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Further knowledge of the genus *Nyctobrya* Boursin, 1957 from the Canary Islands (Spain), with description of a new species from El Hierro (Lepidoptera: Noctuidae)

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Abstract

It describes *Nyctobrya ingridae* Falck, sp. nov. and record *N. canaria* (Alphéraky, 1890) for the first time from the Canary Island, El Hierro, Spain. Photographs of adults and genitalia of the new species are provided. Both species are DNA barcoded. Both morphology and analyses of DNA barcodes support the identification and distinctiveness of the new species as it appears well-supported and genetically isolated.
Keywords: Lepidoptera, Noctuidae, new species, new record, DNA barcodes, Canary Islands, Spain.

Profundización en el conocimiento del género *Nyctobrya* Boursin, 1957 de las Islas Canarias (España), con descripción de una nueva especie de El Hierro (Lepidoptera: Noctuidae)

Resumen

Se describe *Nyctobrya ingridae* Falck, sp. nov. y se registra *N. canaria* (Alphéraky, 1890) por primera vez de la isla canaria de El Hierro, España. Se presentan fotografías de adultos y genitalia de la nueva especie. Ambas especies tienen ADN códigos de barras genéticos. Tanto la morfología como los análisis de los ADN códigos de barras, apoyan la identificación y el carácter distintivo de la nueva especie, ya que parece bien sustentada y aislada genéticamente.
Palabras clave: Lepidoptera, Noctuidae, nueva especie, nuevo registro, ADN código de barra, Islas Canarias, España.

Introduction

The genus *Nyctobrya* Boursin, 1957 (Noctuidae) is treated in three relatively recent papers: Behounek & Speidel (2013), Fischer & de Freina (2014) and Falck & Karsholt (2022) with description of three new species. Hitherto six species are known: *N. simonyi* (Rogenhofer, 1889), *N. canaria* (Alphéraky, 1889), *N. maderensis* (Bethune-Baker, 1891), *N. pinkeri* Behounek & Speidel, 2013, *N. hierroana* Fischer & de Freina, 2014 and *N. vilfredi* Falck & Karsholt, 2022.

Fieldwork undertaken in the Canary Island, El Hierro from the end of July until the beginning of August 2022 by the author revealed several new records of Lepidoptera. The most surprisingly record is that of an unknown *Nyctobrya*-species dealt with in the present paper.

Material and methods

Al the specimens were attracted to an 8-watt super actinic light. Genitalia were dissected and prepared following Robinson (1976). Adults were photographed with a Canon EOS 700D camera equipped with a Canon EF 100 mm objective. The genitalia slides were photographed using a Soptop CX40T Trinocular microscope in conjunction with a Toup Tek P10500A-E3 / E3ISPM05000KPA-E3 / 5.0MP USB3 camera.

DNA samples were prepared from dried legs according to the prescribed standards and processed at the Canadian Centre for DNA Barcoding (CCDB, Biodiversity Institute of Ontario, University of Guelph) to obtain the 658 base-pair long barcode fragment of the mitochondrial COI gene (cytochrome c oxidase I). Intra- and interspecific distances of DNA barcode fragments were calculated using analytic tools of BOLD with the Kimura 2-parameter model of nucleotide substitution. Genetic clusters are presented with their barcode index number (BIN; cf. Ratnasingham & Hebert, 2013). A neighbour-joining tree was constructed using analytic tools of BOLD with the Kimura 2-parameter model and COI-5P Cytochrome Oxidase Subunit 1-5' Region (15) as marker. Details of successfully sequenced voucher specimens are publicly available through the dataset DS-NYCTOB at www.boldsystems.org and at dx.doi.org/10.5883/DS-NYCTOB.

Abbreviations used

GP Genitalia preparation
PF Collection of Per Falck, Neksø, Denmark
MNCN Collection of Antonio Vives, Museo Nacional de Ciencias Naturales, Madrid, Spain

Results

Nyctobrya ingridae **Falck, sp. nov.** (Figures 1-3, 3a, 5)

Holotype ♂: Spain, El Hierro, Sabinosa, 100 m, 22-VII-3-VIII-2022, leg. P. Falck (MNCN).

Paratypes: Spain, El Hierro, Sabinosa, 100 m, 2 ♀, 22-VII-3-VIII-2022, leg. P. Falck, genitalia slide 3754PF; Tacorón, 170 m, 3 ♂, 5 ♀, 22-VII-3-VIII-2022, leg. P. Falck; Frontera, 280 m, 2 ♂, 1 ♀, 22-VII-3-VIII-2022, leg. P. Falck, genitalia slide 3755PF, DNA samples Lepid Phyl 1134PF/ CILEP1133-23, 1135PF/CILEP1134-23 (PF).

Description: Male. Wingspan 14-17.5 mm. Labial palp upturned, segment 2 with dark brown scale-tuft mottled with beige, segment 3 slightly shorter than segment 2, slender, dark brown mottled with beige medially and towards the tip. Antenna black, with relatively long ciliae approximately three times the length of the antenna diameter. Head and neck brownish; tegula and thorax dark brown. Forewing ground colour olive-brown; basal patch black; antemedian fascia black more or less confluent with claviform and orbicular stigmata, reniform stigmata blackish brown; antemedian fascia black; postmedian and subterminal fasciae jagged, blackish brown; at costa near apex and above tornus two irregular blackish spots; fringe brownish grey. Hindwing brownish grey, slightly paler at base; discal spot clearly recognizable; fringe brownish grey. Abdomen brown.

Female: Antenna with much shorter cilia than in the male. Ground colour dark brown. Wing pattern as in male, but less distinct.

Male genitalia (Figures 3, 3a): Uncus long and spatulate. Tegumen sub-triangular. Valva basally relatively broad, slightly narrowing distally; ventral edge apically pointed. Ampulla long and evenly curved. Juxta trapezoid, anteriorly acute. Phallus relatively short and broad, vesica with a large group of relatively small cornuti.

Female genitalia (Figure 5): Ostium membranous, narrow and rounded. Ductus bursae relatively long and broad, slightly sclerotized, transition to ostium short, constricted and membranous. Corpus bursae membranous, very long almost parallel-sided, posterior apex rounded, slightly sclerotised.

DNA barcodes (Figure 7): Two specimens were sequenced resulting in full length DNA barcodes (658 bp) for both specimens. The barcodes fall within Barcode Index Number (BIN) BOLD: AEU9813. The intraspecific distance is 0%. The minimum p-distance to nearest neighbour *N. canaria* is 3.04%, with the Barcode Index Number (BIN) BOLD: AEE9801. The result supports the status of *N. ingridae* sp. nov. as a separate species.

Diagnosis: *N. ingridae* resembles the other members of the genus. It differs by the much smaller wingspan (21-28 mm in the other species with the exception of *N. simonyi debilis* (Rebel, 1894) with a wingspan of 18.5-21mm) and the less contrasting forewing without white and orange mottling. Males differs from *N. canaria* and *N. vilfredi* by the longer ciliae of the antenna; in *N. canaria* and *N. vilfredi* the length of the ciliae are approximately as long as the diameter of the antenna. In the male genitalia *N. ingridae* differs from *N. canaria* by the lack of triangular projection distally at costa and the larger cornuti. From *N. vilfredi* it differs by the slenderer valva, the larger projection apically of the ventral edge of valva and the larger cornuti. From *N. simonyi*, *N. pinkeri*, *N. hierroana* and *N. maderensis* it differs by the lack of the large and robust cornutus. In the female genitalia it differs from all other members of the genus by the very long and narrow corpus bursae.

Biology: Early stages unknown. The specimens were attracted to light from late July to early August relatively close to the coast.

Distribution: Known only from the southern and northern part of the island of El Hierro, Spain. The species is probably endemic to El Hierro.

Etymology: The species name is dedicated to my newborn granddaughter Ingrid.

Nyctobrya canaria (Alphéraky, 1890) (Figures 4, 4a, 6)

Bryophila algae var. *canaria* Alphéraky, 1890, in Romanoff. *Mém. Lép., 5,* 224, pl. 11, fig. 5

Material examined: Spain, El Hierro, Frontera, 280 m, 2 ♀, 22-VII-3-VIII-2022, leg. P. Falck, genitalia slide 3772PF, 3820PF, DNA samples Lepid Phyl 1131PF/CILEP1130-22, 1235PF/CILEP1234-23; Jinama, 1250 m, 1 ♂, 22-VII-3-VIII-2022, leg. P. Falck, genitalia slide 3773PF; Cruz de Las Reyes, 1360 m, 1 ♀, 22-VII-3-VIII-2022, leg. P. Falck, genitalia slide 3775PF, DNA sample Lepid Phyl 1236PF/CILEP1235-23 (PF). First records from El Hierro.

DNA barcodes (Figure 7): Three specimens were sequenced resulting in 658 bp, full length DNA barcode fragments for two specimens and fragments of 640 bp for one specimen. The barcodes fall within Barcode Index Number (BIN) BOLD: AEU9814. The intraspecific distance is 0%. The minimum p-distance to nearest neighbour *N. canaria* (the La Gomera and Tenerife populations) is 2.88%, with the Barcode Index Number (BIN) BOLD: AEE9801.

Distribution: Hitherto known from La Palma (Behounek & Speidel, 2013), La Gomera and Tenerife.

Remarks: The adults and genitalia of both sexes are figured by Behounek & Speidel (2013, p. 161-163) and Falck & Karsholt (2022, pp. 159, 162, 164).

Although the minimum uncorrected p-distance between the populations from La Gomera, Tenerife and El Hierro is above the 2% threshold suggested as a putative guideline for species delimitation by Hebert et al. (2003), it was not possible to separate the two populations by differences neither in adult appearance nor in the morphology of the genitalia (see figures 4, 4a, 6).

For comparison a Neighbor-joining tree of DNA barcodes from all species known in the Canary Islands is provided (Figure 7).

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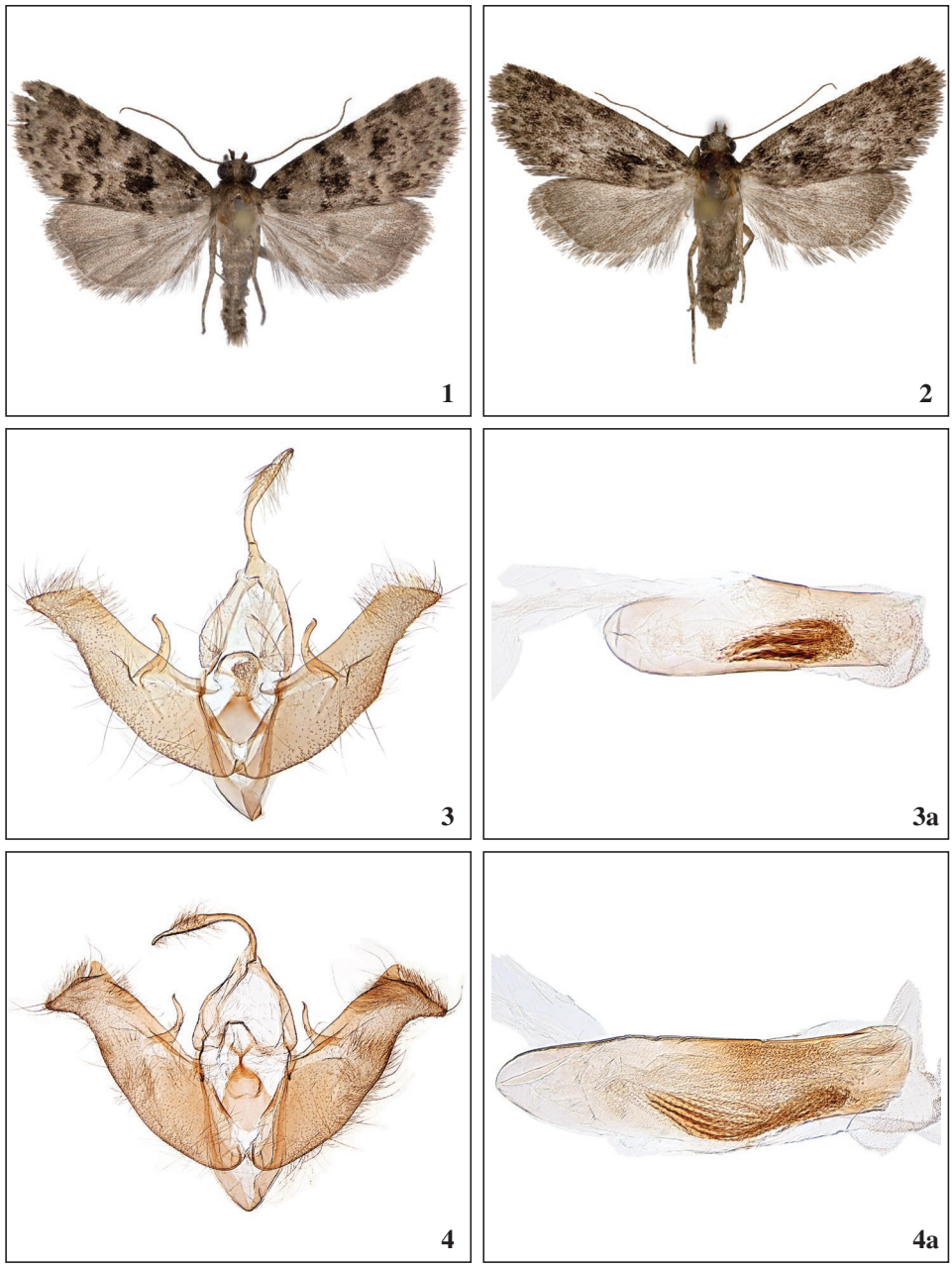

Figures 1-4a. 1. *Nyctobrya ingridae* Falck, sp. nov., ♂, El Hierro, 17.5 mm. **2.** *Nyctobrya ingridae* Falck, sp. nov., ♀, El Hierro, 15.5 mm. **3.** *Nyctobrya ingridae* Falck, sp. nov., male genitalia, GP3755PF. **3a.** Phallus, GP3755PF. **4.** *Nyctobrya canaria* (Alphéraky, 1890), male genitalia, GP3773PF. **4a.** Phallus, GP3773PF.

Figures 5-6. 5. *Nyctobrya ingridae* Falck, sp. nov., female genitalia, GP3754PF. **6.** *Nyctobrya canaria* (Alphéraky, 1890), female genitalia, GP3754PF.

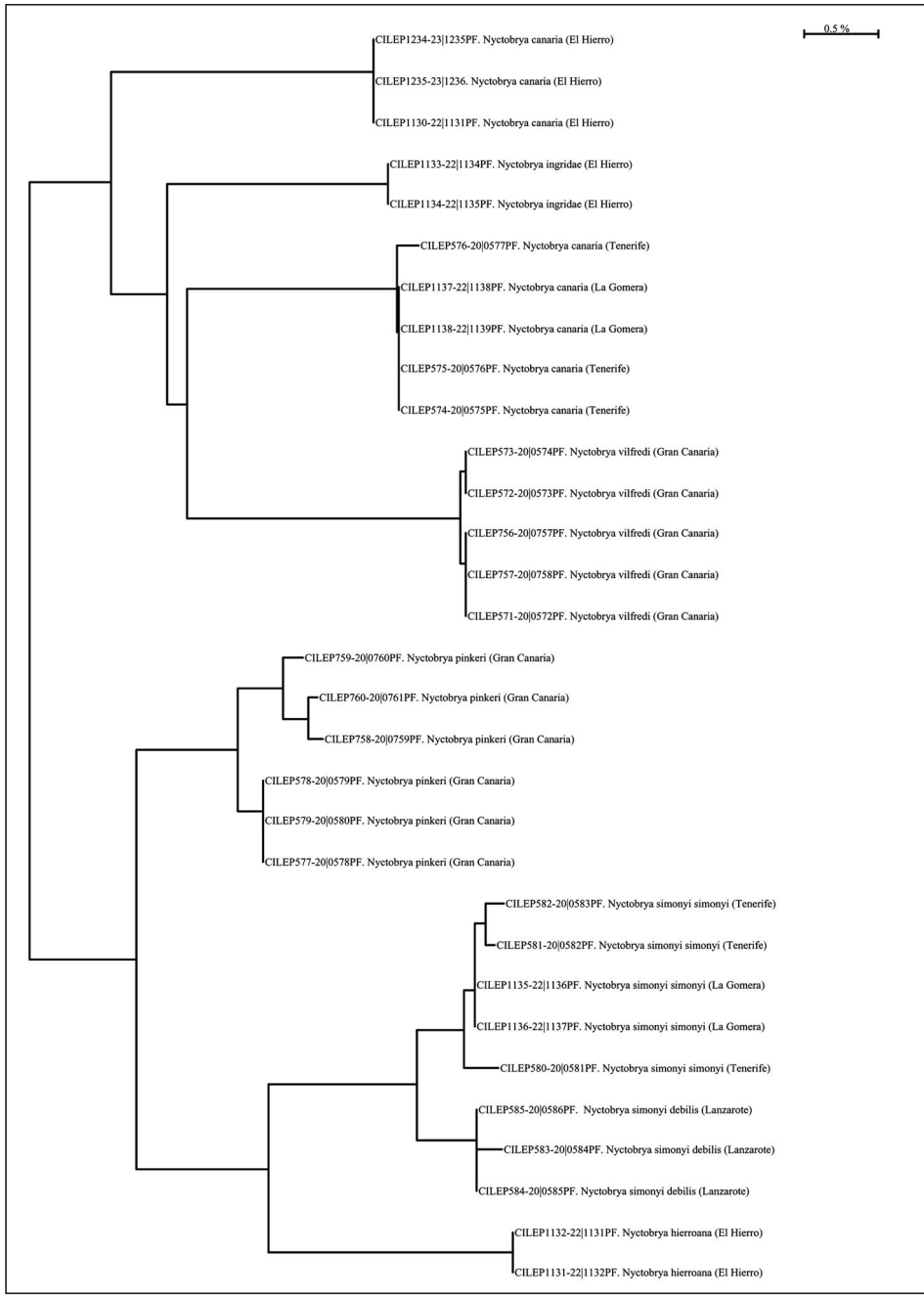

Figure 7. Neighbor-joining tree of DNA barcodes of six *Nyctobrya*-species from the Canary Islands.