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Description of previously unknown females of three *Euriphene* Boisduval, 1847 species and the unknown male of *Bebearia inepta* Hecq, 2001 from Western Africa, with notes on their taxonomy, bionomy and distribution (Lepidoptera: Nymphalidae, Limenitidinae)

Sz. Sáfián, S. C. Collins, C. Belcastro, O. Brattström & R. Tropek

Abstract

During extensive field research of fruit-feeding Lepidoptera in various West African forests, we have collected a rich material of several rare or poorly known species. Among them we identified four species, where only one of the sexes was described. Here, we describe unknown females of *Euriphene lomaensis* Belcastro, 1986, *E. taigola* Sáfián & Warren-Gash, 2009 and *E. bernaudi* Hecq, 1994 with reference to the latter species' taxonomic position (stat. rev.). We also describe the male of *Bebearia inepta* Hecq, 2001. We report observations on their habitats and behaviour and review their known distribution.

KEY WORDS: Lepidoptera, Nymphalidae, Limenitidinae, tropical rainforest, Cameroon, Liberia, Nigeria, West Africa.

Descripción de las hembras de tres especies, antes desconocidas, de *Euriphene* Boisduval, 1847 y del macho desconocido de *Bebearia inepta* Hecq, 2001 de África Occidental, con notas sobre su bionomía y distribución (Lepidoptera: Nymphalidae, Limenitidinae)

Resumen

Durante una extensa investigación de campo sobre los Lepidoptera que se alimentan de fruta en varios bosques húmedos tropicales de África occidental, hemos recogido un rico material de especies raras o escasamente conocidas. Entre otras, identificamos cuatro especies, donde solamente uno de los sexos estaba descrito. Aquí, describimos las desconocidas hembras de *Euriphene lomaensis* Belcastro, 1986, *E. taigola* Sáfián & Warren-Gash, 2009 y *E. bernaudi* Hecq, 1994 con referencia a la posición taxonómica de la última especie (estatus revisado). También describimos el macho de *Bebearia inepta* Hecq, 2001. También informamos sobre las observaciones de su hábitat y comportamiento y revisamos su distribución conocida.

PALABRAS CLAVE: Lepidoptera, Nymphalidae, Limenitidinae, bosque húmedo tropical, Camerún, Liberia, Nigeria, África Occidental.

Introduction

In recent years, research on fruit-feeding Lepidoptera (mainly Charaxinae, Satyrinae and Limenitidinae) has been intensified in tropical areas, including western Africa. One of the main reasons for this was the publication of Torben Larsen's comprehensive work on the West African Lepidoptera

(LARSEN, 2005), which is now used as a foundation for both taxonomic and ecological research in the region. The second and third authors were involved in various research projects in West African forests since 1974, while the other authors between 2006 and 2018, during which an extensive material of fruit-feeding butterflies (particularly Limentitidinae, Adoliadini) was collected in Western Cameroon, Ghana, Guinea, Ivory Coast, Liberia and Sierra Leone.

In the material collected during these research projects, previously unknown sexes of a few recently described species in the genera *Euriphene* and *Bebearia* were recognised: females of *Euriphene lomaensis* Belcastro, 1986, *E. taigola* Sáfián & Warren-Gash, 2009, and *E. bernaudi* Hecq, 1994, and males of *Bebearia inepta* Hecq, 2001. This paper aims to present morphological descriptions and illustrations of the previously unknown sexes. It also provides further information on the habitats, distribution and biogeography of these poorly known species.

Methods

Euriphene taigola, *E. lomaensis* and *Bebearia inepta* were observed and collected on various field expeditions in Sierra Leone during over ten field trips to the Gola Forests between 1989 and 2017 by Claudio Belcastro, specimens were also collected in Sierra Leone and Liberia between 2010 and 2017 by Szabolcs Sáfián, Robert Tropek, Oskar Brattström; a few specimens collected in Diecké Forest, Guinea, by C. Belcastro and local collectors were also examined. Female specimens of *E. bernaudi* were first collected by the African Butterfly Research Institute, (ABRI) collectors in 2010 and 2011 and during an expedition organized by Marianne Espeland, Robert Tropek and Szabolcs Sáfián in the Cameroon Highlands in April 2013.

For comparison of the newly described sexes and their respective relatives, we consulted the Rhopalocera collection of the African Butterfly Institute, Nairobi, Kenya (ABRI) and the research reference collections of Claudio Belcastro, Szabolcs Sáfián and Oskar Brattström. In the descriptions we followed the English numbering of wing venation, as described in MILLER (1970). Sáfián's research reference collection is now deposited at the African Natural History Research Trust's (ANHRT) Museum in Leominster, UK.

Descriptions

Euriphene lomaensis Belcastro, 1986

The species was described from a male holotype collected in the Loma Mountains, Sierra Leone, (BELCASTRO, 1986) and was originally believed to be endemic to the area, until another male was found in the Tai National Park, western Ivory Coast (LARSEN, 2005). Recently, further males and the first female of the species were obtained in the lowland forests of the Gola Rainforest National Park, Sierra Leone (BELCASTRO & LARSEN, 2006). Oskar Brattström found the first specimens for Liberia in the Sapo National Park, including the second female. Another female was found in the Sapo National Park by Robert Tropek and Szabolcs Sáfián and subsequently, the species was also recorded (both males and females) from the Liberian side of the Nimba Mountains on various occasions, where it seems to be generally more common. No specimens have been found outside the Liberian sub-region so far. The species were found both in lowland and upland and even sub-montane forest within its range, but it appeared only in primary or old grown secondary forest with closed canopy. Males were observed expressing display behaviour on hilltops in the Nimba Mountain, possibly because abundance of the populations is generally low. On some occasions both males and females were captured in fruit-baited net-traps set close to the ground.

Description of female: Illustrated specimen data: SIERRA LEONE, Gola North, Lalehun 1-V-2013, leg. Belcastro, (Fig. 1 A, B); Liberia, Sapo National Park, Putu Jawodee 26-XI-09-XII-2009, leg. Oskar Brattström (Fig. 1 C, D).

Forewing: 31-33 mm, wingspan: 54-57 mm (between the specimens illustrated). The female is of "Catuna-type" with unusually falcate forewing outer margin and acute apex. The ground colour is

brown with creamy yellow pattern. The pale-yellow lines and spotting on the forewing are inconspicuous looking rather shades of the pattern itself. The central transverse band on the forewing is also very weakly marked and narrow (much more conspicuous on the underside) but the four whitish spots in the apex are visible. The hindwing upper side has a prominent creamy transverse band, broadening significantly from the abdominal fold towards the apex (4 mm in space 1b and 11 mm in space 6). The underside is similar in both colour and pattern to the upper side but is generally lighter, the pattern is more conspicuous, and the hindwing's creamy-yellow area and the forewing's sub-apical area are sparsely speckled with dark brown scales. There is a prominent pale yellowish spot in the hindwing base and another more irregular pale-yellow area centred on the base of the hindwing cell.

The female of *E. lomaensis* is not easily recognizable in the wild, being very similar to the female of *E. coerulea*. It was considered quite different by T. Larsen, because the presumably closely related Central African *E. karschi* has a very different, typical 'Euriphene-type' female with uniformly reddish-brown ground colour, black apical area with a prominent white subapical band and four white spots in the forewing apex. However, despite its similarity to the female of *E. coerulea* (1 E, F), the falcate outer margin of the forewing with a rather acute apex, the hindwing underside with the pale yellowish basal spot and the pale creamy yellow outer half, speckled with brown scales are convincing features to pair it up with the male *E. lomaensis*. Other *Euriphene* species related to *E. lomaensis* (e. g., *E. obsoleta*) have very similar wing shape and underside pattern.

Other material examined: GUINEA: 1 ♀, Guinea, Fôret Classée de Diecké, VI-2012 (leg. local collector, coll. C. Belcastro); LIBERIA: 1 ♀, Grand Gedeh County, Sapo NP, Gamboh trail, 15-20-XI-2012 (leg. R. Tropek and Sz. Sáfíán, coll. Sz. Sáfíán); 1 ♀, Grand Gedeh County, Putu Jawodee, buffer zone to Sapo National Park, 26-XI-8-XII-2009 (leg. O. Brattström, coll. ABRI) (Fig. 1 C, D); SIERRA LEONE: 2 ♀♀, Gola Forests (South and North), 11-12-V-2011 (leg. and coll. C. Belcastro);

Euriphene taigola Sáfíán & Warren-Gash, 2009

The first (male) specimens of this recently described species were found in the Tai National Park, western Ivory Coast, by Haydon Warren-Gash, who was hesitant to describe it until more morphologically identical males were collected in the Gola Rainforest National Park, Sierra Leone (LARSEN *et al.*, 2009). The species was believed to be rare and local, but extensive field studies in the Gola Forests in Sierra Leone and Liberia and other forest areas in Liberia revealed that *E. taigola* is not necessarily rare, but its distribution is probably centred in Liberia's generally under-recorded lowland forests. There, it is relatively widespread and could be occasionally common. The species is associated with hyper-wet and wet forests in good conditions, none were found in the submontane forests of Nimba Mountains, Liberia, while specimens were recorded from the lowland zone at the foothills of the Liberian Nimba and in the lowland forest of Diecké in Guinea near the Nimba Mountains. Males were observed displaying on hilltops and both sexes were found in fruit-baited traps.

Description of female: Illustrated specimen data: SIERRA LEONE, Gola North, Lalehun forest trail, 5-V-2014 (leg. and coll. C. Belcastro) (Fig. 2A, B).

Forewing: 29 mm, wingspan: 52.5 mm. The upper side is of typical 'Euriphene-type' with blackish brown ground colour in the outer half of the forewing, warmer brown in the inner half of the forewing and the hindwing and with a prominent whitish sub-apical band on the forewing. The band is unbroken, it tapers down strongly towards the costa from vein 4 at the end of the discoidal cell, where its outer edge is also strongly serrated. The spot in space between veins 3 and 4 is at least twice as large as those above it. The crescent shaped spot between veins 2 and 3 is partially conjoined. There are four small white subapical dots in the spaces between veins 4 and 9. On the hindwing upper side there is a row of sub-marginal crescent-shaped dark brown lunules and another one with conical spots towards the centre, with lighter spots in-between. A fine dark median line is also visible, and the margin is also sparsely covered with darker scales. The underside ground colour is warm hazel brown with the prominent sub-apical band on the forewing and the four white dots of the upper side, a white dusted black centre spot on the hindwing and prominent whitish pattern and scaling. The white scaling is particularly visible in centre area of the hindwing, where a quadrangular area is well edged by a white

band that runs from the inner margin through the blackish central spot, where it turns in right angle upwards to the costa. Apart from this central quadrangle, there are also whitish spots overlaid in the discoidal cell and a larger whitish area in the tornus. The post-median row of lunules and the spots of the upper side also appear as whitish spots. Further white pattern appears in the forewing discoidal cell and a prominent whitish spot at the tornus, adjacent to the end of the white sub-apical band. Many West African *Euriphene* females are similar in appearance, however, the female of *E. taigola* could easily be separated from all but that of *E. aridatha feronia* via the white-barred quadrangle on the hindwing underside which is characteristic only of *E. taigola* and *E. aridatha feronia* in West Africa. The separation of *E. taigola* from *E. aridatha feronia* is particularly difficult for inexperienced eyes, but the white sub-apical band tapers down towards the costa in *E. taigola* (Fig. 2 A, B), while it is generally of even width in *E. aridatha feronia* (Fig. 2 C, D).

Other material examined: GUINEA, 1 ♀, Fôret Classée de Diecké, VI-2012 (leg. local collector, coll. C. Belcastro); LIBERIA, 1 ♀, Nimba Mountains, Western Range, Vanyenpah, Gba Community Forest, 20-27-II-2012 (leg. Sz. Sáfián and M. Strausz, coll. ANHRT); 8 ♀♀, Gola Forests (South and North), various dates in 2013-2015 (leg. and coll. C. Belcastro); SIERRA LEONE, 1 ♀, Gola North, Lalehun, (1-IV-XII-2008 (leg. Sz. Sáfián, G. Csontos and R. Vorgas; coll. ANHRT).

Euriphene bernaudi Hecq, 1994, **stat. n.**

The butterfly was described as a subspecies of *E. simplex* (Staudinger, 1891) by HECQ (1994) but was already treated as a distinct species by HECQ (2002) and subsequently also by LARSEN (2005). Despite the obvious morphological and ecological differences between *E. simplex* and its sub-species, *E. bernaudi* was not formally raised to species level, as pointed out by WILLIAMS (2017), which here we correct. The male of *E. simplex* is morphologically very distant from *E. bernaudi*, since it is one of the few species, where the blue colour completely overlays the usual *Euriphene* pattern, whereas on males of *E. bernaudi* the pattern is clearly visible. *E. bernaudi* is also significantly larger in size (the species is one of the largest *Euriphene*) based on the series examined in the ABRI collection and the real-size illustration of the holotype in HECQ (2002). *E. simplex* is a widely distributed lowland species of the Upper Guinean forest zone, whereas *E. bernaudi* is a Gulf of Guinea Highlands endemic orophilous specialist, which does not commonly occur below 1500 m asl. (LARSEN, 2005). For these differences the two cannot be treated conspecific (**stat. n.**).

The male was first collected on the Obudu Plateau, Eastern Nigeria, by St. Leger in 1965 and then on a few occasions by several collectors (LARSEN, 2005; Robert Warren, pers. comm.), and later in its type locality in the Rumpi Hills, Cameroon, by D. Bernaud (HECQ, 1994). Quite a few specimens, including females, were found recently on Mount Kupe in Cameroon by ABRI collectors in 2010-2011, and by Szabolcs Sáfián, Robert Tropek and Marianne Espeland in 2013.

Description of female: Illustrated specimen data: CAMEROON, South-Western Province, Mount Kupe (Koupé), 2010-2011 (leg. and coll. ABRI) (Fig. 3A, B).

Forewing: 40.5 mm, wingspan 73.5 mm, significantly larger than the majority of species in the genus, even compared to its morphologically closest relatives (*E. jacksoni*, *E. hecqi*) (Fig 3. A, B). It is of the typical '*Euriphene*-type', with dark apical area on the forewing and a white sub-apical band, although the ground colour is reddish-brown instead of hazel or light chocolate brown. The apex of the forewing is black and not brown, which is also not rare in *Euriphene* females. The sub-apical white band is not continuous but formed by three rectangular white spots separated only by the veins, the centre one between veins 3 and 4 is prominent and rather oval with a dentation on its inner edge. The white spot between veins 2 and 3 is of crescent shape with a smaller lunule on the inner edge. There are also two minute white dots in the apical area between veins 4 and 6 and two slightly larger apical spots along the costa. The hindwing is almost completely reddish brown, apart from a darker margin, which broadens from the apex (3.5 mm) to the tornus (7 mm). The darker margin is separated from the rest of the wing by a row of blackish lunular and triangular spots, and there is another much more faints row of spots towards the post-median. The width of the spots varies among the examined specimens. The underside is warm hazel-brown with a whitish flush in the sub-apical area and along the costa of the

forewing and in the median and post-median on the hindwing. The forewing sub-apical white spots (band) are clearly visible also on the underside. There is an ochreous-brown more or less triangular area from the base along the cell well into the spaces between 2 and 3 which widens towards the inner margin. The hindwing underside is warm hazel-brown with the above-mentioned whitish flush, which is well separated from the sub-basal area by a slightly irregular median line, which turns toward the base with a right angle when reaching vein 2. There is an oval black ring edged with a whitish flush in the cell, the faint whitish flush actually forms here a band (or the hint of a band), which also turns to the base at the base of vein 2. The white flush or scaling is strongest along the median line and in the post-median, where a row of faint whitish spots is visible in the spaces. The shade of the sub-marginal crescent-shaped spots from the upper side is also visible as a zig-zagging line. The dorsal side of the body is dark brown, while the ventral side is covered with long dirty-white hairs. The antennae are black on the dorsal side, while dark brown below.

The female of *E. bernaudi* differs from its morphologically closest relatives *E. jacksoni* and *E. hecqi* by its larger size (wingspans are 74 mm, 64.5 mm and 58.5 mm respectively in the examined material), also by the spotting in the sub-apical area: The central oval spot is much more prominent in *E. bernaudi* than in the other two species. The costal section of the linear white band, formed by the three conjoined rectangular spots between veins 5 and 9 almost touches the prominent central spot on the corner in *E. bernaudi*, while it is separated by a broader black area in *E. jacksoni* and *E. hecqui*. The lunular spot of the band between veins 2 and 3, is also much closer to the central white spot in *E. bernaudi* than in the other two species.

Other material examined: CAMEROON, 12 ♀♀, South-Western Province, Mount Kupe (Koupé), 2010- (leg. and coll. ABRI); 1 ♀, South-Western Province, Mount Kupe (Koupé), IV-2013 (leg. Sz. Sáfián, R. Tropek and M. Espeland, coll. Sz. Sáfián).

Bebearia inepta Hecq, 2001

B. inepta was originally described from a female holotype, collected by M. Auberger in the Danané area, western Ivory Coast, in 1975 (HECQ, 2001). Another three females were subsequently collected from Danané and the Taï National Park, Ivory Coast, confirming its specific status (LARSEN, 2005), but the male remained unknown. The first specimen caught in Sierra Leone was another female in the corridor area between the Gola Rainforest National Park and the Liberian border (the Moro River), while the first male was found on the Liberian side of the river (now Gola Forest National Park) just a couple of days later in January. In Liberia, further males were collected near Camp Alpha, Gola National Forest, in February 2011, and on Mount Swa, Nimba County, in November-December 2012, while several specimens of both sexes are in the collection of Belcastro, collected over a long period of time in the Gola Forests and other locations in western Ivory Coast and Guinea.

It is another Liberian sub-region endemic species (ranging between the Taï National Park, Ivory Coast, and the Gola Rainforest National Park, Sierra Leone), which is usually rare in lowland rainforests and old secondary growths in good condition throughout its range. Similar to all other Adoliadini, both males and females were recorded feeding on fallen fruits, while males were observed hill-topping on forested hilltops in the Putu Range, Grand Gedeh County and on Mount Swa, Nimba County, Liberia, approximately 4-6 metres above the ground at 14:30-15:30 in the afternoon.

Description of male: Illustrated specimen data: LIBERIA, Nimba County, Mount Swa, 29-XI-3-XII-2012 (leg. Sz. Sáfián and R. Tropek, coll. ABRI) (Fig. 4 A, B).

Forewing: 28 mm, wingspan 47 mm. The forewing is strongly falcate, like in other morphologically close species (e. g. *B. demetra* and *B. warrengashi*) with which *B. inepta* flies in full sympatry. The hindwing is not rounded but rather conical, with a rounded tip at the anal angle. The ground colour of the upper side is dark brown and rusty-brown, with the usual dark blackish-brown *Bebearia* pattern (figure-of-eight in the forewing cell, spotting and cross-bands) but with an unusual golden-olive greenish sheen on both wings, which somewhat fades over time and dead specimens could partially lose their greenish colour. The rusty-brown colour is most visible in the forewing tornus and the anal angle of the hindwing on the specimen illustrated, but individual variation occurs, and the

ground colour could also turn more greyish with no rusty colour present. The shade of the brown on *B. inepta* is similar to that of *B. laetitia*, but on the latter, this brown colour appears slightly darker and is distributed all over the wings, filling up the space between the *Bebearia* pattern, and the forewing outer margin is also much less falcate. The golden-greenish sheen is also missing from *B. laetitia* (Fig. 4 C, D). The greyish forms are more similar to lighter specimens of male *B. demetra* (Fig. 4 E, F), however *B. demetra* specimens always have the apical white spot right on the tip of the apex, whereas it is always displaced inwards in *B. inepta* (also in females, as described in LARSEN (2005)). The underside, similarly to that of *B. demetra*, is shiny green, when fresh, with white spots in the forewing cell, another one between the cell and the apex along the costa and in the apex. There is a single white spot on the hindwing in space 7 on the costa.

The main distinguishing feature on the underside is the white spot in the forewing apex, which is, similarly in the female (see description in LARSEN, 2005), not centred on the apex, but slightly displaced towards the centre (the white spot is sometimes visible, but rather inconspicuous on the upper side of some specimens). All other closely related species have a prominent white spot exactly on the apex, except *B. laetitia*, which has a brownish underside and the displaced white apical spot is minute in most cases.

Other material examined: LIBERIA, 1 ♂, Gola National Forest, Money Camp, 20-I-2011 (leg. Sz. Sáfian, coll. ABRI); SIERRA LEONE, 1 ♂, Gola Forest, Gola South, Nemahugoima, 15-XII-2013 (leg. and coll. C. Belcastro).

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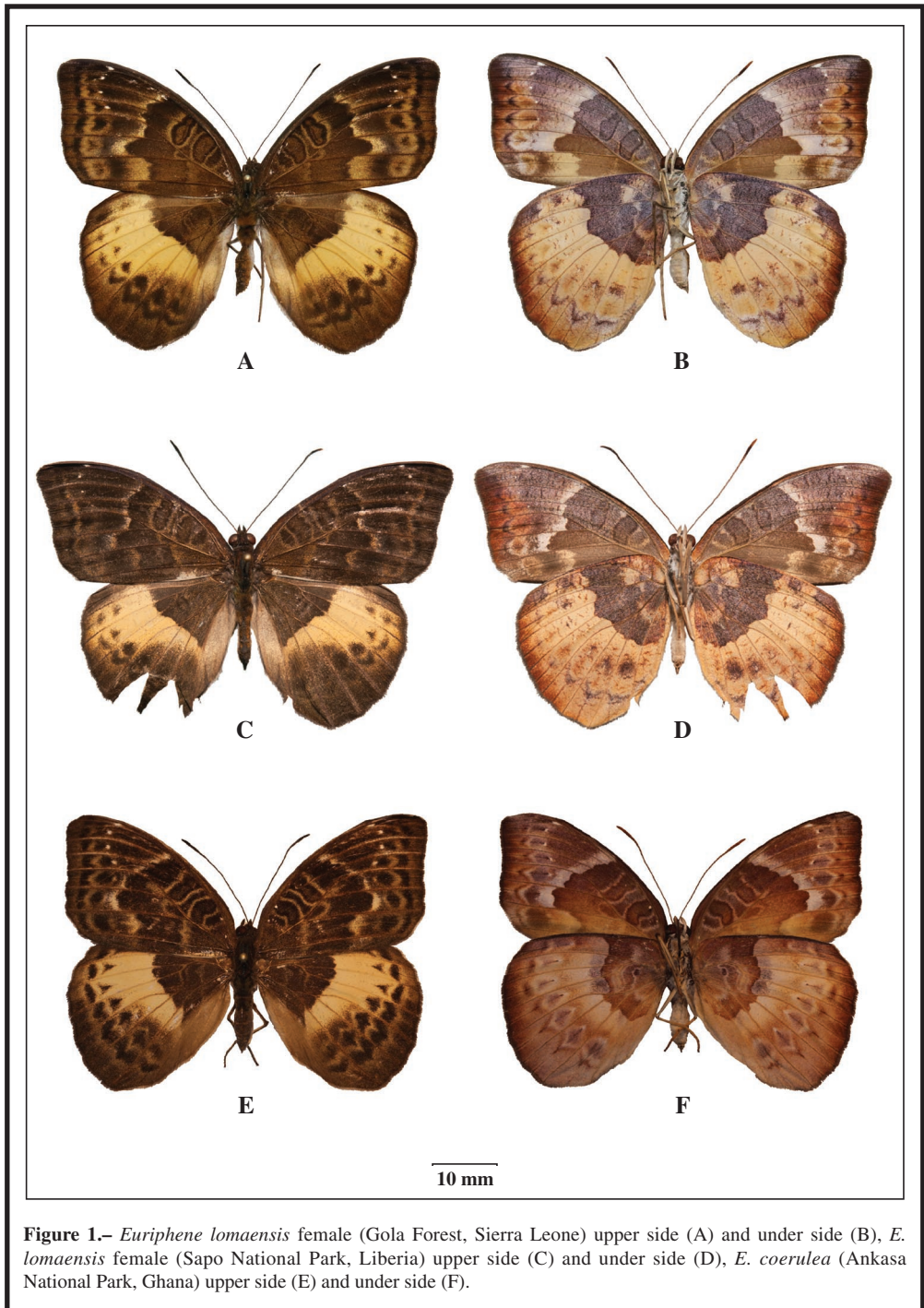


Figure 1.– *Euriphene lomaensis* female (Gola Forest, Sierra Leone) upper side (A) and under side (B), *E. lomaensis* female (Sapo National Park, Liberia) upper side (C) and under side (D), *E. coerulea* (Ankasa National Park, Ghana) upper side (E) and under side (F).

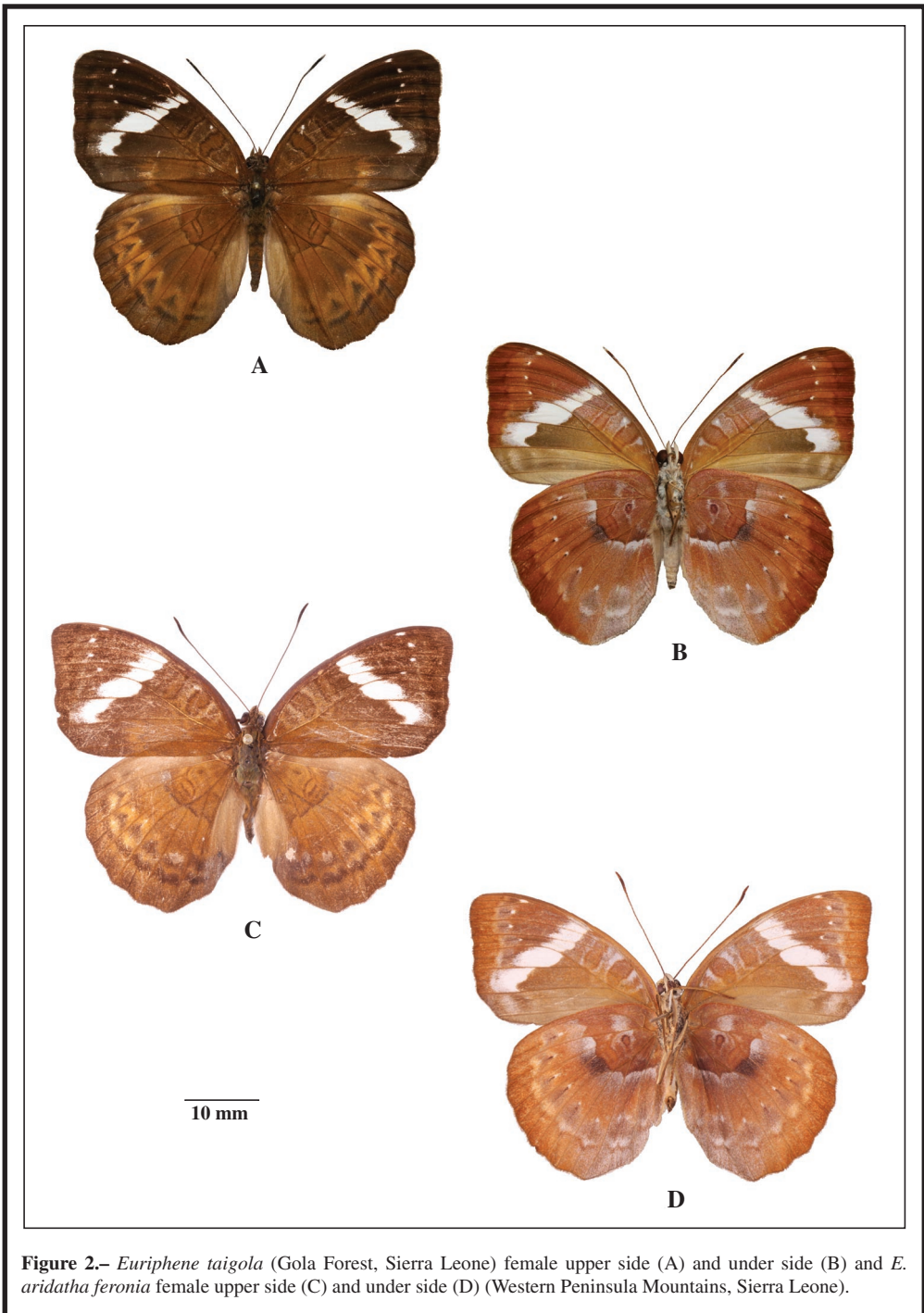


Figure 2.– *Euriphene taigola* (Gola Forest, Sierra Leone) female upper side (A) and under side (B) and *E. aridatha feronia* female upper side (C) and under side (D) (Western Peninsula Mountains, Sierra Leone).

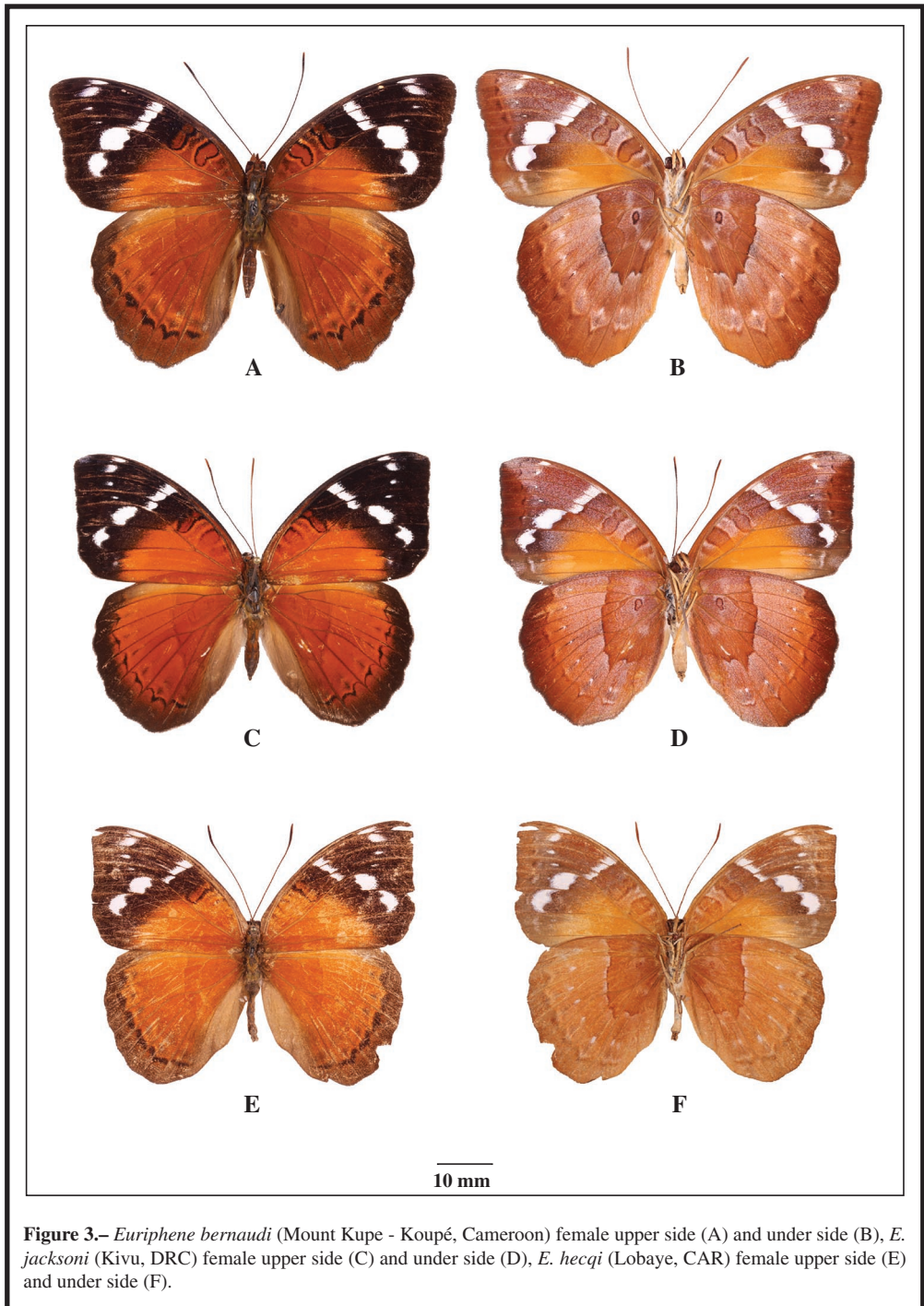


Figure 3.– *Euriphene bernaudi* (Mount Kupe - Koupé, Cameroon) female upper side (A) and under side (B), *E. jacksoni* (Kivu, DRC) female upper side (C) and under side (D), *E. hecqi* (Lobaye, CAR) female upper side (E) and under side (F).



Figure 4.– *Bebearia inepta* (Mount Swa, Liberia) male upper side (A) and under side (B), *B. laetitia* (Cape Three Points, Ghana) male upper side (C) and under side (D), *B. demetra* (light form Guma Valley, Sierra Leone) male upper side (E) and under side (F).

REVISION DE PUBLICACIONES *BOOK REVIEWS*

O. Pekarsky, L. Ronkay, G. Ronkay & Z. Varga
A Taxonomic Atlas of the Eurasian and North African Noctuoidea.
Psaphinae II. Erebidae II
299 páginas, 48 planchas color
Formato: 29 x 21 cm
Heterocera Press, Budapest, 2019
ISBN: 978-615-5279-08-09

Tenemos ante nosotros un nuevo volumen (el décimo 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 Psaphidinae, de la segunda parte de la familia Erebidae y de las tribus Feraliini y Psaphidine; de los trece géneros considerados, se destaca *Lygephila* Billberg, 1820, 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 presentan un resumen de los principales Cambios Nomenclatoriales que se encuentran en esta obra, a saber: Se describen como nuevos 2 Subtribus, 2 géneros, 4 subgéneros, 4 especies, 2 nuevos estatus, 2 especies que pasan a subespecies, se establecen 9 nuevas sinonimias y 17 nuevas combinaciones, así como la designación de 1 Neotipo y 7 Lectotipos.

Ya entrando en la parte más importante del libro, se estudian 114 especies, agrupadas en 12 géneros y 4 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.

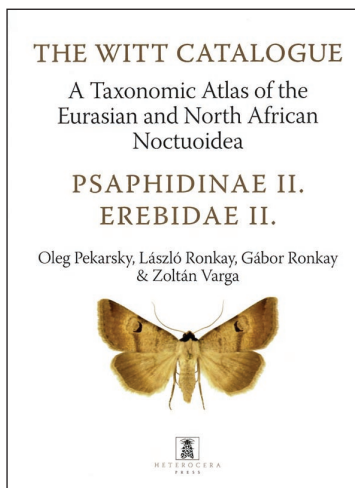
Todas las especies consideradas están fotografiadas a todo color, primero aumentadas de tamaño y luego a tamaño natural, encontrándose representados muchos tipos, especies y subespecies destacadas.

Sin lugar a dudas las 107 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.

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Ancylis sederana Chrétien, 1915 a new species to the European fauna from Spain (Lepidoptera: Tortricidae)

F. Graf & T. Sobczyk

Abstract

Ancylis sederana Chrétien, 1915 is for the first time reported from Europe. During an expedition in Southern Spain, the first author captured a female of this species near Almería. This species is described from Northern Africa, Algeria (Biskra) and Tunisia (Gafsa). Furthermore was found they on Arabian Peninsula (Oman). The foodplant is *Zizyphus lotus* (L.) Lam. For the first time the female genital is imaged.

KEY WORDS: Lepidoptera, Tortricidae, *Ancylis sederana*, new record, Spain, Europe.

Ancylis sederana Chrétien, 1915 una nueva especie para la fauna europea de España
(Lepidoptera: Tortricidae)

Resumen

Se menciona por primera vez *Ancylis sederana* Chrétien, 1915 para Europa. Durante una expedición al sudoeste de España, el primer autor capturó una hembra de esta especie en Almería. Se describe esta especie del norte de África, Argelia (Biskra) y Túnez (Gafsa). Además se ha encontrado en la Península Arábiga (Omán). La planta nutricia es *Zizyphus lotus* (L.) Lam. Se representa por primera vez la genitalia de la hembra.

PALABRAS CLAVE: Lepidoptera, Tortricidae, *Ancylis sederana*, nueva cita, España, Europa.

Introduction

In June 2018, the first author undertook a tour with his motorhome on presentation of the necessary permits for the study of Microlepidoptera fauna through southern Spain. In a light capture on the edge of the dune landscape in the vicinity of the holiday development El Toyo Almería a Tortricidae was collected, which could not be determined for the time being. Only after the return and further research it became clear that this is a new species for Europe.

Materials and methods

The light traps were carried out with 100 W HWL 100 mixed-light lamp, a 20-W UV energy-saving lamp WEMLITE BL 368 and two super-active fluorescent tubes PHILLIPS Actinic BL 18 W. For the pictures, a Sony system camera with a Sony SEL-30M35 macro lens was used.

Results and discussion

Ancylis sederana Chrétien, 1915

Ancylis sederana Chrétien, 1915. *Annls. Soc. Ent. Fr.*, **84**(3): 308

LT: Biskra (Algeria) and Gafsa (Tunisia)

SPAIN, Almería, Cabo de Gata, sand dunes, (36° 50' 18.53" N, 2° 17' 35.25" W), 1 ♀ (figs 1-3), 15-VI-2018, leg. Friedmar Graf.

An inquiry at Knud Larsen (Dyssegård, Denmark) revealed belonging to *Ancylis sederana* Chrétien, 1915. The intact specimen has developed locally. The light trap site is located about 15 km east of Almeria at Retamar in the dune landscape on the AL-3115 (fig. 4). CHRÉTIEN (1915) found the caterpillars on spun leaves and on the branches of *Zizyphus lotus* (L.) Lam. This plant is a deciduous shrub in the buckthorn family Rhamnaceae, native to the Mediterranean region, including the Sahara in Morocco. This is a dominant perennial shrub in arid regions and stabilized sand fields in the Sahara. *Zizyphus lotus* has an edible fruit that can be used either dried or fresh for both human and animal nutrition. The species also occurs in the Iberian Peninsula and has a distribution focus in the province of Almeria (RIVAS & BELLOT, 1944; REY *et al.*, 2018). The heavily endangered Lycaenidae *Tarucus theophrastus* (Fabricius, 1793) also lives on this plant.

A. sederana was found outside of North Africa also on the Arabian Peninsula (Oman, UAE) (GROENEN & AARVIK, 2007). Perhaps the species is more widespread with its food plant.

Zizyphus lotus habitats are included as Mediterranean arborescent matorral with *Ziziphus*, habitat 5220 (COUNCIL OF THE EUROPEAN UNION, 1992), which list Europe's most endangered and vulnerable habitats.

According to CHRÉTIEN (1915), *A. sederana* forms several generations a year. The overwintering caterpillars he found hidden in empty cases of a Psychidae of genus *Amicta* Heylaerts, 1881. He named it *A. quadrangularis* (Christoph, 1913). It seems likely that these were the *A. mauretanica* Rothschild, 1913 widespread in the desert areas of Tunisia, Algeria and Morocco.

As noteworthy other species were found at the locality: *Flabellobasis capensis* (Hampson, 1901) (Pyralidae), as well as *Menophra annegreteae* Skou, 2007 and *Lhommeia biskraria* (Oberthür, 1885) (Geometridae).

Acknowledgements

The authors want to thank Dr. Knud Larsen (Dyssegård, Denmark), for determination of the species and additional information. The authors are grateful to Dr. Antonio Vives (Madrid, Spain) for translating the abstract into Spanish and the Environmental Authority in Andalusia (Spain) for the permit into the Scientific Project of SHILAP.

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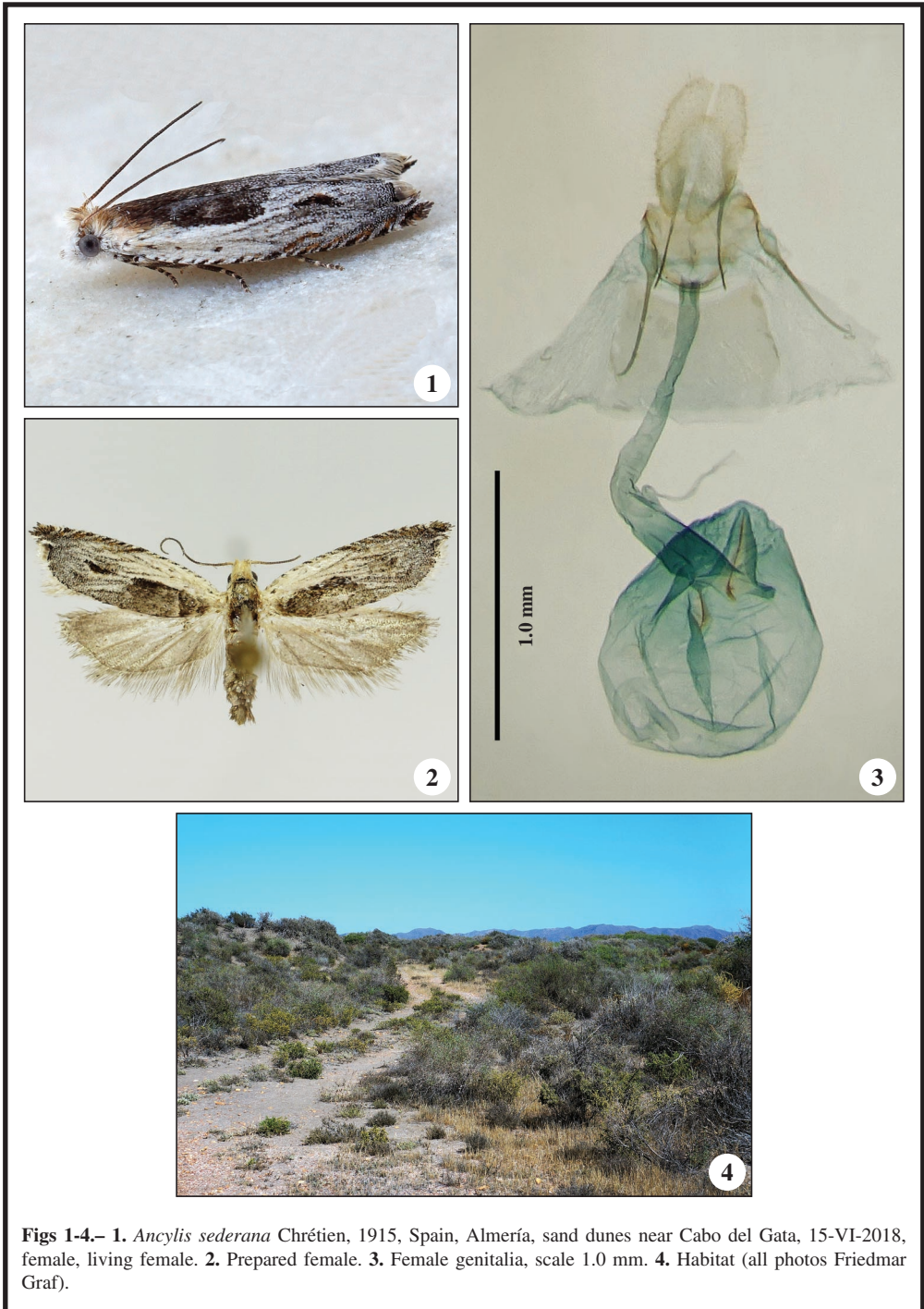
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Figs 1-4.- 1. *Ancylis sederana* Chrétien, 1915, Spain, Almería, sand dunes near Cabo del Gata, 15-VI-2018, female, living female. 2. Prepared female. 3. Female genitalia, scale 1.0 mm. 4. Habitat (all photos Friedmar Graf).

A New Record of the Genus *Lepidogma* Meyrick, 1890 from Turkey with Description of the Genitalia (Lepidoptera: Pyralidae, Epipaschiinae)

K. Akın, E. Seven & A. Çakır

Abstract

Lepidogma wiltshirei Amsel, 1949 is new discovered in the Turkish fauna. The female genitalia of the species are described for the first time, the male genitalia are re-described and, the pictures of the species are illustrated.

KEY WORDS: Lepidoptera, Pyralidae, Epipaschiinae, *Lepidogma wiltshirei*, fauna, Turkey.

Un nuevo registro del género *Lepidogma* Meyrick, 1890 de Turquía con descripción de la genitalia
(Lepidoptera: Pyralidae, Epipaschiinae)

Resumen

Lepidogma wiltshirei Amsel, 1949 es nuevo descubrimiento en la fauna turca. Se describe, por primera vez, la genitalia de la hembra, la genitalia del macho se re-describe y se ilustran las imágenes de la especie.

PALABRAS CLAVE: Lepidoptera, Pyralidae, Epipaschiinae, *Lepidogma wiltshirei*, fauna, Turquía.

Introduction

The most distinct external morphological feature of the subfamily Epipaschiinae, which is a subfamily of Pyralidae, is that the 3rd segment of the labial palpi is always upturned and pointed at the apex (SOLIS & MITTER, 1992). This subfamily is known only one species, *Lepidogma tamaricalis* (Mann, 1873) from Europe and with 2 species, *Teliphasa lophotalis* (Hampson, 1900) and *L. tamaricalis* (Mann, 1873) from Turkey (LERAUT, 2014; KOÇAK & KEMAL, 2018). The Pyralidae family belongs to the Pyraloidea superfamily and, number of the known Pyraloidea species in Turkey is 672 (KOÇAK & KEMAL, 2018; AKIN, 2018; AKIN *et al.*, 2018).

Lepidogma wiltshirei was described from Iraq by AMSEL (1949) based on 4 males and 1 female specimens. Drawing of forewing and genital of the male species were presented in the study. Additionally, AMSEL (1949) described morphology of the adult in detail, but expression on the male genitalia was very inadequate, explained just one sentence. And, the female genitalia of *L. wiltshirei* was not mentioned in the study (AMSEL, 1949). Later, AMSEL (1954) presented a figure of the adult male paratype of the species. Moreover, WILTSHIRE (1957) mentioned about the habitat (river banks and islands in the Central plain) and flight periods (May and September) of species. In addition, he estimated that its food-plant could be *Tamarix* (Tamaricaceae), because of the *Tamarix* is the food-plant of *Lepidogma tamaricalis* and for its closely related of *L. wiltshirei*. Afterwards, AMSEL (1961) described *L. hyrcanalis* from Iran and explained the differences from *L. wiltshirei*.

This study aims to contribute to the distribution of *L. wiltshirei*. Besides, male genitalia of it are re-described and, female genitalia are described for the first time.

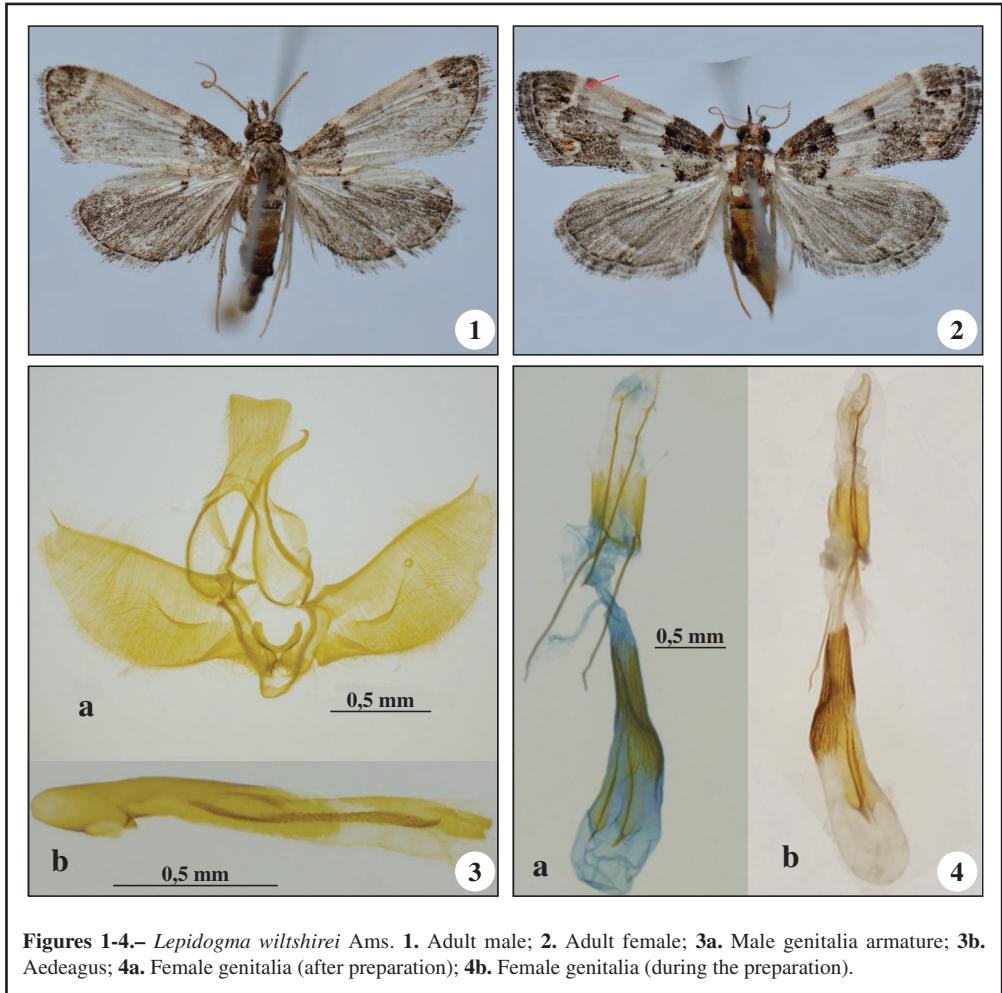
Material and Methods

The materials of study, one male and one female, were collected by using a simple UV light trap. The genitalia were dissected using standard procedures under Olympus SZ61 stereo microscope (ROBINSON, 1976). For genitalia figures, Leica S8APO stereo microscope was used. The adult specimens were photographed with Nikon D7100. For the identification of species, the studies of AMSEL (1949, 1954 and 1961) were used.

Results

Lepidogma wiltshirei Amsel, 1949 (Figs 1-2)

Material examined: Turkey, Elazığ Prov., Maden: 1 ♂, Kısabekir, 860 m, 29-VI-2017; 1 ♀, Sağırlı, 920 m, 23-VII-2017, leg. E. Seven & A. Çakır.



Figures 1-4.– *Lepidogma wiltshirei* Ams. **1.** Adult male; **2.** Adult female; **3a.** Male genitalia armature; **3b.** Aedeagus; **4a.** Female genitalia (after preparation); **4b.** Female genitalia (during the preparation).

Male genitalia (Re-description) (Figs 3a-b): Uncus rectangular, middle part of apex slightly submerged. Gnathos hooked towards apical. Parts of tegumen ellipse. Vinculum V-shaped. Valvae like half-moon, costal reinforcing strip extends beyond cucullus, apical pointed as thorn. Pocket-shaped line towards amidst from the proximal of valvae. Anellus V- to U-shaped. Aedeagus slightly straight and about 1.5 x length of valvae. Phallobase forked. Cornutus slightly spiral, over spined and about 1/2 x length of aedeagus.

Female genitalia (Fig. 4): Papillae anales triangular. Apophyses posteriores nearly equal length with apophyses anteriores. Ostium bursae rounded and ductus seminalis located just below its. Ductus bursae almost 2/3 sclerotized, and this sclerotization progressed to the anterior region of bursa copulatrix. Signa forked and combined with sclerotized structure in the anterior area.

Discussion

In this study, the most striking feature in the diagnosis of *L. wiltshirei*, is the way of access of the external transversal line to costa, as AMSEL (1961) expresses in describing of *L. hyrcanalis*. (Fig. 2). The line reaches slightly outward on *L. tamaricalis* and *L. hyrcanalis*, while reaches inward on *L. wiltshirei* (see red line in Figure 2). And, AMSEL (1961) described of *L. hyrcanalis* as very similar to *L. wiltshirei*. In this study, these species were compared by only external morphologies because of *L. hyrcanalis* was defined based on a single specimen (female) and genital structure of this species was not given.

As a result of this research, *L. wiltshirei* is new recorded in the Pyraloidea fauna of Turkey and it is discovered for the first time after the type-locality. With this study, the number of Pyraloidea species in Turkey has reached 673. The female genitalia of the species have been described for the first time, and the male genitalia have also been re-described.

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Erstmeldungen der Gattungen *Pithyllis* Grünberg, 1910 und *Tyndis* Ragonot, 1881 von der Arabischen Halbinsel (Lepidoptera: Pyralidae, Pyralinae)

M. Seizmair

Zusammenfassung

Für die Arabische Halbinsel werden erstmalig Vorkommen der Gattungen *Pithyllis* Grünberg, 1910 und *Tyndis* Ragonot, 1881 gemeldet auf Basis von Material, das in Dhofar (Süd-Oman) aufgesammelt wurde. *Tyndis megistalis* Hampson, 1906 wird neu für die Fauna der Arabischen Halbinsel gemeldet. *Pithyllis dhofaralis* Seizmair, sp. n. wird neu für die Wissenschaft beschrieben. Die morphologisch nächststehenden Arten sind *Pithyllis mirei* Leraut, 2009 und *Pithyllis pallidalis* Leraut, 2007, von denen die neue Art primär in der männlichen Genitalmorphologie zu unterscheiden ist. Die männlichen Falter sowie die männlichen Genitalien werden abgebildet und beschrieben. Die Morphologie der Weibchen bleibt unbekannt.

SCHLÜSSEL WORTE: Lepidoptera, Pyralidae, Pyralinae, *Tyndis*, *Pithyllis*, neue Art, Taxonomie, Morphologie, Arabische Halbinsel, Oman.

First records of the genera *Pithyllis* Grünberg, 1910 and *Tyndis* Ragonot, 1881 from the Arabian Peninsula (Lepidoptera: Pyralidae, Pyralinae)

Abstract

Occurrences of the genera *Pithyllis* Grünberg, 1910 and *Tyndis* Ragonot, 1881 are reported for the first time for the Arabian Peninsula based on records collected in Southern Oman (Dhofar). *Tyndis megistalis* Hampson, 1906 is reported as new for the fauna of the Arabian Peninsula. *Pithyllis dhofaralis* Seizmair, sp. n. is described as new for science. The externally most similar species are *Pithyllis mirei* Leraut, 2009 and *Pithyllis pallidalis* Leraut, 2007, from which the new species is distinguished primarily in the male genital morphology. The male adult and the male genitalia are figured. The female is still unknown.

KEY WORDS: Lepidoptera, Pyralidae, Pyralinae, *Tyndis*, *Pithyllis*, new species, taxonomy, morphology, Arabian Peninsula, Oman.

Primer registro de los géneros *Pithyllis* Grünberg, 1910 y *Tyndis* Ragonot, 1881 para la Península Arábiga (Lepidoptera: Pyralidae, Pyralinae)

Resumen

Se registran, por primera vez para la Península Arábiga, la presencia del género *Pithyllis* Grünberg, 1910 y *Tyndis* Ragonot, basado sobre los registros en el sur de Omán (Dhofar). Se registra como nueva para la fauna de la Península Arábiga a *Tyndis megistalis* Hampson, 1906. Se describe nueva para la Ciencia a *Pithyllis dhofaralis* Seizmair, sp. n. Las especies exteriormente más similares son *Pithyllis mirei* Leraut, 2009 y *Pithyllis pallidalis* Leraut, 2007, de las que, principalmente, se separa la nueva especie por la morfología de la genitalia del macho. Se representa el adulto y la genitalia del macho. La hembra todavía es desconocida.

PALABRAS CLAVE: Lepidoptera, Pyralidae, Pyralinae, *Tyndis*, *Pithyllis*, nueva especie, taxonomía, morfología, Península Arábiga, Omán.

Einleitung, Material und Methoden

Die Vertreter der Gattung *Pithyllis* Grünberg, 1910 aus der Subfamilie der Pyralinae Latreille, 1809 sind nach dem bisherigen Kenntnisstand auf dem afrikanischen Festland von Tschad über Äthiopien, Zentralafrika bis nach Südafrika verbreitet (GRÜNBERG, 1910; LERAUT, 2007, 2009, 2011). Weitere Arten neben der Typenart *Pithyllis metachryseis* (Hampson, 1906) dieser bislang wenig erforschten Gattung sind erst in den letzten 12 Jahren bekannt geworden (LERAUT, 2007, 2009, 2011; DE PRINS & DE PRINS, 2018).

Die Gattung *Pithyllis* Grünberg, 1910 ist mit der Gattung *Tyndis* Ragonot, 1881 eng verwandt (GRÜNBERG, 1910). Eines der Hauptdifferenzierungsmerkmale zwischen diesen beiden Gattungen ist nach dem aktuellen Kenntnisstand die Stielung der Radialadern R2 und R3 am Vorderflügel: Bei *Tyndis* Ragonot, 1881 sind R2 und R3 aufeinander gestielt, bei *Pithyllis* Grünberg, 1910 hingegen voneinander getrennt aus R1 verlaufend (GRÜNBERG, 1910; RAGONOT, 1881).

Im Rahmen von vier Forschungsexkursionen nach Dhofar (Süd-Oman) im Januar 2016-2018 sowie im November 2018 konnte der Verfasser Serienmaterial aufsammeln, das auf Basis des o. a. Differenzierungsmerkmals anteilig den Gattungen *Tyndis* Ragonot, 1881 und *Pithyllis* Grünberg, 1910 zuzuordnen ist. Der Anteil, der der Gattung *Pithyllis* Grünberg, 1910 (2 ♂♂) zuzuordnen ist, wird aufgrund von morphologischen Unterschieden zu den bislang bekannten Vertretern der Gattung einer für die Wissenschaft neuen Art, *Pithyllis dhofaralis* Seizmair, sp. n. zugeordnet. Der Anteil, der der Gattung *Tyndis* Ragonot, 1881 (8 ♂♂) zuzuordnen ist, wurde als *Tyndis megistalis* Hampson, 1906 bestimmt.

Die Vorkommen der Gattungen *Pithyllis* Grünberg, 2011 und *Tyndis* Ragonot, 1881 werden als neu für die Entomofauna der Arabischen Halbinsel gemeldet.

Der Holotypus der neuen Art wird in der Zoologischen Staatssammlung München (ZSM) hinterlegt, die Paratypen verbleiben in der Privatsammlung des Verfassers.

Abkürzungsverzeichnis

Hfl	Hinterflügel
mm	Millimeter
OS	Oberseite
US	Unterseite
Vfl	Vorderflügel
ZSM	Zoologische Staatssammlung München, München, Deutschland

Tyndis megistalis Hampson, 1906 (Abb. 1)

Material: OMAN, Dhofar, Jebel al Qamar, 20 km E Sarfait, 2 ♂♂, 28-I-2017; Dhofar, Grenze Oman / Jemen, 2 km W Sarfait, 1 ♂, 16-I-2016; 4 ♂♂, 18-I-2018; Dhofar, 4 km W Dalkuth, 1 ♂, 8-XI-2018, leg. und coll. M. Seizmair.

Die Art wurde auf Basis eines weiblichen Holotypen beschrieben. Das ♂ wurde erstmals in ROUGEOT (1978) abgebildet und beschrieben. Die Art ist sexuell stark dimorph. Ost-afro-eremisch verbreitet.- Die bislang bekannten Vorkommen beschränken sich auf Kenia (Typenfundort) sowie Äthiopien und Djibouti (ROUGEOT, 1978).

Diagnose: R2 und R3 aufeinander gestielt, Stielungspunkt sehr nahe an R1, R3, R4 und R5 zueinander äquidistant (Abb. 2), Vfl quasi triangulär. Termen geradeläufig. Vfl OS in der Basisbeschuppung dunkelbraun, mit einer gelben, schwach angedeuteten, unregelmäßig verlaufenden Anteterminallinie, die von einem deutlich abgesetzten gleichfarbigen Subcostalfleck ausgeht.

Antemedianlinie gelb mit sinusartigem Verlauf, deutlich abgesetzt. Ciliarlinie hellgelb bis weißlich. Hfl OS in der Basisbeschuppung hellgelb bis weißlich, Anteciliarlinie dunkelgrau bis braun, Ciliarlinie hellgelb bis weißlich.

***Pithyllis dhofaralis* Seizmair, sp. n. (Abb. 3-5)**

Typenmaterial: Holotypus ♂ (Abb. 3), OMAN, Dhofar, Grenze Oman / Jemen, 2 km W Sarfait, 16-I-2016, leg. M. Seizmair, coll. ZSM. Paratypen: OMAN, Dhofar, 4 km W Dalkuth, 1 ♂, 8-XI-2018, leg. und coll. M. Seizmair.

Beschreibung: Länge Vfl Holotypus: 15 mm, Flügelspannweite Holotypus: 33 mm, Länge Vfl Paratypus: 12 mm, Flügelspannweite Paratypus: 23 mm. Kopf: Stirn und Vertex ocker, Labialpalpen auffallend breit, Länge entspricht dem Durchmesser der Augen, am distalen Ende spitz zulaufend, porrekt, an der Spitze dunkelbraun beschuppt, über alle restlichen Segmente kräftig gelb. Maxillar-Palpen sowie Sauger gattungstypisch stark zurückgebildet, kräftig gelb. Fühler filiform ciliat, dunkelgrau. Thorax: Dorsal und ventral ocker mit unregelmäßig verteilten hellgrauen Überschuppungen, am Prothorax dorsal sowie an der Tegula mit dunkelgrauer Überschuppung. hellgelb. Abdomen: kräftig gelb, an den Segmenten unregelmäßig hellgrau überschuppt.

Vfl: Apex abgerundet, Termen deutlich nach außen gebogen, Analrand (A3) nahe der Basis mit deutlicher konkaver Auswölbung, R2, R3 und R4 in etwa äquidistant und parallelläufig, R2 und R3 gattungstypisch getrennt, Abstand R3 und R2 auf R1 entspricht 1/5 des Abstandes zwischen R2 und Termen (Abb. 4). OS: Grundfarbe dunkelgrau. Analrand von der Radix bis in das Medianfeld mit kräftig gelber Überschuppung. Antemedianlinie gelb, deutlich abgesetzt, mit sinusoidem Verlauf. Postmedianlinie wie die Antemedianlinie gefärbt, mit unregelmäßigem Verlauf, zwischen Costa und M1 als kräftiger Makel angedeutet, der an der Costa stark verbreitet ist und zur M1 hin spitz zuläuft, von M1 bis A3 nur mehr schwach angedeutet. Anteciliarlinie hellgrau bis weißlich, Cilien und Fransen dunkelgrau. US wie OS.

Hfl: OS: Grundfarbe hellgelb, an den Costal- und Analrändern mit unregelmäßigen grauen Überschuppungen, Anteciliarlinie deutlich abgesetzt, weißlich, Fransen und Cilien hellgrau. US wie OS.

Männliche Genitalien (Abb. 5): Uncus fingerförmig, distal schmal zulaufend, am Apex abgerundet. Gnathos mit zwei kräftig ausgeprägten Armen, Spitze auffallend nach innen eingebogen. Tegumen an beiden Seiten mit quasi symmetrischen schulterförmigen Lappen, die proximal spitz zulaufen, am distalen Rand konvex eingewölbt, lateral mit konvex eingebogenen, spitz zulaufenden Processi. Valven an der Basis stark verbreitert, Verhältnis Länge / Breite entspricht ca. 3/2, am Apex abgerundet. Juxta geteilt in zwei zueinander quasi-symmetrische, kolbenförmige Hälften, die proximal spitz zulaufen, am distalen Rand abgerundet. Saccus an der Basis breit, Verhältnis Länge / Breite in etwa 1/1, distal spitz zulaufend. Aedeagus langgezogen, Caecum mit sinusoider Ausformung, Länge des Caecums entspricht 3/4 der Gesamtlänge des Aedeagus, Vesica quasi rektangulär, ohne Cornutus, mit leichten Sklerotisierung am distalen Ende, Ductus seminalis gut ausgeprägt.

Differenzialdiagnose: Die neue Art steht im Habitus *Pithyllis mirei* Leraut, 2009 am nächsten. Sie unterscheidet sich von *Pithyllis mirei* Leraut, 2009 habituell in folgenden Merkmalen: Labialpalpen bei der neuen Art deutlich kräftiger, Antennen bei *Pithyllis mirei* Leraut, 2009 mit langen Rami, die bei der neuen Art fehlen. Färbung des Thorax bei *Pithyllis mirei* Leraut, 2009 einfarbig beige-braun, bei der neuen Art hingegen kräftig ocker mit grauen Einschuppungen. Die neue Art ist von *Pithyllis mirei* Leraut, 2009 in der Flügelzeichnung kaum zu unterscheiden.

Die Hauptdifferenzierungsmerkmale liegen in der männlichen Genitalmorphologie: Uncus: Bei der neuen Art am Apex abgerundet und stark verschmälert, Apex bei *Pithyllis mirei* Leraut, 2009 hingegen deutlich breiter.

Tegumen: Schultern am proximalen Ende spitz zulaufend, bei *Pithyllis mirei* Leraut, 2009 hingegen abgerundet, distaler Rand bei der neuen Art gegenüber *Pithyllis mirei* Leraut, 2009 deutlich mehr in die Länge gezogen, mit markanter konvexer Wölbung, die bei *Pithyllis mirei* Leraut, 2009

fehlt, Innenseiten mit konvexen Auswölbungen, die sich an einem Punkt berühren, bei *Pithyllis mirei* Leraut, 2009 hingegen geradeläufig.

Juxta: Bei der neuen Art an der Basis gegenüber *Pithyllis mirei* Leraut, 2009 stark verbreitert und abgerundet, bei *Pithyllis mirei* Leraut, 2009 hingegen an der Basis distal spitz zulaufend. Kolben bei der neuen Art proximal spitz zulaufend, bei *Pithyllis mirei* Leraut, 2009 hingegen an der Spitze deutlich verbreitert.

Saccus: Bei der neuen Art distal spitz zulaufend, bei *Pithyllis mirei* Leraut, 2009 hingegen abgerundet.

Aedeagus: Vesica bei der neuen Art am distalen Ende verbreitert und kantig, bei *Pithyllis mirei* Leraut, 2009 hingegen verschmälert und abgerundet, linguiform.

Pithyllis dhofaralis Seizmair, sp. n. und *Pithyllis mirei* Leraut, 2009 stehen *Pithyllis pallidalis* Leraut, 2007 genitalmorphologisch nahe, insbesondere in der Ausformung der Valven, des Uncus, Gnathos sowie der Juxta. Die neue Art ist von *Pithyllis pallidalis* Leraut, 2007 zu unterscheiden am Aedeagus-Vesica bei *P. pallidalis* Leraut, 2007 linguiform, am distalen Ende abgerundet ähnlich wie bei *P. mirei* Leraut, 2009, am Saccus bei *P. pallidalis* Leraut, 2007 ähnlich wie bei *P. mirei* Leraut, 2009 am distalen Ende abgerundet sowie an der Struktur des Tegumen-Innenseiten der Schultern voneinander getrennt, ohne die für die neue Art charakteristische Auswölbung. Des Weiteren sind die Typen von *P. pallidalis* Leraut, 2007 deutlich größer (durchschnittliche Flügelspannweite: 40 mm) als die von *P. mirei* Leraut, 2007 und *Pithyllis dhofaralis* Seizmair, sp. n. (durchschnittliche Flügelspannweiten: 32 mm).

Bionomie: Unbekannt. Der Typenfundort liegt am Rande einer Buschwaldzone.

Verbreitung: Bislang nur vom Typenfundort im westlichen Dhofar im Grenzgebiet zum Jemen bekannt. Vorkommen auf dem afrikanischen Festland sind nicht auszuschließen.

Etymologie: Die Benennung nimmt Bezug auf die Lage des Typenfundorts in Dhofar, Oman.

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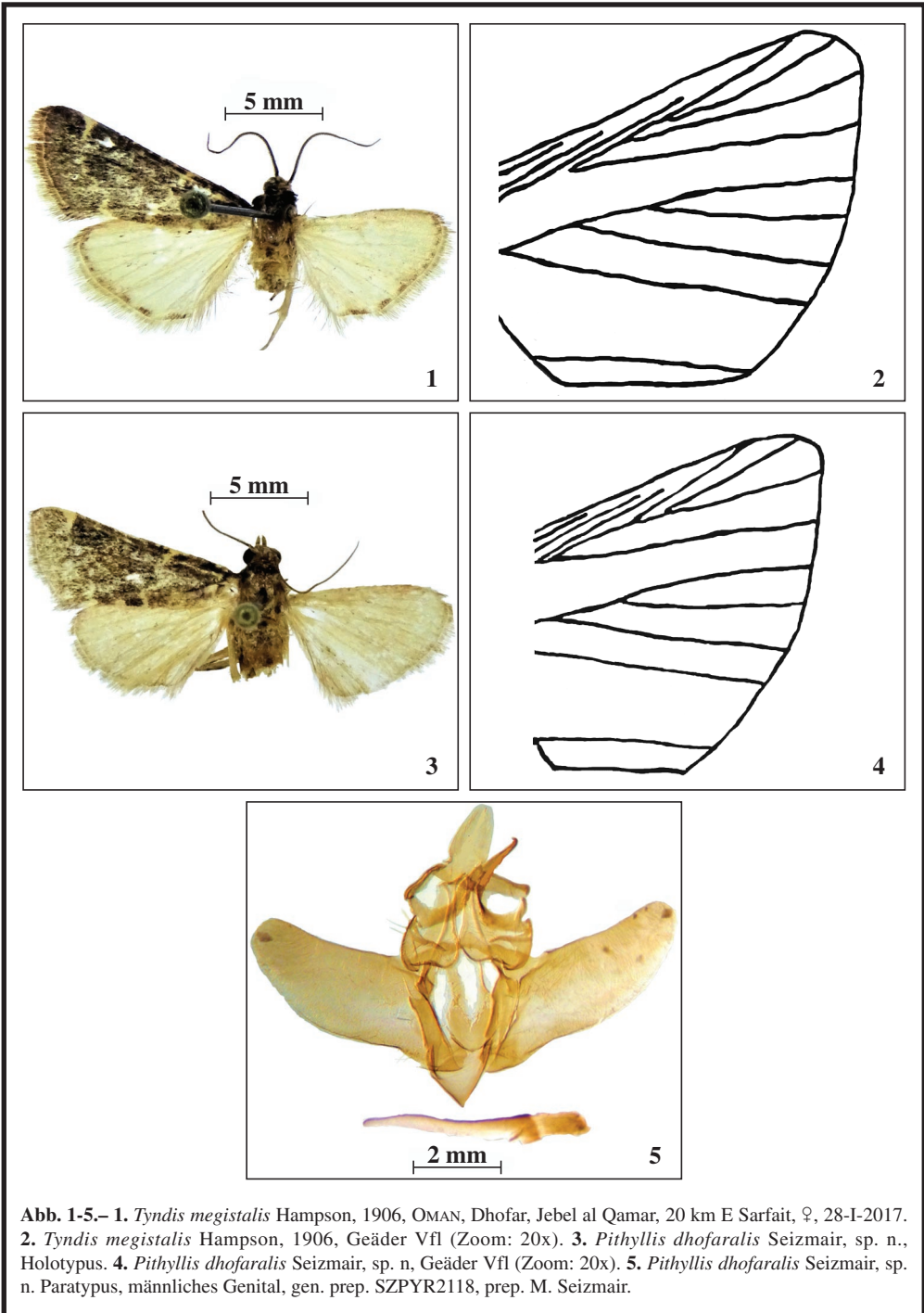


Abb. 1-5.– 1. *Tyndis megistalis* Hampson, 1906, OMAN, Dhofar, Jebel al Qamar, 20 km E Sarfait, ♀, 28-I-2017. 2. *Tyndis megistalis* Hampson, 1906, Geäder Vfl (Zoom: 20x). 3. *Pithyllis dhofaralis* Seizmair, sp. n., Holotypus. 4. *Pithyllis dhofaralis* Seizmair, sp. n, Geäder Vfl (Zoom: 20x). 5. *Pithyllis dhofaralis* Seizmair, sp. n. Paratypus, männliches Genital, gen. prep. SZPYR2118, prep. M. Seizmair.

REVISION DE PUBLICACIONES *BOOK REVIEWS*

G. M. Van der Poorten & N. E. Van der Poorten

Field Guide to the Butterflies of Sri Lanka

250 páginas

Formato: 19 x 12 cm

Lepodon Books, Toronto, 2018

ISBN: 978-1-77136-605-2

Después de la primera edición de esta obra sobre los Rhopalocera de Sri Lanka, la antigua Ceilán, que se publicó en el año 2016, los autores nos presenta esta guía de bolsillo, dándonos toda la información resumida que nos permite poder conocer la interesante fauna que se encuentra en esta mirífica isla, facilitando el trabajo tanto al profesional como al aficionado.

Después del Prefacio, nos hablan sobre la isla y sus Lepidoptera, las zonas climáticas y sus hábitat, sobre la vida de estos insectos, los procedimientos de conservación considerados, como ver estas especies en los jardines y como seguir esta guía.

Ya entrando en la parte más importante del libro, se estudian 244 especies de las que 50 son Hesperiiidae, 86 son Lycaenidae, 68 son Nymphalidae, 15 son Papilionidae, 28 son Pieridae y una es Riodinidae.

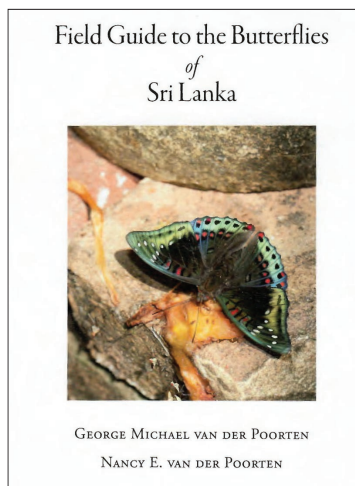
De cada uno de estos taxones, nos dan el nombre común y el científico, su envergadura, morfología externa, periodo de vuelo y altitud, sus plantas nutricias y unas fotografías del ejemplar en vivo a todo color, si bien cuando hay problemas de identificación, los autores nos dan unas claves que ayudan mucho en este menester, como ocurre con los géneros *Suastus* Moore, 1881, *Borbo* Evans, 1949, *Parnara* Moore, [1881], *Pelopidas* Walker, 1870, *Nacaduba* Moore, 1881, *Prosotas* Druce, 1891, *Petrelaea* Toxopeus, 1929, *Ionolyce* Toxopeus, 1929, *Spindasis* Wallengren, 1857, *Ideopsis* Horsfield, [1858], *Parantica* Moore, [1880] y *Tirumala* Moore, [1880].

Finalizando con un Apéndice A donde podemos ver, en un mapa de la isla, la distribución conocida de cada especie; un Apéndice B con la lista sistemática, unas notas aclaratorias muy interesantes y un Apéndice C, con las plantas nutricias en inglés, cingalés y tamil, finalizando con una pequeña bibliografía, un índice de las especies tratadas y los agradecimientos.

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

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Primera cita de *Calamia tridens* (Hüfnagel, 1766) para Madrid, España (Lepidoptera: Noctuidae)

J. Gómez-Fernández & F. Truyols-Henares

Resumen

Calamia tridens (Hüfnagel, 1766), es una especie Euro-Siberiana, distribuida ampliamente en Europa (excepto en el extremo norte y algunas zonas del sur) llegando hasta Asia Central (ZILLI *et al.*, 2005). En este documento se presenta la primera cita para Madrid, España.

PALABRAS CLAVE: Lepidoptera, Noctuidae, *Calamia tridens*, primera cita, Madrid, España.

First record of *Calamia tridens* (Hüfnagel, 1766) for Madrid, Spain (Lepidoptera: Noctuidae)

Abstract

Calamia tridens (Hüfnagel, 1766), is an Euro-Siberian specie widely distributed from Europe (except in the extreme north and some areas of the south) reaching Central Asia (ZILLI *et al.*, 2005). In this document we present the first record for Madrid, Spain.

KEY WORDS: Lepidoptera, Noctuidae, *Calamia tridens*, first report, Madrid, Spain.

Introducción

Calamia tridens (Hüfnagel, 1766) es una especie Euroasiática poco documentada en España, habiéndose efectuado registros aislados de su presencia en varias provincias de España continental, siendo las citas oficiales de Burgos (MAGRO & JAMBRINA, 2014), Cuenca (CALLE, 1982; GARRE *et al.*, 2016; ORTIZ *et al.*, 2009), Gerona (BELLAVISTA, 1991), Huesca (CALLE, 1982), Jaén (CALLE, 1982), León (CALLE, 1982; MAGRO & JAMBRINA, 2014), Lérida (ORTIZ *et al.*, 2015), Lugo (FERNÁNDEZ, 2011), Orense (FERNÁNDEZ, 2011; PINO, 2013), Palencia (MAGRO & JAMBRINA, 2014; JUBETE, 2015), Segovia (CALLE, 1982), Teruel (REDONDO *et al.*, 2015) y Zamora (CALLE, 1982; MAGRO & JAMBRINA, 2014).

C. tridens no tiene otra especie con la que se pueda confundir con el color verde lima, sin dimorfismo sexual y tiene una expansión alar de 38-42 mm, presentando algunas variaciones en el tamaño de la mancha reniforme (LÉRAUT, 2019).

Respecto a su ecología y etología, se conoce como especie monovoltina, con un periodo de vuelo comprendido entre los meses de junio a septiembre, y variando ligeramente en función de la zona geográfica. Según nuestras informaciones, las plantas nutricias de las larvas pertenecen a los géneros *Stellaria*, *Plantago* y *Brachypodium* (ROBINSON *et al.*, 2010), ambas presentes también en la Península Ibérica. La falta de información sobre algunas especies como *C. tridens*, puede ser debida a un reparto heterogéneo de los muestreos que se han llevado a cabo en la provincia de Madrid, siendo

unos puntos muy estudiados respecto a otros que, por su poco valor ecológico, generan un interés menor para el estudio y monitoreo de biodiversidad.

Resultados

El material estudiado fue capturado en MADRID, Bustarviejo, 1.081 m. altitud, UTM 30TVL32, 1 ♂, 17-VIII-2018, J. Gómez leg.



El ejemplar acudió a una trampa de luz compuesta por una bombilla de vapor de mercurio de 500 W asociada a una pantalla reflectora suspendida de forma vertical y otra horizontal de 3 x 3 metros, siendo el único espécimen que acudió durante todo el muestreo.

Una vez determinado, siguiendo en la nomenclatura a VIVES MORENO (2014), el ejemplar se ha donado al Museo Nacional de Ciencias Naturales, en Madrid (España), con el número de catálogo MNCN_Ent 244206.

Sería conveniente seguir muestreando toda la zona norte de la provincia de Madrid para poder realizar un amplio mapa de distribución de esta especie.

Agradecimientos

A la Consejería de Medio Ambiente de Madrid por los permisos concedidos que nos han permitido realizar las investigaciones, dentro del Proyecto Científico de SHILAP. A José Juan Luna Rodríguez toda su gran ayuda y apoyo en la realización de este documento y a Rafael Pérez Fernández su ayuda prestada en la búsqueda de recursos bibliográficos.

También una mención especial para la Dra. Amparo Blay y a Mercedes París, conservadoras del Museo Nacional de Ciencias Naturales en Madrid (España), por su ayuda en la consulta de las colecciones de Lepidoptera de esta Institución.

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New and interesting Portuguese Lepidoptera records from 2018 (Insecta: Lepidoptera)

M. F. V. Corley, J. Nunes, J. Rosete & S. Ferreira

Abstract

14 species are added to the Portuguese Lepidoptera fauna and three species deleted, mainly as a result of fieldwork undertaken by the authors and others in 2018. In addition, second and third records for the country, new province records and new food-plant data for a number of species are included. A summary of recent papers affecting the Portuguese fauna is included.

KEY WORDS: Insecta, Lepidoptera, distribution, Portugal.

Novos e interessantes registos portugueses de Lepidoptera em 2018 (Insecta: Lepidoptera)

Resumo

Como resultado do trabalho de campo desenvolvido pelos autores e outros, principalmente no ano de 2018, são adicionadas 14 espécies de Lepidoptera à fauna de Portugal e três são retiradas. Adicionalmente, são apresentados segundos e terceiros registos de espécies previamente conhecidas, bem como novas plantas alimentícias para algumas espécies. É apresentado um sumário dos mais recentes trabalhos relevantes para a fauna portuguesa.

PALAVRAS CHAVE: Insecta, Lepidoptera, distribuição, Portugal.

Nuevas e interesantes citas portuguesas de Lepidoptera en 2018 (Insecta: Lepidoptera)

Resumen

Con el trabajo de campo efectuado por los autores y otros, principalmente durante el año de 2018, se añaden 14 especies de Lepidoptera a la fauna de Portugal y se eliminan tres especies. Adicionalmente, se muestran segundos y terceros registros de especies ya conocidas, así como nuevas plantas nutricias de algunas otras especies. Finalmente, se presenta un resumen de los trabajos más recientes que son relevantes para la fauna portuguesa.

PALABRAS CLAVE: Insecta, Lepidoptera, distribución, Portugal.

Introduction

This paper is the thirteenth in the series of annual summaries of new knowledge of Portuguese Lepidoptera. It gives records of species of Lepidoptera added to the Portuguese fauna in 2018, together with new province records not included in the checklist (CORLEY, 2015). Additional data includes

new data on larval food-plants within the country and second and third records of species for the country, which are only indicated when they are not in new provinces. Papers published in 2018 and part of 2019 that relate to the Portuguese Lepidoptera fauna are listed and briefly summarised. Finally an Appendix lists the new species for Portugal separately, with numbers indicating their position in the checklist; new genera for Portugal have author and year of publication given.

14 species new for Portugal are listed below, of which 2 are new for the Iberian Peninsula. Three species are removed from the Portuguese list. A few of the new species listed here have been previously listed for Portugal, but the records were rejected in CORLEY (2015), as being erroneous or unsubstantiated.

In CORLEY *et al.* (2018) the number of Lepidoptera species recognised from Portugal was 2689. With the current paper and other papers mentioned herein, this total has risen to 2709.

Material and Methods

Most species were captured at light in traps of various kinds, or over or beside a white sheet. For specimens not taken at light, the means of capture is given. Specimens are retained in the collections of the original recorders, unless otherwise stated. However, a few records are based only on photographic evidence.

The order and nomenclature of families and species has been revised in accordance with the new Portuguese list (CORLEY, 2015). The nomenclature of plant names follows the EURO+MED PLANT-BASE where possible.

The entry for species new for Portugal concludes with a summary of the known European distribution, and available information on the larval food-plant, given in square brackets if the information comes from outside Portugal.

Localities with UTM squares and altitude: (District in brackets)

Algueirão-Mem Martins (Sintra)	MC7095	180 m
Almada	MC8682	20 m
Almansil (Loulé)	NB8605	65 m
Almograve, 2 km S. of, (Odemira)	NB1764	55 m
Alportel, 2 km N. of (São Brás de Alportel)	NB9517	350 m
Ansião, 2 km E. of,	NE5019	250 m
Areia (Vila do Conde)	NF2375	30 m
Bajouca, Gemunde (Maia)	NF3069	85 m
Barragem de Bemposta (Mogadouro)	QF1175	400 m
Boliqueime (Loulé)	NB7510	70 m
Bombarral	MD8646	50 m
Bombeira da Guadiana (Mértola)	PB1864	25 m
Buracas de Casmilo (Penela)	NE4333	300 m
Canidelo, near Malta (Vila do Conde)	NF2974	110 m
Carrapateira (Vila do Bispo)	NB0806	25 m
Carvalho, Ribalonga (Alijó)	PF2678	700 m
Casais do Porto, Louriçal (Pombal)	NE2229	20 m
Castelo de Juromelo, Rabaçal (Penela)	NE4828	250 m
Chão de Couce (Ansião)	NE5218	270 m
Chão do Ulmeiro, Serra de Sicó (Pombal)	NE3717	350m
Colado, 2 km SW of Soeira (Vinhais)	PG7134	680 m
Convento da Arrábida (Setúbal)	NC0058	240 m
Costa da Cabrita, Castro Laboreiro (Melgaço)	NG7055	1100 m

Couce (Valongo)	NF4356	50 m
Covão do Boi, Serra da Estrela (Manteigas)	PE1864	1850 m
Cruzinha, Mexilhoeira Grande (Portimão)	NB3411	20 m
Faia Brava (south end) (Figueira de Castelo Rodrigo)	PF6030	450 m
Frecha de Mizarela (Vale de Cambra)	NF6023	700 m
Fonte da Benémola, Querença (Loulé)	NB8818	140 m
Fonte de Marcos, Rosmaninhal (Idanha-a-Nova)	PD6495	230 m
França, 5 km west of, (Bragança)	PG8441	750 m
Freixiel (Vila Flor)	PF4876	400 m
Ilha da Murraceira (Figueira da Foz)	NE1542	3 m
Lagoa de São José, Mata do Urso, Cariço (Pombal)	NE1128	45 m
Maçores (Torre de Moncorvo)	PF6855	600 m
Mansores (Arouca)	NF5331	370 m
Mértola, 1 km S. of,	PB1765	50 m
Minas de Santo Adrião (Vimioso)	QG1000	560 m
Mindelo (Vila do Conde)	NF2274	5 m
Moinho do Caniço, Ponte de Castrelos (Bragança)	PG7534	600 m
Moinhos de Paneiro (Santiago de Cacém)	NB2795	210 m
Monchique, turning to Alferce	NB3929	470 m
Mosteiro de São João de Arga (Caminha)	NG2232	440 m
Pampilhosa de Botão (Mealhada)	NE4964	90 m
Parâmio (Vinhais)	PG7740	860 m
Parque Biológico de Gaia (Vila Nova de Gaia)	NF3650	110 m
Poço do Inferno, Serra da Estrela (Manteigas)	PE2570	1100 m
Ponte de Jugais, Lapa dos Dinheiros (Seia)	PE1071	750 m
Praia Verde (Castro Marim)	PB3515	7 m
Quinta da Lousa (Valongo)	NF4163	220 m
Quinta do Canal, Bizarreiro (Figueira da Foz)	NE1639	3 m
Quinta do Chegão, R. Agueda (Figueira de Castelo Rodrigo)	PF7541	135 m
Sapais de Castro Marim (Castro Marim)	PB3921	4 m
Sargaçal (Lagos)	NB2711	30 m
Segura, Praia fluvial (Idanha-a-Nova)	PE7310	180 m
Serra da Nogueira (Bragança)	PG7724	1125 m
Serra de Valverde, R. Tua (Mirandela)	PF5183	200 m
Sombra, Telões (Vila Pouca de Aguiar)	PF0689	1115 m
Teixoeiras, W. of Algodres (Figueira de Castelo Rodrigo)	PF6136	470 m
Valarinho, Louriçal (Pombal)	NE2230	35 m
Vale Andinho, S. of Poço do Inferno (Manteigas)	PE2569	1260 m
Vale do Lameirão (Vila Velha de Rodão)	PD1289	80 m
Vale Santo (Vila do Bispo)	NB0402	80 m
Vallone das Furnas, Salgueiros (Vinhais)	PG6341	930 m
Valongo	NF4159	200 m
Vila Nova de Foz Côa	PF5650	405 m
Vila Nova de Milfontes (Odemira)	NB1975	30 m
Vilarinho, Macieira de Maia (Vila do Conde)	NF2676	55 m

The map below shows the 10x10 km UTM grid squares from which records cited in this paper were made.

Recorders

Paula Banza
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Abbreviations and symbols

coll. collection
comm. communicated by
conf. confirmed by
det. determined by
NHMUK Natural History Museum, London
* New for Portugal, i.e. not listed for Portugal in CORLEY (2015).
** New for the Iberian Peninsula.

Provinces:

ALG Algarve
BA Beira Alta
BAL Baixo Alentejo
BB Beira Baixa
BL Beira Litoral
DL Douro Litoral
E Estremadura
M Minho
TM Trás-os-Montes



List of families and species

NEPTICULIDAE

Stigmella rhamnella (Herrich-Schäffer, 1860)

TM: Carvalho, leafmines on *Frangula alnus* Mill., 28-IX-2018, Corley.

Stigmella aurella (Fabricius, 1775)

DL: Valongo, reared from leafmines on *Rubus fruticosus* L., 13-VI-2018, Nunes.

Trifurcula bupleurella (Chrétien, 1907)

E: Convento da Arrábida, leafmine on *Bupleurum fruticosum* L., 9-X-2018, Corley.

Ectoedemia ilicis (Mendes, 1910)

DL: Valongo, leafmine on *Quercus suber* L., 7-I-2018, Nunes, reared adult det. Corley.

ERIOCOTTIDAE

Delete *Eriocottis andalusiella* Rebel, 1901

All Portuguese records belong to *E. hispanica*. The first record (MONTEIRO & CARVALHO, 1984) predates the description of *E. hispanica*. Subsequent records were assumed to be *E. andalusiella* after comparison with material in NHMUK, which had evidently not been curated following the description of *E. hispanica*. There is currently no evidence supporting the occurrence of *E. andalusiella* in Portugal.

* *Eriocottis hispanica* Zagulajev, 1988

For records and distribution of this species see under *E. andalusiella* in CORLEY (2015). Spain. Larva unknown.

TINEIDAE

Infurcitinea corleyi Gaedike, 2011

DL: Couce, 19-VIII-2018, Nunes and Silva, det. Corley.

Neurothaumasia ragusaella (Wocke, 1889)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Monopis nigricantella (Millière, 1872)

M: Mosteiro de São João de Arga, 26-X-2018, Nunes, Silva and Jesus.

GRACILLARIIDAE

Phyllonorycter mespilella (Hübner, 1805)

BL: Casais do Porto, reared from *Cydonia oblonga* Miller, 23-II-2018, Rosete, det. Corley.

YPONOMEUTIDAE

Zelleria oleastrella (Millière, 1864)

E: Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata.

Paraswammerdamia albicapitella (Scharfenberg, 1805)

DL: Quinta da Lousa, 18-VIII-2018, Nunes.

AUTOSTICHIDAE

Oegoconia novimundi (Busck, 1915)

ALG: Alportel, 5-X-2018, Corley and Ferreira.

Symmoca uniformella Rebel, 1900

BB: Segura, 13-V-2018, Corley and Ferreira.

Symmocoides oxybiella (Millière, 1872)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira; E: Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata.

Symmocoides don (Gozmány, 1963)

BL: Ansião, 13-VII-2018, Rosete.

Orpecovalva burmanni (Gozmány, 1962)

DL: Valongo, 19-VIII-2018, Nunes, det. Corley.

LECITHOCERIDAE

Eurodachtha siculella (Wocke, 1889)

ALG: Sapais de Castro Marim, 2-X-2018, Corley and Ferreira.

OECOPHORIDAE

Endrosis sarcitrella (Linnaeus, 1758)

DL: Bajouca, in house, 3-V-2018, Silva.

Kasyniana griseosericeella (Rebel, 1902)

BL: Frecha de Mizarela, 11-V-2018, Corley.

Epicallima formosella (Denis & Schiffermüller, 1775)

BL: Ansião, 13-VII-2018, Rosete.

DEPRESSARIIDAE

Agonopterix rotundella (Douglas, 1846)

E: Almada, 2-II-2018, Nunes, det. Corley; BA: Quinta do Chegão, larva on *Daucus crinitus* Desf., 16-V-2018, Corley.

Agonopterix vendettella (Chrétien, 1908)

E: Almada, larva on *Smyrnium olusatrum* L., 2-II-2018, Nunes, det. Corley.

Agonopterix fruticosella (Walsingham, 1903)

E: Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata.

Agonopterix thapsiella (Zeller, 1847)

E: Algueirão, in cave, 8-IX-2018, Costa det. Corley.

Depressaria douglasella Stainton, 1849

BA: Covão do Boi, 1-VIII-2018, Rosete, det. Corley.

Depressaria badiella (Hübner, 1796)

E: : Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata.

Depressaria veneficella Zeller, 1847

BA: Quinta do Chegão, larva on *Thapsia maxima* Mill., 16-V-2018, Corley.

COSMOPTERIGIDAE

Eteobalea beata (Walsingham, 1907)

ALG: Carrapateira, 8-X-2018, Corley, Ferreira and Valadares.

GELECHIIDAE

Syncopacma larseniella Gozmány, 1957

BL: Valarinho, 18-VIII-2018, Rosete, det. Corley.

Syncopacma azosterella (Herrich-Schäffer, 1854)

ALG: Monchique, turning to Alferce, 7-X-2018, Corley and Ferreira.

Syncopacma albipalpella (Herrich-Schäffer, 1854)

M: Costa da Cabrita, 28-VII-2011, Corley.

Anacampsis timidella (Wocke, 1887)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Nothris congressariella (Bruand, 1858)

M: Mosteiro de São João de Arga, 26-X-2018, Nunes, Silva and Jesus.

Apatetris agenjoi Gozmány, 1954

BB: Fonte de Marcos, 14-V-2018, Corley, Ferreira and Mateus.

Epidola stigma Staudinger, 1859

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Pectinophora gossypiella (Saunders, 1844)

Third record. ALG: Praia Verde, 3-X-2018, Corley and Ferreira.

Chrysoesthia sexguttella (Thunberg, 1794)

DL: Canidelo, leafmines on *Chenopodium* sp., 23-V-2018, Corley.

Bryotropha plebejella (Zeller, 1847)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Megacraspedus subdolellus Staudinger, 1859

Delete. According to HUEMER & KARSHOLT (2018) this is a synonym of *M. lanceolellus* (Zeller, 1850). At least the majority of Portuguese records referred to in CORLEY (2015) belong to *Megacraspedus trineae* Huemer & Karsholt, 2018.

Megacraspedus binotella (Duponchel, 1843)

Delete. According to HUEMER & KARSHOLT (2018) this species is not present in the Iberian Peninsula. At least the majority of Portuguese records referred to in CORLEY (2015) belong to *Megacraspedus ibericus* Huemer & Karsholt, 2018.

Megacraspedus quadristictus Lhomme, 1946

BL: Buracas de Casmilo, 4-IX-2015, Rosete, det. Corley.

* *Pyncostola bohemiella* (Nickerl, 1864)

BL: Chão de Couce, 8-VII-2015, Rosete, det. Corley. Southern Europe and parts of central Europe north to Czech Republic, absent from several countries and all Mediterranean islands. [*Achillea millefolium* L.].

Mirificarma mulinella (Zeller, 1839)

BL: Lagoa de São José, 29-IX-2018, Corley, Rosete and Ferreira.

Filatima algarbiella Corley, 2014

BB: Segura, 13-V-2018, Corley, Ferreira and Mateus.

* *Scrobipalpa suaedicola* (Mabille, 1906)

ALG: Sapais de Castro Marim, 2-X-2018, Corley and Ferreira. Spain, France. [*Suaeda vera* Forsk. ex J. F. Gemel.].

Caryocolum provinciella (Stainton, 1869)

BL: Lagoa de São José, 23-VI-2018, Rosete.

Teleiodes luculella (Hübner, 1813)

BAL: Moinhos de Paneiro, 13-V-2017, Grundy, Marabuto, Nunes, Silva and Jesus.

Carpatolechia decorella (Haworth, 1812)

E: Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata.

Schistophila laurocistella Chrétien, 1899

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira; BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Telphusa cistiflorella (Constant, 1890)

E: Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata.

ELACHISTIDAE

Perittia piperatella (Staudinger, 1859)

TM: França, 19-V-2018, Corley, Ferreira and Mateus.

Elachista gormella Nielsen & Traugott-Olsen, 1987

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Elachista fuscibasella Chrétien, 1915

BL: Lagoa de São José, 23-VI-2018, Rosete, det. Corley.

Haplochrois buvati (Baldizzone, 1985)

BB: Segura, 30-IX-2018, Corley and Ferreira.

COLEOPHORIDAE

Coleophora lutarea (Haworth, 1828)

Third record. TM: Vallone das Furnas, flying over *Stellaria holostea* L., 18-V-2018, Corley.

Coleophora alcyonipennella (Kollar, 1832)

DL: Mindelo, 12-VII-2018, Nunes, Silva and Jesus, det. Corley.

Coleophora calycotomella Stainton, 1869

BL: Lagoa de São José, 23-VI-2018, Rosete.

Coleophora helianthemella Millière, 1870

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Coleophora albicosta (Haworth, 1828)

TM: França, 19-V-2018, Corley, Ferreira and Mateus.

Coleophora brunneosignata Toll, 1944

DL: Valongo, 20-IV-2018, Nunes, det. Corley.

** *Coleophora adpersella* Benander, 1939

BL: Quinta do Canal, 22-VII-2017, Corley and Rosete; Ilha da Murraceira, 24-VII-2018, Rosete, det. Corley. Nearly all Europe, but not recorded from a few countries, including Spain. [*Atriplex* sp., *Chenopodium* sp., *Suaeda maritima* (L.) Dumort.].

Coleophora scabrida Toll, 1959

BL: Lagoa de São José, 23-VI-2018, Rosete, det. Corley.

Coleophora granulata Zeller, 1849

DL: Mindelo, 4-VIII-2018, Nunes, Silva and Jesus, det. Corley.

Coleophora albilineella Toll, 1960

TM: Serra de Valverde, 21-V-2018, Corley, Ferreira and Mata.

SCYTHRIDIDAE

Scythris ventosella Chrétien, 1907

Second record. BA: Faia Brava reserve (south end), 2-VI-2018, Nunes, Silva and Jesus, det. Corley (fig. 1).

PTEROPHORIDAE

Amblyptilia acanthadactyla (Hübner, 1813)

DL: Quinta da Lousa, 18-VIII-2018, Nunes.

Merrifieldia leucodactyla (Denis & Schiffermüller, 1775)

BB: Fonte de Marcos, 14-V-2018, Corley, Ferreira and Mateus; BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

* *Emmelina argoteles* (Meyrick, 1922)

BL: Valarinho, Lourçal, 18-VIII-2018, Rosete, det. Corley. Western Europe from Spain and England, east to Slovakia and Hungary, also in Bulgaria. [*Calystegia sepium* (L.) R. Br.].

TORTRICIDAE

Philedonides seeboldiana (Rössler, 1877)

TM: Sombra, 28-IV-2018, Lemos, comm. Nunes, det. Corley.

Clepsis razowskii (Gastón, Vives & Revilla, 2017)

ALG: Praia Verde, 3-X-2018, Corley and Ferreira; BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira; E: Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata; BL: Chão do Ulmeiro, 12-IV-2018, Rosete, det. Corley; BB: Segura, 30-IX-2018, Corley and Ferreira; BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus; TM: Serra de Valverde, 21-V-2018, Corley, Ferreira and Mata.

Cnephasia alfacarana Razowski, 1958

TM: Vila Nova de Foz Côa, 16-V-2018, Corley, Ferreira and Mateus.

Cnephasia longana (Haworth, 1811)

BB: Segura, 13-V-2018, Corley, Ferreira and Mateus.

Acleris schalleriana (Linnaeus, 1761)

BA: Ponte de Jugais, larval spinings on *Viburnum tinus* L., 15-V-2018, Corley.

Cochylimorpha elongana (Fischer von Röslerstamm, 1839)

BL: Lagoa de São José, 23-VI-2018, Rosete, det. Corley.

Aethes languidana (Mann, 1855)

BL: Lagoa de São José, 23-VI-2018, Rosete.

Cochylidia heydeniana (Herrich-Schäffer, 1851)

DL: Valongo, 19-VIII-2018, Nunes, det. Corley.

Hedya nubiferana (Haworth, 1811)

BL: Chão do Ulmeiro, 12-IV-2018, Rosete.

Lobesia indusiana (Zeller, 1847)

Third record. ALG: Sapais de Castro Marim, 2-X-2018, Corley and Ferreira.

Epinotia immundana (Fischer von Röslerstamm, 1839)

BB: Segura, 30-IX-2018, Corley and Ferreira.

Eucosma cana (Haworth, 1811)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Eucosma albidulana (Herrich-Schäffer, 1851)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

* *Gypsonoma imparana* Müller-Rurz, 1914

BL: Valarinho, Lourçal, 18-VIII-2018, Rosete, det. Corley. Western Europe from Spain and Italy north to Germany. [*Salix viminalis* L.].

Cydia adenocarpis (Ragonot, 1875)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

* *Pammene giganteana* (Peyerimhoff, 1863)

DL: Parque Biológico de Gaia, 7-IV-2018, Nunes, det. Corley (fig. 2). Middle latitudes of Europe, but absent in the south-east and absent from Mediterranean islands. [Larva lives as an inquiline in galls on *Quercus* sp.].

Pammene gallicolana (Lienig & Zeller, 1846)

BA: Teixoeiras, 30-VI-2018, Nunes, Silva and Jesus, det. Corley.

** *Pammene agnotana* Rebel, 1914

TM: Carvalho, 20-V-2018, Corley, Ferreira and Mateus. From Switzerland to Romania and north to England and Sweden. [Larva under bark of *Crataegus* sp.].

* *Pammene spiniana* (Duponchel, 1843)

TM: Minas de Santo Adrião, larva on *Crataegus* sp., 20-V-2018, Nunes, adult emerged 15-VIII-

2018 (fig. 3). Widespread in Europe but absent from the south-east and Mediterranean islands. [*Prunus spinosa* L., *Crataegus* sp., *Sorbus* sp., *Cydonia* sp. and *Viburnum* sp.].

BRACHODIDAE

Brachodes funebris (Feisthamel, 1833)

TM: Barragem da Bemposta, 16-VI-2018, Laštůvka and Laštůvka (LAŠTŮVKA & LAŠTŮVKA, 2019).

COSSIDAE

Cossus cossus (Linnaeus, 1758)

BB: Fonte de Marcos, 14-V-2018, Corley, Ferreira and Mateus.

ZYGAENIDAE

Zygaena rhadamanthus (Esper, 1789)

TM: Colado, 20-V-2018, Ferreira, det. Corley.

PYRALIDAE

Sciota rhenella (Zincken, 1818)

Second record. TM: Serra de Valverde, 21-V-2018, Corley, Ferreira and Mateus.

Epischmia illotella Zeller, 1839

BB: Segura, 30-IX-2018, Corley and Ferreira.

Psorosa mediterranea Amsel, 1953

BB; Segura, 30-IX-2018, Corley and Ferreira; BA: Teixoeiras, 15-IX-2018, Nunes, Silva and Jesus, det. Corley.

* *Psorosa ferrugatella* (Turati, 1924)

ALG: Sapais de Castro Marim, 2-X-2018, Corley and Ferreira, conf. Slamka. Spain, Sardinia. Larva unknown.

Phycitodes bentinckella (Pierce, 1937)

BA: Poço do Inferno, 24-VII-2017, not *Phycitodes maritima* (Tengström, 1848) as given in CORLEY *et al.* (2018).

Phycitodes lacteella (Rothschild, 1915)

ALG: Alportel, 5-X-2018, Corley and Ferreira.

Phycitodes saxicola (Vaughan, 1870)

BB: Vale do Lameirão, 5-IX-2018, Nunes, Silva and Jesus, det. Corley.

Ephestia parasitella Staudinger, 1859

ALG: Fonte de Benémola, 4-X-2018, Corley and Ferreira.

CRAMBIDAE

Loxostege sticticalis (Linnaeus, 1761)

DL: Mindelo, 1-IX-2018, Nunes, Silva and Jesus.

* *Udea prunalis* (Denis & Schiffermüller, 1775)

TM: Serra da Nogueira, 13-VIII-2016, Nunes, Silva and Marabuto. Almost all Europe, absent from Mediterranean islands. [Polyphagous on trees, shrubs and herbs].

Patania crocealis (Duponchel, 1834)

BB: Segura, 30-IX-2018, Corley and Ferreira.

Duponchelia fovealis Zeller, 1847

DL: Mindelo, 4-VIII-2018, Nunes, Silva and Jesus.

Metasia suppannalis (Hübner, 1823)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Metasia cuencalis Ragonot, 1894

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Cydalima perspectalis (Walker, 1859)

DL: Quinta da Lousa, 18-VIII-2018, Nunes.

Evergestis dumerlei Leraut, 2003

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Eudonia lineola (Curtis, 1827)

DL: Mindelo, 4-VIII-2018, Nunes, Silva and Jesus.

Euchromius vinculellus (Zeller, 1847)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

* *Agriphila argentistrigellus* (Ragonot, 1888)

ALG: Sapais de Castro Marim, 2-X-2018, Corley and Ferreira. Spain, Sicily. Larva unknown.

Agriphila cyrenaicellus (Ragonot, 1887)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Agriphila tersellus (Lederer, 1855)

BB: Segura, 30-IX-2018, Corley and Ferreira.

Catoptria staudingeri (Zeller, 1863)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Ancylolomia palpella (Denis & Schiffermüller, 1775)

Second locality. ALG: Fonte da Benémola, 4-X-2018, Corley and Ferreira.

Paraponyx stratiotata (Linnaeus, 1758)

BB: Segura, 30-IX-2018, Corley and Ferreira.

LASIOCAMPIDAE

* *Phyllodesma ilicifolia* (Linnaeus, 1758)

BA: Ponte de Jugais, 14-V-2018, Corley and Ferreira. Most European countries, but rare in south and probably extinct in England. [Larva polyphagous on shrubs and trees].

SPHINGIDAE

Hyles euphorbiae (Linnaeus, 1758)

ALG: Praia Verde, 3-X-2018, Corley and Ferreira.

GEOMETRIDAE

Idaea efflorata Zeller, 1849

BL: Pampilhosa, 1-VIII-2018, Jesus.

Idaea attenuaria (Rambur, 1833)

ALG: Almansil, 7-V-2018, Jacinto, det. Corley.

Idaea cervantaria (Millière, 1869)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Epirrita dilutata (Denis & Schiffermüller, 1775)

E: Bombarral, 8-I-2018, Costa.

* *Philereme vetulata* (Denis & Schiffermüller, 1775)

TM: Moinho do Caniço, larva on *Rhamnus catharticus* L., 19-V-2018, Corley. Nearly all Europe but rare in south and absent from Mediterranean islands.

Eupithecia cocciferata Millière, 1864

DL: Vilarinho, Macieira de Maia, 10-V-2018, Corley and Ferreira.

Eupithecia liguriata Millière, 1884

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Eupithecia innotata (Hufngel, 1767)

DL: Mindelo, 4-VIII-2018, Nunes, Silva and Jesus, det. Corley.

Eupithecia breviculata (Donzel, 1837)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Eupithecia weissii Prout, 1938

BB Segura, 30-IX-2018, Corley and Ferreira.

Lobophora halterata (Hufnagel, 1767)

Second record. TM: França, 19-V-2018, Corley and Ferreira.

Isturgia murinaria (Denis & Schiffermüller, 1775)

BB: Segura, 30-IX-2018, Corley and Ferreira.

Neognopharmia stevenaria (Boisduval, 1840)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Ennomos erosaria (Denis & Schiffermüller, 1775)

ALG: Fonte da Benémola, 4-X-2018, Corley and Ferreira.

Crocallis auberti Oberthür, 1883

TM: Freixiel, 27-IX-2018, Corley, Ferreira, Gonzalez and Rodrigues.

Afriberina tenietaria (Staudinger, 1900)

BAL: see CORLEY *et al.* (2013); Mértola, 9-V-2017, Grundy.

Afriberina salemmae Skou & Sihvonen, 2019

Additional records from ALG: Boliqeime, 15-X-2010, Dale; Cruzinha, 5-V-2017, Grundy and Banza; Fonte da Benémola, 4-X-2018, Corley and Ferreira; BAL: Vila Nova de Milfontes, 14-V-2017, Grundy; Almogrove, 16-V-2017; E: Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata.

Charissa mucidaria (Hübner, 1799)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

NOTODONTIDAE

Thaumetopoea processionea (Linnaeus, 1758)

BL: Castelo de Juromelo, 22-VIII-2011, Rosete.

Neoharpyia verbasci (Fabricius, 1798)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Stauropus fagi (Linnaeus, 1758)

DL: Bajouca, larva on *Quercus robur* L., 21-X-2018, Silva.

EREBIDAE

Zebebea falsalis (Herrich-Schäffer, 1839)

BB: Segura, 13-V-2018, Corley, Ferreira and Mateus.

Diaphora mendica (Clerck, 1759)

DL: Mansores, 11-V-2018, Corley, Ferreira and Oliveira.

Parascotia nisseni Turati, 1905

BB: Segura, 30-IX-2018, Corley and Ferreira.

Odice pergrata (Rambur, 1858)

BA: Vale Andinho, 26-VII-2018, Nunes, Jesus and Berkemeier.

Drasteria cailino (Lefèbvre, 1827)

BB: Segura, 13-V-2018, Corley, Ferreira and Mateus.

Grammodes bifasciata (Petagna, 1787)

BB: Segura, 30-IX-2018, Corley and Ferreira.

NOCTUIDAE

Pseudozarba bipartita (Herrich-Schäffer, 1850)

BB: Segura, 30-IX-2018, Corley and Ferreira.

Aedia leucomelas (Linnaeus, 1758)

DL: Couce, 19-VIII-2018, Nunes and Silva.

Cucullia scrophulariphila Staudinger, 1859

BB: Segura, 13-V-2018, Corley, Ferreira and Mateus.

Cleonymia yvanii (Duponchel, 1833)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Amphipyra effusa Boisduval, 1828

E: Algueirão, in cave, 8-IX-2018, Costa.

Amphipyra pyramidea (Linnaeus, 1758)

TM: França, larva on *Fraxinus angustifolia* Vahl, 20-V-2018, Nunes.

Caradrina proxima Rambur, 1837

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Caradrina ibeasi (Fernández, 1918)

Third Portuguese locality and first record since 1970s (CRUZ & GONÇALVES, 1974). TM: Maçores, 29-IX-2018, Nunes, Silva and Jesus (fig. 4).

Luperina dumerilii (Duponchel, 1826)

BB: Segura, 30-IX-2018, Corley and Ferreira.

Luperina testacea (Denis & Schiffermüller, 1775)

ALG: Vale Santo, 8-X-2018, Corley and Ferreira.

Eremopola orana (H. Lucas, 1848)

Third record. ALG: Sapais de Castro Marim, 2-X-2018, Corley and Ferreira.

Polymixis dubia (Duponchel, 1836)

BB: Segura, 30-IX-2018, Corley and Ferreira.

Orthosia cruda (Denis & Schiffermüller, 1775)

TM: Minas de Santo Adrião, larva on *Quercus rotundifolia* Lam., 21-V-2018, Nunes.

Hadena magnolii (Boisduval, 1829)

BB: Segura, 13-V-2018, Corley, Ferreira and Mateus.

Leucania obsoleta (Hübner, 1803)

BA: Quinta do Chegão, 16-V-2018, Corley, Ferreira and Mateus.

Leucania putrescens (Hübner, 1824)

BB: Segura, 30-IX-2018, Corley and Ferreira.

Leucania punctosa (Treitschke, 1825)

E: Convento da Arrábida, 9-X-2018, Corley, Ferreira and Mata.

Dichagyris flammatra (Denis & Schiffermüller, 1775)

ALG: Sargaçal, 19-V-2018, Valadares.

Euxoa tritici (Linnaeus, 1761)

BL: Lagoa de São José, 11-VII-2017, Rosete, det. Corley.

Agrotis chretieni (Dumont, 1903)

BL: Frecha de Mizarela, 11-V-2018, Corley, Ferreira and Oliveira.

Xestia baja (Denis & Schiffermüller, 1775)

DL: Quinta da Lousa, 18-VIII-2018, Nunes.

Xestia kermesina (Mabille, 1869)

BAL: Bombeira da Guadiana, 1-X-2018, Corley and Ferreira.

Eugnorisma arenoflavida (Schawerda, 1934)

BB: Segura, 30-IX-2018, Corley and Ferreira.

NOLIDAE

Nola squalida Staudinger, 1871

BL: Valarinho, 18-VIII-2018, Rosete, det. Corley.

Nola cicatricalis (Treitschke, 1835)

DL: Areia, 5-V-2018, Jesus, det. Yela.

Nola confusalis (Herrich-Schäffer, 1847)

TM: Parâmio, 17-V-2018, Corley, Ferreira, Mata and Mateus.

Recent literature

BIDZILYA *et al.* (2019) point out that *Oxypteryx* Rebel, 1911 is a senior synonym of *Eulamprotes* Bradley, 1971.

BUCHNER & CORLEY (2019) describe *Agonopterix olusatri* Corley & Buchner from Algarve and elsewhere in southern Europe. This species has long been misidentified as *A. chironiella* (Constant, 1893), which must be removed from the Portuguese list.

CORLEY *et al.* (2018) add 24 species to the Portuguese list.

CORLEY *et al.* (2019) describe *Depressaria infernella* Corley & Buchner, from Portugal and Spain.

CORLEY *et al.* (2019) describe *Ypsolopha rhinolophi* Corley from Portugal and France.

HODGES (1986) placed *Dichomeris lamprostoma* (Zeller, 1847) (under the name of its synonym *Gelechia zulu* Walsingham, 1881) in genus *Helcystogramma* Zeller, 1877. This placement appears to have been overlooked until recently.

HUEMER & KARSHOLT (2018) have revised the large genus *Megacraspedus* Zeller, 1839 (Gelechiidae) describing many new species. They recognise four species in Portugal: *M. trineae* Huemer & Karsholt, sp. n., *M. occidentellus* Huemer & Karsholt, sp. n., *M. ibericus* Huemer & Karsholt, sp. n and *M. quadristictus* Lhomme, 1946. Of the two species previously recorded in Portugal (CORLEY, 2015) they question the presence of *M. binotellus* (Duponchel, 1843) in Portugal and Spain and they have no Portuguese records for *M. subdolellus* Staudinger, 1859, which they place in synonymy with *M. lanceolellus* (Zeller, 1850). Of the four species recognised from Portugal they give records of *M. trineae* from BAL, BB and BA, of *M. occidentellus* from E, of *M. ibericus* from BA and TM and of *M. quadristictus* from ALG and E. *M. occidentellus* is endemic to Portugal.

LAŠTŮVKA & LAŠTŮVKA (2019) add *Chelis maculosa* (Gerning, 1780) and *Helotropha leucostigma* (Hübner, 1808) to the Portuguese fauna.

MACIÀ *et al.* (2019) revise the genera *Coscinia* Hübner, 1819 and *Spiris* Hübner, 1819. *C. benderi* Marten, 1957, with no published record from Portugal, is reduced to subspecies rank under *C. cribraria*,

but the form *chrysocephala* of *C. cribraria* is raised to species. *C. chrysocephala* (Hübner, 1804) is widespread in the south of Portugal and known from Algarve and Baixo Alentejo (Corley, unpublished records). *C. chrysocephala* was not mentioned for Portugal in any published works. It has not been recorded separately from *C. cribraria*, so the precise distributions of the two species need revision.

MÜLLER *et al.* (2019) include the description of *Afriberina salemae* Skou & Sihvonen, sp. n., closely related to *A. tenietaria*. Earlier records of *Afriberina* Wehrli, 1947 from central and western parts of Algarve (under the names of *A. terraria* (Bang-Haas, 1907) or *A. tenietaria* (Staudinger, 1900)) belong to the new species, but not all localities are mentioned under its description. Additional records are given in the current paper. *Afriberina* records from eastern Baixo Alentejo belong to *A. tenietaria*. Other changes are listed here, including some relating to earlier volumes of Geometrid Moths of Europe which are given in an updated checklist of European Geometridae in volume 6, resulting in changes to the Portuguese list.

Isturgia pulinda deerraria (Walker, 1861) is raised to species rank.

Isturgia pulinda pulinda (Walker, 1860) is not in Portugal.

Gnopharmia stevenaria (Boisduval, 1940) is moved to genus *Neognopharmia* Wehrli, 1951.

Gnophos perspersata Treitschke, 1827 is newly combined into genus *Ortaliella* Hausmann, 1993

Charissa avilarius is reduced to subspecies level as *Charissa crenulata* (Staudinger, 1871) ssp. *avilarius* Reisser, 1936

Tephronia oranaria (Staudinger, 1892) is newly combined into genus *Eumannia* Fletcher, 1979

Idaea exilaria (Guenée, 1858) and *Idaea manicaria* (Herrich-Schäffer, 1852) are newly combined into genus *Brachyglossina* Wagner, 1914.

There are also extensive changes to the order of subfamilies and genera used in CORLEY (2015), particularly in the subfamily Ennominae. These changes are not followed here because many of the placements are tentative and therefore subject to further change.

Appendix: Changes to the Portuguese fauna list

Species added to the Portuguese fauna listed in this and other papers are summarised here, each with a number indicating their placement in the checklist (CORLEY, 2015). New genera for the Portuguese fauna show the author and year of publication of the genus.

Name changes due to changes at genus level or to new synonymy are given, with each species retaining its list number. In a case where a new name is provided for a previously misidentified species, the new species retains the number of the misidentified species. Thus *Agonopterix olusatri* Corley & Buchner, 2019 replaces *Agonopterix chironiella* (Constant, 1893), which is the subject of a longstanding misidentification, but the species retains the number 0455 in the checklist.

MÜLLER *et al.* (2019) provide an updated checklist of European Geometridae which results in a number of changes to the Portuguese list. These are incorporated in this Appendix.

0111 *Eriocottis hispanica* Zagulajev, 1988 (*andalusiella* auct. nec Rebel, 1901)

0321.1 *Ypsolopha rhinolophi* Corley, 2019

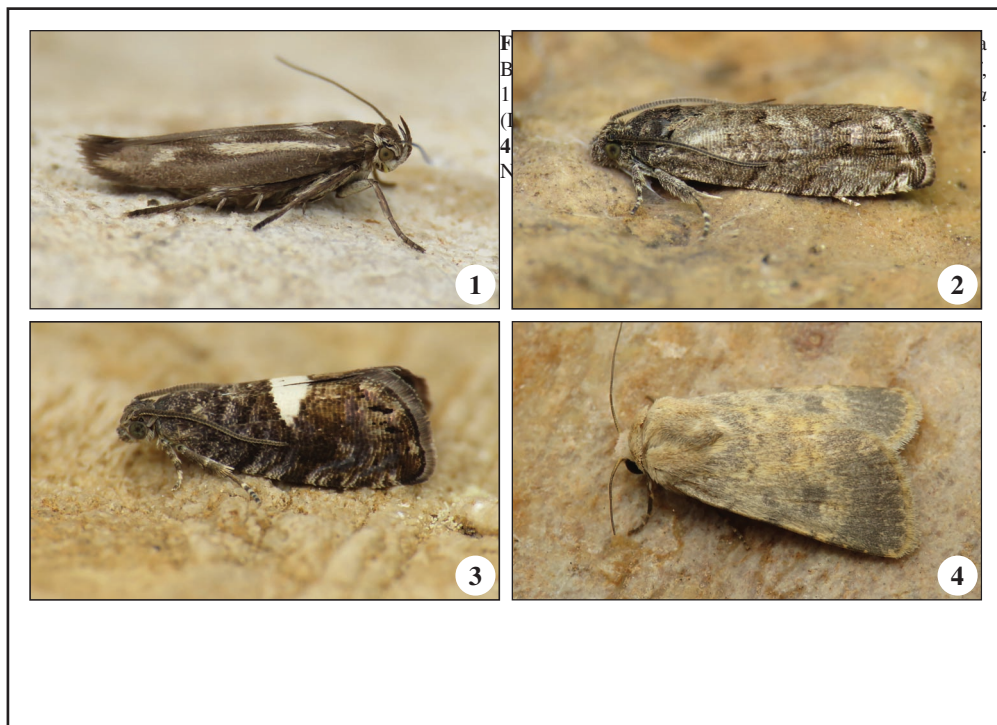
0455 *Agonopterix olusatri* Corley & Buchner, 2019 (*chironiella* auct. nec Constant, 1893)

0463.1 *Depressaria infernella* Corley & Buchner, 2019

- 0543 *Helcystogramma lamprostoma* (Zeller, 1847) (*Dichomeris lamprostoma* (Zeller, 1847))
 0576 *Megacraspedus trineae* Huemer & Karsholt, 2018 (*subdolellus auct. nec* Staudinger, 1859)
 0576.1 *Megacraspedus occidentellus* Huemer & Karsholt, 2018
 0577 *Megacraspedus ibericus* Huemer & Karsholt, 2018 (*binotella auct. nec* (Duponchel, 1859))
 0577.1 *Megacraspedus quadristictus* Lhomme, 1946
Pyncostola Meyrick, 1917
 0592.1 *bohemiella* (Nickerl, 1864)
Oxypteryx Rebel, 1911 (*Eulamprotes* Bradley, 1971)
 0620 *Oxypteryx unicolorella* (Duponchel, 1843) (*Eulamprotes unicolorella* (Duponchel, 1843))
 0621 *Oxypteryx immaculatella* (Douglas, 1850) (*Eulamprotes immaculatella* (Douglas, 1850))
 0622 *Oxypteryx helotella* (Staudinger, 1859) (*Eulamprotes helotella* (Staudinger, 1859))
 0667.1 *Scrobipalpa suaedicola* (Mabille, 1906)
 0851.1 *Coleophora adpersella* Benander, 1939
 0967.1 *Emmelina argoteles* (Meyrick, 1922)
 1157.1 *Gypsonoma imparana* Müller-Rutz, 1914
 1205.1 *Pammene agnotana* Rebel, 1914
 1206.2 *Pammene giganteana* (Peyerimhoff, 1863)
 1210.1 *Pammene spiniana* (Duponchel, 1843)
 1494.1 *Psorosa ferrugatella* (Turati, 1924)
 1579.1 *Udea prunalis* (Denis & Schiffermüller, 1775)
 1652.1 *Agriphila argentistrigellus* (Ragonot, 1888)
 1715.1 *Phyllodesma ilicifolia* (Linnaeus, 1758)
 1775 *Brachyglossina manicaria* (Herrich-Schäffer, 1852) (*Idaea manicaria* (Herrich-Schäffer, 1852))
 1789 *Brachyglossina exilaria* (Guenée, 1858) (*Idaea exilaria* (Guenée, 1858))
 1882.3 *Philereme vetulata* (Denis & Schiffermüller, 1775)
 1955 *Isturgia deerraria* (Walker, 1861) (*Isturgia pulinda deerraria* (Walker, 1861))
 1959 *Neognopharmia stevenaria* (Boisduval, 1940) (*Gnopharmia stevenaria* (Boisduval, 1940))
 2004.1 *Afriberina salemae* Skou & Sihvonen, 2019
Eumannia Fletcher, 1979
 2023 *oranaria* (Staudinger, 1892) (*Tephronia oranaria* (Staudinger, 1892))
Ortaliella Hausmann, 1993
 2033 *perspersata* (Treitschke, 1827) (*Gnophos perspersata* Treitschke, 1827)
 2036 *Charissa crenulata* (Staudinger, 1871) ssp. *avilarius* (Reisser, 1936) (*Charissa avilarius* (Reisser, 1936))
 2125.1 *Chelis maculosa* (Gerning, 1780)
 2130.1 *Coscinia chrysocephala* (Hübner, 1804)
Helotropha Lederer, 1857
 2334.1 *leucostigma* (Hübner, 1808)

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A new species of *Crypsiptya* Meyrick, 1894 from China (Lepidoptera: Crambidae)

L. L. Jie & W. C. Li

Abstract

Crypsiptya spinosa Jie & Li, sp. n. is described from Jiangxi Province, China. The new species can be diagnosed by three tufts of scales on the ventral base of forewing, and in male genitalia the valva with a long sella, and phallus has two clusters of long spine-like cornuti. The images of the head, habitus, tympanal organs, and male genitalia are provided.

KEY WORDS: Lepidoptera, Crambidae, *Crypsiptya*, new species, China.

Una nueva especie de *Crypsiptya* Meyrick, 1894 de China (Lepidoptera: Crambidae)

Resumen

Crypsiptya spinosa Jie & Li, sp. n., se describe de la provincia China de Jiangxi. La nueva especie puede diagnosticarse por tres plumeros de pelos escamiformes en la base ventral de las alas anteriores y la valva con un largo sella, phallus con dos grupos de cornuti espino-dorsales en la genitalia del macho. Se proporcionan imágenes de la cabeza, habitus, órgano timpánico y genitalia del macho.

PALABRAS CLAVE: Lepidoptera, Crambidae, *Crypsiptya*, nueva especie, China.

Introduction

The genus *Crypsiptya* was erected by Meyrick in 1894 for *Botys nereidalis* Lederer, 1863. MEYRICK (1894) recognized at that time only one species. It can be recognized by the special tufts of scales on the ventral base of the forewing, and in the male genitalia the editum has peculiar setae arranged in a line and a prominent, sclerotized sella. To date, the genus has eight species worldwide (HAMPSON, 1913; ROSE & PAJANI, 1979; MAES, 2002, 2014). Prior to this study, only a single species, *C. coclesalis* (Walker, 1859), was recorded in China (MAES, 2002). In the present paper, we add a new species to the genus from China. All the specimens are deposited in the Insect Museum, Jiangxi Agricultural University, Nanchang, China (JXAUM).

Crypsiptya spinosa Jie & Li, sp. n. (Figs. 1-5)

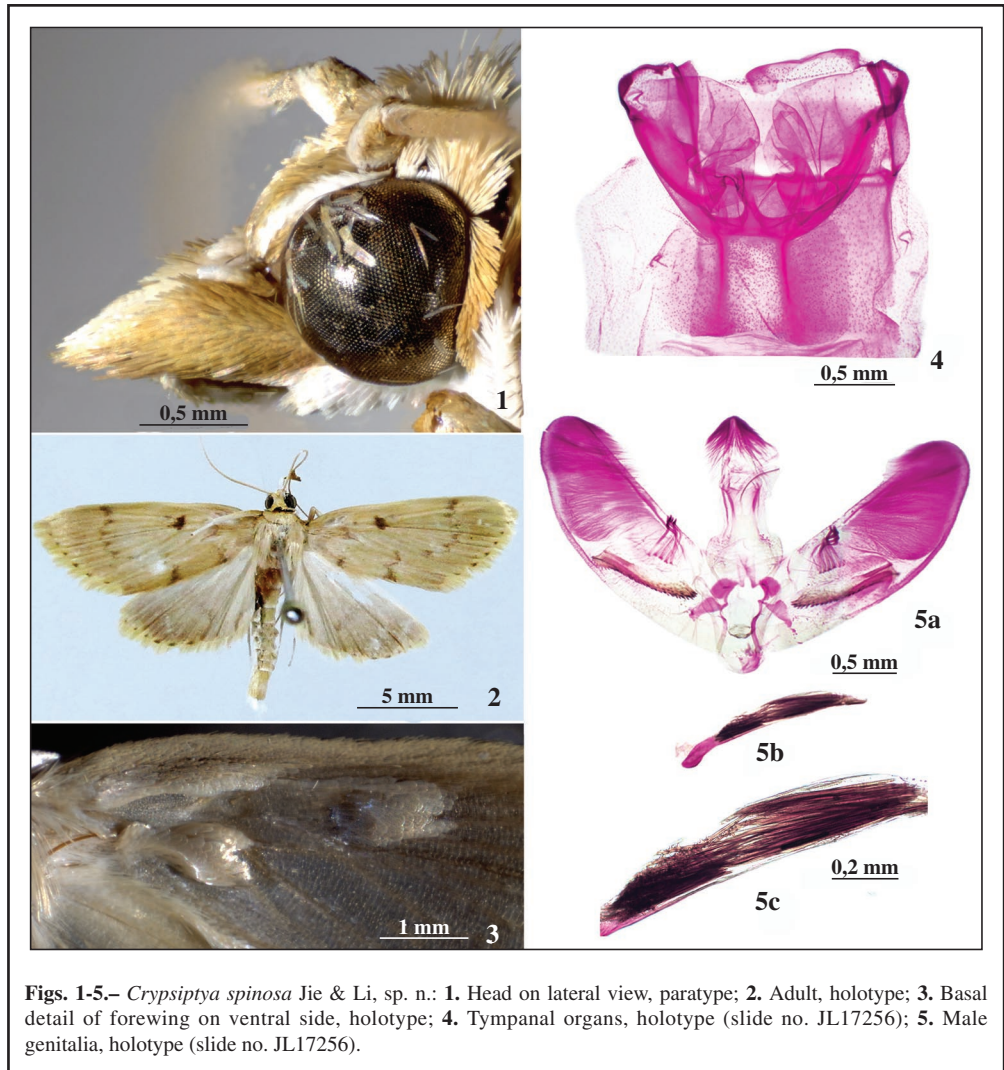
Material examined: Holotype ♂, CHINA, Jiangxi Province: Tongboshan [28°15'N, 117°07'E], 700 m, 28-IV-2012, Weichun Li, genitalia slide no. JL18030. Paratypes, 2 ♂♂, same data as holotype; 1 ♂, CHINA, Jiangxi Province: Fuliang, Huangzihao [29°15'N, 117°09'E], 220 m, 26-V-2012, Weichun Li, genitalia slide no. JL17256.

Description: Adult (Figs. 1-3): Forewing length 10.0-11.0 mm. Frons rounded, ochereous with two lateral white streaks. Vertex ochereous. Labial palpus porrect, ochereous except basally white. Maxillary palpus slightly upright, basal half ochereous, distal half white. Antenna scape dorsally white, ventrally pale brown; flagellomere pale brown. Thorax pale brown. Forewing ochereous, apex obtuse; ventral base with three tufts of scales; antemedian line pale brown, not well-developed; distal discoidal stigma

ovate, blackish brown; postmedian line brown, wave-shaped, meeting costa and dorsum perpendicularly, convex at costal one-third, concave at dorsal one-third; termen pale yellow with six black marginal spots; cilia yellow. Hindwing grayish brown; postmedian line pale brown; termen with six black marginal spots; cilia yellow. Abdomen pale brown.

Tympanal organs (Fig. 4): Bulla tympani convex on inner margin, concave at base. Pons tympani divided into two small branches at base. Saccus tympani extending to about one-third of second tergite. Venula secunda nearly straight.

Male genitalia (Fig. 5): Uncus nearly triangular, densely covered with setae. Valva with same width at basal two-thirds, distal one-third gently narrowed towards round apex; editum consist of five peculiar flattened, terminally forked setae; sella well-developed and strongly sclerotized, ventrally serrated, reaching middle of ventral margin of valva. Saccus a semicircle. Juxta nearly ovate. Phallus thin and long, about half as long as valva, equipped with two clusters of long spine like cornuti.



Figs. 1-5.— *Crypsityta spinosa* Jie & Li, sp. n.: **1.** Head on lateral view, paratype; **2.** Adult, holotype; **3.** Basal detail of forewing on ventral side, holotype; **4.** Tympanal organs, holotype (slide no. JL17256); **5.** Male genitalia, holotype (slide no. JL17256).

Female: Unknown.

Distribution: China (Jiangxi).

Diagnosis: This species can be distinguished from its congeners by the unique characters: the ventral base of forewing has three tufts of scales; the valva with a thin and long sella reaching the ventral part of the valva, and the cornuti consisting of two clusters of long spines in the male genitalia.

Etymology: The specific name is derived from the Latin *spinus* = spinous, in reference to the spine shaped cornuti in the male genitalia.

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We give our cordial thanks to the reviewers for their critical reading of the manuscript and helpful comments. Special thanks are given to Dr. Antonio Vives for providing the Spanish translation in this work. The research is supported by the National Natural Science Foundation of China (No. 31601885).

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REVISION DE PUBLICACIONES *BOOK REVIEWS*

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Tenemos en nuestras manos el primero de los dos volúmenes dedicados al estudio de los Microlepidoptera presente en Europa central, de un total de cuatro volúmenes que, concretamente, tratarán la fauna presente en la República Checa, el único inconveniente que encontramos en esta obra, es que sólo está escrito en checo.

La fauna de conocida en Europa Central se acerca a las 1.500 especies, mientras que en la zona de estudio, lo que era la antigua Checoslovaquia (Chequia y Eslovaquia) se aproxima a las 1.200 especies.

Después del prefacio y los agradecimientos, los autores nos dan una visión histórica de la zona estudiada, sobre la nomenclatura y clasificación seguidos, por unos principios sobre la morfología de las larvas y los adultos, así como técnicas de captura y microscópicas.

Ya dentro de la parte principal de la obra, estudian la fauna de las superfamilia Micropterigoidea (con la familia Micropterigidae), Eriocranioidea (con la familia Eriocraniidae), Nepticuloidea (con la familia Nepticulidae y Opostegidae), Adeloidea (con las familias Heliozelidae, Adelidae, Incurvariidae y Prodoxidae), Ticheroidea (con las familias Ticheriidae y Millieriidae), Tineoidea (con la familia Tineidae), Gracillarioidea (con las familias Roeslerstammiidae, Bucculatricidae y Gracillariidae), Yponomeutoidea (con las familias Yponomeutidae, Ypsolophidae, Praydidae, Plutellidae, Glyphiterigidae, Argyresthiidae, Bedelliidae, Lyonetiidae y Heliodinidae), Douglasioidea (con la familia Douglasiidae), Gelechioidea (con las familias Austotichidae, Oecophoridae, Lypusidae, Depressariidae, Lecithoceridae, Elachistidae, Parametriotidae, Momphidae, Batrachedridae, Coleophoridae, Pterolonchidae, Blastobasidae, Stathmopodidae, Scythrididae y Cosmopterigidae).

De cada especie nos dan sobre su morfología externa, su envergadura, periodo de vuelo y siempre que es conocida, también la planta nutricia, así como una excelente representación del adulto, en su mayoría dibujos a todo color, de la mano de uno de los autores Ales Laštůvka, así como representaciones de las minas realizadas por sus orugas, principalmente en los Nepticulidae o los estuches larvarios en los Coleophoridae. Finalizando con una bibliografía específica, un resumen en inglés y checo, e índice.

No podemos terminar estas líneas, sin felicitar a los autores, conocidos por sus destacadas contribuciones en el estudio de los Lepidoptera europeos, que han escrito este importante trabajo, siendo un libro que no puede faltar en cualquier biblioteca que se precie.

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Estados inmaduros de Lepidoptera (LVII). *Ateliotum insularis* (Rebel, 1896) en Huelva, España (Lepidoptera: Tineidae, Myrmecozelinae)

M. Huertas-Dionisio

Resumen

Se describen e ilustran los estados inmaduros de *Ateliotum insularis* (Rebel, 1896), que vuela en Huelva, así como su ciclo biológico, su alimentación y la distribución.

PALABRAS CLAVE: Lepidoptera, Tineidae, Myrmecozelinae, *Ateliotum insularis* estados, inmaduros, Huelva, España.

Immature stages of Lepidoptera (LVII). *Ateliotum insularis* (Rebel, 1896) in Huelva, Spain (Lepidoptera: Tineidae, Myrmecozelinae)

Abstract

The Immature stages of *Ateliotum insularis* (Rebel, 1896) from Huelva, Spain, are described and illustrated, as well as its biological cycle, feeding and the distribution.

KEY WORDS: Lepidoptera, Tineidae, Myrmecozelinae, *Ateliotum insularis*, immature stages, Huelva, Spain.

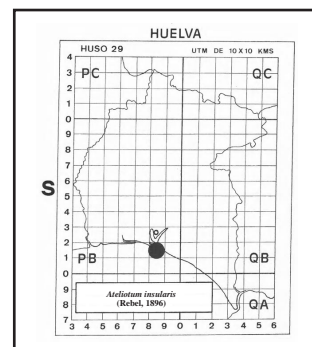
Introducción

Según PETERSEN (1988), se han descrito 12 especies del género *Ateliotum* Zeller, 1839, de las que tres de ellas: *A. hungaricellum* Zeller, 1839 (parte de Europa y Asia); *A. petrinella* (Herrich-Schäffer, 1854 (Europa, Islas Canarias y norte de África) y *A. insularis* (Rebel, 1896) (Islas Canarias y parte de Europa) vuelan en la Península Ibérica y *A. larseni* Gaedike, 2011 en Gran Canaria (VIVES MORENO, 2014). Las genitalias de estas especies en PETERSEN (1957, 1960, 1988) y GAEDIKE (2019).

Con respecto a *A. insularis*, especie que aquí estudiamos, viene representado el adulto en la descripción original (REBEL, 1896) y el andropigio del tipo en PETERSEN (1957), aún no se conocía la hembra. Hasta que con ejemplares de Alella (Barcelona) fue figurado el ginopigio (PETERSEN, 1960). Para la clasificación de esta especie, se ha seguido a GAEDIKE (2019).

Material y métodos

En este caso ha influido la cuestión suerte, puesto que se observó en La Cascajera, Isla Saltes (Huelva) UTM 29SPB81 (ver mapa), el día 21 de enero de 2006, sobre las ramas secas de un matorral que se encontraba debajo de un pino (*Pinus pinea* L.), los restos aplasta-



dos de un nido (figura 15), que contenía restos de corteza, inflorescencias y hojas del pino, otros restos vegetales y pelo de conejo, todo muy húmedo, se retiró el conglomerado de restos y al abrirlo se descubrieron tres orugas que se introdujeron cada una en un bote de cristal con los restos descubiertos. No se verificó que se alimentaba, pero posiblemente de las hojas descompuestas. Se sacrificó una de las orugas y se dejó a las otras que completara su ciclo, dando lugar a los 32 días de pasar a crisálida, dos hembras, el 13 y 14 de marzo de 2006, una de ellas, la del día 14, fue enviada al Dr. Gaedike que la determinó como *Ateliotum insularis* y cuya foto aparece en la lámina 2, figura 189b de GAEDIKE (2019).

Estados inmaduros

No se han encontrado la descripción de sus estados inmaduros, sólo hay un dato de BÁEZ (1998) que señala que la oruga vive en las hojas descompuestas del mantillo. Por lo tanto, se describen aquí por primera vez. A pesar de obtener dos hembras, no se pudo conseguir la puesta. La oruga de última edad (figuras 1 y 2) mide de 14 a 16 mm de longitud, blanco translúcido con tonalidad amarillenta; pináculos anchos, un poco más oscuros que el cuerpo, excepto los SD1 de uritos abdominales 1-9 más pequeños, con setas rubio claro (figuras 3 y 9). Espiráculos translúcidos con el peritrema amarillento, muy pequeños, excepto los del protórax y 8º urito un poco mayores. Tabula (zona del protórax, que incluye las setas L1 L2 y L3) elíptica, castaño claro, con una mancha del mismo color detrás del espiráculo. Base de las setas D1 D2 SD1 y SD2 del mesotórax y metatórax pardo oscuro, y las L1 L2 y L3 pardo claro (figura 9). Patas torácicas translúcidas con tonalidad amarillenta y las ventrales portan (de forma oval) ganchos amarillos que cierran el círculo, con un número de uñas entre 35 y 37 (figura 7); las patas anales con 19 y 21 uñas, mayores en el centro y menores en los extremos (figura 8). La cápsula cefálica (figura 4) mide 1,25 mm de ancha, pardo claro. En las antenas, la antacoria translúcida con una mancha amarillenta; el artejo medio amarillento con la zona inferior translúcida; artejo basal y terminal translúcido. El escudo protorácico (figura 5) castaño claro, dividido en dos por una línea muy fina; en la zona lateral-posterior el borde es más grueso y oscuro, y entre las setas D2 SD2 SD1 y XD2 una mancha pequeña también oscura. El escudo anal (en la figura 6 con el noveno urito) del color del cuerpo.

La crisálida hembra (figuras 10, 11 y 12) mide de 8 a 9 mm de longitud, color pajizo, cuerpo liso, con una línea de espinas muy pequeñas en el dorso de los uritos 3 a 7, que se extienden de uno a otro espiráculo, en el 8º es más corto. Prolongación cefálica más oscura, ligeramente inclinada hacia el frente. Las antenas se unen formando un arco, no sobrepasando el final de las alas. El extremo del abdomen redondeado y más oscuro, con una prolongación cónica pardusca a cada lado de la depresión anal y 6 setas ganchudas (figuras 13 y 14). El capullo lo hace en el mismo lugar donde se desarrolla la oruga, es alargado, de 3 x 10 mm y cubierto de detritus.

Quetotaxia

Para la denominación de las setas, se ha seguido a HINTON (1946 y 1956). El mapa setal de la figura 9, nos indica que la seta SD1, en los uritos 1 a 9, está situada más hacia el dorso que la SD2, tiene mayor longitud y una base más pequeña que las otras setas. Las setas L1 y L2 en paralelo en los uritos 1 a 7, y la L1 más cerca del espiráculo en el 8º. Las setas SV1 SV2 y SV3 forman un triángulo, faltando la SV3 en el 8º y la SV2 y SV3 en el 9º urito. En este último segmento, las setas L1 L2 y L3 están prácticamente en línea, lo mismo que las del protórax dentro de la tabula. En el escudo protorácico (figura 5) la seta D1 es pequeña y situada dentro de la superficie del escudo, mientras que las otras son mayores y situadas en el borde.

Ciclo biológico y distribución

Se la ha capturado en abril (REBEL, 1896); en mayo y agosto (PETERSEN, 1960); en mayo y oc-

tubre (PASSOS DE CARVALHO *et al.*, 1995); en junio (GAEDIKE & ZERAFÁ, 2010) y en Huelva en marzo, así que vuela desde marzo a octubre en varias generaciones. Según BÁEZ (1998), vuela en las Islas Canarias durante todo el año.

Fue descrita de Tenerife como *Dysmasia insularis* Rbl. (REBEL, 1896), desde entonces se la ha citado de Sicilia (PETERSEN, 1957); de Alella (Barcelona) y Chiclana (Cádiz) (PETERSEN, 1960) (ZAGULAJEV, 1975); de Gran Canaria, La Palma y La Gomera (PETERSEN & GAEDIKE, 1979; DAVIS, 1986); de Malta (PETERSEN, 1988; GAEDIKE & ZERAFÁ, 2010) y de Portugal (PASSOS DE CARVALHO *et al.*, 1995); también de Gibraltar, Italia y Francia (GAEDIKE, 2019).

Discusión

Cuando queremos hacer un trabajo sobre la biología de los Lepidoptera, nos encontramos con la falta de datos sobre sus estados inmaduros, su ciclo biológico y su alimentación, detalles muy importantes para conocerlos mejor, a veces como en este caso la suerte nos acompañó y pudimos descubrir a la oruga de *A. insularis* en un entorno que hubiera pasado desapercibido. Sirva este trabajo para animar a descubrir la biología de los Lepidoptera, tan necesaria para este grupo de insectos.

Agradecimientos

Mi más sincero agradecimiento al Dr. Reinhard Gaedike por la determinación de *Ateliotum insularis* y de varias especies de Tineidae dudosas.

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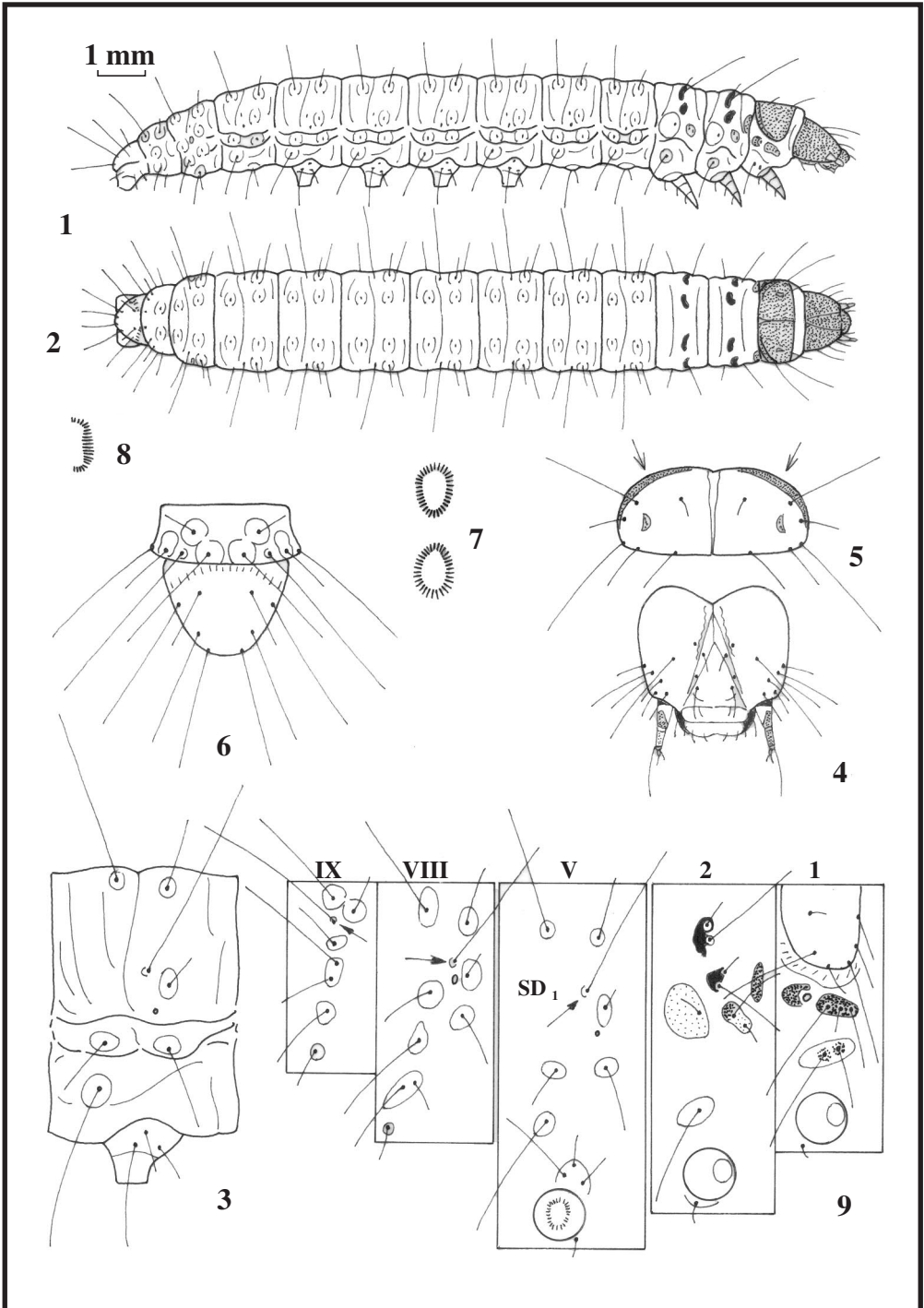
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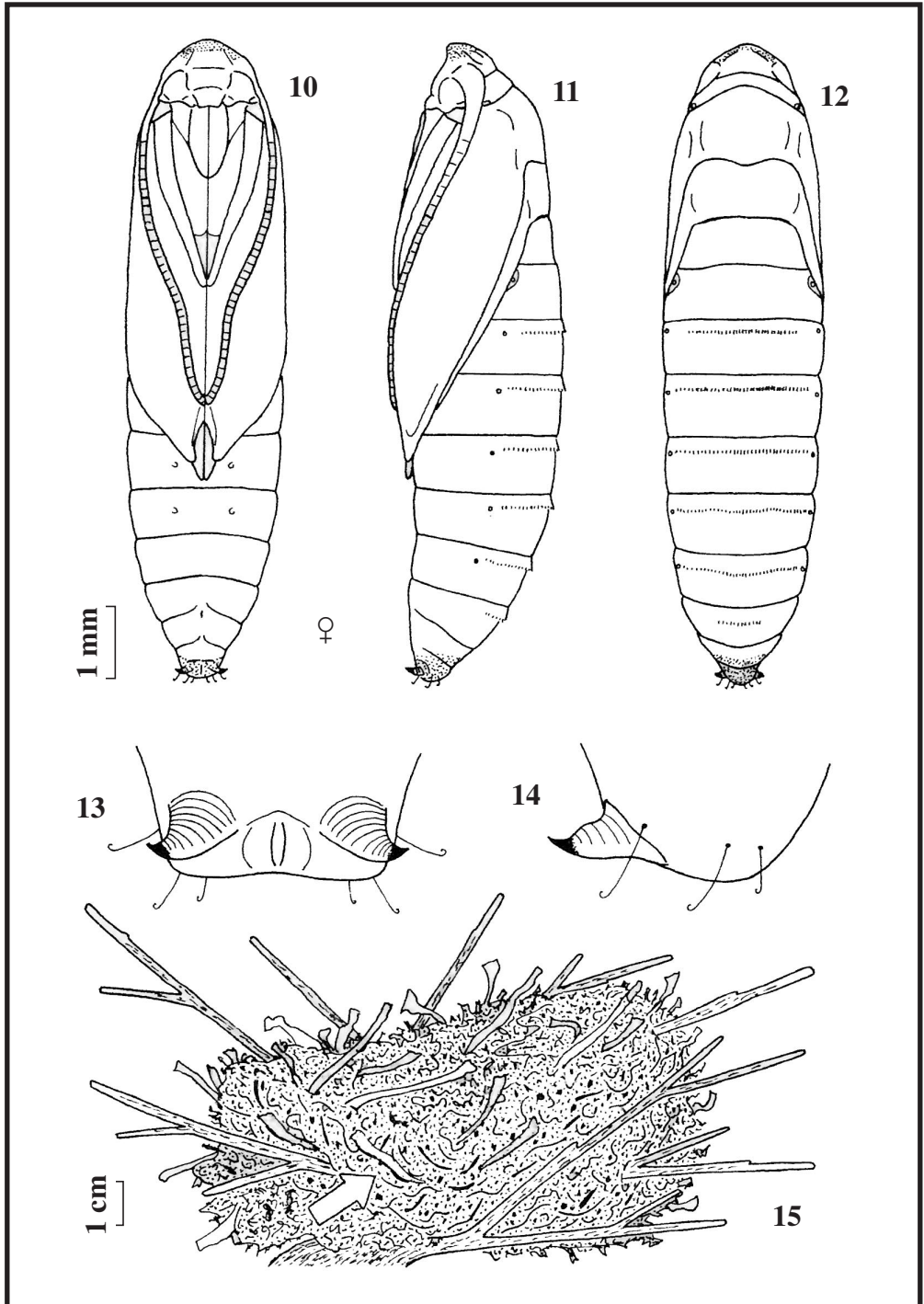
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The *Ethmia terminella* group from the Canary Islands (Spain) and Morocco (Lepidoptera: Depressariidae, Ethmiinae)

P. Falck & O. Karsholt

Abstract

The *Ethmia terminella* group is reviewed. Three species and one subspecies are recognized: *E. terminella terminella* Fletcher, 1938, *E. terminella micropunctella* Amsel, 1955, *E. bennyi* Falck & Karsholt, sp. n. (Spain: Gran Canaria) and *E. pseudoterminella* Falck & Karsholt, sp. n. (Spain: Fuerteventura, Morocco). Adults and genitalia of these four taxa are illustrated. The taxonomic results are supported by the DNA barcodes from sequencing of the 658 bp fragment of the mitochondrial COI gene.

KEY WORDS: Lepidoptera, Depressariidae, Ethmiinae, *Ethmia*, new species, Canary Islands, Spain, Morocco.

El grupo de *Ethmia terminella* de las Islas Canarias (España) y Marruecos (Lepidoptera: Depressariidae, Ethmiinae)

Resumen

Se revisa el grupo de *Ethmia terminella*. Se reconocen tres especies y una subespecie: *E. terminella terminella* Fletcher, 1938, *E. terminella micropunctella* Amsel, 1955, *E. bennyi* Falck & Karsholt, sp. n. (España: Gran Canaria) y *E. pseudoterminella* Falck & Karsholt, sp. n. (España: Fuerteventura, Marruecos). Se ilustran los adultos y la genitalia de estas cuatro taxas. El resultado taxonómico es soportado por el código de barras del ADN mitocondrial desde la secuencia de un fragmento de 658 pb del gen para COI.

PALABRAS CLAVE: Lepidoptera, Depressariidae, Ethmiinae, *Ethmia*, nuevas especies, Islas Canarias, España, Marruecos.

Introduction

Ethmiinae are a moderately small subfamily of Lepidoptera with about 250 described species in five genera (HODGES, 1998: 138). Like several other family-groups of Gelechioidea Ethmiinae have led a rather tumultuous existence in the Lepidoptera system. Until the middle of the last century they were either placed in the Yponomeutidae or in the Oecophoridae, but since then there has been consensus that Ethmiinae are nested within the Gelechioidea. Here they have been considered as a separate family (e.g. SATTTLER, 1967), a subfamily or a tribe of Elachistidae or (as followed here) a subfamily of Depressariidae (HEIKKILÄ *et al.*, 2013).

The Palaearctic Ethmiinae were revised by SATTTLER (1967). All European and North African species are referred to the genus *Ethmia* Hübner, [1819]. SATTTLER (1967) listed 25 species from Europe, and it was not until 2003 that further European species were described (DOMINGO *et al.*, 2003; KARSHOLT & KUN, 2003). There are currently 28 species of *Ethmia* in Europe (KUN, 2011),

14 of which are found in the Iberian Peninsula (VIVES MORENO, 2014: 132-133). This author listed two species from the Canary Islands: *E. quadrinotella* (Mann, 1861) and *E. bipunctella* (Fabricius, 1775).

SATTLER (1967) divided the Palaearctic *Ethmia* species into 23 species-groups, based on adult and genitalia morphology. Below we deal with the *Ethmia terminella* group which until now included only one species and one subspecies.

Material and methods

All specimens were attracted to artificial light. Label data are listed in a standardized way under each species, with the islands in alphabetic sequence, and the records in chronological order. Data on holotypes are cited literally from their labels.

A part of the material was subjected to DNA barcoding (sequencing of the 658 bp fragment of the mitochondrial COI gene) for detection of genetically distinct taxa and for obtaining molecular data for new species. The K2P divergences between the examined taxa were calculated using analytic tools in BOLD systems.

The photographs of specimens were taken with Canon EOS700D camera and Soptop SZN 6745 Trinocular zoom microscope and Toup Tek P10500A-E3 / E3ISPM05000KPA-E3 / 5.0MP USB3 camera. Those of the genitalia by using a Soptop CX40T Trinocular microscope and the same camera.

Abbreviations used

GP	Genitalia preparation
KL	Collection of Knud Larsen, Dyssegård, Denmark
PF	Collection of Per Falck, Neksø, Denmark
MNCM	Collection Antonio Vives, Museo Nacional de Ciencias Naturales, Madrid, Spain
SMNK	Staatliches Museum für Naturkunde Karlsruhe, Germany
ZMUC	Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark

Results

According to SATTLER (1967: 80) characteristics for the *Ethmia terminella* group are: Male genitalia are characterized by the divided uncus; posterior part of gnathos with rows of fine rounded spines; short rounded labis and cucullus strongly tapered towards apex. Female genitalia are characterized by triangular anterior apophysis, with broad base evenly tapered towards apex; antrum fusiform; bursa copulatrix without appendix and signum dome-shaped covered with spines. Adults are whitish to greyish with four black dots on thorax.

Ethmia terminella terminella Fletcher, 1938 (Figs 1-2)

Tinea sexpunctella Hübner, [1810] nec Fabricius, 1794. *Samml. eur. Schmett., Tin.*: pl. 44, fig. 304

Ethmia terminella Fletcher, 1938. *Entomologist's Rec. J. Var.*, **50**(5): 53

Diagnosis: Characterized by the pure white forewing, with costal quarter uniform grey from base to near apex, and light grey on the dorsal quarter from near base to near termen, and an indistinct greyish marking just below laterally to the discal spot; 6 distinct black dots around the cell: 1 at base, 3 on vein R (at 1/3, 1/2 and 1 at cell apex (discal spot)); 2 dots on vein Cu; marginal dots distinctly black. Specimens from Spain are generally darker grey along costa and dorsum. In the male genitalia (Figs 6, 6a), the triangular posterior part of gnathos, and the short rounded labis are characteristic. In the female genitalia (Figs 10, 10a) tergite VIII with anterior margin sclerotized and sloping from near ostium bursae to ventral part of anterior apophysis; the relatively short, asymmetrical antrum with microspines in the exit area for ductus seminalis is characteristic.

Biology: The characteristic larva feeds on *Echium vulgare* L. (Boraginaceae).

Distribution: Most of Europe, apart from northernmost parts, North Africa and Turkey (SATTLER, 1967: 81). We were able to examine specimens in ZMUC from Tunisia and northern Morocco: Ouezzane, and a sympatric occurrence of *E. terminella* and *E. pseudoterminella* sp. n. is therefore possible. Not listed from Russia (SINEV, 2008: 53).

Ethmia terminella micropunctella Amsel, 1955 (Fig. 3)

Ethmia micropunctella Amsel, 1955. *Z. wien. ent. Ges.*, **66**: 281, fig. 7

Holotype ♂, leg. H. Amsel [reverse side:] *Ethmia micropunctella* GU 3111, 13-III-1953 Jordan Valley Zerqa R.[iver] Colony C., 100 m below S.[ea]L.[level] at light Trevor Trought (SMNK). Paratype ♂, same data as holotype but GU 3182, and 16-II-1952, 107 m below S. L. (SMNK).

Diagnosis: Characterized by the white forewing, with few grey scales along costa and 4 small black dots. The genitalia (Fig. 7) do not differ from the nominotypical subspecies.

Biology: Early stages unknown. The type specimens were collected at an altitude of about 100 m below sea level.

Distribution: Only known from the type locality in Jordan, and probably also from Israel: Sea of Galilee (SATTLER, 1967: 81).

Remarks: In the genitalia preparations of the type specimens the phallus has not been removed, and it is not possible to see details of the cornuti.

***Ethmia bennyi* Falck & Karsholt, sp. n. (Fig. 4)**

Holotype ♂: SPAIN, Gran Canaria, Pie de la Cuesta, 500 m, 4-23-III-2019, leg. P. Falck (ZMUC). Paratypes: SPAIN, Gran Canaria, Pie de la Cuesta, 500 m, 10 ♂♂, 7 ♀♀, 4-23-III-2019, leg. P. Falck, genitalia slide 3051PF, DNA sample Lepid Phyl 0169PF; Ayacata, 1400 m, 13 ♂♂, 11 ♀♀, 4-23-III-2019, leg. P. Falck, genitalia slides 2961PF, 2962PF, 2963PF, 2965PF, 2966PF, DNA sample Lepid Phyl 0168PF, 0170PF; El Sao, 110 m, 1 ♂, 4-23-III-2019, leg. P. Falck (PF, MNCN).

Description: Wingspan 17-21 mm. Labial palpus white, segment 3 dorsally mixed grey at tip; segment 2 laterally and dorsally mixed with grey. Antenna dark grey, dorsally whitish. Frons, collar, tegula, neck and thorax white, mixed dark grey. Forewing narrow, costa almost straight, apex pointed; white, with heavy suffusion of grey to dark grey, basal streak and costa more whitish; 4 small, diffuse black dots around the cell, 2 on vein R, at its middle and at cell apex (discal spot); 2 dots on vein Cu; just below the discal spot, medially a diffuse white marking and laterally a diffuse darker grey marking; marginal dots black, very small and indistinct; fringe white, with grey suffusion. Hindwing light grey. Abdomen grey, segment 1-3 dorsally light ochreous.

Genitalia ♂ (Figs 8, 8a): Uncus with almost parallel sides, split in posterior third. Tegumen rectangular with U-shaped incision in anterior part. Posterior part of gnathos subtriangular, covered with rounded spines; anterior part of gnathos with scattered tiny spines. Anellus funnel-shaped. Labis moderately slender, long and with rounded tip. Valva rectangular in basal half. Cucullus sharply narrowed to fine point. Sacculus angled about 145°. Phallus (Fig. 8a) bent almost 180° in basal part; cornuti a group of 12-14 (n=3) spines.

Genitalia ♀ (Figs 11, 11a): Posterior apophysis slightly longer than papilla analis; anterior apophysis short triangular, base wide. Sternite VIII almost divided by a heavily sclerotized posterior rectangular incision to ostium bursae, medial margins heavily sclerotized. Antrum slightly longer than segment VIII (length from tip of anterior apophysis to posterior margin), tapering towards ductus bursae, margins slightly curved, exit for ductus seminalis in the upper right side. Ductus bursae membranous, long, helical. Corpus bursae ovoid, with one elongate, dome-shaped signum, covered with spines.

Molecular diagnosis: Three specimens of *E. bennyi* were sequenced, resulting in DNA barcode fragments of 632 bp for one specimen and 631 bp for two specimens. The nearest neighbor to *E. bennyi* is *E. pseudoterminella* with 3.69 % divergence; to *E. terminella* the divergence is 5.45%. The barcodes

of *E. bennyi* exhibit 0 % intraspecific variation. The results support the status of *E. bennyi* as a distinct species.

Differential diagnosis: Characterized by the narrow forewing, with almost straight costa, the grey to dark grey color, and very indistinct markings. In the male genitalia the slender, long labis, and the relatively short cucullus are characteristic. In the female genitalia the long, symmetrical antrum, the shape of tergite VIII which is almost divided, and the heavy sclerotization of the margins of the colliculum are characteristic.

Biology: Unknown. The specimens were collected in spring at light.

Distribution: Known only from a few scattered localities in the southern half of Gran Canaria at altitudes between 120 m and 1400 m.

Etymology: The species is named after our good friend, the Danish lepidopterologist Benny Lynggård, who helped the first author on part of a collection trip to Gran Canaria.

Remark: Despite the lack of the 4 dots on thorax, *E. bennyi* is placed in the *terminella* group, because of similar genitalia morphology both in male and female, and because the nearest neighbors in DNA barcodes are species belonging to this group.

Ethmia pseudoterminella Falck & Karsholt, sp. n. (Fig. 5)

Holotype ♂: SPAIN, Fuerteventura, Corralejo, 10 m, 27-II-19-III-2018, leg. P. Falck (ZMUC). Paratypes: SPAIN, Fuerteventura, 7 km NW Betancuria, Playa del Valle, 1 ♂, 19-I-2002, leg. O. Karsholt, genitalia slide 5349OK (ZMUC); Betancuria, 400 m, 1 ♂, 1 ♀, 27-II-19-III-2018, leg. P. Falck, genitalia slide 2761PF; Caldereta, 120 m, 1 ♂, 1 ♀, 27-II-19-III-2018, leg. P. Falck, genitalia slide 2969PF, DNA sample Lepid Phyl 0061PF; Corralejo, 10 m, 7 ♂♂, 4 ♀♀, 27-II-19-III-2018, leg. P. Falck, genitalia slides 2763PF, 3052PF; Lajares, 50 m, 7 ♂♂, 3 ♀♀, 27-II-19-III-2018, leg. P. Falck, genitalia slides 2745PF, 2970PF, DNA sample Lepid Phyl 0063PF (PF, MNCN); Barranco tras del Lomo, 100 m, 1 ♂, 25-26-II-2019, leg. K. Larsen (KL). MOROCCO, Tafraut, 1000 m, 1 ♀, 23-24-III-2005, leg. O. Karsholt; High Atlas, Ouirgane, 920 m, 2 ♀♀, 30-IV-5-V-2016, leg. C. Hviid, K. Larsen & D. Nilsson, genitalia slide 5360OK, genitalia slide 3054PF, DNA sample Lepid Phyl 0171PF; High Atlas, 7 km S Ouirgane, 950 m, 5 ♂♂, 1-5-V-2016, leg. C. Hviid, K. Larsen & D. Nilsson (all ZMUC).

Description: Wingspan 15-21.5 mm. Labial palpus white, segment 2 dark grey dorsally and laterally, posteriorly pure white to near segment 3. Antenna grey. Frons, collar, tegula and neck white. Thorax white with 4 indistinct dots. Scapula white with few dark grey scales. Forewing with costa slightly arched, apex pointed; color at costal third dark grey to near apex; dorsal third grey to dark grey from near base to near termen; dorsal part of base, mid-third of wing and apical area white, with suffusion of dark grey, especially between the two distal dots; 5 distinct dots around the cell: 1 at base, 2 on vein R (at 1/3 and at cell apex (discal spot)); 2 dots on vein Cu; terminal dots black, distinct. Fringe white with suffusion of grey scales. Hindwing grey, lighter towards base. Abdomen grey.

Genitalia ♂ (Figs 9, 9a): Uncus barrel-shaped, split in posterior third. Tegumen rectangular with U-shaped incision in anterior part. Posterior part of gnathos subtriangular, covered with rounded spines; anterior part of gnathos covered with small spines. Anellus funnel-shaped. Labis moderately short with rounded tip. Valva rectangular in basal half. Cucullus sharply narrowed to parallel-sided beak-like apex. Saccus curved about 145°. Phallus (Fig. 9a) bent 180° in basal part; cornuti a group of 18-21 spines (n=2).

Genitalia ♀ (Figs 12, 12a): Posterior apophysis slightly longer than papilla analis; anterior apophysis short triangular, base wide. Sternite VIII with a posterior rectangular incision to ostium bursae, anterior margin sclerotized, sloping from middle down to apophysis anterior on right side. Antrum slightly shorter than segment VIII (length from tip of anterior apophysis to posterior margin), tapering towards ductus bursae, left margin with a bulb like thickening opposite to ductus seminalis, right margin almost straight, exit for ductus seminalis in the upper right side. Ductus bursae membranous, long, helical. Corpus bursae ovoid, with one elongate, dome-shaped signum, covered with spines.

Molecular diagnosis: Two specimens of *E. pseudoterminella* were sequenced, resulting in 658 bp, full-length DNA barcode fragment for both specimens. The nearest neighbor to *E. pseudoterminella* is *E. bennyi* with a 3.69% divergence; to *E. terminella* the divergence is 4.89%. The barcodes of *E. pseudoterminella* exhibit 0.31% intraspecific variation. The results support the status of *E. pseudoterminella* as a distinct species.

Differential diagnosis: External appearance of *E. pseudoterminella* sp. n. resembles *E. terminella* Fletcher, 1938, but differs by the suffusion with darker grey scales in the white area of the forewing and by having only five (not six) black dots in the forewing (the lack of black dot on vein R at 1/2 is characteristic for *E. pseudoterminella* sp. n.). In the male genitalia, a barrel-shaped uncus, and the medium-sized (compared to other species in the *terminella* group) labis are characteristic. In the female genitalia, the asymmetric antrum without micro spines, and the shape of sternite VIII are characteristic.

Biology: Unknown. The specimens were collected in early spring at light.

Distribution: Known from Spain (Fuerteventura) and Morocco.

Etymology: The new species most resembles *E. terminella*. *Pseudo* means false in Latin.

Discussion

Due to their relatively large size and distinct and/or colorful wing markings Ethmiinae are well studied compared to several other groups of the so-called Microlepidoptera, and the discovery of two undescribed species from the Canary Islands is therefore surprising. Our study is primarily based on morphology, and the use of DNA barcoding supported these results. We find it likely that the use of the latter method in other species groups of *Ethmia* may detect cryptic diversity, but that is beyond the aims of the present paper.

Although the early stages of the new species are still unknown it is probably that their larvae may live on *Echium*, which is also the host plant of *E. terminella* and several other *Ethmia* species (SATTLER, 1967: 18-19). There is a high diversity of endemic *Echium* species in the Canary Islands (ARECHAVALETA *et al.*, 2010: 150-151), and at least *E. bennyi* sp. n. may be connected to one of these.

Acknowledgements

We are grateful to Robert Trusch and Michael Falkenberg (SMNK) for loan of the type series of *E. micropunctella*. We also want to thank Carsten Hviid, Knud Larsen and Danny Nilsson, all Denmark for collecting specimens of *Ethmia* used for this study, and Thomas Simonsen, Naturhistorisk Museum, Århus, for his valuable help with interpretation of the DNA Barcoding results. We are moreover grateful to Antonio Vives, Madrid, Spain for translating the abstract into Spanish, for editing our manuscript, and for his kind help with obtaining permission to collect Lepidoptera in the Canary Islands into the Scientific Project of SHILAP. Martin Corley, Faringdon, United Kingdom, kindly commented on and improved the English language of the final version of the manuscript.

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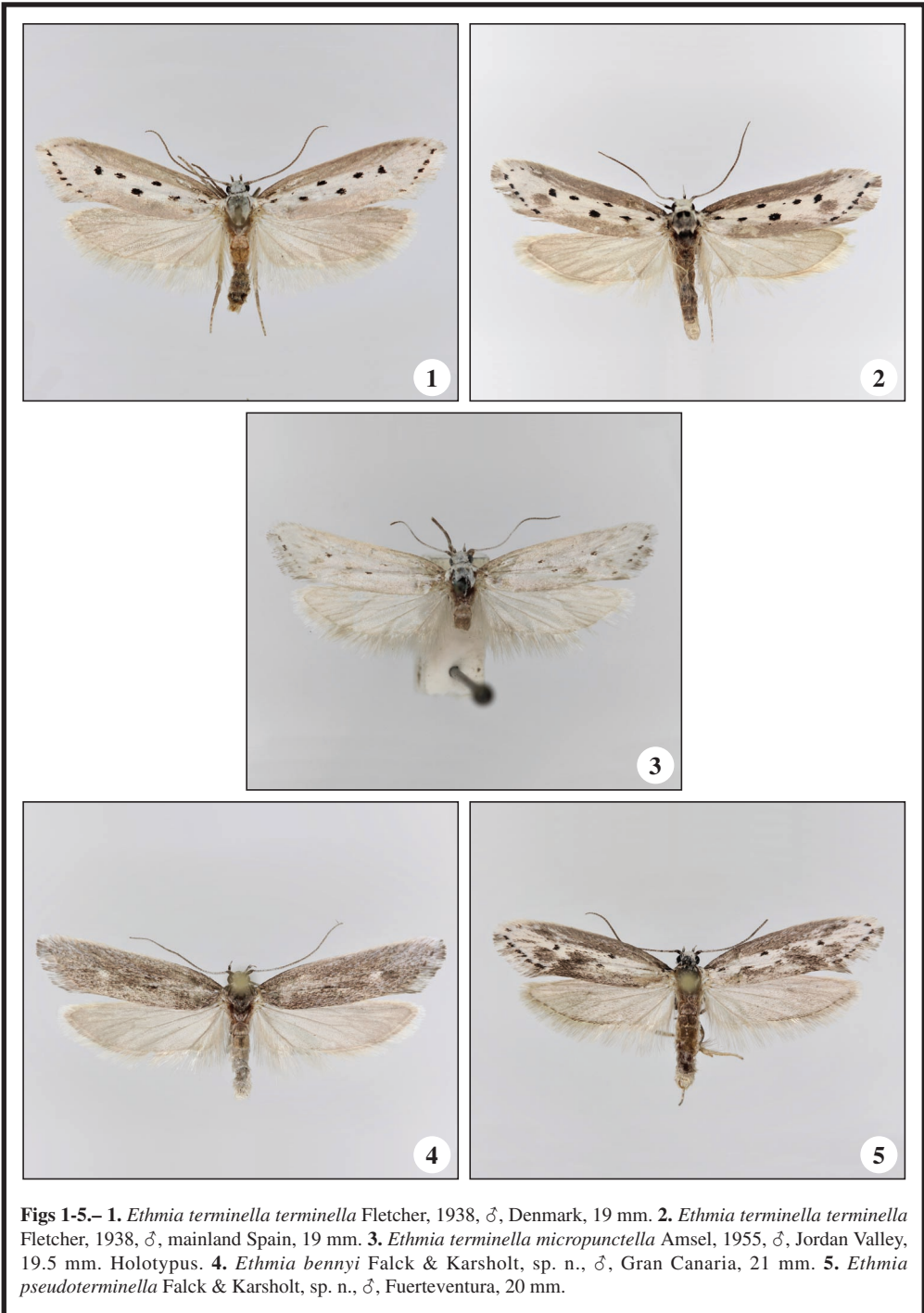
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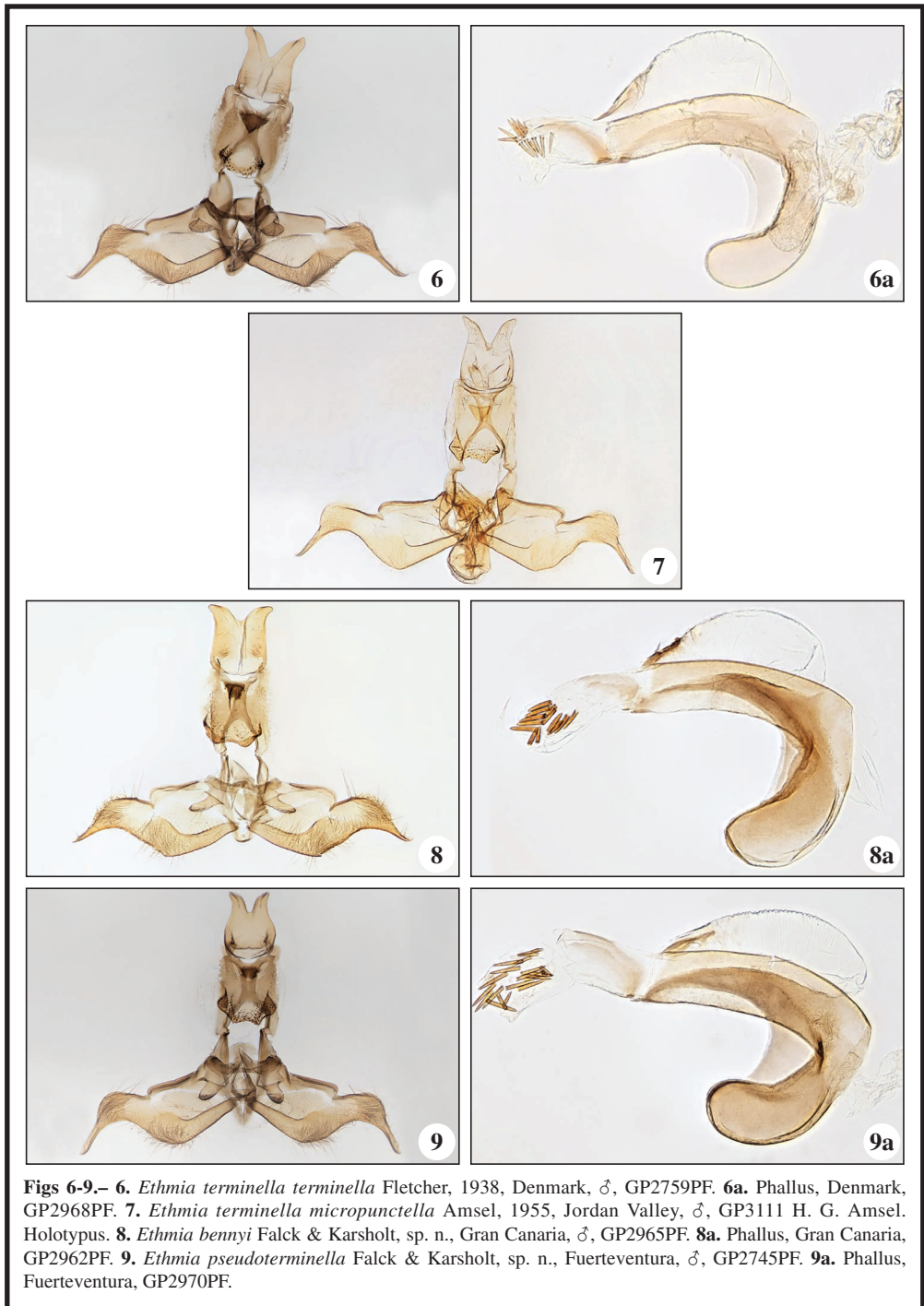
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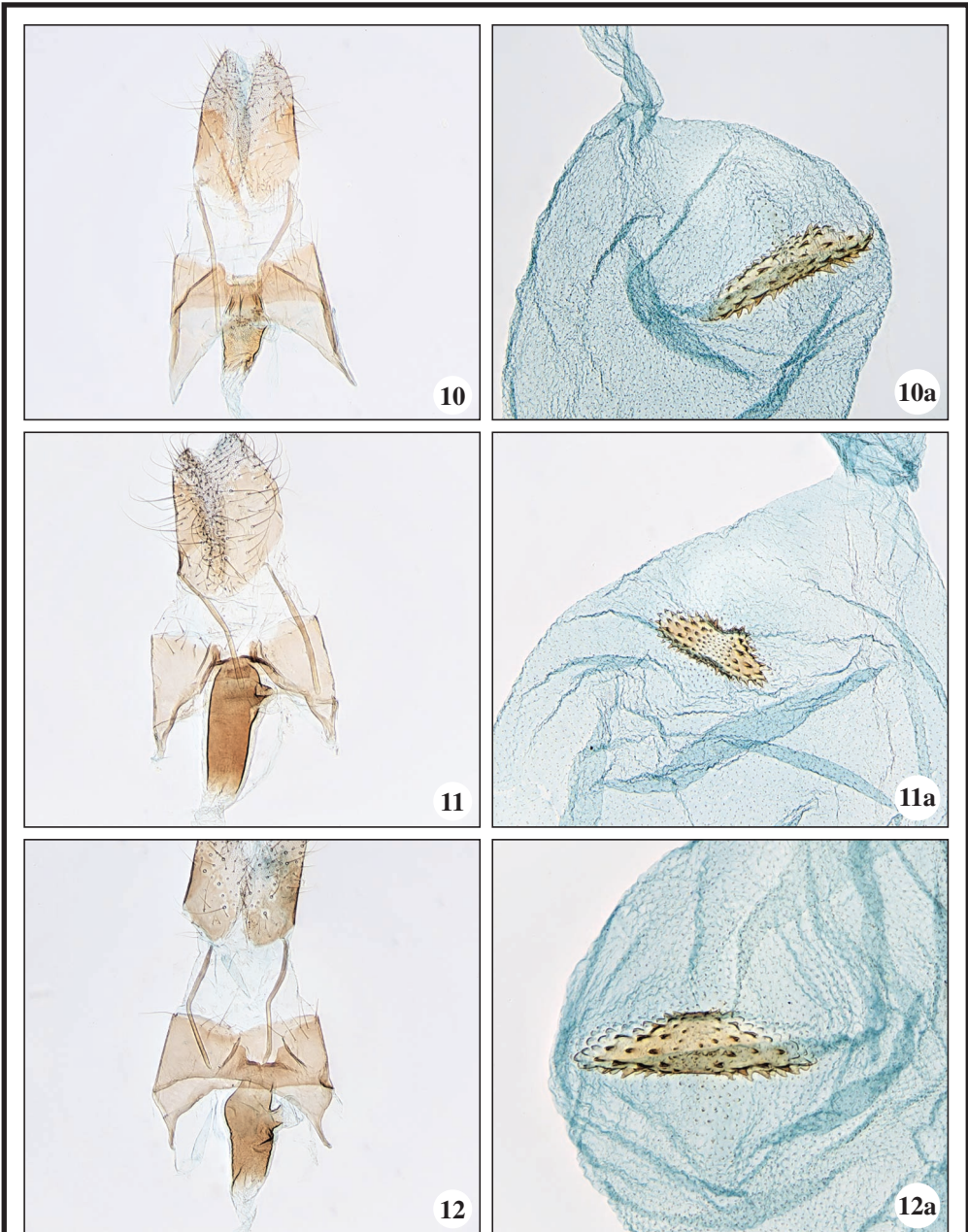
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Figs 1-5.— 1. *Ethmia terminella terminella* Fletcher, 1938, ♂, Denmark, 19 mm. 2. *Ethmia terminella terminella* Fletcher, 1938, ♂, mainland Spain, 19 mm. 3. *Ethmia terminella micropunctella* Amsel, 1955, ♂, Jordan Valley, 19.5 mm. Holotypus. 4. *Ethmia bennyi* Falck & Karsholt, sp. n., ♂, Gran Canaria, 21 mm. 5. *Ethmia pseudoterminella* Falck & Karsholt, sp. n., ♂, Fuerteventura, 20 mm.



Figs 6-9.– **6.** *Ethmia terminella terminella* Fletcher, 1938, Denmark, ♂, GP2759PF. **6a.** Phallus, Denmark, GP2968PF. **7.** *Ethmia terminella micropunctella* Amsel, 1955, Jordan Valley, ♂, GP3111 H. G. Amsel. Holotypus. **8.** *Ethmia bennyi* Falck & Karsholt, sp. n., Gran Canaria, ♂, GP2965PF. **8a.** Phallus, Gran Canaria, GP2962PF. **9.** *Ethmia pseudoterminella* Falck & Karsholt, sp. n., Fuerteventura, ♂, GP2745PF. **9a.** Phallus, Fuerteventura, GP2970PF.



Figs 10-12.— **10.** *Ethmia terminella terminella* Fletcher, 1938, Denmark, ♀, GP3049PF. **10a.** Signum, GP3049PF. **11.** *Ethmia bennyi* Falck & Karsholt, sp. n., Gran Canaria, ♀, GP3051PF. **11a.** Signum, GP3051PF. **12.** *Ethmia pseudoterminella* Falck & Karsholt, sp. n., Fuerteventura, ♀, GP3052PF. **12a.** Signum, Fuerteventura, GP2761PF.

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Delplanqueia enderleini (Rebel, 1934) en la isla de Mallorca (Balears, España) (Lepidoptera: Pyralidae, Phycitinae)

J. Ylla, R. Macià, J. Gastón & M. R. Honey

Resumen

Se dan a conocer nuevos hallazgos y más datos sobre el Phycitinae *Delplanqueia enderleini* (Rebel, 1934) en la isla de Mallorca (Islas Baleares, España), los cuales han permitido acabar con las numerosas dudas existentes alrededor del poco conocido endemismo balear.

PALABRAS CLAVE: Lepidoptera, Pyralidae, Phycitinae, *Delplanqueia*, endemismo, distribución, Mallorca, Baleares, España.

Delplanqueia enderleini (Rebel, 1934) on the Mallorca Island (Balearic Islands, Spain)
(Lepidoptera: Pyralidae, Phycitinae)

Abstract

New findings and more data on the Phycitinae *Delplanqueia enderleini* (Rebel, 1934) are reported on the Mallorca Island (Balearic Islands, Spain), which have made it possible to end the numerous doubts surrounding this rare and little-known Balearic endemic.

KEY WORDS: Lepidoptera, Pyralidae, Phycitinae, *Delplanqueia*, endemism, distribution, Mallorca, Balearic Island, Spain.

Introducción

La enigmática especie *Pempelia enderleini* Rebel, 1934 fue descrita a partir de un macho capturado en la localidad de “Palma El Terreno, 23-IX-1934, G. Enderlein leg.” (Balears, España). Se incluyó inicialmente en el género *Pempelia* Hübner, [1825] 1816 y posteriormente en los géneros *Pempeliella* Caradja, 1916 (KARSHOLT & RAZOWSKI, 1996; VIVES MORENO, 1991, 1994, 2014) y *Pseudosyria* Rebel, 1926 (ROESLER, 1985). En LERAUT (2014) no figura dicha especie en el índice, pero sí se menciona en la página 344, en el apartado de *Pempeliella sororiella* (Zeller, 1839) indicando que es una especie para él desconocida. YLLA *et al.* (2019), basándose en la venación alar del tipo trífida y la morfología del andropigio y del ginopigio, la han incluido en el género *Delplanqueia* Leraut, 2001.

Hasta el presente las únicas citas conocidas de *D. enderleini* son las siguientes:

1.– El macho descrito por REBEL (1934), indicado que fue capturado por G. Enderlein y se depositó en el Zoologisches Museum (actualmente Museum für Naturkunde) en Berlín. Sin embargo, a pesar de las indagaciones llevadas a cabo y la colaboración del Dr. Wolfram Mey, conservador de la colección de Lepidoptera del mencionado Museo, no ha sido posible localizarlo. Intentamos localizar la

colección Enderlein en otros Museos sin éxito. Una situación similar se da con la localización del material del Tortricidae *Gypsonoma gymnesiarum* Rebel, 1934, capturado también por G. Enderlein en la misma localidad mallorquina que *D. enderleini*, pero con la fecha del 22-VIII-1932.

2.– La hembra capturada en el Parque Natural de la Albufera, por Barry Goater el 18-V-1992, está depositada en el Zoologisk Museum (Copenhague, Dinamarca). Dicho ejemplar, ya fue provisionalmente determinado (con dudas) como *P. enderleini* por František Slamka en el año 2015. Lo que sí resulta sorprendente, es que sea éste el único ejemplar recolectado en el Parque Natural de la Albufera después de más de 25 años de muestreo de Lepidoptera en dicha localidad como parte del trabajo realizado por miembros del grupo TAIB, incluidas numerosas prospecciones por parte de uno de los autores (M. R. Honey).

3.– Un macho capturado en “March Valley”, cerca de Pollensa, “Villa Tramuntana”, Mallorca entre el 19-IV-1997 y el 5-V-1997, M. Honey leg. y coll., determinado inicialmente como *Delplanqueia dilutella* ([Denis & Schiffermüller], 1775), pero que hemos comprobado que se trata de *D. enderleini*.

4.– El macho capturado en Cúber, por J. J. Pérez de-Gregorio, el 2-IX-2000, ejemplar que, para fijar y clarificar la identidad de esta especie, fue designado como Neotipo (YLLA *et al.*, 2019) y depositado en el Museo de Ciencias Naturales de Barcelona (España) y que inicialmente había sido determinado como *D. dilutella*.

5.– Hay datos de otra hembra capturada en Pollensa, entre el 12 y el 19-VII-1997, R. J. Heckford leg., actualmente en la colección de uno de los autores (M. R. Honey).

Material y métodos

El estudio de campo se ha llevado a cabo en la Sierra de Tramontana, situada al oeste de la isla de Mallorca, durante las noches de los días 27, 28 y 30-V-2019. La noche del 29-V-2019 se muestreó el Parque Natural de la Albufera, situado en la zona nordeste de la citada isla.

Los Lepidoptera fueron capturados mediante la utilización de trampas luz de las siguientes características: Combinación de una lámpara de vapor de mercurio (125 W) y luz mixta (160 W), alimentadas por un grupo electrógeno; varias trampas de luz actínica, modelo “Heath” (6W y 8W) y otras de luz de cátodo frías, alimentadas todas por baterías de 12V; una trampa formada por la combinación de un total de 24 LEDS de 3w de la marca “Future Eden Ltd.”, alimentados por una batería de 12V a saber UV, 9 unidades de 380-390 nm; “Esmerald Green”, cuatro unidades de 520-530 nm; “Royal Blue”, siete unidades de 440 nm; “Cool White”, dos unidades y “Violet”, dos unidades de 410-420 unidades.

Las trampas funcionaron de forma alternada entre ellas, permaneciendo conectadas durante la totalidad de la noche, con la excepción de la primera de ellas que sólo funcionó durante las tres primeras horas de oscuridad.

Las localidades muestreadas se escogieron a tenor de la información previamente conocida sobre los hallazgos de *D. enderleini* y fueron las siguientes: Nudo de la Corbata, Escorba, 31TDE8409, 664 m, 27-V-2019; La Bassa, Fornaluch, Carretera Ma10, 31TDE7804, 515 m, 28 y 30-V-2019. Parque Natural de la Albufera, 31TEE0805, 5 m, 29-VIII-2019.

Abreviaturas utilizadas:

JY: Josep Ylla

TAIB: The Albufera International Biodiversity Group

Resultados

De las tres localidades muestreadas, en dos de ellas (La Bassa y Nudo de la Corbata) se detectó la presencia de *Delplanqueia enderleini*. Ambas localidades están situadas cerca del pantano de Cúber, donde ya se había capturado un ejemplar en el año 2000 por J. J. Pérez de Gregorio.

En la localidad de la Albufera, a pesar de que se situaron las trampas exactamente en el mismo

punto donde el año 1992 se había capturado un ejemplar hembra por Barry Goater, no se detectó ni un solo ejemplar.

En la localidad de la Bassa, a lo largo de las dos noches muestreadas se logró capturar nueve ejemplares (5 ♂♂ y 4 ♀♀), mientras que en el Nudo de la Corbata sólo se detectó un macho. Muy probablemente, se hubiera registrado un número mayor de ejemplares si la temperatura nocturna no hubiese descendido hasta los 11°C, que es bastante fría para Mallorca en esta época del año.

El aspecto de los ejemplares (figuras 1-2), es muy parecido al de *Ephestia parasitella* Staudinger 1859, especie que volaba en abundancia y con la que se confundía fácilmente.

Los ejemplares de *D. enderleini* ahora detectados tienen un tamaño promedio de 18,4 mm (n=10), siendo las hembras (19,1 mm; n=4) ligeramente mayores que los machos (17,9 mm; n=6). Los imagos de ambos sexos, por lo que a características externas se refiere, comparten el patrón propio del género *Delplanqueia*, es decir, tienen el ala anterior de un tono general oscuro en la cual sobresalen dos líneas transversales: la postmediana, blanquecina por el lado externo y negra por el interno, con un visible quiebro en su zona central y la antemediana que limita un área basal más clara. Presentan dos puntos negros en el extremo de la celda, muy evidentes en los ejemplares frescos. Alas inferiores de una tonalidad grisácea, trifine, con las venas destacadas y las fimbrias muy visibles bordeadas por una línea triple compuesta por una línea central blanquecina limitada a ambos lados por sendas líneas más oscuras (figuras 1a y 1b). Antenas filiformes y débilmente ciliadas en ambos sexos, presentando los machos unas placas escamosas en la base.

Su estructura genital, tanto del macho como de la hembra (figuras 3-4), coincide con las publicadas por YLLA *et al.* (2019). Concretamente el andropigio se distingue fácilmente del resto del género *Pempeliella* sensu lato por el evidente y único cornutus acabado en punta curvada con la base envainada en una especie de saco forrado de micro-conuti, característica del género, mientras que el ginopigio se determina rápidamente por la doble hilera de placas muy esclerotizadas con bordes aserrados que recorren la totalidad de la copulatrix y por la visible placa redondeada rematada por numerosos cornuti situada en la parte basal.

La presente investigación nos permite llegar a las siguientes conclusiones:

1.- A pesar de los años transcurridos y de las escasas citas existentes, se confirma sin lugar a duda la existencia de *D. enderleini* como un endemismo mallorquín. Curiosamente cada una de las tres grandes islas del mediterráneo occidental dispone de una "*Pempeliella*" endémica, a saber: *D. enderleini* en Mallorca (España), *D. cortella* (Constant, 1884) en Córcega (Francia) y *P. matilella* (Leraut, 2001) en Cerdeña (Italia). La cita de *D. cortella* en Cerdeña (HARTIG & AMSEL, 1951) ha sido corregida por PINZARI & PINZARI (2019) al comprobar que se trataba de *P. matilella*.

2.- A tenor de los resultados, no parece que *D. enderleini* sea una especie rara o escasa y como siempre suele suceder en estos casos, es sólo cuestión de estar en el hábitat apropiado en el momento oportuno.

3.- Se confirman las indicaciones en YLLA *et al.* (2019), el asociar los dos ejemplares disponibles como el macho y la hembra de la especie de REBEL (1934) y el hecho de que ambos estuvieran volando juntos en el mismo hábitat, ratifican nuestra propuesta.

4.- La designación del Neotipo de *D. enderleini* fue indispensable para clarificar y fijar la identidad de la especie.

5.- Como el resto de sus congéneres, *D. enderleini* acude a la luz con facilidad.

Agradecimientos

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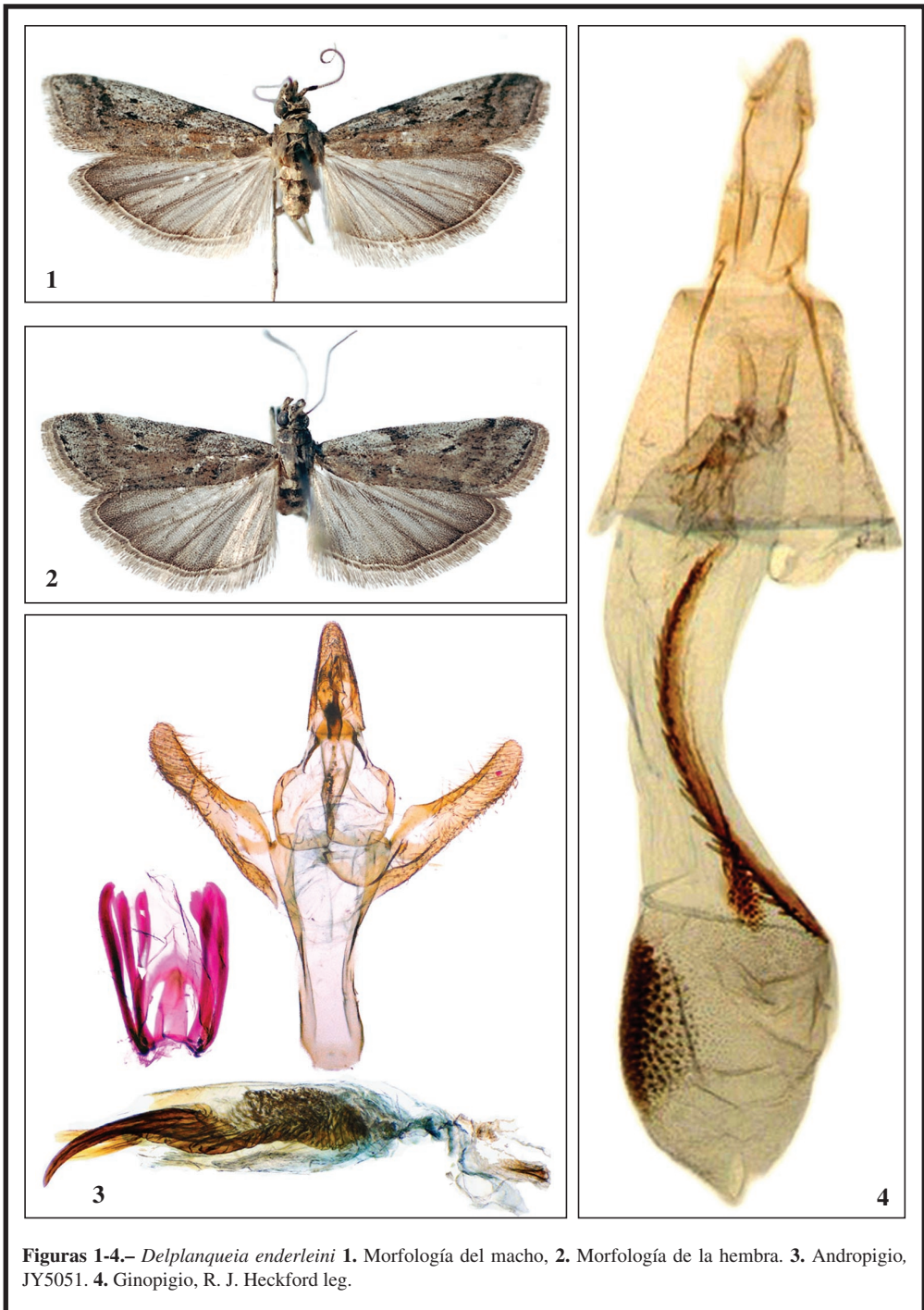
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Figuras 1-4.- *Delplanqueia enderleini* 1. Morfología del macho, 2. Morfología de la hembra. 3. Andropigio, JY5051. 4. Ginopigio, R. J. Heckford leg.

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Description of *Corymbus* Park, gen. n. with six new species from the Afrotropical Region (Lepidoptera: Lecithoceridae)

K.-T. Park, J.-M. Koo & L. Aarvik

Abstract

The new genus *Corymbus* Park, gen. n., including six new species from the Afrotropical Region - Kenya, Malawi, Tanzania, and Uganda - is described. The new species are: *C. deprinsi* Park & Aarvik, sp. n., *C. malmoius* Park & Aarvik, sp. n., *C. hirtitibia* Park & Aarvik, sp. n., *C. kenyaensis* Park & Aarvik, sp. n., *C. hallicis* Park & Aarvik, sp. n., and *C. nigrizosterus* Park & Aarvik, sp. n. *Corymbus crossogramma* (Meyrick, 1921), comb. n. is transferred from the genus *Eridachtha* Meyrick, 1910 to *Corymbus* Park. The venation of the type species, and adults and male genitalia of the new species are illustrated. A key to the species is provided.

KEY WORDS: Lepidoptera, Lecithoceridae, *Corymbus*, new genus, new species, Africa.

Descripción de *Corymbus* Park, gen. n. con seis nuevas especies de la región Afrotropical (Lepidoptera: Lecithoceridae)

Resumen

Se describe el nuevo género *Corymbus* Park, gen. n., incluyendo seis nuevas especies de la región Afrotropical - Kenia, Malawi, Tanzania y Uganda. Las seis nuevas especies son: *C. deprinsi* Park & Aarvik, sp. n., *C. malmoius* Park & Aarvik, sp. n., *C. hirtitibia* Park & Aarvik, sp. n., *C. kenyaensis* Park & Aarvik, sp. n., *C. hallicis* Park & Aarvik, sp. n. y *C. nigrizosterus* Park & Aarvik, sp. n. *Corymbus crossogramma* (Meyrick, 1921), comb. n. es transferido desde el género *Eridachtha* Meyrick, 1910 a *Corymbus* Park. Se ilustra la venación de la especie tipo, los adultos y la genitalia de los machos de las nuevas especies. Se proporciona una clave de las especies.

PALABRAS CLAVE: Lepidoptera, Lecithoceridae, *Corymbus*, nuevo género, nuevas especies, África.

Introduction

The fauna of Microlepidoptera in general and of the family Lecithoceridae in particular in the Afrotropical Region (= Ethiopian Region) have been poorly documented. The first known species of Lecithoceridae from the Afrotropical Region is *Idiopteryx obliquella* (Walsingham, 1881) and followed by *Lecithocera flavipalpis* Walsingham, 1891. Later JANSE (1954, 1963) treated 22 species of Lecithoceridae. VÁRI *et al.* (2002) listed 21 species of the family for the fauna of southern Africa. The taxonomic history and status of the family in the Afrotropical Region were summarized by PARK & DE PRINS (2019). In the website "www.afromoths.net" compiled by J. & W. DE PRINS (updated 25 April 2019), 133 species belonging to 22 genera of the family are listed. In the website, ten recently described species belonging to the subfamily Lecithocerinae from Cameroon by PARK (2018a), seven species of the subfamily Torodorinae and eight new species of the genus *Ptilothyris* Walsingham, 1897 described by PARK (PARK, 2018b; PARK *et al.*, 2019) are included.

The genus *Corymbus* Park, gen. n. (Lecithoceridae: Lecithocerinae) is related to *Notioseus* Park,

2018 and *Paniculata* Park, 2018, both described from Cameroon. The three genera share the ochreous forewing ground colour and the 2nd segment of labial palpus having a cluster of long hair like scales which are appressed dorsally. The characters separating *Corymbus* Park from the above two genera and other related ones are discussed under the description of the genus.

In the present paper, six new species of *Corymbus* Park are described from the Afrotropical Region, and the previously known species, *Eridachtha crossogramma* (Meyrick, 1921), is transferred to this new genus as *Corymbus crossogramma* (Meyrick, 1921), **comb. n.**

Material and methods

The present study is based partly on material preserved in the Royal Museum for Central Africa, Tervuren, Belgium (RMCA) and partly on material collected by the third author in Kenya, Malawi, and Tanzania and which is preserved in The Natural History Museum, University of Oslo, Norway (NHMO). Additional material collected by David Agassiz in East Africa will be deposited in The Natural History Museum, London, UK (NHMUK). The type specimen of *Eridachtha crossogramma* (Meyrick, 1921) preserved in the Ditsong National Museum of Natural History (formerly Transvaal Museum, Pretoria) (TMSA) was examined. Dissected genitalia were mainly stained with Chlorazol black and wings were mainly stained by Double Stain containing lignin pink, acid fuchsin, GAA, lactic acid, and phenol. Both were slide mounted in Euparal. Wingspan was measured from the apex of the left wing to the apex of the right wing. The colour standard for the descriptions of adults followed KORNERUP & WANSCHER (1978).

Taxonomy

Corymbus Park, gen. n.

Type species: *Corymbus deprinsi* Park & Aarvik, sp. n.

Corymbus Park, 2019 is superficially similar to *Notioseus* Park, 2018 and *Paniculata* Park, 2018 sharing some diagnostic characters, including the ochreous ground colour of the forewing and the labial palpus with similar long, hair like scales appressed dorsally. However, the new genus can be distinguished from *Notioseus* Park by the hindwing venation with M_2 absent, but M_3 and CuA_1 stalked, whereas *Notioseus* has M_3 and CuA_1 clearly coalescent, and its male genitalia with a distinct ring shaped plate fused with basal lobes of the uncus. *Paniculata* Park differs by the presence of a prominent black scale tuft ventrally at the basal segment of the antenna, and also by the presence of M_2 in the hindwing; M_3 and CuA_1 are coalescent. The new genus also resembles the Oriental genus *Eridachtha* Meyrick, 1910 described from S India, which has similar rough scales on the labial palpus and similar male genitalia. However, *Corymbus* Park can be distinguished from *Eridachtha* by the forewing venation with R_3 free, and CuA_1 and CuA_2 remote from M_3 , and the labial palpus which has a cluster of dorsally appressed, long, hair like scales, whereas *Eridachtha* has rough hairs, not appressed, above and beneath. This type of rough hairs on the labial palpus are also found in *Syntetarca* Gozmány, 1978 described from Malaysian Borneo, but *Syntetarca* has a well developed vein M_2 in the hindwing.

Adult: Head covered with pale orange scales dorsally. Antenna slightly longer than forewing; basal segment elongate, slightly dilated toward apex; flagellum orange white, filiform, not ciliate. Second segment of labial palpus with cluster of rough hair like, yellowish white to pale orange scales appressed dorsally; 3rd segment usually shorter than 2nd segment, pointed apically. Thorax yellowish white to pale orange. Tegula of same colour, with fuscous scales along anterior margin. Hind tibia uniformly covered with rough scales above and beneath. Forewing ground colour yellowish white to pale orange, often brownish scales scattered irregularly; fuscous discal spots weakly expressed in middle and at end, often absent; costa slightly arched; apex acute or often obtuse; termen oblique; venation (Fig. 1) with R_1 arising from about 2/5 length of cell, distance between R_2 and R_3 less than 1/3 length of that of R_2 and R_1 , R_3 free arising near from upper corner of cell, R_4 and R_5 stalked for about

basal 2/3, R₅ to termen, M₁ remote from R₄₊₅ at base, nearly parallel to R₄₊₅, M₂ and M₃ free, CuA₁ and CuA₂ free, A1+A2 forked at base. Hindwing yellowish white to orange white; venation with Sc and M₁ stalked for about half of their length; M₂ absent; M₃ and CuA₁ stalked.

Male genitalia: Similar to those of *Lecithocera* Herrich-Schäffer, 1853 and *Eridachtha* Meyrick, 1910. Basal lobes of uncus semiovalate, usually directed distally or outwardly. Gnathos with sclerotized, broad basal plate; median process narrowed toward apex, curved downward from beyond 2/3, pointed apically. Costal bar well developed. Tegumen broad, weakly sclerotized. Valva elongate; cucullus thumb like with rounded apex; ventral margin with a small triangular process or instead slightly protruded medially. Juxta usually with slender, weakly sclerotized latero caudal lobes. Aedeagus stout, curved medially, often with apical spines on dorsal surface, no cornuti.

Etymology: The generic name is derived from Latin, *corymb* or Greek, *κόρυμβος* (= *cluster*), referring to the cluster of long hair like scales on the 2nd segment of the labial palpus.

Key to the species of the genus *Corymbus* Park (due to the missing hind wing *C. crossogramma* (Meyrick, 1921) is not included in the key)

1. Hindwing with club shaped black streak centrally or irregularly scattered with black scales2
- Hindwing without such streak or black scales3
2. Hindwing with club shaped black scales centrally; the male genitalia with a triangular, apically pointed process at lower corner of cucullus on ventral margin*C. nigrizosterus* Park & Aarvik, sp. n.
- Hindwing with black scales irregularly scattered, especially along costa, centrally, and around tornus; male genitalia with a toe like process on ventral margin of basal part of valva
.....*C. hallicis* Park & Aarvik, sp. n.
3. Valva of male genitalia with a triangular, apically pointed process on ventral margin4
- Valva of male genitalia without such process, instead with protrusion on ventral margin
.....*C. malmoius* Park & Aarvik, sp. n.
4. Forewing ground colour pale orange; apex obtuse*C. hirtitibia* Park & Aarvik, sp. n.
- Forewing ground colour orange white or yellowish white; apex more or less sharply produced5
5. Forewing densely covered with yellowish brown scales; male genitalia: caudal margin of basal lobes of uncus convex medially; ventral process of valva small, short, triangular
.....*C. deprinsi* Park & Aarvik, sp. n.
- Forewing sparsely scattered with yellowish brown scales; caudal margin of basal lobes of uncus incised in V-shape medially; ventral process of valva slender, digitate
.....*C. kenyaensis* Park & Aarvik, sp. n.

***Corymbus deprinsi* Park & Aarvik, sp. n.** (Figs 1A, 2A-F)

Holotype: ♂, KENYA, Taita Hills, (K4), Yal plantation; 13-III-1999; U. Dall'Asta leg.; Hg+ Hal; gen. slide no. CIS-7133/Park; RMCA.

Paratypes: 1 ♂; same data as holotype; wing slide no. CIS-7149/Park; 1 ♂; Taita Hills, (K4), Ngangao For. & Plantation; 6-VII-1998; U. Dall'Asta leg.; gen. slide no. CIS-7128/Park; RMCA.

Description Adult (Figs 2A, B): Male wingspan 15-17 mm. Head: Vertex covered with orange white scales. Antenna slightly longer than forewing; basal segment elongate, slightly dilated toward apex, orange white; flagellum orange white, filiform, not ciliate. Second segment of labial palpus with long, hair like orange white scales above; 3rd segment shorter than 2nd segment, strongly upturned, orange white to pale orange, pointed apically. Thorax orange white to pale orange; tegulae of same colour, with fuscous scales along anterior margin. Hind tibia densely haired, fuscous grey on outer surface. Forewing ground colour orange white, brownish scales scattered irregularly, more dense beneath costa and in distal region; a round fuscous discal spot in middle and a kidney shaped one near end of cell; costa slightly arched; apex more or less acute; termen oblique; venation (Fig. 1A) as described for the genus. Hindwing orange white; venation with M₂ absent; M₃ and CuA₁ stalked.

Abdomen yellowish brown on dorsal surface; tergites lack spinose zones; segment VII with sclerotized ridge on anterior margin (Fig. 2F).

Male genitalia (Figs 2C-E): Basal lobes of uncus semi ovate, directed outwardly, convex medially on caudal margin. Gnathos with heavily sclerotized basal plate; median process slender, curved downward beyond middle. Costal bar banded, arising from base of tegumen and reaching middle of valva, without distinctly acute median angle. Valva broad in basal 1/4, then narrowed; costa deeply concave medially; cucullus elongate, more or less thumb like with round apex, densely setose, with broad scales along apical margin; a small, triangular process near lower corner of cucullus, followed by small pegs along ventral margin towards apex; sacculus broad, terminated with round apex, shorter than 1/2 the length of basal part of valva. Juxta weakly sclerotized; latero caudal process slender, directed outwardly, slightly shorter than length of juxta; anterior margin broadly convex. Vinculum broad, with round apices; outer margin sclerotized, banded. Aedeagus thick, as long as valva, curved medially, with pair of small triangular spines subapically on dorsal margin. Female unknown.

Diagnosis: The new species is similar to the following new species, *C. malmoius* but it can be distinguished by more oblique termen of the forewing, fringes concolourous with weak median brownish band. In *C. malmoius*, the fringes are dark brown in distal half; and the valva of the male genitalia has a small, sharply acute, triangular process apically near the lower corner on ventral margin of cucullus, whereas *C. malmoius* does not have such a sharply pointed triangular process, but has a rounded protrusion on the ventral margin.

Distribution: Kenya (Central).

Etymology: The species is named in honour of Willy De Prins who gave a remarkable contribution to studies on African moths, compiling the Afromoths website.

Corymbus malmoius Park & Aarvik, sp. n. (Figs 3A-G)

Holotype: ♂, TANZANIA, Arumeru Distr., Usa River; 1170 m; 1-VIII-1991; L. Aarvik leg.; gen. slide no. CIS-7146/Park; NHMO.

Paratypes: 1 ♂, KENYA, Taita Hills, Wundanyi; 1350 m; 11-VII-1999; A. Bjørnstad leg.; gen. slide no. CIS-7171/Park, wing slide CIS-7253/Park; NHMO; 1 ♂, Eastern Prov., Lewa Conservancy; 2080 m; [UTM:] 37N CA 2838 1547; 28-30-XI-2008; L. Aarvik, D. Agassiz, A. Kingston leg.; gen. slide no. CIS-7145/Park; NHMO; 1 ♂, Taita Hills (C4), Ngangao mixed forest; 5-III-1999; U. Dall'Asta leg.; Hg+Hal; gen. slide no. CIS-7148/Park; RMCA; 1 ♂, Taita Hills (E4), Mbololo mixed for.; 7-III-1999; U. Dall'Asta leg.; Hg+Hal; gen. slide no. CIS-7152/Park; RMCA.

Description Adult (Fig. 3A, B): Male wingspan 14-16 mm. Head, vertex orange white, with orange white, (comma not needed) erect scales laterally; frons orange white. Antenna longer than forewing; basal segment orange white, slightly dilated toward apex, without pecten; flagellum filiform, orange white throughout, not ciliate. Second segment of labial palpus densely covered with long, orange white hair like scales above, ventral surface more less smooth; 3rd segment shorter than 2nd segment, upturned, orange white, pointed apically. Thorax orange white; tegulae of same colour with fuscous scales along anterior margin. Hind tibia with dense hair like scales above and beneath, orange white mixed with grey scales. Forewing ground colour pale orange, densely and irregularly scattered with brownish scales, more dense in upper part of cell and distal 2/5; a distinct round, fuscous discal spot in middle and a kidney shaped one near end of cell; costa slightly arched in basal half and beyond 2/3; apex more or less acute; termen oblique, slightly sinuate medially; fringe shining white in basal 1/3, then black beyond; venation as *C. deprinsi* sp. n. Hindwing orange white; venation as in *C. deprinsi* sp. n. Abdomen yellowish brown on dorsal surface, lacking spinose zones on tergites; segment VII with sclerotized ridge on anterior margin. (Fig. 3G).

Male genitalia (Figs 3C-F): Basal lobes of uncus semiovalate, directed outwardly, emarginated in V-shape medially on caudal margin. Gnathos with heavily sclerotized basal plate; median process slender, curved downward beyond 2/3. Tegumen posteriorly deeply emarginated in V-shape. Costal bar banded, curved downward at middle, not sharply angled medially. Valva extremely broad in basal 1/4, then

abruptly narrowed; costa deeply concave medially; cucullus elongate, thumb like, densely setose, strongly convex on dorsal margin, with broad scales along apical margin; ventral margin with broad protrusion at lower corner, followed by numerous pegs along margin towards apex; sacculus broad, terminated with round apex, about 1/4 length of ventral margin of valva. Juxta with slender latero caudal processes, shorter than the length of juxta; caudal margin concave medially and anterior margin medially with triangular process. Vinculum broad, rounded apically; outer margin narrowly sclerotized. Aedeagus stout, as long as valva, strongly curved medially, with pair of small triangular processes subapically on dorsal margin.

Diagnosis: This new species is similar to the preceding new species, *C. deprinsi* sp. n. in external and genital characters, but the forewing ground colour is more yellowish brown with more distinct discal spots, and the termen is less oblique. The male genitalia can be distinguished by the more elongate cucullus, remarkably convex on dorsal margin, ventral margin protruded at lower corner of cucullus. Different from *C. deprinsi* sp. n. which has a triangular process pointing apically.

Distribution: Tanzania (North), Kenya (South-East).

Etymology: The species epithet is derived from a Korean archaic word, *malmoye*, meaning a language dictionary.

Corymbus hirtitibia Park & Aarvik, sp. n. (Figs 4A-H)

Holotype: ♂, TANZANIA, Morogoro Distr., Kimboza For. Res.; 300 m; 30-X-1992; L. Aarvik leg.; gen. slide no. CIS-7147/Park; NHMO.

Paratype: 1 ♂, KENYA, Central, Thika; 6000 ft; 3-XI-1999; D. J. L. Agassiz leg.; gen. slide no. CIS-7129/Park; NHMUK.

Description Adult (Figs 4A-D): Male wingspan 11-11.5 mm. Head, vertex orange white, with pale orange erect scales laterally; frons orange white. Antenna about 1.2 times longer than forewing; basal segment orange white, slightly dilated toward apex, without pecten; flagellum filiform, orange white throughout, not ciliate. Second segment of labial palpus strongly angled, upturned, densely covered with pale orange, long hair like scales above; ventral surface yellowish white, more or less smooth; 3rd segment slightly shorter than 2nd segment, pale orange, pointed apically. Thorax orange white; tegulae of same colour, mixed with fuscous scales along anterior margin. Hind tibia with rough yellowish brown scales above and beneath. Forewing ground colour light orange or orange white, uniformly speckled with brownish scales; discal spots weakly developed, a small one in middle and a kidney shaped one near end of cell; costa slightly arched in basal 1/3, with some fuscous scales along costal margin in basal 2/5 and yellowish white scales beyond in apical 4/5; apex obtuse; termen oblique; fringe on termen concolorous in basal 1/3, with narrow orange white band medially, fuscous in apical half. Hindwing orange white; apex acute; fringes concolorous.

Male genitalia (Figs 4E-H): Basal lobes of uncus semiovate, directed outwardly, emarginated medially on caudal margin. Gnathos with heavily sclerotized basal plate; median process slender, curved downward beyond 2/3. Tegumen posteriorly deeply emarginated in V-shape. Costal bar banded, not sharply angled medially. Valva broad in basal 1/4; costa deeply concave medially; cucullus elongate, thumb like, densely setose, slightly convex on costal margin; ventral margin apically near lower corner with sharply pointed triangular process, followed by numerous pegs along margin; sacculus more or less slender with round apex, about half the length of basal part of valva. Juxta shield shaped with protrusions medially on lateral margins; latero caudal lobes directed distally; caudal margin concave medially and anterior margin triangularly produced. Vinculum broad, rounded apically, narrowly sclerotized along outer margin. Aedeagus stout, as long as valva, strongly curved medially, with a pair of small triangular processes subapically on dorsal margin.

Diagnosis: The new species can be distinguished from the above two species by the light orange forewing ground colour, the lack of distinct fuscous discal spots, the pale yellow hindwing, and the hind tibia with rough yellowish brown scales above and beneath. The male genitalia are similar to those of *C. deprinsi* sp. n., but it can be distinguished by the longer gnathos, the larger and more apically

acute ventral process on the cucullus, and the larger juxta with latero caudal lobes directed distally, whereas they are directed outwardly in *C. deprinsi* sp. n.

Distribution: Tanzania (South), Kenya (Central).

Etymology: The species epithet is derived from Latin, *hirtus* (= hairy) and *tibia* (= leg), referring to the hairy hind tibia.

***Corymbus kenyaensis* Park & Aarvik, sp. n. (Figs 5A-E)**

Holotype: ♂, KENYA, Central, Thika; 5000 ft; 28-V-2000; D. J. L. Agassiz leg.; gen slide no. CIS-7259/Park; NHMUK.

Description Adult (Figs 5A-B): Male wingspan, 14 mm. Head, vertex yellowish white, with orange white erect scales laterally. Antenna slightly longer than forewing; basal segment orange white, dilated in distal half, without pecten; flagellum filiform, orange white, not ciliate. Second segment strongly angled, upturned, densely covered with pale orange, long, hair like scales above, smooth on ventral surface; 3rd segment slightly shorter than 2nd segment, pale orange, pointed apically. Thorax yellowish white; tegulae of same colour as thorax, fuscous along anterior margin. Hind tibia with rough yellowish brown scales above and beneath; tarsi yellowish white. Forewing ground colour yellowish white, speckled with brownish scales, more dense in upper 1/3 and in distal 2/5; discal spots weak, a small one in middle and a kidney shaped one near end of cell; costa slightly arched in basal half, with some fuscous scales along costal margin in basal 1/3; apex obtuse; termen oblique; fringe on termen concolorous in basal half and fuscous in apical half. Hindwing orange white; apex acute; fringes concolorous. Abdomen dorsally orange white, lacking spinose zones on tergites; segment VII with sclerotized ridge on anterior margin; sternite VIII broad, concave medially on caudal margin (Fig. 5E).

Male genitalia (Figs 5C-D): Basal lobes of uncus semiovalate, directed distally, emarginated in V-shape medially on caudal margin. Gnathos with heavily sclerotized basal plate; median process slender, preapically curved downward. Tegumen posteriorly deeply emarginated in V-shape. Costal bar banded, gently curved, with median angle. Valva broad in basal 1/4; costa deeply concave medially; cucullus thumb like, dilated distally, densely setose, with nearly straight costal margin; ventral process of valva not sharply pointed apically, followed by numerous pegs along ventral margin of cucullus and termen; sacculus shorter than basal part of valva, slightly dilated distally with round apex. Juxta shield shaped; latero caudal lobes very slender, as long as the length of juxta; caudal margin medially slightly concave. Vinculum broad, rounded apically, narrowly sclerotized along outer margin. Aedeagus stout, shorter than valva, curved medially; apical triangular processes very small.

Diagnosis: The male genitalia of *C. kenyaensis* sp. n. are similar to those of *C. hirtitibia* sp. n., but the basal lobes of the uncus are more deeply incised on the caudal margin; the cucullus is more dilated distally, with a ventral process slightly longer but not sharply pointed apically; the latero caudal lobes of the juxta directed outwardly; and the aedeagus with minute processes subapically. However, it is easily distinguished from *C. hirtitibia* sp. n. by the yellowish white ground colour of both wings.

Distribution: Kenya (Central).

Etymology: The species epithet is derived from the type locality.

***Corymbus hallicis* Park & Aarvik, sp. n. (Figs 6A-F)**

Holotype: ♂, MALAWI, Ntchisi; 13° 22'S 34° 00'E; 1500 m; 11-XII-2002; D. J. L. Agassiz leg.; gen. slide no. CIS-7130/Park; NHMUK.

Description Adult, (Figs 6A-C, F): Male wingspan 18 mm. Head, vertex pale greyish orange, laterally with yellowish brown erect scales. Antenna slightly longer than forewing; basal segment dark brown in basal 3/5 on external surface, slightly dilated in apical 1/3, without pecten; flagellum filiform, pale orange becoming orange white towards apex, not ciliate. First segment of labial palpus dark brown externally; second segment strongly angled, arched, upturned, densely covered with pale orange, long, hair like scales above, smooth on ventral surface; 3rd segment shorter than 2nd segment, pale orange,

pointed apically. Thorax covered with brownish scales dorsally; tegulae of same colour as thorax, fuscous along anterior margin. Hind tibia with rough orange white hair like scales above and beneath; tarsi orange white. Forewing ground colour orange white, irregularly speckled with dark brown scales; a round, small dark brown discal spot in middle and a kidney shaped, dark brown oblique one near end of cell; costa slightly arched in basal half, nearly straight beyond; apex obtuse; termen oblique; fringe on termen pale orange grey. Hindwing ground colour orange white; a row of erect scales running from base along lower margin of cell; a row of black scales centrally from base to termen, around tornus, and along termen; apex acute; fringes concolorous. Abdominal segments lacking spinose zones on tergites; sternite VIII concave on caudal margin medially (Fig. 6F).

Male genitalia (Figs 6D-E): Basal lobes of uncus semiovalate, directed outwardly emarginated medially on caudal margin. Basal plate of gnathos sclerotized latero caudally with triangular acute processes; median process slender, curved downward preapically. Tegumen posteriorly deeply emarginated in V-shape. Costal bar slender, gently curved, without median angle. Valva broad basally, with a great toe like process on the ventral margin of basal part; costa gently concave medially; cucullus thumb like, densely setose, with slightly convex costal margin, with numerous pegs along ventral margin; sacculus shorter than basal part of valva, nearly parallel sided, slightly oblique near apex. Juxta slender latero caudal lobes as long as the length of juxta; caudal margin medially deeply concave. Vinculum broad, rounded apically, with narrowly sclerotized band along outer margin. Aedeagus stout, shorter than valva, curved medially; with pair of large triangular processes apically on dorsal margin.

Diagnosis: The new species can be distinguished from its congeners by the more fuscous forewing and the hindwing with blackish scales in central part, around tornus, and along termen. The male genitalia have more easily distinguishable diagnostic characters with a great toe like process on the basal part of the valva, not on cucullus, and the aedeagus has a pair of large triangular processes on ventral margin basally.

Distribution: Malawi (Central).

Etymology: The species epithet is derived from Latin, *hallex* (= great toe, hallux) referring to the toe like process on the ventral margin of the valva.

Corymbus nigrizosterus Park & Aarvik, sp. n. (Figs 7A-G)

Holotype: ♂, TANZANIA, Muheza Distr., Amani; 900-950 m; 12-XII-1992; L. Aarvik leg.; gen. slide no. CIS-7134/Park; NHMO.

Paratypes: 1 ♂, TANZANIA, Tanga, E. Usambaras, Sigi River; 2000 ft; 17-VIII-2000; D. J. L. Agassiz leg.; NHMUK; 1 ♂, UGANDA, Budongo Forest, 3000 ft, 19-VII-2000; D. J. L. Agassiz leg.; gen. slide no. CIS-7257/Park; NHMUK.

Description Adult (Figs 7A-C, G): Male wingspan 14-14.5 mm. Head vertex orange white, laterally with orange white erect scales. Antenna about 1.2 times longer than forewing length; basal segment yellowish white, without pecten; flagellum filiform, yellowish white, not ciliate. Second segment of labial palpus nearly straight in basal 1/3, then bent at right angle, upturned, densely covered with orange white, long hair like scales appressed above, nearly smooth on ventral surface; 3rd segment much shorter than 2nd segment, orange white, pointed apically. Thorax and tegulae orange white. Hind tibia with rough orange white hair like scales above and beneath; tarsi yellowish white. Forewing ground colour yellowish white, scattered with pale orange scales in basal 1/3; discal spots weak, one smaller in middle and a kidney shaped one near end of cell; costa slightly arched beyond 2/3; apex obtuse; termen oblique; fringes on termen concolorous in basal half and fuscous in apical half. Hindwing orange white, with a black, club shaped streak arising from middle of cell to near termen; apex more or less obtuse; fringes concolorous. Abdomen orange white dorsally, lacking spinose zones on tergites; segment VII with sclerotized ridge on anterior margin; sternite VIII broad, concave medially on caudal margin. (Fig. 7G).

Male genitalia (Figs 7D-F): Basal lobes of uncus large, broad, with more or less dentate caudal

margin medially; the median process of the gnathos relatively short; posterior margins of tegumen with distinct oblique, V-shape ridges; ventral process at the lower corner of the cucullus triangular with broader base; cucullus apically nearly forming a right angle; juxta with thick latero caudal lobes, directed caudally. Aedeagus stout, broader in basal 1/3, strongly curved medially, with pair of apical triangular processes on dorsal surface.

Diagnosis: The new species can be distinguished from all congeners by the presence of a black, club shaped streak in the hindwing, running from near middle to near termen. The male genitalia are similar to those of *C. kenyaensis* sp. n., but can be distinguished by the large, broad basal lobes of the uncus, which are more or less dentate medially on the caudal margin; the shorter median process of the gnathos; the tegumen with distinct V-shaped, oblique ridges on posterior margin; triangular process with broader base at the lower corner of the cucullus; and the latero caudal lobes of the juxta thicker.

Distribution: Tanzania (East: Tanga region), Uganda.

Etymology: The species name is derived from Latin, *niger* (= *black*), referring to the conspicuous black streak in the hindwing.

Corymbus crossogramma (Meyrick, 1921) **comb. n.** (Fig. 1B)

Corthyntis crossogramma Meyrick, 1921: 87.

Eridachtha crossogramma; Meyrick, 1925: 220; Janse, 1954: 367; Park & De Prins, 2019: 67.

Material examined: ♀♀ (holotype), ZIMBABWE, Rhodesia, Victoria Falls; Jan.; A. J. T. Janse leg.; *Corthyntis crossogramma* M., Type no. 576; gen. slide no. 3739; TMSA.

Adult (Fig. 3C): Wing venation and labial palpus were illustrated by JANSE (1954, pl. 161, figs 8 & 9), and the adult on pl. 157, fig. 3. Wingspan 14 mm.

Male genitalia: see JANSE (1954, pl. 153, fig. 1- photo; pl. 161, fig. 10- line drawing).

Remarks: The forewing veins CuA_1 and CuA_2 of *crossogramma* are remote from each other, differing from those of *Eridachtha* in which they are stalked. It is assumed that MEYRICK (1925) placed *crossogramma* in *Eridachtha* due to a miss interpretation of CuA_1 and CuA_2 , which are shortly stalked in the forewing, and JANSE (1954) followed it. Also the expansible tuft of hairs on the 2nd segment of the labial palpus in *crossogramma* differs from that of *Eridachtha*, forming a cluster of long hair like scales. Consequently, *crossogramma* is transferred to *Corymbus* Park. The species can be distinguished from the new species described above by the external appearance as figured in figure 1B.

Distribution: Zimbabwe.

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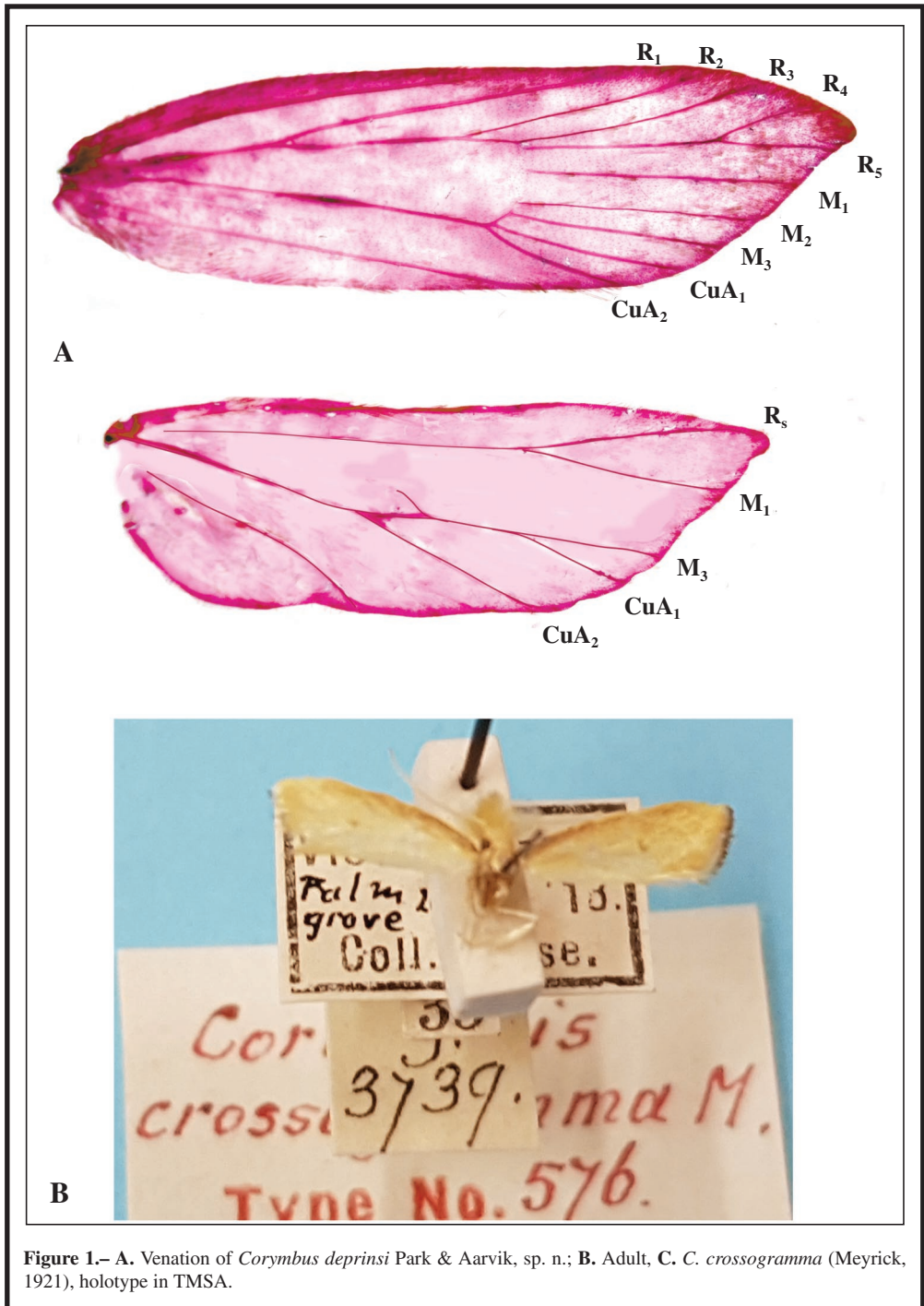


Figure 1.– A. Venation of *Corymbus deprinsi* Park & Aarvik, sp. n.; B. Adult, C. *C. crossogramma* (Meyrick, 1921), holotype in TMSA.

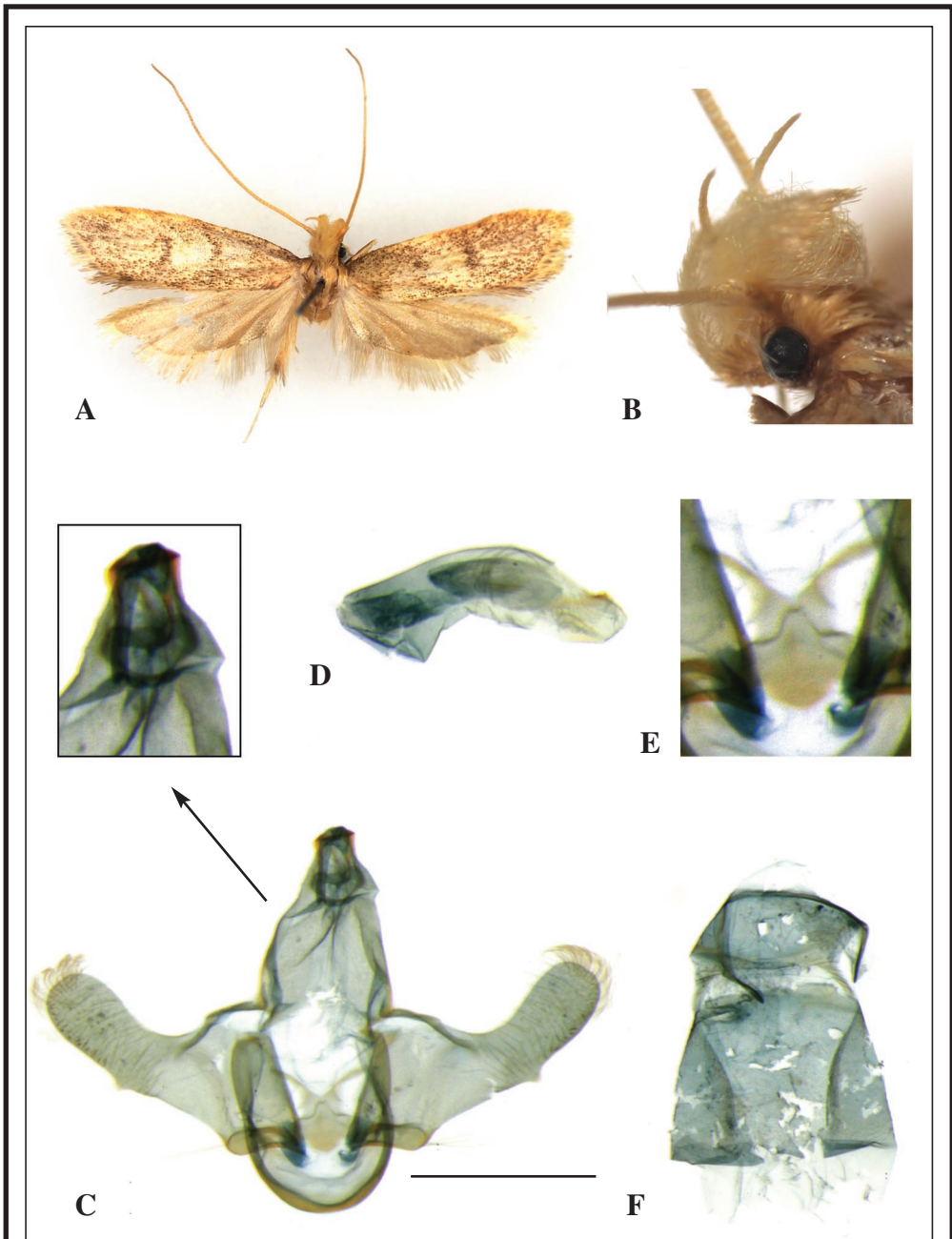


Figure 2.– *Corymbus deprinsi* Park & Aarvik, sp. n.; **A.** Adult, holotype; **B.** Labial palpus, lateral view; **C.** Male genitalia, paratype, gen. slide no. CIS-7133/Park; **D.** Ditto, aedeagus; **E.** Close up juxta; **F.** Abdominal segment VII-VIII. Scale bar: 0.5 mm.

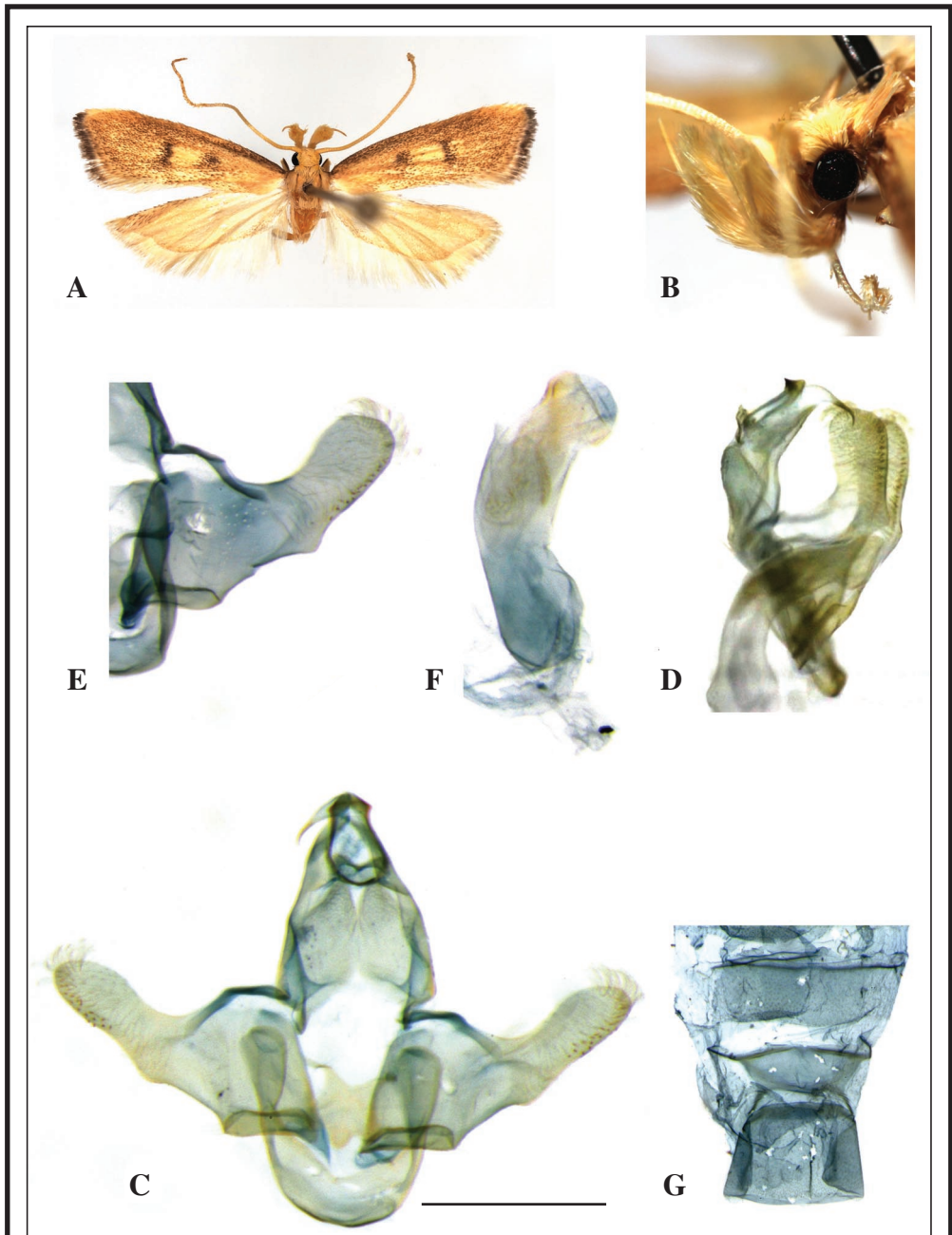
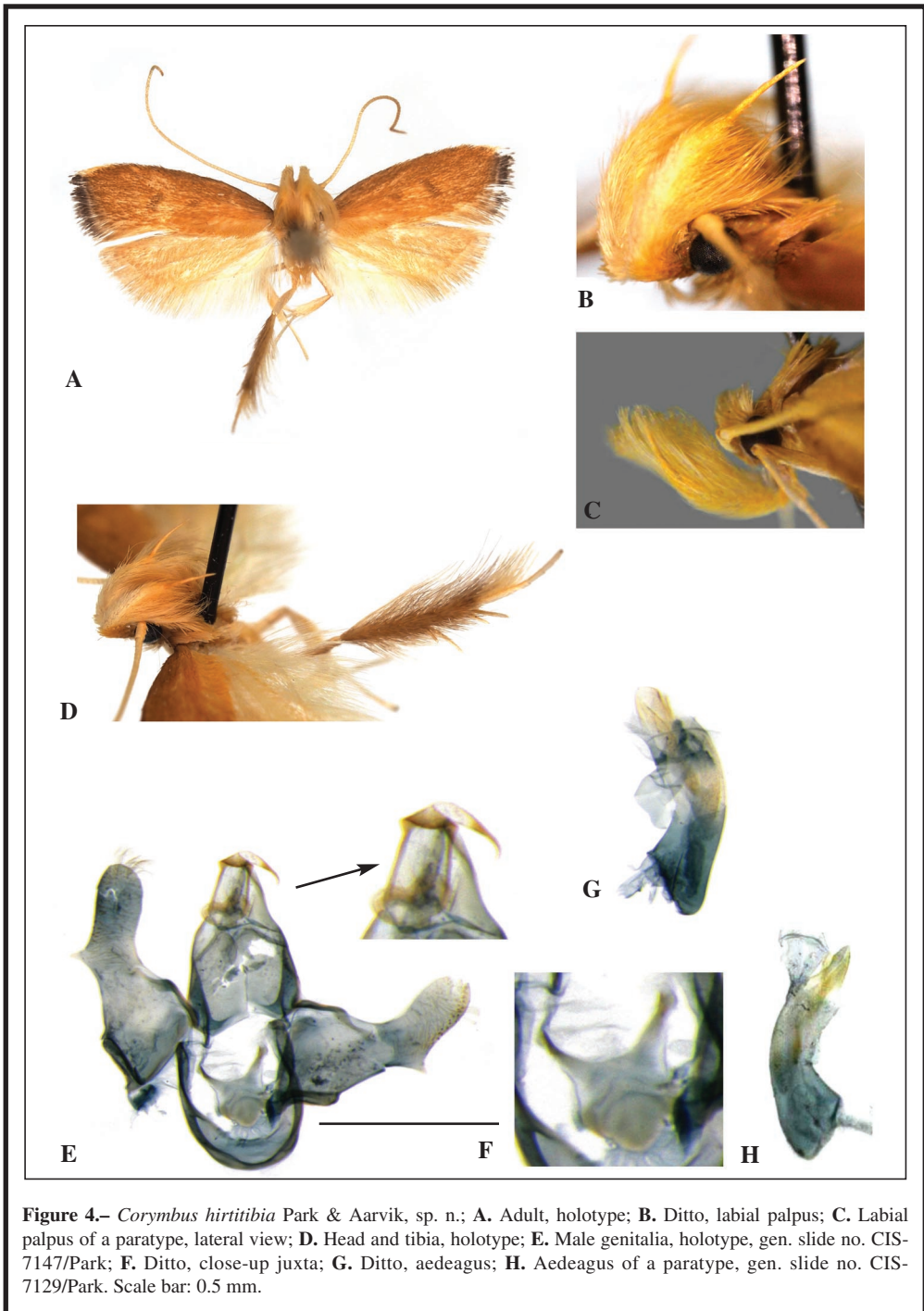


Figure 3.– *Corymbus malmoius* Park & Aarvik, sp. n.; **A.** Adult, holotype; **B.** Labial palpus, lateral view, holotype; **C.** Male genitalia, paratype, gen. slide no. CIS-7171/Park; **D.** Ditto, lateral view; **E.** Right valve of paratype, gen. slide no. CIS-7146; **F.** Ditto, aedeagus; **G.** Abdominal segment V-VIII. Scale bar: 0.5 mm.



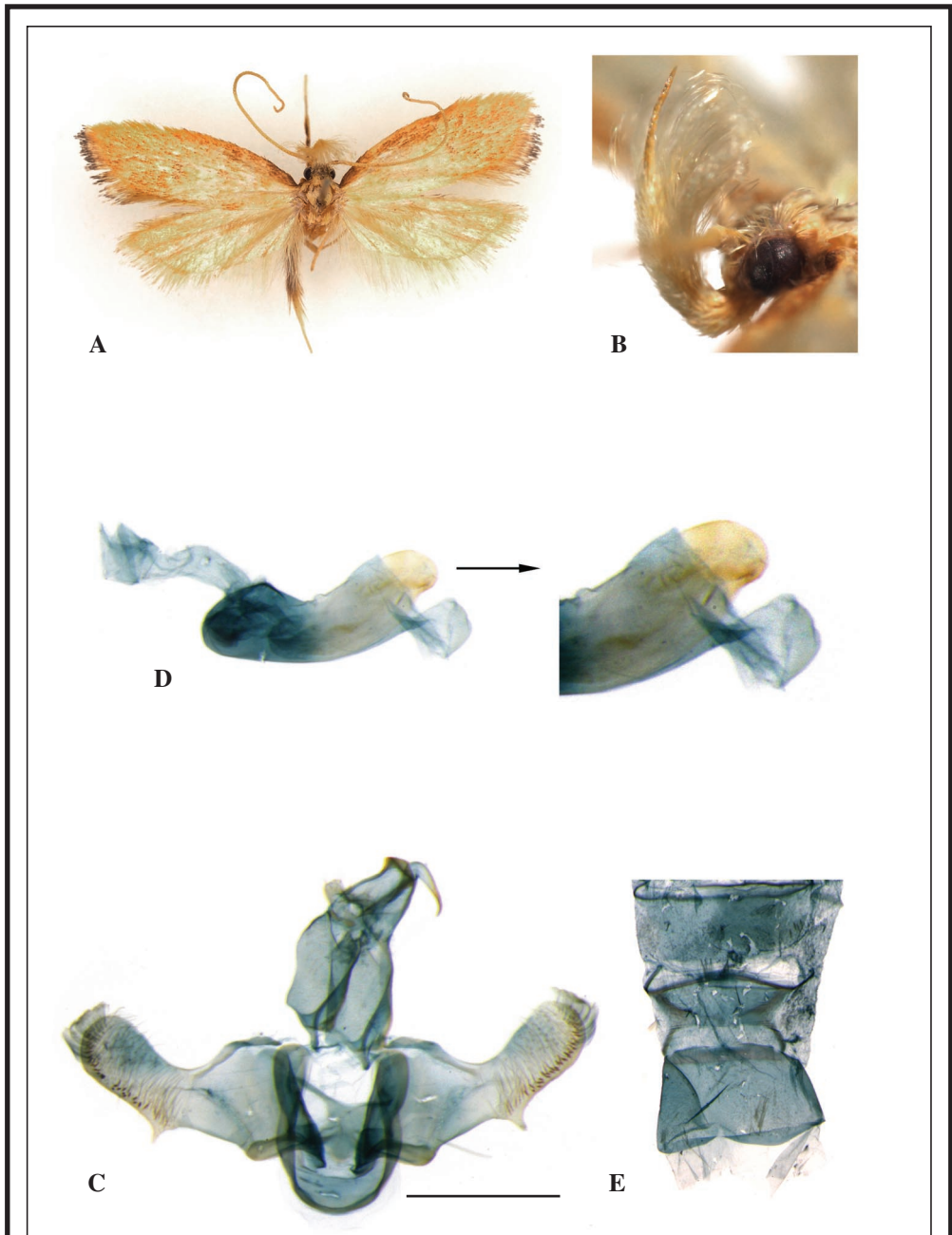


Figure 5.– *Corymbus kenyaensis* Park & Aarvik, sp. n.; **A.** Adult, holotype; **B.** Ditto, labial palpus and head, lateral view; **C.** Male genitalia, holotype, gen. slide no. CIS-7259/Park; **D.** Ditto, aedeagus; **E.** Abdominal segment VI-VIII. Scale bar: 0.5 mm.

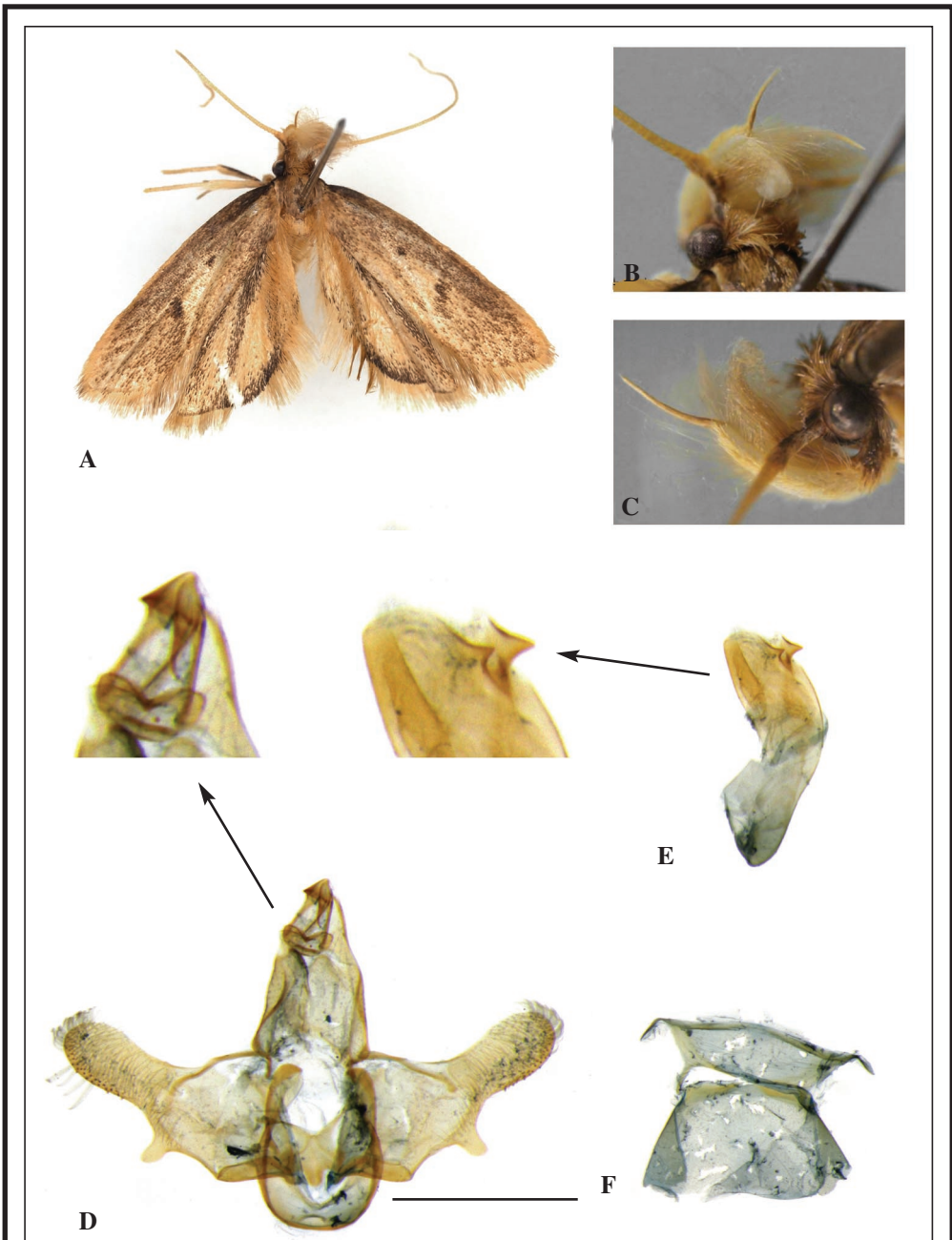


Figure 6.– *Corymbus hallicis* Park & Aarvik, sp. n.; **A.** Adult, holotype; **B.** Head, dorsal view; **C.** Labial palpus, lateral view; **D.** Male genitalia, holotype, gen. slide no. CIS-7130/Park; **E.** Ditto, aedeagus; **F.** Abdominal segment VII-VIII. Scale bar: 0.5 mm.

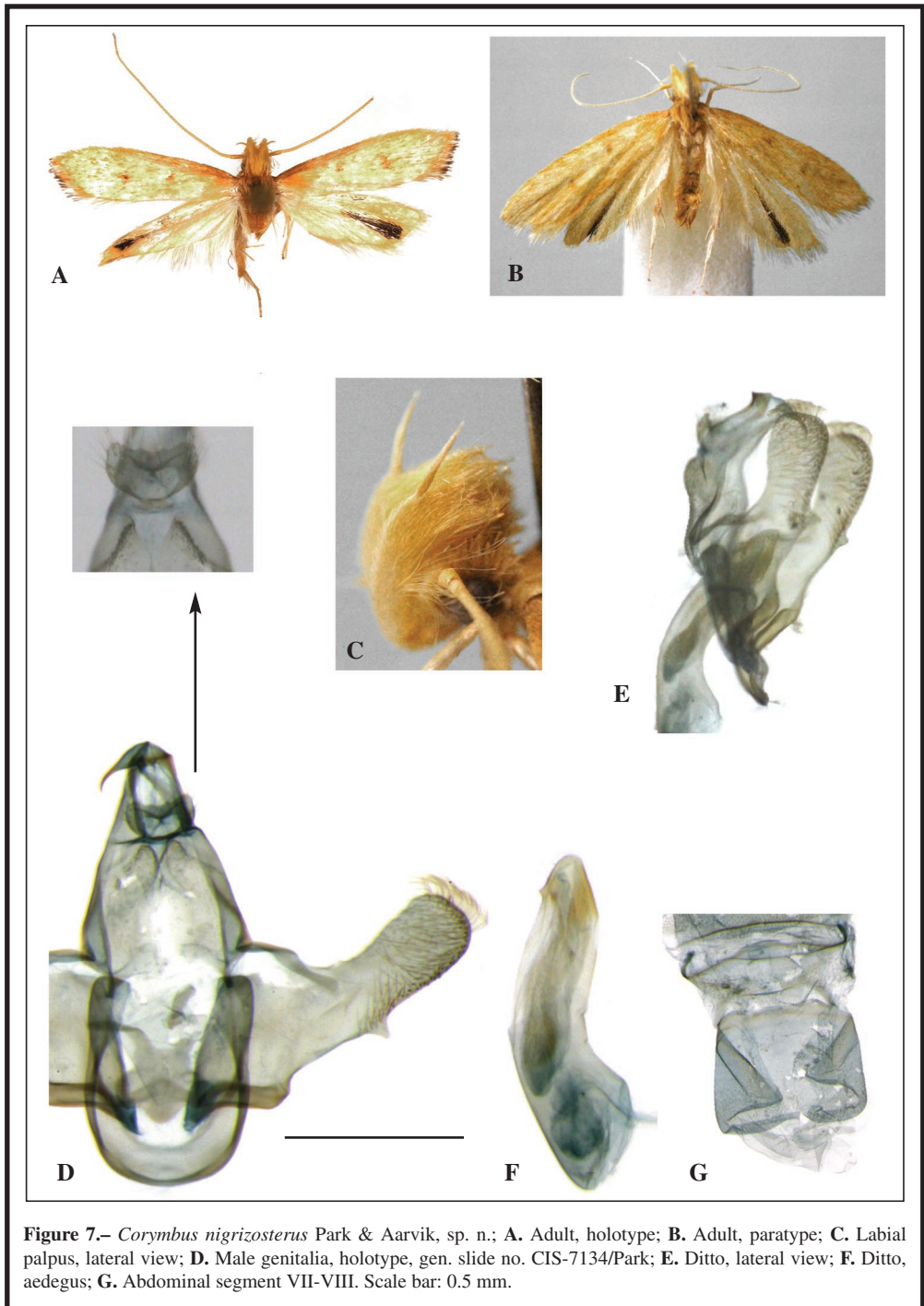


Figure 7.– *Corymbus nigrizosterus* Park & Aarvik, sp. n.; **A.** Adult, holotype; **B.** Adult, paratype; **C.** Labial palpus, lateral view; **D.** Male genitalia, holotype, gen. slide no. CIS-7134/Park; **E.** Ditto, lateral view; **F.** Ditto, aedeagus; **G.** Abdominal segment VII-VIII. Scale bar: 0.5 mm.

Habitat preference of Geometridae species in Western Black Sea region of Turkey (Lepidoptera: Geometridae)

M. Özdemir

Abstract

In this study, 3399 specimens belonging to 188 species of the Geometridae (Lepidoptera) family were examined. Species composition and abundance rates of Geometridae communities were analyzed with respect to the plant formations of the region as deciduous forests, dry coniferous-oak forests, humid coniferous forests, pseudomaquis and farmlands. The results also indicates that 26 species in deciduous forests, 23 species in coniferous-oak forests, 20 species in humid coniferous forests, 20 in pseudomaquis and 20 species in farmlands have high abundance rate. The highest rates of abundance in deciduous forests and dry coniferous-oak forests belong to *Cyclophora linearia* (Hübner, [1799]) with 14,7% and *Peribatodes rhomboidaria* ([Denis & Schiffermüller], 1775) 13,1%, respectively. Also, the highest rates of abundance in humid coniferous forests and pseudomaquis belong to *Scotopteryx moeniata* (Scopoli, 1763) with 23,46% and *Cyclophora pupillaria* (Hübner, [1799]) with 19,83%. Species richness is much higher in deciduous forests than it is in other habitats. Faunal similarities between the Geometridae communities are reported below 50% among all habitats. The highest faunal similarity was found to be between dry coniferous-oak forests followed by the second highest similarity between pseudomaquis and deciduous forests.

KEY WORDS: Lepidoptera, Geometridae, habitat, similarity, Black Sea, Turkey.

Preferencia de hábitat de las especies de Geometridae en la región occidental del Mar Negro de Turquía (Lepidoptera: Geometridae)

Resumen

En este estudio, fueron revisados 3.399 ejemplares que pertenecían a 188 especies de la familia de Geometridae (Lepidoptera). Fueron analizadas y evaluadas la composición de los Geometridae con respecto a las formaciones de plantas de la región como bosques de hojas caducas, bosques conífero-robles secos, bosques coníferos húmedos, bosques de hoja perenne y arbustos de hoja caduca y tierras de cultivo. Los resultados también indican, que las 26 especies en bosques de hojas caducas, 23 especies en bosques conífero-roble, las 20 especies en bosques coníferos húmedos, 20 en bosques de hoja perenne y arbustos de hoja caduca y las 20 especies en tierras de cultivo, tienen ratio de abundancia. Los ratios más altos de la alta abundancia en bosques de hojas caducas y los bosques conífero-roble secos, pertenecen a *Cyclophora linearia* (Hübner, [1799]) con 14,7 % y *Peribatodes rhomboidaria* ([D. & Schiff.], 1775) 13,1 %, respectivamente. También, los ratios más altos de la abundancia en bosques coníferos húmedos y bosques de hoja perenne y arbustos de hoja caduca, pertenecen a *Scotopteryx moeniata* (Scopoli 1763) con 23,46 % y *Cyclophora pupillaria* (Hübner, [1799]) con 19,83 %. La abundancia de las especies es mucho más alta en los bosques de hojas caducas que en otros hábitats. Las semejanzas de Fauna entre las comunidades de Geometridae están por debajo del 50 % entre todos hábitats. La similitud de fauna más alta se ha encontrado en los bosques conífero-roble secos, seguida por la segunda similitud más alta entre los bosques de hoja perenne y arbustos de hoja caduca y los bosques de hojas caducas.

PALABRAS CLAVE: Lepidoptera, Geometridae, hábitat, semejanza, Mar Negro, Turquía.

Introduction

The Geometridae is the most species-rich family of Lepidoptera apart from Noctuidae and Pyralidae. There are over 23000 described species known in worldwide (SCOBLE & HAUSMANN, 2007), 900 in Europe (HAUSMANN, 2001) and 608 in Turkey (KOÇAK & KEMAL, 2009). Geometridae is a valuable Lepidoptera family as an indicator group to monitor environmental changes due to its characteristics such as richness in species number, ability to adapt to different habitats, and sensitivity to environmental or human-driven changes in the ecosystem (HAUSMANN, 2001; BREHM, 2002). More importantly, a decrease in the diversity of Geometridae species in an ecosystem is attributed to the environmental changes driven by human factors (BECK *et al.*, 2002).

The study area is located in the western part of the Black Sea of Turkey has a more rugged terrain. In the north, parallel to the sea, the western Black Sea Mountains lie. The Küre Mountains extending parallel to the coast and the Ilgaz Mountains in the south determine the topographic structure of the region. Bartın and Kastamonu provinces in the study area extend along the Black Sea coast. Karabük, another province, is located inside and neighbor to others. All Provinces are located within the borders of the Euro-Siberian region biogeographically. Depending on the climatic changes Oceanic, sub-Mediterranean and Mediterranean, different types of vegetation become dominant from the north to the south of the area. Oceanic climate, which is characterized in low altitudes by humid deciduous forests dominated by *Fagus* and in high altitudes by humid coniferous forests dominated by *Abies* and *Pinus*. Additionally, pseudomaqui regions are discontinuously encountered along the coast of Black Sea. The less oceanic Southern side of the mountains are dominated by relatively dryer forests dominated by *Pinus* and *Quercus* and by meadows in clearings (AKMAN, 1990, 1993; DEMİRÖRS & KURT, 2005; AYDINÖZÜ, 2008). The study area, as a whole, encompasses Küre Mountains and Yenice Mountains, which were recognized as forest hot spots by World Wild Fund (WWF) in 1999.

Studies of Geometridae diversity in the western Black Sea Region has been limited. KOÇAK & KEMAL (2009) have reported only ten species from the locations that the present study investigates. Subsequently, AKBULUT *et al.* (2003), CAN (2008), TOPER KAYGIN *et al.* (2009), OKYAR (2012) and AKKUZU *et al.* (2015) have added some new species to the list on top of KOÇAK & KEMAL (2009). SEVEN & ÖZDEMİR (2007) investigated relation between some Butterflies and plant association in eastern part of Black Sea Region of Turkey. OKYAR *et al.* (2009) have evaluated Heterocera species' stability in different habitats in the Western Black Sea region using Shannon-Wiener diversity index. Moreover, SEVEN (2017) has examined habitat preferences of diurnal Lepidoptera species around the Salt Lake in Central Anatolia region using Jaccard Similarity analysis.

This study examines diversity and habitat preferences of Geometridae species in the Western Black Sea Region. Farmlands and natural habitats were compared. In this study, for the first time, analyzes faunal similarities and species transition of Geometridae family across different habitats in this region.

Material and methods

This study was conducted in Bartın, Karabük and Kastamonu provinces in the Western Black Sea region of Turkey. The fieldwork was carried out from May to September between 2008-2012. The samples were collected during periods of no moonlight by means of 8W "black light" fluorescent lamp in farmlands and four other selected areas each displaying separate plant formations. Through the fieldwork, samplings were conducted in five different habitat types four times each month between May and September. A total of 20 samplings for each of the five habitats resulted in 100 samplings in total (Fig. 1). Habitats were characterized based on GÜNAL (2013) and ATALAY (1994). Additionally, HAUSMANN (2001, 2004), MIRONOV (2003), VIIDALEPP (2007), HAUSMANN & VIIDALEPP (2012) and SKOU & SIHVONEN (2015) were consulted during the identification of Geometridae species.

Species whose specimen rate is equal to or greater than 1% were considered to have high abundance rates (DAPKUS, 2004). The species composition of communities were compared using the

Bray-Curtis similarity index. Biodiversity Pro 2 software was used for the calculation of species richness, similarity and for forming the diagrams (MCALEECE, 1997) (Fig. 3).

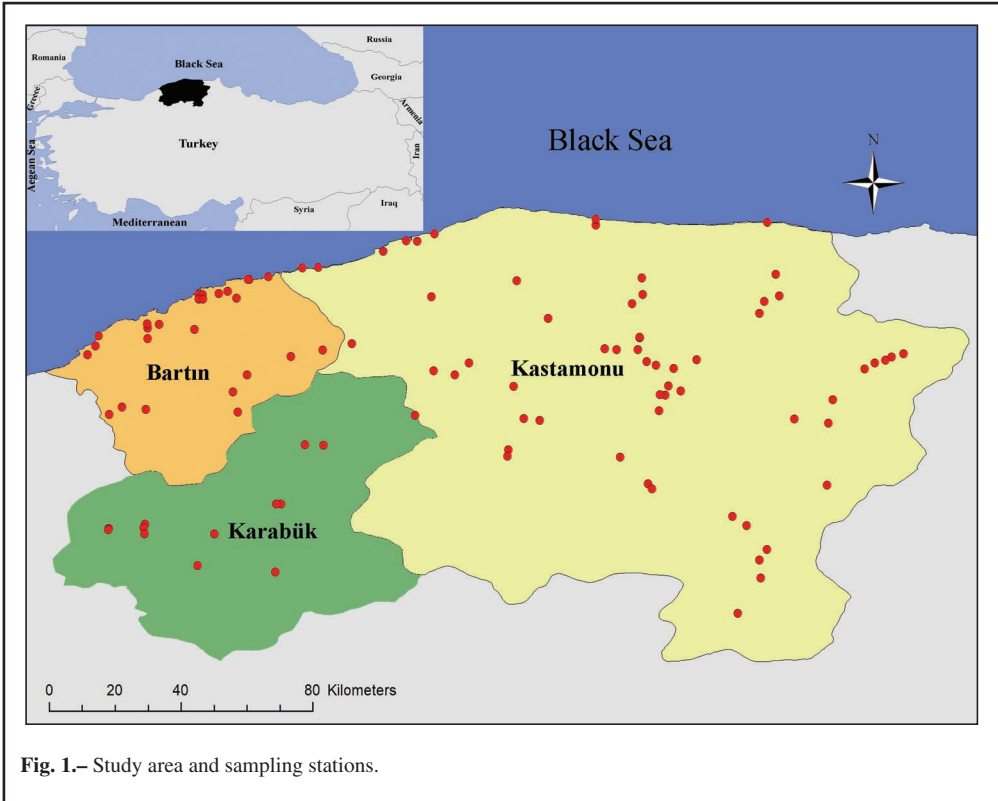


Fig. 1.– Study area and sampling stations.

Description of the study sites

1. Deciduous forest: Hygrophilous forests that cover the Northern side of the Black Sea Mountains. The dominant species along the piedmont is *Fagus orientalis* Lipsky, *Carpinus betulus* L., *C. orientalis* Mill., *Alnus glutinosa* (L.) Gaertn., *Castanea sativa* Mill., *Quercus hartwissiana* Steven., *Q. petraea* (Matt.) Lebl., *Q. robur* L., *Acer* sp., *Tilia* sp., *Fraxinus* sp., *Ulmus* sp., *Corylus avellane* L., *Salix* sp., *Populus tremula* L., are also encountered among the forests. The forest ground is covered with *Rhododendron ponticum* L., *R. luteum* Sweet, *Ilex* sp., *Vaccinium Arctostaphylos* L., *Prunus laurocerasus* L., *Polypodium vulgare* L. and *Hedera helix* L.
2. Dry Coniferous-oak forests: Forests formed by continental climate enforced by precipitation and temperature trends on the Southern side of Black Sea Mountains. The dominant species in these forests are *Pinus Sylvestris* L., *Pinus nigra* J. F. Arnold, *Quercus infectoria* Olivier, *Q. pubescens* Willd. and *Q. cerris* L. There also exist *Juniperus* sp., *Berberis crataegyna* DC, *Paliurus spina-cristi* Mill., *Pyrus elaeagnifolia* Pall., *P. amygdaliformis* Vill., *Prunus microcarpa* C. A. Mey, and *Crataegus orientalis* M. Bied. among the forests.
3. Humid coniferous forests: Forests of coniferous trees that consist of *Pinus nigra* J. F. Arnold, *Abies nordmanniana equi-trojani* (Arsch. & Sint. Ex Boiss.) Coode & Cullen and *Pinus sylvestris* L.
4. Pseudomaquis: Brush formations that extend from the sea level to altitudes of 200-250 m.

Pseudomaquis is also seen in areas of 750 m. altitude due to the effect of Black Sea climate that can penetrate through river valleys. The pseudomaquis formation consists of maquis species such as *Erica arborea* L., *Arbutus unedo* L., *A. andrachne* L., *Pistacia terebinthus* L., *Phillyrea latifolia* L., *Laurus nobilis* L., *Juniperus oxycedrus* L., *Cistus salviifolius* L., *Spartium junceum* L., *Myrtus communis* L., and non-evergreen shrubs such as *Cornus sanguinea* L., *C. mas* L., *Corylus avellane* L., *Mespilus germanica* L., *Crataegus monogyna* Jacq., *Ligustrum vulgare* L. There also exists hygrophilous species indigenous to the Black Sea region such as *Rhododendron ponticum* L., *Daphne pontica* L., *Laurocerasus officinalis* L., *Sorbus torminalis* (L.) Crantz, among the pseudomaquis formation.

5. Farmlands: Agricultural lands for cereal, sugar beet, rice and garlic cultivation along with orchards and vegetable gardens among residential areas.

Results and discussion

In the present study, 188 Geometridae species are identified from the Western Black Sea region. Distribution of species with respect to habitats: 109 species in deciduous forest (1343 specimens), 96 species in dry coniferous-oak forests (442 specimens), 82 species in humid coniferous forests (520 specimens), 90 species in pseudomaquis (802 specimens) and 65 species in farmlands (292 specimens) (Fig. 2). The deciduous forest is found to be the most species-rich site.

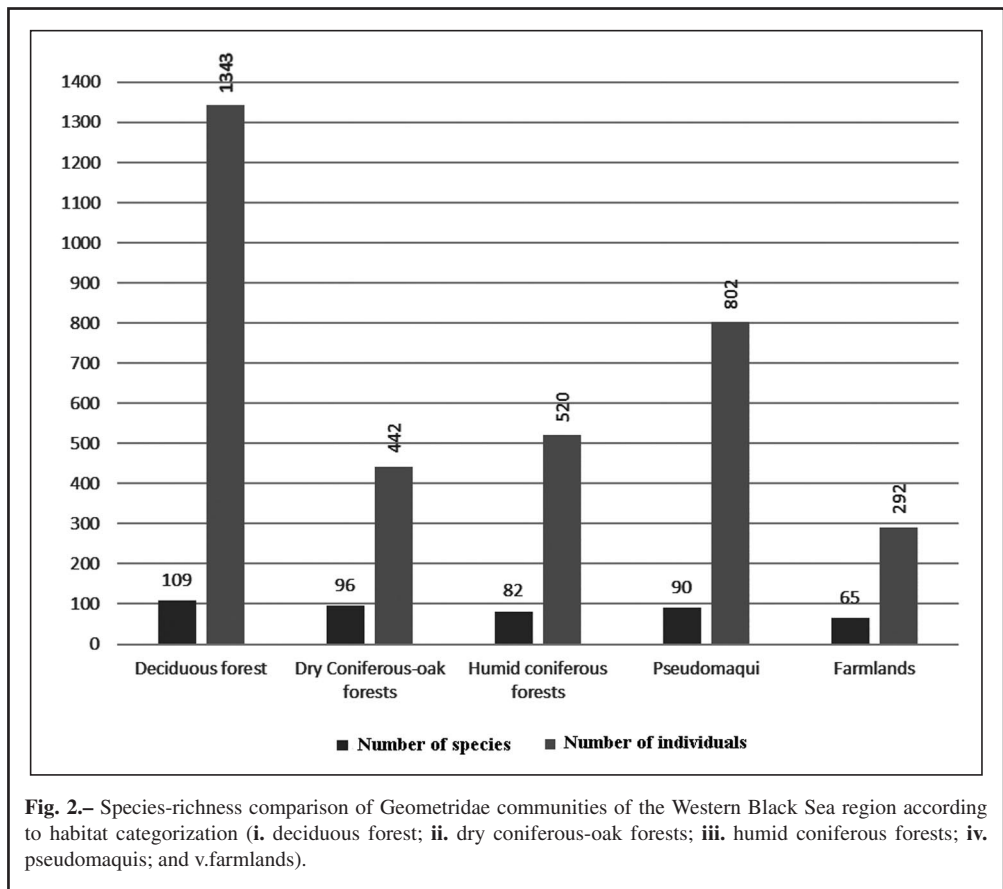


Fig. 2.– Species-richness comparison of Geometridae communities of the Western Black Sea region according to habitat categorization (i. deciduous forest; ii. dry coniferous-oak forests; iii. humid coniferous forests; iv. pseudomaquis; and v. farmlands).

When all specimens collected from the sampling stations are considered, abundance rates of 21 species are found to be equal to or greater than 1% (Table 1). The most dominant species within the study area is *Peribatodes rhomboidaria* (11,06%), which is known as the most widespread species among Lepidoptera communities. Skou (1986) lists forest fringes, brush, field hedges and gardens as the habitat of *Peribatodes rhomboidaria*. It feeds on various trees and bushes and is prevalent in Europe, Central Asia, the Caucasus, Iran, Turkey, and North Africa. Hence, the reason of the species' high abundance rate in the study field dominated by forests is thought to be its eurytopic characteristic.

Another dominant species of the region is *Cyclophora linearia* (6,12%), which displays high abundance rate only in deciduous forest. This species is monophagous on *Fagus sylvatica* L., or oligophagous (2-3), but clearly preferring *Fagus* (Fagaceae) (HAUSMANN, 2004). Thus, the reason of the species' high abundance rate is thought to be the species' feed preference toward *Fagus*, which is widely found in the deciduous forests located in Western Black Sea region.

When all Geometridae communities are considered, abundance rate of 26 species is found to be equal to or greater than 1% in deciduous forests. Only 13 species among them are dominant in this habitat (*Asthena albulata* (4,5%), *Cabera pusaria* (2%), *Campaea margaritata* (4,9%), *Catarhoe rubidata* (1,2%), *Cyclophora annularia* (1,9%), *C. linearia* (14,7%), *Ectropis crepuscularia* (1,1%), *Ennomos quercinaria* (1,9%), *Hydriomena furcata* (3,1%), *Hypomecis roboraria* (1,9%), *Macaria notata* (5,7%), *Plagodis dolabraria* (1,6%) and *Selenia dentaria* (1,8%)).

Subsequently, 24 species are found to be abundant species in the dry coniferous-oak forests (Table 1). Among these species, *P. rhomboidaria* (13,1%), *Scotopteryx luridata* (Hufnagel, 1767) (7,2%), *Rhodostrophia discopunctata* Amsel, 1935 (6,1%), *Idaea rufaria* (Hübner, [1799]) (6,1%) also prefer other habitats while they have high abundance rates only in dry coniferous-oak forests. *Charissa certhiata*, *Eupithecia intricata*, *E. semigraphata* *Scotopteryx coarctaria* are reported to be the species that prefer only dry coniferous-oak habitat. It is known that *C. certhiata* shows prevalence in dry limestone habitats (BESHKOV, 2013). The studied habitat also shows similar characteristics. *E. intricata* generally feeds on *Juniperus* sp. (MIRONOV, 2003), which belongs to the species composition of dry coniferous-oak habitat. MIRONOV (2003) also describes the preferred habitat of *E. semigraphata* as warm and dry, preferably stony slopes, rocks and scree areas, which fits only to the dry coniferous-oak forests studied in the present study. As a xerothermophilous species (HAUSMANN & VIIDALEPP, 2012), *S. coarctaria*, is recorded from an area fitting to the habitat requirements of the species.

When it comes to humid coniferous forests, 20 Geometridae species are reported to display dominance. *Scotopteryx moeniata* is found to be the most abundant species with 23,46% abundance rate respectively and only prefer humid coniferous forests among other studied habitats. These species are xerothermophilous according to HAUSMANN & VIIDALEPP (2012). Based on the results of the present study, however, these two species are thought to have high abundance rates because they have been supported by Fabaceae species grown in areas of low tree density and small clearings in coniferous forests. Due to the fact that *Scotopteryx moeniata* have not been encountered in other habitats, it is inferred that they show high habitat selectivity in favor of coniferous forests. Moreover, *Eupithecia tantillaria* and *Pungeleria capreolaria* are found to be other selective and dominant species that prefers only coniferous forests. *E. tantillaria* is an oligophagous species that feeds on *Abies* and *Pinus* during larval stage (MIRONOV, 2003). *P. capreolaria*, on the other hand, is a sylvicolours species. This species occurs in coniferous and mixed forest with conifers as well as in more open woodland with conifers (SKOU & SIHVONEN, 2015). The results of the present study are, thus, consistent with previous insights about the specified species.

Furthermore, a total of 20 species display abundance rates greater than 1% in pseudomaquis

areas. Among these, *C. pupillaria* (Hübner, [1799]) is the most widespread species that lives in the Mediterranean maquis and in sparse oak forests (*Quercus pubescens*, *Q. ilex*). It could be seen from 0 m. up to 1000 m. above the sea level in southern Europe, and up to 1500 m. in Turkey (HAUSMANN, 2004). The reason why *C. pupillaria* reaches an abundance rate of 5,59% is its high abundance rate (19,83%) observed in pseudomaquis areas. This concludes that Geometridae species that generally exist in maquis could also prefer pseudomaquis areas located in the coastal part of the Black Sea. Lastly, *Gnophos sartatus* (1,12%) and *Phaiogramma etruscaria* (1,12%) are found to be the dominant species that only prefer pseudomaquis habitat.

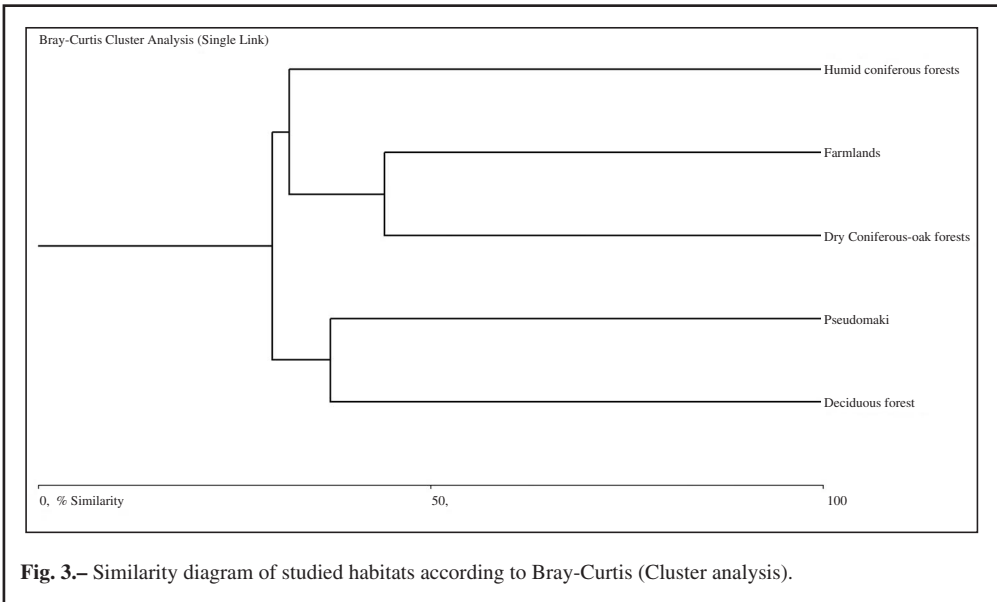
Next, farmlands are dominated by 25 Geometridae species in which *Peribatodes rhomboidaria* (15,41%) and *Idaea rufaria* (15,07%) display the highest dominance rates. As mentioned before, *P. rhomboidaria* is reported to have high specimen numbers in all habitats sampled in this study. Moreover, *I. rufaria* is a xerothermophilous species of open habitats, often on dry, low-nutrient grassland, sun-exposed slopes, preferring sandy soils and limestone (HUSMANN, 2004). While forests cover most of the study area, open areas provided by farmlands may cause *I. rufaria* population to increase.

Overall, deciduous forest is the preferred habitat for most of the species (109 species) examined for this study while, at the same time, many of them having high abundance rates. This indicates that any loss of deciduous forest caused by climate change or anthropogenic factors will most probably affect species' richness and composition in the region. In turn, the conservation efforts become extremely important in the Western Black Sea region that encompasses two of the Turkey's nine forest hot spots recognized by WWF.

Subsequently, similarity of Geometridae communities among habitats is below 50% (Table 2). The highest similarity rate is observed between farmlands and dry coniferous-oak forests (44,14%). This is because farmlands, for most of the time, are located discontinuously within dry coniferous forests. The second highest similarity rate is reported between deciduous forests and pseudomaquis areas (37,20%.) followed by the third highest between dry coniferous-oak forests and humid coniferous forests (32,02%). Finally, the lowest similarity rate prevails between deciduous forests and farmlands (14,92%). Figure 2 shows that the region could be segregated into two sub-regions with respect to habitats that dominate them: 1. Sub-region dominated by deciduous forest and pseudomaquis; 2. Sub region dominated by dry coniferous-oak forests, humid coniferous forests and farmlands whereas humid coniferous forests display characteristics different than the other two habitats. The reason of humid coniferous forests being in the second sub-region is because dry coniferous-oak forests of pine forest type. While the Northern side of the mountains are dominated by pseudomaquis, deciduous forests and humid coniferous forests starting from the sea level, the Southern side of mountains are dominated by dry coniferous-oak forests in the Western Black Sea region. Clearings of dry coniferous-oak forests are also suitable for steppe development. This study shows that species composition of Geometridae communities in the Western Black Sea region is shaped by plant formations found in humid areas on the Northern side of mountains where Oceanic climate is in effect.

Table 2.– Similarity rates between habitats of Geometridae communities of Western Black Sea region based on Bray-Curtis Similarity Index.

	Deciduous forest	Dry Coniferous-oak forests	Humid coniferous forests	Pseudomaquis	Farmlands
Deciduous forest	*	23,19	19,86	37,20	14,92
Dry Coniferous-oak forests	*	*	32,02	29,90	44,14
Humid coniferous forests	*	*	*	14,98	22,41
Pseudomaquis	*	*	*	*	23,03
Farmlands	*	*	*	*	*



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Table 1.– Distribution ratios of Geometridae species identified from the Western Black Sea region according to habitat categorization.

Species	Deciduous forest	Dry Coniferous-oak forests	Humid coniferous forests	Pseudomaqui	Farmlands	Total
	No. İnd. (%)	No. İnd. (%)	No. İnd. (%)	No. İnd. (%)	No. İnd. (%)	No. İnd. (%)
<i>Abraxas sylvata</i> (Scopoli, 1763)	0 (0)	0 (0)	1 (0,19)	0 (0)	0 (0)	1 (0,03)
<i>Alcis repandatus</i> (Linnaeus, 1758)	33 (2,5)	2 (0,5)	34 (6,54)	0 (0)	0 (0)	69 (2,03)
<i>Apeira syringaria</i> (Linnaeus, 1758)	4 (0,3)	0 (0)	0 (0)	1 (0,12)	0 (0)	5 (0,15)
<i>Aplasta ononaria</i> (Fuessé, 1783)	2 (0,1)	0 (0)	0 (0)	1 (0,12)	0 (0)	3 (0,09)
<i>Aplocera efformata</i> (Guenée, [1858])	1 (0,1)	0 (0)	1 (0,19)	8 (1)	10 (3,42)	20 (0,59)
<i>Aplocera fraudulentata</i> (Herrich-Schäffer, 1861)	0 (0)	0 (0)	1 (0,19)	0 (0)	0 (0)	1 (0,03)
<i>Aplocera plagiata</i> (Linnaeus, 1758)	0 (0)	3 (0,7)	1 (0,19)	0 (0)	3 (1,03)	7 (0,21)
<i>Aplocera uniformata</i> (Urbahn, 1971)	0 (0)	0 (0)	20 (3,85)	0 (0)	1 (0,34)	21 (0,62)
<i>Ascotis selenaria</i> (D. & Schiff., 1775)	10 (0,7)	2 (0,5)	1 (0,19)	33 (4,11)	0 (0)	46 (1,35)
<i>Asovia maeticaria</i> (Alpheraky, 1876)	25 (1,9)	1 (0,2)	1 (0,19)	0 (0)	6 (2,05)	33 (0,97)
<i>Aspitates ochrearia</i> (Rossi, 1794)	0 (0)	0 (0)	0 (0)	1 (0,12)	3 (1,03)	4 (0,12)
<i>Asthena albulata</i> (Hufnagel, 1767)	60 (4,5)	0 (0)	3 (0,58)	6 (0,75)	0 (0)	69 (2,03)
<i>Biston betularius</i> (Linnaeus, 1758)	3 (0,2)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0,09)
<i>Cabera exanthemata</i> (Scopoli, 1763)	7 (0,5)	0 (0)	0 (0)	0 (0)	0 (0)	7 (0,21)
<i>Cabera pusaria</i> (Linnaeus, 1758)	27 (2)	1 (0,2)	1 (0,19)	2 (0,25)	0 (0)	31 (0,91)
<i>Campaea margaritata</i> (Linnaeus, 1761)	66 (4,9)	1 (0,2)	1 (0,19)	2 (0,25)	0 (0)	70 (2,06)
<i>Campptogramma bilineata</i> (Linnaeus, 1758)	1 (0,1)	3 (0,7)	3 (0,58)	2 (0,25)	1 (0,34)	10 (0,29)
<i>Cataclysmes rigata</i> (Hübner, [1813])	0 (0)	13 (2,9)	0 (0)	0 (0)	5 (1,71)	18 (0,53)
<i>Catarhoe cuculata</i> (Hufnagel, 1767)	7 (0,5)	1 (0,2)	0 (0)	0 (0)	0 (0)	8 (0,24)
<i>Catarhoe rubidata</i> (D. & Schiff., 1775)	16 (1,2)	0 (0)	2 (0,38)	3 (0,37)	0 (0)	21 (0,62)
<i>Charissa certhiata</i> (Rebel & Zerny, 1931)	0 (0)	8 (1,8)	0 (0)	0 (0)	0 (0)	8 (0,24)
<i>Charissa mutilata</i> (Staudinger, 1879)	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Charissa obscurata</i> (D. & Schiff., 1775)	3 (0,2)	3 (0,7)	11 (2,12)	0 (0)	20 (6,85)	37 (1,09)
<i>Charissa zeitunaria</i> (Staudinger, 1901)	0 (0)	0 (0)	0 (0)	0 (0)	18 (6,16)	18 (0,53)
<i>Chiasmia clathrata</i> (Linnaeus, 1758)	3 (0,2)	2 (0,5)	10 (1,92)	0 (0)	5 (1,71)	20 (0,59)
<i>Chlorissa cloraria</i> (Hübner, [1813])	3 (0,2)	0 (0)	0 (0)	3 (0,37)	1 (0,34)	7 (0,21)
<i>Chlorissa viridata</i> (Linnaeus, 1758)	5 (0,4)	0 (0)	0 (0)	3 (0,37)	0 (0)	8 (0,24)
<i>Chloroclysta siterata</i> (Hufnagel, 1767)	0 (0)	2 (0,5)	0 (0)	0 (0)	0 (0)	2 (0,06)
<i>Chloroclystis v-ata</i> (Haworth, 1809)	16 (1,2)	0 (0)	0 (0)	9 (1,12)	0 (0)	25 (0,74)
<i>Cidaria fulvata</i> (Forster, 1771)	1 (0,1)	6 (1,4)	9 (1,73)	0 (0)	0 (0)	16 (0,47)
<i>Cleora cinctaria</i> (D. & Schiff., 1775)	0 (0)	0 (0)	1 (0,19)	0 (0)	0 (0)	1 (0,03)
<i>Cleorodes lichenarius</i> (Hufnagel, 1767)	11 (0,8)	7 (1,6)	1 (0,19)	0 (0)	2 (0,68)	21 (0,62)
<i>Cleta filacearia</i> (Herrich-Schäffer, 1847)	0 (0)	0 (0)	2 (0,38)	0 (0)	0 (0)	2 (0,06)
<i>Coenotephria ablutaria hangavi</i> (Vojnits, 1986)	0 (0)	0 (0)	1 (0,19)	8 (1)	1 (0,34)	10 (0,29)
<i>Colostygia fezae</i> Hausmann, 2011	0 (0)	0 (0)	2 (0,38)	0 (0)	0 (0)	2 (0,06)
<i>Colostygia pectinataria</i> (Knoch, 1781)	0 (0)	0 (0)	3 (0,58)	0 (0)	1 (0,34)	4 (0,12)
<i>Cosmorhoe ocellata</i> (Linnaeus, 1758)	34 (2,5)	9 (2)	12 (2,31)	7 (0,87)	2 (0,68)	64 (1,88)
<i>Costaconvexa polygrammata</i> (Borkhausen, 1794)	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Crocallis elinguarina</i> (Linnaeus, 1758)	2 (0,1)	1 (0,2)	3 (0,58)	2 (0,25)	0 (0)	8 (0,24)
<i>Cyclophora albicellaria</i> (Hübner, 1789)	4 (0,3)	1 (0,2)	0 (0)	1 (0,12)	0 (0)	6 (0,18)
<i>Cyclophora annularia</i> (Fabricius, 1775)	25 (1,9)	0 (0)	0 (0)	3 (0,37)	0 (0)	28 (0,82)
<i>Cyclophora linearia</i> (Hübner, [1799])	198 (14,7)	1 (0,2)	2 (0,38)	5 (0,62)	2 (0,68)	208 (6,12)
<i>Cyclophora porata</i> (Linnaeus, 1767)	0 (0)	0 (0)	1 (0,19)	0 (0)	0 (0)	1 (0,03)

<i>Cyclophora punctaria fritzae</i> Hausmann, 2003	14 (1)	1 (0,2)	0 (0)	3 (0,37)	0 (0)	18 (0,53)
<i>Cyclophora puppillaria</i> (Hübner, [1799])	24 (1,8)	5 (1,1)	1 (0,19)	159 (19,83)	1 (0,34)	190 (5,59)
<i>Cyclophora quercimontaria</i> (Bastelberger, 1897)	10 (0,7)	1 (0,2)	4 (0,77)	11 (1,37)	0 (0)	26 (0,76)
<i>Cyclophora suppunctaria</i> (Zeller, 1847)	0 (0)	1 (0,2)	0 (0)	0 (0)	2 (0,68)	3 (0,09)
<i>Dyscia conspersaria</i> (D. & Schiff.), 1775)	0 (0)	4 (0,9)	0 (0)	0 (0)	0 (0)	4 (0,12)
<i>Dyscia innocentaria</i> (Christoph, 1885)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,34)	1 (0,03)
<i>Dysstroma truncata</i> (Hufnagel, 1767)	1 (0,1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Ecliptopera silaceata</i> (D. & Schiff.), 1775)	4 (0,3)	0 (0)	2 (0,38)	0 (0)	0 (0)	6 (0,18)
<i>Ectropis crepuscularia</i> (D. & Schiff.), 1775)	15 (1,1)	2 (0,5)	0 (0)	0 (0)	0 (0)	17 (0,5)
<i>Ematurga atomaria</i> (Linnaeus, 1758)	1 (0,1)	0 (0)	0 (0)	12 (1,5)	0 (0)	13 (0,38)
<i>Ennomos erosarius</i> (Hübner, 1790)	1 (0,1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Ennomos fuscantaria</i> (Haworth, 1809)	1 (0,1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Ennomos quercaria</i> (Hübner, [1813])	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Ennomos quercinaria</i> (Hufnagel, 1767)	26 (1,9)	1 (0,2)	0 (0)	0 (0)	0 (0)	27 (0,79)
<i>Epione repandaria</i> (Hufnagel, 1767)	3 (0,2)	0 (0)	1 (0,19)	0 (0)	0 (0)	4 (0,12)
<i>Epione vespertaria</i> (Linnaeus, 1767)	1 (0,1)	0 (0)	4 (0,77)	0 (0)	0 (0)	5 (0,15)
<i>Epirrhoe alternata</i> (Müller, 1764)	0 (0)	1 (0,2)	0 (0)	0 (0)	1 (0,34)	2 (0,06)
<i>Epirrhoe galiata</i> (D. & Schiff.), 1775)	18 (1,3)	12 (2,7)	4 (0,77)	17 (2,12)	2 (0,68)	53 (1,56)
<i>Epirrhoe molluginata</i> (Hübner, [1813])	0 (0)	0 (0)	3 (0,58)	0 (0)	0 (0)	3 (0,09)
<i>Eucrostes indigenata</i> (Villers, 1789)	0 (0)	0 (0)	0 (0)	2 (0,25)	0 (0)	2 (0,06)
<i>Eumannia oppositaria</i> (Mann, 1864)	0 (0)	3 (0,7)	0 (0)	5 (0,62)	2 (0,68)	10 (0,29)
<i>Euphyia biangulata</i> (Haworth, [1809])	6 (0,4)	2 (0,5)	0 (0)	0 (0)	0 (0)	8 (0,24)
<i>Euphyia frustata</i> (Treitschke, 1828)	0 (0)	2 (0,5)	0 (0)	0 (0)	0 (0)	2 (0,06)
<i>Eupithecia alliardia</i> Staudinger, 1870	1 (0,1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Eupithecia breviculata</i> (Donzel, 1837)	5 (0,4)	3 (0,7)	0 (0)	2 (0,25)	0 (0)	10 (0,29)
<i>Eupithecia centaureata</i> (D. & Schiff.), 1775)	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Eupithecia denotata</i> (Hübner, [1813])	2 (0,1)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0,06)
<i>Eupithecia denticulata</i> (Treitschke, 1828)	0 (0)	8 (1,8)	0 (0)	1 (0,12)	0 (0)	9 (0,26)
<i>Eupithecia ericeata</i> (Rambur, 1833)	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Eupithecia haworthiata</i> Doubleday, 1856	2 (0,1)	0 (0)	0 (0)	3 (0,37)	0 (0)	5 (0,15)
<i>Eupithecia intricata</i> Zetterstedt, [1839]	0 (0)	8 (1,8)	0 (0)	0 (0)	0 (0)	8 (0,24)
<i>Eupithecia limbata</i> Staudinger, 1879	0 (0)	2 (0,5)	0 (0)	0 (0)	0 (0)	2 (0,06)
<i>Eupithecia marginata</i> Staudinger, 1892	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,34)	1 (0,03)
<i>Eupithecia orphnata</i> Petersen, 1909	0 (0)	0 (0)	1 (0,19)	0 (0)	0 (0)	1 (0,03)
<i>Eupithecia oxycedrata</i> (Rambur, 1833)	0 (0)	2 (0,5)	0 (0)	0 (0)	0 (0)	2 (0,06)
<i>Eupithecia pimpinellata</i> (Hübner, [1813])	0 (0)	5 (1,1)	5 (0,96)	0 (0)	0 (0)	10 (0,29)
<i>Eupithecia pulchellata</i> Stephens, 1831	3 (0,2)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0,09)
<i>Eupithecia pusillata</i> (Fabricius, 1787)	0 (0)	0 (0)	1 (0,19)	1 (0,12)	0 (0)	2 (0,06)
<i>Eupithecia pyreneata</i> Mabille, 1871	5 (0,4)	0 (0)	0 (0)	0 (0)	0 (0)	5 (0,15)
<i>Eupithecia selinata</i> Herrich-Schäffer, 1861	1 (0,1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Eupithecia semigraphata</i> Braund, [1847]	0 (0)	8 (1,8)	0 (0)	0 (0)	0 (0)	8 (0,24)
<i>Eupithecia</i> sp.	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Eupithecia subfuscata</i> (Haworth, [1809])	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,34)	1 (0,03)
<i>Eupithecia succenturiata</i> (Linnaeus, 1758)	3 (0,2)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0,09)
<i>Eupithecia tantillaria</i> Boisduval, 1840	0 (0)	0 (0)	19 (3,65)	0 (0)	0 (0)	19 (0,56)
<i>Eupithecia vulgata</i> (Haworth, [1809])	0 (0)	0 (0)	1 (0,19)	0 (0)	0 (0)	1 (0,03)
<i>Gnophos sartatus</i> (Treitschke, 1827)	0 (0)	0 (0)	0 (0)	9 (1,12)	0 (0)	9 (0,26)
<i>Gymnoscelis rufifasciata</i> (Haworth, [1809])	5 (0,4)	1 (0,2)	1 (0,19)	9 (1,12)	3 (1,03)	19 (0,56)
<i>Heliomata glarearia</i> (Brahm, 1791)	0 (0)	17 (3,8)	0 (0)	0 (0)	15 (5,14)	32 (0,94)

<i>Hemistola chrysoprasaria</i> (Esper, [1794])	1 (0,1)	2 (0,5)	1 (0,19)	1 (0,12)	0 (0)	5 (0,15)
<i>Hemithea aestivaria</i> (Hübner, 1789)	4 (0,3)	0 (0)	0 (0)	3 (0,37)	0 (0)	7 (0,21)
<i>Heterolocha laminaria</i> (Herrich-Schäffer, [1852])	1 (0,1)	0 (0)	2 (0,38)	0 (0)	0 (0)	3 (0,09)
<i>Horisme corticata</i> (Treitschke, 1835)	9 (0,7)	1 (0,2)	1 (0,19)	7 (0,87)	4 (1,37)	22 (0,65)
<i>Horisme tersata</i> ([D. & Schiff.], 1775)	2 (0,1)	4 (0,9)	2 (0,38)	7 (0,87)	3 (1,03)	18 (0,53)
<i>Hydriomena furcata</i> (Thunberg, 1784)	42 (3,1)	0 (0)	2 (0,38)	0 (0)	0 (0)	44 (1,29)
<i>Hylaea fasciaria</i> (Linnaeus, 1758)	0 (0)	0 (0)	3 (0,58)	1 (0,12)	1 (0,34)	5 (0,15)
<i>Hypomecis punctinalis</i> (Scopoli, 1763)	9 (0,7)	0 (0)	0 (0)	3 (0,37)	0 (0)	12 (0,35)
<i>Hypomecis roboraria</i> (Fabricius, 1787)	25 (1,9)	0 (0)	0 (0)	5 (0,62)	0 (0)	30 (0,88)
<i>Idaea albitorquata</i> (Püngeler, 1909)	0 (0)	2 (0,5)	0 (0)	0 (0)	0 (0)	2 (0,06)
<i>Idaea aversata</i> (Linnaeus, 1758)	41 (3,1)	6 (1,4)	6 (1,15)	2 (0,25)	0 (0)	55 (1,62)
<i>Idaea biselata</i> (Hufnagel, 1767)	4 (0,3)	0 (0)	0 (0)	0 (0)	0 (0)	4 (0,12)
<i>Idaea consolidata</i> (Lederer, 1853)	5 (0,4)	0 (0)	0 (0)	1 (0,12)	0 (0)	6 (0,18)
<i>Idaea degeneraria</i> (Hübner, [1799])	9 (0,7)	3 (0,7)	0 (0)	22 (2,74)	1 (0,34)	35 (1,03)
<i>Idaea deversaria</i> (Herrich-Schäffer, 1847)	15 (1,1)	16 (3,6)	1 (0,19)	24 (2,99)	1 (0,34)	57 (1,68)
<i>Idaea dilutaria</i> (Hübner, [1799])	8 (0,6)	1 (0,2)	0 (0)	0 (0)	0 (0)	9 (0,26)
<i>Idaea dimidiata</i> (Hufnagel, 1767)	2 (0,1)	0 (0)	0 (0)	5 (0,62)	0 (0)	7 (0,21)
<i>Idaea filicata</i> (Hübner, [1799])	5 (0,4)	3 (0,7)	0 (0)	4 (0,5)	4 (1,37)	16 (0,47)
<i>Idaea humiliata</i> (Hufnagel, 1767)	0 (0)	1 (0,2)	0 (0)	1 (0,12)	1 (0,34)	3 (0,09)
<i>Idaea infirmaria</i> (Rambur, 1833)	0 (0)	1 (0,2)	0 (0)	4 (0,5)	4 (1,37)	9 (0,26)
<i>Idaea metohiensis</i> (Rebel, 1900)	0 (0)	1 (0,2)	0 (0)	2 (0,25)	0 (0)	3 (0,09)
<i>Idaea moniliata</i> ([D. & Schiff.], 1775)	2 (0,1)	3 (0,7)	0 (0)	0 (0)	0 (0)	5 (0,15)
<i>Idaea obsoletaria</i> (Rambur, 1833)	0 (0)	4 (0,9)	0 (0)	2 (0,25)	0 (0)	6 (0,18)
<i>Idaea ochrata</i> (Scopoli, 1763)	2 (0,1)	1 (0,2)	1 (0,19)	0 (0)	7 (2,4)	11 (0,32)
<i>Idaea ossiculata</i> (Lederer, 1871)	0 (0)	2 (0,5)	0 (0)	2 (0,25)	0 (0)	4 (0,12)
<i>Idaea ostrinaria</i> (Hübner, [1813])	0 (0)	0 (0)	0 (0)	1 (0,12)	2 (0,68)	3 (0,09)
<i>Idaea politaria</i> (Hübner, [1799])	4 (0,3)	0 (0)	0 (0)	2 (0,25)	0 (0)	6 (0,18)
<i>Idaea rubraria</i> (Staudinger, 1901)	1 (0,1)	2 (0,5)	0 (0)	7 (0,87)	5 (1,71)	15 (0,44)
<i>Idaea rufaria</i> (Hübner, [1799])	3 (0,2)	27 (6,1)	2 (0,38)	0 (0)	44 (15,07)	76 (2,24)
<i>Idaea straminata</i> (Borkhausen, 1794)	2 (0,1)	0 (0)	2 (0,38)	0 (0)	0 (0)	4 (0,12)
<i>Idaea subsericeata</i> (Haworth, [1809])	9 (0,7)	3 (0,7)	0 (0)	9 (1,12)	1 (0,34)	22 (0,65)
<i>Idaea trigeminata</i> (Haworth, [1809])	1 (0,1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Jodis lactearia</i> (Linnaeus, 1758)	1 (0,1)	0 (0)	1 (0,19)	0 (0)	0 (0)	2 (0,06)
<i>Lampropteryx suffumata</i> ([D. & Schiff.], 1775)	0 (0)	0 (0)	1 (0,19)	0 (0)	0 (0)	1 (0,03)
<i>Ligdia adustata</i> (Fabricius, 1787)	1 (0,1)	1 (0,2)	2 (0,38)	6 (0,75)	1 (0,34)	11 (0,32)
<i>Lomaspilis bithynica</i> Wehrli, 1939	11 (0,8)	2 (0,5)	5 (0,96)	7 (0,87)	4 (1,37)	29 (0,85)
<i>Lomographa temerata</i> ([D. & Schiff.], 1775)	12 (0,9)	0 (0)	0 (0)	4 (0,5)	0 (0)	16 (0,47)
<i>Lythria purpuraria</i> (Linnaeus, 1758)	0 (0)	2 (0,5)	0 (0)	0 (0)	0 (0)	2 (0,06)
<i>Macaria alternata</i> ([D. & Schiff.], 1775)	4 (0,3)	0 (0)	0 (0)	6 (0,75)	1 (0,34)	11 (0,32)
<i>Macaria liturata</i> (Linnaeus, 1761)	8 (0,6)	1 (0,2)	16 (3,08)	0 (0)	7 (2,4)	32 (0,94)
<i>Macaria notata</i> (Linnaeus, 1758)	76 (5,7)	0 (0)	1 (0,19)	4 (0,5)	0 (0)	81 (2,38)
<i>Melanthia procellata</i> ([D. & Schiff.], 1775)	9 (0,7)	0 (0)	0 (0)	3 (0,37)	0 (0)	12 (0,35)
<i>Minoa murinata</i> (Scopoli, 1763)	5 (0,4)	1 (0,2)	6 (1,15)	1 (0,12)	0 (0)	13 (0,38)
<i>Neognopharmia stevenaria</i> (Boisduval, 1840)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,34)	1 (0,03)
<i>Nychiodes waltheri</i> Wagner, 1919	0 (0)	6 (1,4)	0 (0)	4 (0,5)	3 (1,03)	13 (0,38)
<i>Odontopera bidentata</i> (Linnaeus, 1761)	0 (0)	0 (0)	3 (0,58)	0 (0)	0 (0)	3 (0,09)
<i>Opisthoptis luteolata</i> (Linnaeus, 1758)	13 (0,9)	2 (0,5)	4 (0,77)	1 (0,12)	1 (0,34)	21 (0,62)
<i>Orthostixis cribraria</i> (Hübner, [1799])	1 (0,1)	5 (1,1)	0 (0)	0 (0)	0 (0)	6 (0,18)
<i>Pachynemina hippocastanaria</i> (Hübner, [1799])	16 (1,2)	0 (0)	0 (0)	20 (2,49)	0 (0)	36 (1,06)

<i>Pachynemia tibiaria</i> (Rambur, 1829)	1 (0,1)	0 (0)	0 (0)	3 (0,37)	0 (0)	4 (0,12)
<i>Parectropis similaria</i> (Hufnagel, 1767)	6 (0,4)	0 (0)	0 (0)	1 (0,12)	0 (0)	7 (0,21)
<i>Pareulype berberata</i> (Fabricius, 1787)	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Pasiphila rectangulata</i> (Linnaeus, 1758)	2 (0,1)	0 (0)	0 (0)	1 (0,12)	0 (0)	3 (0,09)
<i>Pennithera firmata</i> (Hübner, [1822])	0 (0)	2 (0,5)	3 (0,58)	2 (0,25)	0 (0)	7 (0,21)
<i>Perconia strigillaria</i> (Hübner, 1787)	0 (0)	0 (0)	2 (0,38)	0 (0)	0 (0)	2 (0,06)
<i>Peribatodes rhomboidaria</i> ([D. & Schiff.], 1775)	102 (7,6)	58 (13,1)	25 (4,81)	146 (18,2)	45 (15,41)	376 (11,06)
<i>Peribatodes umbrarius</i> (Hübner, [1809])	0 (0)	3 (0,7)	0 (0)	0 (0)	0 (0)	3 (0,09)
<i>Petrophora chlorosata</i> (Scopoli, 1763)	0 (0)	0 (0)	0 (0)	3 (0,37)	0 (0)	3 (0,09)
<i>Phaioграмма etruscaria</i> (Zeller, 1849)	0 (0)	0 (0)	0 (0)	9 (1,12)	0 (0)	9 (0,26)
<i>Philereme transversata</i> (Hufnagel, 1767)	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Plagodis dolabraria</i> (Linnaeus, 1767)	22 (1,6)	0 (0)	0 (0)	3 (0,37)	0 (0)	25 (0,74)
<i>Protorhoe unicata</i> (Guenée, 1857)	0 (0)	1 (0,2)	0 (0)	0 (0)	0 (0)	1 (0,03)
<i>Pseudoterpna pruinata</i> (Hufnagel, 1767)	3 (0,2)	2 (0,5)	9 (1,73)	5 (0,62)	1 (0,34)	20 (0,59)
<i>Pungeleria capreolaria</i> (Fabricius, 1787)	0 (0)	0 (0)	7 (1,35)	0 (0)	0 (0)	7 (0,21)
<i>Rheumaptera montivagata</i> Duponchel, 1830	0 (0)	0 (0)	3 (0,58)	0 (0)	0 (0)	3 (0,09)
<i>Rhodostrophia discopunctata</i> Amsel, 1935	18 (1,3)	27 (6,1)	2 (0,38)	12 (1,5)	6 (2,05)	65 (1,91)
<i>Rhodostrophia vibicaria</i> (Clerck, 1759)	1 (0,1)	13 (2,9)	17 (3,27)	2 (0,25)	1 (0,34)	34 (1)
<i>Rhoptria asperaria</i> (Hübner, [1817])	0 (0)	0 (0)	2 (0,38)	13 (1,62)	0 (0)	15 (0,44)
<i>Scopula decorata</i> ([D. & Schiff.], 1775)	0 (0)	5 (1,1)	0 (0)	0 (0)	1 (0,34)	6 (0,18)
<i>Scopula flaccidaria</i> (Zeller, 1852)	5 (0,4)	1 (0,2)	0 (0)	7 (0,87)	2 (0,68)	15 (0,44)
<i>Scopula imitaria</i> (Hübner, [1799])	7 (0,5)	1 (0,2)	0 (0)	13 (1,62)	0 (0)	21 (0,62)
<i>Scopula incanata</i> (Linnaeus, 1758)	0 (0)	2 (0,5)	2 (0,38)	0 (0)	0 (0)	4 (0,12)
<i>Scopula marginepunctata</i> (Goeze, 1781)	1 (0,1)	6 (1,4)	0 (0)	7 (0,87)	3 (1,03)	17 (0,5)
<i>Scopula nigropunctata</i> (Hufnagel, 1767)	5 (0,4)	0 (0)	0 (0)	2 (0,25)	0 (0)	7 (0,21)
<i>Scopula ornata</i> (Scopoli, 1763)	1 (0,1)	0 (0)	1 (0,19)	15 (1,87)	1 (0,34)	18 (0,53)
<i>Scopula ruginata</i> (Hufnagel, 1767)	2 (0,1)	4 (0,9)	1 (0,19)	3 (0,37)	11 (3,77)	21 (0,62)
<i>Scopula submutata</i> (Treitschke, 1828)	1 (0,1)	0 (0)	0 (0)	3 (0,37)	0 (0)	4 (0,12)
<i>Scopula transcaspica</i> Prout, 1935	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,34)	1 (0,03)
<i>Scopula turbulentaria</i> (Staudinger, 1870)	0 (0)	0 (0)	0 (0)	0 (0)	2 (0,68)	2 (0,06)
<i>Scotopteryx chenopodiata</i> (Linnaeus, 1758)	8 (0,6)	3 (0,7)	6 (1,15)	0 (0)	0 (0)	17 (0,5)
<i>Scotopteryx coarctaria</i> ([D. & Schiff.], 1775)	0 (0)	5 (1,1)	0 (0)	0 (0)	0 (0)	5 (0,15)
<i>Scotopteryx luridata</i> (Hufnagel, 1767)	0 (0)	32 (7,2)	43 (8,27)	0 (0)	4 (1,37)	79 (2,32)
<i>Scotopteryx moeniata</i> (Scopoli, 1763)	0 (0)	0 (0)	122 (23,46)	0 (0)	0 (0)	122 (3,59)
<i>Scotopteryx mucronata</i> (Scopoli, 1763)	1 (0,1)	0 (0)	8 (1,54)	2 (0,25)	0 (0)	11 (0,32)
<i>Selenia dentaria</i> (Fabricius, 1775)	24 (1,8)	4 (0,9)	0 (0)	7 (0,87)	1 (0,34)	36 (1,06)
<i>Selenia lunularia</i> (Hübner, 1788)	29 (2,2)	1 (0,2)	4 (0,77)	13 (1,62)	1 (0,34)	48 (1,41)
<i>Selidosema plunaria</i> ([D. & Schiff.], 1775)	0 (0)	2 (0,5)	6 (1,15)	0 (0)	1 (0,34)	9 (0,26)
<i>Stegania dilectaria</i> (Hübner, 1790)	2 (0,1)	0 (0)	0 (0)	16 (2)	0 (0)	18 (0,53)
<i>Synopsis sociaria</i> (Hübner, [1799])	0 (0)	0 (0)	0 (0)	5 (0,62)	1 (0,34)	6 (0,18)
<i>Thalera fimbrialis</i> (Scopoli, 1763)	1 (0,1)	1 (0,2)	1 (0,19)	3 (0,37)	0 (0)	6 (0,18)
<i>Thera britannica</i> (Turner, 1925)	9 (0,7)	0 (0)	9 (1,73)	0 (0)	0 (0)	18 (0,53)
<i>Thera obeliscata</i> (Hübner, 1787)	0 (0)	0 (0)	2 (0,38)	0 (0)	1 (0,34)	3 (0,09)
<i>Thera variata</i> ([D. & Schiff.], 1775)	9 (0,7)	2 (0,5)	5 (0,96)	0 (0)	0 (0)	16 (0,47)
<i>Timandra comae</i> Schmidt, 1931	0 (0)	0 (0)	0 (0)	0 (0)	1 (0,34)	1 (0,03)
<i>Xanthorhoe ferrugata</i> (Clerck, 1759)	1 (0,1)	0 (0)	0 (0)	1 (0,12)	2 (0,68)	4 (0,12)
<i>Xanthorhoe montanata</i> ([D. & Schiff.], 1775)	0 (0)	0 (0)	3 (0,58)	0 (0)	0 (0)	3 (0,09)
Total Individual number	1343	442	520	802	292	3399
Total Species number	109	96	82	90	65	188

Contribución al conocimiento del género *Euchromia* Hübner, [1819] 1816 en Guinea Ecuatorial (Lepidoptera: Erebidae, Arctiinae, Euchromiini)

A. Vives Moreno

Resumen

En el curso de la reorganización y catalogación del material de Lepidoptera que se encuentran depositados en las colecciones de Entomología del Museo Nacional de Ciencias Naturales (MNCN), en Madrid (España), con el nombre de “exótico”, hemos revisado dos especies del género *Euchromia* Hübner, [1819] 1816, de la Guinea Española, procedentes de las exploraciones realizadas por diferentes científicos españoles. La Guinea Española por entonces se encontraba dividida en dos provincias desde 1959, a saber: la de Fernando Poo, con las islas de Fernando Poo y Annobón y la de Río Muni, con el territorio continental de Río Muni y las islas de Corisco, Elobey Grande y Elobey Chico, pasando a ser un país independiente en 1968 tomando el nombre de República de Guinea Ecuatorial.

De acuerdo con nuestras investigaciones, dos especies de este género se encuentran en Guinea Ecuatorial, *Euchromia guineensis* (Fabricius, 1775) y *E. lethe* (Fabricius, 1775). En este trabajo hacemos una revisión de su distribución y realizamos un estudio de la genitalia del macho y de la hembra.

PALABRAS CLAVE: Lepidoptera, Erebidae, Arctiinae, Euchromiini, *Euchromia*, Guinea Ecuatorial.

Contribution to the knowledge of the Genus *Euchromia* Hübner, [1819] 1816 in Equatorial Guinea (Lepidoptera: Erebidae, Arctiinae, Euchromiini)

Abstract

In the course of the reorganization and cataloguing of the Lepidoptera material deposited in the Entomology Collection of the Museo Nacional de Ciencias Naturales (MNCN), in Madrid, Spain, under the name “Exotic”, we have revised two species of Genus *Euchromia* Hübner, [1819] 1816, originating in exploratory work carried out by different Spanish Scientists. Spanish Guinea was divided into two provinces after 1959: Fernando Poo province, including Fernando Poo and Annobon Islands and Rio Muni province, including the continental territory of Rio Muni and the islands of Elobey Grande, Elobey Chico and Corisco. It became an independent country in 1968, taking the name of Republic of Equatorial Guinea.

According to our investigations, two species of this Genus are present in Equatorial Guinea: *Euchromia guineensis* (Fabricius 1775) and *Euchromia lethe* (Fabricius 1775). In this work we revise their distribution and carry out the study of both male and female genitalia.

KEY WORDS: Lepidoptera, Erebidae, Arctiinae, Euchromiini, *Euchromia*, Equatorial Guinea.

Introducción

La ubicación familiar del género *Euchromia* Hübner, [1819] 1816, ha ido cambiando a lo largo del tiempo siendo BUTLER (1876: 342, 361) quién crea el nombre subfamiliar de Euchromiinae, que se sigue manteniendo en FORBES (1920: 43, 1939: 99, 1960: 56), mientras que NEUMOGEN & DYAR

(1893: 99, 100) consideran Euchromiidae como nombre válido de familia. WATSON *et al.* (1980: IX) incluyen los Euchromiinae como subfamilia de los Ctenuchidae, mientras que HOLLOWAY (1988: 4, 37), establece los Euchromiinae como subfamilia de los Arctiidae. COMMON (1990: 438), mantiene el género en la familia Arctiidae, subfamilia Ctenuchinae, si bien EDWARDS (1996: 286) considera que debería de estar en la familia Arctiidae, subfamilia Ctenuchinae y tribu Euchromiini. En nuestro trabajo consideramos la validez de la tribu Euchromiini Butler, 1876, dentro de la subfamilia Arctiinae Leach, [1815] 1830 y de la familia Erebidae Leach, [1815] 1830 (véase LU *et al.*, 2012: 462).

El género *Euchromia* forma dos grandes grupos, uno localizado en la región Afrotropical con ocho especies: *E. amoena* (Möschler, 1872), *E. deprinsi* Fiebig, Ochse & Stadie, 2018, *E. folletii* (Guérin-Méneville, 1832), *E. guineensis* (Fabricius, 1775), *E. hampsoni* Seitz, 1926, *E. lethe* (Fabricius, 1775), *E. madagascariensis* (Boisduval, 1833), *E. manfredi* Fiebig, Ochse & Stadie, 2018 y *E. schoutedeni* Debauche, 1936 y el otro en la región Indoaustraliana con cuarenta especies conocidas.

Carl von LINNE (1707-1778) describió las dos primeras especies de la región Indoaustraliana; a saber: *Euchromia creusa* (Linnaeus, 1758) y *E. polymena* (Linnaeus, 1758). Posteriormente fue Johann Christian FABRICIUS (1745-1808) (ZIMSEN, 1964), nacido en Tondem (Dinamarca) y que en 1762 se trasladó a Uppsala, durante dos años, para estudiar bajo la supervisión del propio Linné, que le consideró como uno de sus mejores alumnos. A su regreso a Dinamarca, publicó su primer trabajo entomológico en 1775 y describió las dos primeras especies conocidas de este género en la región Afrotropical, *Euchromia guineensis* (Fabricius, 1775) y *E. lethe* (Fabricius, 1775).

Material y métodos

El material de la Guinea Española que se encuentra depositado en el Museo Nacional de Ciencias Naturales en Madrid (España), nos ha permitido estudiar un total de 98 ejemplares del género *Euchromia* que fueron recogidos por Amando Eugenio Ossorio Zabala (1886), Manuel Martínez de la Escalera (1919), José Alonso Martínez (1926), Teodoro Vives Camino (1928), Federico Bonet Marco y Juan Gil Collado (1933), Eugenio Ortiz de Vega (1948) y Salvador Vicente Peris Torres (1961). Para más detalle de estas expediciones véase a MARTIN (2016).

Como ya indicamos en VIVES MORENO (2019), fue el Prof. Dr. Ignacio Bolívar (BOLIVAR, 1910), quién se encargaría de identificar el grueso del material que había sido recogido en la Guinea Española por el entomólogo Manuel Martínez de la Escalera y que, posteriormente, se lo remitiría para su estudio al alemán Napoleón Manuel Kheil, entre otro, el del género *Euchromia*.

Para su identificación nos hemos basado en el examen comparativo de los caracteres morfológicos externos y, sobre todo, en el análisis de la estructura genital de los ejemplares. La preparación de la genitalia se ha efectuado siguiendo a ROBINSON (1976), con modificaciones. Se han utilizado los microscopios Leica DMLB, Leica MZAPO, NIKON Eclipse E400 y las cámaras digital Leica DFC550, NIKON D3100 y SONY á100 DSLR-A100K con objetivo AF 100 MACRO 1:2,8 (32), e igualmente para el retoque fotográfico, el programa de Adobe Photoshop ©

Parte sistemática

Euchromia Hübner, [1819] 1816

Verz. *Bekannter Schmett.*: 121

Especie tipo: *Sphinx sperchius* Cramer, 1777, *Uitlandsche Kapellen (Papillons exot.)*, 2: 79, 150, pl. 146, fig. C, por subsecuente designación por Kyrby, 1882, *Synonymic Cat. Lepid. Heterocera*, 1: 117
= *Phalanna* Walker, 1854

List Specimens lepid. Insects Colln. Br. Mus., 1: 218

Especie tipo: *Sphinx polymena* Linnaeus, 1758, *Syst. Nat. (Edn. 10)*, 1: 494, por subsecuente designación por Hampson, 1898, *Cat. Lepid. Phalaenae Br. Mus.*, 1: 293
= *Hira* Walker, 1854

List Specimens lepid. Insects Colln. Br. Mus., 1: 220

Especie tipo: *Sphinx sperchius* Cramer, 1777, *Uitlandsche Kapellen (Papillons exot.)*, 2: 79, 150, pl. 146, fig. C, por subsecuente designación por Hampson, 1898, *Cat. Lepid. Phalaenae Br. Mus.*, 1: 293

Euchromia lethe (Fabricius, 1775) (Figs. 1-3)

Zygaena lethe Fabricius, 1775; *Syst. Ent.*: 553

LT: África [Guinea]

= *Sphinx eumolphus* Cramer, [1779]; *Uitl. Kapellen*, 3(17-21): 8, pl. 197, fig. D

LT: Guinea

= *Euchromia fulvida* Butler, 1888; *Trans. Ent. Soc. Lond.*, 1888(1): 112, pl. 4, fig. 15

LT: Angola, Congo, Sierra Leona

= *Euchromia lethe* ab. *congoana* Strand, 1917; *Archiv Naturg.*, 82 A (2): 84

LT: Congo

= *Euchromia lethe* ab. *nigricincta* Joicey & Talbot, 1926; *Entomologist*, 59: 225

LT: São Thomé [Santo Tomé y Príncipe]

= *Euchromia lethe* ab. *flava* Debauche, 1936; *Bull. Mus. r. Hist. nat. Belg.*, 12(25): 16

LT: Eala, Congo Belga [República Democrática del Congo]

Descripción original: 14. *Z. alis nigris: maculis duabus luteis, abdomine cingulis rubris, nigris, cyaneis alboque.*

Habitat in Africa. Drury.

Praecedenti nimis affinis, nitidissima. Antennae nigrae, fuperne ante apicem albae. Caput cyaneum, nitidum, palpis nigris. Thorax niger; lobo antico lineisque tribus dorsalibus cyaneis. Punctum coccineum utrinque ante alas. Abdomen cylindricum, nitidum, cingulis diversicoloribus variegatum. Cingulum baseos rufum, utrinque album, dein cingula duo cyanea et duo nigra alterna, tunc rufum, postea sequitur album et denique tria ultima segmenta cyanea, ano rudo. Alae atrae, omnibus maculis duabus luteis, et anticis inter maculas lunula cyanea.

Genitalia del macho: Uncus cónico, con dos apéndices semicirculares en la parte superior del tegumen. Valvae subcuadrangular, con una proyección puntiaguda en la parte distal superior y más reducida en su zona basal. Saccus puntiagudo. Aedeagus fuerte, cilíndrico y fuerte, sin cornuti.

Genitalia de la hembra: Papillae anales subcuadrangulares. Apophyses posteriores más largas que las anteriores, que apenas están desarrolladas. Ostium bursae ovoidal, con una destacada muesca en el signum vaginalis. Ductus bursae fuerte, plano y subrectangular, presentando una zona fuertemente plegada en su unión con la bursa copulatrix. Bursa copulatrix redondeada y recubierta por pequeñas espinas quitinizadas que cubren las dos terceras partes de la misma, suele presentar una bursa auxiliar, poco quitinizada, en su zona latero-superior.

Material examinado: Akonibe, [Río Muni] (Guinea Española), Sa-[19]48, E. Ortiz leg.; Ayamiken, [Río Muni] (Guinea Española), 1 ♀, VII-[19]48, E. Ortiz leg.; Bata, [Río Muni], (Guinea Española), 2 ♂♂, 1 ♀, X-1928, T. Vives leg.; Biafra, Cabo de S[an] Juan, [Río Muni], 16 ♂♂ (prep. gen. 61662), 2 ♀♀ (prep. gen. 61660, 61661), VII-1901, [M.] Escalera leg.; Biapa (Concepción), Fernando Poo, 1 ♂, II-1933, F. Bonet-J. Gil leg.; Boloko, Fernando Poo, 2 ♂♂, I-1933, 3 ♂♂, III-1933, F. Bonet-J. Gil leg.; Botonós, Fernando Poo, 1 ♀, I-1933, F. Bonet-J. Gil leg.; Ebebiyin, [Río Muni] (Guinea Española), 1 ♂, 2 ♀♀, VIII-[1]926, 1 ♀ (prep. gen. 61655, fig. 8), 1 ♀ (prep. gen. 61652, 61653), X-1926, J. Alonso-Martínez leg., 1 ♂, 21-VI-[19]48, E. Ortiz leg.; Fernando Poo, 1 ♂, II-1933, F. Bonet-J. Gil leg.; Fernando Poo, 1 ♂; Ndumensoc, [Río Muni] (Guinea Española), 1 ♀, 8-X-[19]48, E. Ortiz leg.; Río Benito, [Río Muni] (Guinea Española), 1 ♀; [Río] Noya, 1 ♀, [1886], [A.] Ossorio leg.; Santa Isabel, Fernando Poo, 12 ♂♂, 18 ♀♀, VIII-1928, 3 ♀♀, IX-1928, T. Vives leg.; 1 ♀, I-1933, F. Bonet-J. Gil leg.; 2 ♀♀, VIII-[19]59, S. V. Peris-J. Álvarez leg.; San Carlos, Fernando Poo, 3 ♀♀, VIII-1932, [F. Bonet-J. Gil leg.]; Santa Isabel, Fernando Poo, 4 ♂♂, 1 ♀ (prep. gen. 61669), VIII-1919, [M.] Escalera leg., 3 ♂♂, XI-1928, 1 ♀, (prep. gen. 61654, fig. 7), T. Vives leg.; Yengüe, [Río Muni] (Guinea Española), 2 ♀♀, VII-[19]48, E. Ortiz leg.

Distribución: Según nuestros datos esta especie ha sido citada de Angola (BUTLER, 1888: 112,

como *Euchromia fulvida* Butler, 1888), Benín (AGBOTON *et al.*, 2014: 11), Camerún (PLÖTZ, 1880: 79), Congo (HAMPSON, 1898: 296), Gabón (AURIVILLIUS, 1925: 1304), Gambia (ZERNY, 1912: 87), Guinea Bissau (AURIVILLIUS, 1910: 507), Guinea Ecuatorial (KHEIL, 1909: 491), Madagascar (BUTLER, 1876: 363), Níger (HAMPSON, 1898: 296), República Democrática del Congo (SNE-LLEN, 1872: 36), Santo Tomé y Príncipe (AURIVILLIUS, 1910: 511, 514), Senegal (ZERNY, 1912: 87), Sierra Leona (WALKER, 1854: 222), Sudáfrica (BUTLER, 1875: 399), Uganda (BUTLER, 1888: 82, como *Euchromia fulvida* Butler, 1888).

Biología: La oruga fue descrita por primera vez por AURIVILLIUS (1904: 32-33) y se han encontrado las siguientes plantas nutricias: *Anacardium occidentale* L. (Anacardiaceae) (AGBOTON *et al.*, 2014: 11) e *Ipomoea batatas* (L.) Lam. (Convolvulaceae) (SCHAUS & CLEMENTS, 1893: 22).

Euchromia guineensis (Fabricius, 1775) (Figs. 4-6)

Zygaena guineensis Fabricius, 1775; *Syst. Ent.*: 551

LT: Guinea

= *Sphinx sperchius* Cramer, [1777]; *Uitl. Kapellen*, 2(9-16): 79, 150, pl. 146, fig. C

LT: Sierra Leona

= *Euchromia interstans* Walker, 1854; *List Spec. Lepid. Insects Colln Br. Mus.*, 1: 221

LT: Ashanti, Sierra Leona

= *Euchromia leonis* Butler, 1876; *J. Linn. Soc. Lond. Zool.*, 12(60-62): 363

LT: Sierra Leona

= *Euchromia splendens* Butler, 1888; *Trans. Ent. Soc. Lond.*, 1888(1): 113, pl. 4, fig. 4

LT: Old Calabar, [Nigeria]

= *Euchromia bellula* Mabilie, 1890; *Ann. Soc. ent. Fr.*, (6) 10: 36

LT: Assinie, [Costa de Marfil]

= *Euchromia sperchia* ab. *interrupta* Grünberg, 1910; *Sitzungsber. Ges. naturf. Fr. Berlin*: 176

LT: Isla Sesse, [Uganda]

= *Euchromia guineensis* ab. *discifera* Zerny, 1912; *Dt. ent. Z. Iris*, 26(2): 120

LT: Beni, Stanleyville, Congo Belga [República Democrática del Congo]

= *Euchromia guineensis intermedia* Aurivillius, 1925; *Zweiten Dt. Zentral-Afrika-Exped. (Zool.) (Lep. 4)*, 1: 1304

LT: Bata, Guinea Española [Guinea Ecuatorial], Molundo, Camerún

= *Euchromia guineensis jullieni* Debauche, 1936; *Bull. Mus. r. Hist. nat. Belg.*, 12(25): 13-14

LT: Kuki, Congo Belga [República Democrática del Congo]

Descripción original: 6. *Z. alis fuscis*: *maculis duabus albis, abdomine cyaneo: cingulo fulvo.*

Habitat in Guinea. D. Schloffer.

Antennae pectinatae, nigrae, apice fetaceae. Caput et thorax nigra, cyaneo nitida. Abdomen cyaneum, nitidum, cingulo albo baseos et fulvo in medio: fubtus albicans, apice cyaneum. Alae omnes furcae, maculis duabus albis, alcera ad basiu, altera ad apicem.

Genitalia del macho: Uncus cónico, con dos lóbulos digitiformes puntiagudos en la parte superior del tegumen. Valvae subrectangular con dos proyecciones puntiagudas, inferior y superior, en su zona distal. Saccus subrectangular con dos pequeñas proyecciones digitiformes en su parte baso-distal. Aedeagus largo y fuertemente curvado en su zona basal, teniendo una zona más angulosa en su inserción con el ductus ejaculatorius, no presentando cornuti.

Genitalia de la hembra: Papillae anales subcuadrangulares. Apophyses posterior corta y anterior no desarrolladas. Ostium bursae fuertemente quitinizado, subrectangular con forma subtriangular en el signus vaginalis. Ductus bursae fuertemente quitinizado, subrectangular plano y tan largo como el ostium bursae, fuertemente plegado en su unión con la bursa copulatrix. Bursa copulatrix pequeña, redondeada y quitinizada, presentando, en su zona basal, pequeñas espinas que la recubren en toda su zona basal. Se aprecia una bursa auxiliar en su zona distal izquierda poco quitinizada.

Material examinado: Biafra, Cabo S.[an] Juan [Río Muni], 5 ♂♂, VII-1901, [M.] Escalera leg.; Biapa (Concepción), Fernando Poo, 1 ♂ (prep. gen. 61659, fig. 9), II-1932, F. Bonet & J. Gil leg.;

S[an]ta Isabel, Fernando Poo, 1 ♀, IX-1928, T. Vives leg.; Guinea Española, 1 ♂, 2 ♀♀; [Río] Noya, 1 ♂, [1886], [A.] Ossorio leg.; San Carlos, Fernando Poo, 1 ♀ (prep. gen. 61651, fig. 10), VIII-1932;

Distribución: Según nuestros datos esta especie ha sido citada de Angola (BUTLER, 1876: 363, como *Euchromia sperchius* (Cramer, [1777])), Camerún (BUTLER, 1888: PLÖTZ, 1888: 113, como *Euchromia splendens* Butler, 1888), Congo (BUTLER, 1876: 363, como *Euchromia sperchius* (Cramer, [1777])), Costa de Marfil (MABILLE, 1890: 36), Gabón (AURIVILLIUS, 1881: 46, como *Euchromia sperchius* (Cramer, [1777])), Gambia (DRUCE, 1887: 494, *Euchromia sperchius* (Cramer, [1777])), Ghana (WALKER, 1854: 221, como *Euchromia sperchius* (Cramer, [1777])), Guinea (FABRICIUS, 1775: 551), Guinea Ecuatorial (DRUCE, 1890: 243, como *Euchromia leonis* Butler, 1876), Nigeria (HAMPSON, 1898: 551), República Democrática del Congo (WALKER, 1854: 220, como *Euchromia sperchius* (Cramer, [1777])), Sierra Leona (WALKER, 1854: 220, como *Euchromia sperchius* (Cramer, [1777])), Uganda (BUTLER, 1888: 82, como *Euchromia fulvida* Butler, 1888).

Biología: Desconocida.

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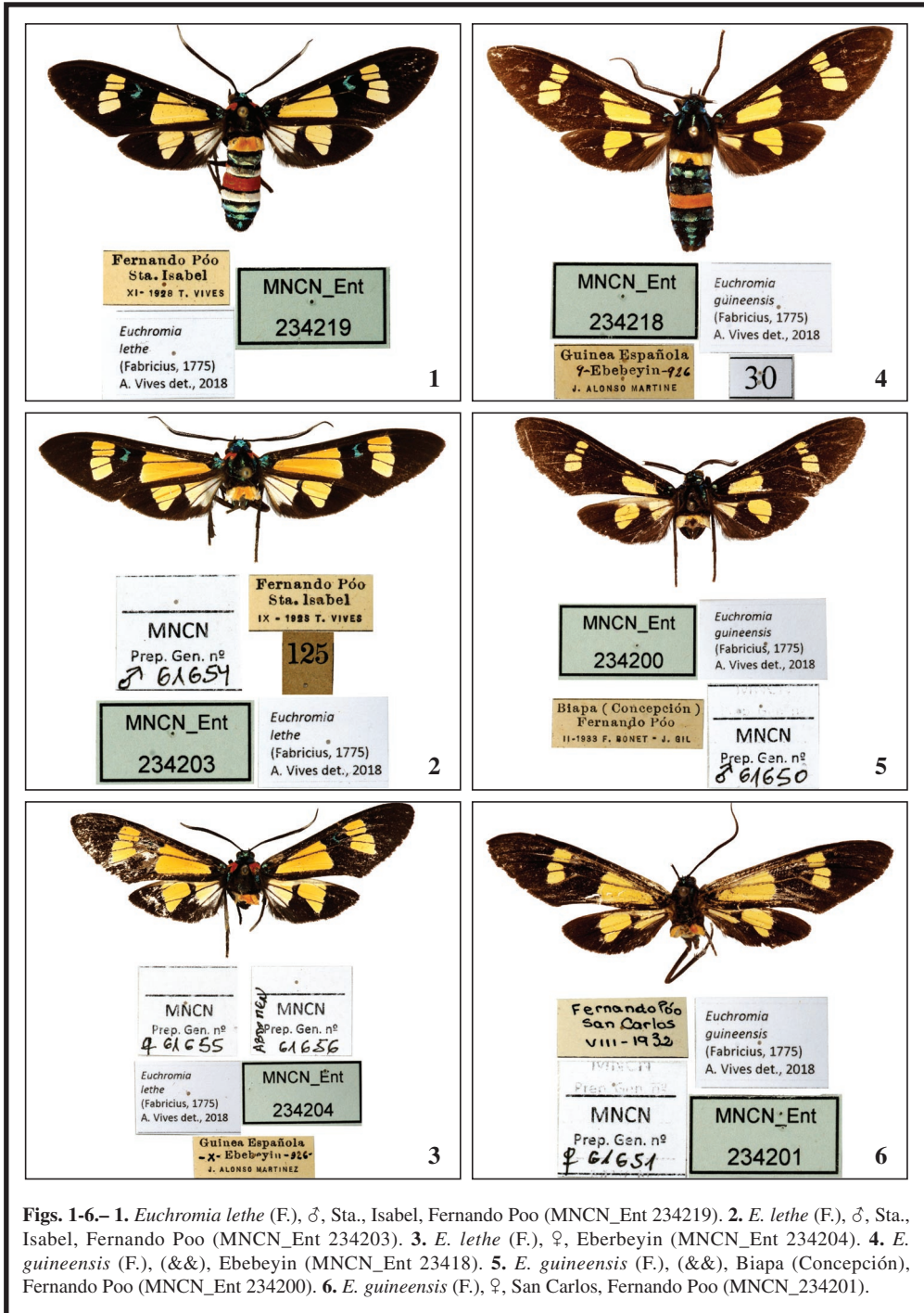
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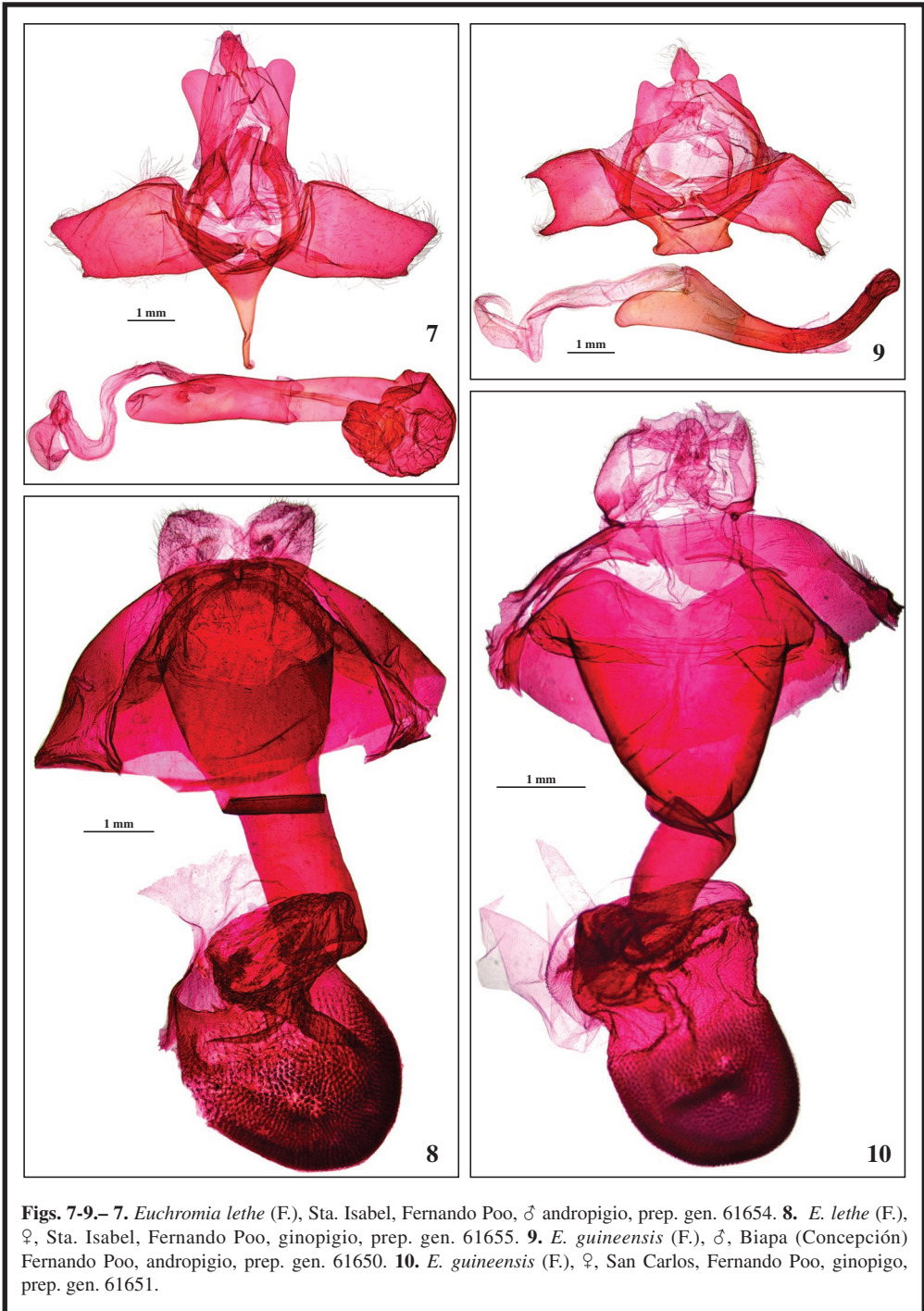
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Lista de socios altas y bajas *List of members join and cease*

La Sociedad da la bienvenida a las siguientes personas que han sido elegidas como nuevos socios recientemente. Deseamos que sea por mucho tiempo y que realicen una productiva actividad científica con la Sociedad:

The Society extends a warm welcome to the following persons who have been elected to the membership recently. We wish them all a long, happy and productive association with the Society:

D. Pedro C. Rodríguez Saldaña (España / Spain)
Mr. Josef Grieshuber (Alemania / Germany)
D. Arturo Sánchez de Vivar Lacourge (España / Spain)
Dr. Hans Christof Zeller-Lukashort (Austria / Austria)
Dr. Milan Švestka (República Checa / Czech Republic)
Mr. Oliver Janzek (Austria / Austria)
Mr. Georg Stiegel (Alemania / Germany)
Mr. Helmut Friedl (Alemania / Germany)

Mr. Gottfried Meicher (Alemania / Germany)
D. Francisco Truyols Henares (España / Spain)
Mr. Ole Karsholt (Dinamarca / Denmark)
Dr. Jens Tonboe (Dinamarca / Denmark)
(Reingreso / Rejoin)
D. Luis Hiernaux Candela (España / Spain)
(Reingreso / Rejoin)

La Sociedad ha recibido comunicación formal, de darse de baja como socio de:

The Society has received formal notice of the resignation from the membership of the following:

Mr. Torsten van der Heyden (Alemania / Germany)
Mr. Harry Edward Beaumont
(Gran Bretaña / Great Britain)
D. Fernando Santos Carvalho (Portugal / Portugal)
Mr. Reima Leinonen (Finlandia / Finland)
Dr. Arne L. Viborg (Dinamarca / Denmark)
Mr. Adam Faber (Dinamarca / Denmark)

Mr. Ryan St Laurent (EE.UU. / USA)
Mr. Pierre Boyer (Francia / France)
Mr. Morten S. Mølgaard (Dinamarca / Denmark)
Mr. Josef Procházka (República Checa / Czech Republic)
Dr. Jorge Leonel León Cortés (México / Mexico)
Dr. Klaus Schurian (Alemania / Germany)

La Sociedad da de baja, por no pagar la Cuota Anual en el tiempo fijado por la Junta Directiva, a los siguientes socios:

The Society ceases the following members, due to unpaid subscription in the time allocated by the Governing Body:

Dr. Matthias Nuss (Alemania / Germany)

Mr. Andreas Rudolph (Alemania / Germany)

La Sociedad lamenta tener que dar la noticia de la baja por fallecimiento de los siguientes socios:

The Society regrets to have to give the news of the death of the following member:

Mr. Marc Meyer (Luxemburgo / Luxembourg)

Dr. Christopher John Luckens
(Gran Bretaña / Great Britain)

Butterfly diversity in different habitats in Simian Mountain Nature Reserve, China (Insecta: Lepidoptera)

Q.-L. Yang, Y. Zeng, Y. Yang & X.-C. Du

Abstract

Butterflies, as environmental indicators, can act as representatives for less well-monitored insect groups. In this study, a field survey was conducted in five fixed-distance belt transects during three years. Four indices were used to indicate the butterfly diversity. A total of 3004 individuals of 151 species belonging to 82 genera in 6 families were recorded in the survey. Among them, 67 species were recorded in Simian Mountain for the first time, and *Celastrina argiolus* (Linnaeus, 1758) was the dominant species; Nymphalidae was the dominant family. Among the five habitats, the species diversity of butterfly in Sample V was the highest, closely followed by that in Sample I in which ecological environment was relatively intact; and the diversity of butterfly in Sample IV, in which human interference was strong, was least. According to our research, the butterfly diversity in habitats with better ecological environments was higher; while the butterfly diversity in habitats with the most intact ecological environment was not the highest; strong human interference could significantly decrease the diversity of butterfly.

KEY WORDS: Insecta, Lepidoptera, butterfly diversity, Simian Mountain Nature Reserve, China.

Diversidad de las mariposas en diferentes hábitats en la Reserva Natural de la Montaña de Simian, China (Insecta: Lepidoptera)

Resumen

Las mariposas, como indicadores ambientales, pueden actuar como representantes de otros grupos de insectos peor conocidos. En este estudio, fue realizada una campaña con cinco transectos a distancia fija durante tres años. Cuatro índices fueron usados para indicar la diversidad de las mariposas. Se registraron en el estudio un total de 3.004 individuos de 151 especies pertenecientes a 82 géneros en 6 familias. Entre otros asuntos, 67 especies fueron registradas en la Reserva Natural de la Montaña de Simian por primera vez y *Celastrina argiolus* (Linnaeus, 1758) era la especie dominante; Nymphalidae fue la familia dominante. Entre los cinco hábitats, la diversidad de especie en el ejemplo V fue la más alta, seguida de cerca por el ejemplo I en el que el entorno ecológico estaba relativamente intacto; la diversidad de las mariposas fue la menor en el ejemplo IV, donde la interferencia humana en la muestra era la mayor. De acuerdo con nuestra investigación, la diversidad de mariposas en hábitats con mejores entornos ecológicos fue mayor; mientras que la diversidad de mariposas en hábitats con los entornos ecológicos más intactos, no era la más alta; la fuerte interferencia humana grande podría reducir la diversidad de las mariposas significativamente.

PALABRAS CLAVE: Insecta, Lepidoptera, diversidad de mariposas, Reserva Natural Montaña de Simian, China.

Introduction

Nowadays, global biodiversity loss is well known and biodiversity conservation is closely relevant to human well-being (LI *et al.*, 2011; MA *et al.*, 2012; XU *et al.*, 2012; WU *et al.*, 2013; DENNIS *et al.*, 2017). With urbanization and the development of tourism, the ecological environment has been

destroyed, and habitats have become fragmented, which threatens the environments where butterflies and other animals live (VU, 2009; HARSH *et al.*, 2015; MEI *et al.*, 2015). Butterflies occupy an important position in ecosystems due to their pollinator status and their environmental indicator status (ROBBINS *et al.*, 1997; ALURI *et al.*, 2002; GHAZOU, 2002; WANG *et al.*, 2008; KHANDOKAR *et al.*, 2013). Butterflies can respond quickly to changes in climate, humidity, temperature, light and some other factors and may act as representatives for less well-monitored insect groups (PARMESAN *et al.*, 1999; FANG *et al.*, 2010; MIHINDUKULASOORIYA *et al.*, 2014; DENNIS *et al.*, 2017). Moreover, butterfly indicator can monitor changes and assess the biodiversity status of environment (DENNIS *et al.*, 2017). In addition, positive relationships have been reported between butterfly diversity and plant diversity (THOMAS & MALORIE, 1985; LEPŠ & SPITZER, 1990). Contemporarily, the existence and diversity of butterflies are facing threats from vegetation damage, habitat degradation, habitat fragmentation and human interference (KHANDOKAR *et al.*, 2013; HARSH *et al.*, 2015).

Simian Mountain is a nature reserve of the forest ecosystem type and contains a well-preserved belt of subtropical, evergreen, primary, broad-leaved forest. Naturally, it is an excellent habitat for insects due to its abundant and diverse vegetation, moderate climate and plentiful rainfall (LU *et al.*, 2009; YANG, 2009; HE & DU, 2013). However, it is also a tourist area and summer resort because of its beautiful scenery and cool summer, which will certainly have influence on the habitats and diversity of insects. So far, only a few studies on the species diversity or fauna of insects have been reported in Simian Mountain (CHEN *et al.*, 1994; LI *et al.*, 2004; HE *et al.*, 2013).

This study was conducted to reveal and compare the composition and diversity of butterflies in different habitats, and to reveal the influence of ecological environment and human interference on butterfly diversity in Simian Mountain. The results would provide original data for biodiversity assessment and be constructive to conservation of butterfly diversity.

Materials and methods

STUDY AREA AND SAMPLING SITES

The field survey was conducted in different habitats in Simian Mountain Natural Reserve (28.251~28.391 N, 106.221~106.251 E) in Jiangjin District, Chongqing, China.

The five fixed-distance belt transects, i.e., sampling sites, selected for the field survey were chosen mainly based on their vegetation, altitude and intensity of human interference and so on. Each permanent belt transect measures two kilometres long and five metres wide (POLLARD, 1977). The five belt transects were abbreviated as Sample I, Sample II, Sample III, Sample IV and Sample V, respectively, in this paper.

MATERIALS

The butterflies in this study were observed or collected from the five belt transects in Simian Mountain, and some photos were taken during the survey. Specimens were deposited in the College of Plant Protection, Southwest University, Chongqing, China (SWUCPP).

SURVEY METHODS

Monthly field surveys were conducted from April to September in the five belt transects during 2016 to 2018. The intervals between two monthly observations were 20-30 days. The butterfly observations were carried out between 9:00 and 12:00 am or between 14:30 and 17:30 pm on sunny or cloudy days with temperatures above 17~25°C and a wind speed below 2 m/s.

Butterfly species and their populations were observed and recorded along the belt transects within a five-metre-wide area and five metres above and five metres to the front of recorder (POLLARD,

1977; RAMESH & HUSSAIN, 2010; LEVANONI *et al.*, 2011; MAYUR *et al.*, 2013; NIDUP *et al.*, 2014). In general, the survey of each belt transect was finished within 1.5~2.0 hours by the observers keeping their walking speed slow and uniform. Necessary stops were made to examine and identify the species closely and to take photos. A few individuals that could not be identified accurately in the field were captured and brought to the laboratory for identification. When the butterfly population was too large to be measured exactly, the number of butterflies had to be estimated, and usually photos or videos were taken at the same time for a more accurate estimate. In addition, the habitat data for each survey, such as the date, time, temperature, humidity, weather conditions and environmental status, were recorded for further statistical analysis.

BUTTERFLY IDENTIFICATION

Identification of butterfly species mainly followed CHOU (1994, 1998), WU (2001, 2010), WANG & FAN (2002), LANG (2012, 2017), YUAN *et al.* (2015), WU & XU (2017) and so on. The classification system of butterflies mainly followed CHOU (1994) and LANG (2012) in this study.

DATA ANALYSIS

The indices used in the butterfly diversity analysis are as follows. 1. Shannon-Wiener index (H'): $H' = -\sum P_i \ln P_i$; 2. Pielou evenness index (J): $J = H'/\ln S$; 3. Relative abundance (R_a): $R_a = N_i/N \times 100\%$; 4. Margalef index (R): $R = (S-1)/\ln N$.

Results and Analysis

A total of 3004 individuals of 151 species belonging to 82 genera in 6 families were recorded in our survey, and two subfamilies (Heliconiinae, Libytheinae), 22 genera and 67 species of them were recorded from Simian Mountain for the first time. *Celastrina argiolus* (Linnaeus, 1758), recorded in all belt transects and with 646 recorded individuals and a relative abundance (R_a) of 21.50%, was the dominant species in Simian Mountain. It was closely followed by *Pieris canidia* (Sparman, 1768) with 473 individuals and a relative abundance of 15.75%, and the relative abundance of remaining species were not more than 5.13%. A total of 48 species, such as *Papilio machaon* Linnaeus, 1758, *P. polytes* Linnaeus, 1758 and *Gonepteryx maxima* Butler, 1885, etc., had only one individual observed in the three years, were very rare in this area (see the Appendix).

Among the 6 families, Nymphalidae had 35 genera and 81 species recorded in the survey. It had the highest species richness (R), followed by Hesperidae, Nymphalidae (Satyrinae), Lycaenidae, Papilionidae, Riodinidae, Pieridae, Nymphalidae (Morphinae, Amathusiini) and Nymphalidae (Danainae) and had the highest species diversity ($H'(S)$), followed by Hesperidae, Nymphalidae (Satyrinae), Papilionidae, Riodinidae, Pieridae, Lycaenidae, Nymphalidae (Morphinae, Amathusiini) and Nymphalidae (Danainae). Lycaenidae had the highest genus diversity ($H'(G)$), followed by Hesperidae, Nymphalidae (Nymphalinae), Nymphalidae (Satyrinae), Pieridae, Riodinidae, Papilionidae and Nymphalidae (Morphinae, Amathusiini). The species richness, species diversity, genus diversity of Nymphalidae (Heliconiinae, Acraeini) and Nymphalidae (Libytheinae) were all the least. In addition, the genus diversity of Nymphalidae (Danainae) was also the least. The results showed that Nymphalidae was the dominant group and that its community composition was more stable than that of the other families in Simian Mountain (Table 1).

In terms of butterflies in different habitats, the family diversity ($H'(F)$) in Sample I was the highest, followed by that in Samples II, III, IV, V; the genus diversity ($H'(G)$) in Sample II was the highest, followed by that in Samples III, I, V and IV; the species diversity ($H'(S)$) and the evenness index (J) in Sample V were the highest, followed by that in Samples I, III, II and IV; and the species richness (R) in Sample V was the highest, followed by that in Samples III, I, II, and IV. It can be concluded that most metrics of butterfly diversity were the least in Sample IV, including the genus

diversity, species diversity, evenness index and species richness (Table 2). It could be concluded that the butterfly diversity were higher in those habitats with better ecological environment, while the highest diversity of butterfly was not in the habitat with the most intact ecological environment, and strong human interference could significantly decrease the diversity of butterfly.

Table 1.– Quantity indices of the butterfly community in Simian Mountain.

Families	Genera	Species	Individuals	Diversity indices		Evenness index (J)	Species richness (R)
				H'(S)	H'(G)		
Papilionidae	4	13	272	1.828	1.091	0.713	2.141
Hesperiidae	16	20	89	2.621	2.718	0.875	4.233
Pieridae	6	9	986	1.510	1.677	0.687	1.160
Riodinidae	4	8	145	1.537	1.213	0.739	1.407
Lycaenidae	17	20	777	0.842	2.788	0.281	2.855
Nymphalidae Libytheinae	1	1	21	0	0	0	0
Nymphalidae Danainae	1	2	4	0.562	0	0.811	0.721
Nymphalidae Morphinae Amathusiini	3	4	24	0.710	1.040	0.512	0.944
Nymphalidae Satyrinae	10	23	208	2.613	1.820	0.833	4.122
Nymphalidae Heliconiinae Acraeini	1	1	5	0	0	0	0
Nymphalidae Nymphalinae	19	50	473	3.248	2.281	0.830	7.956

Table 2.– Diversity parameters of butterflies in the different habitats in Simian Mountain.

Samples	Diversity indices			Evenness index (J)	Species richness (R)
	H'(F)	H'(G)	H'(S)		
I	1.542	3.577	3.620	0.815	12.924
II	1.513	3.823	2.802	0.623	12.605
III	1.497	3.644	3.514	0.797	13.038
IV	1.402	3.222	2.053	0.569	6.279
V	1.328	3.504	3.666	0.841	13.045

Discussion

In our survey, 67 species of butterflies were recorded for the first time in Simian Mountain and 68 species recorded by LI & HOU (2004) were not found in our survey. It is possible that the fauna investigation by Li and Hou was not comprehensive and some habitats suitable for some butterflies were not included in our sampling sites; of course, other reasons might also exist. In summary, the diversity of butterfly in this area is rich.

This study showed that Nymphalidae had the highest species diversity and species richness among the 6 families, and Acraeini and Libytheinae had the least in Simian Mountain. This result was also found in other studies (MAJUMDER *et al.*, 2013; QURESHI, 2014; HARSH *et al.*, 2015; SHANG *et al.*, 2017). It could be attributed to the following factors. First, Nymphalidae is the most speciose group

of butterflies (NIDUP *et al.*, 2014), while Acraeini and Libytheinae are small groups. Second, members of Nymphalidae are able to inhabit different habitats for resources owing to their polyphagous nature and their stronger ability to fly (ESWARAN & PRAMOD, 2005; KRISHNAKUMAR *et al.*, 2008; RAUT & PENDHARKAR, 2010; SARKAR *et al.*, 2011; HARSH *et al.*, 2015; WIDHIONO, 2015). In addition, they can avoid shade and dense vegetation but frequent openings in all vegetation types, including clearings in evergreen forest (MALI *et al.*, 2014).

Overall, the ecological environment of Simian Mountain is suitable for the existence of butterflies. Species diversity is closely associated with their habitats, for example, butterfly diversity can reflect the diversity of host plants in the habitat (NIDUP *et al.*, 2014; HARSH *et al.*, 2015). In other words, an abundance of diverse vegetation generally supports high butterfly diversity. And other factors in habitats, such as light and human activities, can also influence species diversity. These were demonstrated in our survey. Among the five belt transects, the species diversity of butterfly in Sample V was the highest, closely followed by that in Sample I. It showed that Sample I in which ecological environment was relatively intact had not the highest butterfly diversity. And it indicated that not only an abundance of diverse vegetation but also a wide field of vision with sufficient light, a feature of Sample V, was important factor for a higher species diversity of butterfly. Moreover, intermediate human interference in Sample V might be helpful for species diversity which accorded with the intermediate disturbance hypothesis (CONNELL, 1978; HU *et al.*, 2010). In addition, the diversity of butterfly in Sample IV was the least because of its less and simpler vegetation and strong human interference. This result implied that the ecological environment might have been destroyed or the vegetation had become simple probably if the diversity and populations of butterflies were distinctly decreased in the habitats under normal climatic conditions. Therefore, an effective way to protect the diversity of butterflies is to protect the environment in which they live.

At present, the main threat to butterfly diversity in Simian Mountain is the influence of tourism development. Therefore, measures such as controlling the number of tourists and vehicles and stopping additional construction in the Natural Reserve must be taken to decrease human interference and protect the habitats of butterflies. Of course, continued monitoring of butterfly diversity is highly advocated for biodiversity assessment and conservation.

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Appendix: Species of butterflies in different habitats in Simian Mountain, China.

Family	Genus	Species	The individual numbers				
			I	II	III	IV	V
PAPILIONIDAE	* <i>Atrophaneura</i> Reakirt, 1865 <i>Byasa</i> Moore, 1882 <i>Graphium</i> Scopoli, 1777 <i>Papilio</i> Linnaeus, 1758	* <i>A. aidonea</i> (Doubleday, 1845)	2	2	2		
		* <i>B. menci</i> us (C. & R. Felder, 1862)		2	9		
		* <i>G. chironides</i> (Honrath, 1884)		11			1
		<i>G. cloanthus</i> (Westwood, 1841)	1				
		<i>G. leechi</i> (Rothschild, 1895)		1			
		<i>G. sarpedon</i> (Linnaeus, 1758)	4	15	2	1	2
		<i>P. bianor</i> Cramer, 1777	16	36	17	12	17
		<i>P. machaon</i> Linnaeus, 1758					1
		* <i>P. memnon</i> Linnaeus, 1758	1	1			2
		<i>P. nephelus</i> Boisduval, 1836	4	1		1	4
		<i>P. paris</i> Linnaeus, 1758	9	24	12	3	8
		<i>P. polytes</i> Linnaeus, 1758		1			
		<i>P. protenor</i> Cramer, [1775]	12	18	9	2	6
		HESPERIIDAE	<i>Aeromachus</i> Nicéville, [1890] * <i>Ampittia</i> Moore, 1881 <i>Bibasis</i> Moore, [1881] <i>Choaspes</i> Moore, 1881 <i>Caltoris</i> Swinhoe, 1893 <i>Celaenorhynchus</i> Hübner, [1819] * <i>Capila</i> Moore, 1866 * <i>Ctenoptilum</i> Nicéville, 1890 * <i>Daimio</i> Murray, 1875 <i>Gerosis</i> Mabille, 1903 <i>Hasora</i> Moore, 1881 * <i>Halpe</i> Moore, 1878 <i>Notocrypta</i> Nicéville, 1889 <i>Parnara</i> Moore, [1881] <i>Polytremis</i> Mabille, 1904 * <i>Scobura</i> Elwes & Edwards, 1897	* <i>A. catocyanea</i> (Mabille, 1876)		1	
<i>A. piceus</i> Leech, 1893				1			
* <i>A. virgata</i> (Leech, 1890)	3			6			
<i>B. gomata</i> (Moore, [1866])							1
<i>C. benjaminii</i> (Guérin-Mèneville, 1843)	1			5			
<i>C. cahira</i> (Moore, 1877)	1						
<i>C. maculosus</i> (C. & R. Felder, 1867)				9	5		
* <i>C. patula</i> de Nicéville, 1889				2			
* <i>C. omeia</i> (Leech, 1894)	3			2	3		
* <i>C. vasava</i> (Moore, [1866])	4			2			
* <i>D. tethys</i> (Ménétriès, 1857)	1						
<i>G. phisara</i> (Moore, 1884)	1			1	4		
<i>H. anurade</i> de Nicéville, 1889	1			7			1
* <i>H. nephele</i> Leech, [1893]				2			
<i>N. curvijascia</i> (C. & R. Felder, 1862)				1			
* <i>N. feisthamelii</i> (Boisduval, 1832)				2			
<i>P. ganga</i> Evans, 1937				1			
<i>P. guttatus</i> (Bremer & Grey, [1852])				2	5		
* <i>P. matsuii</i> Sugiyama, 1999				4	6		
* <i>S. masutarai</i> Sugiyama, 1996					1		
PIERIDAE	<i>Colias</i> Fabricius, 1807 <i>Dercas</i> Doubleday, 1847 <i>Eurema</i> Hübner, [1819] <i>Gonepteryx</i> Leach, [1815] <i>Pieris</i> Schrank, 1801 <i>Talbotia</i> Bernardi, 1958	<i>C. fieldii</i> Ménétriès, 1855		2	1	3	
		<i>D. lycorias</i> (Doubleday, 1842)	43	35	21		20
		<i>E. hecabe</i> (Linnaeus, 1758)	30	30	32	4	1
		<i>G. amintha</i> Blanchard, 1871		1	1		1
		* <i>G. maxima</i> Butler, 1885					1
		<i>P. canidia</i> (Sparman, 1768)	61	128	67	156	61
		<i>P. melete</i> Ménétriès, 1857	14	33	27	13	25
		<i>P. rapae</i> (Linnaeus, 1758)	3	6		9	3
		<i>T. naganum</i> (Moore, 1884)	18	12	78	33	13
		RIODINIDAE	<i>Abisara</i> C. & R. Felder, 1860 <i>Dodona</i> Hewitson, 1861 <i>Stiboges</i> Butler, 1876 <i>Zemeros</i> Boisduval, [1836]	<i>A. burnii</i> (Nicéville, 1895)	2		1
<i>A. echerius</i> (Stoll, [1790])	3						
* <i>A. fylla</i> (Westwood, 1851)	5			10	6	1	6
<i>A. fylloides</i> (Moore, 1902)	23			7	3		2
* <i>D. maculosa</i> Leech, 1890							1
* <i>S. elodinia</i> Fruhstorfer, 1914	3						
<i>S. nymphidia</i> Butler, 1876	13						
<i>Z. flegyas</i> (Cramer, [1780])	30			10	12	1	5

LYCAENIDAE	* <i>Amblopala</i> Leech, 1893 * <i>Ancema</i> Eliot, 1973 <i>Curetis</i> Hübner, [1819] <i>Celastrina</i> Tutt, 1906 <i>Catochrysops</i> Boisduval, 1832 * <i>Deudorix</i> Hewitson, 1863 <i>Everes</i> Hübner, [1819] <i>Taraka</i> Doherty, 1889 * <i>Gonerilia</i> Shirôzu & Yamamoto, 1956 <i>Heliophorus</i> Geyer, [1832], in Hübner <i>Jamides</i> Hübner, [1819] <i>Lampides</i> Hübner, [1819] * <i>Orthomiella</i> de Nicéville, 1890 <i>Rapala</i> Moore, [1881] <i>Tongeia</i> Tutt, [1908] <i>Udara</i> Toxopeus, 1928 <i>Pseudozizeeria</i> Beuret, 1955	* <i>A. avidiena</i> (Hewitson, 1877) * <i>A. ctesia</i> (Hewitson, 1865) <i>C. acuta</i> Moore, 1877 <i>C. argiolus</i> (Linnaeus, 1758) <i>C. lavenderis</i> (Moore, 1877) <i>C. strabo</i> (Fabricius, 1793) * <i>D. rapaloidea</i> (Naritomi, 1941) <i>E. argiades</i> (Pallas, 1771) <i>T. hamada</i> (Druce, 1875) * <i>T. shiloi</i> Tamai & Guo, 2001 * <i>G. seraphim</i> (Oberthür, 1886) * <i>H. saphir</i> (Blanchard, 1871) <i>J. bochus</i> Cramer, 1782 <i>L. boeticus</i> (Linnaeus, 1767) * <i>O. rantaizana</i> Wileman, 1910 * <i>R. micans</i> (Bremer & Grey, 1853) * <i>T. filicaudis</i> (Pryer, 1877) * <i>T. potanini</i> (Alphéraky, 1889) <i>U. albocaerulea</i> (Moore, 1879) <i>P. maha</i> (Kollar, 1844)	1 1 8 104 1 1 1 1 1 2 2 1 2 1 16 8	1 3 496 10 1 1 1 1 1 4 1 1 2 2 2	6 10 1 1 1 1 4 4 1 1 1 2 2	1 14 2 2 1 1 1 1 1 1 1 1 1 1 1 2	2 22 1 1 1 1 1 1 1 1 4 1 1 6 2
NYMPHALIDAE LIBYTHEINAE	* <i>Libythea</i> Fabricius, 1807	* <i>L. lepita</i> Moore 1857	6	11	3		1
NYMPHALIDAE DANAINAE	<i>Parantica</i> Moore, [1880]	* <i>P. melaneus</i> (Cramer, [1775]) <i>P. sita</i> (Kollar, 1844)			1 2	1	
NYMPHALIDAE MORPHINAE AMATHUSINI	<i>Aemonia</i> Hewitson, 1868 <i>Faunis</i> Hübner, [1819] <i>Stichopthalma</i> C. & R. Felder, 1862	<i>A. amathusia</i> (Hewitson, 1867) * <i>A. oberthueri</i> Stichel, 1906 <i>F. aerope</i> (Leech, 1890) <i>S. howqua</i> (Westwood, 1851)		3 1 5			1 1 1
NYMPHALIDAE SATYRINAE	<i>Acropolis</i> Hemming, 1934 <i>Lethe</i> Hübner, [1819] <i>Mycalesis</i> Hübner, [1818] * <i>Melanitis</i> Fabricius, 1807 <i>Mandarina</i> Leech, [1892] <i>Neorina</i> Westwood, [1850] <i>Neope</i> Moore, [1866] <i>PentHEMA</i> Doubleday, [1848] <i>Ragadia</i> Westwood, [1851] <i>Ypthima</i> Hübner, [1818]	<i>A. thalia</i> (Leech, 1891) * <i>L. baucis</i> Leech, 1891 * <i>L. chandica</i> (Moore, [1858]) * <i>L. christophi</i> Leech, 1891 <i>L. lanaris</i> Butler, 1877 <i>L. satyrina</i> Butler, 1871 <i>L. syrcis</i> (Hewitson, 1863) <i>L. verma</i> (Kollar, [1844]) <i>M. francisca</i> (Stoll, [1780]) * <i>M. leda</i> (Linnaeus 1758) <i>M. regalis</i> (Leech, 1889) <i>N. patria</i> Leech, 1891 * <i>N. pulahoides</i> (Moore, [1892]) <i>P. adelma</i> (C. & R. Felder, 1862) <i>R. crisilida</i> Westwood, [1851] <i>Y. baldus</i> (Fabricius, 1775) <i>Y. chinensis</i> Leech, 1891 <i>Y. conjuncta</i> Leech, 1891 * <i>Y. megalomma</i> Bulter, 1874 <i>Y. multistriata</i> Butler, 1883 <i>Y. praenubila</i> Leech, 1891 * <i>Y. pratti</i> Elwes, 1893 * <i>Y. sinica</i> Uémura & Koiwaya, 2000		1 1 1 1 1 9 1 1 7 4 11 2 4 8 1	1 5 1 1 1 9 2 2 1 2 1 3 6 1 4 8 1 4	1 1 1 1 1 2 1 1 2 2 1 1 1 6 7 12 5 4	3 1 1 1 1 7 3 3 1 1 1 3 3 1 4 1 2
NYMPHALIDAE HELICONIINAE ACRAEINI	* <i>Acraea</i> Fabricius, 1807	* <i>A. violae</i> (Fabricius, 1793)			1		4

NYMPHALIDAE	* <i>Araschnia</i> Hübner, [1819]	* <i>A. doris</i> Leech, [1892]	1		1			
NYMPHALINAE		* <i>A. prorsoides</i> (Blanchard, 1871)	1					
	<i>Argyreus</i> Scopoli, 1777	<i>A. hyoerbius</i> (Linnaeus, 1763)	2	9	2	24		4
	<i>Athyma</i> Westwood, [1850]	* <i>A. asura</i> Moore, [1858]	11	4				1
		<i>A. fortuna</i> Leech, 1889	2					1
		<i>A. jina</i> Moore, [1858]	15	11	3			6
		<i>A. opalina</i> (Kollar, [1844])	2	4	4			1
		* <i>A. ranga</i> Moore, [1858]	1					
	* <i>Cethosia</i> Fabricius, 1807	* <i>C. biblis</i> (Drury, [1773])			1			
	<i>Cyrestis</i> Boisduval, 1832	<i>C. thyodamas</i> Boisduval, 1846	8	6	1			1
	<i>Euthalia</i> Hübner, [1819]	* <i>E. bunzoi</i> Sugiyama, 1996						4
		<i>E. kardama</i> (Moore, 1859)				1		3
		* <i>E. omeia</i> Leech, 1891						3
		* <i>E. patala</i> (Kollar, [1844])		1				6
		* <i>E. thibetana</i> (Poujade, 1885)	1					
	* <i>Hestina</i> Westwood, [1850]	* <i>H. assimilis</i> (Linnaeus, 1758)						1
		* <i>H. nama</i> (Doubleday, 1844)	1	1				
	* <i>Helcyra</i> Felder, 1860	* <i>H. subalba</i> (Poujade, 1885)			0			2
	* <i>Junonia</i> Hübner, [1819]	* <i>J. iphita</i> (Cramer, [1779])			2			
	<i>Kallima</i> Doubleday, [1849]	<i>K. inachus</i> (Boisduval, 1846)			1			
	* <i>Mimathyma</i> Moore, [1896]	* <i>M. schrenckii</i> (Ménétriés, 1859)			1			
	<i>Neptis</i> Fabricius, 1807	<i>N. ananta</i> Moore, 1857	5	5	1			1
		<i>N. antilope</i> Leech, 1890						1
		<i>N. armandia</i> (Oberthür, 1876)	2		1	1		1
		<i>N. clinia</i> Moore, 1892	6	5	1			7
		* <i>N. hesione</i> Leech, 1890	2					
		<i>N. hylas</i> (Linnaeus, 1758)	5	4	1			8
		* <i>N. kuangtungensis</i> Mell, 1923	2					
		* <i>N. mahendra</i> Moore, 1872				1		
		* <i>N. manasa</i> Moore, 1857	3	1	3			2
		* <i>N. meloria</i> Oberthür, 1906			1			
		<i>N. miah</i> Moore, 1857	1	1	2	1		
		* <i>N. namba</i> Tytler, 1915			1			
		* <i>N. nata</i> Moore, [1858]				1		
		* <i>N. noyala</i> Oberthür, 1906						1
		* <i>N. sankara</i> (Kollar, 1844)	9	2	3			2
		<i>N. sappho</i> (Pallas, 1771)	13	7	8			11
		<i>N. soma</i> Moore, 1858	8	7	6			7
		* <i>N. speyeri</i> Staudinger, 1887	1					
		* <i>N. thestias</i> Leech, [1892]	1					
		<i>N. yerburii</i> Butler, 1886						2
	<i>Phaedyma</i> Felder, 1861	<i>P. aspasia</i> (Leech, 1890)	2	4	1			1
	<i>Polyura</i> Billberg, 1820	<i>P. narcaea</i> (Hewitson, 1854)	1	10	2			2
	* <i>Rohana</i> Moore, [1880]	* <i>P. parisatis</i> (Westwood, 1850)	1					
	<i>Pseudergolis</i> C. & R. Felder, [1867]	<i>P. wedah</i> (Kollar, 1848)	22	13	13	3		6
	<i>Symbrenthia</i> Hübner, [1819]	* <i>S. brabira</i> Moore, 1872	10	2		5		
		<i>S. lilaea</i> (Hewitson, 1864)	4	6	4	4		2
		<i>S. nicea</i> (Gray, 1846)	4	6	2			2
	<i>Stibochiona</i> Butler, 1869	<i>V. cardui</i> (Linnaeus, 1758)			1			1
	<i>Vanessa</i> Fabricius, 1807	<i>V. indica</i> (Herbst, 1794)	7	3	3	2		4

Note.— The symbol (*) indicates the taxon which was recorded for the first time in Simian Mountain, Chongqing, China.

Contribución al conocimiento de los Lepidoptera de España, con la descripción de un género y una nueva especie para nuestra fauna (Lepidoptera: Pyralidae, Phycitinae)

J. Gastón & A. Vives Moreno

Resumen

Se describe un nuevo género *Propeacrobasis* Gastón & Vives, gen. n., y una nueva especie del sur de España, *Propeacrobasis notarioi* Gastón & Vives, sp. n.

PALABRAS CLAVE: Lepidoptera, Pyralidae, Phycitinae, nuevo género, nueva especie, España.

**Contribution to the knowledge of the Lepidoptera of Spain, with the description of a new genus and a new species for our fauna
(Lepidoptera: Pyralidae, Phycitinae)**

Abstract

A new genus *Propeacrobasis* Gastón & Vives, gen. n., and one new species *Propeacrobasis notarioi* Gastón & Vives, sp. n. from southern of Spain are described.

KEY WORDS: Lepidoptera, Pyralidae, Phycitinae, new genus, new species, Spain.

Introducción

Como consecuencia de la revisión del material procedente de una rambla situada al sur del municipio de Vélez de Benaudalla, Granada (España), se detectó una especie de Phycitinae que desde el principio nos llamó la atención, y que no pudimos adscribirla a ninguna de las especies conocidas.

Como resultado de nuestras investigaciones, comprobamos que este material no se ajustaba a ningún género ni especie conocidos por nosotros, por lo que se hace necesario crear un nuevo género que aquí denominamos *Propeacrobasis* Gastón & Vives, gen. n., siendo el más próximo *Acrobasis* Zeller, 1839 y cuya especie tipo es *Propeacrobasis notarioi* Gastón & Vives, sp. n.

Material y métodos

Los especímenes estudiados se obtuvieron mediante muestreos de campo utilizando trampas de luz en el municipio de Vélez de Benaudalla en Granada (España). Para su identificación nos hemos basado en el examen comparativo de los caracteres morfológicos externos y, sobre todo, en el análisis de la estructura genital de los ejemplares. La preparación de la genitalia se ha efectuado siguiendo a ROBINSON (1976), con modificaciones. Se han utilizado los microscopios Leica DMLB, Leica

MZAPO, NIKON Eclipse E400 y las cámaras digital Leica DFC550, NIKON D3100 y SONY α 100 DSLR-A100K con objetivo AF 100 MACRO 1:2,8 (32), e igualmente para el retoque fotográfico, el programa de Adobe Photoshop ©.

Abreviaturas

JG Javier Gastón

prep. genit. Preparación de genitalia

MNCN Museo Nacional de Ciencias Naturales, Madrid, España

Resultados

Género *Propeacrobasis* Gastón & Vives, gen. nov.

Especie tipo: *Propeacrobasis notarioi* Gastón & Vives, sp. n.

Diagnosis: Habitus. Palpos labiales cortos. Antenas filiformes recubiertas de pequeñas cerdas blanco-grisáceas. Alas anteriores poco esbeltas, curvas y convexas. Termen, redondeado, lo mismo que el ápice. Alas posteriores con el ápice sobresaliente, termen redondeado y ángulo anal inapreciable. R y M1 nacen juntas y se separan a la mitad de su recorrido, M2 y M3 separadas.

Genitalia: Del macho con uncus piramidal con el extremo redondeado. Gnathos con su extremo aplanado adquiriendo una forma redondeada muy característica. Valvas alargadas. Sacculus esclerotizado. Juxta bilobular. Aedeagus corto y abultado en su parte central. Culcita muy característica, con forma de X de centro desplazado hacia su base. De la hembra con papilas anales bien desarrolladas. Apófisis anteriores y posteriores de mediano tamaño. Ostium membranoso. Ductus bursae piramidal y bursa ovoidal.

Etimología: Se describe un nuevo género como *Propeacrobasis* Gastón & Vives, gen. n. por su cercanía con el género *Acrobasis* Zeller, 1839. Siguiendo a VIVES MORENO (2014), tenemos que situarlo detrás del género *Acrobasis* Zeller, 1839.

Propeacrobasis notarioi Gastón & Vives, sp. n.

Material estudiado: Holotypus 1 ♀, ESPAÑA, GRANADA, Rambla Escalate, 90 m, 31-V-2019 F. Morente leg. en coll. JG, prep. genit. 7292JG (MNCN_Ent 234220); depositado en el Museo Nacional de Ciencias Naturales, en Madrid, España.

Paratypus 3 ♂♂, 1 ♀: ESPAÑA, GRANADA: 2 ♂♂, Rambla Escalate, 90 m, 11-V-2019, F. Morente leg. en coll. JG, prep. genit. 7275JG, 7281JG; 1 ♂, ditto, 31-V-2019, F. Morente leg. en coll. JG, prep. genit. 7277JG; 1 ♀, ditto, F. Morente leg. en coll. JG, prep. genit. 7290JG.

Descripción del macho (fig. 2): Envergadura, 13,33 mm, (n = 3). Cabeza bien desarrollada con pelos escamiformes blanco-grisáceos. Palpos labiales cortos, recubiertos de pelos escamiformes grises y blanco-grisáceos en bandas transversales, ligeramente curvados en su extremo hacia arriba. Antenas filiformes recubiertas de pequeñas cerdas blanco-grisáceas. Tórax, patagio y tégulas recubiertos de escamas blanco-grisáceas con el extremo manchado de gris más oscuro, lo que le confiere un aspecto general “gris-claro”. Abdomen recubierto de las mismas escamas que el tórax. Alas anteriores poco esbeltas, con la costa (margen costal), curva y convexa. Termen, (margen externo), redondeado, lo mismo que el ápice. Alas posteriores con el ápice sobresaliente, termen redondeado y ángulo anal inapreciable. El color de fondo de las alas delanteras es blanco-grisáceo, bastante oscuro, compuesto de una alternancia de escamas grises oscuras y blanco-grisáceas. En la zona discal, destaca sobre el fondo gris una doble franja vertical de escamas más oscuras que enlaza el margen costal con el margen interno. En esta doble franja vertical, la que limita con la zona post-basal se compone enteramente de escamas negras, mientras que la situada hacia la zona post-discal solo dispone de escamas negras en la parte superior (cerca de la costa), sustituyéndose éstas por escamas ocreas y blanco-ocráceas (incluso alguna de color naranja) hacia el margen interno del ala. En la zona basal predominan las escamas

oscuras, aclarándose éstas en la zona post-basal, adquiriendo un tono gris muy claro. La zona post-discal es de un color gris claro, bastante uniforme, destacando dos puntos o máculas negras poco perceptibles ubicadas en su parte central y algo desplazadas hacia la costa. Estas máculas no se sitúan en un plano vertical, ya que la emplazada en la parte inferior, está ligeramente dirigida hacia el ángulo dorsal (tornus). La zona marginal de las alas anteriores se compone de escamas grises algo más claras que las de la zona post-discal. En su parte superior, junto al ápice se observa una mancha triangular de escamas muy oscuras, casi negras. Entre esta mancha y el ápice existen dos pequeñas máculas oscuras, y poco perceptibles, situadas se forma vertical y paralelas al margen externo del ala. Las fimbrias de las alas anteriores se componen de escamas de tonos grises y blanco-grisáceos alternos, lo que confieren un remate de las alas con doble línea oscura. Las alas posteriores son de color gris claro “blanco sucio”, sin manchas. En la zona marginal, estas escamas claras se oscurecen, especialmente en el ápice. Las fimbrias están formadas por pelos de color gris-ocráceo en su base y blanco-grisáceo muy claro en su extremo.

Genitalia del macho (fig. 3): Uncus piramidal con el extremo redondeado. Gnathos con su extremo muy aplanado adquiriendo una forma redondeada muy característica, rematado en su parte superior con un apéndice en forma de lengua bífida muy acusada. Valvas alargadas con la costa ligeramente convexa con un cordón marginal esclerotizado, estrechas y con el cucullus redondeado. La estructura de las mismas coincide con las que presenta el género *Acrobasis* Zeller, 1839, manteniendo una base prácticamente nada esclerotizada, (exceptuando su conexión superior con tegumen y el sacculus), y una parte central y distal más esclerotizada con forma de cuchara y altamente recubierta de pelos. Sacculus bastante esclerotizado, dispone de una base ancha para adelgazarse posteriormente y rematarse con un extremo delgado y afilado. Juxta claramente bilobular, con dos potentes brazos divergentes estrechándose paulatinamente hacia sus extremos, que se rematan en una punta redondeada. Saccus pequeño, apuntado con su extremo redondeado. Aedeagus corto, abultado en su parte central, con la vesica forrada en su parte basal de minúsculos granos algo esclerotizados. El octavo segmento del abdomen incluye una culcita muy característica, con forma de X de centro desplazado hacia su base.

Descripción de la hembra (fig. 1): Envergadura, 13 mm, (n = 2). La morfología de las hembras no difiere de la de los machos.

Genitalia de la hembra (fig. 4): Papilas anales de bien desarrolladas, muy anchas en su base y apuntadas en su extremo, que es redondeado. Apófisis posteriores de mediano tamaño. El octavo segmento dispone de una cara dorsal estrecha y una ventral mucho más alta y desarrollada (tres veces más alta), rematada por su parte anterior por un cordón esclerotizado sumamente curvado de forma cóncava. Apófisis anteriores de mediano tamaño y ostium membranoso y poco ostensible y con forma de cáliz de poco fondo. Ductus bursae piramidal y membranoso, con la parte más estrecha en contacto con el ostium, y la más ancha en contacto con la bursa, punto en el que se aprecia un leve ensanchamiento bulboso. Bursa ovoidal, membranosa, con el ductus seminalis muy fino, que entronca con ésta en su parte superior, cerca del cervix. Los gránulos que forman la pared de la bursa se esclerotizan en la zona alta de ésta, presentando una suave mancha horizontal.

Biología: Desconocida. No se conocen los estados inmaduros ni las plantas que sustentan a las orugas. Los imagos se capturaron cerca del río Guadalfeo, en una rambla kárstica formada por calizas y dolomías, en el piso bioclimático termomediterráneo, y a una altitud de aproximadamente 90 m. sobre el nivel del mar. Por los datos de que disponemos, hemos comprobado que vuela únicamente en una generación que se extiende desde comienzos de abril hasta finales de mayo.

La vegetación de esta zona está compuesta por matorrales formados mayoritariamente por *Rosmarinus officinalis* L., *Ulex parviflorus* Pourr., *Cistus albidus* L., *Chamaerops humilis* L., *Osyris lanceolata* Hocht. & Steud. y *Maytenus senegalensis europaea* (Boiss.) Rivas Goday & Rivas Martínez, con algunas zonas de *Quercus ilex rotundifolia* Lam., *Ceratonia siliqua* L., *Olea europea* L., *Pistacia lentiscus* L., *Rhamnus alaternus* L. y *Daphne gnidium* L., con matorral subxerófilo como *Buxus balearica* Lam. en umbrías y *Rosmarinus tomentosus* Hub.-Mor. & Maire, en solanas.

Distribución: Todos los ejemplares se capturaron en la rambla Escalate, en el límite sur del término municipal de Vélez de Benaudalla (Granada).

Nota: Siguiendo a VIVES MORENO (2014), debería colocarse detrás del género *Acrobasis* Zeller, 1839.

Etimología: Se dedica esta especie a nuestro estimado amigo y colega el Prof. Dr. Ing. Antonio Notario, Presidente de SHILAP.

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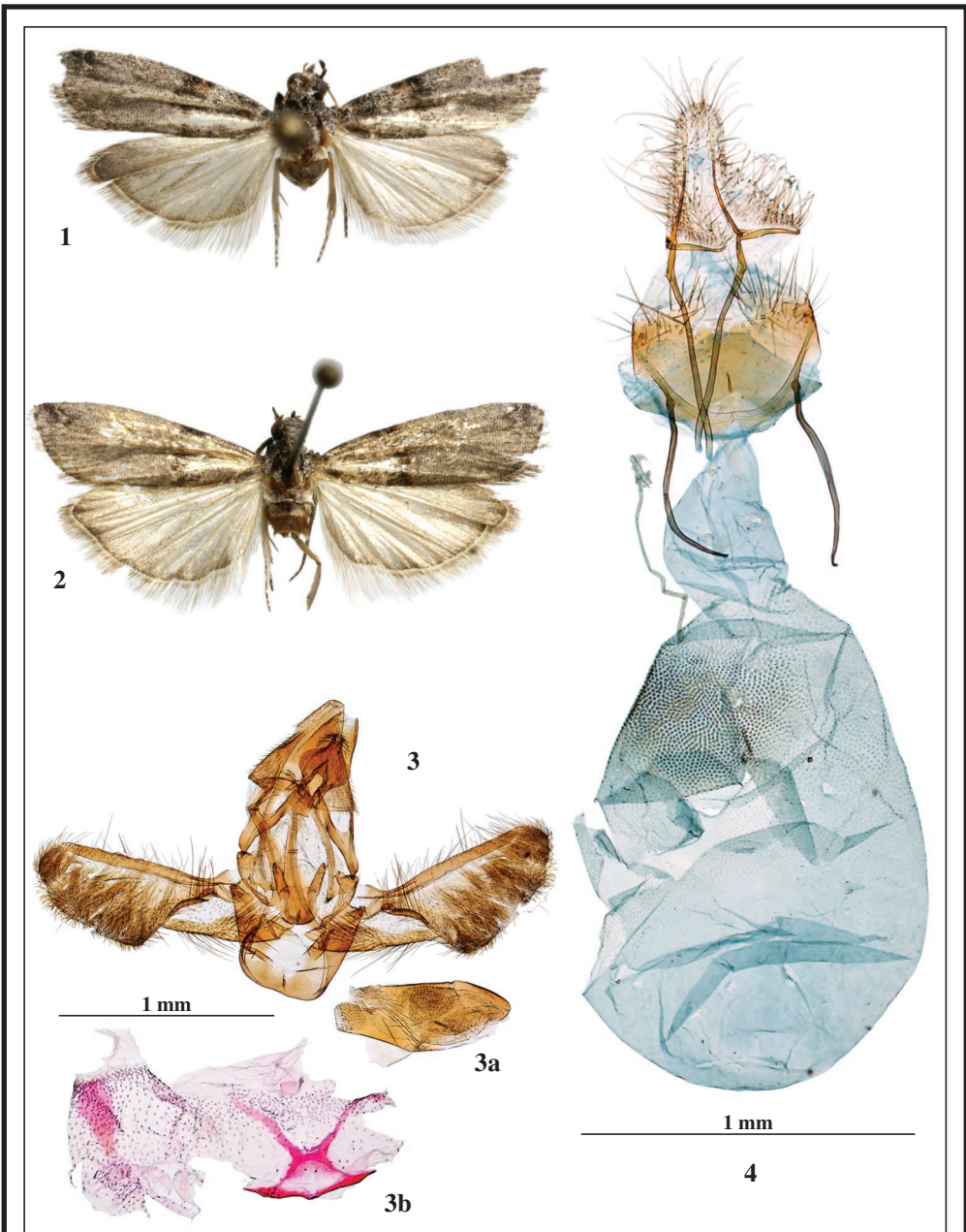
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Figs. 1-4.- Adultos y genitalia. 1. *Propeacrobasis notarioi* Gastón & Vives, sp. n., ♀, HOLOTIPO. 2. *Propeacrobasis notarioi* Gastón & Vives, sp. n., ♂, PARATIPO. 3. *Propeacrobasis notarioi* Gastón & Vives, sp. n., PARATIPO, prep. gen. 7277JG. 3a. Ditto, aedeagus. 3b. Ditto, culcita. 4. *Propeacrobasis notarioi* Gastón & Vives, sp. n., HOLOTIPO, prep. gen. 7292JG.

**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 lepidópteros 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 un correo electrónico al Secretario General de SHILAP con todos los datos personales, incluyendo nombre, apellidos, dirección, DNI o número de pasaporte, número de teléfono (con código del país y prefijo) y correo electrónico. 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 y/o región), el período de tiempo (días, meses o todo el año); método 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, serán incluidos en el Proyecto de Investigación Científica creado por la Sociedad y denominado: “*Faúna Lepidopterológica Ibérica, Balearica y región Macaronésica*”.
- 5.- Con el fin de contribuir con este Proyecto Científico, se ruega remitan a SHILAP, **o una copia por correo electrónico (e-mail), con el listado del material recogido en EXCEL**, sólo en este formato, indicando la Familia, Subfamilia, Tribu, nombre de la especie (género, especie, autor y año), localidad, coordenadas UTM (1 X 1) o GPS, 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 sinónimo 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 Revista de lepidopterología**, las nuevas especies o subespecies 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 de la obligación de estar autorizados para recoger Lepidoptera, con fines científicos, en España y que está prohibida todo tipo de actividad comercial, con el material capturado.
- 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.

Application for permits 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.- To send an electronic mail the General Secretary of SHILAP, with all the personal data, including name, surname, address, ID card number or Passport number, telephone number (with country code and prefix) and electronic mail address. These data must reach the General Secretary at least 45 days in advance of the foreseen collecting activity.
- 3.- The collecting area to be visited by the applicant should also be detailed (province and/or region), expected dates (days, months, or the whole year), collecting method (entomological net, generator, etc.), taxonomical groups of interest to be collected (species, genera, families and/or superfamilies); any other data the applicant wishes to add.
- 4.- All members of SHILAP who apply for these permits to collect Lepidoptera in Spain with scientific purposes, will be included in the Scientific Investigation Project created by the Society and called: “*Lepidopterological Fauna of the Iberian Peninsula, Balearic Islands and Macaronesian region*”.
- 5.- In order to contribute to this Scientific Project, it is requested to send to SHILAP, **either a copy by electronic mail (e-mail), with the listing of materials collected in EXCEL** (- only in this format, please), indicating the Family, Subfamily, Tribe, name of the species (genera, species, author's name and year), town, UTM (1 X 1) or GPS coordinates, province, dates of capture, collector and numbers of males and females captured (**only 5 specimens per taxon and locality, maximum**). Please, use only the “*Catálogo sistemático y sinónimo de los Lepidoptera de la Península Ibérica, de Ceuta, de Melilla y de las islas Azores, Baleares, Canarias, Madeira y Salvajes (Insecta: Lepidoptera)*” (A. VIVES MORENO, 2014)”. This list is necessary for this Scientific Project of SHILAP and for new authorizations.
- 6.- **It's obligatory to publish in SHILAP Revista de lepidopterología**, the new species or subspecies that are discovered and to remit to SHILAP **a part of the TYPE material**, for later incorporation into the Lepidoptera Collection of the National Museum Natural Sciences, Madrid, Spain.
- 7.- All members are kindly reminded of the obligation to be duly authorized for collecting Lepidoptera, with scientific purposes, in Spain and that it is forbidden all type of commercial activity, with the captured material.
- 8.- To know about the scientific aims of SHILAP and to commit to pay the expenses of participation in this Scientific Project, that the Board of Directors considers at any given moment.

Batrachedra amydraula Meyrick, 1916, nueva especie para España y Europa (Lepidoptera: Batrachedridae)

Tx. Revilla & J. Gastón

Resumen

Se menciona por primera vez la presencia de *Batrachedra amydraula* Meyrick, 1916, en España y Europa, se ilustra el adulto y el aparato genital masculino.

PALABRAS CLAVE: Lepidoptera, Batrachedridae, nueva especie, Almería, España, Europa.

Batrachedra amydraula Meyrick 1916, new species from Spain and Europe
(Lepidoptera: Batrachedridae).

Abstract

The presence of the *Batrachedra amydraula* Meyrick, 1916, is reported for the first time in Spain and Europe, the adult and male genitalia are illustrated.

KEY WORDS: Lepidoptera, Batrachedridae, new species, Almeria, Spain, Europe.

Introducción

La fauna de Europa en general y de la Península Ibérica en particular se está incrementando en los últimos años con la aportación de especies que proceden de zonas más cálidas, algunas de ellas consideradas incluso graves plagas en sus lugares de origen.

Tuvimos la ocasión de capturar en los alrededores de Mojácar (Almería, España), un ejemplar de un Lepidoptera cuyo estudio ha dado origen a la publicación de este artículo.

Material y método

El ejemplar estudiado se obtuvo mediante muestreos de campo utilizando trampas de luz en el municipio de Mojácar, en la provincia de Almería (España). Para su identificación nos hemos basado en el examen comparativo de los caracteres morfológicos externos y, sobre todo, en el análisis de la estructura genital del ejemplar, consultándose a KOSTER & SINEV (2003).

La preparación de genitalia se ha efectuado siguiendo a ROBINSON (1976), con modificaciones. Se han utilizado los microscopios NIKON Eclipse E400 y las cámaras digital NIKON D3100 y SONY á100 DSLR-A100K con objetivo AF 100 MACRO 1:2,8 (32), e igualmente para el retoque fotográfico, el programa de Adobe Photoshop ©.

El ejemplar se encuentra depositado en la colección del primer autor.

Batrachedra amydraula Meyrick, 1916 (Fig. 1)

Batrachedra amydraula Meyrick, 1916. *Exot. Micr.*, **2**(1): 30

LT: Pusa, Bengala [India]

Material estudiado: ALMERÍA: Mojácar Costa, 50 m, 1 ♂, 19-V-2019 (Tx. Revilla leg. y coll.) prep. gen. 7530JG (Fig. 2).

Resultados y discusión

Batrachedra amydraula Meyrick, 1916, se distribuye por el norte de África (Argelia, Túnez, Libia, Egipto) y Oriente Medio hasta la India (KOSTER & SINEV, 2003), ahora también presente en el sur de España.

La oruga se encuentra sobre *Phoenix dactylifera* L. (Arecaceae), de la que se alimenta, causando graves daños en la producción de dátiles, considerándose una de las mayores plagas de la palmera datilera (KOSTER & SINEV, 2003).

Agradecimiento

A Ole Karsholt por su amabilidad y desinteresada ayuda en cuantas consultas le hemos realizado y a la Consejería de Medio Ambiente de Andalucía por facilitarnos el permiso para muestrear en esta región española.

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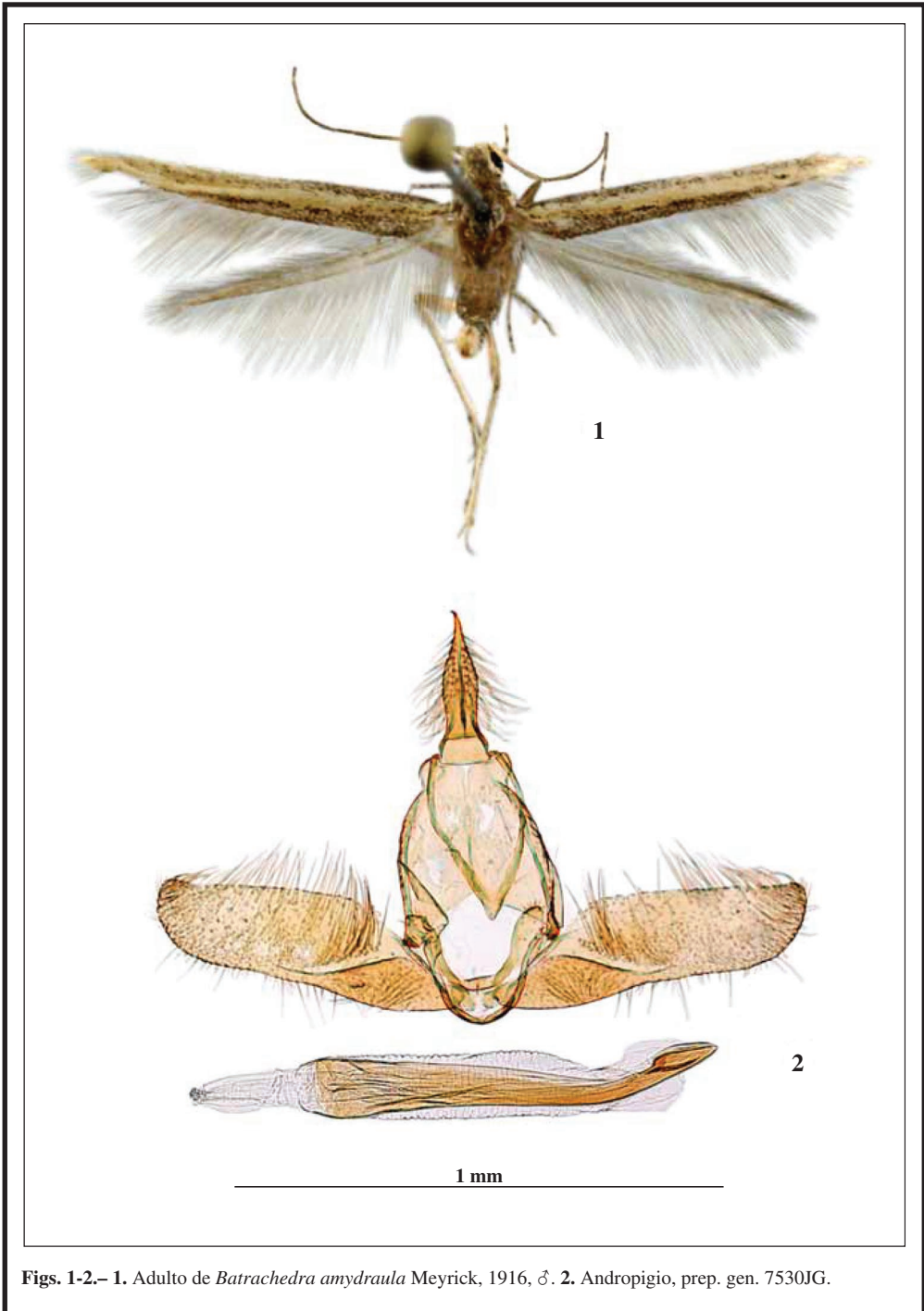
<https://orcid.org/0000-0003-3382-3874>

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Figs. 1-2.– 1. Adulto de *Batrachedra amydraula* Meyrick, 1916, ♂. 2. Andropigio, prep. gen. 7530JG.

NOTICIAS GENERALES / GENERAL NEWS

CORRECCIÓN / CORRECTION.— En el trabajo de P. M. Dobado-Berrios, 2019. “Redescubrimiento en España del endemismo ibérico *Ethmia fumidella delattini* Agenjo, 1964 (Lepidoptera: Gelechioidea)”, publicado en *SHILAP Rev. lepid.*, **47**(187): 437-442, en la página 439: Dice en el tercer párrafo de la discusión: “No obstante, en su porción distal, el trazo de los ejemplares españoles se aprecia menos grueso que en *E. fumidella delattini*,...” Debe decir: “No obstante, en su porción distal, el trazo de los ejemplares españoles se aprecia menos grueso que en *E. fumidella fumidella*,...”. Dice en el cuarto párrafo de la discusión: “Asimismo, muestran coherencia con los periodos de vuelo reportados para *E. fumidella delattini* (marzo-abril) y *E. fumidella delattini* (abril) en sus respectivas áreas de distribución (Tabla I).” Debe decir: “Asimismo, muestran coherencia con los periodos de vuelo reportados para *E. fumidella fumidella* (marzo-abril) y *E. fumidella turcica* (abril) en sus respectivas áreas de distribución (Tabla I).”.— **DETALLES / DETAILS:** Pablo M. Dobado Berrios; Plaza del Moreno, 3-4º A; E-14001 Córdoba, ESPAÑA / SPAIN (e-mail: pablomdb1966@gmail.com).

SHILAP REVISTA DE LEPIDOPTEROLOGÍA EN LOS ÍNDICES DE IMPACTO INTERNACIONALES 2018 / SHILAP REVISTA DE LEPIDOPTEROLOGIA IN THE INTERNATIONAL IMPACT INDEXES 2018.— Según SCOPUS / ELSEVIER en su Índice SJR 2018 de *SCImago Journal Rank*, aparecemos con un **Indicador SJR de 0,176 FI, Índice H: 9, Categoría: 131/146 (Q4, Ciencia de los Insectos)**. Según THOMSON REUTERS (ISI) en su Índice JCR 2018 de *Journal Citation Reports*, aparecemos con un **Índice de Impacto de 0,350 FI, Categoría: 89/98 (Q4, Entomología), el Índice de Inmediatez de 0,161, el Eigenfactor de 0,00018 y la Categoría Eigenfactor: Ecología y Evolución.** / According to SCOPUS / ELSEVIER in their Index SJR 2018 of *SCImago Journal Rank*, we appear with a **SJR Indicator of 0,176 FI, H Index: 9, Rank: 131/146 (Q4, Insect Science)**. According to THOMSON REUTERS (ISI) in their Index JCR 2018 of *Journal Citation Reports*, we appear with an **Impact Index of 0,350 FI, Rank: 89/98 (Q4, Entomology), the Immediacy Index of 0,161, the Eigenfactor of 0,00018 and the Eigenfactor Category: Ecology and Evolution.**— **DETALLES / DETAILS:** SHILAP, Apartado de correos, 331, E-28010 Madrid, ESPAÑA / SPAIN (E-mail: avives@orange.es).

ALFILERES ENTOMOLÓGICOS PRECIO ESPECIAL PARA LOS SOCIOS DE SHILAP.— En estos momentos SHILAP pone a disposición de sus socios alfileres entomológicos pavonados en negro y fabricados en la República Checa con una excelente calidad y de dos marcas diferentes a elegir AUSTERLITZ y MORPHO / SPHINX (la marca MORPHO ha cambiado de nombre y se denomina SPHINX), los precios y los números disponibles en estos momentos son:

ELEFANT - IMPERIAL EMIL ARLT

Números: 000, 00, 0, 1, 3, 4, 5, 6 y 7 (hasta final de existencias)..... 8,50 euros / 100 alfileres
 Minucias: 0,10, 0,15 y 0,20 (hasta final de existencias) 15 euros / 500 alfileres
 Minucias (KARLSBADER): 0'15 (hasta final de existencias)..... 15 euros / 500 alfileres

AUSTERLITZ

Números: 000, 00, 0, 1, 2, 3, 4, 5, 6 y 7 5,50 euros / 100 alfileres

MORPHO / SPHINX

Números: 000, 00, 0, 1, 2, 3, 4, 5, 6 y 7 5 euros / 100 alfileres
 Minucias: 0,10 0,15 y 0,20..... 12 euros / 500 alfileres

A estos precios hay que incluir los gastos de envío.— **DETALLES / DETAILS:** SHILAP; Apartado de correos, 331; E-28080 Madrid, ESPAÑA / SPAIN (E-mail: avives@orange.es).

DE LAS SEPARATAS / REPRINTS.— Los autores recibirán un **PDF gratis de su trabajo**. Si necesita separatas adicionales en papel del mismo, deberían de comunicárselo con antelación al Secretario General y el gasto correrá a cargo del autor/es. / **Authors shall receive a PDF of their paper free of charge.** If they need additional reprints of their paper, these should be ordered beforehand from the General Secretary, at extra cost to be paid for by the author.— **DETALLES / DETAILS:** SHILAP; Apartado de correos, 331, E-28080 Madrid, ESPAÑA / SPAIN (E-mail: avives@orange.es).

Redescubrimiento de *Piercolias coropunae* (Dyar, 1913) con la redesccripción del macho y primera descripción de la hembra (Lepidoptera: Pieridae)

J. Farfán & J. Cerdeña

Resumen

Se cita el redescubrimiento de *Piercolias coropunae* (Dyar 1913) en base a la reciente recolección de diez machos y cuatro hembras en la localidad tipo (Coropuna). La descripción original de *P. coropunae* se basó sobre un único macho recolectado en 1911 por la Expedición peruana de la Universidad de Yale al Perú, en el volcán nevado Coropuna (Arequipa) y desde entonces, más de 100 años atrás, la especie no había sido registrada nuevamente. Se proporciona una redesccripción del macho y la primera descripción de la hembra.

PALABRAS CLAVE: Lepidoptera, Pieridae, *Piercolias*, Coropuna, Arequipa, Perú.

Rediscovery of *Piercolias coropunae* (Dyar 1913) with re-description of male and first description of the female (Lepidoptera: Pieridae)

Abstract

The rediscovery of *Piercolias coropunae* (Dyar, 1913) is reported herein, based on ten males and four females collected at the type locality (Coropuna). The original description of *P. coropunae* was based on a unique male collected in 1911 by the Yale University Peruvian Expedition, at the Coropuna volcano (Arequipa) and since that time, almost 100 years ago, the species had not been recorded. A redescription of the male and the first description of the female are provided.

KEY WORDS: Lepidoptera, Pieridae, *Piercolias*, Coropuna, Arequipa, Peru.

Introducción

Piercolias coropunae (Dyar, 1913) (Lepidoptera: Pieridae) fue descrita originalmente en el género *Andina* Staudinger, 1895, con base en un único ejemplar (holotipo por monotipia), no indicando el sexo del espécimen en la descripción original, proveniente del volcán nevado Coropuna (Arequipa), recolectado en octubre de 1911 a una altitud entre 16,000 y 17,000 pies (4.975 y 5.180 m), durante la Expedición de la Universidad de Yale al Perú dirigida por Hiram Bingham (FIELD & HERRERA 1977).

STAUDINGER (1894: 56) describió el género *Trifurcula* con la especie tipo *Trifurcula huanaco* Staudinger, 1894, sin percatarse que este nombre genérico estaba preocupado por *Trifurcula* Zeller, 1848 (Lepidoptera: Nepticulidae). STAUDINGER (1895: ii), al notar esta homonimia, propuso el nombre *Andina*, como reemplazo del anterior; sin embargo GROTE (1903: 139) consideró este último nombre innecesario, ya que anteriormente STAUDINGER (1894: 56) había citado el nombre *Piercolias*

en la sinonimia de *Trifurcula* y, siguiendo lo establecido por el Artículo 11.6.1. del Código Internacional de Nomenclatura Zoológica (ICNZ 1999) se debe aceptar *Piercolias* Staudinger, 1894 como el nombre genérico válido, con *Andina* Staudinger, 1895 como sinónimo objetivo más reciente.

FORSTER (1955) al revisar una serie de ejemplares de *P. huanaco* recolectados en Bolivia, se percató que uno de los ejemplares presentaba una reducida pigmentación en la superficie dorsal del ala anterior, considerándolo similar a *P. coropunae* y sin mayor argumento, propuso a *P. coropunae* como sinónimo de *P. huanaco*, pero FIELD & HERRERA (1977) al realizar una revisión de *Piercolias*, designaron como una nueva especie (*P. forsteri*) a los ejemplares recolectados por Forster en Bolivia reconociendo a *P. coropunae* como una especie válida, basándose en diferencias morfológicas en la genitalia masculina, la reducida pigmentación en la superficie dorsal del ala anterior, la coloración rosado-púrpura cubriendo la superficie ventral del ala posterior y el ápice del único ejemplar entonces conocido.

Por lo tanto, hasta el momento se reconoce tres especies válidas de *Piercolias* (LAMAS, 2004), dos de ellas en Bolivia, *P. huanaco* y *P. forsteri* y una en Perú, *P. coropunae*, conocida solo de la localidad tipo (Coropuna).

En junio de 2019, durante una visita realizada por los autores al volcán nevado Coropuna, Departamento de Arequipa, suroeste de Perú, se logró capturar diez machos y cuatro hembras de *P. coropunae*. El hábitat donde fue localizada, corresponde a una ladera pedregosa inclinada con escasa y pequeña vegetación de porte reducido (Fig. 1), a una altitud de 4.800 m, entre las 10:00 y 12:00 horas, adicionalmente se observó varios individuos de la misma especie en el área donde se capturaron los ejemplares (15°34'20" S / 72°42'35" W), que efectuaban vuelos rápidos y cortos.

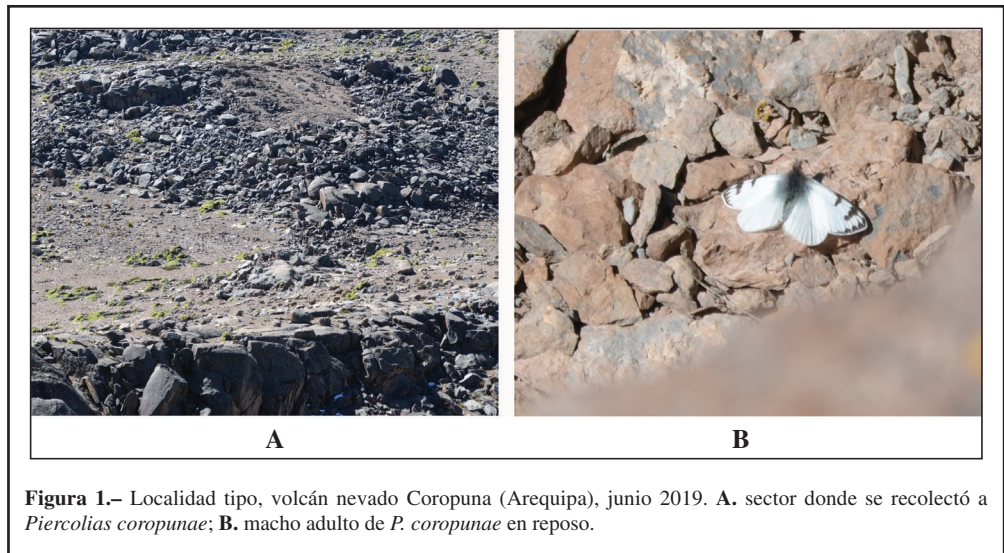


Figura 1.– Localidad tipo, volcán nevado Coropuna (Arequipa), junio 2019. **A.** sector donde se recolectó a *Piercolias coropunae*; **B.** macho adulto de *P. coropunae* en reposo.

Estos ejemplares representan el primer registro documentado con precisión de *P. coropunae*, luego de más de 100 años de la recolección del único ejemplar conocido por la expedición de la Universidad de Yale en 1911.

Ofrecemos aquí una redescrición del macho y, por primera vez, de la hembra de *P. coropunae*, con base en la serie de ejemplares capturados recientemente en la localidad tipo.

Materiales y métodos

El material examinado se encuentra depositado en las colecciones del Museo de Historia Natural

de la Universidad Nacional Mayor San Marcos, Lima, Perú (MUSM) y del Museo de Historia Natural Universidad Nacional San Agustín, Arequipa, Perú (MUSA).

Para estudiar la genitalia, el abdomen de los ejemplares fue removido y calentado en una solución de KOH (10%) por unos minutos, y posteriormente se efectuó su disección bajo un estereoscopio. La genitalia del macho fue montada en portaobjetos con glicerina para ser fotografiada; en tanto la de la hembra fue puesta en una placa petri con alcohol (98%) para ser observada y montada en portaobjetos con glicerina para ser fotografiada. La nomenclatura genitálica sigue a KLOTS (1970). Los adultos fueron fotografiados con una cámara fotográfica Nikon D610.

Las siguientes abreviaturas son usadas en el texto: AA: ala anterior. AP: ala posterior. CD: cara dorsal. CV: cara ventral.

Resultados

Piercolias Staudinger, 1894

Trifurcula Staudinger, 1894 *nec* Zeller, 1848

Andina Staudinger, 1895, nombre de reemplazo

Piercolias coropunae (Dyar, 1913) (Figs. 1B, 2A-H, 3, 4)

Andina coropunae: Dyar, 1913: 629.

Piercolias coropunae: Talbot, 1932: 60; Forster, 1955: 138 (en parte); Field & Herrera, 1977: 42, figs. 30, 42, 141; Lamas, 1979: 56; D'Abbrera, 1981: 156; Lamas, 2004: 115; Farfán, 2018: 364.

Piercolias (Piercolias) coropunae: Field, 1958: 118; Lamas, 1977: 66.

Diagnosis: Esta especie puede ser separada de las demás *Piercolias*, por el siguiente conjunto de caracteres: Coloración gris-rosácea en la CV del AP y en el ápice del AA; borde alar negro en la CD del AA angosto y dentado, alcanzando el margen externo del ala; hilera de manchas submarginales en la CD del AA del macho alcanzando hasta el espacio M_1 - M_2 ; genitalia masculina con el subscaphium sin presentar un proceso apical puntiagudo; genitalia femenina con el corpus bursae amplio; proceso anterior de la placa genital interna con el borde posterior más largo que el ventral.

Descripción del macho (Figs. 2A-D): Cabeza cubierta mayormente por escamas grises, palpos con abundante pilosidad gris, antenas con la superficie dorsal de coloración similar al resto de la cabeza, y ventral más clara. Tórax cubierto de escamas de coloración similar a la cabeza, con abundantes pelos grises cubriendo todo el tórax. Alas con envergadura alar 17-21 mm (n=10), CD del AA blanca, obscurecida en la base, con una pequeña mancha negra en el borde distal de la celda discal, una hilera de manchas negras subapicales entre las venas R_1 y M_2 , con el borde alar negro alcanzando hasta el espacio entre las venas M_2 y A_2 , siendo más ancho entre las venas R_1 y M_2 , continuando como una delgada línea oscura, con ligeras proyecciones en el borde entre las venas R_1 y M_2 . CD del AP blanca, obscurecida en la base alar. La CV del AA de color blanco con el ápice de color gris rosáceo entre las venas R_1 - M_2 , notándose el margen oscuro de la CD, la mancha distal de la celda discal y las manchas subapicales. CV del AP gris rosáceo, similar al del ápice del AA, con una hilera de manchas oscuras submarginales, que en algunos individuos son poco notorias. Patas recubiertas de escamas de color similar a la CV del AA. Abdomen recubierto de escamas gris claro en el dorso, y blancas en la superficie ventral. Genitalia (Fig. 3A) con el uncus alargado, ligeramente más ancho en su primera mitad basal y más delgado en la distal; tegumen recto de tamaño similar al uncus; gnathos ausente y valvas anchas con un proceso apical en su mayoría largo, con un lóbulo clasper en la cara interna; vinculum alongado y uniforme, ligeramente convexo; saccus con borde proximal redondeado; aedeagus tubular, uniforme.

Descripción de la hembra (Figs. 2E-H): Alas con envergadura alar 18-21mm (n=4). Aspecto externo similar al macho, pero con las manchas negras subapicales en la CD del AA alcanzando en algunos ejemplares hasta el espacio entre las venas Cu_2 y A_2 , y el borde oscuro en la CD del AA más ancho y alcanzando hasta cerca del tornus, la coloración de las alas en la CD puede variar entre el blanco y amarillo pálido. Genitalia (Fig. 4): papilas anales amplias con sedas largas; ductus bursae

membranoso; corpus bursae redondeado y membranoso con signa fuertemente dentadas y un pequeño appendix bursae; ostium bursae rodeado de placas genitales esclerosadas, la interna con el proceso posterior alargado y el anterior más corto.

Material examinado: Holotipo macho: Coropuna, 16,600-17,000 pies [4.875-5.180 m], Oct.-1911, YalePeruvExp [Yale University Peruvian Expedition] (Fotos examinadas); 10 machos y 4 hembras: PERÚ, Arequipa, Coropuna, 15°34'20" S / 72°42'35" W, 4.800 m, 29-VI-2019, Jackie Farfán leg. (MUSM y MUSA).

Discusión

Los ejemplares de *P. coropunae* recolectados recientemente, presentan algunas diferencias en la pigmentación respecto al holotipo, ilustrado en FIELD & HERRERA (1977) y WARREN *et al.* (2019); la hilera de manchas negras subapicales en la CD del AA, reducida a dos pequeñas manchas en el holotipo, en los espacios R₁ a M₁ y en algunos de los ejemplares recolectados presentan tres manchas, abarcando hasta el espacio M₁-M₂, por lo que suponemos que el holotipo, representaría un ejemplar con pigmentación reducida en el AA, atípica en comparación con la serie recientemente recolectada (n=10), similar a lo reportado por FORSTER (1955), de un ejemplar con pigmentación reducida en una serie de ejemplares de *P. forsteri* recolectados en Bolivia.

En su revisión de *Piercolias*, FIELD & HERRERA (1977) describieron la genitalia masculina de *P. coropunae*, con base en el único ejemplar entonces conocido y mencionaron que se diferencia de las otras dos especies (*P. forsteri* y *P. huanaco*) por presentar la valva con un proceso apical muy corto; sin embargo, en los machos de *P. coropunae* examinados (n=4), se constató que existe variabilidad con respecto al proceso apical de las valvas; la mayoría (n=3) presentó un proceso apical largo (Fig. 3A), similar a las otras dos especies, cuyas genitalias fueron ilustradas en FIELD & HERRERA (1977). Entretanto, se observó que la forma del saccus (parte basal) y el vinculum en vista ventral (Fig. 3A) en todos los ejemplares examinados coinciden con lo ilustrado por FIELD & HERRERA (1977), y que nosotros aquí proponemos como caracteres diagnósticos para *P. coropunae*, por las diferencias en las proporciones y formas de ellos comparadas con las otras dos especies. Con respecto a la genitalia femenina, consideramos a la placa genital interna ubicada cerca al ostium bursae, como un carácter diagnóstico de *Piercolias*, coincidiendo con FIELD & HERRERA (1977), específicamente en lo referente a los bordes de sus procesos anterior y posterior de la placa genital interna, mostrando marcadas diferencias entre especies, como ilustrado por FIELD & HERRERA (1977).

A pesar de tener un rango de distribución muy restringido, consideramos que actualmente *P. coropunae* no se encuentra amenazada, pero podría considerarse vulnerable, pues el hábitat donde fue hallada parece estar siendo perturbado por amenazas como el cambio climático, teniendo en cuenta, que el nevado Coropuna ha experimentado una pérdida del 54% de su cobertura glaciar en los últimos 48 años (SILVERIO 2004; PEDUZZI *et al.*, 2010). Por ello, recomendamos estudios más exhaustivos sobre la historia natural de esta especie, para conocer mejor sus adaptaciones a este ambiente tan particular.

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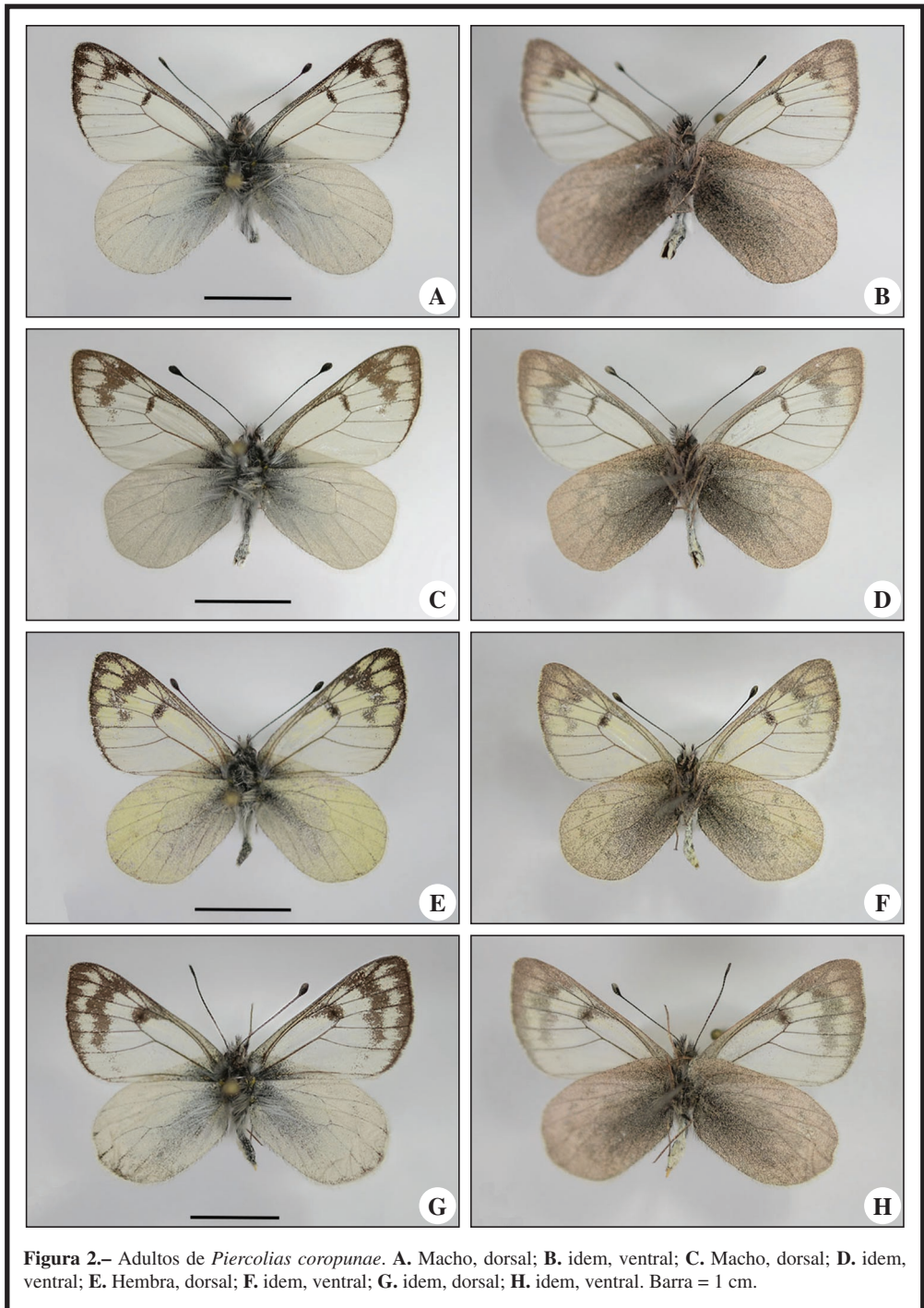
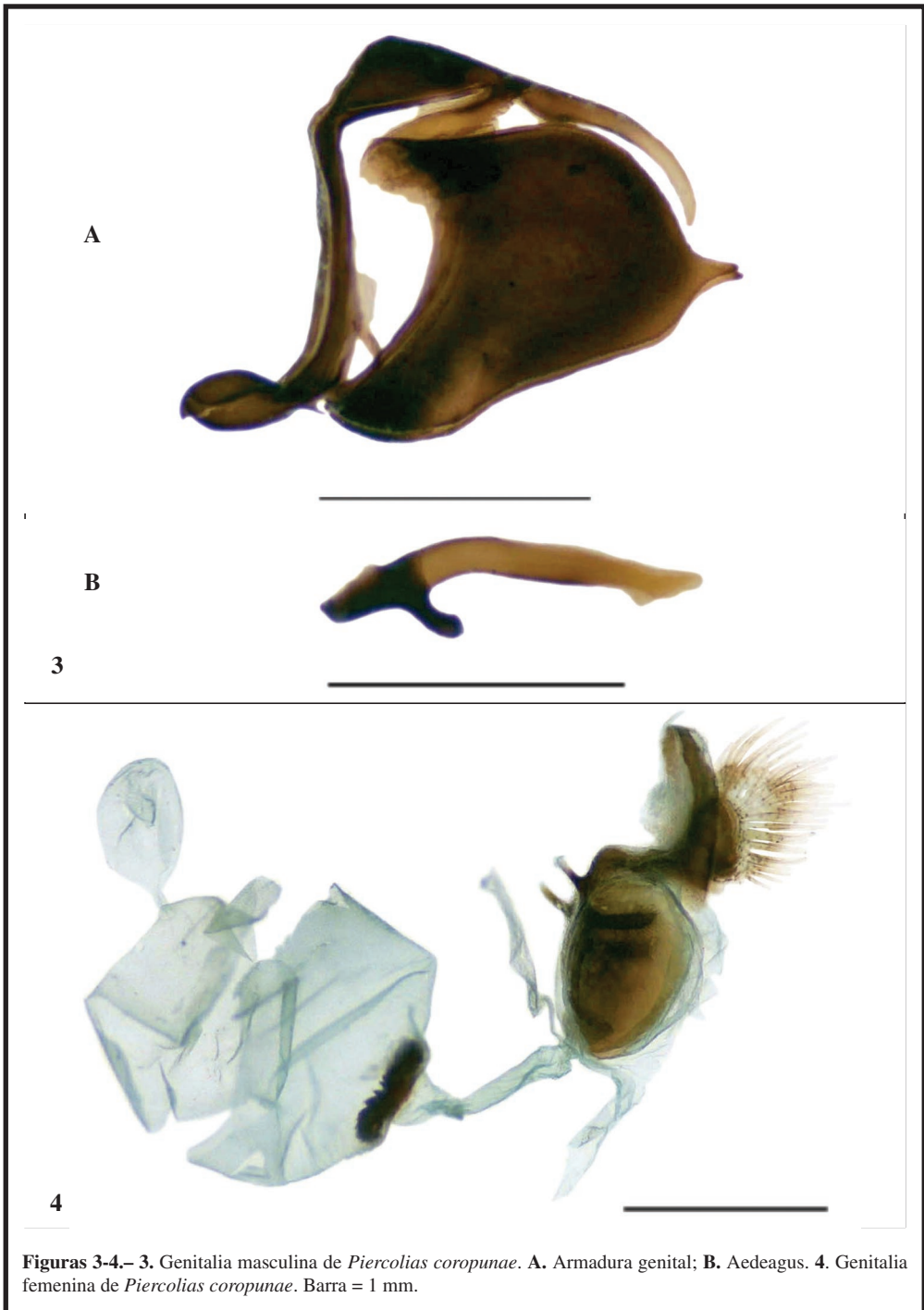


Figura 2.— Adultos de *Piercolias coropunae*. **A.** Macho, dorsal; **B.** idem, ventral; **C.** Macho, dorsal; **D.** idem, ventral; **E.** Hembra, dorsal; **F.** idem, ventral; **G.** idem, dorsal; **H.** idem, ventral. Barra = 1 cm.



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The “*Themis* Group” of *Euphaedra* Hübner, [1819] in Angola. Revision and description of one new species (Lepidoptera: Nymphalidae, Limenitidinae)

A. Bivar-De-Sousa & L. F. Mendes

Abstract

New data are presented relatively to the *Euphaedra* Hübner, [1819], subgenus *Euphaedrana* Hecq, 1976 of the “group *themis*” in Angola. Four species are assigned being one of them described as new with base on specimens from the Cabinda Territory.

KEY WORDS: Lepidoptera, Nymphalidae, Limenitidinae, new species, new data, Angola.

El “grupo *themis*” de *Euphaedra* Hübner, [1819] en Angola. Revisión y descripción de una nueva especie (Lepidoptera: Nymphalidae, Limenitidinae)

Resumen

Se presentan nuevos datos en relación al “grupo *themis*” de *Euphaedra* Hübner, [1819], subgénero *Euphaedrana* Hecq, 1976 en Angola. Se mencionan cuatro especies, una se describe como nueva en base a los ejemplares del Territorio de Cabinda.

PALABRAS CLAVE: Lepidoptera, Nymphalidae, Limenitidinae, especie nueva, nuevos datos, Angola.

O “grupo *themis*” de *Euphaedra* Hübner, [1819] em Angola. Revisão e descrição de uma nova espécie (Lepidoptera: Nymphalidae, Limenitidinae)

Resumo

Novos dados são apresentados relativamente para o “grupo *themis*” de *Euphaedra* Hübner, [1819], subgénero *Euphaedrana* Hecq, 1976 em Angola. São referidas quatro espécies, sendo uma delas descrita como nova com base em exemplares do Território de Cabinda.

PALAVRAS CHAVE: Lepidoptera, Nymphalidae, Limenitidinae, espécie nova, novos dados, Angola.

Introduction

Euphaedra Hübner, [1819] is an exclusively Afrotropical genus known by ca. 200 species, especially diversified in the Central African forests. It is known from eight subgenera (HECQ, 1997, 1999) based in the male genitalia features (aedeagus cornuti and valves apex) subgenus *Euphaedrana* Hecq, 1976 being the most diverse. This subgenus includes five species groups being the “*themis*-

group” characterized by a reddish area at the base of the hindwing verso - a similar area may occur also on the base of the forewing verso and, less frequently, on the wings recto. At the forewing verso there are two medio-cellular black spots, one on the base of costal and subcostal spaces and, often, a third one on the cell basal area; incidentally, the hindwing red spot may be overlaid by black scales and/or the forewing red area may attenuate or disappear. The hindwing verso shows an entire row of submarginal black spots.

The “*themis* group” was considered to integrate half a dozen lineages and was already reported from Angola by *E. eberti* Aurivillius, 1896 and some non-valid or not identified subspecies reported as *E. themis* (Hübner, [1807]). The reference to the former species for the country is confirmed upon one such BACELAR (1956) re-examined specimens; the same happens with one specimen she-was B ♀ or ♂ identified as *E. themis adonina* (Hewitson, 1865), today *E. adonina spectacularis* Hecq, 1997. The nominate subspecies of *E. permixtum* (Butler, 1873) is recorded, and one new species is described.

Material and methods

All the examined specimens are housed in to the Natural History and Science National Museum in Lisbon (MUHNAC) though they were originally deposited in distinct entomological collections: in the now Centro de Zoologia of the Instituto de Investigação Científica Tropical (CZ), plus in the private collection of Passos de Carvalho (PC) and of the second co-author (BS), this last one integrating specimens caught by A. Figueira (AF). All the samples from Cabinda were obtained by Laura Malheiro da Silva more than six decades ago. If no collector is assigned, the specimens were obtained by the owners of the integrated collections. All the specimens were collected in forest.

The following abbreviations will be also used along the text: CAR: Central African Republic; CDR: Congo Democratic Republic; E: East, eastern; FW: Forewing; HW: Hindwing; N: North, northern; nn: not numbered sample; R: Dorsal surface, recto; V: Ventral surface, verso; W: West, western; WL - FW length measured from apex to the insertion in the thorax.

All the studied specimens were collected in forests close to the following localities (coordinates according to MENDES *et al.*, 2013): CABINDA - Bucu Zau (04°46'S, 12°34'E, 50 m); KWANZA NORTE - Cassoalala (09°29'S, 14°22'E, < 50 m); Maria Teresa / Dondo (09°41'S, 14°26'E, ca. 100 m); Nova Oeiras (09°28'S, 14°27'E, ca. 100 m); KWANZA SUL - Roça Rio Bimbe (11°05'S, 14°13'E, 300-400 m); UIGE - Inga (07°18'S, 14°25'E, ca. 600 m).

Taxonomy

Euphaedra (*Euphaedrana*) *eberti* Aurivillius, 1896 (Figs 1, 2)

Euphaedra eberti Aurivillius, 1896; *Öfvers. K. VetenskAkad. Förh.*, **53**: 433

TL: Ubangi [Democratic Republic of Congo]

Material examined: CABINDA, Bucu Zau, 1 ♀ (CZ-nn), 25-VII-1952.

E. eberti (WL: 46 mm for the re-examined specimen) is a variable species which main diagnostic feature concern the reduction of the V reddish basal spot which (almost) lacks on the FW and is reduced and brick on the HW. The FWR post-discal white band is in the specimen examined as less S-shaped than usual and there is no basal spot on this forewings.

BACELAR (1956) identifies as *E. eberti*, 2 ♂♂, 1 ♀ from Bucu Zau, as a matter of fact 1 ♂, 2 ♀♀, all revised: one female is *E. eberti* as registered, but the couple (from 18 and 25 May) actually belongs to *E. (E.) mayumbensis*, part of a distinct species-group. After HECQ (1997) and D'ABRERA (2004) *E. eberti* nominate subspecies occurs in N CDR and S CAR only; neither of them took into consideration its BACELAR (1956) reference. A few morphological dissimilarities and the geographical remoteness of the Angolan specimen relatively to the nominate subspecies known range, led us to suspect that the Cabinda population may even correspond to a non-described subspecies. The only other known subspecies, *E. eberti hamus* Berger, 1940, is restricted to the E CDR and Uganda.

Euphaedra (Euphaedrana) permixtum (Butler, 1873) (Figs 3-6)

Romaleosoma permixtum Butler, 1873; *Cist. Ent.*, 1(7): 158

TL: Gabon

Material examined: KWANZA NORTE, Cassoalala, 1 ♂ AF- NYN64004 (BS-36497), 08-XII-1971; Id, 2 ♂♂ AF-NYM64181-2 (BS-36495-6), 28-XII-1971; Id, 1 ♂ AF-NYM64183 (BS-36498), 02-I-1972. Dalatando, 1 ♀ (PC-nn), 28-XI-1975; Id, 1 ♂, 1 ♀ (PC-nn), 08-I-1975; Id, 1 ♂ (PC-nn), 08-XI-1975; Id, 1 ♂ (PC-nn), 05-XII-1975. Maria Teresa, Dondo, coll. A. Serrano & R. Capela, 1 ♀ (BS-35134), 22-XI-2015. Nova Oeiras, 1 ♀ (BS-32910), 17-VI-1973; Id, 1 ♀ (BS-14633), 08-XII-1973. KWANZA SUL, Roça Rio Bimbe, 1 ♂ (BS-16150), I-1963. UIGE: Inga, 1 ♀ (BS-16121), XI-1964; Id, 1 ♀, (BS-16120), XI-1964.; Id, 1 ♀ (BS-16129), XII-1964.

With the WL ca 35 mm (♂) and 43-47 mm (♀), this primary submontane and coffee-forest species is characteristic: like in the previous *E. eberti* with no R red basal spots exist but the four wings V show however, developed and conspicuous red basal area. The probably close *E. themis* (Hübner, [1806]) known from Sierra Leone and Nigeria to Congo and *E. permixtum diva* Hecq, 1997 reported to occur exclusively in Nigeria, Cameroon and Gabon (HECQ, 1997), both almost certainly not reaching Angola, have quite clear red basal areas in the FWR. Further, the post-discal FWR band is more parallel-sided and often lighter and wider especially in the female, and at least in the male of *E. themis* it is not reduced; indeed, for *E. permixtum diva* there is no agreement: cf. pl. XVII figs 1, 2 of Hecq, 1997, and photos of the types of the last one: holotype male from Nigeria, Calabar, New Ndebiji, November 1958, allotype female from Nigeria, Calabar, Nkpot, June 1958, both in the MRAC (site of the Royal Museum for Central Africa, Tervuren) with figure of page 412 in D'ABRERA (2004). HECQ (1997) is, indeed, quite dubious in what the real validity of *E. permixtum* subspecies is concerned, as he reports relatively to *E. permixtum diva* "... mais on note que sur l'ensemble des spécimens recoltés au Cameroun, tous les passages existe entre le permixtum typique et la sous-espèce décrite ci-après...".

***Euphaedra (Euphaedrana) divoides* Bivar de Sousa & Mendes, sp. n. (Figs 7-10)**

Material examined: Holotype 1 ♀ (CZ-nn), CABINDA, Bucu Zau, 18-V-1952. Paratype, 1 ♂ (CZ-nn), Id, 23-V-1952.

Identification: WL male 41 mm, female 51 mm. FWR with red basal spot well developed, the wing' black discal area occupying all cell, except for the red basal mark. Post-discal band light yellow; in the female it almost attains the costa, becoming narrow in this area; in the male it is ovoid and quite short, reduced to the two most discal spaces. The female FWR green area extends on the anal, cubito-anal and inter-cubital spaces and in the male it is restricted to the two most posterior spaces. V is light-green with numerous large black spots and the wings basal areas are red; the double black spot in the FW cell apex is quite close to the predistal light band and the HW blackish marginal band is narrow being the ante-marginal black spots semi-ovoid.

Etymology: The species is named according to its eventual closeness to *E. permixtum diva* Hecq, 1997.

Biotope: Forest.

Discussion: The re-examined specimens were identified by BACELAR (1956) as *E. themis* (1 ♂) and as *E. themis* ab. *permixtum* (1 ♀ - *E. permixtum* in the handmade label). They seem quite alike the extra-limital *E. permixtum diva* Hecq, 1997, with which it shares the conspicuous red spot at the FWR base but some conspicuous dissimilarities must be enhanced: in the male of *E. divoides* sp. n. the shape and reduction of the light yellowish post-discal band are quite distinct from that of the female and in its female the green scaling extends to the inter-cubital FWR space; further, the position of the FWV cell double black spot well separated from the post-discal light band, as well as the clearly wider HWV blackish marginal band are characteristic of the new species.

DRUCE (1875) and KIRBY (1904-1908) point *E. themis* (unidentified subspecies) from Angola (none locality reported) in what shall correspond to a synonym of *E. divoides* sp. n. Otherwise, *E.*

themis innocentia Staudinger, 1886 was considered after ACKERY *et al.* (1995) and WILLIAMS (2007) as an eventual synonym of *E. permixtum diva* Hecq, 1982; it was described from “Angola” and may be, rather, also a synonym of the present taxon.

Euphaedra (Euphaedrana) adonina spectacularis Hecq, 1997 (Figs 11-12)

Euphaedra (Euphaedrana) adonina spectacularis Hecq, 1997; *Union ent. Belges*: 66

LT: Zaire

Material examined: CABINDA, Buco Zau, 1 ♀, 18-V-1952 (CZ-nn).

The only re-examined specimen (WL: 49 mm) was identified by BACELAR (1956) as *Euphaedra themis* f. *adonina* (Hewitson, 1865) (sex not reported) and corresponds almost exactly to the photo of the CAR ♀ presented by HECQ (1997). The subspecies is the only representative of the “*justitia* subgroup” known to occur in Angola and despite BACELAR (1956) reference it was pointed by HECQ (1997) and by WILLIAMS (2007) as flying from Cameroon to Zaire only. *E. adonina reflecta* Hecq, 1982 described from Nigeria and considered as a valid subspecies by D’ABRERA (2004) though not figured, was previously considered in the synonymy of the nominate subspecies by HECQ (1997); D’ABRERA (2004) doesn’t report, further, *E. adonina spectacularis*.

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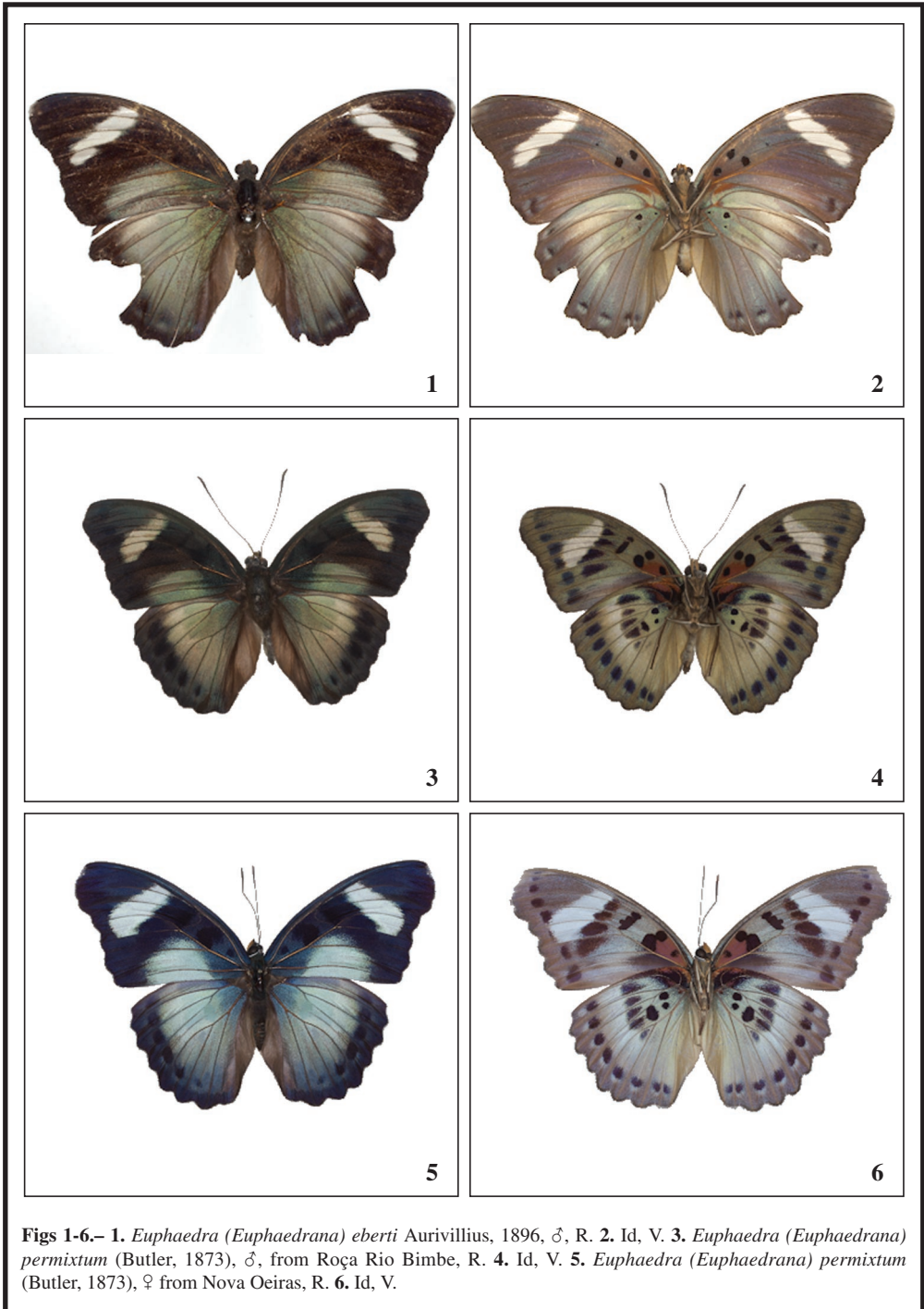
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Figs 7-12.– 7. *Euphaedra (Euphaedrana) divoides* Bivar de Sousa & Mendes, sp. n. Holotype ♀, from Buco Zau, Cabinda, R. 8. Id, V. 9. *Euphaedra (Euphaedrana) divoides* Bivar de Sousa & Mendes, sp. n. Paratype ♂, from Buco Zau, Cabinda, R. 10. Id, V. 11. *Euphaedra (Euphaedrana) adonina spectacularis* Hecq, 1997, ♀, from Buco Zau, Cabinda, R. 12. Id, V.

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Tinagma asignatum Gaedike & Falck, sp. n. from the Canary Islands (Spain) (Lepidoptera: Douglasiidae)

R. Gaedike & P. Falck

Abstract

Tinagma asignatum Gaedike & Falck, sp. n. is described from the Canary Island, Gran Canaria. Images of the adult and the genitalia are presented.

KEY WORDS: Lepidoptera, Douglasiidae, new species, Gran Canaria, Canary Islands, Spain.

Tinagma asignatum Gaedike & Falck, sp. n. de las Islas Canarias (España)
(Lepidoptera: Douglasiidae)

Resumen

Se describe de las Islas Canarias, Gran Canaria *Tinagma asignatum* Gaedike & Falck, sp. n. Se presentan imágenes del adulto y de la genitalia.

PALABRAS CLAVE: Lepidoptera, Douglasiidae, nueva especie, Gran Canaria, Islas Canarias, España.

Introduction

Recent field work by the second author has revealed several undescribed species of Lepidoptera occurring in the Canary Islands (FALCK *et al.*, 2019; FALCK & KARSHOLT, 2019; GAEDIKE & FALCK, 2019). In this paper we deal with a new Douglasiidae species, representing the first record of that family from the Canary Islands (VIVES MORENO, 2014).

According to REGIER *et al.* (2014) the Douglasiidae together with the Millieriidae are members of an unassigned superfamily, located between Gracillarioidea and Hyblaeoidea. Hitherto, 31 species were known worldwide: 1 Holarctic, 21 Palaearctic, 8 Nearctic and 1 Australasian.

Larvae of Douglasiidae are internal feeders in leaves or reproductive parts of their host plants. They feed on Boraginaceae, Hydrophyllaceae, Rosaceae and Lamiaceae.

Adults of some species have been observed to fly at dusk, in the morning hours and during the daytime.

Abbreviations

GP	Genitalia preparation
PF	Collection of Per Falck, Neksø, Denmark
MNCN	Collection Antonio Vives, Museo Nacional de Ciencias Naturales, Madrid, Spain
RG	Reinhard Gaedike, Bonn, Germany
SDEI	Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany
ZMUC	Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark

Tinagma asignatum Gaedike & Falck, sp. n.

Material examined: Holotype, ♂, SPAIN, Gran Canaria, Ayacata, 1400 m, 4-23-III-2019, leg. P. Falck (ZMUC).

Paratypes: 7 ♂♂, 14 ♀♀, SPAIN, Gran Canaria, Ayacata, 1400 m, 4-23-III-2019, leg. P. Falck, genitalia slides 3041PF, 3042PF, 3061PF, 3062PF, 9718RG, 9719RG (coll. PF, MNCN, SDEI).

Description (Figs 1-3): Wingspan 10-11 mm (male), 11-12 mm (female). Labial palpus short, dark grey with few white scales towards the tip and medially. Antenna as long as the forewing in the males, and 3/4 of the length of the forewing in the females. Scape without pecten. Head and thorax covered by deep-grey scales, some with whitish base and some with white tip, underside of thorax and abdomen with more whitish coloured scales. Forewing covered by white and black-grey tipped scales, without any distinct pattern. Fringe grey; at dorsum, a short narrow light yellowish coloured stripe, in females somewhat triangularly shaped. Hindwing grey, lighter towards base. Fringe grey, basally yellowish coloured.

Male genitalia (Figs 4-5): Uncus apically rounded, with two minutes bristled processes. Vinculum with strongly sclerotized apical edge, without saccus. Anellus basally broad, narrower to apex. Valva basally broad, broadening towards apex, ventral edge straight, costal edge convex, on inside along apical edge with numerous long bristles, mostly with more or less blunt tip. Phallus more than two times longer than valva, narrow, sometimes apically pointed, without any internal structures.

Female genitalia (Figs 6-7): Anterior apophyses apically enlarged, more or less triangularly; at 1/2 with two small hook-shaped prolongations; between the apical ends of apophyses a small, more or less square structure, a little more strongly sclerotized than the surrounding area. Corpus bursae without signum.

Diagnosis: Superficially distinguishable from *T. ocnerosomella* (Stainton, 1850) by its deep-grey forewings and by yellow fringes (this is most clearly seen on the underside, see fig. 3), while *T. ocnerosomella* with light grey forewings and fringes. The male genitalia are rather similar to *T. ocnerosomella*, but the vinculum is strongly sclerotized and a saccus is lacking in *T. asignatum*. In the female genitalia the absence of a signum is characteristic.

Biology: The early stages are unknown. Adults were flying in numbers in the afternoon sun.

Distribution: Only known from the type-locality Ayacata, Gran Canaria, Spain.

Etymology: The species is named after the lack of a signum in the female genitalia.

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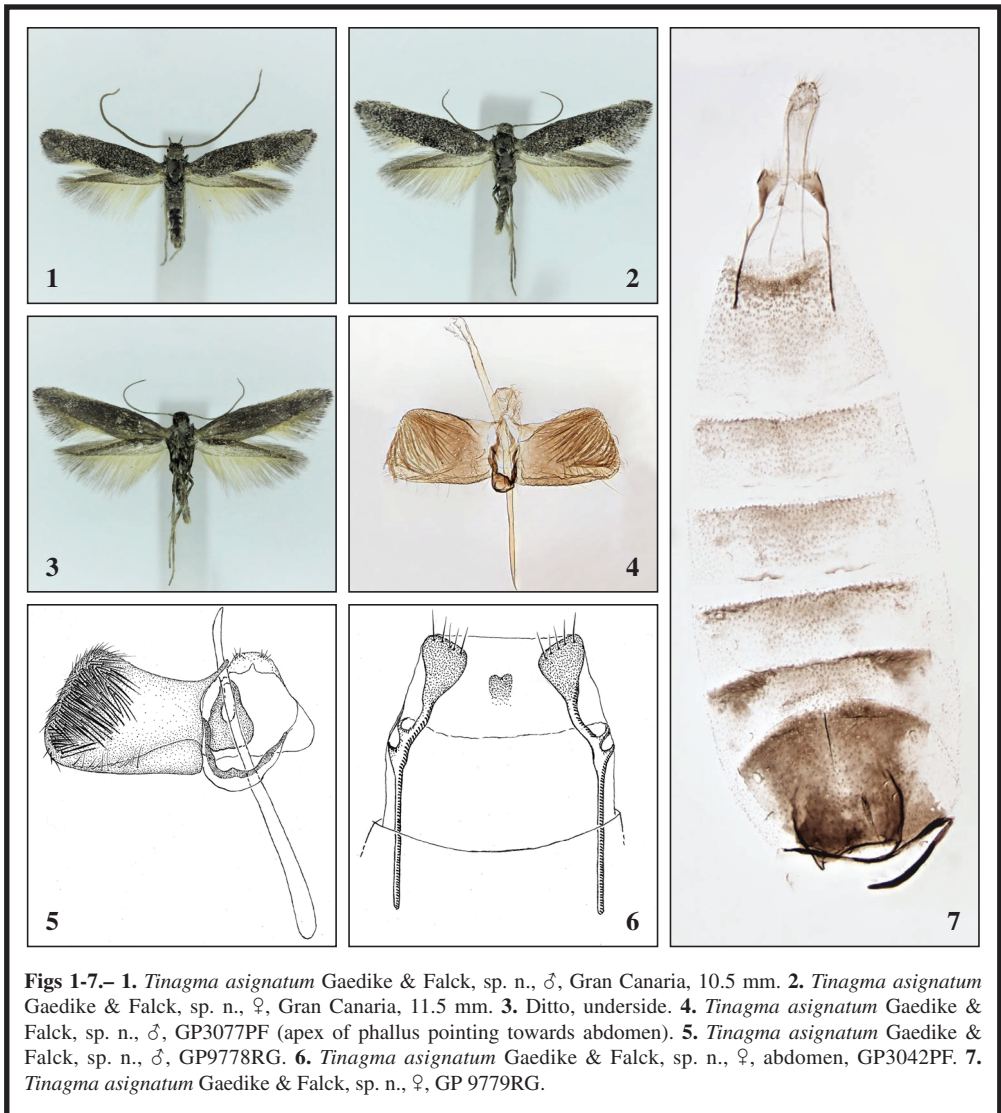
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Epicallima icterinella (Mann, 1867) new to Italy (Lepidoptera: Oecophoridae)

M. Pinzari

Abstract

Epicallima icterinella (Mann, 1867), an interesting Oecophoridae species, present only in the Balkan Peninsula and in the islands of Cyprus and Crete, was found for the first time in Italy in Basilicata.

KEY WORDS: Lepidoptera, Oecophoridae, *Epicallima icterinella*, Italy.

Epicallima icterinella (Mann, 1867) nueva para Italia (Lepidoptera: Oecophoridae)

Resumen

Epicallima icterinella (Mann, 1867), una interesante especie de la familia Oecophoridae, sólo presente en la Península de los Balcanes y en las islas de Chipre y Creta, se encontró por primera vez en Italia en Basilicata.

PALABRAS CLAVE: Lepidoptera, Oecophoridae, *Epicallima icterinella*, Italia.

Introduction

In the context of an ongoing study on Lepidoptera fauna in Latium, research has been carried out for many years and showed how much the fauna (PINZARI, 2016a; PINZARI, 2018b; PINZARI & PINZARI, 2019a, 2019b, 2019c) and biology (PINZARI & SBORDONI, 2013; PINZARI, 2016b, 2019; PINZARI *et al.*, 2017, 2018a, 2019a, 2019b) of Lepidoptera in central Italy are still scarcely known.

The genus *Epicallima* included six species in Europe (VAN NIEUKERKEN & KARSHOLT, 2019): *E. bruandella* (Ragonot, 1889) in central Europe from France to Romania; *E. formosella* ([Denis & Schiffermüller], 1775) an Holarctic species, present almost everywhere in Europe, Caucasus, Egypt, Israel, central Asia, USA (LVOVSKY *et al.*, 2016); *E. gerasimovi* (Lvovsky, 1984) in Russia and eastern palearctic; *E. icterinella* (Mann, 1867) in Bulgaria, Croatia, former Jugoslavia, Cyprus, Greek mainland, Kriti and Near East (LVOVSKY *et al.*, 2016); *E. mercedella* (Staudinger, 1859) in Portugal and Spain; *E. mikkolai* (Lvovsky, 1995) in Spain and North Africa (VIVES MORENO, 2003).

In Italy two species are present: *E. formosella*, quoted generically in the North, in the South, in Sardinia and in Sicily (BALDIZZONE *et al.*, 1995) and also recorded in Sila in Calabria (LEONETTI *et al.*, 2018); *E. bruandella* in Alto Adige (South Tyrol), Piemonte and Emilia Romagna (TOKAR *et al.*, 2005; BALDIZZONE *et al.*, 2013).

In recent times, research activity has also been extended to the South of Italy and to the Islands with results (PINZARI & PINZARI, 2019) which lead to a further attention. This paper illustrates a first result of the survey campaign carried out in Basilicata in July 2019: the finding of *Epicallima icterinella* (Mann, 1867).

Materials and methods

Collecting site: The survey on Lepidoptera fauna in South of Italy was carried out on 8-14 July 2019 at Marina di Pisticci (MT) both on the coastal dune and in the cultivated areas in the surrounding of Masseria Macchia Relais San Pio & Marina. Moths were light-trapped by Mixed Light 160 W lamp mounted in fixed sites with electricity available.

Species identification: The moth species was identified by external *habitus* using the taxonomic characters reported by PARENTI (2000) and TOKAR *et al.* (2005).

Results

Epicallima icterinella (Mann, 1867)

Record: ITALY, Basilicata, Marina di Pisticci (MT), at sea level, 1 ♂, 6-VII-2019, Manuela and Mario Pinzari leg.

Notes: The specimen is a male with a fresh appearance (fig. 1). It was attracted by lux at 10 P. M. within an area mainly cultivated with citrus groves some kilometres away from the coastal dune.

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; LVOVSKY *et al.*, 2016). Adults are on the wing from mid-May until August.

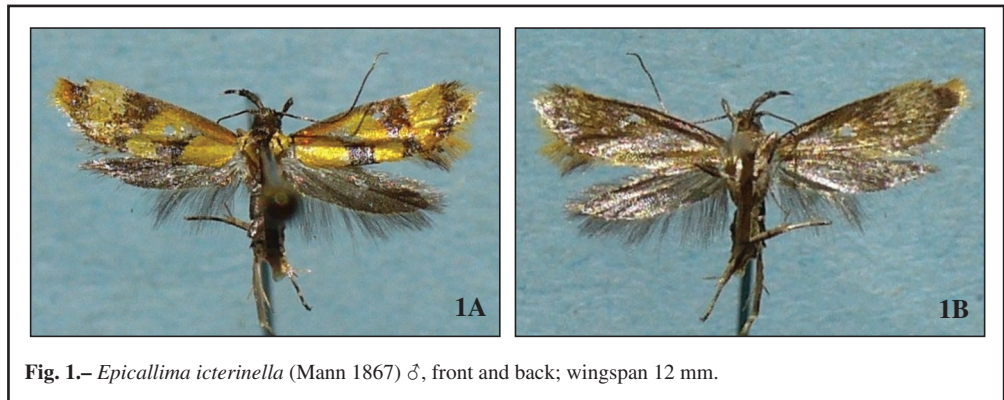


Fig. 1.– *Epicallima icterinella* (Mann 1867) ♂, front and back; wingspan 12 mm.

Remarks

The *habitus* of *E. icterinella* allows a certain distinction with respect to *E. formosella* and *E. bruandella* (TOKAR *et al.*, 2005), both present in Italy. Comparing *icterinella* with other European species the species determination is based on the following features: *E. mercedella* has a very similar wing pattern, but the wing drawing is margined by white colour, and also the head and *prothorax* are white; on the contrary, in *icterinella* the head and *prothorax* are brown; *E. gerasimovi* has a similar wing pattern but different at the basal area on upper surface of the forewings (LVOVSKY, 1984); *E. mikkolai* has a wing pattern substantially different from *E. icterinella* (VIVES MORENO, 2003).

Conclusion

The collecting site of *E. icterinella* represents the westernmost finding of the species. The freshness of the specimen let us think that it emerged locally and not came from Greece or the east-Mediterranean islands but we cannot exclude this possibility. The microlepidoptera fauna of the South

of Italy and especially Basilicata are still relatively little known, except for some sites, mainly in the mountains, where research has also been focused in the past, especially on macrolepidoptera. More recent research conducted by Scalercio and others has been showed or confirmed in the South of Italy the occurrence of species present in the Balkan peninsula and in the near east. For example, *Phycita imperialella* (Ragonot, 1887) was recorded at Mt Pollino (SCALERCIO *et al.*, 2016) confirming its presence in Italy previously reported in Lazio with a single specimen by PINZARI *et al.* (2010); *Pempelia amoenella* (Zeller, 1848) at the Ionian coast of Calabria (SCALERCIO *et al.*, 2014); and, *Wegneria panchalcella* (Staudinger, 1871) in Basilicata (BASSI & NEL, 2015) and at the Fiumara Amendolea mouth in Calabria (BALDIZZONE & SCALERCIO, 2018). From the coastal areas but not only, we expect new surprises: dedicated investigations would be needed.

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Tortricidae from Ethiopia, 4 (Insecta: Lepidoptera)

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Abstract

Forty species of Tortricidae from North-Western Ethiopia are recorded of which fifteen species are described as new (*Eugnosta amharana* Razowski & Trematerra, sp. n.; *Procrisca sinuata* Razowski & Trematerra, sp. n.; *Metamesia flava* Razowski & Trematerra, sp. n.; *Clepsis paragongyla* Razowski & Trematerra, sp. n.; *Epichoristodes fekensae* Razowski & Trematerra, sp. n.; *Thiopeia chokeana* Razowski & Trematerra, sp. n.; *Thiodia africana* Razowski & Trematerra, sp. n.; *Megaherpystis wofwasha* Razowski & Trematerra, sp. n.; *Megaherpystis valvalobata* Razowski & Trematerra, sp. n.; *Cosmetra triangularis* Razowski & Trematerra, sp. n.; *Protancyllis secundus* Razowski & Trematerra, sp. n.; *Thylacandra delimana* Razowski & Trematerra, sp. n.; *Dracontogena bradiana* Razowski & Trematerra, sp. n.; *Thaumatotibia parimitans* Razowski & Trematerra, sp. n., and *Thaumatotibia machakelana* Razowski & Trematerra, sp. n.). Moreover, the new genus *Thiopeia* Razowski & Trematerra is described and a new combination of *Syntozyga alatheta* (Razowski & Trematerra, 2010) comb. n. are reported. Females of *Procrisca ophiograptia* (Meyrick, 1933), *Lobesia semosa* Diakonoff, 1992, *Eccopsis brunneopostica* Razowski & Trematerra, 2010, and *Parabactra addisalema* Razowski & Trematerra, 2018, are described.

KEY WORDS: Insecta, Lepidoptera, Tortricidae, faunistics, new taxa, Ethiopia.

Tortricidae de Etiopía, 4 (Insecta: Lepidoptera)

Resumen

Del noroeste de Etiopía se registran 40 especies, de las cuales quince se describen como nuevas (*Eugnosta amharana* Razowski & Trematerra, sp. n.; *Procrisca sinuata* Razowski & Trematerra, sp. n.; *Metamesia flava* Razowski & Trematerra, sp. n.; *Clepsis paragongyla* Razowski & Trematerra, sp. n.; *Epichoristodes fekensae* Razowski & Trematerra, sp. n.; *Thiopeia chokeana* Razowski & Trematerra, sp. n.; *Thiodia africana* Razowski & Trematerra, sp. n.; *Megaherpystis wofwasha* Razowski & Trematerra, sp. n.; *Megaherpystis valvalobata* Razowski & Trematerra, sp. n.; *Cosmetra triangularis* Razowski & Trematerra, sp. n.; *Protancyllis secundus* Razowski & Trematerra, sp. n.; *Thylacandra delimana* Razowski & Trematerra, sp. n.; *Dracontogena bradiana* Razowski & Trematerra, sp. n.; *Thaumatotibia parimitans* Razowski & Trematerra, sp. n. y *Thaumatotibia machakelana* Razowski & Trematerra, sp. n.). Además, se describe un nuevo género *Thiopeia* Razowski & Trematerra y se aporta una nueva combinación *Syntozyga alatheta* (Razowski & Trematerra, 2010) comb. n. Se describen las hembras de *Procrisca ophiograptia* (Meyrick, 1933), *Lobesia semosa* Diakonoff, 1992, *Eccopsis brunneopostica* Razowski & Trematerra, 2010 y *Parabactra addisalema* Razowski & Trematerra, 2018.

PALABRAS CLAVE: Insecta, Lepidoptera, Tortricidae, faunística, nuevas taxas, Etiopía.

Introduction

Tortricidae of Ethiopia are still very little known and since the MEYRICK (1932) publication of the results of an expedition to Abyssinia (Ethiopia) in the years 1926-1927 only the collecting trips discussed below were made. The history of the entomological expeditions of the University of Molise

(Italy) to southeast Ethiopia in the years 2009 and 2010 were described by RAZOWSKI & TREMATERRA (2010). The two expeditions to the Oromia Region by the entomologists of the University of Molise and University of Milano were mentioned by same authors (RAZOWSKI & TREMATERRA, 2012). Results of an expedition made in February-March 2017 by the entomologists of the University of Molise to Amhara Region and Oromia Region in Central-Northeast Ethiopia were published by RAZOWSKI *et al.* (2018).

The material of the present study comes from new expeditions made in North-Western Ethiopia from August 2017 to July 2018 by Dr Tesfu Fekensa Tujuba (University of Molise, Campobasso, Italy and the Ethiopian Biodiversity Institute, Addis Ababa, Ethiopia). The itinerary of the expeditions visited five sites of Amhara Region (Amber, Bradi, Choke Mts, Delima and Wof-Washa).

The characteristics of the collection sites are as follows.

AMBER (Figure 1): Amber is located at 30 km south of the city of Debre Markos. The collections site is situated at an elevation of 2460 m on adjacent to the main road's north side (latitudes 10°15'15"N and longitudes 37°51'35"E). Despite the latitude, the higher parts of these regions tend to share characteristics with oceanic climates, though it also tends to be noticeably drier during the "low-sun" season, with mild summers and noticeably cooler winters. The locality receives a mean annual rainfall of 1300-1380 mm and the temperature ranges between 15°C and 22°C. It has a very small remaining of natural forest with evergreen shrub and tree savannah, which is often both shrubs and acacia bushes. The study area has high diversity of the medicinal plant species of the families Lamiaceae, Solanaceae and Asteraceae.

BRADI (Figure 2): Bradi natural forest is located at Guangua district, Awi Zone in North-Western Ethiopia. It is part of the Gojam Floristic Region, western Ethiopian highlands. This natural forest was categorized as Dry Evergreen Afromontane vegetation present in the territory of Blue Nile basin. The forest patch is situated between latitudes 10°51'4.35"N and longitudes 36°37'15.86"E. The altitudinal range lies between 1830 m and 2182 m and the area encompasses 458 hectares of land. The vegetation of the area is dominated by *Rothmania urcelliformis* (Hiern) Bullock, *Vepris dainellii* (Pic. Serm.), *Rytigynia neglecta* (Hiern) Robyns, *Albizia schimperiana* (Prota) and *Croton macrostachyus* Hochst. ex Delile. The sites of collections are at 1830 m/a.s.l. and at 2182 m/a.s.l.

CHOKE MTS (Figures 3-4): The forest patch is situated between latitudes 10°51'4.35"N and longitudes 36°37'15.86"E. This area have quite a few springs. Most of them emerge from nowhere, creating little muddy streams with flattened yellow flowers. But there are also buzu sheep grazing at this high altitude, so most of the muddy streams became trampled with little sheep hooves and started to resemble wallowing areas. Agricultural activity is extensive, with cultivation up to 3000 m/a.s.l. In the sites were rocks and lichens. The major natural habitats are moist moorland with giant *Lobelia* sp., *Alchemilla* sp., sedges and tussocks of *Festuca* sp. and other grasses, montane grasslands and meadows, cliffs and rocky areas. Woody plants, *Erica* sp., *Hypericum revolutum* (Forssk.) Vah and *Arundinaria alpina* K. Schum. are only found in patches. The collections sites are in a mosaic environment at: 2510 m/a.s.l., 2530 m/a.s.l., and 2590 m/a.s.l.

DELIMA (Figure 5): It is a dry evergreen montane forest in Machakel Woreda, East Gojjam Zone. The Machakel Woreda has an area of 79556 hectares with 23 rural kebeles in the administrative center of Amanuel. The study site is situated between three Kebeles of the Woreda (latitudes 10°37'26"N and longitudes 37°40'50"E). The average annual rain fall and temperature of the Woreda is between 900 mm to 1800 mm and 18°C and 25°C, respectively. Machakel region is experiencing high levels of environmental degradation. Deforestation rates are as high, and only 7% of degraded forest fragments remain. Forest fragments are dominated by few species, mainly *Acacia abyssinica* Hochst. ex Benth. and *Croton macrostachyus* Hochst. ex Delile. Forest cover is observed to be low and shrub and bush cover dominate. The collections site is at 2377 m/a.s.l.

WOF-WASHA (Figure 6): Natural forest covers an area of 54000 hectares. The area has a mean annual rainfall and temperature of about 1200 mm and 15.5°C, respectively. The altitude of the area ranges between 1500 m and 3100 m. Wof-Washa Forest is located in North Shewa Administrative Zone (latitudes 8°58'18"N and longitudes 38°32'20"E), central highlands of Ethiopia. The forest is under

steady human and livestock pressures which is believed to reduce the area of the Wof-Washa Forest as time goes on. Some of the common woody species in Wof-Washa Forest include *Juniperus procera* Hochst. ex Endl, *Afrocarpus falcatus* Thunberg, *Polyscias fulva* (Hiern) Harms, *Hypericum revolutum* Vahl, *Ekebergia capensis* Sparrm., *Bersama abyssinica* Fresen., *Olea hochstetteri* Bak., *Celtis africana* Burm., *Hagenia abyssinica* (Bruce) Gmel., and *Prunus africana* (Hook.) Kalkm. The collections site is at 2900 m/a.s.l. (BEKELE, 1994; TEKETAY & BEKELE, 1995).

During the expeditions 40 Tortricidae species were collected, 15 species of which are new to science. The new genus *Thiopeia* is described, and *Syntozyga alatheta* (Razowski & Trematerra, 2010) is a comb. n. Females of *Procrice ophiograptia* (Meyrick, 1933), *Lobesia semosa* Diakonoff, 1992, *Eccopsis brunneopostica* Razowski & Trematerra, 2010, and *Parabactra addisalema* Razowski & Trematerra, 2018 are also described. Twenty-three species were repeatedly found: *Procrice ophiograptia* (Meyrick 1932); *Lozotaenia sciarrettae* Razowski & Trematerra, 2010; *Lozotaenia karchana* Razowski & Trematerra, 2010; *Metamesia physetoma* (Meyrick, 1932); *Metamesia episema* Diakonoff, 1960; *Metamesia designata* (Meyrick, 1921); *Lobesia semosa* Diakonoff, 1992; *Lobesia talyana* Razowski & Trematerra, 2012; *Eccopsis wahlbergiana* Zeller, 1852; *Eccopsis brunneopostica* Razowski & Trematerra, 2010; *Pareccopsis addis* Agassiz & Aarvik, 2014; *Afroploce karsholti* Aarvik, 2004; *Aterpia niphoclasma* Diakonoff 1992; *Bactra helgei* Aarvik, 2008; *Parabactra addisalema* Razowski & Trematerra, 2010; *Syntozyga alatheta* (Razowski & Trematerra, 2010); *Endothenia ethiopica* Razowski & Trematerra, 2010; *Endothenia albapex* Razowski & Trematerra, 2010; *Epinotia latiloba* Razowski & Trematerra, 2010; *Gypsonoma paradelta* (Meyrick, 1925); *Eucosmocydia zegiana* Razowski & Trematerra, 2018; *Cydia tythaspis* Razowski & Trematerra, 2010; *Thaumatotibia batrachopa* (Meyrick, 1908).

Material and methods

Adults were collected during the night using UV-LED light traps and from a white sheet placed behind the same light. Genitalia were prepared using standard methods, the abdomen was macerated in 10% KOH and dissected under a stereoscopic microscope, the genitalia were separated and mounted in euparal on a glass slide. Adults and slides are housed in P. Trematerra Collection, Campobasso (Italy).

Systematic part

COCHYLINI

Eugnosta amharana Razowski & Trematerra, sp. n. (Figure 7)

Material examined: Choke Mts, Holotype ♂, 2590 m, 16-V-2018 (GS 3138PT); paratypes: Choke Mts, 2510 m, 1 ♂, 7-IV-2018 (GS 3163PT). 2590 m, 1 ♂, 21-IX-2017 (GS 3164PT).

Description: Male, wing span 18 mm. Head and thorax yellow. Forewing almost uniformly broad; costa weakly convex; termen straight, slightly oblique. Ground colour yellow, basal fourth of costa and base of dorsum suffused brown, remaining part of latter spotted brown, suffused brownish-grey, browner at tornus; concolour darker suffusion from before tornus to costal half of median fascia. Markings brown extending from mid-dorsum to beyond mid-costa, oblique from median cell to latter. Cilia damaged, remnants yellowish. Hindwing cream distinctly strigulated greyish brown; cilia damaged.

Male genitalia (Figure 32): Socii long, very slender; valva tapering terminad with costa slightly curved posteriorly; sacculus simple, tapering terminad; median part of transtilla broad, deeply concave apically; juxta small; aedeagus longer than valva with short ventral termination and broad, rounded coecum penis; cornuti, two long slender, capitate spines.

Female unknown.

Dignosis: *E. amharana* is related to *E. marginana* Aarvik, 2010 from Uganda but the socius of latter is short and the median part of transtilla without terminal incision.

Etymology: The name refers to the Amhara Region (Ethiopia).

ARCHIPINI

Procris ophiograptis (Meyrick, 1933) (Figure 8)

Material examined: Amber, 2460 m, 1 ♂, 19-VIII-2017; 1 ♀, 19-VIII-2017 (GS 3139PT). Choke Mts, 2510 m, 1 ♂, 20-IX-2017. 2530 m, 1 ♂, 11-X-2017; 1 ♂, 15-XII-2017. 2590 m, 1 ♂, 23-VIII-2017; 2 ♂♂, 23-IX-2017; 3 ♂♂, 10-X-2017; 2 ♂♂, 16-V-2018; 1 ♀, 4-VII-2018. Delima, 2377 m, 1 ♂ and 1 ♀, 20-XII-2017. Wof-Washa, 2900 m, 3 ♂♂ and 1 ♀, 18-X-2017; 1 ♂, 19-X-2017; 1 ♂, 20-X-2017; 1 ♂, 14-IX-2017; 1 ♂, 15-IX-2017; 3 ♂♂, 16-IX-2017.

Description: Female wing span 24 mm. Facies identical with the male.

Female genitalia (Figure 33): Lateral arms of sterigma broad, triangular; anteostial sterigma cup-shaped, slightly tapering proximally; sclerite of antrum small; ductus bursae long; cestum absent; capitulum of signum large, blade long, slender.

Remarks: *P. ophiograptis* was recorded from the Harenn Forest, Ilubabor Zoone and the Suba Forest (RAZOWSKI & TREMATERRA, 2010 and 2012; RAZOWSKI *et al.*, 2018).

Procris sinuata Razowski & Trematerra, sp. n. (Figure 9)

Material examined: Wof-Washa, Holotype ♂, 2900 m, 14-VIII-2017 (GS 3140PT); paratype, Wof-Washa, 2900 m, 1 ♂, 13-VIII-2017.

Description: Male, wing span 21 mm. Head and thorax yellow mixed brownish; labial palpus brownish. Forewing slightly expanding terminally; costa weakly convex to middle, then straight; apex pointed; termen slightly concave toward middle, moderately oblique. Ground colour pale brownish yellow, strigulated and dotted yellow-brown; markings darker than strigulation marked brown: remnants of basal blotch at dorsum, median fascia interrupted near middle; subapical blotch small. Cilia paler than ground colour. Hindwing yellowish, greyish at wing base, strigulated grey; cilia yellowish cream.

Male genitalia (Figure 34): Uncus broad expanding postmedially, broadest at 2/3, tapering toward end; socius large, rounded terminally; gnathos short; valva rounded caudally; sacculus concave near base, with sharp free termination; transtilla slender; aedeagus narrowing postmedially.

Female unknown.

Diagnosis: *P. sinuata* is related to *P. parisii* Razowski & Trematerra, 2010 from Bale Mountains, RAZOWSKI & TREMATERRA (2010) illustrated this species but the male genitalia were originally mistakenly numbered (RAZOWSKI *et al.*, 2018). From *P. parisii* this species differs in colouration and the shape of the uncus.

Etymology: The name refers to sinuate termen of forewing.

Lozotaenia sciarettae Razowski & Trematerra, 2010

Material examined: Choke Mts, 2510 m, 3 ♂♂, 21-VIII-2017; 1 ♂ and 1 ♀, 20-IX-2017; 2 ♀♀, 14-X-2017; 1 ♀, 15-XI-2017. 2530 m, 1 ♀, 11-X-2017; 4 ♂♂, 16-XI-2017; 1 ♀, 19-V-2018. 2590 m, 2 ♂♂, 23-VIII-2017; 1 ♀, 21-IX-2017; 2 ♂♂ and 1 ♀, 23-IX-2017; 1 ♀, 10-X-2017; 4 ♂♂, 17-XI-2017; 2 ♂♂, 10-I-2018; 1 ♀, 16-V-2018. Delima, 2377 m, 3 ♂♂ and 1 ♀, 19-XI-2017; 1 ♀, 16-I-2018; 1 ♂, 17-I-2018. Wof-Washa, 2900 m, 3 ♂♂, 14-VIII-2017; 2 ♀♀, 14-IX-2017; 2 ♀♀, 15-IX-2017; 5 ♂♂ and 5 ♀♀, 16-IX-2017; 3 ♂♂ and 2 ♀♀, 18-X-2017; 4 ♂♂ and 5 ♀♀, 19-X-2017; 1 ♂ and 6 ♀♀, 20-X-2017.

Remarks: *L. sciarettae* was described from the Harenn Forest, then recorded from Oromia (RAZOWSKI & TREMATERRA, 2010; RAZOWSKI *et al.*, 2018).

Lozotaenia karchana Razowski & Trematerra, 2010

Material examined: Choke Mts, 2510 m, 1 ♂, 7-IV-2018. 2530 m, 1 ♂, 22-IX-2017. 2590 m, 1 ♂, 20-X-2017; 1 ♂, 13-XII-2017; 1 ♂, 5-III-2018.

Remarks: This species is known from the Harenn Forest RAZOWSKI & TREMATERRA (2010) and the Suba Forest (RAZOWSKI *et al.*, 2018).

Metamesia physetopa (Meyrick, 1932)

Material examined: Choke Mts, 2510: 1 ♂, 20-IX-2017; 1 ♂, 14-XII-2017; 1 ♀, 18-II-2018. 2590 m, 2 ♀♀, 21-IX-2017; 1 ♂, 14-XI-2017; 1 ♀, 13-XII-2017; 1 ♀, 16-V-2018. Wof-Washa, 2900 m, 1 ♀, 18-X-2017.

Remarks: Recorded by RAZOWSKI & TREMATERRA (2010) from the Harena Forest.

Metamesia episema Diakonoff, 1960

Material examined: Choke Mts, 2510: 1 ♂, 20-IX-2017. 2530 m, 1 ♂, 16-XI-2017. 2590 m, 1 ♂, 23-VIII-2017; 2 ♂♂, 21-IX-2017; 1 ♂, 10-X-2017. Delima, 2377 m, 2 ♂♂, 18-XI-2017. Wof-Washa, 2900 m, 1 ♂, 14-VIII-2017.

Remarks: Recorded in the Harena Forest (RAZOWSKI & TREMATERRA, 2010).

Metamesia designata (Meyrick, 1921)

Material examined: Bradi, 2182 m, 1 ♂, 13-VI-2018; 1 ♂, 14-VI-2018. Choke Mts, 2510 m, 2 ♂♂, 21-VIII-2017; 1 ♂, 20-IX-2017; 1 ♂, 7-IV-2018. 2530 m, 1 ♂, 20-VIII-2017. 2590 m, 1 ♂, 23-VIII-2017; 1 ♂, 21-IX-2017. Delima, 2377 m, 1 ♂, 19-XII-2017; 2 ♂♂, 20-XII-2017; 1 ♂, 16-I-2018; 2 ♂♂, 17-I-2018. Wof-Washa, 2900 m, 3 ♂♂, 18-X-2017; 7 ♂♂ and 1 ♀, 19-X-2017; 3 ♂♂ and 1 ♀, 20-X-2017.

Remarks: This species was described from South Africa, RAZOWSKI & KRÜGER (2007) illustrated the type. Our specimen differs from the holotype of *M. designata* in the colouration of the forewing which in letter is yellow spotted black.

***Metamesia flava* Razowski & Trematerra, sp. n.** (Figure 10)

Material examined: Choke Mts, Holotype ♂, 2590 m, 23-VIII-2017 (GS 3141PT); paratypes, Choke Mts, 2510 m, 1 ♂, 21-VIII-2017; 1 ♂, 14-X-2017 (GS 3168PT). 2530 m, 1 ♂, 20-VIII-2017; 1 ♂, 16-XI-2017 (GS 3165PT). Delima, 2377 m, 1 ♂, 18-XI-2017 (GS 3166PT). Wof-Washa, 2900 m, 1 ♂, 15-IX-2017 (GS 3169PT); 1 ♂, 19-X-2017 (GS 3167PT); 3 ♂♂, 20-X-2017.

Description: Male, wing span 11 mm. Head and thorax brownish yellow; front yellowish; labial palpus yellowish. Forewing expanding terminad; costa almost uniformly curved; termen straight, oblique. Wing yellow, basal part of costa brown. Cilia gray-yellowish slightly paler than wing. Hindwing cream with light brown venation, distal line clearer; cilia light yellow.

Male genitalia (Figure 35): Uncus broad, bilobed terminally; socii reduced; valva elongate sub-triangular; sacculus slightly slender in distal part; lateral parts of transtilla thorny, median part slender; aedeagus uniformly elongate; coecum penis moderate; cornuti long.

Female unknown.

Diagnosis: *M. flava*, in facies is similar to *M. incepta* (Meyrick, 1912) but differs from it by a lack of black forewing dots on a dark yellow ground colour. The male genitalia are similar to those of *M. designata* (Meyrick, 1912) but distal lobes of uncus slenderer. The forewing markings are in form of brown remnants of the typical *Metamesia* pattern. The two mentioned species are South African (RAZOWSKI & KRÜGER, 2007).

Etymology: The name *flava* refers to the yellow uniform wing colour.

***Clepsis paragongyla* Razowski & Trematerra, sp. n.** (Figure 11)

Material examined: Choke Mts, Holotype ♂, 2590 m, 19-VIII-2017 (GS 3142PT); paratypes, Amber, 2460 m, 1 ♀, 19-VIII-2017 (GS 3143PT). Wof-Washa, 2900 m, 1 ♂, 15-IX-2017 (GS 3170PT).

Additional material: Bradi, 1830 m, 1 ♂ and 1 ♀, 23-V-2018; 2 ♂♂, 13-VI-2018; 4 ♂♂ and 3 ♀♀, 14-VI-2018; 3 ♂♂ and 1 ♀, 15-VI-2018. Choke Mts, 2510 m, 1 ♂, 21-VIII-2017; 4 ♂♂, 14-X-2017; 2 ♂♂, 18-II-2018; 1 ♂, 7-III-2018; 2 ♂♂ and 1 ♀, 7-IV-2018; 7 ♂♂ and 2 ♀♀, 17-V-2018; 5 ♂♂ and 1 ♀, 9-VI-2018; 1 ♂, 5-VII-2018. 2530 m, 4 ♂♂ and 1 ♀, 20-VIII-2017; 22 ♂♂ and 4 ♀♀, 22-IX-

2017; 11 ♂♂ and 1 ♀, 11-X-2017; 1 ♂, 16-XI-2017. 2590 m, 2 ♂♂ and 1 ♀, 19-VIII-2017; 3 ♂♂ and 1 ♀, 23-VIII-2017; 2 ♂♂ and 1 ♀, 21-IX-2017; 2 ♂♂, 10-X-2017; 2 ♂♂, 13-X-2017; 1 ♂, 14-XI-2017; 1 ♂, 16-II-2018; 2 ♂♂, 6-IV-2018; 22 ♂♂, 16-V-2018; 10 ♂♂, 8-VI-2018; 3 ♂♂, 4-VII-2018. Delima, 2377 m, 1 ♂, 19-XI-2017; 1 ♂, 19-XII-2017; 2 ♂♂, 20-XII-2017; 1 ♂ and 2 ♀♀, 15-I-2018; 3 ♂♂, 16-I-2018; 5 ♂♂, 17-I-2018; 2 ♂♂, 21-II-2018; 1 ♂, 23-II-2018. Wof-Washa, 2900 m, 1 ♂, 14-IX-2017; 3 ♂♂ and 3 ♀♀, 15-IX-2017; 14 ♂♂, 16-IX-2017; 5 ♂♂, 18-X-2017; 1 ♂, 19-X-2017; 2 ♂♂, 20-X-2017.

Description: Male, wing span 16 mm. Head orange yellow, labial palpus orange yellow; thorax brown. Forewing not expanding terminad; costa weakly convex; termen slightly oblique, tolerably straight. Ground colour brownish orange strongly suffused rust brown, yellow along termen. Markings dark rust brown, diffuse, consisting of median fascia and subapical blotch. Cilia orange yellow. Hindwing brownish grey, in apical part yellow; cilia grey and yellowish, respectively.

Female similar to male with paler, yellower ground colour covering broad terminal area; the marking are more distinct than in the male. Hindwing grey-brown, yellowish apical area weak.

Male genitalia (Figure 36): Uncus broad, expanding towards the top, rounded apically; socii reduced; gnathos arm slender, terminal plate long; valva mostly broad, slightly tapering terminad, rounded caudally; sacculus slender, bent at mid-valva then directed dorsal; labides strong, bent, expanding terminally; juxta small; aedeagus long, slender, arched postbasally, armed with dorsoposterior process, ventroterminal part slender. Arms of vinculum large, broad in median part, tapering terminally.

Female genitalia (Figure 37): Distal part of papilla analis very short, proximal part tapering apically; sterigma fairly short with broad, rounded proximal parts; antrum sclerite long, colliculum short, membranous; ductus bursae long, slender; capitulum of signum reduced, blade serrate.

Diagnosis: *C. paragongyla* is related to *C. gongyla* Razowski, 2014 from Congo but is distinct by having the slender markings, broad uncus, short aedeagus, short processes of transtilla, and short arms of vinculum.

Etymology: The name refers to similarity with *C. gongyla* Razowski.

Epichoristodes fekensae Razowski & Trematerra, sp. n. (Figures 12-13)

Material examined: Choke Mts, Holotype ♂, 2590 m, 21-IX-2017 (GS 3144PT); paratypes, Choke Mts, 2510 m, 1 ♂, 21-VIII-2017 (GS 3171PT); 7 ♂♂, 21-VIII-2017. 2590 m, 1 ♀, 21-IX-2017 (GS 3145PT).

Additional material: Choke Mts, 2510 m, 8 ♂♂, 20-IX-2017; 2 ♂♂, 14-X-2017; 1 ♂, 15-XI-2017; 1 ♂, 14-XII-2017; 4 ♂♂, 18-II-2018; 1 ♀, 5-III-2018; 4 ♂♂, 7-III-2018; 1 ♂ and 1 ♀, 7-IV-2018. 2530 m, 1 ♂, 20-VIII-2017; 11 ♂♂, 22-IX-2017; 9 ♂♂ and 2 ♀♀, 11-X-2017; 6 ♂♂, 16-XI-2017. 2590 m, 1 ♂, 19-VIII-2017; 2 ♂♂ and 1 ♀, 23-VIII-2017; 7 ♂♂, 21-IX-2017; 1 ♂, 23-IX-2017; 1 ♂, 13-X-2017; 4 ♂♂, 17-XI-2017; 1 ♂, 12-XII-2017; 8 ♂♂, 8-VI-2018; 2 ♂♂, 4-VII-2018. Delima, 2377 m, 1 ♂, 18-XI-2017; 1 ♂, 20-XII-2017; 1 ♂, 18-XI-2017. Wof-Washa, 2900 m, 2 ♂♂, 19-X-2017; 1 ♂, 20-X-2017; 6 ♂♂ and 1 ♀, 15-IX-2017; 11 ♂♂, 16-IX-2017.

Description: Male, wing span 19 mm. Head and thorax yellow brownish; labial palpus brownish. Forewing not expanding terminad; costa almost uniformly broad; termen straight, oblique. Wing yellow, basal part of costa brown. Numerous black dots over the wing except for costa and dorsum, agglomerate at costal half of termen. Cilia slightly paler than wing. Hindwing grey, yellowish in apical part; cilia yellowish.

Variation: Paratype forewing weakly dotted; larger spot at end of median cell.

Female, wing span 20 mm. Similar to male with black dots over the wing except for costa and basal part, agglomerate at subterminal blotch.

Male genitalia (Figure 38): Uncus slender, long, pointed apically; socii broad, rounded apically; gnathos arms slender with proportionally short terminal plate; valva ovate, membranous dorsally, sacculus long, slender armed with small ventropostbasal thorn and weak median and postmedian

serration; transtilla slender, interrupted medially with broad lateral parts expanding and thorny dorsally; juxta small; vinculum arms slender; aedeagus broad, tapering in distal half, with pointed ventral termination and subterminal, ventral thorn.

Female genitalia (Figure 39): Papilla analis and apophyses reduced; sterigma with lateral sclerotized rounded corners; proximal part of antrum weakly sclerotized; ductus bursae large, without sclerites; corpus bursae elongate; signum a rounded sclerite without blade.

Diagnosis: *E. fekensae* is similar to *E. imbriculata* (Meyrick, 1936) from Zaire but *E. fekensae* has a weakly convex base of the forewing costa and slenderer, subterminally thorny aedeagus; from *E. intensa* (Meyrick, 1921), from Natal, South Africa this species differs also by the shape of the aedeagus, sacculus and uncus.

Etymology: The name refers to the collector Dr Tesfu Fekensa Tujuba, Ethiopian Biodiversity Institute, Addis Ababa, Ethiopia.

***Thiopeia* Razowski & Trematerra, gen. n.**

Type species: *Thiopeia chokeana* Razowski & Trematerra, sp. n.

Description: Venation of wings (Figure 14), in forewing all veins separate. R₅ to termen beneath apex. In hindwing R_s-M₁ and M₂-M₃ stalked basally.

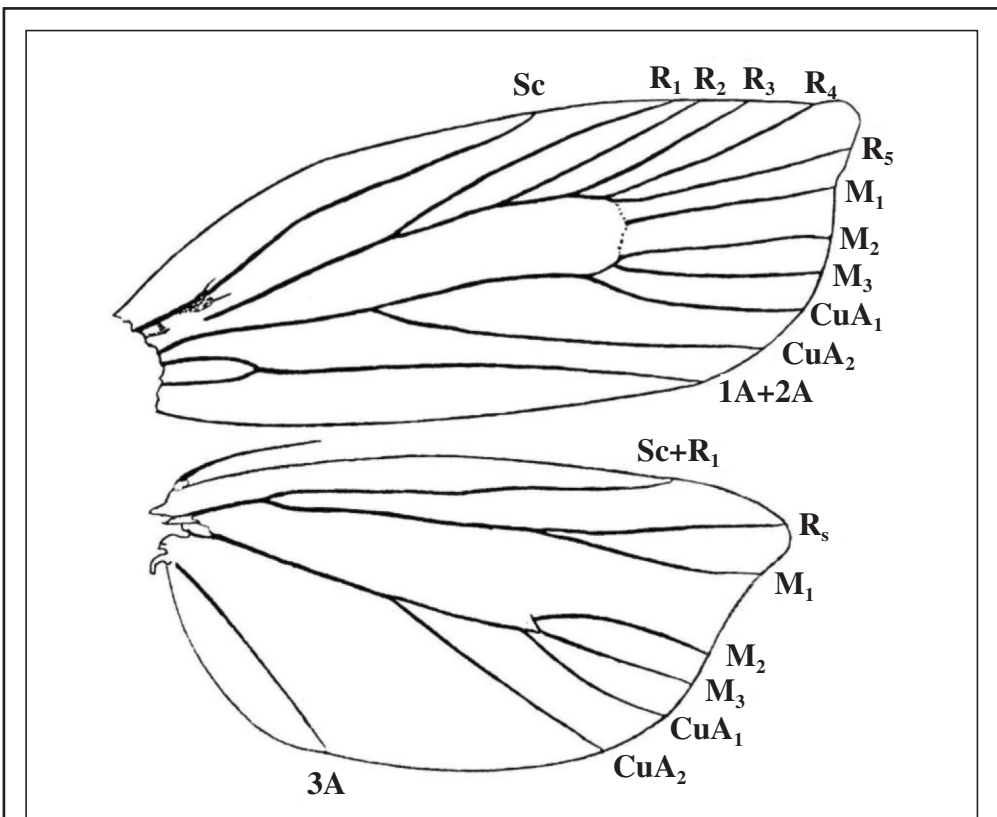


Figure 14.– *Thiopeia chokeana* Razowski & Trematerra, sp. n.: venation of wings.

Male genitalia (Figure 40): Uncus club-shaped; socius large; gnathos moderately large with fairly short arms; vinculum arms slender; valva broad basally distinctly tapering terminad; costa of valva completely reduced; sacculus longer than valva with small free termination and densely setose posterior half of ventral edge; transtilla constricted medially; juxta small, simple; aedeagus moderately large, bent, with three dorsoterminal thorns and sharp ventral termination; cornuti missing; caulis minute. Subgenital sternite large, strongly sclerotized with pair of lateral, rounded proximal lobes.

Female genitalia (Figure 41): Papilla analis slender; apophyses thin, apophyses anteriores twice longer than apophyses posteriores; sterigma short with large, triangular, lateroproximal lobes; sclerite of antrum large, incised posteriorly, tapering proximally; ductus bursae broad; corpus bursae proportionally slender; signum a small plate with short blade.

Diagnosis: *Thiopeia* is related and in male genitalia similar to *Choristoneura* Lederer, 1859 and *Mabilleodes* Diakonoff, 1960, but differs from the former by a very small caulis, the setose sacculus, presence of sterigma lobes, broad ductus bursae, absence of cestum, minute blade of signum and large, strongly sclerotized subgenital sternite. It is also similar to the Madagascan *Cornusaccula* Diakonoff, 1968 but this genus characterizes by short sacculus armed with long setae.

Etymology: The generic name is an anagram of the country name Ethiopia, from which the type-species of the genus comes.

Thiopeia chokeana Razowski & Trematerra, sp. n. (Figures 15-16)

Material examined: Choke Mts, Holotype ♂, 2510 m, 21-VIII-2017 (GS 3146PT); paratypes, Choke Mts, 2530 m, 1 ♀, 20-VIII-2017 (GS 3147PT). 2590 m, 1 ♂, 23-VIII-2017. Wof-Washa, 2900 m, 1 ♀, 16-IX-2017 (GS 3172PT).

Additional material: Bradi, 2182 m, 1 ♂ and 2 ♀♀, 14-VI-2018. Choke Mts, 2510 m, 1 ♀, 21-VIII-2017; 1 ♂, 20-IX-2017. 2530 m, 2 ♂♂, 22-IX-2017; 1 ♂, 8-III-2018. 2590 m, 1 ♂, 21-IX-2017; 1 ♂, 5-III-2018. Delima, 2377 m, 1 ♀, 19-XII-2017; 2 ♂♂ and 2 ♀♀, 20-XII-2017; 2 ♀♀, 17-I-2018. Wof-Washa, 2900 m, 2 ♂♂, 15-IX-2017; 1 ♂, 18-X-2017; 1 ♂, 19-X-2017; 1 ♂, 20-X-2017.

Description: Male, wing span 19 mm. Head yellow cream, labial palpus yellow cream; thorax brownish. Forewing not expanding terminad, broadest submedially; costa convex basally; apex pointed; termen straight, slightly oblique. Ground colour yellow cream delicately strigulated brownish, mixed brown along costa and dorsum, slightly so terminally. Markings brownish with brown dots or strigulae: basal blotch ill-defined, median fascia interrupted near middle, atrophying at dorsum, with dark brown blotch before dorsum; subapical blotch elongate triangular reaching apex of wing; elongate mark at vein M_2 subterminally; cilia yellow. Hindwing greyish brown, yellowish at apex where sparsely spotted brownish; cilia yellowish.

Female, wing span 15–22 mm, similar to male but forewing ground colour much paler, venation in tornal area brownish, basal blotch ill-defined; median fascia brownish yellow, twice interrupted; brownish grey area of hindwing more or less reduced. In one example forewing markings are weakly developed while suffusions dark, distinct.

Male genitalia (Figure 40) and female genitalia (Figure 41) as described with the genus.

Diagnosis: *T. chokeana* is the only representative of the genus; it can be compared with *Tortrix diametrica* Meyrick, 1932 from Madagascar but the latter has a broad valva and a thorn from the end of the sacculus. From *Cornusaccula periopa* Diakonoff, 1960 this species differs chiefly by having a short sacculus and a simple aedeagus.

Etymology: The name refers to Choke territory where the species was collected.

OLETHREUTINI

Lobesia semosa Diakonoff, 1992 (Figure 17)

Material examined: Choke, 2510 m, 1 ♀, 20-IX-2017; 1 ♀, 18-II-2018. 2530 m, 1 ♂, 15-XII-2017. 2590 m, 1 ♂, 21-IX-2017. Delima, 2377 m, 1 ♀, 19-XI-2017 (GS 3148PT).

Description: Female genitalia (Figure 42). Sterigma a slender terminally tapering tube; subgenital sternite with slender posterior part; ductus bursae slender, long; two signa, unequally long bande weakly sclerotized.

Remarks: This species was already mentioned from Oromia (RAZOWSKI *et al.* 2018).

Lobesia talyana Razowski & Trematerra, 2012

Material examined: Choke Mts, 2510 m, 1 ♂, 5-VII-2018.

Remarks: *L. talyana* was described from Congo and also is known from Nigeria. RAZOWSKI & TREMATERRA (2012) recorded it from the Wellega Zone at the Didessa River.

Eccopsis wahlbergiana Zeller, 1852

Material examined: Choke Mts, 2590 m, 1 ♂, 5-III-2018.

Remarks: *E. wahlbergiana* is widely distributed in Tropical Africa, from South Africa to Saudi Arabia and Nigeria.

Eccopsis brunneopostica Razowski & Trematerra, 2010 (Figure 18)

Material examined: Choke Mts, 2510 m, 1 ♀, 21-VIII-2017 (GS 3149PT).

Description: Female wing span 18 mm. Facies similar to the male, more pale.

Female genitalia (Figure 43): Sterigma sclerotized, collar-shaped; distal part of antrum broad, posterior edge incised; sclerite present in posterior half of ductus bursae. Antrum sclerite strongly sclerotized followed by distinct membranous broadening; signum with large median process accompanied by a few small thorns.

Pareccopsis addis Agassiz & Aarvik, 2014

Material examined: Choke Mts, 2510 m, 1 ♂, 14-X-2017. 2530 m, 1 ♂ and 1 ♀, 22-IX-2017; 1 ♀, 11-X-2017; 1 ♂, 16-XI-2017. 2590 m, 1 ♀, 21-IX-2017; 1 ♂, 23-IX-2017; 1 ♀, 17-XI-2017; 1 ♀, 4-VII-2018. Wof-Washa, 2900 m, 1 ♂, 14-IX-2017; 1 ♂, 15-IX-2017; 1 ♀, 16-IX-2017; 3 ♂♂, 18-X-2017; 1 ♀, 20-X-2017.

Remarks: *P. addis* was described from Addis Ababa.

Afroploce karsholti Aarvik, 2004

Material examined: Choke Mts, 2590 m, 1 ♂, 10-X-2017.

Remarks: *A. karsholti* was described from Tanzania.

Aterpia niphoclasma Diakonoff, 1992

Material examined: Choke Mts, 2590 m, 2 ♂♂, 23-IX-2017.

Remarks: *A. niphoclasma* was described from Madagascar.

BACTRINI

Bactra helgei Aarvik, 2008

Material examined: Choke Mts, 2510 m, 1 ♂, 17-V-2018. Bradi, 2182 m, 1 ♂, 14-VI-2018.

Remarks: *B. helgei* was described from Tanzania.

Parabactra addisalema Razowski & Trematerra, 2018 (Figure 19)

Material examined: Choke Mts, 2590 m, 1 ♂, 13-X-2017. Delima, 2377 m, 1 ♀, 17-I-2018 (GS 3150PT).

Description: Female, wing span 17 mm. The specimen is damaged thus the wing markings are impossible to be described accurately.

Female genitalia (Figure 44): Sterigma and colliculum weakly sclerotized; colliculum funnel

like; ductus bursae elongate and enlarged proximally; corpus bursae weakly differentiated; signum thorny, fairly large.

Remarks: *P. addisalema* was described from the Ambo Park, Addis Alema in Oromia from one male (RAZOWSKI *et al.*, 2018).

Syntozyga alatheta (Razowski & Trematerra, 2010), **comb. n.** (Figure 20)

Material examined: Wof-Washa, 2900 m, 2 ♂♂, 14-VIII-2017.

Remarks: This species was described from the Harennna Forest, Bale Mountains. It was collected in late September on the altitude of 2350 m. We illustrate the present specimen as it is better preserved than the holotype. *S. alatheta* was described in *Bubonoxena* Diakonoff, 1968 which proved a synonym of *Syntozyga* Lower, 1901 and placed in *Olethreutini*.

Endothenia ethiopica Razowski & Trematerra, 2010

Material examined: Amber, 2460 m, 1 ♂, 19-VIII-2017. Bradi, 2182 m, 1 ♂, 23-V-2018; 1 ♂, 4-VI-2018; 1 ♂, 14-VI-2018. Choke Mts, 2510 m, 3 ♂♂, 21-VIII-2017; 2 ♂♂, 20-IX-2017; 4 ♂♂, 14-X-2017; 1 ♂, 15-XI-2017; 1 ♂ and 1 ♀, 18-II-2018; 1 ♂, 7-IV-2018; 1 ♂, 17-V-2018; 1 ♂, 9-VI-2018; 1 ♂ and 1 ♀, 5-VII-2018. 2530 m, 1 ♂, 20-VIII-2017; 1 ♂, 22-IX-2017; 3 ♂♂, 16-XI-2017. 2590 m, 1 ♂, 21-IX-2017; 2 ♂♂ and 1 ♀, 23-IX-2017; 2 ♂♂, 10-X-2017; 1 ♂, 13-XII-2017; 1 ♀, 10-I-2018; 1 ♂, 16-V-2018; 1 ♂, 4-VII-2018. Delima: 1 ♂, 2377 m, 18-XII-2017; 1 ♂, 21-II-2018; 2 ♂♂, 22-II-2018; 1 ♂, 23-II-2018. Wof-Washa, 2900 m, 2 ♂♂ and 1 ♀, 14-IX-2017; 4 ♂♂, 15-IX-2017; 11 ♂♂ and 1 ♀, 16-IX-2017; 1 ♂, 18-X-2017; 5 ♂♂, 19-X-2017; 6 ♂♂, 20-X-2017.

Remarks: *E. ethiopica* was described from the Harennna Forest, Bale Mts and then recorded from Amhara (RAZOWSKI *et al.*, 2018).

Endothenia alpapex Razowski & Trematerra, 2010

Material examined: Choke Mts, 2510 m, 2 ♂♂, 14-X-2017; 1 ♀, 15-XI-2017; 4 ♂♂ and 1 ♀, 18-II-2018; 1 ♂, 7-IV-2018; 1 ♂, 17-V-2018; 2 ♂♂, 5-VII-2018. 2590 m, 1 ♂, 12-XII-2017; 1 ♂, 13-XII-2017; 1 ♂, 11-I-2018. Delima, 2377 m, 1 ♂, 18-XI-2017; 1 ♂, 19-XI-2017. Wof-Washa, 2900 m, 1 ♂, 20-X-2017; 1 ♀, 18-X-2017.

Remarks: *E. alpapex* was described from the Harennna Forest, Bale Mts from an altitude of 2170 m.

EUCOSMINI

Thiodia africana Razowski & Trematerra, **sp. n.** (Figure 21)

Material examined: Choke Mts, Holotype ♂, 2590 m, 10-X-2017 (GS 3151PT); paratypes, Choke Mts, 2590 m, 1 ♀, 23-VIII-2017 (GS 3173PT); 1 ♂, 10-X-2017; 1 ♀, 12-XII-2017 (GS 3177PT); 1 ♀, 13-XII-2017 (GS 3175PT); 1 ♀, 13-XII-2017 (GS 3176PT); 2 ♀♀, 13-XII-2017. 2510 m, 2 ♂♂, 14-X-2017; 1 ♀, 15-XI-2017 (GS 3174PT); 1 ♀, 18-II-2018 (GS 3178PT); 1 ♀, 18-II-2018 (GS 3179PT).

Additional material: Amber, 2460 m, 1 ♂, 19-VIII-2017.

Description: Male, wing span 15 mm. Head and thorax brown, also front and labial palpus. Forewing not expanding terminad, costa weakly convex; apex elongate, sharp; termen moderately olique, slightly sinuate beneath apex. Ground colour pale brownish, strongly suffused brown, costal strigulae innumeros, brownish cream. Markings brown, diffuse, median fascia preserved at costa. Cilia rubbed, remnants creamish. Hindwing brown, cilia similar.

Variation: Female forewing span 12-13 mm., apex somewhat longer and termen more sinuate than in male. Forewing almost unicolorous dark brown, hindwing paler.

Male genitalia (Figure 45): Uncus well sclerotized, broad basally, slightly expanding terminally; socii moderately broad, drooping, broadest medially; median part of gnathos preserved; valva slightly

tapering towards middle; cucullus small, oval; sacculus slender, concave near middle, followed by small, spined convexity and ventropostmedian spined area; aedeagus slender, somewhat longer than uncus.

Female genitalia (Figure 46): Ovipositor short; papillae anales elongate; sterigma moderately long, incised in middle posteriorly, situated in deep incision of posterior part of subgenital sternite, followed by a pair of sublateral convexities; anteostial sterigma well developed; ostium bursae large; ductus bursae slender; cingulum long, less sclerotized; signum an elongate rib.

Diagnosis: *T. africana* is distinct by its genitalia; in male genitalia it resembles the Palaearctic *T. irinae* Budashkin, 1990 but *T. irinae* has small, slender uncus and subdorsal row of spines in the disc of the valva. In female genitalia, the sterigma of *T. africana* resembles that of another Palaearctic species, *T. couleruana* (Duponchel, 1834) but the latter has an elongate, telescopic ovipositor and a rudimentary signum and, as *T. irinae*, white forewing ground colour.

Etyymology: The name refers to Africa.

Epinotia latiloba Razowski & Trematerra, 2010

Material examined: Bradi, 2182 m, 1 ♂, 22-V-2018; 2 ♂♂, 14-VI-2018. Choke Mts, 2510 m, 1 ♂, 21-VIII-2017; 1 ♂, 20-IX-2017; 1 ♂, 18-II-2018; 7 ♂♂, 7-IV-2018; 1 ♂, 17-V-2018; 2 ♂♂, 5-VII-2018. 2530 m, 7 ♂♂, 22-IX-2017. 2590 m, 1 ♂, 21-IX-2017; 3 ♂♂, 23-IX-2017; 1 ♂, 6-III-2018; 12 ♂♂, 16-V-2018; 1 ♂, 4-VII-2018. Delima, 2377 m, 1 ♂, 17-I-2018. Wof-Washa, 2900 m, 1 ♂, 12-VIII-2017; 2 ♂♂, 14-IX-2017; 2 ♂♂, 15-IX-2017; 11 ♂♂, 16-IX-2017; 2 ♂♂, 19-X-2017; 5 ♂♂, 20-X-2017.

Remarks: *E. latiloba* was described from the Harenna Forest, the Bale Mountains where it was collected in September at the altitude of 2350 m. The present specimens are taken in July and October at altitudes from 2182 m to 2900 m.

***Megaherpystis wofwasha* Razowski & Trematerra, sp. n.** (Figure 22)

Material examined: Choke Mts, Holotype ♂, 2590 m, 23-VIII-2017 (GS 3153PT); paratypes, Choke Mts, 2510 m, 1 ♂, 7-IV-2018 (GS 3180PT); 2 ♂♂, 7-IV-2018. Wof-Washa, 2900 m, 1 ♂, 20-X-2017 (GS 3181PT); 1 ♂, 20-X-2017 (GS 3182PT); 3 ♂♂, 20-X-2017.

Description: Wing span 18 mm. Head and thorax brown. Forewing slightly expanding terminally; costa weakly, uniformly broad throughout; termen sinuate beneath apex. Ground colour cream brown in form of slender interfascia, suffused brown. Markings broad, diffuse, dark brown; costa and termen concolorous. White line from beneath apex to mid-termen. Cilia brown. Hindwing greyish brown, cilia brownish cream.

Male genitalia (Figure 47): Uncus short, mostly slender basally, expanding, bifid terminally; base of socius armed with a thorn, median part broad, tapering toward the tip; valva fairly slender, neck moderately long, ventral incision shallow; cucullus upcurved, convex caudally; patch of short spines extending from ventral lobe; aedeagus short, tapering terminad.

Female unknown.

Diagnosis: *M. wofwasha* differs from *M. maficana* (Razowski, 2015), *M. calliarma* (Meyrick, 1909), *M. nereidopa* (Meyrick, 1927) and some related species chiefly in the shapes of the uncus (the lateral lobes of the latter are small), socii and sacculus.

Etyymology: The name refers to the locality of Wof-Washa where the new species was collected.

***Megaherpystis valvalobata* Razowski & Trematerra, sp. n.** (Figure 23)

Material examined: Wof-Washa, Holotype ♂, 2900 m, 18-X-2017 (GS 3154PT); paratypes, Choke Mts, 2510: 1 ♂, 7-IV-2018 (GS 3183PT); 1 ♂, 7-IV-2018 (GS 3184PT); 1 ♂, 7-IV-2018 (GS 3185PT); 1 ♂, 7-IV-2018 (GS 3186PT). 2590 m, 1 ♂, 8-VI-2018 (GS 3187PT); 1 ♂, 8-VI-2018 (GS 3188PT). Wof-Washa, 2900 m, 1 ♂, 19-X-2017.

Description: Male, wing span 15 mm. Head yellow-brown, also palpus yellow-brown; thorax brown. Forewing not expanding terminad; costa slightly convex; termen moderately oblique, concave beneath apex. Ground colour brownish yellow with browner suffusions and dots; costal strigulae small, yellowish cream, divisions brown. Markings brown: basal blotch subdivided into diffuse parts with some dark brown strigulae and spots; median fascia marked brown medially; subapical blotch brown, also with brown marks. Cilia damaged, remnant brown and yellowish. Hindwing brown, paler basally; cilia similar.

Male genitalia (Figure 48): Uncus short, bifurcate in distal third; socius with broad, oval dorsal half and finger-like terminal part; valva broad with weak ventral incision; cucullus with rounded ventral lobe and large upwards curved dorsal lobe, convex caudally; sacculus slightly convex subterminally; medioterminal part of basal cavity slender; aedeagus fairly broad; cornuti long.

Female unknown.

Diagnosis: *M. valvalobata* is related to the South African (Natal) *M. calliarma* (Meyrick, 1909) and *M. nereidopa* (Meyrick, 1927) from Kenya differing from them chiefly in the shape of the cucullus.

Etymology: The name *valvalobata* refers to shape of valva.

Cosmetra triangularis Razowski & Trematerra, sp. n. (Figures 24-25)

Material examined: Choke Mts, Holotype ♂, 2590 m, 21-IX-2017 (GS 3155PT); paratypes, Choke Mts, 2510 m, 1 ♂, 12-I-2018 (GS 3190PT); 1 ♀, 12-I-2018 (GS 3189PT); 1 ♀, 18-II-2018 (GS 3156PT); 2 ♀♀, 18-II-2018. 2590 m, 1 ♀, 16-II-2018.

Additional material: Choke Mts, 2510 m, 1 ♀, 14-XII-2017; 1 ♂, 12-I-2018; 1 ♂, 18-II-2018; 2 ♂♂ and 2 ♀♀, 7-III-2018. 2530 m, 1 ♂, 16-XI-2017. 2590 m, 1 ♂, 23-IX-2017; 2 ♂♂ and 1 ♀, 13-XII-2017; 1 ♂ and 1 ♀, 10-I-2018; 1 ♂, 4-VII-2018. Delima, 2377 m, 1 ♂, 18-XII-2017. Wof-Washa, 2900 m, 1 ♂, 19-X-2017; 3 ♂♂, 20-X-2017.

Description: Male, wing span 14 mm. Head and thorax brownish, front brownish, labial palpi brownish. Forewing weakly expanding terminad; costa weakly convex; termen slightly oblique, straight. Ground colour brownish cream with pale brownish suffusions and browner strigulation; costal strigulae creamish, divisions brown. Markings brown: costal remnant of median fascia small; dorsum to middle and tornal triangular blotch brown. Cilia (damaged) concolorous with ground colour, brown beneath apex. Hindwing pale brown, cilia slightly paler.

Male genitalia (Figure 49): Uncus short, triangular; socius long, arched, long hairy; valva slender, long; sacculus gently angulate postbasally, convex at middle, hairy from angle to before cucullus; latter small, convex caudally; aedeagus moderately long and broad.

Female genitalia (Figure 50): Sterigma and ostium vicinity convex medioposteriorly; sclerite of antrum large, triangularly tapering in proximal part; membranous part of ductus bursae short; two proportionally short sigma present.

Diagnosis: *C. triangularis* is similar and closely related to the South African *C. tumulata* (Meyrick, 1908) but differs from it in having a very short, subtriangular uncus, strongly curved, long socii, a convex caudal edge of the cucullus, and a long, slender valva. In *C. tumulata* the most important differing character is a slender uncus. The female of this species has a longer sclerite antrum and a shorter subgenital sternite than *C. tumulata*.

Etymology: The name refers to the tornal triangular blotch of the forewings.

Protancyllis secundus Razowski & Trematerra, sp. n. (Figure 26)

Material examined: Choke Mts, Holotype ♂, 2510 m, 7-III-2018 (GS 3157PT).

Description: Male, wing span 10 mm. Head and thorax brownish, front cream, labial palpus cream with distal part brownish. Forewing slightly expanding terminad; costa almost straight; apex pointed; termen somewhat oblique, gently concave beneath apex. Ground colour brownish, partly tinged whitish, suffused brown. Markings rubbed, remnants dark brown in form of costal part of median fascia and submedian remnant of a blotch or dorsobasal marking. Cilia damaged. Hindwing dark brown, cilia paler.

Male genitalia (Figure 51): Tegumen slightly tapering terminad, rounded apically; socii broad, lateral, rounded terminaly; gnathos membranous; valva broad to middle with distinct, short neck and ventral concavity; sacculus angulate, marked by large group of dense hairs at the angle; cucullus elongate, slender; aedeagus short, broad; cornuti long.

Female unknown.

Diagnosis: *P. secundus* is closely related to *P. amseli* Diakonoff, 1983 from Saudi Arabia but *P. amseli* has slender forewing, distinctly oblique termen, edged white; in male genitalia a longer neck and shallow, ventral incision of valva, and short cucullus.

Remarks: *P. amseli*, the first species of the genus was described from the Asir Mountains, Saudi Arabia. Originally (DIAKONOFF, 1983b), it was compared to *Eucosma*, *Epiblema*, *Epinotia* and *Ancylys*. The female genitalia of *Protancylys* Diakonoff, 1983 are similar to *Epiblema* but the socii are typical of *Gypsonoma*

Etyymology: The name means that this species is the second in the genus *Protancylys*.

Gypsonoma paradelta (Meyrick, 1925)

Material examined: Amber, 2460 m, 1 ♂, 19-VIII-2017. Choke Mts, 2590 m, 1 ♀, 19-VIII-2017; 1 ♂ and 1 ♀, 10-X-2017; 2 ♀♀, 10-I-2018. Wof-Washa, 2900 m, 1 ♂, 18-X-2017; 2 ♂♂, 20-X-2017.

Remarks: *G. paradelta* was recorded by RAZOWSKI *et al.* (2018) from the Suba Forest, Oromia, Ethiopia. Its synonym, *Eucosma picrodelta* Meyrick, 1932 was described from Djem-Djem Forest, Ethiopia.

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Eucosmocydia zegieana Razowski & Trematerra, 2018

Material examined: Choke Mts, 2530 m, 1 ♀, 22-IX-2017. 2590 m, 1 ♂, 21-IX-2017; 1 ♂, 23-IX-2017; 1 ♀, 13-X-2017. Wof-Washa, 2900 m, 1 ♀, 16-IX-2017.

Remarks: *E. zegieana* was described from Amhara, the Zegie Peninsula. *E. zegieana* differs from *E. pharangodes* (Meyrick, 1920) by having a slender, long cucullus and a slender, almost straight terminal part of aedeagus while in *E. pharangodes* the cucullus is broad, short, the terminal part of aedeagus is short. The ductus bursae of *E. pharangodes* is slender as is exactly figured by AGASSIZ & AARVIK (2014) while that of *E. zegieana* it is broad in the proximal third. In RAZOWSKI *et al.* (2018) the female (Figure 35) named *zegieana* may prove *E. pharangodes*.

Eucosmocydia pharangodes (Meyrick, 1920)

Material examined: Wof-Washa, 2900 m, 1 ♀, 16-IX-2017; 1 ♂, 18-X-2017; 2 ♀♀, 20-X-2017.

Remarks: For differences to *E. zegieana*, see the remarks of the latter.

Coniostola stereoma (Meyrick, 1912)

Material examined: Choke Mts, 2590 m, 1 ♂, 13-X-2017; 1 ♀, 17-XI-2017.

Remarks: *C. stereoma* was described from Pusa, Bengal in India. AGASSIZ & AARVIK (2014) recorded its distribution in Africa and Oriental Region.

Cydia tythaspis Razowski & Trematerra, 2010

Material examined: Choke Mts, 2510 m, 1 ♂, 5-VII-2018.

Remarks: *C. tythaspis* was described from the Bale Mountains from one male. The female remains unknown.

***Thylacandra delimana* Razowski & Trematerra, sp. n.** (Figures 27-28)

Material examined: Choke Mts, Holotype ♂, 2590 m, 10-I-2018 (GS 3158PT); paratype, Choke Mts, 2590 m, 1 ♀, 10-I-2018 (GS 3159PT).

Additional material: Choke Mts, 2510 m, 2 ♂♂, 14-X-2017; 41 ♂♂ and 1 ♀, 15-XI-2017; 29 ♂♂, 18-II-2018; 4 ♂♂, 7-III-2018. 2530 m, 2 ♂♂, 20-VIII-2017; 3 ♂♂, 16-XI-2017; 1 ♂, 10-VI-2018. 2590 m, 1 ♂, 20-IX-2017; 18 ♂♂, 21-IX-2017; 5 ♂♂, 22-IX-2017; 3 ♂♂, 13-X-2017; 1 ♂, 12-XII-2017; 1 ♂, 13-XII-2017; 1 ♂, 6-III-2018; 1 ♂, 8-III-2018. Delima, 2377 m, 6 ♂♂, 19-XI-2017; 1 ♂, 20-XI-2017; 2 ♂♂, 18-XII-2017; 1 ♂, 20-XII-2017; 1 ♂, 23-II-2018. Wof-Washa, 2900 m, 2 ♂♂, 14-IX-2017; 1 ♂, 15-IX-2017; 2 ♂♂, 16-IX-2017; 1 ♂, 15-IX-2017; 2 ♂♂, 16-IX-2017; 1 ♂, 18-X-2017; 1 ♂, 19-X-2017; 1 ♂, 20-X-2017.

Description: Male, wing span 19 mm, female 18 mm. Head rust brown, labial palpus cream with distal part brown; thorax brown, yellow-brown laterally. Forewing slender; costa hardy curved outwards, termen oblique, tolerably straight. Ground colour brownish yellow with brown suffusions and venation; costal strigulae absent; costa to before apex and a fascia from apex to end of median cell brown, the latter followed by paler suffusion. Cilia damaged. Hindwing brown, paler basally; remnants of cilia yellowish.

Male genitalia (Figure 52): Tegumen delicate with slender pedunculi; socii reduced to groups of long hairs; gnathos submembranous; valva almost uniformly broad; sacculus slender with small angle; neck broad, armed with large ventral extension near middle; cucullus short, with ventral angle; long seta at posterior base of latter; bristled area of cucullus small; aedeagus slender, tapering postmedially.

Female genitalia (Figure 53): Ovipositor and apophyses short; sterigma short, slightly convex posteriorly, distinctly so anteriorly; ductus bursae membranous; signum slender.

Diagnosis: *T. delimana* is related to *T. sycophyes* Diakonoff, 1970 from Madagascar and *Cryptophlebia hemon* Diakonoff, 1983 from the Comoro Islands but the mentioned species differ from *T. delimana* chiefly by having a broad forewings and elongate cuculli.

Etymology: The species is named after Delima, one of the type localities.

***Dracontogena bradiana* Razowski & Trematerra, sp. n.** (Figure 29)

Material examined: Bradi, Holotype ♂, 2182 m, 22-V-2018 (GS 3160PT).

Description: Male, wing span 17 mm. Head dark brown, front dark brown, labial palpus brown; thorax whitish with brown collar and posterior part yellowish. Foreing slightly expanding terminad; termen hardly concave beneath apex, indistinctly oblique. Ground colour along dorsum white forming two confluent blotches, otherwise blackish brown, costal strigulae white. Markings invisible. Cilia white from beneath apex to middle, otherwise blackish brown. Hindwing brown, paler basally; cilia brownish.

Male genitalia (Figure 54): Socii absent; proximal haf of valva fairly slender, slightly expanding posteriorly; neck small; cucullus large, broad, rounded caudally, oblique in dorsal third; aedeagus broad to middle, distinctly tapering toward the end, slender terminally.

Female unknown.

Diagnosis: *D. bradiana* should be similar to *D. sundi* Aarvik & Karisch, 2012 from Uganda and *D. metamorphica* (Meyrick, 1928) from the Sao Thome Island from which it differs by its slender forewing and dark coloured posterior half, slender posterior part of aedeagus, and a shallow ventral incision of the valva. From *D. sundi* this species differs in the brown, not pale, greyish hindwing, a shape of the cucullus, and in the number of cornuti which in *D. sundi* is ca 20 and in *D. bradiana* is ca 30.

Etymology: The name refers to the locality of Bradi where the new species was collected.

Thaumatotibia batrachopa (Meyrick, 1908)

Material examined: Choke Mts, 2590 m, 1 ♂, 17-II-2018; 1 ♂, 16-V-2018. Wof-Washa, 2900 m, 1 ♂, 18-X-2017.

Remarks: RAZOWSKI & TREMATERRA (2010) recorded this species from the Harena Forest, the Bale Mountains.

***Thaumatotibia parimitans* Razowski & Trematerra, sp. n.** (Figure 30)

Material examined: Wof-Washa, Holotype ♂, 2900 m, 18-X-2017 (GS 3161PT); paratype, Choke Mts, 2530 m, 1 ♂, 8-III-2018 (GS 3152PT).

Description: Male wing span 21 mm. Head and thorax yellow-brown; palpi yellow browns. Forewing slightly expanding terminad; costa weakly bent; termen moderately oblique. Ground colour brownish yellow dotted and strigulated brown; costal strigulae yellowish cream, divisions brownish. Markings rubbed, ill-defined, brown; basal blotch and median fascia rudimentary; subterminal fascia slender. Cilia damaged. Hindwing brownish, in apical part more yellow; strigulation or spots brownish; cilia damaged.

Male genitalia (Figure 55): Top of tegumen rounded; socii absent; valva almost uniformly broad; neck atrophied, sacculus to beyond 1/3 of latter, straight; angle small; slender fold beneath end part of basal cavity; cucullus elongate, rounded caudally; row of spines from before mid-length of valva, ventrally; aedeagus broad with ventroterminal process, with minute dorsal thorn; nests of cornuti numerous.

Female unknown.

Diagnosis: In facies, *T. parimitans* is similar to *Cryptoschesis imitans* Diakonoff, 1988 from Madagascar but differs from it chiefly in having a short, broad aedeagus.

Etymology: The species is named after *C. imitans*.

***Thaumatotibia machakelana* Razowski & Trematerra, sp. n.** (Figure 31)

Material examined: Bradi, Holotype ♂, 2182 m, 14-VI-2018 (GS 3162PT); paratypes, Bradi, 2182 m, 2 ♂♂, 14-VI-2018. Delima, 2377 m, 1 ♂, 21-II-2018 (GS 3191PT).

Description: Male, wing span 14 mm. Head and proximal part of thorax orange cream, front orange; remaining parts of thorax brownish, palpi orange cream. Forewing expanding terminad; termen straight, moderately oblique. Ground colour creamish more or less suffused brownish and ferruginous, strigulated and reticulated brown. Markings: dorsobasal blotch edged rust brown followed by brown suffusion; median fascia rudimentary in costal part brownish; subterminal fascia indistinct parallelly edged, reaching posterior part of termen. Cilia brownish cream. Hindwing grey cream with brownish grey suffusions and similar cilia.

Male genitalia (Figure 56): Socii rudimentary; proximal half of vava uniformly broad, neck absent; sacculus straight; cucullus large with rounded ventral lobe, tapering apically; aedeagus moderately broad, slightly tapering terminally; cornuti fairly long.

Female unknown.

Diagnosis: In facies, *T. machakelana* is similar to *T. batrachopa* but differs from it by having an ill-defined subterminal fascia; in genitalia, it resembles *T. leucotreta* Meyrick, 1913 from which it differs chiefly by longer cucullus and ventroterminal part of the aedeagus. *T. machakelana* differs from the two mentioned species chiefly by having a thorn-like process of the neck of valva.

Etymology: The name refers to the territory of Machakel Woreda where the new species was collected.

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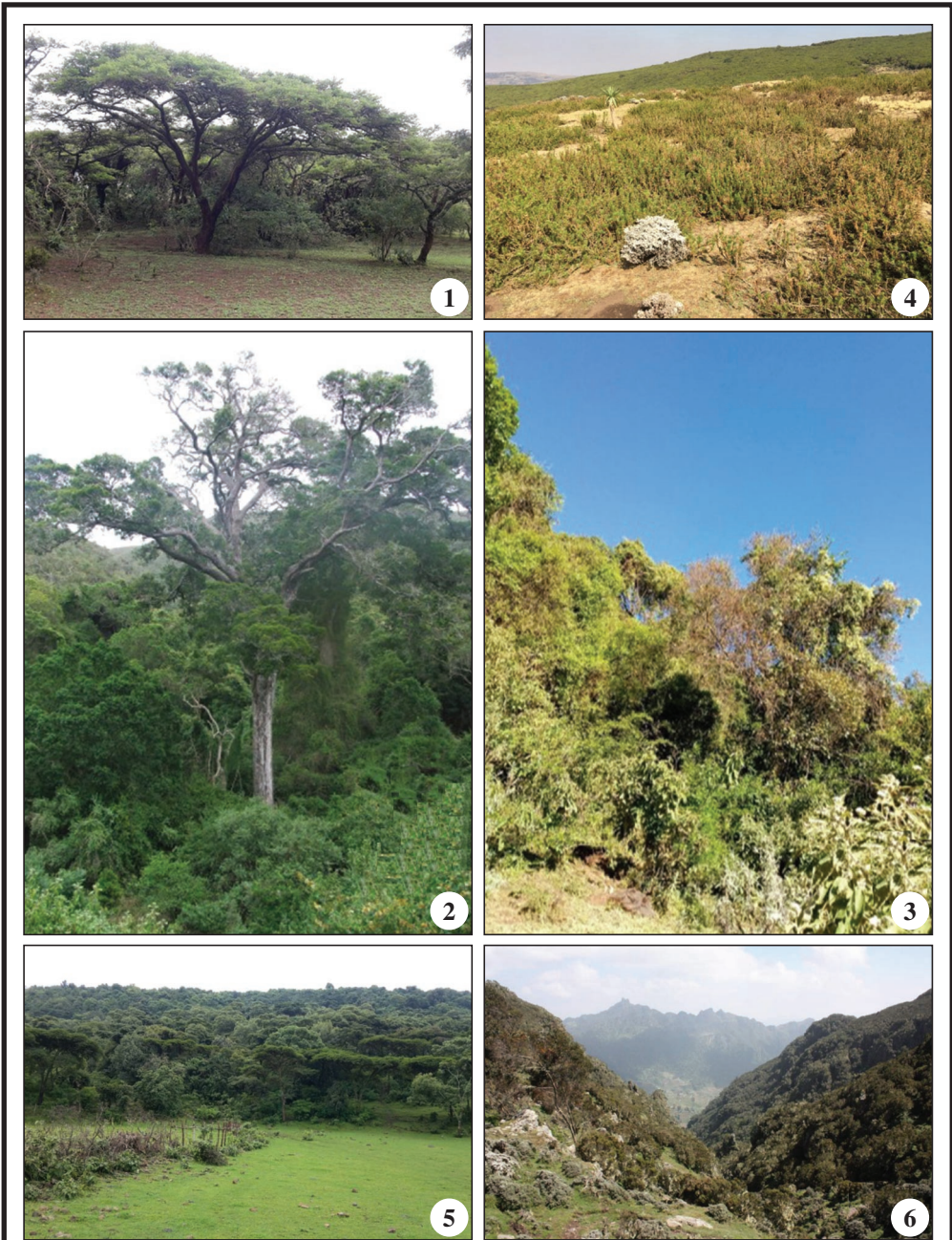
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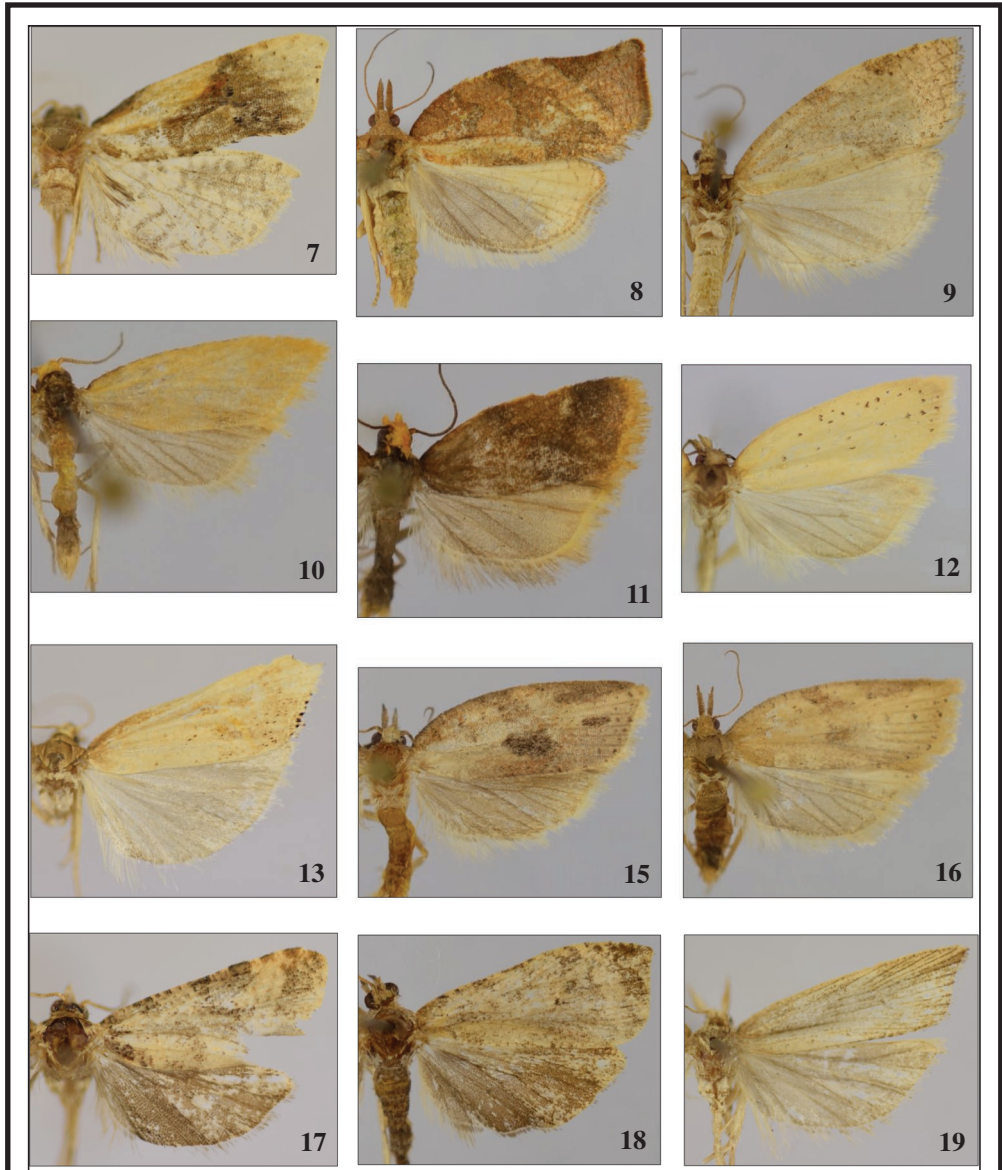
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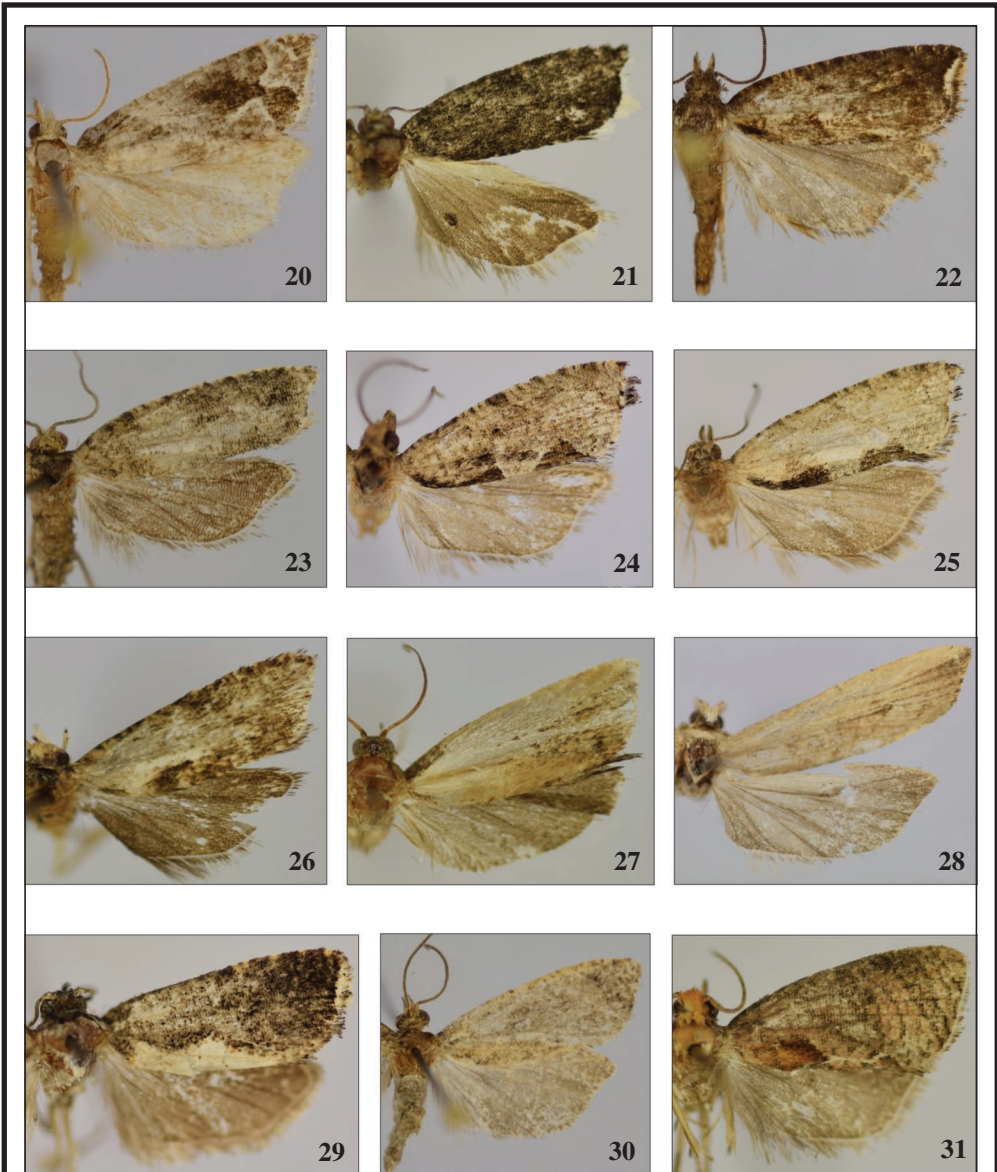
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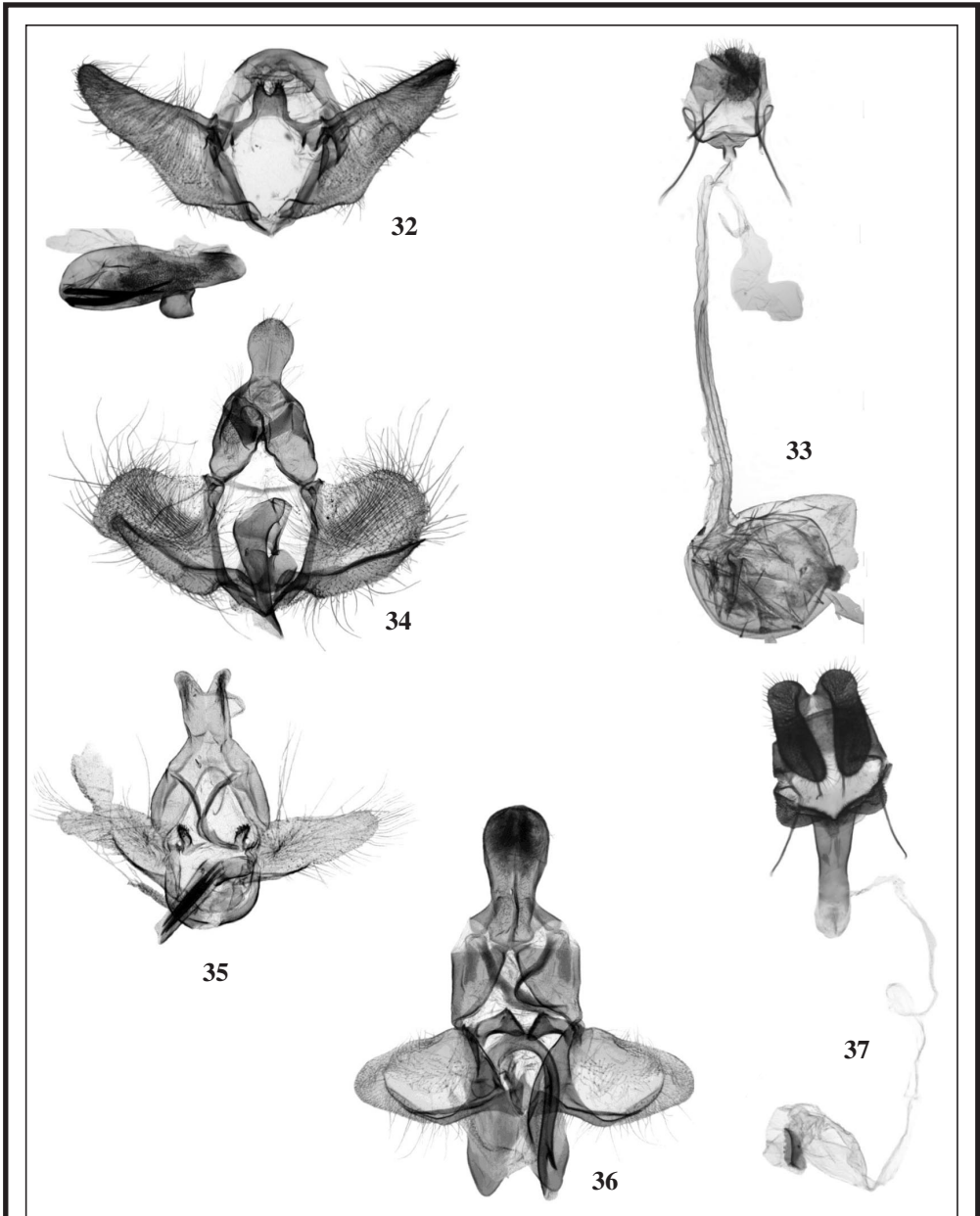
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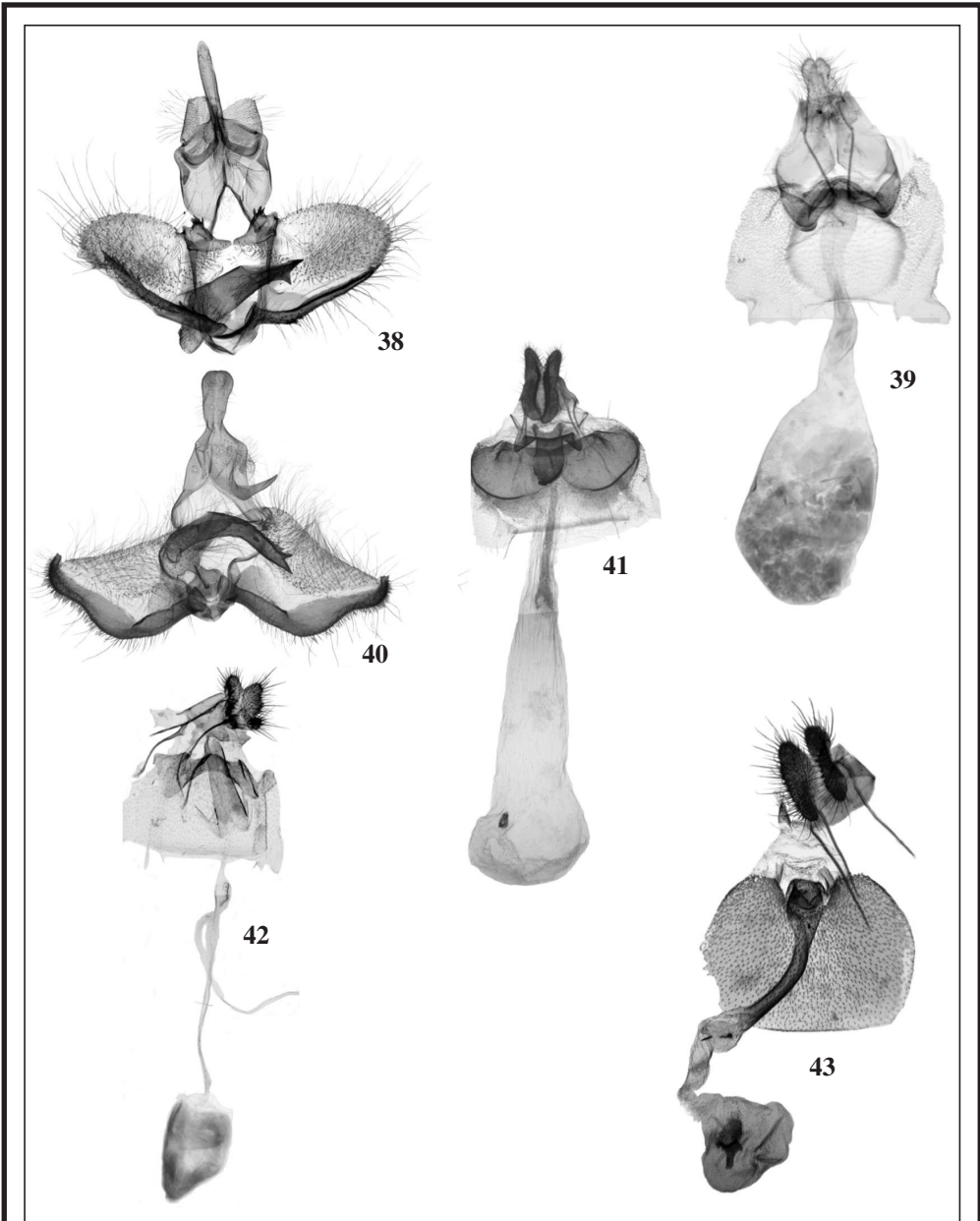
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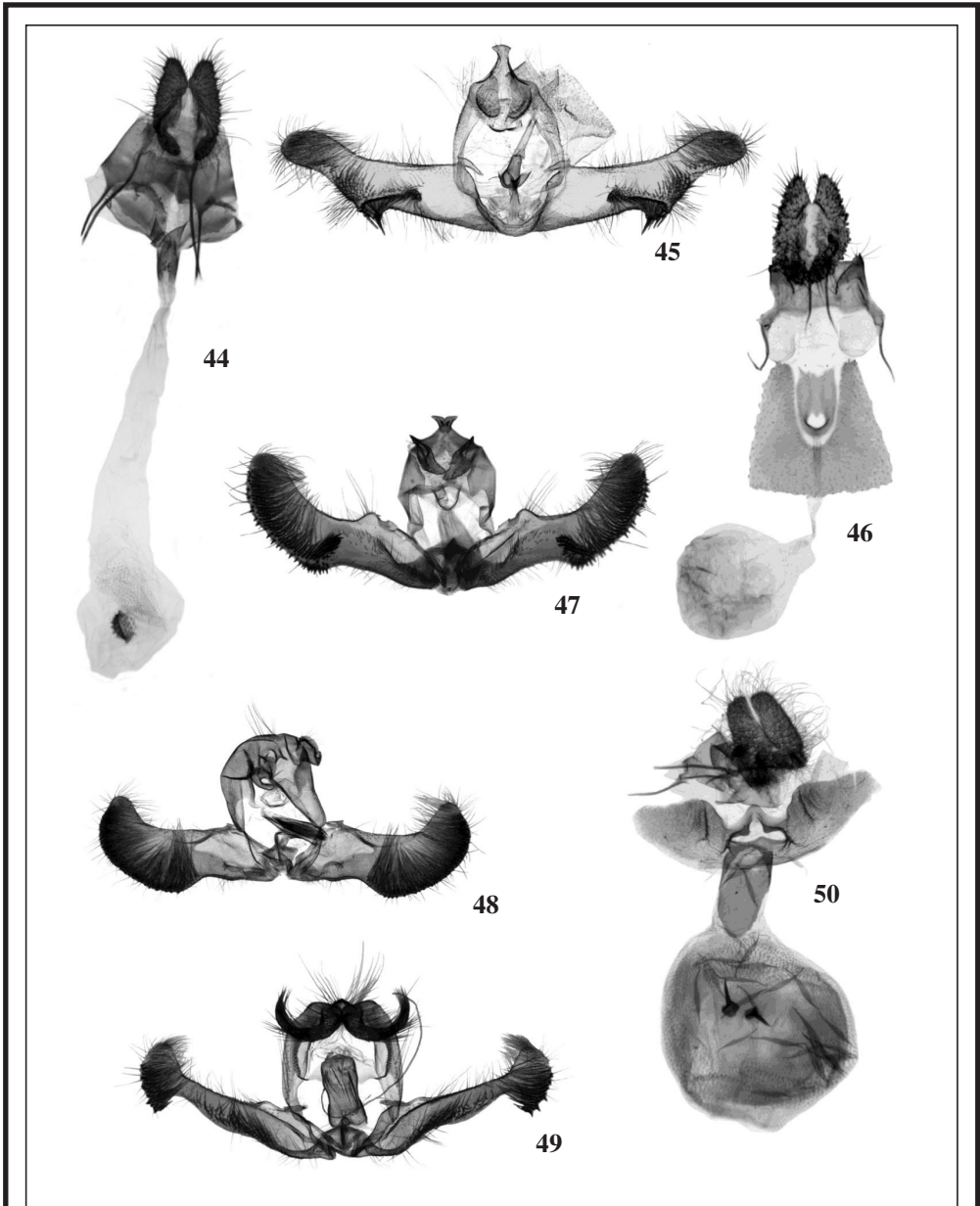
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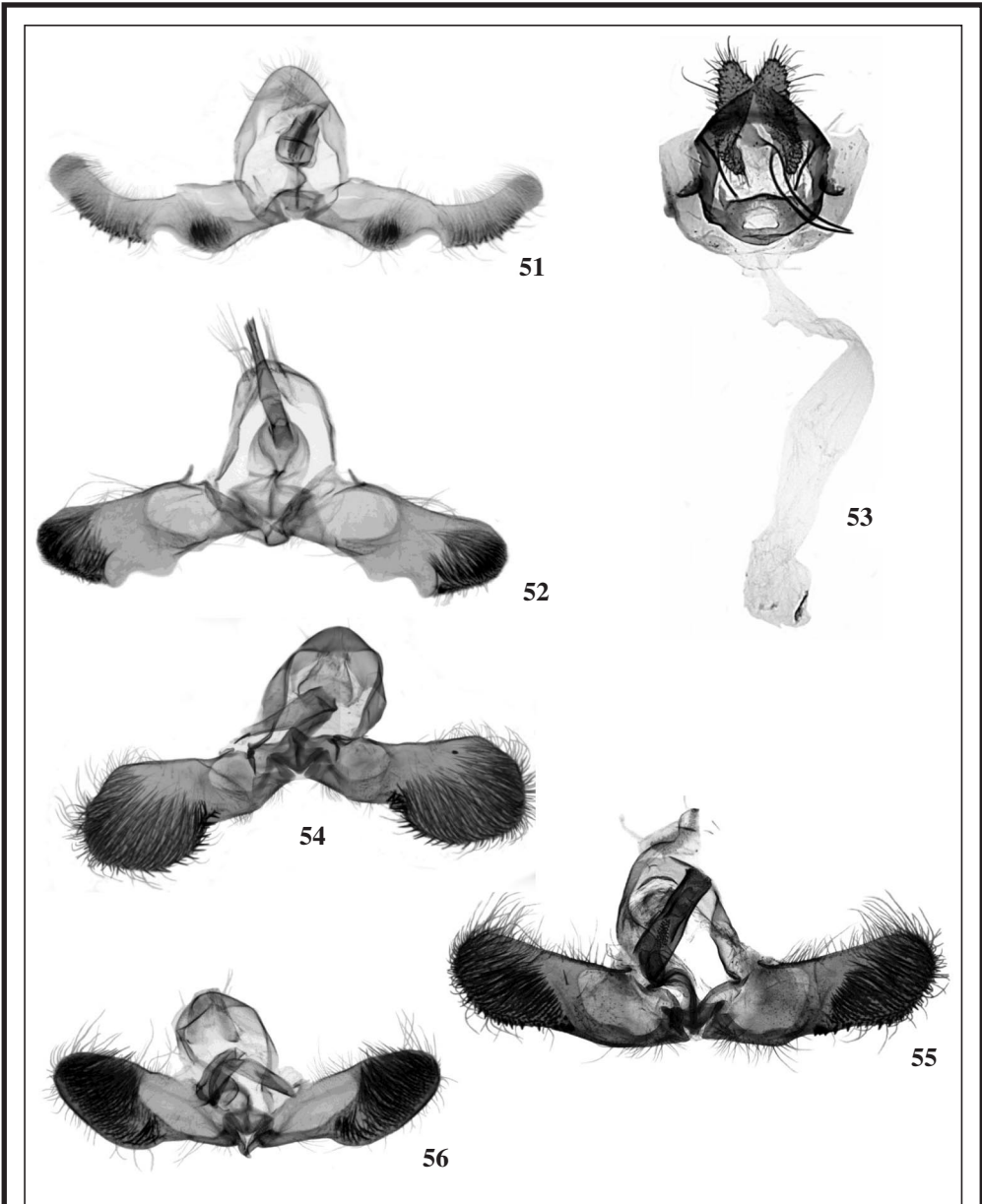
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