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Scrobipalpa antoniovivesi Huemer, sp. n., a remarkable new species from Spain (Lepidoptera: Gelechiidae)

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Abstract

Scrobipalpa antoniovivesi Huemer, sp. n., a new species of the tribe Gnorimoschemini, family Gelechiidae, is described from Spain (Huesca). The adult and male genitalia are figured, whereas the female sex remains unknown. The nearest species *S. dorsolutea* Huemer & Karsholt, 2010 is only known from the southern Ural Mountains. (Russian Federation). However, the new species differs both morphologically and in the DNA barcode from this taxon and all other known representatives of the genus.
KEY WORDS: Lepidoptera, Gelechiidae, *Scrobipalpa*, new species, Spain.

Scrobipalpa antoniovivesi **Huemer, sp. n., una remarcable especie nueva de España (Lepidoptera: Gelechiidae)**

Resumen

Se describe una especie nueva de la tribu Gnorimoschemini, familia Gelechiidae, de España (Huesca) *Scrobipalpa antoniovivesi* Huemer, sp. n. Se representa la genitalia del macho y del adulto, mientras que la hembra permanece desconocida. La especie más cercana es *S. dorsolutea* Huemer & Karsholt, 2010 sólo se conoce en las montañas del sur de los Urales (Federación Rusa). Sin embargo, la nueva especie difiere tanto morfológicamente, como en el código de barras del ADN de este taxón y de todos los demás representantes conocidos del género.
PALABRAS CLAVE: Lepidoptera, Gelechiidae, *Srobipalpa*, nueva especie, España.

Introduction

Scrobipalpa is an extraordinary diverse genus of Gelechiidae, with an estimated 400 species, mainly distributed in the Palearctic region. Many species have been described by the late prof. Dalibor Povolný in numerous papers and adults figured in colour in a monograph (POVOLNÝ, 2002). The European fauna was revised by HUEMER & KARSHOLT (2010) who described 13 new species and gave an update in a new checklist of European Gelechiidae (HUEMER & KARSHOLT, 2020). In addition, several smaller or larger papers have dealt with the taxonomy of one or few species or with regional faunas of *Scrobipalpa*, resulting in numerous additional descriptions, mainly from Asia (i.e., BIDZILYA, 2009, 2012; BIDZILYA & LI, 2010; FALKOVITSH & BIDZILYA, 2009; LI & BIDZILYA, 2019). Molecular data only point to moderately few additional species from Europe (HUEMER *et al*., 2020) one of which is here described as new.

Material and methods

Specimens: Material used in this study was traditionally set and dried or pinned and subsequently

spread. Genitalia preparations followed standard techniques (ROBINSON, 1976), adapted for the male genitalia of Gelechiidae by the "unrolling technique" as described by PITKIN (1986).

Tissues (dried legs) to obtain DNA barcodes of the mitochondrial COI gene (cytochrome c oxidase I) were prepared according to the prescribed standards and processed at the Canadian Centre for DNA Barcoding (CCDB, Biodiversity Institute of Ontario, University of Guelph) using the standard high-throughput protocol described in DEWAARD *et al.* (2008). Results are based on a recently published analysis (HUEMER *et al*., 2020), covering 96 named European species, publicly available in the dataset "DS-GELECHEU Lepidoptera (Gelechiidae) of Europe" dx.doi.org/10.5883/DS-GELECHEU in the Barcode of Life Data Systems (BOLD systems v. 4.0. http://www.boldsystems.org (RATNASINGHAM & HEBERT, 2007). 18 European species remained without sequences (HUEMER *et al*., 2020), but these and a recently described additional species (LERAUT, 2020) were compared from morphology. Additionally, morphology of extra-European Palearctic species was assessed for eventual conspecificity.

Intra- and interspecific distances of DNA barcode fragments were calculated using analytical tools of BOLD under the Kimura 2-parameter model of nucleotide substitution. A Neighbor-joining tree of the new taxon and the five nearest species in BOLD was constructed using MEGA 6 (TAMURA *et al.*, 2013). For each of these six species a Barcode Identification Number (BIN) is provided, which is automatically calculated for records in BOLD that are compliant with the DNA Barcode standard (RATNASINGHAM & HEBERT, 2013).

Photographic documentation: Photographs of the adults were taken with an Olympus SZX 10 binocular microscope and an Olympus E 3 digital camera and treated using the software Helicon Focus 4.3, Adobe Photoshop CS4, and Lightroom 2.3 software's. Genitalia photographs were taken with an Olympus E1 Digital Camera through an Olympus BH2 microscope.

Results

Molecular analysis

DNA sequencing resulted in barcode fragments of > 500 bp for 382 specimens and 8 sequences < 500 bp, covering 96 nominal European species of *Scrobipalpa*. Analysis reveals low intraspecific variation of 0.23%, however, based on small numbers of sequences per species. Interspecific distances to the nearest neighbours are much higher with 4.24% on average, ranging from minimum 0.35% to maximum 9.28%. The distance of *S. antoniovivesi* Huemer, sp. n. and *S. dorsolutea* is 4.17% and just in the medium range of barcode gaps between nearest neighbours. Only few additional species in BOLD are at a distance of ca. 5% (fig. 1).

Taxonomy

Scrobipalpa antoniovivesi Huemer, sp. n.

Material examined: Holotype ♂, SPAIN, Huesca, Puente de Montañana, 0º43.49'E, 42º9.23'N, 15-VII-2021, leg. Huemer & Mayr, TLMF 2013-011; DNA barcode ID TLMF Lep 22269; gen. slide P. Huemer GEL 1321 ♂ (coll. Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria).

Diagnosis: *Scrobipalpa antoniovivesi* Huemer, sp. n. is similar to *S. dorsolutea* Huemer & Karsholt, 2010 (figs 2-3) and *S. voltinella* (Chrétien, 1898) in external appearance and only weakly differs from the former by the darker colour of the thorax and tegula and from the latter by the largely reduced black spots. However, better diagnostic characters are found in the male genitalia morphology which groups the species next to *S. dorsolutea*, but have a slenderer tegumen, a distinctly longer valva without truncate apex, an in relation to valva distinctly shorter sacculus, and a longer and slenderer saccus (figs 4-5).

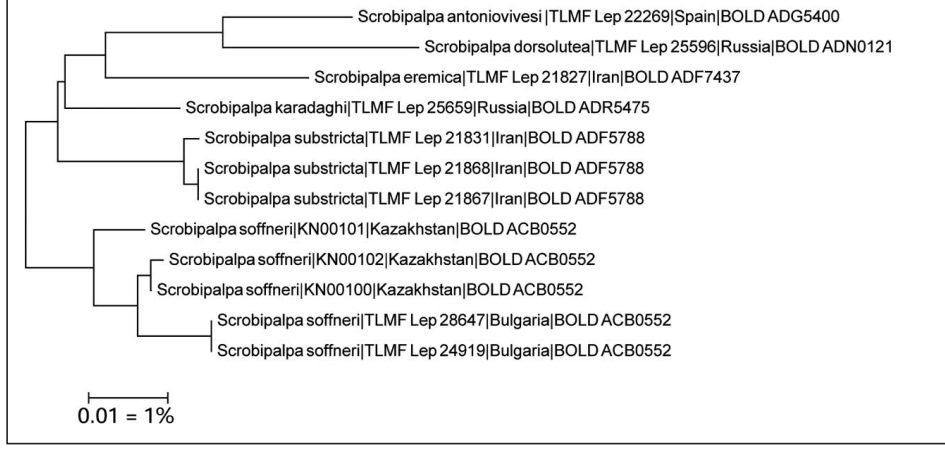


Fig. 1.– Neighbor-Joining tree of *Scrobipalpa antoniovivesi* Huemer, sp. n. and it´s nearest species (Kimura 2 parameter). Source: DNA Barcode data from BOLD (Barcode of Life Database, cf. RATNASINGHAM & HEBERT, 2007).

Description Adult (fig. 2): Head grey-brown, face cream mixed grey-brown; antenna grey-brown, distinctly annulated with cream; labial palpus cream, segment 2 with overlaid grey-brown scales on outer surface, segment 3 mixed cream with grey brown with dark brown apical part; thorax and tegula mixed grey-brown and light brown. Forewing length ♂ 4.8 mm (n=1). Forewing upper side dark grey-brown, dorsum largely covered with light orange yellow, first third of subcosta with orange-yellow stripe, costal and tornal area at 4/5 with some orange-yellow mottling but without distinct spots, dark stigmata largely reduced; termen with light, dark brown tipped scales; grey-brown fringes with indistinct darker fringe line. Hindwing light grey with concolorous fringes. Underside of forewing grey-brown with cream-brown edges.

Male genitalia (fig. 4): Uncus moderately slender, distally weakly tapered, posterior edge broadly rounded; gnathos-hook short, weakly curved; culcitula well developed; tegumen elongated, anteriorly broadly widened with sinusoid anterior edge, pedunculus long and slender, apically rounded; valva distinctly exceeding apex of uncus, distal third weakly widened, apex rounded; sacculus long, about one-third length of valva, of same width from base to apex, weakly curved ventrad, apex with short tip; vincular process basally broader and about half length of sacculus, sub-triangular with outwardly turned and pointed apex, inner margin continuous with broadly V-shaped posteromedial emargination of vinculum; saccus about length of vinculum, exceeding apex of pedunculus, slender, evenly tapered to apex; phallus moderately short, stout, coecum inflated.

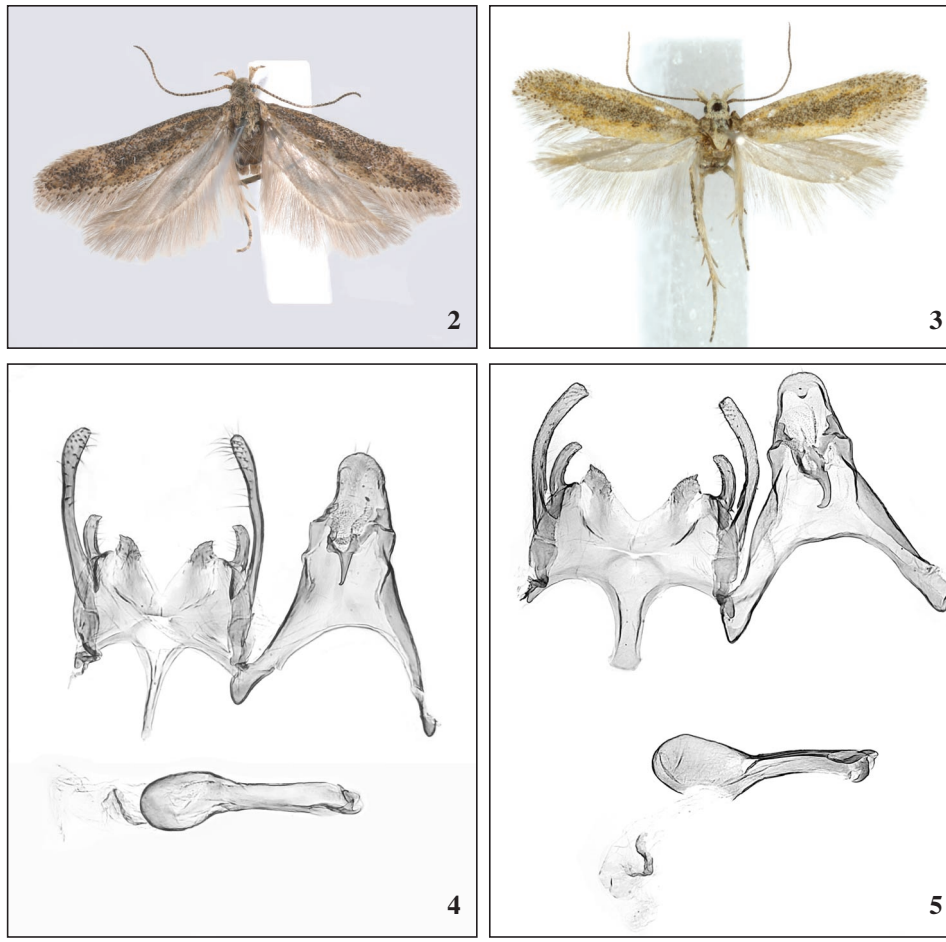
Female genitalia: Unknown.

Molecular data: BIN: BOLD:ADG5400. The intraspecific average distance of the barcode region is unknown (n=1). The distance to the nearest neighbor *S. dorsolutea* is 4.17% (p-dist).

Distribution: Currently only known from type locality in the province of Huesca but likely more widely distributed in Spain.

Bionomics: Host-plants and early stages of the new species are unknown. The holotype has been collected in mid-July at light.

Derivatio nominis: The new species is dedicated to Dr. Antonio Vives (Madrid, Spain) in recognition of his outstanding contribution to Spanish Lepidopterology.



Figs 2-5.– 2-3. Adults: **2.** *Scrobipalpa antoniovivesi* Huemer, sp. n., holotype. **3.** *Scrobipalpa dorsolutea* Huemer & Karsholt, 2010, paratype. **4-5.** Male genitalia: **4.** *Scrobipalpa antoniovivesi* Huemer, sp. n., holotype. **5.** *Scrobipalpa dorsolutea* Huemer & Karsholt, 2010, holotype.

Discussion

A basic requirement for the description of new species is the availability of modern generic revisions. Such a pre-requisite is already available for the vast majority of European Lepidoptera, but unfortunately parts of the family Gelechiidae still lack revisionary attempts. However, though it is expected that a considerable number of cryptic species in this family remains unnamed so far (HUEMER *et al*., 2020) new descriptions should only be introduced after thorough revisionary work. This is particularly true for descriptions of new species from unique specimens, which should normally be avoided, due to possible intraspecific variability, but also in view of eventual abnormalities of genitalia structures. In critical cases, the aim is therefore to always sample additional material, a

requirement which often cannot be achieved. In the case of *S. antoniovivesi* Huemer, sp. n. too, no further specimen has yet been discovered, despite an intensive search in various collections.

However, the holotype of the new species is not only morphologically significantly differentiated from the nearest taxon *S. dorsolutea*, but independently also by the DNA barcode. Both species are obviously highly disjunct in their distribution pattern, with areas in the Pyrenees (Spain) and in the southern Urals (Russia) respectively. Since the new species also clearly differs morphologically from all other known taxa of the Palearctic region (see i.e., POVOLNÝ, 2002) with yet unknown DNA barcode, a description seems justified despite of the limited material. This new description should at the same time draw the attention of the scientific community to the fauna of microlepidoptera of Spain in general and the new species in particular.

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BIBLIOGRAPHY

BIDZILYA, O. V., 2009.– On the distribution of gelechiid moths (Lepidoptera, Gelechiidae) in Siberia. Contribution 3.– *Proceedings of Zoological museum Kiev taras Shevchenko national university*, **5**: 3-13.

BIDZILYA, O. V., 2012.– Two new species of the tribe Gnorimoschemini (Lepidoptera, Gelechiidae) from Palaearctic Aisa.– *Entomofauna*, **33**: 157-164.

BIDZILYA, O. V. & LI, H., 2010.– The genus *Scrobipalpa* Janse (Lepidoptera, Gelechiidae) in China, with description of 13 new species.– *Zootaxa*, **2513**: 1-26. https://doi.org/10.11646/zootaxa.2513.1.1.

DEWAARD, J. R., IVANOVA, N. V., HAJIBABAEI, M. & HEBERT, P. D. N., 2008.– Assembling DNA Barcodes: Analytical Protocols. Pp. 275–293 *In* C. C. MARTIN (ed.) *Methods in Molecular Biology: Environmental Genomics*. 364 pp. Humana Press Inc., Totowa, USA. https://doi.org/10.1007/978-1-59745-548-0_15.

FALKOVITSH, M. I. & BIDZILYA, O. V., 2009.– A list of gelechiid moths (Lepidoptera, Gelechiidae) of the Southern Kyzylkum.– *Proceedings of Zoological museum Kiev taras Shevchenko national university*, **5**: 65-98.

HUEMER, P. & KARSHOLT, O., 2010.– Gelechiidae II (Gelechiinae: Gnorimoschemini).– *In* P. HUEMER, O. KARSHOLT & M. NUSS (eds.). *Microlepidoptera of Europe,* **6**: 586 pp. Apollo Books, Stenstrup. https://doi.org/10.1163/9789004260986.

HUEMER, P. & KARSHOLT, O., 2020.– Commented checklist of European Gelechiidae (Lepidoptera).– *ZooKeys*, **921**: 65-140. https://doi.org/10.3897/zookeys.921.49197.

HUEMER, P., KARSHOLT, O., AARVIK, L., BERGGREN, K., BIDZILYA, O., JUNNILAINEN, J., LANDRY, J.-F., MUTANEN, M., NUPPONEN, K., SEGERER, A., ŠUMPICH, J., WIESER, C., WIESMAIR, B. & HEBERT, P. D. N., 2020.– DNA barcode library for European Gelechiidae (Lepidoptera) suggests greatly underestimated species diversity.– *ZooKeys*, **921**: 141-157. https://doi.org/10.3897/zookeys.921.49199.

LERAUT, G., 2020.– Contribution à la connaissance de la faune du Mercantour. Description d'une espèce et une sous-espèce nouvelles et discussion sur le statut d'une espèce remarquable de cette région (Lepidoptera Gelechiidae, Yponomeutidae et Ethmiidae).– *L'Entomologiste*, **76**(2): 89-96.

LI, H. & BIDZILYA, O., 2019.– New species and new records of the genus *Scrobipalpa* Janse (Lepidoptera, Gelechiidae) from China.– *ZooKeys*, **840**: 101-131. https://doi.org/10.3897/zookeys.840.30434.

PITKIN, L. M., 1986.– A technique for the preparation of complex male genitalia in Microlepidoptera.– *Entomologist's Gazette*, **37**: 173-179.

POVOLNÝ, D., 2002.– *Iconographia tribus Gnorimoschemini (Lepidoptera, Gelechiidae) Regionis Palaearcticae*: 110 pp., 16 colour pls, 87 pls. 110 pp., 16 colour pls, 87 pls. František Slamka publisher, Bratislava.

RATNASINGHAM, S. & HEBERT, P. D. N., 2007.– BOLD: The Barcode of Life Data System (http://www.barcodinglife.org).– *Molecular Ecology Notes*, **7**: 355-364. https://doi.org/10.1111/j.1471- 8286.2007.01678.x.

RATNASINGHAM, S. & HEBERT, P. D. N., 2013.– A DNA-based registry for all animal species: The Barcode Index Number (BIN) system.– *PLoS ONE*, **8**(7), e66213. https://doi.org/10.1371/journal.pone.0066213.

ROBINSON, G. S., 1976.– The preparation of slides of Lepidoptera genitalia with special reference to the Microlepidoptera.– *Entomologist's Gazette*, **27**: 127-132.

TAMURA, K., STECHER, G., PETERSON, D., FILIPSKI, A. & KUMAR, S., 2013.– MEGA6: Molecular Evolutionary Genetics Analysis version 6.0.– *Molecular Biology and Evolution*, **30**: 2725-2729. https://doi.org/10.1093/molbev/mst197.

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