VOLUMEN / ***VOLUME*** **47 eISSN: 2340-4078 ISSN: 0300-5267**
NÚMERO / ***NUMBER*** **186 LCCN: sn 93026779 CODEN: SRLPEF**
(Fecha de publicación 30 de junio de 2019 / ***Issued 30 June 2019***

SHILAP

REVISTA DE LEPIDOPTEROLOGIA

Madrid
2019

Sede Social
Cátedra de Entomología Agraria
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Alimentación y Biosistemas
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ISSN: 0300-5267 (edición impresa / *print edition*) / eISSN: 2340-4078 (edición electrónica / *online edition*)
CODEN: SRLPEF / LCCN: sn 93026779 / NLM ID: 101611953 / CDU: 595.78(05) / GND: 3004332-3
TIRADA / *EDITION*: 500 ejemplares / *500 copies*
EDITADO por / *EDITED by*: © Sociedad Hispano-Luso-Americana de Lepidopterología
IMPRESO por / *PRINTED by*: IMPROITALIA. Tomelloso, 27. E-28026 Madrid, ESPAÑA / *SPAIN*
Depósito Legal: M. 23.796-1973

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 197-208 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.553

New faunistic and taxonomic insights on little known Crambidae from forested habitats of Italian Peninsula (Lepidoptera: Pyraloidea)

S. Scalercio, A. Ienco & S. Greco

Abstract

We provided new distribution data and taxonomic notes concerning eleven Crambidae species new or little known for the Italian fauna. Most records were collected in Calabria, the southernmost region of peninsular Italy, where forested habitats were surveyed during last years. Some accessory data were mined from Barcode of Life Data System (BOLD) and were used to refine the distribution of treated species. In detail, we found three species new for Italian fauna: *Evergestis subfuscalis* (Staudinger, 1870), *Udea languidalis* (Eversmann, 1842), and *Hyperlais siccalis* (Guenée, 1854). Three species not recorded in peninsular Italy so far: *Cynaeda gigantea* (Wocke, 1871), *Evergestis dumerlei* Leraut, 2003, and *Catoptria staudingeri* (Zeller, 1863). Four species not recorded in southern Italy so far, *Evergestis infirmalis* (Staudinger, 1870), C*ynaeda dentalis* ([Denis & Schiffermüller], 1775), *Paratalanta pandalis* (Hübner, 1796), *Hodebertia testalis* (Fabricius, 1794). *Evergestis sophialis* (Fabricius, 1787) was for the first time recorded in Calabria. Barcoding analysis allowed us to confirm the status of *Evergestis subfuscalis* as bona species, eastern vicariant of *E. mundalis*. Furthermore, we underlined the needs of a revision of the *Udea fimbriatralis* species group as barcodes of western and eastern European specimens appear to be intermingled, suggesting the presence of one unique variable species. In conclusion, the importance of the Italian peninsula as a bridge between western and eastern European faunas was remarked.
KEY WORDS: Lepidoptera, Pyraloidea, *Evergestis subfuscalis*, *Udea languidalis*, *Hyperlais siccalis*, fauna, barcoding, Calabria, Italy.

Nuevos conocimientos faunísticos y taxonómicos sobre los Crambidae poco conocidos de los hábitats boscosos de la Península Italiana (Lepidoptera: Pyraloidea)

Resumen

Proporcionamos nuevos datos de distribución y notas taxonómicas con respecto a once especies de Crambidae nuevas o poco conocidas para la fauna italiana. La mayoría de los registros fueron colectados en Calabria, la región más meridional de Italia peninsular, donde los hábitats boscosos fueron registrados durante los últimos años. Algunos datos accesorios fueron extraídos del código de barras genético "Life Data System (BOLD)" y fueron usados para afinar la distribución de especies tratadas. En detalle, encontramos tres especies nuevas para la fauna italiana: *Evergestis subfuscalis* (Staudinger, 1870), *Udea languidalis* (Eversmann, 1842) y *Hyperlais siccalis* (Guenée, 1854). Cuatro especies no registradas, hasta ahora, en Italia peninsular: *Cynaeda gigantea* (Wocke, 1871), *Evergestis dumerlei* Leraut, 2003 y *Catoptria staudingeri* (Zeller, 1863). Tres especies no registradas, hasta ahora, en el sur de Italia, E*vergestis infirmalis* (Staudinger, 1870), *Cynaeda dentalis* ([Denis & Schiffermüller], 1775), *Paratalanta pandalis* (Hübner, 1796), *Hodebertia testalis* (Fabricius, 1794). *Evergestis sophialis* (Fabricius, 1787) fue registrado por primera vez en Calabria.

El análisis con el código de barras genético permitió que confirmáramos el estado de *Evergestis subfuscalis* como buena especie vicariante oriental de *E. mundalis*. Además, subrayamos la necesidad de una revisión de la especie de *Udea fimbriatralis* cuando se agrupan con el código de barras genético de las muestras europeas occidentales y orientales parecen estar mezclados, indicando la presencia de una única clase variable. En conclusión, se comenta la importancia de la península italiana como un puente entre faunas europeas occidentales y orientales.

PALABRAS CLAVE: Lepidoptera, Pyraloidea, *Evergestis subfuscalis*, *Udea languidalis*, *Hyperlais siccalis*, fauna, código de barras genético, Calabria, Italia.

Introduction

Recent papers demonstrated how the Pyraloidea fauna in Italy is far from being sufficiently known. To our knowledge, during last ten years one species new to science, *Catoptria apenninica* Bassi 2017, and 19 species new to the Italian fauna were reported in literature (BALDIZZONE *et al.*, 2013; BASSI, 2017; HUEMER, 2012; LERAUT, 2012; PINZARI *et al.*, 2010; SCALERCIO *et al.*, 2014; ZILLI & PAVESI, 2015). Furthermore, a few species had their Italian distribution significantly refined (PINZARI *et al.*, 2013; SCALERCIO, 2016; SCALERCIO *et al.*, 2016a, 2016b; SCALERCIO & SLAMKA, 2015) filling several gaps in Central and South Italy.

This paper listed the most interesting findings for Italian fauna concerning Crambidae species as the result of surveys carried out in the main forest type of the Calabria Region, the southernmost territory of Italian Peninsula. In detail, we surveyed (1) beech and *Acer*-dominated forests of the Pollino National Park, (2) Calabrian black pine forests and *Alnus*-dominated woodlots of the Sila National Park, (3) silver-fir forests of the Regional Park of the Serre Mountains, (4) chestnut woodlots of the Catena Costiera Mountains, and (5) mixed forest of Calabrian black pine and beech of the Aspromonte National Park. Notes concerning species range, biology and taxonomy were also provided.

Methods

Samplings were carried out using UV LED light traps (INFUSINO *et al.*, 2017) powered by portable batteries, under weather conditions favourable to moth activity and trap efficiency, i.e. low wind speed, temperatures near the average of a given period, low or absent moonlight, low or absent rain. Exact locations of sampling sites were reported in the list of species. Further records available in the public repository Barcode of Life Data System (BOLD) were utilized to refine the range of species and their presence in Italy.

Identification was carried out using specialised literature concerning European Crambidae (GOATER *et al.*, 2005; LERAUT, 2012; SLAMKA, 2006, 2008, 2013). Most difficult species were dissected, and genitalia were mounted on microscope slides. Nomenclature followed the Fauna Europaea available online at www.faunaeur.org. Specimens and slides of genitalia were preserved in the Lepidoptera collection of the Research Centre for Forestry and Wood, Rende, Italy.

Some specimens were submitted to DNA barcoding, an analysis of the 658bp long sequence of the mitochondrial 5' cytochrome oxidase gene, subunit 1 (COI), using the standard procedures of the Canadian Centre for DNA Barcoding (CCDB). Obtained sequences were blasted in the BOLD data systems (RATNASINGHAM & HEBERT, 2007), to compare sequences with those available. For barcoded specimens we reported: the sample ID, the length of the obtained COI sequences (bp), the Barcode Index Number (BIN) to which they belong and their statistics, i.e. average (Av.dist.) and maximum percentage distances (Max.dist.) among sequences belonging to the same BIN and percentage distance from the Nearest Neighbor (NN), and, finally, the name and the BIN of the NN.

Results

CRAMBIDAE
ODONTIINAE

Cynaeda gigantea (Wocke, 1871)

Original records - Italy, Calabria, Saracena, Serra Ambruna, 1035 m, 39.8234ºN-16.0768ºE, 1 ♂, 20-VII-2015, S. Scalercio & M. Infusino leg. (slide CREA-0204); Italy, Calabria, Saracena, Serrapaolo, 1010 m, 39.8225ºN-16.0883ºE, 1 ♂, 20-VII-2015, S. Scalercio & M. Infusino leg.

BOLD record - Italy, Abruzzi, Taranta Peligna, Pian di Valle, 770 m, 42.026ºN-14.162ºE, 1 ex., 20-VII-2011, P. Huemer leg. (BOLD sample ID: TLMF Lep 06066).

It is known from South-East Europe, Asia minor through West Afghanistan (SLAMKA, 2006). In Italy it was only recently reported from the North (LERAUT, 2012), but the exact locality was unspecified. These are the first records from peninsular Italy. Calabrian specimens were collected by light traps in two localities of the Pollino National Park with dry and sunny habitats, typical for this species, and where larvae can find their foodplants *Echium* and *Onosma* (SLAMKA, 2006).

Identification was based on wing pattern (Fig. 1) and morphology of genitalia (Fig. 12). It can be easily distinguished as the phallus has two cornuti, whereas in *C. dentalis* ([Denis & Schiffermüller], 1775), the only congeneric species known to fly in the same range, cornuti are absent (SLAMKA, 2006).

Cynaeda dentalis ([Denis & Schiffermüller], 1775)

Original records - Italy, Calabria, Saracena, Piano del Minatore, 1433 m, 39.7798ºN-16.0774ºE, 2 ♂♂, 30-VII-2016, S. Scalercio & M. Infusino leg.; Italy, Calabria, San Fili, Fiego, 740 m, 39.3302ºN-16.1293ºE, 1 ♀, 14-IX-2015, S. Scalercio & M. Infusino leg.; Italy, Calabria, Mendicino, Ianni-Pirillo, 1100 m, 39.220ºN-16.141ºE, 1 ♂, 8-VI-2000, S. Scalercio & M. Aceto leg.

It was found from Europe to Central Asia, Middle East, North Africa, Madeira and Mediterranean Islands, absent from the northernmost European regions (LERAUT, 2012). In Italy was reported from the North, Latium, Sicily and Sardinia (PINZARI *et al.*, 2010). This is the first record from South Italy, where it was collected by light traps in a prairie of the Pollino National Park, and in a chestnut woodlot and a sunny grassland of the Catena Costiera Mountains. Larvae feed on *Echium*, *Anchusa* and *Onosma* (SLAMKA, 2006). Identification was based on the wing pattern (Fig. 2).

EVERGESTINAE

Evergestis dumerlei Leraut, 2003

Original record - Italy, Calabria, Spezzano Piccolo, Righio, 1341 m, 39.3153ºN-16.5273ºE, 1 ♂, 31-V-2017, S. Scalercio & M. Infusino leg. (BOLD sample ID: LEP-SS-00694).

BOLD record - Italy, Latium, Rieti, Monte Terminillo, 1730 m, 42.4833ºN-13.0000ºE, 2 exx., 11-VII-2010, P. Huemer leg. (BOLD sample IDs: TLMF Lep 01521,TLMF Lep 01522).

Recorded from Morocco, Spain, France (LERAUT, 2012) and Italy where it is known from the surroundings of Bolzano, Alto Adige (HUEMER, 2012). These are the first records from peninsular Italy. Calabrian specimen was found during daytime in a humid grassland of the Sila National Park. Larval foodplants are probably Brassicaceae (SLAMKA, 2006). For this species it is reported one generation per year from July to October (SLAMKA, 2006; LERAUT, 2012), however the finding of late-May suggests the presence of two generations per year, the first in Spring and the second in Summer-early Autumn.

Identification was based on wing pattern (Fig. 3) and DNA barcoding which showed a low intraspecific variability among sequenced specimens (Table I), and a high similarity between Calabrian and Central Italy samples (99.85%).

Table I.– Details concerning samples deposited in the Barcoding Of Life Database (BOLD), specifically: the sample ID, the length of the obtained COI sequences (Bp), Barcode Index Number (BIN) and their statistics, i.e. average (Av.dist.) and maximum (Max.dist.) percentage distances among sequences belonging to the same BIN and percentage distance from the Nearest Neighbor (NN), code of the nearest BIN and taxon to which they belong.

Species	Sample ID	Bp	BIN				Nearest BIN	
			BOLD:	Av.dist. %	Max.dist. %	Dist.NN %	BOLD:	Taxon
Evergestis dumerlei	LEP-SS-00694	658	AAJ0346	0.29	0.86	4.82	AAQ1986	*Evergestis politalis*
Evergestis dumerlei	TLMF Lep 01521	658						
Evergestis dumerlei	TLMF Lep 01522	658						
Evergestis subfuscalis	LEP-SS-00322	658	AAO3308	0.34	0.46	2.39	ACO5191	*Evergestis mundalis*
Evergestis subfuscalis	BC MTD Lep 500	658						
Evergestis subfuscalis	BC MTD Lep 501	658						
Evergestis subfuscalis	BC MTD subfuscalis	658						
Evergestis subfuscalis	BC MTD 01778	658						
Evergestis infirmalis	LEP-SS-00693	658	AAO4591	0.08	0.16	2.41	AAI55	*Evergestis caesialis*
Evergestis infirmalis	BC ZSM Lep 78577	658						
Evergestis infirmalis	TLMF Lep 01658	658						
Evergestis infirmalis	TLMF Lep 04208	658						
Udea languidalis	LEP-SS-00716	658	AAO4485	0.96	1.77	2.41	ACA9716	*Udea* sp.
Udea languidalis	BC MTD Lep 00753	658						
Udea languidalis	BC MTD Lep 01809	658						
Udea languidalis	TLMF Lep 06418	658						
Udea languidalis	BC MTD Lep 01668	658						
Hyperlais siccalis	LEP-SS-00688	658	ADJ6942	0.48	0.48	6.26	ABV209595	*Hyperlais* sp.
Hyperlais siccalis	LEP-SS-00689	658						

Evergestis subfuscalis (Staudinger, 1870)

Original records - Italy, Calabria, Saracena, Bruscata, 1370 m, 39.8103ºN-16.0468ºE, 2 ♂♂, 20-V-2015, S Scalercio & M. Infusino leg. (slide CREA-0203); Italy, Calabria, Saracena, Serrapaolo, 1010 m, 39.8225ºN-16.0883ºE, 1 ♂, 20-V-2015, 1 ♂, 20-VII-2015, S. Scalercio & M. Infusino leg. (slide

CREA-0202) (BOLD sample ID: LEP-SS-00322); Italy, Calabria, Saracena, Serra Ambruna, 1035 m, 39.8234ºN-16.0768ºE, 1 ♂, 20-VII-2015, S. Scalercio & M. Infusino leg.

According to GOATER *et al.* (2005), it is known from Bulgaria, former Yugoslavia and Greece, but probably belong to this species also the populations of *E. mundalis* reported from Middle-East to Armenia in LERAUT (2012). This is the first record from Italy, where it was collected by light traps in three localities of the Pollino National Park, within beech forest stands. Immature stages are unknown (GOATER *et al.*, 2005).

Identification was based on the morphology of genitalia and DNA barcoding, as wing pattern (Fig. 4) is not enough to separate it confidently from *E. mundalis* (Guenée, 1854). Male genitalia are characterized by rather short parallel-sided valvae with rounded apex, and by the distal portion of phallus slender than in *E. mundalis*, with an oblique row of strong cornuti near base (GOATER *et al.*, 2005) (Fig. 13). However, DNA barcoding was decisive for species identification as also morphology of genitalia is questioned leading some authors to consider *E. subfuscalis* a synonym of *E. mundalis* (LERAUT, 2012). In fact, the COI sequence of Calabrian specimen showed a marked genetic distance from those of *E. mundalis* from France (Table I) but share the same BIN with two Iranian and two Greek specimens, demonstrating definitively its eastern affinity, and confirming also the existence of an eastern species distinct from *E. mundalis* (Fig. 18).

In Italy *E. mundalis* is known from Central and North regions (BASSI *et al.*, 1995), whilst none record is available for southern regions, so far. Recently, several specimens regarded as *E. mundalis* were reported from Central Italy (PINZARI *et al.*, 2010). It should be interesting to verify the exact identity of these specimens and to assess the distribution of the *mundalis* / *subfuscalis* species pair along the Italian Peninsula.

Evergestis sophialis (Fabricius, 1787)

Original records - Italy, Calabria, Alessandria del Carretto, Vallone Lupara, 1345 m, 39.9245ºN-16.3609ºE, 1 ♂, 19-VII-2017, S. Scalercio & M. Infusino leg. (slide CREA-0210).

It is known from South Europe, eastwards to southern Siberia (GOATER *et al.*, 2005). In Italy it was only reported from the North and the South (BASSI *et al.*, 1995). This is the first record from Calabria, where it was collected by light traps in a locality of the Pollino National Park, within an ecotonal habitat between a dry and sunny calcareous slope and a young *Acer* forest. Immature stages on Descurainia sophia (L.) Webb ex Prantl. and Sisymbrium spp. (GOATER *et al.*, 2005).

Identification was based on the morphology of male genitalia, with valvae, uncus and gnathos clearly different from those of the similar *E. infirmalis* (Staudinger, 1870), and with the phallus bearing two dense clusters of long cornuti in *E. sophialis* and two clusters of small cornuti in *E. infirmalis* (GOATER *et al.*, 2005) (Fig. 14). Wing pattern is sometimes useless, especially in worn specimens as the male we recorded (Fig. 5).

Evergestis infirmalis (Staudinger, 1870)

Original records - Italy, Calabria, Alessandria del Carretto, Vallone Lupara, 1345 m, 39.9245ºN-16.3609ºE, 1 ♂, 19-VII-2017, S. Scalercio & M. Infusino leg. (slide CREA-0209) (BOLD sample ID: LEP-SS-00693).

BOLD records - Italy, Basilicata, Lagonegro, Monte Sirino, 1390 m, 40.1596ºN-15.8401ºE, 1 ex., 29-VIII-2013, A. Hausmann leg. (BOLD sample ID: BC ZSM Lep 78577); Italy, Abruzzi, Rieti, Monte Terminillo, 1730 m, 42.4833ºN-13.01ºE, 1 ex., 16-VII-2010, P. Huemer leg. (BOLD sample ID: TLMF Lep 01658); idem, 1 ex., 17-VII-2010, T. Mayr leg. (BOLD sample ID: TLMF Lep 04208).

According to PINZARI *et al.* (2010), it is known from Greece, European Russia, Turkey, Syria and Italy, where it was found in Central Apennine. In Calabria it was collected by light traps in the same locality and during the same night of *E. sophialis*, i.e. within an ecotonal habitat between a dry and sunny calcareous slope and a young *Acer* forest of the Pollino National Park. Early stages are unknown (GOATER *et al.*, 2005).

Identification was based on the morphology of male genitalia, as wing pattern (Fig. 6) is not

always enough to separate it confidently from *E. caesialis*. (Herrich-Schäffer, 1849). In male genitalia of *E. infirmalis* the main distinctive features from *E. caesialis* are the slightly bulbous uncus, the slender gnathos without evident teethes, the valva dilated at base and tip, and the distal portion of the spinulose phallus bearing two clusters of small cornuti (GOATER *et al.*, 2005). The dissected male genitalia of the Calabrian specimen perfectly matched this description (Fig. 15). DNA barcode of the dissected specimen has a great homogeneity with other Italian specimens deposited in BOLD that belong to the same BIN (Table I) (Fig. 19), demonstrating their conspecificity.

PYRAUSTINAE

Udea languidalis (Eversmann, 1842)

Original record - Italy, Calabria, Alessandria del Carretto, Difesa Privitera, 1285 m, 39.9274ºN-16.3572ºE, 1 ♂, 19-VII-2017, S. Scalercio & M. Infusino leg. (slide CREA-0164) (BOLD sample ID: LEP-SS-00716).

BOLD records - Italy, Piedmont, Valdieri, Cuneo, 950 m, 44.2836ºN-7.3977ºE, 2 exx., 1-VIII-2010, P. Huemer leg. (BOLD sample IDs: BC MTD Lep 00753, BC MTD Lep 01809); Italy, Abruzzi, Pescara, Santo Spirito/Roccamorice, 850m, 42.181N-14.221E, (1ex.), 23-VII-2011, P. Huemer leg.) (BOLD sample ID: TLMF Lep 06418); Italy, Abruzzi, Chieti, Lama dei Peligni, 750 m, 42.0333ºN-14.1833E, 1 ex., 12-VII-2009, H. Schreiber leg. (BC MTD Lep 01668).

Recorded from South-East Europe, Turkey, North Iran and Turkmenistan (SLAMKA, 2013). This is the first record for Italy. Calabrian specimen was collected in a small clearing within an Acer forest on calcareous substratum, in the Pollino National Park. Preimaginal stages are unknown (SLAMKA, 2013).

Identification was not easy as the congeneric *U. fimbriatralis*, also not mentioned for the Italian fauna so far, has similar wing pattern and genitalia of both species are rather similar and quite variables (SLAMKA, 2013). According to MALLY & NUSS (2011), based on molecular and morphological evidences, *fimbriatralis* - *languidalis* compose a strictly related species-pair the former having a western and the latter an eastern range (SLAMKA, 2013). LERAUT (2012) considers *languidalis* the eastern subspecies of *fimbriatralis*. Here we used the name *languidalis* for our specimen as markings on wings are well developed (Fig. 7), and a small thorn is present on the distal part of the phallus (Fig. 16), both characters attributable to *U. languidalis* (SLAMKA, 2013). The great intra-BIN genetic variability justifies the taxonomic uncertainty present in this species group (Table I). We can hypothesize the presence of only one variable species, but the question deserves further studies.

Paratalanta pandalis (Hübner, 1796)

Original record - Italy, Calabria, Serra San Bruno, Cattarinella, 940 m, 38.5492ºN-16.3195ºE, 1 ♂, 26-VIII-2015, S. Scalercio & M. Infusino leg..

Eurasian species (SLAMKA, 2013), in Italy known from North and Central regions and from Sicily (SLAMKA, 2013). This is the first record for southern Italy, where it was collected by light traps in a silver fir forest. Larva feeds on several plants (SLAMKA, 2013). Identification was based on the wing pattern (Fig. 8).

SPILOMELINAE

Hodebertia testalis (Fabricius, 1794)

Original record - Italy, Calabria, Montalto Uffugo, Glicarello, 550 m, 39.4072ºN-16.1256ºE, 1 ♂, 9-XI-2015, S. Scalercio & M. Infusino leg.

Tropical and subtropical species, probably resident in the Mediterranean Basin (SLAMKA, 2013), also known in northern Italy and Sicily (BASSI *et al.*, 1995). This is the first record for

southern Italy, where it was collected by light traps in a chestnut orchard. Larva feeds mainly on Asclepiadaceae (SLAMKA, 2013). Identification was based on the wing pattern (Fig. 9).

CYBALOMIINAE

Hyperlais siccalis (Guenée, 1854)

Original records - Italy, Calabria, Saracena, Serra Ambruna, 1035 m, 39.8234ºN-16.0768ºE, 2 ♂ ♂, 20-V-2015, S. Scalercio & M. Infusino leg. (slide CREA-0205) (BOLD sample IDs: LEP-SS-00688, LEP-SS-00689).

Known from France, Spain and Morocco (GASTÓN *et al.*, 2015), this is the first record from Italy where it was collected by light traps in a locality of the Pollino National Park within a dry and sunny prairie surrounded by broadleaved forests, on calcareous substratum to which it appears to be associated (COURTOIS, 1986). Early stages feed on *Iberis pinnata* L. (LHOMME, 1935).

Identification was based on the morphology of male genitalia and DNA barcoding, as wing pattern (Fig. 10) is not always enough to separate it from congeneric species. Male genitalia perfectly match those figured in LERAUT (2012) and in GASTÓN *et al.* (2015) (Fig. 17). Barcoded specimens belong to a BIN from which the nearest neighbor has a marked genetic distance and belong to a not specified *Hyperlais* species (Table I).

CRAMBINAE

Catoptria staudingeri (Zeller, 1863)

Original records - Italy, Calabria, Santo Stefano in Aspromonte, Tre Limiti, 1440 m, 38.12ºN-15.87ºE, 1 ♂, 26-VIII-2016, S. Scalercio, F. Manti & E. Castiglione leg.; Italy, Calabria, San Giovanni in Fiore, Montagna Grande, 1355 m, 39.2717ºN-16.6062ºE, 1 ♂, 13-IX-2016, S. Scalercio & M. Infusino leg.; Italy, Calabria, San Giovanni in Fiore, Mangiatoie, 1275 m, 39.2369ºN-16.6625ºE, 1 ♂, 13-IX-2016, S. Scalercio & M. Infusino leg.

Known from Portugal, Spain, South France and Sicily (SLAMKA, 2008), this is the first record from continental Italy where it was collected by light traps in a small clearing within a beech forest of the Aspromonte National Park, and two shrublands of the Sila National Park within a Calabrian black pine forest. Early stages feed on mosses (SLAMKA, 2008). Identification was based on the wing pattern (Fig. 11).

Discussions and conclusions

In this paper we provided new distribution data concerning eleven Crambidae species new or little known for the Italian fauna. Most interesting findings concerned three species new for Italian fauna, namely *Evergestis subfuscalis*, *Udea languidalis*, and *Hyperlais siccalis*. In addition, *Cynaeda gigantea*, *Evergestis dumerlei*, and *Catoptria staudingeri* were not previously recorded from peninsular Italy, and four species were not recorded in southern Italy so far, namely *Evergestis infirmalis*, *Cynaeda dentalis*, *Paratalanta pandalis*, and *Hodebertia testalis*. *Evergestis sophialis* was for the first time recorded in Calabria.

Most of listed species have in Italy the western boundary of their range (*Cynaeda gigantea*, *Evergestis subfuscalis*, *E. caesialis*, *E. infirmalis*, *Udea languidalis*), but *Evergestis dumerlei*, *Hyperlais siccalis* and *Catoptria staudingeri* have there the eastern boundary of their range. The presence of eastern and western elements in the Italian fauna, especially along the peninsular territory, is the result of the complex biogeographic history of this geographic area and is one of the reasons that make lepidopteran fauna of Italy the richest of Europe.

Barcoding analysis allowed us to confirm the status of *Evergestis subfuscalis* as bona species and eastern vicariant of *E. mundalis* and enabled us to underline the needs of a revision of the *Udea fimbriatralis* species group as haplotypes of western and eastern Europe of species belonging to it

appear to be not well differentiated and intermingled, suggesting the presence of a unique variable species.

Acknowledgements

We are deeply indebted with Matthias Nuss (Senckenberg Museum of Zoology, Dresden, Germany), Peter Huemer (Tiroler Landesmuseen-Betriebsgesellschaft m. b. H., Innsbruck, Austria), and Axel Hausmann (Bavarian State Collection of Zoology, München, Germany) for gave us the permission to use their samples deposited in BOLD to refine the range and the Italian distribution of species treated in this paper. We also thank Marco Infusino (Cosenza, Italy) for the precious fieldwork. We thank the Aspromonte National Park for releasing us the permission to collect. This work was financially supported by the Project "ALForLab" (PON03PE_00024_1) co-funded by the National Operational Program for Research and Competitiveness (PON R&C) 2007-2013, through the European Regional Development Fund (ERDF) and national resource (Revolving Fund - Cohesion Action Plan (CAP) MIUR), the Pollino National Park (Project: Studio pilota per il monitoraggio della biodiversità dei Lepidotteri in SIC forestali del Parco Nazionale del Pollino), the Sila National Park (Project: Il Barcoding delle farfalle nel Parco Nazionale della Sila: aree umide).

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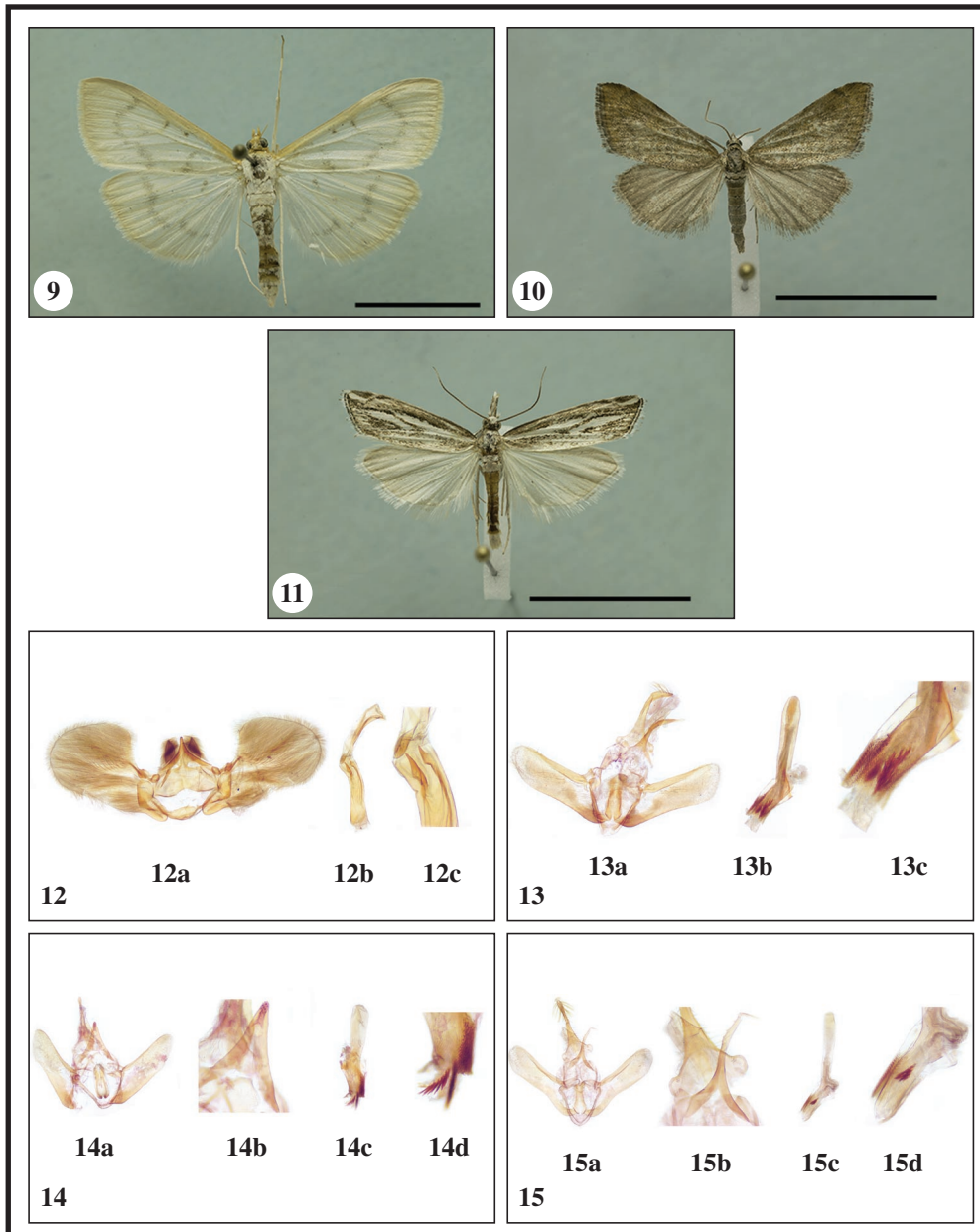
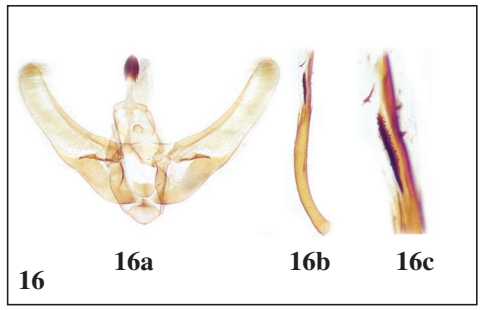
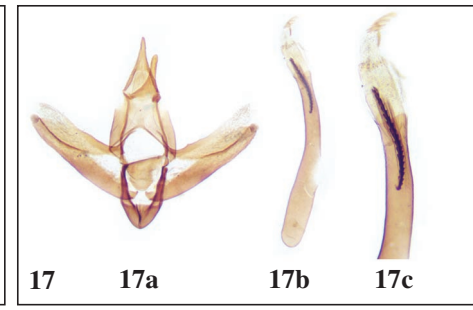
(Recibido para publicación / *Received for publication* 11-V-2018)
(Revisado y aceptado / *Revised and accepted* 30-VI-2018)
(Publicado / *Published* 30-VI-2019)

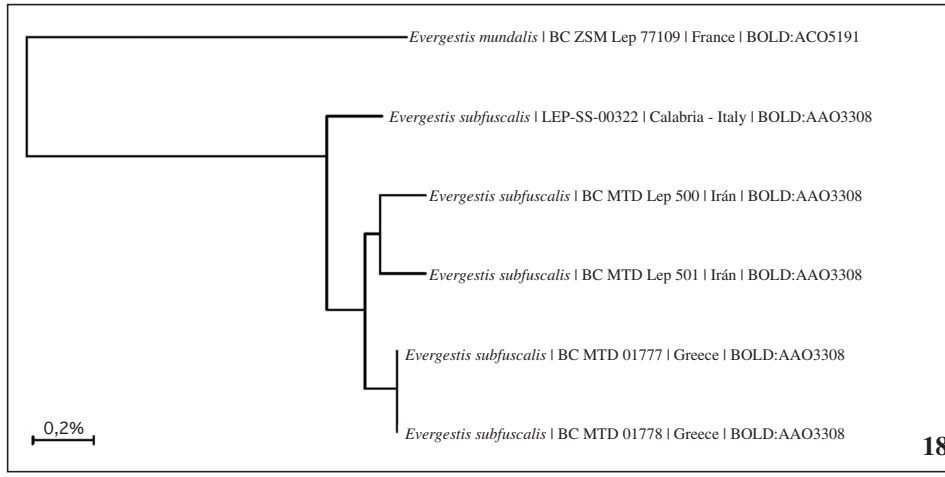
Figs. 1-8.– Crambidae adults. **1.** *Cynaeda gigantea*, Serra Ambruna. **2.** *Cynaeda dentalis*, Piano del Minatore. **3.** *Evergestis dumerlei*, Righio. **4.** *Evergestis subfuscalis*, Serrapaolo. **5.** *Evergestis sophialis*, Vallone Lupara. **6.** *Evergestis infirmalis*, Vallone Lupara. **7.** *Udea languidalis*, Difesa Privitera. **8.** *Paratalanta pandalis*, Cattarinella. Scale bar: 10 mm.

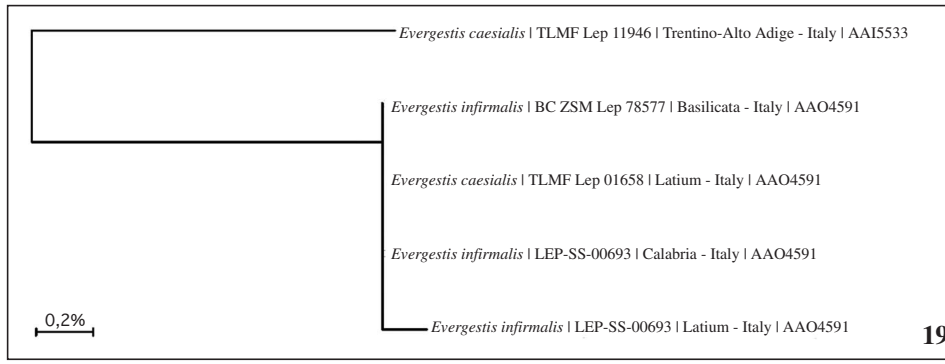


Figs. 9-15.– 9. *Hodebertia testalis*, Glicarello. **10.** *Hyperlais siccalis*, Serra Ambruna. **11.** *Catoptria staudingeri*, Tre Limiti. Scale bar 1 cm. **12-17.–** Male genitalia. **12.** *Cynaeda gigantea*, slide CREA-0204: **12a.** andropigio; **12b.** phallus; **12c.** detail of cornuti. **13.** *Evergestis subfuscalis*, slide CREA-0203; **13a.** andropigio; **13b.** phallus; **13c.** detail of cornuti. **14.** *Evergestis sophialis*, slide CREA-0210; **14a.** andropigio; **14b.** gnathos; **14c.** phallus; **14d.** detail of cornuti. **15.** *Evergestis infirmalis*, slide CREA-0209; **15a.** andropigio; **15b.** gnathos; **15c.** phallus; **15d.** detail of cornuti. Scale bar: 10 mm.









Figs. 16-19.– 16. *Udea languidalis*, slide CREA-0164; **16a.** andropigio; **16b.** phallus; **16c.** detail of cornuti. **17. Hyperlais siccalis**, slide CREA-0205; **17a.** andropigio; **17b.** phallus; **17c.** detail of cornuti. **18.** Neighbor joining trees (Kimura 2-parameter distance model for COI-5P marker) of the specimens belonging to the species pair *Evergestis mundalis* / *subfuscalis* deposited in BOLD. **19.** Neighbor joining trees (Kimura 2-parameter distance model for COI-5P marker) of the specimens belonging to the species pair *Evergestis caesialis* / *infirmalis* deposited in BOLD.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 209-211 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.554

Una nueva especie del género *Xylinophylla* Warren, 1898 del oeste de Papúa, Indonesia (Lepidoptera: Geometridae, Ennominae, Gonodontini)

A. Expósito-Hermosa

Resumen

Se describe *Xylinophylla hollowayi* Expósito, sp. n. del oeste de Papúa, Indonesia. Se ilustran los adultos, así como la genitalia del macho y de la hembra.
PALABRAS CLAVE: Lepidoptera, Geometridae, Ennominae, Gonodontini, *Xylinophylla,* nueva especie, O-Papua, Indonesia.

A new species of the genus *Xylinophylla* Warren, 1898 from West Papua, Indonesia (Lepidoptera: Geometridae, Ennominae, Gonodontini)

Abstract

Xylinophylla hollowayi Expósito, sp. n. of West Papua, Indonesia are described. The adults as well as the genitalia of the male and female are illustrated.
KEY WORDS: Lepidoptera, Geometridae, Ennominae, Gonodontini, *Xylinophylla*, new species, W-Papua, Indonesia.

Introducción

Al ordenar el material del género *Xylinophylla* Warren, 1898 de nuestra colección, se han localizado una serie de ejemplares del oeste de Papúa que no encaja con ninguna de las especies descritas hasta ahora de este género (HOLLOWAY, 1993; YAZAKI, 2012), por este motivo, se describe a continuación como la especie nueva.

Descripción

***Xylinophylla hollowayi* Expósito, sp. n.** (Figs. 1-4)

Holotipo ♂: INDONESIA: Mybri area. Arfak Mts. Manokwari regency. W-Papua 1.500 m, XI-2017 (colector local). Genitalia macho preparación AEH 3313. Paratipos 30 ♂♂ y 2 ♀♀, con la misma data, pero con fechas de captura: III, VIII, X y XI-2017. El holotipo, así como los paratipos se encuentran depositados en la colección del autor en Móstoles, Madrid (España).

El macho (Figs. 1-2) muestra una expansión alar comprendida entre los 42-45 mm, por lo que se hallan dentro del intervalo máximo-maximorum de las especies de *Xylinophylla*. Las antenas son ciliadas, de tono uniforme oscuro y con vertex blanco. En general, el modelo del resto de su morfología externa encaja muy bien con las demás especies descritas de *Xylinophylla* - las cuales presenta un marca-

do dimorfismo sexual entre machos y hembras -. No obstante, existen diferencias con otras especies, como por ejemplo el ápice de las alas anteriores más agudo; la falta de las dos machas oscuras triangulares en la costa y la presencia de un tallo en las alas posteriores M_3=4 más largo que en *Xylinophylla maculata* Warren, 1897. Por el color del fondo alar se pueden citar dos formas diferentes: una más clara y de color ocre, y otra más oscura con tendencia al tono más ceniciento.

La hembra (Figs. 3-4) con una expansión alar entre los 51-55 mm, también están dentro del intervalo máximo de *Xylinophylla.* Las antenas son filiformes, de sección menor que la de los machos y marcados anillos claros que destacan del tono más oscuro de las mismas. La morfología externa encaja con el resto de las especies de *Xylinophylla*, pero el termen de sus alas es más recurvado (repicoteado) con picos más largos y agudos y el fondo de alas más oscuro que en *Xylinophylla maculata* Warren, 1897.

Genitalia ♂ (Fig. 5): Destaca por la presencia del proceso inferior de las valvas que tendría cierta similitud con los de *Xylinophylla mistacalis* Yazaki, 2012, pero en la especie nueva, éste es más corto. El proceso superior se halla unido al cuerpo de la valva y está guarnecido de una serie de irregulares púas más pronunciadas que en *X. mistacalis.* También existe en el centro - por encima del mismo - un cuerpo triangular muy característico. Algunos de estos caracteres ya fueron adelantados por HOLLOWAY (1993: 114 y comunicación personal). El aedeagus (Fig. 5a) es más corto y hay una espina en la vesica que sustituye al proceso digital de *X. mistacalis* - ampliamente distribuida por todas las Islas Filipinas -. La evaginación de la vesica no ha aportado caracteres significativos. En el octavo segmento abdominal (Fig. 5b) el octavo esclerito es trapezoidal - casi rectangular - mientras que en *X. maculata* es triangular; el octavo esternito presenta la clásica hendidura central con los dos lóbulos laterales.

Genitalia ♀ (Fig. 6): Con la típica corona de púas verticales en la bursa copulatrix típica de *Xylinophylla.* Ductus bursae con estrías paralelas. Papilas anales triangulares y alargadas. Apófisis posteriores más largas que las anteriores y considerablemente más finas. El ostium bursae está muy esclerificado y con dibujo como en forma de "M", la zona del colliculum casi se estrangula en la intersección con el ductus bursae.

Distribución: Endemismo de Mybri área, Arfak Mountains, Manokwari regency, oeste de Papúa, Indonesia.

Etimología: Dedicamos esta especie nueva al Dr. J. D. Holloway y se la denomina *hollowayi*.

Agradecimientos

Se agradecen las colaboraciones prestadas por el Dr. J. D. Holloway, Miller Scott, David Pollock; al Dr. Antonio Vives y a los revisores del trabajo por su siempre bien recibida ayuda.

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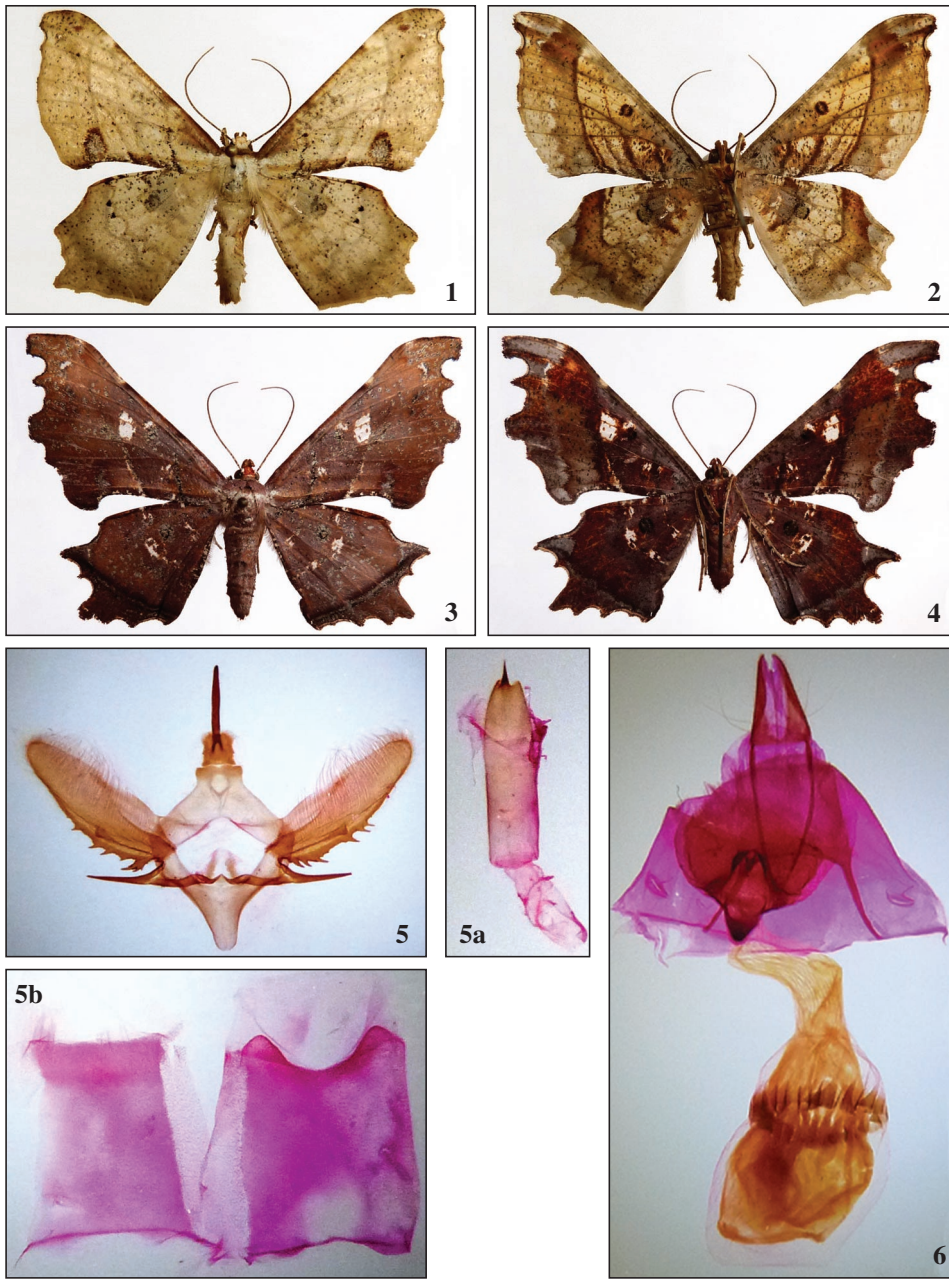
(Recibido para publicación / *Received for publication* 13-XII-2018)
(Revisado y aceptado / *Revised and accepted* 26-XII-2018)
(Publicado / *Published* 30-VI-2019)



Figs. 1-6.– *Xylinophylla hollowayi* Expósito, sp. n., holotipo ♂. **1.** Anverso. **2.** Reverso. **3-4.** Paratipo ♀. **3.** Anverso. **4.** Reverso. **5.** Genitalia ♂, holotipo. **5a.** Aedeagus. **5b.** Octavo segmento abdominal, preparación AEH 3313. **6.** Ginopigio.

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CORRIGENDA.– Se ha publicado en *SHILAP Revista de lepidopterología* **47**(185), de 30 de marzo de 2019, el trabajo de "A. Expósito-Hermosa.– Una nueva especie del género *Ecliptopera* Warren, 1894 de Sulawesi, Indonesia (Lepidoptera: Geometridae, Larentiinae, Cidariini): 189-191", es necesario establecer la siguente mueva sinonimia: *Ecliptopera convexa* Yazaki, 2012 (= *Ecliptopera torajae* Expósito, 2019).– **DETALLES / *DETAILS*:** Andrés Expósito Hermosa; Gardenia, 25; E-28933 Móstoles (Madrid); ESPAÑA / *SPAIN* (E-mail: aexposih@telefonica.net).

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 213-217 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.556

First data about the Papilionoidea from Khara-Adzragyn-Nuruu Protected Area (South-Western Mongolia) (Lepidoptera: Papilionoidea)

R. V. Yakovlev

Abstract

The article gives for the first time the list of the Papilionoidea, collected in July on the territory of Khara-Adzragyn-Nuruu Protected Area (Gobi-Altai aimak, Mongolia). The list includes 26 species, three of them are endemics of the Mongolian Altai: *Tongeia bisudu* Zhdanko & Jakovlev, 2001, *Agrodiaetus mediator* Dantchenko & Churkin, 2003 (Lycaenidae), and *Erebia chastilovi* Churkin, 2003 (Nymphalidae).
KEY WORDS: Lepidoptera, Papilionoidea, fauna, Mongolian Altai, Mongolia.

Primeros datos acerca de los Papilionoidea del Área Protegida de Khara-Adzragyn-Nuruu (Sudoeste de Mongolia) (Lepidoptera: Papilionoidea)

Resumen

El artículo da, por primera vez, la lista de los Papilionoidea, colectados en julio en el territorio del Área Protegida de Khara-Adzragyn-Nuruu (provincia de Gobi-Altai, Mongolia). La lista incluye 26 especies, tres de ellas son endémicas del Altai mongolés: *Tongeia bisudu* Zhdanko & Jakovlev, 2001, *Agrodiaetus mediator* Dantchenko & Churkin, 2003 (Lycaenidae) y *Erebia chastilovi* Churkin, 2003 (Nymphalidae).
PALABRAS CLAVE: Lepidoptera, Papilionoidea, fauna, Altai Mongol, Mongolia.

Introduction

The fauna of Papilionoidea of Mongolia, including the Mongolian Altai, in general, is satisfactorily studied (TSHIKOLOVETS *et al.*, 2009; YAKOVLEV, 2012a). Taxa new to science continue to be still discovered (YAKOVLEV, 2015; DUBATOLOV *et al*., 2016). The local faunas of western Mongolia Butterflies are described in several papers (YAKOVLEV & DOROSHKIN, 2006; YAKOVLEV, 2012b).

In the recent years in Mongolia, many protected areas have been created. Most often they are aimed at the protection of large mammals, rare bird species, and also at organizing scientific and ecological tourism. Though, local faunas of insects are completely not studied in these areas. In 2010, our expeditionary team managed to work on the territory of the mountain ridge Khara-Adzragyn-Nuruu (South-Western Mongolia, Govi-Altai Aimak [district]) (Fig. 1), which later got the status of "protected area". The present article gives a brief overview on the collected material.

Material and methods

The collection was performed in two localities, indicated below as (1) and (2). The material was collected with a butterfly net in the daytime, later mounted on pins and labeled.

(1) SW Mongolia, Gobi-Altai aimak, Mongolian Altai Mts., Khara-Adzragyn-Nuru Mts., Najtvaryn-Sajr river Valley (upper stream), 13-14-VII-2010, 2500-2850 m, 45º 50'N; 95º 34'E; R. Yakovlev & E. Guskova leg. (Fig. 2).

(2) SW Mongolia, Gobi-Altai aimak, Mongolian Altai Mts., Hara-Adzragyn-Nuru Mts., Najtvaryn-Sajr river Valley (under stream), 15-16-VII-2010, 1700-2000 m, 45º 52'N; 95º 30'E; R. Yakovlev & E. Guskova leg. (Fig. 3).

The material deposited in the author's collection (Barnaul, Russia).

Annotated list of species

(*) - endemic species for Mongolian Fauna

Family Hesperiidae Latreille, 1809

Pyrgus alveus (Hübner, [1803])
(2) 2 ♂♂.

Family Papilionidae Latreille, 1802

Parnassius phoebus tsenguun Churkin, 2003
(1) 4 ♂♂, 1 ♀.

Papilio machaon Linnaeus, 1758
(1) 2 ♂♂.

Family Pieridae Duponchel, 1835

Pontia edusa (Fabricius, 1777)
(2) 4 ♂♂.

Pieris bryoniae (Hübner, [1806])
(1) 3 ♂♂, 1 ♀.

Colias chrysotheme (Esper, 1781)
(2) 1 ♂, 1 ♀.

Family Lycaenidae Leach, 1815

Lycaena phlaeas (Linnaeus, 1761)
1) 2 ♂♂.

**Tongeia bisudu* Zhdanko & Jakovlev, 2001
(2) 1 ♂.

Plebejus argyrognomon (Bergsträsser, 1779)
(2) 4 ♂♂, 2 ♀♀.

Plebejus idas shadzgat Yakovlev, 2012
(1) 12 ♂♂, 4 ♀♀.

Eumedonia eumedon (Esper, 1780)
(2) 4 ♂♂, 1 ♀.

Agriades glandon ustjuzhanini Yakovlev & Churkin, 2003
(1) 11 ♂♂, 4 ♀♀.

Albulina orbitulus jugnei Churkin, 2004
(1) 7 ♂♂, 2 ♀♀.

**Agrodiaetus mediator* Dantchenko & Churkin, 2003
(2) 5 ♂♂.

Family Nymphalidae Swainson, 1827

Boeberia parmenio (Boeber, 1809)
(1) 2 ♂♂, (2) 4 ♂♂, 1 ♀.

Coenomympha amaryllis (Stoll, 1782)
(2) 14 ♂♂, 4 ♀♀.

Triphysa nervosa mongolaltaica Dubatolov, Korb & Yakovlev, 2016
(1) 3 ♂♂, 1 ♀.

**Erebia chastilovi* Churkin, 2003
(1) 18 ♂♂, 3 ♀♀.

Hyponephele lycaon kerzhneri Yakovlev, 2011
(2) 19 ♂♂.

Hyponephele cadusina (Staudinger, 1881)
(3) 12 ♂♂, 3 ♀♀.

Oeneis nanna (Ménétriés, 1859)
(1) 1 ♂.

Aglais urticae (Linnaeus, 1758)
(1) 2 ♂♂.

Euphydryas iduna eremita Churkin, 2003
(1) 3 ♂♂.

Melitaea cinxia mogoin Churkin & Kolesnichenko, 2005
(2) 12 ♂♂, 6 ♀♀.

Melitaea arcesia dea Churkin & Kolesnichenko, 2003
(1) 11 ♂♂, 7 ♀♀.

Boloria altica (Grum-Grshimailo, 1893)
(1) 22 ♂♂, 3 ♀♀.

Conclusion

Thus, on the territory of Khara-Adzragyn-Nuruu Protected Area, 26 species of Lepidoptera have been found; three of them are endemics of the Mongolian Altai: *Tongeia bisudu* Zhdanko & Jakovlev, 2001, *Agrodiaetus mediator* Dantchenko & Churkin, 2003 (Lycaenidae), and *Erebia chastilovi* Churkin, 2003 (Nymphalidae).

Acknowledgments

This study was supported in part by the grant No. 6.2884.2017/4.6 given by the Ministry of Education and Science of the Russian Federation.

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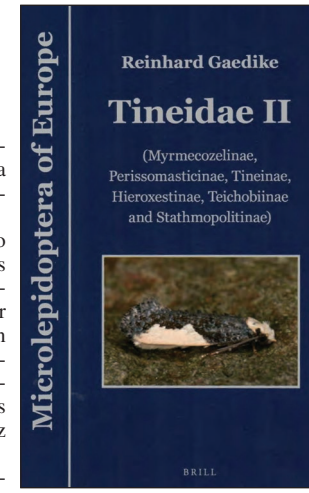
(Recibido para publicación / *Received for publication* 24-VIII-2018)
(Revisado y aceptado / *Revised and accepted* 29-IX-2018)
(Publicado / *Published* 30-VI-2019)

Figures 1-3.– 1. Map of Mongolia with marked (red line) Khara-Adzragyn-Nuruu Protected Area. **2.** SW Mongolia, Gobi-Altai aimak, Mongolian Altai Mts., Khara-Adzragyn-Nuru Mts., Najtvaryn-Sajr river Valley (upper stream) (photo by A. Kechaikin). **3.** SW Mongolia, Gobi-Altai aimak, Mongolian Altai Mts., Hara-Adzragyn-Nuru Mts., Najtvaryn-Sajr river Valley (under stream) (photo by A. Kechaikin).

REVISION DE PUBLICACIONES
BOOK REVIEWS

R. Gaedike
Microlepidoptera of Europe, Volumen 9 Tineidae II
248 páginas, 8 láminas color
Formato 25 x 17,5 cm
Brill, Leiden, Boston 2019
ISBN: 978-90-04-25641-5



De nuevo tenemos en nuestras manos otra entrega de la ya clásica obra sobre los Microlepidoptera de Europa, concretamente el volumen noveno, que de la mano del estimado y conocido especialista en esta familia el Dr. Reinhard Gaedike podemos contemplar en estos momentos.

La confección general es la ya conocida de los anteriores volúmenes, pero en esta ocasión y bajo la segunda parte de la familia Tineidae, nos da a conocer las subfamilias Myrmecozelinae, Perissomasticinae, Tineinae, Hierosextinae, Teichobiinae y Stathmopolitinae que a pesar de haber sido ampliamente estudiada por nuestros apreciados colegas y lamentablemente fallecidos, el Dr. Günter Petersen (1924-2012) y el Dr. Aleksei K. Zagulajev (1924-2007), siempre hay cosas nuevas que descubrir, como ha ocurrido en este caso, tratándose 103 especies, estableciéndose 23 nuevas sinonimias, 1 nueva combinación, se incluyen 9 especies que se describieron después de la publicación del volumen anterior y se da validez a dos especies.

Después de los agradecimientos, pasamos a una introducción general, incluyendo todas las subfamilias consideradas en la obra completa, técnicas de captura y preparación, seguida de una interesante clave de las subfamilias de los Tineidae, pasando a una Lista de todas las especies consideradas presentes en Europa y Macaronesia.

Ya dentro de la parte principal de la obra, se tratan todos los géneros válidos con sus sinonimias y especies tipo, con datos generales sobre su descripción, genitalia, distribución, bionomía y anotaciones extras.

Similar es el tratamiento a cada una de las especies consideradas donde nos presenta las referencias bibliográficas de cada una de ellas, así como de sus sinonimias, una diagnosis sobre su morfología externa, como la genitalia masculina y femenina, distribución, biología y, cuando es necesario, comentarios que permiten despejar dudas sobre la problemática con respecto a la especie tratada y a las próximas, así como otros datos de interés. Todas las especies están detalladamente fotografiadas a todo color, así como de la genitalia de los machos y de las hembras de cada una de ellas.

Con una excelente y detallada tabla donde podemos apreciar a primera vista donde se encuentran cada una de las especies consideradas y con una bibliografía especializada, se termina la obra.

Nuevamente este noveno volumen mantiene la excelente calidad de los volúmenes anteriores, por lo que felicitamos a la Editorial por su esfuerzo y dedicación en esta obra y no podemos por menos de felicitar al autor por su trabajo bien realizado, en el que podemos ver una vez más la gran profesionalidad del mismo.

Esta obra no puede faltar en las bibliotecas de todos aquellos estudiosos de esta interesante familia y con un precio de 93 euros los interesados lo pueden pedir a:

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 219-225 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.558

Aportación al catálogo de los Geometridae del Parque Nacional y Parque Natural de Sierra Nevada (Almería-Granada, España) (Lepidoptera: Geometridae)

A. S. Ortiz, R. M. Rubio, J. J. Guerrero & M. Garre

Resumen

Se aportan nuevos datos de 19 especies de la familia Geometridae en el Parque Nacional y Parque Natural de Sierra Nevada de las que *Tephronia sepiaria* (Hüfnagel, 1767) es nueva para la provincia de Granada y *Aleucis distinctata* (Herrich-Schäffer, 1839), *Biston strataria* (Hüfnagel, 1767), *Charissa predotae* (Schawerda, 1929), *Thera obeliscata* (Hübner, 1787), *Eupithecia phoeniceata* (Rambur, 1834) y *Eupithecia innotata* (Hüfnagel, 1767) son nuevas para la provincia de Almería.
PALABRAS CLAVE: Lepidoptera, Geometridae, faunística, nuevos registros, Sierra Nevada, Almería, Granada, España.

Contribution to the checklist of the Geometridae from the National Park and Natural Park of Sierra Nevada (Almeria-Granada, Spain) (Lepidoptera: Geometridae)

Abstract

Nineteen species belonging to the family Geometridae from the National Park and Natural Park of Sierra Nevada are added to the Systematic checklist of which *Tephronia sepiaria* (Hüfnagel, 1767) is a new record for Granada province and *Aleucis distinctata* (Herrich-Schäffer, 1839), *Biston strataria* (Hüfnagel, 1767), *Charissa predotae* (Schawerda, 1929), *Thera obeliscata* (Hübner, 1787), *Eupithecia phoeniceata* (Rambur, 1834) and *Eupithecia innotata* (Hüfnagel, 1767) are new ones for Almeria province.
KEY WORDS: Lepidoptera, Geometridae, faunistics, new records, Sierra Nevada, Almeria, Granada, Spain.

Introducción

La primera gran aportación al conocimiento de los Geometridae de Sierra Nevada la realizó RIBBE (1909-1912), en la que ofreció numerosos datos de 53 especies obtenidos durante sus estancias en el sur de España en los años 1880 y 1881 y en un viaje posterior en 1905. Posteriormente, varios entomólogos como WEHRLI (1926, 1927), SCHWINGENSCHUSS (1931), LAJONQUIÈRE (1965a, 1965b), DERRA & HACKER (1982) y REDONDO *et al.* (2009), principalmente, aportaron datos hasta alcanzar las 225 especies conocidas (ORTIZ *et al.,* 2013).

Sierra Nevada es el macizo más importante de la Cordillera Penibética que, con una orientación este-oeste, tiene una longitud de casi 80 km y alturas superiores a los 3.000 m, dando lugar a una vertiente norte o atlántica y otra sur o mediterránea, ocupando una extensión de aproximadamente 1.750 km^2 entre las provincias de Granada y Almería. El clima se caracteriza por presentar inviernos

largos y fríos y veranos cortos, frescos y secos. La situación particular a nivel latitudinal y la escasa pluviosidad durante el periodo de mayo a octubre le confiere un carácter diferenciado del resto de las montañas europeas condicionando su composición faunística.

El objetivo del presente trabajo es aumentar el número de especies conocidas de la familia Geometridae presentes en Sierra Nevada y añadir nuevas especies al catálogo de los geométridos de Almería y Granada.

Material y métodos

Los muestreos se realizaron en localidades situadas en las cuadrículas UTM 30SWG00 y 30SWF09 dentro de la provincia de Almería y en las 30SVG60, 30SVF99 y 30SVF69 dentro de la provincia de Granada, así como en la cuadrícula 30SVG90 que incluye a las dos provincias. Las localidades estudiadas se ordenan por cuadrículas UTM y provincias en la Tabla I. Todas las capturas se realizaron con trampas de luz negra y actínica de 6 y 15 vatios (tipo Heath) y en el alumbrado de la Posada de los Arrieros.

El material estudiado se encuentra depositado en la colección del Laboratorio de Biología Animal del Departamento de Zoología y Antropología Física de la Universidad de Murcia.

Tabla I.– Relación de las localidades muestreadas.

Localidad	Municipio	Provincia (m.s.n.m.)	Altitud	U.T.M.
Collado de Gabiarra	Paterna del Río	Almería	2.120	30SWG00
Fuente París	Paterna del Río	Almería	1.940	30SWG00
Loma del Estanquero	Paterna del Río	Almería	1.600	30SWF09
Fuentichaves	Paterna del Río	Almería	1.320	30SWF09
Barranco del Aguadero	Láujar de Andarax	Almería	1.000	30SWF09
Las Viñas	Láujar de Andarax	Almería	1.080	30SWF09
Encinar del Palancón	Bayárcal	Almería	1.720	30SVG90
Posada de los Arrieros	Bayárcal	Almería	1.790	30SVG90
Puerto de La Ragua	Bayárcal	Almería	2.030	30SVG90
Puerto de La Ragua	Ferreira	Granada	2.000	30SVG90
Cortijo de los Benaventes	Laroles	Granada	1.740	30SVG90
Mal de Infierno	Laroles	Granada	1.350	30SVF99
Collado Diablo	Monachil	Granada	2.270	30SVG60
Estación de Esquí Sierra Nevada	Monachil	Granada	2.300	30SVG60
Cortijo Catifalarga	Capileira	Granada	1.500	30SVF69

Resultados y discusión

En el presente trabajo se aportan 19 nuevas especies que se añaden a las 225 publicadas en el catálogo de la familia Geometridae en el Parque Nacional y el Parque Natural de Sierra Nevada (ORTIZ *et al.,* 2013), incrementando hasta 244 el número de especies conocidas en este espacio natural, de las que 10 pertenecen a la subfamilia Ennominae, una a Sterrhinae y 8 a Larentiinae. Estos taxones representan el 39,8% del total de las 613 especies citadas en la Península Ibérica (VIVES MORENO, 2014) y, al comparar la riqueza específica con otras áreas protegidas próximas, se observa que es superior al censo conocido en la Sierra de Espuña en Murcia (113 especies; CALLE *et al.,* 2007; ORTIZ *et al.,* 2008), en la Sierra de María en Almería (139 especies; GARRE *et al.,* 2016a) y en la Sierra del Taibilla-Las Cabras en Albacete (162 especies; GUERRERO *et al.,* 2010), mientras que es similar a otros espacios naturales peninsulares bien estudiados como la

Serranía de Cuenca (197 especies; GARRE *et al.,* 2016b) y el Valle de Arán (233 especies; ORTIZ *et al.,* 2015, 2017).

Estas capturas han permitido confirmar la presencia en el área de estudio de especies como *Idaea carvalhoi* Herbulot, 1979 y *Peribatodes ilicaria* (Geyer, [1833]), citadas solamente por LAJONQUIÈRE (1967), *Idaea lusohispanica* Herbulot, 1991 y *Opisthograptis luteolata* (Linnaeus, 1758) por WEHRLI (1926), *Menophra nycthemeraria* (Geyer, [1831]) por DERRA & HACKER (1982) y *Scopula decorata* ([Denis & Schiffermüller], 1775) por MÜLLER (2010), aunque algunas de ellas fueron señaladas en los mapas de distribución en REDONDO *et al.* (2009).

La mayoría de las nuevas especies para Sierra Nevada han sido citadas varias veces en ambas provincias como *Perigune narbonea, Crocallis dardoinaria, Bupalus piniaria, Hospitalia flavolineata* y *Eupithecia cooptata.* Otras especies han sido citadas en varios espacios naturales de Almería, pero solamente se conocen por citas puntuales en la provincia de Granada, como *Eupithecia massiliata*, en la Sierra de la Sagra por ORTIZ *et al.* (2010) y *Adactylotis gesticularia* en la Sierra de Alfacar y Güejar Sierra, fuera de los límites del Espacio Natural Sierra Nevada, por RIBBE (1909-1912) y *Colotois pennaria* e *Idaea longaria* en Granada por RIBBE (1909-1912).

Las especies nuevas para la provincia de Almería son *Aleucis distinctata* (Herrich-Schäffer, 1839), *Biston strataria* (Hüfnagel, 1767), *Charissa predotae* (Schawerda, 1929), *Thera obeliscata* (Hübner, 1787), *Eupithecia phoeniceata* (Rambur, 1834) y *Eupithecia innotata* (Hüfnagel, 1767). Algunas de estas especies se conocían previamente de Granada, aunque *Charissa predotae* solamente estaba citada en la Sierra de la Sagra por ORTIZ *et al.* (2010) y *Thera obeliscata* solamente en la Sierra de Baza por REDONDO *et al.* (2009).

La especie que es nueva para la provincia de Granada es *Tephronia sepiaria* que es conocida en Almería en la Sierra de María (GARRE *et al.,* 2016a).

A continuación, se presenta la relación de especies estudiadas ordenadas sistemáticamente indicando la provincia, toponimia distintiva, fecha de captura y número de ejemplares.

GEOMETRIDAE

Ennominae

Perigune narbonea (Linnaeus, 1767)

Material estudiado: Las Viñas, 28-III-2016, 1 ♂.

Crocallis dardoinaria Donzel, 1840

Material estudiado: Fuente París, 4-IX-2016, 1 ♀.

Colotois pennaria (Linnaeus, 1761)

Material estudiado: Barranco del Aguadero, 26-X-2017, 1 ♂.

Aleucis distinctata (Herrich-Schäffer, 1839)

Material estudiado: Barranco del Aguadero, 13-V-2018, 1 ♀.

Biston strataria (Hüfnagel, 1767)

Material estudiado: Barranco del Aguadero, 29-III-2018, 1 ♂; 18-IV-2018, 1 ♂.

Adactylotis gesticularia (Hübner, [1817])

Material estudiado: Posada de Los Arrieros, 9-VII-2011, 1 ex.; Fuentichaves, 28-III-2016, 1 ♂; Mal de Infierno, 26-VI-2011, 3 ex.; Cortijo de los Benaventes, 25-VI-2011, 1 ex.

Tephronia sepiaria (Hüfnagel, 1767)

Material estudiado: Cortijo Catifalarga, 16-VIII-2012, 1 ex.; Mal de Infierno, 26-VI-2011, 1 ex.

Tephronia lhommearia (Cleu, 1928)
Material estudiado: Fuente París, 6-VIII-2016, 1 ♂.

Bupalus piniaria (Linnaeus, 1758)
Material estudiado: Fuentichaves, 24-IV-2016, 1 ♂; Puerto de La Ragua (Granada), 25-VI-2011, 1 ex.; Cortijo de los Benaventes, 25-VI-2011, 1 ex.

Charissa (Kemtrognophos) predotae (Schawerda, 1929)
Material estudiado: Encinar del Palancón, 4-IX-2015, 1 ♂, 1 ♀; Fuente París, 7-V-2017, 1 ♂; Cortijo Catifalarga, 25-VI-2012, 1 ex.; Puerto de La Ragua (Granada), 25-VI-2011, 1 ex.

STERRHINAE

Idaea longaria (Herrich-Schäffer, 1852)
Material estudiado: Las Viñas, 28-III-2016, 1 ♂.

LARENTIINAE

Anticlea derivata ([Denis & Schiffermüller], 1775)
Material estudiado: Barranco del Aguadero, 18-IV-2018, 1 ♂, 2 ♀♀.

Thera obeliscata (Hübner, 1787)
Material estudiado: Puerto de La Ragua (Almería), 5-VII-2015, 1 ♂; Collado de Gabiarra, 3-VII-2017, 1 ♂; Loma del Estanquero, 24-IX-2017, 1 ♂; Barranco del Aguadero, 13-V-2018, 1 ♂; Collado Diablo, 31-VII-2014, 1 ex.; Estación de Esquí de Sierra Nevada, 13-VII-2013, 1 ex.; Cortijo de los Benaventes, 29-VII-2011, 1 ex.

Hospitalia flavolineata (Staudinger, 1883)
Material estudiado: Barranco del Aguadero, 4-X-2017, 1 ♂.

Eupithecia massiliata Dardoin & Millière, 1865
Material estudiado: Fuentichaves, 24-IV-2016, 1 ♀.

Eupithecia phoeniceata (Rambur, 1834)
Material estudiado: Barranco del Aguadero, 4-X-2017, 1 ♂.

Eupithecia innotata (Hüfnagel, 1767)
Material estudiado: Las Viñas, 11-IX-2017, 1 ♂.

Eupithecia cooptata Dietze, 1903 (Fig. 1)
Material estudiado: Collado de Gabiarra, 6-VIII-2016, 1 ♂; Fuente París, 22-VII-2017, 1 ♂.

Eupithecia variostrigata Alphéraky, 1876
Material estudiado: Barranco del Aguadero, 26-X-2017, 1 ♂; Las Viñas, 1.080 m, 1 ♂, 1 ♀.

Agradecimiento

A la Dirección del Parque Nacional y Natural de Sierra Nevada por las facilidades dadas para la realización de este trabajo y en especialmente a Blanca Ramos por su interés. Este estudio ha sido financiado con el proyecto del Plan Nacional I+D+i (2008-2011) titulado *Barcoding y taxonomía basada en el ADN de coleópteros carábidos y tenebriónidos, lepidópteros noctuidos e himenópteros*

ápidos de la península ibérica (Insecta, Coleoptera, Lepidoptera Noctuidae e Hymenoptera Apidae) y por la Fundación Séneca (Ref. 19908/GERM/15) de Murcia.

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(Recibido para publicación / *Received for publication* 13-VII-2018)
(Revisado y aceptado / *Revised and accepted* 17-IX-2918)
(Publicado / *Published* 30-VI-2019)

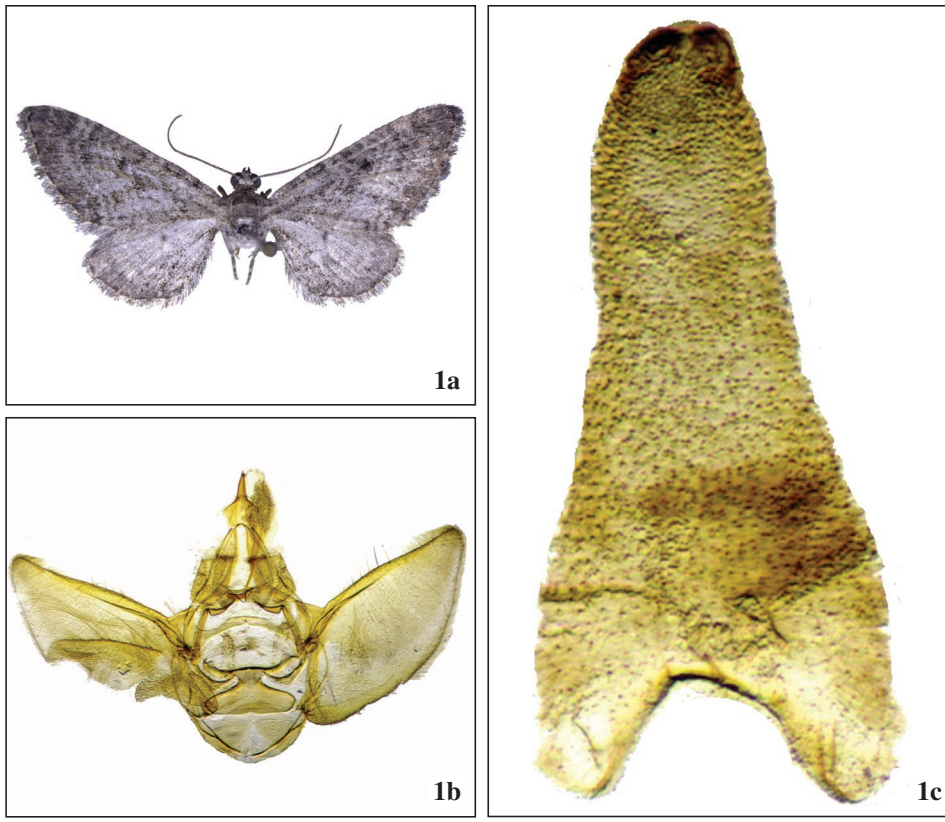
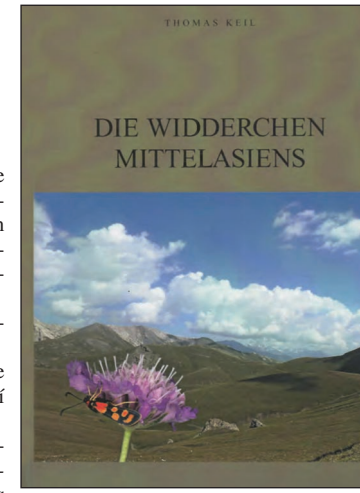


Figura 1.– *Eupithecia cooptata* Dietze: **1a.** Adulto macho, **1b.** genitalia, **1c.** Octavo tergito.

REVISION DE PUBLICACIONES
BOOK REVIEWS

T. Keil
Die Widderchen Mittelasiens
84 páginas
Formato: 24,5 x 17 cm
Entomologischen Nacrichten und Berichte, Colditz-ol Terpitzscher, 2015
ISSN: 0232-5535



Tenemos en nuestras manos una nueva y excelente monografía de los Zygaenidae presentes en Asia Central, más concretamente en los países de Kirguizistán, Tayikistán y Uzbekistán que, anteriormente, fueron estudiadas por los destacados lepidopterólogos como Eversmann, Erschoff, Staudinger, Grum-Grshimailo, Holik, Sheljuzhko, Reiss, Naumann, etc.

Se pretende y consigue, mostrarnos la interesante fauna que se encuentra en esta zona, haciendo hincapié en su biología y distribución.

Comienza la obra con una interesante Introducción sobre la zona de estudio, su geografía, climatología, lista de las especies consideradas, así como la terminología en la morfología considerada.

Ya dentro de la parte sistemática, nos habla del género *Zygaena* Fabricius, 1775, con dos subgéneros *Mesembrynus* Hübner, [1819] y *Agrumenia* Hübner, [1819] y un total de nueve especies, a saber: *Zygaena (Mesembrynus) huguenini* Staudinger, 1887, *Zygaena (Agrumenia) separata* Staudinger, 1887, *Z. (Agrumenia) truchmena* Eversmann, 1854, *Z. (Agrumenia) ferganae* Sheljuzhko, 1941, *Z. (Agrumenia) sogdiana* Erschoff, 1874, *Z. (Agrumenia) kavrigini* Grun-Grshimailo, 1887, *Z. (Agrumenia) cocandica* Erschoff, 1874, *Z. (Agrumenia) pamira* Sheljuzhko, 1919 y *Z. (Agrumenia) magiana* Staudinger, 1889.

De cada una de las especies, se nos dan datos sistemáticos, su distribución, morfología, biología y ecología, así como fotografías de los adultos en vivo y de sus larvas, a todo color, lo que nos permite ver las especies endémicas de esta interesante área zoogeográfica.

La obra termina con los mapas de distribución y datos de las principales plantas nutricias, con fotografías de algunas de ellas, así como 30 fotografías de las especies tratadas y montadas científicamente que nos ayudan a su identificación, una serie de fotografías de las áreas estudiadas y una bibliografía específica.

No podemos terminar estas líneas, sin felicitar al autor por un trabajo bien realizado, al que le ha sido concedida la Medalla Fabricius en el año 2015, así como a la Editorial que no ha escatimado en medios para mantener el gran nivel de calidad necesaria para este tipo de trabajos; recomendando vivamente su adquisición, no pudiendo faltar en cualquier biblioteca que se precie.

El precio de este libro es de 68 euros más gastos de envío y los interesados deben dirigirse a:

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 227-231 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.560

New Records of Carpenter-Moths from Southern Urals (Russia) (Lepidoptera: Cossidae)

R. V. Yakovlev

Abstract

The article gives data on the species *Kotchevnik modestus* (Staudinger, 1887), new for the Russian fauna, and on the founding's new for Southern Urals: *Deserticossus volgensis* (Christoph, 1893), *Phragmataecia albida* Erschoff, 1874 and *Zeuzera pyrina* (Linnaeus, 1761).
KEY WORDS: Lepidoptera, Cossidae, fauna, new record, Ural, Russia.

Nuevos registros de cóssidos del sur de los Urales (Rusia)
(Lepidoptera: Cossidae)

Resumen

El artículo da datos sobre la especie *Kotchevnik modestus* (Staudinger, 1887), nuevo para la fauna rusa y sobre los nuevos encontrados en el sur de los Montes Urales: *Deserticossus volgensis* (Christoph, 1893), *Phragmataecia albida* Erschoff, 1874 y *Zeuzera pyrina* (Linnaeus, 1761).
PALABRAS CLAVE: Lepidoptera, Cossidae, fauna, nuevos registros, Urales, Rusia.

Introduction

The fauna of Carpenter-Moths (Cossidae) of Russia is studied quite well. The basic information is given in the author's papers (YAKOVLEV, 2007; SINEV, 2008). Additionally, two species of Cossidae from Dagestan Republic (Caucasus) and Tuva Republic (Southern Siberia) were described later (YAKOVLEV *et al.*, 2015a; SALDAITIS *et al.*, 2017). Thus, for the Russian fauna, 34 Cossidae species are currently registered, and the distribution of species by regions of the country has been relatively well studied. It also refers to the fauna of Southern Urals; a special paper (YAKOVLEV, 2005) describes the distribution of Cossidae in this region.

Material and methods

The collection of material was performed in the Orenburg Province by A. Ukrainskyi and P. Gorbunov (Figs. 1-2). The material is deposited in the author's collection (Barnaul, Russia).

Results

Kotchevnik modestus (Staudinger, 1887) (Figs. 3-4)

Material: 5 ♂♂, 1 ♀, Russia, Orenburg Province, 12 km W Novotroitsk, Guberlya river Valley, 51º 15'N / 58º 07'E, 25-VII-2017, leg. P. Gorbunov.

Distribution: Kazakhstan, Kyrgyzstan, Uzbekistan, NW China, Iran (YAKOVLEV, 2011), Russia (Orenburg Province). **New for Russia**.

Deserticossus volgensis (Christoph, 1893) (Figs. 5-6)

Material: 4 ♂♂, 1 ♀, Russia, Orenburg Province, 12 km W Novotroitsk, Guberlya river Valley, 51º 15'N / 58º 07'E, 25-VII-2017, leg. P. Gorbunov.

Distribution: NW Kazakhstan, Southern Volga Region, Northern Caucasus (Stavropol Province and Daghestan), Southern Urals (Orenburg Province) (YAKOVLEV, 2011). **New for Southern Urals**.

Phragmataecia albida Erschoff, 1874 (Fig. 7)

Material: 4 ♂♂, Russia, Orenburg Province, 12 km W Novotroitsk, Guberlya river Valley, 51º 15'N / 58º 07'E, 25-VII-2017, leg. P. Gorbunov.

Distribution: Iran, Turkmenistan, Uzbekistan, Kazakhstan, NW China, Afghanistan, Russia (S. Volga reg.) (YAKOVLEV, 2011; YAKOVLEV *et al*., 2015b; YAKOVLEV & WITT, 2016). **New for Southern Urals**.

Zeuzera pyrina (Linnaeus, 1761) (Fig. 8)

Material: 4 ♂♂, Russia, Orenburg Province, 12 km W Novotroitsk, Guberlya river Valley, 51º 15'N / 58º 07'E, 25-VII-2017, leg. P. Gorbunov; 2 ♂♂, Russia, Orenburg Province, Buzuluk District, Opytnyi village, VII-2012, leg. A. S. Ukrainskyi.

Distribution: Distribution: Europe including S. England, N. Africa (Egypt, Tunisia, Morocco, Algeria, Mauritania), Iran, Lebanon, Syria, Turkmenistan, Turkey, Caucasus, Transcaucasia, Southern Urals, N. America (Massachusetts, Connecticut, New York, New Jersey), Central Africa (Ghana) (YAKOVLEV, 2011).

This species was recorded for Bashkortostan and the Orenburg region without specifying exact localities (ANIKIN *et al*., 2000, 2017). It was indicated that there was no new material for Southern Urals (YAKOVLEV, 2005). The present founding confirms the presence of the species in the Southern Urals and its distribution in the Asian part of Russia.

Conclusion

Thus, the Russian fauna has been supplemented by one more Cossidae species- *Kotchevnik modestus* (Staudinger, 1887). It seems promising to study the southern border regions of Russia to clarify the species composition of the fauna.

Acknowledgments

The author is grateful to A. Ukrainskyi (Ekaterinburg) and P. Gorbunov (Moscow) for the given material.

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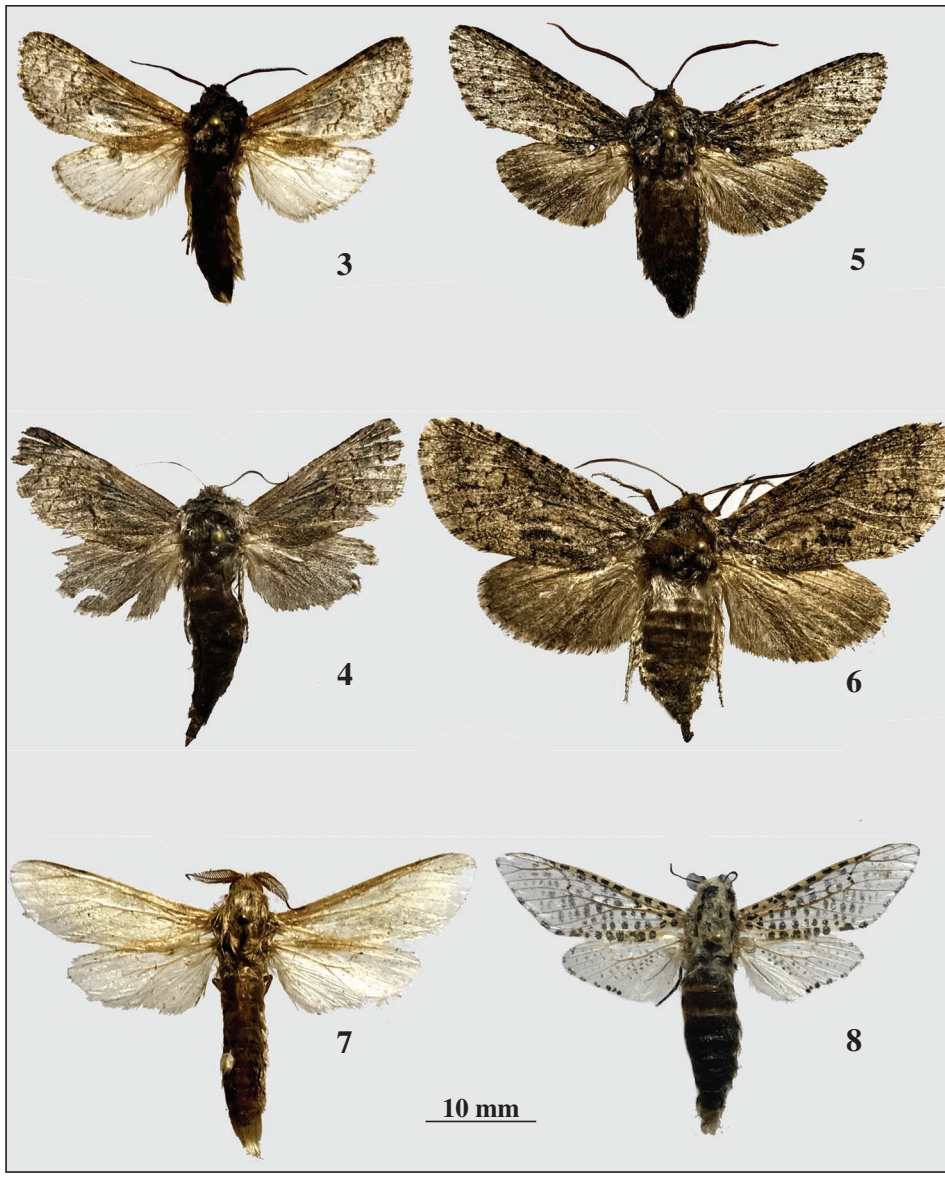
(Recibido para publicación / *Received for publication* 20-VIII-2018)
(Revisado y aceptado / *Revised and accepted* 29-IX-2018)
(Publicado / *Published* 30-VI-2019)

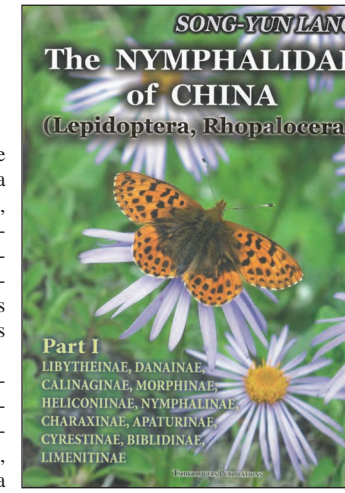
Figs. 1-2.– 1. Map of the collecting localities. **2.** Russia, Orenburg Province, Guberlya river Valley (photo by P. Gorbunov).



Figs. 3-8.– *Kotchevnik modestus* (Staudinger, 1887), ♂, Orenburg Province, Guberlya river Valley (coll. R. Yakovlev). **4.** *Kotchevnik modestus* (Staudinger, 1887), ♀, Orenburg Province, Guberlya river Valley (coll. R. Yakovlev). **5.** *Deserticossus volgensis* (Christoph, 1893), ♂, Orenburg Province, Guberlya river Valley (coll. R. Yakovlev). **6.** *Deserticossus volgensis* (Christoph, 1893), ♀, Orenburg Province, Guberlya river Valley (coll. R. Yakovlev). **7.** *Phragmataecia albida* Erschoff, 1874, ♂, Orenburg Province, Guberlya river Valley (coll. R. Yakovlev). **8.** *Zeuzera pyrina* (Linnaeus, 1761), ♂, Orenburg Province, Guberlya river Valley (coll. R. Yakovlev).

REVISION DE PUBLICACIONES
BOOK REVIEWS

S.-Y. Lang
The Nymphalidae of China (Lepidoptera, Rhopalocera). Part I
454 páginas, 29 láminas color
Formato 29,5 x 21 cm
Tshikolovets Publications, Pardubice, 2012
ISBN: 978-80-904900-1-7



Tenemos en nuestras manos una nueva serie sobre los Nymphalidae de China, concretamente en esta primera parte, se tratan once subfamilias, a saber: Libytheinae, Danainae, Calinaginae, Morphinae, Heliconiinae, Nymphalinae, Charaxinae, Apaturinae, Cyrestinae, Biblidinae y Limenitinae, que abarca un total de 423 especies y sus numerosas subespecies, estableciéndose 5 nuevas combinaciones, 3 estatus nuevos y 29 nuevas sinonimias, que representan todas las especies que se encuentran en el tercer país más grande del mundo, incluso se tratan algunas especies recogidas en los países vecinos como Laos, Rusia y Vietnam.

Después de unas primeras palabras de lo que significa esta publicación, aparecen los agradecimientos y una interesante introducción que abarca sobre cómo está compuesto este libro, acerca de las especies y su sistemática, sobre los mapas de distribución, terminología, nombres científicos, geografía y las diferentes colecciones consultadas, continuando con un lista de todas las especies y subespecies consideradas.

Ya dentro de la parte más importante del libro se nos presenta la familia, subfamilia y el género considerado con su información bibliográfica, la especie tipo, la descripción de la genitalia del macho y de la hembra y su distribución.

De cada especie podemos ver los datos bibliográficos y las subespecies consideradas, su descripción, material estudiado, su distribución conocida, un mapa indicando con un círculo, donde se ha muestreado y, en algunos casos, notas adicionales.

Todas las especies están excelentemente fotografiadas en 28 láminas a todo color, así como en 41 láminas podemos apreciar unas fotografías y dibujos muy detallados de la genitalia del macho y de la hembra, que permiten y facilitan la identificación de las especies consideradas. La obra finaliza con un índice y una extensa bibliografía, básica, para poder abarcar el ingente trabajo que ha supuesto esta obra.

No podemos terminar estas líneas, sin felicitar al autor, por tan minucioso trabajo y a la Editorial por continuar con la publicación de estas obras de referencia, por la excelente impresión del texto y fotografías de las genitalias, así como de las láminas en color, por lo que recomendamos esta obra, no sólo a los interesados en este familia en particular, sino a todos los interesados en los Lepidoptera en general, donde esta obra no debería de faltar.

El precio de este libro es de 119 euros y los interesados lo pueden pedir a:

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 233-236 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.562

Una nueva especie del género *Gonodontis* Hübner, [1823] de Indonesia, oeste de la isla de Timor (Lepidoptera: Geometridae, Ennominae, Gonodontini)

A. Expósito-Hermosa

Resumen

Se describe *Gonodontis ivani* Expósito, sp. n. de Indonesia del oeste de la isla de Timor. Se muestran imágenes del adulto y de la genitalia.
PALABRAS CLAVE: Lepidoptera, Geometridae, Ennominae, Gonodontini*, Gonodontis,* nueva especie, Timor, Indonesia.

A new species of genus *Gonodontis* Hübner, [1823] from Indonesia, West of the Timor Island (Lepidoptera: Geometridae, Ennominae, Gonodontini)

Abstract

Gonodontis ivani Expósito, sp. n. is described of Indonesia West of Timor Island. Images of adult and genitalia are presented.
KEY WORDS: Lepidoptera, Geometridae, Ennominae, Gonodontini, *Gonodontis*, new species, Timor, Indonesia.

Taxonomía

***Gonodontis ivani* Expósito, sp. n.** (Figs. 1-6)

Holotipo (Figs. 1-2): 1 ♀, INDONESIA, Monte Molo, oeste de la isla de Timor, 1.500 m, IV-2016, (colector local). Genitalia ♀ preparación AEH 3309 (Fig. 9). Paratipos 2 ♂♂ con la misma data y otro paratipo 1 ♂, con fecha de captura VII-2016, genitalia ♂ preparación AEH 3303 (Fig. 11). El material está depositado en la colección del autor en Móstoles, Madrid (España).

Descripción (Figs. 1-2): La hembra tiene una expansión alar de 41 mm, así pues, considerablemente inferior a la de *Gonodontis pallida* Butler, 1880 (Figs. 3-4) (HOLLOWAY, 1994; YAZAKI, 2012) con la que se ha comparado y que llega a los 55 mm. Los palpos son igualmente más cortos y en general su cuerpo: cabeza, tórax y abdomen, así como el fondo de sus alas es de un tono marrón-rojizo, es decir, algo más oscuro que el color de *G. pallida.* Las antenas son filiformes. Tanto las alas anteriores como posteriores presentan un termen repicoteado con variadas zonas curvadas cóncavas y prominentes picos externos. La discontinua banda blanca mediana, de las alas anteriores, es más uniforme que en *G. pallida* y llega hasta el borde interno o dorsum. En las alas posteriores las manchas blancas son vestigiales. Reverso semejante pero de color más rojizo-oscuro.

Los machos (Figs. 5-8), tienen una expansión alar comprendida entre los 13-15 mm. Antenas bipectinadas. La morfología externa de los machos es muy semejante a los de *G. pallida,* pero el fondo alar es de un tono más rojizo-oscuro. En las alas posteriores la muesca de M-5 es más profunda.

Genitalia ♀ (Fig. 9): La estructura presenta un patrón diferente al de *G. pallida* (Fig. 10). No obstante, con lóbulos en la bursa copulatrix, los cuales son muy irregulares, con marcado relieve y estrías onduladas verticales. Esto contrasta con la suavidad de los lóbulos de *G. pallida.*

Genitalia ♂ (Fig. 11): La estructura presenta un patrón semejante al de *pallida* (Fig. 10), Sin embargo, los procesos laterales del tegumen de *ivani* son más anchos y cortos que en *pallida* (Fig. 12). El aedeagus es más corto y ancho. El octavo esternito muestra como la hendidura central se estrecha hacia su parte inferior y los bordes externos son más curvos y pronunciados.

Distribución: INDONESIA, endemismo de la isla de Timor.

El material del Mt. Langgelisu de la isla de Sumba, II-2016, INDONESIA, que se ha podido estudiar, posee caracteres análogos a los machos de *G. ivani* de Timor, pero al no disponer de hembras, para su análisis, se ha optado por no incluirlos en la descripción.

Etimología: Se dedica esta especie a Iván, uno de los hijos del autor y se la denomina como *ivani*.

Comentarios: Aunque en el texto e imágenes, de la descripción se ha elegido material de muestra comparativo de *G. pallida* Butler, 1880 de INDONESIA, Mesaholi area riverside de la isla de Ambelau; se ha tenido en cuenta además, para el estudio, otros, ejemplares de la colección Andrés Expósito-Hermosa procedentes de FILIPINAS, Mt. Mantaliegata, Isla de Palawán, II-2016, Genitalia AEH 3301. FILIPINAS, Mt. Canlaon, Isla de Negros, 1.100 m, III-2006, Genitalia AEH 3304. VIETNAM, Thua Thien-Hue, Khe Cha Lenh, 809 m, 12-13-VIII-2004, Genitalia AEH 3305. INDONESIA, norte de Toraja regency Pulu-Pulu area sur de Sulawesi VII-2017, Genitalia AEH 3306. MALASIA, Brinchang, Cameron Highlands 3-VIII-1991, Genitalia AEH 3307, etc., en total cincuenta y seis ejemplares.

La hembra de la nueva especie presenta una morfología externa semejante a las del halogrupo australiano - fundamentalmente a *G. luteola* Turner, 1904 - y los machos a *G. orthotoma* Lower, 1895.

En cuanto a la sistemática del complejo de *Gonodontis pallida* Butler, 1880 de Indonesia y áreas adyacentes, se debería de llevar a cabo un estudio más amplio siguiendo a YAZAKI (2012).

Agradecimientos

Al Dr. Antonio Vives y a los revisores del trabajo por su siempre bien recibida ayuda.

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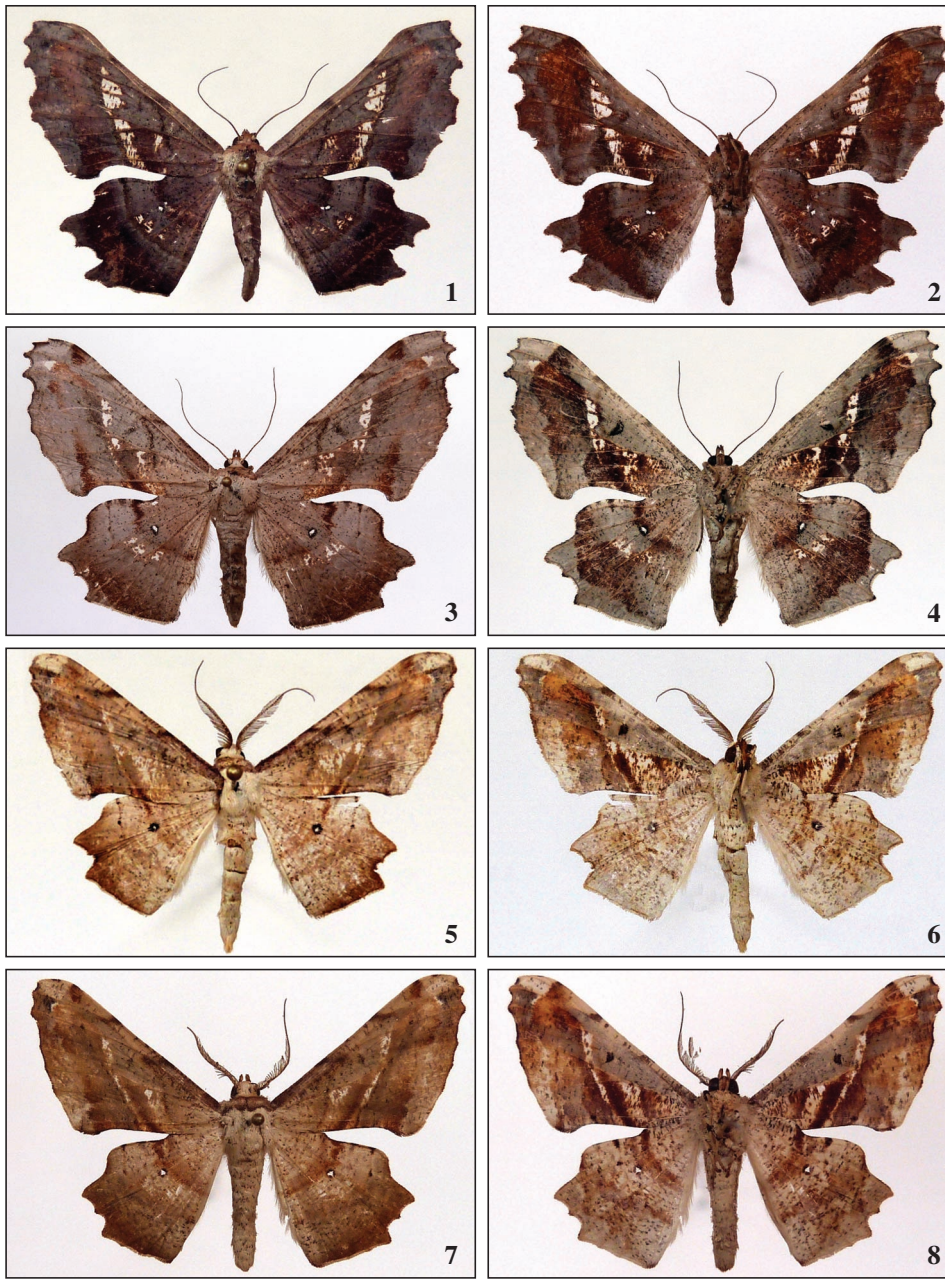
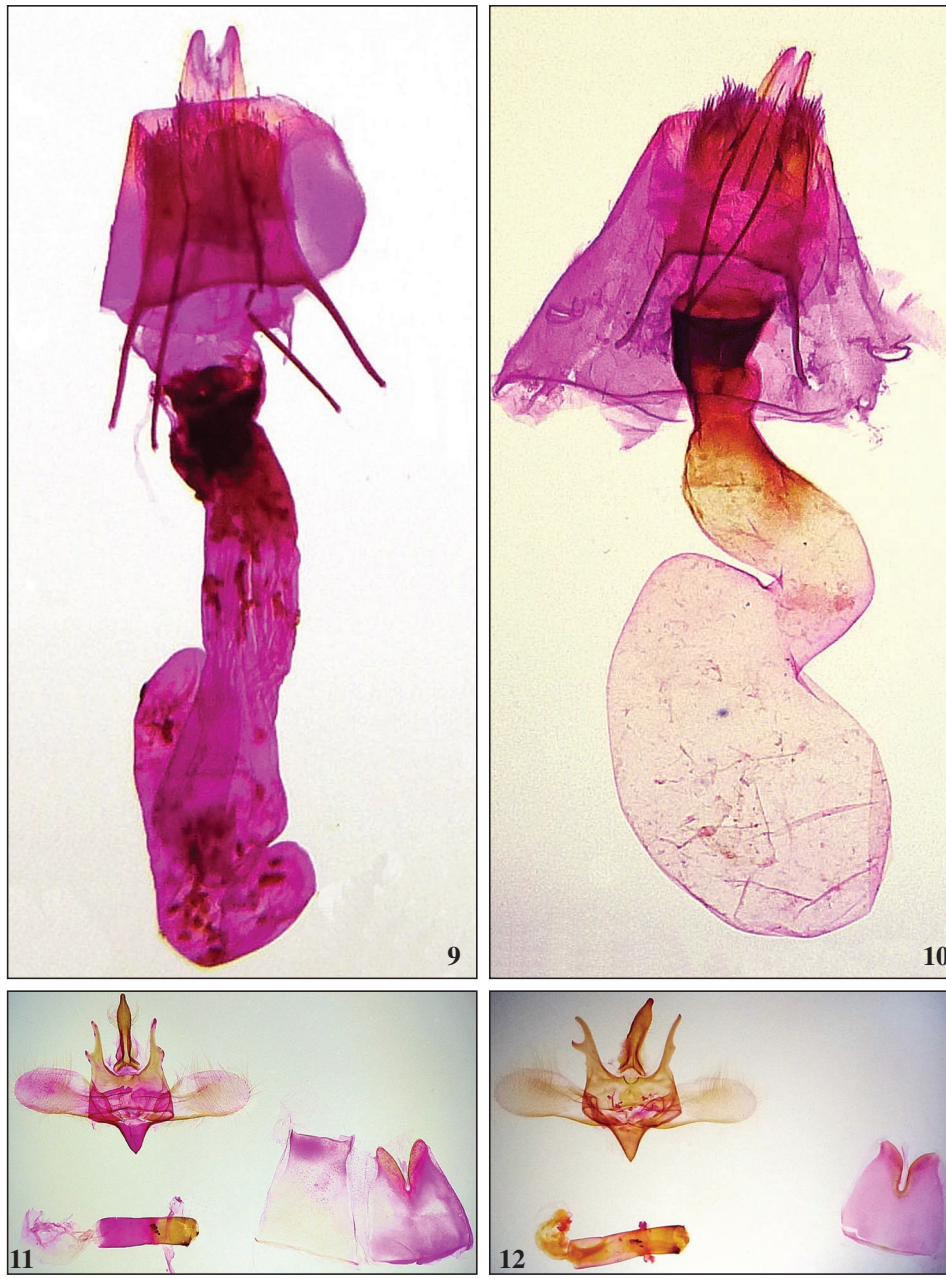
(Recibido para publicación / *Received for publication*: 18-XI-2018)
(Revisado y aceptado / *Revised and accepted* 26-XII-2018)
(Publicado / *Published* 30-VI-2019)



Figs. 1-8.– 1-2. *Gonodontis ivani* Expósito, sp. n., holotipo ♀. **1.** Anverso. **2.** Reverso. **3-4.** *G. pallida* Butler, 1880, ♀, Isla de Ambelau. **3.** Anverso. **4.** Reverso. **5-6.** *G. ivani* Expósito, sp. n., Paratipo 1, ♂. **5.** Anverso. **6.** Reverso. **7-8.** *G. ivani* Expósito, sp. n., paratipo 2, ♂. **7.** Anverso. **8.** Reverso.



Figs. 9-12.– 9. *Gonodontis ivani* Expósito, sp. n., holotipo ♀. Genitalia AEH 3309. **10.** *Gonodontis pallida* Butler, 1880, Isla de Ambelau, ♀. Genitalia AEH 3308. **11.** *G. ivani* Expósito, sp. n., paratipo 3, ♂. Genitalia AEH 3303. **12.** *G. pallida* Butler, 1880, Isla de Ambelau, ♂. Genitalia AEH 3302.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 237-250 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.563

New records of Lepidoptera from the Iberian Peninsula from 2017 and 2018 (Insecta: Lepidoptera)

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Abstract

New records of Nepticulidae, Gracillariidae, Roeslerstammiidae, Plutellidae, Argyresthiidae, Oecophoridae, Coleophoridae, Momphidae, Brachodidae, Erebidae, and Noctuidae for Spain and Portugal are presented. *Stigmella nylandriella* (Tengström, 1848), *Ectoedemia argyropeza* (Zeller, 1839), *E. spinosella* (Joannis, 1908), *Phyllonorycter sorbi* (Freyer, 1855), *Roeslerstammia erxlebella* (Fabricius, 1787), *Rhigognostis senilella* (Zetterstedt, 1839), *Argyresthia aurulentella* Stainton, 1849, *A. thuriferana* (Gibeaux, 1992), *A. buvati* Gibeaux, 1992, *A. reticulata* Staudinger, 1877, *A. submontana* Frey, 1870, *Batia internella* Jäckh, 1972, *Coleophora gryphipennella* (Hübner, 1796), and *Mompha raschkiella* (Zeller, 1839) are new for Spain, *Chelis maculosa* (Gerning, 1780) and *Helotropha leucostigma* (Hübner, 1808) are new for Portugal. *Stigmella nylandriella, Ectoedemia argyropeza, E. spinosella, Rhigognostis senilella, Argyresthia aurulentella*, *A. thuriferana, A. buvati, A. reticulata, A. submontana, Batia internella,* and *Mompha raschkiella* are new for the Iberian Peninsula. New province records are given of 54 species (57 new province records in all).
KEY WORDS: Insecta, Lepidoptera, Nepticulidae, Gracillariidae, Roeslerstammiidae, Plutellidae, Argyresthiidae, Oecophoridae, Coleophoridae, Momphidae, Brachodidae, Erebidae, Noctuidae, new records, Iberian Peninsula.

Nuevos registros de Lepidoptera en la Península Ibérica del 2017 y 2018 (Insecta: Lepidoptera)

Resumen

Se mencionan nuevos registros de Nepticulidae, Gracillariidae, Roeslerstammiidae, Plutellidae, Argyresthiidae, Oecophoridae, Coleophoridae, Momphidae, Brachodidae, Erebidae y Noctuidae para España y Portugal. *Stigmella nylandriella* (Tengström, 1848), *Ectoedemia argyropeza* (Zeller, 1839), *E. spinosella* (Joannis, 1908), *Phyllonorycter sorbi* (Freyer, 1855), *Roeslerstammia erxlebella* (Fabricius, 1787), *Rhigognostis senilella* (Zetterstedt, 1839), *Argyresthia aurulentella* Stainton, 1849, *A. thuriferana* (Gibeaux, 1992), *A. buvati* Gibeaux, 1992, *A. reticulata* Staudinger, 1877, *A. submontana* Frey, 1870, *Batia internella* Jäckh, 1972, *Coleophora gryphipennella* (Hübner, 1796) y *Mompha raschkiella* (Zeller, 1839) son nuevas para España, *Chelis maculosa* (Gerning, 1780) y *Helotropha leucostigma* (Hübner, 1808) son nuevas para Portugal. *Stigmella nylandriella, Ectoedemia argyropeza, E. spinosella, Rhigognostis senilella, Argyresthia aurulentella*, *A. thuriferana, A. buvati, A. reticulata, A. submontana, Batia internella* y *Mompha raschkiella* son nuevas en la Península Ibérica. Nuevas citas provinciales para 54 especies (57 nuevas citas provinciales en total).
PALABRAS CLAVE: Insecta, Lepidoptera, Nepticulidae, Gracillariidae, Roeslerstammiidae, Plutellidae, Argyresthiidae, Oecophoridae, Coleophoridae, Momphidae, Brachodidae, Erebidae, Noctuidae, nuevos registros, Península Ibérica.

Introduction

The ongoing research on Lepidoptera of the Iberian Peninsula performed by the authors brought some interesting results in 2017 and 2018. The important records are presented in this contribution,

supplementing the publications by VAN NIEUKERKEN *et al*. (2004, 2010), LAŠTŮVKA & LAŠTŮVKA (2006, 2007, 2009, 2011, 2014a, b, c, 2015, 2017), LAŠTŮVKA *et al*. (2000), CORLEY *et al.* (2006, 2007, 2009, 2012a, b, 2013, 2016, 2018), CORLEY (2014, 2015a), including summarizing works by VIVES MORENO (1994, 2014) and CORLEY (2015b). The discovery of 11 species new for the Iberian Peninsula, 14 species new for Spain, 2 for Portugal and 54 species new for individual provinces are given here.

Material and methods

The presented records are the results of the authors' (AL & ZL) two three weeks long visits to the Iberian Peninsula from 10th to 30th June 2017 and from 9th to 30th June 2018. Attention was paid only to northern regions of Spain from Gerona to Asturias and to Trás-os-Montes in Portugal. The moths were mostly collected at light (UV lamp 125 W, fluorescent tubes 8 and 20 W). Some species (specimens) were beaten from their host plants by day, adults of some species were collected on flowers or in stands of host plants, and empty mines or mines with larvae were found in some mining species. The determination was performed by the authors. The mining and other small moths are deposited in the collection of the first, material of Sesiidae in the collection of the second author. Therefore, collectors and the collection are not repeated for the individual species.

New Iberian or country records

NEPTICULIDAE

Stigmella nylandriella (Tengström, 1848)

ES: Lérida, Valle de Arán, Tredós, 1 ♀, 14-VI-2017.

Species with European distribution, known predominantly from central and northern parts of Europe, occurrence data are missing from the Balkans and some Mediterranean islands (VAN NIEUKERKEN, 2013). Larvae mine on *Sorbus aucuparia* (*Sorbus domestica* and *Malus*) (e.g. LAŠTŮVKA & LAŠTŮVKA, 1997). **New species for Spain and the Iberian Peninsula** (Fig. 1, 14).

Ectoedemia argyropeza (Zeller, 1839)

ES: Lérida, Valle de Arán, Tredós, 1 ♂, 14-VI-2017.

Eurosiberian species, known throughout Europe, with exception of Mediterranean islands (VAN NIEUKERKEN, 2013). Larvae mine on *Populus tremula* (e.g. LAŠTŮVKA & LAŠTŮVKA, 1997). **New species for Spain and the Iberian Peninsula** (Fig. 2, 15).

Ectoedemia spinosella (Joannis, 1908)

ES: Soria, Aldehuela de Calatañazor, 1 ♂, 23-VI-2017.

Predominantly central and southern European species, unknown from Scandinavia (VAN NIEUKERKEN, 2013). Larvae mine on various *Prunus* species (e.g. LAŠTŮVKA & LAŠTŮVKA, 1997). **New species for Spain and the Iberian Peninsula** (Fig. 3, 16).

GRACILLARIIDAE

Phyllonorycter sorbi (Freyer, 1855)

ES: Huesca, Benasque-Cerler, 4 ♂♂, 3 ♀♀, 16-VI-2017, 2 ♂♂, 24-VI-2017; Lérida, Valle de Arán, Tredós, 4 ♂♂, 14-VI-2017.

Western Palearctic (up to Central Asiatic) species, distributed throughout Europe, with exception of southern parts of the Balkans and Mediterranean islands. In the Iberian Peninsula recorded in Portugal: Trás-os-Montes and Beira Alta (CORLEY, 2015b). Larvae usually mine on *Sorbus aucuparia*, but also other *Sorbus* species, *Cotoneaster, Crataegus, Malus, Mespilus, Prunus padus*, and

Pyrus are occasional or regular host plants (DE PRINS & DE PRINS, 2018). **New species for Spain** (Fig. 4, 17).

ROESLERSTAMMIIDAE

Roeslerstammia erxlebella (Fabricius, 1787)

ES: Huesca, Espés, 1 ♀, 25-VI-2017.

Eurosiberian species, in Europe distributed in western, central and eastern parts, up to southern Scandinavia in the north (KARSHOLT, 2013). In the Iberian Peninsula recorded in Portugal: Minho by CORLEY *et al.* (2012b). Larvae usually develop on *Tilia*, but *Betula* is also mentioned as a host plant (e.g. AGASSIZ, 1996). **New species for Spain** (Fig. 5).

PLUTELLIDAE

Rhigognostis senilella (Zetterstedt, 1839)

ES: Huesca, Benasque-Cerler, 1 ♂, 21-VI-2018.

Eurosiberian species, in Europe more common in central and northern parts, in southern regions mostly in mountains (AGASSIZ, 2013). Larvae develop on some Brassicaceae. BARANIAK (2016) considers *R. senilella* and *R. marmorosella* to be two distinct species, the first of them occurring in Greenland and Iceland, and the second one is broadly distributed. In such case, the Spanish record would belong to *R. marmorosella*. But AARVIK *et al.* (2017) do not confirm this view with regard to the barcoding results and the genitalia morphology. **New species for Spain and the Iberian Peninsula** (Fig. 6, 18).

ARGYRESTHIIDAE

Argyresthia aurulentella Stainton, 1849

ES: Lérida, San Lorenzo de Morunys, Enciens, 1 ♀, 25-VI-2018; beaten from bushes of *Juniperus oxycedrus*.

Species distributed in northern, western and central Europe, also known from some southern European countries (AGASSIZ, 2013). Larvae mine the needles of *Juniperus*, the bionomics are described by FRIESE (1969). **New species for Spain and the Iberian Peninsula** (Fig. 7, 23).

Argyresthia thuriferana (Gibeaux, 1992)

ES: Soria, Aldehuela de Calatañazor, 3 ♂♂, 1 ♀, 18-VI-2017, 1 ♂, 23-VI-2017, 5 ♀♀, 15-VI-2018, 2 ♂♂, 4 ♀, 19-VI-2018; collected at light or beaten from bushes of *Juniperus thurifera*.

Species described from southern France (Hautes-Alpes) (GIBEAUX, 1992) and still only known from there (AGASSIZ, 2013). Larvae probably mine the shoots of *Juniperus thurifera*. **New species for Spain and the Iberian Peninsula** (Fig. 8, 19, 24).

Argyresthia buvati Gibeaux, 1992

ES: Soria, Aldehuela de Calatañazor, 1 ♀, 15-VI-2018, 1 ♀, 19-VI-2018; collected at light in the bushes of *Juniperus thurifera*.

Species described from southern France (Hautes-Alpes) (GIBEAUX, 1992) and still only known from there (AGASSIZ, 2013), similarly to the previous species. Larvae develop on *Juniperus*, probably on non-prickly species. *Argyresthia buvati* is very close (conspecific?) to the eastern Mediterranean-SW Asiatic *Argyresthia impura* (Staudinger, 1879). **New species for Spain and the Iberian Peninsula** (Fig. 9, 25).

Argyresthia reticulata Staudinger, 1877

ES: Soria, Aldehuela de Calatañazor, 1 ♀, 18-VI-2017, 8 ♂♂, 12 ♀♀, 15-VI-2018, 5 ♂♂, 1 ♀, 19-VI-2018; collected at light or beaten from bushes of *Juniperus thurifera*.

Species with insufficiently known distribution, recorded in the Netherlands, Belgium, France, Switzerland and one specimen also from the Czech Republic (AGASSIZ, 2013). Larvae mine young shoots and needles of *Juniperus* spp., apparently both prickly and non-prickly species. **New species for Spain and the Iberian Peninsula** (Fig. 10, 20, 26).

Argyresthia submontana Frey, 1870

ES: Huesca, Espés, 1 ♀, 25-VI-2017.

European species, so far known from some northern, western and central European countries (AGASSIZ, 2013). Larvae live in the buds and shoots of *Amelanchier* and *Sorbus aria* (FREY, 1870), *Sorbus torminalis* and *Cotoneaster* are also given as host plants (LEPIFORUM, 2018). The adults are very similar to *A. sorbiella*, but their forewings are nearly white and the markings are less distinct. **New species for Spain and the Iberian Peninsula** (Fig. 11, 27).

OECOPHORIDAE

Batia internella Jäckh, 1972

ES: Soria, Aldehuela de Calatañazor, 1 ♂, 1 ♀, 23-VI-2017.

Western Palearctic species, distributed throughout Europe (LVOVSKY, 2013), very similar to *Batia lunaris* (Haworth, 1828). Larvae develop in dead tissues (wood) of shrubs and trees. **New species for Spain and the Iberian Peninsula** (Fig. 12, 21).

COLEOPHORIDAE

Coleophora gryphipennella (Hübner, 1796)

ES: Lérida, Valle de Arán, Tredós, larvae on *Rosa* sp., 14-VI-2017.

Eurosiberian species, distributed throughout Europe (VAN DER WOLF & BALDIZZONE, 2013). In the Iberian Peninsula recorded in Portugal: Trás-os-Montes (CORLEY *et al.,* 2007). Larvae mine on *Rosa* and *Rubus* spp. (EMMET *et al*., 1996). **New species for Spain**.

MOMPHIDAE

Mompha raschkiella (Zeller, 1839)

ES: Gerona, Camprodón, Valter 2000, 1 ♂, 27-VI-2018.

Transpalearctic species, widely distributed in Europe with exception of some Balkan countries and Mediterranean islands (KOSTER & SINEV, 2013). Larvae mine on *Epilobium angustifolium* and *E. hirsutum* (KOSTER & SINEV, 2003). **New species for Spain and the Iberian Peninsula** (Fig. 13, 22).

EREBIDAE

Chelis maculosa (Gerning, 1780)

PT: Trás-os-Montes, Bemposta, 1 ♂, 16-VI-2018.

Transpalearctic species, locally distributed in central and southern parts of Europe (PRZYBYLOWICZ *et al*., 2013), also recorded in northern regions of the Iberian Peninsula to Galicia (MACIA *et al.,* 2013). Its occurrence in Portugal is undocumented (CORLEY, 2015b). **New species for Portugal.**

NOCTUIDAE

Helotropha leucostigma (Hübner, [1808])

PT: Trás-os-Montes, Bemposta, 1 ex. observed, 19-VI-2017.

Eurosiberian species, distributed throughout northern and central areas of Europe, including the NE part of the Iberian Peninsula (ZILLI *et al*., 2005). Larvae develop on some hygrophilous plants, e.g.

Carex, *Juncus*, *Scirpus*, *Sparganium,* and *Iris pseudacorus*. The specimen was observed at light near the hygrophilous herbal stands of the river Douro which corresponds to its ecological requirements. **New species for Portugal.**

New province records

NEPTICULIDAE

The faunistic data on the following Nepticulidae are summarized by VAN NIEUKERKEN *et al*. (2004), supplemented by LAŠTŮVKA & LAŠTŮVKA (2008, 2009, 2011, 2014a, b, 2015, 2017), and VAN NIEUKERKEN *et al*. (2010). Only records of species with less than four province records are individually commented.

Stigmella lapponica (Wocke, 1862)
ES: Lérida, Valle de Arán, Tredós, 1 ♂, 14-VI-2017.

Stigmella luteella (Stainton, 1857)
ES: Gerona, Rocabruna, 1 ♂, 11-VI-2017; Huesca, Espés, 1 ♂, 15-VI-2017.

Stigmella thuringiaca (Petry, 1904)
ES: Soria, Aldehuela de Calatañazor, 2 ♂♂, 19-VI-2018.

Stigmella assimilella (Zeller, 1848)
ES: Lérida, Valle de Arán, Tredós, 2 ♂♂, 14-VI-2017.
Species with trophic relation to *Populus alba* and *P. tremula*, known from the provinces of Málaga and Salamanca (VAN NIEUKERKEN *et al*., 2004); third Spanish record.

Stigmella plagicolella (Stainton, 1854)
ES: Lérida, Sarroca de Bellera, mines on *Prunus spinosa*, 26-VI-2017.

Stigmella perpygmaeella (Doubleday, 1859)
ES: Huesca, Saravillo, 1 ♀, 17-VI-2017.

Stigmella basiguttella (Heinemann, 1862)
ES: Lérida, Xerallo, 2 ♂♂, 1 ♀, 24-VI-2018.

Stigmella roborella (Johansson, 1971)
ES: Gerona, Rocabruna, 2 ♂♂, 1 ♀, 11-VI-2017.

Glaucolepis thymi (Szöcs, 1965)
ES: Huesca, Espés, 2 ♂♂, 15-VI-2017; Lérida, San Lorenzo de Morunys, 1 ♂, 27-VI-2017; Soria, Aldehuela de Calatañazor, 5 ♂♂, 1 ♀, 19-VI-2018.

Glaucolepis montana (Laštůvka, Laštůvka & Van Nieukerken, 2007)
ES: Soria, Aldehuela de Calatañazor, 1 ♂, 19-VI-2018.

Trifurcula subnitidella (Duponchel, 1843)
ES: Huesca, Espés, 1 ♂, 15-VI-2017.

Trifurcula silviae Van Nieukerken, 1990
ES: Huesca, Candasnos, 1 ♂, 12-VI-2018; Lérida, Xerallo, 1 ♂, 24-VI-2018.

Trifurcula immundella (Zeller, 1839)
ES: Huesca, Benasque-Cerler, 1 ♂, 24-VI-2017.

Bohemannia pulverosella (Stainton, 1849)
ES: Lérida, Sarroca de Bellera, mines on *Malus,* 26-VI-2017.
Known only from the province of Gerona (LAŠTŮVKA & LAŠTŮVKA, 2008); second Spanish record.

Zimmermannia hispanica (Van Nieukerken, 1985)
ES: Huesca, Candasnos, 2 ♂♂, 12-VI-2018; PT: Trás-os-Montes, Bemposta, 2 ♂♂, 16-VI-2018.

Ectoedemia intimella (Zeller, 1848)
ES: Huesca, Chía, 1 ♀, 20-VI-2018.
Known so far from the province of Zaragoza (LAŠTŮVKA & LAŠTŮVKA, 2008); second Spanish record.

Ectoedemia caradjai (Groschke, 1944)
ES: Lérida, San Lorenzo de Morunys, 1 ♂, 27-VI-2017.

Ectoedemia ilicis (Mendes, 1910)
ES: Soria, Aldehuela de Calatañazor, 3 ♂♂, 15-VI-2018.

Ectoedemia erythrogenella (Joannis, 1908)
ES: Huesca, Chía, 1 ♂, 20-VI-2018.

Ectoedemia occultella (Linnaeus, 1767)
ES: Gerona, Camprodón, Valter 2000, 1 ♀, 27-VI-2018.
Species with trophic relation to *Betula* spp., known from the province of Orense (LAŠTŮVKA & LAŠTŮVKA, 2017); second Spanish record.

INCURVARIIDAE

Incurvaria vetulella (Zetterstedt, 1839)
ES: Huesca, Benasque-Cerler, 1 ♂, 24-VI-2017.
Species known only from Asturias (LAŠTŮVKA & LAŠTŮVKA, 2017); second Spanish record.

Phylloporia bistrigella (Haworth, 1828)
ES: Huesca, Chía, 1 ♀, 20-VI-2018; Lérida, Valle de Arán, Tredós, 1 ♂, 14-VI-2017.
Species recorded only in the province of Lugo (LAŠTŮVKA & LAŠTŮVKA, 2017); second and third Spanish records.

GRACILLARIIDAE

The faunistic data and remarks on the following Gracillariidae known in more than three provinces are given by VIVES MORENO (1994) and LAŠTŮVKA & LAŠTŮVKA (2006, 2007, 2009, 2011, 2014a, b, 2015, 2017).

Caloptilia roscipennella (Hübner, 1796)
ES: Huesca, Saravillo, 1 ♂, 17-VI-2017.

Povolnya leucapennella (Stephens, 1835)
ES: Lérida, Port del Comte, 1 ♂, 13-VI-2017.

Callisto denticulella (Thunberg, 1794)
ES: Huesca, Espés, 1 ♂, 15-VI-2017.

Parornix betulae (Stainton, 1854)
ES: Lérida, Valle de Arán, Tredós, 1 ♂, 14-VI-2017.
Third Spanish record, species so far known from the provinces of Orense and Zamora (LAŠTŮVKA & LAŠTŮVKA, 2014a, 2015).

Parornix scoticella (Stainton, 1850)
ES: Lérida, Valle de Arán, Tredós, 2 ♂♂, 14-VI-2017.

Parornix tenella (Rebel, 1919)
ES: Teruel, Montalbán, 2 ♂♂, 13-VI-2018.
Species recorded in Andalusia by VIVES MORENO (1994); second Spanish record.

Phyllonorycter cerasinella (Reutti, 1852)
ES: León, Viadangos de Arbas, 1 ♂, 22-VI-2017.

Phyllonorycter haasi (Rebel, 1900)
ES: Gerona, Camprodón, Valter 2000, 1 ♂, 27-VI-2018.

Phyllonorycter floridae Laštůvka & Laštůvka, 2012
ES: Oviedo, Alto de la Farrapona, 1 ♀, 21-VI-2017.

Phyllonorycter hispanicus Laštůvka & Laštůvka, 2014
ES: Oviedo, Alto de la Farrapona, 3 ♂♂, 1 ♀, 21-VI-2017.

Phyllonorycter staintoniella (Nicelli, 1853)
ES: Huesca, Benasque-Cerler, 1 ♂, 1 ♀, 24-VI-2017.

Phyllonorycter ulmifoliella (Hübner, [1817])
ES: Oviedo, El Puerto de Leitariegos, mines on *Betula* sp., 21-VI-2017.

Phyllonorycter cerasicolella (Herrich-Schäffer, 1855)
ES: Lérida, Sarroca de Bellera, mines on *Prunus mahaleb,* 26-VI-2017.

YPONOMEUTIDAE

Niphonympha dealbatella (Zeller, 1847)
ES: León, San Cristobal de Valdueza, 2 ♂♂, 20-VI-2017.
Species known only from the province of Ávila (VIVES MORENO & GASTÓN, 2017); second Spanish record.

ARGYRESTHIIDAE

Argyresthia arceuthina Zeller, 1839
ES: Huesca, Chía, 1 ♂, 20-VI-2018.

Argyresthia praecocella Zeller, 1839

ES: Gerona, Camprodón, Valter 2000, 1 ♂, 27-VI-2018; Queralbs, 1 ♂, 1 ♀, 13-VI-2017; Rocabruna, 1 ♂, 10-VI-2018; Huesca, Benasque-Cerler, 1 ♂, 7 ♀♀, 21-VI-2018; Lérida, Port del Comte, 3 ♀♀, 13-VI-2017, 1 ♂, 25-VI-2018.

Argyresthia kulfani Bengtsson & Johansson, 2012

ES: Lérida, Valle de Arán, Tredós, 1 ♂, 14-VI-2017.

Second Spanish record from the same province (cf. LAŠTŮVKA & LAŠTŮVKA, 2015).

Argyresthia trifasciata Staudinger, 1871

ES: Soria, Aldehuela de Calatañazor, 2 ♂♂, 1 ♀, beaten from *Juniperus thurifera*, 15-VI-2018.

The larva predominantly develops in the shoots of non-prickly *Juniperus* species, e.g. on *Juniperus sabina*, *J. virginiana* or *J. chinensis* in ornamental greenery, and it is known as invasive species in many parts of Europe. The geographical origin of this species is not well known, the Iberian Peninsula is one of the options, where the autochthonous species *Juniperus thurifera, J. phoenicea* and *J. sabina* could be the original hosts.

Argyresthia fundella (Fischer von Röslerstamm, 1835)

ES: Huesca, Saravillo, 1 ♀, 17-VI-2017; Lérida, Valle de Arán, Tredós, 1 ♂, 14-VI-2017.

The larva mines needles of *Abies* spp. For the first time given from the province of Lérida by LAŠTŮVKA & LAŠTŮVKA (2015); second and third Spanish records.

PLUTELLIDAE

Rhigognostis annulatella (Curtis, 1832)

ES: León, Viadangos de Arbas, 1 ♂, 22-VI-2017.

Rhigognostis incarnatella (Steudel, 1873)

ES: León, Viadangos de Arbas, 1 ♀, 22-VI-2017; Lérida, Valle de Arán, Tredós, 1 ♀, 14-VI-2017.

Both relatively sparsely recorded species of higher cooler locations, with trophic relation to some Brassicaceae (e.g. AGASSIZ, 1996).

LYONETIIDAE

Lyonetia prunifoliella (Hübner, 1796)

ES: Huesca, Espés, 1 ♂, 15-VI-2017.

Species so far known from the province of Barcelona (LAŠTŮVKA & LAŠTŮVKA, 2015); second Spanish record.

HELIODINIDAE

Heliodines roesella (Linnaeus, 1758)

ES: Asturias, Alto de la Farrapona, 3 ♂♂, 5 ♀♀, 18-VI-2018; Lérida, Valle de Arán, Tredós, 2 ♂♂, 1 ♀, 22-VI-2018; Huesca, Benasque-Cerler, 1 ♂, 26-VI-2016; always many other specimens observed around the host plant *Chenopodium bonus-henricus*.

SESIIDAE

The faunistic data are summarized and remarks on biology and distribution on the following Sesiidae are given by LAŠTŮVKA *et al*. (2000) and LAŠTŮVKA & LAŠTŮVKA (2014c), with additions in LAŠTŮVKA & LAŠTŮVKA (2015, 2017).

Paranthrene insolita polonica Schnaider, 1839
ES: Huesca, Espés, 1 ♂, 15-VI-2017.

Synanthedon scoliaeformis (Borkhausen, 1789)
ES: Lérida, Valle de Arán, Tredós, exit holes in *Betula* sp., 14-VI-2017.

Synanthedon cephiformis Ochsenheimer, 1808
ES: Lérida, Valle de Arán, Es Bordes, exit holes in *Abies alba*, 15-VI-2017.
Second Spanish record from the same province (cf. LAŠTŮVKA & LAŠTŮVKA, 2015).

Chamaesphecia mysiniformis (Boisduval, 1840)
ES: Gerona, Sant Juan de las Abadesas, 1 ♂, 27-VI-2017; Soria, Aldehuela de Calatañazor, 1 ♂, 18-VI-2017.

Chamaesphecia ramburi (Staudinger, 1866)
ES: Soria, Aldehuela de Calatañazor, 4 ♂♂, 18-VI-2017, about 50 ex. observ., 23-VI-2017.

Chamaesphecia euceraeformis (Ochsenheimer, 1816)
ES: Gerona, San Juan de las Abadesas, 2 ♂♂, 2 ♀♀, 28-VI-2017, San Pablo de Seguríes, 1 ♂, 1 ♀, 28-VI-2017.
Additonal records of this species from the province of Gerona (cf. LAŠTŮVKA *et al*., 2000, CERVELLÓ, 2001).

Chamaesphecia empiformis (Esper, 1783)
ES: Huesca, Chía, larvae in the roots of *Euphorbia cyparissias*, 17-VI-2017, 1 ♂, 1 ♀, ex larva VII-2017.
The westernmost record of this species; so far known from the northern parts of the provinces Barcelona, Gerona, Lérida, and Huesca (c.f. GAVALDÁ, 1988, LAŠTŮVKA *et al*., 2000, LAŠTŮVKA & LAŠTŮVKA, 2017).

BRACHODIDAE

Brachodes funebris (Feisthamel, 1833)
PT: Trás-os-Montes, Bemposta, 1 ♂, 16-VI-2018.
Species actually recorded in Alto Alentejo (CORLEY *et al*., 2016) and Algarve (CORLEY *et al*., 2018); third Portuguese record.

Acknowledgements

We are grateful to M. Corley (Faringdon) for important comments and linguistic revision of the manuscript, to Dr. A. Vives (Madrid) for support in obtaining collecting permits for Spain, into the Scientific Project of SHILAP, and for comments on the manuscript and for linguistic revision of the Spanish abstract, to Dr. M. Seguieira (ICNF, Lisboa), and Dr. C. P. Santos (Parque Natural do Douro Internacional) for the permit to collect Lepidoptera in protected areas of Portugal.

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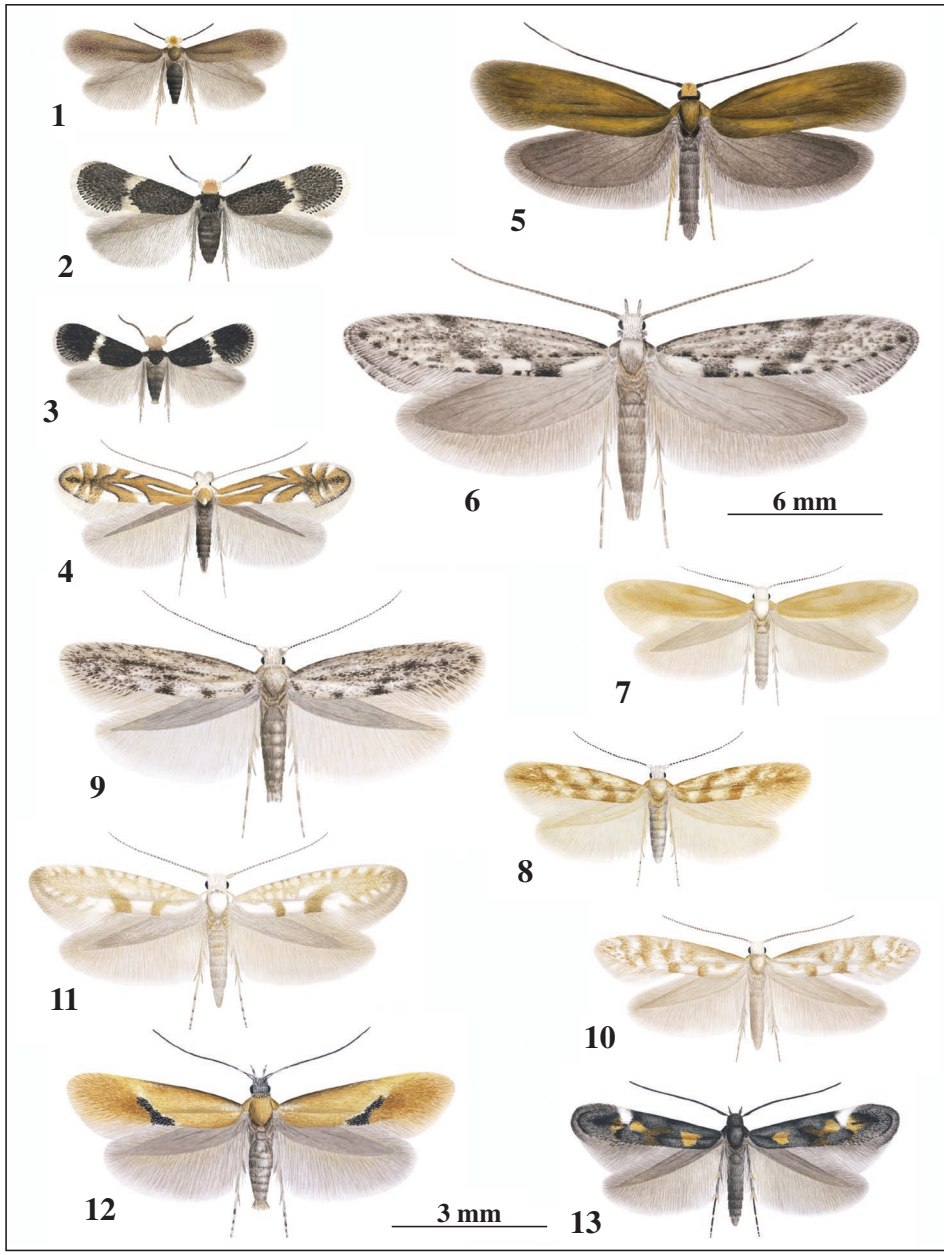
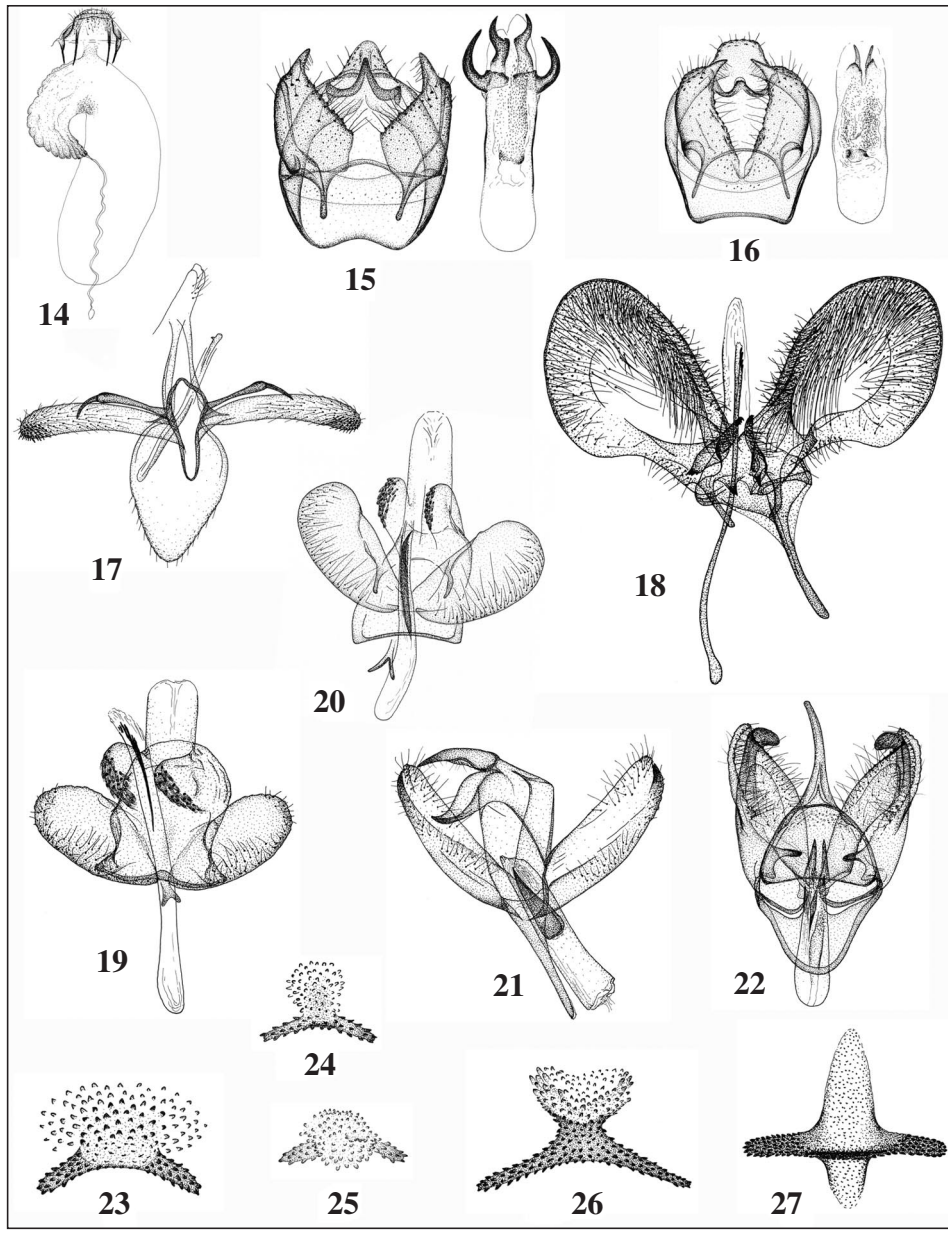
(Recibido para publicación / *Received for publication* 14-XII-2018)
(Revisado y aceptado / *Revised and accepted* 26-XII-2018)
(Publicado / *Published* 30-VI-2019)



Figs. 1-13.– 1. *Stigmella nylandriella* (Tgstr.). **2.** *Ectoedemia argyropeza* (Z.). **3.** *E. spinosella* (Joann.). **4.** *Phyllonorycter sorbi* (Frr.). **5.** *Roeslerstammia erxlebella* (F.). **6.** *Rhigognostis senilella* (Zett.). **7.** *Argyresthia aurulentella* Stainton. **8.** *A. thuriferana* Gbx. **9.** *A. buvati* Gbx. **10.** *A. reticulata* Stgr. **11.** *A. submontana* Frey. **12.** *Batia internella* Jäckh. **13.** *Mompha raschkiella* (Z.).



Figs. 14-27.– Male (15-22) and female (14) genitalia. **14.** *Stigmella nylandriella* (Tgstr.). **15.** *Ectoedemia argyropeza* (Z.). **16.** *E. spinosella* (Joann.). **17.** *Phyllonorycter sorbi* (Frr.). **18.** *Rhigognostis senilella* (Zett.). **19.** *A. thuriferana* Gbx. **20.** *A. reticulata* Stgr. **21.** *Batia internella* Jäckh. **22.** *Mompha raschkiella* (Z.). **23-25.** Signum of the female genitalia. **23.** *Argyresthia aurulentella* Stainton. **24.** *A. thuriferana* Gbx. **25.** *A. buvati* Gbx. **26.** *A. reticulata* Stgr. **27.** *A. submontana* Frey.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 251-259 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.565

Occurrence of new case-bearer on cereals, *Coleophora perplexella* Toll, 1960 (Lepidoptera: Coleophoridae)

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Abstract

Coleophora perplexella Toll, 1960 it is native of Spain and Portugal, but it has detected out of its origin area, and was found in Sardinia, Morocco and Algeria without its host plant being identified. Recently has been observed in France (Toulon) on *Hordeum murinum* L. and *Bromus sterilis* L. (Poaceae). However, it was never cited among the Tunisian entomofauna. In addition, *C. perplexella* was never known as agricultural pest in its area or elsewhere. Moreover, no deep studies diagnosis and biology were conducted. This paper is a first study on *C. perplexella,* detected as an agricultural pest on oat (*Avena sativa* L., 1753) and barely (*Hordeum vulgare* L., 1753) making serious damages on early seedlings. Besides, a description and illustrations of different biological stage was provided. Results highlight a difference between the appearance dates of emerged new adults under both controlled and ambient conditions. According these results we can conclude on adaptation plasticity to the environmental conditions. In fact, *C. perplexella* can survive and cause damage at temperature between 7-10º C from December to February, and 23-25º C of controlled conditions.
KEY WORDS: Lepidoptera, Coleophoridae, *Coleophora perplexella*, agricultural pest, biology, cereal, invasive species, Tunisia.

La aparición de un nuevo coleofórido sobre cereales, *Coleophora perplexella* Toll, 1960 (Lepidoptera: Coleophoridae)

Resumen

Coleophora perplexella Toll, 1960 es originaria de España y Portugal, pero ha sido detectada fuera de su área original y fue encontrada en Cerdeña y Marruecos sin identificar su planta nutricia. Recientemente ha sido observada en France (Toulon) sobre *Hordeum murinum* L. and *Bromus sterilis* L. (Poaceae). Sin embargo, nunca había sido citada de la entomofauna tunecina. Además, *C. perplexella*, nunca fue conocida como plaga agrícola en su área o en otra parte. Además, ningún estudio diagnóstico fue realizado en profundidad o sobre su biología. Este trabajo es el primer estudio sobre *C. perplexella*, detectado como plaga agrícola sobre avena (*Avena sativa* L., 1753) y cebada (*Hordeum vulgare* L., 1753) causando serios daños sobre las plantas de semillas tempranas. Además, se da una descripción de los diferentes estados biológicos. Lo más interesante del resultado es la aparente diferencia que hay entre la aparición de los adultos tanto controladas como ambientales. De acuerdo con estos resultados Podemos concluir sobre la plasticidad de su adaptación a las condiciones ambientales. A decir verdad, *C. perplexella* puede sobrevivir y causar daños a temperaturas entre los 7-10º C de diciembre a febrero y de 23-25º C de las condiciones controladas.
PALABRAS CLAVE: Lepidoptera, Coleophoridae, *Coleophora perplexella*, plaga agrícola; biología, cereal, especie invasiva, Túnez.

[§] CXXXVII Contribution to the knowledge of Coleophoridae.

Introduction

The Coleophoridae has a worldwide distribution with the large dominance in Old World group, and a great diversity in the West Palearctic region and central Asia. Most of them prefer temperate climate regions, with dry or arid conditions, but they are found also in Australia, and South America. The Coleophoridae species are characterized by a small size, dull coloration, and minor economic importance. Nevertheless, the abundance of literature treating this subfamily, with nearly 1500 references (BALDIZZONE *et al*., 2006) reflected their popularity in Europe. They construct portable cases in which they spent most of their larval life and where the pupation takes place. They are commonly known as case-bearers. The case origin and shapes are much diversified among species. They could be made from host material pieces, silk, or a combination of various substances. However, the case shape is specific for each species. During their larval stage, some species can enlarge progressively the origin case or change it by another larger. Larvae are leaf or seed miners and feed without leaving their case. Most of them feed on dicot host plants, with a preference to the Asteraceae, Fabaceae, Lamiaceae, Caryophyllaceae and Chenopodiaceae family. In the other hand, those feeding on monocots use only the seeds of Juncaceae. In Europe and eastern North America, host plants are relatively known, but there not the same for other regions (BALDIZZONE *et al*., 2006). The later reference counts 1342 species, but this number increased up to be almost 1450 species and description of new species continues. The biology of many European species was described, especially by HERING (1957), SUIRE (1961) and EMMET *et al*. (1996).

The *Coleophora lixella* Zeller 1849 group has a particular biology. Their first host plant belongs always to the Lamiaceae family, where the young larva uses the flower to elaborate its primary case to hibernate in it. After, what the caterpillar changes completely its host plant and feeds on any near Poaceae without any preferential species (BALDIZZONE *et al*., 2014). Therefore, there is actually just one specie, *Coleophora ciconiella* Zeller 1849 (= *C. tritici* Lindeman 1881) that completes all its life cycle on grasses. It can attack cereal crops especially wheat and causes damage (VENTURI, 1949). However, this species is rare due may be to the use of pesticides (PATZAK, 1976).

According to BALDIZZONE *et al*. (2006), there are 57 *Coleophora* species in Tunisia. Studies on *Coleophora* species diagnosis and biology are rare. In fact, most species (18 Species) were detected during the 50s of the last Century. *Coleophora gracilella* Toll 1952 and *Coleophora berbera* Baldizzone 1988 were reported in Nefta and Hammamet respectively (BALDIZZONE, 1988). But, the recent and new species *Coleophora tunisiae* Stübner & Baldizzone, 2007 was collected at Ain Draham and Tabarka zone (STÜBNER, 2007). It's a green metallic species whose biology still unknown, but probably grows on Fabaceae family, similarly to the group of metallic green species to which it belongs.

This paper is about the outbreak *C. perplexella* new microlepidopteran cereal pest in Kef region, located in the North West of Tunisia with some morphological and biological data.

Materials and methods

Collecting sites

Coleophora perplexella larvae specimens were collected in December/2016 from different cereal plots showing relevant symptoms. Oat plots were located in Kef-Est at Oued El-Ain (GPS coordinates: 36º 08.910 N, 008º 43.382 E) and Oued Mallegue (GPS coordinates: 36º 18.714 N, 008º 44.860E) and Barely plots (GPS coordinates: 36º 13.963 N, 008º 48.654E) were at Sidi Harraghi.

Insect density

Density measurements were performed at infested plot using a wooden square of 25 cm^2. The square was placed randomly at each plot, then we counted the number hanged and on ground case-bearers inside the square. Three repetitions were carried out in each plot.

Morphological measurements

Collected insects were divided in two lots, the first one was used for insect rearing and the second one was reserved for morphological identification and measurements. Ten case-bearers at last instar were sacrificed to determine the length of each one: The case length was obtained by simple measurement from the oral to the anal opens. However, caterpillars were extracted from their cases by practicing a longitudinal opening along the case. The measurement was taking out when the caterpillar was in elongated position. The length of emerging adult's wingspan was measured and recorded.

Insect rearing

Collected case-bearers were reared on Rihane barley over twelve one liter pots that each one was infested with ten case-bearers. To avoid the risk of infestation by other insects or the leakage of collected one, each pot was covered with insect proof tissue. The insect culture was maintained under tow rearing conditions: at 24 ± 1° C, 12:12 L:D photoperiod and 60-70% RH and at ambient laboratory condition in Kef Graduate School of Agriculture. Sufficient food for insects was provided by new plants grown in separated pots.

Obtained adults from larval rearing were immediately transferred into a nest box to prepare necessary conditions for mating and securing eggs. The nest box was placed in the same conditions of case-bearers rearing. To ensure adults feeding a small box containing solution honeydew renewed periodically, was placed in the nest box where a small piece of paper and leaves of barley were used to support laid eggs and serve as nutrition source for new hatched larvae.

Statistical analyses

Case-bearers density in different plots was compared using one-way ANOVA followed by Duncan test for univariate-comparison when significant differences were observed at $p<0.05$.

Results and discussion

Symptom's detection

During the 2015/2016 campaign, first symptoms including mines on leaves, plants wilting and death with the appearance of glabrous areas were noticed in December 2015 in Barely plot located at Djebel Eddir (Province of Kef, North-Western of Tunisia). At first, damages were suspected to be caused by worms. However, careful examination of the plot revealed the presence of some unknown insect cases (covers) hanging on leaves and abandoned on soil surface. Therefore, some samples were collected and carried to the laboratory for identification. Unfortunately, no emerged adults were obtained because the farmer has already treated his plot with a systemic insecticide.

The next campaign (2016/2017) we cannot detect the pest in the first area, but the prospection of other plots distant from the first one at least 10 Km demonstrated the dispersion of pest on other plots located in Oued El-Ain, Sidi Haraghi and Oued Mallegue (Provence of Kef). The highest degrees of damages were notified on January/2017 in oat plot that revealed a large bare area (Fig. 1a). Attacked leaves looked like old mines (Fig. 1b). A small round hole appeared on each leave (Fig. 1c). Leaves lost their constituents, fade and died. These symptoms are known to be specific to *Coleophora* sp. attack. However, and up to now, there is no report about the effect of *Coleophora* species on cereals.

Examination of attacked plants highlights the existence of some cases hanging at a few degrees on leaves (Fig.1d) and lodged a microlepidopteran larva (Fig. 3a).

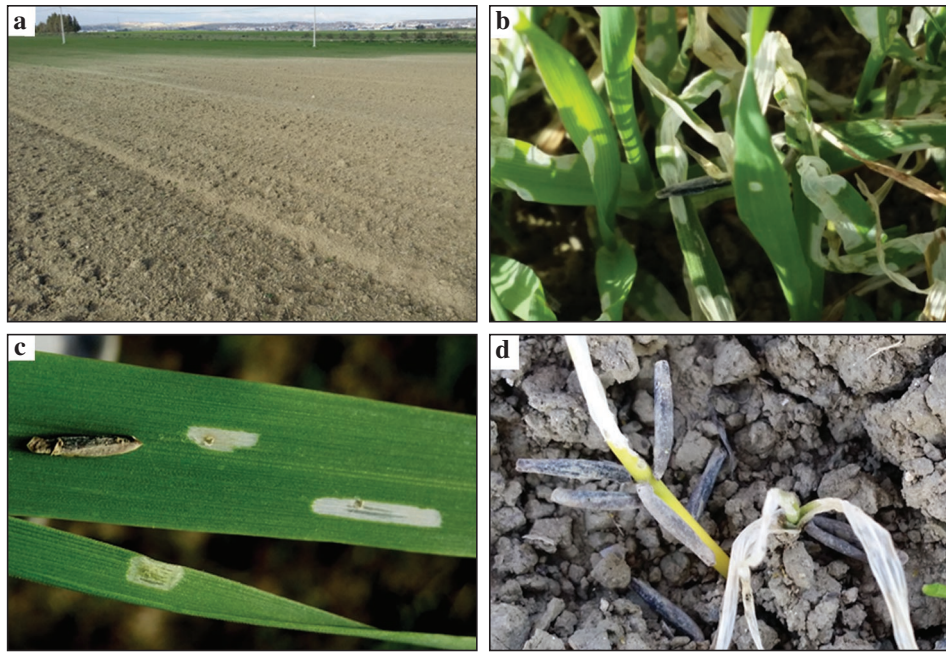

Figure 1.– Damage of *Coleophora perplexella* on oat: **a.** Disappearance of the vegetation covers from oat's plot, due to the pest attack, **b.** Symptoms on oat leaves, **c.** Pest nutrition hole, **d.** Cases hanging on oat leaf.

INSECT DENSITY

Case-bearers density was reported for oat and barely plots located in Oued El-Ain, Oued Mallegue and Sidi Harraghi respectively. Results analyses underline a high case-bearers density (128 case-bearers/m^2) in Oued El-Ain oat plot (Fig. 2). This explains the extinction of all vegetation extended to one Hectare. Vegetation of this area was partially recovered after a treatment with a systemic insecticide, fertilization and abundant irrigation. Concerning oat and barely plots situated in Oued Mallegue and Sidi Harraghi respectively the registered densities are between 90.66 and 85.33 case-bearers/m^2 (Fig. 2). Attacked area highlight a delay in vegetation growth and spike emission. Statistical analysis showed a significant densities difference ($p<0.05$) between oat and barely plots founded in Oued El-Ain and Sidi Harraghi respectively, that's explain the importance of oat plot damage in comparison with the barely one.

Insect description

Larvae: All collected insects were in larvae stage. Each one was protected in a case and thereby named as case-bearer moth (Fig. 3a). This insect belongs to the Lepidoptera order, Gelechioidea suborder, Coleophoridae family and *Coleophora* genus.

Larval case: Is an elongated cylindrical cover with an average length of 7.9 mm and a dark gray color which becomes lighter towards the posterior end with black traits in the anterior part (Fig. 3c). It is characterized by the presence of two openings: one oral and one anal. The oral opening is distinguished by a 45 angle of with respect to a longitudinal axis. This opening provides the larva

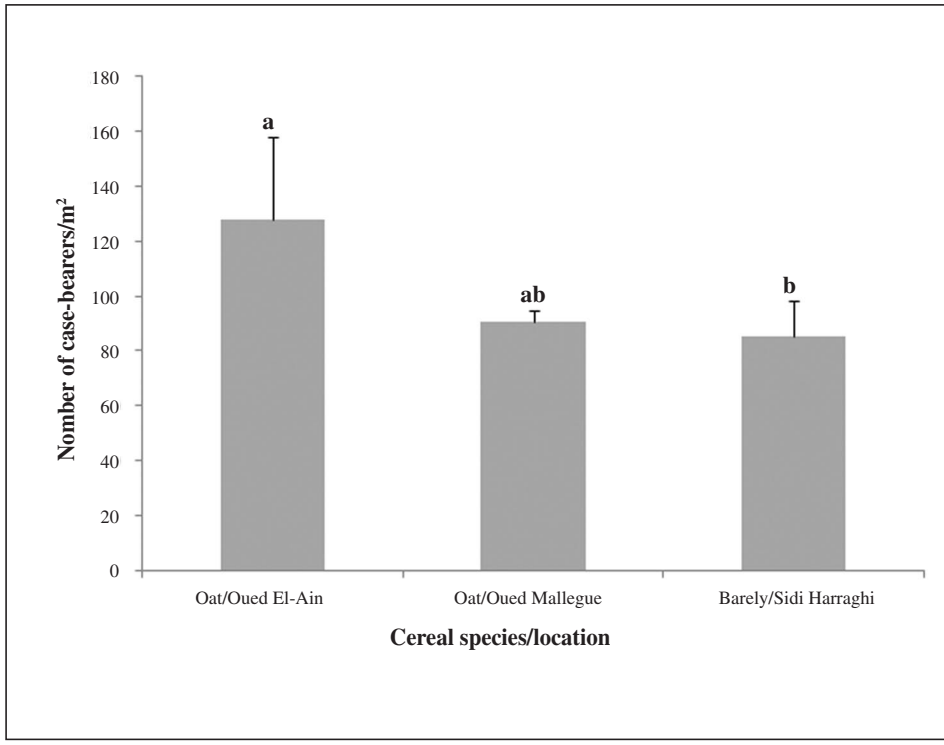

Figure 2.– Case-bearers density in two cereal species and three locations. *The different letters indicate significant differences (P<0.05) according Duncan test.

communication with its environment that will be lined with silk when the larva goes in pupation. While, the anal opening is trilobate, allowing excrements elimination and adult emergence. According to BALDIZZONE (2016), the larval case is entirely made of pleated silk.

Caterpillar: Is illustrated and described by BALDIZZONE (2016). The length measurement of ten caterpillars reported 3.1 mm long with a dark black head, a brown-black thoracic plates and yellow abdominal plates with an exception for the last one (Fig. 3b). In a windy day, caterpillars move the upper leaves and cling to the lower one to control the wind. Pest infestation appears during cold weather (December-February), and can resist due to their cases.

Nymph: Once the caterpillar reaches its last larval stage, it stops feeding and weaves a kind of silk to close the oral end of the case. Pupation undergoes with the case, which makes it difficult to be observed during this stage. However, the release of the nymph from its case showed the presence of a yellow lepidopteran chrysalis, with the appearance of future folded wings, head, eyes, stylus and abdomen (Fig. 3d).

Adults: Were obtained from case-bearers maintained under ambient and controlled conditions [temperature (24±1º C, photoperiod (12:12 L:D) and relative humidity (60-70 %)]. The first emerged adult under controlled conditions was on February/17, 2017. But the maximum emerged adults were registered during March (Table 1). Nevertheless, the first obtained adult under ambient conditions was on April/2017 (Table 1). The adults were characterized by a wingspan length 11.5 mm. The head, thorax and abdomen were yellow. The antennae were long with ocher color. The anterior wings were

yellow with small gray spots and a thin white line along the rib and white ribbed fringes (Fig. 3e). The posterior wings were yellow with white ribbed fringes. The insect identification was carried out by second author basing on case architecture, external morphology and genitalia structures. The insect was identified as *Coleophora perplexella* Toll, 1960. On the basis of current knowledge, this insect was never known to be a cereal pest. This confirms that it is a new pest of cereal crops that makes a threat to cereals in North Tunisia.

Table 1.– Date and number of emerged *C. perplexella* adults under controlled and ambient conditions.

Rearing conditions	Date of emerged adults	Number of emerged adults
Controlled	17/02	1
	14/03	1
	15/03	2
	25/03	2
	27/03	2
	28/03	1
	05/04	1
Ambient	03/04	1
	10/04	1
	24/04	1

Eggs: We are obtained from reared adults with a 15% honey water solution in a separate box, where they were deposited on the extremity of a paper placed in a separate box. Eggs are fairly small, elongated, with a yellow-orange color (Fig. 3f). As preliminary observation and under controlled conditions, eggs required 15.83 days of incubation (Table 2).

Table 2.– incubation period of *C. perplexella* eggs.

Laying date	Hatching date	Incubation period
30/03	14/04	16
01/04	17/04	16
02/04	19/04	17
03/04	19/04	16
07/04	22/04	15
09/04	24/04	15
		Mean=15.83

The originality of this present work is resumed in three points: (i) the new detection of a *Coleophora* species in Tunisian entomofauna, (ii) the determination of its host-plant and (iii) its classification as a cereal pest. In fact, *Coleophora perplexella* Toll 1960 was described from specimens collected in Spain and Portugal and detailed by BALDIZZONE (2016). BALDIZZONE *et al.* (2006) cited its existence in Sardinia, Algeria and Morocco without the identification of the host-plant. Three years later, TAUTEL & NEL (2009) reported its presence in Toulon (France). The next year, NEL (2010) added that *C. perplexella* feeds on leaves of *Hordeum murinum* L. and *Bromus sterilis* L. (Poaceae).

To the best of our knowledge, there is just the work of BALDIZZONE (2016) who has described the adult and larvae of *C. perlexlella*. However, no additional works were performed on its biology. In this study we have presented a description of the nymph and eggs and their duration of pupation and incubation, respectively.

Our study contributed to the identification of new pest cereal insect in Tunisia making havoc on oat and barley plots in specific locations. In this work we have described the biology, illustrated the different pest stage and determined the length of case, caterpillar and wingspan adult and the eggs

incubation period. In the future, it will be necessary to perform deep studies of the pest biological and ecological particularities in the order to establish a control strategy. We propose, also, to study its geographic distribution in relation with its economic impact. Moreover, it will be needed to find out its invasion pathways in Tunisia, to include the effect of different agronomic scenario and bioclimatic zone on its kinetic and abundance.

Acknowledgments

This research was sponsored and performed within the framework of Research/Development (R/D) Convention established between Kef Graduate School of Agriculture and National Institute of Field Crops titled the R/D convention to support for the implementation of Conservation Agriculture. Authors would like to thank Pr. Ben Halima Kamel Monia from Agronomic Institute of Chott-Mariem for her recommendations and remarks. Thank also to Dr. Antonio Vives (Madrid, Spain) for the translation of the abstract in Spanish.

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(Recibido para publicación / *Received for publication* 13-X-2018)
(Revisado y aceptado / *Revised and accepted* 14-I-2019)
(Publicado / *Published* 30-VI-2019)

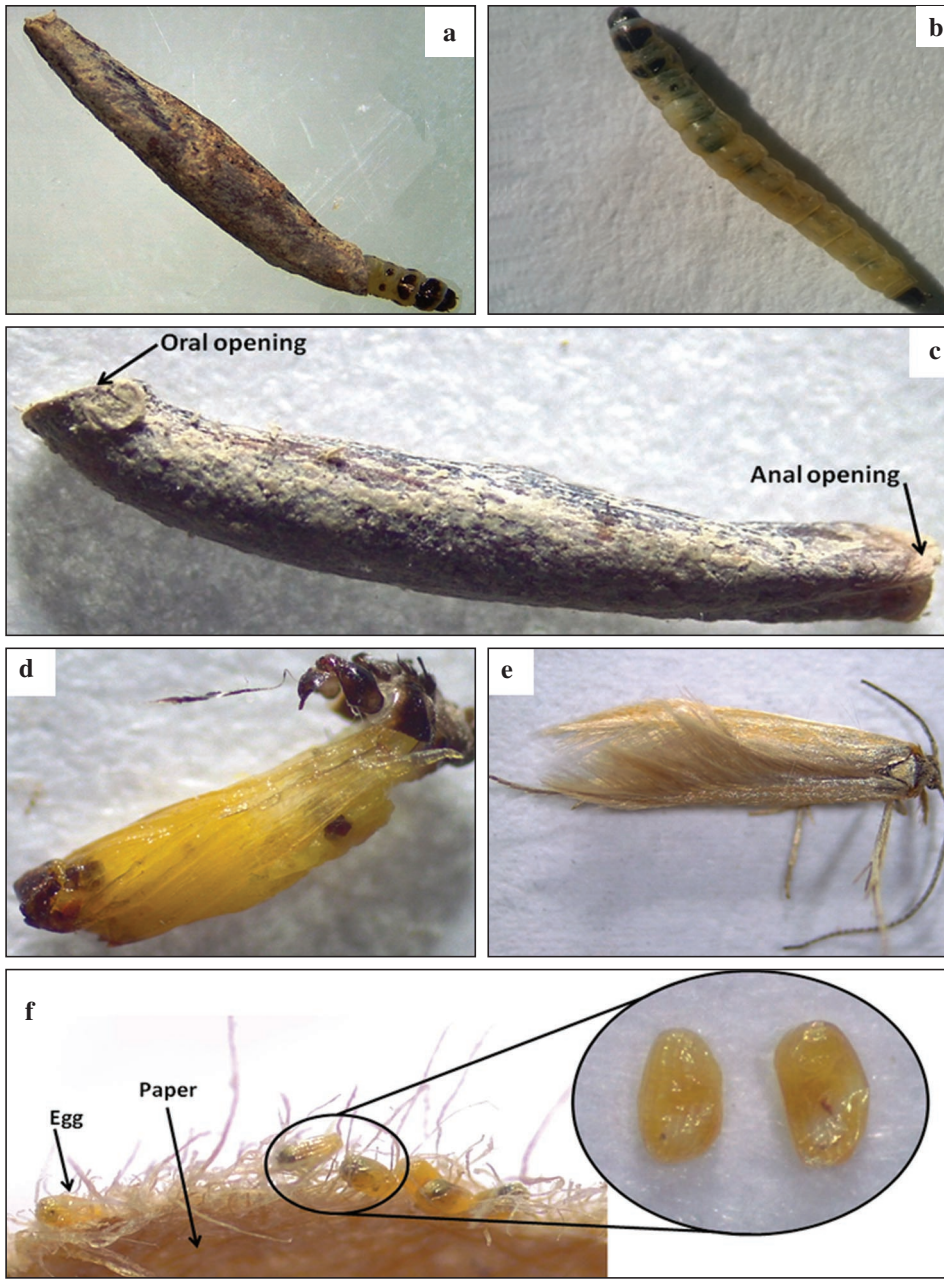

Figure 3.– Different biological stages of *Coleophora perlexella*: **a.** Larva protected within case, **b.** *Coleophora* caterpillar removed from its case, **c.** Larval case of collected insects, **d.** *Coleophora* nymph, **e.** Emerged adult, **f.** Eggs of *Coleophora perlexella.*

REVISION DE PUBLICACIONES
BOOK REVIEWS

A. Zilli
Lepidoptera research in areas with high biodiversity potential in Italy. Volume I
373 páginas, 27 láminas color
Formato: 24'5 x 17'5 cm
Natura Edizioni Scientifiche. Bologna, 2014
ISBN: 978-88-89327-09-8

Tenemos en nuestras manos el primer volumen de una interesante serie denominada *Lepidoptera italica* sobre la fauna de Lepidoptera que se encuentra en Italia en las áreas con alta biodiversidad potencial, bajo la dirección de nuestro estimado colega el Dr. Alberto Zilli y con la colaboración de diferentes autores perfectamente capacitados para el trabajo encomendado.

En este primer volumen, los autores tratan los Macrolepidoptera de las superfamilias Tineoidea, Cossoidea, Zygaenoidea, Thyridoidea, Papilionoidea, Drepanoidea, Lasiocampoidea, Bombycoidea, Geometroidea y Noctuoidea, con unas 815 especies consideradas.

La obra estudia la fauna de siete zonas potencialmente destacadas con una alta biodiversidad, más concretamente son: el Monte Subasio, en Umbria; la Selva del Lamonte, en Latium; el Bosque de Manziana, en Latium; las Montañas Prenestini, en Latium; las Zonas Costeras de Italia central, en Latium; el Mazizo Matesse, sur de los Apeninos y el Monte Cocuzzo, en Calabria.

Cada uno de estos capítulos son firmados por el Dr. Zilli y uno o más del resto de los colaboradores y todos ellos comienzan con una Introducción, una detallada información, el área de estudio, sobre los materiales y métodos utilizados, las localidades que se han explorado y la parte más importante del trabajo, los resultados faunísticos.

Dentro de los resultados faunísticos, nos informan de cada una de las especies encontradas en las diferentes áreas de estudio, con ampliación de la información con datos sobre el número de ejemplares estudiados, tanto machos como hembras; notas sobre las especies más destacadas, incluidos dibujos de algunas genitalias aclaratorias y una interesante discusión sobre los resultados obtenidos. Cada uno de los capítulos termina con los agradecimientos, una destacada bibliografía y un índice.

No podemos terminar estas líneas, sin felicitar al Dr. Zilli por dirigir este proyecto y al resto de los colaboradores por un trabajo bien realizado, así como a la Editorial que no ha escatimado medios para mantener el gran nivel de calidad necesaria para este tipo de trabajos, por lo que recomendamos vivamente su adquisición y no pudiendo faltar en cualquier biblioteca que se precie.

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 261-268 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.566

Redescription of the genus *Allocryptobia* Viette, 1951 (Lepidoptera: Cossidae)

R. V. Yakovlev, S. Yu. Sinev, A. E. Naydenov, F. C. Penco & Th. J. Witt †

Abstract

Based on the study of male and female genitalia and the external features of *Cryptobia musae* Herrich-Schäffer, [1854], the type species of the genus *Allocryptobia* Viette, 1951, this genus is redescribed. Images of the type specimens, male and female genitalia, a new generic diagnosis, and a distribution map are given. Lectotypes of *Cryptobia musae* Herrich-Schäffer, [1854] and *Cossus mucoreus* Herrich-Schäffer, [1853] are designated. *Allocryptobia musae* is recorded for the fauna of Honduras, Panama and Colombia for the first time.
KEY WORDS: Lepidoptera, Cossidae, *Allocryptobia*, lectotype designation, Neotropic.

Redescripción del género *Allocryptobia* Viette, 1951 (Lepidoptera: Cossidae)

Resumen

Basándose en el estudio de la genitalia del macho y de la hembra y de las características externas de *Cryptobia* Herrich-Schäffer, [1854], especie tipo del género *Allocryptobia* Viette 1951, 1951, se redescribe este género. Se dan las especies tipo, genitalia del macho y de la hembra, una diagnosis genérica y un mapa de distribución. Se designan el Lectotipo de *Cryptobia musae* Herrich-Schäffer, [1854] y *Cossus mucoreus* Herrich-Schäffer, [1853]. Se registra por primera vez a *Allocryptobia musae* para la fauna de Honduras, Panamá y Colombia.
PALABRAS CLAVE: Lepidoptera, Cossidae, *Allocryptobia*, designación de lectotipo, Neotropical.

Introduction

The Cossid fauna of Neotropics is poorly known. Only the subfamily Cossulinae (DAVIS *et al*., 2008) has been relatively well treated. We have initiated a systematic revision of the South American carpenter-moths with redescribing of poorly known genera (YAKOVLEV, 2014; PENCO *et al*., 2016; YAKOVLEV *et al*., 2016). Additionally, we have recently published a preliminary list of the Cossidae (PENCO & YAKOVLEV, 2015) of Argentina, and descriptions of several new species (PENCO & YAKOVLEV, 2017; YAKOVLEV *et al*., 2017).

The genus *Allocryptobia* Viette, 1951 belongs to the large but, well defined subfamily Zeuzerinae. Originally, the genus *Cryptobia* has been established for *Cryptobia musae* Herrich-Schäffer, [1854] (type locality: Brazil) (Fig. 1) with the second species *Cossus mucoreus* Herrich-Schäffer, [1853] (type locality: Rio Grande) (Fig. 2) added later. However, the name *Cryptobia* Herrich-Schäffer, [1854] appears to be a junior homonym of *Cryptobia* Leidy, 1846 (Kinetoplastida, Cryptobiidae) (LEIDY, 1846), and *Allocryptobia* was proposed as an objective replacement name (VIETTE, 1951: 38). SCHOORL (1990) synonymised *Cossus mucoreus* and *Cryptobia phobifera* Dyar, 1940 (Fig. 8)

described from Paraguay, Villa Rica (DYAR, 1940). He also examined material from The Natural History Museum (London) and Muséum National d'Histoire Naturelle (Paris) and determined specimens of *A. musae* from Venezuela (Merida) and Guatemala (Guatemala City).

It is known that the type material and other collections of Herrich-Schäffer have been deposited in various European museums (HÄUSER *et al*., 2003). A part of this material from the collection of Kaden, which served as a basis for iconography by HERRICH-SCHÄFFER (1850-1858), was recently found in the entomological collection of ZISP; it includes several types of Cossidae from South America.

Material and methods

Male and female genitalia were mounted in micro tubes (under specimens on a pin) and examined with a Nikon SMZ 800 n microscope. Images of genitalia were taken with the Olympus XC 50 camera. Images of imago were taken by the digital camera of Apple iPhone 7, illuminated in Lightbox. The images were processed using CorelDraw software.

Abbreviations used in the text:

BMNH	British Museum of Natural History (London, Great Britain)
MNHN	Muséum National d'Histoire Naturelle (Paris, France)
MWM	Museum of Thomas Witt (Munich, Germany)
USNM	United States National Museum of Natural History (Smithsonian Institution) (Washington, USA)
ZISP	Zoological Institute, Russian Academy of Sciences (St. Petersburg, Russia)

Results

We examined syntypes of *Cryptobia musae* (male and female) and *Cossus mucoreus* (female) kept in the collection of ZISP, as well as some new material of the first species, collected in Panama and Colombia. Because Figure 165 in HERRICH-SCHÄFFER (1850-1858) depicts the female of *C. musae*, we designate the female specimen as a lectotype and the male one as the paralectotype (article 74B of ICZN, 1999). Figure 39 in HERRICH-SCHÄFFER (1850-1858) for *C. mucoreus* also illustrates a female, and as there is no evidence that it is a unique specimen, we designate it as a lectotype.

Allocryptobia Viette, 1951
Lambillonea, **51**: 38

Type species *Cryptobia musae* Herrich-Schäffer, [1854], by monotypy for *Cryptobia* Herrich-Schäffer, [1854].

Redescription of the genus is given below based on its type species.

Male: Antenna short, bipectinate in proximal half, filiform in distal half. Fore wing relatively narrow, apically rounded, with specific black pattern. Hind wing short, relatively wide, almost completely black basally, with dense reticulated black pattern distally.

Female: Antenna short, filiform. Wings significantly wider than those of male.

Male genitalia (Fig. 9): Uncus long, triangle, with beak-shaped point on top; gnathos arm short, thick, fused with vinculum by membrane; valve relatively narrow, costal edge slightly curved in medium third, abdominal edge strongly curved in proximal third, small lanceolate harpe in medium third of abdominal edge, apex semicircular; juxta small, with long leaf-like lateral processes, strongly fused with phallus; saccus tiny, semicircular; phallus thick, shorter than valve, slightly curved in medium third, robust cornutus in lateral surface of vesica.

Female genitalia (Fig. 10): Ovipositor very long. Ostium poorly immersed, cup-like; ductus thick, of medium length, with sack-shaped bulla extending from it on a long membrane duct; bursa big, oval, with small stellate signum on lateral surface, ductus seminalis thin, extending from top of bursa; anterior apophyses much longer than posterior ones; transverse oblique incisions on lateral surface of ovipositor; papillae anales semicircular.

Allocryptobia musae (Herrich-Schäffer, [1854]) (Figs 3-6, 9-11)
Cryptobia musae Herrich-Schäffer, [1854], *Sammlung neuer oder wenig bekannter Aussereuropäischer Schmetterlinge*: Fig. 165.

Material examined: 1 ♀ (lectotype, here designated), [Brazil], (ZISP); 1 ♂ (paralectotype), [Brazil], (ZISP); 1 ♂ (paralectotype), Rio Grande [Brazil], (ex musaeo Boisduval) (MNHN); 1 ♂, Colombia, Quindío, Valle del Cocora, E of Salento, 2300 m, 4º 38' 32"N / 75º 30' 47"W, 11- III-2017, V. Sinyaev (MWM); 1 ♂, Colombia, Santander, NE of Bucaramanga, near Morro Ventanas, 7º 08' 43"N / 73º 01' 52"W, 13-15- IV-2017, 2250 m, leg. V. Sinyaev & Pinilla (MWM); 1 ♂, 1 ♀, Colombia, Boyacá Municipio Togui Vereda Jupa, 2080 m, 5º 53' 04''N / 73º 29' 27''W, 19-21-IV-2014, leg. V. Sinyaev & M. Márquez (MWM); 1 ♂, Colombia, Santander, road Duitama-Charala, 5º 58' 13''N / 73º 10' 07''W, 24-27-II-2016, 2925 m, leg. V. Sinyaev & J. Machado (MWM); 1 ♀, Colombia, Boyacá, Arcabuco, road Arcabuco-Togui, 5º 49' 15''N / 73º 30' 14''W, 7-8-XII-2015, 2350 m, leg. Sinyaev & Machado (MWM); 1 ♀, Colombia, Huila Municipio Palestina PN Guacharos-Purace 1º 40' 25"N / 76º 13' 29"W 10-12-II-2018, 2177 m, leg. V. Sinjaev & J. Machado (MWM); 1 ♂, NW Honduras, Cortés dept., Cusuco National Park, 15º 29' 47''N / 88º 12' 43''W, 1610 m, 22-28-V-2014, leg. V. Sinjaev & Marquez, coll. Dr. R. Brechlin (MWM); 1 ♂, C. America, Panama, Churiqui prov., Boquete distr., 8.81511 N, 82.48294 W, h=1720 m, 24-VI-2017, A. Kozlov & Yu. Kovaleva leg. (coll. R. Yakovlev, Barnaul).

Male (Figs 4-5): Wingspan 53-72 mm. Thorax and abdomen densely covered with brown scales. Tegulae brown. Fore wing brown, with specific black pattern. Fine black strokes along costal edge; longitudinal strokes between radial and medial veins in postdiscal and submarginal areas, reticulated pattern between cubital veins; discal area without pattern. Fringe brown unicolorous. Hind wing brown but almost completely black basally, with dense reticulated black pattern distally.

Female (Figs 3-6): Wingspan 90-113 mm. Wing pattern almost the same as of male, but more mottled with broad patches of coffee-with-milk color in discal and submarginal areas on fore wing and only distally on hind wing.

Male and female genitalia: See generic description.

Distribution (Fig. 11). Brazil, Colombia, Guatemala, Panama and Venezuela.

Allocryptobia mucoreus (Herrich-Schäffer, [1853]) (Figs 2, 7)
Cossus mucoreus Herrich-Schäffer, [1853], *Sammlung neuer oder wenig bekannter Aussereuropäischer Schmetterlinge*: Fig. 39.

Material examined: 1 ♀ (lectotype, here designated), [Rio Grande, Brazil], (ZISP); 1 ♀, Porto Cabello [Puerto Cabello, Carabobo State, Venezuela] (MNHN).

Distribution. Brazil and Venezuela.

Discussion

Basing on the male genital characters of the type species, the genus *Allocryptobia* belongs to the group of genera of the subfamily Zeuzerinae having one harpe on the lower edge of valve. Now this group includes the South American genera *Brypoctia* Schoorl, 1990 (type species *Xyleutes strigifer* Dyar, 1910), *Morpheis* Hübner, [1820] (type species *Phalaena pyracmon* Cramer, 1782) and some Australian genera combined by the KALLIES & HILTON (2012) into the *"Sympycnodes digitata* group". We are stated that apomorphies for the genus *Allocryptobia* include the specific habitus and the tiny sacculus, the short robust phallus and the gnathos arms fused with vinculum in the male genitalia.

A number of questions on the taxonomy of the genus *Allocryptobia* remain controversial. The most important is the synonymy of *C. mucoreus* with *C. phobifera* established by SCHOORL (1990: 164) with the following argument: "The holotype of *phobifera* is similar to a male specimen from Venezuela in the BMNH, which has been identified together with a female from the same locality as belonging to *mucorea*. Dyar notes that the hind wings are partly without scales due to damage. It appears to be a characteristic that a moderately broad band along the hind wing dorsum is unsealed, since the male in the BMNH has this too. There are apparently no good differences between the two species. Therefore, *phobifera* is synonymized with *mucorea*." However, the conspecificity of the male and female of *C. mucoreus* from Venezuela (BMNH) and the male from Paraguay (holotype *Cryptobia phobifera*) is doubtful (Figures 7 and 8, respectively).

Additionally, SCHOORL (1990) mentioned the pronounced sexual dimorphism as the most important characteristic of the genus *Allocryptobia*. This statement is based on comparing the external features of both sexes of *Cryptobia mucoreus*, however, in the females and males of the type species sexual dimorphism is only slightly expressed. We provisionally leave *C. mucoreus* in the genus *Allocryptobia* but its taxonomic position, as well as conspecifity with *C. phobifera*, needs further study.

Acknowledgments

The authors are grateful to Anna Ustjuzhanina (Tomsk, Russia) and Prof. Boris Kondratieff (Fort Collins, USA) for language improvements. We also express our gratitude to Harald Sulak-Wildenauer (Munich) for providing the photos of the Cossidae type specimens from the USA museums, and to Viktor Sinyaev and Anton Kozlov (both from Moscow) who assisted in getting important additional material from South and Central America.

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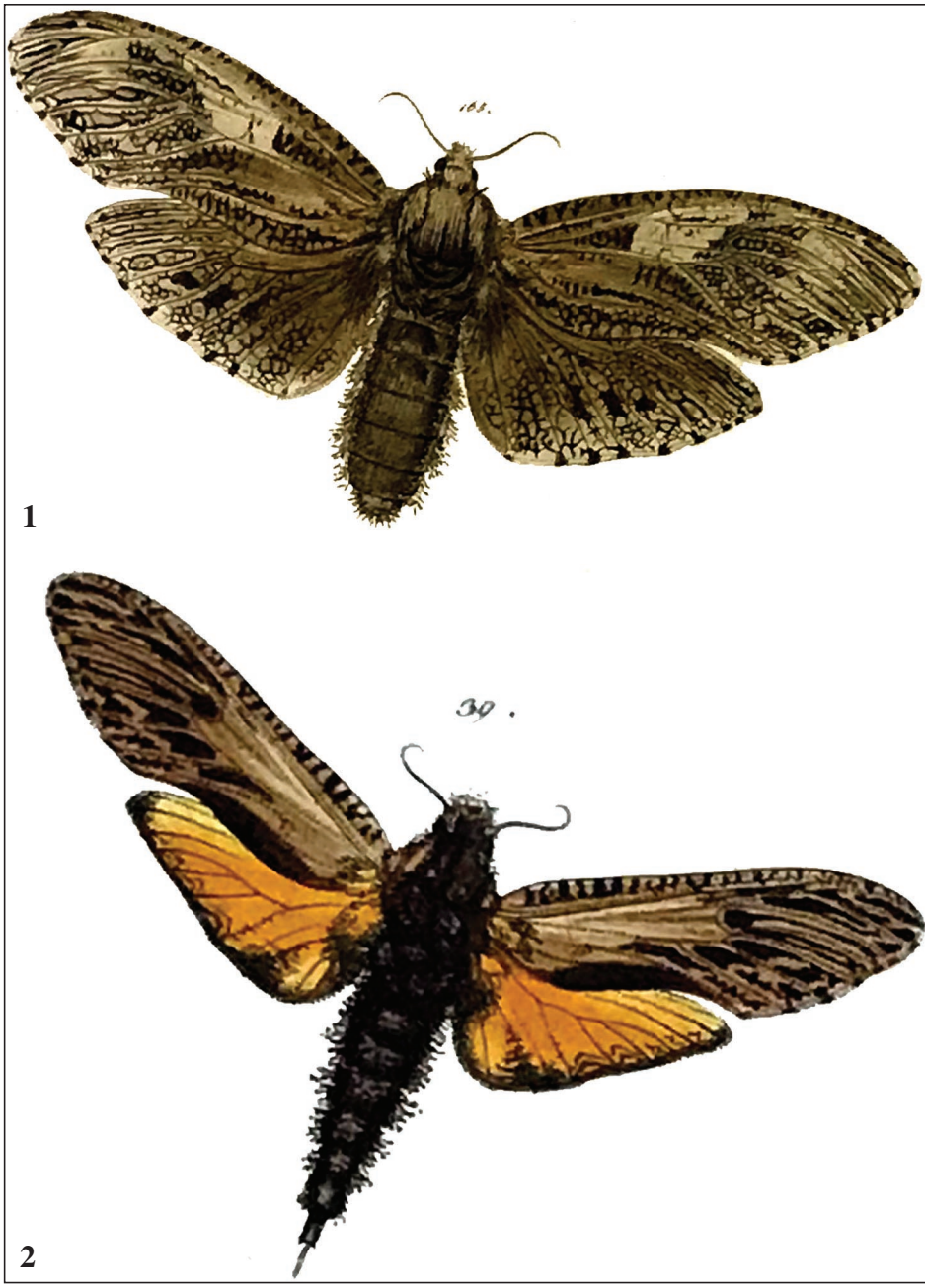
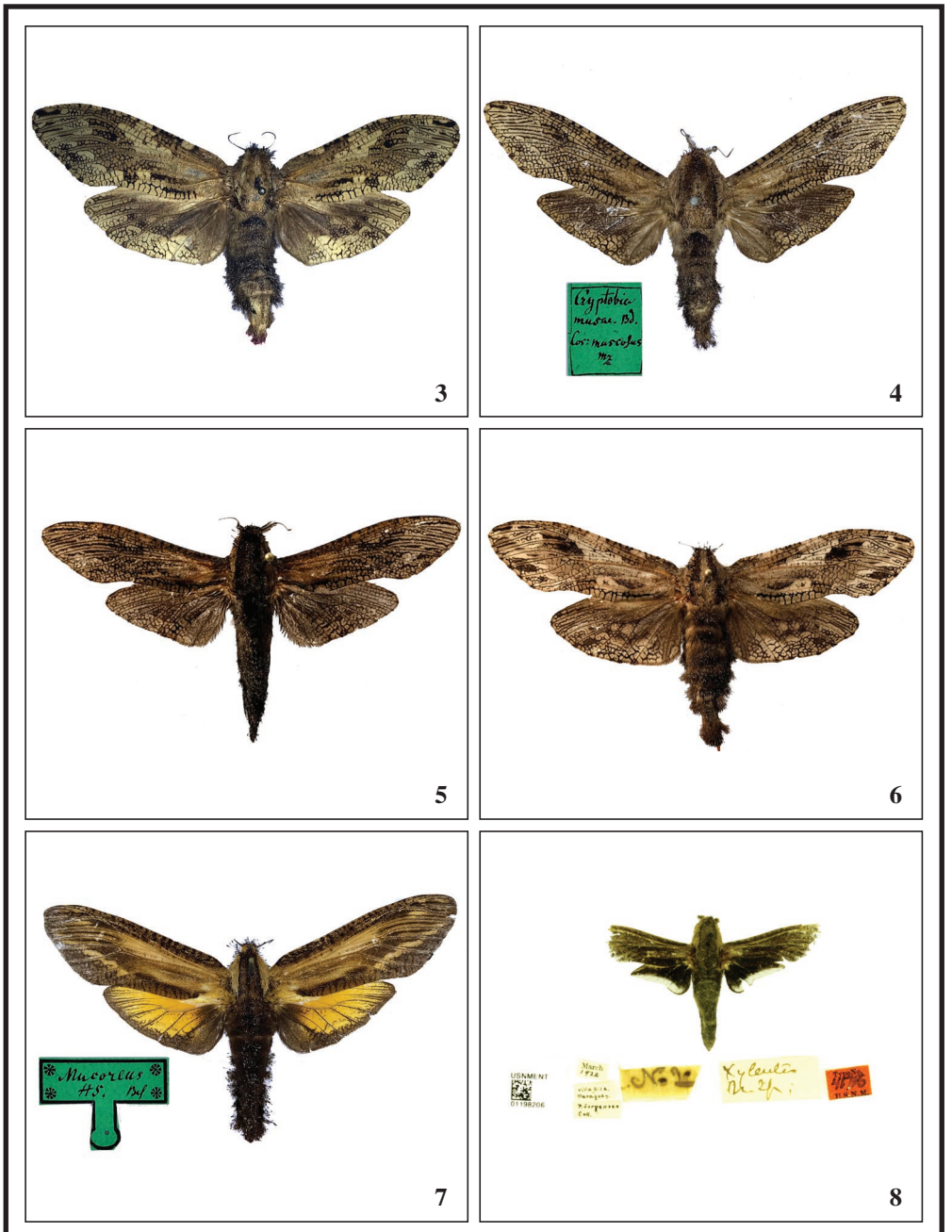
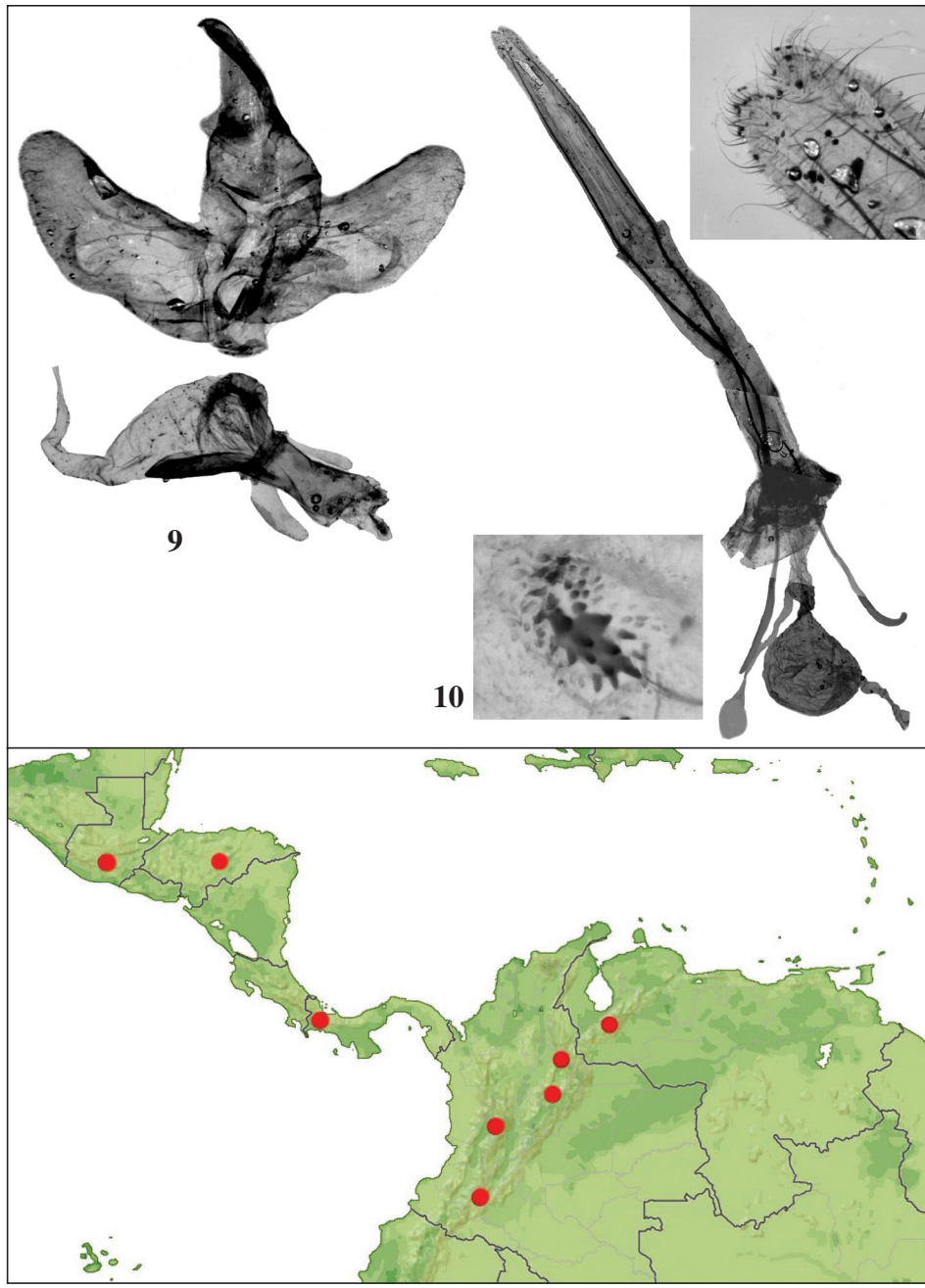
(Recibido para publicación / Received for publication 5-XII-2018)
(Revisado y aceptado / *Revised and accepted* 16-I-2019)
(Publicado / *Published* 30-VI-2019)



Figs 1-2.– Cossidae (Zeuzerinae), adults. **1.** *Cryptobia musae* (after Herrich-Schäffer, [1854], Fig. 165); **2.** *Cossus mucoreus* (after Herrich-Schäffer, [1853], Fig. 39).



Figs 3-8.– Cossidae (Zeuzerinae), adults. **3.** *Cryptobia musae*, lectotype, ♀ (ZISP); **4.** *Cryptobia musae*, paralectotype, ♂ (ZISP); **5.** *Allocryptobia musae*, ♂, Panama (coll. R. Yakovlev, Barnaul); **6.** *A. musae*, ♀, Colombia (MWM); **7.** *Cossus mucoreus*, lectotype, ♀ (ZISP); **8.** *Cryptobia phobifera*, holotype, ♂ (USNM).



Figs 9-11.– *Allocryptobia musae*, genitalia. **9.** Male (Panama); **10.** Female (Colombia); **11.** Distributional map of *Allocryptobia musae*.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 269-277 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.583

Description of *Coleophora oreiosella* Baldizzone, sp. n. and new records on the distribution of some European Coleophoridae (Lepidoptera: Coleophoridae)

G. Baldizzone*

Abstract

A new species of the genus *Coleophora* Hübner, 1822, *C. oreiosella* Baldizzone, sp. n., known to be found only in the Sierra Nevada, Spain, is described. New data on the distribution of some European species are provided. The male of *C. depunctella* Toll, 1961, is shown for the first time.
KEY WORDS: Lepidoptera, Coleophoridae, *Coleophora*, new species, new records, Europe.

Descripción de *Coleophora oreiosella* Baldizzone, sp. n. y nuevos registros sobre la distribución de algunos Coleophoridae europeos (Lepidoptera: Coleophoridae)

Resumen

Se describe una nueva especie del género *Coleophora* Hübner, 1822, *C. oreiosella* Baldizzone sp. n., sólo conocida de Sierra Nevada, España. Se proporcionan nuevos datos sobre la distribución de algunas especies europeas. Se muestra, por primera vez, el macho de *C. depunctella* Toll, 1961.
PALABRAS CLAVE: Lepidoptera, Coleophoridae, *Coleophora*, nueva especie, nuevos registros, Europa.

Introduction

Over the last years, I studied many indeterminate Coleophoridae specimens, both from private collections and from museums. This allowed me to gather much data on the distribution of several species, some of which are rather rare and localized. In particular, with regard to the area of former Yugoslavia, I have acquired many detailed data relative to the various republics into which that territory has been divided, Slovenia and Croatia in particular. The publication presents some of these data, while others will be the subject of future specific wildlife publications, such as on the fauna of the Coleophoridae of Slovenia, in collaboration with Stanislav Gomboc. A new species from Spain is also described, *C. oreiosella* Baldizzone sp. n., and the male genitalia of *C. depunctella* Toll, 1961 are illustrated for the first time.

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* Contribution to the knowledge on Coleophoridae, CXXXIX

Abbreviations:
Bldz = Baldizzone.
BMNH = The Natural History Museum, London, UK.
JT = Jukka Tabell.
ZMUC = Zoological Museum, University of Copenaghen, Copenaghen, Denmark.
ZSM = Zoologische Staatssammlung, München, Germany.

***Coleophora oreiosella* Baldizzone, sp. n.**

Holotype ♂: "Hisp.[ania] Sierra Nevada | Camino de la Veleta | 2050 m, 18-VII-1985, | G. Baldizzone y E. Traugott-Olsen" "Bldz PG nº 7525", coll. Baldizzone.

Paratypes: 1 ♂ (PG Bldz 4557) "Spanien | Sierra Nevada | Veleta | 2200 m | 12-7-1980 | leg. Gg. Derra", coll. Baldizzone; 1 ♂ (PG Bldz 8488) "Hispania | Andalucia | S[ier]ra Nevada | Cam[ino] de la Veleta | 2200 m | 1-7-1986 | E. Traugott-Olsen leg.", coll. ZMUC.

Diagnosis: A species characterized by the almost uniform ochreous shining colour, with thin white costal stripe. Based on the male genital structure, this species belongs to the group of *C. genistae* Stainton, 1857 and is closely related to *Coleophora svenssoni* Baldizzone, 1985. It differs from this species for the habitus, which is smaller, uniform and clear, and for the shape of the genitals, with more prominent and rounded sacculus and a smaller number of cornuti

Description (Fig. 1): Wingspan 10-11 mm. Head white, ochreous tinged. Antenna white, annulated with brown. Scape with a short tuft of pale brown scales. Labial palp brown, second article 0.5 x longer than third article. Thorax white, ochreous tinged. Forewing ochreous brown glossy; costal stripe white, very narrow, from base to near apex; costal fringe white, towards apex pale ochreous, dorsal fringe pale ochreous grey. Hindwing ochreous grey, fringe pale ochreous grey. Abdomen ochreous, lustrous.

Male genitalia (Figs 9, 10, 12): Gnathos knob. Tegumen stout, slightly constricted in the middle with moderately short pedunculi. Transtilla short, triangular. Valvula large, oval. Cucullus elongate, narrow, club shaped. Sacculus well sclerified with oval protuberance elongated outwards. Phallotheca conical, only dorsally sclerotized. Vesica transparent with five cornuti, of which the proximal ones are shaped like curved and slightly long needles and the distal one consisting of numerous small thorns gathered in a curved formation.

Female genitalia: Unknown.

Abdominal structures (Fig. 11): No posterior lateral struts. Transverse strut slightly convex, proximal margin broad. Tergal disks 3 x longer than wide, covered with 40-45 conical spines (3rd tergum).

Bionomy: The early stages and the food plant are not known.

Distribution: Known only from Spain, Sierra Nevada.

Origin of name: From Greek *ὄρειος* = highlander. It refers to the fact that all the specimens were collected at high altitude.

Coleophora ptarmicia Walsingham, 1910

Spain: Prov. Burgos, Villaquirán de los Infantes, Santa Barbara, 885 m, 5-VI-2009, 1 ♂, leg., coll. Lasan.

Distribution: Baltic countries, France, Italy, Sicily, Austria, Croatia, Czech Republic, Slovakia, Hungary, Bulgaria, Greece, Ukraine, Russia (Lower Volga), Turkey, Altai, China. **New for Spain and the Iberian Peninsula**.

Coleophora hiberica Baldizzone, 1985 (Fig. 2)

Spain: "Málaga, Spain, e. l. *Marrubium* sp. ex 14-VI-1901", 1 ♂; idem, 4-VI-1901, 1 ♂, coll. BMNH.

Note: The species is only known to be found in Spain. The food plant is still unknown, so it is

interesting to note that a Walsingham specimen was bred from *Marrubium* sp. Unfortunately, there was no larval case.

Coleophora lineolea (Haworth, 1828)

BULGARIA: 5 km N Sandanski, 150-200 m, 23-27-V-2010, 1 ♂, leg. Karsholt, coll. ZMUC.

Distribution: Almost all of Europe, Morocco, S Siberia, heading east towards the Altai. **New for Bulgaria**.

Coleophora praecursella Zeller, 1847 (Fig. 3)

GREECE: "Corfu, IV-1872, Wlsm. 84601", 1 ♀, coll. BMNH.

Distribution: Very rare and localized species, known to be found only in a few localities of southern France, central Italy, Sicily. **New for Greece**.

Coleophora klimeschiella Toll, 1952

BULGARIA: 5 km N Sandanski, 150-200 m, 23-27-V-2010, 1 ♀, leg. Karsholt, coll. ZMUC; 15 km N Sandanski, 5 km E Ilidentsi, 900 m, 27-V-2010, 1 ♀, leg. Karsholt, coll. ZMUC.

Distribution: Hungary, Romania, Greece, Southern Russia, Turkey, Caucasus, Turkmenistan, Pakistan, USA (introduced). **New for Bulgaria**.

Coleophora moehringiae Burmann, 1967 (Fig. 4)

SLOVENIA: Julijske Alpe, Velo Polje pod Triglav, 1690 m, 7-VII-2013, 1 ♂, leg. Rekelj, coll. Gomboc.

Distribution: Up to now, the known locations were situated within a limited mountainous area between Lombardy and Trentino, in the eastern Italian Alps. **New for Slovenia**.

Coleophora aleramica Baldizzone & Stübner, 2007

SLOVENIA: Pohorje, Uršija gora, Smrekov, 950 m, 16-VII- 2004, 1 ♂, leg., coll. Gomboc.

Distribution: Italy, Sicily, Austria, Slovakia, Hungary, Croatia, Montenegro, Macedonia, Greece, Turkey, Jordan. **New for Slovenia**.

Coleophora variicornis Toll, 1952

SLOVENIA: Notranjska, Unec, Cerje, Stari grad, 9-VII-2009, 1 ♂, leg., coll. Gomboc.

Distribution: Spain, Italy, Switzerland, Germany, Slovakia, Poland, Hungary, Ukraine, Croatia, Macedonia, Albania, Bulgaria, Greece, Turkey. **New for Slovenia**.

Coleophora pulchripennella Baldizzone, 2011

MONTENEGRO: Sveti Stefan, Crvena glavica kamp, 12-VII-2010, 1 ♀, leg., coll. Bassi.

Distribution: Widespread throughout the Mediterranean region, from France and the Iberian Peninsula, to Italy, Croatia, Greece (including Crete and several smaller islands) and Turkey; it is also known to be found in Malta and Tunisia. **New for Montenegro**.

Coleophora serpylletorum E. Hering, 1889

BULGARIA: 10 km NE Balich, Topola, 100 m, 29-30-V-2010, 1 ♂, leg. Karsholt, coll. ZMUC.

Distribution: Almost all of Europe (with the exception of Scandinavia), Turkey, S Siberia. **New for Bulgaria**.

Coleophora flaviella Mann, 1857

BULGARIA: 15 km N Sandanski, 5 km E Ilidentsi, 900 m, 27-V-2010, 1 ♀, leg. Karsholt, coll. ZMUC.

Distribution: Portugal, Spain, France, Italy, Sicily, Germany, Austria, Czech Republic, Slovakia, Croatia, Hungary, Romania, Greece, Turkey, Iran, Libya. **New for Bulgaria**.

Coleophora vicinella Zeller, 1849

BULGARIA: 5 km E Balich, Tuzlata, 10-100 m, 29-30-V-2010, 1 ♀, leg. Karsholt, coll. ZMUC.

Distribution: Central and Southern Europe, Ukraine, Russia (Lower Volga), Turkey, Armenia, Northern Africa, Iran. **New for Bulgaria**.

Coleophora vibicigerella Zeller, 1839

SLOVENIA: Črni Kal, Soceb, 330 m, 17-V-1999, 1 ♂, leg., coll. Lasan.

Distribution: Present throughout most of Europe, Ukraine, Russia, North Africa, Kazakhstan, Kyrgyzstan, Altai, China, Korea. **New for Slovenia**.

Coleophora vulnerariae Zeller, 1839

BOSNIA & HERZEGOVINA: Sarajevo, surroundings Bjelašnica, 1208 m, 5-VI-2009, 5 ♂♂ , 1 ♀, leg., coll. Gomboc.

Distribution: Throughout most of Europe, Russia (Lower Volga), Morocco. **New to Bosnia & Herzegovina**.

Coleophora glaseri Toll, 1961 (Fig. 5)

CROATIA: Strahinšica, Strahinje Radobojsko forest, 356 m, 20-VII-2014, 1 ♀, leg., coll. Gomboc.

Distribution: Found in Austria, Czech Republic, Slovakia, Hungary and Bulgaria. **New for Croatia.**

Coleophora tauricella Staudinger, 1880

MACEDONIA: Ohrid, 9-16-VI-1959, 1 ♀ leg. Klimesch, coll. Baldizzone.

Distribution: Localized species known to be found in southern Italy, Croatia, Bulgaria, Greece, Turkey, Palestine, Syria, Jordan. **New for Macedonia**.

Coleophora insulicola Toll, 1942

GREECE: Peloponnesos, Zachlorou (Kalavryta) 20-30-VI-1958, 1 ♀; ibidem, 26-VI-3-VII-1963, 2 ♂♂ , 1 ♀; ibidem, 14-VII-1963, 1 ♀, leg. Klimesch, coll. ZMS.

Distribution: Portugal, Spain, France, Italy, Sicily, Sardinia, Croatia, Albania. **New for Greece**.

Coleophora sternipennella (Zetterstedt, 1839)

MONTENEGRO: Durmitor, dint. of Zabljak, 1700-2000 m, 15-VII-2010, 1 ♀, leg. coll. Bassi.

Distribution: Throughout most of Europe, Caucasus, Russia (Lower Volga, Siberia, Transbaikalia), Korea, Japan. **New for Montenegro**.

Coleophora dentiferella Toll, 1952

CROATIA: Istra, Barban, Melnica, 175 m, 2-V-2003, 1 ♂, leg., coll. Lasan.

Distribution: France, Italy, Austria, Slovakia, Czech Republic, Hungary, Montenegro, Macedonia, Bulgaria, Greece. **New for Croatia**.

Coleophora anitella Baldizzone, 1985 (Fig. 6)

CORSICA: "Corte, Corsica, 22-V-1896, Wlsm. 83637", 1 ♂, coll. BMNH.

Distribution: Rare and localized species, known only to be found in Spain, southern France, Italy, Sardinia. **New for Corsica**.

Coleophora depunctella Toll, 1961 (Fig. 7)

CROATIA: Dalmatia, Makarska, Topiæi, 3-15-VIII-1988, 1 ♀, leg., coll. Wolschrijn, det. van det Wolf. BULGARIA: Kresna, 21-22-VI-2000, 1 ♂, leg., coll. Junnilainen, det. Tabell.

Distribution: Known to be found only in Macedonia and Greece, recently reported in Croatia (Southern Velebit) (RICHTER & PASTORÁLIS, 2015). **New for Bulgaria**.

Only the female of this species was known. Below is the description of the male genitalia.

Male genitalia (Fig. 14, 16, 17): Oval gnathos knob. Tegumen restricted in the middle with long pedunculi. Transtilla narrow at the base and wide at the apex in a clavate form. Very small valvula, with rounded ventral edge. Cucullus short and stout. Sacculus with a rounded horn-shaped protuberance in the ventral angle, a very hollow outer edge and a sharper protuberance in the dorsal angle. Phallotheca with two thin and different juxta rods, the longer one featuring a pointed tooth at the apex, the other in the distal half being divided into two parts, which then gather at the apex. Cornutus, in the form of a harpoon, consisting of 2-3 spines of different lengths.

Note: The genitals are similar to those of *C. solitariella* Zeller, 1849, with evident differences especially in the structure of the outer edge of the sacculus, which is much hollower and with larger and longer protuberances.

Coleophora scabrida Toll, 1959

BULGARIA: 5 km N Sandanski, 150-200 m, 23-27-V-2010, 1 ♀, leg. Karsholt, coll. ZMUC.

Distribution: Sweden, Baltic States, Denmark, Portugal, Spain, France, Italy, Germany, Poland, Croatia, Macedonia, Romania, Russia (Lower Volga). **New for Bulgaria**.

Coleophora galatellae M. Hering, 1942 (Fig. 8)

SPAIN: Prov. Burgos, Villaquirán de los Infantes, Santa Barbara, 885 m, 5-VI-2009, 1 ♂, leg., coll. Lasan.

Distribution: France, Italy, Germany, Czech Republic, Slovakia, Hungary, Ukraine, Russia (Crimea, Southern Urals). **New for Spain and the Iberian Peninsula**.

Coleophora peribenanderi Toll, 1943

GREECE: Ftiotis, 2 km N Kamena Vourla, 5-VII-1985, 1 ♂, leg. Skou & Skule, coll. Baldizzone; Peristeron E of Saloniki, Volvi sea, 25-V-1995, 1 ♂, leg. Baisch, coll. Baldizzone.

Distribution: Northern and Central Europe, Great Britain, Belgium, France, Italy, Romania, Ukraine, Russia (Lower Volga), Caucasus, Korea. **New for Greece**.

Coleophora kyffhusana Petry, 1898

BULGARIA: Balgarevo, 3 km E, 95 m, 25-26-VII-2018, 1 ♂, leg., coll. Tokár.

Distribution: Sweden, Latvia, Germany, Poland, Italy, Slovakia, Hungary, Greece, Southern Russia. **New for Bulgaria**.

Coleophora striatipennella Nylander, 1848

CROATIA: Bedekovščina, Lug Poznanovečki, 182 m, 27-VIII-2016, 1 ♂, leg., coll. Gomboc.

Distribution: Almost all of northern and central Europe, Portugal, Spain, France, Italy, Slovenia, Montenegro, Macedonia, Caucasus, Russia (Kola, Lower Volga, Urals, Siberia, Altai). **New for Croatia**.

Coleophora nutantella Mühlig & Frey, 1857

BULGARIA: 15 km N Sandanski, 5 km E Ilidentsi, 900 m, 27-V-2010, 1 ♀, leg. Karsholt, coll. ZMUC.

Distribution: Baltic countries, central and southern Europe, Turkey, Armenia, Iran, southern Siberia as far as Altai, Morocco. **New for Bulgaria**.

Acknowledgements:

I would like to thank those who have submitted Coleophoridae to me for study, in particular Graziano Bassi (Avigliana, Italy), Stanislav Gomboc (Kranj, Slovenia), Ole Karsholt (ZMUC, Copenaghen, Denmark), Mojmir Lasan (Ljubljana, Slovenia), Zdenko Tokár (Šala, Slovakia), Kevin

Tuck (NMNH, London, United Kingdom). For some information, I thank Jukka Tabell (Laaksotie, Finland) and Ignac Richter (Malá Čausa, Slovakia), who kindly provided me with a picture of *C. depunctella*. For other photos of adult specimens, I would like to thank Pier Giuseppe Varalda (Morano sul Po, Italy). My thanks also go to Franco Correggia (Torino, Italy) and Federica Pojaga (London, UK) for checking and correcting the text in English and Antonio Vives (Madrid, Spain) for translating the abstract into Spanish.

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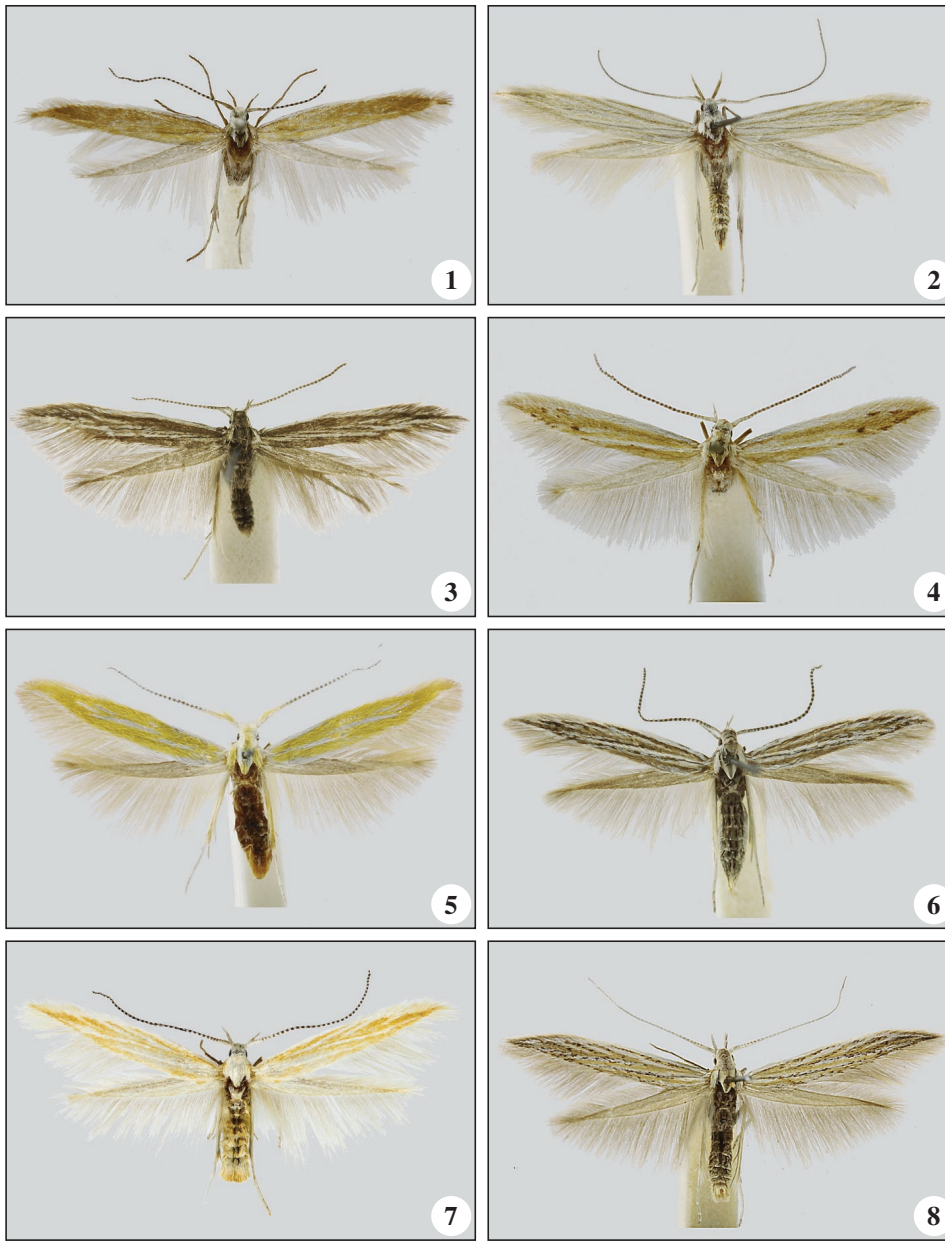
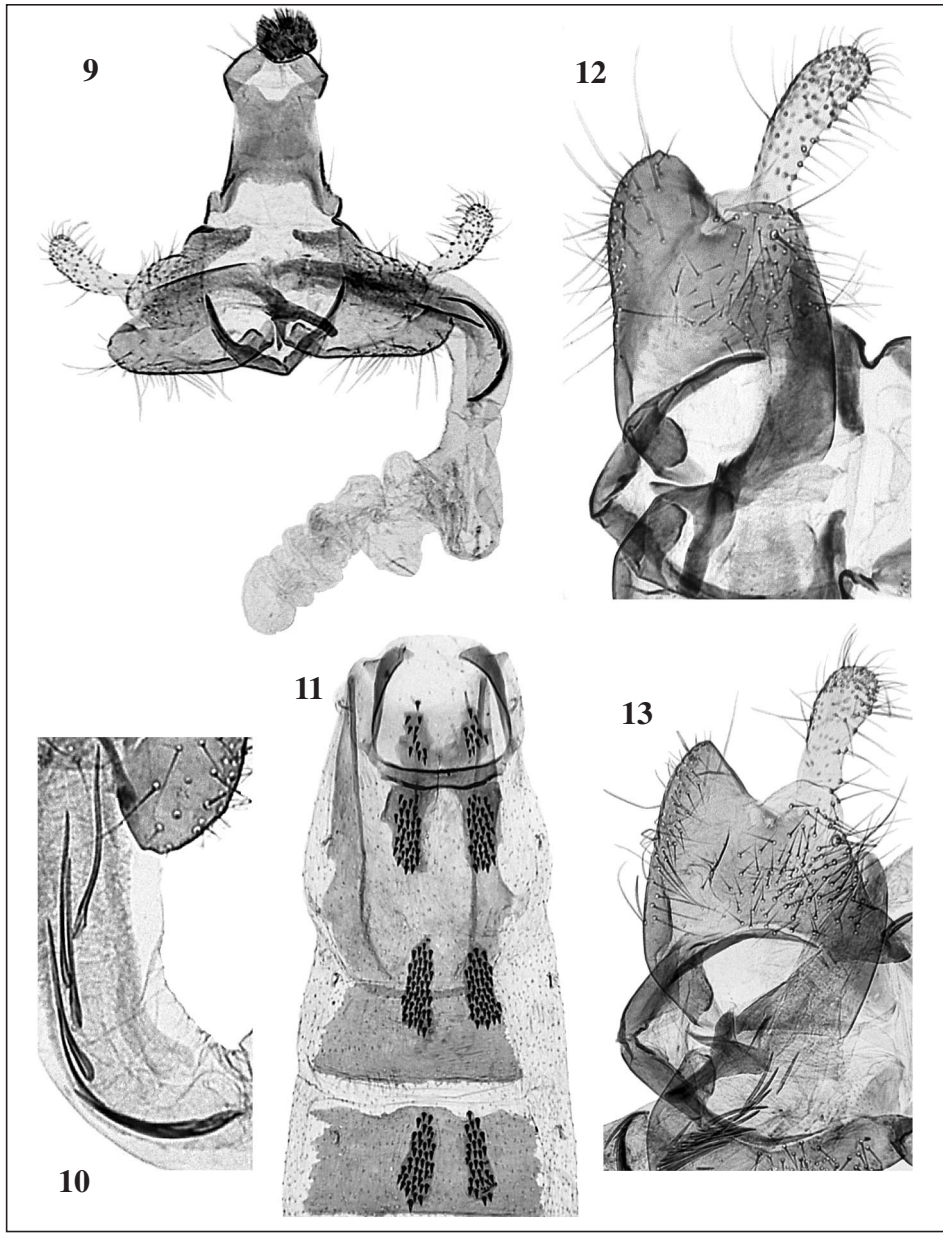
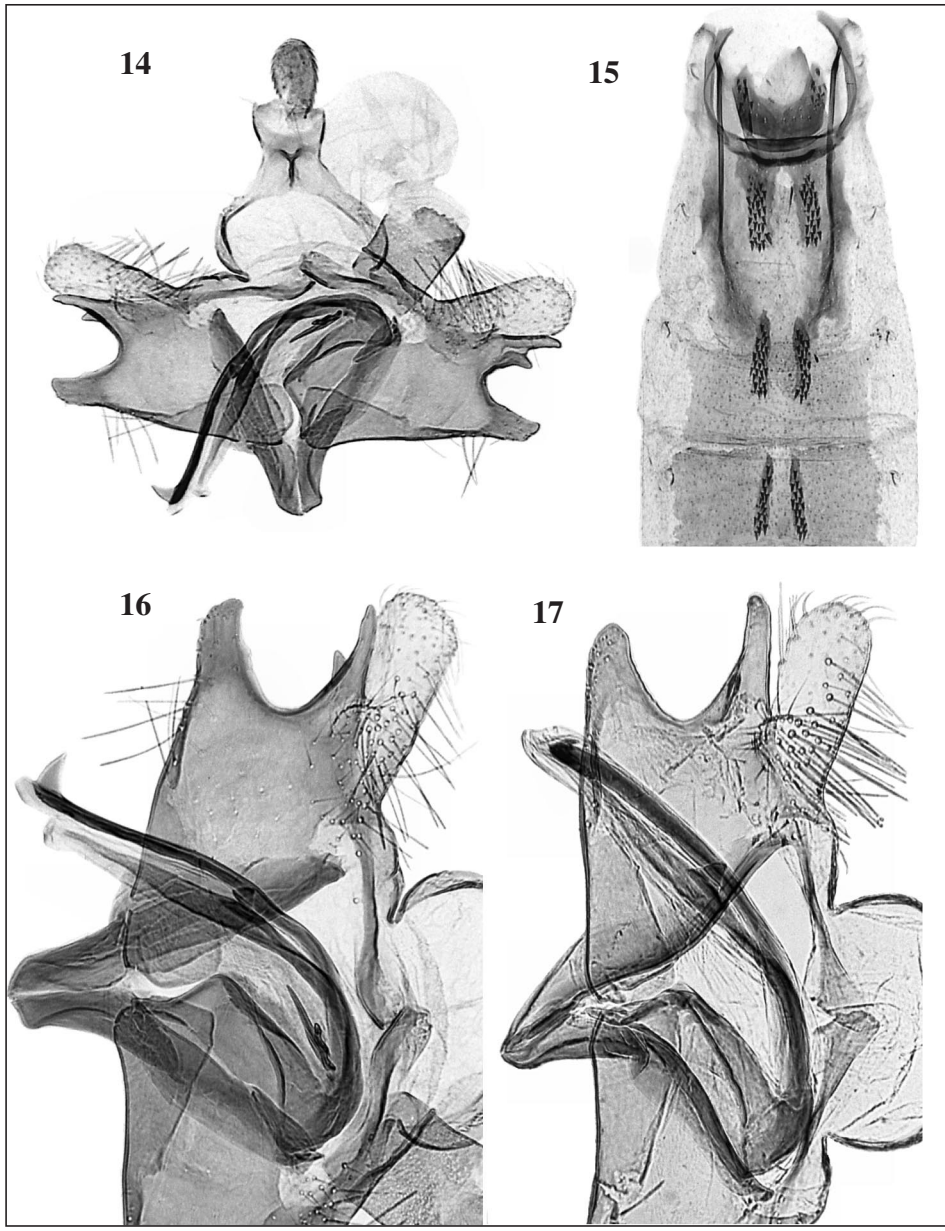
(Recibido para publicación / *Received for publication* 30-I-2019)
(Revisado y aceptado / *Revised and accepted* 28-II-2019)
(Publicado / *Published* 30-VI-2019)



Figs. 1-8.– 1. *Coleophora oreiosella* Baldizzone sp. n., Holotype ♂ (abdomen dissected). **2.** *C. hiberica* Baldizzone ♀ (wingspan 13 mm). **3.** *C. praecursella* Zeller ♀ (12 mm). **4.** *C. moehringiae* Burmann ♀ (adomen dissected, 11 mm). **5.** *C. glaseri* Toll ♀ (12 mm). **6.** *C. anitella* Baldizzone ♀ (10 mm). **7.** *C. depunctella* Toll ♂ (12 mm) [photo Richter]. **8.** *C. galatellae* E. M. Hering, ♂ (13 mm).



Figs. 9-13.– 9. *C. oreiosella* Baldizzone sp. n., male genitalia: (PG Bldz 7525) Holotype. **10.** *C. oreiosella* Baldizzone sp. n., male genitalia: (PG Bldz 4557) Paratype, detail of cornuti. **11.** *C. oreiosella* Baldizzone sp. n., male abdomen: (PG Bldz 7525). **12.** *C. oreiosella* Baldizzone sp. n., male genitalia: (PG Bldz 4557) enlarged detail of cucullus, sacculus and phallotheca. **13.** *C. svenssoni* Baldizzone, male genitalia (PG Bldz 5782) Paratype "Suecia, Pältsa, 1000 m, 10-VII-1978, B. Bengtsson", enlarged detail of cucullus, sacculus and phallotheca.



Figs. 14-17.– 14. *C. depunctella* Toll, male genitalia: (PG Bldz 14148) Greece, Larissa, Olympos Mts., 11 km NE Kalvia, 1850 m, 20-VII-1998, B. Skule & D. Nillson leg. **15.** *C. depunctella* Toll, abdomen genitalia. **16.** *C. depunctella* Toll, male genitalia, enlarged detail of cucullus, sacculus and phallotheca. **17.** *C. depunctella* Toll, male genitalia: (PG JT 3346), Bulgaria, Kresna, 21-22-VI-2000, J. Junnilainen leg., enlarged detail of cucullus, sacculus and phallotheca.

REVISION DE PUBLICACIONES
BOOK REVIEWS

P. A. V. Borges, R. Cunha, R. Gabriel, A. Frias Martins, L. Silva & V. Vieira
Listagem da Fauna e Flora (Mollusca e Arthropoda) (Bryophyta, Pteridophyta e Spermatophyta) terrestre dos Açores
318 páginas
Formato: 30 x 21 cm
Direcção Regional do Ambiente, Horta, 2005
ISBN: 972-8612-22-2

Las islas que componen la Macaronesia tienen una gran diversidad de organismos, con un elevado número de especies endémicas, unas veces sólo presentes en una de las islas y otras compartidas entre varias de ellas, lo que ha despertado el interés de las autoridades ambientales, principalmente de España, Portugal y de la Unión Europea reconociendo a esta región zoogeográfica de primer orden y quedando así reflejado en la Directiva de Hábitats (92/43(EEC).

Bajo la iniciativa del Dr. Paulo A. V. Borges, se pergeñó la iniciativa de realizar un trabajo conjunto sobre la fauna y flora de las islas Azores, para lo que agrupó a los mejores especialistas portugueses en los diferentes órdenes, para llevar a buen fin tan interesante proyecto científico.

Después de un prefacio e introducción, nos hablan sobre la descripción de la biodiversidad terrestre de las Azores; de la utilización del programa informático ATLANTIS-Tierra 2.0, como herramienta para predecir la distribución espacial y adecuación de las especies endémicas; listado de las especies terrestres, de los briofitos; de las plantas vasculares; de los moluscos y de los artrópodos.

En el apartado de los artrópodos, se tratan: Pseudoescorpiones, Opiliones, Acari, Araneae, Brachiopoda, Ostracoda, Malacostracea, Maxillopoda, Symphyla, Pauropoda, Diplopoda, Chilopoda, Collembola, Diplura, Protura, Microcoryphia, Zygentoma, Odonata, Ephemeroptera, Orthoptera, Dermaptera, Phasmatodea, Blattaria, Isoptera, Psocoptera, Thysanoptera, Hemiptera, Homoptera, Neuroptera, Coleoptera, Strepsiptera, Trichoptera, Lepidoptera, Diptera, Siphonaptera e Hymenoptera.

La obra se completa con tres apéndices, a saber: Lista de las especies dudosas; adiciones y correcciones a la lista de especies de flora liquenológica, lista preliminar de los Nematoda, Annelida y Chrodata terrestre de las Azores y finaliza con un índice taxonómico.

No podemos terminar estas líneas, sin felicitar al Dr. Borges por dirigir este proyecto y al resto de los colaboradores por un trabajo bien realizado sobre estas islas de la Macaronesia, por lo que recomendamos vivamente su adquisición y no pudiendo faltar en cualquier biblioteca que se precie.

El precio de este libro es de 40,00 euros y los interesados deben dirigirse a:

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 279-283 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.765

First records of Cossidae from Gabon (West Africa) (Lepidoptera: Cossidae)

R. V. Yakovlev, G. M. Laszlo & T. J. Witt †

Abstract

The present paper provides the first data on Cossidae of Gabon (seven species) based on the materials of the collection of the African Natural History Research Trust (Leominster), Royal Museum of Central Africa (Tervuren), and Museum Witt (Munich). Four species (*Macrocossus toluminus* (Druce, 1887), *Tarsozeuzera livingstoni* Yakovlev, 2006, *Aethalopteryx squameus* (Distant, 1902), and *Strigocossus crassa* (Drury, 1782)) are recorded for the first time in the fauna of Gabon.
KEY WORDS: Lepidoptera, Cossidae, new records, Gabon.

Primeros registros de Cossidae de Gabón (Oeste de África)
(Lepidoptera: Cossidae)

Resumen

El trabajo actual, proporciona los primeros datos sobre Cossidae de Gabón (siete especies) basado sobre el material de la colección del African Natural History Research Trust (Leominster), Royal Museum of Central Africa (Tervuren) y del Museum Witt (Munich). Se registran cuatro especies por primera vez para la fauna de Gabón (*Macrocossus toluminus* (Druce, 1887), *Tarsozeuzera livingstoni* Yakovlev, 2006, *Aethalopteryx squameus* (Distant, 1902) y *Strigocossus crassa* (Drury, 1782).
PALABRAS CLAVE: Lepidoptera, Cossidae, nuevos registros, Gabón.

Introduction

Our knowledge on the Carpenter moths (Lepidoptera: Cossidae) fauna of West Africa is rather incomplete. Extensive faunistic research regarding the entire Afrotropical Region has only been conducted in a few countries: Zimbabwe (YAKOVLEV & LENZ, 2013), Malawi (YAKOVLEV & MURPHY, 2013), Zambia (YAKOVLEV, 2014), and Swaziland (YAKOVLEV & WITT, 2016a). MEY (2015, 2016, 2017) provided a detailed overview of the Southern African (including Namibian) Cossidae.

The Cossidae (as well as other Heterocera) fauna of Gabon is poorly known, single references on the distribution of the family representatives in this country are given in a few articles only (YAKOVLEV, 2011; YAKOVLEV & WITT, 2018a, b).

During the course of studying Afrotropical Cossidae, several materials collected in Gabon, have been located in the collections of the African Natural History Research Trust (Leominster), Royal Museum of Central Africa (Tervuren), and Museum Witt (Munich). This article presents the first check list of Cossidae recorded from Gabon to date.

Abbreviations

ANHRT - African Natural History Research Trust, Leominster, UK
DMP - Ditsong National Museum of Natural History (formerly Transvaal Museum), Pretoria, South Africa
MNHN - Muséum National d'Histoire Naturelle, Paris, France
MWM - Museum Witt, Munich, Germany
NHMUK - (formerly BMNH) - The Natural History Museum (formerly British Museum of Natural History), London, UK
RMCA - Royal Museum of Central Africa, Tervuren, Belgium

Materials and methods

Images of adults were taken by the digital camera of Apple iPhone 7, illuminated in lightbox.

List of species

Macrocossus toluminus (Druce, 1887) (Fig. 1)
Cossus toluminus Druce, 1887: 684-685
Type locality: Gambia
Type material: Holotype in NHMUK, examined.
Material examined: 1 ♂, Gabon, Ogooue Ivindo PN, Ivindo Station de Recherche d'Ipassa, 450 m, 14-26-VI-2016, N0º 30' 43" / E 12º 48' 12", Ruzzier, E., Tasane, T. leg., ANHRT: 2017.19 (coll. ANHRT).
Distribution: From Ivory Coast to Malawi, Tanzania, Namibia, S. Africa (GRÜNDBERG, 1910; SCHOORL, 1990; VÁRI *et al*., 2002). **New record for Gabon**.

Tarsozeuzera livingstoni Yakovlev, 2006 (Fig. 2)
Tarsozeuzera livingstoni Yakovlev, 2006: 211
Type locality: Rep. Pop. Congo, Dimonica
Type material: Holotype in MNHN, examined.
Material examined: 1 ♂, Gabon, Ogooue Ivindo PN, Ivindo Station de Recherche d'Ipassa, 450 m, 14-26-VI-2016, N0º 30' 43" / E 12º 48' 12", Ruzzier, E., Tasane, T. leg., ANHRT: 2017.19 (coll. ANHRT).
Distribution: Congo, Cameroon, Cote d'Ivoire, Gabon, Kenya, Malawi, Tanzania, Zambia, Zimbabwe (YAKOVLEV, 2011; YAKOVLEV & MURPHY, 2013; YAKOVLEV, SOKOLOVA & WITT, 2018). **New record for Gabon**.

Pseudozeuzera biatra (Hampson, 1910) (Fig. 3)
Duomitus biatra Hampson, 1910: 131-132
Type locality: S. Nigeria, Old Calabar [Calabar city]
Type material: Holotype in NHMUK, examined.
Material examined: 1 ♂, Gabon, Monila, 30-II-1964, Rec. V. Allard (coll. RMCA).
Distribution: Sierra Leone, Nigeria, Ghana, Uganda, Cameroon, Togo, Central African Republic, Congo, Gabon (SCHOORL, 1990; YAKOVLEV, 2011; YAKOVLEV & WITT, 2018a).

Aethalopteryx squameus (Distant, 1902) (Fig. 4)
Duomitus squameus Distant, 1902: 213
Type locality: Transvaal, Pretoria (S. Africa)
Type material: Cotypes in coll. NHMUK and DMP, examined.
Material examined: 1 ♂, Gabon, Ogooue Ivindo PN, Ivindo Station de Recherche d'Ipassa, 450 m, 14-26-VI-2016, N0º 30' 43" / E 12º 48' 12", Ruzzier, E., Tasane, T. leg., ANHRT: 2017.19 (coll. ANHRT).
Distribution: South Africa, Botswana, Mozambique, Malawi, Ghana, Angola, Tanzania, CAR (PINHEY, 1979; VÁRI *et al.*, 2002). **New record for Gabon**.

Strigocossus moderata (Walker, 1856) (Fig. 5)
Zeuzera moderata Walker, 1856: 1533
Strigocossus vosseleri; Yakovlev, 2011: 83
Strigocossus moderata; Yakovlev & Murphy, 2013: 381
Type locality: Sierra Leone
Type material: Holotype in NHMUK, examined.

Material examined: 5 ♂♂, Gabon, Monts Cristal, 5-X-1991, leg. Dr. Politzar (coll. MWM).

Distribution: South Africa, Mozambique, Zambia, Malawi, Tanzania, Kenya, Cameroun, Gabon etc. (PINHEY, 1979; VÁRI *et al*., 2002; YAKOVLEV, 2011; YAKOVLEV & MURPHY, 2013).

Strigocossus crassa (Drury, 1782) (Fig. 6)
Phalaena (*Noctua*) *crassa* Drury, 1782: Pl. 2: fig. 1
Type locality: Sierra Leon [Sierra Leone]
Type material: It is lost.

Material examined: 2 ♂♂, Gabon, Andok foula, 0º 25' 51"N / 10º 7' 43"E, 19-22-V-2011, 72 m, leg. Viktor Siniaev & Yury Bezverkhov (MWM); 4 ♂♂, Gabon, Monts de Cristal, SONG, 0º 31' 59"N / 10º 12' 55"E, 25-V-2011, 139 m, leg. Viktor Siniaev & Yury Bezverkhov; 3 ♂♂, Baraka, 3 km NE No-Ayong Village, 0º 38' 24" / 9º 41' 37"E, 1-3-VI-2011, 35 m, leg. Viktor Siniaev & Yury Bezverkhov (coll. MWM).

Distribution: From Central to Southern Africa. New record for Gabon.

Eburgemellus geminatus (Gaede, 1930) (Fig. 7)
Xyleutes geminatus Gaede, 1930: 546, Taf. 80c
Eburgemellus geminatus; Yakovlev & Witt, 2018: 4
Type locality: Kriby, S. Cam. [Kribi, SW Cameroon]
Type material: Holotype in NHMUK, examined.

Material examined: 2 ♂♂, Gabon, Baraka, 3 km NE No-Ayong village, 0º 36' 24" N / 9º 41' 37"E, 1-3-VI-2011, leg. Viktor Siniaev & Yury Bezverkhov (coll. MWM).

Distribution: Cameroon, Cot d'Ivoire, Congo, Gabon (YAKOVLEV & WITT, 2018b).

Acknowledgements

The first author is indebted to Mr. Geoff Martin and Mr. Alessandro Giusti (London) for their kind assistance provided during studying the type material of the Natural History Museum; moreover, to Mr. Richard Smith (Leominster), Dr. Joel Minet (Paris), Dr. Didier Van den Spiegel and Mrs. Alice Buset (Tervuren), Dr. Martin Krüger (Pretoria) for providing opportunity of studying the collection of their institution.

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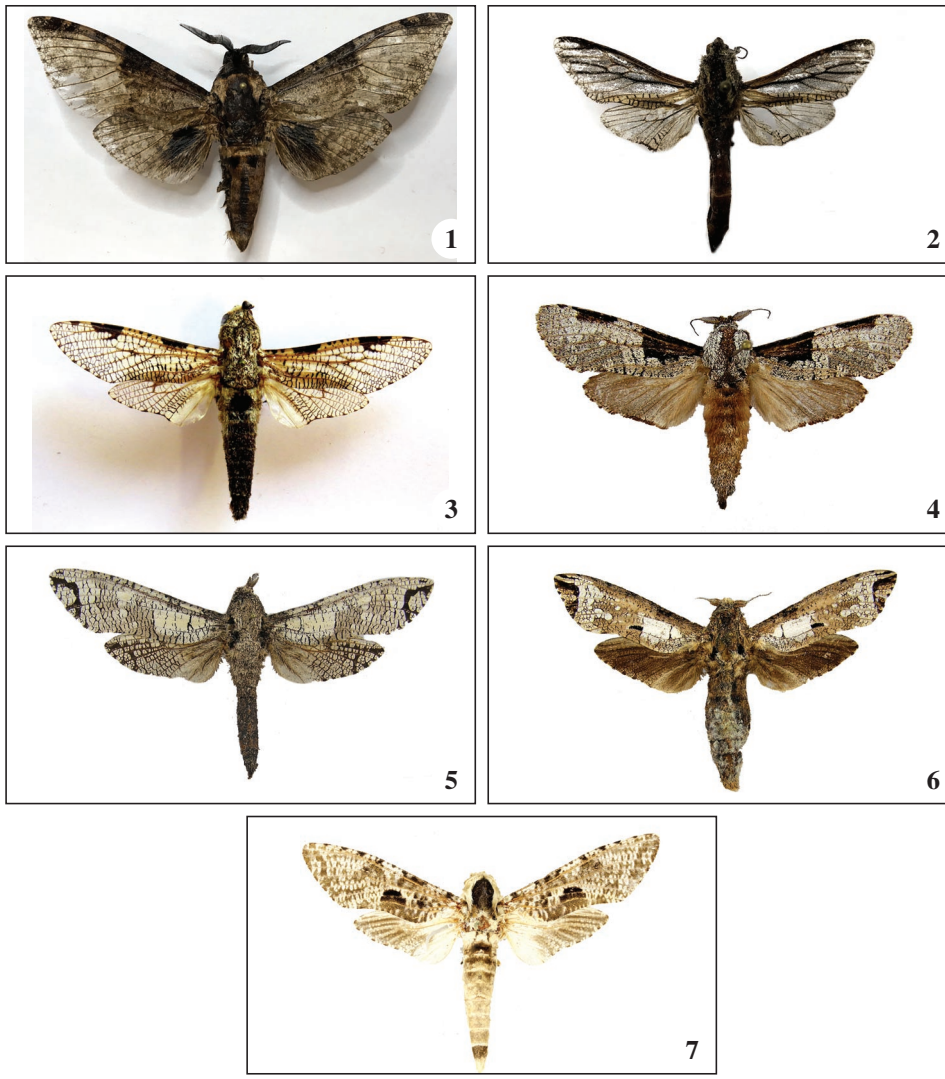
(Recibido para la publicación / *Received for publication* 11-II-2019)
(Revisado y aceptado / *Revised and accepted* 3-III-2019)
(Publicado / *Published* 30-VI-2019)

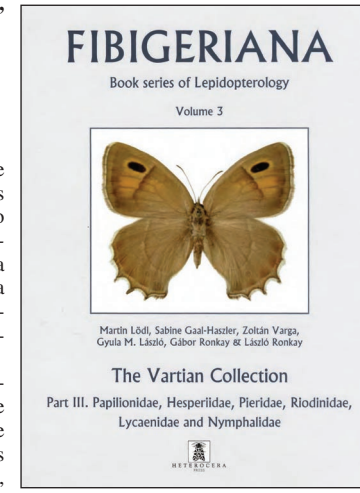


Figures 1-7.– 1. *Macrocossus toluminus* (Druce, 1887), ♂, Gabon, Ogooue Ivindo PN, Ivindo Station de Recherche d'Ipassa, 450 m, 14-26-VI-2016, N0º 30' 43" / E12º 48' 12", Ruzzier, E., Tasane, T. leg., ANHRT: 2017.19 (ANHRT). **2.** *Tarsozeuzera livingstoni* Yakovlev, 2006, ♂, Gabon, Ogooue Ivindo PN, Ivindo Station de Recherche d'Ipassa, 450 m, 14-26-VI-2016, N0º 30' 43" / E12º 48' 12", Ruzzier, E., Tasane, T. leg., ANHRT: 2017.19 (ANHRT). **3.** *Pseudozeuzera biatra* (Hampson, 1910), ♂, Gabon, Monila, 30-II-1964, Rec. V. Allard (RMCA). **4.** *Aethalopteryx squameus* (Distant, 1902), ♂, Gabon, Ogooue Ivindo PN, Ivindo Station de Recherche d'Ipassa, 450 m, 14-26-VI-2016, N0º 30' 43" / E12º 48' 12", Ruzzier, E., Tasane, T. leg., ANHRT: 2017.19 (ANHRT). **5.** *Strigocossus moderata* (Walker, 1856), ♂, Gabon, Monts Cristal, 5-X-1991, leg. Dr. Politzar (MWM). **6.** *Strigocossus crassa* (Drury, 1782), ♂, Gabon, Andok foula, 0º 25' 51"N / 10º 7' 43"E, 19-22-V-2011, 72 m, leg. Viktor Sinyaev & Yury Bezverkhov (MWM). **7.** *Eburgemellus geminatus* (Gaede, 1930), ♂, Gabon, Baraka, 3 km NE No-Ayong village, 0º 36' 24" N / 9º 41' 37"E, 1-3-VI-2011, leg. Viktor Siniaev & Yury Bezverkhov (MWM).

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 284 eISSN: 2340-4078 ISSN: 0300-5267

REVISION DE PUBLICACIONES
BOOK REVIEWS

Martin Lödl, Sabine Gaal-Haszler, Zoltán Varga, Gyula M. László, Gábor Ronkay & László Ronkay
FIBIGERIANA Book series of Lepidopterology, volume 3
229 páginas, 183 láminas color
Formato 29 x 20 cm
Heterocera Press, Budapest, 2015
ISBN: 978-615-5279-04-1



Cuando nos encontrábamos más que satisfechos con las dos series que sobre Noctuoidea había publicado la editorial *Heterocera Press*, una de ellas *"Noctuidae Europaeae*" ya finalizada con trece volúmenes y otra en pleno desarrollo *"Taxonomic Atlas of the Euroasian and North Africa Noctuoidea"* con nueve volúmenes ya publicados y otros en preparación, una nueva serie de monografías sobre esta superfamilia llega a nuestras manos, se trata de FIBIGERIANA nombre en honor a nuestro querido amigo Michael Fibiger (1945-2011) y que pretende recopilar e informarnos del estado de las colecciones lepidopterológicas depositadas en los principales Museos.

En este tercer volumen sus autores, tratan los Papilionidae, Hesperiidae, Pieridae, Riodinidae, Lycaenidae y Nymphalidae de la colección de Eva Vartian (1925-1995) que se encuentra depositada en el Naturhistorische Museum en Viena, Austria y que está formada por 257 cajas entomológicas con 1.174 especies y subespecies de las regiones Paleártica y Neotropical, que fueron estudiados por los mejores especialistas del momento, destacando entre ellos: Walter Forster (Lycaenidae), Rienk de Jong (Hesperiidae), Czeslaw M. Biezanko (Neotropical) y más recientemente Zoltán Varga (Nymphalidae).

Después de una Introducción, nos hablan del material tipo de Rhopalocera que se encuentran en esta espléndida colección y así tenemos dos subespecies en Papilionidae, una subespecie en Pieridae, dos subespecies en Lycaenidae y una especie y siete subespecies en Nymphalidae, que, si ya de por si toda esta información justifica sobradamente la categoría de este trabajo, ésta aumenta, al indicarse la presencia de este material tipo.

En la parte más importante del trabajo, nos presenta los Papilionoidea que se encuentran en la colección Vartian, con dos páginas de abreviaturas de los países de donde proceden los ejemplares y un listado de todas y cada una de las especies y subespecies que forman esta colección, finalizando con una bibliografía específica y en 183 láminas a todo color se puede ver todo el material tratado y que supone una base importante, para identificar cada una de las especies consideradas.

No podemos terminar estas líneas, sin felicitar a los autores por un trabajo bien realizado, así como a la Editorial que como siempre, no ha escatimado medios para mantener el mismo nivel de calidad de los volúmenes precedentes de las series anteriormente mencionadas, por lo que recomendamos vivamente esta nueva serie, que no puede faltar en ninguna biblioteca específica que se precie.

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 285-292 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.768

Nuevos datos sobre la superfamilia Noctuoidea del Parque Natural de las Sierras de Cazorla, Segura y Las Villas (Jaén, España) (Insecta: Lepidoptera)

J. J. Guerrero, R. M. Rubio, M. Garre & A. S. Ortiz

Resumen

Se aportan los datos de captura de 47 especies de la superfamilia Noctuoidea en el Parque Natural de las Sierras de Cazorla, Segura y Las Villas (Jaén, España) pertenecientes a las familias Notodontidae (2), Erebidae (19), Nolidae (1) y Noctuidae (25). Los taxones que se citan por primera vez en el área de estudio son los erébidos *Eublemma parva, Eublemma polygramma, Parascotia nisseni, Raparna conicephala* y *Catocala promissa*; el nólido *Nola subchlamydula;* y los noctuidos *Cryphia pallida, Caradrina aspersa*, *Hecatera dysodea, Dichagyris candelisequa, Chersotis fimbriola* y *Epilecta linogrisea*, de los cuales 10 se citan por primera vez en la provincia de Jaén.
PALABRAS CLAVE: Lepidoptera, Noctuoidea, nuevos datos, Sierras de Cazorla, Segura y Las Villas, Jaén, España.

Contribution to the knowledge of the Noctuoidea from the "Sierras de Cazorla, Segura y Las Villas" Natural Park (Jaen, Spain) (Insecta: Lepidoptera)

Abstract

New data for the Noctuoidea fauna from the "Sierras de Cazorla, Segura y Las Villas" Natural Park (Jaen, Spain) includes 47 species belonging to the families Notodontidae (2), Erebidae (19), Nolidae (1) and Noctuidae (25). The taxa documented in the study area for the first time are the erebids *Eublemma parva, Eublemma polygramma, Parascotia nisseni, Raparna conicephala* and *Catocala promissa*; the nolid *Nola subchlamydula;* and the noctuids *Cryphia pallida, Caradrina aspersa*, *Hecatera dysodea, Dichagyris candelisequa, Chersotis fimbriola* and *Epilecta linogrisea,* of which 10 are cited for the first time in the province of Jaen.
KEYWORDS: Lepidoptera, Noctuoidea, new records, Sierras de Cazorla, Segura y Las Villas, Jaen, Spain.

Introducción

El Parque Natural de las Sierras de Cazorla, Segura y Las Villas está situado en el sistema Prebético de la provincia de Jaén, con una orientación de Suroeste a Noreste, presentando alturas que alcanzan los 2.107 m en el Cerro Empanadas. Tiene una superficie de 214.300 ha, lo que lo convierte en el mayor espacio protegido de España y el segundo de Europa. Fue declarado Reserva de la Biosfera por la UNESCO en 1983, Parque Natural en 1986 y también Zona de Especial Protección para las Aves (ZEPA) en 1987. Estas sierras sirven de divisoria de aguas entre el Atlántico y el Mediterráneo, siendo el lugar donde nacen los ríos Guadalquivir y Segura.

A pesar de su gran extensión y de su diversidad paisajística, el estudio detallado en el parque de la superfamilia Noctuoidea ha permitido conocer la existencia de 243 especies gracias, principalmente, a

los estudios de CALLE (1978a, 1978b, 1980), que aportaron resultados de 124 especies, a los de YELA & HERRERA (1993) con 47 y, recientemente, al trabajo de LENCINA & ALBERT (2017), con la aportación de 72 especies.

El objetivo de este trabajo es aportar nuevos datos sobre la fauna de la superfamilia Noctuoidea en el P. N. de las Sierras de Cazorla, Segura y Las Villas y añadir nuevas especies al catálogo de los noctuidos de Jaén.

Material y métodos

Los muestreos se realizaron dentro de la cuadrícula UTM 30SWG09 en la Casa Forestal de los Rasos, junto al nacimiento del río Guadalquivir, en el municipio de Cazorla (1.180 m), y en el paraje de La Calerilla, próximo a la localidad de Burunchel, en el municipio de La Iruela (1.050 m), a mitad de julio en los años 2011 y 2012.

Los muestreos se realizaron con trampas de luz negra y actínica de 15 vatios (tipo Heath) y en el alumbrado público del Hotel La Calerilla.

El material estudiado se encuentra depositado en la colección del Laboratorio de Biología Animal del Departamento de Zoología y Antropología Física de la Universidad de Murcia.

La nomenclatura y la ordenación sistemática de los taxones se ha hecho de acuerdo con la propuesta de KARSHOLT & VAN NIEUKERKEN (2018)

Resultados

Se capturaron 189 ejemplares de los que fueron identificados como Noctuoidea 47 especies, 2 en la familia Notodontidae, 19 en Erebidae, 1 en Nolidae y 25 en Noctuidae. A continuación, se listan, en orden sistemático, dichas especies.

NOCTUOIDEA
NOTODONTIDAE
THAUMETOPOEINAE

Thaumetopoea pityocampa ([Denis & Schiffermüller], 1775)

Material estudiado: C. F. Los Rasos, 2-VII-2011, 3 ex.; 16-VII-2012, 23 ex.

Cita bibliográfica: GÓMEZ-BUSTILLO (1980); GARCÍA DE VIEDMA & GÓMEZ-BUSTILLO (1981); AISTLEITNER & AISTLEITNER (1998); LENCINA & ALBERT (2017).

NOTODONTINAE

Drymonia querna ([Denis & Schiffermüller], 1775)

Material estudiado: C. F. Los Rasos, 2-VII-2011, 2 ex.; 16-VII-2012, 1 ex.

Cita bibliográfica: PÉREZ-LÓPEZ (1989); FUENTES (1999).

EREBIDAE
LYMANTRIINAE

Euproctis (Euproctis) chrysorrhoea (Linnaeus, 1758)

Material estudiado: La Calerilla, Burunchel, 21-VIII-2012, 1 ex.

Cita bibliográfica: FUENTES (2000a); GÓMEZ-BUSTILLO (1980).

Orgyia (Clethrogyna) trigotephras Boisduval, 1829

Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 1 ex.

Cita bibliográfica: GÓMEZ-BUSTILLO (1980), FUENTES (2000a).

ARCTIINAE

Eilema caniola (Hübner, [1808])
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.
Cita bibliográfica: FUENTES (2000b).

Eilema complana (Linnaeus, 1758)
Material estudiado: C. F. Los Rasos, 2-VII-2011, 4 ex.
Cita bibliográfica: GÓMEZ-BUSTILLO (1980); FUENTES (2000b).

Eilema pygmaeola (Doubleday, 1847)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.
Cita bibliográfica: FUENTES (2000b); GÓMEZ-BUSTILLO (1980).

BOLETOBIINAE

Parascotia nisseni Turati, 1905
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.; La Calerilla, Burunchel, 16-VIII-2012, 1 ex.

PHYTOMETRINAE

Raparna conicephala (Staudinger, 1870)
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.

EUBLEMMINAE

Odice pergrata (Rambur, 1858)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.; La Calerilla, Burunchel, 17-VII-2011, 1 ex.; 16-VIII-2012, 1 ex.; 21-VIII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1983); YELA (1992).

Odice jucunda (Hübner, [1813])
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.; 16-VII-2012, 5 ex.; La Calerilla, Burunchel, 17-VII-2011, 4 ex.; 21-VIII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980, 1983); LENCINA & ALBERT (2017).

Eublemma parva (Hübner, [1808])
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 1 ex.

Eublemma ostrina (Hübner, [1808])
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980).

Eublemma purpurina ([Denis & Schiffermüller], 1775)
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.
Cita bibliográfica CALLE (1978b, 1980).

Eublemma polygramma (Duponchel, 1842)
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 1 ex.

Rhypagla lacernaria (Hübner, [1813])
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980); LENCINA & ALBERT (2017).

EREBINAE
PERICYMINI

Zethes insularis Rambur, 1833
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 1 ex.; 21-VIII-2012, 1 ex.
Cita bibliográfica: CALLE (1978a, b, 1980, 1982).

MELIPOTINI

Drasteria cailino (Lefèbvre, 1827)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980).

CATOCALINI

Catocala conversa (Esper, 1783)
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.; La Calerilla, Burunchel, 7-VII-2011, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980); YELA & HERRERA (1993).

Catocala nymphagoga (Esper, 1787)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 5 ex.; La Calerilla, Burunchel, 17-VII-2011, 6 ex.; 16-VIII-2012, 9 ex.; 21-VIII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980), YELA & HERRERA (1993).

Catocala promissa ([Denis & Schiffermüller], 1775)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.

NOLIDAE

Nola subchlamydula Staudinger, 1871
Material estudiado: C. F. Los Rasos, 2-VII-2011, 5 ex.; 16-VII-2012, 1 ex.

NOCTUIDAE
RAPHIINAE

Raphia hybris (Hübner, [1813])
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980, 1983); LENCINA & ALBERT (2017).

ACRONICTINAE

Acronicta (Acronicta) aceris (Linnaeus, 1758)
Material estudiado: La Calerilla, Burunchel, 16-VIII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980, 1982, 1983); YELA & HERRERA (1993).

Craniophora pontica (Staudinger, 1878)
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980).

AMPHIPYRINAE

Bryonycta pineti (Staudinger, 1859)
Material estudiado: C. F. Los Rasos, 2-VII-2011, 12 ex.; 16-VII-2012, 15 ex.

Cita bibliográfica: CALLE (1978b, 1980, 1983); LENCINA & ALBERT (2017).

BRYOPHILINAE

Cryphia (Euthales) algae (Fabricius, 1775)
Material estudiado: La Calerilla, Burunchel, 21-VIII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980, 1983).

Cryphia (Euthales) pallida (Baker, 1894)
Material estudiado: La Calerilla, Burunchel, 21-VIII-2012, 1 ex.

Nyctobrya (Bryopsis) muralis (Forster, 1771)
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 1 ex.; 21-VIII-2012, 3 ex.
Cita bibliográfica: CALLE (1978b, 1980).

NOCTUINAE
PRODENINI

Spodoptera exigua (Hübner, [1808])
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980), LENCINA & ALBERT (2017).

CARADRININI

Caradrina (Platyperigea) aspersa (Rambur, 1834)
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 2 ex.

DYPTERYGIINI

Polyphaenis sericata (Esper, 1787)
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 11 ex.
Cita bibliográfica: CALLE (1978b, 1980, 1983).

APAMEINI

Apamea monoglypha (Hufnagel, 1766)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980), MATEO (2000).

HADENINI

Hecatera dysodea ([Denis & Schiffermüller], 1775)
Material estudiado: La Calerilla, Burunchel, 16-VIII-2012, 1 ex.

LEUCANIINI

Mythimna (Hyphilare) albipuncta ([Denis & Schiffermüller], 1775)
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980); LENCINA & ALBERT (2017).

Mythimna (Hyphilare) l-album (Linnaeus, 1767)
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 1 ex.

Cita bibliográfica: CALLE (1978b, 1980); LENCINA & ALBERT (2017).

Leucania (*Acantholeucania*) *loreyi* (Duponchel, 1827)
Material estudiado: C. F. Los Rasos, 2-VII-2011, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980, 1983).

NOCTUINI

Dichagyris (Dichagyris) candelisequa ([Denis & Schiffermüller], 1775)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 5 ex.

Dichagyris (Dichagyris) forcipula ([Denis & Schiffermüller], 1775)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.
Cita bibliográfica: CALLE (1977, 1978b, 1980, 1982).

Agrotis segetum ([Denis & Schiffermüller], 1775)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 3 ex.; La Calerilla, Burunchel, 17-VII-2011, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980); LARA (2009).

Chersotis fimbriola (Esper, 1803)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 2 ex.

Noctua fimbriata (Schreber, 1759)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 3 ex.
Cita bibliográfica: CALLE (1978b, 1980, 1982); YELA & HERRERA (1993); LENCINA & ALBERT (2017).

Noctua tirrenica Biebinger, Speidel & Hanigk, 1983
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.
Cita bibliográfica: YELA & HERRERA (1993).

Noctua orbona (Hufnagel, 1766)
Material estudiado: C. F. Los Rasos, 16-VII-2012, 6 ex.
Cita bibliográfica: CALLE (1978b, 1980).

Noctua comes Hübner, [1813]
Material estudiado: C. F. Los Rasos, 16-VII-2012, 1 ex.
Cita bibliográfica: CALLE (1978b, 1980); YELA & HERRERA (1993).

Noctua janthe (Borkhausen, 1792)
Material estudiado: La Calerilla, Burunchel, 21-VIII-2012, 1 ex.
Cita bibliográfica: YELA (1991); YELA & HERRERA (1993); LENCINA & ALBERT (2017).

Epilecta linogrisea ([Denis & Schiffermüller], 1775)
Material estudiado: La Calerilla, Burunchel, 17-VII-2011, 1 ex.

Discusión

En total se aportan datos de 47 especies incluidas dentro de la superfamilia Noctuoidea, de las que 2 pertenecen a la familia Notodontidae, 19 a Erebidae, 1 a Nolidae y 25 a Noctuidae. En el presente trabajo se aportan 12 nuevas especies al catálogo de noctuidos del Parque Natural de las Sierras de Cazorla, Segura y Las Villas, de las que 10 son nuevas para la fauna de la provincia de Jaén.

Las especies que son citadas como nuevas en el área de estudio y en la provincia de Jaén son los

Erebidae *Parascotia nisseni, Raparna conicephala* y *Catocala promissa*; el nólido *Nola subchlamydula;* y los Noctuidae *Cryphia pallida, Caradrina aspersa*, *Hecatera dysodea, Dichagyris candelisequa, Chersotis fimbriola* y *Epilecta linogrisea.* Otras especies inéditas en el parque, pero que habían sido citadas previamente en la provincia de Jaén, son *Eublemma parva* por AGENJO (1963) y CALLE (1982) y *Eublemma polygramma* por CALLE (1982). Entre estas especies destacan *Chersotis fimbriola*, que es una especie conocida de zonas rocosas de escasa vegetación y claros de bosque del Pirineo, Sistema Ibérico y Sierra Nevada, y *Dichagyris candelisequa*, que vive en claros de bosque de baja y media montaña de la mitad norte peninsular, mientras que del sur solo se conoce en Sierra Nevada (PÉREZ-LÓPEZ & TIANUT, 1993) y en las sierras de la provincia de Albacete (LENCINA *et al.,* 2008; GUERRERO *et al.,* 2018).

Agradecimiento

A la Dirección General del Medio Natural de Andalucía por facilitar los permisos necesarios para realizar el estudio y a la Dirección del Parque Natural de las Sierras de Cazorla, Segura y Las Villas por las facilidades ofrecidas para el desarrollo del trabajo. Este estudio ha sido financiado con el proyecto del Plan Nacional I+D+i (2008-2011) titulado *Barcoding y taxonomía basada en el ADN de coleópteros carábidos y tenebriónidos, lepidópteros noctuidos e himenópteros ápidos de la península ibérica (Insecta, Coleoptera, Lepidoptera Noctuidae e Hymenoptera Apidae)* y por la Fundación Séneca (Ref. 19908/GERM/15) de la Región de Murcia.

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(Recibido para publicación / *Received for publication* 17-IX-2018)
(Revisado y aceptado / *Revised and accepted* 20-X-2018)
(Publicado / *Published* 30-VI-2019)

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 293-300 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.769

Depressaria infernella Corley & Buchner, a new Iberian species of the *Depressaria douglasella* group (Lepidoptera: Depressariidae)

M. F. V. Corley, P. Buchner & S. Ferreira

Abstract

Depressaria infernella, a new species most similar to *D. cinderella* Corley, 2002 is described from the mountains of north-east Portugal and Sierra de Gredos in Spain. Photos of adults and male and female genitalia of the new species and *D. cinderella* are given. Morphological and genetic characteristics that demonstrate the distinctiveness of *D. infernella* from other species of *Depressaria* are presented.
KEY WORDS: Lepidoptera, Depressariidae, *Depressaria*, new species, Portugal, Spain.

Depressaria infernella **Corley & Buchner, uma nova espécie ibérica do grupo** *Depressaria douglasella* **(Lepidoptera: Depressariidae)**

Resumo

Depressaria infernella, uma nova espécie muito similar a *D. cinderella* Corley, 2002, é descrita das montanhas do nordeste de Portugal e da Serra de Gredos em Espanha. Os adultos e a genitália do macho e da fêmea da espécie nova e de *D. cinderella* são ilustradas fotograficamente. As características morfológicas e genéticas que permitem a distinção de *D. infernella* das restantes espécies de *Depressaria* são apresentadas.
PALABRAS CHAVE: Lepidoptera, Depressariidae, *Depressaria*, nova espécie, Portugal, Espanha.

Depressaria infernella **Corley & Buchner, una nueva especie ibérica del grupo** *Depressaria douglasella* **(Lepidoptera: Depressariidae)**

Resumen

Se describe *Depressaria infernella*, una nueva especie muy similar a *D. cinderella* Corley, 2002 de las montañas del nordeste de Portugal y de la Sierra de Gredos en España. Los adultos y la genitalia del macho y de la hembra de la nueva especie y de *D. cinderella* son ilustradas fotográficamente. Son presentadas las características morfológicas y genéticas que permiten la distinción de *D. infernella* de las restantes especies de *Depressaria*.
PALABRAS CLAVE: Lepidoptera, Depressariidae, *Depressaria*, nueva especie, Portugal, España.

Introduction

Within the large and diverse genus *Depressaria* Haworth, 1811 there are a number of clearly defined groups (HANNEMANN, 1953). One of these is the *Depressaria douglasella* group, characterised by relatively short forewings with a number of mainly short blackish lines associated with the wing-veins and a pale spot at end of discal cell, male genitalia with clavus and cuiller (a

process arising from end of sacculus and directed toward or across the costa of valva), aedeagus without cornuti (HANNEMANN, 1953). In contrast to most *Depressaria* many of the species do not hibernate in the adult stage (PALM, 1989). There are some fairly easily identified species in the group, but there are also a number of species that present problems of identification. Ideally a full revision of the entire group should be made, but knowledge of the group is too limited for this to be practicable at present. The reasons for this lack of knowledge are outlined below. In the meantime, any additional taxa that can be clearly established will make the ultimate goal of a full revision more feasible, so one such species is described here.

Taxonomic problems in the *D. douglasella* group stem from several causes. There is a general similarity in external appearance between different species, but there is also a degree of infraspecific variation, not just in external appearance, but also in genitalia. Genitalia differences between species are often slight, particularly in females. More than one species may occur at the same time in a single locality, so that there can be a problem establishing which males and females are conspecific. Some species that have been accepted for many years are in fact junior synonyms, but barcode studies indicate that some of the more widespread species may include additional taxa (P. B., own studies). For a few taxa type material is unavailable. All these factors have contributed to the taxonomic confusion.

The difficult species fall into two subgroups, those including and closely related to *D. douglasella* Stainton, 1849 and *D. sordidatella* Tengström, 1848 in which the cuiller is forked at the apex or at least with a small tooth (rarely absent) on the outer margin. These species are for the most part widespread. The *D. incognitella* subgroup species have a smooth, unforked cuiller; the species mainly inhabit montane areas and have restricted distribution, only *D. incognitella* Hannemann, 1990 extends from Croatia, Greece, central Italy and the Alps into northern Spain. The other species are *D. nemolella* Svensson, 1982 (type locality: Sweden, island of *Gotland*) and *D. cinderella* Corley, 2002 (Portugal and Spain). In this paper we describe a new species, closely related to *D. cinderella*, also from Portugal and Spain.

Abbreviations

MFN	Museum für Naturkunde, Berlin, Germany
NHMUK	Natural History Museum, London, U. K.
NMPC	National Museum, Prague, Czech Republic
ZMUC	Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark

Methods

Most specimens have been captured at 125 w mercury vapour light over a white sheet, with additional material from larvae found by searching in daytime. Dissections were made using standard techniques (ROBINSON, 1976). DNA extraction and sequencing was done following the procedures in CORLEY *et al.* (2018). The average divergence (uncorrected p-distance) between the sequence of Portuguese specimens and sequences available in BOLD was calculated in MEGA v.5.2.1 (TAMURA *et al*., 2011).

Depressaria infernella Corley & Buchner, sp. n.

Material examined: Holotype ♂: PORTUGAL, Serra da Estrela, Poço do Inferno, 13-VI. ex l-V-[20]03, M. F. V. Corley, *Conopodium.* (Foto 6672 ME Depressariinae, P. Buchner). To be deposited in NHMUK.

Paratypes: PORTUGAL, 1 ♂, Serra da Estrela, Poço do Inferno, 9-IX-2001, M. F. V. Corley, gen. prep. 1620 (Corley coll.); 1 ♀, Serra da Estrela, Poço do Inferno, 9-IX-2001, M. F. V. Corley, gen. prep. 1979 (Corley coll.); 1 ♂, Serra da Estrela, Poço do Inferno, 16-VI ex l. V-[20]03, M. F. V.

Corley, *Conopodium.* Corley gen. prep. 1940 (Corley coll.); 2 ♂♂, Serra da Estrela, Poço do Inferno, 18-VI ex l. V-[20]03, M. F. V. Corley, *Conopodium.* (Fotos 6671, 6675 ME Depressariinae, det./rev. P. Buchner); 1 ♀, Serra da Estrela, Poço do Inferno, 24-VI- ex l. V-[20]03, M. F. V. Corley, *Conopodium.* Corley gen. prep. 1951 (Corley coll.); 1 ♀, Serra da Estrela, Vale de Zêzere, Albergaria, 1500 m, 5-VIII-2011, M. Corley (Corley coll.). Corley gen. prep. 5653, specimen barcoded (INV00786); 1 ♂, Trás-os-Montes, Serra de Alvão, Arnal, 2-IX-2002, M. F. V. Corley, gen. prep. 1778 (Corley coll.); 1 ♂, Trás-os-Montes, Montalegre, Serra do Larouco, 21-IX-2005, M. F. V. Corley, gen. prep. 2495 (Corley coll.). SPAIN, 1 ♂, Ávila, Sierra de Gredos, 15 km SSW Hoyos del Espinos, 1720 m, 27-28-VII-1988, leg. M. Fibiger, Corley gen. prep 1835 (ZMUC); 1 ♂, Ávila, Sierra de Gredos, 15 km SSW Hoyos del Espinos, 1720 m, 27-28-VII-1988, leg. M. Fibiger. (Foto 2723 ME Depressariinae, det. / rev. P. Buchner). 1 ♂, Prov[incia de] Ávila, S[ier]ra de Gredos, Alman[z]or, 15-20-VII-1999, leg. Dr. U. Koschwitz (MFN) (Foto 6848 ME Depressariinae, det. / rev. P. Buchner); 2 ♀♀, Prov[incia de] Ávila, S[ier]ra de Gredos, Almanzor, 15-20-VII-1999, leg. Dr. U. Koschwitz (MFN) (Fotos 6846, 6847 ME Depressariinae, det. / rev. P. Buchner).

To avoid confusion only dissected specimens have been included as paratypes.

Description: Adult. (Figs 1-3, 5). Wingspan 18-18.5 mm. Head with brownish-black scales with white tips on neck and crown, face white. Labial palp segment 3 four-fifths length of segment 2, segment 2 whitish with two grey-brown bands, outer side with additional grey-brown scales often obscuring bands, upper edge white, segment 3 with two blackish rings, not always distinct due to mixture of whitish and dark brown scales in middle of segment, tip white to buff. Antenna with scape blackish, flagellum dark grey-brown with narrow deep brown rings. Thorax blackish anteriorly, white posteriorly, position of boundary variable, tegulae with some buff scales. Forewing deep grey-brown, with scales more or less tipped blackish; whitish grey scales thinly scattered over most of wing, absent from area between fold and dorsum before middle, more concentrated between cell and costa and at middle of dorsum and forming a spot in middle of cell and a larger one at end, an ill-defined curved fascia beyond end of cell, and a series of spots between veins to termen before terminal spots; blackish brown spots at extreme base of costa and dorsum; white spot on costa following basal spot; black streaks at base of cell and in middle between two whitish cell-spots, another between second cell streak and costa, one on costa at middle, interrupted streaks between veins to costa, narrow streaks between veins to termen, spots on margin between vein-ends from costa at three-quarters around termen; cilia light grey, with deep grey cilia line. Hindwing pale grey, slightly darker posteriorly; cilia light grey with two weak cilia lines; underside with series of blackish spots around termen. Abdomen light grey.

Variation: The appearance of the crown of the head varies according to the length of the white tip of the scales. The extent of white on the thorax also varies according to how far the dark scales extend.

Male genitalia (Figs 7, 8): Gnathos from broad base, slightly longer than wide; socii as wide as long, divergent with shallow notch between them; valva with costal margin slightly convex in basal half, cuiller angled outwards, straight, smooth, tapering evenly, curved inwards just before it crosses costal margin, with about one-fifth of its length projecting beyond costa, pointed; clavus without hairs at base, especially on inner side, otherwise hairy with long hairs exceeding anellus; anellus slightly longer than wide, widest at two-thirds, not or hardly notched at apex; saccus with margins slightly concave, apex rounded; aedeagus slender, slightly curved in basal half, very slightly expanded beyond middle, tapering at four-fifths to parallel-sided apex.

Female genitalia (Figs 11, 13-15): Apophyses posteriores as long as segment VIII, apophyses anteriores short; segment VIII with characteristic lobes developed antero-laterally, posterior margin slightly concave, anterior margin of tergite VIII deeply excavated; ostium near posterior margin with broad sclerotised curved lip tapering laterally to a narrow fold, in lateral view this lip is strongly protruding; ductus bursae without sclerotisation, posteriorly straight, towards corpus bursae with a single spiral twist, corpus bursae elliptical, signum large, rhomboidal, sometimes folded and then appearing triangular, covered with triangular teeth.

Diagnosis: *D. infernella* and *D. cinderella* are closely related and occupy nearly contiguous regions. *D. infernella* is characterised by the deep grey-brown colouring with whitish grey markings. The black streaks are inconspicuous against the dark ground colour. *D. cinderella* (Figs 4, 6) has similar colouring, but has some whitish scales in area between fold and dorsum and for this reason appears more grey. In male genitalia, *D. cinderella* differs from *D. infernella* in the absence of hairs on the clavus (Figs 7-10). Female genitalia differ in the shape of the anterior margin of tergite VIII, deeply excavated in *D. infernella*, slightly concave in *D. cinderella*. DNA barcode from the specimen from Serra da Estrela exhibited a distinct haplotype of the partial COI gene sequence with *D. cinderella* being the most closely related species (uncorrected p-distance 2.7%) and other species including *D. douglasella* with sequences available with over 3.5% divergence (Table 1).

Table 1.– Estimates of Net Evolutionary Divergence between Groups of Sequences. The number of base differences per site from estimation of net average between groups of sequences are shown. Standard error estimate(s) are shown above the diagonal. The analysis involved 13 nucleotide sequences. Codon positions included were 1st+2nd+3rd+Noncoding. All ambiguous positions were removed for each sequence pair. There were a total of 658 positions in the final dataset. BOLD code: accession codes of BOLD database (http://www.boldsystems.org).

	D. infernella	*D. cinderella*	*D. incognitella*	*D. nemolella*	*D. sordidatella*	*D. douglasella*	*D. libanotidella*	*Agonopterix scopariella*	*BOLD code*
D. infernella		0.6%	0.7%	0.8%	0.7%	0.8%	1.0%	1.1%	IBILP466-19
D. cinderella	2.6%		0.6%	0.6%	0.6%	0.7%	1.0%	1.0%	DEEUR311-12, DEEUR306-12, DEEUR325-12
D. incognitella	4.0%	2.4%		0.7%	0.6%	0.7%	1.0%	1.0%	PHLAB845-10, PHLAB846-10, DEEUR171-11
D. nemolella	4.6%	2.9%	3.2%		0.8%	0.9%	1.0%	1.0%	LEFIK064-10
D. sordidatella	4.0%	2.7%	2.7%	4.0%		0.6%	1.0%	1.0%	LEFIL707-10, TYPFN061-11
D. douglasella	5.0%	3.5%	3.8%	4.9%	2.4%		1.0%	1.1%	LEFIL625-10
D. libanotidella	8.1%	7.2%	7.4%	7.6%	7.4%	8.2%		0.9%	LEFIK559-10
Agonopterix scopariella	8.5%	7.1%	7.8%	7.8%	7.3%	8.2%	7.1%		IBILP112-17

D. incognitella has male genitalia with apical part of cuiller not angled as it crosses costa of valva and not much tapered. *D. nemolella* has a relatively short and stout aedeagus and hairy clavus not exceeding the anellus. In the female genitalia both *D. incognitella* and *D. nemolella* lack the antero-lateral lobes on segment VIII which are present in *D. infernella* and *D. cinderella*, although they are not figured in the drawing in CORLEY (2002).

Larvae of *D. cinderella* have greenish pinacula and feed on basal leaves of *Conopodium* before flowers are available (CORLEY, 2002). The host-plant *Conopodium capillifolium* given in CORLEY (2002) is a misidentification, but the *Conopodium* species in question remains unidentified.

Larva: Final instar. Light green, three dark green dorsal lines; head yellowish with four blackish dots posteriorly; prothoracic plate green, with black "square-bracket" markings on either side posteriorly, reduced to four dots when body retracted, two small < -shaped markings laterally; legs green; anal plate green; pinacula fine, black.

Biology: Host-plant *Conopodium majus*, feeding from a spinning among stem leaves, flowers or

developing seeds. Larvae have been found in late May; adults from late June to September. It has been found at altitudes from 920 m to 1500 m in Portugal, and up to 1800 m in Spain.

Distribution: Currently known from inland northern Portugal from Serra da Estrela (Beira Alta) to Serra do Alvão and Serra do Larouco (Trás-os-Montes) and in Spain in Sierra de Gredos (Ávila).

Etymology: The name *infernella* is derived from the type locality Poço do Inferno (Well of Hell) in Serra da Estrela, central Portugal, but also reflects the infernally difficult taxonomy of the *Depressaria douglasella* group.

Acknowledgements

M. C. thanks José Grosso-Silva for introducing him to Poço do Inferno and Fernando Matos for permission to collect Lepidoptera in Parque Natural de Serra da Estrela. We also thank David Lees for the photograph of *D. cinderella* and the trustees of the NHMUK permission to use this photograph. S. F. was funded by the project PORBIOTA-Portuguese E-Infrastructure for Information and Research on Biodiversity (POCI-01-0145-FEDER-022127), supported by Operational Thematic Program for Competitiveness and Internationalization (POCI), under the PORTUGAL 2020 Partnership Agreement, through the European Regional Development Fund (FEDER); this project has also received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 668981.

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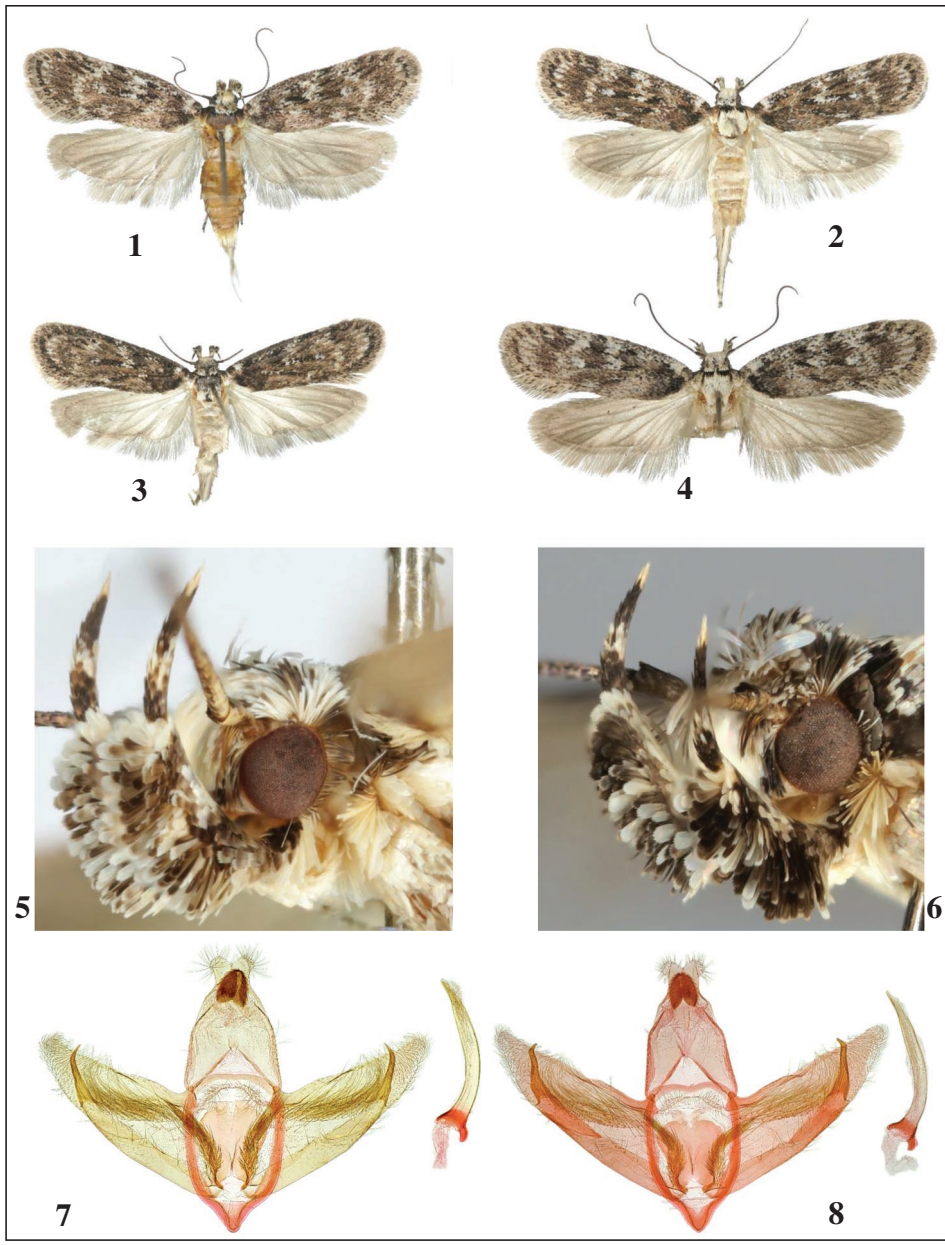
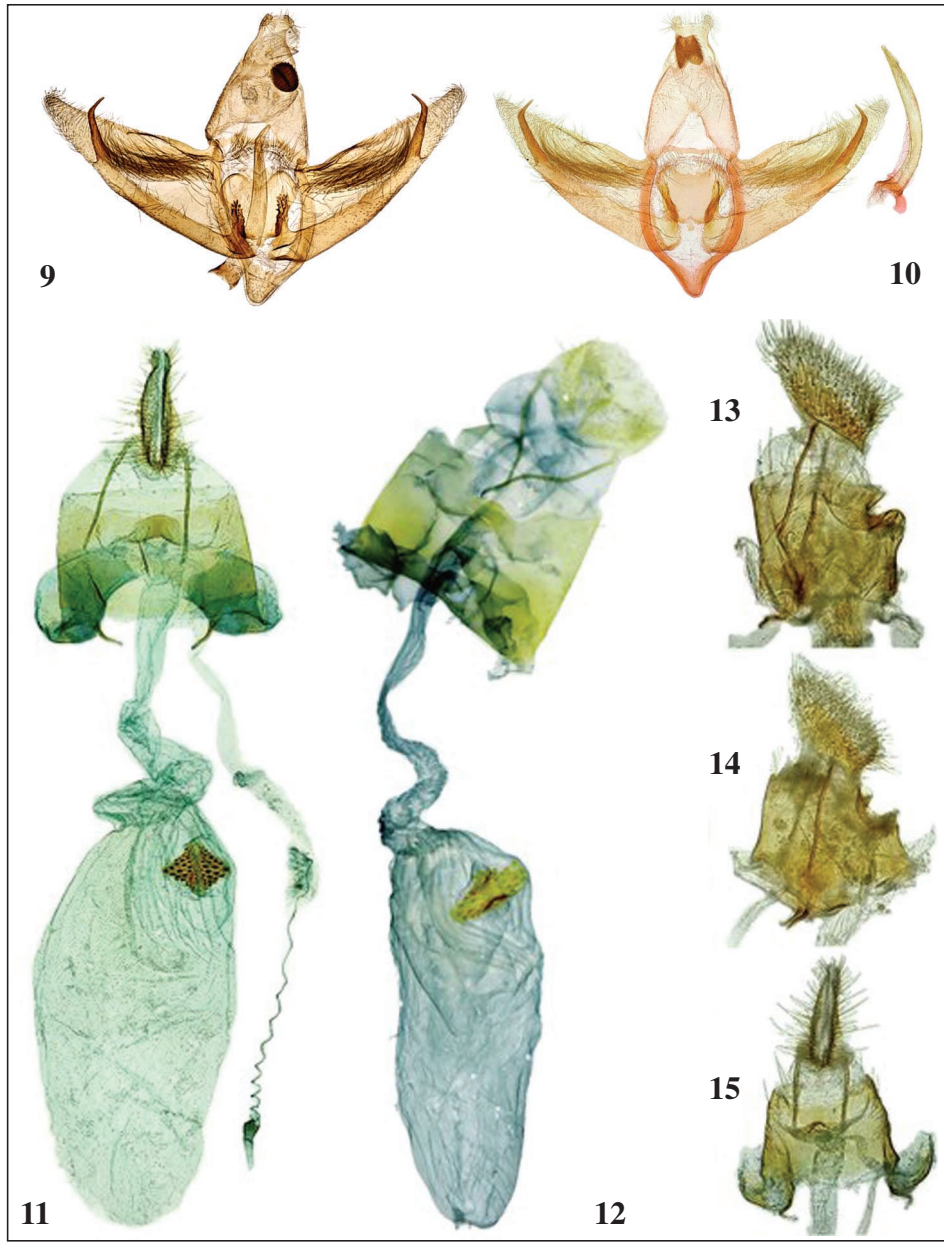
(Recibido para publicación / *Received for publication* 18-II-2019)
(Revisado y aceptado / *Revised and accepted* 3-IIII-2019)
(Publicado / *Published* 30-VI-2019)



Figs 1-8.– Adults: **1-3.** *Depressaria infernella* Corley & Buchner, sp. n., paratypes; **4.** *Depressaria cinderella* Corley. **5-6.–** Heads: **5.** *Depressaria infernella* Corley & Buchner, sp. n., paratype; **6.** *Depressaria cinderella* Corl **7-8.** Male genitalia: **7.** *Depressaria infernella* Corley & Buchner, sp. n., holotype; **8.** *Depressaria infernella* Corley & Buchner, sp. n., paratype.



Figs 9-15.– Male genitalia: **9-10.** *Depressaria cinderella* Corley. **11-15.** Female genitalia: **11.** *Depressaria infernella* Corley & Buchner, sp. n., paratypes; **12.** *Depressaria cinderella* Corley, paratype **13-14.** Segment VIII, lateral view: *Depressaria infernella* Corley & Buchner, sp. n., paratypes; **15.** Segment VIII, ventral view: *Depressaria infernella* Corley & Buchner, sp. n., paratype.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 301-306 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.770

Morphology of pupae of *Bembecia fibigeri* Laštůvka & Laštůvka, 1994 and *Bembecia iberica* Špatenka, 1992 (Lepidoptera: Sesiidae)

M. Bąkowski & D. Fajfer

Abstract

Descriptions of the morphology of pupae of two species of clearwing moths, *Bembecia fibigeri* Laštůvka & Laštůvka, 1994 and *B. iberica* Špatenka, 1992, are presented for the first time. The main morphological features are described and compared with a closely related species, *Bembecia scopigera* Scopoli, 1763. Diagnostic features are also illustrated in pictures and line drawings.
KEY WORDS: Lepidoptera, Sesiidae, exuviae, comparative morphology, taxonomy.

Morfología de la pupa de *Bembecia fibigeri* Laštůvka & Laštůvka, 1994 y *Bembecia iberica* Špatenka, 1992 (Lepidoptera: Sesiidae)

Resumen

Se representa, por primera vez, la descrición de la morfología de la pupa de dos especies de sésidos, *Bembecia fibigeri* Laštůvka & Laštůvka, 1994 y *B. iberica* Špatenka, 1992. Se describen y comparan las características morfológicas con una especie próxima *Bembecia scopigera* Scopoli, 1763. Los diagnósticos especiales son también ilustrados en fotografía y dibujo.
PALABRAS CLAVE: Lepidoptera, Sesiidae, exuvia, morfología comparada, taxonomía.

Introduction

The genus *Bembecia* Hübner, [1819] containing more than 100 species is one of the most difficult to identify among all Sesiidae (ŠPATENKA *et al.,* 1999). Most of them is described from Asia and in Europe is known 24 species (LAŠTŮVKA, 2013). The taxonomic status of some of them, especially closely related species is unclear and need verification (BARTSCH, 2012). The species of this genus are classified into several groups (*ichneumoniformis, scopigera*, *uroceriformis*, *megillaeformis*, *kaszabi* and *hoffmani*) on the basis of their male genitalia morphology. The group *scopigera* is represented by nine species: *Bembecia apyra* Le Cerf, 1937, *B. fibigeri* Laštůvka & Laštůvka, 1994; *B. iberica* Špatenka, 1992; *B. kreuzbergi* Špatenka & Bartsch, 2010; *B. martensi* Gorbunov, 1994; *B. pavicevici* Tosevski, 1989; *B. peterseni* Špatenka, 1997; *B. priesneri* Kallies, Petersen & Riefenstahl, 1989 and *B. scopigera* (Scopoli, 1763) (PÜHRINGER & KALLIES, 2004). Of these species, only the pupal morphology of *Bembecia scopigera* has been described thus far, and within the entire genus, the pupal morphology of only 11 species has been described (PATOČKA & TURČANI, 2005; BĄKOWSKI & FAJFER, 2019). The main aim of this paper is to study the external morphology of pupae and apply results in subsequent analyses concerning with the taxonomic position of the study species. The pupal

stage offers a number of taxonomically diagnostic characters that are potentially useful in phylogenetic analyses (ROUGERIE & ESTRADEL, 2008). One of the aims of the work is also identification of study species already on the basis of pupae or pupal exuviae.

Material and methods

Pupal morphology description is based on the studies of PATOČKA (1987), PATOČKA & TURČANI (2005), BĄKOWSKI (2013). The description of the morphology of the Central European pupae of the genus *Bembecia* has thus far been based primarily on the shape of the labrum, the plate of the head projection blade, clypeus, the lateral depression on the head, and the ventral abdominal end. These morphological features are also used in this paper and are described and illustrated in photographs and line drawings. The pupal exuviae were examined with Nikon SMZ 1000 stereoscope microscope. The photographs were taken with a digital camera AxioCam MRc5 attached to a Lumar V12 stereoscopic microscope, connected to a computer with Axio Vision 4.8 software. The stereoscopic microscope images were made in Laboratory of Electron and Confocal Microscopy (Faculty of Biology, A. Mickiewicz University, AMU, Poznań). The information about biology and distribution of examined species are given by ŠPATENKA *et al.* (1999) and LAŠTŮVKA & LAŠTŮVKA (2001). The morphological studies were carried out on the basis of analyzes of the pupal exuviae donated by Rolf Bläsius. All material is deposited in the collection of senior author in Department of Systematic Zoology AMU, in Poznań (Poland).

Bembecia fibigeri Laštůvka & Laštůvka, 1994

Material examined: 8 pupal exuviae - 5 ♂♂, 3 ♀♀ (France 1994).

Description: Length and width: 11-17.4 x 2.5-4.7 mm (mean: 14.4 x 3.5 mm). Head projection short and sharply rounded in dorsal view. Frontal depressions large and wrinkled. Frontal setae situated approximately at level of lateral angles of frons in dorsal view (Fig. 1a). Dark margin of head projection robust, blade bent dorsally and pointed in lateral view. Head projection blade without indented ventrally in lateral view. Lateral depression on head wide and rounded ventro-caudad. Frons rises at a slight slope from projection blade (Fig. 1b). Clypeal setae Cl_2 close to each other. Distance between setae Cl_2 approximately 2 × greater than the distance of $C1_2$ from Cl_1. Labrum almost triangular, slightly rounded on caudal end. Labium tapered only moderately behind its base (Fig. 1c). End of abdomen in ventral view large and rounded. Cremaster approximately equal in length to anal suture. Anal area rather flat (Fig. 1d).

Diagnostic features: Head projection short. Labrum almost triangular, slightly rounded on caudal end.

Biology: Univoltine, rarely biennial. The larva lives in the root of *Ononis rotundifolia* L. and *O. fruticosa* L.

Distribution: Spain, France.

Bembecia iberica Špatenka, 1992

Material examined: 25 pupal exuviae - 9 ♂♂, 16 ♀♀ (Spain, Portugal, Morocco, 1991-2005)

Description: Length and width: 9.1-15.5 × 2-4 mm (mean: 12.5 × 2.9 mm). Area of head projection blade prolonged and fairly sharply pointed in dorsal view, its length is equal approximately to half of its width. Frontal setae situated approximately at level or slightly behind level of lateral angles of frons in dorsal view. Frontal depressions large and wrinkled (Fig. 2a). Dark margin of head projection robust, blade bent dorsally and pointed in lateral view. Frons rises at a slight slope from head projection blade. Head projection blade distinctly indented ventrally in lateral view. Lateral depression on head relatively narrow and concave caudoventrally (Fig. 2b). Distance between clypeal setae Cl_2 approximately 3 × greater than the distance of $C1_2$ from Cl_1. Labrum truncate on caudal end. Labium tapered only moderately behind its base (Fig. 2c). End of abdomen in ventral view elongated and pointed. Anal suture slightly longer than cremaster. Anal area flat (Fig. 2d).

Diagnostic features: Head projection blade distinctly indented ventrally in lateral view. Labrum truncate on caudal end.

Biology: Univoltine. Larva feed in roots of plants *Lotus* sp., *Hippocrepis* sp., *Melitolus* sp.,. *Anthyllis vulneraria* L.

Distribution: Spain, Portugal, France, Italy, Morocco.

Discussion

According to PATOČKA & TURČANI (2005), the diagnostic features of *Bembecia* pupae are a proboscis that does not reach the mesothoracic legs or apices of the antennae, a rounded head projection blade and a postclypeus without projections. The species *Bembecia fibigeri*, *B. iberica* and a closely related species *B. scopigera* can be separated by comparing their pupal morphology. Head projection in *B. iberica* and *B. scopigera* is elongated and pointed. In *B. fibigeri* head projection is short and rounded. The compared species differ also in the shape of labrum, which is truncate on caudal end in *B. iberica* whereas it is rounded on caudal end in *B. fibigeri* and *B. scopigera.* The compared species differ in the arrangement of the clypeal setae. In *B. fibigeri* distance between clypeal setae Cl_2 is approximately 2 x greater than distance of $C1_2$ from Cl_1, in *B. iberica* and *B. scopigera* from 3 to 3.5 x greater than distance of $C1_2$ from Cl_1. The shape of the cremaster of the study species is also different. In *B. fibigeri,* it is large and rounded, in *B. iberica* and *B. scopigera* it is more slender and pointed. However, it seems this feature is variable and changes with sex. In males, the abdomen is more slender, which is why the end of the abdomen of pupae is often more elongated and pointed. In females, the abdomen is wider; therefore the end of the abdomen of pupae is generally wider and more rounded.

In conlusion, identification of *Bembecia* pupae to the species level is not easy and can be problematic. For this reason the knowledge of host plant from which the larva, pupa or exuvium were collected is important diagnostic information.

We would like to stress that we are aware that it is not possible to classify insect groups only on the basis of pupal morphology, particularly when working with species from a single geographical region. Unfortunately, the biology of many of *Bembecia* species is still unknown.

We only offer suggestions and provide recommendations for taxonomists to consider pupal morphology in the future placement of the species described in this paper.

Acknowledgements

We would like to express our sincere thanks to Rolf Bläsius (Germany) for donation of the exuviae material and Tara Massad (USA) for carefully checking the English of an advanced draft.

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(Recibido para publicación / *Received for publication* 18-I-2019)
(Revisado y aceptado / *Revised and accepted* 20-III-2019)
(Publicado / *Published* 30-VI-2019)

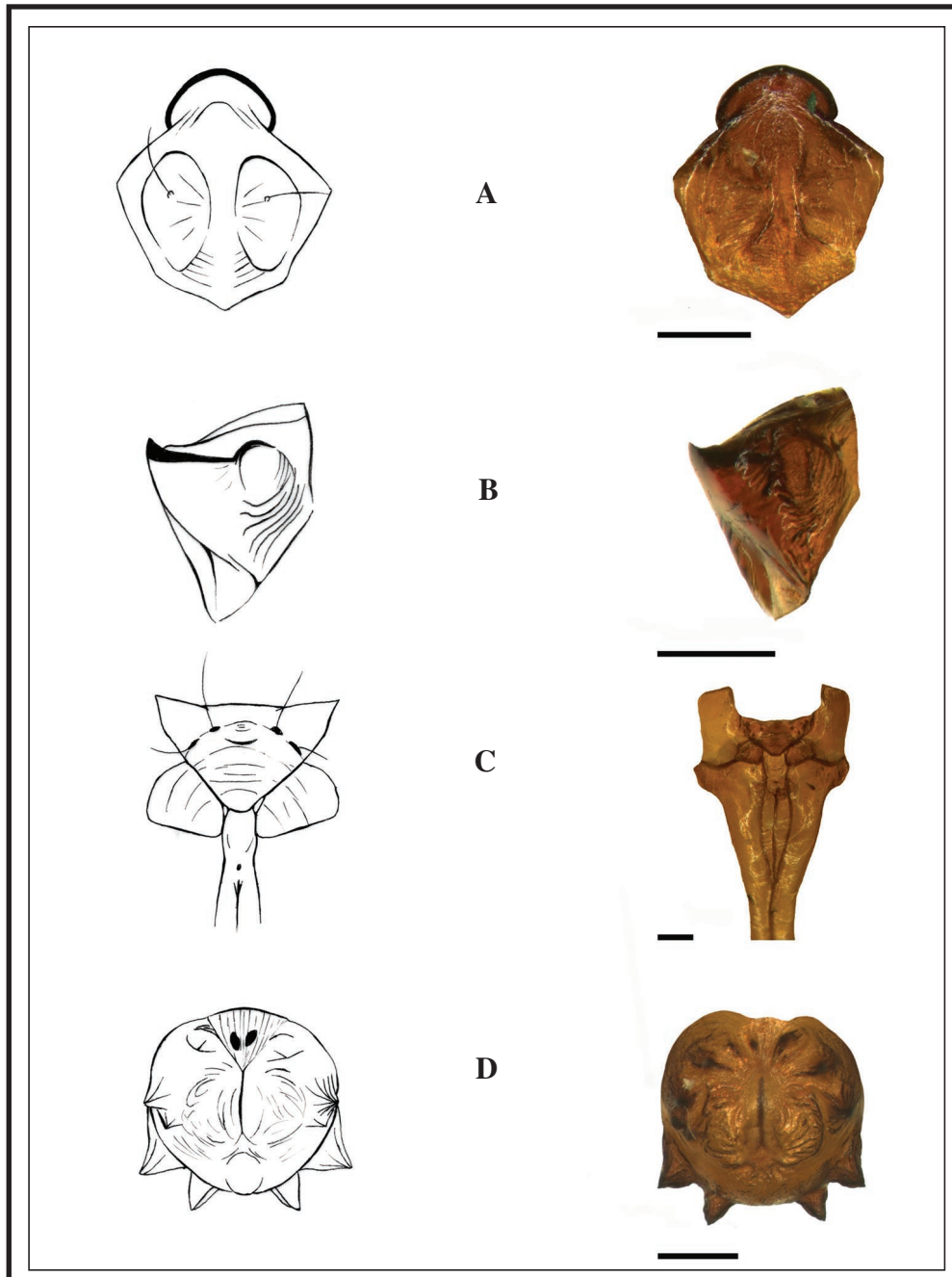

Fig. 1.– Morphology of *Bembecia fibigeri* pupa: **a**. Dorsal view of frons, **b.** Lateral view of frons, **c.** Labrum and vicinity, **d**. Ventral abdominal end. Scale bar - 0.5 mm.

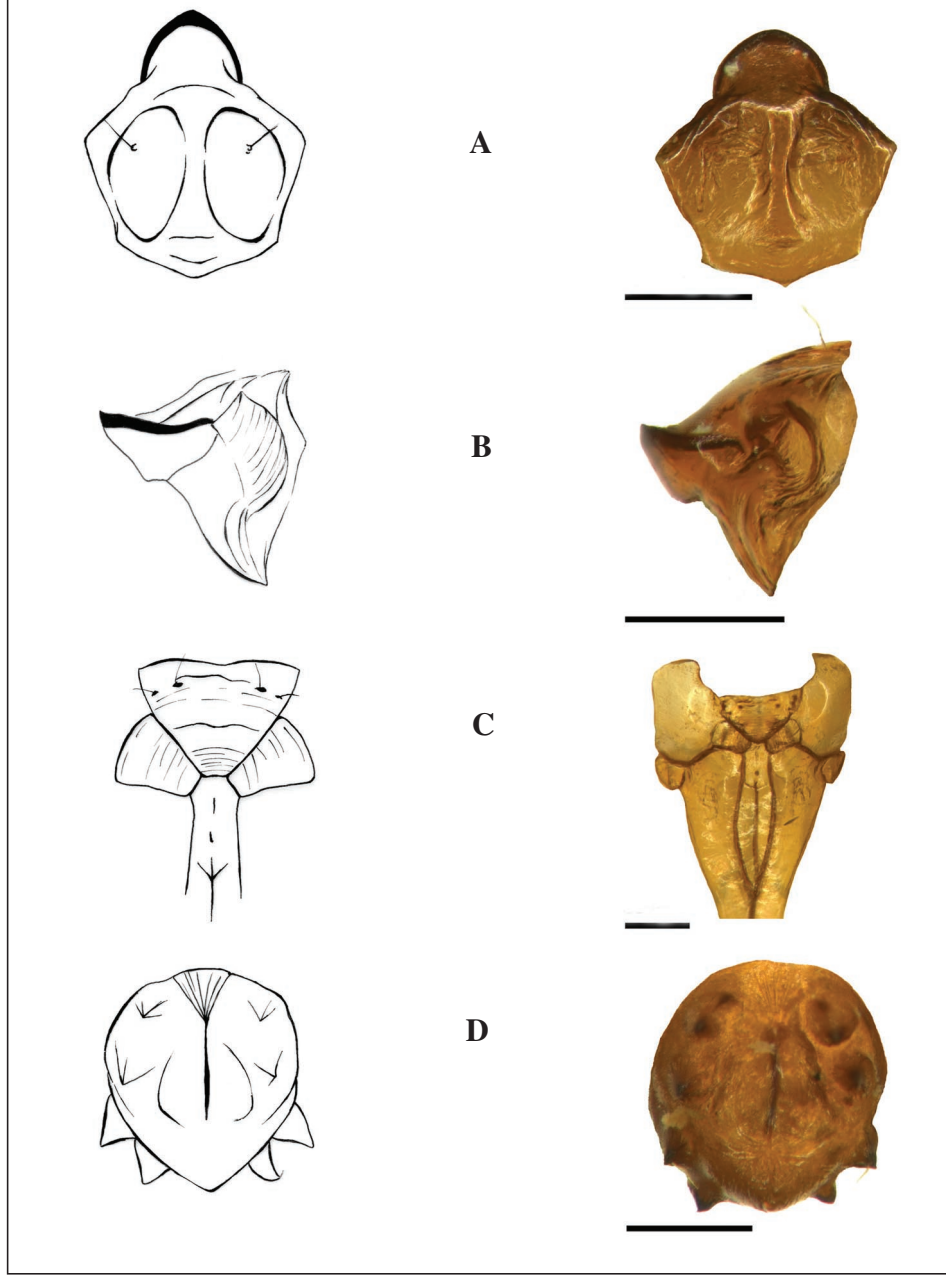

Fig. 2.– Morphology of *Bembecia iberica* pupa: **a**. Dorsal view of frons, **b.** Lateral view of frons, **c.** Labrum and vicinity, **d**. Ventral abdominal end. Scale bar - 0.5 mm.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 307-315 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.771

New synthetic sex attractants for the males of two endemic Iberian Procridinae species (Lepidoptera: Zygaenidae)

K. A. Efetov, E. E. Kucherenko & G. M. Tarmann

Abstract

Sex attractants for *Rhagades* (*Wiegelia*) *predotae* (Naufock, 1930) and *Adscita* (*Tarmannita*) *bolivari* (Agenjo, 1937), two endemic Iberian Procridinae species (Lepidoptera: Zygaenidae), are reported for the first time. During fieldwork in Spain in 2017 and 2018, the males of *Rh. predotae* and *Rh.* (*Rhagades*) *pruni* ([Denis & Schiffermüller], 1775) were attracted to the lures with the substance "EFETOV-S-S-2" (*S*-enantiomer of 2-butyl 2-dodecenoate), while the males of *A. bolivari* reacted to "EFETOV-2" (a racemic mixture of *R*- and *S*-enantiomers). This result (together with our previous data) shows that (2*S*)-butyl 2-dodecenoate is likely to be a "generic" sex attractant for the males of the genus *Rhagades* Wallengren, 1863. We demonstrate that attractive lures may be a sensitive and efficient tool for monitoring the two rare Spanish species, viz. *Rh. predotae* and *Rh. pruni.*
KEY WORDS: Lepidoptera, Zygaenidae, Procridinae, *Rhagades predotae*, *Rhagades pruni*, *Adscita bolivari*, sex attractant, EFETOV-2, EFETOV-S-S-2, Spain.

Nuevo atrayente sintético sexual para los machos de dos especies ibéricas endémicas de Procridinae (Lepidoptera: Zygaenidae)

Resumen

Se indica por primera vez, un atrayente sexual para *Rhagades* (*Wiegelia*) *predotae* (Naufock, 1930) y *Adscita* (*Tarmannita*) *bolivari* (Agenjo, 1937), dos especies ibéricas endémicas de Procridinae (Lepidoptera: Zygaenidae). Durante el trabajo de campo en España en 2017 y 2018, los machos de *Rh. predotae* y *Rh.* (*Rhagades*) *pruni* ([Denis & Schiffermüller], 1775) fueron atraídos a los señuelos con la substancia "EFETOV-S-S-2" (*S*-enantiómero de 2-butil 2-dodecenoato), mientras los machos de *A. bolivari* reaccionan frente a "EFETOV-2" (una mezcla racémica de *R*- and *S*-enantiómeros). Este resultado (con nuestros datos previos) indica que (2*S*)-butil 2-dodecenoato es, probablemente, un atrayente sexual para los machos del género *Rhagades* Wallengren, 1863. Demostramos que los señuelos atrayentes podrían ser una herramienta susceptible y eficiente para monitorear las dos especies singulares españolas, véase *Rh. predotae* y *Rh. pruni.*
PALABRAS CALVE: Lepidoptera, Zygaenidae, Procridinae, *Rhagades predotae*, *Rhagades pruni*, *Adscita bolivari*, atrayente sexual, EFETOV-2, EFETOV-S-S-2, España.

Introduction

The Iberian Peninsula is one of the richest European regions in animal species diversity (RAMOS *et al*., 2001). 54% of the total species described for Europe and approximately 38% of the species assessed by the European Red List of Species are present in Spain (SÁNCHEZ *et al*., 2013). According to the data of the International Union for Conservation of Nature (2018), the country is located in one of the 25 biodiversity hotspots in the world, thanks to its high rate of endemism.

Historically, the researchers have tended to focus on the study of sex pheromones of insect pests

rather than attractive molecules for protected and threatened species (OLEANDER *et al*., 2015; RAZOV *et al*., 2017; SUBCHEV *et al*., 1998, 2009, 2012, 2013, 2016; WITZGALL *et al*., 2010). However, pheromone-based monitoring methods can reveal rare and endangered species even with very low population density due to their sensitivity and species-selectivity. Pheromone lures and traps can detect and monitor the seasonal flight of such insects and provide a better understanding of their biology (LARSSON, 2016). Despite these obvious advantages, pheromones have been exploited for these purposes in very few cases in part because of the high cost and the difficulty of identifying them (MILLAR *et al*., 2010; SVENSSON *et al*., 2012). Synthetic sex attractants can successfully replace natural pheromones especially if they are expensive or unstable (EFETOV *et al*., 2010, 2011, 2015b; SUBCHEV *et al*., 2010; XU *et al*., 2012). Additionally, field screening tests of sex attractants are generally simpler, more effective and less laborious than visual searches for a target species (EFETOV *et al*., 2014b; RAY *et al*., 2014).

Previous studies have reported the attractive properties of 2-butyl 2-dodecenoate (*R*- and *S*-enantiomers and a racemic mixture) produced in the Crimean Federal University. The species and sex specificity of the newly synthesized esters has been proved for Procridinae moths in field observations undertaken in the Crimea, continental Russia, Austria, Greece, Italy, Tajikistan, Turkey, Japan, and some other countries (CAN CENGIZ *et al*., 2018; EFETOV *et al*., 2016a, 2016b, 2017, 2018; EFETOV & GORBUNOV, 2016). In 2017 and 2018, our field screening tests were carried out in Spain.

Large revisional work has been done on Palaearctic Procridinae during the last years (EFETOV, 1992, 1996a, b, 1997a, b, 1998, 1999, 2001a, 2006, 2010; EFETOV *et al*., 2014b; EFETOV & TARMANN, 1999, 2013a, b, 2014a, b, 2016a, b, 2017b; KEIL, 2014; MOLLET & TARMANN, 2007). Based on the recent classification, the Zygaenidae family includes five subfamilies: Inouelinae Efetov & Tarmann, 2017; Procridinae Boisduval, 1828; Chalcosiinae Walker, 1865; Callizygaeninae Alberti, 1954; and Zygaeninae Latreille, 1809 (EFETOV, 2001b; EFETOV *et al*., 2004, 2006, 2014a, 2015a; EFETOV & HAYASHI, 2008; EFETOV & KNYAZEV, 2014; EFETOV & SAVCHUK, 2009, 2013; EFETOV & TARMANN, 2012, 2017a; HOFMANN & TREMEWAN, 2017; KNYAZEV *et al*., 2015a, b). The Zygaenidae fauna of Spain is represented by Procridinae, Chalcosiinae, and Zygaeninae. Six Zygaenidae species are endemics of the Iberian Peninsula: *Rhagades* (*Wiegelia*) *predotae* (Naufock, 1930), *Adscita* (*Adscita*) *jordani* (Naufock, 1921), *A.* (*A.*) *schmidti* (Naufock, 1933), *A.* (*Tarmannita*) *bolivari* (Agenjo, 1937), *Jordanita* (*Jordanita*) *vartianae* (Malicky, 1961) (subfamily Procridinae), and *Zygaena* (*Agrumenia*) *ignifera* Korb, 1897 (subfamily Zygaeninae) (EFETOV, 2004; EFETOV & TARMANN, 2012).

Male specimens of Zygaenidae use chemical and visual signals for finding the females (EFETOV *et al*., 2015b; NAZAROV & EFETOV, 1993). In the subfamily Procridinae the majority of species has cryptic habitus and as a result chemical attraction is more important (EFETOV *et al*., 2010, 2014c). Sex pheromones or sex attractants were unknown for any endemic Spanish species (El-SAYED, 2018; SUBCHEV, 2014). However, it was recently shown that (2*S*)-butyl 2-dodecenoate attracts the males of *Rhagades* (*Rhagades*) *pruni* ([Denis & Schiffermüller], 1775) in the Crimea and Italy (EFETOV *et al*., 2016c, 2017), and *Rhagades* (*Wiegelia*) *amasina* (Herrich-Schäffer, 1851) in the Middle Anatolia Region of Turkey (CAN CENGIZ *et al*., 2017; CAN *et al*., 2018). We hypothesized that the males of the rare endemic Spanish species *Rh. predotae* also might come to lures or sticky traps with synthetic (2*S*)-butyl 2-dodecenoate. Thus, the objectives of the present work were: 1) to determine whether (2*S*)-butyl 2-dodecenoate is a sex attractant for the males of *Rh. predotae*; 2) to test 2-butyl 2-dodecenoate (the racemate and its enantiomers) as an attractant for other Spanish Procridinae species including *Rh. pruni*, a very rare species on the Iberian Peninsula.

Materials and methods

Field experiments with synthetic sex attractants were undertaken in Spain by G. M. Tarmann in Barcelona Province from 13-20 June 2017 and by K. A. Efetov and G. M. Tarmann in Cuenca Province from 9-13 July 2018 (see Table 1 for locality information, Figs 1-6). We tested responses of Procridinae

species to three attractants: EFETOV-2 (the racemate), EFETOV-S-2 (*R*-enantiomer), and EFETOV-S-S-2 (*S*-enantiomer) of 2 butyl 2-dodecenoate. The synthesis of the indicated ester was made according to the procedure published by EFETOV *et al*. (2014c).

Table 1.– A list of studied localities in Spain in 2017 and 2018 (Figs 1-6).

Number of locality	Description of the localities	GPS coordinates
Castilla-La Mancha, Cuenca Province		
I	vic. Huélamo, 1265 m (Fig. 1)	N 40º 15,385' / W 01º 45,920'
II	NE of Huélamo, 1228 m	N 40º 17,700' / W 01º 47,770'
III	NE of Huélamo, 1222 m (Fig. 2)	N 40º 17,706' / W 01º 47,866'
IV	NE of Huélamo, 1225 m (Figs 3-5)	N 40º 17,450' / W 01º 47,650'
V	S of Uña, 1184 m	N 40º 13,457' / W 01º 59,407'
VI	S of Tragacete, 1256 m	N 40º 20,174' / W 01º 49,570'
Catalonia, Barcelona Province		
VII	W of Alpens, 870 m (Fig. 6)	N 42º 07,767' / E 02º 05,050'

To prepare baits, rubber caps were impregnated with different types of attractants, fixed on cardboard rectangles and marked. A variety of methods were used to assess the attractiveness of the baits: Delta plastic sticky traps with lures hung on bushes or trees or cardboard rectangles with rubber caps placed on stones on the ground (Fig. 7) or attached to the hat of the researcher slowly crossing the biotope. Each method had its advantages and drawbacks. In the last two cases, the attracted specimens were collected by netting them near the rubber caps.

All specimens were determined by examination of the genitalia by K. A. Efetov and G. M. Tarmann.

Results and discussion

During our field trials in 2018 the attraction of two endemic Iberian Procridinae species to some of the exposed baits was recorded, viz. *Rh. predotae* and *A. bolivari*. In addition, the males of *Rh. pruni* were attracted in 2017. The list of attracted specimens, type of lures, and time of observation are provided below.

Rh. predotae (Naufock, 1930)

Locality III, near rubber caps with EFETOV-S-S-2, 1 ♂, 10-VII-2018, 20:38; locality III, near rubber caps with EFETOV-S-S-2, 1 ♂, 11-VII-2018, 11:30; locality III, near rubber caps with EFETOV-S-S-2, 3 ♂♂, 11-VII-2018, 20:40-20:47; locality III, near rubber caps with EFETOV-S-S-2, 4 ♂♂, 12-VII-2018, 20:20-20:30; locality IV, near rubber caps with EFETOV-S-S-2, 4 ♂♂, 13-VII-2018, 20:44-21:07.

A. bolivari (Agenjo, 1937)

Locality I, near rubber caps with EFETOV-2, 8 ♂♂, 9-VII-2018, 19:20-20:00; locality V, near trap with EFETOV-2, 1 ♂, 10-VII-2018, 14:00; locality II, near rubber caps with EFETOV-2, 5 ♂♂, 10-VII-2018, 20:00-20:20; locality III, near trap with EFETOV-2, 3 ♂♂, 11-VII-2018, 19:30-20:00; locality VI, near rubber caps with EFETOV-2, 1 ♂, 12-VII-2018, 12:30; locality IV, near rubber caps with EFETOV-2, 2 ♂♂, 13-VII-2018, 20:30.

Rh. pruni ([Denis & Schiffermüller], 1775)

Locality VII, near rubber caps with EFETOV-S-S-2, 2 ♂♂, 15-VI-2017, 11:35; locality VII, near rubber caps with EFETOV-S-S-2, 3 ♂♂, 19-VI-2017, 10:05-10:32.

Totally, 20 *A. bolivari* males were attracted to EFETOV-2, whereas 13 ♂♂ of *Rh. predotae* and 5

♂♂ of *Rh*. *pruni* came to lures with EFETOV-S-S-2. In the locality IV on 13th July 2018 three attractants were simultaneously placed on stones more than 10 m apart from each other. All the males of *Rh. predotae* were attracted only to lures EFETOV-S-S-2, while the males of *A*. *bolivari* were attracted to EFETOV-2. No specimens of any of the species approached the lure EFETOV-S-2 in this locality.

It is interesting that despite the fact that the traps with sticky layers were fixed to the branches of bushes at the altitude 1.0-1.5 m above the ground in almost all localities, we did not find any glued specimen of *Rh*. *predotae* and *A*. *bolivari* in the traps. All specimens were attracted only to rubber caps placed on the stones, fixed to the clothes or the hat of the collector.

Only male moths (Fig. 8) were captured indicating that these compounds act as a sex-specific attractants. Almost all males of *Rh. predotae* were attracted at evening twilight from 20:20-21:07 around the moment of sunset over the mountains. 18 flying males were additionally caught in locality IV without baits on 12 July also in the evening (21:00-21:35). It can thus be suggested that mating activity of this species connected with pheromone communication is at the end of the day. If we compare the time *Rh*. *predotae* and *A*. *bolivari* come to the attractants "EFETOV", we see that *Rh*. *predotae* males were attracted mainly in the evening at sunset, while the males of *A*. *bolivari* were active also during the day.

In this study we show that EFETOV-S-S-2 ((2*S*)-butyl 2-dodecenoate) is a sex attractant for the males of *Rh. predotae*. This is a very rare species of which the biology is insufficiently studied. *Rh. predotae* is only known from several specimens kept in museum collections (NAUMANN *et al*., 1999). The adults are not nocturnal but visual searches for this species in their habitat and inspection of host-plants have been unsuccessful. Now, the application of this attractant-based method allows us to detect *Rh. predotae.*

Previously, it was shown that *Rh. pruni* (EFETOV *et al*., 2016c, 2017) and *Rh. amasina* (CAN CENGIZ *et al*., 2017; CAN *et al*., 2018) were also attracted to EFETOV-S-S-2. Based on this knowledge G. M. Tarmann used the synthetic sex attractant EFETOV-S-S-2 for rediscovering this species in Spain on the southern side of the Pyrenees in 2017. *Rh. pruni* is a very rare species on the Iberian Peninsula and occurs only in the central and eastern Pyrenees in Spain. It reaches here its westernmost distribution in the Palaearctic Region. So far, only three male specimens from three localities were known from the southern side of the Pyrenees, all situated in the Barcelona Province. All other records from Spain are from localities in Valle de Arán, situated on the northern side of the Pyrenees. Therefore, the south-eastern slopes of the Pyrenees in the Catalonian provinces of Barcelona and Lérida were carefully screened by G. M. Tarmann using a rubber lure with EFETOV-S-S-2 on cardboard that was attached to his hat. Literally hundreds of bush-groups of *Prunus spinosa*, partly mixed with *Crataegus* and *Rubus*, the well-known preferred habitats of *Rh. pruni* in Spain, France, Italy and Central Europe, were examined for a whole week, but only in one single locality was the search successful (in locality VII where five males of *Rh. pruni* had been attracted to lures with EFETOV-S-S-2 in good weather conditions with cloudless skies). In conclusion one can say that the artificial attractant EFETOV-S-S-2 was definitely responsible for this rediscovery of *Rh. pruni* in the south-eastern Pyrenees in Spain (although the species was extremely rare in 2017) after more than a third of a century (last record known is from 1980).

Our results provide further support for the hypothesis outlined in the introduction of this paper that (2*S*)-butyl 2-dodecenoate is a "generic" sex attractant for males of different species of the genus *Rhagades* Wallengren, 1863. Pheromone structure can be conservative within closely related Procridinae species of this genus. A similar situation is known also for other insects (RAY *et al*., 2014).

Conclusion

Sex attractants for two endemic Iberian Procridinae species, viz. *Rhagades* (*Wiegelia*) *predotae* and *Adscita* (*Tarmannita*) *bolivari*, were found for the first time. *Rh. predotae* males reacted to lures with (2*S*)-butyl 2-dodecenoate, while *A. bolivari* males were attracted to the racemate of 2-butyl 2-

dodecenoate. Synthetic (2*S*)-butyl 2-dodecenoate is a sensitive and effective tool for monitoring *Rh. predotae* and *Rh. pruni* populations.

Acknowledgments

We thank Dr. A. Vives Moreno (Spain) for his help in obtaining the relevant collecting permits for our field work in Spain into the Scientific Project of SHILAP. For help in preparing attractants, we are indebted to Dr M. Y. Baevsky and Mr A. I. Poddubov (Russia). We also thank Dr A. Spalding (Great Britain) for editing the English text.

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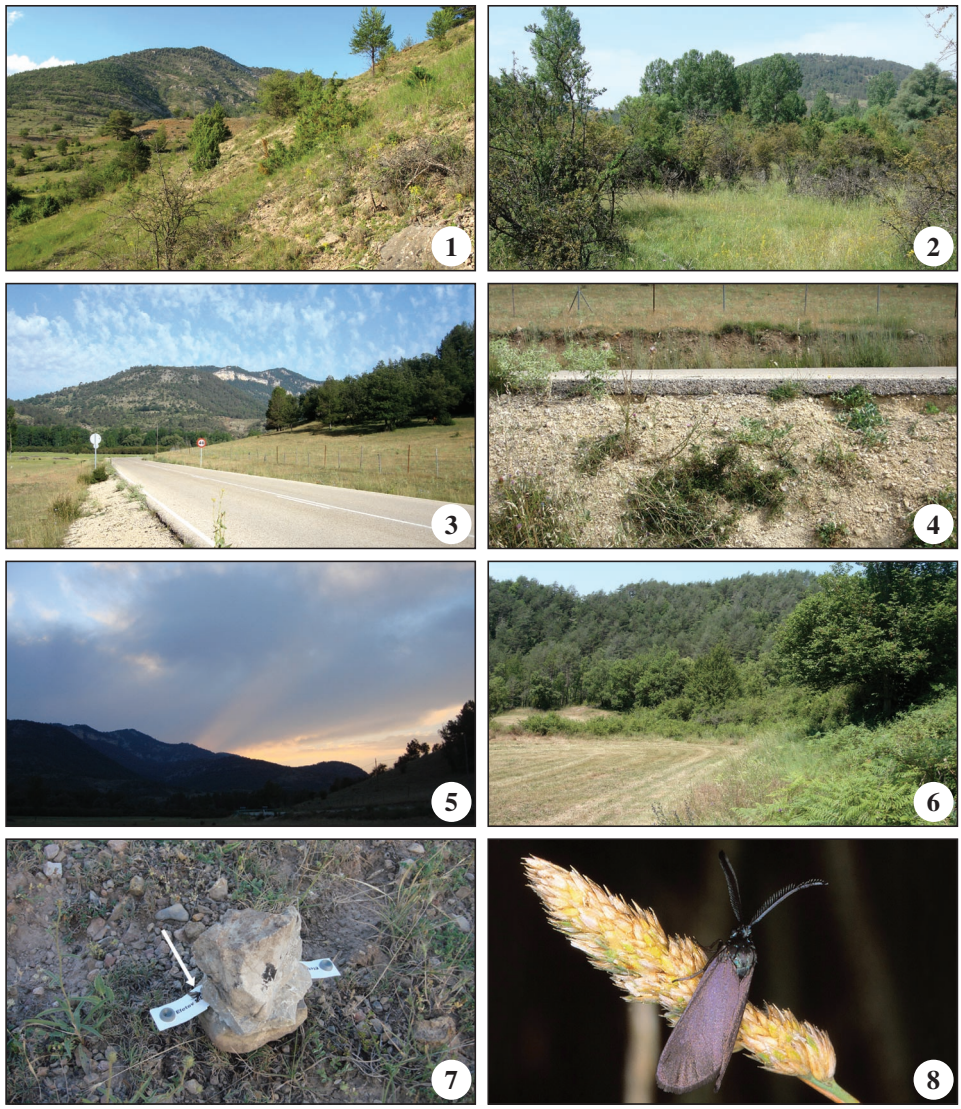
(Recibido para publicación / *Received for publication* 29-I-2019)
(Revisado y aceptado / *Revised and accepted* 3-III-2019)
(Publicado / *Published* 30-VI-2019)



Figures 1-8.– 1. Locality I. Spain, Castilla-La Mancha, Cuenca Province, vic. Huélamo, 1265 m. Habitat of *A. bolivari*. **2.** Locality III. Spain, Castilla-La Mancha, Cuenca Province, NE of Huélamo, 1222 m. Habitat of *Rh. predotae* and *A. bolivari*. **3.** Locality IV. Spain, Castilla-La Mancha, Cuenca Province, NE of Huélamo, 1225 m. Habitat of *Rh. predotae* and *A. bolivari*. **4.** Locality IV. Spain, Castilla-La Mancha, Cuenca Province, NE of Huélamo, 1225 m. This roadside is a secondary biotope in which *Rh. predotae* was found. **5.** Locality IV. Spain, Castilla-La Mancha, Cuenca Province, NE of Huélamo, 1225 m. Evening twilight, the moment of sunset is the main activity time of the males of *Rh. predotae*. **6.** Locality VII. Spain, Catalonia, Barcelona Province, West of Alpens, 870 m. Habitat of *Rh. pruni*. **7.** The male of *Rh. predotae* (shown by white arrow) attracted to the lure EFETOV-S-S-2 fixed on stones on the ground. Locality IV, 13-VII-2018, 21:00. The specimen is trying to copulate with the cardboard. **8.** Male specimen of *Rh. predotae* in the locality IV, 13-VII-2018.

REVISION DE PUBLICACIONES
BOOK REVIEWS

H. Glaßl
Parnassius mnemosyne
142 páginas
Formato: 30 x 21 cm
KDD Kompetenzzentrum Digital-Druck GmbH, Nürnberg, 2017
ISBN: 978-3-00-056478-9

Tenemos en nuestras manos la segunda monografía que nos depara el autor, concretamente nos habla del mirífico *Parnassius mnemosyne* (Linnaeus, 1758), en la que nos habla de la existencia de 170 subespecies y un elevado número de formas locales. Esta especie se extiende por la zonas montañosas de la región Paleártica desde Europa hasta el Asia Central, estando ausente del norte de África.

Comienza la obra con un Prefacio, glosario, sobre la morfología de la especie, glosario de términos, la fotografía del Lectotipo que se conserva en *The Linnean Collection* en Londres (Gran Bretaña), sobre un ejemplar fechado en 1754 y sobre las aberraciones y formas.

Ya dentro de la parte más importante del contenido de la obra, dividen por grupos en diferentes áreas geográficas a saber: Escandinavia; Finlandia; Rusia europea con Polonia y Rumanía; sudeste de Alemania; Alemania central; Bohemia; Cárpatos; "Paponia"; Dalmacia y Serbia; Balcanes; Grecia; Cáucaso; "Sheljuzhkoi"; "Nubilosus"; Asia central; norte de los Alpes; sur del Tirol; Suiza; Francia; Italia y España, donde se realiza una división en dos poblaciones *Parnassius mnemosyne republicanus* Bryk & Peebles, 1931, que se distribuiría por el Pirineo español y parte del francés, así como una segunda subespecies *P. mnemosyne turatii* Fruhstorfer, 1908, que se localizaría en los alrededors de Gèdre, Haute Pyrenées, Francia.

Ya dentro de cada una de las subespecies consideradas, se nos dan datos sistemáticos, su distribución en el área considerada, sus principales diferencias con las subespecies próximas, datos sobre su biología y ecología, así como fotografías de casi todos los adultos en vivo, finalizando con una bibliografía detallada y un índice.

No podemos terminar estas líneas, sin felicitar al autor por un trabajo bien realizado, así como a la Editorial que no ha escatimado en medios para mantener el gran nivel de calidad necesaria para este tipo de trabajos, recomendando vivamente su adquisición, no pudiendo faltar en cualquier biblioteca que se precie.

El precio de este libro es de 88 euros más gastos de envío y los interesados deben dirigirse a:

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 317-324 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.772

Contribución al conocimiento de los Lepidoptera de España. Cinco nuevas especies para nuestra fauna (Insecta: Lepidoptera)

A. Vives Moreno & J. Gastón

Resumen

Se estudia la fauna de Lepidoptera presente en España, con la mención de cinco nuevas especies: *Ypsolopha rhinolophi* Corley, 2019 (Ypsolophidae), *Depressaria hystricella* Moschler, 1860*,* (Depressariidae), *Monochroa lutulentella* (Zeller, 1839) (Gelechiidae), *Apotomis geminata* (Walsigham, 1900) (Tortricidae), esta especie resulta nueva para España y también para Europa y *Agathodes designalis* Guenée, 1854 (Crambidae), la cual ya era conocida de Gibraltar, pero es nueva para el resto de la Península Ibérica.
PALABRAS CLAVE: Insecta, Lepidoptera, nuevos registros, España.

Contribution to the knowledge of the Lepidoptera of Spain. Five new species for our fauna (Insecta: Lepidoptera)

Abstract

The fauna of Lepidoptera from Spain is studied, with the mention of five new species: *Ypsolopha rhinolophi* Corley, 2019 (Ypsolophidae), *Depressaria hystricella* Moschler, 1860 (Depressariidae), *Monochroa lutulentella* (Zeller, 1839) (Gelechiidae), *Apotomis geminata* (Walsingham, 1900) (Tortricidae), this species, is new for Spain and also for Europe and *Agathodes designalis* Guenée, 1854 (Crambidae), which is already well-known from Gibraltar, but is new for the rest of the Iberian Peninsula.
KEY WORDS: Insecta, Lepidoptera, new records, Spain.

Introducción

Hemos estudiado cinco especies de Lepidoptera presentes en España que resultan nuevas para nuestra fauna: *Ypsolopha rhinolophi* Corley, 2019 (Ypsolophidae), *Depressaria hystricella* Moschler, 1860, *Monochroa lutulentella* (Zeller, 1839), *Apotomis geminata* (Walsingham, 1900), especie también nueva para Europa y *Agathodes designalis* Guenée, 1854, que ya era conocida de Gibraltar, pero es nueva para el resto de la Península Ibérica.

Material y métodos

Para su identificación nos hemos basado en el examen comparativo de los caracteres morfológicos externos y, sobre todo, en el análisis de la estructura genital de los ejemplares. La preparación de los genitalia se ha efectuado siguiendo a ROBINSON (1976), con modificaciones. Se han utilizado los microscopios Leica DMLB, Leica MZAPO, NIKON Eclipse E400 y las cámaras digital Leica DFC550, NIKON D3100 y SONY α100 DSLR-A100K con objetivo AF 100 MACRO 1:2,8 (32), e igualmente para el retoque fotográfico, el programa de Adobe Photoshop ©.

Abreviaturas

AV	Antonio Vives
BMNH	The Natural History Museum, Londres, Gran Bretaña
E.T.S.	Escuela Técnica Superior
JG	Javier Gastón
PIF	Puerto de Inspección Fronteriza
prep. gen.	Preparación de genitalia
ZMUC	Zoological Museum, University of Copenhagen, Copenhague, Dinamarca

Resultados

Ypsolopha rhinolophi Corley, 2019 (fig. 1)
Ypsolopha rhinolophi Corley, 2019. *Zootaxa,* **4609**(3): 567, figs. 1 A-D, 2 A-B, 3 A-B
LT: Constantim, Trás-os-Montes, Portugal

Material examinado: Álava, Marieta, a 600 m, 2 ♂♂, 22-VIII-1986, J. Gastón leg. (prep. gen. 6137JG y 7232JG) (fig. 10).

Biología: La especie se alimenta de *Quercus pyrenaica* Wild. (Fagaceae) (CORLEY *et al*., 2019) y vuela en los meses de julio y septiembre, entre los 780 metros y 850 metros (CORLEY *et al*., 2019), en España la hemos encontrado en el mes de agosto a 600 metros en Marieta (Álava).

Distribución: Según nuestros datos, la especie se distribuye por Francia y Portugal (CORLEY *et al*., 2019) y ahora también es **nueva para España**.

Detalles: Siguiendo a VIVES MORENO (2014: 97), la especie detrás de *Ypsolopha lucella* (Fabricius, 1775), indicando **(E.P.)**.

Depressaria (Horridopalpus) hystricella Möschler, 1860 (fig. 2)
Depressaria hystricella Möschler, 1860. *Wien. Ent. Mon*., **4**: 275-276
LT: Sarepta [Volgogrado], Rusia

Material examinado: Álava: Artaza de Foronda, 550 m, 1 ♂, 8-II-2019, F. de Juana leg.; Berganzo, 550 m, 1 ♂, 22-III-1998, J. Gastón leg.; Corro, 625 m, 1 ♂, 11-II-1994, J. Gastón leg.; Hueto Abajo, 564 m, 1 ♂, 26-I-2019, F. de Juana leg.; Igai, 500 m, 1 ♂, 11-II-1992, J. Gastón leg.; Pobes, 500 m, 2 ♂♂, 1-III-1992, 14-XII-1992, J. Gastón leg. (prep. gen. 6869JG) (fig. 8); Vírgala Mayor, 750 m, 1 ♂, 12-XI-2010, J. Gastón leg.; Burgos: Herrera, Ircío, 510 m, 1 ♂, 8-III-1997, J. Gastón leg.; Santuario de Cantonad, 500 m, 1 ♀, 20-XI-1986, J. Gastón leg. (prep. gen. 6868JG) (fig. 12).

Biología: La especie se alimenta de *Spiraea media* F. Schmidt (Rosaceae) (PATOČKA, 1988: 281) y vuela entre los 500 metros de Pobes hasta 750 metros de Vírgala Mayor y vuela desde noviembre hasta marzo.

Distribución: Según nuestros datos, la especie se distribuye por Eslovaquia (PATOČKA, 1988), Kazajistán (BUCHNER *et al*., 2018) y Rusia (Urales [Cheliábinsk], Transbaikalia, Volgogrado) (MÖSCHLER, 1860; LVOVSKY, 1981; BUCHNER *et al*., 2018), tanto la especie como el subgénero *Horridopalpus* Hannemann, 1953, resultan **nuevos para España**.

Detalles: Siguiendo a VIVES MORENO (2014: 132), hay que colocar el subgénero y la especie detrás del subgénero *Hasenfussia* Fetz, 1994).

Monochroa lutulentella (Zeller, 1839) (fig. 3)
Gelechia (Brachmia) lutulentella Zeller, 1839. *Isis von Oken*, **1839**: 201
LT: Oberweisen, Alemania

Material examinado: Burgos, El Ribero, a 750 m, 1 ♂, 24-VI-2017, J. Gastón leg (prep. gen. 7166JG) (figs. 9a, 9b); Cuenca, 8 km N Tragacete, a 1.450 m, 2 ♂♂, 14-VII-1986, C. Gielis leg. (ZMUC), Lérida, Aransís, Valle de Tremp, a 936 m, 1 ♂, 8-VII-1993, P. Skou leg. (ZMUC).

Biología: La especie se alimenta de *Filipendula ulmaria* (L.) Maxim. (Rosaceae) y vuela durante los meses de junio hasta agosto, entre los 750 m de El Ribero hasta los 1.450 m de Tragacete.

Distribución: Según nuestros datos se distribuye por Europa y Asia Menor llegando hasta Armenia (ELSNER *et al*., 1999, BLAND *et al*., 2002).

Detalles: Siguiendo a VIVES MORENO (2014: 174), hay que colocarla detrás de *M. hornigi* (Staudinger, 1883).

Apotomis geminata (Walsigham, 1900) (figs. 4-6)
Argyroploce geminata Walsingham, 1900. *Ann. Mag. nat. Hist.,* (7)**6**: 237
LT: Kiusiu (Kyushu), Japón

Material examinado: Hemos podido criar y estudiar dos ejemplares, capturados en VALENCIA, el PIF de Valencia, a 13 m, 1 ♂, 9-III-2019 (prep. gen. 4060AV) (figs. 11, 11a) y 1 ♀, 8-III-2019 (prep. gen. 4061AV) (fig. 13), T. Vaño leg., que resulta **nueva para España y Europa**. También hemos podido estudiar dos ejemplares procedentes del BMNH, el Lectotype, JAPAN, Peyer., 1 ♂, 1886, nº. 70084, Walsingham Collection 1910-427 (prep. gen. 5785BM) (figs. 5-6); Paralectotype, 1 ♀, nº 70144, Walsingham Collection 1910-427 (prep. gen. 11673BM).

Biología: Según nuestros datos, las plantas nutricias conocidas para esta especie son *Betula* sp. (Betulaceae) *Ulmus* sp. (Ulmaceae) (KAWABE, 1982) y *Ternstroemia gymnanthera* (Wight & Arn.) Beed. (= *japonica* Thunb.) (Pentaphylacaceae) (BYUN *et al*., 1998). Nosotros la hemos criado sobre *Elaeagnus* sp. (Elaeagnaceae), que también resulta una nueva planta nutricia para esta especie.

Distribución: Según nuestros datos, esta especie se conoce de Japón (WALSINGHAM, 1900) y Corea del Sur (PARK, 1983; BYUN *et al*., 1998), ahora también presente en España y Europa, pero al haber sido capturada en un control de aduanas, sería necesario realizar un seguimiento de esta especie, para verificar su asentamiento definitivo en nuestra fauna.

Detalles: Siguiendo a VIVES MORENO (2014: 243), hay que colocarla detrás de *A. betuletana* (Haworth, 1811), precedida por un asterisco.

Agathodes designalis Guenée, 1854 (fig. 7)
Agathodes designalis Guenée, 1854. *Hist. Nat. Insectes (Spec. gén. Lépid.)*, **8**: 209
LT: Brasil y América septentrional?

Material examinado: Hemos podido estudiar un ejemplar, capturado en MÁLAGA, Mijas, a 100-400 m., 1 ♀, 16-21-X-2017, J. Hyttinen leg. (prep. gen. 4059AV) (fig. 14).

Biología: Se encuentra perfectamente detallada en SOURAKOV (2011, 2012, 2013). Se han citado como plantas nutricias a: *Citharexylum berlandieri* B. L. Rob., *C. fructicosum* L. (Verbenaceae); *Erythrina cista-gailli* L., *E. fusca* Lour., *E. herbacea* L., *E. variegata* L., *Inga vera* Willd. (Leguminosae); *Kigelia africana* (Lam.) Benth (= *pinnata* (Jacq.) DC.) (Bignoniaceae) y *Nerium oleander* L. (Apocynaceae) (HEPPNER, 2007: 282) y vuela en el mes de octubre, entre los 100-400 m de Mijas.

Distribución: Según nuestros datos, esta especie se la conoce de América, concretamente de Argentina, Brasil, Colombia, Costa Rica, Ecuador (Islas Galápagos), EE.UU. (desde Florida hasta Arizona), El Salvador, Islas Vírgenes, México, Nicaragua, Panamá, Perú, República Dominicana y Venezuela (BOURQUIN, 1932; DYAR, 1901; LANDRY, 2016; POWELL & OPLER, 2009; SOURAKOV, 2012). Tanto el género *Agathodes* Guenée, 1854 (= *Stenurges* Lederer, 1863: 416), como la especie resultan **nuevos para España**; ya era conocida de Gibraltar (PEREZ *et al*., 2018).

Detalles: El género *Agathodes* fue descrito por GUENÉE (1854: 207) estableciendo como especie tipo a *Perinephela ostentalis* Geyer, 1837, *in* Hübner, por subsecuente designación de DESMAREST (*in* CHENU, 1857: 193), pero citada con *astentalis* Hübner (*lapsus calami*) y siguiendo a VIVES MORENO (2014: 423), habría que colocarlos delante del género *Maruca* Walker, 1859.

Agradecimientos

No podemos terminar este trabajo sin agradecer la colaboración y la ayuda prestada por las si-

guientes personas e Instituciones: a Fernando de Juana Aranzana (Álava, España) y a Peter Buchner (Schwarzau am Steinfeld, Austria) por su colaboración y los datos aportados con *Depressaria hystricella*; al Dr. Ing. Pedro del Estal (E.T.S. de Ingenieros Agrónomos, Madrid, España) y Teresa Vaño (Valencia, España), por proporcionarnos el material de *Apotomis geminata* para su estudio y al Dr. David Lees y al Dr. Martin Honey (BMNH, Londres, Gran Bretaña) que nos permitieron estudiar el material tipo de la especie de Walsingham y a Leif Aarvik (Ås, Noruega) por su colaboración con esta especie; a Ole Karsholt (ZMUC, Copenhague, Dinamarca) por proporcionarnos información adicional sobre *Monochroa lutulentella*; a Jukka Hyttinen (Kauniainen, Finlandia), por proporcionarnos el material de *Agathodes designalis*; a Francisco Javier Conde de Saro (España), por su ayuda en la revisión lingüística del trabajo; a la Dra. Amparo Blay, Conservadora de Entomología, en el Museo Nacional de Ciencias Naturales, en Madrid (España), que siempre ha estado dispuesta a ayudarnos en nuestras investigaciones de los fondos de esta Institución.

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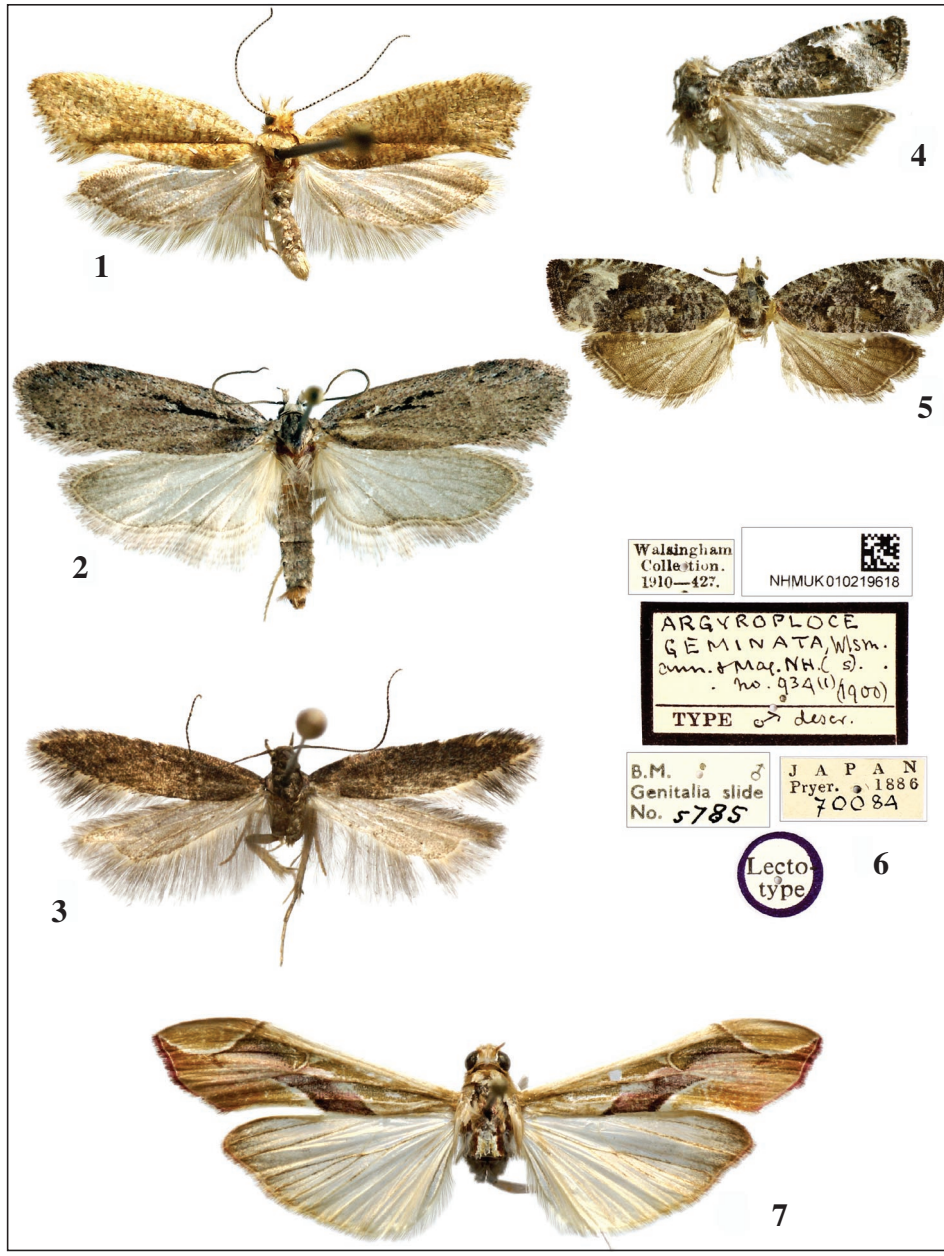
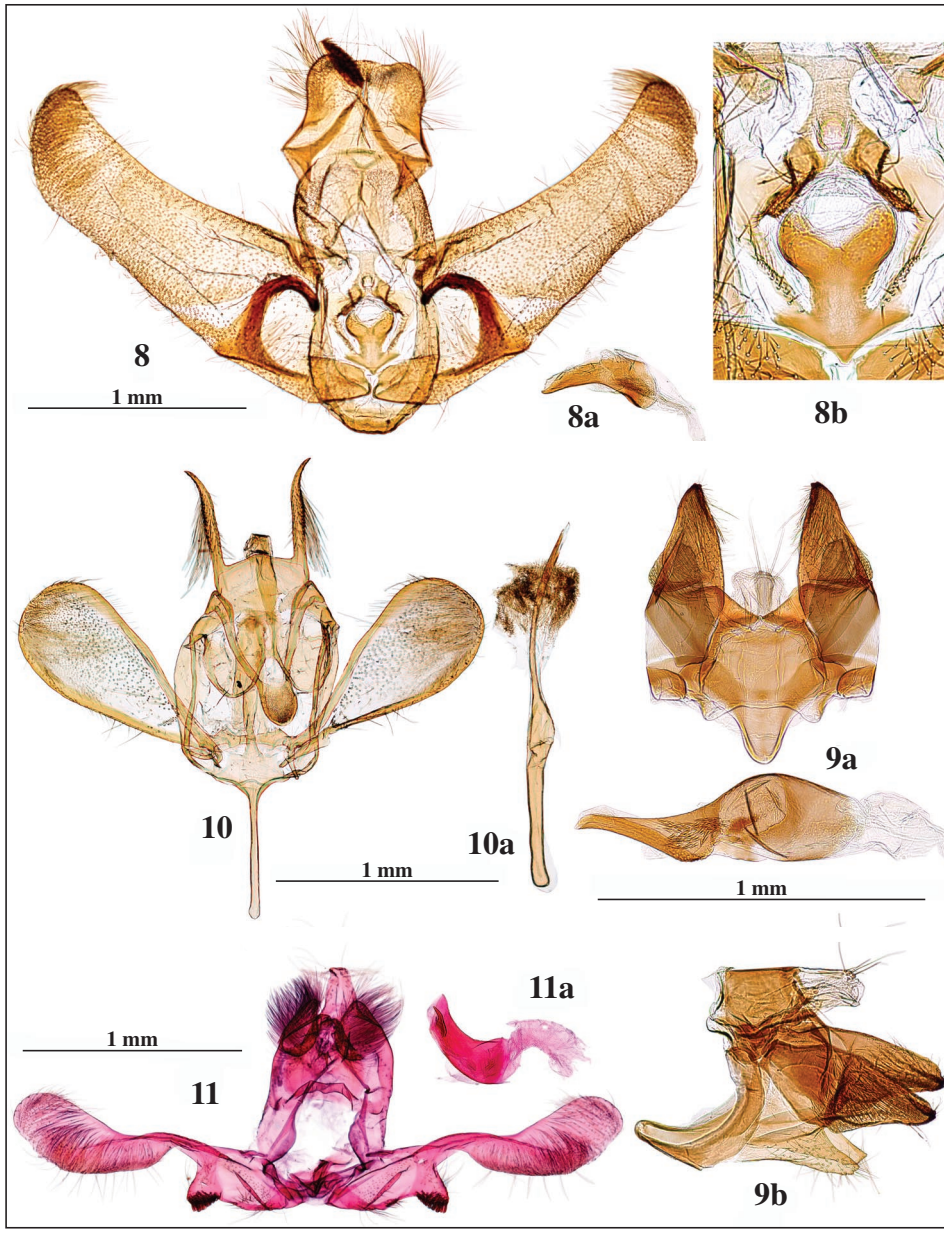
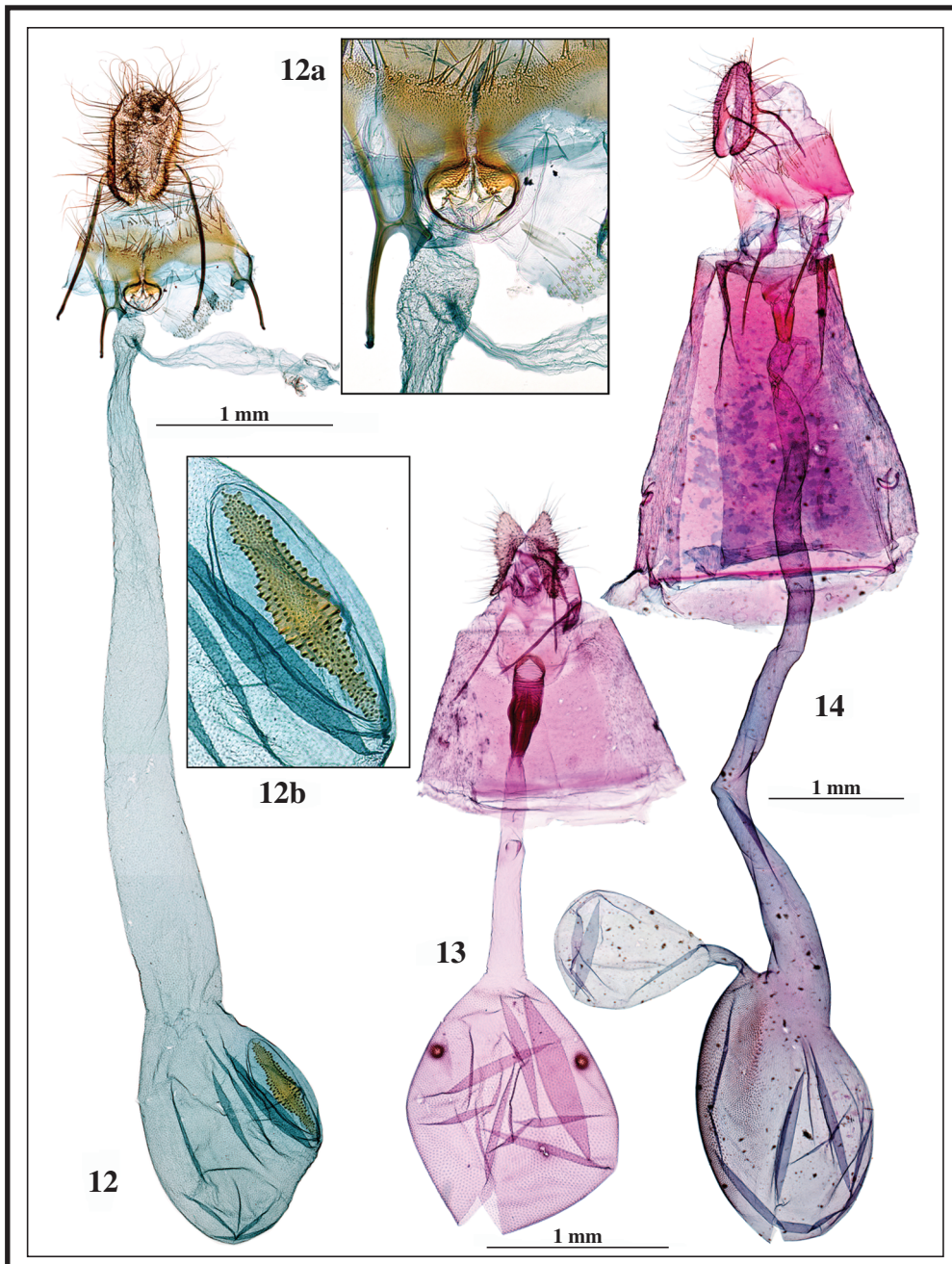
(Recibido para publicación / *Received for publication* 1-II-2019)
(Revisado y aceptado / *Revised and accepted* 4-III-2019)
(Publicado / *Published* 30-VI-2019)



Figs. 1-7.– Adulto. 1. *Ypsolopha rhinolophi* Corley, 2019, ♂ **2.** *Depressaria (Horridopalpus) hystricella* Möschler, 1860, ♂, **3.** *Monochroa lutulentella* (Zeller, 1839), ♂, **4.** *Apotomis geminata* (Walsigham, 1900), ♀, **5.** *Apotomis geminata* (Walsigham, 1900), ♂, Lectotipo (BMNH). **6.** Dito, etiquetas del mismo (BMNH). **7.** *Agathodes designalis* Guenée, 1854, ♀.



Figs. 8-11.– Genitalia macho. 8. *Depressaria (Horridopalpus) hystricella* Möschler, 1860, prep. gen. 6869JG. **8a.** Dito, aedeagus. **8b.** Dito, juxta. **9a.** *Monochroa lutulentella* (Zeller, 1839), prep. gen. 7166JG, vista frontal. **9b.** *Monochroa lutulentella* (Zeller, 1839), prep. gen. 7166JG, vista lateral izquierda. **10.** *Ypsolopha rhinolophi* Corley, 2019, prep. gen. 7232JG. **10a**. Dito, aedeagus. **11.** *Apotomis geminata* (Walsingham, 1900), prep. gen. 4060AV. **11a.** Dito. aedeagus.



Figs. 12-14.– Genitalia hembra. 12. *Depressaria (Horridopalpus) hystricella* Möschler, 1860, prep. gen. 6868JG. **12a.** Dito, detalle ostium. **12b.** Dito, detalle signum bursae. **13.** *Apotomis geminata* (Walsigham, 1900), prep. gen. 4061AV. **14.** *Agathodes designalis* Guenée, 1854, prep. gen. 4059AV.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 325-340 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.774

New data on Praydidae, Oecophoridae, Stathmopodidae, Scythrididae and Cosmopterigidae from the Canary Islands, Spain (Insecta: Lepidoptera)

P. Falck & O. Karsholt

Abstract

Based on recent field work, mainly by the first author, we record the following eleven species of Microlepidoptera as new to the Canary Islands: *Prays peregrina* Agassiz, 2007 (Praydidae); *Epicallima mikkolai* (Lvovsky, 1995) (Oecophoridae); *Stathmopoda auriferella* (Walker, 1864) (Stathmopodidae); *Scythris albidella* (Stainton, 1867), *Scythris eucharis* Walsingham, 1907, *Scythris amplexella* Bengtsson, 2002, *Scythris mus* Walsingham, 1898, and *Enolmis acanthella* (Godart, 1824) (Scythrididae); *Bifascia nigralbella* (Chrétien, 1915), *Bifascioides leucomelanella* (Rebel, 1917), and *Pyroderces apicinotella* (Chrétien, 1915) (Cosmopterigidae). We also describe three hitherto undescribed species: *Tortilia flavescens* Falck & Karsholt, sp. n. (Stathmopodidae), *Scythris brithae* Falck & Karsholt, sp. n., and *Scythris grancanariella* Falck & Karsholt, sp. n. (Scythrididae). The family Oecophoridae, in its present concept, is new to the Canary Islands. We also deal with two species of Cosmopterigidae, which were formerly recorded from the Canary Islands, but not included in the catalogue by VIVES MORENO (2014): *Anatrachyntis rileyi* (Walsingham, 1882) and *C. gerasimovi* Danilevsky, 1950. We moreover discuss the genera *Coccidiphila* Danilevsky, 1950 and *Ascalenia* Wocke, 1876 in the Canary Islands and conclude that the occurrence of *C. ledereriella* (Zeller, 1850), *C. danilevskyi* Sinev, 1997 and *Ascalenia vanella* (Frey, 1860) in these islands is unconfirmed, and they should be removed from the list of Canary Island Lepidoptera. Photographs of adults of all species are shown. Photographs of the genitalia are either shown or references are given to literature where they are figured.
KEY WORDS: Insecta, Lepidoptera, Oecophoridae, Praydidae, Cosmopterigidae, Stathmopodidae, Scythrididae, new species, Canary Islands, Spain.

Nuevos datos sobre Praydidae, Oecophoridae, Stathmopodidae, Scythrididae y Cosmopterigidae de las Islas Canarias, España (Insecta: Lepidoptera)

Resumen

Sobre la base del reciente trabajo de campo, principalmente por el primer autor, registramos como nuevas las siguientes once especies de Microlepidoptara para las Islas Canarias: *Prays peregrina* Agassiz, 2007 (Praydidae); *Epicallima mikkolai* (Lvovsky, 1995) (Oecophoridae); *Stathmopoda auriferella* (Walker, 1864) (Stathmopodidae); *Scythris albidella* (Stainton, 1867), *Scythris eucharis* Walsingham, 1907, *Scythris amplexella* Bengtsson, 2002, *Scythris mus* Walsingham, 1898, and *Enolmis acanthella* (Godart, 1824) (Scythrididae); *Bifascia nigralbella* (Chrétien, 1915), *Bifascioides leucomelanella* (Rebel, 1917) y *Pyroderces apicinotella* (Chrétien, 1915) (Cosmopterigidae). También describimos tres especies hasta ahorta desconocidas: *Tortilia flavescens* Falck & Karsholt, sp. n. (Stathmopodidae), *Scythris brithae* Falck & Karsholt, sp. n., y *Scythris grancanariella* Falck & Karsholt, sp. n. (Scythrididae). La familia Oecophoridae, en su concepto actual, es nueva para las Islas Canarias. También añadimos dos especies de Cosmopterigidae, que fueron registradas de las Islas Canarias, pero no incluidas

en el catálogo por VIVES MORENO (2014): *Anatrachyntis rileyi* (Walsingham, 1882) y *C. gerasimovi* Danilevsky, 1950. Tratamos de los géneros: *Coccidiphila* Danilevsky, 1950 y *Ascalenia* Wocke, 1876 en las Islas Canarias y concluimos la presencia de *C. ledereriella* (Zeller, 1850), *C. danilevskyi* Sinev, 1997 y *Ascalenia vanella* (Frey, 1860) en estas islas, están sin confirmar y deben de ser retiradas de la lista de Lepidoptera de las Islas Canarias. Se muestran fotografías de los adultos de todas las especies. Se muestran fotografías de algunas de las genitalias o se dan las referencias, en la literatura, donde están representadas.
PALABRAS CLAVE: Insecta, Lepidoptera, Oecophoridae, Praydidae, Cosmopterigidae, Stathmopodidae, Scythrididae, nuevas especies, Islas Canarias, España.

Introduction

The Lepidoptera of the Canary Islands are considered well-known. Due to its pleasant climate many entomologists have visited the islands and collected Lepidoptera there. Similar to other oceanic islands the fauna of the Canary Islands is less diverse than that of the adjacent continental countries (Morocco, Portugal), but includes a number of endemic species.

The smaller Lepidoptera, the so-called Microlepidoptera, are often less well studied compared with the larger Macrolepidoptera. The most comprehensive studies of Microlepidoptera of the Canary Islands are those by WALSINGHAM (1908) and KLIMESCH (1977-1995), as well as the papers by Hans Rebel published between 1892 and 1938 (REBEL, 1892, 1938). Further information on Canary Island Microlepidoptera can be found in taxonomic revisions covering larger distribution areas, identification handbooks and in scattered publications in entomological journals.

Checklists of the Lepidoptera of the Canary Islands have been published by BÁEZ (latest version 2010), and VIVES MORENO (2014). In the present paper we refer to the latter.

Recent field work by the first author has revealed a number of hitherto unrecorded or even undescribed species of Lepidoptera occurring in the Canary Islands. In a previous paper (FALCK *et al*., 2019) we dealt with the families Pyralidae and Crambidae, adding 22 species of these families to the fauna of the islands. In the present paper we present new data of several smaller families of Microlepidoptera. It is planned to publish data on further families when these have been studied in detail.

Material and methods

Most specimens have been attracted to artificial light. The two new Scythrididae species were either found resting on rocks or netted in afternoon sunshine.

Label data are listed in a standardized way under each species, with the islands in alphabetic sequence, and the records in chronological order. Data on holotypes are cited literally from their labels. The photographs of specimens were taken with Canon EOS700D camera and Soptop SZN 6745 Trinocular zoom microscope and Toup Tek P10500A-E3 / E3ISPM05000KPA-E3 / 5.0MP USB3 camera. Those of the genitalia by using a Soptop CX40T Trinocular microscope and the same camera.

Abbreviations used

GP	Genitalia preparation
PF	Collection of Per Falck, Neksø, Denmark
MNCN	Collection A. Vives, Museo Nacional de Ciencias Naturales, Madrid, Spain
ZMUC	Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark

Results

PRAYDIDAE

A small family with only 47 species worldwide (NIEUKERKEN *et al*., 2011: 214). Three of

these, belonging to the genus *Prays* Hübner, [1825] are already known from the Canary Islands (VIVES MORENO, 2014: 105).

Prays peregrina Agassiz, 2007 (Fig. 1)

Material examined: FUERTEVENTURA, Betancuria, 400 m, 1 ♀, 7-27-XI-2017, leg. P. Falck, genitalia slide 2641PF (PF). **New to the Canary Islands**.

Distribution: Only known from the London and Kent area in Great Britain since 2003 (AGASSIZ, 2007).

Biology: The early stages are described and figured by PLANT (2016: 311-317). The larva mines leaves of *Ruta chalepensis* L. In the last instar it can also feed from the outside of a leaf. *Ruta chalepensis* is probably introduced to the Canary Islands (GONZÁLEZ, 2019).

Remarks: The genitalia are figured by, e.g. AGASSIZ (2007: 409). *P. peregrina* is a presumed adventive species in Great Britain. The geographical origin of the species is unknown, but it is suggested to have originated from Asia (AGASSIZ, 2007).

OECOPHORIDAE

Oecophoridae is a large family with more than 3,300 species in 313 genera (NIEUKERKEN *et al*., 2011: 214), being most diverse in Australia. The larvae of most species feed on decaying organic material, like dead wood, leaf litter etc. No species of Oecophoridae is listed from the Canary Islands by VIVES MORENO (2014) and based on that catalogue the family -in its present concept- is thus new to these islands. However, BÁEZ (2010: 244) lists one species of Oecophoridae, *Harpella forficella* (Scopoli, 1763) from Gran Canaria. We suppose that it is not listed from the Canary Islands by VIVES MORENO (2014), because it is most likely an accidental imported species which has not established itself in the islands. Other taxa formerly referred to the Oecophoridae by, e.g. BÁEZ (2010) have now been transferred to other families like Depressariidae and Stathmopodidae.

Epicallima mikkolai (Lvovsky, 1995) (Fig. 2)

Material examined: GRAN CANARIA, Puerto Rico 0-50 m, 1 ♂, 1 ♀, 17-30-IX-2018, leg. P. Falck, genitalia slide 2863PF (PF). **New to the Canary Islands**.

Distribution: Known from Tunisia from the type-series (LVOVSKY, 1995) and two specimens ex. larvae *Phoenix dactylifera* L. from Spain: ALICANTE, Elche, 86 m, 8-IV-1998 (VIVES MORENO, 2003: 95, fig. 4).

Biology: The early stages are not described. The Spanish specimens were bred from larvae found on *Phoenix dactylifera* L. (Arecaceae).

Remarks: The genitalia are figured by LVOVSKY (1995), and the male genitalia by VIVES MORENO (2003: 105).

STATHMOPODIDAE

The Stathmopodidae is known from 408 described species, mostly with a tropical distribution (NIEUKERKEN *et al*., 2011: 215). Only one species, *Neomariania rebeli* (Walsingham, 1894), was hitherto recorded in this family from the Canary Islands (VIVES MORENO, 2014: 134).

Stathmopoda auriferella (Walker, 1864) (Fig. 3)

Material examined: GRAN CANARIA, Pie de la Cuesta, 500 m, 1 ♂, 11-24-VI-2018, leg. P. Falck; Puerto Rico, 0-50 m, 1 ♂, 1 ♀, 11-24-VI-2018, same data, 3 ♂♂, but 17-30- IX-2018, leg. P. Falck, genitalia slides 2764PF, 2765PF (all PF). **New to the Canary Islands**.

Distribution: Middle East, Far East of Russia and widespread in the Oriental and Afrotropical regions (KOSTER & SINEV, 2003: 64). In Europe there have been some cases of introduction; one or two larvae in slight silken tubes in the calyx of a *Punica granatum* L. (Pomegranate) in the British

Isles, Devon, Plymouth, 30-X-2006 (HECKFORD, 2013), and one adult on an ornamental plant, *Melodorum fruticosum* Lour. in a greenhouse in the Netherlands, 29-VII-2009 (EPPO Global Database, 2010).

Biology: According to KOSTER & SINEV (2003: 64) the larva lives in silken galleries among various types of decaying vegetable matter. It has sometimes been recorded from living flowers, seeds or shoots, injured by other invertebrates. It is known as a pest of minor importance of pomegranates.

Remarks: Probably an adventive species which is already established on the southern part of Gran Canaria.

***Tortilia flavescens* Falck & Karsholt, sp. n.** (Figs 4, 18, 18a)

Holotype ♂, SPAIN: Gran Canaria, Pie de la Cuesta 8 km nnv, 895 m, 17-30-IX- 2018, leg. P. Falck", genitalia slide 2814PF (coll. ZMUC). Paratypes: SPAIN, Gran Canaria, Puerto Rico, 0-50 m, 3 ♂♂, 17-30-IX-2018, leg. P. Falck; El Sao, 110 m, 1 ♂, 17-30-IX-2018, leg. P. Falck; Pie de la Cuesta, 500 m, 4 ♂♂, 17-30-IX-2018, leg. P. Falck; 8 km nnv, Pie de la Cuesta, 895 m, 9 ♂♂, 17-30-IX-2018, leg. P. Falck, genitalia slides 2736PF, 2811PF, 2839PF (coll. PF, MNCN).

Description: Wingspan 10-11mm. Head and eye tuft white; neck dark brown; thorax light yellow. Scapula dark brown, distally and ventrally whitish; antenna lamellate dark brown. Labial palpus ascending, dorsally white with distal part of segment 2 dark brown, ventrally white; the length of segment 3 about two-thirds of segment 2. Forewing shining light yellow, with more or less suffusion of brown scales especially towards dorsum, sometimes forming two diffuse brown markings. Hindwing grey, with light yellow cilia. Abdomen light yellow.

Genitalia ♂ (Fig. 18): Tegumen with uncus and gnathos large, not as long as valva; valva long and slender with the distal part of cucullus bent, dorsal edge clearly concave, costa short, ampulla diminutive, sacculus short, about 2/5 length of valva; phallus (Fig. 18a) short and almost quadrangular, distally with apical strong hook.

Genitalia ♀: Unknown.

Differential diagnosis: The lack of distinct pattern of the forewing separates *T. flavescens* from most other members of *Tortilia*. The genitalia are different from all other *Tortilia* species: the long, slender valva, the bent distal part of cucullus and the short quadrangular phallus are characteristic for the new species.

Biology: The early stages and host-plant are unknown.

Distribution: Only known from the Spanish island of Gran Canaria.

Remarks: Hitherto only eight species of *Tortilia* are known (SINEV, 2015: 57-58).

Etymology: The species is named after the coloration of the forewing (*flavescens* means yellowish in Latin).

SCYTHRIDIDAE

This family is known from 669 species Worldwide (NIEUKERKEN *et al*., 2011: 215), most of them in the genus *Scythris* Hübner, [1825]. Thirteen species have been recorded from the Canary Islands (VIVES MORENO, 2014: 151-155), nine being endemic to these islands (BENGTSSON, 1997). Here we add six species for the Canary Islands and describe two new species.

Scythris albidella (Stainton, 1867) (Fig. 5)

Material examined: Fuerteventura, Betancuria, 400 m, 4 ♂♂, 1 ♀, 7-27-XI-2017, leg. P. Falck; Las Parcelas, 70 m, 3 ♂♂, 7-27-XI-2017 leg. P. Falck, genitalia slides 2575PF, 2576PF, 2678PF; Corralejo, 0-10 m, 1 ♂, 1 ♀, 27-II-19-III-2018, leg. P. Falck; Caldereta, 1 ♂, 27-II-19-III-2018, leg. P. Falck, genitalia slide 2698PF (all PF**). New to the Canary Islands**.

Distribution: Throughout North Africa to the Middle East and the Balkans (BENGTSSON, 1997: 57).

Biology: The early stages and host-plant are unknown. All the specimens were attracted to artificial light.

Remarks: The genitalia are figured by BENGTSSON (1997: Figs 48, 271).

Scythris eucharis Walsingham, 1907 (Fig. 6)

Material examined: FUERTEVENTURA, Corralejo, 0-10 m, 1 ♂, 1 ♀, 7-27-XI-2017, leg. P. Falck, genitalia slides 2580PF, 2681PF; Betancuria, 400 m, 1 ♀, 7-27-XI-2017, leg. P. Falck, genitalia slide 2578PF (all PF). **New to the Canary Islands**.

Distribution: Algeria, Israel and Tunisia (BENGTSSON, 1997: 85).

Biology: The type series was reared from *Traganum nudatum* Moq. (BENGTSSON, 1997: 85), which has not been found in the Canary Islands (GONZÁLEZ, 2019). On the biotope *Traganum moquinii* Webb occurs commonly and may be the hostplant for *S. eucharis*. All the specimens were attracted to artificial light.

Remarks: The genitalia are figured by BENGTSSON (1997: Figs 93, 314).

Scythris amplexella Bengtsson, 2002 (Fig. 7)

Material examined: FUERTEVENTURA, Corralejo, 0-10 m, 1 ♀, 7-27-XI-2017, leg. P. Falck, genitalia slide 2577PF (PF). **New to the Canary Islands.**

Distribution: Oman, Sudan and Yemen (BENGTSSON, 2002a, b).

Biology: The early stages and host-plant are unknown. The specimen was attracted to artificial light.

Remarks: The genitalia are figured by BENGTSSON (2002a: 110).

Scythris camelella Walsingham, 1907 (Fig. 8)

Material examined: TENERIFE, El Médano, 0-50 m, 2 ♂♂, 1-20-III-2017, leg. P. Falck, genitalia slide 2571PF (PF). **New to the Canary Islands**.

Distribution: Algeria, Egypt, Iran, Sudan, Tunisia and Yemen (BENGTSSON, 2002b: 70).

Biology: The early stages and host-plant are unknown. All the specimens were attracted to artificial light.

Remarks: The genitalia are figured by BENGTSSON (1997: Figs. 160, 363).

Scythris mus Walsingham, 1898 (Fig. 9)

Material examined: FUERTEVENTURA, Betancuria, 400 m, 4 ♂♂, 1 ♀, 7-27-XI-2017, leg. P. Falck, genitalia slide 2679PF; same data, 2 ♂♂, 2 ♀♀, but 27-II-19-III- 2018, leg. P. Falck; Vallebrón, 250 m, 1 ♂, 2 ♀♀, 7-27-XI-2017, leg. P. Falck; Corralejo, 0-10 m, 2 ♂♂, 7-27-XI-2017, leg. P. Falck; Caldereta, 120 m, 2 ♂♂, 1 ♀, 7-27-XI-2017, leg. P. Falck (all PF); LANZAROTE, Urb. Famara, 55 m, 1 ♂, 2-8-XI-2018, leg. B. Skule & C. Hviid; 2 km SW Urb. Famara, Las Laderas, 55 m, 5 ♂♂, 2-8-XI-2018, leg. B. Skule & C. Hviid (all ZMUC); TENERIFE, El Médano, 0-50 m, 1 ♂, 1-20-III-2017, leg. P. Falck, genitalia slide 2680PF (PF). **New to the Canary Islands**.

Distribution: Widely distributed in the Mediterranean area, from Spain and North Africa to Saudi Arabia (BENGTSSON, 1997: 137).

Biology: The early stages and host-plant are unknown. All the specimens were attracted to artificial light.

Remarks: The genitalia are figured by BENGTSSON (1997: Figs 159, 367).

***Scythris brithae* Falck & Karsholt, sp. n.** (Figs 10, 19, 19a, 20)

Holotype ♂: "SPAIN, GRAN CANARIA, Los Tilos de Moya, 500 m, 11-24-VI-2018, leg. P. Falck" (coll. ZMUC). Paratypes: GRAN CANARIA, Los Tilos de Moya, 500 m, 10 ♂♂, 3 ♀♀, 11-24-VI-2018,

leg. P. Falck, genitalia slides 2731PF, 2733PF, 2860PF; same data, 2 ♂♂, but 17-30-IX-2018, leg. P. Falck, genitalia slide 2862PF (coll. PF, MNCN).

Description: Wingspan 9.5-10.5 mm. Head, collar, tegula and thorax dark brown, with a different degree of mixture with pale ochreous scales, especially around the neck. Scapula dark brown with mixture of ochreous; antenna dark brown, length 3/4 of the forewing, cilia in male about 0.7 of antenna diameter, in female absent. Labial palpus slightly ascending, dark brown on the upper side, beige ventrally, length of third segment 3/4 of second segment. Forewing blackish brown with two incomplete whitish fasciae and two or more pale blotches in distal third and near the apex; an outward oblique fascia at 1/3 to the middle of forewing; outer fascia from tornus more straight reaching the middle of forewing; cilia dark grey. Hindwing width about 1/2 of the forewing, dark fuscous; cilia dark grey, ochreous towards base. Underside of wings uniform dark grey. Legs dark fuscous, paler ochreous inwardly. Abdomen dark brown dorsally, laterally and ventrally beige ochreous, more whitish in female.

Genitalia ♂ (Fig. 19): Almost symmetrical. Uncus anvil-shaped, slightly depressed posteriorly. Gnathos small and apex hook-like. Tegumen with lateral, rounded protrusions. Valvae almost symmetrical, basally subtriangular, with a long lateral tapering process. Phallus almost straight in caudal half then meandering with two bends. Tergum VIII (Fig. 19a) subtriangular with two small lateral protrusions and asymmetrical anvil-shaped posterior tip; sternum VIII (Fig. 19a) subrectangular, posterior end with two digitate rounded processes.

Genitalia ♀ (Fig. 20): Sternum VII with almost invisible median fissure. Segment VIII subrectangular with a small spine anteriorly. Antrum small and funnel-shaped.

Differential diagnosis: The dark colour of forewing and the incomplete, oblique fascia separate *S. brithae* from the other members of the *S. petrella*-group; however, *S. arachnodes* has dark coloured forewings too, but there are two complete diffuse white fasciae. The genitalia are different from the other species: the anvil-shaped uncus, an almost symmetrical valva with long tapering process, the phallus almost straight in caudal part and with two bends distally in the male, and small funnel-shaped antrum, sternum VII with almost invisible median fissure and no sclerotized, anterior, V-shaped structure in the female are characteristic.

Biology: The early stages are unknown, but the larva probably feeds on lichens. The type-specimens were collected sitting on - or disturbed from a rock wall with abundant growth of lichens.

Distribution: Only known from the type-locality Los Tilos de Moya, Gran Canaria, Canary Islands.

Remarks: *S. brithae* and *S. grancanariella* belong to the *S. petrella* species-group (BENGTSSON, 1997: 138): *S. arachnodes* Walsingham, 1908, *S. hierroella* Klimesch, 1986, *S. petrella* Walsingham, 1908 and *S. pseudarachnodes* Bengtsson, 1997. These species are rather small with dark forewings and whitish markings in form of more or less complete fasciae and sometimes additional pale blotches. Male genitalia with sigmoid or meandering phallus, lateral, rounded extension on tegumen, small valvae and asymmetrical segment VIII. Female genitalia are usually with visible antrum; sternum VII with median fissure, furnished with sclerotized, anterior, V-shaped structure. Larva feeds on lichens. Endemic species group of the Canary Islands (BENGTSSON, 1997: 138). BENGTSSON (1997: 10) notes that classification is further complicated by the fact that the female genitalia in several cases do not match a grouping based on the male genitalia, which seems to be the case with the two new species, sternum VII has a slurred median fissure and lacks the sclerotized, anterior V-shaped structure.

Etymology: The species is named after the wife of the first author, Britha Falck, who has been very supportive during many collecting trips to the Canary Islands.

***Scythris grancanariella* Falck & Karsholt, sp. n.** (Figs 11, 21, 21a, 22)

Holotype ♀: "SPAIN, Gran Canaria, Los Tilos de Moya, 500 m, 11-24-VI-2018, leg. P. Falck"

genitalia slide (coll. ZMUC). Paratypes: GRAN CANARIA, Los Tilos de Moya, 500 m, 1 ♂, 2 ♀♀, 11-24-VI-2018, leg. P. Falck, genitalia slides 2732PF, 2961PF (coll. PF, MNCN).

Description: Wingspan 9-10 mm. Head, collar and neck dark grey-brown, slightly bronzy, especially the head. Mesothorax and thorax dark grey-brown with whitish scales posteriorly. Scapula dark brown; antenna dark brown, length 3/4 of forewing, cilia in male longer than antenna diameter, in female shorter than antenna diameter. Labial palpus slightly ascending, dark grey-brown, length of third segment about 3/4 of second segment. Forewing greyish brown, darker towards costa; white markings rather diffuse giving the moth a speckled appearance; a bent fascia at 1/3, a diffuse zigzag fascia from tornus almost to costa, often with a dark spot in the middle, scattered white scales and a diffuse white patch in apical area; cilia grey. Hindwing width about 3/4 of forewing, dark grey; cilia grey. Underside of wings uniform greyish brown. Abdomen dark greyish brown, ventrally whitish.

Genitalia ♂ (Fig. 21): Asymmetrical. Uncus anvil-shaped. Tegumen with lateral, rounded protrusions. Gnathos small and hook-like. Valvae asymmetrical, left valva digitate, basally subtriangular, dorsally a spatulated process and a hook-like process (sacculus?), tapering with pointed apex; right valva as left, but sacculus only with a small spine. Phallus basally straight, dorsally sigmoid. Tergum VIII (Fig. 21a) almost symmetrical, with lateral oval protrusion, posterior part digitate with two rounded protrusions. Sternum VIII (Fig. 21a) subrectangular with lateral tounge-shaped protrusion, posterior part asymmetrical with two rounded sclerotized processes.

Genitalia ♀ (Fig. 22): Sternum VII with slurred median fissure, rim slightly sclerotized. Segment VIII sub-rectangular. Antrum funnel-shaped, clearly visible, ductus bursae with a circular sclerotized dilatation.

Differential diagnosis: External appearance of *S. grancanariella* is similar to *S. hierroella* Klimesch, 1986, *S. petrella* Walsingham, 1908 and *S. pseudoarachnodes* Bengtsson, 1997; the lighter greyish forewings with more blurred whitish markings separates *S. grancanariella* from *S. brithae*, which occurs in the same locality, and *S. arachnodes* Walsingham, 1908. The genitalia of *S. grancanariella* are clearly distinct from the other species in the group: the asymmetrical valvae with the hook-shaped process on the left, the oval protrusion on tergum VIII in the male, and the visible antrum and the swelling of ductus bursa in the female are characteristic.

Biology: The early stages are unknown, but the larva probably feeds on lichens. Adult specimens were flying in the afternoon sun.

Distribution: Only known from the type-locality Los Tilos de Moya, Gran Canaria, Canary Islands.

Remarks: See previous species.

Etymology: The species is named after the Canary Island: Gran Canaria, where the type-serie was collected.

Enolmis acanthella (Godart, 1824) (Fig. 12)

Material examined: LANZAROTE, above Barranco la Elvira, at Haria, 575 m, 1 ♂, 2-XI-2018, leg. B. Skule & C. Hviid, genitalia slide 5351OK (ZMUC). **New to the Canary Islands.**

Distribution: South-western Europe and North-western Africa (BENGTSSON, 1997: 170).

Biology: The early stages and host-plant are unknown, but the larva is assumed to feed on lichens. The specimen was attracted to artificial light.

Remarks: The genitalia are figured by BENGTSSON (1997: 255, 278).

COSMOPTERIGIDAE

This is a rather large family with 1792 species in 135 genera (NIEUKERKEN *et al*., 2011: 215). Thirteen species have been recorded from the Canary Islands (VIVES MORENO, 2014: 151-159). Here we add five species which are new to these islands. The first two belong to the subfamily Chrysopeleiinae and the other three to the subfamily Cosmopteriginae.

Bifascia nigralbella (Chrétien, 1915) (Fig. 13)

Material examined: FUERTEVENTURA, Corralejo, 0-10 m, 2 ♂♂, 1 ♀, 7-27-XI-2017, leg. P. Falck; Betancuria, 400 m, 1 ♂, 7-27-XI-2017, leg. P. Falck; Caldereta, 120 m, 1 ♀, 7-27-XI-2017, leg. P. Falck (all PF). **New to the Canary Islands**.

Distribution: Spain, North Africa, Middle East eastwards to Pakistan and western India, Central Asia eastwards to Mongolia (KOSTER & SINEV, 2003: 187).

Biology: *Acacia* Mill. and *Tamarix* L. (KOSTER & SINEV, 2003: 187).

Remarks: The genitalia are figured by KOSTER & SINEV (2003: Figs 155).

Bifascioides leucomelanella (Rebel, 1917) (Fig. 14)

Material examined: TENERIFE, Arona, 600 m, 1 ♂, 1-20-III-2017, leg. P. Falck (PF). **New to the Canary Islands**.

Distribution: Malta and North Africa (KOSTER & SAMMUT, 2006).

Biology: Unknown.

Remarks: The genitalia are figured by KOSTER & SINEV (2003: Figs 156).

Pyroderces apicinotella (Chrétien, 1915) (Figs 15, 23)

Material examined: FUERTEVENTURA, Corralejo, 0-10 m, 1 ♂, 7-27-XI-2017, leg. P. Falck, genitalia slide 2672PF; GRAN CANARIA, Puerto Rico, 0-50 m, 1 ♀, 11-24-VI-2018, leg. P. Falck; TENERIFE, Armenime, 0-50 m, 2 ♀♀, 1-20-III-2017, leg. P. Falck, genitalia slides 2508PF, 2516PF (all PF). **New to the Canary Islands.**

Genitalia ♀ (Fig. 23): Apophyses anteriores about 0.8 as long as apophyses posteriores. Ostium small, surrounded by a sclerotized rim. Sterigma large, bulbous, U-shaped, tapering anteriorly and with bent sclerotized rim in middle. Ductus bursae about two-thirds as long as corpus bursae. Corpus bursae oval; signa tongue-shaped with broader base and surrounded by several smaller blunt sclerotized spines. The large U-shaped sterigma and signa are characteristic.

Distribution: Tunisia, Libya and Iraq (KOSTER & SINEV, 2003: 129).

Biology: Unknown.

Remarks: The species was hitherto only known from males.

Anatrachyntis rileyi (Walsingham, 1882) (Fig. 16)

Material examined: GRAN CANARIA, El Sao, 110 m, 1 ♀, 11-24-VI-2018, leg. P. Falck, genitalia slide 2736PF.

Distribution: The species is found in much of the warm or tropical areas of the Old World, Australia, South and North America and Caribbean (COCK & BURRIS, 2013).

Biology: The larvae have been recorded from rotten cotton bolls, cotton seeds, corn, Milo maize, stems of corn, corn husks, flowers of castor bean, etc. (KOSTER & SINEV, 2013).

Remarks: This species is included here because it was recorded from the Canary Islands (Tenerife) by KOSTER & SINEV (2003: 130), but not included from there by VIVES MORENO (2014). The genitalia are figured by, e. g. KOSTER & SINEV (2003: 280, 340).

Coccidiphila Danilevsky, 1950

During the 20th Century several authors, e.g. WALSINGHAM (1908: 963-964) and KLIMESCH (1983: 105) listed *Coccidiphila ledereriella* (Zeller, 1850) from the Canary Islands. TRAUGOTT-OLSEN (1986) proved that *Coccidiphila* in these islands was represented by at least three species: *C. gerasimovi* Danilevsky, 1950, *C. riedli* (Traugott-Olsen, 1986) and *C. kasypinkeri* (Traugott-Olsen, 1986). He also included *C. ledereriella*, based on literature records. BÁEZ (2010: 237) listed the same four species as TRAUGOTT-OLSEN, and *C. patriciae* Nel & Nel, 2000.

KOSTER & SINEV (2003: 133-136), in their treatment of the European Cosmopterigidae included the following species from the Canary Islands: *C. gerasimovi*, *C. riedli*, *C. kasypinkeri*, and the then recently described *C. patriciae*. They referred Canary Island records of *C. lederiella* to *C.*

riedli. KOSTER & SINEV (2003: 134) considered *C. patriciae*, which was described from two females with distorted genitalia, as a doubtful taxon, and Sjaak Koster (in litt.) is of the opinion that it is probably a synonym of *C. gerasimovi*.

In the recent catalogue by VIVES MORENO (2014: 157) the following species of *Coccidiphila* are listed from the Canary Islands: *C. patriciae*, *C. kasypinkeri*, *C. riedli* and *C. danilevskyi* Sinev, 1997, the latter with the synonym "*ledereriella* sensu Traugott-Olsen, 1986". The status of *C. ledereriella* and *C. danilevskyi* as distinct species is unclear KOSTER & SINEV (2003: 135), and according to Koster (in litt.) they are most likely synonyms.

Awaiting further research, especially based on studied of the DNA of the involved species, we refrain from establishing new synonyms here. However, we are of the opinion that there are three confirmed species of *Coccidiphila* in the Canary Islands: *C. gerasimovi*, *C. riedli* and *C. kasypinkeri*, and one species of doubtful status (*C. patriciae*). The occurrence of *C. ledereriella* and / or *C. danilevskyi* in these islands is unconfirmed, and they should be removed from the list of Canary Island Lepidoptera.

Coccidiphila gerasimovi Danilevsky, 1950 (Fig. 17)

Material examined: Fuerteventura, Betancuria, 400 m, 1 ♂, 7-27-XI-2017, leg. P: Falck, genitalia slide, 2568PF; Corralejo, 0-10 m, 1 ♂, 4 ♀♀, 7-27-XI-2017, leg. P: Falck, genitalia slides 2569PF, 2671PF; Lajares 50-80 m, 1 ♀, 7-27-XI-2017, leg. P: Falck, genitalia slide 2570PF. Gran Canaria, El Sao, 110 m, 2 ♂♂, 11-24-VI-2018, leg. P. Falck, genitalia slide 2794PF; Puerto Rico, 0-50 m, 2 ♂♂, 2 ♀♀, 11-24-VI-2018, leg. P. Falck; Los Tilos de Moya, 500 m, 3 ♂♂, 1 ♀, 11-24-VI-2018, leg. P. Falck; Pie de la Cuesta, 500 m, 1 ♂, 1 ♀, 17-30-IX-2018, leg. P. Falck (all PF). Lanzarote, 0.8 km S Conil, 1.4 km N Tias, 240 m, 1 ♂, 2-8-XI-2018, leg. B. Skule og C. Hviid (ZMUC). Tenerife, Adeje, 300 m, 1 ♀, 1-20-III-2017, leg. P. Falck, genitalia slide 2513PF; Aguamansa, 1050 m, 1 ♂, 1-20-III-2017, leg. P. Falck, genitalia slide 2514 (all PF).

Distribution: Mediterranean countries from Portugal to Turkey, Middle East and Caucasus (KOSTER & SINEV, 2003: 134).

Biology: The larva feed on eggs of Coccoidea (KOSTER & SINEV, 2003).

Remarks: This species is included here because it was recorded from the Canary Islands (Tenerife) by KOSTER & SINEV (2003: 130), but not included from there by VIVES MORENO (2014). The genitalia are figured by, e. g. KOSTER & SINEV (2003: 280, 340).

Ascalenia Wocke, 1876

Two species of *Ascalenia* have been recorded from the Canary Islands: *A. vanella* (Frey, 1860) and *A. acaciella* Chrétien, 1915 (KOSTER & SINEV, 2003: 177, 180; VIVES MORENO, 2014: 155). The occurrence of *A. vanella* is based on KASY (1969: 345) who writes: "Dünen im Süden von Gran Canaria bei Maspalomas". In his review of family Walshiidae from the Canary Islands KLIMESCH (1983: 106) only deals with one *Ascalenia* species, viz. *A. acaciella* from: "Gran Canaria: Maspalomas, Dunengebiet" and "La Gomera: Hermigua". At the same time (KLIMESCH, 1983: 106) -under *A. acaciella* and without mentioning *A. vanella*- he refers to KASY (1969: 362-365). Our interpretation is that Kasy's specimen(s) of *A. vanella* had by then been identified as *A. acaciella*. This is not surprising to us, as the latter is the only *Ascalenia* occurring in the dune area by Maspalomas, where *Acacia* grows plentiful. Based on this we propose to remove *A. vanella* from the list of Lepidoptera occurring in the Canary Islands.

Discussion

The Lepidoptera fauna of the Canary Islands consists of the following elements: 1) endemic species, 2) species with a wider distribution (most often including North Africa and western Europe, 3) occasional or regularly migrant species, 4) species originally brought to the islands by man,

having now become established there, and 5) accidentally introduced species, which have not become established in the islands.

The two new species of *Scythris* described above almost certainly belong to the endemic species, not only because that have only been found in the Canary Islands, but also because they belong to the *S. petrella*-group, which are considered as endemic to the islands. Although *Tortilia flavescens* Falck & Karsholt, sp. n. at moment should be considered endemic, we are of the opinion that it more likely belongs to "group 4", and that it has been introduced to the Canary Islands (like *Stathmopoda auriferella*), but its origin is presently unknown. That is also the case for *Prays peregrina*, which is at present only known from the U. K., but most likely originates from Asia. The remaining new species belong to "group 2", and their occurrence in the Canary Islands has thus hitherto been overlooked.

It is a main focus for both field work and taxonomic studies to keep trace of the taxa of a certain group of organisms occurring in a given area. Checklists and catalogues are indispensable tools for that, but a main problem is that during the preparation of such works species previously listed in such lists are not always critically evaluated. During the preparation of the present paper we became aware of three species of Cosmopterigidae (*Coccidiphila ledereriella*, *C. danilevskyi* and *Ascalenia vanella*), which are listed from the Canary Islands in the most recent checklist of the Lepidoptera occurring there, but which - due to different mistakes - do not belong to the fauna. We are of the opinion that not only the addition of species but also the removal of misplaced species represent equally important progress towards a better knowledge of the fauna of the Canary Islands.

Acknowledgements

The authors are grateful to Bengt Åke Bengtsson, Färjestaden, Sweden; Sjaak J. C. Koster, Naturalis Biodiversity Center, Leiden, The Netherlands, and to Sergey Yu. Sinev, Zoological Institute, Russian Academy of Science, St. Petersburg, Russia for sharing from their expertise on Scythrididae, Cosmopterigidae and Stathmopodidae with us. We also want to thank Carsten Hviid and Bjarne Skule (Denmark) for collecting Microlepidoptera used for this study. We are moreover grateful to Antonio Vives, Madrid, Spain for translating the abstract into Spanish, for editing our manuscript, and for his kind help with obtaining permission to collect Lepidoptera in the Canary Islands into the Scientific Project of SHILAP. Martin Corley, Faringdon, U. K. kindly commented on and improved the English language of the final version of the manuscript.

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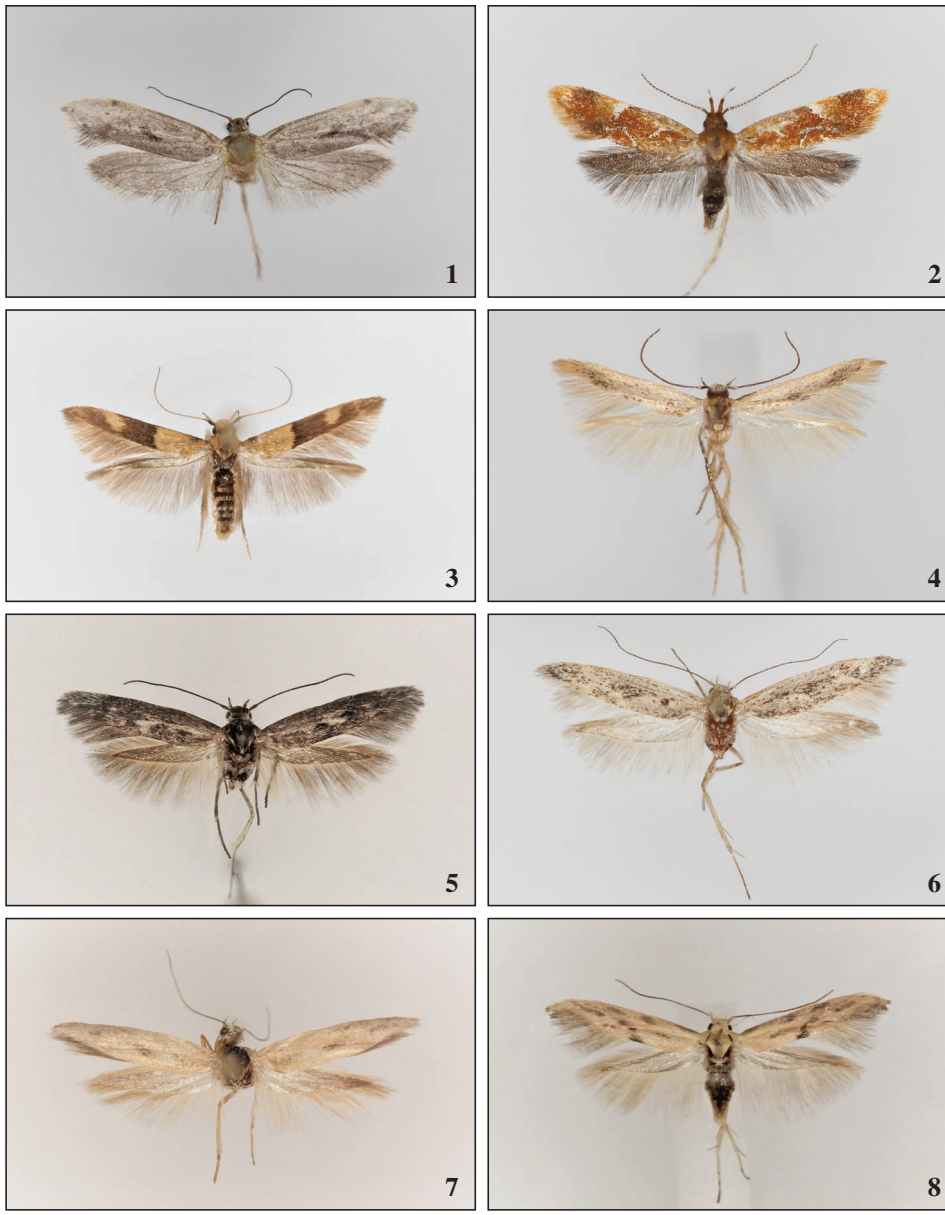
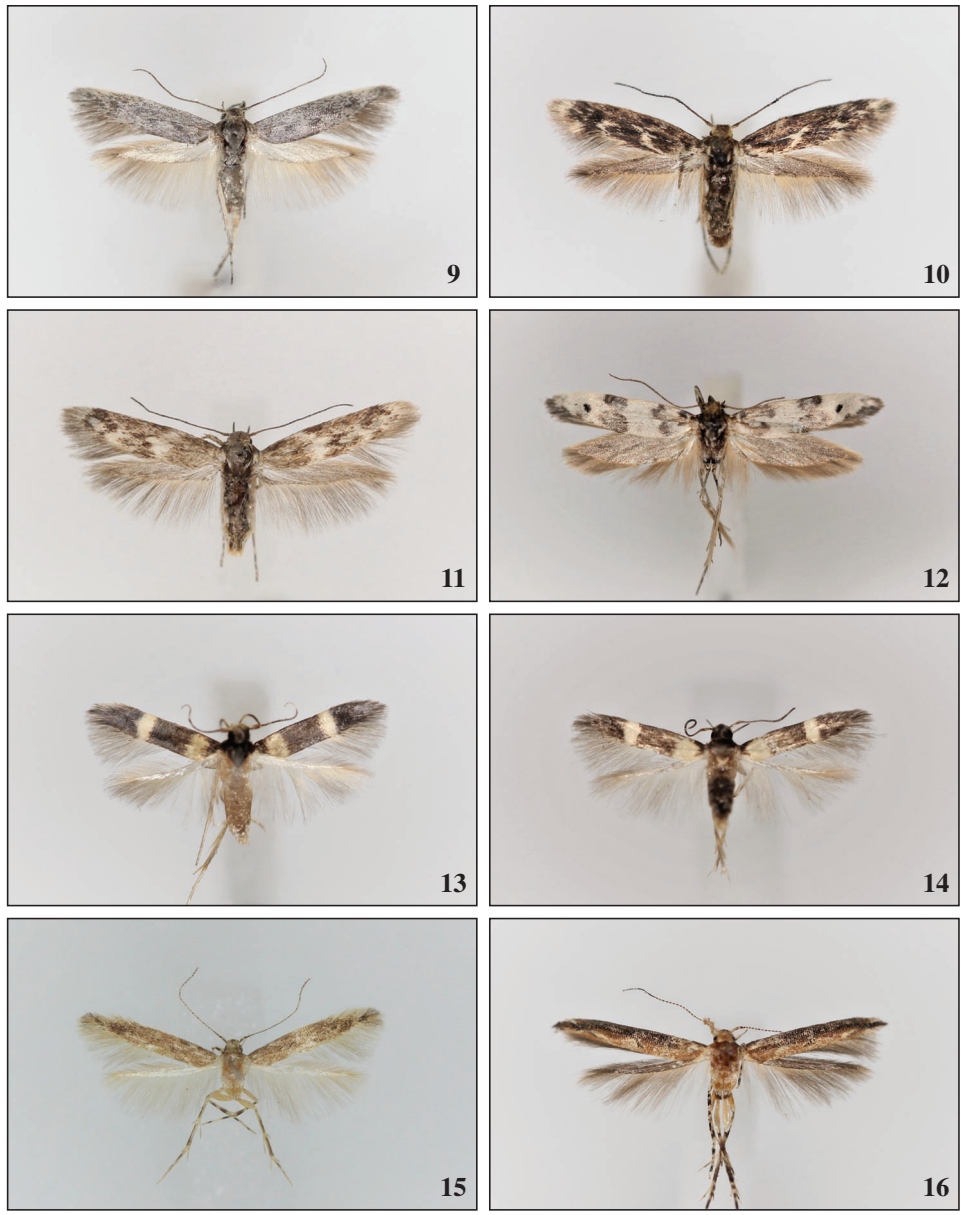
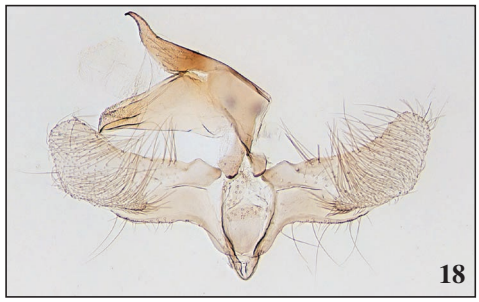
(Recibido para publicación / *Received for publication* 17-II-2019)
(Revisado y aceptado / *Revised and accepted* 18-III-2019)
(Publicado / *Published* 30-VI-2019)

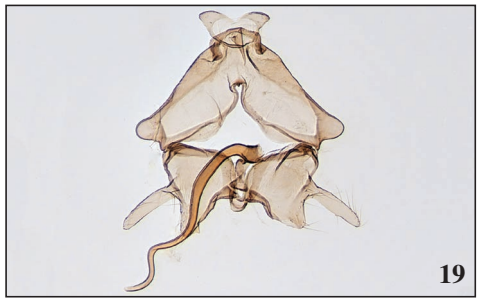


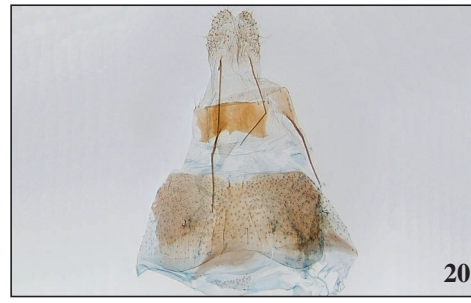
Figs 1-8.– 1. *Prays peregrina* Agassiz, 2007, ♀, Fuerteventura, 14 mm. **2.** *Epicallima mikkolai* (Lvovsky, 1995), ♀, Gran Canaria, 9.5 mm. **3.** *Stathmopoda auriferella* (Walker, 1864), ♀, Gran Canaria, 13 mm. **4.** *Tortilia flavescens* Falck & Karsholt, sp. n., ♂, Gran Canaria, 10.5 mm. Paratypus. **5.** *Scythris albidella* (Stainton, 1867), ♂, Fuerteventura, 11 mm. **6.** *Scythris eucharis* Walsingham, 1907, ♀, Fuerteventura, 14 mm. **7.** *Scythris amplexella* Bengtsson, 2002, ♀, Fuerteventura, 12.5 mm. **8.** *Scythris camelella* Walsingham, 1907, ♂, Fuerteventura, 11 mm.



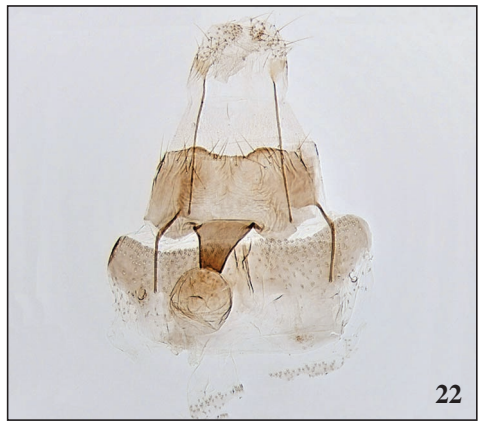
Figs 9-16.– 9. *Scythris mus* Walsingham, 1898, ♂, Fuerteventura, 10 mm. **10.** *Scythris brithae* Falck & Karsholt, sp. n., ♂, Gran Canaria, 10 mm. Paratypus. **11.** *Scythris grancanariella* Falck & Karsholt, sp. n., ♂, Gran Canaria, 9.5 mm. Paratypus. **12.** *Enolmis acanthella* (Godart, 1824), ♂, Lanzarote, 16 mm. **13.** *Bifascia nigralbella* (Chrétien, 1915), ♂, Fuerteventura, 7 mm. **14.** *Bifascioides leucomelanella* (Rebel, 1917), ♂, Tenerife, 7 mm. **15.** *Pyroderces apicinotella* (Chrétien, 1915), ♀, Tenerife, 9.5 mm. **16.** *Anatrachyntis rileyi* (Walsingham, 1882), ♀, Gran Canaria, 11 mm.

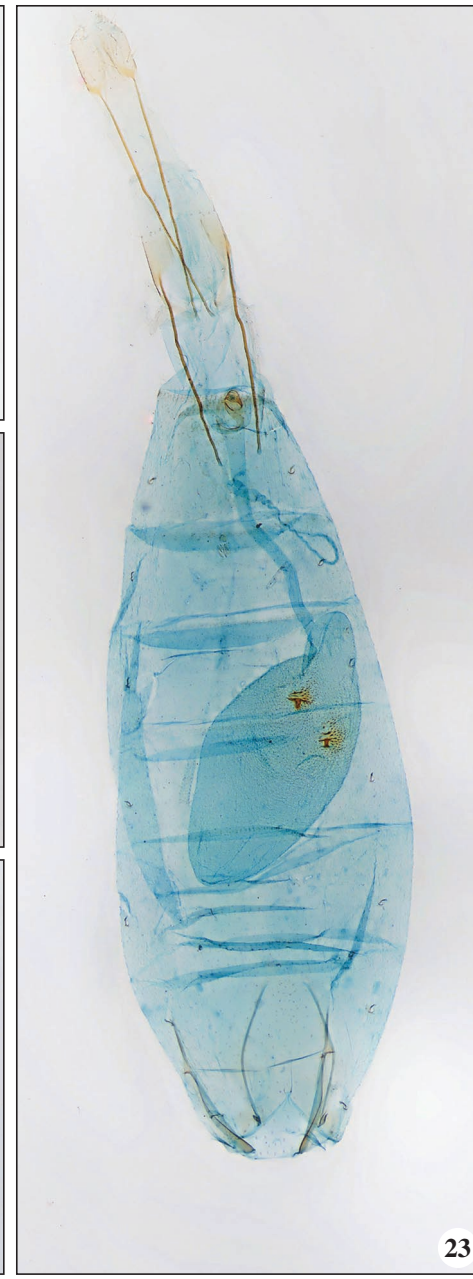






Figs 17-20.– 17. *Coccidiphila gerasimovi* Danilevsky, 1950, ♂, Tenerife, 9 mm. **18.** *Tortilia flavescens* Falck & Karsholt, sp. n., Gran Canaria, ♂, GP2886PF. **18a.** Phallus, GP2814PF. **19.** *Scythris brithae* Falck & Karsholt, sp. n., Gran Canaria, ♂, GP2860PF. **19a.** Segment VIII. **20.** *Scythris brithae* Falck & Karsholt, sp. n., Gran Canaria, ♀, GP2733PF.





Figs 21-23.– 21. *Scythris grancanariella* Falck & Karsholt, sp. n., Gran Canaria, ♂, GP2732PF. **21a.** Segment VIII. **22.** *Scythris grancanariella* Falck & Karsholt, sp. n., Gran Canaria, ♀, GP2730PF. **23.** *Pyroderces apicinotella* (Chrétien, 1915), Tenerife, ♀, GP2508PF.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 341-347 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.775

Zygaena diaphana Staudinger, 1887 bona species (Lepidoptera: Zygaenidae)

A. Nahirnić

Abstract

Zygaena purpuralis (Brünnich, 1763), *Z. minos* ([Denis & Schiffermüller], 1775) and *Z. diaphana* Staudinger, 1887 with the same label data from Pelister National Park (Mt. Baba) in southwestern North Macedonia were discovered in the Witt collection (Zoologische Staatssammlung Munich). Consequently, on the basis of sympatry and good differences in male genitalia with *Z. minos*, *Z. diaphana* is reinstated to species rank. *Zygaena smirnovi* Christoph, 1884, is also treated as separate species.
KEY WORDS: Lepidoptera, Zygaenidae, *Zygaena purpuralis*, *Z. minos*, *Z. diaphana* stat. rev., *Z. smirnovi* stat. rev., sympatry, Pelister, Balkan Peninsula, North Macedonia.

Zygaena diaphana **Staudinger, 1887 buena especie (Lepidoptera: Zygaenidae)**

Resumen

Fueron descubiertas en la colección Witt (Zoologische Staatssammlung, Múnich), *Zygaena purpuralis* (Brünnich, 1763), *Z. minos* ([Denis & Schiffermüller], 1775) y *Z. diaphana* Staudinger, 1887 con la misma etiqueta y datos del Parque Nacional Pelister (Monte Baba) en el suroeste de Macedonia. Consecuentemente, sobre la base de simpatría y buenas diferencias en la genitalia del macho con *Z. minos*, se restituye al rango de especie a *Z. diaphana*. *Zygaena smirnovi* Christoph, 1884, también se restituye al rango de especie.
PALABRAS CLAVE: Lepidoptera, Zygaenidae, *Zygaena purpuralis*, *Z. minos*, *Z. diaphana* stat. rev., *Z. smirnovi* stat. rev. simpatría, Pelister, Península Balcánica, Macedonia norte.

Introduction

Zygaena Fabricius, 1775 is a Palaearctic genus represented by 108 species according to HOFMANN & TREMEWAN (2017). One of the most problematic groups in *Zygaena* is the *Z. purpuralis* complex. *Z. purpuralis* and *Z. minos* are cryptic species which can be distinguished only by male and female genitalia, larva and larval host-plants. Although initially described as species, they were considered conspecific in the 19th and the beginning of the 20th century until REISS (1940, 1941) examined the genitalia and proved that they are in fact distinct species (*Z. purpuralis* and *Z. pimpinellae* Guhn, [1913] sensu Reiss). ALBERTI (1958-1959) gave priority to the taxon *Z. diaphana* over *Z. pimpinellae*; this was followed by REISS & TREMEWAN (1960, 1967). The correct identity and authorship of both species has been established by TREMEWAN (1981a, 1981b) as *Zygaena purpuralis* (Brünnich, 1763) and *Z. minos* ([Denis & Schiffermüller], 1775). TREMEWAN (1981b) treated *Zygaena diaphana* Staudinger, 1887 as a subspecies of *Z. minos*. According to the last revision of this species group by NAUMANN *et al*. (1983) and NAUMANN & NAUMANN (1985) only two species were recognized, viz. *Z. purpuralis* and *Z. minos*. Another taxon that belongs to this group was also described as a species, *Z. smirnovi* Christoph, 1884. It was downgraded to a subspecies of *Z. minos*

(NAUMANN *et al*., 1983). CESARONI *et al*. (1989) did similar morphometric analysis to that of NAUMANN *et al*. (1983), but they used multivariate statistics and as a result got three clusters *Z. purpuralis*, *Z. minos* and *Z. diaphana* from Yozgat in Turkey. In the same study, results of allozymic analysis were confusing as gene flow seems to occur between sympatric populations of *Z. purpuralis* and *Z. minos* in Abruzzo in Italy. However, allozymes of *Z. diaphana* were not analyzed, nor of any population outside of Italy. The sample was not extensive and did not include many important populations. However, the results showed that a reasonable doubt still exists that more than two cryptic species are involved. HOFMANN & TREMEWAN (1996, 2010, 2017) and NAUMANN *et al*. (1999) followed their initial decisions that there are just two species: *Z. purpuralis* and *Z. minos*.

In *Z. minos* ([Denis & Schiffermüller], 1775) two groups are recognized: the *"minos*-group" and the *"diaphana*-group" with differences in male genitalia, larvae and host-plants (NAHIRNIĆ & TARMANN, 2016; HOFMANN & TREMEWAN, 2017). Differences in genitalia are known only in males. In *Z. diaphana* the uncus is slender while the lamina dorsalis has a triangular shape. In *Z. minos*, the uncus is only slender and pointed at the top and the sides of the lamina dorsalis are convex. *Z. minos* final instar larvae are of very light mint blue to light grey. The final instar larvae of *Z. diaphana* from eastern Serbia and western Bulgaria are greenish bright yellow (NAHIRNIĆ & TARMANN, 2016), the final instar larvae from Chelmos are greyish dark olive-green (NAHIRNIĆ & TARMANN, 2016), while those from Turkey are light grey to dark grey, usually with a narrow and sometimes broad, pale yellow mediodorsal line (HOFMANN & TREMEWAN, 2017).

Populations of the *"minos*-group" feed on *Pimpinella* species, while those of the *"diaphana*-group" feed on *Eryngium* species. Both the *"minos*-group" in Crimea (EFETOV, 1990) and the *"diaphana*-group" on Toros dağlari in Turkey (HOFMANN & TREMEWAN, 2017) feed on *Falcaria vulgaris* Bernh.; the latter larvae accept *Eryngium* sp. in captivity (HOFMANN & TREMEWAN, 2017). The distribution of the *"minos*-group" includes Sweden, central and eastern Europe, western Balkan Peninsula to Russia and Transcaucasia, while the *"diaphana*-group" ranges from the southern, central and eastern Balkan Peninsula to Turkey and Transcaucasia. Since both taxa have never been found in sympatry they were considered to belong to the same species by many authors.

New investigations on the *Z. purpuralis* complex with special emphasis on the Balkans including extensive examination of specimens revealed a sympatry of the *"minos*-group" and the *"diaphana*-group" on Mt. Baba in North Macedonia.

Material and methods

Genitalia dissections were done according to ROBINSON (1976). Some of the genitalia were mounted in Euparal on slides, while others are preserved in micro-vials filled with glycerol. All specimens are deposited in the Witt collection in the Zoologische Staatssammlung, Munich, Germany (ZSM). Photographs of genitalia slides were done with an Olympus E-4 camera mounted on an Olympus BH-2 stereo microscope.

Results

New records of *Z. minos* and *Z. diaphana* from the wider area of their sympatry in the Balkans:

Zygaena minos ([Denis & Schiffermüller], 1775)

Republic of North Macedonia, Veles, Topolka Gorge, 150 m, 6 ♂♂, 27-V- 07-VI-1979, leg. (J. de Freina). Pelister [Mt. Baba], 18 km W Bitola, 1900 m, 1 ♂, 11-VII-1980, leg (P. Schaider). Pelister [Mt. Baba], 18 km W Bitola, 1800 m, 1 ♂, 11-VII-1980, leg (P. Schaider). Albania, Devoll river, 2 ♂♂, VI-1934

Zygaena diaphana Staudinger, 1887 **stat. rev.**

Republic of North Macedonia, Pelister [Mt. Baba], 18 km W Bitola, 1900 m, 1 ♂, 11-VII-1980,

leg. (P. Schaider). Pelister [Mt. Baba], 18 km W Bitola, 1800 m, 1 ♂, 11-VII-1980, leg (P. Schaider). Umgebung Bitola, Pelister [Mt. Baba], 1500-1750 m, 1 ♂, 07-08-VII-1979, leg. (J. de Freina)

These are the first reports of *Z. minos* in North Macedonia and Albania. The report of *Z. minos* from Albania in NAHIRNIĆ *et al*. (2013) has to be referred to *Z. diaphana*. The same applies to NAUMANN *et al*. (1983) for North Macedonia since the genitalia of all North Macedonian specimens are illustrated and belong to *Z. diaphana*. *Zygaena purpuralis* is found in the same series as *Z minos* and *Z. diaphana* mentioned above, except at Devoll river.

Discussion

Specimens of *Z. purpuralis, Z. minos* and *Z. diaphana* have the same label data from Pelister National Park (Mt. Baba). All three were collected at the same place at elevations of 1800 and 1900 m. There are not many roads "18 km west from Bitola" which lead to these elevations. In fact, there are two possibilities: the slope next to the road to Široka or the meadows above the Hotel "Molika" which is 12 km west from Bitola where the road ends and then a few kilometers uphill on the foot above the "Kopanki" mountain hut. Paul Schaider used frequently to collect around the hotel "Molika" in the 1980s (Predrag Jakšić, pers. comm.). As *Z. minos* and *Z. diaphana* were found to be sympatric and synchronic on one mountain range, and most probably syntopic, *Z. diaphana* Staudinger, 1887 must be reinstated to species rank. Moreover, there are clear differences in male genitalia (Fig. 1) and habitus between the males of *Z. minos* and *Z. diaphana* from that series. However, on Mt. Baba determination based on habitus is not possible because *Z. minos* and *Z. diaphana* can't be easily distinguished from *Z. purpuralis* due to its high variability. The male genitalia of *Z. purpuralis* are also illustrated on figure 1. De Freina collected only *Z. diaphana* on Mt. Baba at altitudes of 1500-1750 m. This locality could be above hotel "Molika" which is at 1450 m, and around mountain hut "Kopanki" which is at 1630 m. In the 1980s, Schaider and de Freina were both frequently collecting only above hotel "Molika" accompanied by Predrag Jakšić (Predrag Jakšić, pers. comm.). Although this was after the years when they collected *Z. minos* and *Z. diaphana*, the most accessible locality for collecting at that time was the area of hotel "Molika" and its surroundings.

Other discoveries of *Z. minos* in the Balkan Peninsula show that *Z. minos* is geographically closely distributed to *Z. diaphana* (Figure 2). COUTSIS (2017) found *Z. diaphana* on one more locality at Mt. Baba on its southern side which belongs to Greece (in Greece known as Varnús or Peristeri). COUTSIS (2017) reported it as *Z. minos* but according to his description of male genitalia it is clear that all specimens belong to *Z. diaphana*. In the West on the nearby Mt. Galičica, separated by Prespa Lake from Mt. Baba, *Z. diaphana* is a common species (NAUMANN *et al*., 1983, NAHIRNIĆ & TARMANN, unpublished). The southernmost occurrence of *Z. minos* in the Balkans is at Devoll River in Albania in the South-West from Mt. Galičica. Another locality in the southern distributional limit of *Z. minos* is the Topolka River Gorge in central North Macedonia. This population is quite isolated from others of *Z. minos* and *Z. diaphana*. In recent years, knowledge of the distribution of *Z. minos* and *Z. diaphana* has considerably improved. New localities and new country records in the Balkans have been published in NAHIRNIĆ *et al*. (2013), COUTSIS (2017) and NAHIRNIĆ *et al*. (2019). Nonetheless *Z. minos* has been reported as new for Belgium based on old museum material (RENNESON, 2018). The intensive ongoing research will probably reveal more closely distributed and sympatric populations.

Genitalia slides of *Z. minos* from Mt. Baba were already prepared by Karl-Heinz Wiegel, though the date of these genitalia preparations remains unknown to the author of this paper. It is strange that Wiegel didn't notice that NAUMANN *et al*. (1983) published *Z. diaphana* (then as *Z. minos*) from Mt. Galičica and illustrated the genitalia different that those he had done from nearby Mt. Baba. If he (or anyone else who could have seen these genitalia slides) had been triggered by the presence of two different genitalia on two nearby mountains and consequently examined more specimens from Mt. Baba they would likely have found *Z. diaphana* on Mt. Baba sympatric with *Z. minos* and resolved this problem a long time ago.

Preliminary field studies on Mt. Baba could not confirm the presence of *Z. minos* nor *Z. diaphana*.

The visited localities were Kopanki at 1500-1900 m and the road to Široka. Overgrowing of vegetation was noticed in both visited areas. The reason for their possible absence may be that habitats favorable for *Eryngium amethystinum* L., which is the host-plant of *Z. diaphana* on nearby Mt. Galičica (Nahirnić, pers. obs.), or potential host-plant *Eryngium campestre* L. which was observed in lower altitudes on Mt. Baba, are both subject to succession. *Eryngium campestre* could have occupied early successional habitats made by construction of the ski center "Kopanki" which was officially put into operation on 04-XI-1975.

Differences in habitats occupied by *Z. minos* and *Z. diaphana* on the Balkan Peninsula are evident. If all Balkan populations of *Z. diaphana* were considered to belong to *Z. minos*, it would be very difficult to explain why would a xero-mesophilous species like *Z. minos* have made a sudden shift to xero-thermophilous habitats in the central Balkan Peninsula when proceeding to the South. In the Dinaric mountains *Z. minos* inhabits *Mesobromion* grasslands close to the coniferous forest at an altitude of 1200-1300 m. On Mt. Baba it probably inhabits clearings in *Pinus peuce* Griseb. forest. In the southern Balkans, *Z. diaphana* is found in dry rocky grasslands mainly between 1200-1800 m. In the eastern part of the Balkans it is found also in dry rocky grasslands from 350 to 1000 m (NAHIRNIĆ *et al*., 2019). Localities where *Z. minos* were found are sheltered and always in vicinity of the forest while those of *Z. diaphana* are open and windy, very often on exposed mountain slopes. Moreover, why should this species make a host-shift? At several localities where *Z. minos* occurs, *E. amethystinum* or *E. campestre* occur as well. The same applies for localities of *Z. diaphana*, where *Pimpinella* sp. were found.

Another question which could challenge reinstatement of *Z. diaphana* is what could be the refugium of each species during the Pleistocene glaciations? *Z. diaphana* is much more widely distributed in the Balkans than *Z. minos*. One of the reasons for this maybe the availability of the larval host-plants as *E. campestre* is common throughout all of the Balkans and *E. amethystinum* is common in the mountains in southern Balkans. *Z. diaphana* has a continuous range in the Balkans while *Z. minos* is very local with geographically distant populations. The majority of the localities of *Z. minos* on the Balkans are near or at refugial localities such as deep gorges or small gorges of east-west direction. Populations from North Macedonia and Albania are well-differentiated from other Balkan populations which means that they had time to differentiate and that they were present in the Balkans before the postglacial period. Dispersed distribution of *Z. minos* in the Balkans could well be explained as relict populations from Pleistocene which migrated over the Dinaric Alps and Scardo-Pindhic mountain system and found refugia there. As *Z. minos* occurs in Crimea, Georgia, Armenia and Dagestan, it is possible that one way of expansion during the glaciations to the south was along the Black Sea to Transcaucasia and further to the South. Another way could be along the Apennine Peninsula. A possible refugium of *Z. diaphana* could be southern Balkans and Turkey. *Zygaena diaphana* shows an expansion which is most probably postglacial. Apparently different origins of *Z. minos* and *Z. diaphana* in the Balkans indicate the possibility that they were already different species during the last Glacial Age. They must have been in contact during the glacial and interglacial stages, but in the whole Balkan Peninsula specimens with intermediate male genitalia have not been found so far.

A check list of the subspecies of *Z. minos* and *Z. diaphana,* primarily based on male genitalia morphology, is provided below. All these subspecies were treated as *Z. minos* by HOFMANN & TREMEWAN (1996) and EFETOV (2004).

Zygaena minos ([Denis & Schiffermüller], 1775)
- *Z. minos minos* ([Denis & Schiffermüller], 1775)
- *Z. minos sareptensis* Rebel, 1901
- *Z. minos normanna* Verity, 1922
- *Z. minos viridescens* Burgeff, 1926
- *Z. minos ingens* Burgeff, 1926
- *Z. minos dagestana* Sheljuzhko, 1936

Zygaena diaphana Staudinger 1887, **bona sp., stat. rev.**

Z. diaphana diaphana Staudinger, 1887, **stat. rev.**

Z. diaphana clavigera Burgeff, 1914, **comb. n.**

Z. diaphana peloponnesica Holik, 1937 **comb. n.**

Z. diaphana alagezi Holik & Sheljuzhko, 1953, **comb. n.**

Z. diaphana alanyca Reiss & Reiss, 1972, **comb. n.**

Z. diaphana tatvanica Reiss & Reiss, 1973, **comb. n.**

Further revision is needed as several taxa are provisionally treated here as *Z. diaphana*. Preliminary results of sequencing of the 658-bp region the COI mitochondrial gene *Z. minos persica* Burgeff, 1926, initially described as *"Smirnowi* [sic] Christoph var. *persica* n. v." showed a distance of 5% from all other samples of *Z. purpuralis*, *Z. minos* and *Z. diaphana* which originated from Italy, Austria, Balkans, Ukraine and Turkey (NAHIRNIĆ & TARMANN, 2016; NAHIRNIĆ & TARMANN, unpublished). Based on the male and female genitalia and the external appearance *persica* and *smirnovi* are most probably conspecific, and this would lead to the reinstatement of *Z. smirnovi* because it has priority over *persica*. If *Z. smirnovi* would be accepted here as conspecific with *Z. diaphana* to which it is morphologically closer than to *Z. minos* this would cause synonymy of *Z. diaphana* as *Z. smirnovi* was described earlier. *Z. smirnovi* Christoph, 1884, stat. rev., is therefore also treated here as separate species and *Z. smirnovi persica* Burgeff, 1926 as subspecies of the same species. There is a constant difference in male and female genitalia between *Z. smirnovi* and other taxa from *Z. purpuralis* complex. *Zygaena smirnovi* has a slender uncus but it is not so slender as in *Z. diaphana*. The lamina dorsalis is close to that of *Z. purpuralis* but it is slightly triangular. Lastly, female genitalia are similar to those of *Z. minos* and *Z. diaphana*. The known larval host-plant of *Z. smirnovi persica* is *Eryngium creticum* Lam. (Keil, 2014). Even *tatvanica* could be closely related to *Z. smirnovi*. There is an ongoing research on *Z. smirnovi* which will reveal more detailed information. The genitalia morphology of *alagezi* is more similar to that of *Z. diaphana* than to that of *Z. minos* while its biology is unknown.

Based on this discovery the distribution of *Z. minos* is as follows: France, Belgium, Italy, Germany, Switzerland, Austria, the Czech Republic, Denmark, Sweden, Poland, Lithuania, Estonia, Belarus, Slovakia, Hungary, Bosnia and Herzegovina, Montenegro, Albania, North Macedonia, Romania, Ukraine, Russia, Georgia and Armenia. *Zygaena diaphana* is distributed in Serbia, Albania, North Macedonia, Bulgaria, Greece, Turkey, Armenia and Iran.

Acknowledgements

I am thankful to Thomas Witt (†) (Museum Witt, Munich) for supporting my stay in ZSM, Gerhard M. Tarmann for valuable comments and for taking photos of genitalia slides, and Stoyan Beshkov and Predrag Jakšić for valuable comments. Colin Plant (Bishops Stortford, United Kingdom) is thanked for linguistic corrections. Antonio Vives (Madrid, Spain) is thanked for translating abstract to Spanish.

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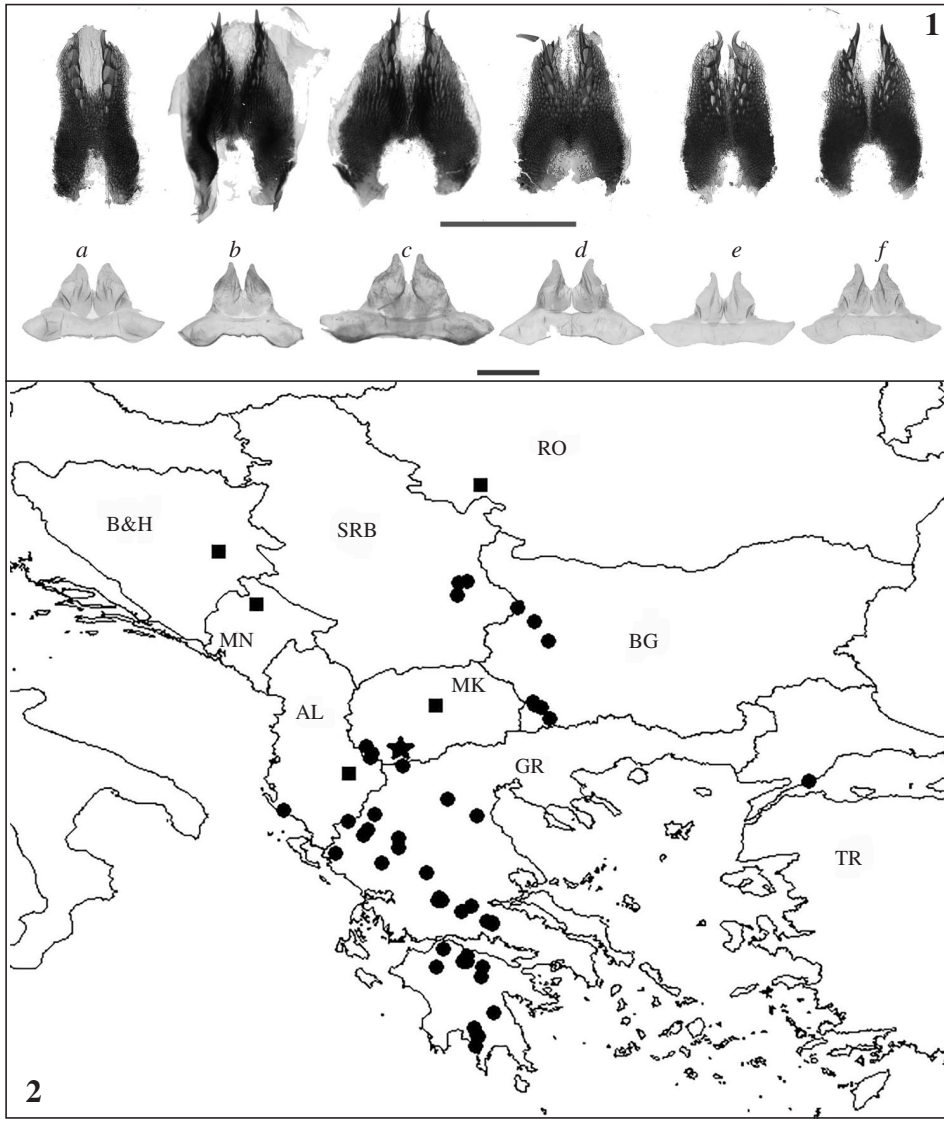
(Recibido para publicación / *Received for publication* 24-I-2019)
(Revisado y aceptado / *Revised and accepted* 13-V-2019)
(Publicado / *Published* 30-VI-2019)



Figures 1-2.– 1. Laminae dorsales (upper row) and uncus-tegumen complexes (lower row) of *Zygaena purpuralis* (Brünnich, 1763), *Z. minos* ([Denis & Schiffermüller], 1775) and *Z. diaphana* Staudinger, 1887 from Mt. Baba. **a.–** *Z. purpuralis*, Mt. Baba, 18 km W Bitola, 1900 m; **b.–** *Z. minos*, Mt. Baba, 18 km W Bitola, 1900 m; **c.–** *Z. minos*, Mt. Baba, 18 km W Bitola, 1800 m; **d.–** *Z. diaphana*, Mt. Baba, 18 km W Bitola, 1800 m; **e.–** *Z. diaphana*, Mt. Baba, 18 km W Bitola, 1900 m; **f.–** *Z. diaphana*, Mt. Baba, Umgebung Bitola, 1500-1750 m. Scales for laminae dorsales and uncus-tegumen complexes are 1 mm. **2.** Distribution of *Zygaena minos* ([Denis & Schiffermüller], 1775) and *Z. diaphana* Staudinger, 1887 on the Balkan Peninsula. Squares - *Z. minos*, circles - *Z. diaphana*, asterisk - *Z. minos* and *Z. diaphana* sympatric. B&H - Bosnia and Herzegovina, MN - Montenegro, SRB - Serbia, RO - Romania, AL - Albania, MK - Republic of North Macedonia, BG - Bulgaria, GR - Greece, TR - Turkey. Locality in Romania is not on the Balkan Peninsula but it is very close to its border.

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Artículo en volumen colectivo:

REBEL, H., 1901.- Famil. Pyralidae-Micropterygidae. 2 Theil.- *In* O. STAUDINGER & H. REBEL. *Catalog der Lepidopteren des palaeartischen Faunengebietes*: 368 pp. R. Friedlander & Sohn, Berlin.

Libro:

HIGGINS, L. G., 1975.- *The Classification of European Butterflies*: 320 pp. Collins, London.

Internet:

DE PRINS, J. & DE PRINS, W., 2011.- *Global taxonomic database of Gracillariidae (Lepidoptera).* Disponible en http://www.gracillariidae.net (accedido el 14 de diciembre de 2011).

Las citas bibliográficas se relacionarán siguiendo el orden alfabético de los autores. Cuando se haga referencia a más de un trabajo de un mismo autor, las citas bibliográficas correspondientes se relacionarán en orden de antigüedad de los trabajos.

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 349-357 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.776

Sobre el nombre de *Chelonia latreillii* Godart, [1823] 1822, un estudio histórico y bibliográfico (Lepidoptera: Erebidae, Arctiinae)

A. Vives Moreno

Resumen

Se realiza un estudio histórico y bibliográfico, para comprobar el nombre correcto de *Chelonia latreillii* Godart, [1823] 1822 y se revisan los cambios de nombre sufridos desde su descripción hasta comienzos del siglo XXI.
PALABRAS CLAVE: Lepidoptera, Erebidae, Arctiinae, *Chelonia latreillii*, estudio bibliográfico.

On the name of *Chelonia latreillii* Godart, [1823] 1822, a historical and bibliographical study (Lepidoptera: Erebidae, Arctiinae)

Abstract

A historical and bibliographical study is carried out, the correct name of *Chelonia latreillii* Godart, [1823] 1822 is revised and the changes name suffered from their description until beginnings of the XXI century are checking.
KEY WORDS: Lepidoptera, Erebidae, Arctiinae, *Chelonia latreillii*, bibliographical study.

Introducción

Chelonia latreillii fue descrita por Godart en 1823 (GODART, [1823] 1822, **4**: 318, pl. XXXIII, figura 1), e indica: *"Décrite d'après un individu mâle et unique, trouvé en Espagne par M. le baron Dejean, et faisant aujourd'hui partie de la riche collection de M. Latreille*" y la incluye en el género nuevo *Chelonia* Godart, [1823] 1822, que es un nombre preocupado por *Chelonia* Bronghiart, 1800 (Reptilia) (BRONGHIART, 1800: 89).

La monumental obra *Histoire Naturelle de Lépidoptères de France* se publicó en fascículos a lo largo de 25 años y la empezó Jean Baptiste GODART (1775-1825) desde el volumen uno hasta el quinto, pero tras su fallecimiento, continuó la obra Philogène Auguste Joseph DUPONCHEL (1774-1846) (que ya había colaborado en los volúmenes anteriores), desde el volumen sexto hasta el once, incluidos los cuatro suplementos. Para la correcta datación de las distintas partes, se ha seguido a LANKESTER (1904, *in* LANCASTER *et al*.) y a JOANNIS (1915).

Datos bibliográficos siglo XIX

Después de la descripción original, el primer autor que menciona la especie es MEIGEN (1832, **3**: 30, pl. 83, fig. 5), que la cambia de género y la incluye en *Arctia* Schrank, 1802 (SCHRANK, 1802, **2**(2): 152), pero mantiene la grafía original de la especie *"latreillii*". Para la datación de la obra de Meigen, se ha seguido a GRIFFIN (1931: 421).

FEISTHAMEL (1834: XLI), en la *Séance du 6 août 1834*, da a conocer la hembra de esta especie y dice: *"M. Feisthamel apprend qu'il vient d'obtenir de chysalides, la ♀ de la Chelonia Latreillii.* Como podemos ver, se mantiene el género y la especie con la grafía original, pero considera que no debería de situarse en el género *Trichosoma* Rambur, 1832.

Aunque FEISTHAMEL (1834) no indica la procedencia del material que le ha servido para descubrir la hembra de esta especie, BOISDUVAL (1835) indica *"qui a reçu de Barcelone des chrysalides vivantes de cette espèce, ne nous eût assuré que la femelle était en tout semblable au mâle*" GRAELLS (1843: 359) es quien aclara el tema y que fue el propio autor español, quien le mandó el material y así podemos leer: *"La Chelonia Latreillii fut découvert en Espagne par M. le général Dejean, lequel, si les notions que je possède à cet égard son exactes, ne trouva que le mâle de ce lépidoptère; la femelle resta inconnue jusqu'en 1834, époque où elle fut communiquée à la Société par M. le baron Feisthamel, qui obtint une femelle de trois chrysalides que je lui avais envoyées de Barcelone"*

BOISDUVAL (1835: 124, pl. 59, fig. 5) menciona la especie como *Chelonia latreilli*, se mantiene la grafía original del género y de la especie.

GRAELLS (1843: 359-366) describe el ciclo biológico de la especie; si bien en todo el texto utiliza el nombre original de *Chelonia latreillii*, curiosamente en el pie de figuras de la plancha, 12, figura II, números 1 a 3, aparece, por primera vez, el nombre de *Chelonia latreillei*, lo que, sin duda alguna, se debe a un *laspsus calami*.

DUPONCHEL (1844: 63), menciona la especie como *Chelonia latreillei;* es la primera vez, después de GRAELLS (1843), que se cambia el nombre a *"latreillei*".

FREYER (1845, **5**: 58, pl. 418, fig. 2), menciona la especie como *Eyprepia latreillii*, mantiene la grafía original de la especie, pero la cambia al género *Eyprepia* Ochsenheimer, 1810 (OCHSENHEIMER, 1810: 298).

HERRICH-SCHAFFER (1846, **2**: 146, pl. 13, figs. 66, 67), menciona la especie con el nombre de *Chelonia latreillii*.

CUNI I MARTORELL (1847: 57), menciona la especie como *Arctia latreillei*.

HEYDENREICH (1851: 29), menciona la especie como *Chelonia latreillii*.

WALKER (1855, **3**: 598), menciona la especie como *Arctia latreillii*. Para la datación de la obra de Walker, se ha seguido a NYE (1973: 6-7).

STAUDINGER (*in* STAUDINGER & WOCKE, 1861: 25), menciona la especie como *Arctia latreillii*.

BELLIER DE LA CHAVIGNERIE (1861: 31-32), menciona la especie como *Chelonia latreillei*, sobre un ejemplar hermafrodita de España.

STAUDINGER (*in* STAUDINGER & WOCKE, 1871: 58), menciona la especie como *Arctia latreillei*.

MILLIÈRE (1864: [345]), menciona la especie como *Chelonia latreillii*.

RAMBUR ([1866] (2): 217), crea un género nuevo para la especie como *Pachylischia* Rambur, [1866] 1858, que se menciona como *Pachylischia latreillii*. Es interesante destacar que, en la página 248 podemos leer: *"On voit qu'elle diffère peu du genre Pachylischia, dont elle présente les principaux caractères; celui des tibias antérieurs surtout, et l'immobilité des segments de la chrysalides, l'éloignent du genre Arctia; nous en formons le sous-genre Artimelia"* Posteriormente, en la página 249, dice: *"L'Artimelia Latreillii, d'abord rapportée d'Espagne, par le général Dejean, à été prise depuis en Andalousie, par MM. Lederer et Staudinger"*

ZAPATER & KORB (1883: 313), mencionan la especie como *Arctia latreillei* y la indican de la localidad española de Moscardón (Teruel).

HOFMANN (1887: 42, pl. 7, fig. 12), menciona la especie como *Arctia latreillii*.

KIRBY (1892: 265), la menciona como *Artimelia latreillii*. El autor mantiene la grafía original de la especie, pero da validez al subgénero *Artimelia* Rambur, [1866] 1858 y lo eleva a nivel de género, como nosotros lo consideramos en VIVES MORENO (2014: 598).

SCHULTZ (1896: 411), menciona la especie como *Arctia latreillei*, sobre un ejemplar ginandromorfo.

SCHULTZ (1897: 397), menciona la especie como *Arctia latreillei*, sobre un ejemplar ginandromorfo.

Datos bibliográficos del siglo XX

Se revisan los datos de los trabajos publicados en la primera mitad del siglo XX.

STAUDINGER (*in* STAUDINGER & REBEL, 1091: 370), menciona la especie como *Arctia latreillei*. Hay que tener en cuenta la gran influencia que ha tenido este catálogo para todos los autores coetáneos y posteriores.

HAMPSON (1901: 226-227), menciona la especie como *Ocnogyna latreilli,* mantiene la grafía original, pero elimina una de las dos letras *"i*" finales y la cambia al género *Ocnogyna* Lederer, 1852 (LEDERER, 1852: 78), al considerar que el género *Trichosoma* Rambur, 1832 está preocupado por *Trichosoma* Rudolphi, 1819 (Vermes) (RUDOLPHI, 1819: 13).

MENDES (1903: 75), menciona la especie como *Arctia latreillei*, sobre material recogido en el Monte de S. José (Beira Baixa, Portugal), siendo la primera cita.

SCHULTZ (1904: 310), menciona la especie como *Arctia latreilli*, sobre un ejemplar ginandromorfo.

SCHULTZ (1905: 134), menciona la especie como *Arctia latreilli*, sobre un ejemplar ginandromorfo.

SPULER (1906, **2**: 188, pl. 73, fig. 4), menciona la especie como *Arctia latreillei*. Se describe la aberración *Arctia latreillei* ab. *aurantiaca* Spuler, 1906, de las zonas montañosas de España.

ROTHSCHILD (1910: 83), menciona la especie como *Ocnogyna latreilli*, al nombre específico le falta la segunda *"i*". Indica que ha estudiado 2 ♂♂ de Castilla (España, segunda cita), 1 ♀ de los Alpes Maritimes (Francia, primera cita para este país, posiblemente se debe a un error de etiquetaje) y 1 ♂ de Cintra (Portugal, segunda cita), con las alas traseras amarillentas.

SEITZ (1910: 78, pl. 14, fig. e ♀), menciona la especie como *Ocnogyna latreillei*. Para la datación de la obra de Seitz, se ha seguido a GRIFFIN (1936).

THIERRY-MIEG (1910: 385-386), menciona la especie como *Arctia latreillei* y describe tres aberraciones a saber: *Arctia latreillei* ab. *ochracea* Thierry-Mieg, 1910, *Arctia latreillei* ab. *millieri* Thierry-Mieg, 1910 y *Arctia latreillei* ab. *berthina* Thierry-Meig, 1910, sobre material de España, pero sin indicar localidad.

OBERTHÜR (1911, **5**(1): 91-93), menciona la especie como *Arctia latreillii*. Se describe *Arctia latreillii* ab. *flavescens* Oberthür, 1911 y la menciona de diferentes provincias españolas como las de Madrid y Segovia.

RIBBE (1912: 350), menciona la especie como *Arctia latreillei*.

SEITZ (1913: 78, pl. 14e), menciona la especie como *Ognogyna latreillei*.

SAGARRA (1917: 88), menciona la especie como *Arctia latreillei*.

STRAND (1919: 134), menciona la especie como *Ocnogyna latreilli*.

ZERNY (1927a: 129), menciona la especie como *Arctia (Ocnogyna) latreillei* y la indica de la localidad española de San Roque (Cádiz)

ZERNY (1927b: 436), menciona la especie como *Arctia (Ocnogyna) latreillei*.

SCHAWERDA (1934: 428), menciona la especie como *Ocnogyna latreillei* y describe una nueva variedad *Ocnogyna latreillei* var. *lusitanica* Schawerda, 1934, de Guarda, Portugal y también describe la aberración *flava*.

MARTEN (1936: 465), menciona la especie como *Ocnogyna latreillei*.

SILVA CRUZ & WATTINSON (1934: 9), mencionan la especie como *Ocnogyna latreillei* y la mencionan de las provincias portuguesas de Beira Baixa (São Fiel), Estremadura (Rio Mouro) y también mencionan la ab. *aurantiaca* Spuler, 1906 de Beira Alta (Trancoso), Duoro Litoral (Serra de Santa Justa) y Minho (Gêrez)

ZERKOWITZ (1946: 236), menciona la especie como *Ocnogyna latreillei* y la indica de las provincias portuguesas de Beira Baixa, Estremadura y Minho.

AGENJO ([1948] 1946), menciona la especie como *Ocnogyna latreillei*.

MARTEN (1950: 55, Abb. 1, fig. b), menciona la especie como *Ocnogyna latreillei* y describe

Ocnogyna latreillei f. *primula* Marten, 1950 de Barcelona y se menciona de la Cordillera Cantábrica, Montes Universales (Albarracín), Pirineos, Sevilla, Sierra de la Demanda, Sierra de Gredos y Portugal (Setúbal).

GÓMEZ-BUSTILLO (1979: 221), menciona la especie como *Ocnogyna latreillei*.

GÓMEZ-BUSTILLO & ARROYO-VARELA (1981: 298), mencionan la especie como *Ocnogyna latreillei*.

VIVES MORENO (1994: 439), menciona la especie como *Artimelia latreillei*.

Datos bibliográficos del siglo XXI

PÉREZ DE GREGORIO *et al*. (2001: 193), menciona la especie como *Ocnogyna latreillei* y de las provincias españolas de Gerona y Tarragona.

REDONDO *et al*. (2010: 192), menciona la especie como *Artimelia latreillei* y la indican de las provincias españolas de León y Teruel.

WITT & RONKAY (2011: 106-113, pl. 6, figs. 1-14, 203), mencionan la especie como *Artimelia latreillii* y la mencionan de las provincias españolas de Barcelona Tarragona (Tortosa) y de las provincias portuguesas de Beira Alta (Guarda) y Estremadura (Lisboa).

VIVES MORENO (2014: 598), menciona la especie como *Artimelia latreillei*.

CORLEY (2015: 169), menciona la especie como *Artimelia latreillii* correctamente escrito el nombre específico y la indica de las provincias portuguesas de Alto Alentejo, Beira Alta, Beira Baixa, Beira Litoral, Douro Litoral, Estremadura, Minho y Trás-os-Montes.

Conclusiones

La especie fue originalmente descrita como *Chelonia latreillii* y el nombre específico ha sido cambiado a lo largo del siglo XIX a *latreillei* y *latreilli*

Durante el siglo XX y XXI, aparecen combinaciones similares a las del siglo XIX, el nombre que más se repite es *latreillei*.

Consideramos que el nombre específico correcto es *latreillii*, tal y como la describió Godart en [1823] 1822 y debía de incluirse en el género *Artimelia* Rambur, [1866] 1858.

Siguiendo a VIVES MORENO (2014: 598) quedaría de la siguiente manera:

***Artimelia* Rambur, [1866] 1858**

(E.P.) ***latreillii* (Godart, [1823] 1822)**
(= *aurantiaca* Spuler, 1909) ab.
(= *ochracea* Thierry-Mieg, 1910) ab.
(= *millieri* Thierry-Mieg, 1910) ab.
(= *berthina* Thierry-Mieg, 1910) ab.
(= *flavescens* Oberthür, 1911) ab.
(= *latreilli*; Strand, 1919) *lapsus calami*
(= *lusitanica* Schawerda, 1934)
(= *flava* Schawerda, 1934) ab.
(= *primula* Marten, 1950) f.
(= *falvescens*; Gómez-Bustillo, 1979) *lapsus calami*
(= *latreillei* sensu auctorum) *lapsus calami*

Agradecimientos

A Francisco Javier Conde de Saro (España), por su ayuda en la revisión lingüística del trabajo y a la Dra. Amparo Blay, Conservadora de Entomología, en el Museo Nacional de Ciencias Naturales, en

Madrid (España), que siempre ha estado dispuesta a ayudarnos en nuestras investigaciones de los fondos de esta Institución.

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(Recibido para publicación / *Received for publication* 10-II-2019)
(Revisado y aceptado / *Revised and accepted* 14-III-2019)
(Publicado / *Published* 30-VI-2019)

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 359-372 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.777

Diversidade de Borboletas em Fragmentos de Floresta Estacional Semidecidual e Campos do Bioma Pampa Brasileiros (Lepidoptera: Papilionoidea)

J. M. Silva, K. Gawlinski, M. Moscoso, M. P. V. Zurschimiten, S. K. da Cunha, C. Iserhard, E. E. Silva & F. R. M. Garcia

Resumo

Este trabalho teve por objetivo analisar a diversidade de três comunidades de borboletas em Floresta Estacional Semidecidual e Campos do Bioma Pampa no Rio Grande do Sul. Foram realizadas coletas mensais através do uso de redes entomológicas, entre outubro de 2012 a junho de 2013. Totalizando 180h horas-rede por local, verificou-se que mesmo próximas ou compartilhando as mesmas formações vegetais, as comunidades apresentam características próprias que podem estar relacionadas a condições e recursos intrínsecos do ambiente. A área A1 apresentou valores intermediários de abundância e diversidade, e os maiores valores de riqueza. A2 é a área mais diversa, com valor intermediário de riqueza, e o menor número de indivíduos. A3 obteve o maior número de indivíduos, porém a menor riqueza e diversidade. Quanto à diversidade e dominância, todas as áreas obtiveram uma boa equitabilidade, não apresentando espécies dominantes.
PALAVRAS CHAVE: Lepidoptera, Papilionoidea, biodiversidade, comunidade, conservação, Rio Grande do Sul, Brasil.

Diversity of Butterflies in Fragments of the Seasonal Semidecidual Forest and Fields in the Brazilian Grassland Biome (Lepidoptera: Papilionoidea)

Abstract

This study aimed to analyze the diversity of the three communities of butterflies in semideciduous forest and fields of the Grassland Biome in Rio Grande do Sul. Monthly samples were collected through the use of entomological nets, from October 2012 to June 2013. Totaling 180h for local time-net, it was found that even close to or sharing the same plant formations, communities have characteristics that may be related to conditions and intrinsic features of the environment. The A1 area showed intermediate values of abundance and diversity, and greater richness. A2 is the most diverse area, an intermediate value of wealth and fewer individuals. A3 had the highest number of individuals, but the lowest richness and diversity. As for diversity and dominance, all areas obtained good equitability and did not present dominant species.
KEY WORDS: Lepidoptera, Papilionoidea, biodiversity, community, conservation, Rio Grande do Sul, Brazil.

Diversidad de mariposas en fragmentos de selva estacional semicaducifolio y campos en el bioma pastizales brasileño (Lepidoptera: Papilionoidea)

Resumen

Este trabajo aspira a analizar la diversidad de tres comunidades de mariposas en Bosque Estacional

Semidecidual y Campos de Bioma Pampa en Rio Grande do Sul. Fueron realizadas recolecciones mensuales por medio del uso de redes entomológicas, entre octubre de 2012 a junio de 2013. Totalizando 180h horas-red por puesto, fueron verificados las zonas próximas o compartiendo las mismas formaciones vegetales, las comunidades con características que pueden estar relacionadas con las mismas características ambientales. El área A1 indicaba valores intermedios de la abundancia y la diversidad y la mayor abundancia. A2 es el área más diversa, con valor intermedio de la riqueza o el menor número de individuos. A3 obtiene el número más alto de individuos, pero la menor riqueza y diversidad. En cuanto a la diversidad y dominación, todas las áreas obtuvieron buena equidad y no presentaron especies dominantes.

PALABRAS CLAVE: Lepidoptera, Papilionoidea, biodiversidad, comunidad, conservación, Rio Grande do Sul, Brasil.

Introdução

As borboletas são representadas por cerca de 20.000 espécies em todo o mundo, com cerca de 3.300 registradas para o Brasil (DUARTE *et al.,* 2012). Elas realizam boa parte dos processos essenciais dos ecossistemas terrestres como herbivoria e polinização, além de contribuírem de forma considerável como biomassa alimentar para níveis tróficos superiores (FREITAS *et al.*, 2003).

Em função de suas características, as borboletas são utilizadas como exemplo em vários estudos ecológicos (BROWN JR. & FREITAS, 1999). Estão entre os melhores grupos para o monitoramento ambiental, pois respondem com rapidez a alterações no ambiente e são relativamente fáceis de amostrar e identificar (FREITAS *et al*., 2005). Devido ao seu carisma, também podem ser utilizados como bandeira ou guarda-chuva em iniciativas conservacionistas (NEW, 1997).

Apesar do elevado número de inventários já realizados no Rio Grande do Sul, trabalhos com diversidade de borboletas ainda são recentes e pouco explorados (SANTOS *et al*., 2008), além de mal distribuídos no estado (MARCHIORI *et al.*, 2014).

Pesquisas sobre diversidade taxonômica, genética e ecológica, são essenciais para compreender as comunidades biológicas e contribuir para a sua conservação (PURVIS & HECTOR, 2000). Em vista disso, objetivou-se analisar a diversidade de três comunidades de borboletas na Floresta Estacional Semidecidual e Campos do Bioma Pampa no Rio Grande do Sul.

Material e métodos

O trabalho foi realizado em três áreas (A1, A2, A3), duas localizadas no município de Morro Redondo e uma no município de Capão do Leão, extremos sul do Rio Grande do Sul (Fig. 1). Encontram-se nas regiões geomorfológicas da Encosta do Sudeste e da Planície Costeira, respectivamente. Pertencem ao Bioma Pampa e se localizam nas fisionomias da Floresta Estacional Semidecidual e na transição entre esta e as Formações Pioneiras (VELOSO *et al*., 1991).

A área A1 (31º 43’ 05.85” S, 52º 41’ 45.42” O) é formada por Floresta Estacional Semidecidual de Encosta, circundada por áreas de campo. A trilha encontra-se entre mata nativa bem preservada e campo arbustivo ou estrada, sendo esta mata um fragmento relativamente grande, com mais de 1,5 km^2 de vegetação conectado a outros fragmentos menores. A área A2 (31º 43’ 41.80” S, 52º 41’ 28.10” O), possui também Floresta Estacional Semidecidual de Encosta, circundada por campos. A trilha encontra-se entre mata ciliar, com aproximadamente 50 m de largura, e campo com criação de gado. A área A3 no Horto Botânico Irmão Teodoro Luis (31º 48’ 58” S, 52º 25’ 55” O) apresenta aproximadamente 23 hectares de mata nativa circundado por campos e banhados, sendo nitidamente uma Área de Tensão Ecológica entre a Floresta Estacional Semidecidual e as Formações Pioneiras. A trilha percorrida localiza-se entre estrada e beira de mata ou campo limpo com criação de búfalos.

Fig. 1.– Localização aproximada dos municípios do Capão do Leão e Morro Redondo, onde foram coletadas borboletas para a Floresta Estacional Semidecidual e os Campos do Bioma Pampa no Extremo Sul do Brasil, entre outubro de 2012 a junho de 2013.

Foram realizadas coletas mensais entre outubro de 2012 a junho de 2013, por quatro coletores com o uso de redes entomológicas. As trilhas foram percorridas durante 2h 30 min pela manhã e pela tarde em dias alternados, no período entre 8h 30 min e 16h 30 min. Espécimes de fácil identificação no campo foram marcados numericamente através de caneta permanente, fotografados e liberados. Para cada indivíduo avistado foi registrada a espécie, data, turno e área de coleta.

Indivíduos de identificação incerta e exemplares testemunho foram coletados e encaminhados ao Museu Entomológico Ceslau Biezanko da Universidade Federal de Pelotas, onde foram montados, identificados e depositados. A identificação das espécies foi realizada com base no padrão morfológico, por comparação com o material disposto na coleção do museu mencionado, uso de bibliografias especializadas (CANALS, 2000, 2003; D'ABRERA, 1984) e da consulta a especialistas. A nomenclatura e a sistemática foram atualizadas segundo LAMAS (2004).

A partir da identificação dos espécimes foram obtidas a riqueza, abundância e composição de espécies registradas nas três áreas. Foi feita rarefação baseada em indivíduos, com intervalos de 95% de confiança, e a riqueza foi verificada através dos estimadores analíticos Jackknife 1, Jackknife 2 e Bootstrap. Estes estimadores são baseados na incidência de espécies por amostras, sendo os mais confiáveis para poucas amostras. A dominância foi estimada segundo o índice de Simpson (1-D) e a diversidade de acordo com o índice de Shannon-Wiener (H). A composição de espécies foi analisada através de um NMDS (Non-Metric Multidimensional Scalling) a partir do índice de similaridade de Morisita. Esta análise foi posteriormente testada por um ANOSIM com 9999 aleatorizações. Todas as análises foram realizadas através do programa Past versão 2.17 (HAMMER *et al*., 2001).

Resultados

Em um total de 180 horas-rede de esforço amostral por localidade (totalizando 540 horas-rede), foram registrados 3.065 indivíduos distribuídos em 154 espécies e seis famílias de borboletas em três fragmentos de Floresta Estacional Semidecidual e Campos do Bioma Pampa no Rio Grande do Sul (Tab. 1). De acordo com os dados obtidos através dos estimadores analíticos de riqueza (Jackknife 1, Jackknife 2 e Bootstrap), A1 obteve 73-87% da comunidade amostrada, A2 69-87% e A3 66-87% (Tab. 2).

Tabela 2.– Riqueza**,** abundância e estimadores de riqueza (Jackknife 1, Jackknife 2 e Bootstrap) das borboletas amostradas para a Floresta Estacional Semidecidual e os Campos do Bioma Pampa no Extremo Sul do Brasil, entre outubro de 2012 a junho de 2013.

Distribution	A1	A2	A3
Riqueza	113	104	90
Abundância	954	906	1205
Jackknife 1	147	136	119
Jackknife 2	155	150	136
Bootstrap	130	119	103

De acordo com a curva de rarefação baseada em indivíduos, com a mesma abundância A1 apresentou riqueza superior às demais. A3 foi a que deteve a maior abundância, porém a menor riqueza entre elas (Fig. 2). Quanto aos dados de diversidade e dominância, os valores foram muito semelhantes (H'=3,87; H'3,88; H'=3,74 e 1-D=0,96; 1-D=0,97; 1-D=0,97).

Nas três áreas a família mais abundante foi Nymphalidae (51-54%), seguida de Hesperiidae (31-35%), juntas estas famílias representaram em torno de 86-87% da abundância registrada em cada local. Quanto à riqueza, Nymphalidae e Hesperiidae também foram as famílias mais representativas. Em A1 e A3 Hesperiidae superou Nymphalidae em 2%, A2 diferiu deste resultado, apresentando 7% a mais de Nymphalidae do que de Hesperiidae. Com relação à ordenação das demais famílias, A1 e A2 apresentaram Lycaenidae, seguida de Riodinidae, Pieridae e Palionidae. A3 obteve Pieridae, seguida de Lycaenidae, Papilionidae e Riodinidae (Fig. 3).

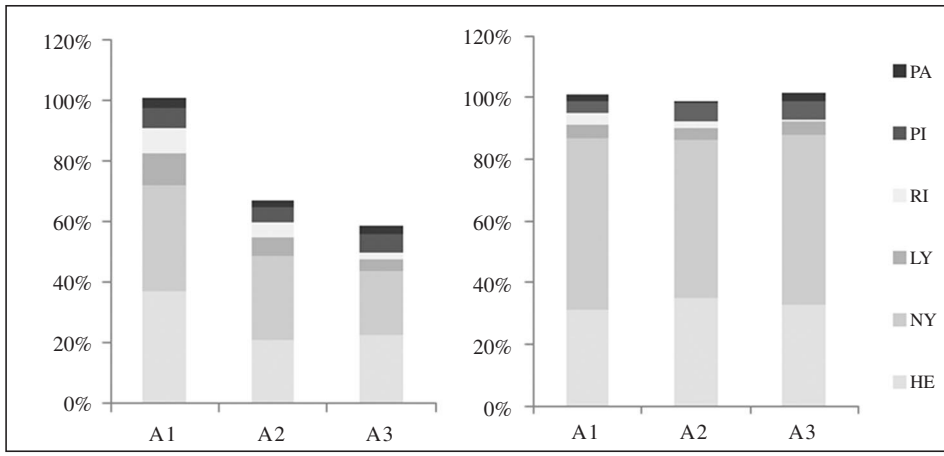

Fig. 2.– Curva de rarefação baseada em indivíduos de borboletas amostrados na Floresta Estacional Semidecidual e nos Campos do Bioma Pampa no Extremo Sul do Brasil, entre os meses de outubro de 2012 a junho de 2013.

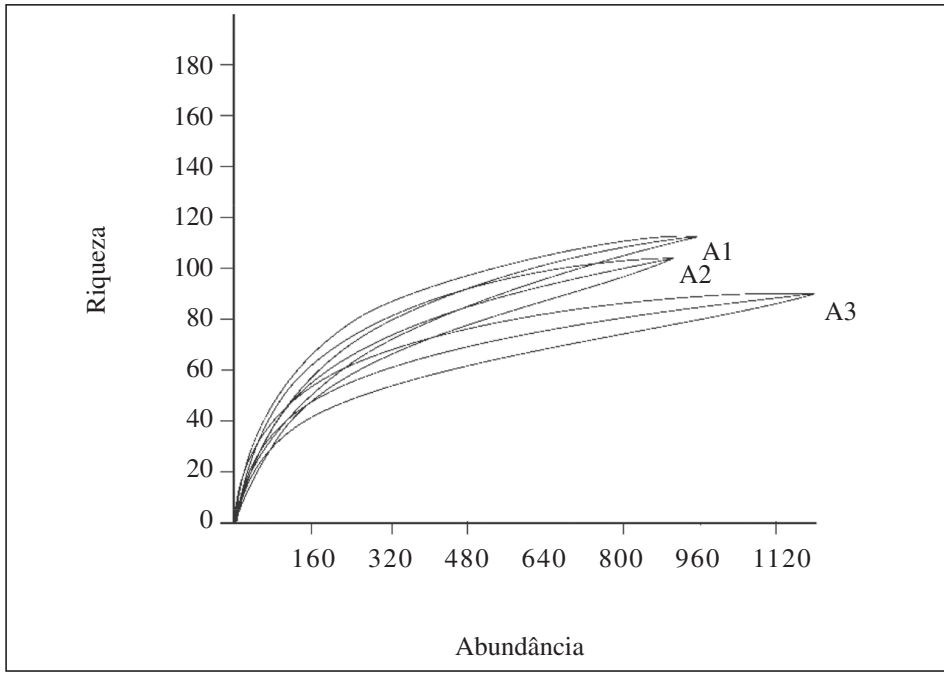

Fig. 3.– Riqueza (esquerda) (%) e abundância (direira) (%) por famílias de borboletas amostradas para a Floresta Estacional Semidecidual e os Campos do Bioma Pampa no Extremo Sul do Brasil, entre os meses de outubro de 2012 a junho de 2013. (PA) Papilionidae; (PI) Pieridae; (RI) Riodinidae; (LY) Lycaenidae; (NY) Nymphalidae e (HE) Hesperiidae.

Do total de espécies, 53 (34%) foram compartilhadas por todos os ambientes. Nymphalidae apresentou o maior número de espécies em comum (25), seguida de Hesperiidae (17), Lycaenidae (4), Pieridae (4), Papilionidae (2) e Riodinidae (1). A1 obteve o maior número de espécies exclusivas, após A3 e A2 (Fig. 4). De acordo com o índice de Morisita, os maiores valores ocorreram entre A1 e A2 (P=0,1603), o que indica que estas áreas são muito semelhantes na sua composição, enquanto para A1 e A3 (P=0,0002) e A2 e A3 (P=0,0001) a diferença entre elas é significativa (Fig. 5).

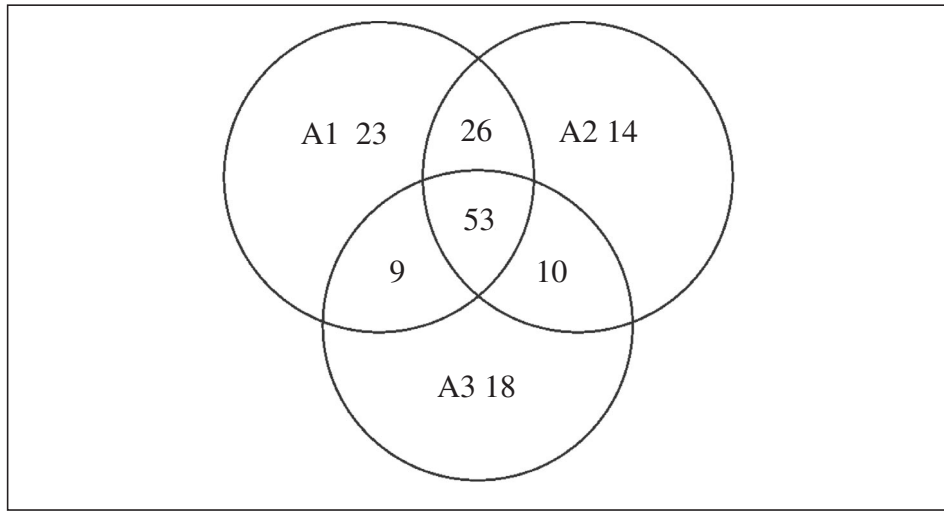

Fig. 4.– Número de espécies de borboletas exclusivas e comuns às áreas de estudo na Floresta Estacional Semidecidual e nos Campos do Bioma Pampa, Extremo Sul do Brasil, entre outubro de 2012 a junho de 213.

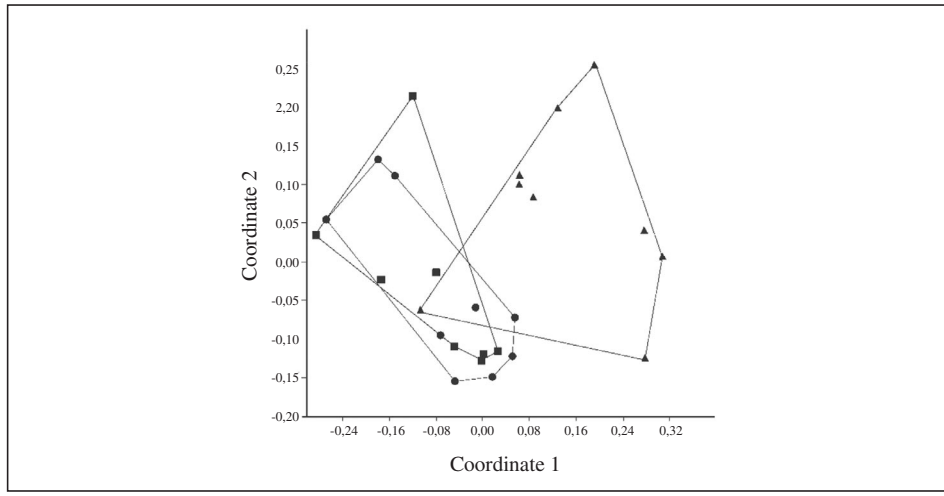

Fig. 5.– Similaridade (Morisita) entre as comunidades de borboletas amostradas na Floresta Estacional Semidecidual e nos Campos do Bioma Pampa no Extremo Sul do Brasil, entre os meses de outubro de 2012 a junho de 2013. A1 (quadrados); A2 (círculos); A3 (triângulos).

Discussão

Descrição geral da comunidade de borboletas

Os resultados obtidos com a curva de rarefação corroboram os dados brutos de riqueza, onde A1 é a área mais rica, seguida de A2 e A3. Quanto à diversidade e dominância, todas as áreas obtiveram uma boa equitabilidade, não apresentando espécies dominantes. Índices de diversidade não paramétricos ou de heterogeneidade não caracterizam uma comunidade, mas podem ser úteis na comparação entre elas. Os valores não exibiram uma diferença significativa entre as áreas, mas dão apoio aos demais dados apresentados neste trabalho.

A abundância de Nymphalidae e Hesperiidae encontrada, também foi relatada em outros trabalhos no estado, porém, nesses a importância de Hesperiidae é bastante inferior (MARCHIORI & ROMANOWSKI, 2006 a,b; DESSUY & MORAIS, 2007; MORAIS *et al.*, 2012, SILVA *et al.* 2013, SILVA *et al*.,2017). Com relação à riqueza, Hesperiidae tem sido referida como uma das famílias mais ricas para diversos locais do Brasil, particularmente para a Floresta Estacional Semidecidual (FRANCINI *et al*., 2011). Este grupo é um excelente indicador de qualidade ambiental, principalmente de regularidade e abundância de recursos florais (BROWN JR. & FREITAS, 2000), além disso, sua predominância pode indicar um ambiente bem amostrado (ROSA *et al.*, 2011).

Sobre a ordenação das demais famílias, A1 e A2 obtiveram resultados semelhantes ao encontrado para o Rio Grande do Sul por MORAIS *et al.* (2007). A baixa representação de Lycaenidae e Riodinidae em A3 destoa destes dados e do esperado para outros locais do país (FRANCINI *et al*., 2011). Era previsto uma riqueza superior, em especial de Riodinidae visto que Pelotas e arredores estão entre os locais mais ricos no estado (SIEWERT *et al*., 2014). É importante salientar que esta família é sensível a perturbações ambientais e a poluição (BROWN JR. & FREITAS, 2000).

Estrutura e composição das comunidades de borboletas

A diferença encontrada na composição de espécies entre as áreas pode estar diretamente relacionada à distância entre elas. A1 e A2 são áreas muito próximas e pertencem a Floresta Estacional Semidecidual propriamente dita, enquanto A3 fica distante das demais, localizada em uma transição entre esta vegetação e as Formações Pioneiras. No entanto, mesmo locais próximos e que apresentam as mesmas formações vegetais, em escalas menores, podem apresentar variações particulares de condições e recursos. Alguns dados e características dos locais estudados serão discutidos a seguir.

A área A1 apresentou valores intermediários de abundância e diversidade, e os maiores valores de riqueza. A1 exibe a maior extensão de área preservada com conectividade a diversos fragmentos, apresentando uma vegetação bastante heterogênea o que pode ter conduzido a estes resultados. A riqueza de borboletas está significativamente correlacionada a estes fatores, tanto com a conectividade simples da paisagem quanto com a heterogeneidade de condições e recursos (BROWN JR. & FREITAS, 2000; BROWN JR. & FREITAS, 2002).

A2 é a área mais diversa, com valor intermediário de riqueza, e o menor número de indivíduos. Também foi a área que apresentou Nymphalidae como a família mais rica e o maior número de espécies exclusivas desta família. A trilha percorrida em A2 encontra-se entre mata ciliar e campo limpo, matas ciliares podem atuar como corredores ecológicos naturais, ligando fragmentos florestais, o que facilita o deslocamento da fauna (CARDOSO-LEITE *et al*., 2005). Como observado no estudo, algumas borboletas utilizavam o contorno da mata como via de acesso a outros fragmentos, em especial espécies grandes, com boa capacidade de deslocamento.

A área A3 obteve o maior número de indivíduos, porém a menor riqueza e diversidade. Alta abundância e baixa riqueza podem ser características de ambientes perturbados, onde algumas espécies desaparecem enquanto outras aumentam suas populações (DE VRIES & WALLA, 2001).

A3 por estar localizada em um ambiente de transição entre duas formações distintas possui uma boa heterogeneidade de habitat, no entanto é um fragmento pequeno e isolado, que sofreu fortes pressões antrópicas no seu passado (LUIS & BERTELS, 1951). A diversidade de borboletas é significativamente correlacionada com a área de mata e com seu grau de isolamento (BAZ & BOYERO, 1995). É possível que os resultados sejam consequências de perturbações ambientais. No entanto, sem informações antecedentes não há como afirmar, pois, dados de composição, riqueza e abundância se comportam de maneira desigual em ambientes distintos e sobre efeito de diferentes alterações.

O Bioma Pampa tem sofrido diversas ações antrópicas nos últimos anos, o quanto isso têm afetado sua biodiversidade ainda é pouco conhecido e muito negligenciado (CORDEIRO & HASENACK, 2009; OVERBECK *et al.* 2009). Análises de diversidade são importantes instrumentos para caracterizar ambientes e fornecem informações que servem de base para ações conservacionistas. Através de futuros monitoramentos da comunidade de borboletas, será possível obter uma visão mais clara sobre as condições das áreas estudadas, em especial de A3 (Horto Botânico Irmão Teodoro Luis). Assim medidas poderão ser tomadas antes que os efeitos de prováveis perturbações sejam irreversíveis (UEHARA-PRADO *et al*., 2004).

Agradecimentos

Os autores agradecem aos Drs. André Freitas, Lucas Kaminski, Sr. Alfred Moser, Mes. Eduardo Barbosa e Ricardo Siewert pelo auxílio na identificação e provisão de informações sobre algumas espécies. Também agradecem ao mestrando Fabian Gavíria pela confecção do mapa. A CAPES pela bolsa de mestrado de JMS, Ao CNPq pela bolsa de Produtividade em Pesquisa de FRMG.

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(Recibido para publicación / *Received for publication* 19-XII-2018)
(Revisado y aceptado / *Revised and accepted* 19-III-2019)
(Publicado / *Published* 30-VI-2019)

Tabela I.– Borboletas amostradas em Floresta Estacional Semidecidual e Campos no Bioma Pampa extremo Sul do Brasil, entre outubro de 2012 e junho de 2013. (A1) área um, (A2) área dois, (A3) área três. *Espécies exclusivas, com mais de dois indivíduos coletados.

Família/Espécie	**A1**	**A2**	**A3**
HESPERIIDAE			
HESPERIINAE			
Ancyloxypha nitedula (Burmeister, 1878)			X
Anthoptus epictetus (Fabricius, 1793)	X	X	
Callimormus interpunctata (Plötz, 1884)	X	X	
Callimormus rivera (Plötz, 1882)	X	X	X
Conga chydaea (Butler, 1877)	X		X
Conga iheringii (Mabille, 1891)	X	X	X
Conga zela (Plötz, 1883)	X		X
Corticea obscura Mielke, 1969*		X	
Cumbre triumviralis (Hayward, 1939)	X		
Cymaenes distigma (Plötz, 1882)	X		
Cymaenes gisca Evans, 1955	X		X
Cymaenes odilia (Burmeister, 1878)	X	X	
Cymaenes tripunctus theogenis (Capronnier, 1874)*			X
Hylephila phyleus (Drury, 1773)	X	X	X
Lucida lucia (Capronnier, 1874)		X	
Lucida ranesus (Schaus, 1902)	X	X	
Nyctelius nyctelius (Latreille, 1824)			X
Panoquina sp.			X
Perichares aurina Evans, 1955*			X
Polites vibex catilina (Plötz, 1886)	X	X	X
Quadrus u-lucida (Plötz, 1884)		X	
Sodalia coler (Schaus, 1902)	X	X	
Synale hylaspes (Stoll, 1781)	X		
Vettius diana diana (Plötz, 1886)	X		
Wallengrenia premnas (Wallengren, 1860)	X	X	X
Zariaspes mys (Hübner, 1808)		X	
Zenis jebus (Plötz, 1882)	X		
PYRGINAE			
Achlyodes busirus rioja Evans, 1953			X
Achlyodes mithridates thraso (Hübner, 1807)	X	X	X
Antigonus liborius areta Evans, 1953	X	X	X
Astraptes elorus (Hewitson, 1867)	X	X	X
Astraptes fulgerator (Walch, 1775)	X		
Autochton integrifascia (Mabille, 1891)	X	X	X
Autochton zarex (Hübner, 1818)	X		
Carrhenes canescens pallida Röber, 1925	X		X
Celaenorrhinus similis Hayward, 1933	X		
Chioides catillus (Cramer, 1779)	X	X	
Epargyreus tmolis (Burmeister, 1875)			X
Gorgythion begga (Prittwitz, 1868)	X	X	X
Gorgythion beggina escalophoides Evans, 1953	X	X	X
Heliopetes arsalte (Linnaeus, 1758)		X	X
Heliopetes omrina (Butler, 1870)		X	X
Heliopetes laviana (Hewitson, 1868)			X
Milanion leucaspis (Mabille, 1878)	X	X	
Pellicia costimacula Herrich-Schäffer, 1870	X		
Pyrgus orcynoides (Giacomelli, 1928)	X	X	X
Pyrgus orcus (Stoll, 1780)	X	X	X

Staphylus sp.*		X	
Urbanus albimargo (Mabille, 1876)	X		X
Urbanus dorantes (Stoll, 1790)	X	X	X
Urbanus esta Evans, 1952	X		
Urbanus simplicius (Stoll, 1790)	X	X	X
Urbanus teleus (Hübner, 1821)	X	X	X
Urbanus zagorus (Plötz, 1880)*	X		
Xenophanes tryxus (Stoll, 1780)	X	X	X
PYRRHOPYGINAE			
Elbella hegesippe (Mabille & Boullet, 1908)	X		
Elbella mariae mariae (Bell, 1931)	X	X	
Myscelus amystis epigona (Hewitson, 1867)			X
Mysoria barcastus barta Evans, 1951		X	X
Sarbia damippe Mabille & Boullet, 1908*			X
LYCAENIDAE			
THECLINAE			
Arawacus meliboeus (Fabricius, 1793)	X	X	X
Atlides cosa (Hewitson, 1867)			X
Calycopis caulonia (Hewitson, 1877)	X	X	X
Cyanophrys herodotus (Fabricius, 1793)	X	X	
Evenus latreillii (Hewitson, 1865)	X	X	X
Laothus phydela (Hewitson, 1867)*	X		
Nicolaea cupa (Druce, 1907)	X	X	
Parrhasius orgia (Hewitson, 1867)		X	X
Rekoa palegon (Cramer, 1780)	X	X	X
Strymon bazochii (Godart, 1824)	X	X	
Strymon eurytulus (Hübner, 1819)	X	X	
Strymon sp.	X		
Theritas triquetra (Hewitson, 1865)*	X		
Ziegleria ceromia (Hewitson, 1877)	X		
NYMPHALIDAE			
LIBYTHEINAE			
Libytheana carinenta (Cramer, 1777)*			X
DANAINAE			
Danaus erippus (Cramer, 1775)	X		X
Danaus gilipus (Cramer, 1775)	X	X	X
MORPHINAE			
Caligo martia (Godart, 1824)*			X
Morpho epistrophus catenaria (Perry, 1811)	X		X
CHARAXINAE			
Memphis sp.		X	
Zaretys sp.	X		
BIBLIDINAE			
Biblis hyperia (Cramer, 1779)	X	X	X
Diaethria candrena (Godart, 1824)	X	X	X
Eunica eburnea Fruhstorfer, 1907	X	X	X
Haematera pyrame (Hübner, 1819)	X	X	X
APATURINAE			
Doxocopa kallina (Staudinger, 1886)	X	X	X
Doxocopa laurentia (Godart, 1824)		X	X
LIMENITIDINAE			
Adelpha mythra (Godart, 1824)	X	X	
Adelpha syma (Godart, 1824)	X	X	

Adelpha thessalia indefecta Fruhstorfer, 1913	X	X	
Adelpha zea (Hewitson, 1850)*		X	
HELICONIINAE			
Actinote carycina Jordan, 1913	X	X	X
Actinote discrepans d'Almeida, 1958		X	
Actinote mamita elena Hall, 1921		X	X
Actinote melanisans Oberthür, 1917	X	X	
Actinote pellenea Hübner, 1821	X	X	
Actinote thalia pyrrha (Fabricius, 1775)	X	X	X
Agraulis vanillae maculosa (Stichel, 1908)	X	X	X
Dione juno (Cramer, 1779)	X	X	X
Dryas iulia alcionea (Cramer, 1779)	X	X	X
Euptoieta hortensia (Blanchard, 1852)	X	X	
Heliconius eratho phyllis (Fabricius, 1775)	X	X	X
Philaethria wernickei (Röber, 1906)	X		
SATYRINAE			
Capronnieria galesus (Godart, 1824)	X	X	X
Hermeuptychia sp.	X	X	X
Moneuptychia paeon (Godart, 1824)	X	X	
Moneuptychia soter (Butler, 1877)	X	X	X
Paryphthimoides eous (Butler, 1867)	X	X	X
Paryphthimoides poltys (Prittwitz, 1824)*		X	
Praepedaliodes phanias (Hewitson, 1862)*		X	
Yphthimoides celmis (Godart, 1824)	X	X	X
Yphthimoides sp.		X	
Zischkaia pacarus (Godart, 1824)		X	
NYMPHALINAE			
Anartia amathea roeselia (Eschscholtz, 1821)	X	X	X
Hypanartia bella (Fabricius, 1793)	X	X	X
Hypanartia lethe (Fabricius, 1793)			X
Junonia evarete (Cramer, 1779)	X	X	X
Ortilia ithra (Kirby, 1900)	X	X	X
Ortilia orthia (Hewitson, 1864)	X	X	X
Siproeta epaphus trayja Hübner, 1823	X	X	
Siproeta stelenes meridionalis (Fruhstorfer, 1909)	X	X	
Tegosa claudina (Eschscholtz, 1821)	X	X	X
Tegosa orobia (Hewitson, 1864)	X	X	X
Vanessa braziliensis (Moore, 1883)	X	X	X
PAPILIONIDAE			
PAPILIONINAE			
Battus polydamas (Linnaeus, 1758)			X
Heraclides anchisiades capys (Hübner, 1809)		X	X
Heraclides astyalus (Godart, 1819)	X	X	X
Heraclides hectorides (Esper, 1794)	X	X	X
Heraclides thoas brasiliensis (Rothschild & Jordan, 1906)*			X
Mimoides lysithous eupatorion (Lucas, 1859)*	X		
PIERIDAE			
COLIADINAE			
Colias lesbia (Fabricius, 1775)		X	X
Eurema albula sinoe (Godart, 1819)	X	X	X
Eurema deva (Doubleday, 1847)	X	X	X
Eurema elathea flavescens (Chavannes, 1850)	X		
Phoebis neocypris (Hübner, 1823)	X	X	X

Phoebis philea (Linnaeus, 1763)	X		X
Rhabdodryas trite banksi (Breyer, 1939)		X	X
PIERINAE			
Ascia monuste (Linnaeus, 1764)	X		
Hesperocharis paranensis Schaus, 1898	X		X
Pereute antodyca (Boisduval, 1836)	X	X	X
Theochila maenacte (Boisduval, 1836)		X	X
RIODINIDAE			
EUSELASIINAE			
Euselasia eucerus (Hewitson, 1872)	X	X	
Euselasia hygenius occulta Stichel, 1919	X	X	
RIODININAE			
Aricoris montana (Schneider, 1937)	X		
Calephelis nilus (Felder & Felder, 1861)	X	X	
Caria plutargus (Fabricius, 1793)			X
Chalodeta theodora (Felder & Felder, 1862)		X	
Emesis lupina melancholica Stichel, 1916	X	X	
Emesis mandana (Cramer, 1780)	X	X	X
Emesis russula Stichel, 1910*	X		
Pirascca sagaris phrygiana (Stichel, 1916)	X	X	
Riodina lysippoides Berg, 1882			X
Synargis paulistina (Stichel, 1910)	X	X	
Theope thestias Hewitson, 1860		X	

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 373-377 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.778

Una nueva planta hospedera para *Glutophrissa drusilla* (Cramer, 1777) en Maracay, Aragua, Venezuela (Lepidoptera: Pieridae, Pierinae)

F. Romero-Montesino & J. Clavijo-Albertos

Resumen

Se reporta por primera vez a *Moringa oleifera* Lamarck (Moringaceae), como planta hospedera de *Glutophrissa drusilla* (Cramer, 1777), donde se alimenta de los foliolos de las hojas. El ciclo de vida, en base a 3 ejemplares machos, tuvo una duración de 17 días (huevo= 3 días, larva= 8 días, y pupa= 6 días). Se discute el efecto de la siembra de *M. oleifera* como factor que afectaría positivamente el aumento de las poblaciones de *G. drusilla* en áreas urbanas de ciudades y pueblos en Venezuela, como ocurrió con otro Pieridae, *Anteos menippe* (Hübner, [1818]) por la introducción de *Senna siamea* (Lamarck) (Fabaceae).
PALABRAS CLAVES: Lepidoptera, Pieridae, Pierinae, alimentación, larvas, áreas urbanas, plantas introducidas, plantas nutricias, *Moringa*, Moringaceae, Venezuela.

A new host plant for *Glutophrissa drusilla* (Cramer, 1777) in Maracay, Aragua, Venezuela (Lepidoptera: Pieridae, Pierinae)

Abstract

It is reported for the first time *Moringa oleifera* Lamarck (Moringaceae), as a host plant of *Glutophrissa drusilla* (Cramer, 1777), where it feeds on leaflets. The life cycle, based on 3 males, lasted 17 days (egg = 3 days, larva = 8 days, and pupa = 6 days). The effect of planting *M. oleifera* as a factor that would positively affect the increase of *G. drusilla* populations in urban areas of cities and towns in Venezuela is discussed, as was the case with another Pieridae, *Anteos menippe* (Hübner, [1818]) by the introduction of *Senna siamea* (Fabaceae).
KEY WORDS: Lepidoptera, Pieridae, Pierinae, feeding, larvae, urban areas, introduced plants, host plants, *Moringa*, Moringaceae, Venezuela.

Introducción

El género *Glutophrissa* Butler, 1887 está representado en América por dos especies, *G. drusilla* (Cramer, 1777) y *G. punctifera* (d'Almeida, 1939) donde la primera tiene una distribución desde el sur de los Estados Unidos de Norteamérica (Florida y Texas) (WARREN *et al*., 2019) hasta la parte central de la Provincia de Buenos Aires, Argentina (NÚÑEZ, 2011). Se reconocen ocho subespecies de *G. drusilla*: *G. drusilla drusilla* (Cramer, 1777), *G. drusilla boydi* Comstock, 1943 (Española, Mona, Puerto Rico, Culebra, Islas Vírgenes), *G. drusilla castalia* (Fabricius, 1793) (Jamaica), *G. drusilla comstocki* (Dillon, 1947) (Dominica, Guadalupe, Montserrat y Martinica), *G. drusilla monomorpha* (Hall, 1936) (Granada y Granadinas), *G. drusilla neumoegenii* (Skinner, 1894) (sur de Florida), *G. drusilla poeyi* (Butler, 1872) (Bahamas, Cuba, Isla Juventud, Islas Caimán) y *G. drusilla tenuis* Lamas, 1981 (oeste de México, sur de Texas, hasta noroeste de Perú) (WARREN *et al*., 2019). *G. drusilla drusilla* (Cramer, 1777) y *G. drusilla tenuis* Lamas, 1981 aparentemente se superponen en su distribución geográfica lo que hace complicada su separación, además que los ejemplares en ambas subespecies, al igual que en

las otras subespecies, son muy variables. En *G. punctifera* (d'Almeida, 1939) su distribución está restringida a la Española, Puerto Rico y las Islas Vírgenes (WARREN *et al*., 2019).

En relación a la planta nutricia de origen asiático *Moringa oleifera* (Figura 1) (Moringaceae), citada por PITTIER (1926) y SCHNEE *et al*. (2010), aunque no se tiene conocimiento exacto de cuando fue introducida en Venezuela, es posible que haya sido entre finales del siglo XIX y comienzos del XX, por el amplio uso y distribución que tiene en Venezuela. Esta planta tiene múltiples usos, desde medicinal a uso culinario. Además de ser conocida vulgarmente por su nombre genérico "Moringa", también se conoce como "Ben" (PITTIER, 1926; SCHNEE *et al*., 2010). En los últimos 15 años, *M. oleifera* se ha vuelto muy popular en Venezuela, por lo que ha sido sembrada en áreas urbanas de pueblos y ciudades, por su rápido crecimiento y características medicinales que se le atribuyen. Esta situación ha hecho que *G. drusilla* la utilice, tanto para la alimentación de sus larvas, como por el uso del néctar de sus flores por adultos de ambos sexos.

Material y métodos

En una planta pequeña, en maceta, de *Moringa oleifera*, en la Urbanización Las Acacias, de la ciudad de Maracay, Aragua, Venezuela, a 450 m de altitud, se observó una hembra de *G. drusilla* colocando cuatro huevos en el follaje, a las 9:30 am del 7-I-2019. Esta planta fue trasladada a una caja de cría con las siguientes dimensiones: 50 cm x 50 cm x 70 cm. Diariamente se chequeaban los huevos para detectar el momento de su eclosión. Las fotos que documentan este trabajo fueron tomadas con un iPhone 7, pero no se pudieron fotografiar los huevos por su pequeño tamaño y la resolución de la cámara usada. No se determinó el número de fases larvales, sino el tiempo total entre la eclosión de los huevos y la formación de las pupas. Los ejemplares adultos están depositados en el Museo del Instituto de Zoología Agrícola Francisco Fernández Yépez (MIZA), Facultad de Agronomía, Universidad Central de Venezuela, Maracay, Aragua, Venezuela.

Resultados y discusión

Los cuatro huevos recolectados eclosionaron por la mañana, tres días después de colocados por la hembra, siendo las larvas de primer estado de color amarillo naranja (Figura 2), que de manera inmediata empezaron a alimentarse de los foliolos de la planta. Una de las larvas desapareció de la caja de cría, posiblemente depredada por una hormiga que encontramos dentro de la misma y que fue eliminada. Las larvas restantes (3) se desarrollaron perfectamente (Figura 3), presentaban un color verde, se confundían fácilmente entre los foliolos y empuparon ocho días después de la eclosión de los huevos. Las pupas (Figuras 4 y 5), también de color verde como las larvas, que se ocultan muy fácilmente entre las hojas y tallos de la planta, emergieron seis días después y los adultos fueron todos machos (Figura 6). La duración total del ciclo vida fue de 17 días en los tres individuos criados.

El uso de *Moringa oleifera* como planta hospedera es el primer reporte que se tiene para *G. drusilla* y tampoco ha sido señalado para ninguna de las otras especies de mariposas diurnas neotropicales (BECCALONI *et al.,* 2008). Así mismo, tampoco se encontró a *M. oleifera* en ROBINSON *et al.* (2010) como planta nutricia de alguna mariposa diurna, incluso en el área de distribución natural de las Moringaceae. Las familias botánicas, géneros y especies conocidas anteriormente para *G. drusilla* (Cramer, 1777) se citan en la Tabla 1.

En ésta podemos observar que se reportan siete familias: Brassicaceae (1 género, 1 especie), Capparaceae (6 géneros, 9 especies), Cleomaceae (1 género, 4 especies), Dichapetalaceae (1 género, 2 especies), Fabaceae (3 géneros, 5 especies), Putranjivaceae (1 género, 4 especies), y Simaroubaceae (1 género, 1 especie). Las familias utilizadas por *A. drusilla* como plantas nutricias, incluyendo la nueva reportada en este trabajo, pertenecen a los órdenes Brassicales (Brassicaceae, Capparaceae, Cleomaceae, Moringaceae), Fabales (Fabaceae), Malpighiales (Dichapetalaceae, Putranjivaceae) y Sapindales (Simaroubaceae). En el orden Brassicales se encuentra el mayor número de especies (15) repartidas en 9 géneros, luego le sigue Fabales (5 especies y 3 géneros), Malpighiales (6 especies y 2 géneros), y Sapindales (1 especie y 1 género). En la Tabla 1 podemos observar que *Brassica oleracea* L. se señala como una de las plantas nutricias de *G. drusilla*. Es interesante señalar que teniendo *G. drusilla* una am-

plia distribución en áreas donde se cultiva *B. oleracea* ¿por qué no aparecen más citas alimentándose en esa especie, siendo tan intensivamente cultivada? Una posible explicación es que o bien ha sido una excepción el uso de esa especie, como hospedera, por parte de *G. drusilla*, o podría tratarse de una identificación errada, quizás confundiéndola con ejemplares de *Ascia monuste* (Linnaeus, 1764), especie muy común en *B. oleracea*. Por esto, siempre es importante mantener ejemplares testigo que puedan permitir reconfirmar la identidad de las especies involucradas en publicaciones científicas.

Tabla 1.– Plantas hospederas de *G. drusilla* (Cramer, 1777). Toda la información es tomada de BECCALONI *et al.* (2008), excepto (1) WARREN *et al*. (2019) y (2) SMITH (2007). La taxonomía botánica sigue a la presentada en WORLD FLORA ONLINE (2019).

Familia	Especie	Distribución geográfica
Brassicaceae	*Brassica oleracea* L.	Brasil
Capparaceae	*Atamisquea emarginata* Miers ex Hook. & Arn.	Brasil
	Capparidastrum quiriguense (Standl.) Cornejo & Iltis	Belize
	Capparis sp.	Antillas, Brasil, Cuba, Paraguay[2]
	Capparis baducca L.	Costa Rica, México
	Capparis spinosa L.	Uruguay
	Cynophalla flexuosa (L.) J. Presl	Jamaica
	Forchhammeria hintonii Paul G. Wilson	México
	Forchhammeria trifoliata Radlk. ex Mill.	Belize
	Quadrella cynophallophora (L.) Hutch.	Brasil
Cleomaceae	*Cleome* sp.	Brasil, Paraguay[2]
	Cleome houstonii R. Br.	Brasil
	Cleome spinosa Jacq.	Argentina, Brasil, Uruguay
	Cleome trachycarpa Klotzsch ex Eichler	Brasil
Dichapetalaceae	*Dichapetalum morenoi* Prance	Costa Rica[1]
	Dichapetalum stipulatum J. F. Macbr.	Costa Rica
Fabaceae	*Cassia* sp.	Argentina, Brasil
	Medicago sativa L.	Argentina
	Senna sp.	Paraguay[2]
	Senna corymbosa (Lam.) H. S. Irwin & Barneby	Argentina
	Senna uniflora (Mill.) H. S. Irwin & Bar Barneby	Brasil
Putranjivaceae	*Drypetes* sp.	Costa Rica, Cuba, Paraguay[2]
	Drypetes alba Poit.	Jamaica
	Drypetes brownii Standl	Belize
	Drypetes lateriflora (Sw.) Krug & Urb.	Costa Rica, Jamaica
Simaroubaceae	*Castela tortuosa* Liebm.	EE. UU.[1]

Es notable que *G. drusilla* ahora es una especie común en pueblos y ciudades de Venezuela, cuando antes era extraño verlas volar en dichas áreas. En los más de 45 años de colecta que llevamos realizando en Maracay, hemos visto cómo, aproximadamente en los últimos 10 años, *G. drusilla* pasó de ser una especie poco común de observar, a ser vista frecuentemente colocando huevos en plantas de *M. oleifera*. Su vuelo rápido y errático la diferencia con facilidad de otras especies de apariencia similar, como *A. monuste*, cuando se ve adultos de ambos sexos alimentándose en flores de varias especies de plantas ornamentales. Esto coincide con el incremento en la siembra de *M. oleifera* en áreas urbanas, por las razones arriba mencionadas.

Una situación similar ocurrió alrededor de 1960, con otro Pieridae, *Anteos menippe* (Hübner, [1818]), cuyas poblaciones aumentaron notablemente al utilizar una Fabaceae introducida de Asia, *Senna siamea* (Lamarck), conocida popularmente como "Casia de Siam" (SCHNEE *et al.*, 2010). Esta especie fue traída al país como posible sombra para los cultivos de café y cacao, por René Lichy (Jean

Pierre Lichy, comunicación personal) y sembrada ampliamente como árbol ornamental, muy popular en pueblos y ciudades de Venezuela. Alrededor de 1980 y debido al daño producido por las raíces de *S. siamea* en el pavimento, aceras y construcciones urbanas, muchos ejemplares fueron talados, reduciéndose notablemente las poblaciones de esa planta y junto a ellas, *A. menippe* dejó de ser una especie abundante y ahora es raro observarla en las flores que adornan pueblos y ciudades venezolanas. Es importante señalar la necesidad de estudiar la biodiversidad asociada a áreas urbanas, lo que puede ofrecer importante información sobre la bioecología de las especies que habitan nuestros pueblos y ciudades y que puede ser un excelente tema para realizar "ciencia ciudadana", involucrando a expertos en el tema con ciudadanos que puedan contribuir a la realización de dichas investigaciones.

Agradecimientos

Se agradece a la Srta. Conchita Romero M. por la toma de las fotografías y al Prof. Quintín Arias C., por el procesamiento electrónico de dichas fotografías, al Sr. Jean Pierre Lichy por su información sobre la introducción de S*enna siamea* en Venezuela, al Dr. Gerardo Lamas, Universidad Nacional Mayor de San Marcos, Perú, por su sugerencia de usar *Glutophrissa* en este trabajo, y a la Dra. Adriana Zapata, Universidad Nacional de Córdoba, Argentina, por su información sobre *G. drusilla* en Argentina.

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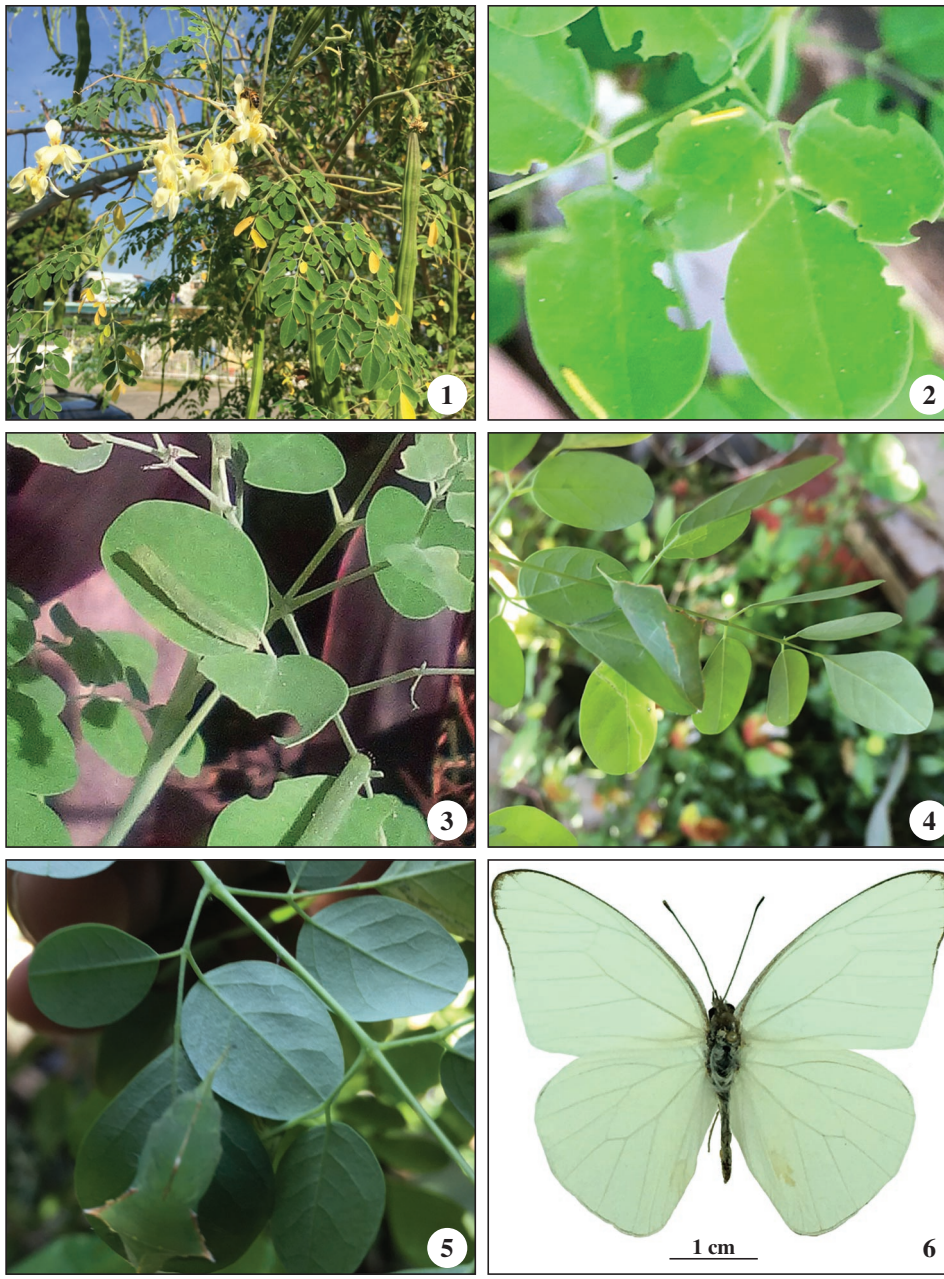
(Recibido para publicación / *Received for publication* 7-III-2019)
(Revisado y aceptado / *Revised and accepted* 2-IV-2019)
(Publicado / *Published* 30-VI-2019)



Figuras 1-6.– 1. Flores y frutos de *Moringa oleifera* Lamarck; **2.** Larvas de primer estado de *G. drusilla* (Cramer, 1777); **3.** Larvas de 4-5 estado de *G. drusilla* (Cramer, 1777); **4.** Vista lateral de la pupa *G. drusilla* (Cramer, 1777); **5.** Vista dorsal de la pupa *G. drusilla* (Cramer, 1777); **6.** Adulto macho *G. drusilla* (Cramer, 1777).

COMITÉ PARA LA PROTECCIÓN DE LA NATURALEZA, PROYECTO DE INVESTIGACIÓN CIENTÍFICA DE SHILAP / *COMMITTEE FOR THE PROTECTION OF NATURE, PROJECT OF SCIENTIFIC INVESTIGATION OF SHILAP*

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3.– The collecting area to be visited by the applicant should also be detailed (province and/or region), expected dates (days, months, or the whole year), collecting method (entomological net, generator, etc.), taxonomical groups of interest to be collected (species, genera, families and/or superfamilies); any other data the applicant wishes to add.

4.– All members of SHILAP who apply for these permits to collect Lepidoptera in Spain with scientific purposes, will be included in the Scientific Investigation Project created by the Society and called: *"Lepidopterological Fauna of the Iberian Peninsula, Balearic Islands and Macaronesian region"*.

5.– In order to contribute to this Scientific Project, it is requested to send to SHILAP, **either a copy by electronic mail (e-mail), with the listing of materials collected in EXCEL** (- only in this format, please), indicating the Family, Subfamily, Tribe, name of the species (genera, species, author's name and year), town, UTM (1 X 1) or GPS coordinates, province, dates of capture, collector and numbers of males and females captured (**only 5 specimens per taxon and locality, maximum**). Please, use only the *"Catálogo sistemático y sinonímico de los Lepidoptera de la Península Ibérica, de Ceuta, de Melilla y de las islas Azores, Baleares, Canarias, Madeira y Salvajes (Insecta: Lepidoptera)* (A. VIVES MORENO, 2014)". This list is necessary for this Scientific Project of SHILAP and for new authorizations.

6.– It's obligatory to publish in *SHILAP Revista de lepidopterología*, the new species or subspecies that are discovered and to remit to SHILAP **a part of the TYPE material**, for later incorporation into the Lepidoptera Collection of the National Museum Natural Sciences, Madrid, Spain.

7.– All members are kindly reminded of the obligation to be duly authorized for collecting Lepidoptera, with scientific purposes, in Spain and that it is forbidden all type of commercial activity, with the captured material.

8.– To know about the scientific aims of SHILAP and to commit to pay the expenses of participation in this Scientific Project, that the Board of Directors considers at any given moment.

SHILAP Revista de lepidopterología, 47 (186) junio 2019: 379-381 eISSN: 2340-4078 ISSN: 0300-5267
https://doi.org/10.57065/shilap.779

New species of plume moths from South Africa (Lepidoptera: Pterophoridae)

P. Ya. Ustjuzhanin & V. N. Kovtunovich

Abstract

The present article describes a new Pterophoridae species *Hellinsia bidzilya* Ustjuzhanin & Kovtunovich, sp. n., basing on the materials of Wolfram Mey (Berlin, Germany), Oleksiy Bidzilya (Kiev, Ukraine) and the collection of the Natural History Museum in Pretoria, the Republic of South Africa, and of the author's collections. The data on its distribution and phenology are provided.
KEY WORDS: Lepidoptera, Pterophoridae, new species, Republic of South Africa.

Nueva especie de terofórido de Sudáfrica (Lepidoptera: Pterophoridae)

Resumen

El presente artículo describe una nueva especie de Pterophoridae *Hellinsia bidzilya* Ustjuzhanin & Kovtunovich, sp. n., basándose sobre el material de Wolfram Mey (Berlín, Alemania), Oleksiy Bidzilya (Kiev, Ucrania) y la colección del Natural History Museum en Pretoria, República de Sudáfrica y las colecciones de los autores. Se proporcionan los datos sobre su distribución y fenología.
PALABRAS CLAVE: Lepidoptera, Pterophoridae, nueva especie, República de Sudáfrica.

Introduction

The genus *Hellinsia* Tutt, 1905 in South Africa is one of the largest concerning the species diversity. It includes over 15 species. Most of them prefer habitats with moderate moisture, more often in mountains and forest cenoses, they are much less common in deserts. In recent years, three species from South Africa have been described, one from Namibia (ARENBERGER, 2004), one from Lesotho (KOVTUNOVICH & USTJUZHANIN, 2011) and one from desert regions of West of South Africa (USTJUZHANIN & KOVTUNOVICH, 2016).

The type material is deposited in the museums: (MFN) Museum für Naturkunde (formerly Zoologisches Museum der Humboldt Universität), Berlin, Germany; (TMSA) Distong National Museum of Natural History, Pretoria, South Africa (formerly Transvaal Museum) and (CUK) Collection of P. Ustjuzhanin and V. Kovtunovich (Novosibirsk and Moscow, Russia).

***Hellinsia bidzilya* Ustjuzhanin & Kovtunovich, sp. n.** (Figs 1-2)

Type material: Holotype ♂, (MFN 201701), South Africa, Eastern Cape, Graaff-Reinet, Asante Sana Game Farm, 10-XI-2012, W. Mey leg. Paratypes: 2 ♂♂, (MFN, CUK) South Africa, Eastern Cape, Graaff-Reinet, Petersburg, Sourkloof, 07-XI-2012, O. Bidzilya; 1 ♂, (TMSA) South Africa, Northern Cape, Nababieb, 29º 35'S, 17º 49'E, 30-VIII-02-IX-1962, Vari & Goode; 1 ♂, (TMSA) South Africa, Eastern Cape, Groor River Pass, 33º 57'S, 23º 34'E, 22-23-I-1955, A. J. T. Janse; 1 ♂, (CUK) South Africa, KwaZulu Natal, Weenen G. R., 28º 50'S, 29º 59'E, 950 m, 04-XII-2011, V. Kovtunovich, P. Ustjuzhanin.

Description: Head with pale brown setae, thorax and tegulae yellow grey. Labial palpus thin, straight, length equal to longitudinal eye diameter. Antenna pale brown. Wingspan 13-16 mm. Fore wing yellowish brown. Small dark brown spot in front of cleft. Elongated brown patches of scales along costal edge of fore wing distally. Second lobe noticeably paler than first, two small spots of brown scales on outer edge. Fringe inside cleft dark brown. Hind wing unicolor, brown grey, darker than fore wing, fringe between lobes dark grey. Hind leg yellow.

Male genitalia: Valva asymmetric. Thin, long harpe on left valva, slightly protruding beyond apex of valva. Right harpe slightly smaller than uncus, directed towards apex of valva, apically tapered. Sacculus wide, protruding beyond posterior edge of valva, with well-expressed rod-shaped harpe, slightly curved and sharp at end. Uncus thin, quite long. Saccus concave, arched. Anellus arms wide, of unequal length, left arm 2/3 of right arm, apex uncinate, right arm noticeably wider, tapered to apex. Phallus thin, almost straight, 1/2 of valva in length, slightly bent distally.

Female: Unknown.

Diagnosis: The new species is close to *Hellinsia adumbratus* (Walsingham, 1881), but these species differ in the genital structures. In the new species, the harpe on the left valva is long, slightly protruding beyond the apex of the valva; the harpe on the right valva is slightly smaller than the uncus and directed towards the apex of the valva, while in *H. adumbratus,* the harpe on the left valva does not reach the top of the valva, and the harpe on the right valva is 1/2 of the uncus and is directed perpendicularly to the outer edge of the valva.

Distribution: South Africa: Eastern Cape, Northern Cape, Kwa Zulu Natal.

Flight period: August- January.

Etymology: The species is named after the Ukrainian lepidopterologist, Oleksiy Bidzilya.

Acknowledgments

The authors are grateful to the curator of MFN, Dr Wolfram Mey (Berlin, Germany) and Dr Martin Krüger, curator of TMSA (Pretoria, RSA), for the possibility to work with collections. We also express our sincere gratitude to Oleksiy Bidzilya (Kiev, Ukraine) for the material provided for examination, and to Sergey Reshetnikov (Novosibirsk, Russia) for the photo of the adult.

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(Recibido para publicación / *Received for publication* 31-VIII-2018)
(Revisado y aceptado / *Revised and accepted* 28-IX-2018)
(Publicado / *Published* 30-VI-2019)

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Figs. 1-2.– *Hellinsia bidzilya* Ustjuzhanin & Kovtunovich, sp. n. **1.** Adult (Holotype, MFN). **2.** Male genitalia (Holotype, MFN 201701).

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SHILAP Revista de lepidopterología, 47 (186) junio 2019: 383-384 eISSN: 2340-4078 ISSN: 0300-5267

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