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SUMARIO / *CONTENTS*

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Atlas provisional de los Lepidoptera de la familia Hesperiidae Latreille, 1809, en la provincia de Valladolid (España) (Lepidoptera: Hesperiidae)

R. Magro

Resumen

Se presenta un atlas provisional de los Lepidoptera de la provincia de Valladolid (España) en cuadrículas UTM de 10 km de lado. Las especies tratadas pertenecen a la familia Hesperiidae Latreille, 1809. También se incluyen comentarios generales relacionados con su fenología y abundancia.
PALABRAS CLAVE: Lepidoptera, Hesperiidae, atlas provisional, UTM, Valladolid, España.

A provisional atlas of the Lepidoptera of the family Hesperiidae Latreille, 1809, of Valladolid province (Spain) (Lepidoptera: Hesperiidae)

Abstract

A provisional atlas of the Lepidoptera from Valladolid province (Spain) is presented following the UTM program using 10 km. squares. The species treated belong to family Hesperiidae Latreille, 1809. General comments related to their phenology and abundance, are included.
KEY WORDS: Lepidoptera, Hesperiidae, provisional atlas, UTM, Valladolid, Spain.

Antecedentes

Son muy escasas las menciones de hespéridos de la provincia de Valladolid. VÁZQUEZ-FIGUEROA (1900: 152), cita con fecha aproximada, 9 especies capturadas en "Monte Torozos", alrededores de Valladolid (léanse los comentarios realizados por MAGRO, 1994: 8, sobre esta zona geográfica). Las especies son las siguientes: *Carchadorus lavatherae* (Esper, 1780), *Sloperia proto* (Ochseheimer, 1808), *Pyrgus malvae* (Linnaeus, 1758), *Pyrgus alveus* (Hübner, 1803), *Pyrgus fritillarius* (Poda, 1761), *Thymelicus sylvestris* (Poda, 1761), *Thymelicus lineola* (Ochsenheimer, 1808), *Hesperia comma* (Linnaeus, 1758) y *Spialia orbifer* (Hübner, [1823]). Esta última especie, nunca se ha capturado en España, se trata de una confusión, probablemente con *Spialia sertorius* (Hoffmannsegg, 1804), aunque es sabido que A. Vázquez-Figueroa mandaba las ejemplares difíciles a O. Staudinger para que se los determinase. Comentarios al respecto, pueden encontrarse en VÁZQUEZ-FIGUEROA (1894: 256). SÁNZ-ROJO & POLLO-ZORITA (1979: 146), citan *Carchadorus lavatherae* (Esp.), en varios puntos de Gallinera, Simancas, Valladolid. RODRÍGUEZ-MARTÍN (1982: 130) cita de Salamanca, en el límite territorial de la provincia de Valladolid a *Pyrgus amoricanus* (Oberthür, 1910) y *Pyrgus onopordi* (Rambur, 1840). Posteriormente no se han vuelto a citar hespéridos de Valladolid con localidad y fecha. Hay dibujados mapas con cuadrículas UTM en AGUADO (2007: 735-811) la mayoría de la citas ya co-

nocidas, sólo aporta para 8 especies de hespéridos 11 cuadrículas para Valladolid. Cabe reseñar con respecto a esta publicación que la estructura genital de la página 812, foto 195, tomada de FERNÁNDEZ-RUBIO (1980: 48) que también es la misma de FERNÁNDEZ-RUBIO (1991: 349) está erróneamente determinada como *Carcharodus baeticus* (Rambur, 1840), la estructura genital mostrada pertenece en realidad a *Carcharodus lavatherae* (Esper, 1780) (aparte, el nombre que usa es *boeticus sic*., sinonimizada mucho antes, según VIVES MORENO, 1994: 271). Por lo tanto, para la especie *baeticus* no se presenta microfotografía puesto que las figuras 194 y 195 son iguales. BLAZQUEZ-CASELLES *et al*. (2013), en su estudio sobre la distribución de los hespéridos de la provincia de León, para 11 especies incluyen varias cuadrículas punteadas en las zonas limítrofes entre las dos provincias que al penetrar en territorio Vallisoletano se toman en consideración aquí.

Material y métodos

Para determinar las especies se han consultado, fundamentalmente, HIGGINS & RILEY (1980: 372-397); HIGGINS & HARGREAVES (1985: 208-220) y MANLEY & ALLCARD (1970: 11-21). Las especies que presentaron dudas se determinaron por el análisis de sus armaduras genitales, consultándose los trabajos de HIGGINS (1975: 33-58) y FERNÁNDEZ-RUBIO (1980: 34-61). En relación a las tinciones de las preparaciones, se comenzó utilizando técnicas químicas (MAGRO, 2002) sustituyendo paulatinamente, en la mayoría de los casos, por procedimientos digitales (MAGRO, 2008).

La conservación del material, etiquetado, la realización de preparaciones de los órganos genitales externos y otras operaciones, están ampliamente documentados en la bibliografía especializada, por lo que no aquí no incluiremos más comentarios.

El material estudiado para la confección de este artículo procede, en su mayor parte, de observaciones y determinaciones personales. Se ha examinado para este trabajo seis colecciones, dos de ellas, la de don Víctor Aguilar y la de don Francisco de la Torre se encuentran depositadas en el Museo Nacional de Ciencias Naturales de Madrid. El resto del material del autor se encuentra consignado en la colección JCSR (don Juan Carlos Sanz-Rojo) de Valladolid. Los datos publicados hasta la fecha por diversos científicos en planos generales se ignoran en la confección de los mapas que aquí se incluyen, por razones obvias con respecto a su imprecisión.

En las labores de campo los lepidópteros se capturaron con cazamariposas. Los datos se almacenaron en cuadernos, en soporte fotográfico y videográfico, registros fonográficos con grabadora *in situ* y en documentos de texto en computadores personales portátiles. Los análisis y toma de citas se han formalizado en cualquiera de los estadios en los que pueden presentarse las especies que componen el Orden Lepidoptera Linnaeus, 1758. La generalidad de los aquí señalados conciernen a imagos. Los datos geográficos y las cuadrículas UTM almacenadas en bases de datos relacionales SQL-Server se gestionaron por medio del aplicativo EPHESIA Lepidopterología V.3.2, en concreto con los módulos de ESPECÍMENES, COORDENADAS y CONSULTAS SQL. Ejecutados los procedimientos almacenados (procedure, Transact-SQL) sobre las tablas de datos correspondientes, las enumeraciones vinculadas a COREL DRAW X4 se trazaron en mapas vectoriales y se finalizaron en gráficos de matrices de puntos (raster bitmap). Se han visitado todas las cuadrículas (un total de 111) pertenecientes a la provincia de Valladolid al menos una vez. La frecuencia y densidades de los muestreos y otros datos de captura, pueden consultarse en MAGRO, 2013: 204-206. Para la realización de transectos se han usado ortofotos y mapas. En concreto, se establecieron las rutas y zonas de estudio a partir de varios geolocalizadores: Instituto Geográfico Nacional (IBERPIC-ORIGINAL e IBERPIC-2, 2013); sistema de identificación de parcelas agrarias del Fondo Español de Garantía Agraria del Ministerio de Medio Ambiente y Medio Rural y Marino (SIGPAC [antiguo visor], SIGPAC [nuevo visor], y SIGPACCYL, 2013), de éstos se tomó todo lo concerniente a los toponímicos. También se usó BING MAPS, 2013 y para comparaciones entre sistemas de imágenes por satélite el visor genérico de LABORATORIOREDIAM, 2013. Para los datos geográficos sobre la zona de estudio pueden consultarse anteriores trabajos sobre distribución de especies de lepidópteros en Valladolid y Castilla y León (MAGRO, 1989: 304 y 306-307 y MAGRO, 1997: 5-6).

Para la investigación se solicitaron al departamento administrativo concreto de la Junta de Castilla

y León, los permisos pertinentes para la zona de estudio, algunos de ellos dentro del marco del Proyecto de Investigación Científica de SHILAP. En lo referente a la sistemática hemos seguido el orden de VLIEGENTHART *et al*. (2011) teniendo en consideración parcialmente en lo relativo a nombres de táxones a VIVES-MORENO (1994: 266-275) y a GARCÍA-BARROS *et al*. (2013: 96-180).

Resultados

En este trabajo se estudian 18 especies de hespéridos:

Ochlodes venata (Bremer & Grey, 1853)
Hesperia comma (Linnaeus, 1758)
Thymelicus acteon (Rottemburg, 1775)
Thymelicus lineola (Ochsenheimer, 1808)
Thymelicus sylvestris (Poda, 1761)
Carcharodus alceae (Esper, 1780)
Carcharodus baeticus (Rambur, 1840)
Carcharodus lavatherae (Esper, 1780)
Erynnis tages (Linnaeus, 1758)
Sloperia proto (Ochseheimer, 1808)
Pyrgus alveus (Hübner, 1803)
Pyrgus armoricanus (Oberthür, 1910)
Pyrgus cirsii (Rambur, 1839)
Pyrgus malvoides (Elwes & Edwards, 1897)
Pyrgus onopordi (Rambur, 1840)
Pyrgus serratulae (Rambur, 1840)
Pyrgus fritillarius (Poda, 1761)
Spialia sertorius (Hoffmannsegg, 1804)

Las especies que ocupan mayor extensión se ordenan del siguiente modo:

Spialia sertorius (Hoffmsg.), 34 cuadrículas, 37,74 % del total en la provincia.
Thymelicus lineola (O.), 29 cuadrículas, 32,19 % del total en la provincia.
Thymelicus sylvestris (Pod.), 26 cuadrículas, 28,86 % del total en la provincia.
Sloperia proto (Ochs.), 24 cuadrículas, 26,64 % del total en la provincia.
Carcharodus lavatherae (Esp.), 22 cuadrículas, 24,42 % del total en la provincia.
Carcharodus alceae (Esp.), 18 cuadrículas, 19,98 % del total en la provincia.
Hesperia comma (L.), 18 cuadrículas, 19,98 % del total en la provincia.
Thymelicus acteon (Rott.), 12 cuadrículas, 13,32 % del total en la provincia.
Erynnis tages (L.), 12 cuadrículas, 13,32 % del total en la provincia.
Pyrgus malvoides (Elws. & Edws.), 9,99 cuadrículas, 99 % del total en la provincia.

Las especies más escasas son:

Ochlodes venata (Brem. & Gry.), en una cuadrícula.
Pyrgus cirsii (Rbr.), dos citas de León BLAZQUEZ-CASELLES *et al*. (2013), en sendas cuadrículas de 10 x 10 km que son compartidas y fronterizas con Valladolid. Dada la orografía mesetaria de la zona nada hace suponer que no vuele en la provincia.
Pyrgus onopordi (Rbr.), en dos cuadrículas, muy rara.
Pyrgus armoricanus (Obth.), tres cuadrículas. Tal vez y dadas sus preferencias ambientales se extienda por más localidades de la provincia. Es posible que esté confundida en las colecciones locales con *P.*

malvoides, P. alveus incluso con *Pyrgus onopordi*. Es extraño que no se haya localizado en los Montes de Valderrobledo.

Pyrgus serratulae (Rbr.), en tres cuadrículas, parece ser muy escasa y rara, acaso porque son pocas la zonas de Valladolid que superan los 900 metros de altitud, límite de vuelo estipulado en la bibliografía por varios autores.

En algunos puntos, como por ejemplo en los lugares que se denominaban "Los Cerezos" y "Los Almendros" que hoy en día están integrados en el barrio de "Ciudad Parquesol", están totalmente urbanizados por lo que las especies han desaparecido. Lo mismo sucede en el "Cerro de San Cristobal" hoy un polígono industrial, y en "El Cerro de las Contiendas" en la actualidad un camposanto. Todos ellos eran lugares clásicos de captura para entomólogos locales con colonias abundantes de hespéridos y en general ricas en lepidópteros y variadas en insectos. Lamentablemente cabe comentar que en los citados lugares las colonias más abundantes y florecientes de *Carcharodus lavatherae* (Esp.) que presentaban ejemplares espléndidos de gran talla y habitus albino, hoy en día están extinguidas. Salvo las excepciones reseñadas, las colonias de hespéridos en Valladolid son abundantes, y los asentamientos se mantienen bastante estables. Son muy frecuentes los bebederos con gran cantidad de individuos, incluso con especies diferentes de hespéridos y simpátricamente con otros táxones de distintas familias como por ejemplo Lycaenidae Leach [1815]. En la provincia vuelan desde principios de la primavera hasta finales de otoño, pero en inviernos benignos y días cálidos y soleados es posible observar posados orientados hacia el sol ejemplares divagantes, por ejemplo de *Spialia sertorius* (Hoffmsg.).

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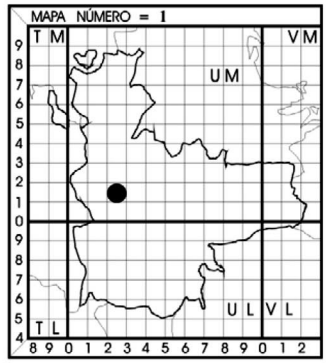

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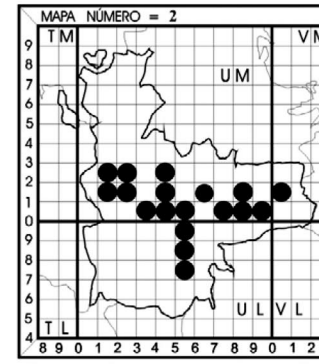

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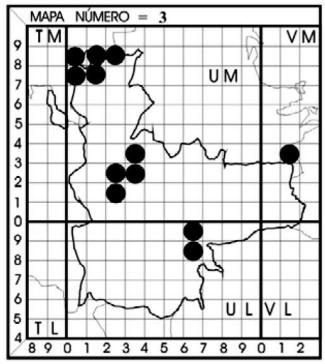

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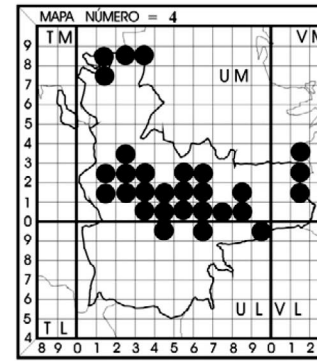

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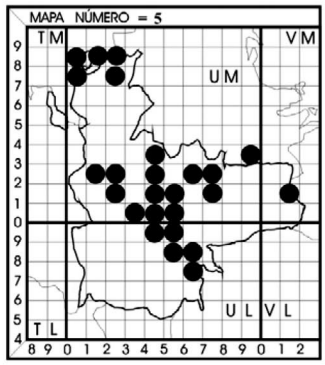

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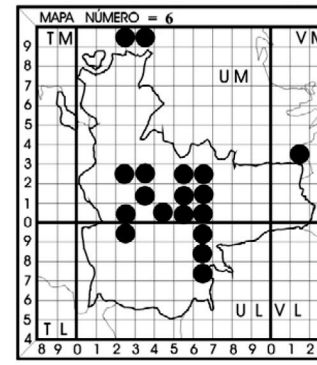

Carcharodus alceae (Esp.).

(R. MAGRO, Del.)

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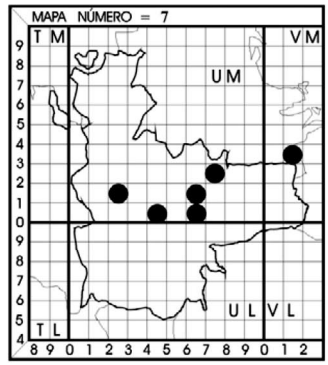

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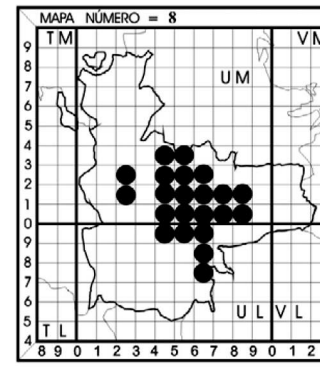

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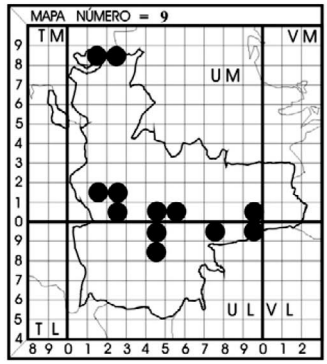

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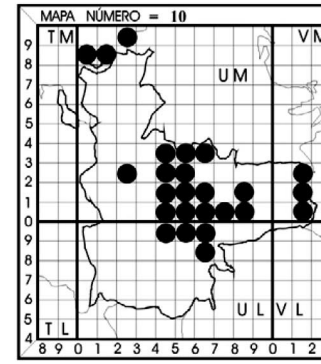

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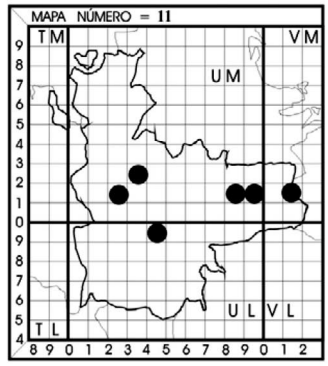

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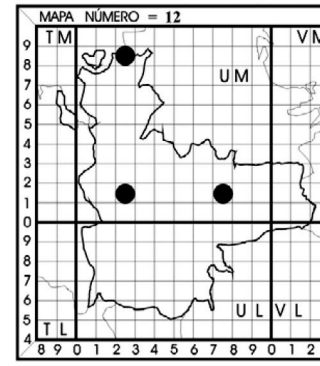

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(R. MAGRO, Del.)

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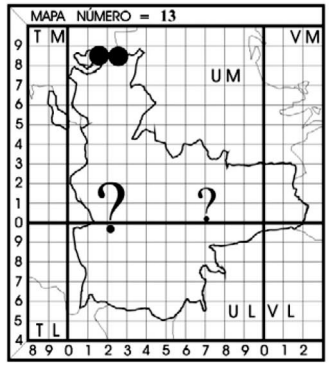

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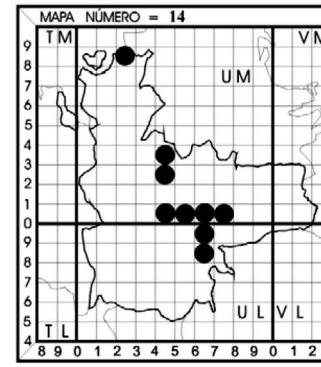

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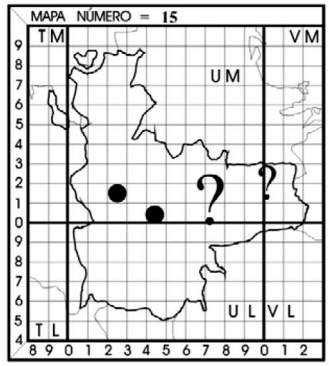

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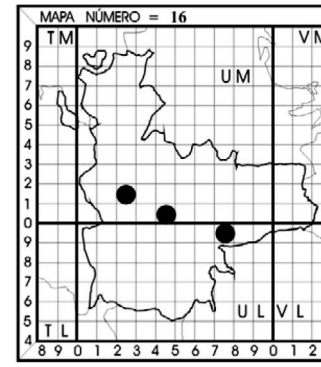

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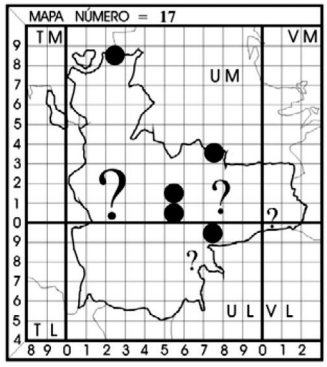

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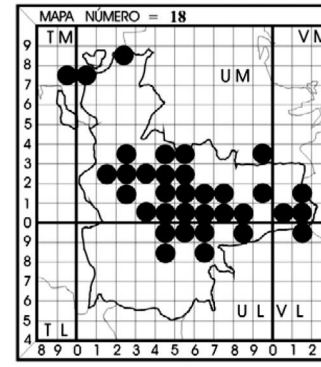

Spialia sertorius (Hoffmsg.)

(R. MAGRO, Del.)

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Amastus gilvus Köhler, 1924, otro error de rotulado (Lepidoptera: Erebidae)

H. M. Beccacece & A. I. Zapata

Resumen

En este trabajo se propone un nuevo sinónimo de *Amerila bauri* Möschler, 1884: *Amastus gilvus* Köhler, 1924 **syn. n**. En el rótulo del holotipo ♀ de *A. gilvus*, se consignó erróneamente Misiones, Argentina, como lugar de procedencia. El espécimen corresponde a *A. bauri*, especie de distribución Paleotropical. Se destaca la importancia del correcto asentamiento de datos en los rótulos de los ejemplares depositados en las colecciones biológicas.
PALABRAS CLAVE: Lepidoptera, Erebidae, Arctiinae, Arctiini, Phaegopterina, colecciones biológicas.

Amastus gilvus **Köhler, 1924, another mistake of labeling (Lepidoptera: Erebidae)**

Abstract

In this study a new synonymy is proposed for *Amerila bauri* Möschler, 1884: *Amastus gilvus* Köhler, 1924 **syn. n**. The holotype ♀ of *A. gilvus* was mistakingly labeled as coming from Misiones, Argentina. The specimen is in fact *A. bauri*, with a Paleotropical distribution. This error shows the importance of good labeling of biological collections.
KEY WORDS: Lepidoptera, Erebidae, Arctiinae, Arctiini, Phaegopterina, biological collections.

Introducción

Amastus gilvus Köhler, 1924 (Lepidoptera: Erebidae) fue una de las 407 especies de Lepidoptera de supuesta presencia en Argentina descritas por Pablo E. Köhler (PASTRANA, 1981; BECCALONI *et al.*, 2003). Según la ilustración incluida en la publicación original, la descripción fue realizada presuntamente a partir a una hembra con rótulo que indicaba como procedencia Misiones, Argentina, perteneciente a la colección de Alberto Breyer (KÖHLER, 1924). Sin embargo, en el catálogo de árctidos Neotropicales, WATSON & GOODGER (1986) sugieren que la ilustración original parecería corresponder mejor a una especie del género *Amerila* Walker. Más recientemente, VINCENT & LAGUERRE (2014) no incluyen a *A. gilvus* en ninguno de los ocho grupos basados en el habitus propuestos por TOULGOËT (1988; 1992).

El objetivo de este estudio fue determinar si la especie *Amastus gilvus* propuesta por KÖHLER (1924) es una especie válida.

Material y Métodos

Durante la revisión de los ejemplares de árctidos depositados en la colección Breyer en el Museo La Plata (MLP), Argentina, se localizó un ejemplar rotulado como el espécimen tipo de *A. gilvus* Köh-

ler, 1924, **syn. n.** Este ejemplar fue comparado con la imagen de la descripción original (KÖHLER, 1924) y se consideraron las revisiones previas de la subfamilia y los géneros en cuestión (MÖSCHLER, 1884; WATSON & GOODGER, 1986; TOULGOËT, 1988, 1992; HÄUSER & BOPPRÉ, 1997; VINCENT & LAGUERRE, 2014). El espécimen y sus etiquetas fueron fotografiados con una cámara digital Sony DSCH7 (Fig. 1).

Resultados

El ejemplar, que porta cinco etiquetas: "COLL. BREYER REP. ARGENTINA MISIONES"; "2378"; "REP. ARGENTINA A. BREYER"; "TIPUS"; "AMASTUS GILVUS" (Fig. 1), presenta todas las características correspondientes a *Amerila* Walker, particularmente a *A. bauri* Möschler, 1884 (MÖSCHLER, 1884; HÄUSER & BOPPRÉ, 1997).

Los integrantes del género *Amerila* Walker, de tamaño mediano a grande y de cuerpo robusto, poseen probóscide desarrollada, antenas filiformes en ambos sexos, ala anterior alargada y parcial o completamente transparente en la zona media, y ala posterior, más pequeña que el ala anterior, generalmente con escasas escamas. La coloración general es blanca, gris o castaña, con manchas negras circulares dispuestas una en la cabeza, dos en la patagia, una o dos en la tégula, seis en el tórax y dos en la base del ala anterior.

Por su parte, las características del ejemplar estudiado coinciden con las características y el patrón de coloración del habitus de *A. bauri*, esto es: cabeza y tórax ocre pálido; tégula con un único punto negro en la base anterior; abdomen levemente rojizo por dorsal y ocre pálido por ventral; ala anterior ocre pálido desde la base hasta la región discal, luego castaño pálido hacia el ápice y zona postdiscal central transparente; venas del ala anterior parcialmente cubiertas con escamas más oscuras; ala posterior castaño pálido, débilmente escamada (Fig. 1). El lectotipo ♀ de *Amerila bauri* perteneciente a la fauna Paleotropical, Baziya, Sudáfrica, e ilustrado por MÖSCHLER (1882) en su lámina 16, fig. 2, es virtualmente idéntico al presunto holotipo de *Amastus gilvus* Köhler y fotografiado en una revisión posterior (HÄUSER & BOPPRÉ, 1997).

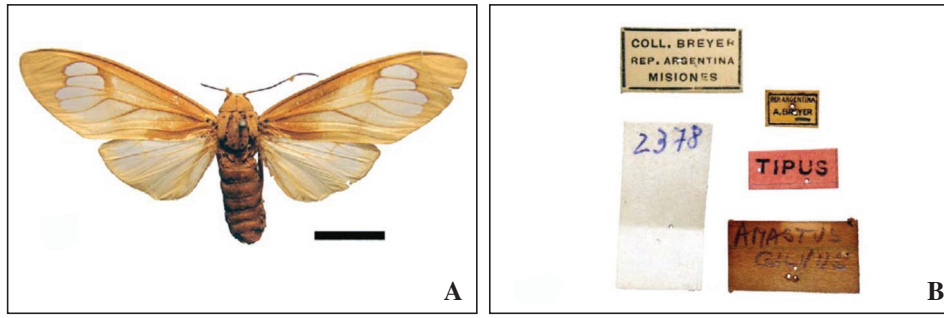

Fig. 1.– A. Holotipo ♀ *Amastus gilvus* Köhler, 1924, vista dorsal; **B.** Rótulo del holotipo (Barra: 1 cm.)

Discusión

KÖHLER (1924) describe *A. gilvus* con el convencimiento de su procedencia argentina, asimilándola al género más semejante de distribución Neotropical. En esta descripción, el autor no explicita si la descripción se basó en uno o más ejemplares, sólo indica que pareciera ser muy poco frecuente. En el presente trabajo se considera al ejemplar rotulado como Tipo, y coincidente con la imagen que se muestra en la descripción original, el holotipo de *A. gilvus*, en ausencia de otros ejemplares y de evidencias que demuestren lo contrario.

Se desconoce el origen del error, pero se sabe que parte de los ejemplares depositados en la colección Breyer provinieron de compras, donaciones o intercambios que no siempre fueron asentados adecuadamente en los rótulos. Casos similares se han detectado con anterioridad: *Amauris albimaculata* Butler, 1875 = *Hirsutis virginalis* Köhler, 1923 y *Belenois creona severina* (Stoll, 1781) = *Pieris guarani* Köhler, 1923, ambas especies pertenecientes a la región Paleotropical al igual que *A. bauri* (FOX, 1956; LAMAS, 1993).

Por las características ya señaladas y la ausencia de otros ejemplares de la especie tanto en las colecciones públicas relevadas (Museo de Ciencias Naturales Bernardino Rivadavia, Buenos Aires e Instituto y Fundación Miguel Lillo, Tucumán) como en colectas recientes, y en coincidencia con lo sugerido por WATSON & GOODGER (1986), se concluye que el ejemplar estudiado corresponde a un individuo hembra de *A. bauri* Möschler, 1884 y se establece entonces una nueva sinonimia por error de rotulado:

Amerila bauri (Möschler, 1884): *Amastus gilvus* Köhler, 1924, **syn. n.**

Por lo antes expuesto, se recomienda realizar una revisión exhaustiva de todas las especies descriptas por Köhler a partir de la colección Breyer y de las mencionadas en sus listas para Argentina (KÖHLER, 1923, 1924; 1932), a fin de aclarar su situación real. Estos errores resaltan la importancia que tiene el correcto rotulado de los ejemplares en las colecciones biológicas.

Agradecimientos

A la Dra. Analía Lanteri por permitirnos revisar la colección del MLP y a Cristian Klimaitis por facilitarnos una fotografía preliminar del ejemplar. A los evaluadores por la revisión crítica del manuscrito y valiosos comentarios. Este estudio fue parcialmente financiado por el CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina), a través de una beca de doctorado para HMB.

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Checklist of grass-mining moths of Ukraine with description of one new species (Lepidoptera: Elachistidae)

O. Bidzilya, Yu. Budashkin & A. Zhakov

Abstract

An annotated list of 71 species of Elachistidae of Ukraine is given. One species *Elachista laurii* Bidzilya & Budashkin, sp. n. is described as new from the Eastern Ukraine (Luhansk region) and Volga area of Russia (Ulyanovsk, Saratov and Volgograd regions). *Elachista purella* Sruoga, 2000 is recorded from Europe for the first time and the hitherto unknown female of this species is illustrated. Eight species: *Elachista grandella* Traugott-Olsen, 1992, *Elachista parvula* Parenti, 1978, *Elachista nitidulella* (Herrich-Schäffer, 1855), *Elachista spumella* Caradja, 1920, *Elachista heringi* (Rebel, 1899), *Elachista nolckeni* Šulcs, 1992, *Elachista littoricola* Le Marchand, 1938 = *Elachista volgella* Lastukhin, 2009, syn. n., and *Biselachista contaminatella* (Zeller, 1847) = *Biselachista arzamastsevi* Lastukhin, 2009, syn. n., are recorded from the Ukraine for the first time. Four species: *Elachista regificella* Sircom, 1849, *Elachista anitella* Traugott-Olsen, 1985, *Elachista elegans* Frey, 1859 and *Biselachista albidella* (Nylander, 1848), are removed from the Ukrainian fauna due to previous misidentification. One species *Perittia sibirica* Sinev, 1992 is removed from the European fauna. Type material is deposited in the collections of ZMKU (Kiev, Ukraine), FMNH (Helsinki, Finland), K. Nupponen (Espoo, Finland), V. Zolotuhin (Ulyanovsk, Russia).
KEY WORDS: Lepidoptera, Elachistidae, checklist, new species, Ukraine.

Lista de los elachístidos de Ucrania con descripción de una nueva especie (Lepidoptera: Elachistidae)

Resumen

Se da una lista anotada de 71 especies de Elachistidae de Ucrania. Se describe una nueva especie *Elachista laurii* Bidzilya & Budashkin, sp. n., del este de Ucrania (región de Lugansk) y del área Volga de Rusia (regiones de Uliánovsk, Sarátov y Volgogrado). Por primera vez, *Elachista purella* Sruoga, 2000 se registra como nueva para Europa y se describe e ilustra la hembra desconocida de esta especie. Ocho especies: *Elachista grandella* Traugott-Olsen, 1992, *Elachista parvula* Parenti, 1978, *Elachista nitidulella* (Herrich-Schäffer, 1855), *Elachista spumella* Caradja, 1920, *Elachista heringi* (Rebel, 1899), *Elachista nolckeni* Šulcs, 1992, *Elachista littoricola* Le Marchand, 1938 = *Elachista volgella* Lastukhin, 2009, syn. n., y *Biselachista contaminatella* (Zeller, 1847) = *Biselachista arzamastsevi* Lastukhin, 2009, syn. n., se registran por primera vez para Ucrania. Cuatro especies: *Elachista regificella* Sircom, 1849, *Elachista anitella* Traugott-Olsen, 1985, *Elachista elegans* Frey, 1859 y *Biselachista albidella* (Nylander, 1848), se eliminan de la fauna ucraniana, debido a malas identificaciones anteriormente. Una especie *Perittia sibirica* Sinev, 1992 se retira de la fauna europea. El material tipo es depositado en las colecciones de ZMKU (Kiev, Ucrania), FMNH (Helsinki, Finlandia), K. Nupponen (Espoo, Finlandia), V. Zolotuhin (Uliánovsk, Rusia).
PALABRAS CLAVE: Lepidoptera, Elachistidae, catálogo, nueva especie, Ucrania.

Introduction

The study of Elachistidae in Ukraine goes back more than 150 years. NOWICKI (1860) was the

first who mentioned 16 species of grass-mining moths in his fundamental "Enumeratio Lepidopterorum Haliciae orientalis" devoted to the Lepidoptera of eastern "Halicia" (now Lvov region). Three additional species were recorded from this region five years later (NOWICKI, 1865). This outstanding beginning was carried on by the next generation of Polish lepidopterists in the first third of XX century. KLEMENCIEWICZ (1898, 1899, 1901, 1902, 1905, 1906, 1907), GATNAR (1906), STÖKL (1908, 1922), BRUNICKI (1913) contributed greatly to the study of all groups of Lepidoptera, and Elachistidae among them, in the territories of present Lvov and Ivano-Fankovsk regions mainly. At the same time HORMUZAKI (1907, 1910) published two important papers on Microlepidoptera of Bukowina, mentioning seven Elachistidae species from Tchernovtsy region. KHRANEVICH (1927) reported one species from Khmelnitsky region. Nearly all the faunistic information obtained by these authors was summarized in a monograph "Fauna motyli Polski" by SHILLE (1930). As a result the number of Elachistidae species known by 1930 from the western Ukraine was 37. Shille's monograph remains the most complete compilation on Lepidoptera of the western Ukraine up to now.

In the beginning of the XX century the first records of Elachistidae were taken from others regions. KSENZHOPOLSKY (1915) recorded one species from the vicinity of Zhitomir. LJUBOMUDROV (1917) and ZHIKHAREV (1928) found one species in Kiev. Later LEBEDEV (1937) and SOVINSKY (1938) listed four and five species of Elachistidae respectively for Kiev in their contributions to the Microlepidoptera fauna of Kiev region.

Incredible but true: more than 40 years passed before the study of Microlepidoptera (incl. Elachistidae) in Ukraine was recommenced. In 1981-1989 the late A. Zagulajev organized a series of collecting trips to the Crimea. It was the beginning of the integrated study of all families of micromoths in this region. In 1983 this initiative was taken up by Yu. Budashkin, who started the permanent twelve-month study of diversity and ecology of Lepidoptera in Crimea. Concerning Elachistidae this work has yielded a first contribution directly devoted to the grass-mining moths of Ukraine (BUDASHKIN & SINEV, 1991). In this paper, the authors compiled all known data on Elachistidae from the Crimea at that time. As a result a list of 24 species was provided for Karadagh Nature Reserve, and four species were described as new, two of which are now considered valid.

Since 1990, O. Bidzilya and A. Zhakov have been studying the Elachistidae mainly in the steppes regions of Ukrainian mainland. Kamennye Mogily Nature Reserve (Zaporozhie and Donetsk regions) was one of the first localities that has been intensively studied. The summarized list of Lepidoptera of this Nature Reserve includes nine species of grass-minning moths (BIDZILYA *et al*., 2001). In the mean-time 28 Elachistid species from the steppe zone and other regions have been mentioned in the series of faunistic papers (BIDZILYA, 1995, BIDZILYA & BUDASHKIN, 1998, BIDZILYA *et al*., 2003, 2006).

The current study of Elachistidae is part of an ongoing project on prepearing "The Catalogue of Lepidoptera of the Ukraine". During the work on this first compilation on Ukrainian Lepidoptera we revised all data already published, studied additional materials from the collections of the Schmalhausen Institute of Zoology (Academy of Sciences of Ukraine), Kiev National Taras Shevchenko University and Karadagh Nature Reserve. We also critically checked all literature sources which deal with Elachsitidae from Ukraine. It turned out to be especially urgent due to the fact that the taxonomy of Elachistidae changed considerable over the last two decades. A number of new species have been described, several groups of closely related species have been revised, some species have been recognized as "species complexes" based on the study of type materials, etc. (KAILA *et al*., 2001, KAILA & JUNNILAINEN, 2002, KAILA *et al*., 2003, SUGISIMA, 2005, KAILA, 2007, 2009, 2011, 2012).

The main aim of the present paper is to provide the final list of Ukrainian grass-mining moths updated in accordance to the latest changes in taxonomy and nomenclature of the family. The system of Elachistidae in the present list follows KAILA (1999) except for *Dibrachia* Sinev & Sruoga, 1992, *Biselachista* Traugott-Olsen & Nielsen, 1977 and *Cosmiotes* Clemens, 1860 that we treat as separate genera according to SINEV (2008). The sections on "Distribution" are arranged geographical from

northwest to south-east and countries referred to by their current names. The doubtful records are mentioned with "(?)".

List of species

Perittia farinella (Thunberg, 1794)

Distribution: Northern and Central Europe, Russia (North-Western of the European Part) (PARENTI, 1996, SINEV, 2008). In Ukraine it is known from Ivano-Frankovsk region (BIDZILYA *et al*., 2006).

Perittia herrichiella (Herrich-Schäffer, 1855)

Distribution: Northern and Central Europe, Russia (Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine is known only from Lvov region (KLEMENCIEWICZ, 1905, 1906, SCHILLE, 1930).

Perittia weberella Whitebread, 1984

Distribution: Switzerland, Russia (Southern Ural) (WHITEBREAD, 1984, PARENTI, 1996, KAILA *et al*., 2003, as *sibirica* Sin.). In Ukraine it is known only from the Donetsk reg. (BIDZILYA & BUDASHKIN, 1998).

Notes: The species was erroneously recorded from the Southern Ural as *Perittia sibirica* Sinev, 1992 (KAILA *et al*., 2003). Later this record was mentioned in the "Catalogue of the Lepidoptera of Russia" (SINEV, 2008). *P. sibirica* is known only from the Irkutsk region (SINEV, 1992, SINEV & SRUOGA, 1997, SINEV, 2008) and must be removed from the European fauna.

Perittia karadaghella Sinev & Budashkin, 1991

Distribution: Crimea, Asia Minor (BUDASHKIN & SINEV, 1991, KAILA, 2009). In Ukraine it is known only from Crimea (Karadagh Nature Reserve) (BUDASHKIN & SINEV, 1991, BUDASHKIN, 2004).

Stephensia brunnichella (Linnaeus, 1767)

Material examined: 1 ♀, Crimea, Dobroe, Krasnolesie, forest road, 11-13, 20-IV-1989 (Zagulajev).

Distribution: Europe, Asia Minor (FALKOVITSH, 1981, PARENTI, 1996). In Ukraine it was known from Lvov and Ternopol regions as well as from Crimea (KLEMENCIEWICZ, 1898, STÖKL, 1922, SCHILLE, 1930, BUDASHKIN & SINEV, 1991).

Dibrachia kalki (Parenti, 1978)

Distribution: Germany, Austria (?), Italy, Slovakia, Hungary, Russia (Middle and Lower Volga, Southern Ural, Tuva), Kazakhstan (PARENTI, 1978, SINEV & SRUOGA, 1992, PARENTI, 1996, HUEMER, 2000, KAILA *et al*., 2003, SINEV, 2008, HUEMER, 2013). In Ukraine was known only from Donetsk region (BIDZILYA & BUDASHKIN, 1998).

Elachista geminatella (Herrich-Schäffer, 1855)

Material examined: 1 ♂, Ivano-Frankovsk reg., Jaremche vic., 28-VI-2003 (Bidzilya).

Distribution: Great Britain, Spain, France, Netherland, Belgium, Denmark, Sweden, Germany, Austria, Slovakia, Latvia (KAILA *et al*., 2001). In Ukraine it was known only from Lvov region (NOWICKI, 1860).

Notes: The *Elachista regificella*-complex comprises three closely related and possible sympatrically distributed species: *E. regificella* Sircom, 1849, *E. tengstromi* Kaila, Bengtsson, Šulcs & Junnilainen, 2001 and *E. geminatella* (Herrich-Schäffer, 1855) (KAILA *et al*., 2001). As a result of the re-examination of the above cited specimen of *"E. regificella*" we found out that it actually referred to *E. geminatella*, whereas *E. regificella* must be removed from the fauna of Ukraine (BIDZILYA *et al*.,

2006). It is unclear which species from this complex is referred to in the "Catalogue of the Lepidoptera of Russia" (SINEV, 2008).

Elachista tengstromi Kaila, Bengtsson, Šulcs & Junnilainen, 2001

Material examined: 1 ♂, Ukraine, Kiev vic., Muzychi, on light, 14-VI-2008 (Nesterov).

Distribution: Great Britain, Denmark, Norway, Sweden, Finland, Germany, Switzerland, Austria, Poland, Estonia, Latvia, Russia (North-East of the European Part, Karelia, South Kuril Islands), Japan (PARENTI, 1983, KAILA *et al*., 2001, SUGISIMA, 2005). In Ukraine it was known only from Lvov region (NOWICKI, 1860, as *magnificella* Z., KLEMENCIEWICZ, 1905, as *magnificella* Tgstr., BRUNICKI, 1913, as *magnificella* Tgstr., STÖKL, 1922, as *magnificella* Tgstr., SCHILLE, 1930, as *magnificella* Tgstr.).

Elachista gleichenella (Fabricius, 1781)

Material examined: 1 ♀, Crimea, Demerdzhi, lavanda glade, on light, 14-VIII-2005 (Budashkin).

Distribution: Europe, Russia (Kaliningrad reg., North-East and Central of the European Part, Western Caucasus, Southern Ural, South of Western Siberia, Altai, Amur reg., Primorskyi krai), Transcaucasia (Georgia) (SRUOGA, 1991, KAILA, 1992, PARENTI, 1996, SINEV & SRUOGA, 1997, KAILA *et al*., 2003, SUGISIMA, 2005, SINEV, 2008). In Ukraine it was known from Lvov and Ivano-Frankovsk regions as well as from Crimea (BRUNICKI, 1913, SCHILLE, 1930, BUDASHKIN & SINEV, 1991, SRUOGA, 1991, 2000, BUDASHKIN, 2004).

Elachista quadripunctella (Hübner, [1825])

Material examined: 1 ♂, Kiev reg., Kiev vic., Muzychi, on light, 6-VII-2008 (Nesterov).

Distribution: Mainly Northern and Central Europe, Russia (?) (PARENTI, 1996, SINEV, 2008). In Ukraine was known from Lvov, Ivano-Frankovsk and Kiev regions (NOWICKI, 1860, as *quadrella* Hb., BRUNICKI, 1913, as *quadrella* Hb., SCHILLE, 1930, as *quadrella* Hb., LEBEDEV, 1937, as *quadrella* Hb., SOVINSKY, 1938, as *quadrella* Hb., BIDZILYA *et al*., 2006).

Elachista tetragonella (Herrich-Schäffer, 1855)

Distribution: Spain, France, Sweden, Finland, Switzerland, Germany, Austria, Italy, Czech Republic, Slovakia, Bulgaria, Russia (Middle Volga, Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it is known only from Lvov region (NOWICKI, 1860, SCHILLE, 1930).

Elachista biatomella (Stainton, 1848)

Distribution: Central and partially Southern Europe, Russia (Southern Ural (?), Altai, Transbaikalia), Kazakhstan (SRUOGA, 1991, KAILA, 1992, PUPLESIS *et al*., 1992, PARENTI, 1996, BIDZILYA *et al*., 1998, 2002, KAILA *et al*., 2003, SINEV, 2008). In Ukraine is known from Zaporozhie and Donetsk regions as well as from Crimea (BUDASHKIN & SINEV, 1991, BIDZILYA, 1995, BIDZILYA *et al*., 2001, BUDASHKIN, 2004).

Notes: The record from Uzbekistan (KAILA, 1992) is based on the inadvertent double citation of locality from SRUOGA (1991) that actually must be referred to Kazakhstan.

Elachista argentella (Clerck, 1759)

Material examined: 1 ♂, Kiev, Kirillovskie ovragi, 31-V-1922 (Sheljuzhko); 1 ♂, 1 ♀, Ukraine, Kiev reg., Kievo-Svjatoshinskiy distr., Kruglik, forest-steppe, 14-VIII-1980 (Nesterov); 3 ♂♂, Kiev vic., Belichi, 1-VI-2006 (Nesterov); 1 ♀, Kiev vic., Muzychi, on light, 1-V-2009 (Nesterov); 2 ♂♂, Odessa reg., N vic. of Kotovsk (Nikolaevskiy forest), 7-V-2010 (Khalaim); 1 ♂, Kiev reg., Mironovskiy distr., Velikiy Bukrin, 20-V-2011 (Kostjuk).

Distribution: Europe, Russia (West, North-West and Central of the European Part, Volga region, Western Caucasus) (PARENTI, 1996, SINEV, 2008). In Ukraine it was known from Lvov, Ivano-

Frankovsk, Ternopol, Tchernovtsy, Zhitomir and Kiev regions (GATNAR, 1905, HORMUZAKI, 1907, BRUNICKI, 1913, KSENZHOPOLSKY, 1915, LJUBOMUDROV, 1917, SCHILLE, 1930, SOVINSKY, 1938).

Elachista pollutella (Duponchel, 1843)

Material examined: 3 ♂♂, Ukraine, Donetsk reg., Novoazovsk distr., Khomutovskaya steppe Nature Reserve, 10-V-2000 (Bidzilya); 1 ♂, 1 ♀, Crimea, Krymskiy Nature Reserve, Bolshaja Chuchel' Mt., jaila, evening collection, 3-VI-2006 (Budashkin); 2 ♂♂, Crimea, Kerch peninsula, 5 km N of Bagerovo, on light, 15-IV-2010 (Kostjuk).

Distribution: France, Belgium, Luxemburg, Switzerland, Italy, Germany, Austria, Czech Republic, Slovakia, Hungary, former Yugoslavia, Albania, Greece, Romania, Russia (Middle and Lower Volga, Middle Ural (?), Altai), Asia Minor, Mongolia (PARENTI, 1996, SINEV, 2008, KAILA, 2011). In Ukraine is known from Zaporozhie and Donetsk regions as well as from Crimea (BUDASHKIN & SINEV, 1991, BIDZILYA *et al*., 2001, 2003, BUDASHKIN, 2004, 2006, KAILA, 2011).

Elachista rutjani Kaila, 2011

Distribution: Russia (Lower Volga, Southern Ural, Tuva) (KAILA, 2011). In Ukraine it is known only from Donetsk region (KAILA, 2011).

Elachista purella Sruoga, 2000 (det. L. Kaila) (Figs. 1, 14, 19, 20)

Material examined: 60 ♂♂, 4 ♀♀, Crimea, Karadagh, biostation, on light and in the evening in steppes and meadow-steppes habitats, 23-V–6-VI-1985, 16-V–2-VI-1986, 31-V–22-VI-1987, 19-V–13-VI-1988, 8-V–7-VI-1989 (Budashkin).

Distribution: Kazakhstan (SRUOGA, 2000). **New for Europe**.

Notes: This species was recorded from Karadagh Nature Reserve as *Elachista festucicolella* Zeller, 1853 (BUDASHKIN & SINEV, 1991). The latter must be excluded from the fauna of Crimea.

Elachista festucicolella Zeller, 1853

Distribution: Belgium (?), Sweden, Germany, Switzerland, Austria, Poland, Czech Republic (?), Slovakia (?), Hungary, Greece (?), Bulgaria, Russia (?), Asia Minor (FALKOVITSH, 1981, PARENTI, 1996). In Ukraine it is known only from Tchernovtsy region (HORMUZAKI, 1907, SCHILLE, 1930).

Elachista nitidulella (Herrich-Schäffer, 1855)

Material examined: 1 ♂, Donetsk reg., Novoazovsk distr., Khomutovskaya steppe Nature Reserve, 15-V-1996 (Bidzilya).

Distribution: France, Belgium, Germany, Switzerland, Austria, Czech Republic, Slovakia, Hungary, Romania, Russia (Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). **New for Ukraine**.

Elachista dispilella Zeller, 1839

Distribution: Europe, Russia (Kaliningrad reg., North-East of the European Part) (PARENTI, 1996, SINEV, 2008). In Ukraine it is known only from Lvov region (KLEMENCIEWICZ, 1902, 1906, SCHILLE, 1930).

Elachista flavescens Parenti, 1981

Material examined: 1 ♂, Kherson reg., Tchernomorskiy Nature Reserve, Ivano-Rybal'chanskiy loc., on light, 24-V-2000 (Rutjan).

Distribution: Russia (Lower Volga, Southern Ural), Transcaucasia (Armenia), Asia Minor (PARENTI, 1981, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it is known only from Kherson region (BIDZILYA *et al*., 2003).

Notes: Records from Zaporozhie and Donetsk region (BIDZILYA & BUDASHKIN, 1998, BIDZILYA *et al*., 2001) must be referred to the next species.

Elachista spumella Caradja, 1920 (det. L. Kaila) (Figs. 3, 15, 21)

Material examined: 1 ♀, Crimea, Sevastopol', 28-VII-1981 (Nesterov); 1 ♂, Ukraine, Kamennye Mogily Nature Reserve, 18-VI-1991 (Zhakov); 3 ♂♂, 1 ♀, Ukraine, Kamennye Mogily Nature Reserve, 14-19-VII-1994 (Bidzilya); 1 ♂, Donetsk reg., Khomutovskaya steppe Nature Reserve, 15-V-1996 (Bidzilya); 1 ♀, Luhansk reg., Stanichno-Luhanskoe, 14-V-2000 (Bidzilya); 14 ♂♂, 4 ♀♀, Crimea, Tarkhankut, on light, 6-VII-2003 (Budashkin); 3 ♂♂, 2 ♀♀, Crimea, Kazantip, on light, 10-VII-2005 (Budashkin); 7 ♂♂, Crimea, S Prisivashie, Lvovo vic., halophyte steppe, evening collection, 12-V-2007, 17-V-2013 (Budashkin); 2 ♂♂, Zaporozhie reg., Zaporozhie distr., Kushugum vic., on light, 30-IV-2014 (Zhakov).

Distribution: Austria, Italy, Czech Republic, Slovakia, Croatia, Hungary, Russia (Southern Ural, Altai), Kazakhstan (KAILA, 1992, PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008, ŠUMPICH, 2013). **New for Ukraine**.

Elachista grandella Traugott-Olsen, 1992 (det. L. Kaila) (Fig. 2)

Material examined: 7 ♂♂, Kherson reg., Tsjurupinsk distr., Proletarka vic., on light, 24–25-IV-2014 (Zhakov).

Distribution: Germany, Austria, Hungary (PARENTI, 1996). **New for Ukraine**.

Elachista deceptricula Staudinger, 1880

Distribution: Spain, former Yugoslavia, Greece, Asia Minor (NIELSEN & TRAUGOTT-OLSEN, 1978, PARENTI, 1996). In Ukraine it is known only from Crimea (BUDASHKIN & SINEV, 1991).

Elachista dispunctella (Duponchel, 1843)

Material examined: 2 ♂♂, Crimea, Ai-Petri, jaila, evening collection, 24-25-VI-2002 (Budashkin).

Distribution: Central and Southern Europe, Russia (Middle and Lower (?) Volga) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it is known from Zaporozhie, Donetsk and Luhansk regions as well as from Crimea (BUDASHKIN & SINEV, 1991, BIDZILYA *et al*., 2001, 2003).

Notes: Records from Zaporozhie, Donetsk and Luhansk regions (BIDZILYA *et al*., 2001, 2003) must partially be referred to *E. spumella*.

Elachista parvula Parenti, 1978 (det. L. Kaila) (Fig. 18)

Material examined: 3 ♂♂, Crimea, Karadagh, biostation, on light, 19-V, 14-VII-1987 (Budashkin); 1 ♂, Crimea, Ai-Petri, jaila, evening collection, 26-VI-2004 (Budashkin).

Distribution: France, Belgium (?), Switzerland, Italy, former Yugoslavia, Bulgaria (PARENTI, 1978, 1996). **New for Ukraine**.

Notes: The species has erroneously been recorded from Karadagh Nature Reserve as *Elachista anitella* Traugott-Olsen, 1985 (BUDASHKIN & SINEV, 1991). The latter must be excluded from the fauna of Ukraine.

Elachista dumosa Parenti, 1981 (Fig. 4)

Material examined: 1 ♂, Crimea, Sevastopol' vic., Kolkhoznoe, on light, 25-VI-2006 (Budashkin).

Distribution: Macedonia (PARENTI, 1981, 1996). In Ukraine it is known from Zaporozhie, Donetsk and Luhansk regions as well as from Crimea (BUDASHKIN & SINEV, 1991, as *kimmeriella* sp. n., BIDZILYA *et al*., 2001, as *kimmeriella* Sin. & Bud., 2003, as *kimmeriella* Sin. & Bud., BUDASHKIN, 2004, 2006).

***Elachista laurii* Bidzilya & Budashkin, sp. n.**

Type material: Holotype: ♂, S-E Ukraine, z-k Provalskaya steppe, 17-V-2000 (Bidzilya) (gen. prep. 142/13, O. Bidzilya) (ZMKU). Paratypes: 7 ♂♂, S-E Ukraine, z-k Provalskaya steppe, 17-V-2000 (Bidzilya) (ZMKU); 1 ♂, [Russia], Ulyanovsk, 12-VI-1994 (Isajeva) (L. Kaila prep. 4132) (coll. V. Zolotuhin); 5 ♂♂, Russia, 140 km S Ulyanovsk, Srednikovo, steppe, 23-V-1996 (Zolotuhin) (L. Kaila prep. 3959, 3967-70) (Coll. MZH, Helsinki; coll. V. Zolotuhin); 1 ♂, 52º 50'N, 48º 19'E [Russia], 168 km S Ulyanovsk, 8 km S Vjazovka, Radishchevo distr., 3-6-VI-1998 (Zolotuhin) (L. Kaila prep. 3966) (coll. V. Zolotuhin); 1 ♂, 54º 36'N 47º 05'E, [Russia], 120 km W Ulyanovsk, Bolshoy Kuvay, 31-V, 4-VI-1999 (Zolotuhin) (L. Kaila prep. 3962) (coll. V. Zolotuhin); 2 ♂♂, Russia, Volga reg., Prov. Saratov, distr. Krasnyi Kut, prope pag. Djakovka, fl. Eruslan 9-13-V-2004 (Rutjan) (L. Kaila prep. 4785, 4442, DNA sample 20860 Lepid. Phyl.) (ZMKU); 1 ♂, Russia, Volgograd distr., nr. Olhovka village 12-V-2005 (Nupponen) (L. Kaila prep. 4837, DNA sample 20847 Lepid. Phyl.) (Coll. Nupponen).

Additional material: 1 ♂, Donetsk reg., Khomutovskaya steppe Nature Reserve, on light, 21-V-1996 (Bidzilya).

Description (Fig. 5): Wingspan 9.5-10.1 mm. Head white, tufts of scales on patagia off-white. Labial palpus rather large, outer surface white mixed with yellow, inner and upper surface white. Scapus and flagellum off-white. Thorax and tegulae white mottled with reddish. Forewing off-white with three broad diffuse reddish transversal fascias, apex shaded with reddish, dark scales sparsely scattered over the wing. Cilia reddish-white with brown marking line along apex and rather big off-white pattern near the thornal angle. Hindwing dark brown, cilia light, yellowish-grey. Abdomen moderately light, greyish-brown.

Male genitalia (Fig. 25): Uncus lobes nearly hairless, moderately big, inner margin weakly narrowed towards rounded apex, divided by deep emargination that is rather narrow in basal half and broadened in distal half. Tegumen of moderate width and length. Distal sclerite of gnatos fusiform. Valva rather broad, of moderate length, cucullus not broadened distally, costal margin broadly bulged before middle. Juxta lobes subrectangular, terminating posteriolaterally into long and narrow beak-shaped projection, medial incison deep and narrow. Labidae digitate, wide, of moderate length. Vinculum triangular, saccus not developed. Phallus of moderate length and width, evenly curved dorso-ventrally, distal 1/4 tapered towards pointed apex, caecum small, no cornuti.

Female genitalia: Unknown.

Diagnosis: New species resembles *Elachista olschwangi* Kaila, 2003 (Fig. 6), that was recently described from the Southern Ural, but ground colour of forewings, hindwing and particularly their cilia are lighter. The male genitalia are similar to those of *E. olschwangi* too (Fig. 23), but uncus lobes more prolonged and narrower, with deeper medial incision, costal margin of valva weaker bulged, cucullus not broadened distally, labidae thicker and shorter, and phallus narrower.

Biology: Adults have been collected from the first decade of May to the beginning of the second decade of June.

Distribution: Ukraine (Donetsk and Luhansk regions: Khomutovskaya and Proval'skaya steppe Nature Reserves), Russia (Ulyanovsk, Saratov, Volgograd regions).

Etymology: The species is named in honor of key specialist for Elachistidae, Finnish lepidopterologist Dr. Lauri Kaila.

Notes: Holotype and eight paratypes are kept in the Zoological Museum, Kiev Taras Shevchenko National University (ZMKU), three paratypes in Finnish Museum of Natural History, Helsinki (FMNH), one paratype in the collection of K. Nupponen (Espoo, Finland), rest of paratypes in the collection of V. Zolotuhin (Ulyanovsk, Russia).

Elachista sp. pr. *olschwangi* Kaila, 2003 (Figs. 7, 24)

Material examined: 8 ♂♂, Crimea, Kazantip, on light, 24-V-1994, 23-V-2007 (Budashkin); 1 ♀, Crimea, S slope of Uzun-Syrt, steppes habitats, evening collection, 11-V-2014 (Budashkin).

Notes: New species related to *Elachista olschwangi* Kaila, 2003 which will be described soon (L. Kaila, pers. comm.). This species was recorded from Kazantip as *Elachista pollinariella* Zeller, 1839 (BUDASHKIN, 2006). The latter must be excluded from the fauna of Crimea.

Elachista heringi (Rebel, 1899) (det. L. Kaila) (Figs. 8, 22)

Material examined: 19 ♂♂, Zaporozhie reg., Zaporozhie distr., balka Nizhnjaja Khortitsa, daytime in steppe, 21-V-1990, 20, 27-V-1991, 2-VI-1992 (Budashkin); 1 ♂, Donetsk reg., Khomutovskaya steppe Nature Reserve, on light, 21-V-1996 (Bidzilya); 1 ♂, Zaporozhie reg., Zaporozhie distr., Razumovka, balka Nizhnjaja Khortitsa, 17-V-1998 (Zhakov); 1 ♂, Zaporozhie reg., Tokmak distr., Zhovtneve, in grass, 24-V-1998 (Ivko); 2 ♂♂, Luhansk reg., Provalskaya steppe Nature Reserve, 17, 18-V-2000 (Bidzilya); 1 ♂, Luhansk reg., Provalskaya steppe Nature Reserve, on light, 28-30-VI-2011 (Rutjan).

Distribution: Spain, France, Italy, Austria, Czech Republic, Slovakia, Hungary, Croatia, Romania, Russia (Southern Ural, Altai) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008, ŠUMPICH, 2013). **New for Ukraine**.

Notes: This species was recorded from Zaporozhie and Donetsk regions as *Elachista pollinariella* Zeller, 1839 (BIDZILYA *et al*., 2001, 2003). The latter must be removed from the fauna of these regions.

Elachista pollinariella Zeller, 1839

Distribution: Northern and Central Europe, Russia (Kaliningrad reg., North-West and Central of the European Part, Western Caucasus, Middle Volga, Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it is known from Lvov and Tchernovtsy regions (HORMUZAKI, 1907, SCHILLE, 1930).

Elachista gormella Nielsen & Traugott-Olsen, 1987 (Fig. 9)

Material examined: 2 ♂♂, Crimea, Ai-Petri, 14-VI, 5-VII-2002 (Budashkin); 9 ♂♂, Crimea, Dvujakornaja bukhta, halophilic steppe, evening collection, 17-VI-2006 (Budashkin); 3 ♂♂, 1 ♀, Crimea, 1-st km of Arabatskaya strelka, halophilic-sand steppe with saline, on light, 19-V-2007 (Budashkin); 2 ♂♂, 2 ♀♀, Crimea, Shchebetovka vic., Vodjanaja balka, forest meadows, evening collection, 22-V-2007 (Budashkin).

Distribution: Balearic Islands, Portugal, Spain, France, Austria, Italy (and Sardinia), Czech Republic, Slovakia, former Yugoslavia, Hungary, Russia (Middle Volga (?)) (PARENTI, 1996, SINEV, 2008). In Ukraine it is known only from Crimea (BUDASHKIN & SINEV, 1991, BUDASHKIN, 2004).

Elachista subocellea (Stephens, 1834)

Material examined: 6 ♂♂, Crimea, Krymskiy Nature Reserve, Bolshaja Chuchel' Mt., jaila, evening collection, 3-VI-2006 (Budashkin).

Distribution: Central and Southern Europe, Russia (Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it is known from Lvov, Ternopol regions and Crimea (NOWICKI, 1860, as *disertella* F. R., SCHILLE, 1930, as *disertella* H.-S., TOLL, 1936, as *subcollutella* sp. n., BIDZILYA *et al*., 2003).

Elachista nolckeni Šulcs, 1992 (det. L. Kaila) (Figs. 10, 26)

Material examined: 1 ♂, Kiev reg. [Vyshgorod distr.], vic. of Staroselie [now under the water of Kiev storage pond], on light, 19-VI-1919 (Sovinsky).

Distribution: France, Germany, Switzerland, Italy, Austria, Poland, Czech Republic, Slovakia, Estonia, Latvia, Russia (Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). **New for Ukraine**.

Elachista latipenella Sinev & Budashkin, 1991

Distribution: The species was described from Crimea (Karadagh Nature Reserve) (BUDASHKIN & SINEV, 1991, PARENTI, 1996). There are no records from other regions yet.

Elachista rudectella Stainton, 1851

Distribution: Central and Southern Europe, Russia (Southern Ural, Altai, Tuva) (KAILA, 1992, PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008, based on our materials). In Ukraine it is known from Lvov, Ivano-Frankovsk and Kherson regions (KLEMENCIEWICZ, 1901, BRUNICKI, 1913, SCHILLE, 1930, BIDZILYA *et al*., 2003).

Elachista pullicomella Zeller, 1839

Material examined: 1 ♂, Ukraine, Nikolaev reg., Yuzhnyi Bug river near Pervomaisk, 22-V-1980 (Nesterov); 1 ♀, Kiev reg., Kievo-Svjatoshinskiy distr., Kruglik, forest-steppe, 11-VII-1980 (Nesterov); 1 ♂, Kherson reg., Tsjurupinskiy distr., N. Majachka, 27-V-1984 (Nesterov); 1 ♂, Zaporozhie reg., Zaporozhie distr., balka Nizhnjaja Khortitsa, day-time in steppe, 21-V-1990 (Budashkin); 1 ♂, Zaporozhie reg., Orekhovskiy distr., 5 km N of Kirovo, 20-VII-2000 (Zhakov); 1 ♀, Ukraine, Kamennye Mogily Nature Reserve, on light, 7-V-2002 (Rutjan); 1 ♂, Crimea, Krymskiy Nature Reserve, kordon Zelenyi Gai, on light, 2-VI-2006 (Budashkin); 1 ♂, Crimea, Krymskiy Nature Reserve, Shakhty, on light, 25-VII-2006 (Budashkin); 1 ♂, Kiev reg., Kiev vic., Belichi, 1-VI-2006 (Nesterov); 13 ♂♂, Kiev reg., Kiev vic., Muzychi, on light, 22-V, 27-VII, 1-VIII-2006, 12, 21-VII-2007, 16-VII-2008, 10-VIII-2010 (Nesterov); 2 ♂♂, Kiev reg., Mironovka distr., Velikiy Bukrin vic., on light, 20-V-2011 (Kostjuk); 1 ♂, Zaporozhie reg., Primorskiy distr., Azov, on light, 8, 9-VII-2011 (Zhakov); 1 ♀, Kiev reg., Obukhov distr., Dmitrovichi, on light, 17-V-2013 (Kostjuk).

Distribution: Western Europe, Russia (West, North-West, North and Central of the European Part, Middle Volga, Southern Ural), Kazakhstan (KAILA, 1992, PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known from Lvov, Ternopol, Zaporozhie and Donetsk regions as well as from Crimea (NOWICKI, 1860, as *pulella* F. R. and *pullicomella* Z., KLEMENCIEWICZ, 1898, 1899, as *pullella* H.-S., SCHILLE, 1930, BUDASHKIN & SINEV, 1991, SRUOGA, 1991, BIDZILYA *et al*., 2001, 2003, BUDASHKIN, 2004).

Elachista bedellella (Sircom, 1848)

Distribution: Europe, Russia (Kaliningrad reg., North-West and Central of the European Part, Middle Volga, Southern Ural, Burjatia, Transbaikalia), Central Asia (Kirgizia (?)) (KAILA, 1992, PARENTI, 1996, BIDZILYA *et al*., 1998, KAILA *et al*., 2003, KAILA, 2007, SINEV, 2008). In Ukraine it is known from Tchernovtsy and Zaporozhie regions (HORMUZAKI, 1907, BIDZILYA *et al*., 2003).

Elachista hedemanni Rebel, 1899

Material examined: 6 ♂♂, 4 ♀♀, Crimea, Tepe-Oba, steppe habitats, evening collection, 16-V-2006, 5-V-2007, (Budashkin); 3 ♀♀, Crimea, S slope of Uzun-Syrt, steppe biotopes, evening collection, 7, 11-V-2014 (Budashkin).

Distribution: Spain, Germany, Austria, Poland, Czech Republic, Slovakia, Hungary, Bulgaria, Russia (Middle Volga, Southern Ural, Tuva), Mongolia (PARENTI, 1991, 1996, KAILA *et al*., 2003, SINEV, 2008, KAILA, 2012). In Ukraine it is known from Kherson and Luhansk regions as well as from Crimea (BUDASHKIN & SINEV, 1991, as *tauricella* sp. n., BIDZILYA *et al*., 2003, as *tauricella* Sin. & Bud., BUDASHKIN, 2004, KAILA, 2012).

Elachista exigua Parenti, 1978 (Fig. 11)

Material examined: 2 ♂♂, Crimea, Ai-Petri, 14-VI, 5-VII-2002 (Budashkin).

Distribution: France, Switzerland, Italy, Albania (PARENTI, 1978, 1996). In Ukraine it was known only from Crimea (Karadagh Nature Reserve) (BUDASHKIN & SINEV, 1991, BUDASHKIN, 2004).

Elachista littoricola Le Marchand, 1938 (Figs. 12, 16, 27)

= *Elachista volgella* Lastukhin, 2009, **syn. nov**.

Material examined: 1 ♂, Ukraine, Donetsk reg., Khomutovskaya steppe Nature Reserve, 11-V-1996 (Bidzilya); 1 ♂, Crimea, Karadagh, biostation, on light, 15-VI-1998 (Budashkin); 1 ♂, Crimea, Dvujakornaya bukhta, halophilic steppe, at day-time, 3-IX-2006 (Budashkin); 1 ♂, Crimea, S Prisivashie, Lvovo vic., evening collection in halophilic steppe, 3-VI-2007 (Budashkin); 1 ♂, 1 ♀, Kiev reg., Kiev vic., Muzychi, on light, 31-VII-2008, 10-VIII-2010 (Nesterov); 1 ♀, Odessa reg., SW vic. of Kotovsk, Tokarskiy garden, 5-V-2010 (Khalaim).

Distribution: Great Britain, France, Denmark, Germany, Italy, Czech Republic, Slovakia, Finland, Estonia, Latvia, Russia (Middle and Lower Volga, Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008, LASTUKHIN, 2009). **New for Ukraine**.

Notes: *Elachista volgella* was described from the single male collected on the light trap in Astrakhanskiy Nature Reserve (Russia, Astrakhan' region) (LASTUKHIN, 2009). In the original description the species is compared with *E. pullicomella*. However, as far as one can judge from the rather unclear photographs of adult and the genitalia, the habitus, phallus, valva and other characters of *E. volgella* are indistinguishable from those of *E. littoricola*. We therefore synonymyze it with the latter.

Elachista squamosella (Herrich-Schäffer, 1855)

Material examined: 1 ♂, Ukraine, Luhansk reg., Provalskaya steppe Nature Reserve, on light, 27-VIII-1987 (Kostjuk & Pljushch); 3 ♂♂, Donetsk reg., Khomutovskaya steppe Nature Reserve, 5, 7-V-1996 (Bidzilya); 1 ♂, Zaporozhie reg., Zaporozhie distr., balka Krylovskaya, 13-V-1997 (Zhakov); 3 ♂♂, Luhansk reg., Melovoe distr., Strel'tsovskaya steppe Nature Reserve, 6-8-VII-2002 (Bidzilya); 1 ♂, Crimea, Sevastopol' vic., Kolkhoznoe, on light, 25-VI-2006 (Budashkin); 1 ♂, Zaporozhie reg., Melitopol' distr., balka Troitskaya, on light, 30-VII-2012 (Zhakov).

Distribution: Central and Southern Europe, Russia (Southern Ural, Altai) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine is known from Lvov, Zaporozhie and Donetsk regions as well as from Crimea (NOWICKI, 1860, SCHILLE, 1930, BUDASHKIN & SINEV, 1991, SRUOGA, 1991, BIDZILYA, 1995, as *chrysodesmella* Z., BIDZILYA *et al*., 2001, 2003, BUDASHKIN, 2004).

Elachista chrysodesmella Zeller, 1850

Distribution: Central and Southern Europe, Russia (North-West and Central of the European Part), Asia Minor (FALKOVITSH, 1981, PARENTI, 1996, SINEV, 2008). In Ukraine it is known only from Crimea (BUDASHKIN & SINEV, 1991).

Notes: The record from Luhansk region (BIDZILYA, 1995) must be referred to *E. squamosella* (Herrich-Schäffer, 1855).

Elachista gangabella Zeller, 1850

Material examined: 1 ♂, Ukraine, Kiev reg., Irpen', forest edge, 30-VI-1980 (Nesterov).

Distribution: Central and partially Southern Europe, Russia (Kaliningrad reg., Central of the European Part, Western Caucasus, Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known from Lvov and Kiev regions (NOWICKI, 1860, KLEMENCIEWICZ, 1898, SCHILLE, 1930, LEBEDEV, 1937, as *taeniatella* Stt., SOVINSKY, 1938, as *taeniatella* Stt.).

Elachista bisulcella (Duponchel, 1843)

Distribution: Northern and Central Europe, Russia (Kaliningrad reg., North-West of the European Part, Middle Volga, Altai) (KAILA, 1992, PARENTI, 1996, SINEV, 2008). In Ukraine it is known only from Lvov region (NOWICKI, 1860, SCHILLE, 1930, as *zonariella* Tgstr.).

Elachista obliquella Stainton, 1854

Material examined: 1 ♂, Ukraine, Luhansk reg., Proval'skaya steppe Nature Resreve, 17-V-2000

(Bidzilya); 1 ♀, Luhansk reg., Melovoe distr., Strel'tsovskaya steppe Nature Reserve, 7-VII-2002 (Bidzilya).

Distribution: Europe, Russia (Kaliningrad reg., North-West and Central of the European Part, Western Caucasus, Middle Volga, Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it is known from Ivano-Frankovsk, Kiev and Luhansk regions as well as from Crimea (BRUNICKI, 1913, as *megerlella* Stt., SCHILLE, 1930, as *megerlella* Stt., LEBEDEV, 1937, as *megerlella* Stt., SOVINSKY, 1938, as *megerlella* Stt., BUDASHKIN & SINEV, 1991, as *megerlella* Hb., BIDZILYA *et al*., 2003, as *megerlella* Hb., BUDASHKIN, 2004, as *megerlella* Hb.).

Elachista adscitella Stainton, 1851

Distribution: Europe, Russia (North-West and Central of the European Part, Eastern Caucasus, Southern Ural, Irkutsk reg., Primorskyi krai) (PARENTI, 1996, SINEV & SRUOGA, 1997, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it is known only from Ivano-Frankovsk region (BIDZILYA *et al*., 2006).

Elachista cingillella (Herrich-Schäffer, 1855)

Material examined: 1 ♂, Kiev reg., Obukhov distr., Malye Dmitrovichi, 11-VII-2013 (Kostjuk).

Distribution: Great Britain, Norway, Finland, France, Austria, Czech Republic, Poland, Hungary, Romania, Russia (Karelia, Southern Ural, Primoskyi krai) (PARENTI, 1996, KAILA & JUNNILAINEN, 2002, KAILA *et al*., 2003, SINEV, 2008, LAŠTŮVKA & LIŠKA, 2011). In Ukraine it was known only from Crimea (BUDASHKIN & SINEV, 1991).

Elachista fasciola Parenti, 1983

Material examined: 3 ♂♂, Kiev reg., Kiev vic., Muzychi, on light, 27, 30-VII-2007, 13-VI-2008 (Nesterov).

Distribution: Italy, Czech Republic, Slovakia, Poland, Latvia, Russia (Middle Volga, Southern Ural, Primorskyi krai), Japan (PARENTI, 1983, 1996, SINEV & SRUOGA, 1997, KAILA, JUNNILAINEN, 2002, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known only from Ivano-Frankovsk region (BIDZILYA *et al*., 2006).

Elachista subalbidella Schläger, 1847

Distribution: Europe, Russia (Kaliningrad reg., North-West, North and Central of the European Part, Southern Ural, Irkutsk reg.), North America (KAILA, 1992, PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known from Ivano-Frankovsk region (BIDZILYA *et al*., 2006). Records from Lvov and Ternopol regions (SCHILLE, 1930) need confirmation.

Elachista apicipunctella Stainton, 1849

Distribution: Northern and Central Europe, Russia (North-West and North of the European Part, Southern Ural, Transbaikalia), Japan (PARENTI, 1983, 1996, KAILA *et al*., 2003, SINEV, 2008, based on our material). In Ukraine it was known from Lvov, Ivano-Frankovsk and Ternopol regions (KLEMENCIEWICZ, 1898, STÖKL 1922, SCHILLE, 1930).

Elachista dimicatella Rebel, 1903

Material examined: 2 ♂♂, Ukraine, Ivano-Frankovsk reg., Carpathian Mts., Tchornogora Range, Pip Ivan Mt., 2000 m, 27-VI-2003 (Bidzilya).

Distribution: France, Germany, Switzerland, Italy, Austria, Slovakia, Poland, Romania (PARENTI, 1996). In Ukraine it was known only from Ivano-Frankovsk region (BRUNICKI, 1913, SCHILLE, 1930).

Elachista bifasciella Treitschke, 1833

Material examined: 5 ♂♂, Ukraine, Ivano-Frankovsk reg., Jaremtche distr., Vorokhta vic.,

Pozhezhevskaya Mt., 1500 m, 27-VII-1989 (Ermolenko); 1 ♀, Zakarpatskiy reg., Rakhov distr., Karpatskiy Nature Reserve, Goverla Mt., 200 m, Picea-Fagus forest, 7-VIII-1989 (Ermolenko).

Distribution: Central Europe, Russia (Central of the European Part, Middle Volga) (PARENTI, 1996, SINEV, 2008). In Ukraine it was known from Lvov and Ivano-Frankovsk regions (NOWICKI, 1865, BRUNICKI, 1913, SCHILLE, 1930, BIDZILYA *et al*., 2006).

Elachista albifrontella (Hübner, [1817])

Material examined: 1 ♂, Ukraine, Kiev vic., Irpen', 15-VI-1980 (Nesterov); 1 ♀, Kiev vic., Romanovka, 30-VI-1980 (Nesterov); 1 ♀, Kiev reg., Kievo-Svjatoshinskiy distr., Kruglik, forest-steppe, 14-VII-1980 (Nesterov).

Distribution: Northern and Central Europe, Russia (Kaliningrad reg., North-West, North and Central of the European Part, Middle Volga, Southern Ural, Altai, Irkutsk reg., Transbaikalia) (KAILA, 1992, BUDASHKIN & KOSTJUK, 1994, PARENTI, 1996, BIDZILYA *et al*., 1998, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known from Lvov, Ivano-Frankovsk and Ternopol regions (NOWICKI, 1860, KLEMENCIEWICZ, 1899, STÖKL, 1908, BRUNICKI, 1913, SCHILLE, 1930).

Elachista atricomella Stainton, 1849

Distribution: Europe, Russia (Central of the European Part, Western Caucasus) (PARENTI, 1996, SINEV, 2008). In Ukraine was known from Kiev region and from Crimea (LEBEDEV, 1937, as *holdenella* Stt., SOVINSKY, 1938, as *holdenella* Stt., BUDASHKIN & SINEV, 1991, BUDASHKIN, 2004).

Elachista luticomella Zeller, 1839

Distribution: Northern and Central Europe, Russia (Kaliningrad reg., North-West and Central of the European Part) (PARENTI, 1996, SINEV, 2008). Records from Transbaikalia, Primorskyi krai and probably from Mongolia should be referred to closely related *Elachista baikalica* Kaila, 1992 (SINEV & SRUOGA, 1997, BIDZILYA *et al*., 1998, KAILA *et al*., 2003). In Ukraine it was known from Lvov and Ivano-Frankovsk regions (KLEMENCIEWICZ, 1902, 1906, BRUNICKI, 1913, SCHILLE, 1930, BIDZILYA *et al*., 2006).

Elachista griseella (Duponchel, 1843)

Material examined: 3 ♂♂, Crimea, Karadagh Nature Reserve, talweg of balka Karadagskaya, evening collection, 21-V-2006 (Budashkin); 1 ♂, Crimea, Kazantip, at day-time in meadow steppe, 23-V-2006 (Budashkin); 3 ♂♂, Crimea, Shchebetovka vic., Vodjanaya balka, evening collection, 15, 17-V-2007, 21-V-2008 (Budashkin).

Distribution: France, Switzerland, Italy, Austria, Poland, Czech Republic, Slovakia, Hungary, former Yugoslavia, Romania, Russia (Irkutsk reg.) (KAILA, 1992, PARENTI, 1996, SINEV, 2008). In Ukraine it was known only from Crimea (BUDASHKIN & SINEV, 1991, BUDASHKIN, 2004).

Elachista subnigrella Douglas, 1853

Distribution: Northern and Central Europe, Russia (?) (PARENTI, 1996, SINEV, 2008). In Ukraine it is known only from Lvov region (BRUNICKI, 1913, SCHILLE, 1930).

Elachista humilis Zeller, 1850

Distribution: Northern and Central Europe, Russia (Kaliningrad reg., North-West, North and Central of the European Part, Middle Volga, Transbaikalia (?)) (PARENTI, 1996, BIDZILYA *et al*., 1998, SINEV, 2008). In Ukraine it is known from Lvov and Ivano-Frankovsk regions (NOWICKI, 1865, HORMUZAKI, 1910, as *perplexella*, BRUNICKI, 1913, as *perplexella* Stt. and *humilis* Z., SCHILLE, 1930, as *perplexella* Stt. and *humilis* Z., BIDZILYA *et al*., 2006).

Elachista herrichii Frey, 1859

Material examined: 1 ♂, Crimea, Ai-Petri, in the evening on jaila, 26-VII-1989 (Budashkin); 1 ♂,

Ukraine, Zaporozhie vic., balka Nizhnjaja Khortitsa, at day-time in steppe, 12-VI-1991 (Zhakov); 6 ♂♂, Zaporozhie, Khortitsa Island, at day-time in steppe, 15, 20, 25-VI-1991 (Zhakov); 1 ♂, Zaporozhie reg., Gusarka vic., Sukhaya Konka river, 22-VI-1998 (Zhakov); 1 ♂, Crimea, Kazantip, on light, 10-VII-2005 (Budashkin).

Distribution: France, Belgium, Switzerland, Italy, Germany, Austria, Poland, Czech Republic, Slovakia, Hungary, Latvia, Romania, Russia (West and North-West of the European Part, Southern Ural, Altai, Tuva) (PARENTI, 1996, BIDZILYA *et al*., 2002, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known from Lvov and Zaporozhie regions as well as from Crimea (BRUNICKI, 1913, as *reuttiana* Frey, SCHILLE, 1930, as *reuttiana* Frey, BIDZILYA *et al*., 2003, as *elegans* Frey, KAILA *et al*., 2008).

Notes: This species was erroneously recorded from Crimea and Zaporozhie region as *Elachista elegans* Frey, 1859 (BUDASHKIN & SINEV, 1991, BIDZILYA *et al*., 2003, BUDASHKIN, 2004, 2006). Material from Crimea (Karadagh Nature Reserve) has been authentically re-determined by L. Kaila (KAILA *et al*., 2008), hence *E. elegans* must be removed from both Crimea and Ukraine.

Elachista canapennella (Hübner, [1813])

Distribution: Northern and Central Europe, Russia (North-West, North and Central of the European Part, Middle Volga) (PARENTI, 1996, SINEV, 2008). In Ukraine it is known from Lvov and Ivano-Frankovsk regions (NOWICKI, 1860, as *incanella* F. R., KLEMENCIEWICZ, 1901, as *obscurella* Stt., SCHILLE, 1930, as *incanella* H.-S., BIDZILYA *et al*., 2006).

Elachista alpinella Stainton, 1854

Material examined: 1 ♂, Ukraine, Sumy reg., Konotop distr., Jurievka, on light, 8-VIII-2000 (Govorun); 1 ♀, Kiev vic., Muzychi, on light, 21-VII-2008 (Nesterov); 1 ♂, Zhitomir reg., Emil'chino vic., h=204 m, on light, 18-VIII-2012 (Kostjuk).

Distribution: Northern and Central Europe, Russia (North-West, North and Central of the European Part, Southern Ural) (PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known only from Lvov region (BRUNICKI, 1913, as *monticola* Wck., SCHILLE, 1930, as *monticola* Wck., STÖKL, 1936, as *monticola* Wck.).

Elachista anserinella Zeller, 1839

Material examined: 1 ♂, Ukraine, Kiev vic., Glevakha, 13-VII-2005 (Bidzilya).

Distribution: Europe, Russia (Central of the European Part, Middle Volga, Southern Ural, South of the Western Siberia, Transbaikalia) (KAILA, 1992, PARENTI, 1996, BIDZILYA *et al*., 1998, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known from Lvov and Ternopol regions (NOWICKI, 1860, KLEMENCIEWICZ, 1898, SCHILLE, 1930).

Elachista rufocinerea (Haworth, 1828)

Distribution: Central and Southern Europe, Asia Minor (FALKOVITSH, 1981, PARENTI, 1996). In Ukraine it is known from Lvov and Tchernovtsy regions (KLEMENCIEWICZ, 1902, HORMUZAKI, 1907, SCHILLE, 1930).

Elachista maculicerusella Bruand, 1859

Material examined: 15 ♂♂, Ukraine, Kiev, 2, 6-VI, 7-24-VII-1927; 8-IX-1928 (Zhikharev); 1 ♂, Lvov reg., Morshin, 26-V-1998 (Rutjan); 1 ♂, Kiev vic., Muzychi, on light, 13-VI-2008 (Nesterov).

Distribution: Northern and Central Europe, Russia (Kaliningrad reg., North-West, North and Central of the European Part, Middle Volga, Southern Ural, South of the Western Siberia), Asia Minor, Kazakhstan (FALKOVITSH, 1981, KAILA, 1992, PARENTI, 1996, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known from Ivano-Frankovsk and Kiev regions (BRUNICKI, 1913, as *cerusella* Hb., ZHIKHAREV, 1928, as *cerusella* Hb., SCHILLE, 1930, as *cerusella* Hb., STÖKL, 1936, as *cerusella* Hb.).

Biselachista contaminatella (Zeller,1847) (det. L. Kaila) (Figs. 13, 17, 28)
= *Biselachista arzamastsevi* Lastukhin, 2009, **syn. nov**.

Material examined: 1 ♂, Crimea, Karadagh, biostation, on light, 11-VI-1977 (Falkovitsh); 2 ♂♂, 2 ♀♀, Crimea, Karadagh, biostation, on light, 15-V-1985, 21-VII-1987, 3-VII-1989 (Budashkin); 2 ♂♂, 1 ♀, Zaporozhie reg., Zaporozhie distr., Konka river, Rybkhoz, on light, 17-VII-1987 (Zhakov); 3 ♂♂, Luhansk reg., Stanichno-Luhanskoe, 14-V-2000 (Bidzilya); 3 ♂♂, Zaporozhie reg., Akimovka distr., Bogatyr, 9, 11, 22-VII-2000 (Getmanchuk); 7 ♂♂; Crimea, Dvujakornaja bukhta, evening collection, 16, 17-V-2006 (Budashkin); 1 ♂, Crimea, S Prisivashie, Lvov vic., halophilic steppe, evening collection, 25-V-2006 (Budashkin); 1 ♂, Crimea, 1-st km of Arabatskaya strelka, halophilic-sand steppe with saline, on light, 19-V-2007 (Budashkin); 1 ♀, Crimea, Kazantip, on light, 23-V-2007 (Budashkin); 1 ♂, Odessa region, Belaevo distr., 7 km W of Majaki, Nizhnednestrovskiy National Park, 7-V-2012 (Khalaim); 1 ♂, Luhansk reg., S vic. of Severedonetsk, dacha near Kleshnja lake, on light, 7-VIII-2013 (Demijanenko).

Distribution: Canary Islands, Portugal, Spain, France, Italy (including Sicilia and Sardinia Islands), Austria, Slovakia, Hungary, former Yugoslavia, Bulgaria, Albania, Russia (Lower Volga, Southern Ural) (PARENTI, 1996, SINEV, 2008, LASTUKHIN, 2009), Turkmenistan (SRUOGA, 1990).

Notes: The species was erroneously recorded as *Biselachista albidella* (Nylander, 1848) from Crimea (BUDASHKIN & SINEV, 1991), Zaporozhie and Luhansk regions (BIDZILYA *et al*., 2003). **New for Ukraine**.

Biselachista arzamastsevi was described from two males collected on the light trap in Astrakhanskiy Nature Reserve (Russia, Astrakhan' region) (LASTUKHIN, 2009). The drawing of the holotype and the photograph of the male genitalia of *B. arzamastsevi* in the original description fully agree in all details with *B. contaminatella*, so that there remains no doubt of the synonymy of these species.

Biselachista cinereopunctella (Haworth, 1828)

Distribution: Europe, Russia (Primorskyi krai) (PARENTI, 1996, SINEV & SRUOGA, 1997, SINEV, 2008). In Ukraine it is known only from Lvov region (BRUNICKI, 1913, SCHILLE, 1930).

Biselachista utonella (Frey, 1856)

Material examined: 1 ♂, Ukraina m., Nikolajev (in urbe), lum, 1-VIII-1932 (Obraztsov); 1 ♂, Odessa reg., Belaevo distr., 7 km W of Majaki, Nizhnednestrovskyi National Park, 7-V-2012 (Khalaim); 1 ♂, Nikolaev reg., Pervomaisk distr., S vic. of Kuripchino, 8-VI-2012 (Khalaim).

Distribution: Europe, Russia (Kaliningrad reg., North-West and North of the European Part, Middle and Lower Volga, Southern Ural, Primorskyi krai) (PARENTI, 1996, SINEV & SRUOGA, 1997, KAILA *et al*., 2003, SINEV, 2008). In Ukraine it was known from Lvov, Ivano-Frankovsk, Zaporozhie and Donetsk regions (STÖKL 1908, as *paludum* Frey, BRUNICKI, 1913, as *paludum* Frey, SCHILLE, 1930, as *paludum* Frey, BIDZILYA *et al*., 2001).

Cosmiotes consortella (Stainton, 1851)

Material examined: 4 ♂♂, Crimea, Dvujakornaja bukhta, halophilic steppe, evening collection, 2-VI-2007 (Budashkin).

Distribution: Europe, Transcaucasia, (Georgia), Central Asia (Tadzhikistan) (SRUOGA, 1991, KAILA, 1992, PARENTI, 1996). In Ukraine it was known from Zaporozhie region and from Crimea (BUDASHKIN & SINEV, 1991, BIDZILYA *et al*., 2003).

Cosmiotes exactella (Herrich-Schäffer, 1855)

Material examined: 1 ♂, Crimea, cape Sarych, mountains slopes, 7-V-1991 (Lvovsky).

Distribution: Europe, Russia (North-West, North and Central of the European Part, Transbaikalia, Sakhalin Island, South Kuril Islands, Primorskyi krai) (PARENTI, 1996, SINEV & SRUOGA, 1997,

BIDZILYA *et al*., 1998, SINEV, 2008). In Ukraine it was known only from Lvov region (NOWICKI, 1860, as *parvulella* F. R., BRUNICKI, 1913, SCHILLE, 1930). **New for Crimea**.

Cosmiotes stabilella (Stainton, 1858)

Distribution: Mainly Central Europe, Russia (Altai, Transbaikalia, Sakhalin Island, Primorskyi krai) (PARENTI, 1996, SINEV & SRUOGA, 1997, BIDZILYA *et al*., 1998, 2002, SINEV, 2008). In Ukraine it is known only from Lvov region (SCHILLE, 1930).

Cosmiotes freyerella (Hübner, [1825])

Distribution: Europe, Russia (North-West, North and Central of the European Part, Western Caucasus, Middle Volga, Primorskyi krai) (KAILA & JALAVA, 1994, PARENTI, 1996, SINEV & SRUOGA, 1997, SINEV, 2008). In Ukraine it is known from Lvov, Tchernovtsy and Khmelnitskiy regions (NOWICKI, 1865, as *arundinella* Z., KLEMENCIEWICZ, 1907, as *nigrella* Hw. ♂ ab. *Elutella* m., HORMUZAKI, 1907, as *nigrella* Hw., BRUNICKI, 1913, as *nigrella* Hw., KHRANEVITCH, 1927, as *nigrella* Hw., SCHILLE, 1930, as *nigrella* Hw. and *arundinella* Z.).

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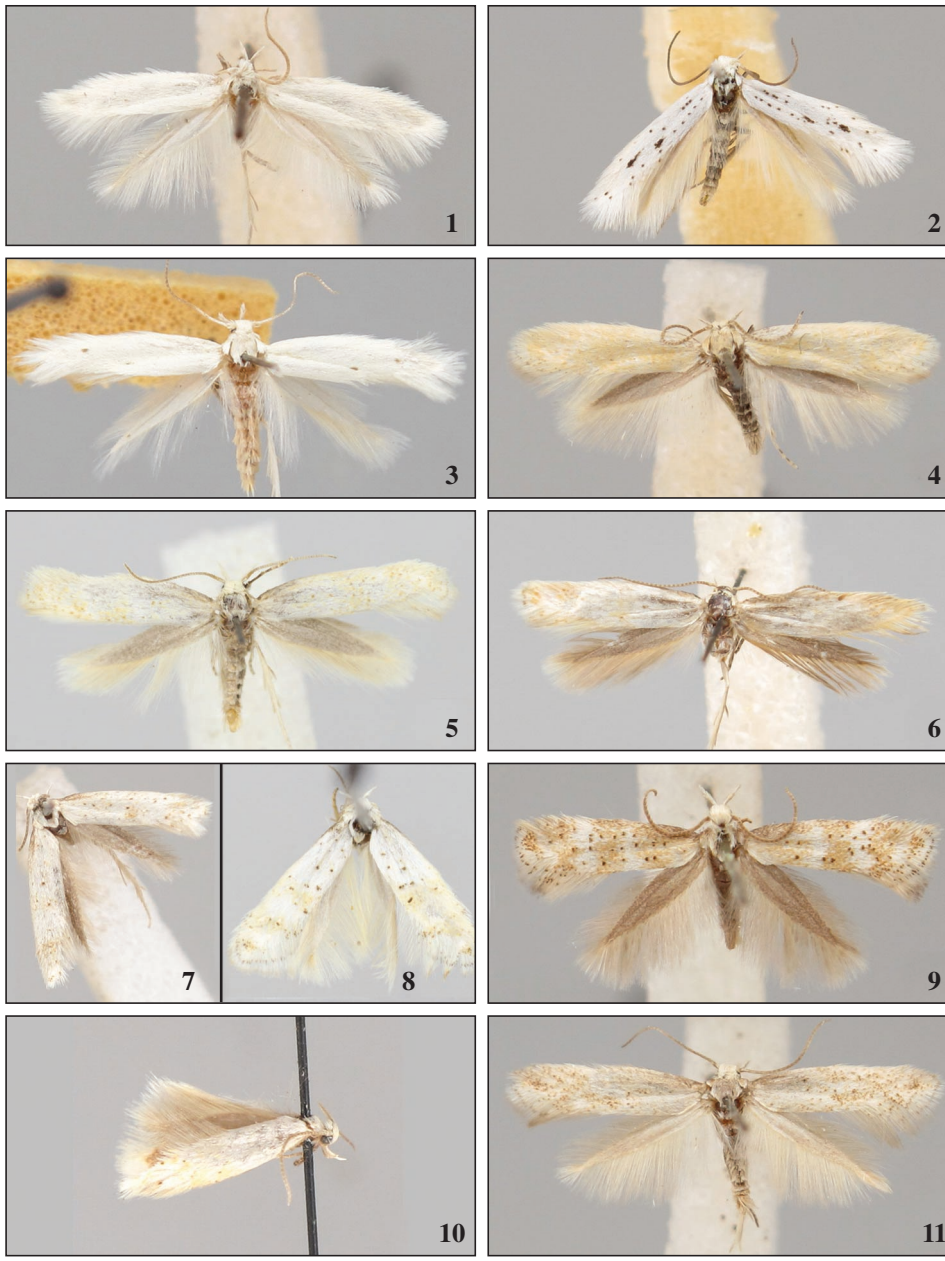
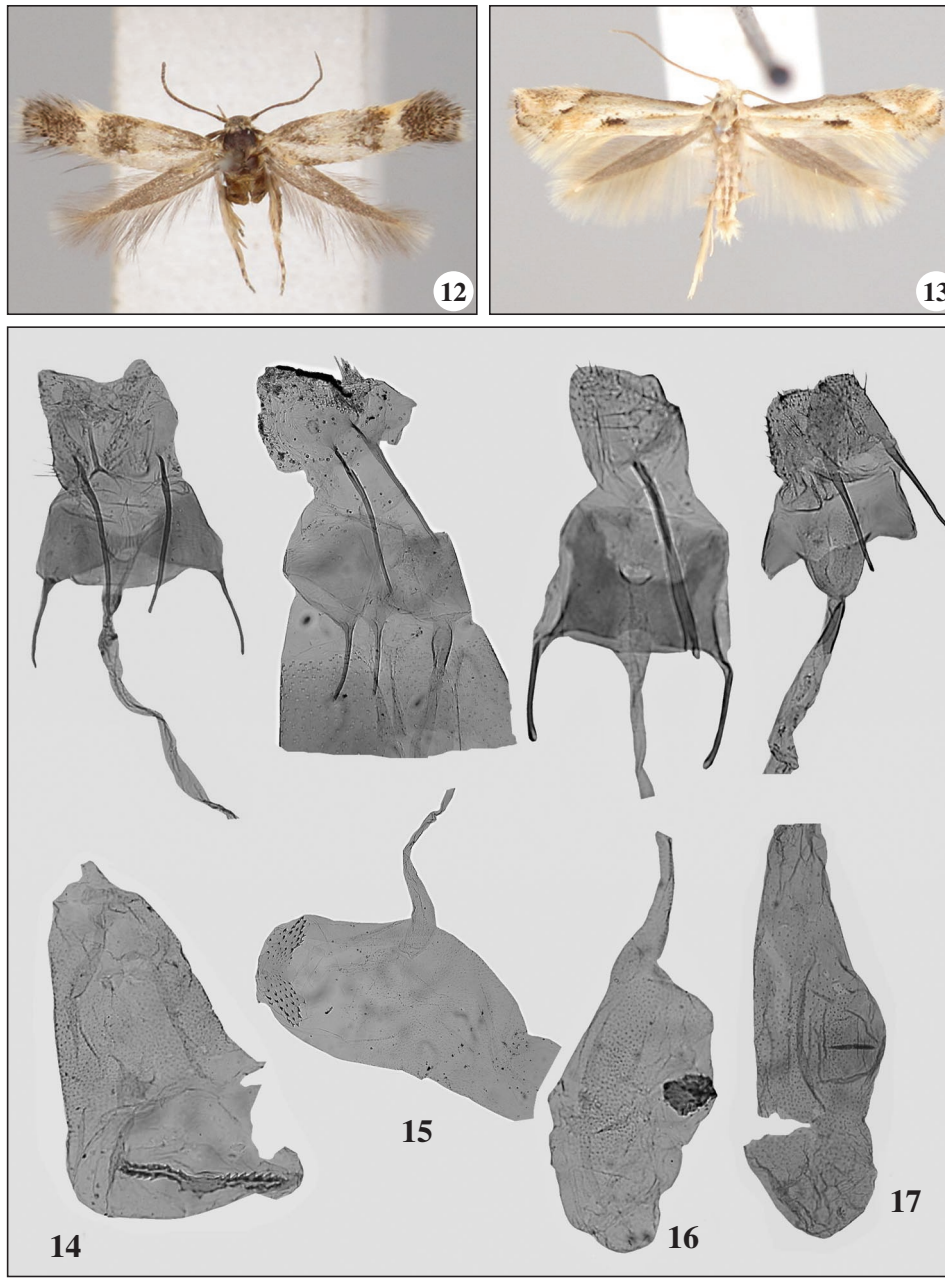
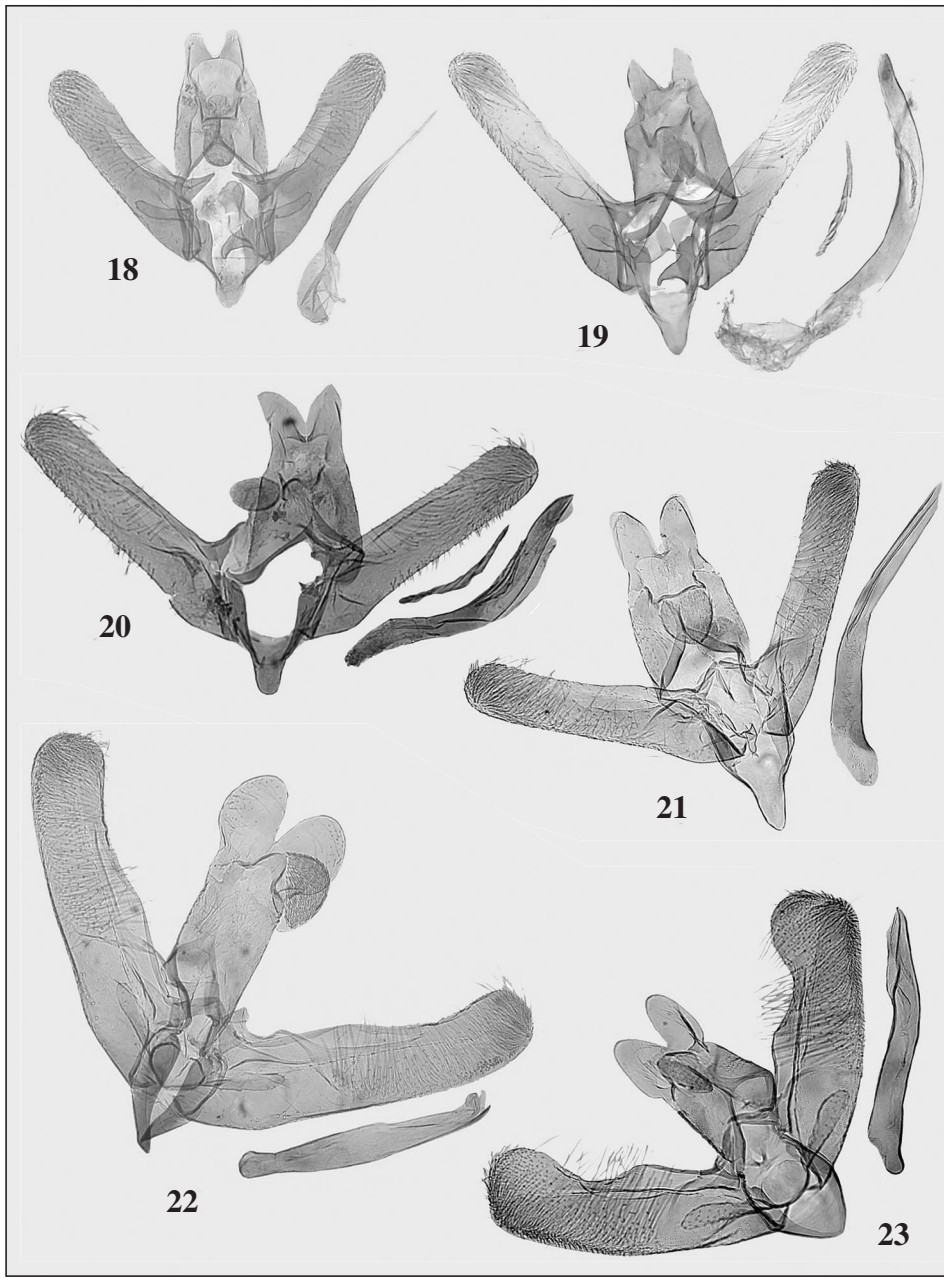


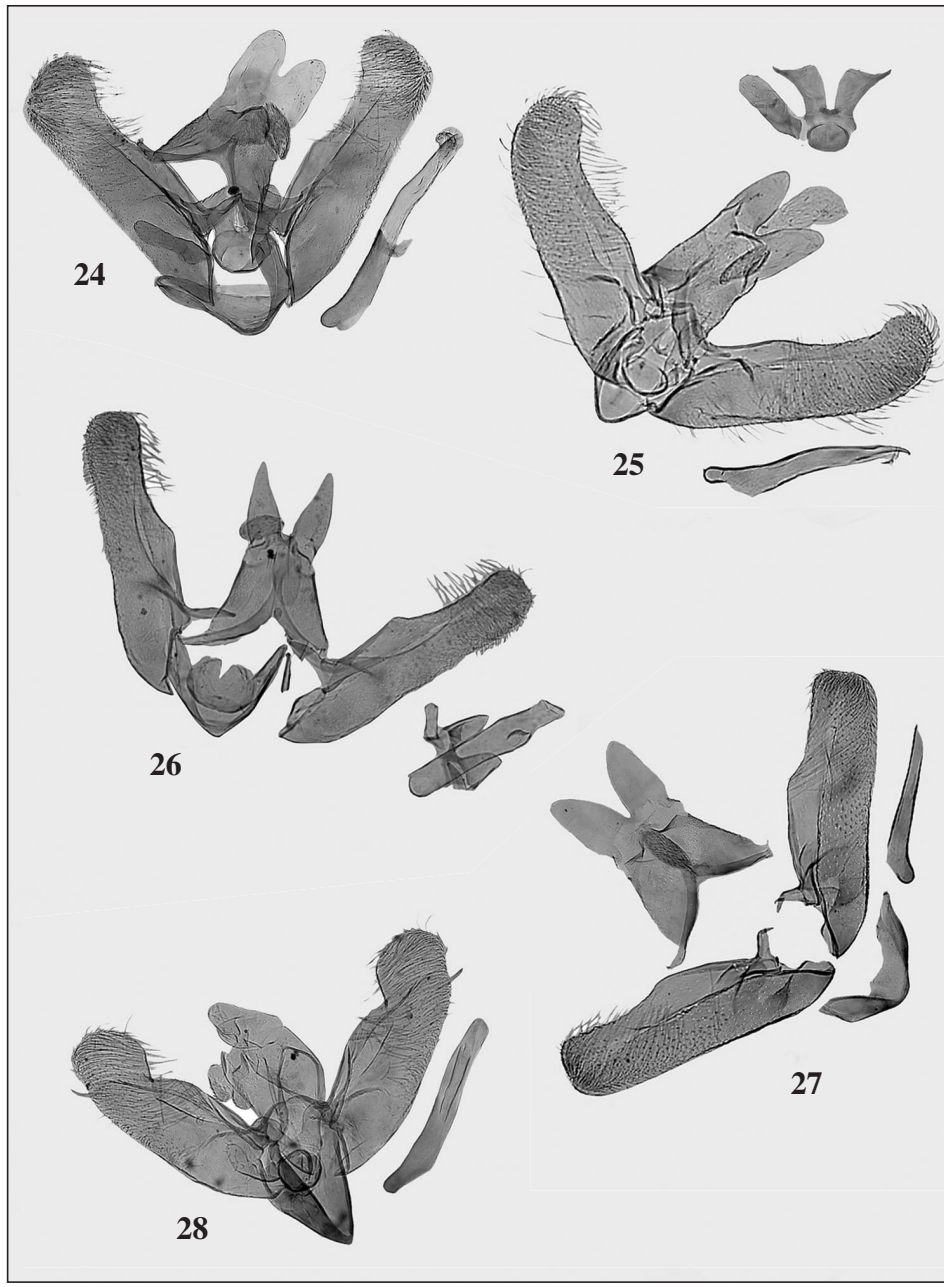
Figs. 1-11.– Adults. **1.** *Elachista purella* Sruoga, 2000. **2.** *Elachista grandella* Traugott-Olsen, 1992. **3.** *Elachista spumella* Caradja, 1920. **4.** *Elachista dumosa* Parenti, 1981. **5.** *Elachista laurii* Bidzilya & Budashkin, sp. n. **6.** *Elachista olschwangi* Kaila, 2003. **7.** *Elachista* sp. pr. *olschwangi* Kaila, 2003. **8.** *Elachista heringi* (Rebel, 1899). **9.** *Elachista gormella* Nielsen & Traugott-Olsen, 1987. **10.** *Elachista nolckeni* Šulcs, 1992. **11.** *Elachista exigua* Parenti, 1978.



Figs. 12-17.– Adults. **12.** *Elachista littoricola* Le Marchand, 1938. **13.** *Biselachista contaminatella* (Zeller, 1847). **14-17.** Female genitalia. **14.** *Elachista purella* Sruoga, 2000. **15.** *Elachista spumella* Caradja, 1920. **16.** *Elachista littoricola* Le Marchand, 1938. **17.** *Biselachista contaminatella* (Zeller, 1847).



Figs. 18-23.– Male genitalia. **18.** *Elachista parvula* Parenti, 1978. **19, 20.** *Elachista purella* Sruoga, 2000. **21.** *Elachista spumella* Caradja, 1920. **22.** *Elachista heringi* (Rebel, 1899). **23.** *Elachista olschwangi* Kaila, 2003.



Figs. 24-28.– Male genitalia. **24.** *Elachista* sp. pr. *olschwangi* Kaila, 2003. **25.** *Elachista laurii* Bidzilya & Budashkin, sp. n. **26.** *Elachista nolckeni* Šulcs, 1992. **27.** *Elachista littoricola* Le Marchand, 1938. **28.** *Biselachista contaminatella* (Zeller, 1847).

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A new species of the genus *Dahlica* Enderlein, 1912 from the Pyrenees of Aragon (Province of Huesca) in Spain (Lepidoptera: Psychidae, Dahlicini)

W. R. Arnscheid

Abstract

A new Psychid, *Dahlica michaela* Arnscheid, sp. n. is described from the Spanish Pyrenees (Aragon, Huesca). The differences to other related species within the tribe Dahlicini is given.
KEY WORDS: Lepidoptera, Psychidae, Dahlicini, *Dahlica*, new species, morphology, distribution, biology, Benasque, Huesca, Spain.

Una nueva especie del género *Dahlica* Enderlein, 1912 de los Pirineos de Aragón (provincia de Huesca) en España (Lepidoptera: Psychidae, Dahlicini)

Resumen

Se describe un nuevo psíchido, *Dahlica michaela* Arnscheid, sp. n., de los Pirineos españoles (Aragón, Huesca). Se dan las diferencias con otras especies relacionadas dentro de la tribu Dahlicini.
PALABRAS CLAVE: Lepidoptera, Psychidae, Dahlicini, *Dahlica*, nueva especie, morfología, distribución, biología, Benasque, Huesca. España.

Introduction

During the last 3 years the author visited several times the environment of Benasque, situated in the Pyrenees of Aragon (Huesca) to study the Psychid species of this and adjacent areas. Beside other interesting results, a new species of the tribe Dahlicini has been found, which is described here as:

***Dahlica michaela* Arnscheid, sp. n.**

Material

Holotype: ♂, Spain, Huesca, Benasque, Val Ballibierna, 1600 m, e. l., 16-V-2013, leg. W. Arnscheid (deposited at coll. A. Vives/Museo Nacional de Ciencias Naturales, Madrid, Spain). Paratypes: 3 ♂♂, same data (emerged 16-17-V-2013), 6 ♂♂, Val Ballibierna, 1400-1600 m, e. l. 10-15-V-2014, leg. W. Arnscheid, coll. W. Arnscheid (Bochum, Germany) and M. Weidlich (Neißemünde, Germany).

Description

Among the tribe Dahlicini only a few species are known from the Iberian Peninsula. These species

belong either to genus *Dahlica* Enderlein, 1912 or *Brevantennia* Sieder, 1953. The latter is characterized by the short antennae of the female which bear less than 11 segments, mostly 3-5 and have a low genital index (mostly < 1.0) The former is characterized by the absence of a tarsal epiphysis which is present in the genus *Siederia* Meier, 1953, a genus which is until now not known from Spain or Portugal, as well as the alpine and south-east European genus *Postsolenobia* Meier, 1958.

Nevertheless, inclusion of the new species in the genus *Dahlica* is provisional. Due to the lack of females we could not verify definitively whether it belonged to *Brevantennia,* but the general appearance, the relatively broad scales on forewings and the higher genital index are good reasons for inclusion in *Dahlica.* Male wingspan 13 to 13.5 mm, wings stretched, slender, costal margin more or less straight, apex slightly pointed, forewing coloration blackish grey with regularly scattered whitish grey spots forming an indifferent reticular pattern which is very evenly distributed. The distal end of the discal cell without a dark spot. The scales between discal area and apex are relatively broad, mostly tridentate but also bidentate (mostly class 3 after SAUTER, 1956). The fringe scales are long, narrow with 3 dentations, light yellowish grey, very long towards anal margin. Venation on forewing with 9 veins emanating from discal cell, m1 and m2 free or rising from one point. Accessory cell present, intercalary cell absent. Hindwings slender, apex slightly pointed, lighter greyish. Fringes yellowish grey, longer towards anal margin. On hindwings 6 veins amanating from discal cell, m3 and m4 one point rising or free. Additional cells absent.

Head, thorax and abdomen covered with long yellowish grey hair-like scales. Eyes large, eye-distance distinctly larger than eye-diameter, labial palps reduced. Antennae thread-like, slightly longer than half forewing length, with 23-24 segments. Covered dorsally with small yellowish grey scales and short ciliated ones ventrally. Forelegs without tibial epiphysis, midtibia with one pair, hindtibia with two pairs of spurs.

Male genitalia typical for Dahlicini, tegumen oval, long in lateral view, indented distally, vaulted and narrower caudally. Vinculum narrow laterally, broader ventrally. Valva stretched and more slender and hairy distally. Broader basally, clasper of sacculus hook-shaped, mostly slender and curved upwardly, sometimes shorter and broad. Cucullus lobe-shaped. Saccus absent. Phallus long, distinct curved, thin, attached basally to fultura inferior by a long chitinized clasp, cornuti absent. Genital index (after SAUTER, 1956) 1.71 - 1.81 (n=4).

Female: Unknown.

Cases: Length 6-7 mm, width 1.9 to 2.1 mm. Greyish to dark yellowish brown, covered densely with particles of soil and other mineral debris, especially small stones. Partially scattered with particles of lichens.

Diagnosis and discussion

Beside the parthenogenetic species only a few sexual species of Dahlicini are known from the Iberian Peninsula. The first described species was *Dahlica larella* (Chrétien, 1906) from the Sierra de Guadarrama, Madrid. Smaller, distinctly lighter in coloration, the cases are more or less of unique shape in the genus and clearly different being broader and flatter. The genital index is distinctly lower (SAUTER, 1958). Also from Sierra de Guadarrama recently *Dahlica navacerradensis* Sobczyk, 2014 has been described. It differs also from the new species by the wingspan which is distinctly smaller. More greyish brown, head covered by grey hair-like scales (SOBCZYK, 2014). The white spots on forewing are confined to the outer half and very evenly scattered in the new species. On forewing it bears a dark spot on outer end of discal cell which is absent in *D. michaela* Arnscheid, sp. n. From Leon Province *D. rianella* Hättenschwiler, 1981 has been described. The genital index is lower and the scales much broader than in the new species (classes 4-6). From the Mediterranean coastline of Catalonia *Brevantennia pinkeri* Sieder, 1964 is much smaller (9.8-12.2 mm) and lighter greyish. It differs also by the genital index 0.90-1.05. *Brevantennia estrela* Arnscheid, 2012 from Serra da Estrela in Portugal is also smaller and differs beside other characteristics by the broader scales on forewing (classes 5-6).

Looking closer to other *Dahlica* species from west Europe only the alpine species *D. argenterae* (Wehrli, 1924), *D. rebeli* (Wehrli, 1924) and *D. leoi* (Dierl, 1970) resemble slightly the new species. The scales of *D. rebeli* and *D. leoi* are distinctly narrower (classes 2 and 2-3) and the genital index is lower in both species. *D. wehrlii* is larger in wingspan (14.5-17.5) and has very narrow scales as well as *D. argenterae*. The genital index of both species is lower.

Table 1.– Data matrix for morphologic characteristics of sexual *Dahlica* species. Data from CHRÉTIEN (1906), DIERL (1966), SOBCZYK (2014), HÄTTENSCHWILER (1977, 1981, 1996) and SAUTER (1958).

***Dahlica* species**	**Male wingspan**	**Scales (class after SAUTER, 1956)**	**Hindwing venation m2/m3**	**Gen. index**
***michaela* sp. n.**	13-13.5	3	one-point or free	1.71- 1.81
generosensis	12-15	2-3	free	1.51-1.89
leoi	11-14.5	2-3	variable	1.20 -1.44
rebeli	11-14	2	variable	1.45
argenterae	12.8	4-5	short stalked	1.65
larella	11-14	4	short stalked or free	1.08
navacerradensis	12.2-12.6	4	free	1.68 -1.82
rianella	11.5-13.5	4-6, most 5	one-point or short stalked	1.12 -1.13
wehrlii	14.5-17.5	2	one-point or short stalked	1.50 -1.71
goppensteinensis	12-17	2-3	short stalked or one-point	1.48 -1.89

Derivatio nominis: This nice new species is dedicated to my beloved wife Michaela Gärtner for her kind and useful companionship during the field work in the Iberian Peninsula, including at the type locality of the new species.

Bionomics

D. michaela Arnscheid, sp. n. is up to present only known from a little valley situated north of Benasque (Province of Huesca). The cases have been found to be very rare on rocks and large stones between 1400 and 1600 m in the coniferous belt with dense population of *Buxus* spec. and *Ilex aquifolium*. It seems quite certain that the flight period ranges from middle of May to early June. The larvae feed on algae and lichens. It is very interesting that at the type locality 2 other *Dahlica* species exist. At the same rocks the larval cases of the parthenogenetic forms of *D. triquetrella* (Hübner, [1813]) and *D. lichenella* (Linnaeus, 1761) have been collected and reared to adults. Furthermore the psychid species *Diplodoma laichartingella* (Goeze, 1783), *Eumasia parietariella* (Heidenreich, 1851), *Pseudobankesia casaella* Hättenschwiler, 1994 and *Apterona nylanderi* (Wehrli, 1927) occur in the habitat of *D. michaela* sp. n.

Acknowledgements

I am grateful to my friend Dr. Michael Weidlich, Neißemünde, for critical discussion as well as to Dr. Antonio Vives, Madrid, for his support to get permit for our field work in the Province of Huesca (Spain) into the Scientific Project of SHILAP.

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Figs. 1-3.– 1. *Dahlica michaela* Arnscheid sp. n. Holotype, **2.** Larval case with exuvia, **3.** Habitat of *Dahlica michaela* Arnscheid, sp. n.

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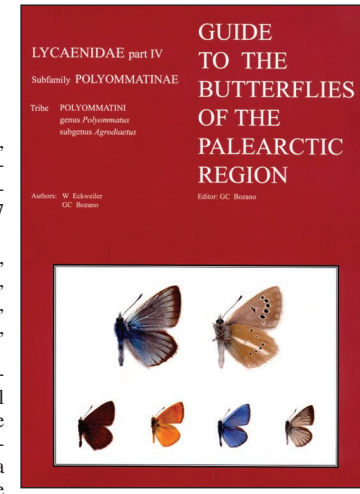
REVISION DE PUBLICACIONES
BOOK REVIEWS

W. Eckweiler & G. C. Bozano
Guide to the Butterflies of the Palearctic Region. Lycaenidae part IV
132 páginas
Formato 29'5 x 21 cm
Omnes Artes, Milano, 2016
ISBN: 978-88-87989-18-2



Un nuevo volumen de esta clásica serie ha llegado a nuestras manos, se trata de la cuarta parte de los Lycaenidae Leech, [1815], más concretamente de la subfamilia Polyommatinae Swainson, 1827 y de la tribu Polyommatini Swainson, 1827 y de la subtribu Polyommatina Swainson, 1827 y que supone el decimoctavo de la misma.

En el caso que nos ocupa, se trata el género *Polyommatus* Latreille, 1804 y más concretamente del interesante subgénero *Agrodiaetus* Hübner, 1822 quedando dividido en diez grupos, a saber DAMON, ADMETUS, DOLUS, DAMA, CARMON, IPHIGENIA, DAMONE, ACTINIDES, ERSCHOFFI y DAMOCLES, considerando la presencia de 120 especies válidas.

Sin lugar a dudas, el género *Agrodiaetus* es uno de los más apasionantes de la fauna Paleártica, si bien sus especies son fácilmente separadas del resto de los géneros, no ocurre lo mismo entre las diferentes especies que componen el mismo, algunas de ellas fáciles de separar pero en un gran número de los casos es bastante complicado y, ni que decir tiene, en cuanto a las subespecies, muchas de ellas basadas en caracteres no suficientemente válidos lo que conlleva al establecimiento de sus correspondientes sinonimias. No podemos olvidar los destacados trabajos del francés Hubert de Less sobre los cromosomas durante el pasado siglo XX, que aportaron mucha luz a este complicado género como podemos ver en la página 11.

Como ya es habitual a lo largo de esta obra, después de las consideraciones generales sobre la familia Lycaenidae, subfamilia Polyommatinae, nos dan una relación de todas y cada una de las especies y subespecies consideradas en el área de estudio y es de destacar la clave fotográfica que realizan los autores para poder identificar las especies y subespecies, basada en los caracteres de las alas de los machos.

Ya dentro de cada una de las especies, se presentan los datos sistemáticos y sinonímicos, los principales caracteres para su diagnosis, la morfología de la genitalia del macho, las particulares características que permiten separar las subespecies tratadas por los autores como válidas, así como destacadas notas taxonómicas.

Las especies están perfectamente fotografiadas en color permitiendo identificar a todas y cada una de ellas, así como dibujos anatómicos de interés, un mapa de la distribución conocida de cada una de las especies y de una bibliografía específica.

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 anteriores fascículos, por lo que recomendamos vivamente esta serie, que no puede faltar en ninguna biblioteca específica que se precie.

El precio de este libro es de 32 euros y los interesados lo pueden pedir a:

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Enolmis delnoydella Groenen & Schreurs, sp. n., a new species from Spain (Lepidoptera: Scythrididae)

F. Groenen & A. Schreurs

Abstract

In May 2014 five specimens of an unknown Scythrididae were captured at light at Sopalmo, Almeria, Spain. The new species belongs to genus *Enolmis* Duponchel, 1845 and is here described and discussed. The holotype and the female paratype are deposited in the collection of the Naturalis Biodiversity Center, Leiden, The Netherlands. The males paratypes are in the collections of the authors.
KEY WORDS: Lepidoptera, Scythrididae, new species, Spain.

Enolmis delnoydella **Groenen & Schreurs, sp. n., una nueva especie para España (Lepidoptera: Scythrididae)**

Resumen

En mayo de 2014 cinco especímenes de un desconocido Scythrididae fueron capturados a la luz en Sopalmo, Almería, España. La nueva especie pertenece al género *Enolmis* Duponchel, 1845 y aquí se describe y discute. El holotipo y el paratipo hembra están depositados en la colección del Naturalis Biodiversity Center, Leiden, Holanda. Los paratipos machos están depositados en la colección de los autores.
PALABRAS CLAVE: Lepidoptera, Scythrididae, nueva especie, España.

Introduction

In May 2014 Jos Delnoye captured, during his holidays, five Scythrididae specimens externally close to *Enolmis acanthella* (Godart, 1824) at light. The specimens were donated to the collection of the first author. For this the authors are very grateful. After examining the genitalia and discussing the results with the European specialists in this group, Bengt Bengtsson, Dr. Pietro Passerin d'Entrèves and Dr. Angela Roggero, it was concluded that these specimens belongs to an unknown species. Here *E. delnoydella* Groenen & Schreurs, sp. n., is described.

Enolmis delnoydella Groenen & Schreurs, sp. n.

Material: Holotype: 1 ♂, Spain, Almeria, Sopalmo, 15-29-V-2014, gen slide FG2911 deposited in the Naturalis Biodiversity Center, Leiden, The Netherland; Paratypes: 1 ♀, gen. slide AS1406 deposited in the Naturalis Biodiversity Center, Leiden, The Netherland; 3 ♂♂, gen. slides AS1402; FG1912, FG2913; all leg. J. Delnoye, deposited in the collection of the authors.

Description: Wingspan 12-13 mm (fig. 1 ♂, 2 ♀♀). Head, thorax and tegulae brown fuscous, antenna grey, ringed black. Forewing white coloured, markings dark grey, basal fascia hardly reaching dorsum, subbasal fascia angled, interrupted at middle, median fascia broad, incised at middle, single black dot

between median and terminal fascia, terminal fascia along termen, sinuate. Fringe fuscous, apically mixed white and at tornus darkgrey. Hindwing grey, fringe fuscous. Abdomen grey, anal tuft beige.

Male genitalia (fig. 3) with the tegumen rounded distally. Uncus short and laterally hairy, distal arm of gnathos a small hook. Phallus slender, long, sinuate and tapered. Left valva curved, base subparallel and with bunch hair-like scales, in middle constricted, corona bulbous and all over haired and at tip with a brush of longer hair scales. Right valva curved, little longer than left valva, basal 1/3 subparallel and with bunch of hair-like scales, distal 2/3 subparallel, hairy, top suboval, with dorsal row of hairs. Sternum 8 (fig. 4) subtriangular, with a posterior extension at tip and having laterally an indistinct broad lobe, and subapically a semi-circular lobe.

Female genitalia (fig. 5) with short henia, almost completely hidden by S7, except for naked hood-shaped, apical sclerotization. S7 anteriorly with two lobes, posteriorly sinuate with to very slender and omited pointed projections at middle. Sterigma a hexagonal sclerotization.

Biology: Unknown.

Diagnosis: Externally *E. delnoydella* Groenen & Schreurs, sp. n. is very similar to *Episcythris triangulella* (Ragonot, 1875) and several species of the genus *Enolmis*. The new species can only be distinguished by dissecting the genitalia. It is most closely related to *Enolmis nevadensis* Passerin d'Entrèves, 1997 and *E sierraenevadae* Passerin d'Entrèves, 1997. The shape of the valvae and S8 and the structure of the hair-scales on the corona of the valva are characteristic for the male of the new species. In the female genitalia the shape of the henia and S7 are the most important characteristics. The male genitalia of *E. delnoydella* Groenen & Schreurs, sp. n. are unusually stable compared to other *Enolmis*-species (Bengtsson, pers. comm.).

Distribution: Almeria, Spain.

Etymology: The species is named after the collector of the species Mr. Jos Delnoye.

Acknowledgements

We wish to thanks Mr. Jos Delnoye for giving us the opportunity to study the material collected by him. We also wish to thank Mr. Bengt Bengtsson, Dr. Pietro Passerin d'Entrèves and Dr. Angela Roggero for their help with examining the new species and their comments on the manuscript.

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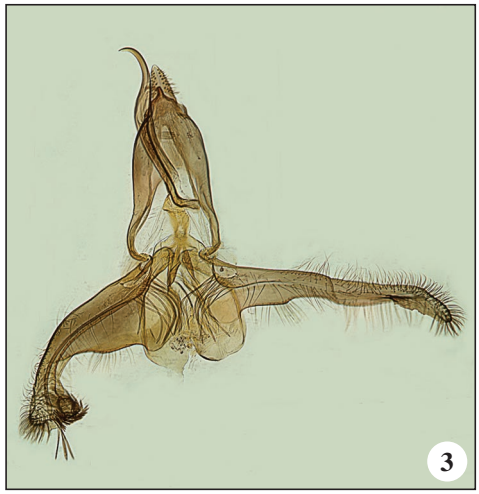

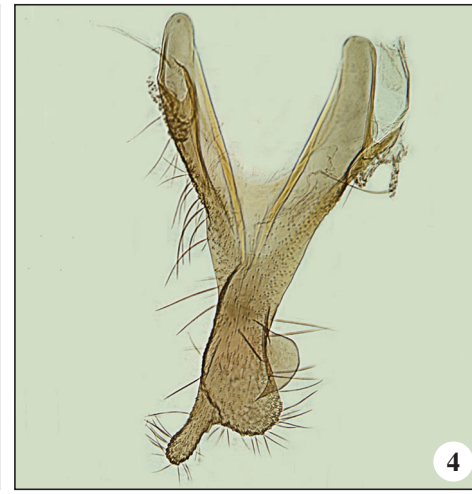

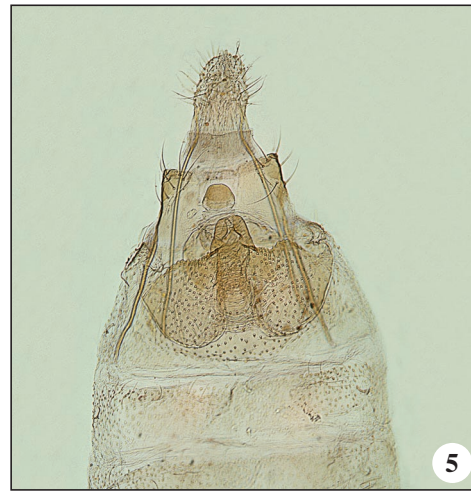

Figs. 1-5.– *Enolmis delnoydella* Groenen & Schreurs, sp. n., **1.** Male; **2.** Female; **3.** Male genitalia, slide FG2911, **4.** Male genitalia S8, slide FG2911, **5.** Female genitalia, slide AS1406.

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REVISION DE PUBLICACIONES
BOOK REVIEWS

Z. Varga, G. Ronkay, L. Ronkay & P. Gyulai
A Taxonomic Atlas of the Eurasian and North African Noctuoidea. Noctuidae II
362 páginas, 59 planchas color
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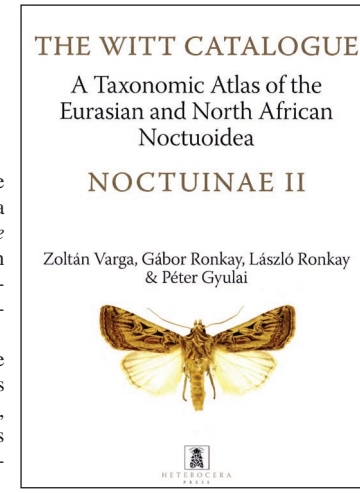
Heterocera Press, Budapest, 2015
ISBN: 978-615-279-05-8



Tenemos ante nosotros un nuevo volumen (el octavo de la serie), que bajo la denominación general *"The Witt Catalogue*", pretende realizar una revisión de la mítica obra del Dr. Albert Seitz *"Die Gross- Schmetterlinge der Erde*" en lo que se refiere a la fauna que está presente en Eurasia y en el norte de África, con un proyecto que comenzó en el año 2008 y que pretende publicarse a lo largo de unos 25 años y abarcando unos 60 volúmenes.

En este caso se trata de la segunda parte de la subfamilia Noctuinae Latreille, 1809 y la tribu Noctuini Latreille, 1809 y de las especies de los diecinueve géneros considerados, destacando *Eugnorisma* Boursin, 1946, sin lugar a dudas, las aportaciones sistemáticas y taxonómicas que nos plantean los autores, en nada tienen que envidiar a los volúmenes anteriores, por la gran cantidad de datos científicos que podemos encontrar.

Después del Índice, Prefacio y los Agradecimientos, nos presenta un resumen de los principales Cambios Nomenclatoriales que se encuentran en esta obra, a saber: Se describen como nuevos 1 género, 2 subgéneros, 7 especies, 20 subespecies, se establecen 5 nuevas sinonimias y 6 nuevas combinaciones, así como la designación de 11 Lectotipos.

Ya entrando en la parte más importante del libro, se estudian 130 especies, agrupadas en 19 géneros y 6 subgéneros. De cada uno de estos taxones, nos dan las referencias bibliográficas, la diagnosis tanto del adulto como de la genitalia, así como la distribución conocida.

Todas las especies consideradas están fotografiadas a todo color, primero aumentadas de tamaño y luego a tamaño natural, encontrándose representados muchos tipos, especies y subespecies e incluso algunas formas destacadas.

Sin lugar a dudas las 130 láminas en blanco y negro que representan las microfotografías de las genitalias de los machos y de las hembras, son una valiosa aportación científica que aumentan más si cabe la importancia de esta obra que finaliza con una detallada y extensa bibliografía y de un índice.

No podemos terminar estas líneas, sin felicitar a los autores por este nuevo e importante trabajo científico, así como a la Editorial por esta excelente edición, siendo un libro que no puede faltar en cualquier biblioteca que se precie.

El precio de este libro es de 147 euros más gastos de envío y los interesados deben dirigirse a:

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A list of *Drasteriodes* Hampson, 1926 species in Iran with a new record of *Drasteriodes kisilkumensis* (Ershov, 1874) (Lepidoptera: Noctuidae)

A. Matov, M. M. Rabieh & M. Esfandiari

Abstract

The genus *Drasteriodes* Hampson, 1926, includes eight species and seven subspecies, of which, three species and one subspecies were previously reported from Iran. In this study, we report *Drasteriodes kisilkumensis* Ershov, 1874, as a new record for the fauna of Iran with illustrations of the collected males and its genitalia as well as notes on the distribution and bionomics of the recorded species from Iran.
KEY WORDS: Lepidoptera, Noctuidae, *Drasteriodes*, fauna, new record, Iran.

Una lista de especies de *Drasteriodes* Hampson, 1926 en Irán con un nuevo registro de *Drasteriodes kisilkumensis* (Ershov, 1874) (Lepidoptera: Noctuidae)

Resumen

El género *Drasteriodes* Hampson, 1926, incluye once especies y siete subespecies, de las cuales tres especies y una subespecie estaban registradas previamente de Irán. En este estudio, citamos *Drasteriodes kisilkumensis* Ershov, 1874, como nuevo registro para la fauna de Irán con ilustraciones de los machos colectados y de sus genitalias, así como notas sobre la distribución y bionómica de las especies registradas de Irán.
PALABRAS CLAVE: Lepidoptera, Noctuidae, *Drasteriodes*, fauna, nueva cita, Irán.

Introduction

The genus *Drasteriodes* Hampson, 1926, was originally described according to the type species *Photedes limata* Christoph, 1884, and was treated in the Noctuidae, Ophiderinae by NYE (1975). WILTSHIRE (1979) revised *Drasteriodes* and relative genera in the tribe Armadini in Ophiderinae. Subsequently this genus was transferred to the Tytinae (Noctuidae) by SPEIDEL *et al*. (1996). POOLE (1989) included *Drasteriodes* in the subfamily Ophiderine, but this genus was transferred to Calpinae by KITCHING & RAWLINS (1999). GOATER *et al*. (2003) listed the genus *Drasteriodes* Hampson, 1926 in the tribe Armadini of the subfamily Catocalinae, but later the tribe was listed in the subfamily Acontiinae by FIBIGER & LAFONTAINE (2005) and this systematic position is approved by noctuidologists now. This tribe comprises 39 species, in 9 genera. They are all found in the arid or semiarid desert zones of North Africa, the Middle East and the dry steppe zone of North Africa, the Middle East and dry steppe areas and deserts of Central Asia (GOATER *et al*., 2003).

Species of the genus *Drasteriodes* are characterized by fully developed proboscis; palpi obliquely upturned, the 2nd joint reaching to about middle of frons and moderately scaled, the 3rd short and thickly scaled; frons with pointed corneous process with flattened corneous plate below it; eyes large, round; antennae of male ciliated; thorax covered almost entirely with scales, the metathorax with depressed crest; fore tibiae smoothly scaled, the mid and hind tibiae slightly fringed with hair above; abdomen smoothly scaled and without crests. Forewing rather narrow, the apex rounded, the termen evenly

curved and not crenulate. Hindwing with the cell half the length of wing (HAMPSON, 1926). The genus *Drasteriodes* includes eight species and seven subspecies, of which, three species and one subspecies were previously reported from Iran (HACKER, 1990; HACKER & KAUTT, 1999; EBERT & HACKER, 2002; MUHABBET *et al*., 2007).

We found *Drasteriodes kisilkumensis* Ershov, 1874 in Khorasan-e-Razavi for the first time. The geographical position of the Great Khorasan province (including Khorasan-e-Razavi, Shomali and Jonoubi) shows that the fauna of Northeastern Iran was influenced by elements of the Central Asia region (FET, 1994). The Shirahmad wildlife refuge near Sabzevar city of Khorasan-e-Razavi province, placed in the margin area of the Dasht-e-Kavir, is a vast saline desert of the central Iranian plateau. In this region, while the mean annual temperature ranges from 15 to 18º C, the extreme maximum temperature can reach 42º C and the extreme minimum temperature can fall to -20º C. In most of the region, annual rainfall does not exceed 200 mm and in most parts rainfall is less than 100 mm (FET, 1994). According to ZOHARY (1973), the central Iranian sector hosts the most typical vegetation of Iran's steppe and desert regions. Dwarf scrub vegetation is common in large areas of the interior of Iran and is very diverse and rich in species; in non-saline areas, a variant with many thorn-cushions is formed. Under extremely arid conditions, a very open variant of the dwarf shrub lands appears, also characteristic of large areas of the Iranian interior. This study presents a list of *Drasteriodes* species in Iran with a new record of *D. kisilkumensis*. Notes on the distribution and bionomics for all of the recorded species as well as illustrations of adults and their genitalia are presented.

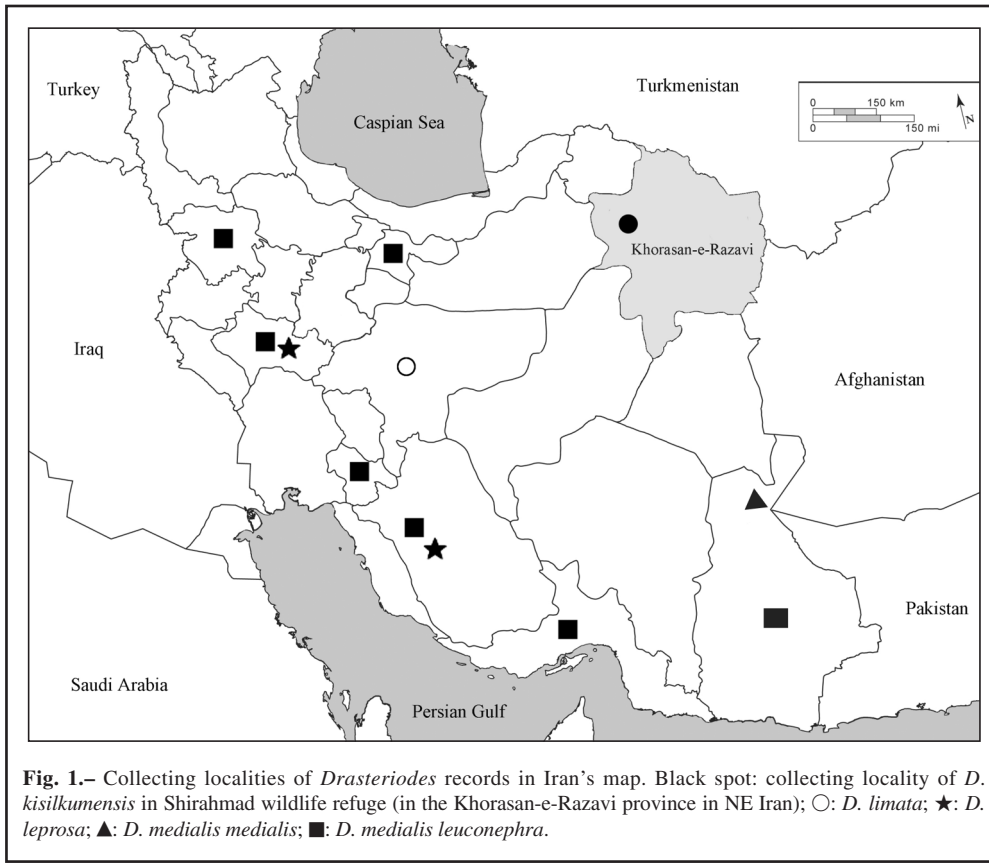

Fig. 1.– Collecting localities of *Drasteriodes* records in Iran's map. Black spot: collecting locality of *D. kisilkumensis* in Shirahmad wildlife refuge (in the Khorasan-e-Razavi province in NE Iran); ○: *D. limata*; ★: *D. leprosa*; ▲: *D. medialis medialis*; ■: *D. medialis leuconephra*.

Material and Methods

Collecting was carried out in 2011 from the Shirahmad wildlife refuge near Sabzevar city of Khorasan-e-Razavi province in North-East Iran (Figs. 1, 3), by using a generator driven mercury-vapour (MV) lamp (150 W) which was placed inside a white tent about 1.8 m high with a 8 W UVB tube light.

The specimens and slides of their genitalia were deposited in the Insect and Mite Collection of Ahvaz (IMCA), Plant Protection Department, Shahid Chamran University of Ahvaz, Ahvaz, Iran, except one which is deposited now in P. Gyulai's private collection (Hungary). Systematics and nomenclature are according to LÖDL *et al*. (2012).

Results and Discussion

Drasteriodes kisilkumensis (Ershov, 1874)

Type-locality: [Turkmenistan], in desertis Kisil-kum.

Type material: 2 syntypes, male and female, Russian Turkestan, no lectotype designated [Zoologicheskij Institut (ZIN), Russia, Saint-Petersburg].

Material examined: Iran, Khorasan-e-Razavi Prov., Sabzevar, Shirahmad, 985 m, 2 ♂♂, 2-V-2011, 36º 07' 09" N 57º 51' 08" E, (M. M. Rabieh).

Diagnosis: Antennae ciliate; head and thorax light brown; wingspan 21 mm. Ground colour of forewing light grayish brown; median area darker than basal and terminal area; this is the best distinguishing characteristic of this species as in *D. leprosa* and *D. leuconephra* the median area is approximately the same colour of the background; orbicular and reniform stigmata distinct, lighter than background; both surrounded by dark, thin lines; in *D. leprosa* reniform is approximately indistinct and in *D. leuconephra* reniform missed the dark line in edge; ante- and postmedian lines black, sinusoidal. Hindwings light brown, slightly darker toward margins (Fig. 2-1).

Male genitalia: Valve elongate and more or less rounded at the tip, without cucullus and corona, left clasper strongly developed and tapered, right one weak and rounded; clavus absent, juxta elongate (Fig. 2-2). Aedeagus curved; vesica long, distally narrowed with two elongate areas of minute spines in basal and median area (Fig. 2-3).

Female genitalia: Papillae anales short, broad; apophyses anteriores and posteriores short, thin; antrum broad, conical; bursa copulatrix large, globular, with extensive parallel longitudinal ribbing and a large sleeve-shaped appendix (WILTSHIRE, 1979).

Distribution: Turkmenistan: Kizil-Kum desert (ERSHOV, 1874), Krasnovodsk, Merw, Repetek (WILTSHIRE, 1979), Karakalpakia (Tahta Kumyr) (ZIN collection); Uzbekistan: Dengiz Kul lake, Ajakguzhumdy, 60 km E of Uchkuduk (ZIN collection); Iran (this study).

Bionomics: Adults of this species are on the wing in April-May. Larval food plants are unknown. *Peganum harmala* L. and *Haloxylon* sp. are dominant species in the collecting area and considered as possible foodplants.

Remarks: Our specimens are somewhat larger than normal.

Drasteriodes limata (Christoph, 1884)

Distribution: Iran (EBERT & HACKER, 2002: Esfahan province), Turkmenistan, Afghanistan, Iraq (WILTSHIRE, 1979), Kazakhstan, Uzbekistan (ZIN collection).

Bionomics: Adults of this species are on the wing in April-May. Larval food plants are unknown.

Drasteriodes leprosa (Brandt, 1938)

Distribution: Iran (WILTSHIRE, 1979: Fars province; EBERT & HACKER, 2002: Lorestan & Fars provinces), Iraq (HACKER, 1990).

Bionomics: Adults of this species are on the wing in September-October. Larval food plants are unknown.

Drasteriodes medialis medialis (Hampson, 1908)

Distribution: Iran (MUHABBET *et al.* 2007), Pakistan (WILTSHIRE, 1979).

Bionomics: Adults of this species are on the wing in April-July. Larval food plants are unknown.

Drasteriodes medialis leuconephra (Brandt, 1938)

Distribution: Iran (provinces of: WILTSHIRE, 1979: Fars, Hormozgan, Tehran; EBERT & HACKER, 2002: Kordestan, Lorestan, Kohgiluyeh-va-Boyer Ahmad, Fars, Sistan-va-Baluchestan; HACKER & KAUTT, 1999: Fars); Afghanistan (WILTSHIRE, 1979).

Bionomics: Adults are on the wing in April-July. Larval food plants are unknown.

Discussion

Three species and one subspecies of the genus *Drasteriodes* were previously reported from Iran. We added *D. kisilkumensis*, as a new record, to this list. There is little information on the bionomics and distribution of species of genus *Drasteriodes* in Iran. As GOATER *et al*. (2003) mentioned all species of the genus *Drasteriodes* in the Middle East are found in the arid or semiarid desert zones and the dry steppe zone of this area. In Iran, all the reported species are found in the dry steppes and semiarid regions in marginal area of the central deserts. We found the specimens of *D. kisilkumensis* in a semiarid desert zone in the marginal area of the Dasht-e-Kavir, where there is vegetation of *Haloxylon*, *Sophora*, *Astragalus*, *Zygophyllum*, *Tamarix* and *Amygdalus* species. In this area, the dominant species are sagebrush (*Artemisia siberi*, *Astragalus gossypinus*) and others. In areas receiving over 100 mm of rain, other genera of plants such as *Pteropyrum*, *Zygophyllum* and *Amygdalus* can also be found (HESHMATI, 2007). However, the larval food plants of the *Drasteriodes* species are still unknown in Iran and elsewhere.

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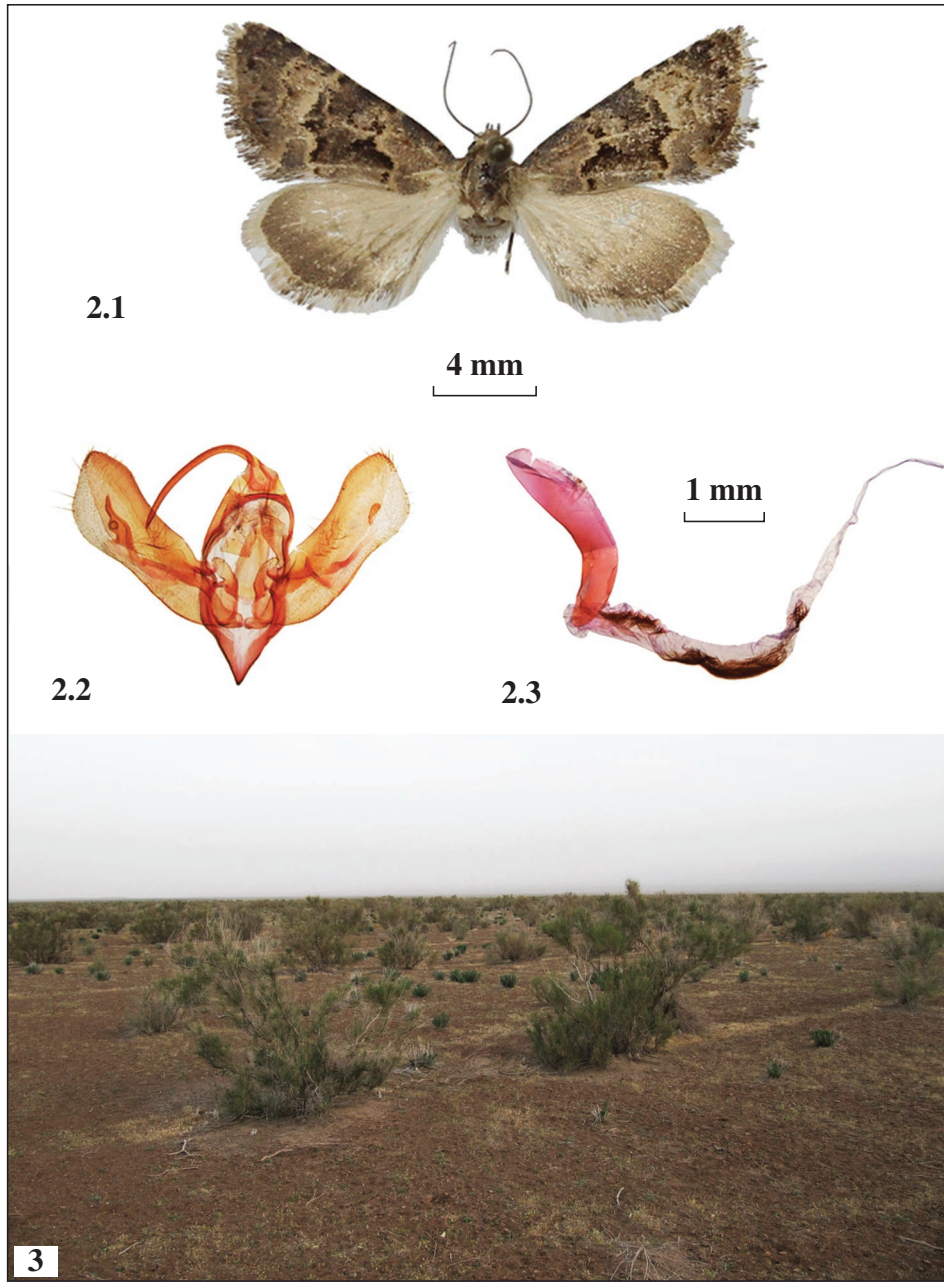

Figs. 2-3.– 2. Main morphological characters. **2.1.** Wing pattern of *D. kisilkumensis*, male; **2.2.** Andropigio, **2.3.** Aedeagus with everted vesica. **3.** Habitat of *D. kisilkumensis* in the Shirahmad wildlife refuge in NE Iran. Sparse bushes and shrubs including *Haloxylon, Peganum* and sagebrushes occur in this habitat at an altitude of 985 m.

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Trichura dixanthia (Hampson, 1898) first records from Colombia and Venezuela, South America, with notes on collecting and geographic distribution (Lepidoptera: Erebidae, Arctiinae)

F. Hernández-Baz, S.B. Muriel-Ruiz, R. Mattei, F. Romero M. & J. M. González

Abstract

This work provides the first records of *Trichura dixanthia* (Hampson, 1898) from Colombia and Venezuela, South America. Brief notes on collecting and the geographical distribution of the species is updated.
KEY WORDS: Lepidoptera, Erebidae, Arctiinae, biodiversity, wasp moths, Brazil, Colombia, Venezuela.

Trichura dixanthia **(Hampson, 1898) primer registro para Colombia y Venezuela, Sudamérica, con notas sobre su colecta y distribución geográfica (Lepidoptera: Erebidae, Arctiinae)**

Resumen

En este trabajo presentamos los primeros reportes de *Trichura dixanthia* (Hampson, 1898) en Colombia y Venezuela, Sudamérica. Se incluyen notas breves sobre colecta y se actualiza su distribución geográfica.
PALABRAS CLAVE: Lepidoptera, Erebidae, Arctiinae, biodiversidad, polillas avispa, Brasil, Colombia, Venezuela.

Introduction

Wasp-moths belonging to Ctenuchina (Erebidae: Arctiinae) are Neotropical in distribution. The group includes several nocturnal moths as well as many daylight flyers, which are sometimes captured at lights (HERNÁNDEZ-BAZ *et al*., 2014). Their resemblance to wasps allows for an easy recognition of the group (HERNÁNDEZ-BAZ, 2012). However, many species appear to be uncommon in nature, some have restricted geographical ranges and they are also infrequently collected, being rare in entomological collections (HERNÁNDEZ-BAZ *et al*., 2013).

A total of 110 wasp moths (Ctenuchina and Euchromiina) have been recorded from Colombia, as well as 130 from Venezuela within the database "Polilla" (HERNÁNDEZ-BAZ, 2012). Such a small number of recorded specimens/species should be considered unusual since both countries are known to be among the most biologically diverse in the world (DUARTE & VELHO, 2008; RODRÍGUEZ & ROJAS-SUÁREZ, 2008).

The genus *Trichura* Hübner, [1827], is very characteristic and easy to recognize because the entire group of species exhibit a tail-like appendage frequently called "hair" which is densely covered with scales (Fig. 1). Seventeen species are known from the Americas (DRAUDT, 1916), but only two have been previously recorded from Colombia [*Trichura esmeralda* (Walker, 1854) and *T. latifascia* (Walker

1854)] and from Venezuela [*T. esmeralda* and *T. cerberus* (Pallas, 1772)] within the data base "Polilla," based on the revision of several collections from both countries and worldwide (HERNÁNDEZ-BAZ, 2012). A third Colombian species, *Trichura viridis* was described based on two specimens (1 ♂, 1 ♀) and supposedly collected in Bogotá (GAEDE, 1926). *Trichura cerberus*, known also from Trinidad, *T. druryi* Hübner, [1819], and *T. esmeralda* have been also registered from Venezuela by a few authors (BEEBE & FLEMMING, 1951; HAMPSON, 1898; OSUNA, 2000; SANDOVAL et al., 2008). After examining the works of HAMPSON (1898), DRUCE (1898), and DRAUDT (1916), contacting some Lepidoptera researchers and Museums from Colombia and Venezuela, and comparing the specimens to material from several worldwide collections and photographs of type specimens, we can conclude that as far as we know, *T. dixanthia* (Hampson, 1898) (Fig. 1) is a new record for both countries, considerably enhancing the known geographic distribution of the species (Fig. 2).

Material examined

Trichura dixanthia (Hampson, 1898) (Fig. 1): 1 ♂, Colombia, Antioquia, Municipio San Jerónimo, Vereda Loma Hermosa, Granja J. J. González, 648 m, 20-XI-2010, Politécnico Colombiano "Jaime Isaza Cadavid", Col. F. Hernández-Baz, Collecting time: 10:00 hours, day-flight, N 9º 26' 58.51", W 75º 44' 24.64"; unknown sex, Colombia, Valle del Cauca, Cali, 1000 msnm, Abril 2011, Col. Vaclv Pacl (from photograph); 1 ♂, Venezuela, Barinitas, Barinas, 900 m, X-1988, al Rabo de Alacrán, Colls. F. Romero R. & F. Romero M., colección Familia Romero.

Comments on biology, behavior and distribution

This species was thought to be distributed in Southern Brazil, based on specimens collected in Minas Gerais (HAMPSON, 1898) and São Paulo (DRAUDT, 1918). The larvae of the species are unknown, and nothing is known on its life history. Adults have been located flying and perching on leaves inside the forest in the shade of trees in the undergrowth area. The examined specimen from Colombia (Fig. 1) was collected at 10:00 h on a sunny day. It was flying fast in a circular fashion for about 10 minutes before resting for some 30 seconds on a leaf on top of a bush. After this short rest, it repeated the cycle by flying for 10 more minutes, to rest again. Collectors from Venezuela and Colombia have known that species in the genus *Trichura* (*T. esmeralda*, *T. cerberus* & *T. dixanthia*) are frequently attracted to "rabo de alacrán" (heliotrope; *Heliotropium* spp.: Boraginaceae) (Fig. 4), just as happens with Ithomiini (Nymphalidae: Danainae). It is quite common to see 2 or 3 of these wasp-moths feeding on the bait, they arrive either early in the morning or late in the afternoon. Curiously enough, other wasp-moths from this and similar genera within the family might arrive in larger numbers if it is slightly raining or foggy.

One of the studied specimens from Colombia is held at the entomological collection "Museo Francisco Luis Gallego", Universidad Nacional de Colombia, Medellin, while the second one was photographed by J. Salazar and is part of the personal insect collection of Mr. Vaclv Pacl from Cali. The studied Venezuelan specimen is deposited at the Romero Family Collection, Maracay. This latter specimen was collected feeding on a *Heliotropium* spp. plant used as bait. *Trichura* spp. is easily recognized while flying since they do so in a "wasp-like" fashion making small circles until finally resting on a plant.

Even though they are easily recognized, *Trichura dixanthia*, as well as other species in the genus are frequently overlooked by collectors, making them uncommon in collections worldwide. After revising several collections from Colombia and Venezuela, only a few specimens have been found from both countries. However, these new records clearly suggest that the species is distributed in a wider area in South America than originally thought (Fig. 2).

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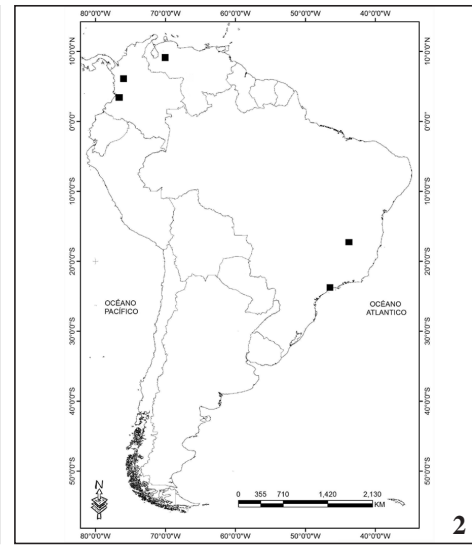

Figures 1-3.– 1. *Trichura dixanthia* (Hampson 1898), 1 ♂, Deposited at the Entomology Collection of Politécnico Colombiano Jaime Isaza Cadavid, Municipio San Jerónimo, Departamento de Antioquia, Colombia. (Picture: F. Hernández-Baz). **2.** Known distribution of *Trichura dixanthia* (Hampson 1898) in South America. **3.** Specimens of Ithomiini (Nymphalidae: Danainae) [*Hypoleria ocalea* (Doubleday & Hewitson, 1847) -left, bottom- and *Hypothyris fluonia* Hewitson, 1854 - center, left], *Agyrta dux* (Walker, 1854) (Arctiidae) (bottom, right) and *Trichura dixanthia* (Hampson, 1898) (top, left) are seen sucking on dry flowers of a *Heliotropium* sp. (Boraginaceae) plant used as bait. Villavicencio, Meta, Colombia (Picture: Gregory Nielsen).

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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).

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Contribución al conocimiento de los Geometridae Leach, 1815 del Parque Natural Cabo de Gata-Níjar (Almería, España) (Lepidoptera: Geometridae)

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

Resumen

La familia Geometridae está representada en el Parque Natural Cabo de Gata-Níjar (Almería, sureste de España) por 104 especies pertenecientes a las subfamilias Ennominae, Desmobathrinae, Geometrinae, Sterrhinae y Larentiinae. El corotipo atlanto-mediterráneo es ampliamente mayoritario (58,7%), incluyendo 8 endemismos ibéricos. Del total de especies, 20 son nuevas para la provincia de Almería y 48 para el territorio del parque natural y su entorno.
PALABRAS CLAVE: Lepidoptera, Geometridae, Parque Natural Cabo de Gata-Níjar, Almería, España.

Contribution to the knowledge of the Geometridae Leach, 1815 in the Cabo de Gata-Nijar (Almeria, Spain) Natural Park (Lepidoptera: Geometridae)

Abstract

The Geometridae fauna in the Cabo de Gata-Níjar (Almeria, southern Spain) Natural Park includes 104 species belonging to the subfamilies Ennominae, Desmobathrinae, Geometrinae, Sterrhinae and Larentiinae. The atlanto-mediterranean corotype is widely represented (58.7%), including 8 Iberian endemisms. The study contributes with twenty new records for Almeria province and forty-eight new records for the park and surrounding area.
KEY WORDS: Lepidoptera, Geometridae, Cabo de Gata-Nijar Natural Park, Almeria, Spain.

Introducción

El Parque Natural Cabo de Gata-Níjar es un área de especial interés entomológico debido a su situación geográfica en la península ibérica y por la proximidad con el norte de África, destacando sus excepcionales valores paisajísticos, geológicos y botánicos y sus particulares características climáticas que lo convierten en el punto más seco y cálido de Europa. Sin embargo, el conocimiento de su fauna lepidopterológica y de la familia Geometridae en particular, parece claramente insuficiente. El mayor volumen de capturas es aportado por KRAUS (1997, 1999), que cita 29 especies en unos muestreos realizados en primavera y otoño; otras resultan de las visitas esporádicas al parque realizadas por AGENJO (1952), LAJONQUIERE (1963), HACKMAN (1968), HACKER & WOLF (1982), MUÑOZ (1992) y ORTIZ *et al.* (2010) coincidiendo, como es habitual, con los meses más favorables del año. Además, otras citas se pueden consultar en obras de carácter general (HAUSSMAN, 2001, 2004; REDONDO *et al.,* 2009; HAUSMANN & VIIDALEPP, 2012).

El Parque Natural Cabo de Gata-Níjar está situado en el sureste de la península ibérica compartiendo parte de los municipios de Almería, Carboneras y Níjar. El área de estudio ocupa una superficie de 37.500 ha terrestres y está formado por cuatro unidades geomorfológicas: la sierra de Cabrera, la depresión de Níjar, la sierra de Cabo de Gata y la llanura litoral de la Bahía de Almería (Figura 1).

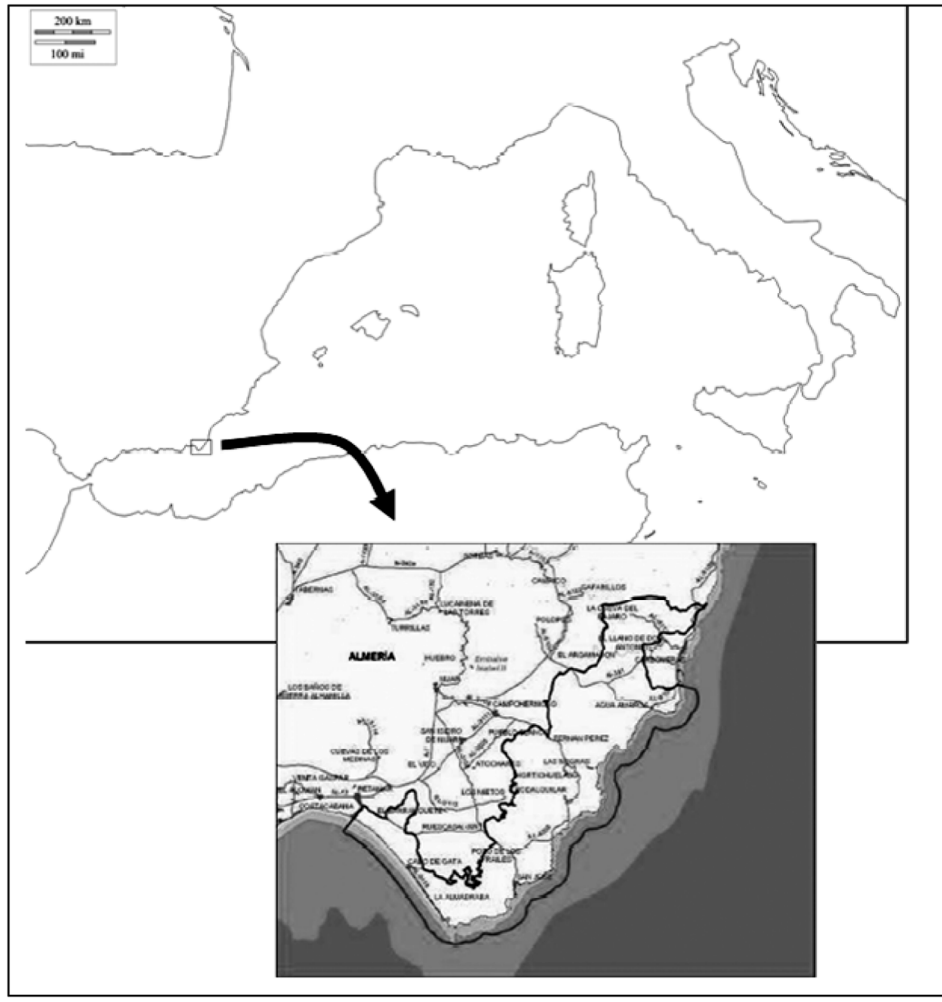

Figura 1.– Mapa de situación del Parque Natural Cabo de Gata-Níjar.

Geológicamente, este espacio natural forma parte del sector suroriental de la Cordillera Bética, limitando al norte con las estribaciones de la Sierra de Cabrera, que está formada por sustratos carbonatados y silicatados y cuya mayor altitud es La Serrata (562 m). Al este, y prolongándose como una franja litoral de relieve muy accidentado, se alza la sierra de Cabo de Gata y Carboneras,

constituida por rocas volcánicas ácidas y con el Cerro del Fraile (492 m) como mayor elevación. Al pie de estos macizos montañosos se han depositado los sedimentos cuaternarios de origen erosivo que rellenan las llanuras interiores (depresión de Níjar). Por otra parte, las llanuras litorales comprenden las playas, dunas y saladares, cuya mayor expresión se da al suroeste del territorio (dunas de Torregarcía, salinas de Cabo de Gata).

Bioclimáticamente, el área de estudio se define como xérico-oceánico, con temperaturas medias anuales entre 18 y 20º C y precipitaciones medias anuales entre 180 y 270 mm. Se puede distinguir el piso bioclimático inframediterráneo limitado a la estrecha franja terrestre más cercana al mar, y el piso termomediterráneo en el resto del territorio. Los ombrotipos presentes son el árido y el semiárido.

Biogeográficamente, el Parque Natural se encuadra en la provincia corológica Murciano-Almeriense, sector Almeriense y subsector Caridemo (PEINADO *et al*., 1992). Las series climatófilas reconocidas en el área de estudio son la serie del cornical (*Mayteno europaei-Periploco angustifoliae* S.), extendida en los pisos infra y termomediterráno inferior, con ombrotipos árido y semiárido y localizada en solanas abruptas, donde se ve favorecida por el efecto amortiguador de los vientos marinos húmedos. Cuando se incrementa la continentalidad y la aridez, aquella es sustituida por la serie termomediterránea superior, semiárida del lentisco (*Chamaeropo humilis-Rhamno lycioidis* S.). En las zonas llanas y sobre materiales sedimentarios se presenta la serie infra-termomediterránea, árido-semiárida del azufaifo (*Zizipho loti* S.). En la actualidad, la mayor parte de la superficie que podrían ocupar las comunidades climácicas está colonizada por sus etapas seriales (retamares, espartales, tomillares, matorrales nitrófilos, etc.) y por cultivos de secano o regadío.

En aquellos ambientes donde las características edáficas o microtopográficas son condicionantes, se presentan diversas comunidades permanentes como los retamares edafoxerófilos, que colonizan amplias extensiones de roquedos y pedregales en áreas montañosas, al contrario que las comunidades temporihigrófilas que prosperan muy discretamente en los cauces fluviales secos y ramblas que surcan el territorio. En las llanuras litorales, ya sea por efecto de la arena, la maresía y el viento, o de la salinidad y humedad del suelo, se reconocen las geopermaseries de playas y dunas litorales (psammófilas) y de saladares (halófilas), respectivamente.

El objetivo de este trabajo es ofrecer un catálogo sistemático de las especies de la familia Geometridae presentes en el Parque Natural Cabo de Gata-Níjar, realizar su análisis biogeográfico y fenológico y destacar las especies más interesantes.

Material y métodos

Se presentan los resultados de los 54 muestreos nocturnos realizados en varias localidades del Parque Natural Cabo de Gata-Níjar, a los que se suma la localidad limítrofe de la Rambla de la Granatilla, durante el período comprendido entre la segunda quincena de mayo de 2012 y la primera quincena de mayo de 2014. Además, se han considerado algunos otros muestreos esporádicos efectuados en años anteriores en parajes colindantes del municipio de Mojácar. La totalidad de las localidades estudiadas se ordenan por municipios en la Tabla 1, aunque los muestreos periódicos se han realizado en las nueve primeras. Estas localidades tienen las siguientes características:

Estaciones 1-3. Se localizan en el ámbito de los arenales y saladares litorales, colonizados por una flora con apetencias ecológicas estrictas y adaptadas a medios muy especializados. Estaciones 4-6. Se ubican en el dominio de la serie fitosociológica del cornical, encontrándose la comunidad cabeza de serie, en general, muy bien conservada y con una alta diversidad florística. Estaciones 7-8. Se sitúan en el dominio de la serie del lentisco, representada principalmente por sus etapas seriales (espartales y tomillares). Estación 9. Se halla en el entorno de los retamares edafoxerófilos.

Los muestreos se han realizado utilizando trampas de luz negra y actínica de 6 vatios (tipo Heath).

Tabla 1.– Relación de las localidades muestreadas.

Nº	Localidad	Municipio	Altitud (m.s.n.m.)	U.T.M.
1	Salinas de Cabo de Gata	Almería	3	30SWF66
2	Rambla de Morales	Almería	3	30SWF67
3	Playa del Charco	Almería	3	30SWF67
4	Río Alías	Carboneras	8	30SWF99
5	El Saladero	Carboneras	25	30SWF99
6	El Algarrobico	Carboneras	35	30SWF99
7	Cañada del Madroñal	Níjar	190	30SWF87
8	Cerro de la Cruz	Níjar	220	30SWF87
9	Rambla de la Granatilla	Mojácar	90	30SWG90
10	Rambla de Macenas	Mojácar	120	30SWG90
11	Rambla de Alfaix	Mojácar	70	30SXG00
12	El Pueblo Indalo	Mojácar	15	30SXG00

La relación de especies estudiadas se puede consultar en el Apéndice, ordenadas sistemáticamente e indicando, para cada taxón, la toponimia distintiva, fecha de captura u observación, número de ejemplares, corotipo, fenología y referencias bibliográficas. Las especies que se citan por vez primera para la provincia de Almería están marcadas con un asterisco (*) y con dos asteriscos (**) para el P.N. Cabo de Gata-Níjar. Asimismo, se indica el período de vuelo (en meses y numeración romana) que se ha confirmado en base a las capturas, observaciones y referencias bibliográficas específicas. En lo que respecta a las citas bibliográficas, se han seleccionado aquellas referidas expresamente al ámbito del parque natural, aunque también se han tenido en consideración algunas localidades limítrofes (Sierra de Cabrera, Retamar y El Alquián).

La nomenclatura y la ordenación de los taxones en sus correspondientes categorías taxonómicas se han hecho de acuerdo con la propuesta de Fauna Europaea (2013) y REDONDO *et al.* (2009). Los datos biogeográficos y fenológicos se han obtenido mayoritariamente de las principales obras de carácter generalista (HAUSMAN, 2001, 2004; MIRONOV, 2003; ROBINEAU, 2007; REDONDO *et al.,* 2009, LERAUT, 2009; HAUSMANN & VIIDALEPP, 2012).

Resultados y discusión

La fauna de Geometridae del Parque Natural Cabo de Gata-Níjar está compuesta, hasta el momento, por 104 especies, distribuidas en las subfamilias Ennominae (27 especies), Desmobathrinae (1), Geometrinae (7), Sterrhinae (39) y Larentiinae (30). De éstas, 20 son nuevas para la provincia de Almería y 48 lo son para el territorio del Parque Natural y su entorno más inmediato.

Biogeográficamente, la influencia mediterránea, sumando los endemismos, es ampliamente mayoritaria (83,7%), en correspondencia con la posición geográfica del área de estudio en el continente europeo, destacando los elementos atlanto-mediterráneos (51%) sobre los asiático-mediterráneos (25,0%) (Tabla 2). Los taxones endémicos de la península ibérica representan el 7,7% del total con 8 especies. El importantísimo número de especies que se distribuyen exclusivamente por Europa occidental y el noroeste de África, evidencia la condición de este espacio protegido como refugio para una fauna que vive en un área geográfica reducida. Entre los elementos de amplia distribución destacan ligeramente los euroasiáticos (7,7%).

En la subfamilia Ennominae destacan los endemismos *Menophra annegreteae* Skou, 2007, descrita de Almería, *Sardocyrnia fortunaria* (Vázquez, 1905) y *Charissa assoi* (Redondo & Gastón, 1997). Esta última especie vive en una hábitat diferenciado geográfica, climática y ecológicamente de las localidades en las que anteriormente se conocía su presencia (GARRE *et al.,*

2013). Entre las especies de esta subfamilia, la captura de la especie ibero-magrebí *Lhommeia biskraria* (Oberthür, 1885) confirma su presencia en el sureste de la península ibérica junto con las citas en las localidades almerienses de La Garrofa (REDONDO *et al*., 2009) y El Alquián (MAGRO, 2013).

Tabla 2.– Distribución de las especies de Geometridae en las diferentes categorías biogeográficas o corotipos en el Parque Natural Cabo de Gata-Níjar.

Corotipo	**nº especies**	**%**	**% clases principales**
Paleártico	3	2,9%	16,3%
Euroasiático	8	7,7%	
Cosmopolita	3	2,9%	
Tropical	3	2,9%	
Atlanto-mediterráneo	53	51,0%	76,0%
Asiático-mediterráneo	26	25,0%	
Endémico	8	7,7%	7,7%
TOTAL	**104**	**100,0%**	**100,0%**

La subfamilia Desmobathrinae está representada por *Myinodes interpunctaria* (Herrich-Schäffer, 1939), especie escasamente citada en la mitad sur peninsular (REDONDO *et al*., 2009).

La subfamilia Geometrinae incluye el elemento paleotropical *Pingasa lahayei* (Oberthür, 1887), solamente conocido en Europa de las localidades almerienses de Cabo de Gata (VALLHONRAT, 1980; KRAUS, 1997, 1999) y Villaricos (REDONDO *et al*., 2009).

En la subfamilia Sterrhinae destaca la presencia de cinco especies endémicas: *Idaea alicantaria* (Reisser, 1963), *I. urcinata* (Agenjo, 1952), solamente conocida de Almería, *I. lutulentaria* (Staudinger, 1892), *I. deitanaria* Reisser & Weisert, 1977 y *Brachyglossina hispanaria* (Püngeler, 1913). La presencia de las especies simpátricas y sincrónicas *Idaea alyssumata* (Millière, 1871) e *I. urcinata,* implica el estudio de sus genitalias para evitar errores de identificación, aunque el color más claro del fondo de las alas y los puntos discales más contrastados en *I. urcinata* son caracteres muy constantes y útiles para diferenciar ambas especies (HAUSSMAN, 2004). Otros taxones interesantes que tienen una distribución típicamente meridional en la Península Ibérica son *Idaea attenuaria* (Rambur, 1833), *I. rainerii* Hausmann, 1994, *I. blaesii* Lenz & Hausmann, 1992, *I. fractilineata* (Zeller, 1847) y *Oar reaumuraria* (Millière, 1864) (REDONDO *et al.,* 2009).

La familia Larentiinae tiene entre sus representantes más destacados a *Epirrhoe sandosaria* (Herrich-Schäffer, 1852), *Larentia malvata* (Rambur, 1833), *Horisme scorteata* (Staudinger, 1901), *Eupithecia orana* Dietze, 1910 y *E. unitaria* Herrich-Schäffer, 1851. Un caso singular sería la captura de un ejemplar de *Epirrita dilutata* ([Denis & Schiffermüller], 1775) de la que se tienen escasos datos en la mitad sur peninsular (REDONDO *et al*., 2009; HAUSMANN & VIIDALEPP, 2012). La especie se capturó en un hábitat extremadamente xerofítico, cálido y prácticamente desprovisto de arbolado que contrasta con sus requerimientos mesófilos y silvícolas (REDONDO *et al*., 2009; HAUSMANN & VIIDALEPP, 2012). En cuanto a la posible planta nutricia de la oruga, de acuerdo con HAUSMANN & VIIDALEPP (2012), solamente se ha constatado la presencia, a relativa distancia, de algunos bosquetes autóctonos de álamo blanco (*Populus alba*).

Fenológicamente, la abundancia relativa de especies durante todos los meses del año varía entre 26 y 54 especies y parece estar relacionada con las condiciones climáticas anuales del área de estudio, ya que los inviernos son muy suaves y similares a la primavera de latitudes superiores. De esta manera, el mayor número de especies se concentra en primavera y otoño, con su máximo en abril y octubre, disminuyendo moderadamente durante los meses más fríos desde diciembre a febrero y en la diapausa estival, debido a las condiciones de aridez extrema y a un agostamiento generalizado de la vegetación (Figura 2). Al margen de la subfamilia Desmobathrinae, que solo cuenta con un único representante de vuelo invernal, las subfamilias Ennominae y Larentiinae se

ajustan al esquema fenológico general, mientras que las subfamilias Geometrinae y Sterrhinae desplazan sus máximos en el final de la primavera y al comienzo del verano.

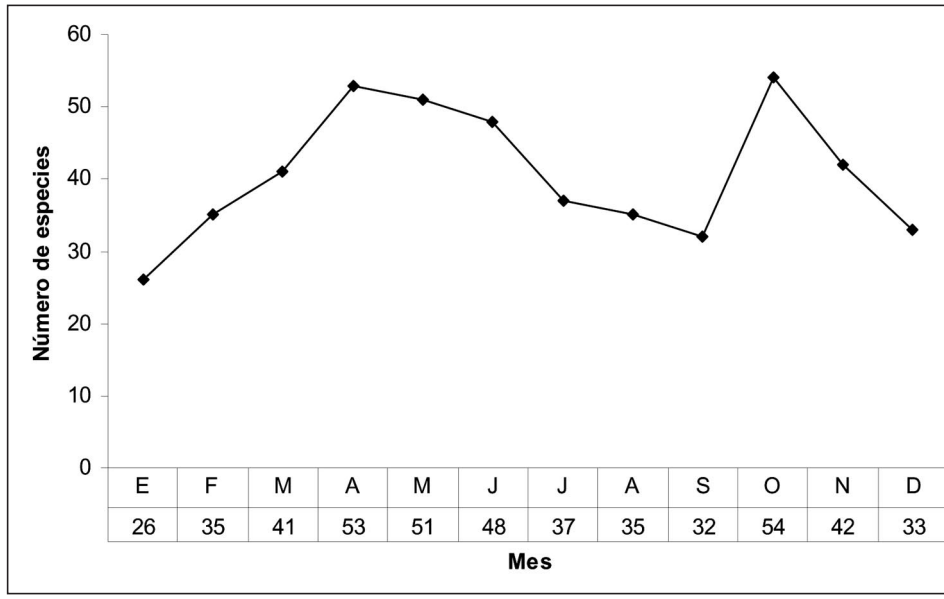

Figura 2.– Esquema fenológico de las especies de geométridos en el Parque Natural Cabo de Gata-Níjar entre mayo de 2012 y mayo de 2014.

Tabla 3.– Distribución de las especies de Geometridae, en número de especies y sus respectivos porcentajes, según sus ciclos vitales en el Parque Natural Cabo de Gata-Níjar.

Subfamilia	Univoltinas		Bivoltinas		Polivoltinas	
Ennominae (27)	9	8,7%	9	8,7%	9	8,7%
Desmobathrinae (1)	1	1,0%	0	0,0%	0	0,0%
Geometrinae (7)	0	0,0%	4	3,8%	3	2,9%
Sterrhinae (39)	11	10,6%	13	12,5%	15	14,4%
Larentiinae (30)	13	12,5%	11	10,6%	6	5,8%
TOTAL (104)	**34**	**32,7%**	**37**	**35,6%**	**33**	**31,7%**

En relación al ciclo vital, las especies univoltinas suponen el 32,7% del total, las bivoltinas el 35,6% y las polivoltinas el 31,7% (Tabla 3), lo que parece estar relacionado con las condiciones climáticas y la disponibilidad de alimento durante la mayor parte del año, que permite a las especies reproducirse en sucesivas generaciones.

La fenología de los imagos confirmada en este territorio parece coincidir con la información extraída de las fuentes bibliográficas, muy especialmente en el caso de las especies univoltinas. Sin embargo, el período de vuelo en las especies bivoltinas y polivoltinas se mantiene en muchos casos sin interrupciones, solapándose las sucesivas generaciones. En tales circunstancias, se ha renunciado a delimitar los intervalos generacionales y se ha optado por indicar el periodo de vuelo completo en el Apéndice.

En el caso de los taxones que son, aparentemente, muy escasos en el territorio y de los cuales se cuenta con muy pocos registros parece que su período de vuelo no tiene que coincidir necesariamente con el observado.

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APÉNDICE

Familia Geometridae Leach, 1815
Subfamilia Ennominae Duponchel, 1845

Chiasmia aestimaria (Hübner, [1809])
Material estudiado: El Pueblo Indalo, 7-IV-2010, 1 ♂; 25-IV-2011, 1 ♂; 27-IV-2011, 1 ♂; Rambla de Morales, 22-IV-2014, 1 ♂.
Citas bibliográficas: KRAUS (1999).
Elemento asiático-mediterráneo. Bivoltina. Imagos: IV-V.

****Narraga nelvae*** (Rothschild, 1912)
Material estudiado: Rambla de la Granatilla, 17-VI-2012, 1 ♂; El Algarrobico, 10-III-2013, 1 ♂.
Elemento atlanto-mediterráneo. Bivoltina. Imagos: II-X.

Isturgia miniosaria (Duponchel, 1829)
Material estudiado: El Saladero, 2-XI-2012, 1 ♂; 22-XI-2012, 1 ♂; El Algarrobico, 16-XII-2013, 1 ♂.
Citas bibliográficas: KRAUS (1997, 1999).
Elemento atlanto-mediterráneo. Univoltina. Imagos: IX-XII.

Itame vincularia (Hübner, [1813])
Material estudiado: El Saladero, 6-VIII-2012, 1 ♀.
Citas bibliográficas: HACKER & WOLF (1982); KRAUS (1997, 1999).
Elemento atlanto-mediterráneo. Bivoltina. Imagos: I-XI.

Acanthovalva inconspicuaria (Hübner, [1819])
Material estudiado: Rambla de la Granatilla, 8-VI-2009, 1 ♂, 1 ♀; El Saladero, 31-VII-2012, 1 ♂.
Citas bibliográficas: KRAUS (1997, 1999).
Elemento tropical. Polivoltina. Imagos: I-XII.

Isturgia catalaunaria (Guenée, 1858)
Material estudiado: El Saladero, 31-VII-2012, 1 ♂; 8-VIII-2012, 1 ♂.
Citas bibliográficas: HACKER & WOLF (1982); KRAUS (1999).
Elemento tropical. Polivoltina. Imagos: I-XII.

Rhoptria asperaria (Hübner, [1817])
Material estudiado: El Saladero, 17-X-2012, 1 ♀; 4-II-2013, 1 ♂.
Citas bibliográficas: KRAUS (1999).
Elemento atlanto-mediterráneo. Bivoltina. Imagos: II-IV, VIII-XII.

****Petrophora narbonea*** (Linnaeus, 1767)
Material estudiado: Rambla de la Granatilla, 21-III-2010, 1 ♂; El Saladero, 17-X-2012, 1 ♂; Playa del Charco, 8-XII-2013, 1 ♂; Cerro de la Cruz, 16-II-2014, 1 ♂.
Elemento atlanto-mediterráneo. Bivoltina. Imagos: I-VI, IX-XII.

Petrophora convergata (Villers, 1789)
Material estudiado: El Algarrobico, 7-X-2012, 1 ♂.
Citas bibliográficas: MAGRO (2013).
Elemento atlanto-mediterráneo. Univoltina. Imagos: X-XII.

Toulgoetia cauteriata (Staudinger, 1859)

Material estudiado: El Algarrobico, 17-II-2013, 1 ♀; El Saladero, 16-III-2013, 1 ♂.

Citas bibliográficas: KRAUS (1999).

Elemento atlanto-mediterráneo. Univoltina. Imagos: II-III.

**Chemerina caliginearia* (Rambur, 1833)

Material estudiado: El Algarrobico, 22-XI-2012, 1 ♂; El Saladero, 22-XI-2012, 1 ♂.

Elemento atlanto-mediterráneo. Univoltina. Imagos: XI-III.

***Menophra abruptaria* (Thunberg, 1792)

Material estudiado: Rambla de la Granatilla, 21-III-2010, 1 ♂; El Saladero, 7-VIII-2012, 1 ♂; 17-X-2012, 1 ♂; 23-XII-2012, 3 ♂♂; 3-II-2014, 1 ♂; El Algarrobico, 22-XI-2012, 1 ♂; 9-XII-2012, 1 ♂; 23-XII-2012, 1 ♂; 2-IV-2013, 1 ♀.

Elemento asiático-mediterráneo. Polivoltina. Imagos: I-VIII, X-XII.

Menophra japygiaria (Costa, 1849)

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♂; 18-VIII-2010, 1 ♂; El Algarrobico, 3-VIII-2012, 1 ♂; El Saladero, 16-III-2013, 1 ♂.

Citas bibliográficas: KRAUS (1997, 1999); MAGRO (2013).

Elemento asiático-mediterráneo. Polivoltina. Imagos: I, III-IV, VI-VIII, X-XII.

Menophra annegreteae Skou, 2007

Material estudiado: El Saladero, 1-VII-2012, 1 ♂; 9-XII-2012, 1 ♂.

Citas bibliográficas: KRAUS (1999) como *Menophra undulosa* (Albers & Warnecke, 1941); SKOU (2007); REDONDO *et al.* (2009).

Elemento endémico. Polivoltina. Imagos: III, V-VII, X-XII.

Phaselia algiricaria Oberthür, 1913

Material estudiado: Rambla de la Granatilla, 6-IV-2010, 1 ♂; El Saladero, 3-VI-2012, 1 ♂; 15-VII-2012, 1 ♂; 7-VIII-2012, 1 ♂; Río Alías, 19-V-2013, 1 ♂; Cerro de la Cruz, 17-IV-2014, 1 ♂.

Citas bibliográficas: ORTÍZ *et al.* (2010).

Elemento atlanto-mediterráneo. Bivoltina. Imagos: III-X.

**Calamodes occitanaria* (Duponchel, 1829)

Material estudiado: El Algarrobico, 2-XI-2012, 1 ♀; Playa del Charco, 8-XII-2013, 1 ♀.

Elemento atlanto-mediterráneo. Univoltina. Imagos: X-XII.

Sardocyrnia fortunaria (Vázquez, 1905)

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♂; 23-VIII-2010, 1 ♂; 26-IV-2011, 1 ♂; El Algarrobico, 27-I-2013, 1 ♂; Playa del Charco, 24-III-2014, 1 ♂.

Citas bibliográficas: KRAUS (1997, 1999) como *Sardocyrnia bastelicaria* (Bellier, 1862).

Elemento endémico. Polivoltina. Imagos: I-VI, VIII-X, XII.

**Selidosema taeniolaria* (Hübner, [1813])

Material estudiado: El Algarrobico, 10-IX-2012, 1 ♂; 24-IX-2012, 1 ♀.

Elemento atlanto-mediterráneo. Univoltina. Imagos: VIII-X.

**Tephronia codetaria* (Oberthür, 1881)

Material estudiado: Salinas de Cabo de Gata, 10-V-2013, 2 ♂♂; Rambla de Morales, 19-X-2013, 1 ♂; 2-V-2014, 1 ♂.

Elemento atlanto-mediterráneo. Bivoltina. Imagos: V, X.

Lhommeia biskraria (Oberthür, 1885)
Material estudiado: Playa del Charco, 19-X-2013, 1 ♂.
Citas bibliográficas: MAGRO (2013).
Elemento atlanto-mediterráneo. Polivoltina. Imagos: X.

****Gnophos perspersata*** Treitschke, 1827
Material estudiado: Rambla de la Granatilla, 20-V-2012, 1 ♂.
Elemento atlanto-mediterráneo. Univoltina. Imagos: IV-VII.

Charissa mucidaria (Hübner, [1799])
Material estudiado: El Saladero, 22-XI-2012, 1 ♀; Cerro de la Cruz, 16-II-2014, 1 ♂.
Citas bibliográficas: HACKER & WOLF (1982).
Elemento atlanto-mediterráneo. Polivoltina. Imagos: I-V, IX-XII.

Charissa assoi (Redondo & Gastón, 1997)
Citas bibliográficas: GARRE *et al.* (2013).
Elemento endémico. Polivoltina. Imagos: VI, XI.

Aspitates ochrearia (Rossi, 1794)
Material estudiado: Rambla de la Granatilla, 7-X-2012, 1 ♂; Río Alías, 17-II-2013, 1 ♂.
Citas bibliográficas: HACKMAN (1968).
Elemento euroasiático. Bivoltina. Imagos: II-IV, X.

Dyscia penulataria (Hübner, [1819])
Material estudiado: El Saladero, 31-VII-2012, 1 ♂.
Citas bibliográficas: KRAUS (1997).
Elemento atlanto-mediterráneo. Bivoltina. Imagos: I-XII.

Onychora agaritharia (Dardoin, 1842)
Material estudiado: El Algarrobico, 24-IX-2012, 1 ♂; 17-X-2012, 1 ♂; Río Alías, 1-IX-2013, 1 ♂.
Citas bibliográficas: KRAUS (1999).
Elemento atlanto-mediterráneo. Univoltina. Imagos: IX-XI.

Compsoptera opacaria (Hübner, [1819])
Material estudiado: El Saladero, 7-X-2012, 2 ♀♀; 1-XI-2013, 1 ♀.
Elemento atlanto-mediterráneo. Univoltina. Imagos: X-XI.

Subfamilia Desmobathrinae Meyrick, 1886

****Myinodes interpunctaria*** (Herrich-Schäffer, 1839)
Material estudiado: El Saladero, 4-II-2013, 1 ♂; 16-III-2013, 2 ♂♂; Río Alías, 17-II-2013, 1 ♂; Cañada del Madroñal, 16-II-2014, 3 ♂♂; 17-III-2014, 1 ♀.
Elemento atlanto-mediterráneo. Univoltina. Imagos: II-III.

Subfamilia Geometrinae Stephens, 1829

Pingasa lahayei (Oberthür, 1887)
Citas bibliográficas: VALLHONRAT (1980); KRAUS (1997, 1999).
Elemento tropical. Bivoltina. Imagos: V, VIII.

Pseudoterpna coronillaria (Hübner, [1817])
Citas bibliográficas: ORTÍZ *et al.* (2010).
Elemento asiático-mediterráneo. Bivoltina. Imagos: V-VI, X.

Thetidia plusiaria Boisduval, 1840
Material estudiado: El Algarrobico, 19-V-2013, 1 ♂; Rambla de Morales, 2-V-2014, 1 ♀.
Citas bibliográficas: AGENJO (1964).
Elemento atlanto-mediterráneo. Bivoltina. Imagos: IV-XI.

****Kuchleria insignata*** Hausmann, 1994
Material estudiado: Rambla de la Granatilla, 16-VIII-2010, 1 ♂; El Saladero, 17-VI-2012, 1 ♂; 2-IV-2013, 1 ♂; El Algarrobico, 20-XI-2013, 1 ♀.
Elemento atlanto-mediterráneo. Polivoltina. Imagos: III-XI.

Phaiogramma etruscaria (Zeller, 1849)
Material estudiado: Rambla de la Granatilla, 16-VIII-2010, 1 ♂; 19-VIII-2010, 1 ♀; El Algarrobico, 10-IX-2012, 1 ♂.
Citas bibliográficas: HACKER & WOLF (1982) como *Chlorissa pulmentaria* (Guenée, 1857); MUÑOZ (1992).
Elemento asiático-mediterráneo. Bivoltina. Imagos: IV-IX.

****Phaiogramma faustinata*** (Millière, 1868)
Material estudiado: El Saladero, 3-VI-2012, 1 ♂; 17-VI-2012, 1 ♂; 17-II-2013, 1 ♂.
Elemento asiático-mediterráneo. Polivoltina. Imagos: II-IX, XI.

Microloxia herbaria (Hübner, [1813])
Material estudiado: Rambla de la Granatilla, 20-VIII-2010, 1 ♀; El Saladero, 1-VII-2012, 1 ♀.
Citas bibliográficas: AGENJO (1952).
Elemento asiático-mediterráneo. Polivoltina. Imagos: IV-VIII, X.

Subfamilia Sterrhinae Meyrick, 1892

Idaea mediaria (Hübner, [1819])
Material estudiado: El Saladero, 23-VI-2013, 1 ♂.
Citas bibliográficas: ORTÍZ *et al.* (2010).
Elemento atlanto-mediterráneo. Univoltina. Imagos: IV-VII.

Idaea ochrata (Scopoli, 1763)
Material estudiado: El Algarrobico, 3-VI-2012, 1 ♂.
Elemento asiático-mediterráneo. Univoltina. Imagos: IV-VI.

Idaea alicantaria (Reisser, 1963)
Material estudiado: El Algarrobico, 3-VIII-2012, 1 ♀; Rambla de Morales, 10-V-2013, 1 ♀; 22-IV-2014, 1 ♀; Río Alías, 19-V-2013, 1 ♂.
Citas bibliográficas: KRAUS (1999); HAUSMANN (2004).
Elemento endémico. Bivoltina. Imagos: IV-VI, VIII-X.

Idaea mustelata (Gumppenberg, 1892)
Citas bibliográficas: ORTÍZ *et al.* (2010).
Elemento atlanto-mediterráneo. Bivoltina. Imagos: VI-VII, X.

Idaea attenuaria (Rambur, 1933)

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 1 ♂, 1 ♀; 24-IX-2012, 1 ♂; El Algarrobico, 2-IV-2013, 1 ♂; 5-X-2013, 1 ♀; El Saladero, 8-V-2014, 1 ♂. KRAUS (1999) menciona la especie *Idaea incalcarata* (Chrétien, 1913) con la misma fecha de captura que, con anterioridad (Kraus, 1997), lo hace para *I. attenuaria*, aparentemente, corrigiendo esta última cita. Considerando que *I. attenuaria* está más vinculada a hábitats costeros (HAUSMANN, 2004) y es la única que se ha capturado en este estudio, parece más razonable mantener la referencia a este taxón.

Citas bibliográficas: KRAUS (1997, 1999).

Elemento atlanto-mediterráneo. Bivoltina. Imagos: III-V, IX-XI.

***Idaea alyssumata* (Millière, 1871)

Material estudiado: Rambla de la Granatilla, 23-VIII-2010, 1 ♀; El Saladero, 3-VIII-2012, 1 ♂; El Algarrobico, 16-IX-2013, 1 ♀.

Elemento atlanto-mediterráneo. Bivoltina. Imagos: VIII-IX.

***Idaea urcinata* (Agenjo, 1952)

Material estudiado: Rambla de la Granatilla, 20-VIII-2010, 1 ♀; 20-V-2012, 1 ♂; 17-VI-2012, 1 ♀; Río Alías, 1-IX-2013, 1 ♀.

Elemento endémico. Bivoltina. Imagos: V-VI, VIII-IX.

***Idaea rainerii* Hausmann, 1994

Material estudiado: Rambla de la Granatilla, 18-VIII-2010, 1 ♂; 19-VIII-2010, 1 ♂; 21-VIII-2010, 1 ♀; 23-VIII-2010, 1 ♂; Río Alías, 19-V-2013, 1 ♂, 1 ♀.

Elemento atlanto-mediterráneo. Bivoltina. Imagos: V-VI, VIII-IX.

Idaea calunetaria (Staudinger, 1859)

Citas bibliográficas: HACKER & WOLF (1982).

Elemento atlanto-mediterráneo. Bivoltina. Imagos: IX.

***Idaea belemiata* (Millière, 1868)

Material estudiado: El Algarrobico, 31-VII-2012, 1 ♀; 1-VIII-2012, 1 ♂, 2 ♀♀; 3-VIII-2012, 1 ♀.

Elemento atlanto-mediterráneo. Univoltina. Imagos: VII-VIII.

Idaea elongaria (Rambur, 1833)

Material estudiado: El Algarrobico, 15-VIII-2012, 1 ♂; El Saladero, 3-VIII-2012, 1 ♂.

Citas bibliográficas: HACKER & WOLF (1982); KRAUS (1997, 1999).

Elemento asiático-mediterráneo. Bivoltina. Imagos: V-IX.

***Idaea obsoletaria* (Rambur, 1833)

Material estudiado: El Saladero, 17-VI-2012, 1 ♀; 15-VII-2012, 1 ♀.

Elemento asiático-mediterráneo. Univoltina. Imagos: VI-VIII.

Idaea blaesii Lenz & Hausmann, 1992

Citas bibliográficas: HAUSMANN (2004); REDONDO *et al.* (2009, 2010).

Elemento atlanto-mediterráneo. Bivoltina.

Idaea lutulentaria (Staudinger, 1892)

Citas bibliográficas: ORTÍZ *et al.* (2010).

Elemento endémico. Univoltina. Imagos: VI.

Idaea longaria (Herrich-Schäffer, 1852)

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♂; 21-III-2010, 1 ♂; 6-IV-2010, 1 ♂; El Algarrobico, 31-VII-2012, 1 ♂; 17-X-2012, 1 ♂; El Saladero, 2-XI-2012, 1 ♂.

Citas bibliográficas: MUÑOZ (1992).

Elemento asiático-mediterráneo. Polivoltina. Imagos: I-XII.

Idaea minuscularia (Ribbe, 1912)

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♂; 21-III-2010, 2 ♂♂; 6-IV-2010, 1 ♀; 17-VIII-2010, 1 ♂; El Algarrobico, 3-VII-2012, 1 ♂; El Saladero, 22-XI-2012, 1 ♂; 9-XII-2012, 1 ♀.

Citas bibliográficas: MUÑOZ (1992) como *Idaea herbuloti* Agenjo, 1952; KRAUS (1999).

Elemento atlanto-mediterráneo. Polivoltina. Imagos: I-VIII, X-XII.

Idaea carvalhoi Herbulot, 1979

Material estudiado: Rambla de la Granatilla, 9-VI-2009, 1 ♂; El Saladero, 1-VII-2012, 1 ♀; 3-VIII-2012, 2 ♀♀; 1-VI-2013, 1 ♀; El Algarrobico, 6-VIII-2012, 2 ♂♂; 10-IX-2012, 1 ♂.

Citas bibliográficas: KRAUS (1999).

Elemento atlanto-mediterráneo. Univoltina. Imagos: V-X.

Idaea subsericeata (Haworth, 1809)

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 2 ♂♂; El Algarrobico, 10-III-2013, 1 ♂; El Saladero, 2-IV-2013, 1 ♂.

Citas bibliográficas: ORTÍZ *et al.* (2010).

Elemento euroasiático. Bivoltina. Imagos: III-VI, VIII.

***Idaea fractilineata* (Zeller, 1847)

Material estudiado: Rambla de la Granatilla, 9-VI-2009, 1 ♂; 18-VIII-2010, 1 ♂; El Algarrobico, 24-IX-2012, 2 ♂♂; Salinas de Cabo de Gata, 10-V-2013, 1 ♀; Río Alías, 19-V-2013, 2 ♀♀; 1-VI-2013, 1 ♀; 8-V-2014, 1 ♂; Rambla de Morales, 2-V-2014, 1 ♀.

Elemento atlanto-mediterráneo. Polivoltina. Imagos: V-IX.

Idaea cervantaria (Millière, 1869)

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♂; 21-III-2010, 1 ♀; El Saladero, 1-VII-2012, 1 ♂; 9-XII-2012, 1 ♀; 8-I-2013, 1 ♀.

Citas bibliográficas: HACKER & WOLF (1982).

Elemento atlanto-mediterráneo. Polivoltina. Imagos: I-VI, IX-XII.

***Idaea deitanaria* Reisser & Weisert, 1977

Material estudiado: Rambla de la Granatilla, 27-IV-2011, 1 ♂; 11-IV-2012, 2 ♂♂; El Saladero, 1-VII-2012, 2 ♂♂; 6-IV-2014, 1 ♂; El Algarrobico, 31-VII-2012, 1 ♀; 2-IV-2013, 1 ♂.

Elemento endémico. Bivoltina. Imagos: IV-XI.

**Idaea infirmaria* (Rambur, 1833)

Material estudiado: El Saladero, 17-VI-2012, 1 ♀; 15-VII-2012, 1 ♂.

Elemento atlanto-mediterráneo. Univoltina. Imagos: VI-IX.

Idaea ostrinaria (Hübner, [1813])

Material estudiado: Río Alías, 16-IV-2013, 1 ♂.

Citas bibliográficas: ORTÍZ *et al.* (2010).

Elemento asiático-mediterráneo. Univoltina. Imagos: IV-VI.

Idaea eugeniata (Dardoin & Millière, 1870)

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♂; 21-VIII-2010, 1 ♀; El Saladero, 17-X-2012, 1 ♂; 16-III-2013, 1 ♂; 2-IV-2013, 1 ♀.

Citas bibliográficas: HACKER & WOLF (1982).

Elemento atlanto-mediterráneo. Polivoltina. Imagos: III-X.

**Idaea degeneraria* (Hübner, [1799])

Material estudiado: El Algarrobico, 6-IV-2014, 1 ♀.

Elemento asiático-mediterráneo. Polivoltina. Imagos: IV.

Brachyglossina hispanaria (Püngeler, 1913)

Material estudiado: Rambla de la Granatilla, 18-VIII-2010, 1 ♂; El Saladero, 17-VI-2012, 1 ♀; Río Alías, 2-V-2013, 1 ♂.

Citas bibliográficas: ORTÍZ *et al.* (2010).

Elemento endémico. Univoltina. Imagos: IV-IX.

Oar reaumuraria (Millière, 1864)

Material estudiado: Rambla de Morales, 10-V-2013, 2 ♂♂; 2-V-2014, 1 ♂, 1 ♀; El Algarrobico, 19-V-2013, 1 ♂; Playa del Charco, 19-X-2013, 1 ♂.

Citas bibliográficas: Como *Oar pratana* (Fabricius, 1794) en HACKER & WOLF (1982), MUÑOZ (1992) y KRAUS (1997, 1999).

Elemento atlanto-mediterráneo. Polivoltina. Imagos: III-V, VIII-XI.

Cinglis andalusiaria Wagner, 1935

Material estudiado: Rambla de la Granatilla, 20-VIII-2010, 1 ♂; 2-VIII-2012, 1 ♀.

Citas bibliográficas: MUÑOZ (1992) como *Cinglis humifusaria* (Eversmann, 1837).

Elemento atlanto-mediterráneo. Bivoltina. Imagos: IV-IX.

***Scopula submutata* (Treitschke, 1828)

Material estudiado: Rambla de Macenas, 26-IV-2011, 1 ♀.

Elemento asiático-mediterráneo. Bivoltina. Imagos: IV-VIII, X.

***Scopula decolor* (Staudinger, 1898)

Material estudiado: El Algarrobico, 27-I-2013, 1 ♂; 3-II-2014, 1 ♂; Rambla de Morales, 24-III-2014, 1 ♂, 1 ♀; 22-IV-2014, 1 ♀.

Elemento asiático-mediterráneo. Polivoltina. Imagos: I-IV.

***Scopula marginepunctata* (Goeze, 1781)

Material estudiado: El Saladero, 1-VII-2012, 1 ♀; El Algarrobico, 8-VIII-2012, 1 ♂.

Elemento euroasiático. Polivoltina. Imagos: IV-VIII, XII.

Scopula imitaria (Hübner, [1799])

Material estudiado: Rambla de la Granatilla, 26-IV-2011, 1 ♂; El Saladero, 9-XII-2012, 1 ♂; El Algarrobico, 4-II-2013, 1 ♂; 10-III-2013, 1 ♂.

Citas bibliográficas: KRAUS (1999).

Elemento asiático-mediterráneo. Polivoltina. Imagos: II-VIII, XII.

Scopula minorata (Boisduval, 1833)

Material estudiado: El Pueblo Indalo, 30-IV-2009, 1 ♀; 7-VI-2009, 1 ♂.

Citas bibliográficas: HACKER & WOLF (1982).

Elemento cosmopolita. Polivoltina. Imagos: IV-VI, VIII-IX.

Glossotrophia asellaria (Herrich-Schäffer, 1849)

Material estudiado: Rambla de la Granatilla, 21-III-2010, 1 ♂, 2 ♀♀; El Algarrobico, 2-XI-2012, 1 ♀.

Citas bibliográficas: KRAUS (1997, 1999).

Elemento atlanto-mediterráneo. Polivoltina. Imagos: I-XII.

****Rhodostrophia pudorata** (Fabricius, 1794)

Material estudiado: El Algarrobico, 20-V-2012, 1 ♂; Río Alías, 2-V-2013, 1 ♂.

Elemento atlanto-mediterráneo. Univoltina. Imagos: IV-VI.

****Rhodostrophia calabra** (Petagna, 1786)

Material estudiado: Rambla de la Granatilla, 26-IV-2011, 1 ♂; El Algarrobico, 16-IV-2013, 1 ♀.

Elemento asiático-mediterráneo. Univoltina. Imagos: IV-VI.

Cyclophora puppillaria (Hübner, [1799])

Material estudiado: Rambla de la Granatilla, 16-VIII-2010, 1 ♂; El Saladero, 10-III-2013, 1 ♂; El Algarrobico, 5-X-2013, 1 ♀.

Citas bibliográficas: ORTÍZ *et al.* (2010).

Elemento asiático-mediterráneo. Polivoltina. Imagos: III-IV, VI-VIII, X-XI.

****Rhodometra sacraria** (Linnaeus, 1767)

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 1 ♀; El Saladero, 24-IX-2012, 1 ♂.

Elemento cosmopolita. Polivoltina. Imagos: III-XI.

Casilda consecraria (Staudinger, 1871)

Material estudiado: El Saladero, 2-XI-2012, 1 ♂; Salinas de Cabo de Gata, 10-V-2013, 1 ♀; Rambla de Morales, 19-X-2013, 1 ♂; 22-IV-2014, 1 ♀.

Citas bibliográficas: KRAUS (1999).

Elemento euroasiático. Polivoltina. Imagos: IV-V, X-XI.

Subfamilia Larentiinae Duponchel, 1845

****Scotopteryx peribolata** (Hübner, [1817])

Material estudiado: El Algarrobico, 7-X-2012, 1 ♀; 5-X-2013, 1 ♀.

Elemento atlanto-mediterráneo. Univoltina. Imagos: X.

Orthonama obstipata (Fabricius, 1794)

Material estudiado: El Algarrobico, 8-VII-2013, 1 ♀.

Citas bibliográficas: ORTÍZ *et al.* (2010).

Elemento cosmopolita. Polivoltina. Imagos: VI-VII.

***Xanthorhoe fluctuata** (Linnaeus, 1758)

Material estudiado: Rambla de la Granatilla, 6-IV-2010, 1 ♂; El Saladero, 17-X-2012, 1 ♂; El Algarrobico, 22-XI-2012, 1 ♂; Cerro de la Cruz, 16-II-2014, 1 ♀.

Elemento paleártico. Polivoltina. Imagos: I-V, X-XII.

***Catarhoe basochesiata** (Duponchel, 1861)

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 1 ♀; 9-XII-2012, 1 ♂; El Saladero, 2-XI-2012, 2 ♂♂; El Algarrobico, 2-XI-2012, 1 ♀; 17-II-2013, 1 ♀.

Elemento atlanto-mediterráneo. Bivoltina. Imagos: I-IV, X-XII.

****Epirrhoe sandosaria*** (Herrich-Schäffer, 1852)

Material estudiado: Rambla de la Granatilla, 21-III-2010, 1 ♀; 7-IV-2010, 1 ♂, 1 ♀; 10-IV-2012, 1 ♂; El Saladero, 17-X-2012, 1 ♀; 9-XII-2012, 1 ♀.

Elemento atlanto-mediterráneo. Bivoltina. Imagos: I-V, X-XII.

Larentia malvata (Rambur, 1833)

Material estudiado: El Saladero, 17-X-2012, 1 ♂; 2-XI-2012, 1 ♂, 1 ♀; El Algarrobico, 2-XI-2012, 1 ♂, 1 ♀; 22-XI-2012, 1 ♂; 9-XII-2012, 1 ♂; 20-XI-2013, 1 ♂, 1 ♀; 16-XII-2013, 1 ♀.

Citas bibliográficas: HAUSMANN & VIIDALEPP (2012).

Elemento atlanto-mediterráneo. Univoltina. Imagos: X-I.

Antilurga alhambrata (Staudinger, 1859)

Aunque se trata de una especie de vuelo típicamente otoñal (HAUSMANN & VIIDALEPP, 2012), solo ha sido citada en el mes de abril.

Citas bibliográficas: KRAUS (1997, 1999).

Elemento atlanto-mediterráneo. Univoltina. Imagos: IV.

Nebula ibericata (Staudinger, 1871)

Material estudiado: Rambla de la Granatilla, 6-IV-2010, 1 ♂; El Algarrobico, 17-X-2012, 1 ♂.

Elemento atlanto-mediterráneo. Bivoltina. Imagos: I-IV, X-XII.

Colostygia multistrigaria (Haworth, 1809)

Material estudiado: El Saladero, 23-XII-2012, 1 ♂; El Algarrobico, 23-XII-2012, 1 ♂.

Elemento asiático-mediterráneo. Univoltina. Imagos: XII-I.

****Almeria kalischata** (Staudinger, 1870)

Material estudiado: Rambla de la Granatilla, 9-VI-2009, 1 ♀; 20-III-2010, 1 ♀; El Algarrobico, 23-XII-2012, 1 ♂.

Elemento atlanto-mediterráneo. Bivoltina. Imagos: I-IX, XI-XII.

Hospitalia flavolineata (Staudinger, 1883)

Material estudiado: El Saladero, 7-X-2012, 1 ex.

Elemento atlanto-mediterráneo. Univoltina. Imagos: X.

Horisme scorteata (Staudinger, 1901)

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♀; 21-III-2010, 1 ♀; 6-IV-2010, 1 ♂; 7-IV-2010, 1 ♂, 1 ♀.

Citas bibliográficas: REDONDO *et al.* (2009).

Elemento atlanto-mediterráneo. Polivoltina. Imagos: III-IV, X.

Epirrita dilutata ([Denis & Schiffermüller], 1775)

Material estudiado: Rambla de la Granatilla, 9-XII-2012, 1 ♂.

Elemento asiático-mediterráneo. Univoltina. Imagos: XII.

Gymnoscelis rufifasciata (Haworth, 1809)

Material estudiado: Rambla de la Granatilla, 9-XII-2012, 1 ♀; El Saladero, 4-II-2013, 1 ♀; 17-II-2013, 1 ♂.

Citas bibliográficas: AGENJO (1964); KRAUS (1997).

Elemento paleártico. Polivoltina. Imagos: I-VIII, X-XII.

Eupithecia ultimaria Boisduval, 1840

Material estudiado: Rambla de la Granatilla, 6-IV-2010, 1 ♂; 19-VIII-2010, 1 ♂, 2 ♀♀; 21-VIII-2010, 1 ♀; 10-IV-2012, 1 ♀; El Algarrobico, 8-VIII-2012, 1 ♀; Rambla de Morales, 22-IV-2014, 1 ♂, 1 ♀.

Citas bibliográficas: MUÑOZ (1992); KRAUS (1997, 1999).

Elemento asiático-mediterráneo. Bivoltina. Imagos: III-V, VIII-X.

Eupithecia minusculata Alphéraky, 1882

Material estudiado: Rambla de Morales, 2-V-2014, 1 ♂, 1 ♀.

Citas bibliográficas: KRAUS (1999) como *Eupithecia herrenschmidti* von Mentzen & Moberg, 1992.

Elemento asiático-mediterráneo. Polivoltina. Imagos: III, V.

**Eupithecia venosata* (Fabricius, 1787)

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 1 ♀; Río Alías, 17-II-2013, 1 ♀; El Algarrobico, 17-II-2013, 1 ♂; 3-III-2014, 1 ♂.

Elemento euroasiático. Univoltina. Imagos: II-IV.

**Eupithecia cocciferata* Millière, 1864

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♂; El Algarrobico, 16-III-2013, 1 ♀; El Saladero, 16-III-2013, 1 ♀.

Elemento atlanto-mediterráneo. Univoltina. Imagos: III-IV.

**Eupithecia dodoneata* Guenée, 1858

Material estudiado: El Saladero, 4-II-2013, 1 ♀; 17-II-2013, 1 ♀; 10-III-2013, 1 ♀; 16-III-2013, 2 ♂♂; 2-IV-2013, 1 ♂, 1 ♀; 3-II-2014, 1 ♂; El Algarrobico, 4-II-2013, 1 ♂, 1 ♀; 16-III-2013, 1 ♂.

Elemento euroasiático. Univoltina. Imagos: II-IV.

***Eupithecia massiliata* Dardoin & Millière, 1865

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 1 ♀.

Elemento atlanto-mediterráneo. Univoltina. Imagos: IV.

Eupithecia oxycedrata (Rambur, 1833)

Citas bibliográficas: HACKER & WOLF (1982).

Elemento asiático-mediterráneo. Bivoltina. Imagos: IX.

***Eupithecia orana* Dietze, 1804

Material estudiado: Rambla de la Granatilla, 20-III-2010, 1 ♂, 2 ♀♀; 9-XII-2012, 1 ♀; El Saladero, 17-X-2012, 1 ♂, 1 ♀; 22-XI-2012, 1 ♂; 17-II-2013, 1 ♂; El Algarrobico, 17-X-2012, 1 ♂, 1 ♀; 27-I-2013, 1 ♂.

Citas bibliográficas: EXPÓSITO-HERMOSA (1985).

Elemento atlanto-mediterráneo. Bivoltina. Imagos: I-III, X-XII.

Eupithecia unedonata Mabille, 1868

Material estudiado: Rambla de la Granatilla, 21-III-2010, 1 ♀; 10-IV-2012, 1 ♂; El Algarrobico, 2-XI-2012, 1 ♂; El Saladero, 17-II-2013, 1 ♀; Playa del Charco, 24-III-2014, 1 ♂.

Citas bibliográficas: KRAUS (1997, 1999).

Elemento asiático-mediterráneo. Bivoltina. Imagos: II-IV, X-XII.

***Eupithecia unitaria* Herrich-Schäffer, 1852

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 2 ♂♂, 1 ♀; El Saladero, 2-IV-2013, 1 ♂.

Elemento atlanto-mediterráneo. Bivoltina. Imagos: II-IV.

Eupithecia distinctaria Herrich-Schäffer, 1848

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 3 ♂♂, 1 ♀; El Algarrobico, 20-V-2012, 1 ♀; 9-XII-2012, 2 ♀♀; 2-IV-2013, 1 ♀; El Saladero, 17-X-2012, 1 ♀; 19-V-2013, 1 ♀; 16-II-2013, 1 ♀; Río Alías, 1-VI-2013, 1 ♀; Cerro de la Cruz, 16-II-2014, 1 ♂.

Citas bibliográficas: KRAUS (1999).

Elemento euroasiático. Bivoltina. Imagos: I-VI, IX-XII.

**Eupithecia centaureata* ([Denis & Schiffermüller], 1775)

Material estudiado: El Saladero, 2-IV-2013, 1 ♂; Río Alías, 5-X-2013, 1 ♂; Cerro de la Cruz, 16-II-2014, 1 ♂.

Elemento paleártico. Polivoltina. Imagos: II-VI, X-XI.

**Eupithecia variostrigata* Alphéraky, 1876

Material estudiado: El Saladero, 20-XI-2013, 1 ♂.

Elemento asiático-mediterráneo. Univoltina. Imagos: XI.

***Eupithecia gratiosata* Herrich-Schäffer, 1861

Material estudiado: Rambla de Alfaix, 11-IV-2012, 1 ♂.

Elemento euroasiático. Univoltina. Imagos: IV.

***Eupithecia semigraphata* Bruand, 1850

Material estudiado: El Saladero, 17-X-2012, 1 ♀; El Algarrobico, 1-XII-2013, 2 ♀♀.

Elemento asiático-mediterráneo. Bivoltina. Imagos: X-XI.

**Chesias isabella* Schawerda, 1915

Material estudiado: Rambla de la Granatilla, 7-IV-2010, 1 ♀; 9-XII-2012, 1 ♂; El Saladero, 22-XI-2012, 4 ♂♂; 9-XII-2012, 1 ♀; 23-XII-2012, 2 ♂♂; 4-II-2013, 2 ♂♂, 1 ♀; Río Alías, 3-II-2014, 1 ♀.

Elemento atlanto-mediterráneo. Univoltina. Imagos: XI-IV.

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*

Solicitud de autorización para recoger Lepidoptera con fines científicos en España

Las solicitudes cumplirán las siguientes condiciones:

1.– Estar al día en el pago de la cuota anual de la Sociedad, antes de solicitar los permisos.

2.– Enviar una carta al Secretario General de SHILAP con todos los datos personales, incluyendo nombre, apellidos, dirección, DNI o número de pasaporte, correo electrónico y teléfono con código del país y prefijo. Estos datos serán enviados al Secretario General con un mínimo de 45 días de antelación al período de captura previsto.

3.– Se detallará el área donde se desea capturar el material (provincia o Región), el período de tiempo (días, meses o todo el año); procedimiento de captura que se desea emplear (manga entomológica, grupo electrógeno, etc.), material que se desea recoger (especies, géneros, familias y/o superfamilias) y cualquier otro dato que se desee añadir.

4.– Todos los socios de SHILAP que soliciten estos permisos para recoger Lepidoptera en España con fines científicos, se incluirán en el Proyecto de Investigación Científica creado por la Sociedad y denominado: *"Faúnula Lepidopterológica Ibérica, Baleárica y región Macaronésica"*.

5.– Con el fin de contribuir con este Proyecto Científico, se ruega remitan a SHILAP, **una copia por correo electrónico, con el listado del material recogido en EXCEL** (sólo en este formato, por favor), indicando la Familia, Subfamilia, Tribu, nombre de la especie (género, especie, autor y año), localidad, coordenadas UTM (Datum: ETRS89) o GPS (Datum: WGS84) (puede usar el programa español gratuito http://www.ign.es/iberpix2/visor), provincia, fecha de captura, colector y número de machos y hembras capturados (**sólo 5 ejemplares por taxón y localidad, máximo**). Por favor utilice sólo el *"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)*". Esta lista es necesaria para este Proyecto Científico de SHILAP y para nuevas autorizaciones.

6.– Es obligatorio publicar en *SHILAP Revta. lepid.,* las nuevas especies que se descubran y remitir a SHILAP **una parte del material TIPO**, para su posterior incorporación a la colección de Lepidoptera del Museo Nacional de Ciencias Naturales, en Madrid, España.

7.– Se recuerda a todos los socios la obligación de estar autorizados para recoger Lepidoptera, con fines científicos, en España.

8.– Conocer los fines científicos de SHILAP y comprometerse a pagar los gastos de participación en este Proyecto Científico, que la Junta Directiva considere en cada momento y que se comunicará con antelación.

Application for permit to collect Lepidoptera in Spain for scientific purposes

Applications must abide by the following conditions:

1.– The Society's annual fee must be paid before applying for the permits.

2.– A letter applying for the permit has to be addressed to the General Secretary of SHILAP, including name, surname, address, ID card number or Passport number, electronic mail, telephone number with country code and prefix. These data must reach the General Secretary at least 45 days in advance of to the foreseen collecting activity.

3.– The collecting area to be visited by the applicant should also be detailed (province 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); and 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, **a copy by electronic 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 (Datum: ETRS89) or GPS (Datum: WGS84) coordinates (you can use the Spanish free program http://www.ign.es/iberpix2/visor), 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 Revta. lepid.*, the new species 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 History, Madrid, Spain.

7.– All members are kindly reminded of the obligation to be duly authorized for collecting Lepidoptera, with scientific purposes, in Spain.

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 and that will be communicated in advance.

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Pseudophacusa multidentata Efetov & Tarmann, a new genus and species of Procridini from Myanmar, China and Laos (Lepidoptera: Zygaenidae, Procridinae)

K. A. Efetov & G. M. Tarmann

Abstract

A new genus, *Pseudophacusa* Efetov & Tarmann, gen. n. and a new species, *Pseudophacusa multidentata* Efetov & Tarmann, sp. n., are described from Myanmar, China and Laos. Possible mimicry between *Pseudophacusa multidentata* Efetov & Tarmann, sp. n., *Illiberis* (*Alterasvenia*) *banmauka* Efetov & Tarmann, 2014, and species of the genera *Phacusa* Walker, 1854, and *Zama* Herrich-Schäffer, 1855, is discussed. A differential diagnosis of the genera *Pseudophacusa* gen. n., *Phacusa* Walker, 1854, and *Zama* Herrich-Schäffer, 1855, is provided.
KEY WORDS: Lepidoptera, Zygaenidae, Procridinae, Procridini, *Pseudophacusa, P. multidentata*, mimicry, COI, mitochondrial DNA barcoding, new genus, new species, Myanmar (Burma), China, Laos.

Pseudophacusa multidentata **Efetov & Tarmann, un nuevo género y especie de Procridini de Myanmar, China y Laos (Lepidoptera: Zygaenidae, Procridinae)**

Resumen

Se describe un nuevo género *Pseudophacusa* Efetov & Tarmann, gen. n. y una nueva especie, *Pseudophacusa multidentata* Efetov & Tarmann, sp. n., de Myanmar, China y Laos. Un posible mimetismo entre *Pseudophacusa multidentata* Efetov & Tarmann, sp. n., *Illiberis* (*Alterasvenia*) *banmauka* Efetov & Tarmann, 2014, y especies de los géneros *Phacusa* Walker, 1854 y *Zama* Herrich-Schäffer, 1855 se somete a discusión. Se ofrece el diagnóstico diferencial de los géneros *Pseudophacusa* gen. n., *Phacusa* Walker, 1854 y *Zama* Herrich-Schäffer, 1855.
PALABRAS CLAVE: Lepidoptera, Zygaenidae, Procridinae, Procridini, *Pseudophacusa, P. multidentata*, mimetismo, COI, ADN mitocondrial códigos de barras, nuevo género, nueva especie, Myanmar (Birmania), China, Laos.

Introduction

During the last 20 years major work has been undertaken on Asian Procridinae (EFETOV, 1995, 1996, 1997a, b, c, 1998, 2000, 2001a, b, 2004, 2005a, b, 2006, 2010; EFETOV & HAYASHI, 2008; EFETOV *et al*., 2004, 2006, 2010, 2011; EFETOV & TARMANN, 1994, 1995, 1996, 1999, 2008, 2012, 2013a, b, 2014; KEIL, 2014; KIM *et al*., 2004; OWADA & INADA, 2005; SUBCHEV *et al*., 2010, 2012, 2013; TARMANN, 1994). In spite of this, there is still substantial revisionary work to be done. There are not only a number of taxa that remain undescribed, but also the correct relationships between taxa and taxa groups have to be verified. Possible mimicry has always to be taken into account in the Zygaenidae, as some species resemble not only each other but also those of other families of Lepidoptera

and even those of other orders of insects such as Hymenoptera, Diptera, Hemiptera and Coleoptera. As our studies have to be based on examination of type material and should be accompanied by field observations, these investigations are time consuming and can only be done step by step. While examining material of the subfamily Procridinae from Myanmar, Thailand, Laos and China (Yunnan), we found some male and female specimens representing a new genus and species. The description is provided below. Possible mimicry involving sympatric species and their relationship is discussed.

Pseudophacusa Efetov & Tarmann, gen. n.

Type species: *Pseudophacusa multidentata* Efetov & Tarmann, sp. n., here designated.

Diagnosis

Habitus: Wings narrow, with transparent areas, forewings almost twice as long as hindwings.

Head: Spherical, space between compound eye and ocellus without scales, chaetosemata rounded, labial palps short, porrect; antenna bipectinate to apex in both sexes, without club distally. Proboscis well developed. Wings almost transparent, with blackish brown veins, margins and fringes. Wings with all veins free from cell or r2 + r3 stalked; medial stem present in both wings; hindwing with only two medial veins. Foreleg with tibial epiphysis, hind tibia with one pair of spurs (apical).

Genitalia male: Uncus strongly sclerotized, with short pointed apex. Anal tube with longitudinal sclerotized band on dorsal wall (as in *Phacusa*). Valva subquadrate, without process at apex and on ventral margin. Aedeagus (phallus) broad, vesica with a large number of strongly sclerotized, small cornuti, their length approximately equal to their breadth.

Genitalia female: With sclerotized praebursa of irregular shape, strongly folded, with rows of spines.

Differential diagnosis: The genus most closely related to *Pseudophacusa* is *Phacusa* with which it shares the longitudinal sclerotized band on the dorsal wall of the anal tube, a character that is absent in all other Procridinae. *Pseudophacusa* differs from *Phacusa* by the absence of any process on the ventral margin and apex of sacculus and the presence of a large number of small short cornuti on the vesica seminalis. In *Phacusa* the vesica bears from two to four cornuti, and at least two of them are hook-shaped.

Derivatio nominis: The name of this new genus indicates a close relationship to the genus *Phacusa* Walker, 1854.

Pseudophacusa multidentata Efetov & Tarmann, sp. n. (Figs. 1, 2, 7, 8, 10)

Material: Holotype ♂, with printed pin-label: "MYANMAR, Sagaing province, Banmauk, 170 m, 16-25-VII-2011; leg. Native collector, E 95º 51' 29" / N 24º 23' 48", TLMF 2011-106" (Coll. Tiroler Landesmuseen, Ferdinandeum, Innsbruck, Austria). Paratypes 9 ♂♂, 4 ♀♀: Myanmar, Sagaing province, Banmauk, 170 m (E 95º 51' 29" / N 24º 23' 48"), 9 ♂♂, 1 ♀, 16-25-VII-2011 (4 specimens used for barcoding in ZYGMO project, sample ID: PPGen07#sp1#001, PPGen07#sp1#002, PPGen07#sp1#003, PPGen07#sp1#004; process ID: ZYGMO591-13, ZYGMO592-13, ZYGMO593-13, ZYGMO594-13), native collector leg., coll. Tiroler Landesmuseen, Ferdinandeum, Innsbruck, Austria, 5 ♂♂, 1 ♀ and coll. K. A. Efetov / Crimean State Medical University, Simferopol, Crimea, Russia, 4 ♂♂; China, Yunnan, Techong county, Mt. Gaoligongshan, 2000 m (E 98º 33' 31" / N 25º 07' 59"), 20-27-VI-2011, 2 ♀♀, native collector leg., coll. Tiroler Landesmuseen, Ferdinandeum, Innsbruck, Austria and coll. K. A. Efetov / Crimean State Medical University, Simferopol, Crimea, Russia; Laos, Phongsalis province, Mt. Kheukayasan, 1600 m (E 101º 54' 43" / N 22º 10' 58"), 14-28-IV-2012, 1 ♀, native collector leg., coll. Tiroler Landesmuseen, Ferdinandeum, Innsbruck, Austria. The holotype and paratypes have been supplied with printed pin-labels on red paper: "HOLOTYPUS [or PARATYPUS] male [or female] *Pseudophacusa multidentata* Efetov & Tarmann, 2015".

Description: Habitus of male and female similar. Length of body: male 8.2-8.6 mm, female 8.2-9.3 mm; length of forewing: male 12.0-13.1 mm, female 13.0-15.2 mm; breadth: male 3.1-4.2 mm, female 4.8-5.2 mm; length of hindwing: male 6.2-7.2 mm, female 6.9-8.2 mm; breadth: male 3.0-3.3 mm, female 3.1-4.2 mm; length of antenna: male 6.4-6.9 mm, female 6.3-7.4 mm. Frons as broad as compound eye in frontal view, black, occiput covered with black scales, with a tinge of blue in fresh specimens, compound eyes of normal size, black, ocelli small, chaetosemata rounded, un-scaled space between compound eye and ocellus ca 1.2 times of diameter of ocellus. Labial palps short, porrect, blackish brown. Antenna black, bipectinate to apex, tapering towards and pointed at apex, pectination long (length of pectination in middle part of antenna 0.8-0.9 mm in male and 0.5 mm in female), ratio of breadth of 4th segment from apex to breadth of 15th segment nearly 0.7, antenna with 43-46 segments in male and female. Proboscis brown, well developed. Tegulae and patagia black. Thorax and abdomen black, thickly covered with scales. Wings almost transparent, with blackish brown veins, margins and fringes. Apex of forewing upperside, space between costa and subcosta, distal margin of cell, proximal parts of medial stem and posterior wing parts slightly anterior and posterior of anal vein blackish brown, opaque; on forewing underside space between anal vein and posterior margin of wing covered with a flat layer of broad, creamy white scales. Hindwing on upperside with an opaque anterior part until medial stem and M_1 that is covered with creamy white scales that are followed by a blackish brown opaque area posteriorly which ends at the posterior margin of cell; underside of hindwing similar but anterior margin blackish brown (not creamy white) and only anterior part of cell creamy white. All veins free from cell or r2 + r3 stalked. Medial stem present in both wings. Hindwing with two medial veins situated slightly posterad of medial stem. Translucent part of upperside of wings covered with short, narrow scales (most of them having a double apex) arranged vertically to surface of wing. Scales along veins and on darker parts of wings also short, but broader (each having a single, double or triple apex) arranged in flat layers. Legs black, thickly covered with black scales; foreleg with tibial epiphysis, hind tibia with one pair of spurs (apical).

Male genitalia: Short apical part of uncus much narrower than rest of uncus, the latter 1.5 times shorter than tegumen. Dorsal wall of anal tube sclerotized. Valva broad, subquadrate, its apex and ventral margin without any process. Pulvinus well developed, covered with many short setae. Juxta ovoid, long, its distal half covered with small spicules. Aedeagus three times longer than uncus, broad, its breadth nearly equal to length of uncus, vesica with many strongly sclerotized, short cornuti.

Female genitalia: Papillae anales ovoid, covered with numerous very long setae, apophyses posteriores straight, eighth sternite slightly sclerotized, covered with many short spicules; eighth tergite strongly sclerotized, narrow, arc-shaped; ostium bursae broad, not sclerotized, proximal part of ductus bursae strongly dilated, forming a sclerotized, strongly folded praebursa of irregular shape, its internal surface covered with numerous spines placed separately as well as in two rows (one longitudinal, one transverse); corpus bursae spherical, translucent.

Differential diagnosis: In habitus, *Pseudophacusa multidentata* sp. n. (Figs. 1, 2) is extremely similar to the sympatric *Illiberis* (*Alterasvenia*) *banmauka* Efetov & Tarmann, 2014 (Fig. 3). The latter is easily distinguished externally by its yellow proboscis. Moreover, both species have very different genitalic structures. All known species of *Phacusa* and *Zama* also have a yellow proboscis. From *Phacusa* species, *Pseudophacusa multidentata* sp. n. can be easily distinguished by its genitalic morphology. Males of *Phacusa* (Fig. 9) have valvae with processes at the ventral margin, or at the apex of the sacculus, and the vesica has only a few (2-4) cornuti, some of them hook-shaped, while *Pseudophacusa multidentata* sp. n. has no processes on the valva and its vesica is covered with many short, not hook-shaped, cornuti (Figs. 7, 8). Males of *Zama* have the apex of sacculus with a process and vesica with two large cornuti, while females have a strongly sclerotized, broadly open, bowl-shaped antrum with a bottle-shaped appendix. Moreover, females of *Zama* can be easily recognised by the presence of a hair tuft at the end of the abdomen.

Bionomics: Flight of imagines from April (Laos) to June (Myanmar), depending on the region and elevation of the locality. Larval host-plant(s) unknown.

Etymology: This species is named *"multidentata*" because of the extraordinary number of tooth-like cornuti on the vesica seminalis in the male (Figs. 7, 8).

Relationship: The longitudinal sclerotized band on the dorsal wall of the anal tube is a character that is shared with *Phacusa*. So far that character was thought to represent an autapomophy of that genus, as it has not been found elsewhere (Alberti, 1954: 258). Based on morphology we can suppose that *Pseudophacusa* and *Phacusa* are sister groups. Our DNA mitochondrial barcoding (COI) results (project ZYGMO, BOLD, Life Data Systems) (Fig. 11) does not oppose the opinion that *Pseudophacusa* and *Phacusa* are closely related. These genera have the smallest genetic distance if to compare with other examined South-East Asian genera and therefore cluster in the tree on the same branch. However, the authors are aware that such trees are not a proof for a close phylogenetic relationship.

Mimicry: The fact that *Pseudophacusa multidentata* and *Illiberis* (*Alterasvenia*) *banmauka* (Figs. 1-3) are sympatric, at least at their type locality, viz. Banmauk in Myanmar where both are also sympatric with other externally similar clear-winged species of the subfamily Procridinae such as species of the genera *Phacusa* (Fig. 5) and *Zama* (Fig. 6) (see EFETOV & TARMANN, 2012), and with species of Ctenuchinae (Erebidae), suggests that mimicry may play an evolutionary role in the development of external characters of some of these involved species. However, confirmation of this can only be obtained by studies *in situ*. It is at least remarkable that so far *Illiberis (Alterasvenia*) *banmauka* is the only known species of subgenus *Alterasvenia* with such a habitus (Fig. 3). In all other known species of this subgenus the wings are less transparent as in *I.* (*A.*) *banmauka*. As an example we figure *Illiberis* (*Alterasvenia*) *cernyi* Efetov & Tarmann, 2013 (Fig. 4), the most closely related species to *I.* (*A.*) *banmauka*. The close relationship of both species and their systematic position in *Illiberis* (*Alterasvenia*) is strongly supported by genitalic morphology (EFETOV & TARMANN, 2013: 35, fig. 3; 2014: 65, fig. 3; 66, fig. 4).

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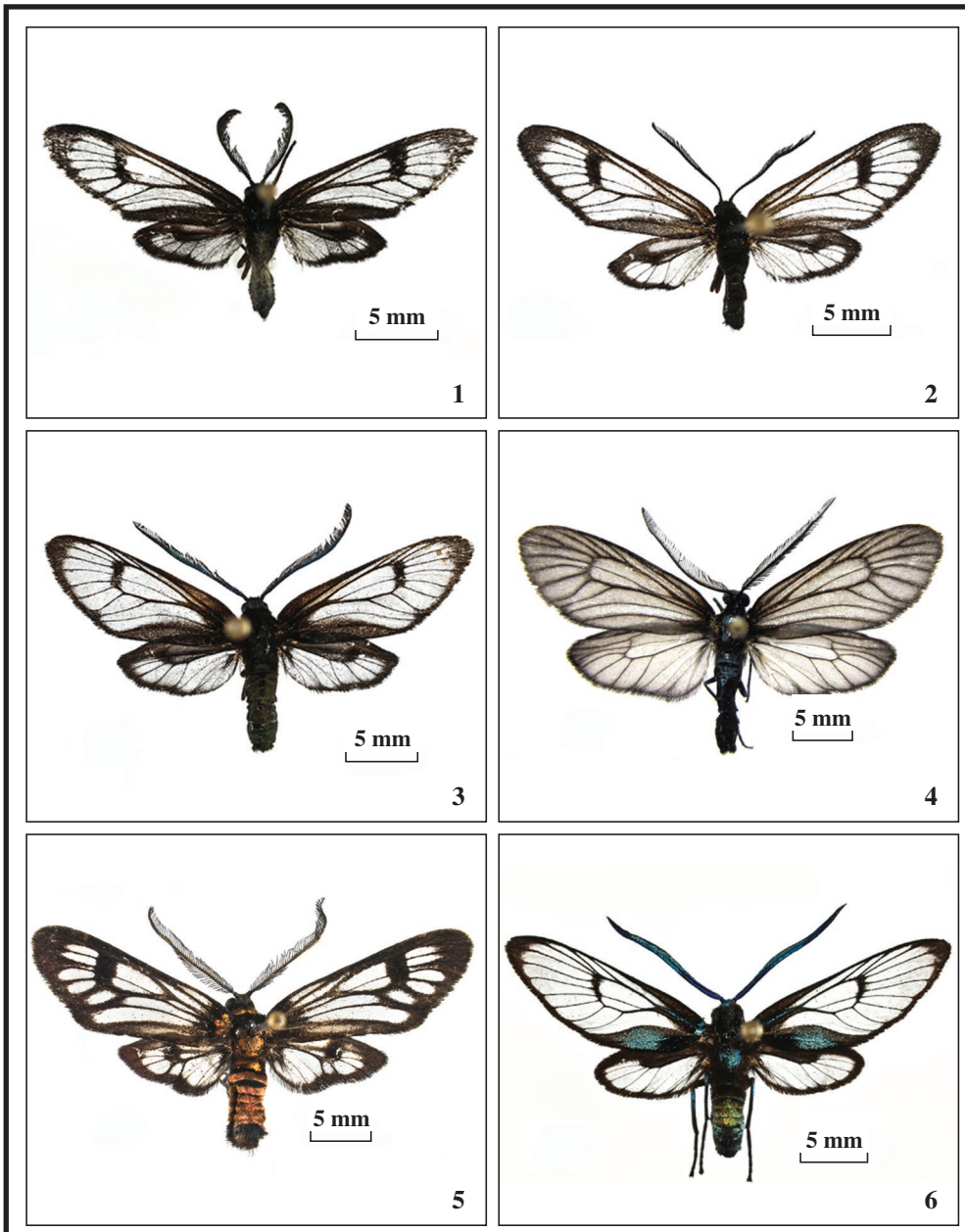
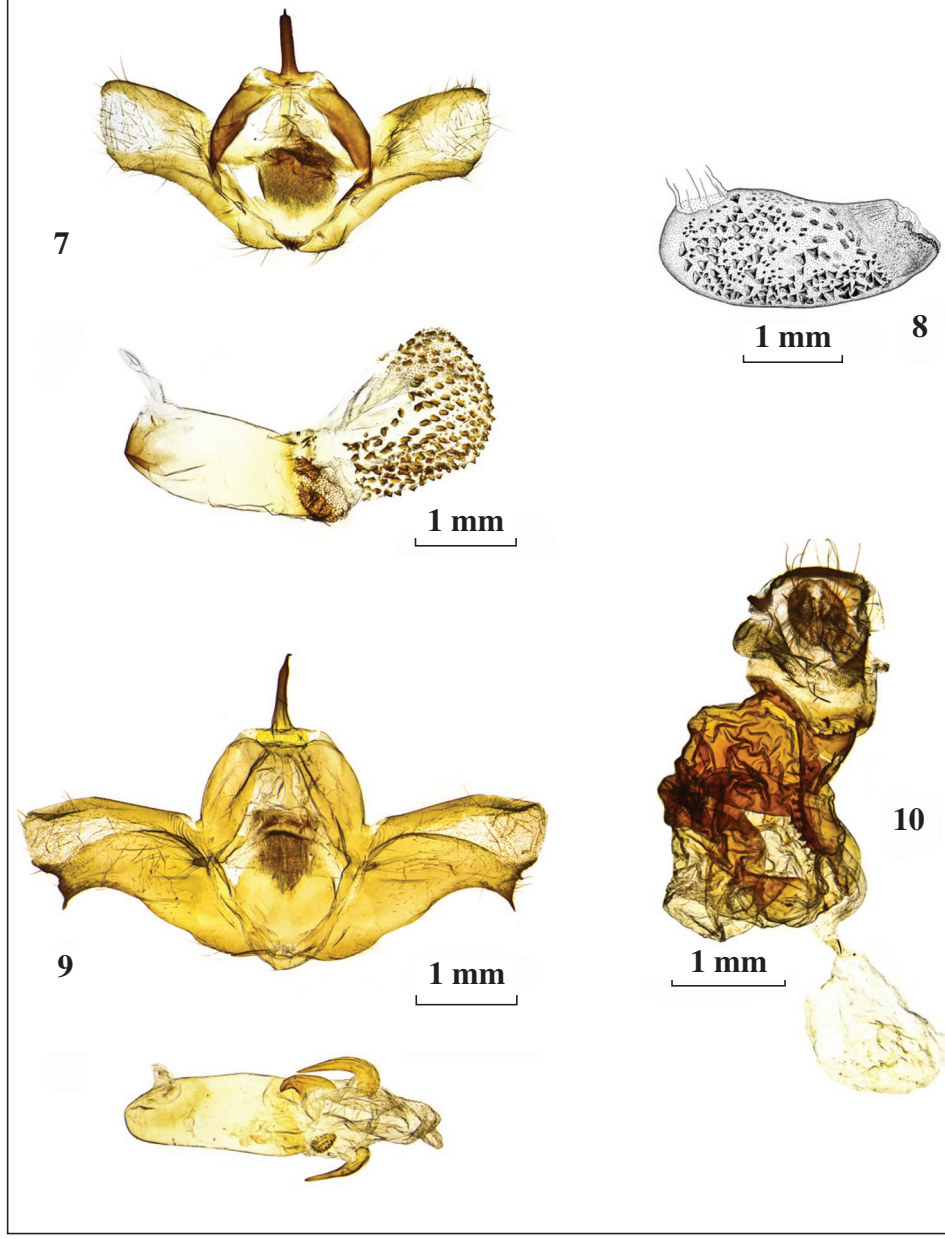


Figures 1-6.– 1-2. *Pseudophacusa multidentata* Efetov & Tarmann, sp. n. **1.** Holotype male. **2.** Paratype female from Myanmar. **3**. *Illiberis* (*Alterasvenia*) *banmauka* Efetov & Tarmann, 2014, holotype male, Myanmar. **4**. *Illiberis* (*Alterasvenia*) *cernyi* Efetov & Tarmann, 2013, holotype male, Thailand. **5**. *Phacusa birmana* (Oberthür, 1894). Male specimen from Laos. **6**. *Zama* cf. *nigrigemma* (Walker, 1854). Male specimen from Myanmar.



Figures 7-10.– 7, 8, 10. *Pseudophacusa multidentata* Efetov & Tarmann, sp. n. **7.** Male genitalia of paratype, **8**. Drawing of aedeagus of another paratype with vesica not everted. **10.** Female genitalia of paratype from China. **9.** *Phacusa tenebrosa* Walker, 1854. Male genitalia of a specimen from India (Sikkim).

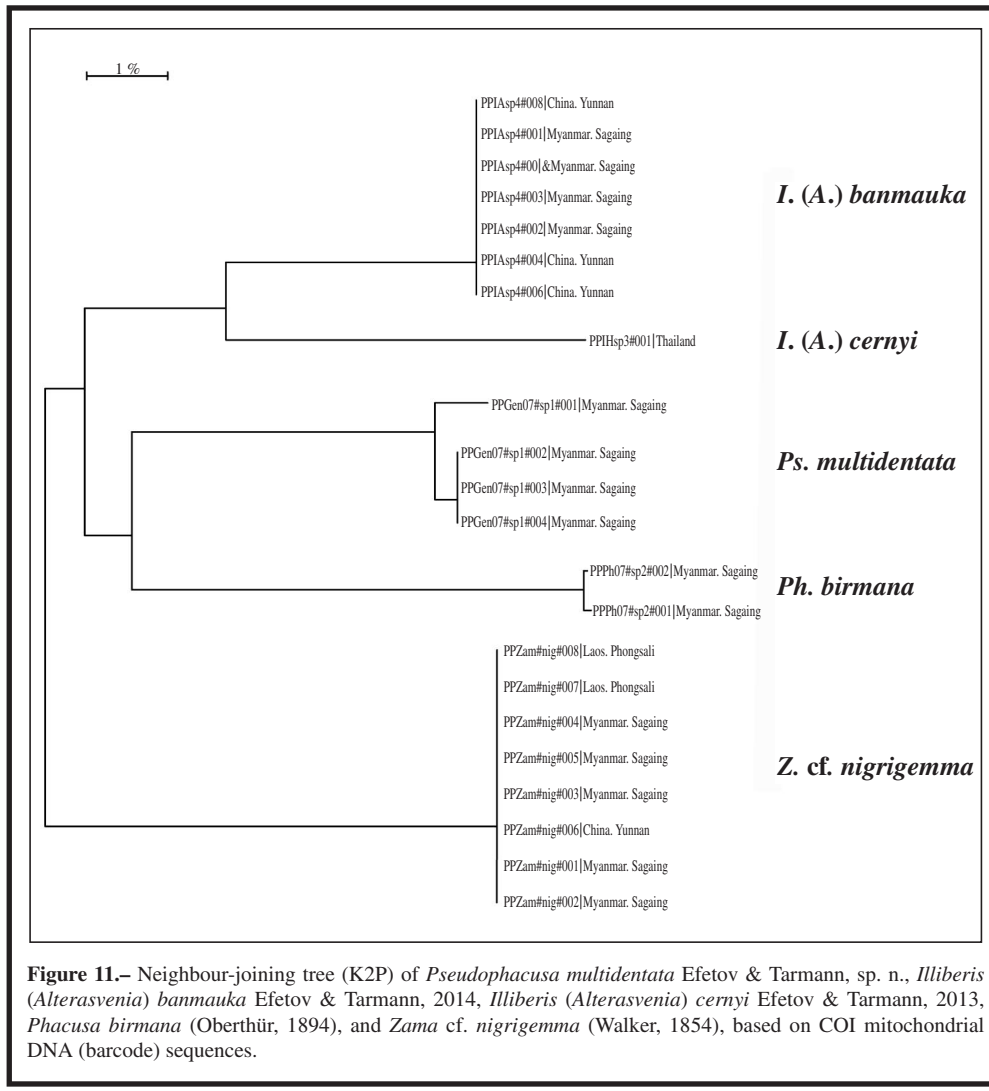


Figure 11.– Neighbour-joining tree (K2P) of *Pseudophacusa multidentata* Efetov & Tarmann, sp. n., *Illiberis* (*Alterasvenia*) *banmauka* Efetov & Tarmann, 2014, *Illiberis* (*Alterasvenia*) *cernyi* Efetov & Tarmann, 2013, *Phacusa birmana* (Oberthür, 1894), and *Zama* cf. *nigrigemma* (Walker, 1854), based on COI mitochondrial DNA (barcode) sequences.

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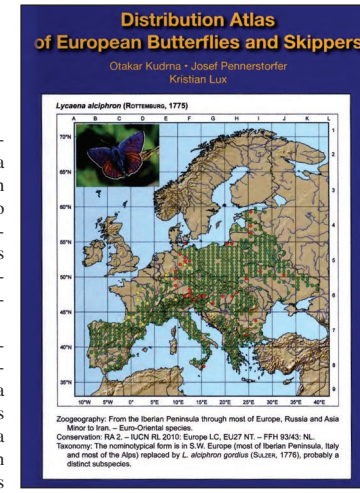
REVISION DE PUBLICACIONES
BOOK REVIEWS

O. Kudrna, J. Pennerstorfer & K. Lux
Distribution Atlas of European Butterflies and Skippers
632 páginas
Formato 24'5 x 18 cm
Wisseschaftlicher Verlag - Peks, Schwanfeld, 2015
ISBN: 978-3-938249-71-0



Nos encontramos ante la tercera edición (MEB-3)de esta publicación, las anteriores en el año 2002 (MEB-1) y 2011 (MEB-2), lo que supone una puesta al día sobre el conocimiento y la distribución de los Rhopalocera que se encuentran en Europa, principalmente debido al destacado trabajo personal del Dr. Kudrna a lo largo de los últimos veinte años (1995-2015) cuando comenzó el *"Mapping European Butterflies*" (MEB). Cuenta en la actualidad con más de 250.000 datos y más de 650.000 registros, abarcando la distribución de 446 especies conocidas, plasmadas en sus respectivos mapas en cuadrículas de 30' x 60' o de 0'5º x 1'0º, que cumplimentan 1.848 cuadrículas de un total de 2.046 cuadrículas disponibles.

Después del Prefacio, que ha supuesto el trabajo realizado para esta obra, datos generales de como se ha podido llevar a cabo con el sistema computerizado empleado al efecto, las personas que han colaborado y los agradecimientos, pasamos a un interesante capítulo sobre la Taxonomía empleada y los complejos de especies más complicadas como los Polyommatinae, el complejo de *Euchloe ausonia*; a continuación hay una lista sistemática de las especies y de los géneros, así como un pequeño apartado sobre las diferencias morfológicas de las genitalias de los machos más destacados.

Pasamos a un interesante y discutido capítulo sobre la zoogeografía, datos paleontológicos y la dinámica de las poblaciones, localización de las especies en sus diferentes hábitats y la elaboración de los correspondientes mapas a una escala de 1:37.000.000, si bien hay tres especies que no tienen mapa a saber: *Aricia hyacinthus* (Herrich-Schäffer, 1847); *Azanus jesous* (Guerin, 1940) y *Erebia serotina* Descimon & De Less, 1954, así como las especies presentes en la región Macaronésica, estas últimas aparecen en el apartado correspondiente en la página 525.

La parte principal de libro, como no podía ser de otra manera, la configuran los mapas de distribución de todas y cada una de las especies consideradas, donde podemos ver el nombre de la especie considerada, con una fotografía del adulto tomada al natural, con datos zoogeográficos, de donde se encuentra, sobre el estatus de su conservación e interesante información taxonómica.

Acaba la obra con una discusión sobre la evaluación de los datos obtenidos a lo largo de los diferentes países, sobre la composición zoogeográfica, la biodiversidad, la conservación y conclusiones finales, terminando con un índice alfabético de las especies, las diferentes localizaciones en los diferentes países europeos, glosario de términos, autores de las fotografías y una bibliografía, que amplía la ya conocida en las anteriores ediciones.

No podemos terminar estas líneas, sin felicitar a los autores principalmente al Dr. Kudrna por su trabajo a lo largo de estos años, si bien hay algunas interpretaciones con las que mantenemos nuestras dudas, es un trabajo bien realizado, no escatimando medios para mantener el mismo nivel de calidad de los anteriores ediciones, por lo que recomendamos vivamente esta serie, que no puede faltar en ninguna biblioteca específica que se precie.

El precio de este libro es de 75 euros más gastos de envío y los interesados lo pueden pedir a:

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On the taxonomy of the genus *Dasypolia* Guenée, 1852. New data and subgenus for the little-known species, *Dasypolia lithophila* (Kapur, 1960) (Lepidoptera: Noctuidae)

B. Benedek, A. V. Volynkin & M. Černila

Abstract

The male specimen and genitalia of *Dasypolia lithophila* (Kapur, 1960) are illustrated and a new subgenus, *Kapuria* Benedek, Volynkin & Černila, subgen. n. is described for the species.
KEY WORDS: Lepidoptera, Noctuidae, *Dasypolia*, *Kapuria*, new subgenus, Nepal.

Sobre la taxonomía del género *Dasypolia* Guenée, 1852. Nuevos datos y subgénero para la especie poco conocida de *Dasypolia lithophila* (Kapur, 1960) (Lepidoptera: Noctuidae)

Resumen

Se ilustra el espécimen macho y la genitalia de *Dasypolia lithophila* (Kapur, 1960) y se describe un nuevo subgénero para la especie, *Kapuria* Benedek, Volynkin & Černila, subgen. n.
PALABRAS CLAVE: Lepidoptera, Noctuidae, *Dasypolia*, *Kapuria*, subgénero nuevo, Nepal.

Introduction

The present paper contains new data on the taxonomy of the Palaearctic noctuid genus *Dasypolia* Guenée, 1852 including more than a hundred species according to our recent knowledge, with some still waiting for description. The genus is distributed predominantly in the mountain massifs of Asia, reaching the highest species diversity in the Himalayan region. Many *Dasypolia* species have been described during the last three decades (HACKER & PEKS, 1990; 1992; 1996; RONKAY & VARGA, 1990; RONKAY & PLANTE, 1992; RONKAY & ZILLI, 1993; GYULAI & RONKAY, 1995; HREBLAY & RONKAY, 1995; 1999; RONKAY *et al.,* 1995; HACKER & RONKAY, 1996; HREBLAY & RONKAY, 1998; HREBLAY *et al.*, 1998; RONKAY *et al.*, 1998; IVINSKIS & SALDAITIS, 2010; BENEDEK *et al.*, 2011; VOLYNKIN, 2012; BENEDEK *et al.*, 2014; RONKAY *et al.*, 2014; BENEDEK & SALDAITIS, 2014).

D. lithophila (Kapur, 1960) was described, based on a single female as a member of subgenus *Cteipolia* Staudinger, 1896, later RONKAY & ZILLI (1993) transferred it to the subgenus *Sinipolia* which was upgraded to generic level by BENEDEK & SALDAITIS (2014). During a climbing expedition to the Annapurna Himalaya in Nepal in November, 1990 (Fig. 5), two male specimens of *lithophila* were collected. The examination of the male genitalia revealed that *lithophila* does not belong to *Sinipolia*, but to an undescribed subgenus of *Dasypolia*. The new subgenus and the male of *lithophila* are described below.

Material and methods

Institutional abbreviations are as follows: BBT = coll. Balázs Benedek (Törökbálint, Hungary); GBG/ZSM = coll. Gottfried Behounek (Grafing, Germany) / Zoologische Staatssammlung München (Germany); MČK = coll. Matjaž Černila (Kamnik, Slovenia); ZSI = coll. Zoological Survey of India (Kolkata, India). Male and female genitalia were studied after boiling the abdomen for a short time in 7 % KOH solution and the vesica was everted. Pictures were processed using Adobe Photoshop CS4 software.

Taxonomy

Genus *Dasypolia* Guenée, 1852
Dasypolia Guenée, 1852, *in* Boisduval & Guenée, *Histoire Naturelle des Insectes. Spécies Général des Lépidoptéres. Noctuelites,* **2**: 44.
Type-species: *Noctua templi* Thunberg, 1792.
Type locality: Sweden.

Subgenus *Kapuria* Benedek, Volynkin & Černila, subgen. n.

Type species: *Cteipolia lithophila* Kapur, 1960.

Diagnosis: The new, as yet monotypic subgenus is similar to the recently described subgenus *Kitapolia* Benedek, Behounek, Floriani & Saldaitis, 2011 (Figs. 6, 2). External differences are the longer male antennae with longer pectination and the more triangular shape of forewings with a more acute apex and diffuse patterns of *Kapuria*. The autapomorphic characters of the male genitalia structure in *Kapuria* are the short but broad, oblonge-shaped uncus, the characteristically elliptical-shaped harpe with much weaker basis and the short but evenly moderately narrow valvae. The aedeagus is strongly curved in its first third, the coecum is much smaller, the carina is represented by a few short, small spines on the dorsal side, the vesica is long and membranous without spiculi but with a coarse surface.

Etymology: The subgeneric name is dedicated to A. P. Kapur, the author of the type species.

Dasypolia (*Kapuria*) *lithophila* (Kapur, 1960) **comb. n.** (Figs. 1-3, 6-7)
Cteipolia lithophila Kapur, 1960: 118.
Type locality: E Nepal, Khumbu, Bhote Kosi Valley.

Type material examined: Photographs of the holotype ♀ (Fig. 3): •"Nepal, Daily Mail 1954, Himalaya Expd., B. Biswas Coll." / "Nepal (eastern) Khambu, above Marlung, Bhote Kasi Valley, ca. 16000 ft., 9 Mar. 1954, B. Biswas coll." / "on bare rocks, coloration perfectly matching with such rocks" / "female genitalia on slide" / "z. s. l. Reg. No. 224/H10" / "Type" (coll. ZSI).

Additional material examined: 2 ♂♂: "Nepal, Annapurna mtn. range, vic. v. Lethe, mt. Nilgiri, 4300 m, Ministi Khola val., N basecamp Annapurna I. 28º 37' 36" N, 83º 45' 37" E. 23 Nov. 1990, Jamnik A.", slide No. AV0928 Volynkin (colls. BBT and MČK).

Diagnosis: Externally, male of *D. lithophila* (Figs. 1-2) is similar to the single *Kitapolia* species, *D. kita* Benedek, Behounek, Floriani & Saldaitis, 2011 (Fig. 4), but differs in the longer male antennae with longer pectination, somewhat larger size, more elongated and triangular forewing shape with a more acute apex, lighter forewing coloration with more diffuse patterns, narrower medial area, more strongly wavy ante-and postmedian fascia, lighter reniform without a black streak on its proximal side, cell shadowed between reniform and orbicular stigma and lighter hindwing with absence of a discal spot. The male genitalia of *D. lithophila* (Fig. 7) differ from those of *D. kita* (Fig. 8) in the shorter and much broader uncus, the larger juxta, the smaller and more rounded vinculum, the narrower and somewhat shorter valva with parallel margins, the ventrally more sclerotized costa between the sacculus and cucullus, the less sclerotised sacculus, the weaker clasper, the larger, characteristically

elliptical-shaped harpe with weaker and narrower base, the more curved aedeagus with a smaller coecum, the presence of the thin carinal spines on the dorsal side and the absence of the numerous spiculi on the vesica.

Description of male (Figs. 1-2): Wingspan 30 mm, length of forewing 13 mm. Antennae broadly bipectinate. Head, thorax and abdomen greyish-brown, densely hairy. Forewings triangular in shape with apex acute, ground color of forewings greyish-brown with rather diffuse patterns, costal margin with seven large, dark brown spots, crosslines well-defined, dark brown, subbasal fascia diffuse, ante- and postmedial fascia rather broad and strongly wavy, subterminal fascia irregularly wavy, terminal fascia represented by a row of dark brown spots between veins, orbicular and reniform stigmata small, pale sandy-brown coloured, the cell between the spots is dark filled, cilia long, mixed with light sandy-brown and dark hairs. Hindwing light dirty-white, discal spot not visible, cilia long, colored like the hindwing.

Male genitalia (Fig. 7): Uncus spatula-like, short but broad, with parallel margins, apically rounded with fine medio-apical incision; tegumen short and broad, positioned moderately high; penicular lobes well developed, rectangular in shape, apically setose; juxta large, shield-like; vinculum short, rounded, narrow U-shaped; valvae elongated, relatively narrow, apically slightly tapering with parallel margins; clasper long, thin, weakly sclerotised, harpe large, broadly elliptical, with narrow basis; aedeagus short and narrow, strongly curved in basal section, coecum long, carina armed with a small patch of thin spiculi on the dorsal side; vesica membranous, almost straight with coarse surface and without diverticulum.

Figs. 1-2.– *Dasypolia lithophila*, adults. **1.** Male, Nepal, Annapurna Mtts. (MCK); **2.** ditto (BBT).

Female genitalia (Fig. 6) were described in details by KAPUR (1962).

Distribution: The species is known only from Nepal. The habitat is the highest ecozone of the region, far above the timberline (Fig. 5).

Discussion

Up to the present genus *Dasypolia* was subdivided into eleven subgenera (RONKAY *et al.*, 2001; BENEDEK *et al.*, 2011; RONKAY *et al*., 2014; BENEDEK & SALDAITIS, 2014), six of which have recently been described (BENEDEK *et al.*, 2011; BENEDEK & SALDAITIS, 2014). *Kapuria* is the twelfth subgenus.

Check list of *Dasypolia* subgenera:

Dasypolia Guenée, 1852
Yetipolia Benedek & Saldaitis, 2014
Fumopolia Benedek & Saldaitis, 2014
Dasythorax Staudinger, 1889

Dasymixis Ronkay & Varga, 1990
Auropolia Hreblay & Ronkay, 1999
Zheduopolia Benedek & Saldaitis, 2014
Cteipolia Staudinger, 1896
Chalapolia Benedek, Behounek, Floriani & Saldaitis, 2011
Kitapolia Benedek, Behounek, Floriani & Saldaitis, 2011
Kapuria Benedek, Volynkin & Černila, **subgen. nov.**
Tatsipolia Benedek, Behounek, Floriani & Saldaitis, 2011

Acknowledgements

We are very grateful to Mrs. Alenka Jamnik (Ljubljana, Slovenia) for material collected and the biotope picture, Mrs. Sheela Saroj (Kolkata, India) for valuable type photographs; to Mr. János Babics (Budapest, Hungary) for his great help with genitalia and imago photographing and Mr. Gottfried Behounek (Grafing, Germany) for loaning the holotype of *Dasypolia kita* for our studies.

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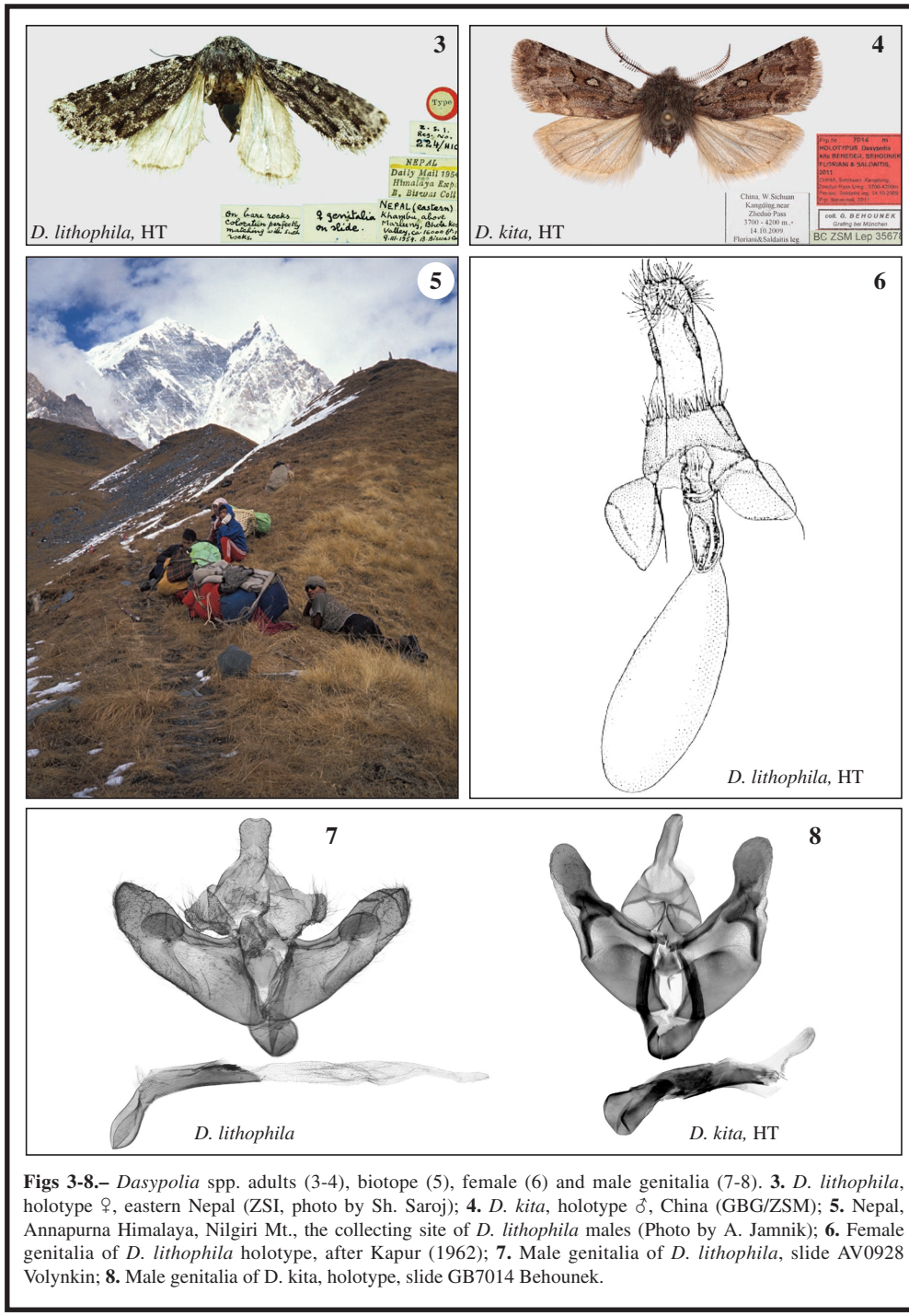

Figs 3-8.– *Dasypolia* spp. adults (3-4), biotope (5), female (6) and male genitalia (7-8). **3.** *D. lithophila*, holotype ♀, eastern Nepal (ZSI, photo by Sh. Saroj); **4.** *D. kita*, holotype ♂, China (GBG/ZSM); **5.** Nepal, Annapurna Himalaya, Nilgiri Mt., the collecting site of *D. lithophila* males (Photo by A. Jamnik); **6.** Female genitalia of *D. lithophila* holotype, after Kapur (1962); **7.** Male genitalia of *D. lithophila*, slide AV0928 Volynkin; **8.** Male genitalia of D. kita, holotype, slide GB7014 Behounek.

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A contribution to the Israeli fauna of Microlepidoptera: Oecophoridae, Autostichidae, Depressariidae, Cryptolechiidae and Lecithoceridae with ecological and zoogeographical remarks (Lepidoptera: Gelechioidea)

A. L. Lvovsky, S. Yu. Sinev, V. D. Kravchenko & G. C. Müller

Abstract

A checklist of 67 Israeli species of families Oecophoridae (17 species), Autostichidae (16), Depressariidae (25), Cryptolechiidae (3), and Lecithoceridae (6) is presented. The checklist is based on material collected by the authors in 2003 in Israel and existing published records. Eight species are new records for the fauna of Israel: *Dasycera intermediella* Stainton, 1867, *Batia internella* Jäckh, 1972, *Carcina quercana* (Fabricius, 1775), *Oegoconia deauratella* (Herrich-Schäffer, 1854), *Oegoconia caradjai* Popescu-Gorj & Căpuşe, 1965, *Agonopterix ferulae* (Zeller, 1847), *Agonopterix kaekeritziana* (Linnaeus, 1767) and *Lecithocera anatolica* Gozmány, 1978. Two new combinations are proposed: *Epicallima einsleri* (Amsel, 1934), **comb. n.** from *Borkhausenia* Hübner, [1825], and *Promalactis splendidella* (Amsel, 1934), **comb. n.** from *Epicallima* Dyar, [1903].
KEY WORDS: Lepidoptera, Gelechoidea, Oecophoridae, Autostichidae, Depressariidae, Cryptolechiidae, Lecithoceridae, new records, new combinations, Israel.

Una contribución a la fauna israelí de Microlepidoptera: Oecophoridae, Autostichidae, Depressariidae, Cryptolechiidae y Lecithoceridae con detalles ecológicos y zoogeográficos (Lepidoptera: Gelechioidea)

Resumen

Se presenta una lista de 67 especies israelies de las familias Oecophoridae (17 species), Autostichidae (16), Depressariidae (25), Cryptolechiidae (3) y Lecithoceridae (6). La lista está basada sobre el material recogido por los autores en 2003 en Israel y las citas publicadas. Ocho especies son nuevos registros para la fauna de Israel: *Dasycera intermediella* Stainton, 1867, *Batia internella* Jäckh, 1972, *Carcina quercana* (Fabricius, 1775), *Oegoconia deauratella* (Herrich-Schäffer, 1854), *Oegoconia caradjai* Popescu-Gorj & Căpuşe, 1965, *Agonopterix ferulae* (Zeller, 1847), *Agonopterix kaekeritziana* (Linnaeus, 1767) y *Lecithocera anatolica* Gozmány, 1978. Se proponen dos nuevas combinaciones: *Epicallima einsleri* (Amsel, 1934), **comb. n.** from *Borkhausenia* Hübner, [1825] y *Promalactis splendidella* (Amsel, 1934), **comb. n.** de *Epicallima* Dyar, [1903].
PALABRAS CLAVE: Lepidoptera, Gelechioidea, Oecophoridae, Autostichidae, Depressariidae, Cryptolechiidae, Lecithoceridae, nuevos registros, nuevas combinaciones, Israel.

Introduction

The Microlepidoptera fauna of the Middle East is until today poorly known. Most records are from the mid-1930's and little or nothing is known about the ecology of most species. H. G. Amsel, a

German entomologist, was one of the pioneers collecting Lepidoptera in general (but with a strong emphasis on Micros) in the former British Mandate of Palestine, long before the formation of the State of Israel. In his fundamental manuscript "Die Lepidopteren Palästinas" and subsequent papers, AMSEL (1933, 1934, 1935) listed 1,335 Lepidoptera species including 58 species of the families that are discussed in this article. Seven of them were subsequently synonymized, four species were misidentified, and four species were recorded for the territory that is presently part of Jordan and Syria. Since AMSEL (1955), BACK (1973), HANNEMANN (1976), GOZMANY (1978, 2000, 2008) and HALPERIN & SAUTER (1992) and prior to the present study, 59 species of Microlepidoptera were recorded for Israel, including Oecophoridae (14), Autostichidae (14), Depressariidae (23), Cryptolechiidae (3) and Lecithoceridae (5).

Material and methods

This survey is based on literature data, analysis of material in several museums (see list of abbreviations below) and more recent material collected in CDC miniature light-traps within the frame of a mosquito project by the two last authors in May and June 2003 (MÜLLER *et al*., 2012). We use chorotype classification accepted for the Levant in our previous publications (KRAVCHENKO *et al*., 2007a, 2007b).

Material was identified in the Zoological Institute of the Russian Academy of Sciences in St. Petersburg. Altogether 860 specimens of the families Oecophoridae, Autostichidae, Depressariidae, Cryptolechiidae and Lecithoceridae were examined and identified. The identification was carried out using the latest keys to the fauna of Europe and the Palearctic (BACK, 1973; HANNEMANN, 1995, 1997; GOZMÁNY, 1978, 2000, 2008; HUEMER, 1998; TOKAR *et al*., 2005). Whenever necessary additional genitalia preparations were made.

Abbreviations of Museums:

LSNK - Landessammlungen für Naturkunde, Karlsruhe, Germany.
MZHF - Finnish Museum of Natural History, Helsinki, Finland.
SIZ - I.I. Schmalhausen Institute of Zoology, National Academy of Sciences, Kiev, Ukraine.
TAU - Tel Aviv University, Israel.
ZIN - Zoological Institute, Academy of Sciences, St. Petersburg, Russia.

OECOPHORIDAE
OECOPHORINAE

Dasycera intermediella Stainton, 1867. **New Record for Israel**

Material examined: 1 ♂, 1 ♀, Nanal Keziv, south-facing slope, 26-V-2003, leg. Z. Gershenson; 3 ♂♂, Meron, 600 m, 28-V-2003, leg. Z. Gershenson (ZIN).

General distribution: Turkey and Israel. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone.

Biology: Unknown. Adults are on the wing from May until June.

Esperia sulphurella (Fabricius, 1775)

Material examined: 1 ♀, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU).

General distribution: Central and Southern Europe, Northern Africa, Turkey; introduced to the West Coast of USA (HODGES, 1974). Holarctic. In Israel: Mediterranean Zone. Coastal Plain (HALPERIN & SAUTER, 1992).

Biology: Larvae feed under the bark of old deciduous trees from summer to spring of the following year, with hibernation (HALPERIN & SAUTER, 1992; FETZ, 1994; HANNEMANN, 1997; HARPER *et al*., 2002). Adults are day active and on wing from April until June.

Epicallima einsleri (Amsel, 1934), **comb. n.**

Material examined: 1 ♂ (holotype), Jerusalem, 29-V-1930, leg. H. Amsel (LSNK); 2 ♂♂ (paratypes), Jerusalem, 1-V-1930, leg. H. Amsel (ZIN); 1 ♂, 3 ♀♀, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU).

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone. Jerusalem, East and Lower Galilee (AMSEL, 1934, 1935; HALPERIN & SAUTER, 1992).

Biology: Larvae feed on decaying material under the bark of *Quercus ithaburensis* (Fagaceae) and dry stems of *Vitex agnus-castus* (Verbenaceae). Adults are on the wing from May until June (HALPERIN & SAUTER, 1992).

Remarks: The species was originally described in the genus *Borkhausenia* Hübner, [1825], but its large labial palpi and long aedeagus in males and its ductus bursae with sclerotization in female (Figs. 1, 2) correspond more to the characters of genus *Epicallima* Dyar, [1903].

Epicallima formosella ([Denis & Schiffermüller], 1775)

General distribution: Central and Southern Europe, Caucasus, Egypt, Central Asia, USA. Holarctic. In Israel: Mediterranean Zone. Haifa (KALCHBERG, 1897).

Biology: Larvae feed on decaying material under the bark of different deciduous trees and on lichens from summer to spring of the following year, with hibernation. Adults are on the wing from late May until late August (LHOMME, 1935; FETZ, 1994; HANNEMANN, 1997; LVOVSKY, 2006).

Epicallima icterinella (Mann, 1867)

Material examined: 4 ♂♂, N. District, Dan, 10-11-VI-1986, leg. R. Linnavuori (ZMUH); 1 ♂, Campus of Tel Aviv University, 27-V-2003, leg. Z. Gershenson (ZIN); 5 ♂♂, Judean Hills, Jerusalem, 31-V / 6-VI-2003; 2 ♂♂, East Galilee, Yftach, 28-31-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Bulgaria, former Yugoslavia, Greece, Turkey, Syria, Lebanon and Iraq. (East-)Mediterranean. In Israel: Mediterranean Zone (TOKAR et al., 2005).

Biology: Larvae probably feed under the bark of old trees from summer to spring of the following year, with hibernation (SPULER, 1910; TOKAR *et al*., 2005). Adults are on the wing from mid-May until August.

Promalactis splendidella (Amsel, 1934), **comb. n.**

Material examined: 1 ♂ (holotype), Hedera, 15-V-1930, leg. H. Amsel (LSNK).

General distribution: Turkey and Cyprus. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone. Hedera, Lower Galilee, Mt. Carmel, Samaria, Coastal Plain, Judean Desert (AMSEL, 1934; HALPERIN & SAUTER, 1992).

Biology: Larvae feed on decaying material under the bark of different deciduous trees from summer to spring of the following year, with hibernation. Adults are on the wing from May until July (HALPERIN & SAUTER, 1992).

Remarks: The species was originally described in genus *Borkhausenia* Hübner, [1825] and then transferred to genus *Epicallima* (ARENBERGER & WIMMER, 2003). However, the forewing pattern with bright orange background and 3 narrow white transversal stripes corresponds more to genus *Promalactis* Meyrick, 1908.

Denisia augustella (Hübner, 1796)

General distribution: Central and Southern Europe, Cyprus, Caucasus. (East-) Mediterranean. In Israel: Mediterranean Zone. Hebron (STAINTON, 1867).

Biology: Larvae feed on decaying material under the bark of different deciduous trees and on

lichens from summer to spring of the following year, with hibernation. Adults are on the wing from the end of April until July (LHOMME, 1935; HANNEMANN, 1997; LVOVSKY, 2006).

Batia internella Jäckh, 1972. **New Record for Israel**

= *Borkhausenia lambdella* Jäckh, 1942 *nec* Donovan, 1793

Material examined: 1 ♂, 2 ♀♀, Judean Hills, Jerusalem, 31-V / 6-VI-2003; 1 ♀, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Western Europe from southern Norway and Sweden to Italy, Greece. Probably (East-) Mediterranean. In Israel: Mediterranean Zone.

Biology: Larvae live under a fine web covered with frass and pieces of lichens on the trunks of pine (*Pinus* sp.) and larch (*Larix* sp.) trees from August to June of the following year, with hibernation. Adults are on the wing from the end of May until early August, resting on the trunks of conifers in daytime (JÄCKH, 1972; HARPER *et al*., 2002; TOKAR *et al*., 2005).

Batia lambdella (Donovan, 1793)

= *Plutella metznerella* Treitschke, 1835

General distribution: Central and Southern Europe, Northern Africa, Turkey. (Circum-) Mediterranean. In Israel: Mediterranean Zone (HARPER *et al*., 2002).

Biology: Larvae live under the dead bark of different deciduous trees and bushes, particularly *Ulex* L. (Fabaceae) from August until June of the following year, with hibernation. Adults are on the wing from June until mid-September (FETZ, 1994; HANNEMANN, 1997; HARPER *et al*., 2002; TOKAR *et al*., 2005).

Batia lunaris (Haworth, 1828)

= *Lampros clavella* Herrich-Schäffer, 1854.

Material examined: 12 ♂♂, 2 ♀♀, Judean Hills, Jerusalem, 31-V / 6-VI-2003; 10 ♂♂, 2 ♀♀, East Galilee, Yftach, 28-V-2003; 1 ♂, Coastal Plain, Zichron Yaakov, 12-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Central and Southern Europe, Northern Africa, Turkey; introduced to the western coast of USA (HODGES, 1974). Holarctic. In Israel: Mediterranean Zone. Samaria (HALPERIN & SAUTER, 1992).

Biology: Larvae live on lichens on trees and under the dead bark of different deciduous trees from August to May of the following year, with hibernation. Adults are on the wing from mid-May until mid-August (HALPERIN & SAUTER, 1992; FETZ, 1994; HANNEMANN, 1997; HARPER *et al*., 2002; TOKAR *et al*., 2005).

Carcina quercana (Fabricius, 1775). **New Record for Israel**

= *Tortrix fagana* [Denis & Schiffermûller], 1775.

Material examined: 1 ♂, 1 ♀, Judean Hills, Jerusalem, 6-VI-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Central and Southern Europe, Northern Africa, Turkey, Israel, Caucasus; introduced to Canada (HODGES, 1974). Holarctic. In Israel: Mediterranean Zone.

Biology: Larvae feed on the underside of leaves of many deciduous trees from August to June of the following year, with hibernation. Adults are on the wing from June until mid-September (FETZ, 1994; HANNEMANN, 1997; HARPER *et al*., 2002; TOKAR *et al*., 2005).

PLEUROTINAE

Pleurota aristella (Linnaeus, 1767)

General distribution: Southern and parts of Central Europe, Caucasus, Turkey, Jordan, Central

Asia. (East-)Mediterranean. In Israel: Mediterranean Zone. Ain Karim (Ein Karem) near Jerusalem, Kasr el Jehud (AMSEL, 1935).

Biology: Larvae feed in silken tubes on leaves at the base of various low plants: *Salvia* L., *Thymus* L. (Lamiaceae), *Achillea* L., *Senecio* L. (Asteraceae), *Anthyllis* L. (Fabaceae), etc., from April until early June. Adults are on the wing from late March until September (AMSEL, 1955; FETZ, 1994; HARPER *et al*., 2002; TOKAR *et al*., 2005).

Pleurota elegans Stainton,1867

= *Pleurota tesserapunctella* Amsel, 1933 (nomen nudum).

= *Pleurota taepperi* Amsel, 1934.

Material examined: 1 ♂, holotype of *Pleurota taepperi*, Tabgha, Tiberias, III-1930, leg. H. Amsel; 4 ♂♂, 4 ♀♀, same label, and Palästina, Jericho, 22-II-1931, leg. W. Einsler (LSNK); 2 ♂♂, paratypes, Tabgha, Tiberias, III-1930, leg. H. Amsel (DEI); 3 ♂♂, 1 ♀, Judean Hills, Jerusalem, 31-V / 6-VI-2003; 9 ♂♂, 2 ♀♀, East Galilee, Yftach, 28-31-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Recorded only in Israel and Jordan. Probably endemic to the Levant. In Israel: Mediterranean Zone and oases in Saharo-Sindian Zone. Haifa, Jericho, Tabgha, Jerusalem, Ramallah, Kasr el Jehud (AMSEL, 1934, 1935).

Biology unknown: Adults are on the wing from the end of February until early June. (AMSEL, 1935; BACK, 1973).

Pleurota platyrrhoa Meyrick, 1923

Material examined: 1 ♀, Jerusalem, 18-VI-1930, leg. H. Amsel (LSNK).

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone. Jerusalem (MEYRICK, 1923).

Biology unknown: Adults were so far only observed in mid-May (MEYRICK, 1923, BACK, 1973).

Pleurota proteella Staudinger, 1879

Material examined: 1 ♂, Ain Karim, Jerusalem, 18-V-1930, leg. H. Amsel (DEI).

General distribution: recorded only in Israel and Lebanon. Probably endemic to the Levant. In Israel: Mediterranean Zone. Ain Karim near Jerusalem (AMSEL, 1935).

Biology unknown: Adults are on the wing from May until early June (AMSEL, 1935).

Pleurota sparella (Lederer, 1855)

= *Pleurota karmeliella* Amsel, 1934.

Material examined: 4 ♂♂, paratypes of *Pleurota karmeliella*, Karmel, Haifa, 7-V-1930, leg. H. Amsel (LSNK); 1 ♂, paratype, same label (DEI); 1 ♂, Coastal Plain, Zichron Yaakov, 12-V-2003; 1 ♂, 10 ♀♀, Judean Hills, Jerusalem, V-2003; 38 ♀♀, East Galilee, Yftach, 28-31-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Turkey, Lebanon, Syria and Jordan. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone. Karmel near Haifa, Ain Karim near Jerusalem, Kiriath Anavim (AMSEL, 1934, 1935).

Biology unknown: Adults are on the wing from early April until the end of June (Back, 1973).

Pleurota tetragyra Meyrick, 1928

General distribution: recorded only in Israel and Jordan. Probably endemic to the Levant. In Israel: Mediterranean Zone. Jerusalem (MEYRICK, 1928).

Biology unknown: Adults are on the wing from March until April (Meyrick, 1928; Back, 1973).

AUTOSTICHIDAE
SYMMOCINAE

Oegoconia deauratella (Herrich-Schäffer, 1854). **New Record for Israel**
= *Oegoconia bacescui* Popescu-Gorj & Căpuşe, 1965

Material examined: 37 ♂♂, East Galilee, Yftach, 28-31-V-2003; 3 ♂♂, Judean Hills, Jerusalem, V-2003; 3 ♂♂, Judean Hills, Jerusalem, Kastel, 6-VI-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Central and Southern Europe, Crimea, Middle Volga region, Caucasus, Turkey and Iran. (East-) Mediterranean. In Israel: Mediterranean Zone.

Biology unknown: Adults are on the wing from May until September (GOZMÁNY, 2008).

Oegoconia caradjai Popescu-Gorj & Căpuşe, 1965. **New Record for Israel**

Material examined: 2 ♂♂, Coastal Plain, Hadera, 12-V-2003; 28 ♂♂, East Galilee, Yftach, 28-31-V-2003, 10 ♂♂, Judean Hills, Jerusalem, V-2003; 18 ♂♂, Judean Hills, Jerusalem, Kastel, 6-VI-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN); 1 ♂, Jaffa, Abu-Kabir, 14-IV-1966; 1 ♂, Jaffa, 20-V-1966, leg. V. Trjapitsyn (ZIN).

General distribution: Central and Southern Europe, Northern Africa, Turkey, Lebanon, Israel, Caucasus, Iran and Central Asia. (East-) Mediterranean. In Israel: Mediterranean Zone.

Biology: Larvae in spinnings amongst dead leaves of cultivated *Juniperus* L. (Cupressaceae) and *Quercus* L. (Fagaceae) (Heckford, 1999). Adults are on the wing from June until October (GOZMÁNY, 2008).

Remarks: The European species *Oegoconia quadripuncta* (Haworth, 1828) mentioned by Amsel for Israel (1933, 1935) can be distinguished from *O. caradjai* only by genitalia. However, these references were not checked based on the study of male genitalia (GOZMÁNY, 2008), and most probably should prove to be misidentifications, since *O. quadripuncta* seems to be restricted to Western Europe, from Spain to Great Britain with its eastern limits in Germany.

Apatema mediopallidum Walsingham, 1900

Material examined: 55 ♂♂, 3 ♀♀, East Galilee, Yftach, 28-31-V-2003; 3 ♂♂, Judean Hills, Jerusalem, V-2003; 8 ♂♂, Judean Hills, Jerusalem, Kastel, 6-VI-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Southern Europe, Northern Africa, Turkey, Syria, Jordan, Iran and Afghanistan. (East-) Mediterranean. In Israel: Mediterranean Zone. Qiryat Anavim, Dagania, Jordan-Tal (GOZMÁNY, 2008).

Biology unknown: Adults are on the wing from March until October (GOZMÁNY, 2008).

Apatema sp.

Material examined: 3 ♂♂, Coastal Plain, Hadera, 12-V-2003; 1 ♂, East Galilee, Yftach, 28-V-2003; 7 ♂♂, Judean Hills, Jerusalem, V-2003; 3 ♂♂, 3 ♀♀, Judean Hills, Jerusalem, Kastel, 6-VI-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN); 1 ♂, Jaffa, Abu-Kabir, 6-VI-1966, leg. V. Trjapitsyn (ZIN).

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone.

Biology unknown: Adults are on the wing from May until June.

Remarks: Differs from *A. mediopallidum* by slightly bigger size, dark coloration of the head, and shape of the sacculus in the male genitalia. No other similar species is known in the Palaearctic region (see GOZMÁNY, 2008).

Apiletria luella Lederer, 1855

General distribution: Northern Africa, Cyprus, Turkey, Syria, Lebanon and Jordan. Probably

sub-endemic to the Levant. In Israel: Mediterranean Zone. Hebron, Hedera, Ain Karim, Abu Gosh, Haifa (AMSEL, 1935; GOZMÁNY, 1965, 2008).

Biology unknown: Adults are on the wing from April until early July.

Apiletria nervosa Stainton, 1867

General distribution: Libya, Jordan and Iraq. (South-)Mediterranean. In Israel: Mediterranean Zone. Haifa (GOZMÁNY, 1965, 2008).

Biology unknown: Adults were so far only observed during April (STAINTON, 1867).

Apiletria purulentella Stainton, 1867

Material examined: 2 ♂♂, 3 ♀♀, Judean Hills, Jerusalem, V-2003; 1 ♂, 3 ♀♀, East Galilee, Yftach, 28-31-V-2003; 1 ♀, Dead Sea area, Jericho-Kalia, V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Turkey, Syria, Lebanon, Jordan, Iraq and Iran. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone and oases in Saharo-Sindian Zone. Jerusalem, Haifa, Jericho, Tabgha (GOZMÁNY, 2008).

Biology unknown: Adults are on the wing from April until mid-June (AMSEL, 1935; GOZMÁNY, 1965, 2008).

Parasymmoca latiusculella (Stainton, 1867)

Material examined: 1 ♂, Judean Hills, Jerusalem, V-2003, leg. G. Müller & V. Kravchenko (TAU).

General distribution: Turkey, Syria and Lebanon. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone. Jerusalem, Qiryat Anavim (GOZMÁNY, 2008).

Biology unknown: Adults are on the wing from late March until June (AMSEL, 1935; GOZMÁNY, 2008).

Symmoca saracenica Gozmány, 2008

General distribution: recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone. Tel-Aviv, Jaffa (GOZMÁNY, 2008).

Biology unknown.

Symmoca sparsella De Joannis, 1891

Material examined: 53 ♂♂ and ♀♀, Judean Hills, Jerusalem, 31-V / 6-VI-2003; 72 ♂♂ and ♀♀, East Galilee, Yftach, 28-31-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Syria, Lebanon, Jordan, Iraq and Egypt. Probably endemic to the Levant. In Israel: Mediterranean Zone. Tel-Aviv, Jerusalem, Ain Karim, Genezareth, Tabgha, Upper Galilee, Haifa, Artas, Wadi el Kelt (GOZMÁNY, 2008).

Biology unknown: Adults are on the wing from May until October, often found on the trunks of apple trees (AMSEL, 1935; GOZMÁNY, 2008).

Dysspastus djinn Gozmány, 1963

General distribution: Recorded only in Lebanon, Jordan and Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone and oases in Saharo-Sindian Zone. Tel-Aviv, Ramallah, Jerusalem, Genezareth, Beth Gordon, Jericho, Judea (GOZMÁNY, 2008).

Biology: Larvae live on dry stems of *Pinus halepensis* (Pinaceae) and *Tamarix aphylla* (Tamaricaceae). Adults are on the wing from April until June and from August until November (HALPERIN & SAUTER, 1992; GOZMÁNY, 2008).

Dysspastus hebraicus Gozmány, 2008.

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone. Javne (GOZMÁNY, 2008).

Biology: Larvae live on dry stems of *Schinus terebinthifolius* (Anacardiaceae). Adults are on the wing in June and from August until September (GOZMÁNY, 2008).

Chionellidea leucella (Amsel, 1934)

General distribution: Recorded only in Israel and Jordan. Probably endemic to the Levant. In Israel: oases in Saharo-Sindian Zone. Jericho, Georgscloster, Jordan bridge (AMSEL, 1934; GOZMÁNY, 2008).

Biology unknown: Adults are on the wing from March until May.

HOLCOPOGONINAE

Holcopogon croesus Gozmány, 2000

General distribution: Recorded only in Israel and Lebanon. Probably endemic to the Levant. In Israel: Mediterranean Zone. Hedera (GOZMÁNY, 2000).

Biology unknown. Adults are on the wing from May until June.

Charadraula parcella (Lederer, 1855)

= *Charadraula chersopsamma* Meyrick, 1931

Material examined: 1 ♂, Judean Hills, Jerusalem, V-2003; 1 ♂, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Syria, Lebanon and Egypt. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone. Jerusalem, Mt. Carmel, Haifa (GOZMÁNY, 2000).

Biology unknown. Adults are on the wing from June until July and from September until October (GOZMÁNY, 2000).

Turatia psammella (Amsel, 1934)

General distribution: Recorded only in Israel and Egypt. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone. Tel-Aviv (GOZMÁNY, 2000).

Biology unknown. Adults were so far only observed during May on coastal sand dunes (AMSEL, 1934; GOZMÁNY, 2000).

DEPRESSARIIDAE

Exaeretia ledereri (Zeller, 1854)

= *Depressaria xyleuta* Meyrick, 1913

= *Depressaria leviella* Amsel, 1934

Material examined: 1 ♂, holotype of *D. leviella*, Palästina expedition, Georgskloster, Wadi el Kelt, 15-IV-1930, leg. H. Amsel; 2 ♂♂, paratypes, Georgskloster, Jericho, 16-XI-1931, leg. W. Einsler (LSNK).

General distribution: Turkey, Caucasus and Central Asia. (East-)Mediterranean. In Israel: Mediterranean Zone and oases in Saharo-Sindian Zone. Jericho (AMSEL, 1934, 1935), Ben Schemen (BODENHEIMER, 1930).

Biology unknown. Adults are on the wing from mid-April until mid-November (AMSEL, 1935; LVOVSKY, 2006).

Exaeretia lutosella (Herrich-Schäffer, 1854)

Material examined: 1 ♀, Dead Sea area, Jericho-Kalia, V-2003, leg. G. Müller & V. Kravchenko (TAU).

General distribution: Southern Europe, Morocco, Turkey and Syria. (Circum-) Mediterranean. In Israel: Mediterranean Zone and oases in Saharo-Sindian Zone. Haifa, Jerusalem (CARADJA, 1920) and Jericho-Kalia.

Biology: Larvae feed on leaves of *Ruta* L. (Rutaceae) from March to April. Adults are on the wing from mid-April until mid-September (LHOMME, 1935; FETZ, 1994).

Agonopterix adspersella (Kollar, 1832)

= *Depressaria amanthicella* Heinemann, 1870

= *Depressaria karmeliella* Amsel, 1934

= *Depressaria rubripunctella* Amsel, 1934

Material examined: 3 ♂♂, Judean Hills, Jerusalem, V-2003; 2 ♀♀, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Central and Southern Europe, Caucasus, Turkey, Iran and Central Asia. (East-) Mediterranean. In Israel: Mediterranean Zone. Karmel near Haifa, Ain Karim near Jerusalem (AMSEL, 1934).

Biology: Larvae feed on leaves of *Bupleurum* L., *Meum* L., *Athamanta* L., *Seseli* L. (Apiaceae) from April to mid-June. Adults are on the wing from June until spring of the following year (SPULER, 1910; LHOMME, 1935; LVOVSKY, 2006).

Agonopterix atomella ([Denis & Schiffermüller], 1775)

General distribution: Central and Southern Europe, Northern Africa, Turkey and Syria. (Circum-) Mediterranean. In Israel: Mediterranean Zone. Haifa (KALCHBERG, 1897), inhabits mountains (AMSEL, 1933).

Biology: Larvae feed on leaves of *Genista* L., *Cytisus* L., *Sarothamnus* Wimm. (Fabaceae) from May to July. Adults are on the wing from mid-July until May of the following year (FETZ, 1994; HANNEMANN, 1995; LVOVSKY, 2006).

Agonopterix comitella (Lederer, 1855)

General distribution: Greece, Turkey, Syria, Lebanon and Iran. (East-) Mediterranean. In Israel: Mediterranean Zone. Kiriath Anavim 20 km W Jerusalem (AMSEL, 1935).

Biology: Larvae feed on leaves of *Anagyris foetida* (Fabaceae) from March to April. Adults are on the wing from May until July (AMSEL, 1935; ELLISON, WILTSHIRE, 1939).

Agonopterix ferulae (Zeller, 1847). **New Record for Israel**

Material examined: 1 ♀, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU).

General distribution: Southern Europe and Morocco. (Circum-) Mediterranean. In Israel: Mediterranean Zone.

Biology: Larvae feed on leaves of *Ferula communis* L. (Apiaceae) from February to March. Adults are on the wing from May until August (SPULER, 1910; LHOMME, 1935; GOZMÁNY, 1958).

Agonopterix irrorata (Staudinger, 1870)

General distribution: Southern Europe, Turkey, Syria and Lebanon. (East-) Mediterranean. In Israel: Mediterranean Zone. Ain Karim 10 km W Jerusalem (AMSEL, 1935).

Biology: Larvae feed on leaves of *Anthriscus silvestris* Hoffm. (Apiaceae) from January to June. Adults are on the wing from April until September (AMSEL, 1935; LHOMME, 1935; ELLISON, WILTSHIRE, 1939; LVOVSKY, 2006).

Agonopterix kaekeritziana (Linnaeus, 1767). **New Record for Israel**

= *Tinea liturella* [Denis & Schiffermüller], 1775.

= *Tinea flavella* Hübner, 1796.

Material examined: 4 ♂♂, 1 ♀, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Europe, Russia, Turkey, Iran and Mongolia. Palearctic. In Israel: Mediterranean Zone.

Biology: Larvae feed on the leaves of *Centaurea* L., *Cirsium* L., *Saussurea* DC., *Scabiosa* L., *Knautia* L. (Asteraceae) from May to June. Adults are on the wing from late June until May of the following year (FETZ, 1994; HANNEMANN, 1995; HARPER *et al*., 2002; LVOVSKY, 2006).

Agonopterix liodryas (Meyrick, 1921)

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone (Nazareth).

Biology unknown: Only one female was collected 2-IV-1920 (MEYRICK, 1921).

Agonopterix remota (Meyrick, 1921)

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone. Haifa (MEYRICK, 1921; AMSEL, 1933).

Biology unknown: Only one male was collected 21-I-1920 (MEYRICK, 1921).

Agonopterix rutana (Fabricius, 1794)

General distribution: Southern Europe, Northern Africa, Caucasus, Turkey and Central Asia. (East-)Mediterranean. In Israel: Mediterranean Zone. Upper Galilee, Coastal Plain, Judean Mts. (HALPERIN & SAUTER, 1992).

Biology: Larvae feed on leaves of *Ruta* L. (Rutaceae) from January to July. Adults are on the wing from mid-March until September, probably in 2 generations (STAINTON, 1870; HALPERIN & SAUTER, 1992; FETZ, 1994).

Agonopterix scopariella (Heinemann, 1870)

Material examined: 1 ♂, Judean Hills, Jerusalem, 6-VI-2003, leg. G. Müller & V. Kravchenko (TAU).

General distribution: Central and Southern Europe, Turkey and Lebanon. Mediterranean. In Israel: Mediterranean Zone. Jerusalem (AMSEL, 1935).

Biology: Larvae feed on leaves of *Sarothamnus* Wimm., *Cytisus* L., *Genista* L., *Lupinus* L., *Calicotome* Link. (Fabaceae) from April to mid-July. Adults are on the wing from May until the spring of the following year (LHOMME, 1935; FETZ, 1994, HANNEMANN, 1995; HARPER *et al*., 2002).

Agonopterix squamosa (Mann, 1864)

General distribution: Southern Europe, Turkey and Lebanon. Mediterranean. In Israel: Mediterranean Zone. Abu Gosch near Kiriath Anavim (AMSEL, 1935).

Biology unknown. Adults are on the wing from the end of June until April of the following year (SPULER, 1910; AMSEL, 1935; LHOMME, 1935).

Agonopterix straminella (Staudinger, 1859)

General distribution: Southern Europe, Northern Africa, Jordan and Iran. (Circum-) Mediterranean. In Israel: Mediterranean Zone. Kiriath Anavim 20 km W Jerusalem (AMSEL, 1935).

Biology: Larvae feed in the stems of *Echinops* L. and *Carduus* L. (Asteraceae) in March. Adults are on the wing from April until June (SPULER, 1910; AMSEL, 1935; LHOMME, 1935).

Agonopterix subpropinquella (Stainton, 1849)

= *Depressaria rhodochrella* Herrich-Schäffer, 1854

= *Depressaria keltella* Amsel, 1935

Material examined: 1 ♂, holotype of *Depressaria keltella*, Palästina, Jericho, ex larva on *Cirsium*, moth 2-V-1930, H. Amsel (LSNK).

General distribution: Central and Southern Europe, Northern Africa, Caucasus, Turkey, Syria, Lebanon and Iran. (Circum-) Mediterranean. In Israel: Mediterranean Zone and oases in Saharo-Sindian Zone. Jerusalem, Jericho, Tabgha (AMSEL, 1935).

Biology: Larvae feed on leaves of *Cirsium* L., *Centaurea* L., *Carduus* L., *Onopordum* L., *Arctium* L., *Cynara* L. (Asteraceae) from May to the beginning of July. Adults are on the wing from July until the end of spring of the following year (LHOMME, 1935; FETZ, 1994; HANNEMANN, 1995; LVOVSKY, 2006).

Agonopterix tabghaella (Amsel, 1934)

Material examined: 1 ♀, holotype, Tabgha, Tiberias, 1-V-1930, leg. H. Amsel (LSNK).

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone. Tabgha (AMSEL, 1934).

Biology: The only specimen was bred from larva on *Carduus* L. (Asteraceae). (AMSEL, 1935).

Agonopterix vasta (Amsel, 1934)

Material examined: 1 ♀, holotype, Palästina, Jericho, 28-XII-1930, leg. H. Amsel (LSNK).

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: oases in Saharo-Sindian Zone. Jericho.

Biology unknown. Only one specimen was collected (AMSEL, 1934, 1935).

Depressaria chaerophylli Zeller, 1839

General distribution: Central and Southern Europe, Libya, Caucasus and Turkey. Mediterranean. In Israel: Mediterranean Zone. Nazareth (BODENHEIMER, 1930).

Biology: Larvae feed in inflorescence (sometimes on leaves) of *Chaerophyllum* L., *Anthriscus* Hoffm., *Athamanta* L. (Apiaceae) from June to July. Adults are on the wing from mid-July until the end of spring of the following year (FETZ, 1994; HANNEMANN, 1995; LVOVSKY, 2006).

Depressaria chlorothorax Meyrick, 1921

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone. Nzareth (MEYRICK, 1921).

Biology unknown. Only one female was collected 15-II-1920 (MEYRICK, 1921).

Depressaria corticinella Zeller, 1854

General distribution: Southern Europe and Turkey. (East-)Mediterranean. In Israel: Mediterranean Zone. Ain Karim 10 km W Jerusalem (AMSEL, 1935).

Biology unknown. Adults are on the wing from May until July (AMSEL, 1935; GOZMÁNY, 1958).

Depressaria depressana (Fabricius, 1775)

General distribution: Central and Southern Europe, Northern Africa, Caucasus, Middle East, Central Asia and Southern Siberia. Palaearctic. In Israel: Mediterranean Zone and oases in Saharo-Sindian Zone. Tel-Aviv, Jericho (AMSEL, 1935).

Biology: Larvae feed in inflorescence (sometimes on leaves) of *Pimpinella* L., *Peucedanum* L., *Daucus* L. and other Apiaceae from June until July. Adults are on the wing from July until the end of spring of the following year (FETZ, 1994; HANNEMANN, 1995; LVOVSKY, 2006).

Depressaria floridella Mann, 1864

General distribution: Greece and Turkey. (East-) Mediterranean. In Israel: Mediterranean Zone. Haifa (KALCHBERG, 1897), in mountains (AMSEL, 1933).

Biology unknown. Adults were so far only observed in July.

Depressaria marcella Rebel, 1901

= *Depressaria cuprinella* Walsingham, 1907

Material examined: 1 ♀, Jerusalem, 2-V-1930, leg. H. Amsel (LSNK).

General distribution: Southern Europe, Northern Africa, Caucasus, Turkey, Syria and Iran. (Circum-)Mediterranean. In Israel: Mediterranean Zone. Haifa, mountains near Jerusalem (KALCHBERG, 1897; AMSEL, 1933).

Biology: Larvae feed in inflorescence of *Daucus carota* L. (Apiaceae) during June. Adults are on the wing from July until spring of the following year (LHOMME, 1935; LVOVSKY, 2006).

Depressaria ruticola Christoph, 1873

Material examined: 1 ♀, Georgskloster (Jericho), ex larva on *Haplophyllum*, 18-V-1930, leg. H. Amsel (LSNK).

General distribution: Northern Africa, Iran and Central Asia. (East-) Mediterranean. In Israel: oases in Saharo-Sindian Zone. Jericho (AMSEL, 1935).

Biology: Larvae feed on leaves of *Ruta* L. (Rutaceae) and *Haplophillum* Juss. (Tetradiclidaceae) from April to May. Adults are on the wing from May until spring of the following year (AMSEL, 1935; LVOVSKY, 2006).

Depressaria tenebricosa Zeller, 1854

= *Depressaria albiocellata* Staudinger, 1870.

= *Depressaria amblyopa* Meyrick, 1921.

Material examined: 1 ♂, Kiriath Anavim 20 km W Jerusalem, 22-IV-1930, leg. H. Amsel (DEI); 1 ♀, same label (LSNK); 1 male, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU).

General distribution: Southern Europe, Turkey, Syria, Jordan and Iran. (East-) Mediterranean. In Israel: Mediterranean Zone. Haifa (KALCHBERG, 1897; MEYRICK, 1921).

Biology: Unknown. Adults are on the wing all year around (SPULER, 1910; MEYRICK, 1921; AMSEL, 1935).

CRYPTOLECHIIDAE

Orophia imbutella (Christoph, 1888)

General distribution: Georgia and Turkey. (East-) Mediterranean. In Israel: Jerusalem (CARADJA, 1920).

Biology unknown: Adults are on the wing from end of May until July.

Zizyphia zizyphella Amsel, 1934

Material examined: 1 ♂, holotype, Jericho, 28-IV-1930, leg. H. Amsel; 3 ♂♂, 1 ♀, paratypes, Jericho, 28-IV / 4-V-1930, leg. H. Amsel (LSNK); 3 ♂♂, 1 ♀, Jericho, 30-IV-1930, leg. H. Amsel (ZIN).

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: oases in Saharo-Sindian Zone. Jericho.

Biology: Larvae feed on leaves of *Ziziphus spinachristi* Willd. (Rhamnaceae). Adults are on the wing from end of April until May (AMSEL, 1935).

Cacochroa permixtella (Herrich-Schäffer, 1854)

General distribution: Southern Europe and Turkey. (East-) Mediterranean. In Israel: Mediterranean Zone. Jerusalem (AMSEL, 1935).

Biology: Larvae are leaf-miners in *Phillyrea* L. (Oleaceae) during autumm, and after hibernation feed on spun leaves. Adults are on the wing from end of May until August (AMSEL, 1935; FETZ, 1994; TOKAR *et al*., 2005).

LECITHOCERIDAE
LECITHOCERINAE

Homaloxestis briantiella (Turati, 1879)

Material examined: 5 ♂♂, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Southern Europe, Northern Africa and Turkey. (Circum-) Mediterranean. In Israel: Mediterranean Zone. Hedera (AMSEL, 1935).

Biology: Larvae feed on plant debris from August to October. Adults are on the wing from late May until November, in 1-2 generations (GOZMÁNY, 1978).

Lecithocera anatolica Gozmány, 1978 **New Record for Israel**

Material examined: 21 ♂♂, 1 ♀, East Galilee, Yftach, 28-31-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Israel and Turkey. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone.

Biology: Unknown. Adults are on the wing during May.

Lecithocera syriella Gozmány, 1978

General distribution: Turkey and Syria. Probably sub-endemic to the Levant. In Israel: Mediterranean Zone (GOZMÁNY, 1978).

Biology: Unknown. Adults are on the wing from June until August.

Nyctocyrma fraudatrix Gozmány, 1978

General distribution: Recorded only in Israel. Probably endemic to the Levant. In Israel: Mediterranean Zone. Haifa.

Biology: Unknown. Adults are on the wing during May.

Remarks: According to GOZMÁNY (1978), one male of this species was erroneously determined as *Lecithocera luticornella* (Zeller, 1839) by AMSEL (1935).

ODITINAE

Odites kollarella (Costa, 1832)

= *Lita luteella* Duponchel, 1840

Material examined: 114 ♂♂ and ♀♀, Judean Hills, Jerusalem, 31-V / 6-VI-2003; 301 ♂♂ and ♀♀, East Galilee, Yftach, 28-31-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Southern Europe, Caucasus, Turkey and Turkmenistan. (East-) Mediterranean. In Israel: Mediterranean Zone. East Galilee, Ain Karim near Jerusalem (AMSEL, 1935).

Biology: Larvae feed on interlaced leaves of *Salvia officinalis* L. (Lamiaceae) during May. Adults are on the wing from May until August (SPULER, 1910; AMSEL, 1935; LHOMME, 1935; GOZMÁNY, 1958; LVOVSKY, 1996).

Odites ternatella (Staudinger, 1859)

Material examined: 3 ♂♂, 4 ♀♀, East Galilee, Yftach, 28-V-2003, leg. G. Müller & V. Kravchenko (TAU, ZIN).

General distribution: Mauritania, Portugal, Spain, Italy and Cyprus. (Circum-) Mediterranean. In Israel: Mediterranean Zone (AMSEL, 1933).

Biology: Unknown. Adults are on the wing from late May until July (SPULER, 1910; LVOVSKY, 1996).

Discussion

The Oecophoridae are distributed worldwide, in the Levant (Lebanon, Syria, Israel, Jordan) 32 species are known altogether (AMSEL, 1933, 1934, 1935, 1955; ZERNY, 1934; OSTHELDER, 1936; HARIRI, 1971; BACK, 1973; HALPERIN, SAUTER, 1992; HANNEMANN, 1997), of which 17 species are known from Israel including three species recorded for Israel for the first time: *Dasycera intermediella*, *Batia internella* and *Carcina quercana*. Most species of the Oecophoridae are associated with forest habitats, but the subfamily Pleurotinae (6 species in Israel) occurs mainly in open and xerophilous habitats.

The Autostichidae are represented by 31 species in the Levant (AMSEL, 1933, 1935; HARIRI, 1971; GOZMÁNY, 2000, 2008), among which 16 are found in Israel including 2 species recorded for Israel for the first time: *Oegoconia deauratella* and *O. caradjai*. The larvae of the Autostichidae prefer xerophytic habitats.

Species of the family Depressariidae are distributed mainly in the forest zone of the northern hemisphere, penetrating far to the south in mesophilic, especially intrazonal biotopes. In Israel 25 species of this family have been recorded so far including 2 species recorded for Israel for the first time: *Agonopterix ferulae* and *A. kaekeritziana*. 10 more species are known from the other parts of Levant (CARADJA, 1920; AMSEL, 1933, 1934, 1935; OSTHELDER, 1936; ELLISON, WILTSHIRE, 1939; HARIRI, 1971; HANNEMANN, 1976, 1995; HALPERIN & SAUTER, 1992).

Only four species of the poorly known family Cryptolechiidae are know from the Levant (CARADJA, 1920; AMSEL, 1933, 1935; SATTLER, 1968). Three were found in Israel by CARADJA (1920) and AMSEL (1933, 1935).

Species of the family Lecithoceridae are common in subtropical and tropical forests of the Old World. Eight species of this family are recorded from the Levant (GOZMÁNY, 1978). In Israel the Lecithoceridae are represented by six species, including *Lecithocera anatolica* recorded for Israel for the first time.

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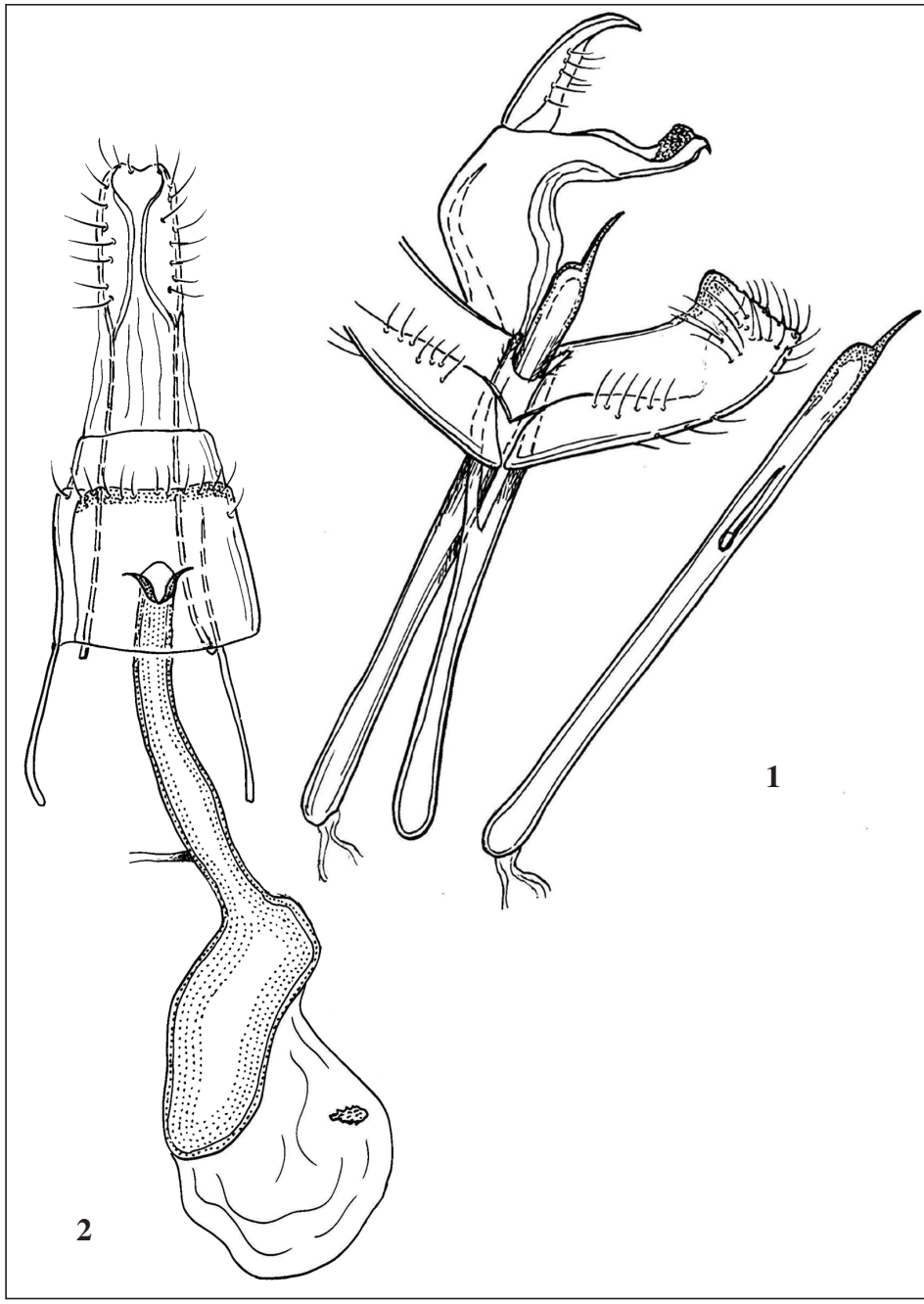

Figs. 1-2.– *Epicallima einsleri* (Amsel). **1.** Male genitalia, paratype, **2.** Female genitalia, paratype.

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    Book:
    HIGGINS, L. O., 1975.- *The Classification of European Butterflies*: 320 pp. Collins, London.
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Borboletas frugívoras em Florestas de Mata Atlântica do Parque Nacional do Iguaçu, Paraná, Brasil (Lepidoptera: Nymphalidae)

C. Graciotim & A. B. B. Morais

Resumo

Borboletas frugívoras, facilmente coletadas através de armadilhas com isca atrativa, podem ser utilizadas em estudos ecológicos comparativos, através de protocolo de amostragem. Desta forma, o presente estudou buscou comparar as assembleias de borboletas frugívoras quanto à abundância, riqueza e composição das espécies em duas fitofisionomias de Mata Atlântica do Parque Nacional do Iguaçu: Floresta Estacional Semidecídua (FES) e Floresta Ombrófila Mista (FOM). Para isso, foram realizadas amostragens mensais entre novembro de 2012 e maio de 2013 através de armadilhas atrativas do tipo Van Someren-Rydon com isca constituída de banana amassada fermentada em caldo de cana. Em cada fitofisionomia, utilizaram-se 15 armadilhas em transectos pré-definidos, revisadas a cada 24 h ao longo de cinco dias por ocasião amostral. Ao final de seis amostragens e 900 armadilhas/dia de esforço total foram registrados 1.127 indivíduos pertencentes a 69 espécies e 4 subfamílias de borboletas frugívoras. Satyrinae foi subfamília mais abundante e com maior riqueza de espécies. Considerando a abundância das espécies, 604 (52,54% dos indivíduos) foram amostrados em FES, enquanto 523 (47,46%) em FOM. A análise de rarefação apresentou maior riqueza significativa de espécies em FES, com 65 espécies observadas, enquanto FOM apresentou 55. As curvas de acúmulo de espécies não atingiram a assíntota para cada uma das fitofisionomias. Da mesma forma, os estimadores analíticos de riqueza Jacknife 1 e Bootstrap calculados apresentaram valores superiores à riqueza amostrada para ambas as áreas indicando que mais espécies poderiam ser observadas com aumento de esforço amostral. Trinta e oito espécies constituíram novos registros para o Parque Nacional do Iguaçu. Apenas uma espécie em cada fitofisionomia foi dominante, sendo *Memphis moruus stheno* (Prittwitz, 1865) em FES e *Pareuptychia summandosa* (Gosse, 1880) em FOM. Os resultados aqui obtidos demonstram que a guilda de borboletas frugívoras do Parque Nacional do Iguaçu apresenta composição e riqueza de espécies expressivas. Além disso, aliados aos demais estudos locais e regionais, podem gerar informações para a conservação e manejo de áreas reservadas para a proteção de biodiversidade.
PALAVRAS CHAVE: Lepidoptera, Nymphalidae, conservação, diversidade, inventário, riqueza de espécies, Brasil.

Fruit-feeding butterflies in Atlantic forests of Iguassu National Park, Parana, Brazil (Lepidoptera: Nymphalidae)

Abstract

Fruit-feeding butterflies easily collected with attractive bait traps can be used in comparative ecological studies through sampling protocol. Thus, the present study is aimed at comparing the fruit-feeding butterfly assemblages of two Atlantic forest phytophysiognomies in Iguassu National Park: Semideciduous forest (FES) and Araucaria forest (FOM) in relation to abundance, richness and species composition. Field work was carried out monthly between November 2012 and May 2013, using Van Someren-Rydon traps with bait consisting of mashed banana in fermented sugarcane juice. For each phytophysiognomy, we used 15 traps in pre-defined transects that were revised every 24 h during five days per sampling occasion. After six samplings and 900 trap/day as total effort, 1,127 individuals representing 69 species and 4 subfamilies of fruit-feeding butterflies were recorded. Satyrinae was the most abundant subfamily with the greatest species richness. Considering species abundance, 604 (52.54 % of the

individuals) were collected in FES, while 523 (47.46 %) in FOM. The rarefaction showed a significantly greater richness of species in FES which 65 species observed while FOM showed 55. Species accumulation' curves did not reach the asymptote for each phytophysiognomy. Similarly, the calculated richness analytical estimators Jacknife 1 and Bootstrap showed higher values than the richness sampled in both areas indicating that more species could be observed with an increased sampling effort. Thirty-eight species were new records for the Iguassu National Park. Only one species for each phytophysiognomy was dominant, *Memphis moruus stheno* (Prittwitz, 1865) in FES and *Pareuptychia summandosa* (Gosse, 1880) in FOM. The results obtained demonstrate that the fruit-feeding butterflies' guild of Iguassu National Park has substantial composition and species richness. Furthermore, combined with other local and regional studies, they shall generate information for the conservation and management of reserved areas for biodiversity protection.
KEY WORDS: Lepidoptera, Nymphalidae, conservation, diversity, inventory, species richness, Brazil.

Mariposas frugívoras en el bosque Atlántico del Parque Nacional de Iguazú, Paraná, Brasil (Lepidoptera: Nymphalidae)

Resumen

Mariposas frugívoras fácilmente capturadas con trampas de cebo, pueden ser usadas en estudios ecológicos comparativos, a través de un protocolo de muestreo. Por lo tanto, el estudio actual compara la agrupación de dos fitofisionomías del Bosque Atlántico del Parque Nacional de Iguazú: Bosque Semicaducifolio (FES) y bosque de Araucaria (FOM) en relación con la abundancia, riqueza y composición de especies. El trabajo de campo fue llevado a cabo mensualmente entre noviembre de 2012 y mayo de 2013, usando trampas Van Someren-Rydon con cebo de plátano aplastado, en jugo de caña de azúcar fermentado. Por cada fitofisionomía, usamos 15 trampas en transectos predefinidos que fueron revisadas cada 24 horas, durante cinco días por cada muestra. Al final de seis muestreos y 900 trampas/día del esfuerzo total, fueron registrados 1.127 individuos representando 69 especies y 4 subfamilias de mariposas frugívoras. Los Satyrinae son la subfamilia más abundante y con la mayor riqueza de especies. Considerando la abundancia de especies, 604 (52.54 % de los individuos) fueron colectados en FES, mientras que 523 (47.46 %) en FOM. El índice de rareza muestra la riqueza de especies significativamente mayor en FES con 65 especies observadas mientras que en FOM se observa 55. Las curvas de acumulación de especies no llegaron a la asíntota para cada fitofisionomía. De forma similar, el cálculo analítico de la estimación de riqueza Jacknife 1 y Bootstrap, mostraban valores más altos que la abundancia probada en ambas áreas, valores que podrían alcanzarse con un mayor esfuerzo de muestreo. Treinta y ocho especies son nuevos registros para el Parque Nacional de Iguazú. Sólo una especie por cada fitofisionomía fue dominante, siendo *Memphis moruus stheno* (Prittwitz, 1865) en FES y *Pareuptychia summandosa* (Gosse, 1880) en FOM. Los resultados obtenidos demuestran que las mariposas frugívoras del Parque Nacional de Iguazú tienen una abundante composición y riqueza de especies. Además, combinando con otros estudios locales y regionales, generarán información para la conservación y protección del medio ambiente y el mantenimiento de áreas reservadas para la protección de la biodiversidad.
PALABRAS CLAVE: Lepidoptera, Nymphalidae, conservación, diversidad, inventario, riqueza de especies, Brasil.

Introdução

Dentre os diversos grupos de fauna utilizados como principais alicerces para as práticas conservacionistas, as borboletas têm se tornado importantes ferramentas para estudos de biodiversidade (BROWN JR. & FREITAS, 2000a; UEHARA-PRADO *et al*., 2005, 2007; BONEBRAKE *et al*., 2010), possuindo ainda um valor particular como indicadores ecológicos (MURPHY, FREAS & WEISS, 1990).

Borboletas frugívoras, facilmente capturadas através de armadilhas com isca atrativa (DEVRIES & WALLA, 2001; UEHARA-PRADO *et al*., 2005), são altamente correlacionadas com a conectividade da paisagem (BROWN JR. & FREITAS, 2000a; HORNER-DEVINE *et al*., 2003) e riqueza total do ambiente (UEHARA-PRADO *et al*., 2009). Desta forma, podem ser utilizadas em estudos ecológicos comparativos, seguindo protocolo de amostragem (DEVRIES & WALLA, 2001; RIBEIRO *et al*., 2008, 2012). Espécies pertencentes a esta guilda são da família Nymphalidae e estão distribuídas em quatro

subfamílias: Satyrinae, Charaxinae, Biblidinae e Nymphalinae (tribo Coeini) (WAHLBERG *et al*., 2009).

O bioma Mata Atlântica inclui paisagens naturais muito complexas ao longo de sua extensão territorial abrangendo variações de clima e relevo, e devido a isso, sua biota é também muito diversificada (GALINDO-LEAL & CÂMARA, 2003; RIBEIRO *et al*., 2009; FUNDAÇÃO SOS MATA ATLÂNTICA & INPE, 2011). Acredita-se que este bioma abrigue de 1 a 8% de toda biodiversidade mundial (LAGOS & MULLER, 2007), incluindo a maioria das espécies oficialmente ameaçadas de extinção no Brasil (MORELLATO & HADDAD, 2000; TABARELLI *et al*., 2005). Portanto, devido ao seu alto grau de biodiversidade e endemismo e à elevada taxa de desmatamento, está entre os cinco principais "hotspots" do mundo (MORELATTO & HADDAD, 2000; MYERS *et al*., 2000; CONSERVAÇÃO INTERNACIONAL, 2013).

O estado atual de conservação das formações florestais da Mata Atlântica brasileira é critico, uma vez que seus remanescentes encontram-se altamente fragmentados (GALINDO-LEAL & CÂMARA, 2003; RIBEIRO *et al*., 2008, 2012; FUNDAÇÃO SOS MATA ATLÂNTICA & INPE, 2011), apesar do grande número de áreas protegidas (GALINDO-LEAL & CÂMARA, 2003). No estado do Paraná, originalmente coberto em 98% do seu território por esse bioma, hoje restam apenas pouco mais de 10% de florestas naturais bem conservadas. Dentre elas, o Parque Nacional do Iguaçu resguarda o maior remanescente contínuo de Mata Atlântica da região sul do Brasil, com área total de 185.262,5 ha inteiramente contido em uma Unidade de Conservação (UC) de proteção integral (IBAMA, 1999; GALINDO-LEAL & CÂMARA, 2003). Esta UC tem continuidade física no país vizinho, Argentina, no Parque Nacional Iguazú, com 67.620 ha de área, totalizando mais de 252.000 ha de florestas protegidas (IBAMA, 1999; SALAMUNI *et al*., 2002). Em relação ao tipo de fitofisionomia florestal, dentro do Parque Nacional do Iguaçu encontra-se o maior e melhor conservado fragmento de Floresta Estacional Semidecídua do Paraná. Além desta formação, a porção norte do Parque é ocupada por Floresta Ombrófila Mista, a Floresta de Araucárias, de ocorrência predominante no sul do Brasil, e também sob forte ameaça de extinção (IBAMA, 1999).

Apesar dos estudos pioneiros padronizados na região Neotropical envolvendo borboletas frugívoras datarem dos anos noventa (DEVRIES *et al*., 1997, 1999), as informações sobre a guilda de borboletas frugívoras na região sul do Brasil eram muitas vezes incompletas em relação às localidades estudadas, períodos de coleta e esforço amostral empregado. Mais recentemente, porém, tem surgido um número crescente de publicações bastante detalhadas (PEDROTTI *et al*., 2011; SANTOS *et al*., 2011; BELLAVER *et al*., 2012; CORSO & HERNÁNDEZ, 2012; SILVA *et al*., 2013; PAZ *et al*., 2014), a maioria referente ao estado do Rio Grande do Sul. No estado do Paraná, a fauna frugívora encontra-se ainda sub-representada nos inventários. Os estudos existentes abrangem principalmente a região oeste do Estado, nos municípios de Curitiba e arredores (MIELKE, 1994; BONFFANTI *et al*., 2011) Guarapuava (DOLIBAINA *et al*., 2011), o cerrado meridional de Jaguariaíva (CASAGRANDE *et al*., 2012) e o Parque Estadual de Vila Velha (Ponta Grossa) (MIELKE *et al*., 2012), constituindo-se todos em inventários da fauna total de borboletas.

No Parque Nacional do Iguaçu, estudos prévios com a fauna de borboletas envolveram a elaboração de uma lista de 257 espécies, pertencentes em sua grande maioria à família Hesperiidae, publicada no Plano de Manejo do Parque (MIELKE, 1968; IBAMA, 1999). Posteriormente, inventários padronizados com uso de rede entomológica e armadilhas atrativas (C. GRACIOTIM, dados não publicados) compilaram as espécies de borboletas ocorrentes na área de turismo e uso público do Parque. Esta região sofreu forte impacto antrópico devido à intensa exploração madeireira antes de se tornar uma UC, e hoje é considerada zona de uso público e visitação das Cataratas do Iguaçu. Assim, o objetivo do presente estudo é aprofundar o conhecimento da fauna de borboletas frugívoras do Parque Nacional do Iguaçu através da realização de inventário em duas fitofisionomias ainda preservadas de Mata Atlântica, a Floresta Estacional Semidecídua e a Floresta Ombrófila Mista, localizadas na zona intangível ao norte do Parque. Além disso, espera-se fornecer subsídios para o conhecimento e conservação dessa fauna através de comparação com outros estudos realizados no Brasil e Argentina, bem como propiciar o acúmulo de informações sobre ecologia e biologia das espécies.

Material e Métodos

Área de estudo

O Parque Nacional do Iguaçu (Parna do Iguaçu) (Figura 1) está localizado na porção oeste do estado do Paraná (25º 05' e 25º 40'S e 54º 30' e 54º 40'W). O clima, segundo a classificação global de Köppen, é do tipo Cfa, caracterizado como temperado subtropical úmido, com estações de inverno e verão bem definidas, onde as chuvas encontram-se distribuídas igualmente ao longo de todo o ano. A temperatura local varia entre 40º C de temperatura máxima e 3º C mínima, tendo como média máxima cerca de 26º C e mínima de 15º C e a pluviosidade média anual é de 1.700 mm, com umidade relativa do ar predominantemente alta, raramente abaixo de 80%, mesmo nos períodos mais secos do ano. A altitude varia de 150 m na porção sul, atingindo 700 m na porção norte do Parque (IBAMA, 1999; SALAMUNI *et al*., 2002).

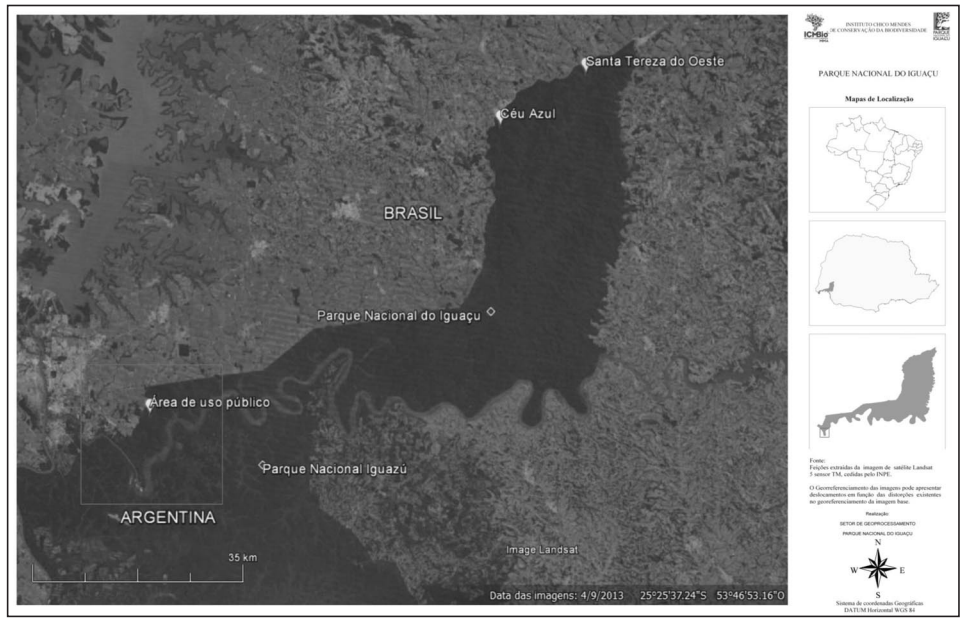

Figura 1.– Localização das áreas de estudo do Parque Nacional do Iguaçu, Paraná, Brasil. Fonte: ICMBio.

A área do Parque abrange territórios de 14 municípios, com formações florestais heterogêneas e diferindo de acordo com a altitude, solo e clima. A vegetação predominante é a Floresta Estacional Semidecídua, ocorrendo da porção sul até altitudes de 450 m. A partir daí, ocorre a Floresta Ombrófila Mista, cujas árvores maiores atingem alturas de 35 m, sendo comum a presença de troncos com mais de um metro de diâmetro, nas regiões melhor conservadas (IBAMA, 1999).

Foram selecionadas duas áreas amostrais na porção norte do Parque: a primeira no município de Céu Azul (25º 09' 16,4"S e 53º 50' 31,5"W), sob domínio da Floresta Estacional Semidecídua (FES), a 400 m de altitude. A segunda, localizada no município de Santa Tereza do Oeste, (25º 04' 13,1"S e 53º 39' 32,9"W), abrange o domínio da Floresta Ombrófila Mista (FOM) e se encontra a 650 m de altitude.

Amostragem

As armadilhas foram dispostas em um transecto pré-definido para cada área amostral. Em cada uma delas, foram realizadas amostragens mensais com duração de cinco dias, entre novembro de 2012 a maio de 2013, seguindo metodologia padronizada adaptada de UEHARA-PRADO *et al*. (2005). A escolha do período amostral baseou-se na constatação de que verão e outono são as estações do ano associadas à maior diversidade de borboletas frugívoras (RIBEIRO *et al*., 2010). Para a captura dos espécimes, utilizaram-se armadilhas do tipo Van Someren-Rydon modificadas (DEVRIES *et al*., 1997), dispostas linearmente em três unidades amostrais (UAs), distanciadas a cada 100 m. Cada UA era composta por cinco armadilhas instaladas em intervalos de 10 m, totalizando 15 em cada área amostral. As armadilhas foram dispostas em dois níveis de altura do solo, intercaladas em 2 e 8 m aproximadamente, e eram instaladas na parte da manhã do primeiro dia sendo revisadas a cada 24 h para coleta e reposição da isca (HUGHES *et al*., 1998). A isca constituiu-se de uma mistura de banana amassada com caldo de cana, fermentada por 48 h (DEVRIES *et al*., 1997).

Uma vez retiradas da armadilha, as borboletas foram identificadas, acondicionadas em envelope entomológico e conduzidas ao laboratório, para posterior montagem e/ou confirmação da identificação com auxílio de bibliografia especializada ou consulta a especialistas. A nomenclatura dos espécimes seguiu LAMAS (2004) e atualizações posteriores, sendo que as categorias supragenéricas foram modificadas segundo WAHLBERG *et al*. (2009), considerando Brassolini e Morphini como tribos de Satyrinae.

Os indivíduos foram capturados através de licença concedida pelos órgãos reguladores (Ministério do Meio Ambiente / Instituto Chico Mendes de Conservação da Biodiversidade / SISBio). O material testemunho encontra-se depositado na coleção de referência do laboratório de Interações Inseto-Planta da Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brasil.

Análise de dados

Os dados foram analisados a partir dos valores de riqueza (S), abundância (N) e frequência relativa (fr). Para análise da abundância das espécies, foram consideradas "abundantes" aquelas que possuíram as mais altas frequências absolutas, e como "dominantes" as que apresentaram frequência relativa maior que 10% (fr>0,1). Foram construídas curvas de acúmulo de espécies para cada fitofisionomia e calculados estimadores analíticos de riqueza, tendo sido selecionados os que melhor atenderam a representatividade das amostras de acordo com as premissas de: a) estabilidade no desvio padrão independente do tamanho da amostra e b) estabilização com o menor esforço de coleta (MAGURRAN, 2004). Para comparar os valores de riqueza de espécies nas duas fitofisionomias foi realizada uma rarefação baseada em indivíduos, com os respectivos intervalos de confiança a 95%. As análises estatísticas foram realizadas através dos softwares EstimateS 9.1.0. (COLWELL, 2013) e PAST 3.0 (HAMMER *et al*., 2001).

Para a confirmação de novos registros para o estado do Paraná, foram consultados os trabalhos de CASAGRANDE & MIELKE (1992), MIELKE (1994), DOLIBAINA *et al*. (2010, 2011), BONFFANTI *et al*. (2011), CASAGRANDE *et al*. (2012) e GARCIA-SALIK *et al*. (2014). Já registros inéditos para o Parna do Iguaçu foram confirmados a partir de consulta a lista constante no Plano de Manejo do Parque Nacional do Iguaçu (IBAMA, 1999).

Os Nymphalinae *Colobura dirce dirce* (Linnaeus, 1758) e *Smyrna blomfildia blomfildia* (Fabricius, 1781), atualmente pertencentes a tribo Nymphalini (WARREN, 2013), foram incluídos na lista de espécies por serem considerados frugívoros nos demais trabalhos com o grupo, estando incluídos até recentemente na tribo Coeini (LAMAS, 2004).

Resultados

Com um esforço total de 900 armadilhas/dia, foram amostrados 1.127 indivíduos, pertencentes a

69 espécies de borboletas frugívoras, nas duas fitofisionomias florestais do Parque Nacional do Iguaçu (Tabela I). A subfamília com maior abundância foi Satyrinae, com 625 indivíduos, representada por 55,46% do total, seguida por Biblidinae (311 indivíduos; 27,59%), Charaxinae (155 indivíduos; 13,75%) e Nymphalinae (36 indivíduos; 3,19%). A ordem de representatividade da riqueza total foi a mesma, com 38 espécies pertencentes à subfamília Satyrinae (55,07%), 19 a Biblidinae (27,54%), nove a Charaxinae (13,04%) e três a Nymphalinae (4,35%).

Tabela I.– Lista de espécies de borboletas frugívoras registradas nas duas fitofisionomias florestais do Parque Nacional do Iguaçu, Paraná, Brasil, entre novembro de 2012 e maio de 2013. FES: Floresta Estacional Semidecídua; FOM: Floresta Ombrófila Mista. *Novos registros para o Parque Nacional do Iguaçu.

TÁXON	**FES**	**FOM**
SATYRINAE (S=38)		
Brassolini (S=7)		
**Blepolenis batea* (Hübner, [1821])	2	4
**Caligo beltrao* (Illiger, 1801)	5	0
**Catoblepia amphirhoe* (Hübner, [1825])	2	5
**Catoblepia berecynthia unditaenia* Frühstorfer, 1907	8	1
**Eryphanis reveesi pusillus* Stichel, 1904	4	6
**Opsiphanes invirae amplificatus* Stichel, 1904	1	0
**Opsiphanes quiteria meridionalis* Staudinger, 1887	1	3
Melanitini (S=1)		
Manataria hercyna (Hübner, [1821])	7	9
Morphini (S=2)		
**Morpho helenor achillides* C. Felder & R. Felder, 1867	10	3
**Pessonia epistrophus titei* Le Moult & Réal, 1962	1	18
Satyrini (S=28)		
**Capronnieria galesus* (Godart, [1824])	26	14
Carminda paeon (Godart, 1824)	3	7
**Cissia terrestris* (Butler, 1867)	43	35
Eteona tisiphone (Boisduval, 1836)	1	2
**Euptychoides castrensis* (Schaus, 1902)	4	30
Forsterinaria necys (Godart, [1824])	7	10
Forsterinaria quantius (Godart, [1824])	3	2
Godartiana muscosa (Butler, 1870)	1	6
Hermeuptychia hermes (Fabricius, 1775)	3	0
**Hermeuptychia fallax* (C. Felder & R. Felder 1862)	3	0
Hermeuptychia sp.	4	0
Moneuptychia soter (Butler, 1877)	3	11
Pareuptychia summandosa (Gosse, 1880)	49	65
**Paryphthimoides phronius* (Godart, [1824])	4	2
Paryphthimoides sp.	0	1
**Paryphthimoides poltys* (Prittwitz, 1865)	51	32
Praepedaliodes phanias (Hewitson, 1862)	3	5
**Pseudodebis euptychidia* (Butler, 1868)	5	39
Splendeuptychia libitina (Butler, 1870)	3	2
**Taygetis acuta* Weymer, 1910	7	0
**Taygetis ruffomaginata* Staudinger, 1888	14	5
**Taygetis sylvia* Bates, 1866	3	4
**Taygetis tripunctata* Weymer, 1907	2	0

**Taygetis ypthima* Hübner, [1821]	4	2
**Yphthimoides celmis* (Godart, [1824])	5	3
**Yphthimoides ochracea* (Butler, 1867)	2	3
Ypththimoides sp.1	0	1
Ypththimoides sp.2	0	1
CHARAXINAE (S=9)		
Anaeini (S=6)		
Consul fabius drurii (Butler, 1874)	5	1
**Fontainea ryphea phidile* (Geyer, 1837)	1	2
Hypna clytemnestra huebneri Butler, 1866	6	0
**Memphis acidalia victoria* (H. Druce, 1877)	11	1
Memphis moruus stheno (Prittwitz, 1865)	61	45
**Zaretis isidora* (Cramer, 1779)	6	4
Preponini (S=3)		
**Archaeoprepona demophoon thalpius* (Hübner, [1814])	3	3
**Archaeoprepona demophoon demophoon* (Hübner, [1814])	1	2
**Prepona pylene* Hewitson, [1854]	3	0
BIBLIDINAE (S=19)		
Ageroniini (S=5)		
Ectima thecla (Fabricius, 1796)	1	4
**Hamadryas amphinome* (Linnaeus, 1767)	1	0
Hamadryas epinome (C. Felder & R. Felder, 1867)	51	17
Hamadryas februa (Hübner, [1823])	2	0
**Hamadryas fornax* (Hübner, [1823])	1	0
Biblidini (S=1)		
Biblis hyperia nectanabis (Fruhstorfer, 1909)	48	43
Callicorini (S=4)		
Callicore hydaspes (Fabricius, 1781)	7	0
Callicore pygas thamyras (Ménétriés, 1857)	2	5
Diaethria clymena janeira (C. Felder, 1862)	8	2
**Haematera pyrame* (Hübner, [1819])	2	1
Catonephelini (S=5)		
Catonephele acontius caeruleus Jenkins, 1985	2	1
**Catonephele numilia neogermanica* Stichel, 1899	12	22
Eunica eburnea Fruhstorfer, 1907	8	1
Eunica tatila bellaria Fruhstorfer, 1908	2	1
Myscelia orsis (Drury, 1782)	6	1
Epiphelini (S=4)		
Epiphile hubneri Hewitson, 1861	14	19
Epiphile orea (Hübner, [1823])	0	2
**Pyrrhogyra neaerea arge* Gosse, 1880	2	1
**Temenis laothoe meridionalis* Fruhstorfer, 1907	16	6
NYMPHALINAE (S=3)		
Coeini (S=1)		
**Historis odius* Lamas, 1995	3	0
Nymphalini (S=2)		
**Colobura dirce* (Linnaeus, 1758)	9	2
**Smyrna blomfildia* (Fabricius, 1781)	16	6

Considerando as duas fitofisionomias florestais amostradas no Parna do Iguaçu, a abundância total e riqueza de espécies apresentaram-se maiores em FES, com 604 indivíduos observados, pertencentes a 65 espécies, enquanto em FOM foram registrados 523 indivíduos de 55 espécies. As representatividades de abundância e riqueza por subfamília seguiram a mesma ordem de grandeza registrada para os valores totais (Tabela II). Os resultados da rarefação (Figura 2) apontam a maior riqueza significativa de espécies em FES. Analisando ainda o padrão de acúmulo de espécies (Figura 3) pode-se observar que as curvas não atingiram a assíntota apresentando-se sempre ascendentes, indicando que uma vez aumentado o esforço amostral mais espécies poderiam ser observadas em ambas as áreas. Da mesma forma, as estimativas do número de espécies de borboletas frugívoras ocorrentes para cada fitofisionomia do Parque, obtidas através dos estimadores analíticos Jacknife1 e Bootstrap apontaram valores maiores do que os amostrados, corroborando as curvas de suficiência amostral obtidas.

Tabela II.– Abundância (N) e riqueza de espécies (S) das subfamílias de borboletas frugívoras amostradas nas fitofisionomias florestais do Parque Nacional do Iguaçu, Paraná, Brasil, entre novembro de 2012 e maio de 2013. FES: Floresta Estacional Semidecídua; FOM: Floresta Ombrófila Mista. Os valores de porcentagem (%) referem-se à abundância e riqueza totais por fitofisionomia, respectivamente.

	FES				FOM			
Subfamílias	**N**	**%**	**S**	**%**	**N**	**%**	**S**	**%**
Satyrinae	294	48,67	35	53,85	331	63,29	31	56,36
Charaxinae	97	16,06	9	13,85	58	11,09	7	12,73
Biblidinae	185	30,63	18	27,69	126	24,09	15	27,27
Nymphalinae	28	4,64	3	4,62	8	1,53	2	3,64
TOTAL	**604**		**65**		**523**		**55**	

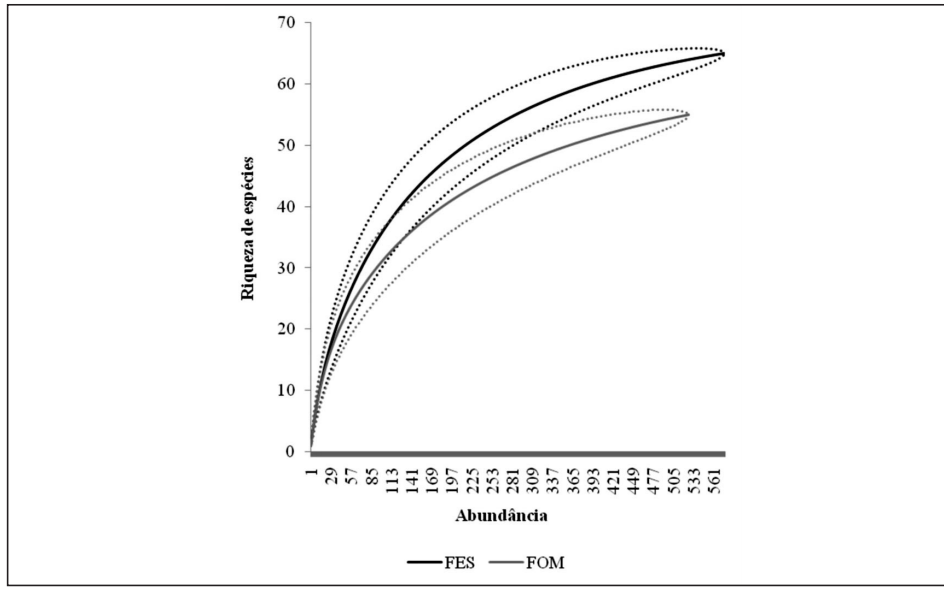

Figura 2.– Curvas de rarefação (limites de confiança de 95%) baseadas em indivíduos das assembleias de borboletas frugívoras amostradas com armadilhas Van Someren-Rydon em duas fitofisionomias do Parque Nacional do Iguaçu, no período de novembro de 2012 a maio de 2013. FES: Floresta Estacional Semidecídua; FOM: Floresta Ombrófila Mista.

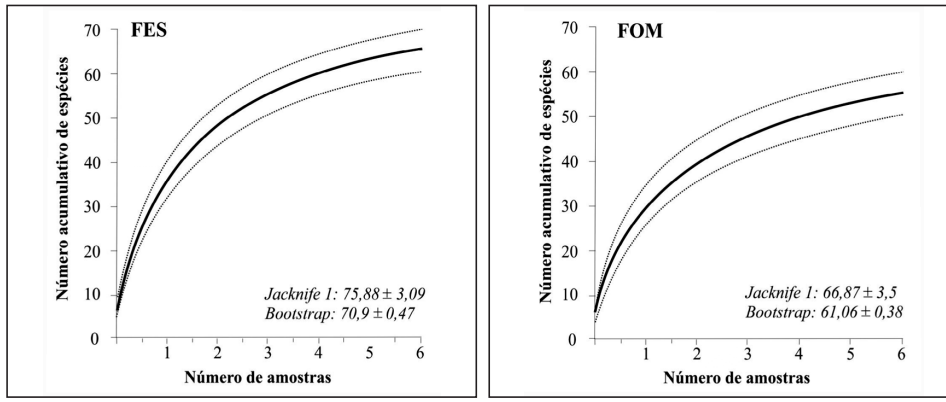

Figura 3.– Curvas de acumulação de espécies para as assembleias de borboletas frugívoras amostradas com armadilhas Van Someren-Rydon em duas fitofisionomias do Parque Nacional do Iguaçu, no período de novembro de 2012 a maio de 2013. FES: Floresta Estacional Semidecídua; FOM: Floresta Ombrófila Mista.

Trinta e oito espécies de borboletas frugívoras constituíram novos registros para o Parque Nacional do Iguaçu, 23 Satyrinae, seis Charaxinae, seis Biblidinae e três Nymphalinae (Tabela I).

No total, as três espécies de borboletas mais abundantes foram *Pareuptychia summandosa* (Gosse, 1880) (Satyrinae), com 114 indivíduos observados, seguida de *Memphis moruus stheno* (Prittwitz, 1865) (Charaxinae) (N=106) e *Biblis hyperia nectanabis* (Fruhstorfer, 1909) (Biblidinae) (N=91). Comparando por fitofisionomia, pode-se destacar ainda *Hamadryas epinome* (C. Felder & R. Felder, 1867) (Biblidinae), *Paryphthimoides poltys* (Prittwitz, 1865) e *Cissia terrestris* (Butler, 1867) (Satyrinae) em FES; e *Pseudodebis euptychidia* (Butler, 1868), *C. terrestris* e *P. poltys* em FOM (Tabela I).

Considerando as frequências relativas, apenas uma espécie pode ser considerada dominante em relação à abundância total, *P. summandosa*, e, da mesma forma, ao comparar as distribuições das duas fitofisionomias, somente uma espécie apresentou-se dominante em cada uma delas, respectivamente *M. moruus stheno* em FES e *P. summandosa* em FOM (Figura 4).

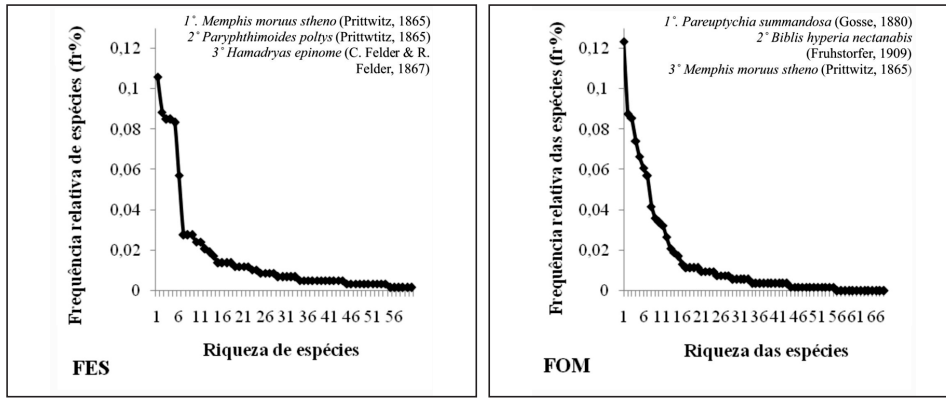

Figura 4.– Distribuição das frequências relativas (fr%) das espécies de borboletas frugívoras na Floresta Estacional Semidecídua (FES) e Floresta Ombrófila Mista (FOM) do Parque Nacional do Iguaçu, amostradas no período de novembro de 2012 a maio de 2013.

No total, seis espécies foram representadas por um único indivíduo ("singletons") e três por dois indivíduos ("doubletons"). Foram elas, respectivamente, os singletons *Opsiphanes invirae amplificatus* Stichel, 1904, *Hamadryas amphinome amphinome* (Linnaeus, 1767) e *Hamadryas fornax fornax* (Hübner, [1823]) em FES; e *Paryphthimoides sp*., *Yphthimoides* sp.1 e *Yphthimoides* sp.2 em FOM. Já *Taygetis tripunctata* Weymer, 1907 *e Hamadryas februa februa* (Hübner, [1823]) foram doubletons da FES, e apenas *Epiphile orea orea* (Hübner, [1823]) em FOM (Tabela I).

Discussão

A riqueza total de borboletas frugívoras encontrada no Parna do Iguaçu foi maior do que aquelas registradas em outros inventários feitos exclusivamente com armadilhas, em fragmentos de Mata Atlântica do sul e sudeste do Brasil, desconsiderando algumas diferenças em relação a esforço amostral e tipos de fitofisionomia (PEDROTTI *et al*., 2011, com 30 espécies; CORSO & HERNÁNDEZ, 2012, com 20; SILVA *et al*., 2013, com 16; PAZ *et al*., 2014, com 44). Porém, ela foi menor do que registrado por SANTOS *et al*. (2011), com 76 espécies, e UEHARA-PRADO *et al*. (2004), com 83. Estudos realizados em áreas de conservação próximas ao Parque, situadas em território argentino, também registraram maiores valores de riqueza (NÚÑEZ-BUSTOS, 2008, com 93; NÚÑEZ-BUSTOS, 2009, com 99), observando, no entanto que os mesmos resultaram de períodos amostrais bem maiores e com uso de outros métodos de coleta, além de revisões bibliográficas e de coleções entomológicas (NÚÑEZ-BUSTOS, 2009).

Os maiores valores de riqueza e abundância de Satyrinae no total e por fitofisionomia também foram registrados em estudos realizados e sul e sudeste da Mata Atlântica do Brasil (PEDROTTI *et al*., 2011; SANTOS *et al*., 2011; UEHARA-PRADO *et al*., 2004; PAZ *et al*., 2014) e Argentina (NÚÑEZ-BUSTOS, 2008, 2009). Esses resultados corroborariam as observações de DEVRIES (1987) de que a grande diversidade de hábitats dos neotrópicos tornaria essa região a maior em riqueza de Satyrinae no mundo, sendo este considerado o maior grupo dentro de Nymphalidae (LAMAS, 2004).

A maior abundância registrada em FES pode ser atribuída em grande parte ao maior número de indivíduos registrado nas espécies mais abundantes nessa fitofisionomia, respectivamente *M. moruus stheno*, *P. poltys* e *B. hyperia nectanabis*. Por outro lado, condições climáticas desfavoráveis a atividade de insetos como temperaturas mais baixas, vento e pluviosidade foram registradas em alguns dias da amostragem em FOM, o que pode ter contribuído para a menor abundância dessa área amostral. *M. moruus stheno* é uma espécie exclusivamente neotropical e presente no sul do Brasil. Essa espécie possui variação morfológica complexa devido a dimorfismo sexual e sazonal, utilizando espécies de Lauraceae como planta hospedeira, como *Ocotea nutans* (Nees) Mez e *Nectandra grandiflora* Ness (DIAS *et al*., 2010), presentes na área de estudo. Já *P. summandosa* é uma espécie de tamanho pequeno, cujos juvenis são geralmente associados a gramíneas (Poaceae) (DEVRIES, 1987). *B. hyperia nectanabis* e *H. epinome* são espécies consideradas comuns e abundantes estando normalmente associadas a habitats de clareiras, bordas de mata e ambientes perturbados (DEVRIES, 1987; MORAIS *et al*., 2007; UEHARA-PRADO *et al*., 2007; SACKIS & MORAIS, 2008).

Euptychoides castrensis (Schaus, 1902) (Satyrinae) merece destaque na FOM, pois teve abundância de 30 indivíduos observados, enquanto na FES apenas quatro foram amostrados. Segundo PEDROTTI *et al*. (2011) essa seria uma espécie associada e muito abundante em ambientes de Floresta Ombrófila Mista no Estado do Rio Grande do Sul. No estado do Paraná, apenas DOLIBAINA *et al*. (2011) registraram anteriormente a ocorrência da espécie, também em Floresta Ombrófila Mista no município de Guarapuava e arredores.

Em relação à composição de espécies, a maioria daquelas consideradas como novo registro para o Parna do Iguaçu já havia sido observada em estudos anteriores realizados no mesmo (C. GRACIOTIM, dados não publicados) assim como nas áreas de conservação vizinhas da Argentina (NÚÑEZ-BUSTOS, 2008, 2009), corroborando uma possível continuidade de habitat para essas borboletas. Além disso, de todas elas, apenas *Caligo beltrao* (Illiger, 1801) e *Hermeuptychia fallax* (C. Felder & R. Felder, 1862) não haviam sido previamente amostradas no estado do Paraná por

DOLIBAINA *et al*. (2011) em regiões de Floresta Ombrófila Mista, Campos Naturais e Floresta Estacional Semidecidual.

Comparando a composição das assembléias entre as fitofisionomias, além das espécies "singletons" e "doubletons", todas aquelas que foram amostradas exclusivamente em FES ou FOM podem ser consideradas raras, pois tiveram abundância menor que 10 indivíduos. Segundo BROWN JR. & FREITAS (1999), muitas dessas espécies aparentemente raras seriam muito difíceis de encontrar em qualquer lugar ou época do ano, até mesmo quando presentes, uma vez que se mantêm em populações pequenas, sazonais e erráticas, possivelmente associadas à maior complexidade estrutural das comunidades (HALFFTER & MORENO, 2005). Uma vez intensificada a amostragem na escala temporal, a riqueza total registrada tende a aumentar, assim como também a probabilidade de detecção de espécies com tamanhos populacionais pequenos (SUMMERVILLE *et al*., 2001).

Finalmente, considerando o papel de indicador ecológico atribuído a algumas espécies de borboletas frugívoras, é importante mencionar a presença no Parna do Iguaçu de *C. beltrao*, *Manataria hercyna hercyna* (Hübner, [1821]), *Taygetis acuta* Weymer, 1910, e *H. fornax fornax* (cujo único indivíduo amostrado foi coletado em armadilha em dossel). *C. beltrao* é citada por NÚÑEZ-BUSTOS (2008) como bastante local na Reserva Privada de Yacutinga (Província de Misiones, Argentina), e de acordo com o mesmo autor poderia estar associada ao estado de conservação da Reserva, pois seus indivíduos não seriam encontrados com facilidade fora da mesma. Por sua vez, *M. hercyna hercyna, T. acuta* e *H. fornax fornax* foram destacadas por BROWN JR. & FREITAS (2000b) como indicadoras de ambiente rico e preservado de Mata Atlântica.

Muito embora a maioria das espécies oficialmente ameaçadas de extinção no país habite o bioma Mata Atlântica, a flora e fauna desse bioma ainda são pouco conhecidas (FUNDAÇÃO SOS MATA ATLÂNTICA & INPE, 2010). Este importante fragmento florestal que é o Parque Nacional do Iguaçu pode servir de refúgio e abrigo para diversas espécies de fauna, incluindo uma expressiva riqueza de borboletas frugívoras, conforme registrado no presente estudo. A continuação dos estudos com a fauna de borboletas do Parque poderá aumentar o conhecimento sobre a biologia, ecologia e conservação dessas espécies. Além disso, aliados aos demais estudos locais e regionais, os resultados obtidos podem gerar informações para a conservação e manejo de áreas reservadas para a proteção de biodiversidade.

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The Coleophoridae of Armenia collected by Ole Karsholt in 2011. Contributions to the knowledge of the Coleophoridae CXXXI (Lepidoptera: Coleophoridae)

G. Baldizzone

Abstract

This work presents the results of the study on Coleophoridae collected in Armenia by Ole Karsholt in 2011. Thirty species have been identified, almost all new to Armenia. Four of these are new to science and are described with the following names; *Coleophora maculata* Baldizzone, sp. n., *C. landryi* Baldizzone, sp. n., *C. noravanki* Baldizzone, sp. n., *C. annekristinae* Baldizzone, sp. n.
KEY WORDS: Lepidoptera, Coleophoridae, new species, Armenia.

Los Coleophoridae de Armenia colectados por Ole Karsholt en 2011. Contribución al conocimiento de los Coleophoridae CXXXI (Lepidoptera: Coleophoridae)

Resumen

Este trabajo presenta el resultado de un estudio sobre Coleophoridae colectados en Armenia por Ole Karsholt en 2011. Treinta especies han sido identificadas, casi todas nuevas para Armenia. Cuatro de estas son nuevas para la ciencia y se describen con los siguientes nombres: *Coleophora maculata* Baldizzone, sp. n., *C. landryi* Baldizzone, sp. n., *C. noravanki* Baldizzone, sp. n., *C. annekristinae* Baldizzone, sp. n.
PALABRAS CLAVE: Lepidoptera, Coleophoridae, nuevas especies, Armenia.

In 2011 the noted Danish micro-lepidopterist Ole Karsholt carried out a research expedition to the Republic of Armenia, accompanied by his wife Anne Kristine, who actively collaborated in collecting specimens. Collecting was carried out primarily by UV light trap. In all 100 Coleophoridae were collected and sent to me for study. I identified 30 species, of which four are new to science. The specimens have been deposited in the Zoologisk Museum, Natural History Museum of Denmark, Copenhagen (ZMUC) and in the collection of Baldizzone (Bldz). Two of the new species were successfully DNA barcoded and their Barcode Index Numbers (BINs) are indicated under the species headings and can be accessed at http://www.boldsystems.org/index.php/databases under the "BIN database". The Barcode Identification Numbers (RATNASINGHAM & HEBERT, 2013) in BOLD are used as registry designations for barcode clusters. Neighbor-joining trees and genetic distances were calculated with BOLD using the Kimura two-parameter (K2P) model of base substitution with the Kalign alignment option. Details of the barcoded specimens and their photographs are available through the following dataset (http://dx.doi.org/10.5883/DS-CNEPETA). The same DOI provides access to the sequence records, trace files, and primer sequences used for PCR amplification, together with GenBank accession numbers.

Coleophora ochripennella Zeller, 1849

Armenia, Kotayk prov., Tsaghkadzor, 1870-2350 m, 9-11-VII-2011, 3 ♂♂. Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 5 ♀♀.

Geographical distribution: Central and southern part of Europe, Denmark, The Netherlands, Greece, Turkey, the Caucasus Region, and Iran. **New record for Armenia**.

Coleophora gryphipennella (Hübner, 1796)

Armenia, Kotayk prov., Tsaghkadzor, 1870-2350 m, 9-11-VII-2011, 1 ♂.

Geographical distribution: Almost all of Europe, central and eastern Siberia, and Japan. **New record for Armenia**.

Coleophora badiipennella (Duponchel, 1843)

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 2 ♂♂. Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 1 ♀.

Geographical distribution: Almost all of Europe, the Caucasus Region, Russia, Iran, and Canada. **New record for Armenia**.

Coleophora serratella (Linnaeus, 1761)

Armenia, Kotayk prov., Tsaghkadzor, 1870-2350 m, 9-11-VII-2011, 1 ♀.

Geographical distribution: Almost all of Europe, the Caucasus Region, Russia including Siberia, Japan, Canada, and U.S.A. **New record for Armenia**.

Coleophora nairica (Fakovitsh, 1991)

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 3 ♀♀.

Geographical distribution: The species is known only from Armenia and the northern Caucasus.

Coleophora albitarsella Zeller, 1849

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 3 ♂♂.

Geographical distribution: Present in almost all of Europe and the Caucasus Region. **New record for Armenia**.

Coleophora albicostella (Duponchel, 1842)

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 1 ♂.

Geographical distribution: Present in almost all of Europe, Turkey, the Caucasus Region, Syria, Lebanon, Siberia and the Altai Region of Russia. **New record for Armenia**.

Coleophora deauratella Lienig & Zeller, 1846

Armenia, Kotayk prov., Tsaghkadzor, 1870-2350 m, 9-11-VII-2011, 2 ♂♂, 2 ♀♀.

Geographical distribution: Present in almost all of Europe, Turkey, the Caucasus Region, Syria, Lebanon, Russia (Siberia), China, Canada, and U.S.A. **New record for Armenia**.

Coleophora paramayrella Nel, 1993

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 1 ♀. Armenia, Kotayk prov., Tsaghkadzor, 1870-2350 m, 9-11-VII-2011, 1 ♀.

Geographical distribution: Known from southern France, Italy, Slovenia, Slovakia, Hungary, Ukraine, Macedonia, and Greece (Corfu). **New record for Armenia**.

Coleophora albiochrella Toll & Amsel, 1967

Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 1 ♀.

Geographical distribution: Known from Turkey, Iran, and Afghanistan. **New record for Armeni**a.

Coleophora eurasiatica Baldizzone, 1989

Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 1 ♂, 2 ♀♀.

Geographical distribution: Present in Hungary, Bulgaria, Russia (Lower Volga, S Ural and the extreme East, Altai), Mongolia, China, and South Korea. **New record for Armenia**.

Coleophora maculata **Baldizzone, sp. n.** (Fig. 1)

Holotype ♂ (PG Bldz 15828), Database # | CNCLEP | 00111720: "Armenia, prov. Vajots Dzor, 10 km SE Areni Noravank, 1600 m | 349º 41' 07"N | 45º 14' 02"E, 15-17-VII-2011, O. Karsholt", coll. ZMUC. Barcode Index Number BOLD: ACM6927. Paratypes: 4 ♂♂ (PG Bldz 15771), idem, coll. ZMUC; 1 ♂, Database # | CNCLEP | 00111721, idem, coll. Baldizzone.

Description: Wingspan 15-16 mm. Head white, tinged grey above the eyes. Antenna with white basal section and tuft of short erect scales; flagellum white. Labial palpus white with some brown scales on the outside; second segment twice as long as third. Proboscis absent. Thorax white. Tegula white. Forewing white with tinge of ivory; sprinkled with dark brown scales which widen to form longitudinal streaks especially in first half of subcostal area, apical area, on ventral edge of cell, in basal fold, and along dorsum. Costal cilia white, dorsal cilia is light grey. Hindwing pale grey, with cilia coloured as those of forewing. Abdomen shiny white.

Male genitalia (Figs. 7, 8, 9): Terminal part of gnathos wide, oval. Tegumen short, stubby, slightly constricted medially with pedunculus moderately dilated. Transtilla short, ribbon-like, not separated medially. Cucullus short, slightly restricted at base. Valva with oblique ventral edge. Aedeagus short conical, sclerotized with cribrose appearance only on the ventral side. Sacculus sub-triangular with thick ventral edge, terminating in heavily sclerotized beak-shaped expansion at dorsal angle.

Female genitalia: Unknown.

Abdominal apodemes (Fig. 10): Postero-lateral bars absent, transverse bar slightly curved. Tergal patches covered with bristly short conical spines, those on 3rd tergite 0.5 times longer than wide.

Diagnosis: Species of average size in the Coleophoridae family, characterized by the dirty white ground colour overlaid with streaks of dark scales of the forewings and the absence of a proboscis (Fig. 2). It belongs to a group of species that live in arid sub-desert areas, like *Coleophora hamata* Falkovitsh, 1972, a species described from Mongolia and recorded also from Uzbekistan (BALDIZZONE *et al*., 2006), *C. elephantella* Falkovish, 1970 from Uzbekistan, and *C. pachyderma* Baldizzone, 1994 from Iran. The male genitalia are most similar to those of *C. hamata*. From the original description of Falkovisth the latter species is indicated as larger (17-19 mm) and with 4-5 large brown scales placed in the apical part of the wing. In male genitalia, *maculata* has a stubbier structure both with regards to the tegumen and the sacculus, of which the lateral protrusion is proportionally larger and shorter than that of *hamata*, whilst the ventral edge is closer and sclerotized; the aedeagus of *maculata* is shorter, with the ventral edge less uniformly chitinized; in *hamata* there is a spherically shaped cornutus, which is absent in *maculata*.

The DNA analysis carried out on two of the specimens of *maculata* revealed that their barcodes are 7.6% distant from the paratype of *hamata*.

A characteristic component of the new species is the absence of a proboscis, a detail that is not mentioned in the description of *C. hamata*. The absence of a proboscis and the greatly reduced mouth parts in other species of Coleophoridae has been discussed in a recent paper on *C. micronotella* Toll, 1956 (LANDRY & BALDIZZONE, 2014).

Geographical distribution: The new species, of which the female and biology are unknown, is recorded only from Armenia.

Etymology: The name is derived from the characteristic elongated markings on the forewings.

Coleophora felixella Baldizzone, 1994

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 6 ♂♂, 2 ♀♀.

Geographical distribution: known only from Armenia and the northern Caucasus Region.

Coleophora vulpecula Zeller, 1849

Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 1 ♂.

Geographical distribution: Central and southern Europe, Turkey, Iran, Afghanistan, Russia (Altai and SW Siberia). **New record for Armenia**.

Coleophora zelleriella Heinemann, 1854

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 1 ♂.

Geographical distribution: Almost all of Europe, Russia (south Ural, far East), the Caucasus Region, Syria, Iran, and Japan. **New record for Armenia**.

Coleophora albipennella Staudinger, 1879

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 1 ♂. Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 1 ♀.

Geographical distribution: Turkey, Armenia, Kazakhstan and Iran.

Coleophora gallipennella (Hübner, 1796)

Armenia, Kotayk prov., Tsaghkadzor, 1870-2350 m, 9-11-VII-2011, 3 ♂♂.

Geographical distribution: Present in almost all of Europe, Turkey, the Caucasus Region, Russia (Lower Volga, SW Siberia, Altai), and Mongolia. **New record for Armenia**.

Coleophora coronillae Zeller, 1849

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 5 ♂♂, 1 ♀.

Geographical distribution: The Netherlands, central and southern Europe, Ukraine, Russia (Lower Volga), Turkey, the Caucasus Region, Armenia, Iran.

Coleophora conspicuella Zeller, 1849

Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 11 ♂♂.

Geographical distribution: Present in almost all of Europe, Turkey, Iraq, Syria, the Caucasus Region, Kazakhstan, Russia (lower Volga, S Ural, Altai, extreme far East). **New record for Armenia**.

Coleophora symphistropha (Reznik, 1976)

Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 1 ♀.

Geographical distribution: Turkey, , Iraq, Syria, Kazakhstan, Armenia, Azerbaijan, and Iran.

***Coleophora landryi* Baldizzone, sp. n.** (Figs. 3, 4)

Holotype ♂ (PG Bldz 15836): "3.u[nd].4-VIII-1976 | Russ.[issche] Armenia | Geghard, 1700 m, 40 km | östl.[ich] Eriwan | Kasy & Vartian". In coll. Baldizzone, Asti. Barcode Index Number: BOLD: AAC8630. Paratypes: 3 ♂♂ (PG Bldz 8944), 4 ♀♀ (PG 15834, 15835), same locality and date of the holotype, coll. Baldizzone; ibidem, 3 ♂♂ (PG Bldz 6369, 6371), 1 ♀ (PG Bldz 6370), ibidem, 28-29-VII-1976, coll. Baldizzone. 1 ♂ (PG Bldz 15777), 1 ♀ (PG Bldz 15778), Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 349º 41' 07"N | 45º 14' 02"E, 15-17-VII-2011, O. Karsholt leg., coll. ZMUC. 1 ♂, Turkey, Erzurum, 40 km nördl. Aºkale, Tasagil, ca. 1600 m, 20-VII-1996, leg. G. Baisch, coll. Baisch; 1 ♀, Turkey, Erzincan, 40 km östl. Erzincan, Bagirpasa Dagi, 1700 m, bei Pülümür, 15-16-VII-1992, leg. G. Baisch, coll. Baisch; 3 ♂♂, 2 ♀♀, Turkey, Erzincan, 5 km östl. Altköy, Fahrweg Kürelik, 5-VII-2001, leg. G. Baisch, coll. Baisch, coll. Canadian National Collection, Ottawa and coll. Baldizzone; 1 ♂, 1 ♀, ibidem, 6-VII-2001, leg. G. Baisch, coll. Baldizzone; 1 ♀, ibidem, 24-VII-2001, leg. G. Baisch, coll. Baisch; 3 ♂♂, 3 ♀♀, Turkey, Kars , 7 - 10 km S Sarikamis, 2000 m, 10-14-VII-1989, St. 523, H. v. Oorshot, W. de Prins, F.

Coenen & R. Koolbergen, coll. Van der Wolf; 1 ♂, Turkey, Hakkari, ca. 20 km WNW Yüksekova, 1800 m, 10-VII-1990, St. 613, leg. H. v. d. Bink, W. d. Prins, coll. Van der Wolf.

Description: Wingspan 16-18 mm. Head suffused with yellow cream on vertex. Antenna with white basal section supplied with thick tuft of long erect scales, white coloured inside and yellow cream on the outside; flagellum white, covered with long cream-coloured scales in basal half. Labial palpus white with second segment 2.5 times longer than third. Forewing yellow cream, furrowed with several silvery stripes, more or less visible on specimens: one subcostal stripe starting at base of wing and interrupted about halfway, four short stripes in apical area, another median stripe as long as half of wing, another along dorsal vein starting broad and tapered, ending before wing edge, and another short stripe along dorsum starting at base; wing apex very falcate with edging of brown scales, more or less darker and wider than those along base of costal edge, and partly so of those on dorsum. Costal cilia yellow cream in proximal half and tinged brown apically in distal half; dorsal cilia grey except for distal section which is almost completely tinged brown. Hindwing brown, cilia brown.

Male genitalia (Figs. 11, 12, 13): Terminal part of gnathos globular. Tegumen narrow and elongate with base of pedunculus outwardly protruded. Transtilla thin and linear, divided medially. Valva large with ventral edge rounded. Cucullus elongate and quite narrow, oblique, with base slightly larger than rounded apex and a small protrusion shaped like obtuse triangle at base of upper edge. Sacculus thickened on ventral edge, the latter rounded and slightly protruding over outer edge. Aedeagus conical, stubby, large, lightly sclerotized. Cornuti small, numerous tightly grouped in long braid.

Female genitalia (Figs. 14, 15, 16): Anal papillae narrow, long, well sclerotized. Posterior apophyses twice as long as anterior ones, which are large and robust. Sterigma conical with two robust longitudinal extensions bordering ostium bursae; extensions slightly oblique, concave on outside, distal part rounded, covered with thin long spines. Ostium bursae elongate. Distal part of colliculum large, covered with thin spines; proximal part thin with well sclerotized walls. Ductus bursae very long, with median band that starts in spiral part near inception of the ductus seminalis and ends dilated in wider part of colliculum; spinulate section of ductus about 8 times longer than sterigma, transparent section the median is about 5 times long the sterigma, completely transparent section of ductus 8 times length of sterigma; this is joined with corpus bursae by tubular section as long as sterigma, wider than the rest of the ductus and finely covered with dots. The corpus bursae is spherical with a large signum in the shape of a leaf.

Abdominal apodemes (Fig. 17): Antero-lateral bars almost twice as long as postero-lateral bars. Transversal bar large with proximal edge straight, thicker centrally and distal edge slightly convex and thickened with respect to tergal patches. Tergal patches covered with short conical spines, about 2 times longer than wide (3rd tergite).

Diagnosis: Species of a medium-large size in the Coleophoridae family, characterized by a pronouncedly falcate forewing and the strong yellow cream colour, with brown edging at the apex in the falcate area. It belongs to the *C. lixella*, Zeller, 1849, group. It is distinguished above all by the characteristic shape of the wing apex, colouration, and the absence of the brown edging around the white stripes. With regards to the genitalia, the male has the narrowest cucullus among all the species of the group, and the sacculus is small and not very pronounced from the ventral side; in the female genitalia, the shape of the sterigma is unmistakable, especially the two chitinized longitudinal extensions, which are similar to those of the two larger species, *C. nevadella* Baldizzone, 1985 and *C. nepetellae* Baldizzone & Nel, 2014; compared to the latter two species, the extensions in *C. landryi* are more narrowed medially with their apices extended obliquely, with a wider base as well as wider ostium bursae.

Note: In 1994 I had treated some specimens of this species as *C. lixella* and speculated that they could be a subspecies. In successive investigations and more detailed study of the *lixella* group, it became evident that it represented a distinct species.

Geographical distribution: The species is known from Armenia and eastern Turkey.

Etymology: *Coleophora landryi* Baldizzone, sp. n. is dedicated to my friend Jean-François Landry, eminent micro-lepidopterist, who made a fundamental contribution to the knowledge of the Coleophoridae.

Note about DNA barcodes: Barcoded specimens of this species were included in the DNA barcode analysis of the *Coleophora lixella* group by BALDIZZONE *et al*. (2014), where they were labelled "lixella-group II". See that reference for full details.

Coleophora caucasica Stainton, 1867

Armenia, Kotayk prov., Tsaghkadzor, 1870-2350 m, 9-11-VII-2011, 2 ♂♂.

Geographical distribution: Turkey, northern Caucasus Region, Georgia, and Armenia.

The species has a wider distribution and is also present in Europe where it has been confused with other species of the *lixella* group. The genitalia and other informations will be presented in a separate monograph on the *Coleophora lixella* group which is in preparation.

Coleophora versurella Zeller, 1849

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 6 ♂♂.

Geographical distribution: Widely distributed in the Palearctic region, present also in India, New Zealand, Canada, U.S.A., Argentina, and Chile. **New record for Armenia**.

Coleophora luteolella Staudinger, 1880

Armenia, prov. Tavush, Dilijan, 1340-1450 m, 12-14-VII-2011, 1 ♂.

Geographical distribution: In part of southern Europe, Morocco, Turkey, Iran, and Afghanistan. **New record for Armenia**.

Coleophora remizella Baldizzone, 1983

Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 4 ♂♂, 1 ♀.

Geographical distribution: Known from part of Central Europe (Slovakia, Romania, Bulgaria, Ukraine) and Russia (lower Volga). **New record for Armenia**.

Coleophora noravanki **Baldizzone, sp. n.** (Fig. 5)

Holotype ♂ (PG Bldz 15807): "Armenia, prov. Vajots Dzor, 10 km SE Areni Noravank, 1600 m | 349º 41' 07"N | 45º 14' 02"E, 15-17-VII-2011, O. Karsholt", coll. ZMUC.

Description: Wingspan 13 mm. Head white, suffused with ochre on vertex. Antenna with white basal section and tuft of short erect scales; flagellum white. Labial palpus ochre laterally and white dorsally, with second segment about 1.5 times longer than third. Thorax white, suffused with ochre centrally. Tegula white, tinged ochre on outside. Forewing pale ochre and mostly covered with white stripes: costal stripe thin and extended to start of cilia which are tinged grey to apex, a small ochre coloured tuft separates them from the dorsal cilia; one subcostal stripe, one in cell, one in wing fold exteded to outer margin and one along dorsum; between these last two ochre ground colour palest, barely evident, darkest towards wing apex. Costal cilia grey. Hindwing and cilia grey. Abdomen dirty white colour.

Male genitalia (Figs. 18, 19, 20): Terminal part of gnathos small and globular. Tegumen narrow medially and centrally reinforced with sclerotized bar, pedunculi basally dilated. Transtilla elongate and rounded at apex. Valva large with rounded ventral edge. Cucullus elongate, larger at apex than base. Sacculus very sclerotized, outer edge curved at ventral side, with elongate extension restricted to dorsal side and extended to medial part of cucullus; internally with sclerotized triangular tooth at base of extension. Aedeagus made of two very sclerotized and pointed bars, one of which slightly longer and more sharply pointed than the other. A single, very small cornutus spine-shaped with thicker base.

Abdominal apodemes (Fig. 21): Postero-lateral bars absent, transverse bar slightly curved and

much thickened. Tergal patches covered with short conical spines, (3rd tergite) about 7 times longer than wide.

Diagnosis: Species of medium-small size, light coloured, with whitish shades prevailing over a light ochre base on the forewings. Based on the male genitalia it belongs to the *Coleophora odorariella* Mühlig & Frey, 1857, group, a species which is recorded in Europe from Turkey (BALDIZZONE *et al*., 2006). Within this group there are also *C. moronella* Falkovisth, 1975, known from Mongolia and the Altai Region of Russia, *C. mediocris* Falkovish, 1977, known from Mongolia and *C. gurunensis* Baldizzone, 1994, known from Turkey. In all these species the male genitalia are characterized by the moderately long, curved extension on the dorsal side of the sacculus, with a triangular blunt denticle at the base. From all these species *C. noravanki* is separated primarily by the shape of the aedeagus, which is short, stubby, and much more sclerotized, and by the cornutus which is much smaller and spine shaped.

Geographical distribution: The species, of which the female and biology are unknown, is recorded only from the type locality.

Etymology: The name is derived from the collection locality, Noravank.

Coleophora alabardata Baldizzone, 1994

Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 7 ♂♂.

Geographical distribution: The species was known only from Iran. **New record for Armenia**.

Coleophora acanthopylli (Falkovitsh, 1989)

Armenia, prov. Vajots Dzor, 10 km SE Areni, Noravank, 1600 m, 15-17-VII-2011, 4 ♂♂.

Geographical distribution: Known from Turkmenistan, Iran, and Afghanistan. **New record for Armenia**.

***Coleophora annekristinae* Baldizzone, sp. n.** (Fig. 6)

Holotype ♂ (PG Bldz 15802): "Armenia, prov. Vajots Dzor, 10 km SE Areni Noravank, 1600 m | 349º 41' 07"N | 45º 14' 02"E, 15-17-VII-2011, O. Karsholt", coll. ZMUC. Paratypes: 1 ♂ (PG Bldz15797), 4 ♀♀ (PG Bldz 15800, 15801, 15803), idem, coll. ZMUC e coll. Baldizzone.

Description: Wingspan 9-11 mm. Head light ochre, slightly darker on vertex. Antenna with basal section white dorsally and ferruginous ochre ventrally, without tuft; flagellum completely white. Labial palpus white suffused ochre on outside of second segment, which is twice as long as third segment. Thorax white suffused ochre in middle. Tegula white. Forewing shiny ochre; thin white stripe extended along costa and widening on the costal cilia, without reaching apex; apical cilia ochre; second short and very thin white stripe on inferior edge of cell and third thin line along wing fold ending before edge of wing. Dorsal cilia light grey. Hindwing and cilia light grey. Abdomen white tinged ochre.

Male genitalia (Figs. 22, 23, 24, 25): Terminal part of gnathos globular. Tegumen constricted to base of gnathos arms, triangularly widened, pedunculi moderately dilated on outside. Transtilla short and rhombic. Valva small with oval ventral edge. Cucullus quite large, elongate, curved at apex. Sacculus well sclerotized with lateral edge curved, ventral edge slightly expanded, and with large curved sharp horn-shaped process extended beyond dorsal edge of cucullus. Aedeagus long and curved, made up from two sclerotized bars, more sclerotized dorsally, shorter bar with small triangular tooth before middle. A single, long, thin spiniform cornutus with slightly larger base.

Note: One of the two examined male genitalia had a shorter cornutus because the terminal part was broken. In the bursa of one of the three female genitalia examined there is a fragment of a cornutus. It is presumed that the cornutus broke during copulation. This observation is quite frequent in the Coleophoridae.

Female genitalia (Figs. 27, 28, 29): Anal papillae narrow and elongate. Posterior apophyses slightly longer than twice length of anterior apophyses. Sterigma trapezoidal, larger and more

sclerotized in proximal half, distal edge rounded, deeply engraved corresponding to ostium bursae which is small, ogival in shape. Colliculum 0.5 times as long as sterigma, uniformly tubular, very chitinized, connection to ductus bursae via asymmetrical loop. Ductus bursae with median band extended over entire length of spinulate section and becoming more slim and fragmented before sclerotized and transparent section; spinulate section of ductus 3 times longer than sterigma, folded and extending about the same length as the previous section, sclerotized but without spines, dilated at inception of ductus seminalis; transparent part of ductus as long as previous section but narrower, widened slightly before inception into bursa,; corpus bursae round, with leaf-shaped signum and sharp basal plate.

Abdominal apodemes (Fig. 26): Postero-lateral bars absent, transverse bar slightly convex with proximal edge more sclerotized centrally and distal edge sclerotized at base of tergal patches. Tergal patches covered with short, conical spines, (3rd tergite) about 4 times longer than wide in male and 2.5 times wider in female.

Diagnosis: Species of a medium-small size, characterized by the overall slightly shiny ochre colour. The male genitalia is characterized by the long, horn-like extension on the dorsal side of the sacculus, something that makes it similar to *Coleophora lima* Falkovisth, 1975, a species known only from Mongolia, but distinguished by several features of the sacculus, shape of the aedeagus and cornutus. The female of *C. lima* is not known and could not be compared with that of *C. annekristinae* which has a unique aspect that does not permit it to be allow comparasion to other described species.

Geographical distribution: The species, of which the biology is unknown, is recorded only from Armenia.

Etymology: The species is dedicated to Mrs. Anne Kristine Karsholt in acknowledgement of her contribution to the research activities of Ole Karsholt during the trip to Armenia.

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I thank Ole Karsholt of the ZMUC, Günther Baisch (Biberach an der Riss, Germany) and Hugo W. van der Wolf (Nuenen, The Netherlands), for the material that they sent me, Gianni Allegro (CRA-PLF Research Unit for Intensive Wood Production, Casale Monferrato, Italy) for photographing the adults, Jean-François Landry (Agriculture and Agri-Food Canada, Ottawa, Canada) for carrying out the DNA analysis of some specimens and for the advice and information he gave me on various topics. I also thank Vasily Anikin (Saratov, Russia) for the translation of the Russian text of the description of *C. hamata*, Michael Zerafa (Naxxar, Malta) for the translation of the present work into English, and Antonio Vives for the translation of the abstract into Spanish.

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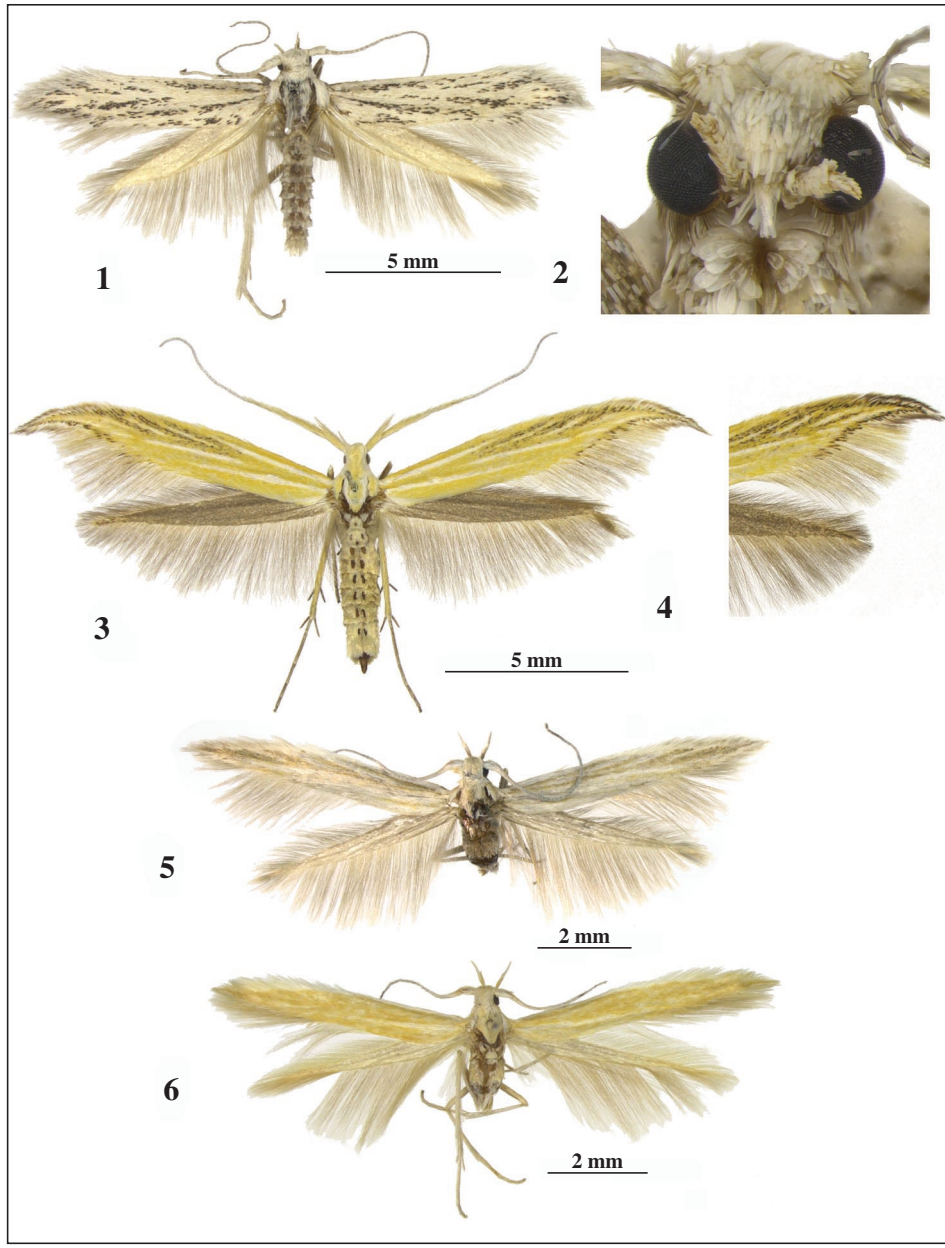
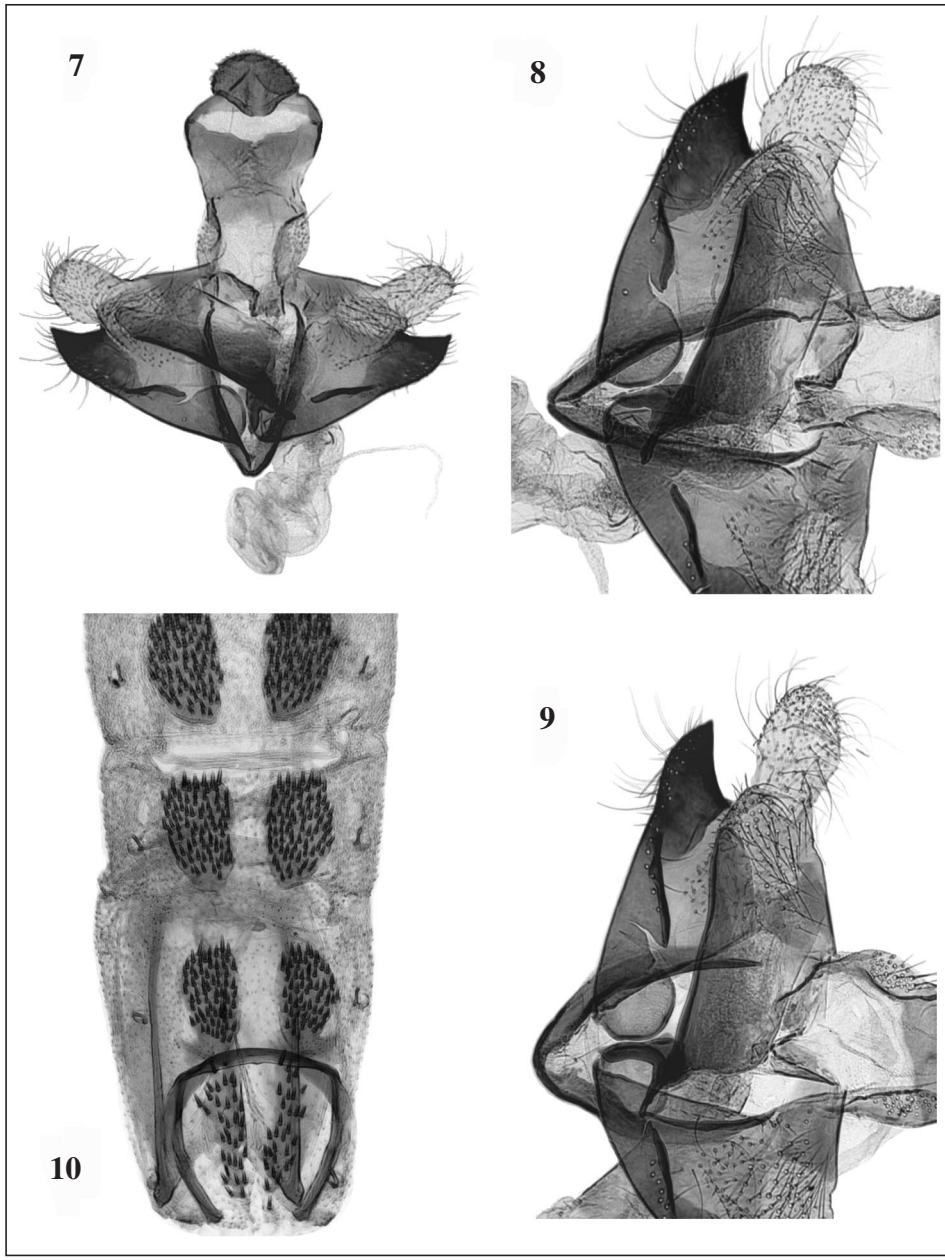
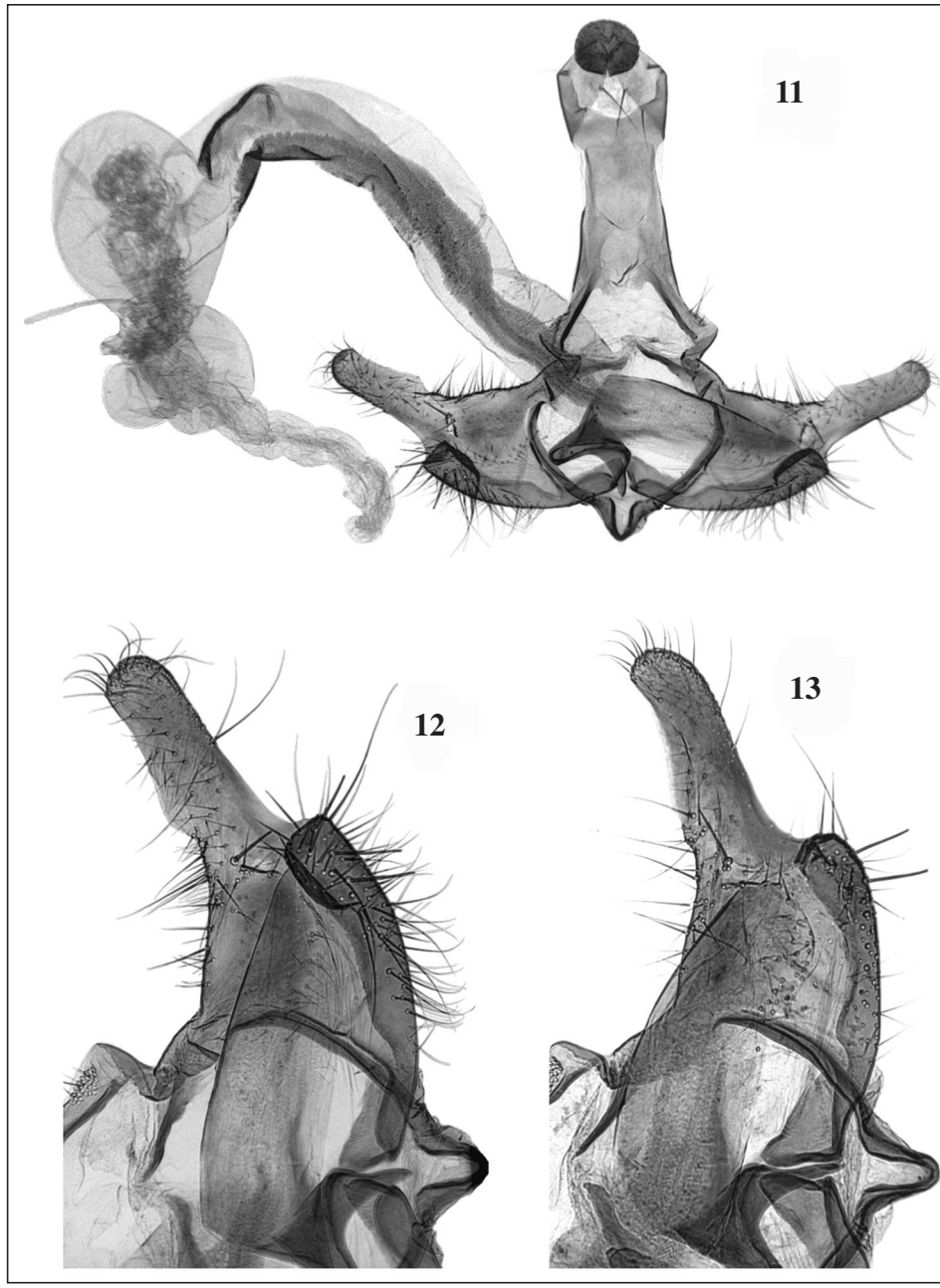


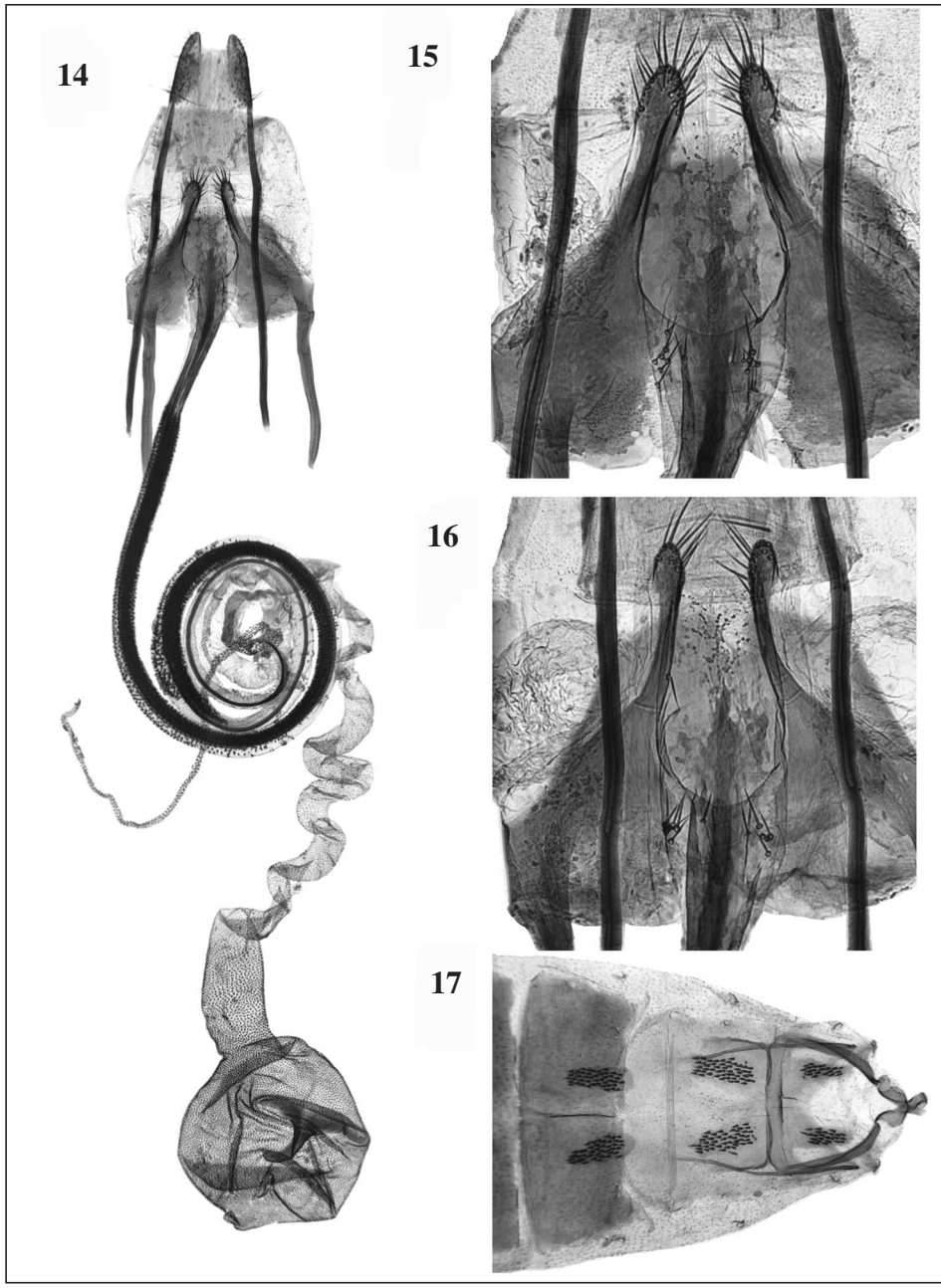
Figs. 1-6.– 1. *Coleophora maculata* Baldizzone, sp. n., paratype ♂. **2.** Idem, ventral view of head (scale 500 µm). **3.** *C. landryi* Baldizzone, sp. n., paratype ♀, Turkey, Erzincan, 5 km östl. Altköy, Fahrweg Kürelik, 6-VII-2001, leg. G. Baisch, coll. Baldizzone. **4.** Idem, paratype ♀, apical part of the wings, same locality, 5-VII-2001, leg. G. Baisch, coll. Baldizzone. **5.** *C. noravanki* Baldizzone, sp. n., holotype ♂. **6.** *C. annekristinae* Baldizzone, sp. n., holotype ♂.



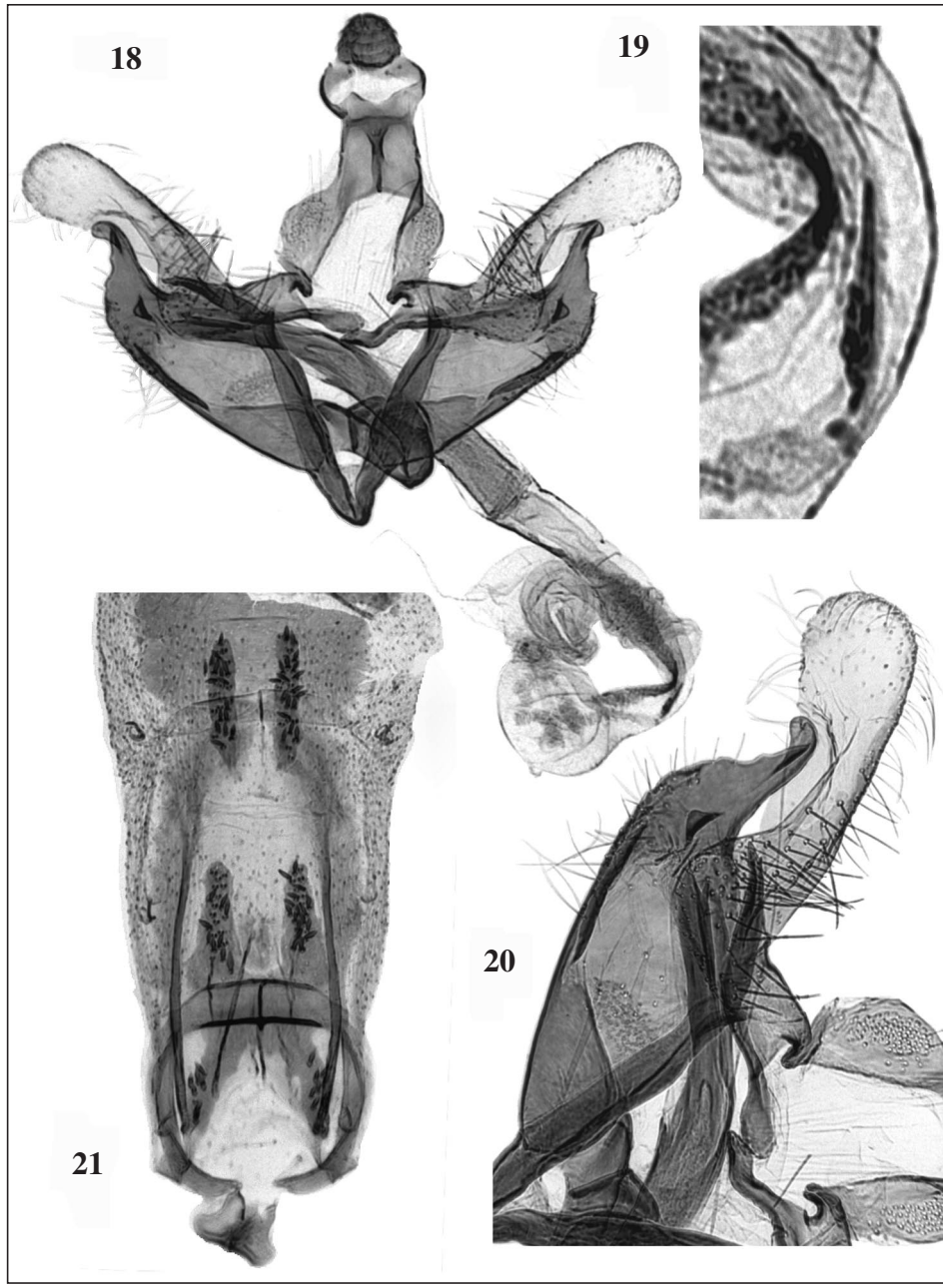
Figs. 7-10.– *C. maculata* Baldizzone, sp. n. **7.** Male genitalia (PG Bldz 15771), paratype. **8.** Detailed close-up of valva, aedeagus and sacculus. **9.** Same detail (PG Bldz 15828), holotype. **10.** Abdominal tergites (PG Bldz 15828).



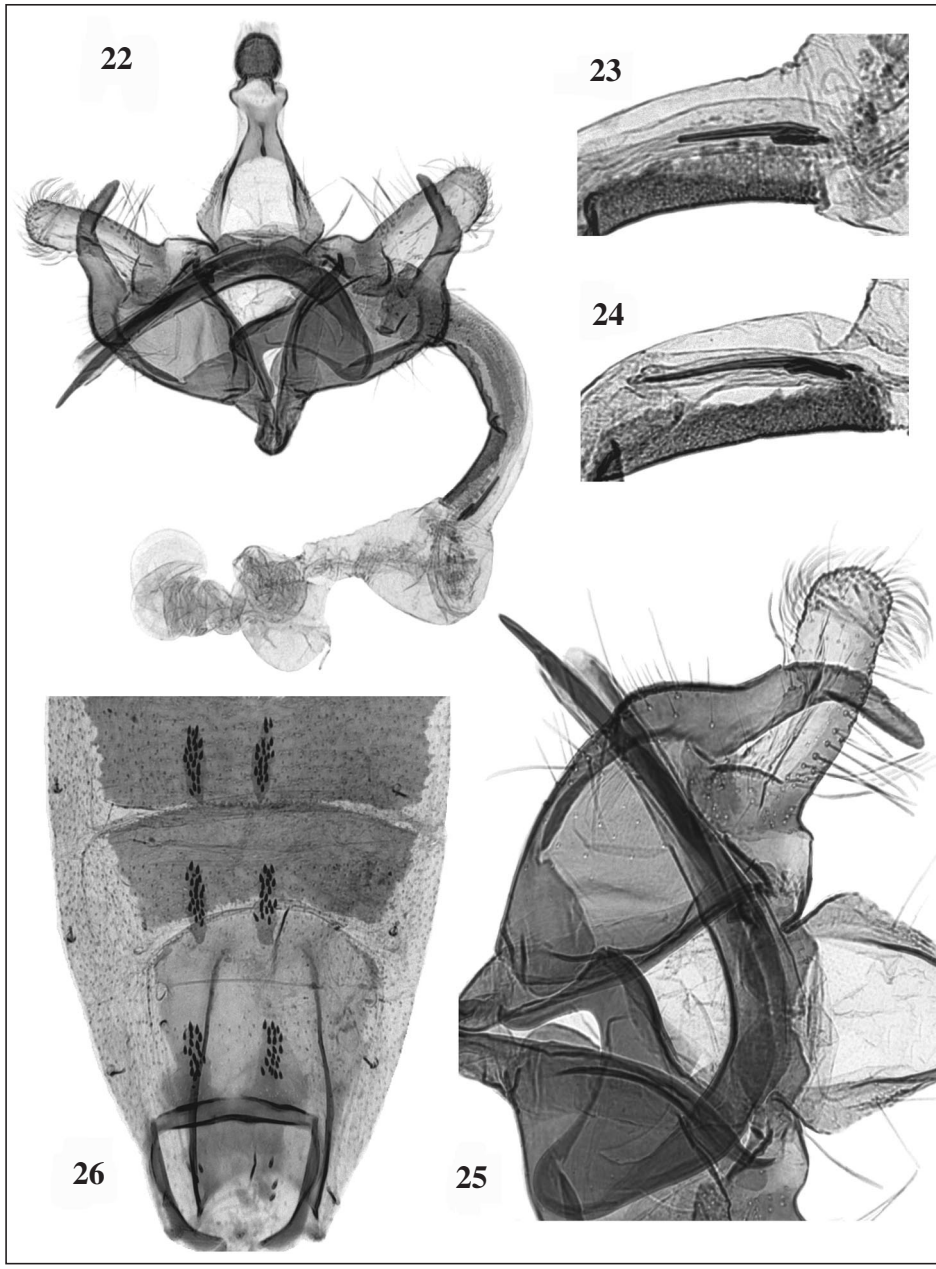
Figs. 11-13.– *C. landryi* Baldizzone, sp. n. **11.** Male genitalia (PG Bldz 15777), paratype. **12.** Detailed close-up of male genitalia. **13.** Same detail (PG Bldz 15838), holotype.



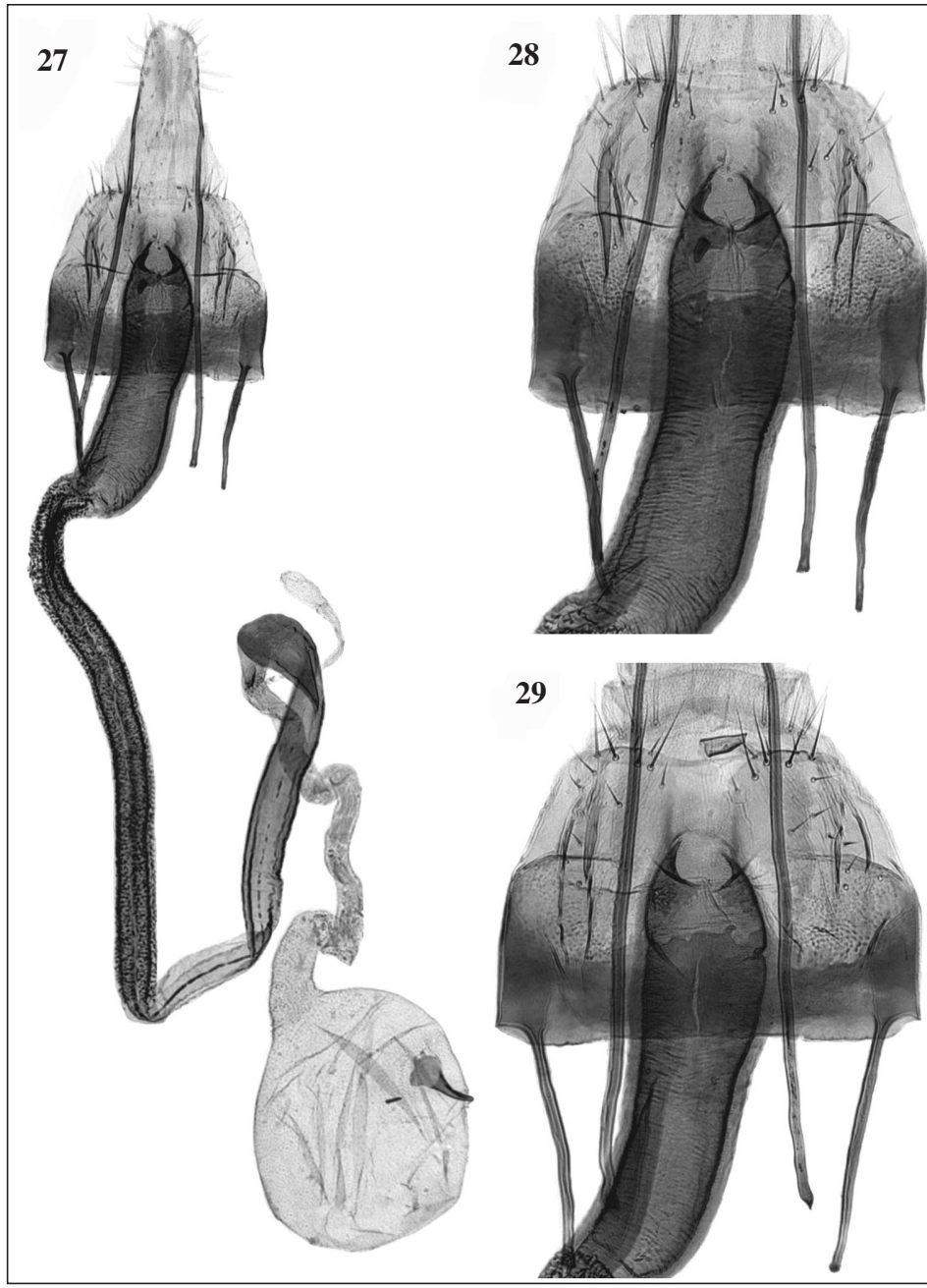
Figs. 14-17.– *C. landryi* Baldizzone, sp. n. **14.** Female genitalia (PG Bldz 15835), paratype. **15.** Detailed close-up of sterigma and colliculum. **16.** Same detail (PG Bldz 15834), paratype. **17.** Abdominal tergites (PG Bldz 15777).



Figs. 18-21.– *C. noravanki* Baldizzone, sp. n. **18.** Male genitalia (PG Bldz 15807), holotype. **19.** Greatly magnified cornutus. **20.** Detailed close up of valva, aedeagus and sacculus. **21.** Abdominal tergites.



Figs. 22-26.– *C. annekristinae* Baldizzone, sp. n. **22.** Male genitalia (PG Bldz 15802), paratype. **23.** Greatly magnified cornutus (PG Bldz 15802). **24.** Same detail (PG Bldz 15797), holotype. **25.** Detailed close up of valva, aedeagus and sacculus. **26.** Abdominal tergites (PG Bldz 15802).



Figs. 27-29.– *C. annekristinae* Baldizzone, sp. n. **27.** Female genitalia (PG Bldz 15803), paratype. **28.** Detailed closup of sterigma and colliculum. **29.** Same detail (PG Bldz 15800), paratype.

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First record of *Dahlica lichenella* (Linnaeus, 1761) for Spain (Lepidoptera: Psychidae)

W. R. Arnscheid

Abstract

The psychid species *Dahlica lichenella* (LINNAEUS, 1761) is reported for the first time for Spain and the Iberian Peninsula from the environment of Benasque (Huesca).
KEY WORDS: Lepidoptera, Psychidae, distribution, Pyrenees, Spain.

Primer registro de *Dahlica lichenella* (Linnaeus, 1761) para España (Lepidoptera: Psychidae)

Resumen

Se registra por primera vez para España y para la Península Ibérica el psíquido *Dahlica lichenella* (Linnaeus, 1761) de los alrededores de Benasque (Huesca).
PALABRAS CLAVE: Lepidoptera, Psychidae, distribución, Pirineos, España.

Dahlica lichenella (Linnaeus, 1761) is one of the most widely distributed psychid species in Europe. Of this species a sexual and a parthenogenetic form exist. Especially the parthenenogenetic form is widespread from France eastwards to Ukraine and Russia. In southern Europe it is very rare and only known from scattered colonies in southern France, Italy, Slovenia, Hungary and Romania (ARNSCHEID, 2004, SAUTER & HÄTTENSCHWILER, 1996, SOBCZYK, 2011). Recently it has been recorded from Greece (WEIDLICH, 2013) and this record represented the southernmost populations of the species. No reliable records are known from the major part of the Mediterranean and the Iberian Peninsula (VIVES MORENO, 1994, CORLEY *et al*., 2013).

Beside the widespread nominotypical parthenogenetic form a sexual form also exists which is very locally distributed in Central and northern Europe eastwards to the Ural Mountains.

In the years 2012, 2013 and 2014 the author visited several times the environment of Benasque in the Pyrenees of Aragon (Huesca). Along the road into the small valley of Ballibierna he collected several larval cases of the parthenogenetic *Dahlica lichenella*. At the end of May only females hatched from the cases and began immediately to lay eggs into the cases. A few days later the young larvae hatched.

The cases were attached to rocks and stones beside the road in the coniferous belt between 1400 and 1600 m. They share their habitat f.e. with the psychid species *Dahlica triquetrella* (Hübner, [1813]) f. parthenogenetic, *Pseudobankesia casaella* Hättenschwiler, 1994 and *Apterona nylanderi* (Wehrli, 1927). Figures 2 to 4 show the difference between the cases of *D. lichenella* and *D. triquetrella* which occur syntop and synchron in the mentioned habitat. The case of *D. triquetrella* is characterized by

debris of small dead insects covered towards the fore-end. Figure 1 show a female of *D. lichenella* after maceration in 20 % KOH to examine the genital structure.

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I am grateful to my friend Dr. Michael Weidlich, Neißemünde, for critical discussion as well as to Dr. Antonio Vives, Madrid, for his support to get the permit for field work in the Province of Huesca into the Scientific Project of SHILAP.

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Figs. 1-3.– 1-2. *Dahlica lichenella* (Linnaeus, 1761). **1.** Female, **2.** Larval case, **3.** *Dahlica triquetrella* (Hübner, [1813]). Larval case.

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On the identity of *Coleophora perplexella* Toll, 1960 and *C. murciana* Toll, 1960. Contributions to the knowledge of Coleophoridae. CXXXIII (Lepidoptera: Coleophoridae)

G. Baldizzone

Abstract

The aim of this work is to clarify the synonymy between *Coleophora perplexella* Toll, 1960 and *C. murciana* Toll, 1960, **syn. n**.. Based on study of the typical materials and recently collected specimens, it is shown that the original type series of *C. murciana* was composed of two species, the male holotype being conspecific with *C. perplexella* and the female allotype with *C. hiberica* Baldizzone, 1985. In this work *C. perplexella* Toll, 1960, is re-described, and the larva L5 is described for the first time.
KEY WORDS: Lepidoptera, Coleophoridae, *Coleophora perplexella*, *Coleophora murciana*, new synonymy, larva.

Sobre la identidad de *Coleophora perplexella* Toll, 1960 y *C. murciana* Toll, 1960. Contribución al conocimiento de los Coleophoridae. CXXXIII (Lepidoptera: Coleophoridae)

Resumen

El objetivo de este trabajo es clarificar la sinonimia entre *Coleophora perplexella* Toll, 1960 y *C. murciana* Toll, 1960, **syn. n.**. Basado en el estudio del material tipo y la reciente captura de nuevos especímenes, se demuestra que la serie tipo original de *C. murciana* estaba compuesta de dos especies el holotipo macho era coespecífico con *C. perplexella* y el alotipo hembra con *C. hiberica* Baldizzone, 1985. En este trabajo se redescribe *C. perplexella* Toll, 1960 y se describe por primera vez la larva L5.
PALABRAS CLAVE: Lepidoptera, Coleophoridae, *Coleophora perplexella*, *Coleophora murciana*, nueva sinonimia, larva.

Introduction

Coleophora perplexella Toll, 1960 and *C. murciana* Toll, 1960 were described by Sergiusz Toll in the same publication, on page 252 and 253 respectively, from specimens collected in southern Spain (TOLL, 1960). The description of the first species was based on a single female from Chiclana, and until recently only the genitalia of the holotype were known. For the second species TOLL (1960) illustrated the genitalia of both sexes after a series of males from various localities in southern Spain and a single female from Murcia, all without collecting date.

The habitus and structural features (wing pattern, abdomen, and genitalia) of both taxa were later published in the author's posthumous volume on the Palaearctic Coleophoridae (TOLL, 1961).

In the last few years I had the chance to study several specimens of *Coleophora* which I have partly attributed to *C. perplexella*, and partly to *C. murciana*.

Under *C. perplexella* I illustrated and described the male genitalia, and showed a picture of the female genitalia, demonstrating that Toll's original drawing was inaccurate: the spiny appendage of the ductus bursae was incorrectly drawn because Toll did not remove the genitalia from the abdomen (BALDIZZONE, 1986). As a matter of fact, I had studied the genitalia preparation of the holotype of *C. perplexella*, by courtesy of J. Razowski, and noted that it would have been impossible to verify the correct structure of the ductus bursae without dismantling, repairing and reassembling the old preparation, a rather challenging task.

NEL (2001) illustrated the male genitalia of a *Coleophora* as that of *C. murciana* and, subsequently, recorded the discovery of *C. perplexella* from France, illustrating also its female genitalia and larval case (TAUTEL & NEL, 2009). The following year NEL (2011) announced the discovery of the host plants of *C. perplexella* and provided information on its bionomics.

The assessment of the bionomics and the study of several specimens from Spain and Southern France prompted me to re-examine several male genitalia preparations without being able to spot any reliable differences between those which were ascribed to *C. murciana* and those I had attributed to *C. perplexella* on the basis of specimens collected by E. Traugott-Olsen near Marbella (Spain). Moreover, a pair of *C. perplexella* reared by NEL (2010) gave the impression that *C. perplexella* and *C. murciana* were the same species.

The main diagnostic features remained therefore those in the female genitalia, which seemed to be very different between the two species as a consequence of the illustration that TOLL (1960, 1961) gave of those of *C. murciana* and *C. perplexella,* the former being totally devoid of spines on the ductus bursae and of signum on the corpus bursae.

In the past, I had the chance to study and photograph the genitalia preparation of the female allotypus of *C. murciana* from Murcia by courtesy of H. J. Hannemann (slide 443 Toll, in Zoologisches Museum der Humboldt-Universität, Berlin). As in Toll's case, the genitalia were left in the abdomen, and were subsequently stained with Chlorazol Black by B. W. Rasmussen in order to obtain a coloration more suitable for photography.

After careful examination of this preparation one can clearly note that the strengthening structure of the abdomen (fig. 8) shows oval tergal discs (3rd tergite) which are only twice as long as wide and thus do not correspond to thos of male *murciana*, where it shows a thin and elongate shape, the discs being at least 5 times longer than wide.

After looking at the structure of the genitalia (fig. 8) I realized that TOLL (1960) described his *C. murciana* based on specimens of two different species: the male specimens perfectly match females of *C. perplexella* collected or reared in later years; whilst the female allotypus of *C. murciana* corresponds to the species that I had subsequently described as *C. hiberica* Baldizzone, 1985.

On the basis of the aforementioned reasoning the following new synonymy is thence proposed.

Coleophora perplexella Toll, 1960 (figs. 2, 3)
Acta zool. Cracov., **5**(7): 252.

Holotypus ♀: "Chiclana, 17-VII"; "PG |Gr. v. Toll No. 1674 ♀"; coll. Polish Academy of Sciences, Institute of Systematics and Evolution of Animals, Kraków, Poland.

= *Coleophora murciana* Toll, 1960, *Acta zool. Cracov*., **5**(7): 253, **syn. n.**

Holotypus ♂: "Murcia";"Präparat |No 440/ Gr. v. Toll";"Coleophora/ murciana Toll | Gr. v. Toll det."; "Holotypus"; "Museum für/ Naturkunde | Berlin | Altbestand", coll. Zoologisches Museum der Humboldt- Universität Berlin, Germany.

Redescription

Wingspan 12-14 mm. Male (fig. 2). Head yellowish white, dorsally with ochreous tinge. Antenna with white scape, ventrally ochre-coloured, and flagellum ringed with white and pale

brown. Labial palpus dorsally and internally whitish, ochreous on external side; second segment with thick tuft of dark apical scales reaching upper part of third segment, which is half as long as the second. Thorax pale ochreous. Forewing yellow, more or less darkened, with thin white line along costa and over costal fringes; thin white lines are also more or less distinctly visible along wing fold and on wing cell; fringes pale pearl grey. Hindwing brown or light grey-brown, with fringes similar to those of forewing. Abdomen light brown.

Female (fig. 3). As in male except for more elongated and slightly falcate forewing tip, with larger and more marked costal line, particularly at tip, and middle streak usually larger and more distinct.

Male genitalia (fig. 5): Knob of gnathos large and oval. Tegumen thickset, constricted at middle, its short peduncles with slightly broadened external margin. Transtilla short and straight. Valvula with round ventral margin. Cucullus short and oblique, slightly narrower at tip. Sacculus with rounded ventral corner, dorsal corner with a triangular protuberance which does not reach tip of cucullus. Phallotheca short, cone-shaped, and weakly sclerotized.

Female genitalia (fig. 6): Papillae anales large, oval in outline and elongated. Apophysis posterior about twice as long as anterior. Sclerotization of the trapezoidal sterigma more evident along the distal and lateral margins, and also along a band which encircles the ostium bursae, this latter being cup-shaped and at the centre of the sterigma. Colliculum elongated and narrow, with lateral margins strengthened. Ductus bursae membranous, widest posteriorly, narrowest at middle, then dilated at junction with bursa; its posterior region with lateral bag-shaped elongated appendix richly provided with spines.

Abdominal apodemes (fig. 7): Postero-lateral bars absent, transversal bar slightly convex with the central area of the proximal margin. Tergal discs (3rd tergite) 5 times longer than wide, and with 20-25 short conical spines.

Larva (L5 stadium) (fig. 1): Length 6-7 mm. Head very dark brown, almost black, trunk chlorophyll green. Thoracic and stigmatic plates brown, their pigmentation weaker expressed from anterior to posterior ones. Prothoracic shield large, heavily sclerotised, blackish-brown and with narrow perpendicular groove; mesothoracic shield consisting of paired large sclerites less sclerotized than prothoracic shield, irregular and oval in shape, drawing closer distally; metathoracic shield with paired sclerites smaller than previous ones, oval and well separated. Spiracular sclerites brown, darkest on T1-T2, of irregular trapezoid shape, that on T2 being the largest. Legs with dark-brown sclerites, darkest externally. Prolegs on A3–A6 with a double row of 4 to 6 crochets. Anal shield brown. Anal proleg formed by two crescents, bearing compact series of 16 to 18 crochets. [Description based on a larva collected by J. Nel in France, Var, île de Gaou, on March 2010].

Larval case (fig. 4): Elongated cylindrical, ca. 8 mm long, entirely made of silk appearing creased; anterior part dark-brown, becoming lighter towards the posterior end, anal opening trilobate. Oral opening angled 30 with respect to longitudinal axis. Note: the cases studied by NEL (2010) correspond well to one found attached to a support in Algarve (Portugal) by M. Corley (pers. comm.), except for the angle of oral opening being set at 45º.

Bionomics

The bionomics was partially described by NEL (2010), who studied the species in southern France. Eggs are probably directly deposited on leaves of *Hordeum murinum* L. and *Bromus sterilis* L. (Poaceae). The young larvae mine the leaves, hibernate and re-start feeding in the following spring, producing distinctive white mines which are 1.5 mm long and 2-3 mm wide. Pupation takes place inside the case attached to a support. Adults are on the wing usually between end-March to mid-May, occasionally until July. In Sardinia the species was collected in May.

Distribution: Portugal, Spain, southern France, Sardinia, Algeria, Morocco (BALDIZZONE *et al*., 2006).

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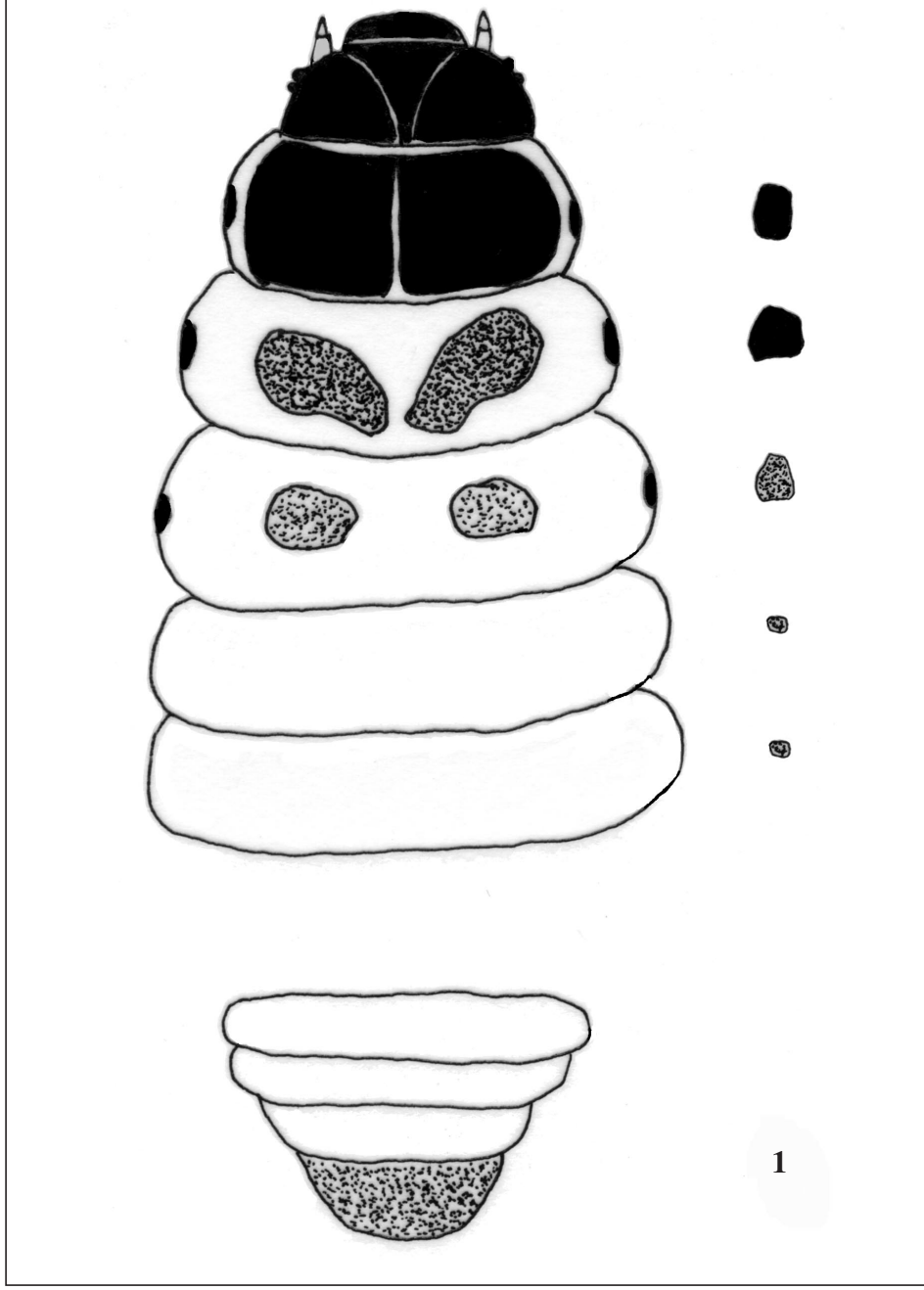
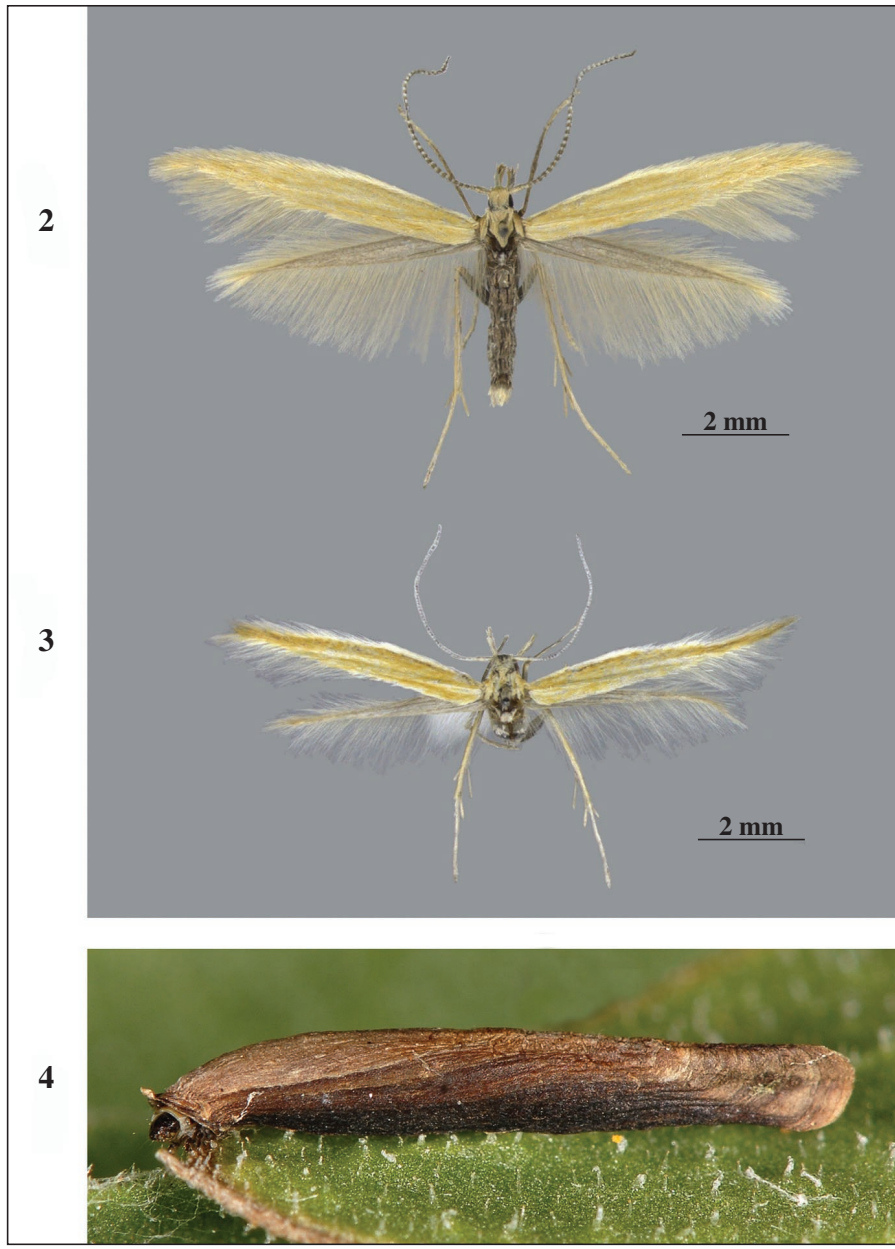
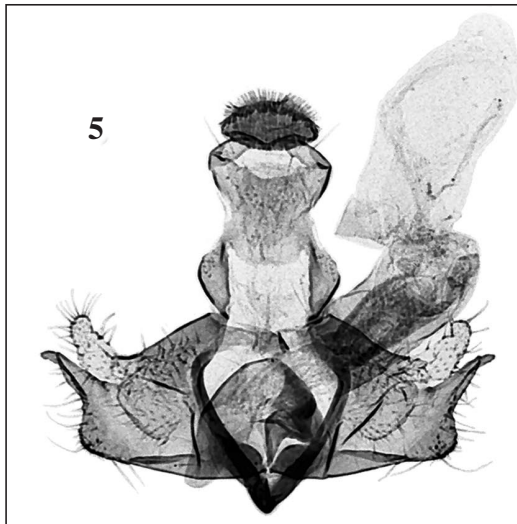
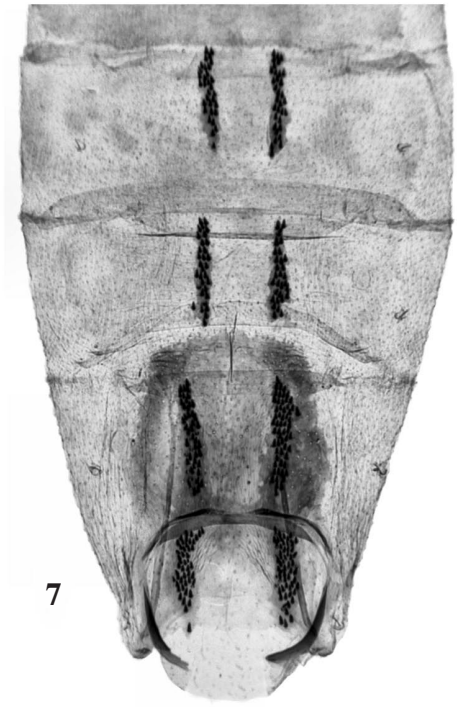


1.– *C. perplexella* Toll. Drawing of the larva. (L5).

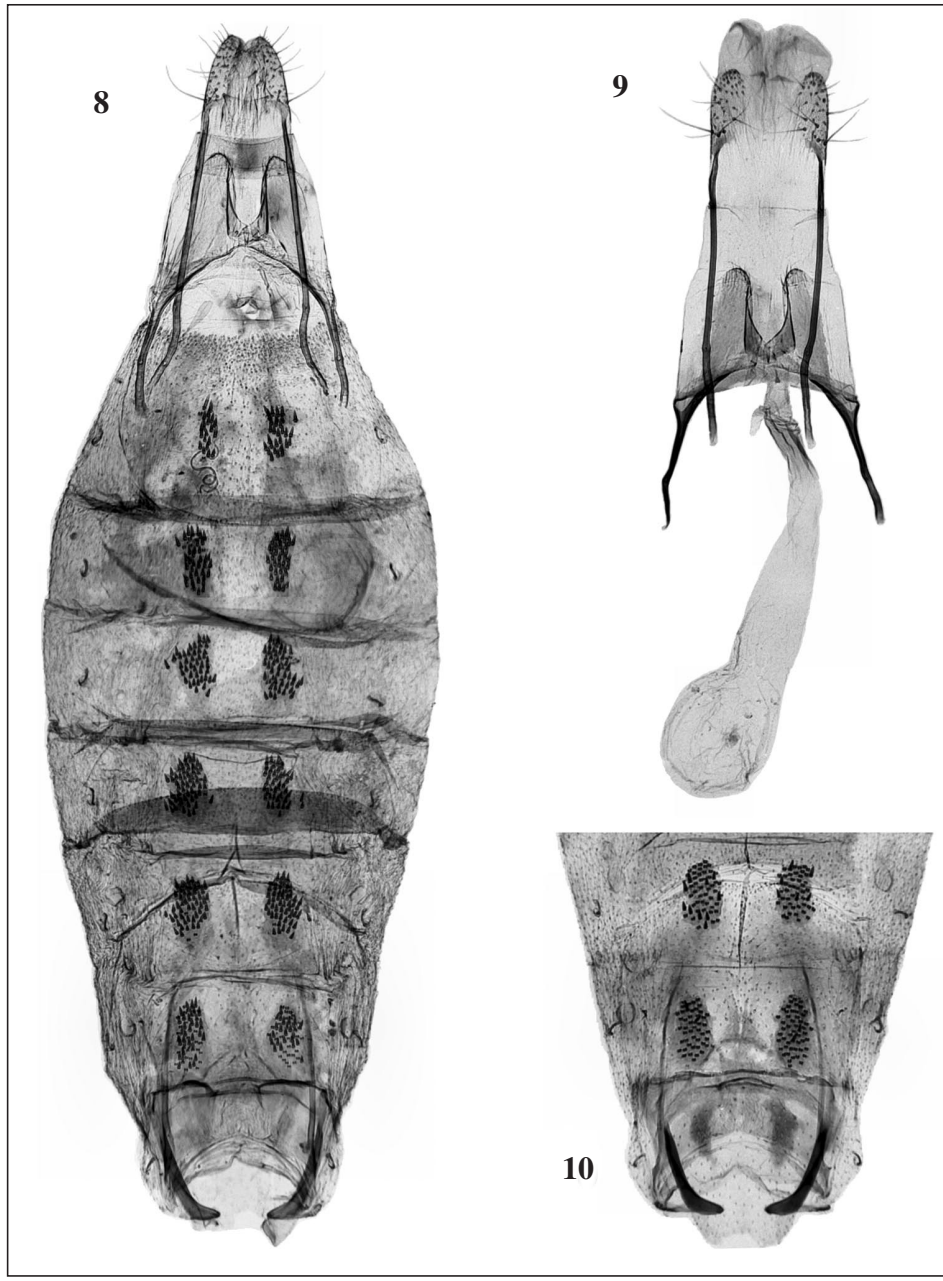


2-4.– 2. *Coleophora perplexella* Toll, ♂ - "Hispania, Andalusia, Marbella - Casa y Campo, 26-III-1972, E. Traugott-Olsen leg. ", coll. Baldizzone. **3.** *C. perplexella* Toll, ♀ - "Hispania, Andalusia, Marbella - El Mirador, 100 m, 22-V-1977, E. Traugott-Olsen leg.", coll. Baldizzone (PG Bldz 5661). **4.** *C. perplexella* Toll - Larval case (8 mm). "France, Var, Fort Carré, 19-III-2010, T. Varenne leg."





5-7.– 5. *C. perplexella* Toll, male genitalia: PG Bldz 5663 "Hispania, Andalusia, Marbella, El Mirador, 100 m, 22-V-1977, Traugott Olsen", coll. Baldizzone. **6.** *C. perplexella* Toll, female genitalia: PG Bldz 5675, idem. **7.** Idem, abdomen ♀ (PG Bldz 5675).



8-10.– 8. *C. hiberica* Baldizzone - Allotypus of *C. murciana* Toll (PG 443 Toll). **9.** *C. hiberica* Baldizzone, female genitalia: PG Bldz 7513 "Hispania, prov. de Granada, Camino de Capileira, 1250 m, 14-VII-1985, G. Baldizzone y E. Traugott-Olsen", coll. Baldizzone. **10.** Idem, abdomen (PG Bldz 7513).

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Rhopalocera de la Caldera de Lubá, isla de Bioko (Guinea Ecuatorial): Papilionidae, Pieridae y Lycaenidae (Lepidoptera: Papilionoidea)

I. Martín & P. Cobos

Resumen

En el presente trabajo se presentan los primeros registros de Papilionidae, Pieridae y Lycaenidae del interior de la Caldera de Lubá, ubicada en el sur de Bioko. De las 16 especies colectadas pertenecientes a estas familias (8 Papilionidae, 4 Pieridae y 4 Lycenidae) cuatro de ellas representan las primeras citas para la isla: *Graphium ucalegon* (Hewitson, 1865), *Papilio phorcas congoanus* Rothschild, 1896; *Nepheronia argia* (Fabricius, 1775) y *Pentila fidoniodes* Schultze, 1923. La cota altitudinal máxima de capturas fue 1.293 msnm y la mínima a nivel del mar, obteniéndose todas ellas en hábitat de bosque monzónico primario, no perturbado. Se cuestiona la abundancia de *Graphium biokoensis* (Gauthier, 1984) en la isla de Bioko.
PALABRAS CLAVE**:** Lepidoptera, Papilionoidea, Caldera de Lubá, bosque monzónico, isla de Bioko, Guinea Ecuatorial.

Rhopalocera of the Caldera de Lubá Bioko Island (Equatorial Guinea): Papilionidae, Pieridae and Lycaenidae (Lepidoptera: Papilionoidea)

Abstract

The present work presents the first registers of Papilionidae, Pieridae y Lycaenidae from inside the Caldera de Lubá, situated in the south of Bioko. Of the 16 species collected belonging to these families (8 Papilionidae, 4 Pieridae and 4 Lycaenidae) four of them represent the first mentions for the Island: *Graphium ucalegon* (Hewitson, 1865), *Papilio phorcas congoanus* Rothschild, 1896; *Nepheronia argia* (Fabricius, 1775) and *Pentila fidoniodes* Schultze, 1923. The maximum height of captures was 1293 m.a.s.l. and the minimum was at sea level, all of them taking place in an undisturbed habitat of primary monsoon forest. The abundance of *Graphium biokoensis* (Gauthier, 1984) in Bioko Island is questioned.
KEY WORDS: Lepidoptera, Papilionoidea, Caldera de Luba, monsoon forest, Bioko Island, Equatorial Guinea.

Introducción

Alrededor del 90% de las mariposas diurnas viven en los sistemas tropicales (BONEBRAKE *et al.*, 2010), pero el conocimiento general sobre su distribución y ecología aún es escaso, al menos en determinadas áreas geográficas (HILL *et al.*, 2001). La isla de Bioko, considerada como una de las zonas geográficas de mayor biodiversidad a nivel mundial (BURGESS *et al.,* 2006), cuenta con una importante cantidad de publicaciones científicas sobre su fauna y acredita una importante cantidad de endemismos (ROBBINS & OPLER, 1997), siendo los lepidópteros un grupo muy estudiado aunque solo parcialmente conocido (SPEARMAN *et al.*, 2000). Al mismo tiempo y pese al importante número de publicaciones científicas sobre la diversidad faunística de la isla, el sur de Bioko no ha sido prospecta-

do de modo intenso seguramente debido a su paisaje abrupto y en ocasiones casi inaccesible (MARTÍNEZ, 1968; VELAYOS *et al.,* 2013). Por ello, la región sur se presenta como un entorno completamente inalterado, albergando la mayor diversidad de plantas y animales de la isla (BUTYNSKI & KOSTER, 1994; ZAFRA-CALVO *et al.*, 2010). En esta región se localiza la Caldera de Lubá (2.261 m) declarada Reserva Científica en 1997, no existiendo entonces conocimiento sobre su diversidad biológica (WEBER, 2001). Las expediciones realizadas en 2005 y 2007 por la Universidad Politécnica de Madrid (MARTÍN & COBOS, 2010a) contribuyen al conocimiento de la diversidad biológica en un área no estudiada y en condiciones prístinas, recopilándose en ellas una importante colección de ejemplares de su interior y pudiéndose así publicar los primeros registros sobre la diversidad de flora (BARBERÁ *et al.*, 2013; VELAYOS *et al.,* 2013) y fauna invertebrada (PRIETO & MARTÍN, 2008; MARTÍN & COBOS, 2010b). En el presente trabajo se muestran los registros de las familias Papilionidae, Pieridae y Lycaenidae, obtenidos en el interior de la Caldera de Lubá.

La familia Papilionidae es una de las mejor estudiadas de la lepidopterofauna afrotropical, si bien algunos géneros se muestran aún poco esclarecidos y sujetos a importantes revisiones (SMITH & VANE-WRIGHT, 2001; HANCOCK, 2006). El género *Graphium* ha sido uno de los taxones que mayor dificultad ha presentado y aún presenta en su nomenclatura y taxonomía (LARSEN, 1994; HANCOCK, 2006). NICULESCU (1991) divide el género en nueve subgéneros estableciendo, entre otros, la nomenclatura de *Graphium policenes* (Cramer, 1775), apoyándose en la descripción de las genitalias. SMITH & VANE-WRIGHT (2001) revisan nuevamente el género y reconocen 39 especies afrotropicales al elevar de rango diversas subespecies, incluyendo a *Graphium biokoensis* (Gauthier, 1984) como nueva especie para Bioko y separándola taxonómicamente de *G. policenes*, si bien son consideradas especies simpátricas por lo que ambas especies pueden, por tanto, estar presentes en Bioko (WILLIAMS, 2008).

Del mismo modo sucede con la familia Pieridae, donde diversos taxones deben ser revisados de modo meticuloso y la distribución de determinadas especies confirmada (LARSEN, 2005).

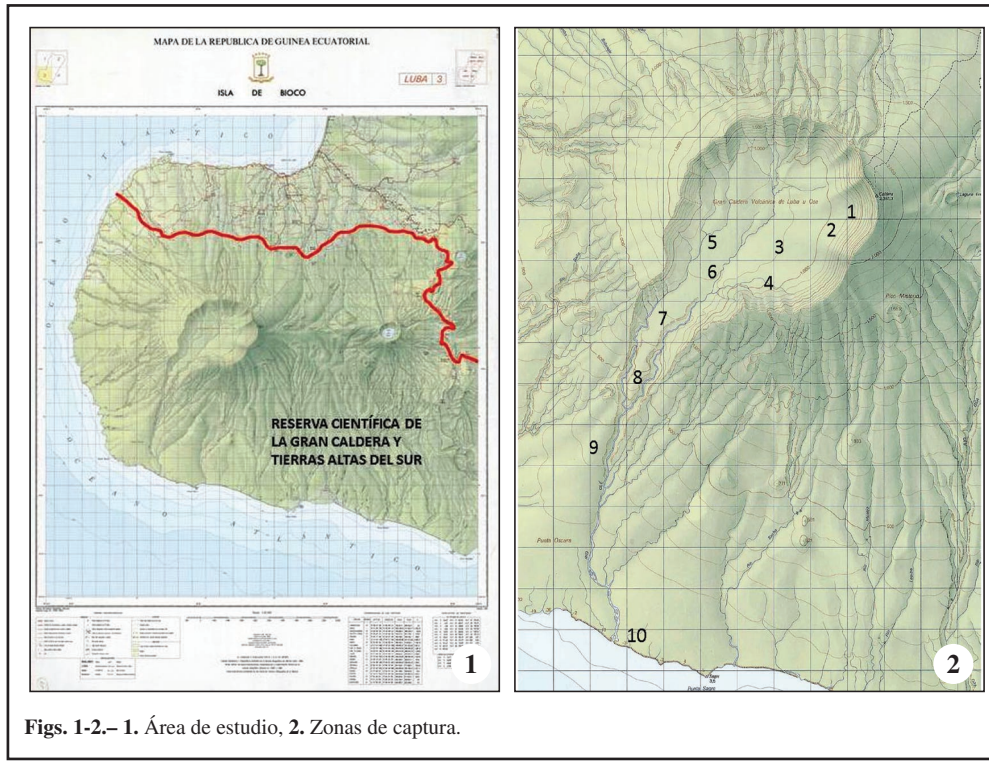
En sentido opuesto destaca la familia Lycaenidae, es decir, ésta es una de la familias menos conocidas de la fauna Afrotropical (SÁFIÀN *et al.*, 2012), aunque en conjunto representan entre el 30 y 40% de todas las especies de Papilionoidea descritas. No obstante, en los últimos años está siendo objeto de numerosas publicaciones, muchos géneros han sido revisados (LIBERT, 2013, 2014) y se ha profundizado en su faunística y taxonomía (D'ABRERA, 2009; LIBERT, 2011). La utilización de los Lycaenidae como indicadores biológicos hace que los estudios sobre su diversidad y conservación cobren especial interés (NEW, 1993; BELCASTRO & LARSEN, 2006).

Materiales y métodos

El área de estudio se encuadra en la Reserva Científica de la Gran Caldera y Tierras Altas del sur de Bioko (Fig. 1), representando la única muestra de bosque monzónico de Guinea Ecuatorial. En la localidad de Ureka (incluida en la RCGCTAS) las precipitaciones anuales medias son de 10.150 mm, registrándose el valor máximo absoluto de 14.451 mm en 1983 (JUSTE & FA, 1994). En esta región sur se encuentran el Pico Biao (2.009 m) y la Caldera de Lubá (2.261 m). En este último volcán se abre un espectacular cráter de 5 km de diámetro, con desniveles de más de 1.400 m originados por el hundimiento de la antigua cumbre (FUSTER, 1956). Este cráter de laderas prácticamente verticales (TERÁN, 1962; MARTÍN & COBOS, 2010a), está drenado por el río Olé o Tudela por lo que se forma tan sólo un pequeño lago en su interior. El interior de la Caldera es un terreno extraordinariamente complejo, encerrado por paredes verticales repletas de selva y surcado por profundos y angostos barrancos (MARTÍNEZ, 1968) lo que justifica el estado prístino de su hábitat, inalterado y sin influencia humana en su evolución.

El trabajo de campo se realizó en diciembre de 2005 y marzo de 2007, contabilizándose un total de 26 jornadas de muestreo. Todas las capturas se obtuvieron, en hábitat de bosque monzónico primario, no perturbado. La altitud máxima de los registros fue de 1.293 msnm y la mínima a nivel del mar. En la (Fig. 2) se muestran las ubicaciones de las capturas, localizadas en las siguientes coordenadas:

1. Fondo Caldera: 3º 31’ N / 8º 31’ E (Altitud 1.293 msnm)
2. Campamento Ureca-Fondo Caldera: 3º 27’ N / 8º 31’ E (Altitud 1.066 msnm)
3. Campamento Ureka: 3º 21’ 34’’N / 8º 30’ E (Altitud 916 msnm)
4. Río San Antonio y Poza Verónica: 3º 20’ N / 8º 29’ E (Altitud 899 msnm)
5. Pizarras: 3º 21’ N / 8º 29’E (Altitud 875 msnm)
6. Campamento UPM y Río Riaco: 3º 20’N / 8º 29’E (Altitud 876 msnm)
7. Campamento UPM/Camp. Hormiga: 3º 19’ N / 8º 28’E (Altitud 713 msnm)
8. Campamento Hormiga: 3º 18’ N / 8º 28’E (Altitud 585 msnm)
9. Chapa Herminio: 3º 17’N / 8º 27’E (Altitud 374 msnm)
10. Moraca: 3º 15’N / 8º 28’E (Altitud nivel mar)



Figs. 1-2.– 1. Área de estudio, **2.** Zonas de captura.

Para la identificación de ciertos taxones se ha estudiado la genitalia en diversos ejemplares, de modo que su determinación sea absolutamente precisa. En algunas especies se han comparado las genitalias de nuestras capturas con las obtenidas de los ejemplares de la colección de ropalóceros de Fernando Poo (Bioko) depositadas en el Museo Nacional de Ciencias Naturales (Madrid, España) actualmente en estudio (Martín *et al*., en preparación)

Resultados

Del total de 69 especies de ropalóceros registradas para el interior de la Caldera de Lubá, 8 son Papilionidae, 4 pertenecen a Pieridae y 4 a Lycaenidae, representando en conjunto alrededor del 23% del total. Todos los registros fueron colectados por la Expediciones Científicas-UPM a la Caldera de Lubá (Exp. UPM 2005 y Exp. UPM 2007)

Familia Papilionidae Latreille, [1802]
Subfamilia Papilioninae Latreille, [1802]

Papilio dardanus Brown, 1776

Moraca, XII-2005,1 ♂ (Exp-UPM 2005 leg.); Campamento UPM, XII-2005, 1 ♂ (Exp-UPM 2005 leg.); Río Riaco, 8-III-2007, 1 ♂ (Exp-UPM 2007 leg); Campamento UPM, 8-III-2007, 1 ♂ y 1 ♀ (Exp-UPM 2007 leg.); Río Riaco, 9-III-2007, 1 ♂ y 1 ♀ (Exp-UPM 2007 leg.); Pizarras, 12-III-2007, 1 ♀ (Exp-UPM 2007 leg.); Campamento Ureka, 12-III-2007, 1 ♀ (Exp-UPM 2007 leg.); Fondo Caldera, 15-III-2007, 3 ♂♂ y 1 ♀ (Exp-UPM 2007 leg.); Junta río Riaco, 16-III-2007, 1 ♂ (Exp-UPM 2007 leg.).

Papilio menestheus canui Gauthier, 1984

Moraca, 6-III-2007, 1 ♂ (Exp-UPM 2007 leg.); Campamento Hormiga, 7-III-2007, 2 ♀♀ (Exp-UPM 2007 leg.); Río Riaco, 9-III-2007, 1 ♂ (Exp-UPM 2007 leg.); Río Riaco, 16-III-2007, 1 ♂ (Exp-UPM 2007 leg.).

Papilio phorcas congoanus Rothschild, 1896

Campamento Hormiga, 7-III-2007, 1 ♂ (Exp-UPM 2007 leg.); Río Riaco, 9-III-2007, 4 ♂♂ (Exp-UPM 2007 leg.); Fondo Caldera, 15-III-2007, 4 ♂♂ y 1 ♀ (Exp-UPM 2007 leg.); Río Riaco, 16-III-2007, 1 ♂ y 1 ♀ (Exp-UPM 2007 leg.).

Papilio charopus Westwood, 1843

Moraca, XII-2005, 1 ♂ (Exp-UPM 2005 leg.).

Papilio fernandus Fruhstorfer, 1903

Campamento UPM, 8-III-2007, 1 ♂ (Exp-UPM 2007 leg); Río Riaco, 16-III-2007, 1 ♂ (Exp-UPM 2007 leg.).

Graphium ucalegon (Hewitson, 1865)

Río Riaco, 9-III-2007, 1 ♂ (Exp-UPM 2007 leg.).

Graphium policenes (Cramer, 1775)

Moraca, XII-2005, 4 ♂♂ y 1 ♀ (Exp-UPM 2005 leg.); Moraca, 6-III-2007, 1 ♀ (Exp-UPM 2007 leg.); Río Riaco, 9-III-2007, 1 ♂ (Exp-UPM 2007 leg.).

Graphium leonidas (Fabricius, 1793)

Moraca, XII-2005, 1 ♂ (Exp-UPM 2005 leg); Campamento Hormiga, 7-III-2007, 1 ♂ (Exp-UPM 2007 leg.); Río Riaco, 9-III-2007, 3 ♂♂ (Exp-UPM 2007 leg.); Río Riaco, 16-III-2007, 1 ♀ (Exp-UPM 2007 leg.).

Familia Pieridae Swainson, 1820
Subfamilia Pierinae Swainson, 1820

Nepheronia argia (Fabricius, 1775)

Río Riaco, 15-XII-2005, 1 ♂ (Exp-UPM 2005 leg.); Pizarras, 12-III-2007, 1 ♂ (Exp-UPM 2007 leg.); Campamento Ureka, 12-III-2007, 1 ♀ (Exp-UPM 2007 leg.).

Appias sabina (Felder & Felder, [1865])

Moraca, 6-III-2007, 3 ♂♂ (Exp-UPM 2007 leg.).

Leptosia marginea (Mabille, 1890)

Río Riaco, 9-III-2007, 1 ♂ (Exp-UPM 2007 leg.).

Leptosia nupta (Butler, 1873)
Campamento UPM-Campamento Hormiga, 18-III-2007 (Exp-UPM 2007 leg.).

Familia Lycaenidae Leach, 1815
Sufamilia Polyommatinae Swainson, 1827

Leptotes pirithous (Linnaeus, 1767)
Moraca, 6-III-2007, 1 ♂ (Exp-UPM 2007 leg.).

Subfamilia Lipteninae Röber, 1892

Larinopoda lagyra (Hewitson, 1866)
Río Riaco, 15-XII-2005, 1 ♂ (Exp-UPM 2005 leg.).

Pentila rotha Hewitson, 1873
Chapa Herminio, 19-III-2007, 1 ♂ (Exp-UPM 2007 leg.).

Pentila fidonioides Schultze, 1923
Campamento Hormiga, 7-III-2007, 1 ♂, 1 ♀ (Exp-UPM 2007 leg.).

Discusión.

Papilio phorcas (Cramer, 1775) ha sido citado en Bioko en una única ocasión (SCHULTZE, 1917) en la localidad de San Carlos (Lubá), anotando la subespecie *bardamu*. Nuestros registros representan la primera cita de *P. phorcas congoanus* Rothschild, 1896 para la isla (MARTÍN COBOS, 2010b), si bien existen tres capturas en Rébola (I-1933, Bonet-Gil leg.) que no han sido publicadas (Martín *et al*., en preparación). *Papilio fernandus* Fruhstorfer, 1903 es citada por vez primera en Bioko por KHEIL (1905) como *Papilio cyproeofila fernandus*. Posteriormente la especie es citada en la localidad de San Carlos-Musola como *P. cyproeofila insularis* Schultze, 1913 (SCHULTZE, 1917). Basados en esta última referencia, SPEARMAN *et al*. (2000) citan *Papilio cyproeofila fernandus* en Bioko, si bien *P. fernandus* y *P. cyproeofila* Butler, 1868 actualmente son taxones diferentes (D'ABRERA, 1997) y tan solo *P. fernandus* aparece actualmente citada como tal en la isla (VANDE WEGHE, 2010) por lo que la presencia en Bioko de *P. cyproeofila* debe ser confirmada. *Graphium ucalegon* (Hewitson, 1865) ha sido recolectado en Kogo, Miwala, (DE OLANO & MARCOS, 1993) y Alén (ACKERY *et al*., 1995) localidades de la región continental de Río Muni, pero no existen citas en Bioko por lo que nuestros registros representan los primeros datos de la presencia de la especie tanto en la Reserva Científica como en la isla. El hábitat de ocupación de la especie es preferentemente el bosque denso o las riberas fluviales (VANDE WEGHE, 2010), lo que coincide con nuestros registros. Los datos publicados sobre la presencia de *Graphium leonidas* (Fabricius, 1793) (SPEARMAN *et al*., 2000) corresponden con las 8 capturas realizadas en Biapá (Concepción) en febrero de 1933 (Bonet-Gil leg.), ampliándose con nuestros datos el área de ocupación de la especie al Sur de Bioko y así como añadiendo nuevos datos sobre su distribución altitudinal en bosque monzónico. *Graphium policenes* (Cramer, 1775) se cita por vez primera en Bioko por SCHULTZE (1917) y desde entones son varias las localidades de la isla donde ha sido recolectada la especie (SPEARMAN *et al*., 2000; MARTÍN & COBOS 2010b), estando presente también en las localidades de Ngaba y Afansok el continente (DE OLANO & MARCOS, 1993). Resulta singularmente importante destacar que en los trabajos de revisión sobre el género *Graphium* Scopoli, 1777 la especie *G. biokoensis* Gauthier, 1984 ha sido sistemáticamente revisada con ejemplares procedentes de Camerún y Gabón (SMITH & VANE-WRIGHT, 2001). Como hemos señalado, una vez estudiada la genitalia de los diversos ejemplares capturados por nosotros en ambas expediciones (UPM 2005 y 2007), han resultado pertenecer inequívocamente a la especie *Graphium policenes* (Cramer, 1775). Asimismo, hemos podido revisar íntegramente la colección de ropaló-

ceros depositada en el Museo Nacional de Ciencias Naturales de Madrid y estudiar la genitalia de varios individuos elegidos al azar, resultando ser igualmente *G. policenes* (Martín *et al*., en preparación), por lo que consideramos que la distribución de ambos taxones debe ser revisada, como ya apuntó HANCOCK (2006).

Appias epaphia (Cramer, 1779) es citada por vez primera en Bioko por DOUBLEDAY (1847) como *Pieris matuta* (Doubleday, 1847). La especie es citada de nuevo por SCHULTZE (1917) con ejemplares capturados en Santa Isabel, la actual Malabo, siendo esta la única localidad apuntada también por SPEARMAN *et al.* (2000), pero existen citas en el Lago Loreto (hoy Biao) (BERNARDI, 1953), así como diversas capturas en Lubá (antes San Carlos), Basilé, Basupú, Biapá, etc. (Martín *et al*., en preparación), por lo que su distribución en la Isla debe ser generalizada. BACELAR (1948) cita *Leptosia alcesta* f *nupta* (Butler, 1873) en Bioko con ejemplares capturados en Lago Biao, Basilé y Moka, pero posteriormente es considerada como especie nueva bajo el nombre de *Leptosia nupta* (Butler, 1843) (BERNARDI, 1953). *L. marginea* (Mabille, 1890) es citada en Bioko por SPEARMAN *et al.* (2000), señalando las localidades de Malabo y Basilé. Además de la nueva cita del presente trabajo, la especie ha sido colectada también en Botonós en 1933 (Bonet-Gil, leg.) (Martín *et al*., en preparación). No se conocen citas de machos de *Nepheronia argia* (Fabricius, 1775) en Bioko, por lo que los datos presentados en este trabajo representan los primeros registros en la isla. No obstante y aunque no figura la especie en la revisión de SPEARMAN *et al.* (2000), ha sido citada una hembra en la localidad de Basupú (BERNARDI, 1967) como *N. argia* f. *aurantiaca*. Asimismo, hemos tenido acceso a un ejemplar macho depositado en el Museo Nacional de Ciencias Naturales (Botonós I-1933, Bonet-Gil, leg.) lo que confirma nuestros registros. La especie también está presente en la región continental de Río Muni (KHEIL, 1905), así como en Camerún y Gabón (VANDE WEGHE, 2010).

Bioko cuenta con alrededor de 77 especies de Lycaenidae presentes en su fauna (Martín *et al*., en preparación) ocupando los diversos hábitat disponibles, desde bosque monzónico hasta áreas antropizadas (TERBLANCHE *et al*., 2003) si bien este número puede estar algo subestimado pues muchos licénidos requieren métodos de captura específicos, ya sea por congregarse en puntos elevados como los machos de algunos Lipteninae (SÁFIAN *et al.*, 2012) o por tener tendencia a concentrarse en las proximidades de determinadas especies de hormiga (HEATH & CLAASSENS, 2003; FIEDLER, 2012), por lo que el número de capturas por nosotros obtenido en el interior de la Reserva Científica puede estar igualmente subestimado, lo que justificaría en sí mismo el bajo número de especies registradas en el área de estudio. No obstante y como hemos señalado, esta familia mantiene un hábitat muy variado ocupando áreas desde bosque primario a zonas degradadas, zonas de praderas y pastos, humedales, etc., por lo que las prospecciones en zonas exclusivamente forestales pueden explicar un número reducido de especies (VAN SOMEREN, 1974; D'ABRERA, 2009; FIEDLER, 2012). El registro de *Pentila fidonioides* representa la primera cita de la especie en Bioko, estando no obstante presente en áreas cercanas a la isla, como el sur de Camerún (SCHULTZE & AURIVILLIUS, 1923) y en el norte de Gabón (VANDE WEGHE, 2010). En todos los casos se trata de una especie de hábitos forestales (STEMPFFER & BENNETT, 1961). Hasta la fecha de elaboración de este trabajo, *Leptotes pirithous* (Linnaeus, 1767) sólo ha sido citada en Bioko en la localidad de Santa Isabel (hoy Malabo) (SCHULTZE & AURIVILLIUS, 1923) por lo que nuestros datos confirman la presencia de la especie 90 años después de su primera y hasta ahora única cita. No obstante, se trata de una especie sumamente común en países próximos como Camerún (LIBERT, 2011) y presenta una amplia distribución geográfica en continua expansión, habiendo colonizado recientemente las Islas Canarias, donde es considerada especie invasora (WIEMERS *et al.*, 2013).

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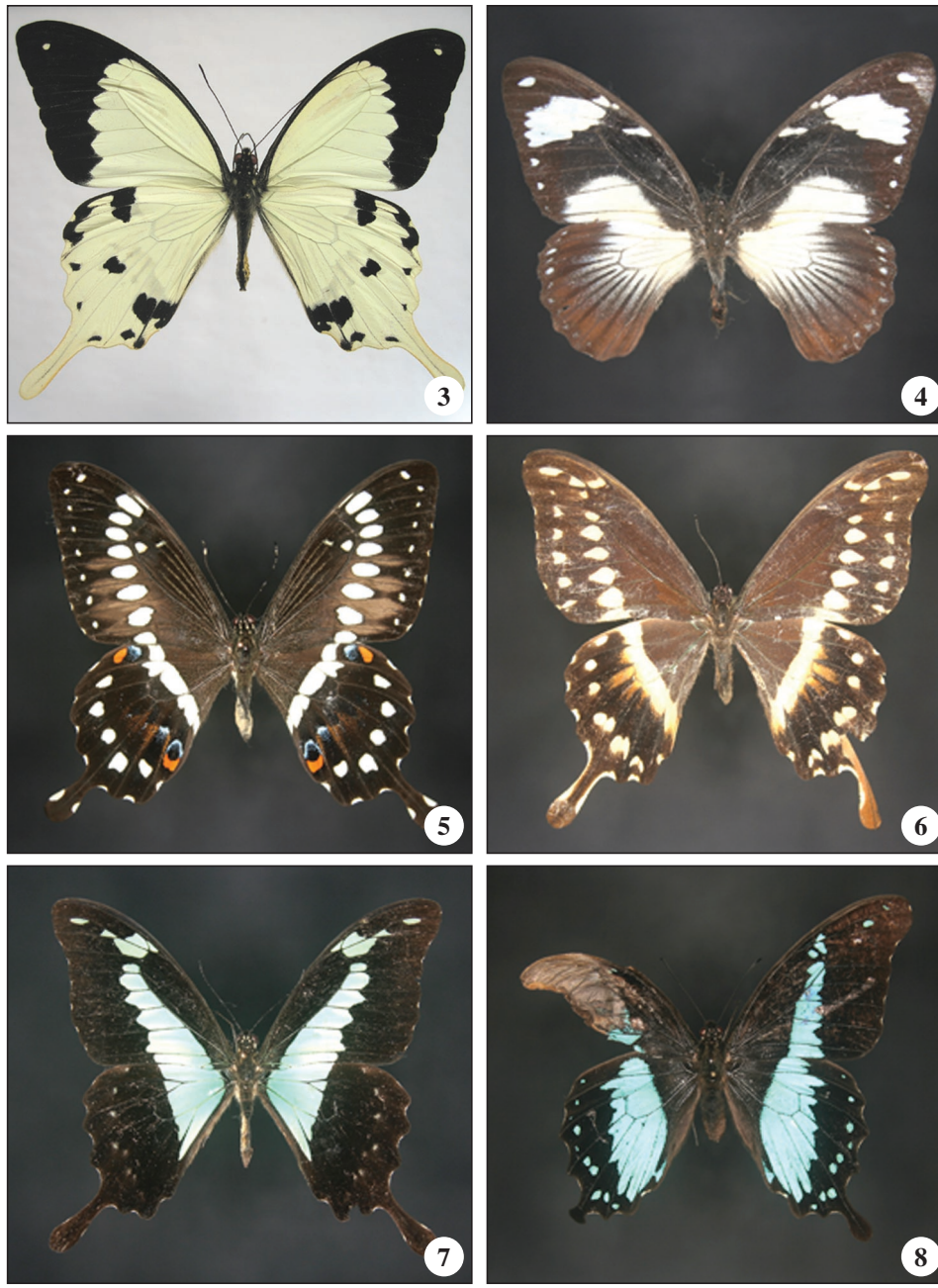
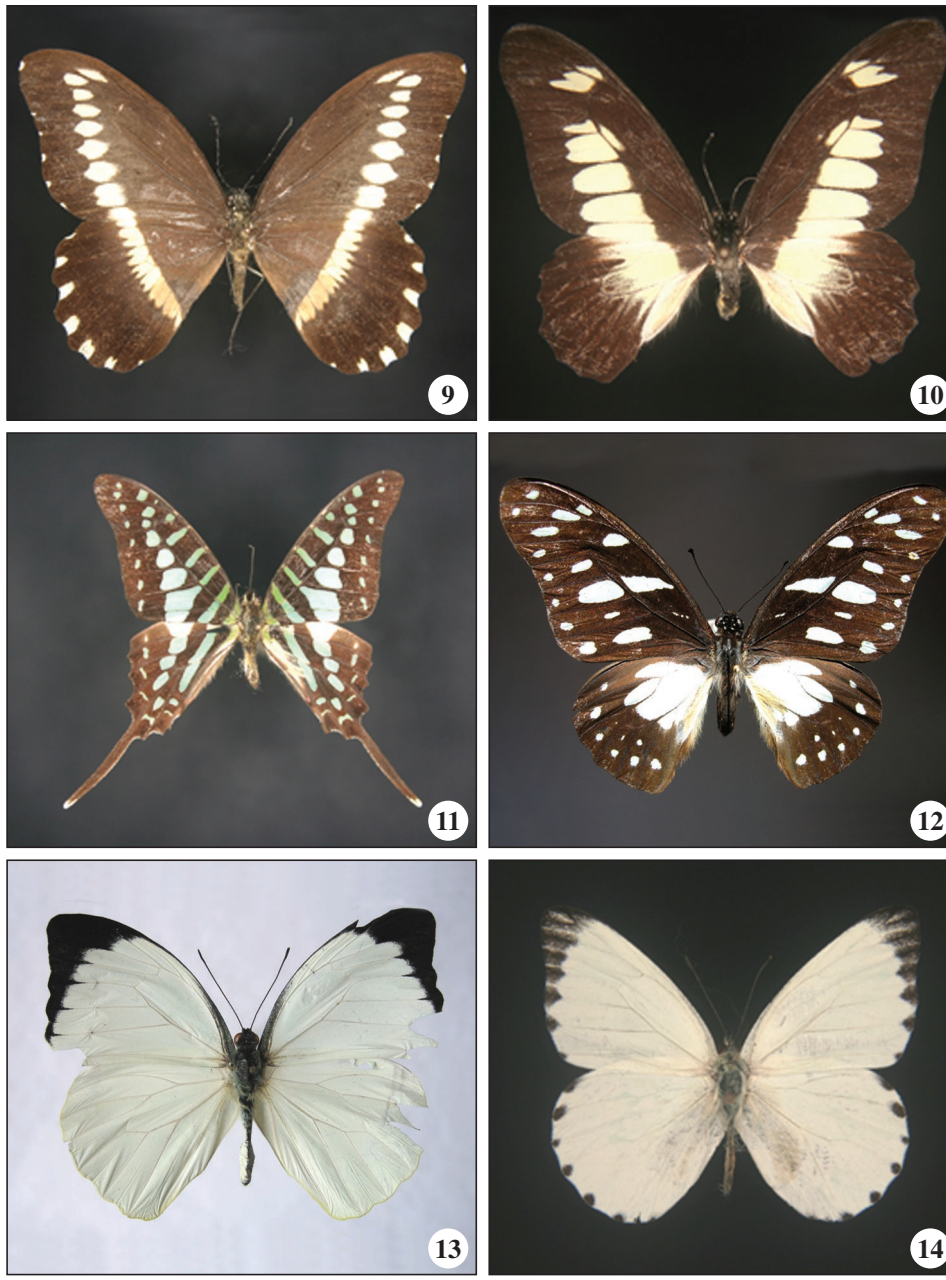
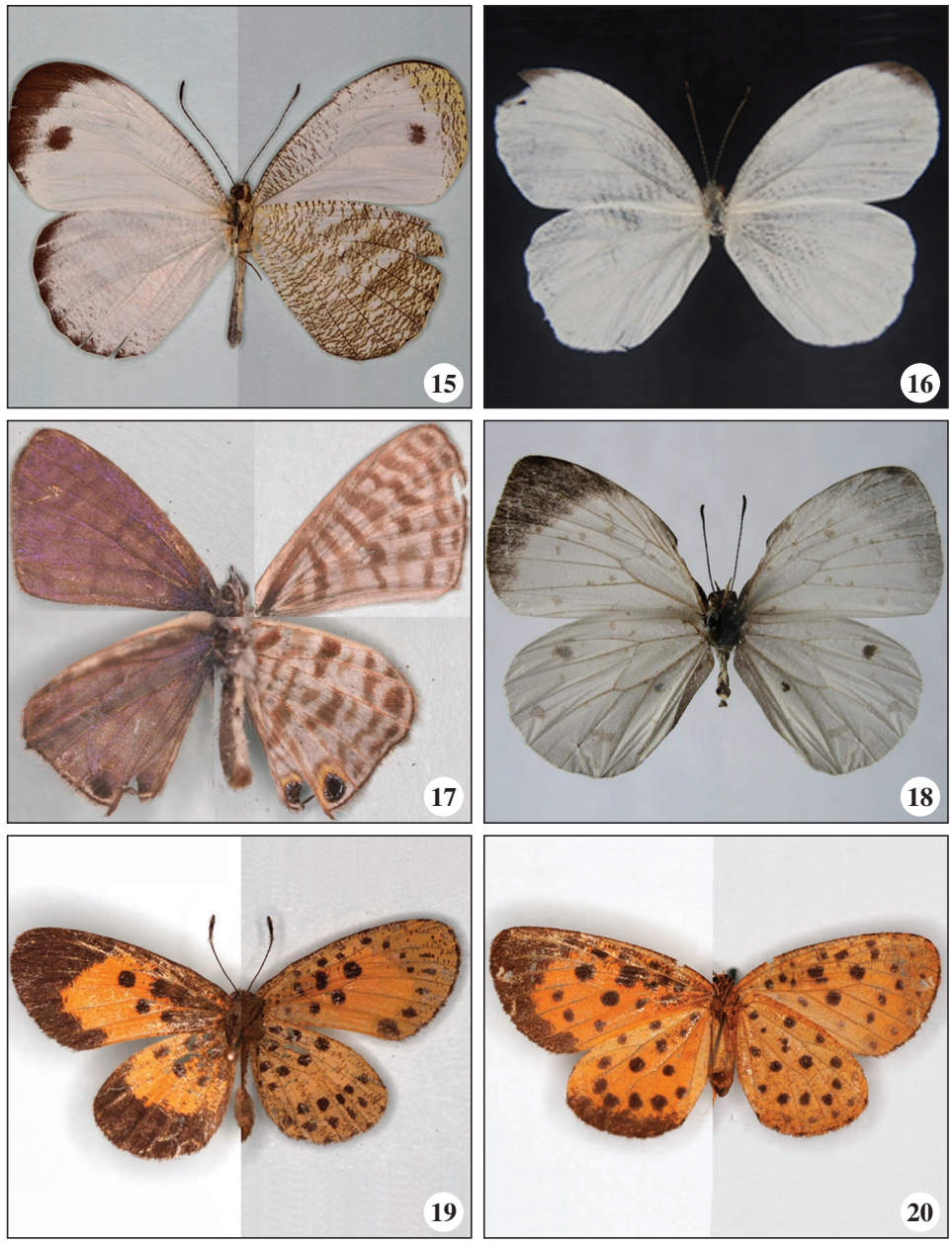


Figs. 3-8.– Macho **3.** Hembra **4.** *Papilio dardanus* Brown, 1776; Macho **5.** Hembra **6.** *Papilio menestheus canui* Gauthier, 1984; **7.** *Papilio phorcas congoanus* Rothschild, 1896; **7.** *Papilio charopus* Westwood, 1843



Figs. 9-14.– 9. *Papilio fernandus* Fruhstorfer, 1903; **10.** *Graphium ucalegon* (Hewitson, 1865); **11.** *Graphium policenes* (Cramer, 1775); **12.** *Graphium leonidas* (Fabricius, 1793); Macho **13.** *Nepheronia argia* (Fabricius, 1775); **14.** *Appias sabina* (Felder & Felder, [1865])



Figs. 15-20.– 15. *Leptosia marginea* (Mabille, 1890) (reverso y verso); **16.** *Leptosia nupta* (Butler, 1873); **17.** *Leptotes pirithous* (Linnaeus, 1767) (reverso y verso); **18.** *Larinopoda lagyra* (Hewitson, 1866) (reverso y verso); **19.** *Pentila rotha* Hewitson, 1873 (reverso y verso); **20.** *Pentila fidonioides* Schultze, 1923 (reverso y verso).

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Coleophora proterella Wikström & Tabell, a new species belonging to *C. virgaureae* species-complex (Lepidoptera: Coleophoridae)

J. Tabell & B. Wikström

Abstract

Coleophora proterella Wikström & Tabell, sp. n. is described as new. The new species belongs to the *C. virgaureae* species-complex. According to the genitalia structures it is closely related to *C. obscenella* Herrich-Schäffer, 1855, *C. virgaureae* Stainton, 1857, *C. cinerea* Toll, 1954, and according to the DNA barcode studies the closest species is *C. squamosella* Stainton, 1856. Photographs of the adult, genitalia and larval case of the new taxon are provided and the known distribution range is given.
KEY WORDS: Lepidoptera, Coleophoridae, *Coleophora proterella*, *Coleophora virgaureae* species-complex, DNA, new species.

Coleophora proterella **Wikström & Tabell, una nueva especie que pertenece al complejo de especies de** *C. virgaureae* **(Lepidoptera: Coleophoridae)**

Resumen

Coleophora proterella Wikström & Tabell, sp. n. se describe como nueva. La nueva especie es pertenece al complejo de especies de *C. virgaureae*. De acuerdo a sus estructuras de la genitalia es relativamente próxima a *C. obscenella* Herrich-Schäffer, 1855, *C. virgaureae* Stainton,1857, *C. cinerea* Toll, 1954 y de acuerdo al código de barras del ADN la especie próxima es *C. squamosella* Stainton, 1856. De la nueva especie proporcionan fotografías de los adultos, genitalia y estuche larvario y el rango de distribución conocida.
PALABRAS CLAVE: Lepidoptera, Coleophoridae, *Coleophora proterella*, *Coleophora virgaureae* complejo de especies, ADN, nueva especie.

Introduction

Coleophora virgaureae Stainton, 1857 is a species that has caused a great deal of confusion among collectors and taxonomists for a long time, due to the assumed variation in the structures of the male genitalia. In Europe three in genitalia closely similar species have been described during the last two centuries, *viz. C. obscenella* Herrich-Schäffer,1855, *C. virgaureae* Stainton,1857 and *C. cinerea* Toll,1954. Later BALDIZZONE (1981, 1992), after studying the type materials, synonymized *C. virgaureae* and *C. cinerea* with *C. obscenella*. During the last years, however, additional studies have revealed this synonymization unjustified and these three taxa have been reverted to distinct species (BALDIZZONE & TABELL, 2002).

In Northern Europe only one member of the *C. virgaureae* species-complex, on *Solidago virgaurea* L. living, widely spread and abundant *C. virgaureae* has been recorded so far. Surprisingly long flight period of the adults, from the last days of May to the end of September or even to the

beginning of October, paid our attention, and we could find some small but steady differences in both male and female genitalia between the early and late flying specimens. As a result one further species of the *C. virgaureae* species-complex, *Coleophora proterella* Wikström & Tabell, sp. n. is described in the present paper. The new species has in genitalia also some similarities with *C. squamosella* Stainton, 1856 and some other species living on *Aster* L., but the shape of sacculus in male genitalia is a distinguishing character and these taxa are not treated here, except for *C. squamosella*.

The type specimens are deposited in the collection of the Finnish Museum of Natural History, University of Helsinki, Finland (MZH) and the private collections of the collectors.

Coleophora proterella Wikström & Tabell, sp. n.

Holotype ♀ (GP 1244 JT) FINLAND, ES: Enäjärvi, 675:50, e. l. 10-VI-1992, *Solidago virgaurea* 22-VIII-1991, J. Tabell leg., Coll. MZH.

Paratypes (83 ♂♂, 44 ♀♀): Finland, V: Kiikala, 671:31, 17-VI-1986, 1 ♀ (GP BW851/-86); 18-VI-1986, 43 ♂♂, 24 ♀♀ (GP BW800/-86 - BW812/-86, BW815/-86 – BW831/-86); 4-VI-2002, 10 ♂♂, 6 ♀♀, Bo Wikström leg. et coll.; 18-VI-1994, 3 ♂♂ (GP 4100 JT), 1 ♀, J. Junnilainen leg. & coll.; 4-VI-2002, 12 ♂♂, 1 ♀, R. & J. Siloaho leg., coll. Siloaho; Finland, EH: Heinola, 6788:448, 16-VI-1984, 1 ♂ (GP 1239 JT), H. & J. Tabell leg., coll. Tabell; Finland, EH: Heinolan mlk, 679:44, e. l. 26-VI / 7-VII-1992, *Solidago virgaurea* 5-IX-1991, 1 ♂ (GP 1050 JT), 3 ♀♀ (GP 1043 JT, 1046 JT, 1218 JT), J. Tabell leg. et coll.; Finland, EH: Hartola, 6839:448, e. l. 4-VI / 26-VI-1992, *Solidago virgaurea* 9-X-1991, 5 ♂♂ (GP 323-5 JT, 328 JT, 333 JT), 3 ♀♀ (GP 320 JT, 322 JT, 604 JT), J. Tabell leg. et coll.; Finland, ES: Enäjärvi, 675:50, e. l. 4-IV / 15-IV-1989, *Solidago virgaurea* 28-VII-1988, 2 ♂♂ (GP 412 JT, 605 JT), 2 ♀♀ (GP 439 JT, 595 JT); 674:50, e. l. 10-VI / 4-VII-1992, *Solidago virgaurea* 22-VIII-1991, 4 ♂♂ (GP 1045 JT, 1225 JT, 1232 JT, 1235 JT), 2 ♀♀ (GP 1237 JT, 1246 JT), J. Tabell leg. et coll.; Finland, PPp: Oulu, e. l. 2006, *Solidago virgaurea* IX-2005, 1 ♂ (GP 4033 JT); e. l. 2014, *Solidago virgaurea* 11-VIII-2013, 1 ♀, J. Tabell leg. et coll.; Finland, PPp: Kiiminki, 722:344, e. l. VI-2014, *Solidago virgaurea* 11-VIII-2013, 1 ♂, J. Tabell leg. et coll.

Other material examined: Hungary: Kecskemet 20 km E, near Kerekegyhaza village, 1 ♂ (GP 4920 JT), 30-VII-2007, T. Nupponen leg., coll. Tabell. Spain: 1 ♂ (gen. prep. 57364), 3 ♀♀ (gen. prep. 57363), coll. Seebold (Museo Nacional de Ciencias Naturales, Madrid). Portugal: Minho, Castro Laboreiro, Assureira, 1 ♂ swept from *Solidago virgaurea*, 5-IX-2013, M. Corley leg. et coll.

Diagnosis: *C. proterella* sp. n is a medium-sized coleophorid moth externally similar to *C. virgaureae* and *C. obscenella*. Other related species, *C. squamosella* Stainton, 1856 and *C. cinerea*, are slightly smaller (wingspan 11-13 mm, in *C. proterella* sp. n. 13-14 mm) and their forewings are darker brown. All five species can be reliably identified by means of genitalia examination. In the male genitalia the shape of phallotheca rods and sacculus are characteristic: in *C. proterella* sp. n. the upper rod (lateral aspect) bears a large apical tooth and the lower rod a triangular medial tooth at the junction of rods. In *C. virgaureae* the upper rod is toothless, but the lower rod bears a large triangular apical tooth and often few small medial ones. In *C. obscenella* the upper rod bears an apical tooth, the lower rod is toothless. In *C. cinerea* the upper rod is toothless or bears an apical tooth, the lower rod is equipped with a large, elongated tooth at the junction of rods. In *C. squamosella* both rods are armed with apical teeth, besides the lower rod bears a medial tooth. In occasional cases we have observed missing or extra teeth on either rod. In *C. proterella* sp. n. the sacculus is slightly narrower than in *C. virgaureae* and a single cornutus is shorter. In *C. obscenella* sacculus is very broad and its dorsal process long, cornuti more numerous. In *C. cinerea* dorsal process of sacculus and a cornutus are longer than in *C. proterella* sp. n. In *C. squamosella* sacculus is markedly narrower.

In the female genitalia the main distinguishing features are the shape of sterigma and the degree of sclerotization of ductus bursae; in C. *proterella* sp. n. the distal margin of sterigma is more oblique than in other four species and the hook-shaped fold at the edge of medial excavation is situated more proximally (similarly with *C. cinerea*), in *C. squamosella* the fold is absent. In *C. virgaureae, C. obscenella and C. cinerea* the wide coil of ductus bursae is transparent or only slightly coloured, in *C.*

proterella sp. n. it is brownish yellow and in *C. squamosella* darker, yellowish brown. The genitalia of *C. squamosella* and *C. virgaureae* are illustrated eg. in RAZOWSKI (1990) and those of *C. obscenella* and *C. cinerea* in BALDIZZONE & TABELL (2002).

Molecular diagnosis: 9 studied DNA samples of *C. proterella* sp. n. display a 0.06% mean K2P intraspecific variation, whereas *C. virgaureae* (n=14) shows 0.09% and *C. squamosella* (n=9) 0.0% mean variation. The mean interspecific divergence between *C. proterella* sp. n. and other in genitalia similar species is 1.16% - 4.3% (Table 1, Fig. 1). Although the interspecific difference between *C. proterella* sp. n. and *C. squamosella* is markedly lower than on average on Coleophoridae, it correlates perfectly with morphological features and bionomy and supports the status of *C. proterella* sp. n. as a distinct species. It is worth noticing that three *Aster*-feeding species, *viz. C. obscenella*, *C. linosyris* E. M. Hering, 1937 and *C. asteris* Mühlig, 1864 have very similar or identical barcode sequences with *C. squamosella*. At present there exist no DNA barcodes for *C. cinerea* in the BOLD.

Table 1.– Interspecific mean K2P divergences (>600 bp) of *C. proterella* Wikström & Tabell, sp. n. and three in genitalia similar species, based on the analysis of COI gene. The number of examined specimens in parenthesis. Mean intraspecific variations marked grey, maximum variations in square brackets.

	proterella	*obscenella*	*squamosella*	*virgaureae*
proterella (9)	0,06 [0,16]	1,4	21,16	4,3
obscenella (2)	1,42	0	0	3,69
squamosella (9)	1,16	0	0	3,64
virgaureae (14)	4,3	3,69	3,64	0,09 [0,31]

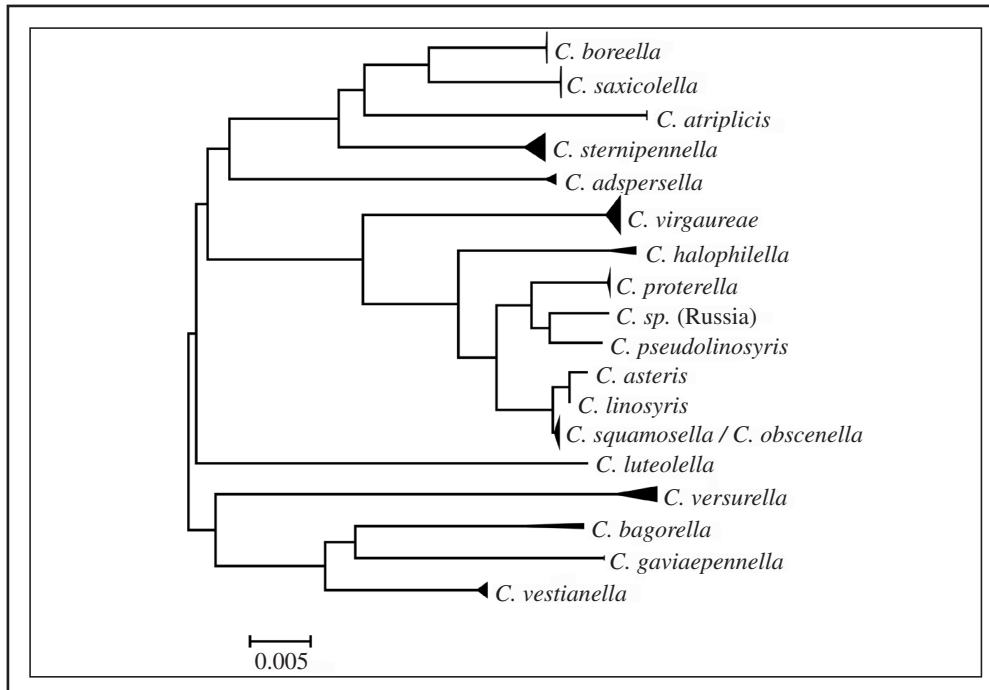
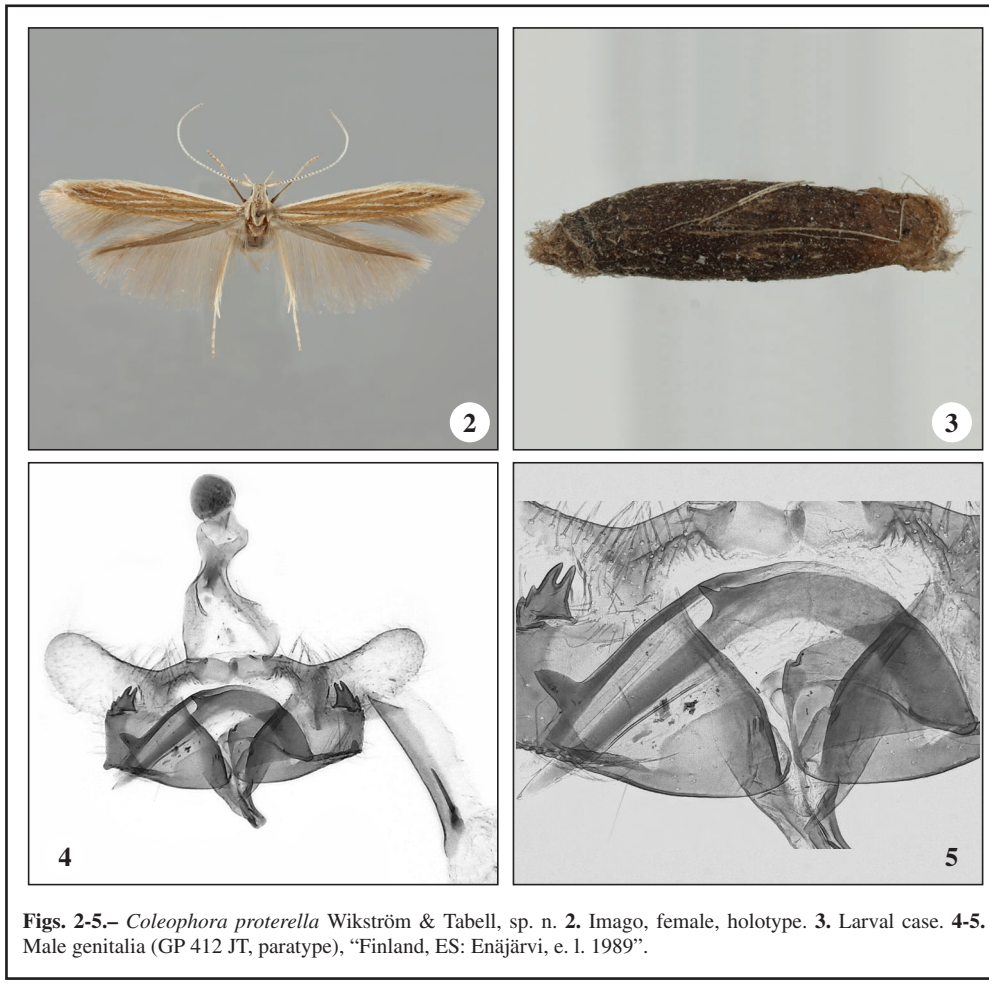


Fig. 1.– Neighbour joining tree of *C. proterella* Wikström & Tabell, sp. n. and an assortment of seed-feeding *Coleophora* species based on sequences of COI gene (658 bp).

Description: Imago (Fig. 2). Wingspan 13-14 mm. Head buff, postocular scales whitish. Labial palpus buff or greyish buff, lower side of middle segment whitish, apical segment whitish buff on inner side. Antenna white, basally often faintly ringed with light brown, thorax buff. Abdomen grey, upper surface with paired spiny tergal discs. Forewing ochreous, costa narrowly creamy white to 2/3, the white lines along the veins to costa usually distinct, a few scattered dark brown scales in distal half of the wing, at fold a narrow dark brown stripe. Hindwing grey, cilia greyish. Foreleg fuscous above, whitish below, middle and hindlegs whitish. Sexual dimorphism very small, the female seems to be somewhat paler in colour.

Abdominal structures (Fig. 7): No latero-anterior bars, latero-posterior bars thick. Transverse bar narrow, slightly curved, proximal edge evenly sclerotized, distal edge broadly thickened around sclerites. Tergal sclerites about 3x longer than wide (3rd tergum), each covered with 30-35 conical spines

Male genitalia (Figs. 4-5). Gnathos knob oval. Tegumen narrow, pedunculi rather long. Transtilla broad. Cucullus broad, ear-shaped, basally slightly narrower. Valvula as broad as cucullus, subtriangular, ventrally rounded, outer margin well delineated, densely covered with bristles. Sacculus broad, ventral margin almost straight, tooth at ventral angle distinct, lateral margin long, vertical, shallowly serrate; dorsal process long, two-pointed, inner tooth longer, extended to middle of cucullus. Phallotheca with two strongly sclerotized, slightly arched rods; upper rod bears one subapical tooth,



Figs. 2-5.– *Coleophora proterella* Wikström & Tabell, sp. n. **2.** Imago, female, holotype. **3.** Larval case. **4-5.** Male genitalia (GP 412 JT, paratype), "Finland, ES: Enäjärvi, e. l. 1989".

and the lower rod bears one basal tooth at the junction of the rods. In vesica one needle-shaped cornutus with a basal plate.

Female genitalia (Fig. 6). Papillae anales long and slender. Posterior apophyses 3x longer than anterior apophyses. Sterigma elongate, slightly longer than broad, tapering off towards the apex. Distal margin rounded, medially deeply cleft and lined with subapical fold. Ostium bursae V-shaped, lined with few setae. Antrum elongate, asymmetrical, in anterior part rounded swelling on both sides. Ductus bursae long; spinulate section slightly longer than sterigma, medial section with wide coloured coil and a region with small spinules, anterior section with several coils. Corpus bursae spherical with one thornlike and one rasplike signum.

Life history: The larva feeds on the seeds of *Solidago virgaurea* from late July to September, sometimes to October, usually together with the larvae of *C. virgaureae*. The larval case (Fig. 3) is similar to that of *C. virgaureae*, 5-6 mm, subcylindrical, trivalved, made of brown silk and covered with fine filaments of pappus. The flight period of adult is early, from late May to the beginning of July (in northern Europe). The habitats are warm, sandy fields and railway or road banks where the host plant flowers early.

Distribution: So far recorded from Finland, Sweden, Norway, Estonia, Latvia, Germany, Hungary, Portugal and Spain. This overlooked species most probably has a wider distribution in Europe. The figures of Spanish specimens of *C. virgaureae* by VIVES MORENO (1987) represent the genitalia of *C. proterella* sp. n.

Derivation of name: The species name is of Greek origin and means “earlier, early flying”, alluding to earlier flight period compared to that of *C. virgaureae*.

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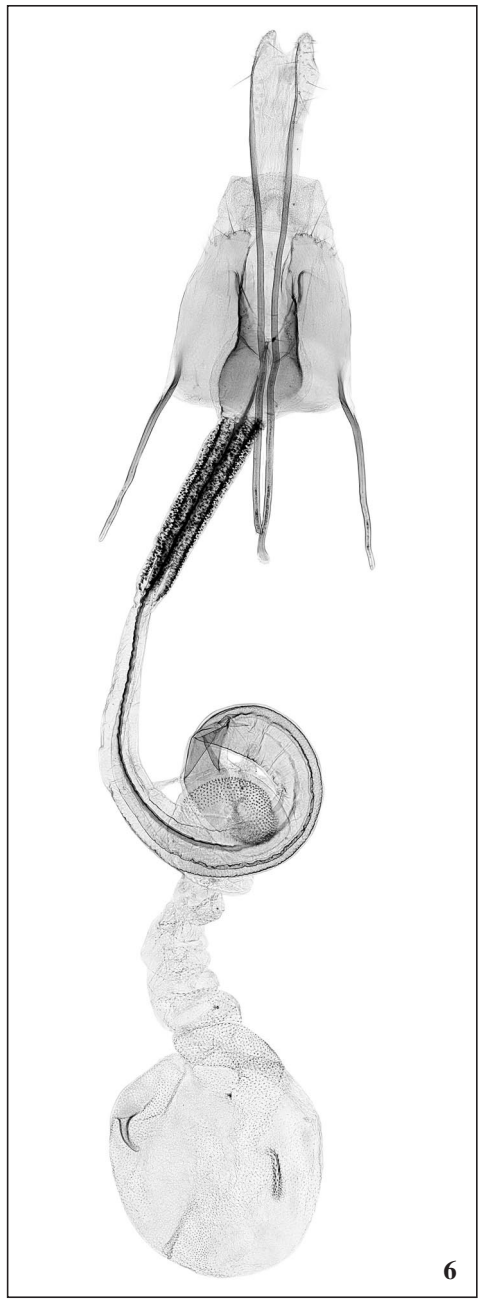

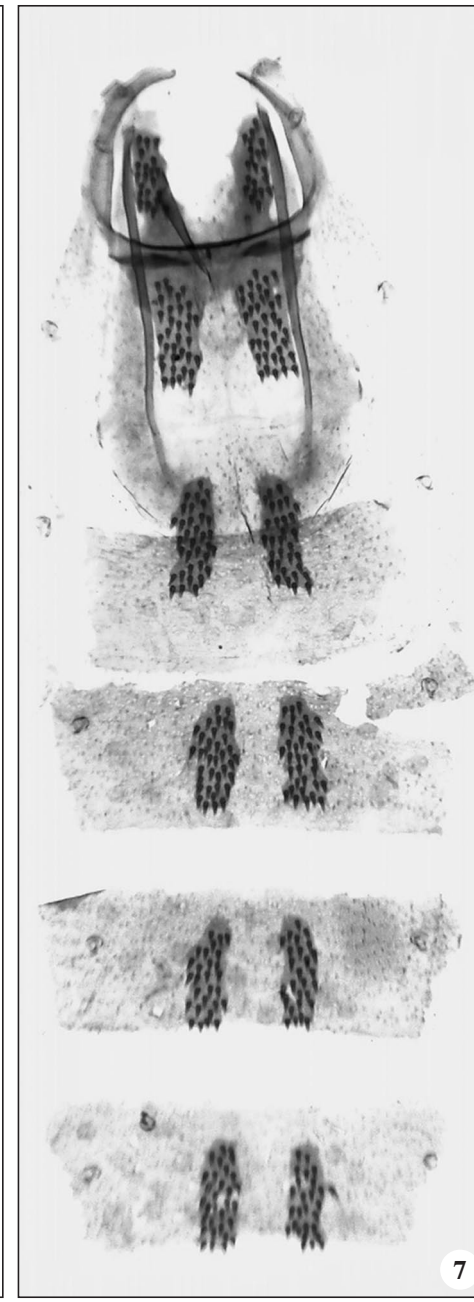

Fig. 6-7.– *Coleophora proterella* Wikström & Tabell, sp. n., **6.** Female genitalia (GP 1244 JT, holotype), "Finland, ES: Enäjärvi, e. l. 1992". **7.** Abdomen.

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