachi*: 21, 22—Western Cuba. Lines indicating keys features (see text for details). Ventral view, scale bar 0.5 mm.

Genitalia dissections of males, there are no known females of *C. gundlachi* other than the holotype, also showed differences between continental (Figs 7–10, 15–16, 19–20) and Cuban specimens (Figs 11–14, 17–18, 21–22), especially in the shape of the different sclerotized processes on the costa of the left valva and near the apex of the right one, the valvae being asymmetric as in many other Pyrginae genera. The shape of the left valva apex of *C. gundlachi* (Figs 17–18) also differs from that of *C. mithrax* (Figs 15–16). In addition, there are some small differences in these features between our two dissected *C. mithrax*, from very distant continental localities, Mexico (Fig. 15) and Argentina (Fig. 16). However, the status of the different continental populations is beyond the scope of this paper. Concluding with the evidence above presented with propose the recognition of *Chiomara gundlachi*, **stat. rev.**, as a valid species, endemic from Cuba.

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