

# *Scopula villumi* Falck & Hausmann, sp. n. from Tenerife, Canary Islands, Spain (Lepidoptera: Geometridae, Sterrhinae)

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## Abstract

*Scopula villumi* Falck & Hausmann, sp. n. is described, based on specimens from Tenerife, Canary Islands (Spain). Adults, male and female genitalia are figured. DNA barcodes (COI) are analyzed. A differential analysis from the closest related species, *Scopula rufomixtaria* (Graslin, 1863), and from the Canary Island congener *S. asellaria* (Herrich-Schäffer, 1847) is given.

KEY WORDS: Lepidoptera, Geometridae, Sterrhinae, *Scopula*, new species, Tenerife, Canary Islands, Spain.

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## Resumen

Se describe *Scopula villumi* Falck & Hausmann, sp. n., basada sobre especímenes de Tenerife, Islas Canarias (España). Se figuran adultos y genitalia del macho y de la hembra. Se analiza el ADN código de barras genético (COI). Se da un análisis diferencial de las especies relativamente próximas, *Scopula rufomixtaria* (Graslin, 1863) y de su congénere en las Islas Canarias *S. asellaria* (Herrich-Schäffer, 1847).

PALABRAS CLAVE: Lepidoptera, Geometridae, Sterrhinae, *Scopula*, especie nueva, Tenerife, Islas Canarias, España.

## Introduction

The Macroheterocera of the Canary Islands are considered well-known. The most comprehensive studies of the Macroheterocera of the Canary Island are those published by REBEL & ROGENHOFER (1894), REBEL (1896-1938) and PINKER (1960-1978). Further information can be found in scattered publications in various entomological journals.

Checklists of the Lepidoptera of the Canary Islands have been published by BÁEZ (2010) and VIVES MORENO (2014). In the present paper we refer to the latter. BACALLADO *et al.* (2005) updated the inventory of Canarian representants of the subfamily Sterrhinae (Lepidoptera: Geometridae), recording 18 species. In the most recent checklist (VIVES MORENO, 2014) three species are added: *Idaea nigra* Hausmann & Bläsius, 2007, *Idaea laevigata* (Scopoli, 1763) (VIVES MORENO, 2014, with comment on page 797) and *Scopula imitaria* (Hübner, [1799]), the last without any comments.

During field work in Tenerife in 2019, the first author collected some specimens of an unknown *Scopula* (*Glossotrophia*) species. It could easily be separated from *Scopula guancharia* (Alphéraky, 1889) and *Scopula asellaria* (Herrich-Schäffer, 1847), both species quite commonly occurring in the

Canary Islands, by the three black spots on the forewing costa, and by the black, large and diffuse discal spots. Review of relevant literature revealed another specimen most likely belonging to this unknown *Scopula* species (BACALLADO & PINKER, 1982: 4, lám. II, fig. 11). The authors hesitated to describe the new species, because of the lack of specimens.

## Material and methods

All the specimens south of Aguamansa were attracted to an 8 Watt super actinic light. Data of the holotype is cited literally from the label.

Three specimens were subjected to DNA barcoding (sequencing of the 658 bp “barcode” fragment of the mitochondrial COI gene). The genetic distances (minimum pairwise distances) were calculated using the analytic tools in the Barcode of Life Data Systems (BOLD; cf. RATNASINGHAM & HEBERT, 2007). Genetic clusters are presented with their barcode index number (BIN; cf. RATNASINGHAM & HEBERT, 2013). Molecular data are accessible in the public dataset DS-VILLUMI on BOLD (<https://dx.doi.org/10.5883/DS-VILLUMI>).

The photographs of adult specimens were taken with Canon EOS700D camera, photographs of the genitalia by using a Soptop CX40T Trinocular microscope and a Toup Tek P10500A-E3 / E3ISPM05000KPA-E3 / 5.0MP USB3 camera.

## Abbreviations used

- PF Collection of Per Falck, Neksø, Denmark  
 MNCN Collection of Antonio Vives, Museo Nacional de Ciencias Naturales, Madrid, Spain  
 MCNT Museo de Ciencias Naturales de Tenerife  
 ZSM Collection Zoologische Staatssammlung München, Germany

## Results

### *Scopula villumi* Falck & Hausmann, sp. n.

Holotype ♂: SPAIN, TENERIFE, 8 km. s. Aguamansa, 1700 m, 21-V-3-VI-2019, leg. P. Falck” (ZSM). Paratypes: SPAIN, TENERIFE, La Fortaleza, 2050 m, 1 ♂, VII-1976, leg. J. Bacallado (MCNT); Villafior, Las Lajas, 1800 m, 1 ♂ (abdomen missing). 24-IV-1998, leg. K. Larsen (coll. P. Skou); 8 km. s. Aguamansa, 1700 m, 4 ♂♂, 3 ♀♀, 21-V-3-VI-2019, leg. P. Falck. Genitalia slides 3065PF, 3279PF, 3285PF, 3286PF. DNA sample IDs BC ZSM Lep 106874, BC ZSM Lep 106875, BC ZSM Lep 106876 (PF, MNCN).

Description (Figs 1-3): Wingspan ♂ and ♀ 22-26 mm. Apex of forewing pointed; ground colour of wings whitish, often with strong sand coloured tinge, and strongly suffused with blackish-brown scales; transverse lines diffuse, postmedial line and subterminal line better marked, on the forewing costa three diffuse black spots; discal spots large and diffuse; fringe dots conspicuous. Underside of the wings uniform dark grey. Proboscis very long (approx. 10 mm). Labial palpus short, sandy coloured, dorso-laterally brownish. Frons dark brown. Vertex, collar and thorax sandy coloured, the last with few black scales. Antennae of ♂ filiform, ciliate-fasciculate, length of cilia about 1.6-2.0 times width of flagellum. Hindtibia of ♂ without pencil, and without spurs.

Male genitalia (Figs 4, 4a): Uncus broad, sub-triangular. Socii long and slender. Saccus rounded, sub-triangular. Anellus with inner ring modified to a conical tube; lateral process of anellus short and rounded. Valvula slender, apex rounded; fibula broad, strongly sclerotized. Aedeagus straight and slender. Sternum A8 (Fig. 4b) basally with a short, broad and rounded projection; cerata symmetrical, short, straight and pointed. So far, no polymorphism in cerata length has been observed (n=4) (cf. HAUSMANN, 1999).

Female genitalia (Figs 5, 5a): Posterior apophysis twice as long as anterior apophysis. Antrum

narrow, laterally strongly sclerotized, posteriorly dilated, covered with a barrel-shaped, posteriorly distinctly concave, large sclerite. Ductus bursae narrow, almost with parallel sides. Corpus bursae oval, signum with laterally pointed spines. Lamella antevaginalis strongly sclerotized, sub-triangular anteriorly pointed and bent medially, corrugated.

Molecular diagnosis: BIN: BOLD:AEB8999. Maximum intraspecific variation 0.16 %, corresponding to one base pair (n=3). Diverging (minimum pairwise distance) by 2.7% from the genetically closest neighbour, the Moroccan populations of *S. rufomixtaria* (Graslin, 1863), by 2.9% from the Spanish populations of *S. rufomixtaria*.

Differential diagnosis: *Scopula villumi* Falck & Hausmann, sp. n. can be distinguished from *S. rufomixtaria* (Graslin, 1863) and *S. asellaria* (Herrich-Schäffer, 1847) by the pointed forewing, the three black costal spots on the forewing, and the large, diffuse discal spots. In the male genitalia it differs from *S. rufomixtaria* by the broader base of fibula, the more straight aedeagus, the shorter and sub-triangular base of sternum A8 and by the shorter and straight cerata. From *S. asellaria* it differs by the longer proboscis, in genitalia by the broader and more rounded lateral processus of anellus, longer, socii, longer projection at the base of sternum A8, and the longer and pointed cerata. In the female genitalia it differs from *S. rufomixtaria* and *S. asellaria* by the sub-triangular lamella antevaginalis.

Biology: The early stages are unknown. The specimens were collected at light from late April to July.

Distribution: Known only from a few localities in Tenerife at altitudes between 1700 m and 2050 m. The species is most likely an endemic species.

Etymology: The species is named after the first author's grandson Villum.

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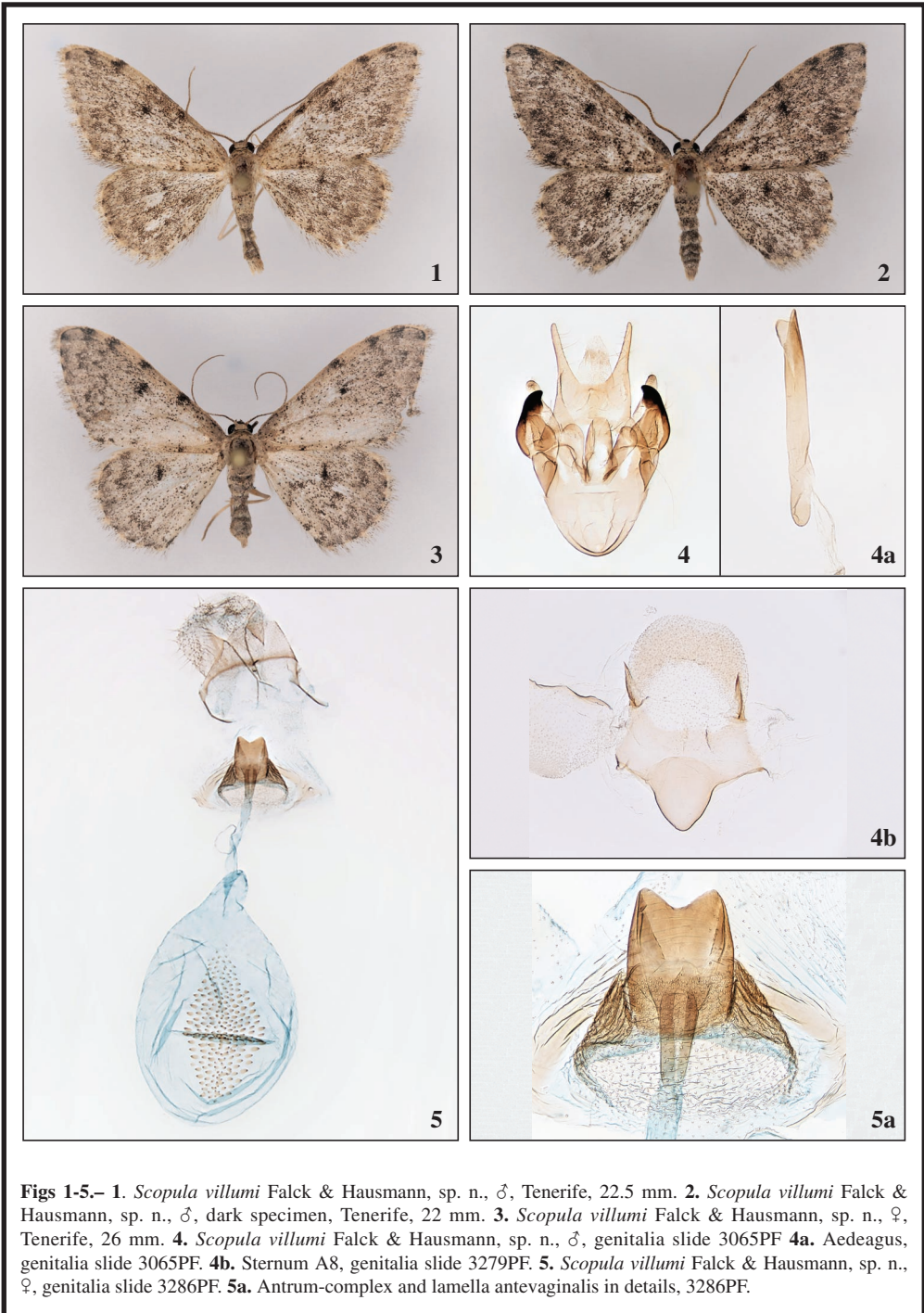
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**Figs 1-5.**– 1. *Scopula villumi* Falck & Hausmann, sp. n., ♂, Tenerife, 22.5 mm. 2. *Scopula villumi* Falck & Hausmann, sp. n., ♂, dark specimen, Tenerife, 22 mm. 3. *Scopula villumi* Falck & Hausmann, sp. n., ♀, Tenerife, 26 mm. 4. *Scopula villumi* Falck & Hausmann, sp. n., ♂, genitalia slide 3065PF. 4a. Aedeagus, genitalia slide 3065PF. 4b. Sternum A8, genitalia slide 3279PF. 5. *Scopula villumi* Falck & Hausmann, sp. n., ♀, genitalia slide 3286PF. 5a. Antrum-complex and lamella antevaginalis in details, 3286PF.