

First record of *Stempfferia insulana* (Aurivillius, 1923) from Gabon, Central-West Africa

Tom Jamonneau^{1,2,3}

¹ Université de Montpellier II, Place Eugène Bataillon, 34095 Montpellier, France

² Centre de Biologie pour la Gestion des Populations (CBGP), Montferrier-sur-Lez, France

³ Association Guibétois, 211 Chemin du triol, 34343 Viol-le-Fort, France

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Corresponding author: Tom Jamonneau (tom.jamonneau@etu.umontpellier.fr, tommalraux@gmail.com)

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Abstract

This note is grounded in the examination of Afrotropical butterflies belonging to the entomological collections at CBGP, Montpellier, France. In the course of historical specimen referencing, the species *Stempfferia insulana* (Aurivillius, 1923; Lycaenidae) was recorded from Gabon. This is the first report of this species for this country, and the most western data for this Central-Western African species.

Key Words

African butterflies, biodiversity, entomological collections, Lepidoptera, rain forests, species diversity

Introduction

Gabon, a country of approximately 268,000 square kilometers in Central-West Africa, is a biodiversity hotspot, notably being home to at least 1,100 butterfly species (superfamily Papilionoidea) as documented by Gael Vande Weghe (2010). The country's remarkable biodiversity can mainly be attributed to its equatorial location and the preservation and remoteness of its ecosystems, particularly its tropical rainforests (Sannier et al. 2016).

Gabon possesses substantial biodiversity potential. As a result, recent studies have revealed numerous new records and species across various taxa. Notable findings include reptiles (e.g., Pauwels et al. 2019), osteichthyan fish (e.g., Sullivan et al. 2016), birds (e.g., Schmidt et al. 2008), Coleoptera (e.g., Bartolozzi et al. 2010), as well as “moths” (e.g., Durante 2012; Bassi 2019). Despite Gael Vande Weghe's comprehensive work on Gabon's

butterflies in 2010, new species and records will continue to emerge, as exemplified by the recent description of a new *Charaxes* sp. species: *C. cristalensis* (Faravel and Bouyer 2022). The ongoing discovery of new species and records in Gabon may be attributed to at least three major factors. First, nearly 300 species may also be found in Gabon, as they are currently known to occur in neighbouring countries (Vande Weghe 2010). Second, extensive unexplored regions within Gabon provide opportunities for additional biodiversity revelations. Third, the presence of specimens in private or institutional collections that have not yet been identified to the species level, or that have not even been scientifically reported, highlights the potential for new discoveries, as exemplified in the current study.

Stempfferia is an Afrotropical genus classified within the Family Lycaenidae; Subfamily Poritiini; and Tribe Epitolini (Jackson 1962). It has undergone thorough

taxonomic and phylogenetic revisions (Libert 1999, 2020) and recent descriptions of taxa (Sáfián 2015; Sáfián et al. 2021) resulting in the recognition of 51 valid species. These forest species are poorly represented in collections (Vande Weghe 2010; Boireau, comm. pers. 2024). Furthermore, the genus harbours a singular ecology, being associated with arboreal *Crematogaster* sp. ants (Larsen 2005; Sáfián 2015), so that individuals are prone to be more common in higher layers of the forest, and in the surroundings of “ant-trees”. This implies that areas already “terrestrially” prospected might be inhabited by more *Stempfferia* species than those already found. This study documents the previously unreported presence of *Stempfferia insulana* in Gabon.

Material and methods

Collecting techniques

Mr. Henri-Pierre Aberlenc collected a *Stempfferia* specimen in February 1999 in the forest commonly referred to as the ‘Forêt des Abeilles’, and located between the cities of Lopé and Boué in the central region of Gabon. The collection site was the Makandé research camp (-0°41.366664'N, 11°55.083333'E (DDM)) (for further details, see Engwald 2004). The specimen was obtained during the ‘Radeau des Cimes’ scientific mission, and captured over the ground using a standard entomological net. To ensure rapid death, it was promptly euthanized, and then placed in a crystal paper envelope for preservation.

Collection and Identification

After the scientific mission, the specimen was archived in the entomological collection of the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) which was then transferred to the CBGP (Centre de Biologie pour la Gestion des Populations) a few years later. In 2022, the specimen was retrieved and identified. It is available at <https://www.inaturalist.org/observations/195188263>.

Identification was made using morphological discriminating criteria, particularly the key to discriminate males of the *S. cercene* group found in Mr. Libert’s revision (Libert 1999, p.64) and using the photographs available in the works of Michel Libert (1999, 2020) and Gaël Vande Weghe (2010). Comparisons were also done with other specimens (see below). The Gabon specimen was photographed at the CBGP using a vhx 5000 keyence microscope. Other photographs of *S. insulana* (2 males, 1 female) and of the two sister species *S. cercenoides* (2 males) and *S. cercene* (2 males, 1 female) were retrieved from the boldsystems online database (https://v3.boldsystems.org/index.php/Taxbrowser_Taxonpage?taxid=464823) and iNaturalist (<https://www.inaturalist.org/observations/102289840>) to illustrate morphological differences between species and sexes (Fig. 1C–R). Note that credits for these photographs belong to Mr. Libert and Mr. Desloges, and that other specimens are available at the same online locations.

All photographs were processed and edited with Adobe Photoshop 2020 and FastStone image viewer. When needed, measurements on the photographs were made using the free online tool Mesurim2 (<https://www.pedagogie.ac-nice.fr/svt/productions/mesurim2/>).

Results and discussion

As (i) the underside of the specimen is not white, the hindwings underside is extensively marked with white and there is no darkened median area separating the discal band from the basal one on the underside of the forewing, this specimen belongs to the *S. cercene* group. Females of the group are easily distinguishable from males since the suffusion of blue scales of the proximal part of the upper forewings is restricted, and is in great part replaced by white marks (Fig. 1). (ii) There is no obvious black spot on the forewing upperside; (iii) the anal vein is not apparent on the forewing upperside; (iv) the cubital vein of the forewings on the upperside is swollen at its base; (v) the hindwings (upperside) do not have a black margin; (vi) on the upperside, the forewings have androconial scales along about 50% of the anal vein; (vii) the costal margin is not narrowed. This leads to the identification of *S. insulana*. Other clues to rule out the two sister species, *S. cercenoides* and *S. cercene*, occurring in Gabon are as follows. Dorsally, males of *S. cercenoides* tend to show a slightly lighter blue, and generally about $\frac{2}{3}$ of the forewing is blue, while in *S. insulana* this ratio is about $\frac{3}{4}$. Males of *S. cercenoides* have a wing length (i.e., from the apex of the forewing to its insertion in the body) of 16–18 mm, whereas the values known for *S. insulana* range between 18 and 22 mm. A length of 20.1 ± 0.2 mm was found after several measurements for the Gabon individual. Besides, the underside of *S. insulana* exhibits finer grayish striations compared to *S. cercene*, and the presence of a darkish triangle in space 1b is more pronounced and extends further towards the outer margin for most males of *S. insulana* than those of *S. cercene*. One might also argue that three other species were recently described in the *S. cercene* group (Sáfián 2015; Sáfián et al. 2021), but they are not reported from Gabon. Additionally the closely related *S. katikae* is for the moment only known in the Nimba Mountains (Liberia), far (> 2000 km) from Gabon (Sáfián 2015). Eventually males of *S. salonga* and *S. buea* possess a black-streak at the end of the discal cell on the forewing upperside which is not the case for *S. insulana* males.

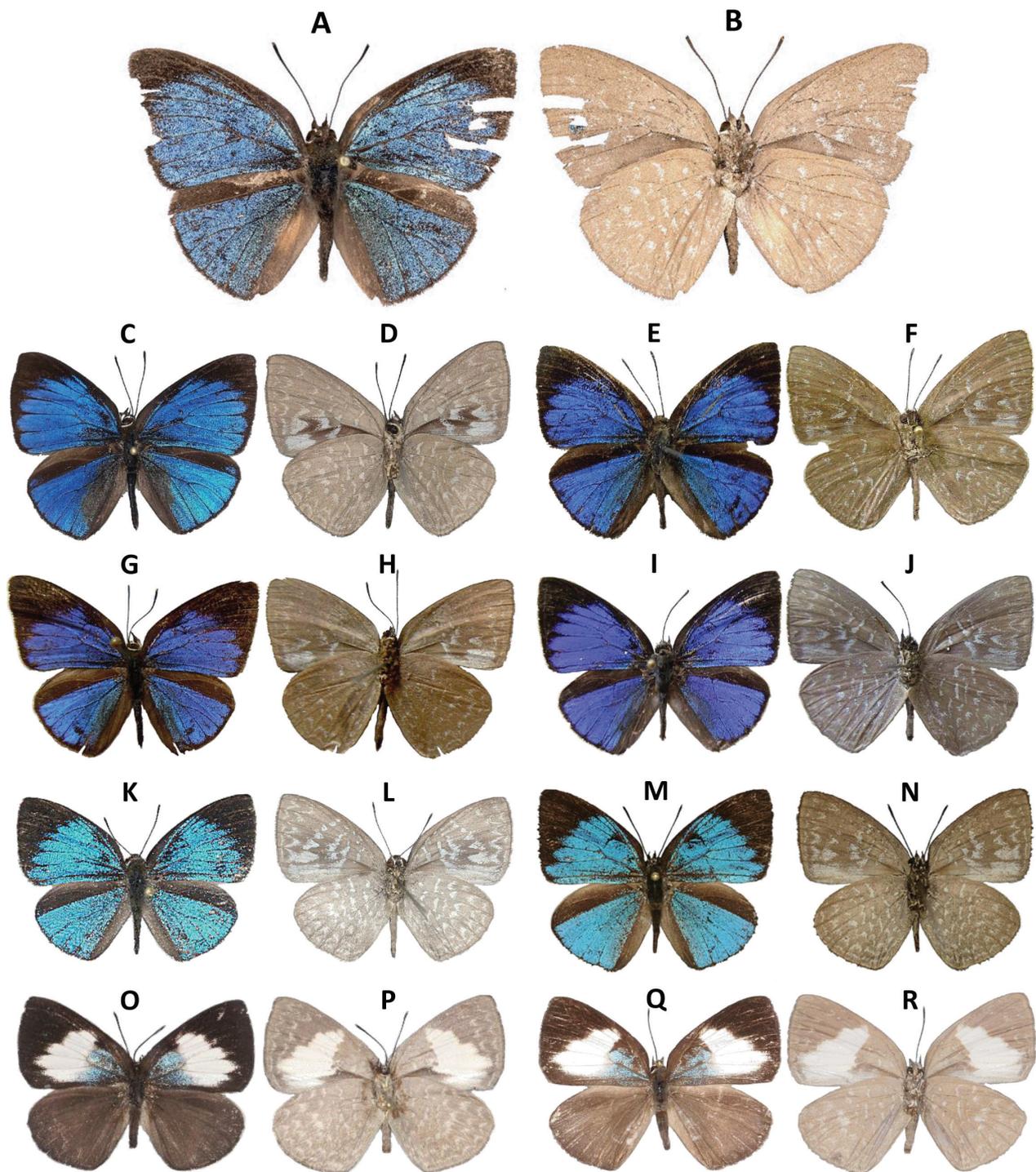


Figure 1. Habitus of nine *Stempfferia* sp. individuals; uppersides on the left and undersides on the right. **A, B.** The male *S. insulana* recorded from Gabon. **C–R.** Additional specimens retrieved. **C, D.** The male *S. insulana* MLIB2273; **E, F.** The male *S. insulana* MLIB-1917; **G, H.** The male *S. cercene* MLIB-1880; **I, J.** The male *S. cercene* MLIB-1485; **K, L.** The male *S. cercenoides* MLIB2292; **M, N.** The male *S. cercenoides* (ex. R. Ducarme) in coll. T. Desloges; **O, P.** the female *S. insulana* MLIB2279; **Q, R.** The female *S. cercene* MLIB-2337. The elements in the figures are not to the same scale.

To date, *S. insulana* has been documented in Cameroon (western regions), Equatorial Guinea (Bioko), Congo, Central African Republic, the Democratic Republic of Congo, Uganda, and northwestern Tanzania (Libert 1999, 2020; Williams 2018; Sáfián and Siklósi 2024). An updated distribution map, based on known occurrences, is

provided below (Fig. 2). The prior distribution, including its proximity to Gabon, along with the shared characteristics of rainforest ecosystems, provide support for this new record, as previously mentioned by Vande Weghe (2010).

This new record reinforces the value of the examination of biological material in entomological collections.



Figure 2. Up-to-date countries where *Stempfferia insulana* is known to occur in Central-West Africa. The dark orange dot is the new occurrence in Gabon. One should bear in mind that this map does not give a locally accurate distribution. For instance *S. insulana* is not found anywhere near the Tanzanian coast.

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Autor(en)/Author(s): Jamonneau Tom

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