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Description of five new subspecies of *Bebearia* Hemming, 1960 and further notes on the genus (Lepidoptera: Nymphalidae, Limenetidinae, Adolaidini)

L. F. Mendes, A. Bivar-de-Sousa & L. F. Lopes

Abstract

Samples of Lepidoptera of genus *Bebearia* Hemming, 1960 deposited in their majority in the MUHNAC collection are studied; they proceed especially from Guinea-Bissau, Angola and Mozambique. Five new subspecies are described, three from the northern Angola and one from the north-eastern Mozambique belong to the "group *mardania*"; a further one, from the north-western Angola, includes the "group *sophus*".
KEY WORDS: Lepidoptera, Nymphalidae, Limenetidinae, Adolaidini, *Bebearia*, new subspecies, Angola, Mozambique.

Descripción de cinco subespecies nuevas de *Bebearia* Hemming, 1960 y otras notas sobre el género (Lepidoptera: Nymphalidae, Limenetidinae, Adolaidini)

Resumen

Se estudian los muestreos de Lepidoptera del género *Bebearia* Hemming, 1960 depositados en su mayoría en la colección del MUHNAC; provienen en especial de Guinea-Bissau, Angola y Mozambique. Se describen cinco subespecies nuevas, tres del norte de Angola y otra del nordeste de Mozambique pertenecientes al "grupo *mardania*"; otra del noroeste de Angola, incluido el "grupo *sophus*".
PALABRAS CLAVE: Lepidoptera, Nymphalidae, Limenetidinae, Adolaidini, *Bebearia*, nuevas subespecies, Angola, Mozambique.

Descrição de cinco subespécies novas de *Bebearia* Hemming, 1960 e outras notas sobre o género (Lepidoptera: Nymphalidae, Limenetidinae, Adolaidini)

Resumo

Estudam-se as amostras de Lepidoptera do género *Bebearia* Hemming, 1960 na sua maioria em depósito na colecção do MUHNAC; provêm em especial da Guiné-Bissau, Angola e Moçambique. Descrevem-se cinco subespécies novas: três do norte de Angola e uma do nordeste de Moçambique pertencem ao "grupo *mardania*"; uma outra, do noroeste de Angola, integra o "grupo *sophus*".
PALAVRAS CHAVE: Lepidoptera, Nymphalidae, Limenetidinae, Adolaidini, *Bebearia*, subespécies novas, Angola, Moçambique.

Introduction

As pointed HECQ (2000a, b), D'ABRERA (2004) and LARSEN (2005), the exclusively Afrotropical genus *Bebearia* Hemming, 1960, currently with more than one hundred described species/subspecies, is close to *Euriphene* Boisduval, 1847 and to *Euphaedra* Hübner, [1819], from which it may be distinguished mainly by details of the forewing venation and, in the great majority of the cases, by the clear sexual dimorphism; the different colour of the underside of the labial palps (gray in *Bebearia*, orange in *Euphaedra*) and the distinct cell spots are considered by LARSEN (2005) as obviously not strong characters though they can be useful in what most of the representatives of these genera are concerned. A detailed study of the wings' shape and pattern, and of the male genitalia morphology are fundamental for the correct diagnosis of the species, as stressed also HANCOCK (1992) and HOLMES (2001).

Present contribution deals with the study of *Bebearia* specimens mainly from Guinea-Bissau, Angola and Mozambique, while a few further samples from other geographical origins are also seen. Previous identification of the taxa registered for those countries are also reported and discussed, and a few corrections are presented.

Five new subspecies, four from the northern Angola and one other from the north-eastern coastal Mozambique are described and notes are presented on the remaining studied taxa. Four among the new taxa belong to the "group *mardania*", which wings verso is crossed by a darker band prolonged from the forewing apex to the hindwing tornus and which caterpillars feed on palms (Monocotyledons, Arecaceae); the fifth one is a subspecies of *B. sophus*, the only known representative of the "group *sophus*", characterized by the strongly falcate forewings, which males are brownish with darker round spots and with an usually hill-defined subapical lighter band, while females' recto is mostly bluish or greenish and its subapical band is as a rule yellow (rarely whitish) and more contrasted; the forewing verso line is in this group arched from the inner margin apex to its middle, and in the known subspecies, the caterpillars feed on *Landolphia* (Apocynaceae) and on *Chrysophyllum* (Sapotaceae).

Methodologies

The studied imagos all dried and pinned and originally dispersed by several Portuguese collections, are now part of the National Natural History and Science Museum, Lisbon University (MUHNAC), of the Natural History Museum, Oporto University (NHMUP) and of the second co-author personal collection (BS, mostly obtained by him). Holotype and paratypes of each one of the newly described taxon whatever the collection they were originally integrated, were deposited in institutional collections, namely that of the MUHNAC, with the exception of one paratype female that integrates the MHMUP. Opposite to what is recommended by the last issues of the ICZN but taking into account that most of the *Bebearia* species show a quite conspicuous sexual dimorphism, we opted for designate an paratype female among the paratypes for the newly described taxa. The original labels are transcribed and previous identifications, even if incorrect, are reported.

The following abbreviations will appear along the text: AF: Collection of A. Figueira, obtained by himself, donated to the NHMUP with the exception of a few duplicates offered to BS – then, both registration numbers maintained, as AF and BS – and to the MUHNAC; AS: Specimens collected by A. Serrano and R. Capela and offered to BS; C: Central; CAR: Central African Republic; CDR: Democratic Republic of Congo, previously Zaire, the former Belgian Congo; Congo: The Congo Republic, formerly the Congo Popular Republic, before that, the French Congo; CZ: Collection of the extinct Instituto de Investigação Científica Tropical / Centro de Zoologia, now integrated in the MUHNAC, the original registration numbers maintained. E: East, eastern; FW: Forewing; FWR: Recto of the forewing; HW: Hindwing; HWR: Recto of the hindwing; HWV: Verso of the hindwing; LC: Specimens collected by Luna de Carvalho, bequeath to the CZ - both registration numbers maintained (LC and CZ); N: North, northern; NP: National Park; NW: North-western; n.: locality number: nn: Devoid of registration number; PC: Collection of Passos de Carvalho, obtained by him especially in Angola, offered to the MUHNAC; PG: Collection of Pessoa Guerreiro, gathered by himself, previously in the CZ; R: Recto (dorsal) surface; RCI: Republic of Ivory Coast; S: South, southern; SE: South-eastern; SFA: Collection assigned as deposited in the "Serviços Florestais de Angola" (the Angolan

Forest Service – Cabinda ? – never seen, currently not localizable if still existent); SW: South-western; V: Verso (ventral) surface; W: West, western; WL: Length of the FW.

The specimens' WL was measured with an etalon clipper along the FW costa, when possible in the left wing, from its apex to the wing' insertion in the thorax.

Most of the Angolan localities from where samples are studied, were listed by MENDES *et al.* (2013); the following ones, all close to the Calulo village in the Cuanza Sul Province and not previously considered, are: Aldeia Catembo (10º00'S, 14º49'E); Cabuta (09º54'S, 14º54'E); Fazenda Klein (10º02'S, 14º54'E); and Fazenda Monte Café (09º59'S, 14º50'E); they all are high between 900 and 1,100 m above sea level.

Coordinates for the Mozambique collecting localities are based on the JMGIC (1946) maps: those concerning the samples now studied are Nacala, Nampula Province (14º03'S; 40º35'E; <50 m) and Mata do Nhangau, Sofala Province (19°44'S; 34°57'E; < 50 m); remaining ones, concerning bibliographic data and all in the Sofala Province are: Amatongas (19º11'S, 33º46'E, 400 m); Dondo (19º37'S, 34º45'E, < 50 m); and Maronga forest (19º51'S, 32º49'E, 1,445 m – S from the Chimanimani NP).

Province and UTM coordinates of the localities in Guinea-Bissau from where samples were studied, include MENDES *et al.* (2007) and BIVAR-DE-SOUSA *et al.* (2016).

Among the remaining studied specimens, one comes from the Impenetrable Forest, a rain forest sanctuary not far from Kabale, SW Uganda, close to the country borders with Rwanda and with RDC; another was obtained in the Taï NP, Djiburuti, Ivory Coast; and a further one was collected, in a low coastal forest area of the Loango NP, near St. Catherine, Ogooué Maritime Province, Gabon; precise coordinates of these three localities remain unavailable - the specimens from Uganda and Gabon were collected by the senior author.

The male genitalias were dissected under a Wild M5A binocular microscope lightened by a Hund Wetzler optical fiber source, gently boiled in a sodium hydroxide water solution and finally washed in 70% ethanol; for definitive preparations they were mounted in Tendeiro' Liquid (PAGÉS & MONTEYS, 2005: 1028) as it allows the direct passing from ethanol and enables an excellent preservation; after mounting for drying and transparentisation, the definitive slides were maintained in a stove at 40-50º C by 2-5 days before observation and after that, they remained there at least during one more week for complete drying; for their detailed study, a SM-LUX optical microscope with camera lucida was used. The micro-photos were taken with a stereomicroscope camera Leica M-165C, associated with a software LAS v.3.0.11.

Taxonomy

Genus *Bebearia* Hemming, 1960
Subgenus *Apectinaria* Hecq, 1990

Group *tentyris*

Bebearia languida (Schultze, 1920) (Figs 1a-1d, 16)
Euryphura tentyris var. *languida* Schultze, 1920. *Egbe. 2tn. Dt. Zent. Afrika. Exp.,* **1**(14): 724
LT: Angu (Uelle-Distr.), Belg. Kongo, ZAIRE

Material examined: ANGOLA, Cabinda, Buco Zau, 1 ♀, 23-V-1952 (CZ-nn); Surroundings of Cabinda town, 1 ♂, 21-XI-1971 (PG-241). Pathway to Gima Lake, 1 ♀, 12-III-1972 (PG-nn). Uige: Inga, 1 ♂, IX-1964 (BS-15800).

B. languida was described from the Uelle (Zaire) as a variety of *Euryphene tentyris* and it is considered by AURIVILLIUS (1928, as *Euryphene subtentyris*) to range from Sierra Leone to N Angola (first reference to the country) and by D'ABRERA (2004, as *Bebearia tentyris languida*) to fly in N Angola and S and C CDR. HECQ (1994) reports its presence from Equatorial Africa eastwards at least to Uganda but later (HECQ, 2000a, b, as a subspecies of *B. subtentyris*) points only Cameroon to

CDR. ACKERY *et al.* (1995, as *B. tentyris languida*) note again its presence in N Angola, Congo and C CDR, though none precise Angolan locality remains known.

HECQ (2000) and D'ABRERA (2004) reinforce the typical R violaceous or purple shine usually patent on all the male four wings, a feature more conspicuous in the specimen from the Uige than in the one from Cabinda. Meanwhile, BERGER (1981, sub *B. tentyris*) considers that *"les mâles d'un fauve clair, avec léger reflet violet, ont été baptisés* subtentyris *Strand*". The re-examined samples are in the base of the species most recent reference for Angola (MENDES *et al.*, 2019) and fairly agree with what was previously known. The male from close to the Cabinda town was misidentified by PG as *B. absolon?* and the female from the Gima Lake, as *Catuna crythea* Drury (both handwritten labels, data never published). The male genitalia valves are robust, longer than the uncus, slightly waved and provided with numerous scales in their basal and median part mixed with thin setae (the scales seem absent from their distal third only).

Bebearia absolon absolon (Fabricius, 1793) (Figs 2a-2d, 17)
Papilio absolon Fabricius, 1793. *Ent. Syst.*, **3**(1): 56
LT: GUINEA

Material examined: ANGOLA, Cabinda, Buco Zau, 1 ♀, 29-VI-1952 (CZ-nn). Cuanza Norte, Salazar, 1 ♀, VIII-1971 (AF-NY665022, BS-nn); Ibid, 2 ♂♂, IV-1972 (BS-14978, 14980); Ibid, 1 ♂, II-1973 (AF-NY665021, BS-nn); Ibid, 1 ♂, V-1973 (AF-NY665020, BS-nn). Uige: Inga, 1 ♂, IX-1964 (BS-15804). Province ?: No locality, 1 ♂, no date (PC-19827).

The species is assigned for Angola by the first time by BACELAR (1958, sub *Euryphene*) upon one unsexed specimen obtained in the Belize river (Cabinda) said to be deposited in the SFA; the Buco Zau sample confirms *B. a. absolon* presence in this territory and the males from Salazar (currently Dalatando) and from Inga, enlarge its range in Angola to the Cuanza Norte and Uige forests - they all are in the base of the MENDES *et al.* (2019) subspecies reference to the country. It is, further, pointed for Angola by FOX (1968, sub *Euphaedra*, no precise location), while HECQ (2000 a, b) notes it is a pan-African subspecies. Its presence in Angola is not objectively considered by ACKERY *et al.* (1995) who states that the species occurs from Liberia to Uganda and that the nominate subspecies flies from Liberia and RCI to Cameroon and CDR - relatively to this country Mayumbe, Ubangi, Mongala, Uele, Ituri, northern Kivu, Tchopo, Tchuapa, Equateur, Kinshasa, Kasai, Sankuru and Lualaba are assigned, the very same provinces reported by BERGER (1981). The R is typically devoid of violaceous reflexions, though this tint may be exceptionally slightly perceptible (ahead, note on *B. micans*). Relatively to the male genitalia, the valves are longer than the uncus and they show on the basal outer area some scales mixed with thin setae (clearly less numerous, however, than in *B. languida*).

Bebearia absolon entebbiae (Lathy, 1906) (Fig. 3a-3b, 18)
Euryphene entebbiae Lathy, 1906. *Trans. Ent. Soc. Lond.*, **1906**(1): 5, pl. 2, fig. 1
LT: Entebbe, UGANDA

Material examined: UGANDA, Southern Uganda, Bwindi NP, Impenetrable Forest, 1 ♂, 16-VIII-2007 (CZ-5362).

The subspecies was described from Entebbe, Uganda, noticed to occur in East Africa by HECQ (2000a, b) without details, and pointed to the same area by ACKERY *et al.* (1995) and by D'ABRERA (2004). The only studied male is darker and somewhat larger than those of the nominate subspecies just reported from N Angola (WL: 28.6 mm *vs.* 23.8-27.4 mm); the genitalia is similar to that of the nominate species though no scales could be spot on the valves (rubbed?).

Bebearia micans (Aurivillius, 1898)
Euryphene absolon var. *micans* Aurivillius, 1898. *K. svenska VetenskAkad. Handl.,* **31**(5): 201
LT: Kamerun - Congogebiet, Sassa, ZAIRE

Note: *B. micans* was described from Sassa, in the Bas Uele (CDR), clearly northwards from

Angola, and it was not considered to include the Angolan fauna by most of the authors: AURIVILLIUS (1928, as a subspecies of *Euryphene absolon*), reports Cameroon to CDR; HECQ (2000a, b), adds Nigeria; ACKERY *et al.* (1995) and D'ABRERA (2004) assign also CDR and Cameroon without details while BERGER (1981) states that *B. micans* is no more than a morph of *B. absolon* with a *"très léger reflet violet*". The only previous reference of *B. micans* for Angola (MENDES *et al*., 2019) is based, indeed, in the misidentification of 1 ♂ of *B. absolon* that exhibits a R week violaceous shine (specimen AF-NY665020, BS-nn), now re-examined and corrected, which, apart from this characteristic, shares the remaining features with the other studied males of the species collected in Cabinda, Cuanza Norte and Uige being so, considered to be con-specific with them. Consequently, and according to the present state of knowledge, it must be stated that *B. micans* doesn't occur in Angola.

Bebearia zonara (Butler, 1871) (Figs 4a-4b, 19)
Aterica zonara Butler, 1871. *Proc. Zool. Soc. Lond*., **1871**: 81
LT: Fantee, Cape Coast, GHANA

Material examined: ANGOLA, Cabinda, Chimbuande Lake, 1 ♂, 21-II-1971 (PG-232). Pathway to Gima Lake, 1 ♂, 12-III-1972 (PG-233), labelled as a ♀. Cuanza Norte, Salazar, 3 ♂♂, IV-1971 (BS-14974, 14976, 14982). Uige, Inga, 2 ♂♂, IX-1964 (BS-15802, 15803).

The species is reported for Angola only recently (MENDES *et al*., 2019) with base on the samples detailed above; indeed, none of the previous notes on the *B. zonara* range considers objectively it attains the country: AURIVILLIUS (1928) reports Ghana (as Gold Coast) to Congo, ACKERY *et al.* (1995) Sierra Leone to Cameroon, CDR (Mayumbe, Ubangi, Mongala, Uele, Ituri, Tchopo, Equateur, Cataractes, Kasai, Sankuru and Lualaba - the same provinces detailed by BERGER, 1981, incorrect subsequent spelling as *B. zonaria*) and Uganda (Bwamba and Toro) while D'ABRERA (2004) states Sierra Leone to Cameroon, CDR and W Uganda. After HECQ (2000a, b) it will be a pan-African element. The male valves are clearly shorter and wider than in the previous species and they are almost devoid of scales.

Bebearia oxione squalida Talbot, 1928
Euryphene oxione squalida Talbot, 1928. *Bull. Hill. Mus*., **2**: 230
LT: Entebbe, UGANDA

Note: According to AURIVILLIUS (1928, sub *Euryphene*), *Bebearia oxione* Hewitson, 1866 occurs from the Old Calabar (nowadays Nigeria) to Angola and Toro (currently, Uganda) in what shall correspond to its first reference for Angola. ACKERY *et al.* (1995), D'ABRERA (2004) and LARSEN (2005) report without details the presence of *B. oxione squalida* Talbot, 1928 from Cameroon, south to Angola and east to Uganda and of *B. oxione oxione* Hewitson, 1866, from Sierra Leone to Nigeria. HECQ (2000a, b) states that *B. oxione squalida* occurs on equatorial and E Africa while the nominate subspecies flies on western Africa - and the photos R and V of both sexes are noted to concern CDR individuals; despite recognizing the existence of the two subspecies and in the absence of details he enhances that *"between the two races, many forms exist*" and that *"tous les intermédiaires existe entre ces deux formes selon leur distribution géographique*". The subspecies presence in Angola (no precise location) is recently pointed again (ANONYMOUS, 2012, 2018). Our previous reference to *B. oxione* in the country (MENDES *et al*., 2019) is exclusively based in the existing data, since we had not the chance to observe material.

Group *mardania*

The group *mardania* is a quite homogeneous one and for long it remains the subject of different opinions according to what could be interpreted with base in a classic unpublished figure, that of Jones' Icones plate 70, where the type-males of *"Papilio Mardania*" and of *"Papilio Cocalia*" are represented - see HANCOCK (1982), HOLMES (2001) and LARSEN (2005). The notes of AURIVILLIUS (1928, sub *Euryphene*) and of D'ABRERA (1980) do not contribute to solve the problem. HANCOCK (1992) states about this group of species that *"…it is perhaps one of the most confused groups of African Nymphalidae …"*. ACKERY *et al.* (1995) accepts it includes *B. badiana* (2 ssp: *B. badiana badiana* and *B. badiana taveta*), *B. guineensis* (monobasic), *B. mardania* (2 ssp: *B. m. mardania* (= *B. cocalia*) and *B. mardania cocalioides*), *B. orientis* (2 ssp: *B. orientis orientis* and *B. orientis insularis*), *B. senegalensis* (2 ssp: *B. senegalensis senegalensis* and *B. senegalensis katera* (= *B. insularis* = *B. continentalis*) and the monobasic *B. theognis*. After HECQ (2000a, b) there are only three distinct species in the group, namely *B. mardania* (Fabricius, 1793), *B. cocalia* (Fabricius, 1793) and *B. cocalioides* Hecq, 1990, being *B. cocalia* known by several subspecies as it is also considered by D'ABRERA (1980, 2004); later HECQ (2010) recognizes a fourth species in the group (*B. paludicola* Schultz, 1920) he re-describes and accepts as bona species. HANCOCK (1982) based on the wing pattern and on the male genitalia morphology, considers *B. mardania* and *B. orientis* as valid, includes *B. cocalia* in the *B. senegalensis* (Herrich-Schäffer, 1858) synonymy, and agrees with the validity of *B. guineensis* (Felder & Felder, 1867). The modifications in the taxonomy of the *Bebearia* species/subspecies of this group is summarized by HOLMES (2001), who accepts the validity of one monobasic species (*B. mardania*) and of four polymorphic species: *B. cocalioides*, with two subspecies, *B. cocalia* with six, *B. paludicola* with two, and *B.orientis* with five - he notes, further, that the juxta arms are apically spinose in *B. paludicola* and *B. cocalia*, while they are smooth and glabrous or with a few setae only in *B. mardania*, *B. cocalioides* and *B. orientis*. More recently, LARSEN (2005) considers again *B. guineensis* as monotypical and valid, independent from *B. cocalia* and discusses the correctness of the figure of the male genitalia of HOLMES (2001). Identification keys for the species of the complex which validity was, then, accepted are presented by HANCOCK (1992) and by HOLMES (2001).

Bebearia mardania (Fabricius, 1793)

Papilio Satyris mardania Fabricius, 1793. *Ent. Syst*., **3**(1): 249

LT: WEST AFRICA

Note: Neither HANCOCK (1992), nor ACKERY *et al.* (1995), nor HOLMES (2001) nor MENDES *et al.* (2019) report *B. mardania* from Angola despite it was assigned from Luanda (as Loanda) by BUTLER (1871, sub *Euryphene*), considered to be common in the country by DRUCE (1875, sub *Euryphene*), pointed to fly from Ghana (as Gold Coast) to Angola and Uganda by AURIVILLIUS (1928, also sub *Euryphene*) and noted to occur in Angola by FOX (1968, sub *Euphaedra*). We fully agree with HECQ (2002b) who strongly suspects that all references to *B. mardania* for Angola will, actually, concern other species of the group while *"B. cocalia guineensis*" has been also partially recognised by BUTLER (op. cit.) who, though without the support of the male genitalia morphology, points *Papilio cocalia* and *P. mardania* as synonyms - the valves are completely different in the two species and none of the male genitalia studied from Angola agrees with HOLMES (2001: fig. 5a) concerning this species; further, the FW profile is also distinct, and none of the studied specimens have FW acuminated apex as HECQ (2010) enhances to the species, being the R clearly darker than HECQ (2002b) represents. HANCOCK (1992) considers that *B. mardania cocalioides* Hecq, 1988 (currently *B. cocalioides*), extends in Cameroon, Congo, CDR and CAR and includes most of the *B. mardania* previous references, while after HECQ (2002b) it must be considered as a valid species; the male' valves shape is, indeed, of the same type in the two entities and close also to what is known for *B. orientis* Karsch, suggesting an independent evolutive line inside the "group *mardania"* reinforced by the chaetotaxy of the juxta, only with thin setulae (HOLMES, 2001). D'ABRERA (2004) states again that *B. mardania* flies in Angola and considers the species ranges for Liberia to Ghana and Cameroon, Angola and S Zaire. Taking into consideration the known morphological and geographical data, we believe however that till (if) new data can confirm *B. mardania* real occurrence in Angola, all its previous references to the country must be interpreted as probable misidentifications.

Bebearia senegalensis (Herrich-Schäffer, [1853]) (Figs 5a-5b, 20)
Eurypheme senegalensis Herrich-Schäffer, 1850-1858. *Samml. aussereurop. Schmett*., **1**(1): 54, pl. [23], figs 95-98
LT: Westafrica, SENEGAL

Material re-examined: GUINEA-BISSAU, Bafatá, Aldeia de Cuor, 1 ♂, 4-II-1946 (CZ-553).

The only specimen reported by BACELAR (1949, as *Euryphaene senegalensis* H. Schäff.), with WL: 28 mm, was revised by BIVAR-DE-SOUSA *et al.* (2008, as a subspecies of *B. cocalia*) and is now studied again. The morphological characteristics fit well with what is currently known for the species: the R pattern fairly agree with the photo of HECQ (2000a) and the male genitalia corresponds to what LARSEN (2005) represents, who justifies it must be faced as a valid species, independent from *B. cocalia* - states that in Guinea-Bissau it flies also in the Bijagós Islands. The occurrence of *B. senegalensis* in Guinea-Bissau is, further, pointed by ACKERY *et al.* (1995) and by HOLMES (2001). The juxta is spinulated, the valves are clearly longer than the ensemble uncus+tegumen, ca. three times longer than wide in their R surface and their distal area shows 5-7 short teeth slightly oriented to the ventral margin. The species has a relatively short range, being known from Senegal, Gambia, Guinea-Bissau, S Guinea and NW Sierra Leone.

Bebearia guineensis (C. Felder & R. Felder, 1867)
Euryphene guineensis C. Felder & R. Felder, 1867. *Reise. Fregatte Nov. Lep*., **2**(2) (3): 430
LT: Calabar Vetus, Guinea [NIGERIA]

Note: *B. guineensis* was described from the Old Calabar (currently SE Nigeria), and noticed by ACKERY *et al.* (1995) for Ghana, Nigeria, Cameroon, Gabon, Congo, W CDR and Angola; LARSEN (2005) considers its most obvious characteristics are the short and wide, almost sub-rectangular FWR pre-distal orange band, the complete lack of violaceous shining and the straight margin of this wing - he notes it flies in Nigeria, Cameroun, Congo, W CDR and N Angola. HOLMES (2001, as *B. cocalia guineensis*) reports the very same range, and HANCOCK (1992, who doesn't recognize the validity of *B. cocalia*) considers *B. guineensis* as valid, selects a lectotype ♂ and adds Ghana and Gabon to its range. HECQ (2000 a, b, again as a subspecies of *B. cocalia*) notes that *"cette sous-espèce occupe le plus souvent les zones côtières de l'Afrique occidentale et central et s'étend quelques fois vers l'intérieur*" and presents photos of the R in both sexes'. D'ABRERA (2004) iconography concerns male (R and V) and female (R) specimens identified as *B. cocalia guineensis* Felder, 1867, he considers however, to fly in Guinea-Bissau only, despite the species was described from SE Nigeria, clearly southwards. We couldn't find any typical representative of this species among the samples obtained in Guinea-Bissau and those from Angola, described afterward as belonging to a new subspecies, have much more acuminated FW; in the complete ignorance of the morphology of the D'ABRERA (*op. cit.*) male valves, we believe that these photos may concern, as a matter of fact, some other subspecies of *B. guineensis* (or of *B. cocalia*) eventually not yet described, close however to the following Angolan endemism.

***Bebearia guineensis inexspectata* Mendes, Bivar & Lopes, ssp. n.** (Figs 6a-6d, 21)

Material examined Holotype 1 ♂, ANGOLA, Cuanza Sul, Novo Redondo (Sumbe), II-1963 (BS-15738). Paratypes: Bengo: Caxito, 1 ♂, III-1971 (BS-15005). Tentativa, 1 ♂, 13-III-1972 (LC-2735, CZ-5322). Ibid, no date, 1 ♂ (LC-2747, CZ-5323). Cuanza Norte, Cassoalala, 1 ♂, 26-VIII-1973 (BS-14623). Nova Oeiras (Zenza do Itombe), 1 ♂, 10-IV-1972 (BS-14966); Ibid, 1 ♀, 17-VI-1973 (BS-14603); Ibid, 1 ♀, 1-IX-1973 (BS-14625); Ibid, 1 ♀, 25-IX-1973 (BS-14624). Cuanza Sul, Novo Redondo (Sumbe), 1 ♀, I-1963 (BS-15744) plus 2 ♂♂, 2 ♀♀ (BS-15735, 15736, 15739, 15743). Ibid, 1 ♀, III-1963 (BS-15745). Non type-specimen. GABON, Ogooué-Maritima, Loango NP, St. Catherine forest, 1 ♀, 27-VIII-2009 (CZ-5762).

Description: WL ♂, 29-34 mm; ♀, 33-37 mm. Antennae maximum length (♀): 16.1 mm. Wings R of male dark brown, the ochreous FW subapical band short and wide, ovoid to sub-rectangular, as it is typical to the species and the white spot of the subapical band on space 3 small, triangular; no violaceous shining. V not strongly marked and with a quite tenuous pinkish shine. Genitalia different from the remaining taxa though similar, but distinct, from the schematic figure presented by LARSEN (2005); juxta clearly spinulated, the valves approximately as long as the ensemble uncus+tegumen, being each one, at its dorsal surface, 2.5-3 times longer than its maximum width and as long as to somewhat (1/6) shorter than the aedeagus; valves apex with 3-4 (exceptionally only one) apical teeth, slightly ventrally oriented. R of female similar to what is known from most of the species in the group, orange-brown and with the FWR light area white, the spot on space 3 (medio-cubital) small, usually sub-triangular and well separated from the remaining white area; V shine somewhat more pinkish than in the remaining females studied in this contribution.

Discussion: The new subspecies clearly approaches *B. guineensis guineensis* (Felder & Felder, 1867) as considered by HANCOCK (1998), HOLMES (2001) and LARSEN (2005), being their main diagnostic features the longer valves of the Angolan subspecies - again, it must be enhanced, according to this last author that the illustration of the male genitalia of HOLMES (2001) doesn't correspond to the one of *B. guineensis* and he also adverts to the complete absence of R violaceous shining. The species presence in Angola is recently noted (ANONYMOUS, 2012, 2018) though, once more, no details were presented. HANCOCK (1992) assigns *B. guineensis* occurrence in Angola upon 1 ♂ from River Lucala, 228 Km East of Luanda (Cuanza Norte or Malanje province) said to be deposited in the Natural History Museum of Zimbabwe, Bulawayo, a specimen we never saw but that quite probably belongs to the present subspecies; the species is reported again for Angola upon 4 ♂♂, 2 ♀♀ of unknown precise origin by HOLMES (2001, as *B. cocalia guineensis*), who states it ranges from *"E Nigeria to Angola, Congo and Zaïre*"; concerning the examined material, he reports Sierra Leone, Nigeria, Cameroon, Equatorial Guinea (Bioko, as Fernando Poo), Angola (no precise localities), CDR and Tanzania, but he suspects of the lack of correction of the first one (*"… Sierra Leone highly unlikely*") and of the last one of these data ("*… the Dar-es-Salaam record is also impossible unless by accidental introduction*") - for true, Angola is also marginal to the species range. HECQ (2000a, b, as *B. cocalia guineensis*) notes without details it flies on the coastal areas from W and Central Africa but that sometimes it extends for the inner areas. After BERGER (1981) it is considered as *B. cocalia* together with a number of other forms (currently valid species) and noted as *"pratiquement partout: le vrai* mardania *est surtout abondant au Mayumbe*" (also part of the newly described subspecies?).

Notes: The only female from Gabon is quite similar to the Angolan specimens, but it is more brownish than orange-brown and the white spot on the inter-cubital space is larger; it is not considered as part of the type-series because it is unique, due to the inexistence of known males in the same area and because it is less well preserved than most of the remaining studied samples. The specimens offered by LC to the CZ were collected by AF.

Etymology: From the Latin *inexpectatus*: not suspected, due to the new subspecies similarity to the nominate one.

Bebearia cocalia cocalia (Fabricius, 1793) (Figs 7a-7b)
Papilio Satyris cocalia Fabricius, 1793. *Ent. Syst.*, **3**(1): 250
LT: "Indiis" [false locality] [West Africa]

Material examined: IVORY COAST, Taï NP, Djiburuti, 22-IV-2000, 1 ♀ (PG-4488).

The studied specimen was obtained in the SW country, close to the RCI border with Liberia. With a WL: 35.5 mm, it fairly agrees with the characteristics of the subspecies, and with the photos presented by HECQ (2002) and by LARSEN (2005), both concerning females proceeding also from RCI; Larsen' figure is, however, more reddish than the studied female, which fully agrees with what Hecq' represented (more brownish). After ACKERY *et al.* (1995) it would be a synonym of *B. mardania mardania*, with a quite distinct light FWR pre-apical band, considered to occur in Sierra Leone, Liberia, RCI and Ghana. The studied specimen, not very well preserved, was accompanied by one hand-written label of *Bebearia mardania* (F.), a reference never published. According to

HOLMES (2001), *B. cocalia* nominate subspecies flies from Guinea to Togo and W Nigeria, but HECQ (2000) says nothing about its range, D'ABRERA (2004) notes it is known from Cameroon to CDR but LARSEN (op. cit.) assigns only Sierra Leone to Ghana.

Bebearia cocalia ngolae **Mendes, Bivar & Lopes, ssp. n.** (Figs 8a-8d, 22)

Material examined: 1 ♂, Holotype, ANGOLA, Cuanza Sul, Calulo, Fazenda Klein, 1-XII-2015 (BS-35041). Paratypes: Bengo: Tentativa, 1 ♂, 13-III-1972 (NY6650489). Cuanza Norte, Salazar (Dalatando), 2 ♀♀, 25-V-1972 (PC-nn); Ibid, 1 ♂, 25-VI-1972 (PC-1000), det. as *B. mardania*; Ibid, 1 ♂, 25-VII-1972 (PC-nn); Ibid, 1 ♂, 21-XI-1972 (PC-1001); Ibid, 1 ♀, 31-I-1973 (PC-19824); Ibid, 1 ♀, 18-II-1973 (BS-14606); Ibid, 1 ♂, 12-VIII-1974 (PC-140); Ibid, 1 ♂, 18-VIII-1974 (PC-157); Ibid, 1 ♂, 23-I-1975 (PC-nn). Cuanza Sul, Cabuta, 1 ♂, 29-XI-2015 (n. 49) (BS-35040). Calulo, Aldeia Catembo, 1 ♂, 5-XI-2014 (BS-33505). Calulo, Alto Ventura, Fazenda Monte Café, (n. 49), 2 ♂♂, 1-XII-2017 (BS-36692, 36693). Calulo, Fazenda Klein, 1 ♂, 1 ♀, 1-XII-2015 (BS-35042, 35043); Ibid, 1 ♀, 8-XII-2017 (n. 44) (BS-36694) plus 1 ♂, 1 ♀ (BS-36690, 36691). Novo Redondo (Sumbe), 4 ♂♂, I-1963 (BS-15735, 15737, 15740, 15742). Uige, Fazenda S. José, Nova Caipemba, 1 ♂, XII-1975 (BS-15741).

Description: WL ♂, 31,5-35,5 mm; ♀, 36,5-39 mm. Antenna maximum length (both sexes): 17.7 mm. R of male dark brown with strong violaceous shining, the FWR light sub-apical band yellow, sub-rectangular but not so thin than in *B. guineensis*. V strongly marked and with a tenuous light greenish shine. Juxta with short and robust spinules. Valve 3-4 times longer at its dorsal surface than wide and much longer than the ensemble uncus+tegumen, its apex with 1-2 main thin spines that may be bifid or trifid and that are not or almost not turned to the ventral surface, the aedeagus slightly longer than its dorsal margin. R of female brownish-orange, the FWR with the white pre-apical band not much different from that of the male, the V well marked and also with a greenish reflection.

Discussion: The present subspecies shall correspond at least partially to what HECQ (2000b) considered to be *B. cocalia guineensis*, once he states that the dark brown D *"éventuellement à reflets plus ou moins pourprés, assez concolor*", opposite to LARSEN (2005), who enhanced the lack of purple shining in *B. guineensis*. HECQ (2000b) considers so, that the violaceous tint could be present or absent in the same species which would be, after him, *B. cocalia guineensis*, even if with distinct FWR ochreous sub-apical band. However, the elongated valves, much longer than the ensemble uncus+tegumen and clearly longer than their own width, allow consider that the new taxon belongs to *B. cocalia* and not to *B. senegalensis* - also identification keys proposed by HOLMES (2001, as *B. cocalia guineensis*). HANCOCK (1998, as *B. guineensis*) doesn't consider *B. cocalia* as valid, rather a synonym of *B. mardania*, to what we completely disagree, but judicially adverts for the fact that both were erroneously considered as originally described from "Indiis" (India).

Notes: All the PC specimens were labelled by him (though never published) as *B. mardania*.

Etymology: From N'Gola, one of the former names (Kimbundo origin) for the country currently named Angola.

Bebearia cocalia katera (van Someren, 1939)
Euryphene mardania katera van Someren, 1939. *J. E. Afr. Uganda nat. Hist. Soc*., **14**(65): 52, pl. 14, figs 3-4, pl. 15, figs 3-4
LT: Katera, CONGO

Note: *Bebearia cocalia katera* is misidentified as a faunistic novelty for Angola by MENDES *et al.* (2019), upon specimens that belong, of a matter of fact, to the following taxon; its occurrence in the country was, further, previously reported (ANONYMOUS, 2012, 2018) eventually also upon specimens of this same taxon. *B. cocalia katera* (van Someren, 1939) is noticed by HECQ (2000a) only as with the sub-apical medium-wide band orange in the male and with the ground colour lighter than *B. cocalia continentalis* Heqc, 1988, and pointed to range from *"Sud-est Zaire, Rwanda, Burundi, Uganda, Tanzanie-ouest*"; he notes, further, *"dans ce dernier pays, cette forme assure une passage* *insensible vers des formes plus orientales*" (*"formes*" means subspecies? species? morphs?); the respective figures are assigned as *"planche 6, fig. 1,2*" and the photographed specimens are noted as from Burundi. In what *B. cocalia continentalis* is concerned (HECQ, 2000a), it is compared with *B. cocalia guineensis* (*"Forme proche de la précédent mais…*") but not with *B. cocalia katera*, and the photos presented by HECQ (2000b), are assigned as *"planche 5, fig. 5, 6"* but they show, indeed, 1 ♂, 1 ♀ (both R) of *Bebearia cocalia cocalia* (Fabricius, 1793) from RCI, being the subspecies pointed (HECQ, 2000a) as ranging from *"Nigeria (et peut-être plus au Nord encore) au Congo-Kin. Central*", despite holotype and paratype were assigned, both, as collected in Beni, in the Kivu, NE CDR. The male genitalia of *B. cocalia katera* from Tanzania is represented by KIELLAND (1990) and recently the species is considered to enter the synonymy of *B. cocalia continentalis* being presented photos of the holotype and paratype preserved in the Tervuren Museum, Belgium (ANONYMOUS, 2019). However, LARSEN (2005, as *B. continentalis continentalis*) comments that it is *"very close to the range of ssp.* katera *van Someren, 1939, which has rather different genitalia from Nigerian ssp.* continentalis *(sufficiently so almost to merit specific status - see illustrations in Holmes (2000)".* The real independence of *B. cocalia continentalis* Hecq, 1988 relatively to *B. cocalia katera* (van Someren, 1939, as a subspecies of *Euryphene mardania*) or their synonymy as considered by ACKERY *et al.* (1995) remain so, quite dubious and we believe that their reference for Angola results of the misidentification of one of the Angolan endemics described ahead.

***Bebearia paludicola meridionalis* Mendes, Bivar & Lopes, ssp. n.** (Figs 9a-9d, 23)

Material examined: 1 ♂ Holotype, ANGOLA, Cuanza Norte: Salazar (Dalatando), 10-IV-1972 (BS-14605). Paratypes: Cuanza Norte: Salazar (Dalatando), 1 ♂, 14-III-1975 (PC-nn). Cuanza Sul, Calulo, Alto Ventura, Fazenda Monte Café, (n. 44), 1 ♀, 8-XII-2017 (BS-36695).

Description: WL: ♂, 34.5 mm, ♀, 41.5 mm making it one of the largest among the females known in the "group *mardania*". Antennae maximum length: 21.5 mm. FW not acuminate and its outer margin straight in both sexes; HW angled, though less clearly in the male than in the female. R of male dark brown and with violaceous shine, the pre-distal light band ochreous, angled on space 4 (between M_2 and M_3), being the two parts of the spot on this space more or less identical and the one on space 3 (medio-cubital) quite reduced; V with not much vivid pinkish or violaceous shining. Juxta clearly spinose. Valves robust, slightly longer than the ensemble uncus+tegumen, ca. 2.5 times longer at the dorsal surface than its maximum width; apically there is one acute tooth which may or may not be accompanied by a dorsal rudiment of a second one; aedeagus as long as the valve' dorsal margin. R of female light brownish, the pre-distal light band white and not much different from that of the male, except for the spot on space 3 which is large and sub-quadrangular; FWR black area of the end of the cell very developed, extended to the tornus; pinkish shine of the V evident.

Discussion: After LARSEN (2005) *B. paludicola* Holmes, 2001 - treated as a subspecies of *B. cocalia* by HECQ (2000a, b) - is known for Sierra Leone, RCI, Ghana, E Nigeria, Cameroon, Congo, CAR and W RCA, and the Dahomey Gap would isolate the ranges of the two known subspecies, the nominate one east of the Gap and *B. paludicola blandi* from Ghana to Sierra Leone. *B. paludicola meridionalis* ssp. n. is more similar to the nominate subspecies due to the development of the FWR light subapical band, but differs from both in the male relatively to the shape of the valve' apex and of the aedeagus, and in the female because of the development of the FWR black area and of the V pinkish shine.

Etymology: From the Latin, *meridionalis*: the south, once it concerns the southernmost known subspecies of *B. paludicola*.

Bebearia orientis malawiensis Holmes, 2011 (Figs 10a-10d, 24)
Bebearia orientis malawiensis Holmes, 2011. *Trop. Zool.*, **14**(1): 56
LT: MALAWI

Material examined: MOZAMBIQUE, Sofala, Mata do Nhangau, 3 ♂♂, 1 ♀, XI-1968 (BS-15746-

15748, 15753); Ibid, 1 ♀, XII-1968 (BS-15754); Ibid, 4 ♂♂, 4 ♀♀, I-1969 (BS-15749-15752, 15755-15758).

WL: ♂, 29.0-31.2 mm; ♀, 35.2-36.5 mm. Antenna: maximum of 16.7 mm, longer than half the costa, like in the following subspecies. The HWR marginal line is not so irregular than it is in the next subspecies, what is conspicuous in both sexes. The male genitalia was never represented, though it is noticed as similar to the case of the nominate subspecies (HOLMES, 2001): juxta smooth, not spinulated (only a few thin setae exist), the valves much longer than the ensemble uncus+tegumen, thin and elongate with the apex ventrally bent (more than in the next new subspecies - cf. Figs 24 and 25). The apical dark area of the female FWR is darker than the remaining wing surface but not blackish and the light pre-apical band is white.

DICKSON & KROON (1978) assign the species (as *B. mardania orientis*) by the first time to the country - photos of specimens from the Maronga Forest are presented and material, considered to be co-subspecific, is pointed from Amatongas and Dondo but neither detailed description, nor the morphology of the male genitalia are reported. VAN SON (1979) points again *B. orientis* (no subspecies considered) from Maronga and presents photos of the male R, male V and female R (that of female V concerns a specimen from Rhodesia - currently Zimbabwe) and KIELLAND (1990) notes it occurs also in Mozambique though no precise location is reported. HOLMES (2001) when accepting *B. orientis* as a valid species, points *B. orientis malawiensis* to the country as *"Moçambique:* 1 ♂, 2 ♀♀ *no locality,* 1 ♂, 1 ♀ *Zambizi*". Previously, HANCOCK (1992) considers already *B. orientis* as a good species but integrating only two subspecies, the nominate one, from S Somalia, E Kenya, E Tanzania, Mozambique (he reported Dondo Forest, Inhaminga area, Beira, currently Sofala Province), S Malawi, E Zambia and N and E Zimbabwe, and *B. orientis insularis*, the Pemba endemic. The central Kenyan and the Kenya-Tanzania border subspecies were considered, respectively, as *B. badiana dealbata* and *B. badiana taveta*.

***Bebearia orientis guerreiroi* Mendes, Bivar & Lopes, ssp. n.** (Figs 11a-11b, 25)

Material examined: 1 ♂, Holotype, MOZAMBIQUE, Nampula, Nacala, 16-VI-1992 (PG-4490). Paratypes: Same data as for the holotype, 4 ♂♂ (PG-4489, PG-4491-4493).

Description: Only the male sex is known. WL: 29.3-31.6 mm. Antennae: maximum of 16.9 mm, exceeding half of the FW costa, the antenna wing ratio 0.54-0.57. R is light-brown, being its dark-brown markings quite conspicuous. FW outer margin straight to almost indistinctly concave, the subapical lighter band somewhat enlarged. V beige with a very light pinkish tint, the dark brown markings well visible on all the wings, the dark-brown band prolonged from the FW apex to the hindwing HW tornus quite conspicuous. Genitalia of male typical for the *B. orientis* group as enhanced by HOLMES (2001), and quite distinct from what is known from *B. cocalia*: the juxta is smooth (only a few cilia occur on the apical area), the valves are thin and elongate, ca. 3.5-4 times longer than their maximum width, being clearly curved ventrally, and their apex is ventrally bent. Despite the same general design of the remaining subspecies of *B. orientis*, in *B. orientis guerreiroi* ssp. n. the valve apex is straightened and acute, not slightly dilated; further, the aedeagus is apically less hooked and with distinct proportions than in the nominate subspecies (*cf.*, figs 5 c, d, e of HOLMES, 2001) said to be very similar to the case of *B. orientis malawiensis*.

Discussion: The five taxa pointed ahead are currently considered to be subspecies of *B. orientis* (recognized as a valid species by LARSEN, 2005, considered a subspecies of *B. cocalia* by HECQ (2000a, b) despite the very distinct genitalia of the males): a. *B. orientis orientis* (Karsch, 1895) from the coastal S Somalia to E Tanzania (Zanzibar Island included) - HOLMES (2001) notes that its reference for Uganda must be due to a labelling error; b. *B. orientis dealbata* (Carcasson, 1958) from inner Kenya; c. *B. orientis taveta* Clifton, 1980, from the Kenya/Tanzania border, SE of the Kilimanjaro; d. *B. orientis insularis* Kielland, 1985, endemic from the Pemba Island; and e. the just reported *B. orientis malawiensis* Holmes, 2011, known from S Malawi, Mozambique and Zimbabwe.

No females of *B. orientis guerreiroi* sp. n. were collected, but the males are distinguishable from all the listed subspecies because of the valves' apex morphology (KIELLAND, 1985, HOLMES, 2001). They are further, different from *B. orientis dealbata* and from *B. orientis taveta* due to the complete absence of violet reflexion, by the clear ochreous FW pre-apical band and by the more contrasted V. In the larger *B. orientis insularis*, considered to be close to the nominate subspecies (KIELLAND, 1985), R is paler than in *B. orientis guerreiroi* sp. n., the HWR marginal dark brown line is distinct and the R maculation is different, less contrasted against the base colour and almost absent for the HW cell; further, the V dark-brown band that crosses the wings from the FW apex to the HW tornus is visibly less contrasted. The two most similar subspecies are *B. orientis orientis* and *B. orientis malawiensis* though in both cases the FWR ochreous pre-apical band is narrower, the HWR marginal dark brown line is distinct, the V brown markings are darker and the male genitalia is different, since the valves apex is somewhat dilated apically, not straightened as represented by HOLMES (2001); the valves are more regularly curved ventrally and more angled apically and the aedeagus is distinct. Shall the Low Zambezi river valley represent a geographical barrier between *B. orientis malawiensis* and *B. orientis guerreiroi*?

Notes: Each type-specimen was accompanied by a PG' handwritten label of *B. senegalensis* Herrich-Schäffer which was corrected (a further handwritten label) by SV in 2016 for *Bebearia orientis malawiensis* Holmes, 2001 - none among these data was ever published.

Etymology: The subspecies is named after the collector of the studied sample, the late Captain Pessoa Guerreiro.

Group *sophus*

Bebearia sophus phreone (Feisthamel, 1850) (Figs 12a-12d, 26)
Euryphene phreone Feisthamel, 1850. *Ann. Soc. Ent. Fr.*, (2)**8**: 253
LT: Cazamance, SENEGAL

Material examined: GUINEA-BISSAU, Quinara, Bacarconte (Canconté), 1 ♀, 1-XII-2002 (CZ-5184). Buba, 1 ♂, 15-II-2001, at night (CZ-5067). Tombali: Cambeque, 1 ♂, 10-VII-2009 (BS-29025). The following samples, reported by BACELAR (1949), MENDES *et al.* (2008) and BIVAR-DE-SOUSA *et al.* (2016), were re-examined: Bafatá, Gafati, woodland, 1 ♀, 6-II-2013 (CZ-6118). Xitole, 1 ♀, 10-II-1946 (CZ-558). Quinara, Buba, 1 ♀, 17-II-1946 (CZ-564). Lagoa de Cufada, 1 ♂, 1-VII-1995 (BS-nn). Tombali, Mampatá Forea, 1 ♂, no date (BS-nn). Pataque, Boé, 1 ♀, 1-II-2013 (CZ-5899).

The two females collected the 1946 (CZ-558, CZ-564) integrate BACELAR (1949) and were correctly identified as *Euryphene sophus* ab. *phreone*, today considered at the subspecies level, the one that ACKERY *et al.* (1995) points to occur in Senegal to Guinea-Bissau and that LARSEN (2005) confirms to occur in this last country; she misidentified however all the studied males as belonging to *E. sophus* as they belong, as a matter of fact, to *B. ultima* as it was enhanced by BIVAR-DE-SOUSA *et al.* (2016, as *B. phantasina ultima*) and it will be reported ahead. Juxta smooth with thin apical setulae only. Male valves robust, more than three times longer in their dorsal surface than wide, ventrally bent before their median area, exceeding the limit of the uncus (longer than the ensemble uncus+tegumen), apically round and smooth, the ventral outer scales not much abundant and present on their basal area only. Uncus longer than the tegumen. The studied females show whitish pre-apical band, opposite to what HECQ (2000) represented to the subspecies, a feature that LARSEN (2005) enhances to be variable in one same population, and the R light area is bluish.

***Bebearia sophus angolensis* Mendes, Bivar & Lopes, ssp. n.** (Figs 13a-13d, 27)

Material examined: 1 ♂, Holotype, ANGOLA, Cuanza Norte, Salazar, 6-I-1975 (PC-nn). Paratypes: ANGOLA, Cuanza Norte, Salazar, 1 ♂, III-1973 (AF-NY681001, in the NHMUP). Uige, Inga, 1 ♀, IX-1964 (BS-15791).

Description: WL: ♂, 29.6 mm, ♀, 30.1 mm. Antennae of male lost, the only one complete of the female 12.4 mm and attaining the pre-apical light band. FW acuminate, more clearly in the male, its outer margin concave in both sexes; HW angled, though less clearly in the female. R of male brown and with darker less contrasting maculation, the pre-distal band yellow, relatively narrow, but quite well defined; V light-brown, its costal-subapical area greenish, the apical area with white scales, the FW line slightly arched and lighter, the pre-distal band poorly visible. Juxta small, with thin apical setulae only. Male valves robust, ventrally bent before their median area, apically rounded and almost attaining the limit of the uncus, the scales abundant, lacking on their distal area only. Tegumen longer than the uncus. Aedeagus about as long as the valve' dorsal margin. R of female with the FW distal half dark-brown, the pre-distal band yellow and wider than that of the male, the inner half as well as the whole HW greenish; V similar to that of the male but with all the costal-apical area lighter, the light pre-apical band well visible and the FW line white and more conspicuous.

Discussion: In the holotype, much darker than that of the males of the previous subspecies and with more acute FW apex, the pre-apical band of the FWR is quite well defined, though not especially wide and contrastingly yellow against the brown ground-colour; its discal dark-brown round spots are clearly less visible since they are much contrasted against the ground-colour; and the V is much lighter and with a greenish gray tint, especially in the HW, being the ocellar spots much more clearly visible; the genitalia differs from that of *E. sophus phreone* being the valves somewhat shorter, not attaining the level of the uncus apex, and with abundant outer scales and the proportional length of uncus and tegumen are distinct. The paratype female shows the FW more falcate than what is known in the previous subspecies, the light yellow FWR pre-apical area is narrower and its dark markings are obsolete; further, opposite to the condition in *B. sophus phreone*, the light colour mainly in the HWR is greenish, not bluish.

Notes: The first reference to the presence of *Bebearia sophus* in Angola is that of DRUCE (1875, sub *Euryphura*) based on material collected by J. J. Monteiro; he is followed by AURIVILLIUS (1928, as *Euriphene sophus*), BACELAR (1958, as *Euryphene sophus sophus*) and FOX (1968, as *Euphaedra sophus*) and no precise Angolan location was ever reported. The only specimen assigned for "Angola" without details by BACELAR (op. cit. - unsexed, undated, not seen) was reported to be deposited in the SFA: obtained by Eng. Azevedo e Silva who worked especially in Cabinda it almost certainly belongs to the present subspecies. ACKERY *et al.* (1995) point the nominate subspecies to range from Senegal to Kenya, Uganda and Tanzania and *B. sophus aruunda* for the CDR only (Mayumbe, Ubangi, Mongala, Uele, North Kivu, Tchopo, Equateur, Cataractes, Kwilu, Kasai, Sankuru, Lomami, Lualaba and Tanganyika, certainly based in BERGER, 1981 - shall they all be part of one only subspecies?) but the previous data relatives to the species in Angola were overlooked. LARSEN (2005) notes that the *B. sophus* easternmost populations were described as subspecies as *E. sophus audeoudi* Riley, 1936 from Uganda and W Kenya, *B. sophus ochreata* Carcasson, 1961, from the Lake Tanganyika area, and *B. sophus monforti* Hecq, 1990, from Rwanda (though he sustains that *"all these, surely cannot be valid*") and that *B. sophus aruunda* Overlaet, 1955, occurs in the Shaba only; this subspecies is considered by BERGER (1981) as a form (?) and paratypes from the Upemba National Park (Shaba) - quite far from the Angolan border though "the closest" to its easternmost border - were photographed. The occurrence of *B. sophus* in Angola (again, no subspecies considered, no precise area - not even the province assigned) is also recently pointed (ANONYMOUS, 2012, 2018, MENDES *et al*., 2019).

Etymology: The new subspecies is named according to its known range.

Group *plistonax*

Bebearia plistonax (Hewitson, 1874) (Figs 14a-14d, 28)
Euryphene plistonax Hewitson, 1874. *Ill. Exot. Butts*, [3]: [51], pl. [26], figs 38-39
LT: Monteiro, ANGOLA

Material examined: ANGOLA, Moxico, Marco 25, 1 ♂, III-1965 (BS-15790). ANGOLA, Province ?:

No precise location,1 ♀, no date (CZ-nn) with a manuscript label of *Euriphene mardania* F. (accidental change of labels?, calligraphy not recognizable).

The species was described from “Angola (West Africa)” by HEWITSON (1874, sub *Euryphura*) from where, we believe, no precise location was ever reported till now. AURIVILLIUS (1928) notes it ranges from Nigeria to Angola, and ACKERY *et al.* (1995) and D’ABRERA (2004) add Zaire and Uganda. After BERGER (1981) the species occurs from “Spanish Guinea” (currently Equatorial Guinea - where its presence is not recognized by VIEJO, 1990 nor by OLANO & MARCOS, 1993) and Nigeria to Zaire and Angola, being in the CDR known from Mongala, Uele, Kivu-Nord, Equateur, Kasai, Sankuru and Lualaba. Recently, the existence of the species in Angola is mapped by SÁFIÁN *et al.* (2016) who show its occurrence in Cabinda, the northern areas of Uige and Malanje, the Lunda Norte and Lunda Sul and the northern part of the Moxico, though none precise location was noticed; the whole known range of the species is shown to include also most of the CDR, NW Zambia, Rwanda, Burundi, and neighbouring areas of Tanzania and Uganda, as well as the southern RCA, Congo, Gabon, Equatorial Guinea, Cameroon and close SE Nigeria.

B. plistonax is recently pointed again to Angola (ANONYMOUS, 2012, 2018), and only one subspecies remains described though after D’ABRERA (2004) the easternmost populations will correspond to an “undescribed race”. However, in the studied specimens and mainly in the male: a. the white FW pre-apical band is visibly more reduced, especially in what its V is concerned, when compared with the D’ABRERA (op. cit.) photo (as usual for this author, no origin is registered), and b. the HWV is distinct, without trace of greyish scales (quite evident in this author’ photo). An obscured marginal HWR band is represented by AURIVILLIUS (1928, pl. 40c), who shows, further, a clearly yellow FWR subapical light band - though this band is noted as usually white - and described a greyish verso (*“le dessous est gris brunâtre*” - AURIVILLIUS, op.cit.: 177). If compared with the Shaba material reported by HECQ (2000) – only the photo of 1? from Katanga is presented - the differences relatives to the male from Moxico are much more attenuated, despite the bigger development of the FW pre-apical white spots, especially in the V. Relatively to the figures of BERGER (1981 - R and V of a Zaire’s male of non-reported origin) the HWR margin is dark brown and the V is darker than in the Angolan specimen, more contrasted and not uniformly brown. The SÁFIÁN *et al.* (2016) R and V photos of 1 ♂ from Tanzania (Bukoba, in the W border of the Victoria Lake) and of 1 ♀ from Nigeria (Ngel Nyaki) reveal also FW subapical white spots more developed than in the Angolan studied specimens. The Moxico’ male genitalia is robust, with the valves longer than the uncus, narrowed on the basal part and almost devoid of proximal scales - though a few ones are visible; compared with the case of the Cameroon’s male genitalia presented by SÁFIÁN *et al.* (2016), the valves are in the Angolan specimen much longer than the uncus, more gradually narrowed to the base and apically more smooth. Despite most of the photographed specimens completely lack detailed information on their geographical origin, they obviously raise the problem of the species real monotypy.

Group *elpenice*

Bebearia hassoni Hecq, 1998
Bebearia hassoni Hecq, 1998. *Ent. Africana,* **3**(2): 39
LT: Cuanza Sul, ANGOLA

Material examined: None specimen was seen.

The species was described from the Cuanza Sul and remains known by its holotype ♀ only, deposited in the Belgian Musée Royal de l’Afrique Centrale in Tervuren (HECQ, 1998, 2000b, ANONYMOUS, 2019); it seems typical from humid forest - primary or secondary wet forest, gallery and riverine forest or forest edge (MENDES *et al.*, 2019). With a wingspan of 65 mm, clearly concave FW margin, rounded FW apex and a large FWR white band, it is also recognizable by its V pattern, as the HW irregular oblique brown band extends to the middle of its inner margin (not to close its tornus), since the subapical white band is clearly contrasted and because the dark annulated marks are less numerous and different.

Subgenus *Bebearia* Hemming, 1960

Group *phantasia*

Bebearia phantasia cf. *concolor* Hecq, 1988
Bebearia phantasia concolor Hecq, 1988. *Lambillionea*, **88**: 84, pl. 3, fig. 3-4
LT: Lolodorf, CAMEROON

Material examined: None specimen was seen.

Note: The species is registered from Angola without details by DRUCE (1875, as *Euryphura phantasia*) as pointed by MENDES *et al.* (2019). The known geographical distribution of the several *B. phantasia* subspecies reported by ACKERY *et al.* (1995), strongly suggest that DRUCE' (op. cit.) Angolan sample, if correctly identified and if not wrongly labelled, will belong to the present subspecies, despite Angola is not considered in the range of none of them - indeed *B. phantasia concolor* is reported (HECQ, 2000) to distribute in Cameroon, Congo (Etoumbi) - border with Gabon - and lower CDR.

Bebearia ultima Hecq, 1990 (Figs 16a-16d, 29)
Bebearia ultima Hecq, 1990. *Revue Ent. Gen.,* **1**: 38
LT: Basse Casmance, GAMBIA

Material examined: No new material was studied, but the following samples, previously reported by BACELAR (1949), BIVAR-DE-SOUSA & PASSOS-DE-CARVALHO (1987, as *B. p. phantasiella*) and BIVAR-DE-SOUSA *et al.* (2016), were re-examined: GUINEA-BISSAU, Bafatá, Dulombi, woodland, 1 ♀, 28-II-2013 (CZ-6119). Xitole, 1 ♂, 11-II-1946 (CZ-559). Biombo, Granja, Ilha de Bissau, 1 ♂, 14-III-1945 (CZ-504). Quinara, Buba, 2 ♂♂, 17-II-1946 (CZ-564); Ibid, 1 ♀, 2-III-1948 (CZ-578). Buba Tombo, 1 ♂, 19-VII-2009 (BS-29022). Cantanha, 1 ♂, 9-VII-2009 (BS-29023). Tombali: Mato de Lauchande, 1 ♀, 9-12-VII-2009 (BS-29021); Mato de Cambeque, 2 ♂♂, 10-VII-2009 (BS-29024, 29025).

The first note on the real presence of the species in Guinea-Bissau is due to BACELAR (1949, as *Euryphaene phantasina* Staudinger) with base on 1 ♀ only from Buba (CZ-578); however, all the males she noticed (CZ-504, 559, 564) were misidentified as *Euryphaene sophus* (F.), as enhanced by BIVAR-DE-SOUSA *et al* (2016, as *B. phantasina ultima*); one further male from Buba (CZ-578) was not part of the material listed by BACELAR (op. cit.) and is here noticed by the first time. The species is not accepted by ACKERY *et al.* (1995) who consider *phantasina* as a subspecies of *B. phantasia*. The male valves are almost as long as the uncus, slightly ventrally bent in the median area and are, at least apparently, devoid of scales.

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(PTDC/AFR/117785/2010) assessing the environmental and socio-economic impacts of cashew expansion in West Africa; and Dr. João Guilherme, on behalf of the Chimbo Foundation in cooperation with local NGO Daridibó - these two last series allowed a better knowledge of the *Bebearia* present in this country.

We remember, further, the late Dr. Eduardo Augusto Luna de Carvalho, who long ago deposited in the CZ his small reference collection of Papilionoidea obtained in Angola while technician in the Dundo Museum and the also deceased Lieutenant António Francisco Figueira who offered to BS a few samples he obtained in the northern Angola - we were kindly received several times at their houses, where we were free to examine their vast collections; among the material collected by AF it must be enhanced the presence of the paratype female of one new subspecies (previously in the BS collection, now in the MUHNAC) as well as of a paratype of the same taxon, now deposited in the NHMUP.

BIBLIOGRAPHY

ACKERY, P. R., SMITH, C. R. & VANE-WRIGHT, R. I., 1995.– *Carcasson's African Butterflies. An Annotated Catalogue of the Papilionoidea and Hesperioidea of the Afrotropical Region*: XII + 803 pp. CSIRO, Victoria.

ANONYMOUS, 2012.– *List of butterflies from Angola*. Available from https:/en.wikipedia.org/w/index.php?title=List_of_butterflies_of_Angola&oldid=520505855"(acessed the 2018).

ANONYMOUS, 2018.– *List of butterflies from Angola*. Available from https:/en.wikipedia.org/w/index.php?title=List_of_butterflies_of_Angola&oldid=829835164 (accessed the 2019).

ANONYMOUS, 2019.– *Lepidoptera Types. Royal Museum for Central Africa, Belgium*. Available from https://www.africamuseum.be/en/research/ biology/collections/ lepidoptera (accessed the 2019).

AURIVILLIUS, C., 1928.– Les Macrolépidoptères de la Faune Ethiopienne. XIII. Diurnes Éthiopiens.– *In* A. SEITZ, 1928. *Les Macrolépidoptères du Globe.* IV^{e} Partie, **13**(4): 1-615 + 80 pl.

BACELAR, A., 1949.– Macrolepidópteros (Rhopalocera) da Guiné Portuguesa.– *Anais da Junta de Investigações Coloniais*, **4** (4): 72-104.

BACELAR, A., 1958.– Alguns lepidópteros (Rhopalocera) do enclave de Cabinda. *Revista portuguesa de Zoologia e Biologia Geral*, **1**(2/3): 197-217.

BERGER, L. A., 1981.– *Les Papillons du Zaïre*: 543 pp., 213 pls. La Présidence de la République du Zaïre, Bruxelles.

BIVAR-DE-SOUSA, A. & PASSOS-DE-CARVALHO, J., 1987.– Ropalóceros da Guiné-Bissau.– *Boletim da Sociedade portuguesa de Entomologia*, **3**(16) (86): 1-14.

BIVAR-DE-SOUSA, A., MENDES, L. F. & CONSCIÊNCIA, S., 2008.– Novos dados sobre os lepidópteros diurnos (Lepidoptera: Hesperioidea e Papilionoidea) da Guiné-Bissau. V. Nymphalidae (Nymphalinae, Cyrestinae e Limenetidinae).– *Boletín de la Sociedad Entomológica Aragonesa*, **43**: 327-341.

BIVAR-DE-SOUSA, A., VASCONCELOS, S., MENDES, L. F., LARSEN, T. B., BAKER, J. & GUILHERME, J., 2018.– Butterflies and skippers from Guinea-Bissau. VIII. New data, new reports, corrections and biodiversity (Lepidoptera: Papilionoidea).– *Zootaxa*, **4201**(1): 77 pp.

BUTLER, A. G., 1871.– On a small collection of butterflies from Angola.– *Proceedings of the Zoological Society of London*, **1871**: 721-725.

D'ABRERA, B., 1980.– *Butterflies of the Afrotropical Region*: xx + 593 pp. Ed. Lansdowne, Melbourne.

D'ABRERA, B., 2004.– *Butterflies of the Afrotropical Region. Part II. Nymphalidae, Libytheidae*: xli + 258-539. Hill House Publisher, Melbourne / London.

DICKSON, C. G. C. & KROON, D. M., 1978.– *Pennington's Butterflies of Southern Africa*: 670 pp. Ed. A. D. Donker, Johannesburg & London.

DRUCE, H., 1875.– A list of the collection of diurnal Lepidoptera made by J. J. Monteiro in Angola with description of some new species.– *Proceedings of the Zoological Society*, **27**: 406-417.

FOX, R. M., 1968.– Contribution à la faune du Congo (Brazzaville). Mission A. Villiers et A. Descarpentries. LXVIII. Lépidoptères Nymphalidae, Danaidae et Riodinidae.– *Bulletin de l'Institut Fondamental de l'Afrique Noire*, (A) **30** (3): 1236-1280.

HANCOCK, D. L., 1992.– The *Bebearia mardania* complex (Nymphalidae).– *Journal of the Lepidopterologists' Society*, **46**(1): 54-69.

HECQ, J., 1994.– Remarques sur quelques espèces de Nymphalidae africains des genres *Euphaedra*, *Bebearia* et *Euryphene*.– *Lambillionea*, **94**(3): 437-439.

HECQ, J., 1998.– Nouvelle espèce de *Bebearia* (Lepidoptera, Nymphalidae).– *Entomologia Africana*, **3**(2): 39-40.

HECQ, J., 2000a.– Nymphalidae IV. *Bebearia*.– *In* E. BAUER & T. FRANKENBACH (eds.). *Butterflies of the World*, **9**: 1-6, pl. 1-32.

HECQ, J., 2000b.– Le genre *Bebearia*.– *In* E. BAUER & T. FRANKENBACH (eds.). *Butterflies of the World*, Supplement **3**: 1-34.

HECQ, J., 2010.– Quatre espèces du genre *Bebearia* Hemming, 1960 d'Afrique occidentale et centrale.– *Lambillionea*, **110**(3): 301-304.

HOLMES, C. W. N., 2001.– A reappraisal of the *Bebearia mardania* complex (Lepidoptera, Nymphalidae).– *Tropical Zoology*, **14**: 31-62.

JMGIC, 1946.– *Ministério das Colónias, Junta das Missões Geográficas e de Investigação Coloniais - carta da colónia de Moçambique*, **1**: 250 000: folio 61.

KIELLAND, J., 1985.– A primarily checklist of the butterflies of Pemba Island, Tanzania.– *Arnoldia Zimbabwe*, **9**(19): 267-276.

KIELLAND, J., 1990.– *Butterflies of Tanzania*: 363 pp. Hill House Publ., Melbourne / London.

LARSEN, R., 2005.– *Butterflies from West Africa*: 595 pp. + 270 pls. Apollo Books, Stenstrup.

MENDES, L. F., BIVAR-DE-SOUSA, A. & CONSCIÊNCIA, S., 2007.– Novos dados sobre os lepidópteros diurnos (Lepidoptera: Hesperioidea e Papilionoidea) da Guiné-Bissau. I. Introdução e Hesperiidae.– *Boletín de la Sociedad Entomológica Aragonesa*, **41**: 209-221.

MENDES, L. F., BIVAR-DE-SOUSA, A., FIGUEIRA, R. & SERRANO, A. R. M., 2013.– Gazetteer of the Angolan localities known for beetles (Coleoptera) and butterflies (Lepidoptera: Papilionoidea).– *Boletim da Sociedade Portuguesa de Entomologia*, **8**(14), 228: 257-290.

MENDES, L. F., BIVAR-DE-SOUSA, A. & WILLIAMS, M. C., 2019.– *Chapter 10. The Butterflies and Skippers (Lepidoptera: Papilionoidea) of Angola: An Updated Checklist.– In* B. J. HUNTLEY, N. M. S. FERRAND-DE-ALMEIDA, V. RUSSO & F. LAGES (eds.) 2019.– Biodiversity of Angola. Science and Conservation: A Modern Synthesis: 167-203. Springer Verlag.

OLANO, I. & MARCOS, J. M., 1993.– Lepidópteros Papilionoidea de Guinea Ecuatorial y sus islas.– *Estudios del Museo de Ciencias Naturales de Álava*, **8**:137-169.

PAGÉS, N. & SARTO I MONTEYS, V., 2005.– Differentiation of *Culicoides obsoletus* and *Culicoides scoticus* (Diptera: Ceratopogonidae) based on mitochondrial cytochrome oxidase subunit I.– *Journal of Medical Entomological*, **42**(6): 1026-1034.

SÁFIÁN, S., PYRCZ, T. & BRATTSTRÖM, O., 2016.– Two new species of *Bebearia* Hemming, 1960, as further evidence of centre of endemism of butterflies in Western Nigeria.– *Zootaxa*, **4175**(5): 449-462.

VAN SON, G., 1979.– *The butterflies of Southern Africa; IV (Nymphalidae: Nymphalinae).*: 286 pp., 76 pls., 265 figs Transvaal Museum, Pretoria.

VIEJO, J. L., 1984.– Contribución al conocimiento de las mariposas del Golfo de Guinea (Lep. Papilionoidea).– *Eos*, **60**: 335-369.

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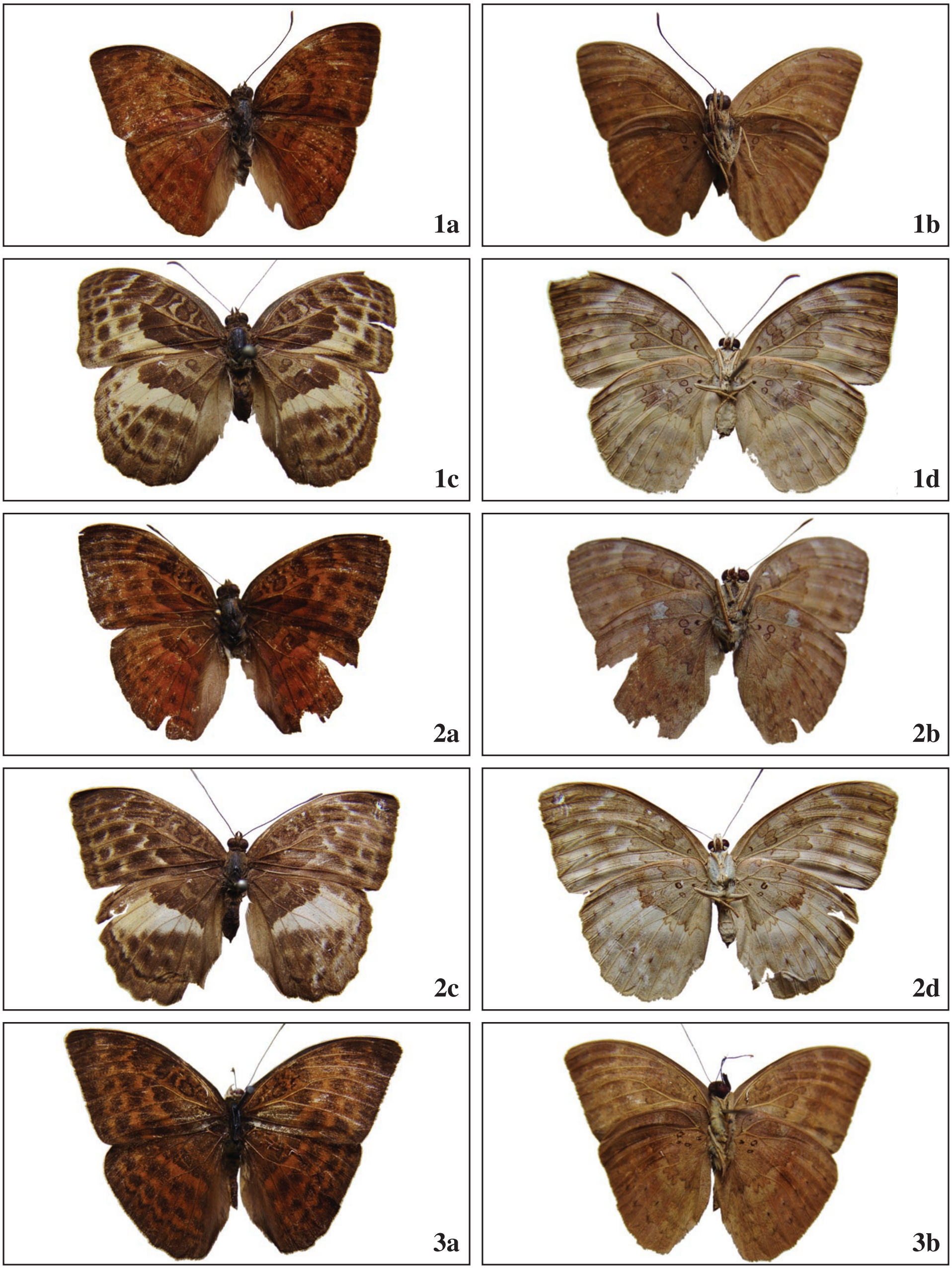
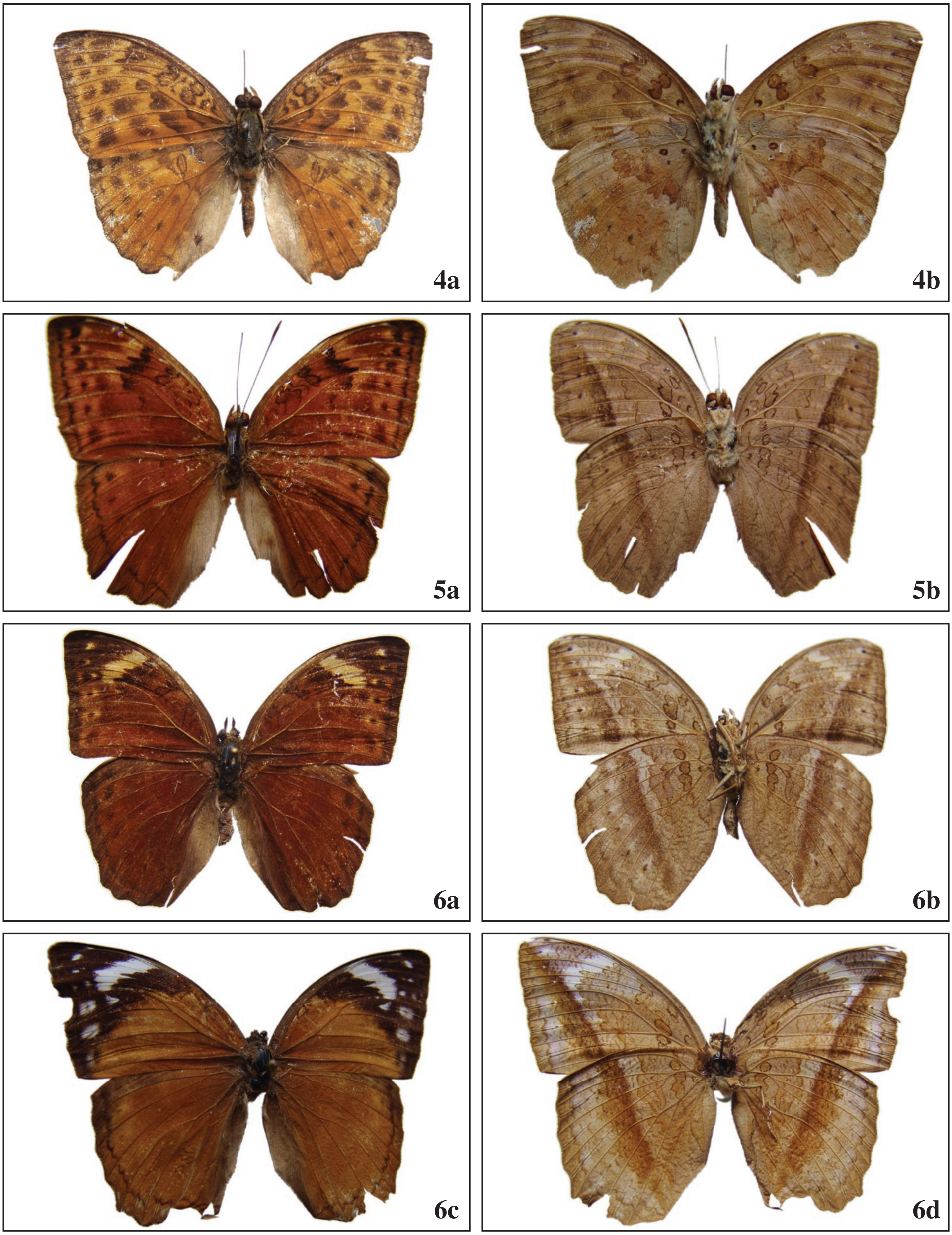
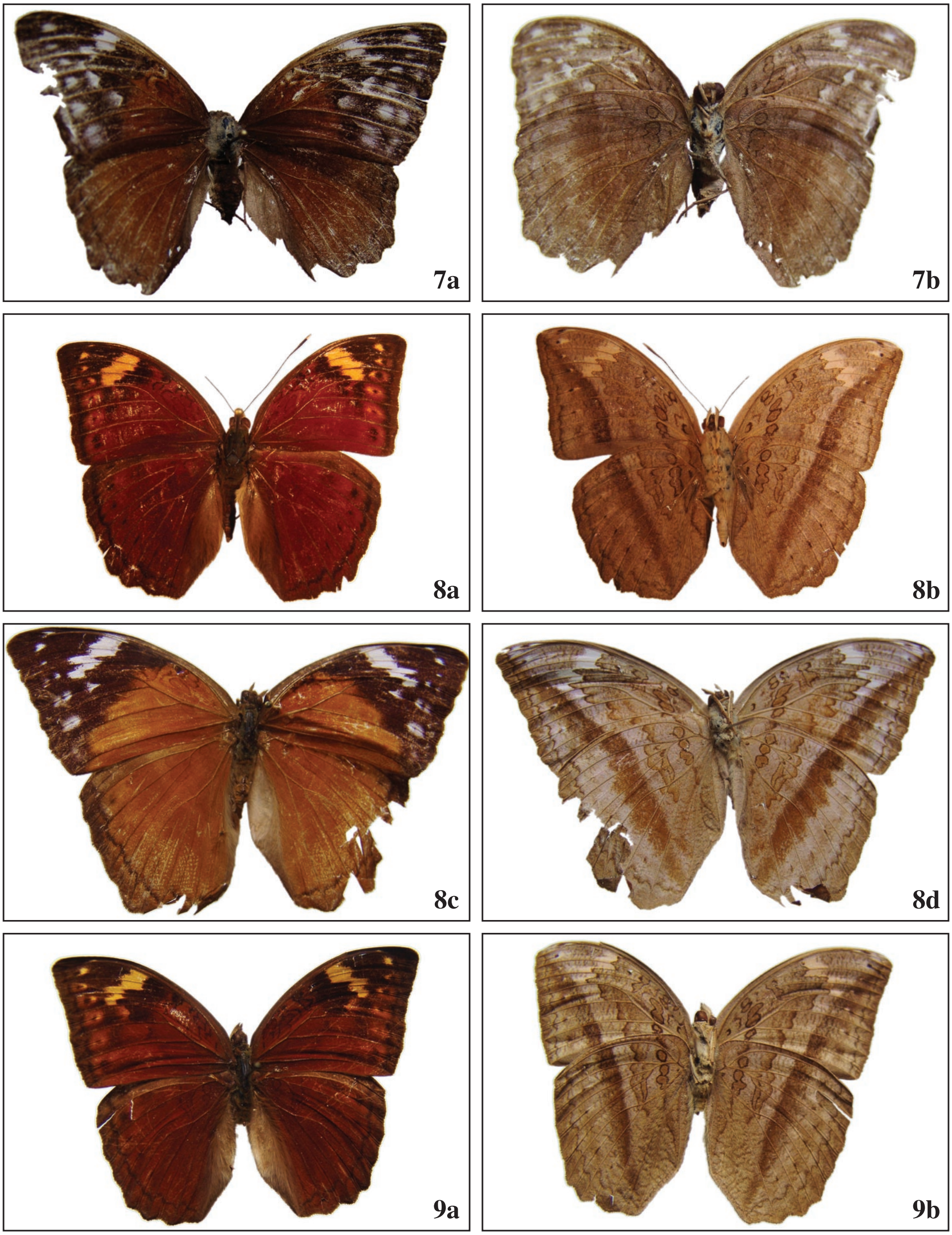


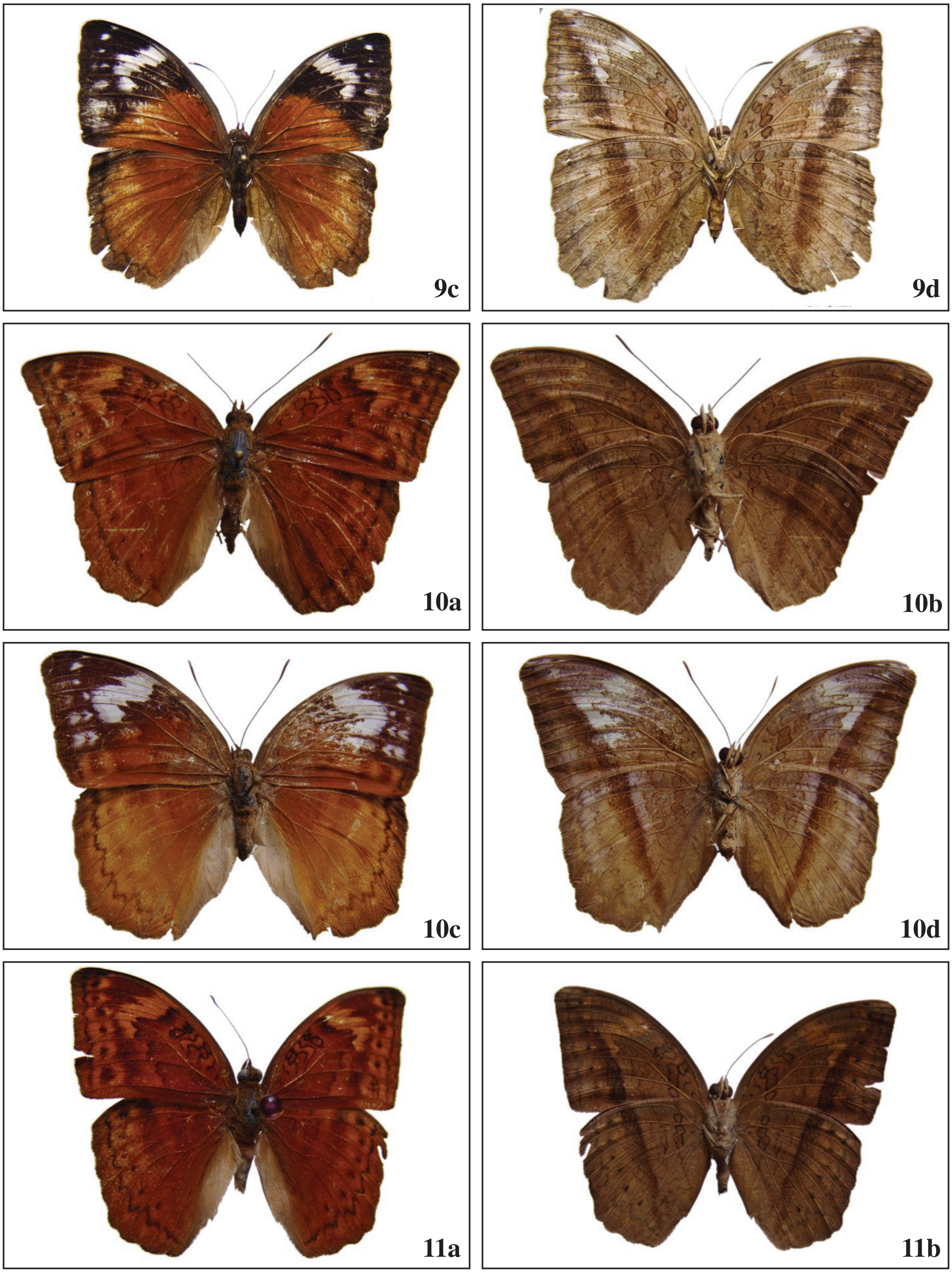
Figs 1-3.– 1a-1d. *Bebearia languida* (Schultze, 1920). **1a.** ♂ (PG-241) R; **1b.** Ibid, V; **1c.** ♀ (CZ-nn) R; **1d.** Ibid, V. **2a-2d.** *Bebearia absolon absolon* (Fabricius, 1793). **2a.** ♂ (PC-19827) R; **2b.** Ibid, V; **2c.** ♀ (CZ-nn) R; **2d.** Ibid, V. **3a-3b.** *Bebearia absolon entebbiae* (Lathy, 1906). **3a.** ♂ (CZ-5362) R; **3b.** Ibid, V.



Figs 4-6.– 4a-4b. *Bebearia zonara* (Butler, 1871). **4a.** ♂ (BS-14974) R; **4b.** Ibid, V. **5a-5b.** *Bebearia senegalensis* (Felder & Felder, 1867). **5a.** ♂ (CZ-553) R; **5b.** Ibid, V. **6a-6d.** *Bebearia guineensis inexpectata* Mendes, Bivar & Lopes, ssp. n. **6a.** Holotype ♂ (BS-15738) R; **6b.** Ibid, V; Fig. **6c.** Paratype ♀ (BS-15744) R; **6d.** Ibid, V.



Figs 7-9.– 7a-7b. *Bebearia cocalia cocalia* (Fabricius, 1793). **7a.** ♀ (PG-4488) R; **7b.** Ibid, V. **8a-8d.** *Bebearia cocalia ngolae* ssp. n. **8a.** Holotype ♂ (BS-35041) R; **8b.** Ibid, V; **8c.** Paratype ♀ (BS-36694) R; **8d.** Ibid, V. **9a-9d.** *Bebearia paludicola meridionalis* Mendes, Bivar & Lopes, ssp. n. **9a.** Holotype ♂ (BS-14605) R; **9b.** Ibid, V.



Figs 9-11.– 9c. Paratype ♀ (BS-36695) R; **9d.** Ibid, V. **10a-10c.** *Bebearia orientis malawiensis* Holmes, 2011. **10a.** ♂ (BS-15746) R; **10b.** Ibid, V; **10c.** ♀ (BS-15754) R; **10d.** Ibid, V. **11a-11b.** *Bebearia orientis guerreiroi* Mendes, Bivar & Lopes, ssp. n. **11a.** Holotype ♂ (PG-4490) R; **11b.** Ibid, V.


12a


12b


12c


12d

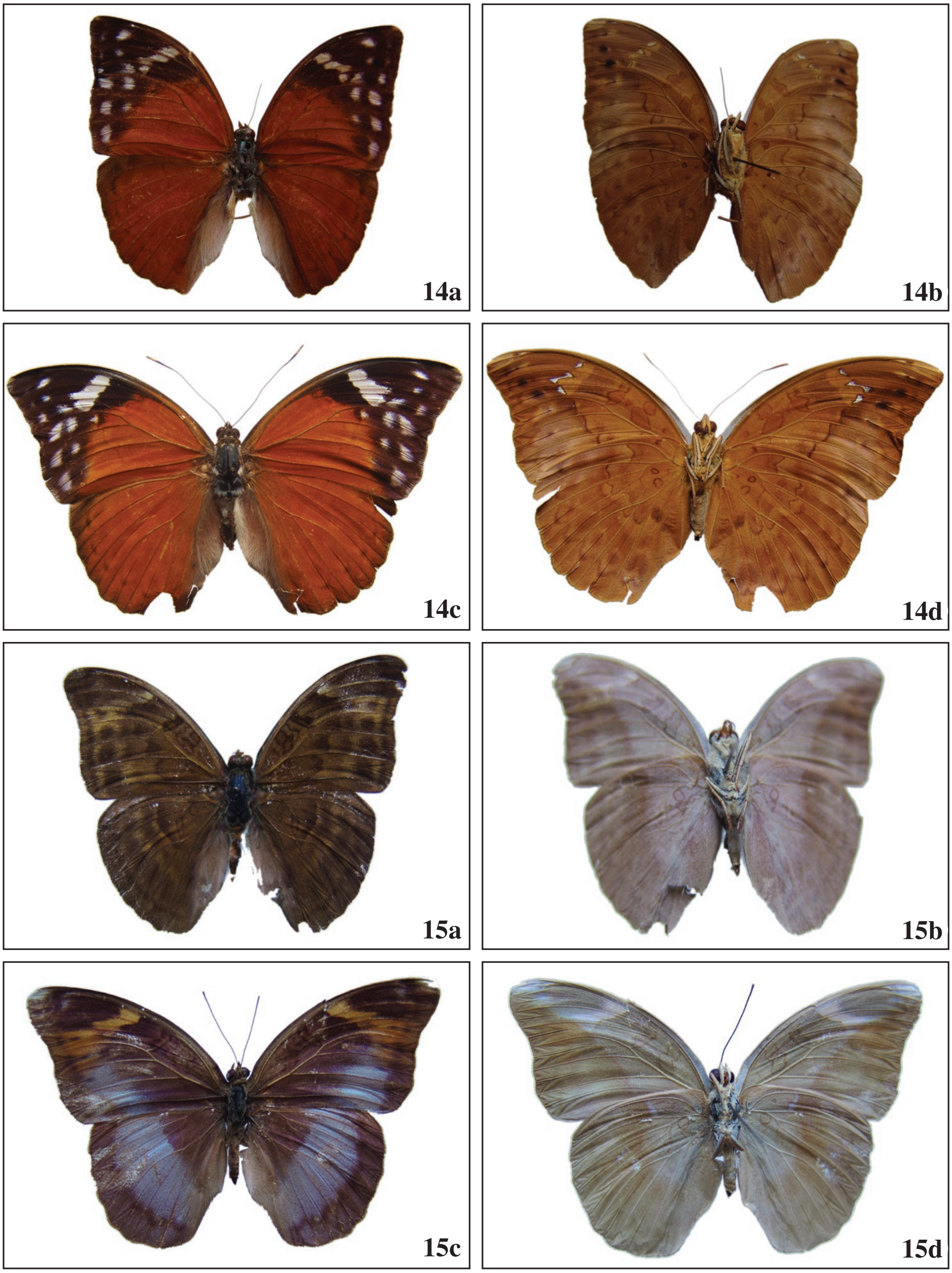

13a


13b

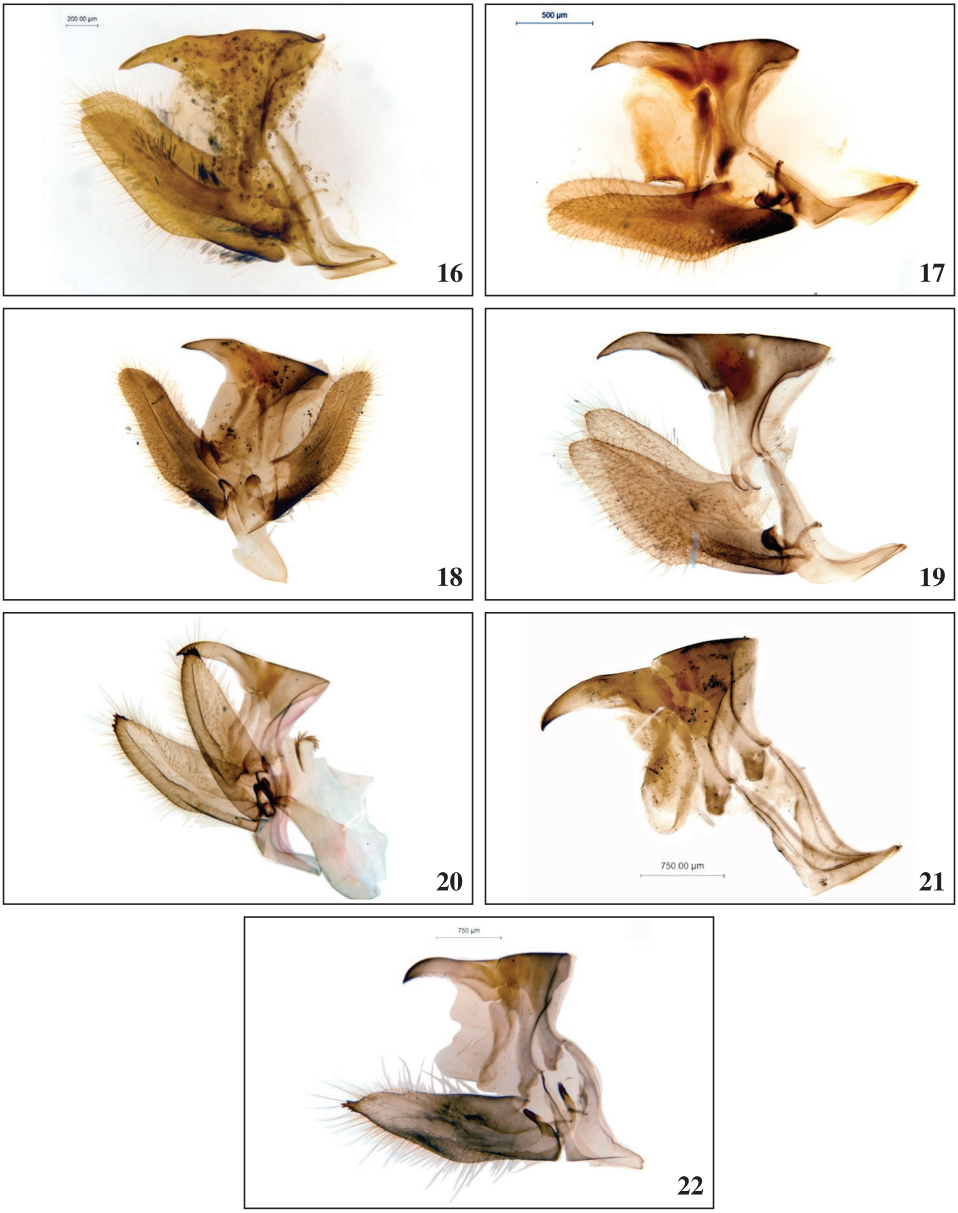

13c


13d

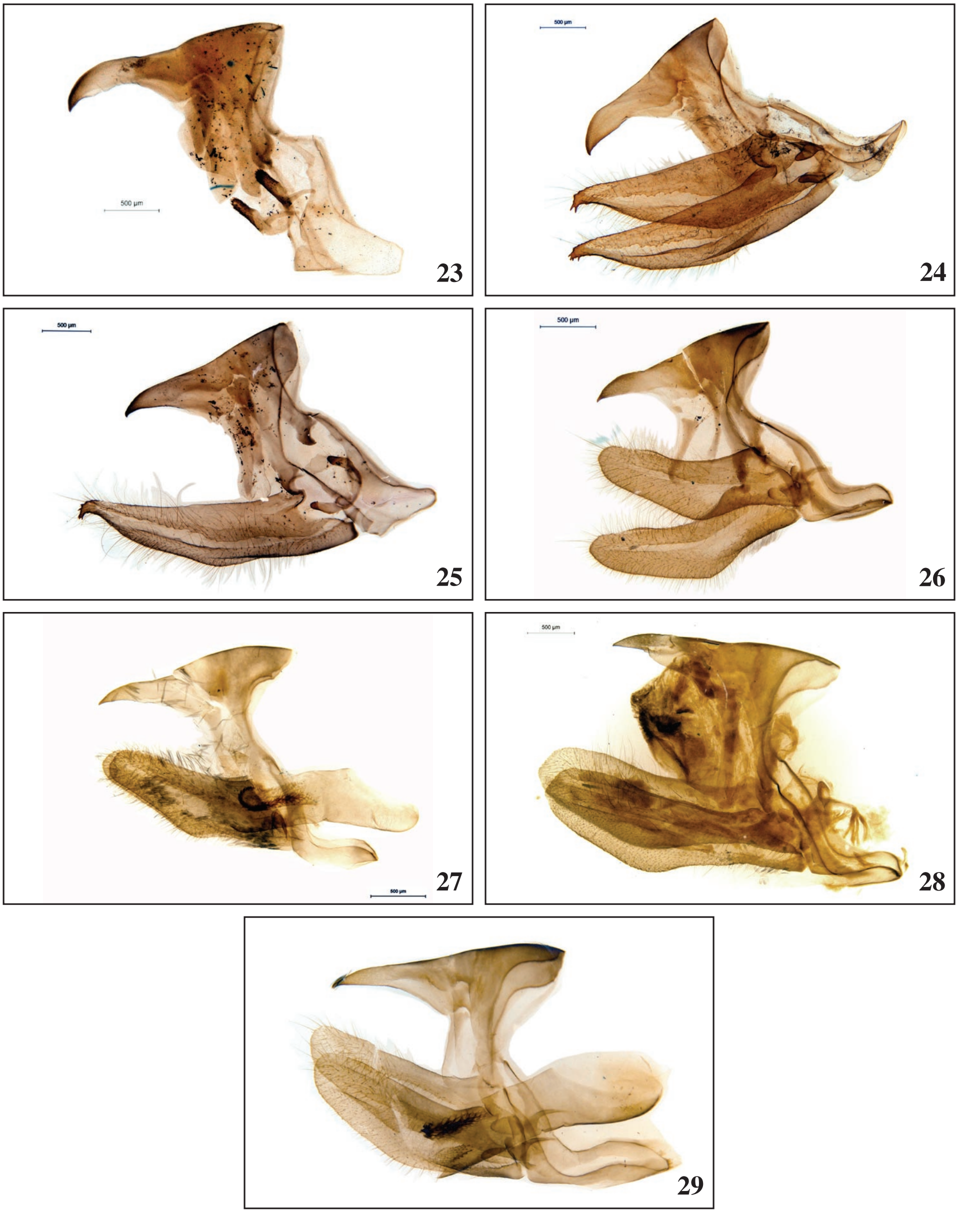
Figs 12-13.– 12a-12d. *Bebearia sophus phreone* (Overlaet, 1955). **12a.** ♂ (CZ-558) R; **12b.** Ibid, V; **12c.** ♀ (CZ-564) R; **12d.** Ibid, V. **13a-13d.** *Bebearia sophus angolensis* Mendes, Bivar & Lopes, ssp. n. **13a.** Holotype ♂ (PC-nn) R; **13b.** Ibid, V. **13c.** Paratype ♀ (BS-15791) R; **13d.** Ibid, V.



Figs 14-15.– 14a-14d. *Bebearia plistonax* (Hewitson, 1874). **14a.** ♂ (CZ-15790) R; **14b.** Ibid, V; **14c.** ♀ (CZ-nn) R; **14d.** Ibid, V. **15a-15d.** *Bebearia ultima* Hecq, 1990. **15a.** ♂ (CZ-564) R; **15b.** Ibid, V; **15c.** ♀ (CZ-578) R; **15d.** Ibid. V.



Figs 16-22.– 16-17. 16. *Bebearia languida* (Schultze, 1920) (PG-241). **17.** *Bebaria absolon absolon* (Fabricius, 1793) (BS-15804). **18-19. 18.** *Bebearia absolon entebbiae* (Lathy, 1906) (CZ-5362). **19.** *Bebearia zonara* (Butler, 1871) (BS-15802). **20-21. 20.** *Bebearia senegalensis* (Felder & Felder, 1867) (CZ-553). **21.** *Bebearia guineensis inexpectata* Mendes, Bivar & Lopes, ssp. n., holotype (BS-15738). **22.** *Bebearia cocalia ngolae* Mendes, Bivar & Lopes, ssp. n., paratype (BS-36693).



Figs 23-29.– 23. *Bebearia paludicola meridionalis* Mendes, Bivar & Lopes, ssp. n., holotype (BS-14605). **24-25. 24.** *Bebearia orientis malawiensis* Holmes, 2011 (BS-15747). **25.** *Bebearia orientis guerreiroi* Mendes, Bivar & Lopes, ssp. n., paratype (PG- 4492). **26-27. 26.** *Bebearia sophus phreone* (Overlaet, 1955) (CZ-558). **27.** *Bebearia sophus angolensis* Mendes, Bivar & Lopes, ssp. n., holotype (PC-nn). **28-29. 28.** *Bebearia plistonax* (Hewitson, 1874) (CZ-15790). **29.** *Bebearia ultima* Hecq, 1990 (BS-559).

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Eilema rungsi (Toulgöet, 1960) a new species of Arctiinae for the Maltese Islands (Lepidoptera: Erebidae, Arctiinae)

A. Catania

Abstract

Eilema rungsi (Toulgöet,1960) is here recorded for the first time from the Maltese Islands.

KEY WORDS: Lepidoptera, Erebidae, Arctiinae, *Eilema rungsi*, Malta.

Eilema rungsi (Toulgöet, 1960) una nueva especie para Malta (Lepidoptera: Erebidae, Arctiinae)

Resumen

Eilema rungsi (Toulgöet,1960) se cita por primera vez para Malta.

PALABRAS CLAVE: Lepidoptera, Erebidae, Arctiinae, *Eilema rungsi*, Malta.

Introduction

Eilema rungsi (Toulgöet,1960) is the smallest member of the genus, with a wingspan of 16-22mm. So far this species has been recorded in Europe from the coastal areas of Portugal, Spain, the Baleares, Italy and Greece, and elsewhere from Morocco. Adult moths are on the wing between April and October (FIBIGER *et al*., 2011).

Material examined: MALTA, 1 ♂, Żebbug, 8-XI-2020, at light [18W Actinic light], Catania leg.

Discussion: The subtribe Lithosiina is represented in the Maltese archipelago by four taxa including the newly recorded species. *Eilema caniola* (Hübner, [1808]), which was first recorded by VALLETTA (1973) is a common, widely distributed species with two generations per year. The second species is *Eilema marcida* (Mann, 1859) which was erroneously determined as *Eilema pygmaeola* (Doubleday, 1847). *Eilema marcida* also has two broods per year. It is on the wing from mid-May to mid-June and again mid-July to mid-September. (PRZYBYŁOWICZ & SAMMUT, 2011). *Lithosia quadra* (Linnaeus, 1758) has been recorded from two specimens, a male from Mellieħa collected in 1976 by L. Cassar (SAMMUT, 2000) and another male from Naxxar collected in 1996 by A. Seguna. *Lithosia quadra* (Linnaeus, 1758) is not known to breed in

Malta (PRZYBYŁOWICZ & SAMMUT, 2011). *Eilema rungsi* (TOULGÖET, 1960) is the fourth species in this subtribe to be recorded in the Maltese Islands.

Eilema rungsi (Toulgöet,1960) was first discovered in 1953, when Charles Rungs and Thami Benmessaoud captured a small series from Merdja Bokka (Morocco). Hervé De Toulgöet, described the species based on these specimens in 1960. The epithet *"rungsi*" is given in honour of Charles Rungs. Later in 1977, Paolo Parenzan discovered this species in Brindisi which is in the extreme South-Eastern part of the Italian Peninsula (PARENZAN, 1977). In a forthcoming paper, SCALERCIO *et al*. (2020) refer to recent new records of *E. rungsi* in Calabria, Italy between August and November of 2019. DERRA & HACKER (1983) collected a specimen from central Greece, which they described as *Pelosia helleníca*. However, this taxon is now considered a synonym of *Eilema rungsi*. (FIBIGER *et al*., 2011). *Eilema rungsi* is also known from Spain and Portugal. (GÓMEZ *et al*., 2020).The early stages and food plants of *E. rungsi* are not yet known although it is suggested they are marshy and halophilous plants.

I would like to thank Dr. Łukasz Przybyłowicz for confirming the species, Dr. Stefano Scalercio for his data from Calabria Italy, Mr. Paul Sammut for his help in reviewing the draft of this paper and Dr. Antonio Vives for providing the Spanish translation.

BIBLIOGRAPHY

DERRA, G. & HACKER, H., 1983.– *Pelosia hellenica* sp. n. eine neue Lithosiinae - Art aus Griechenland (Lepidoptera, Lithosiinae).– *Entomofauna*, **4**(20): 253-260.

FIBIGER, M., GYALA, M. L., RONKAY, G., RONKAY, L., SPEIDEL, W., VARGA, Z., WAHLBERG, N., WITT, T. J., YELA, J. L., ZAHIRI, R. & ZILLI, A., 2011.– *Noctuidae Europaeae XIII. Lymantrinae and Arctiinae, including Phylogeny and Checklist of the Quadrifid Noctuoidea of Europe*.– *In* T. J. WITT & L. RONKAY: 448 pp. Entomological Press, Søro.

GÓMEZ, M. A., BARRANCO, P., HODAR, J. S., YESTE, A., SANTA, M, PARACUELLOS, M., LUQUE, F. R., LOZANO, B. R. & TARIFA, R., 2020.– New records of insects in the Albuferas de Adra (Almería, Spain), and other data of interest for the south of the Iberian peninsula (Arthropoda, Insecta).– *Boletín de la Asociación española de Entomología*, **44**(1-2): 231-237.

PARENZAN, P., (1977).– Contributi alla conoscenza della lepidotterofauna dell'Italia meridionale. IV. Heterocera (Bombyces et Sphinges) di Puglia e Lucania.– *Entomologica*, **13**: 183-245.

PRZYBYŁOWICZ, L. & SAMMUT, P., 2011.– *Eilema marcida* (Mann, 1859) - A new species for Malta with remarks on other members of the Lithosiinae (Arctiidae).– *Nota lepidopterologica*, **33**(2): 253-259.

SAMMUT, P. M., 2000.– *Il-Lepidoptera - Kullana Kulturali 12*: X + 245 pp., 24 pls. Pubblikazzjonijiet Indipendenza, Msida.

SABATINO, M., PECORARO, G. M. & SCALERCIO, S., 2020.– I macrolepidotteri notturni di un oliveto a conduzione biologica della Stretta di Catanzaro, Italia meridionale (Insecta Lepidoptera).– *Memorie della Società Entomologica Italiana*. "Forthcoming".

TOULGOËT, H. 1960.– Description d'une nouvelle Arctiidae Marocaine: *Eilema rungsi* n. sp. (Lep. Lithosiinae).– *Bulletin de la Société entomologique de France*, **65**(1-2): 48-49.

VALLETTA, A., 1973.– *The Moths of the Maltese Islands*: 120 pp. Progress Press, Malta.

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New and interesting Portuguese Lepidoptera records from 2020 (Insecta: Lepidoptera)

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

Abstract

13 species are added to the Portuguese Lepidoptera fauna, of which three are new for the Iberian Peninsula, and three species deleted, mainly as a result of fieldwork undertaken by the authors and others in 2020. In addition, second and third records for the country, new province records and new host-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 2020
(Insecta: Lepidoptera)

Resumo

Como resultado do trabalho de campo desenvolvido pelos autores e outros, principalmente no ano de 2020, são adicionadas 13 espécies de Lepidoptera à fauna de Portugal, das quais três são novas para a Península Ibérica, 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 CHAVES: Insecta, Lepidoptera, distribuição geográfica, Portugal.

Nuevas e interesantes citas portuguesas de Lepidoptera en 2020
(Insecta: Lepidoptera)

Resumen

Como resultado del trabajo de campo efectuado por los autores y otros, principalmente durante el año de 2020, se añaden 13 especies de Lepidoptera a la fauna de Portugal, tres de las cuales nuevas para la Península Ibérica 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 geográfica, Portugal.

Introduction

This paper is the fifteenth 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 2020 and some unpublished earlier records, together with new province records not included in the checklist (CORLEY, 2015). Additional data include new data on larval host-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 2020 and part of 2021 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.

13 species new for Portugal are listed below, of which three 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*. (2020) the number of Lepidoptera species recognised from Portugal was 2723. With the current paper and other papers mentioned herein, this total has risen to 2743.

Material and Methods

Most species were captured at light in traps of various kinds, 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 number of new district records in 2020 is considerably lower than in recent years. Covid 19 restrictions in Portugal and elsewhere and the consequent difficulties of international travel both contributed to a reduction in field work.

The order and nomenclature of families and species follows the Portuguese list (CORLEY, 2015). The nomenclature of plant names follows the EURO+MED PLANT-BASE.

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

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

Abiúl (Pombal)	NE3913	180 m
Adaúfe (Braga)	NG5034	120 m
Águas Santas (Maia)	NF3562	105 m
Alfambras (Aljezur)	NB1724	75 m
Ansião, 2 km E of,	NE5019	250 m
Areia (Vila do Conde)	NF2375	32 m
Bajouca, Gemunde (Maia)	NF3069	85 m
Balsamão (Macedo de Cavaleiros)	PF7993	430 m
Bouças de Arões, Bajouca, Gemunde (Maia)	NF3070	100 m
Cais do Moliço (Vagos)	NE2787	7 m
Carrapateira (Aljezur)	NB0816	10 m
Casais do Porto, Louriçal (Pombal)	NE2429	30 m
Casal do Redinho, Madriz (Soure)	NE3142	25 m
Cesaredas, Reguengo Grande (Lourinhã)	MD7950	155m
Casmilo, Serra de Janeanes (Condeixa-a-Nova)	NE4333	300 m
Castelo do Germanelo, Rabaçal (Penela)	NE4828	250 m
Couce (Valongo)	NF4356	50 m
Foz do Ribeiro, São Bartoloméu de Messines (Silves)	NB6729	125 m

Fradelos (Vila Nova de Famalicão)	NF3378	30 m
Gontães, Serra do Alvão (Vila Real)	NF9773	790 m
Herdade da Varginha, Porto Covo (Sines)	NB2092	70 m
Hortas de Baixo (Arronches)	PD5834	330 m
Lama Grande, Serra de Montesinho (Bragança)	PG8346	1390 m
Louredo (Póvoa do Lanhoso)	NG5900	250 m
Louriçal (Pombal)	NE2228	40 m
Malhada da Figueira, N. of Santa Rita (Tavira)	PB2619	125m
Marvão	PD3962	830 m
Montes Santa Olaia (Figueira da Foz)	NE2446	18 m
Montesinho, 2 km N of, (Bragança)	PG8547	1220 m
Nogueira (Vila Real)	PF0667	520 m
Olmares, 2 km SW of Cacarelhos (Vimioso)	QG1203	750 m
Pampilhosa de Botão (Mealhada)	NE4964	90 m
Picão, 2 km S of, (Castro Daire)	NF8732	950 m
Planalto das Cortes, Camarnais (Bombarral)	MD8051	120 m
Pó (Bombarral)	MD8151	50 m
Poço (Condeixa-a-Nova)	NE3915	220 m
Poço do Inferno, Serra da Estrela (Manteigas)	PE2570	1100 m
Ponte da Carba, Celas (Vinhais)	PG7122	710 m
Ponte do Couço, Rio Tuela, east of Moimenta (Vinhais)	PG 6946	750 m
Porta da Sula, Mata do Buçaco (Mealhada)	NE5469	440 m
Praia da Rocha (Portimão)	NB4108	5 m
Quintarei (Valongo)	NF4163	250 m
Ramila (Marvão)	PD4261	500 m
Ribeira Angueira, E of Vale de Algoso (Vimioso)	QG0606	470 m
Ribeira da Carvalhosa, Picão (Castro Daire)	NF8732	520 m
Salir do Porto (Caldas da Rainha)	MD8673	60 m
Santuário de Santo Ambrósio, Vale da Porca (Macedo de Cavaleiros)	PF7799	580 m
São Joanico (Vimioso)	QG1009	600 m
Sargaçal (Lagos)	NB2711	30 m
Segura, Praia fluvial (Idanha-a-Nova)	PE7310	180 m
Senhora da Madalena, Lindoso (Ponte da Barca)	NG6835	380 m
Sipote, Ermida (Sertã)	NE8805	450 m
Travanca, 3 km E of Carralcova (Arcos de Valdevez)	NG5739	790 m
Vale de Figueiredo (Bombarral)	MD8051	80 m
Vilarinho das Azenhas (Vila Flor)	PF5083	190 m

Recorders

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Agostinho Fernandes
Sónia Ferreira
Darinka Gonzalez
Marcel Hellers
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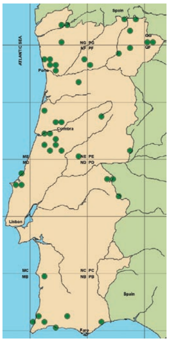
Carlos Silva
Joaquim Teixeira
Ana Valadares

Abbreviations and symbols

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

Provinces:

AAL	Alto Alentejo
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 ilicifoliella (Mendes, 1918)
DL: Couce, 22-I-2020, leafminer on *Quercus suber* L., emerged 3-VII-2020 Nunes, det. Corley.

ADELIDAE

Adela mazzolella (Hübner, 1801)
Second Portuguese record. TM: Ponta da Carba, 9-V-2020, Nunes, det. Corley.

Nematopogon metaxella (Hübner, 1813)
Third Portuguese record. BL: Casal do Redinho, Madriz, 25-V-2020, Rosete.

PSYCHIDAE

Placodoma calpella Sobczyk, 2013
Third Portuguese record. BB: Segura, 10-VI-2020, Silva, Jesus and Nunes, conf. Corley.

Psyche casta (Pallas, 1767)
BL: Louriçal, 18-III-2020, Rosete.

Psyche crassiorella Bruand, 1851
BL: Louriçal, 28-IV-2016, Rosete.

TINEIDAE

** *Nemapogon falstriella* (Haas, 1881)

BL: Ansião, 20-VI-2020, Rosete. Northern half of Europe, extending south to France, Northern Italy and Croatia. Larvae unknown.

Reisserita zernyi Petersen, 1957
DL: Couce, 3-VII-2020, Nunes, conf. Corley.

Reisserita flavofimbriella (Chrétien, 1925)
BB: Segura, 10-VI-2020, Silva, Jesus and Nunes.

GRACILLARIIDAE

Euspilapteryx auroguttella Stephens, 1825
E: Vale do Figueiredo, 26-V-2020, Cardoso.

Phyllonorycter froelichiella (Zeller, 1839)
BL: Casal do Redinho, Madriz, 25-V-2020, Rosete.

GLYPHIPTERIGIDAE

Orthotelia sparganella (Thunberg, 1788)
BL: Casal do Redinho, Madriz, 25-V-2020, Rosete.

Acrolepiopsis assectella (Zeller, 1839)
E: Pó, 8-X-2020, Cardoso; M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes.

LYONETIIDAE

Leucoptera andalusica Mey, 1994
DL: Couce, larvae mining cladodes of *Genista tridentata* L., 25-I-2020, Nunes.

PRAYDIDAE

Prays citri (Millière, 1873)
E: Pó, 5-V-2020, Cardoso.

AUTOSTICHIDAE

Oegoconia quadripuncta (Haworth, 1828)
DL: Areia, 14-V-2020, Jesus, det. Corley.

Symmoca alhambrella Walsingham, 1911
BL: Casmilo, 10-VII-2020, Rosete.

LECITHOCERIDAE

Homaloxestis briantiella (Turati, 1879)
M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes, det. Corley.

OECOPHORIDAE

Batia lambdella (Donovan, 1793)
E: Pó, 2-VI-2020, Cardoso.

* *Metalampra italica* Baldizzone, 1977

DL: Areia, 14-V-2020, Jesus, conf. Corley. Described from Italy in 1977 but has recently spread to Croatia and northern and western parts of Europe, reaching Germany, Netherlands, England, Wales, France and Spain (GASTÓN & VIVES MORENO, 2020: 310). [Larva in fungus-infected decaying wood].

Pleurota andalusica Back, 1973

DL: Couce, 3-VII-2020, Nunes, det. Corley.

DEPRESSARIIDAE

Agonopterix ocellana (Fabricius, 1775)

TM: Ponte da Carba, 8-V-2020, Silva, Jesus and Nunes.

Agonopterix olusatri Corley & Buchner, 2019

BB: Segura, 10-VI-2020, Silva, Jesus and Nunes.

Depressaria depressana (Fabricius, 1775)

BL: Castelo do Germanelo, 5-IX-2020, Rosete.

Odites kollarella (Costa, 1832)

M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes.

COSMOPTERIGIDAE

Anatrachyntis badia (Hodges, 1962)

E: Pó, 12-V-2020, Cardoso.

Coccidiphila gerasimovi Danilevsky, 1950

DL: Águas Santas, Maia, 14-III-2020, Nunes, det. Corley.

Eteobalea dohrnii (Zeller, 1847)

BL: Abiúl, 15-VII-2020, Rosete.

GELECHIIDAE

Stomopteryx basalis Staudinger, 1876

BL: Poço, 23-VII-2020, Rosete.

Aproaerema buvati (Nel, 1995)

BL: Abiúl, larva on *Coronilla repanda* (Poir.) Guss., 31-V-2019, Corley and Rosete.

Aproaerema polychromella (Rebel, 1902)

BB: Segura, 10-VI-2020, Silva, Jesus and Nunes; M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes.

Anacampsis timidella (Wocke, 1887)

DL: Couce, 3-VII-2020, Nunes, det. Corley.

Mondeguina atlanticella Corley & Rosete, 2020

Extension of range. BL: Cais do Moliço, Vagos, 18-VII-2020, Rosete.

Aristotelia decoratella (Staudinger, 1879)
BL: Ansião, 7-VIII-2020, Rosete.

Pyncostola bohemiella (Nickerl, 1871)
Second and third Portuguese records. BL: Abiúl, 15-VII-2020, Rosete; Ansião, 7-VIII-2020, Rosete.

Neofriseria peliella (Treitschke, 1835)
M: Travanca, 18-VII-2020, Silva. Jesus and Nunes, det. Corley.

Mirificarma cytisella (Treitschke, 1833)
BB: Segura, 10-VI-2020, Silva. Jesus and Nunes.

Mirificarma interrupta (Curtis, 1827)
BL: Louriçal, flying at dusk, 9-IV-2020, Rosete.

Caryocolum fibigerium Huemer, 1988
M: Travanca, 18-VII-2020, Silva. Jesus and Nunes, det. Corley.

Teleiodes albidorsella Huemer & Karsholt, 1999
DL: Couce, 3-VII-2020, Nunes, det. Corley.

Schistophila laurocistella Chrétien, 1899
TM: Ribeira Angueira, 9-V-2020, Nunes, det, Corley.

ELACHISTIDAE

Elachista boursini Amsel, 1951
BB: Segura, 10-VI-2020, Silva, Jesus and Nunes, det. Corley.

Elachista igaloensis Amsel, 1951
DL: Couce, leafmine on *Carex* sp., 8-I-2020, Nunes, det. Kaila (fig. 1).

** *Elachista differens* Parenti, 1978
BL: Pampilhosa de Botão, 17-V-2018, Jesus; Abiúl, 2-IX-2019, Rosete, det. Corley. France, Italy, Switzerland, Germany. [Leaf-miner on *Carex ferruginea* Scop.].

COLEOPHORIDAE

Coleophora trifariella Zeller, 1849
Records from Beira Litoral (PIRES & CORLEY, 2007) and from Minho (CORLEY *et al*., 2016) are misidentifications of *Coleophora genistae* Stainton, 1857. Mendes' records from Beira Baixa are correct.

Coleophora sisteronica Toll, 1961
E: Salir do Porto, reared from *Coronilla valentina* L., 7-VII-2020, Nunes, conf. Corley.

Coleophora flaviella Mann, 1857
TM: Ribeira Angueira, 9-V-2020, Nunes, det, Corley.

Coleophora galbulipennella Zeller, 1838

Fourth Portuguese record. TM: Montesinho, 24-VIII-2020, Jesus, Fernandes and Nunes, det. Corley.

SCYTHRIDIDAE

** *Scythris sinensis* (Felder & Rogenhofer, 1875)

M: Adaúfe, 10-VIII-2020, Marques, det. Nunes from photo on Facebook. China, Japan, Korea and Siberia; in Eastern Europe known from Russia, Estonia, Latvia, Lithuania, Belorussia, Ukraine, Moldova, Hungary and Poland, apparently increasing its range. Records from England and Italy are probably accidental imports. [*Chenopodium album* L., *Atriplex patula* L.].

Scythris subseliniella (Heinemann, 1876)

M: Travanca, 18-VII-2020, Silva, Jesus and Nunes, det. Corley.

Enolmis acanthella (Godart, 1825)

E: Pó, 27-IV-2020, Cardoso.

BLASTOBASIDAE

Hypatopa segnella (Zeller, 1873)

BA: Picão, 1-VIII-2020, Silva, Jesus and Nunes, det. Corley; M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes.

MOMPHIDAE

Mompha propinquella (Stainton, 1851)

BL: Porta da Sula, 30-VII-2020, Jesus, det. Nunes.

ALUCITIDAE

* *Alucita grammodactyla* Zeller, 1841

ALG: Praia da Rocha, 3-III-2020, Hellers, det. Corley. South and middle latitudes of Europe north to south Sweden; absent from Mediterranean islands, Greece and British Isles. [*Scabiosa columbaria* L., *S. canescens* Waldst. & Kit.].

SCHRECKENSTEINIIDAE

Schreckensteinia festaliella (Hübner, 1796)

DL: Bajouca, Gemunde, 16-VII-2020, Silva.

EPERMENIIDAE

Epermenia aequidentellus (E. Hofmann, 1867)

TM: Santuário de Santo Ambrósio, larvae on *Pimpinella villosa* Schousb., 10-V-2020, Nunes, det. Corley.

TORTRICIDAE

Cnephasia stephensiana (Doubleday, 1849)

TM: Olmares, reared from *Andryala integrifolia* L., 31-V-2020, Nunes, det. Corley.

Acleris lorquiniana (Duponchel, 1843)
Seond Portuguese locality. BL: Casal do Redinho, Madriz, 25-V-2020, Rosete.

Aethes francillana (Fabricius, 1794)
ALG: Carrapateira, emerged 5-IX-2019 from seeds of *Crithmum maritimum* L., collected 21-VIII-2019, Rosete, det. Corley

Apotomis betuletana (Haworth, 1811)
Third Portuguese record. TM: Montesinho, 24-VIII-2020, Nunes, Jesus and Fernandes.

Lobesia artemisiana (Zeller, 1847)
AAL: Ramila, 3-VII-2020, Valadares.

Gypsonoma imparana Müller-Rutz, 1914
TM: Vilarinho das Azenhas, 25-IX-2020, Nunes, Ferreira and Mata, det. Corley.

* *Epiblema foenella* (Linnaeus, 1758)
BA: Ribeira da Carvalhosa, Picão, 7-VII-2020, Teixeira (fig. 2). Nearly all Europe except Mediterranean islands and Ireland. [Larva in rootstock of *Artemisia vulgaris* L., *A. abrotanum* L. and *Cota tinctoria* (L.) J. Gay].

Pseudococcyx tessulatana (Staudinger, 1871)
BL: Castelo do Germanelo, 29-V-2020, Rosete.

Dichrorampha chavanneana (La Harpe, 1858)
DL: Quintarei, 13-III-2020, Nunes, det. Corley.

Grapholita janthinana (Duponchel, 1843)
M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes.

HETEROGYNIDAE

Delete *Heterogynis penella* (Hübner, 1819) from the Portuguese list. There is no evidence that this species occurs in Portugal. Most probably all records belong to *H. cynetis* de Freina *et al*., 2020.

Heterogynis cynetis de Freina, Monasterio, Escobés, Hinojosa & Vila, 2020
TM: Balsamão, 9-VI-2016, Nunes.

PYRALIDAE

Achroia grisella (Fabricius, 1794)
ALG: Sargaçal, 11-VIII-2017, Valadares, det. Nunes.

Lamoria anella (Denis & Schiffermüller, 1775)
M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes.

Pyralis regalis (Denis & Schiffermüller, 1775)
BA: Poço do Inferno, 16-VIII-2020, Rosete, conf. Corley.

Stemmatophora vulpecalis (Ragonot, 1891)
BB: Segura, 10-VI-2020, Silva, Jesus and Nunes.

* *Valdovecaria hispanicella* (Herrich-Schäffer, 1855)
AAL: Hortas de Baixo, 20-IX-1995, Corley; Ramila, 1-VII-2020, Valadares, det. Marabuto from photo (fig. 3). Spain, France. Larva unknown.

Asalebria florella (Mann, 1862)
M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes.

Elegia fallax (Staudinger, 1881) *sensu* Slamka, 2019
TM: Ponte da Carba, 8-V-2020, Nunes, det. Corley.

Acrobasis fallouella (Ragonot, 1871)
Third Portuguese record. BA: Picão, 1-VIII-2020, Silva, Jesus and Nunes, det. Corley.

Acrobasis glaucella Staudinger, 1859
DL: Valongo, reared from *Quercus suber* L., 17-VI-2020, Nunes, det. Corley.

Euzophera osseatella (Treitschke, 1832)
E: Pó, 21-V-2020, Cardoso.

Delete *Euzopherodes vapidella* (Mann, 1857) from the Portuguese list. NEL *et al*., (2021) describe a new species *Euzopherodes vapidelloides* from France including Corsica and from Spain, distinct from *E. vapidella.* We have examined Portuguese specimens of *Euzopherodes* and found them to belong to the new species. There is no evidence that *E. vapidella* occurs in Portugal and it should be deleted from the Portuguese list. *E. vapidella* is known from Madrid, so its presence in Portugal remains a possibility.

* *Euzopherodes vapidelloides* Labonne, Nel & Varenne, 2021
Portuguese specimens previously identified as *E. vapidella* (Mann, 1857), with records from ALG, AAL, BB and TM, belong to this newly described species. Spain, France, Corsica. Larva unknown.

Phycitodes albatella (Ragonot, 1887)
M: Louredo, 17-X-2020, Nunes, det. Corley.

Ephestia disparella Hampson, 1901
M: Travanca, 18-VII-2020, Silva. Jesus and Nunes.

CRAMBIDAE

Metasia ibericalis Ragonot, 1894
BAL: Herdade da Varginha, 28-VI-2020, Jesus.

Metasia cuencalis Ragonot, 1894
M: Senhora da Madalena, Lindoso, 17-VII-2020, Silva, Jesus and Nunes.

Mesocrambus tamsi Błeszyński, 1960
BAL: Herdade da Varginha, 28-VI-2020, Jesus, conf. Nunes.

* *Mesocrambus marabut* (Błeszyński, 1965)
BL: Montes Santa Olaia, 30-VII-2003, Pires; ALG: Malhada da Figueira, 1-VIII-2011, Montegriffo, det. Corley. This species has been misdentified as *M. carectellus* since MONTEIRO (1982). It is almost certain that all records of *M. caractellus* belong here. Spain. Larva unknown.

Delete *Mesocrambus carectellus* (Zeller, 1847) from the Portuguese list, in which it was included by MONTEIRO (1982), but recent re-examination of a number of specimens suggests that all records belonging to *M. marabut*.

DREPANIDAE

* *Ochropacha duplaris* (Linnaeus, 1761)
M: Castro Laboreiro, 9-VII-2019, Valadares (fig.4). Nearly all Europe, but absent from Mediterranean islands and some Balkan countries. [*Alnus*, *Betula*, *Corylus*, *Populus*, *Quercus*].

LASIOCAMPIDAE

Trichiura castiliana Spuler, 1908
ALG: Sargaçal, 8-XI-2014, Valadares.

GEOMETRIDAE

Idaea circuitaria (Hübner, 1819)
In CORLEY (2015) the first record for Portugal is given from Setúbal, but E was accidentally omitted from the list of provinces.

Cyclophora quercimontaria (Bastelberger, 1897)
M: Fradelos, 24-IV-2020, Nunes, det. Corley.

Cyclophora linearia (Hübner, 1799)
BA: Picão, 1-VIII-2020, Silva, Jesus and Nunes, det. Corley; DL: Bouças de Arões, Bajouca, Gemunde, 30-V-2020, Silva, Jesus, Nunes and Ferreira.

Anticlea derivata (Denis & Schiffermüller, 1775)
TM: São Joanico, 21-III-2019, Cordeiro.

* *Minoa murinata* (Scopoli, 1763)
TM: Lama Grande, 20-V-2020, Teixeira (fig. 5). Most of Europe, but absent from Scandinavia, Baltic states, Ireland, Balearic Islands, Sardinia and Crete. [*Euphorbia* species, particularly *E. cyparissias* L. and *E. amygdaloides* L.].

Lobophora halterata (Hufnagel, 1767)
Third Portuguese record. TM: Ponte da Carba, 21-V-2020, Teixeira.

Isturgia deerraria (Walker, 1861)
BL: Pampilhosa de Botão, 16-IX-2020, Jesus.

Agriopis marginaria (Fabricius, 1776)
E: Vale de Figueiredo, Camarnais, 23-I-2020, Cardoso.

Lomographa bimaculata (Fabricius, 1775)
TM: Gontães, 23-V-20, Fernandes and Gonzalez, det. Nunes.

Ortaliella perspersata (Treitschke, 1827)
BB: Segura, 10-VI-2020, Silva, Jesus and Nunes.

Phaiogramma etruscaria (Zeller, 1849)
BAL: Herdade da Varginha, 28-VI-2020, Jesus.

NOTODONTIDAE

Stauropus fagi (Linnaeus, 1758)
ALG: Alfambras, 13-VI-2020, Valadares.

EREBIDAE

Gynaephora fascelina (Linnaeus, 1758)
Second Portuguese record. TM: Lama Grande, 16-VII-2020, Teixeira.

Callimorpha dominula (Linnaeus, 1758)
TM: Nogueira, 20-V-2017, Fernandes and Gonzalez, det. Nunes.

Coscinia striata (Linnaeus, 1758)
E: Planalto das Cortes, Camarnais, 19-V-2020, Cardoso.

Coscinia chrysocephala (Hübner, 1804)
E: Vale de Figueiredo, Camarnais, 21-VI-2016, Cardoso.

Catocala nupta (Linnaeus, 1767)
ALG: Foz do Ribeiro, 3-VII-2016, Valadares.

NOCTUIDAE

Plusia festucae (Linnaeus, 1758)
ALG: Sargaçal, 5-VI-2015, Valadares.

* *Xanthodes albago* (Fabricius, 1794)
ALG: Sargaçal, 16-VI-2020, Valadares (fig. 6l). Mediterranean species, mainly near the coast from Spain to Greece. [*Malva olbia* (L.) Alef., *M. moschata* L.].

Acronicta alni (Linnaeus, 1767)
TM: Ponte do Couço, 16-V-2020, Silva, Jesus and Nunes.

Bryophila vandalusiae Duponchel, 1842
BB: Sipote, Ermida, 5-IX-2020, Ramos, conf. Corley.

Agrochola helvola (Linnaeus, 1758)
TM: Ponta da Carba, larva on *Quercus pyrenaica* Willd., 9-V-2020, emerged 17-X-2020, Nunes, conf. Corley.

Agrochola lota (Clerck, 1759)
E: Vale de Figueiredo, Camarnais, 1-I-2020, Cardoso.

Polymixis lichenea (Hübner, 1813)
E: Cesaredas, Reguengo Grande, 13-XI-2020, Cardoso.

Hadena magnolii (Boisduval, 1829)
E: Pó, 29-IV-2020, Cardoso.

* *Mythimna pallens* (Linnaeus, 1758)

BL: Casais do Porto, 13-VI-2020, Rosete (figs 7, 8) Almost all Europe including Sicily, but absent from other Mediterranean islands. [Grasses].

Mythimna languida (Walker, 1858)

BAL: Herdade da Varginha, 28-VI-2020, Jesus.

Recent literature

ARNSCHEID & WEIDLICH (2021) review the taxonomy of the *Ptilocephala albida*-species group in Europe, concluding that there are three species. *P. albida sensu stricto* is found in France, south-west Germany, Switzerland and northern Italy, but not in the Iberian Peninsula. In Portugal and Spain the group is represented by *P. lorquiniella* (Bruand, 1853).

CORLEY & FERREIRA (2021) describe *Ypsolopha milfontensis* from the Alentejo coast, a new species with *Ephedra fragilis* Desf. as host-plant.

CORLEY *et al*. (2020a) raise *Agonopterix rigidella* (Chrétien, 1907) from synonymy with *A. fruticosella*. Both species occur in Portugal: *A. fruticosella* is recorded from Algarve; *A. rigidella* is recorded from Algarve and Estremadura.

CORLEY *et al*. (2020b) add 14 species to the Portuguese list and delete two.

CORRO CHANG & METZ (2021) transfer *Tuta absoluta* to genus *Phthorimaea*, based on a cladistic analysis of Gnorimoschemini.

FREINA *et al*. (2020) describe *Heterogynis cynetis* from Algarve. This is wholly or in part the species referred to in CORLEY (2015) as *H. penella* (Hübner, 1819). It has still to be ascertained whether *Heterogynis* from lowland localities further north in Portugal belong to the new species or another and if there is only one species in Algarve, but there is no reason to suppose that *H. penella* occurs in Portugal, and it should therefore be removed from the Portuguese list.

HUEMER & KARSHOLT (2020) place *Monochroa melagonella* in the genus *Pragmatodes* Walsingham, 1908. *Monochroa nigromaculella* (Millière, 1872) is transferred to *Oxypteryx* Rebel, 1911.

MOYA *et al*. (2017) made a very thorough genetic investigation of the relationships of *Argynnis* Fabricius and *Speyeria* Scudder. Their recommendation was that three genera should be recognised, *Argynnis*, *Fabriciana* and *Speyeria* but the justification for this recommendation was a reluctance to alter the names of numerous *Speyeria* species in North America to *Argynnis*. There were three lineages found, but *Fabriciana* and *Speyeria* are nested within *Argynnis*, so recognition of three genera is not justified on evolutionary grounds. For the Portuguese species, following their recommendation would mean changing the names of three of the five species. We favour retention of the name *Argynnis* for all five species, but suggest that the genera they recognise should be treated as subgenera.

NUNES (2021) adds new information on host-plants of 100 species of Lepidoptera within Portugal.

NUNES *et al*. (2021) add six new species for Portugal: *Aplota palpellus* (Haworth, 1828), *Anacampsis obscurella* (Denis & Schiffermüller, 1775), *Coleophora anitella* Baldizzone, 1985, *Apomyelois bistriatella* (Hulst, 1887), *Eublemma amoena* (Hübner, 1803) and *Xestia sexstrigata* (Haworth, 1809).

WIKSTRÖM *et al*. (2020) revise the *Pyralis regalis* group, raising subsp. *sagarrai* Leraut, 2005 to species rank and adding it to the Portuguese fauna, with records from Alto Alentejo and Trás-os-Montes.

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 resulting from 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 *Euzopherodes vapidelloides* Labonne, Nel & Varenne, 2021 replaces *Euzopherodes vapidella* (Mann, 1857), which was previously misidentified, but the species retains the number 1523 in the checklist.

This appendix also gives the opportunity to make some corrections to taxonomic combinations, author citations and spelling of the nomenclature presented in CORLEY (2015). Affected species numbers are 1713, 2102, 2130, 2161, 2222, 2252, 2473.

0136 *Ptilocephala lorquiniella* (Bruand, 1853) (*Ptilocephala albida auct. nec* Esper, 1786).
0169.1 *Nemapogon falstriella* (Haas, 1881)
0324.1 *Ypsolopha milfontensis* Corley & Ferreira, 2021
Metalampra Toll, 1956
0406.1 *Metalampra italica* Baldizzone, 1977
Aplota Stephens, 1834
0430.1 *Aplota palpellus* (Haworth, 1828)
0456.1 *Agonopterix rigidella* (Chrétien, 1907)
0530.1 *Anacampsis obscurella* (Denis & Schiffermüller, 1775)
0618 *Oxypteryx nigromaculella* (Millière, 1872) (*Monochroa nigromaculella* (Millière, 1872))
Pragmatodes Walsingham, 1908
0619 *Pragmatodes melagonella* (Constant, 1895) (*Monochroa melagonella* (Constant, 1895))
0674 *Phthorimaea absoluta* (Meyrick, 1917) (*Tuta absoluta* (Meyrick, 1917))
0727.1 *Elachista differens* Parenti, 1978
0830.1 *Coleophora anitella* Baldizzone, 1985
0867.1 *Scythris sinensis* (Felder & Rogenhofer, 1875)
0921.1 *Alucita grammodactyla* Zeller, 1841
1160.1 *Epiblema foenella* (Linnaeus, 1758)
1251 *Heterogynis cynetis* de Freina, Monasterio, Escobés, Hinojosa & Vila, 2020 (*Heterogynis penella auct. nec* Hübner, 1819)
1421.1 *Pyralis sagarrai* Leraut, 2005
Valdovecaria Zerny, 1927
1444.1 *hispanicella* (Herrich-Schäffer, 1855)
1514.1 *Apomyelois bistriatella* (Hulst, 1887)
1523 *Euzopherodes vapidelloides* Labonne, Nel & Varenne, 2021 (*Euzopherodes vapidella auct. nec* Mann, 1857)
1664 *Mesocrambus marabut* (Błeszyński, 1965) (*Mesocrambus carectellus auct. nec* Zeller, 1847)
Ochropacha Wallengren, 1871
1696.1 *Ochropacha duplaris* (Linnaeus, 1761)
1713 *Gufria limosa* (de Villiers, 1827) (*Gufria limosa* (Serres, 1827))
Minoa Treitschke, 1825
1935.1 *Minoa murinata* (Scopoli, 1763)
Sphrageidus Maes, 1984
2102 *Sphrageidus similis* (Fuessly, 1775) (*Euproctis similis* (Fuessly, 1775))
2130 *Spiris striata* (Linnaeus, 1758) (*Coscinia striata* (Linnaeus, 1758))
2161 *Lygephila lusoria* (Linnaeus, 1758)
subsp. *glycyrrhizae* (Staudinger, 1871) (*Lygephila glycyrrhizae* (Rambur, 1866))
2177.1 *Eublemma amoena* (Hübner, 1803)
2222 *Panchrysia aurea* (Hübner, 1803) (*Panchrysia deaurata* Esper, 1787)
Noctuidae subfamily Bagisarinae
Xanthodes Guenée, 1852

2224.1 *Xanthodes albago* (Fabricius, 1794)
2252 *Synthymia fixa* (Fabricius, 1787)
Luteohadena Beck, 1991
2473 *Luteohadena andalusica* (Staudinger, 1859) (*Conisania andalusica* (Staudinger, 1859)
2486.1 *Mythimna pallens* (Linnaeus, 1758)
2566.1 *Xestia sexstrigata* (Haworth, 1809)

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BIBLIOGRAPHY

ARNSCHEID, W. R. & WEIDLICH, M., 2021.– First taxonomic revision of the *Ptilocephala albida*-species group in Europe (Lepidoptera: Psychidae, Oiketicinae).– *SHILAP Revista de lepidopterología*, **49**(195): 417-433.

CORLEY, M. F. V., BUCHNER, P., RYMARCZYK, F. & DUTHEIL, M., 2020a.– *Agonopterix rigidella* (Chrétien, 1907) resurrected from synonymy (Lepidoptera, Depressariidae).– *Entomologist's Record and Journal of Variation*, **132**: 281-296.

CORLEY, M. & FERREIRA. S., 2021.– *Ypsolopha milfontensis*, a new species from the Portuguese coast (Lepidoptera, Ypsolophidae).– *SHILAP Revista de lepidopterología,* **49**(193): 55-64.

CORLEY, M. F. V., NUNES, J., ROSETE, J., TERRY, R. & FERREIRA, S., 2020b.– New and interesting Portuguese Lepidoptera records from 2019 (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología,* **48**(192): 609-641.

CORLEY, M. F. V., ROSETE, J., GONÇALVES, A. R., NUNES, J., PIRES, P. & MARABUTO, E., 2016.– New and interesting Portuguese Lepidoptera records from 2015 (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **44**(176): 615-643.

CORRO CHANG, P. & METZ, M., 2021.– Classification of *Tuta absoluta* (Meyrick, 1917) (Lepidoptera: Gelechiidae: Gelechiinae: Gnorimoschemini) based on cladistic analysis of morphology.– *Proceedings of the Entomological Society of Washington,* **123**(1): 41-54.

FREINA, J. de, MONASTERIO-LÉON, Y., ESCOBÉS-JIMÉNEZ, R., HINOJOSA, J. C. & VILA, R., 2020.– *Heterogynis* Rambur, 1837 (Lepidoptera: Zygaenoidea, Heterogynidae) from Andalusia and the Algarve (Spain and Portugal): a taxonomic and faunistic review.– *Boletín de la Sociedad Entomológica Aragonesa*, **67**: 75-85.

GASTÓN, J. & VIVES MORENO, A., 2020.– Contribución al conocimiento de los Lepidoptera de España con la descripción de cuatro nuevas especies para nuestra fauna y otras citas de interés (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **48**(190): 307-324.

HUEMER, P. & KARSHOLT, O., 2020.– Commented Checklist of European Gelechiidae (Lepidoptera).– *ZooKeys*, **921**: 65-140.

MONTEIRO, T., 1982.– Espéces portuguesas da Subfamilia Crambinae (Lep. Crambidae.).– *Anais da Faculdade de Ciências de Porto*, **63**: 167-206.

MOYA, R. S. de, SAVAGE, W. K., TENNEY, C., BAO, X., WAHLBERG, N. & HILL, R. I., 2017.– Interrelationships and diversification of *Argynnis* Fabricius and *Speyeria* Scudder butterflies.– *Systematic Entomology,* **42**(4): 635-649. doi:10.1111/syen.12236.

NEL, J., LABONNE, G. & VARENNE, T., 2021.– *Euzopherodes nigrolineella* Zerny, 1936, *bona species*, *stat. restaur*. Description d'*Euzopherodes vapidelloides* sp. n. (Lepidoptera. Pyralidae, Phycitinae).– *Revue de l'Association Roussillonaise d'Entomologie*, **30**(1): 29-35.

NUNES, J., 2021.– New records of Lepidoptera hostplants from Portugal (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología,* **49**(193): 5-19.

NUNES, J., SILVA, C. & JESUS, E., 2021.– New species of Lepidoptera for mainland Portugal (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterologia*, **49**(195): 507-511.

PIRES, P. & CORLEY, M. F. V., 2007.– The Lepidoptera of Baixo Mondego (Beira Litoral, Portugal) (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **35**(138): 187-230.

VIVES MORENO, A., 2014.– *Catálogo sistemático y sinonímico de los Lepidoptera de la Península Ibérica, de Ceuta, de Melilla y de las Islas Azores, Baleares, Canarias, Madeira y Salvajes. (Insecta: Lepidoptera.)*: 1184 pp. Suplemento de SHILAP Revista de Lepidopterología, Improitalia, Madrid.

WIKSTRÖM, B., HUEMER, P., MUTANEN, M., TYLLINEN, J. & KAILA, L., 2020.– *Pyralis cardinalis*, a charismatic new species related to *P. regalis* [Denis & Schiffermüller], 1775, first recognized in Finland (Lepidoptera, Pyralidae).– *Nota lepidopterologica*, **43**: 337-364.

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Figures 1-8.– 1. *Elachista igaloensis* (Millière, 1881), Couce, Valongo (J. Nunes). **2.** *Epiblema foenella* (Linnaeus, 1758), Picão, (J. Teixeira). **3***.* *Valdovecaria hispanicella* (Herrich-Schäffer, 1855), Ramilo, Marvão (A. Valadares). **4.** *Ochropacha duplaris* (Linnaeus, 1761), Castro Laboreiro (A. Valadares). **5.** *Minoa murinata* (Scopoli, 1763), Lama Grande (J. Teixeira). **6.** *Xanthodes albago* (Fabricius, 1794) Sargaçal, Lagos (A. Valadares) **7.** *Mythimna pallens* (Linnaeus, 1758), Casais do Porto, Louriçal (J. Rosete) **8.** *Mythimna pallens* (Linnaeus, 1758), male genitalia, Casais do Porto (J. Rosete).

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

Dña. Sandra Sauces Guallar (España / *Spain*)
Dr. Carlo Matessi (Italia / *Italy*)
D. Andros Mahiques Mahiques (España / *Spain*)
D. Aurino Ferreira Jiménez (Brasil / *Brazil*)
Mr. Enrico Punta (Italia / *Italy*) (Reingreso / *Rejoin*)
Dr. Michael Hull (Reino Unido / *United Kingdom*) (Reingreso / *Rejoin*)
Mr. Willy De Prins (Bélgica / *Belgium*) (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:

Dra. Mirna Martins Casagrande (Brasil / *Brazil*)
D. Eliseo Higinio Fernández Vidal (España / *Spain*)
D. Manuel Rodríguez Moreno (España / *Spain*)
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D. Xosé Marra Quiroga (España / *Spain*)
D. Juan Manuel Novoa Pérez (España / *Spain*)

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:

Mr. André Pouget (Francia / *France*)
Dr. Hans Christof Zeller-Lukashort (Austria / *Austria*)
Dr. Hans Löbel (Alemania / *Germany*)
Mr. Petr Krejik (República Checa / *Czech Republic*)
Mr. Andrea Kopp (Suiza / *Switzerland*)
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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 new of the drop for the following member's death:

Mr. Ernst Arenberger (Austria / *Austria*)
Dr. Vasiliy D. Kravchenko (Israel / *Israel*)
Mr. Kari Nupponen (Finlandia / *Finland*)
Prof. Dr. Ahmet O. Koçak (Turquía / *Turkey*)
Mr. Jacques Bert Wolschrijn (Países Bajos / *Netherland*)

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New species and new records of Palaearctic Meessiidae and Tineidae (Lepidoptera: Tineoidea)

R. Gaedike

Abstract

Newly described and illustrated in the family Meessiidae are *Eudarcia topoliacola* Gaedike, sp. n., and *Novotinea cretica* Gaedike, sp. n., and in the family Tineidae: *Hapsifera tadjikistana* Gaedike, sp. n., *Nemapogon paracyprica* Gaedike, sp. n., *Neurothaumasia hackeri* Gaedike, sp. n., *Neurothaumasia kaschmirella* Gaedike, sp. n., *Dinica nepalica* Gaedike sp. n., *Elatobia rufarea* Gaedike sp. n., *Tinea caucasicola* Gaedike, sp. n., *Proterospastis meyi* Gaedike, sp. n. An illustration of the imago of *Myrmecozela mongolica* Petersen, 1965 is presented. First records for countries are established for ten species.

KEY WORDS: Lepidoptera, Tineoidea, Meessiidae, Tineidae, new species, Palaearctic.

Nuevas especies y nuevos registros de Meessiidae y Tineidae paleárticos (Lepidoptera: Tineoidea)

Resumen

Nuevamente se describen e ilustran en la familia Meessiidae son *Eudarcia topoliacola* Gaedike, sp. n., y *Novotinea cretica* Gaedike, sp. n. y en la familia Tineidae: *Hapsifera tadjikistana* Gaedike, sp. n., *Nemapogon paracyprica* Gaedike, sp. n., *Neurothaumasia hackeri* Gaedike, sp. n., *Neurothaumasia kaschmirella* Gaedike, sp. n., *Dinica nepalica* Gaedike sp. n., *Elatobia rufarea* Gaedike sp. n., *Tinea caucasicola* Gaedike, sp. n., *Proterospastis meyi* Gaedike, sp. n. Se presenta una ilustración del imago de *Myrmecozela mongolica* Petersen, 1965. Se establecen primeros registros para diez especies.

PALABRAS CLAVE: Lepidoptera, Tineoidea, Meessiidae, Tineidae, nuevas especies, Paleártico.

Introduction

During past studies of numerous specimens of the families Meessiidae and Tineidae, several taxa were recognized as belonging to new species. Their description was postponed until additional specimens in better condition could be studied, or the other gender. Because until now no further specimens of these taxa have been found, it now seems justified to describe them. Additionally, some new taxa are described from material collected more recently by several colleagues.

Abbreviations used

coll. Baldizzone	Giorgio Baldizzone, Asti, Italy
coll. Bidzilya	Oleksiy Bidzilya, Kiev, Ukraine
coll. Derra	Georg Derra, Reckendorf, Germany

coll. Mayr	Anton (= Toni) Mayr, Feldkirch, Austria
FMNH	Finnish Museum of Natural History, Helsinki, Finland
RG	Reinhard Gaedike, Bonn, Germany
MNVD	Museum für Naturkunde und Vorgeschichte, Dessau, Germany
SDEI	Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany
ZIN	Zoological Institute, Russian Academy of Sciences, St. Peterburg, Russia
ZMHB	Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Berlin, Germany
ZMUC	Zoological Museum, Copenhagen, Denmark
ZSM	Zoologische Staatssammlung, Munich, Germany

Taxonomy

MEESSIIDAE

Eudarcia nigraella (Mariani, 1937)
Meessia nigraella Mariani, 1937. *G. Sci. nat. Econ. Palermo,* **39**: 11

Material examined: 1 ♂, BULGARIA, 1 ♂, Dobrich Reg., Kap Kaliakra, 5-7-VI-2018, leg. B. S. Larsen (ZMUC). **First record from Bulgaria.** 1 ♂, GREECE, Kefalonia, env. of Assos, 23-V-2017, leg. M. Weidlich (ZMHB). **First record from Greece.**

***Eudarcia topoliacola* Gaedike, sp. n.** (figs 1, 13)

Material examined: Holotype ♂, GREECE: West Crete, 1,7km S of Topolia, 35º24’42”N, 23º40’54”E, 29-30-VI-2012, 380 m, [leg.] Carsten Hviid, Knud Larsen; Genitalia slide 9938 RG (ZMUC).

Description: Wingspan 7 mm; head brush cream-coloured, the neck dark brown; labial palpus cream-coloured, apical segment darker, second segment apically bristled; antenna dark grey, under side lighter, scape without pecten; thorax and tegulae on the basal half dark brown, apical half cream-coloured; forewing cream-coloured with a dark brown pattern: dark brown are the basal fifth, the apex and two stripes at 1/2 and 3/4, the cream-coloured parts of forewing partly overlaid with dark brown scales, fringes nearly completely covered by dark scales; hindwing grey.

Genitalia ♂ (fig. 13): Uncus truncated, gnathos arms fused with the band-shaped subscaphium, apical edge with two more strongly sclerotized curvatures; saccus broad, apically rounded; valva nearly as long as uncus-tegumen-complex, with very long apodeme, basal edge deeply incised, basal third more or less triangular, apical part narrowing to rounded tip; on inside, below the beginning of apodeme a nearly square, more strongly sclerotized, area with two long bristles and a larger thorn; phallus longer than valva, slightly curved, with two cornuti, one smaller with pointed tip and one rod-shaped.

Genitalia ♀: Unknown.

Diagnosis: Superficially not clearly distinguishable from many other members of the genus, but in the genitalia the shape of the fused gnathos arms with subscaphium, the very long apodeme and the sclerotization on the inside of the valva are characters, which distinguish the new species from the hitherto known taxa of the genus.

Biology: Unknown.

Distribution: Greece: Crete.

Etymology: The species is named after the type locality: Topolia.

***Novotinea cretica* Gaedike, sp. n.** (figs 2-3, 14-15)

Material examined: Holotype ♂, GREECE: Crete W. Omalos 1100-1200 m, 28-VII-2-VIII-2001, leg. D. Nilsson, A. Madsen, M. Fibiger, G. Jeppesen; Genitalia slide 6549 RG (ZMUC); Paratypes: 2 ♀♀, GREECE: Creta, Mt. Ida, Astiraki, 500 m, 23-VII-1984, G. Baldizzone leg.; Genitalia slides 2908, 2909 RG (coll. Baldizzone; SDEI).

Description: Wingspan 6-7mm; head brush light yellowish-brown; labial palpus on inside cream-coloured, on outside dark grey; scape of antenna cream-coloured, flagellum somewhat darker; thorax and tegulae also cream-coloured, basally somewhat darker; forewing cream-coloured, apical quarter, and edge along termen with dark brown scales, before the dark brown apex a cream-coloured patch, from dorsum at the end of fringe a dark brown stripe, directed obliquely basally to costa; hindwing grey.

Genitalia ♂ (fig. 14): Uncus with two lateral finger-shaped socii, tegumen square, with more strongly sclerotized edges, prolonged into narrow processi, saccus broad, apically rounded; valva with long more strongly sclerotized apodeme, ventral edge basally with small narrow process, from 1/4 curved upwards to pointed tip, costal edge at 3/4 with smaller bristled area; phallus as long as uncus-tegumen-saccus complex, basally narrow, rounded, apically with a stronger sclerotized area with three thorns and a small curved process, apex hook-shaped.

Genitalia ♀: (fig. 15): VIII segment ventrally more strongly sclerotized, in the middle a circular opening with strongly sclerotized edges, basally an additional wave-shaped sclerotization; signum finger-shaped, covered with numerous minute thorns; oviscapte with short apophyses.

Diagnosis: Superficially somewhat similar to *N. liguriella* Amsel, 1950, but the genitalia structure is quite different. The shape of valvae and phallus in the male and the circular opening in the segment VIII and presence of signum in the female make the new species sure distinguishable from the other members of the genus.

Biology: Unknown.

Distribution: Greece: Crete.

Etymology: The species is named after the location of collecting: Crete.

TINEIDAE

Hapsifera tadjikistana Gaedike, sp. n. (figs 4, 16)

Material examined: Holotype ♂, [TADJIKISTAN], st. Pristanj, v 12 km k ju. ot Dzhilikulja, na r. Vachsh [old Pristan', 12 km S of Dzhilikul, at river Vachsch], 16-II-[19]49, [leg.] Shchetkin; Zool. Mus. Berlin (ZMHB); Paratypes: 3 ♂♂, with same location and collection dates, Genitalia slide 9984 RG (ZMHB; SDEI); 2 ♂♂, with same location dates, but 15-II-[19]49; Genitalia slide 9946 RG (ZMHB; SDEI).

Description: Wingspan 22-23mm; head brush light grey-brown, laterally whitish; labial palpus long, straight, covered with long scales, on outside grey-brown, on inside whitish; scape of antenna grey-brown, flagellum lighter grey; thorax and tegulae light grey-brown, laterally the thorax and tip of tegulae whitish; forewing light cream, basally dark grey, at costa from 3/4 to apex four small grey-brown patches, the entire termen with a stripe of the same colour, on fringe a thin grey-brown scale-line; in the middle of wing at the end of cell a small triangular grey-brown patch and before apex a short grey-brown stripe; from base to the triangular patch an indicated yellowish strip; the entire wing more or less overlaid with scattered darker scales; hindwing whitish. Some specimens with more pronounced darker pattern, or with hardly visible pattern.

Genitalia ♂ (fig. 16): Uncus truncated, laterally with rounded tip; gnathos arms at 1/2 bent, apically with strongly sclerotized, nearly triangular pointed tip; vinculum without saccus; valva as long as uncus-tegumen-vinculum complex, from basal third narrowing to the rounded apex, costal edge narrowly more strongly sclerotized, basally, on inside near apodeme, a smaller folded area; phallus less than half of the length of valva, without cornuti.

Genitalia ♀: Unknown.

Diagnosis: Superficially is distinguishable from the other Palaearctic members of the genus by lacking the tufts of raised scales of forewing, in the genitalia structure the shape of gnathos arms is similar to *H. luridella*, but this taxon with uncus with lateral pointed tips, while *H. tadjikistana* with rounded tips.

Biology: Unknown.

Distribution: Tadjikistan.

Etymology: The species is named after the country of the collecting location: Tadjikistan.

***Nemapogon paracyprica* Gaedike, sp. n.** (figs 5, 17-18)

Material examined: Holotype ♂, TURKEY, Prov. Icel. Taurus, Road Ermenek - Mut, 600 m, 15-VII-1986, leg. M. Fibiger; Zool. Museum DK Copenhagen; Genitalia slide 4296 RG (ZMUC); Paratypes: 1 ♂, TURKEY, Prov. Konya, 5 km SO Ocpinar, Road Bozkor - Hadim. Taurus, 1100 m, 13-VII-1986, leg. M. Fibiger; Zool. Museum DK Copenhagen; Genitalia slide 4265 RG (SDEI); 1 ♂, GREECE, Lakonia, Palaeopanagia, 12 km S Sparti, 350 m, 23-VII-1998, [leg.] B. Skule & D. Nilsson; Zool. Mus. Kobenhavn; Genitalia slide 5551 RG (ZMUC).

Description: Wingspan 10-11mm; head brush white, labial palpus on outside grey-brown, on inside white; antenna grey-brown, scape darker than flagellum; thorax and tegulae cream-coloured, basally grey-brown; forewing whitish, with a grey-brown pattern, characteristic for the genus: costa at basal fourth and from 3/4 to apex with some short stripes, stripe along termen, an oblique band-shaped patch at 1/2 and before apex; the entire wing partly overlaid with darker scales; hindwing light grey. A more exact description of the pattern is impossible because of the bad condition of the specimens.

Genitalia ♂ (figs 17-18): Uncus truncated, edges rounded, in the middle a slit; gnathos arms bent at 1/2, angle rounded, basal half broad, apical half narrowing to the pointed tip, saccus as long as uncus-tegumen; valva with long apodeme and long digitus, more or less oval-shaped, terminated in pointed tip; phallus clearly longer than uncus-tegumen-saccus complex, articulated at 1/3, at 2/3 laterally with a thin lateral process.

Genitalia ♀: Unknown.

Diagnosis: Superficially is not definitely distinguishable from other members of the genus. The new species is similar to *N. cyprica* Gaedike, 1986 in the genitalia structure but: uncus truncated, in the middle with slit, gnathos arms basally broad, angle rounded (see fig. 18: two left rows), phallus articulated at 1/3, while uncus in *cyprica* in the middle notched, gnathos arms with pointed angle (see fig. 18: right two rows), phallus articulated at 1/2.

Biology: Unknown.

Distribution: Turkey and Greece.

Etymology: The species name indicates its similarity to *N. cyprica*.

Nemapogon clematella (Fabricius, 1781)
Tinea clematella Fabricius, 1781. *Species Ins.*, **2**: 297

Material examined: 1 ♂, MONTENEGRO, Durmitor NP 6 km S Zabljak, 1600 m, 19-24-VII-2014, leg. C. Hviid & O. Karsholt (ZMUC). **First record from Montenegro.**

***Neurothaumasia hackeri* Gaedike, sp. n.** (Figs 6, 19)

Material examined: Holotype ♂, INDIA, Rajasthan, 2 km n Ajmer, 26º28'N, 74º38'E, 400 m, 28-XI-1992, leg. Hacker & Peks (coll. Derra); Paratypes: 2 ♂♂, with same dates, Genitalia slides 7144 RG; 9957 RG (coll. Derra; SDEI).

Description: Wingspan 13 mm; head brush cream-coloured, labial palpus with same colouration, on outside with some darker scales, second segment with long scales, third segment short, pointed, directed upwards, antenna also cream-coloured, scape somewhat darker; thorax and tegulae light brown, overlaid with darker scales; forewing relatively broad, with a pattern of dark brown scales on the light brown ground-colour: dark brown are the basal fifth, a narrow band from dorsum oblique to costa at 1/2, costa from base to the band and some short stripes from band to apex, and a larger patch at the apical end of cell; hindwing light grey. The pattern of the holotype is not clearly visible, the entire specimen is somewhat lighter coloured.

Genitalia ♂ (fig. 19): Uncus with two socii, from broad base narrowing to more or less rounded tip, lateral edge more strongly sclerotized, vaulted between socii, covered with minute thorns; tegumen broad, saccus nearly as long as socius, narrow; valva as long as uncus-tegumen, more or less parallel-sided, basally somewhat broader than apically, costal edge slightly concave from base to rounded apex, ventral edge slightly convex; phallus shorter than valva, straight, without cornuti, basally broader.

Genitalia ♀: Unknown.

Diagnosis: Superficially is distinguishable from the other known members of the genus by the upwards-directed third segment of labial palpus, and the relatively broad wings. In the genitalia structure are some similarities to *N. tenuipennella* Gaedike, 2011 and *Cephimallota tunesiella* (Zagulajev, 1966) (the lack of gnathos), but the socii are longer and narrower, the shape of valva is more or less triangular and the phallus is longer than the valva in *tenuipennella*, the saccus and apodeme are longer, the phallus without broader base in *tunesiella*, but both these species have narrower wings.

Biology: Unknown.

Distribution: India: Rajasthan.

Etymology: The species is named after one of the collectors: Hermann Hacker.

Neurothaumasia kaschmirella **Gaedike, sp. n.** (Figs 7, 20-21)

Material examined: Holotype ♂, INDIA: Kaschmir, 15 km W Kangan, Wangan, 16-17-VII-[19]83, leg. M. & E. Arenberger, Genitalia slide 3863 RG (SDEI); Paratypes: 2 ♂♂ with same dates, Genitalia slides 3861, 3862 RG (SDEI).

Description: Wingspan 8-9 mm; head brush light cream-coloured, labial palpus straight, on inside cream-coloured, on outside with some darker scales, second segment bristled, third segment short, with pointed tip, scape of antenna nearly white, flagellum ringed; thorax and tegulae light cream-coloured, basally partly overlaid with some darker scales; forewing with brown pattern on cream-coloured ground-colour: one oblique patch near base, a band at 1/3 on costa oblique to 1/2 on dorsum, interrupted in the middle, one patch at 2/3 on costa and one patch on apex; the entire wing overlaid with scattered brown scales, hindwing white.

Genitalia ♂ (fig. 20): Uncus with two socii, tegumen and vinculum band-shaped, saccus long and narrow; valva nearly as long as uncus-saccus complex, the thin apodeme basally with a large rounded process, the entire valva more or less parallel-sided, costal edge apically rounded, ventral edge with pointed tip; phallus as long as valva, from base narrowing to apex, in the vesica some various-sized thorn-shaped cornuti.

Genitalia ♀: (fig. 21): Segment VIII ventrally immersed around ostium, dorsally with two long thin processi; first part of ductus bursae more strongly sclerotized, before corpus bursae somewhat enlarged, signum represented as an area of minute sclerotized thorns.

Diagnosis: Superficially is distinguishable by the cream-coloured wings with the brown pattern. The shape of valva in male and the long thin processi at dorsal part of segment VIII in females are unique in the genus.

Biology: Unknown.

Distribution: India: Kashmir.

Etymology: The species is named after the location of the type locality: Kaschmir.

Myrmecozela mongolica Petersen, 1965 (Fig. 8)
Myrmecozela mongolica Petersen, 1965. *Reichenbachia,* **7**(12): 107-111, figs 5-5A, 6-6A

The examination of a larger series of fresh specimens from Russia, Tuva republic (GAEDIKE,

2006) make it possible to describe the pattern of the forewing in more detail: Forewing along dorsum up to apex with about 12-14 small brown dots, additional dots at the end of cell and under the cell at 1/2. Superficially similar to *M. lutosella* (Eversmann, 1844), but the tip of phallus in male genitalia (a strongly sclerotized tooth) and the valva, narrowing at 1/2 are characteristic, while *lutosella* with phallus with thin pointed tip, and valva continuously narrowing from base to apex (see figs 5, 5A, 6, 6A in Petersen, 1965).

Ateliotum syriaca (Caradja, 1920)
Dysmasia syriaca Caradja 1920. *Dt. ent. Z. Iris,* **34**(1/2): 172

Material examined: 1 ♂, Oman, Jabal Akhdar, 1850 m, 28-29-X-1997, leg. Gallagher & Naumann (ZMUC). **First record from Oman.**

***Dinica nepalica* Gaedike, sp. n.** (Figs 9, 22)

Material examined: Holotype ♂, Nepal: Kathmandu-Chauni, 1400 m, 22-V-1967, leg. Dierl-Forster-Schacht; Genitalia slide 4434 RG (ZSM).

Description: Wingspan 11 mm; head brush white with a yellowish shade, labial palpus dark brown, second segment with some bristles; scape of antenna white, flagellum grey; thorax and tegulae white with a yellowish shade, tegulae basally dark brown, forewing bicoloured: basal fourth under the nearly black costa white, the area from 1/4 to 1/2 with a nearly black band from dorsum to costa, the basal half white, except one smaller nearly black patch at 3/4 on dorsum; fringe overlaid with dark brown scales, the edge around apex and termen with yellowish scales; hindwing light grey.

Genitalia ♂ (fig. 22): Uncus with two short socii with pointed tip, tegumen and vinculum broad, saccus narrow, basally rounded; valva small, divided into two arms: the dorsal arm straight, narrow, apically truncated, ventral arm broader, curved slightly upwards in a sickle-shape, longer than dorsal arm, apodeme as broad as dorsal arm; phallus longer than uncus-tegumen-saccus complex, slightly curved.

Genitalia ♀: Unknown.

Diagnosis: Superficially is similar to *D. dierli* Petersen, 1983, but the nearly black band on forewing from 1/4 to 1/2, the white coloured head brush, thorax, and apical part of forewing with yellowish shade, while *dierli* with the band from 1/2 to 3/4, and without yellowish shade. The other members of the genus without dark band from costa to dorsum. The shape of valva makes the species distinguishable from all other members, while valva in these taxa not divided into two arms.

Biology: Unknown.

Distribution: Nepal.

Etymology: The species is named after the country in which the type locality is located: Nepal.

Ceratuncus affinitella (Rebel, 1901)
Myrmecozela affinitella Rebel 1901. *Dt. ent. Z. Iris,* **13**: 184

Material examined: 1 ♂, Israel, E bank of Kenneret, Lake Mevo Hama, 18-IV-2018, leg. O. Bidzilya & V. Kravchenko (coll. Bidzilya). **First record from Israel.**

Anomalotinea cubiculella (Staudinger, 1859)
Tinea cubiculella Staudinger 1859. *Stettin. ent. Ztg.,* **20**(7/9): 235

Material examined: 1 ♂, Italy: Sicily, Prov. Palermo, Cefalu, 26-31-III-2018, leg. U. Hiermann (coll. Mayr). **First record from Italy: Sicily.** 1 ♀, Morocco, Ht. Atlas, Gorges du Dadès, 7-IV-1980, leg. W. Thomas (MNVD). **First record from Morocco.**

***Elatobia rufarea* Gaedike, sp. n.** (Figs 10, 23)

Material examined: Holotype ♀ Russia: Primorskij kraj, 20 km V Ussurijska [20 km E of

Ussurijsk], Gornotajezhnoje, svet [lux], [leg. Sinjov], 4-VII-[1]985; Genitalia slide 4761 RG (ZIN); Paratypes: 2 ♀♀, same dates, but 2-VII-[1]985 and 4-VII-[1]985, Genitalia slide 4758 RG (ZIN; SDEI); 1 ♀, Primorskij kraj, Chasanskij r-n, zap. [western] Kedrovaja pad', [leg.] Sinjov, 22-VII-[1]988; Genitalia slide 9983 RG (ZIN); 1 ♀, Russia, Far East, Volshanez ozero [lake Volshanez], 10-VII-2012, LF [lux], leg. W. Mey; Genitalia slide 8132 RG (ZMHB).

Description: Wingspan 14 mm; head brush fuscous, labial palpus on inside light cream-coloured, on outside somewhat darker, second segment bristled, antenna somewhat lighter fuscous than head brush, scape with pecten, thorax, tegulae and forewing also fuscous, wing without any pattern, hindwing lighter fuscous.

Genitalia ♂: Unknown.

Genitalia ♀ (fig. 23): Apical edge of ventral part of segment VIII in the middle V-shaped, dorsal part laterally each with narrow process, apically forked; the entire segment VIII more strongly sclerotized; corpus bursae without signum.

Diagnosis: Superficially is distinguishable from the other members of the genus by having unicoloured scales without lighter tip. Characteristic for the new species is the shape of segment VIII with the two lateral narrow processes and the absence of signum.

Biology: Unknown.

Distribution: Russia: Primorskij.

Etymology: The name of the species is a compilation from the name "RUssian FAR EAst.

Tinea murariella Staudinger, 1859

Tinea murariella Staudinger, 1859. *Stettin. ent. Ztg.,* **20**(7/9): 235

Material examined: 1 ♀, ITALY: Sicily, Prov. Palermo, Cefalu, 10-15-IV-2017, leg. U. Hiermann (coll. Mayr). **First record from Italy: Sicily.**

***Tinea caucasicola* Gaedike, sp. n.** (Figs 11, 24)

Material examined: Holotype ♂ RUSSIA: C. Caucasus, Kabardino-Balkarskij zap. [nature reserve], 35 km SE mt. Elbrus, 43ºN, 43ºE, stony slopes, 2400 m, 24-VII-1990, J. Jalava leg.; Genitalia slide 5088 RG (FMNH).

Description: Wingspan 18 mm; head brush clay-brown, labial palpus cream-coloured, on outside somewhat darker than on inside, second segment bristled, antenna greyish, thorax and tegulae very light yellowish coloured, shining; forewing clay-brown, costa on basal third and a small dot at apex darker brown, the most veins, especially from cell to apex and termen, covered with yellow-brown scales; hindwing shiny light grey.

Genitalia ♂ (fig. 24): Uncus from base narrower to apex, gnathos arms basally broad, bent at 1/3, than narrower to pointed tip; saccus as long as uncus-tegumen; valva a little longer than tegumen, the basal two thirds more or less parallelised, ventral edge of the proximal third oblique upwards to rounded apex; phallus as long as uncus-tegumen-saccus complex, straight, vesica with numerous minutes more strongly sclerotized thorns.

Genitalia ♀: Unknown.

Diagnosis: Superficially is similar to *T. semifulvella* Haworth, 1828, *T. semifulvelloides* Petersen, 1973 and *T. altaica* Gaedike & Šumpich, 2017 but the new species is clearly distinguishable by the wing without larger dark patches and the veins covered with yellow-brown scales. The shape of valva is clearly distinguishable from *semivulvelloides* and *altaica*, and although it is similar to *semifulvella*, the shape of the thorns in the vesica is quite different.

Biology: Unknown.

Distribution: Known only from the collection locality of the holotype.

Etymology: The species is named after the location of the type locality Russia: Caucasus Mts, Kabardino-Balkaria.

Niditinea baryspilas (Meyrick, 1937)
Tinea baryspilas Meyrick, 1937. *Exotic Microlepidopt*., **5**(4): 112

Material examined: 2 ♂♂, ARMENIA, prov. Ararat, Vedi, Goravan sands-Reserve, 25-27-V-2019, leg. O. Karsholt & N. Savenkov (ZMUC). **First record from Armenia.**

Proterospastis meyi **Gaedike, sp. n.** (Figs 12, 25)

Material examined: Holotype ♂ RUSSIA: Far East, Volshanez ozero [Lake Volshanez], 10-VII-2012 LF [lux], leg. W. Mey: Genitalia slide 8131RG (ZMHB).

Description: Wingspan 7 mm; head brush light clay-brown, labial palpus cream-coloured, apical segment on outside darker; antenna more than 3/4 of the length of forewing; thorax and tegulae cream-coloured, basally brown-grey, forewing - somewhat rubbed - light brown-grey, without pattern.

Genitalia ♂ (fig. 25): Uncus apically with small incision, gnathos arms basally broad, angled at 1/3, narrowing to pointed tip; saccus more or less triangular; valva nearly as long as uncus-tegumen, oval-shaped, apodeme short; phallus a little longer than uncus-tegumen, slightly curved, vesica with minute sclerotization's.

Genitalia ♀: Unknown.

Diagnosis: Superficially is clearly distinguishable from the other members of the genus by having no pattern on forewings; the shape of valva is somewhat similar to *P. orientalis* (Petersen, 1959), but phallus without minute cornuti and the row-shaped sclerotization.

Biology: Unknown.

Distribution: Russia: Primorskij kraj.

Etymology: The species is named after the collector, my colleague Wolfram Mey.

Crypsithyris arenbergerarum Gaedike, 2012
Crypsithyris arenbergerarum Gaedike, 2012. *Beitr. Ent*., **62**(1): 181, figs 102-105

Material examined: 1 ♂, AFGHANISTAN, SO-Afghanistan, Safed-Koh, S-Seite, Kotkal, 2350 m, 19-23-VI-1966, leg. H. G. Amsel (SMNK). **First record from Afghanistan.**

Monopis nigricantella (Millière, 1872)
Tinea nigricantella Millière, 1872). *Petites Nouv. Ent.,* **1**(1869-1875): 172

Material examined: 1 ♂, CROATIA, Istrien, Umg. Rovinj, Koukuletovica, 20-VIII-2000, leg. T. Mayr (coll. Mayr). **First record from Croatia.**

Monopis luteocostalis Gaedike, 2006
Monopis luteocostalis Gaedike, 2006. *Beitr. Ent.,* **56**(1): 224, figs 14-17

Material examined: 1 ♂, MONGOLIA, Chovd aimak, 10 km SSW von Somon Bulgan, 1200 m, 5-VII-1966 (Nr. 633), leg. Z. Kaszab (SDEI); 1 ♂, Central aimak, SO von Somon Bajanzogt, 1600 m, 27-VII-1966 (Nr. 751), leg. Z. Kaszab (SDEI); 1 ♂, Chovsgöl aimak, 8 km N von Somon Alagerdene, am Fluss Egija, 1600 m, 17-VII-1968 (Nr. 1121), leg. Z. Kaszab (SDEI). **First records from Mongolia.**

This result corrects the previous determination of specimens from Mongolia as *M. imella* (Hübner, [1813]), published by PETERSEN (1965, 1973): all records, mentioned in these two papers, belong to *luteocostalis*.

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BIBLIOGRAPHY

CARADJA, A., 1920.– Beitrag zur Kenntnis der geographischen Verbreitung der Mikrolepidopteren des paläarktischen Faunengebietes nebst Beschreibung neuer Formen. (Fortsetzung und Schluß). III. Teil.– *Deutsche Entomologische Zeitschrift Iris,* **34**(1/2):75-179.

FABRICIUS, J. C., 1781.– *Species Insectorum exhibentes eorum differentias specificas, synonyma auctorum, loca natalia, metamorphosin adiectis observationibus, descriptionibus,* **2**: 1-494 + 495-514 (Appendix) + 515-517 (Index). Hamburgi et Kilonii, Bohn.

GAEDIKE, R., 1986.– Beitrag zur Kenntnis der ostmediterranen Nemapogoninae (Lepidoptera, Tineidae).– *Reichenbachia, Staatliches Museum für Tierkunde Dresden,* **24**(2): 23-39, 101 figs.

GAEDIKE, R., 2006.– Some new or poorly known tineids from Central Asia, the Russian Far East and China (Lepidoptera: Tineidae).– *Beiträge zur Entomologie,* **56**(1): 213-229, 18 figs.

GAEDIKE, R., 2012.– Beitrag zur Kenntnis der Tineiden von Nepal und benachbarter Gebiete (Lepidoptera: Tineidae).– *Beiträge zur Entomologie,* **62**(1): 165-206, 109 figs.

GAEDIKE, R. & ŠUMPICH, J., 2017.– *Tinea altaica* sp. nov. and new records of some small moths from the Russian Altai (Lepidoptera: Meessiidae, Tineidae, Douglasiidae, Epermeniidae, Glyphipterigidae: Acrolepiinae).– *Acta Entomologica Musei Nationalis Pragae*, **57**(1): 259-273.

MARIANI, M., 1937.– Nuove Species e forme die Lepidotteri di Sicilia ed un nuovo parassita degli agrumi.– *Giornale di scienze naturali ed economiche,* **39**: 1-15.

MEYRICK, E., 1937.– *Exotic Microlepidoptera,* **5**(4): 97-128.

MILLIERE, P., 1872.– [Lépidoptères nouveaux.].– *Petites nouvelles entomologiques,* **1**(1869-1875): 172.

PETERSEN, G., 1965.– 56. Tineidae. Ergebnisse der zoologischen Forschungen von Dr. Z. Kaszab in der Mongolei (Lepidoptera) (Mit einer Revision der paläarktischen *Myrmecozela*-Arten).– *Reichenbachia, Staatliches Museum für Tierkunde in Dresden,* **7**(12): 107-111, 8 figs.

PETERSEN, G., 1983.– Revision der Gattung *Dinica* Gozmány (Lepidoptera, Tineidae).– *Entomologische Abhandlungen Staatliches Museum für Tierkunde in Dresden,* **47**(3): 35-41, 16 figs.

REBEL, H., 1901.– Neue paläarktische Tineen.– *Deutsche Entomologische Zeitschrift Iris,* **13**(1900): 161-188.

STAUDINGER, O., 1859.– Diagnosen nebst kurzen Beschreibungen neuer andalusischer Lepidopteren.– *Sttetiner Entomologische Zeitung,* **20**(7/9): 211-259.

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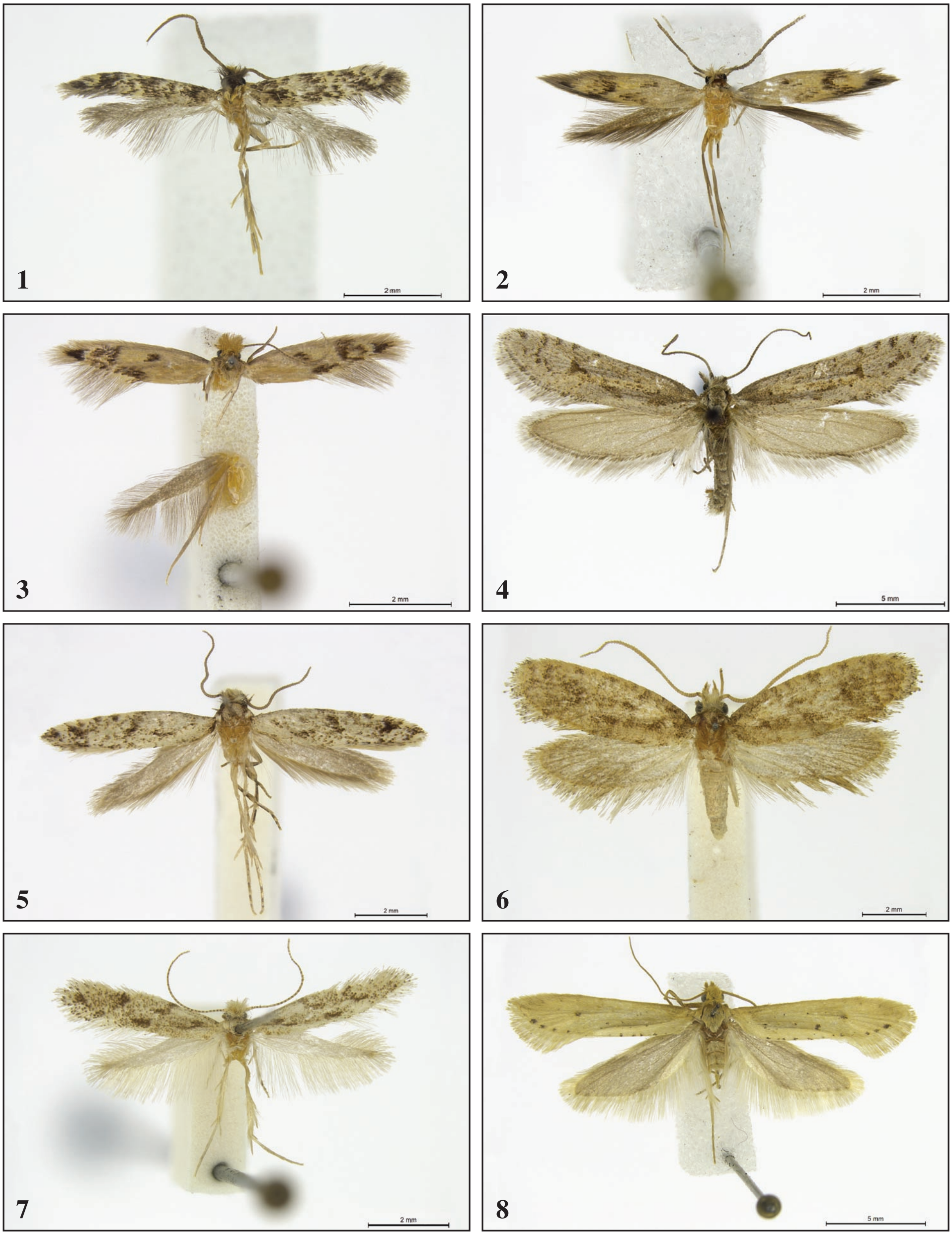

Figs 1-8.– 1. *Eudarcia topoliacola* Gaedike, sp. n., holotype. **2.** *Novotinea cretica* Gaedike, sp. n., holotype. **3.** *Novotinea cretica* Gaedike, sp. n., paratype. **4.** *Hapsifera tadjikistana* Gaedike, sp. n., holotype. **5.** *Nemapogon paracyprica* Gaedike, sp. n., holotype. **6.** *Neurothaumasia hackeri* Gaedike, sp. n., holotype. **7.** *Neurothaumasia kaschmirella* Gaedike, sp. n., paratype. **8.** *Myrmecozela mongolica* Petersen, 1965.


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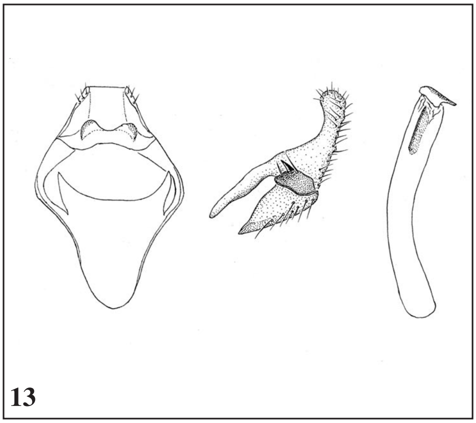
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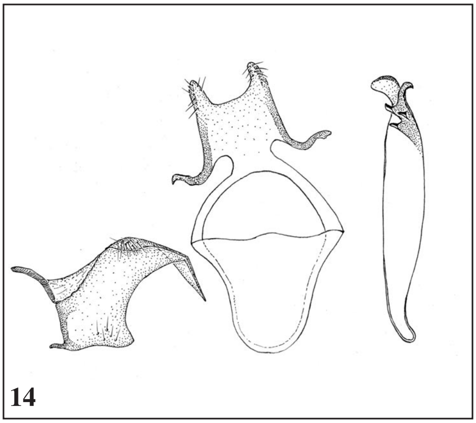
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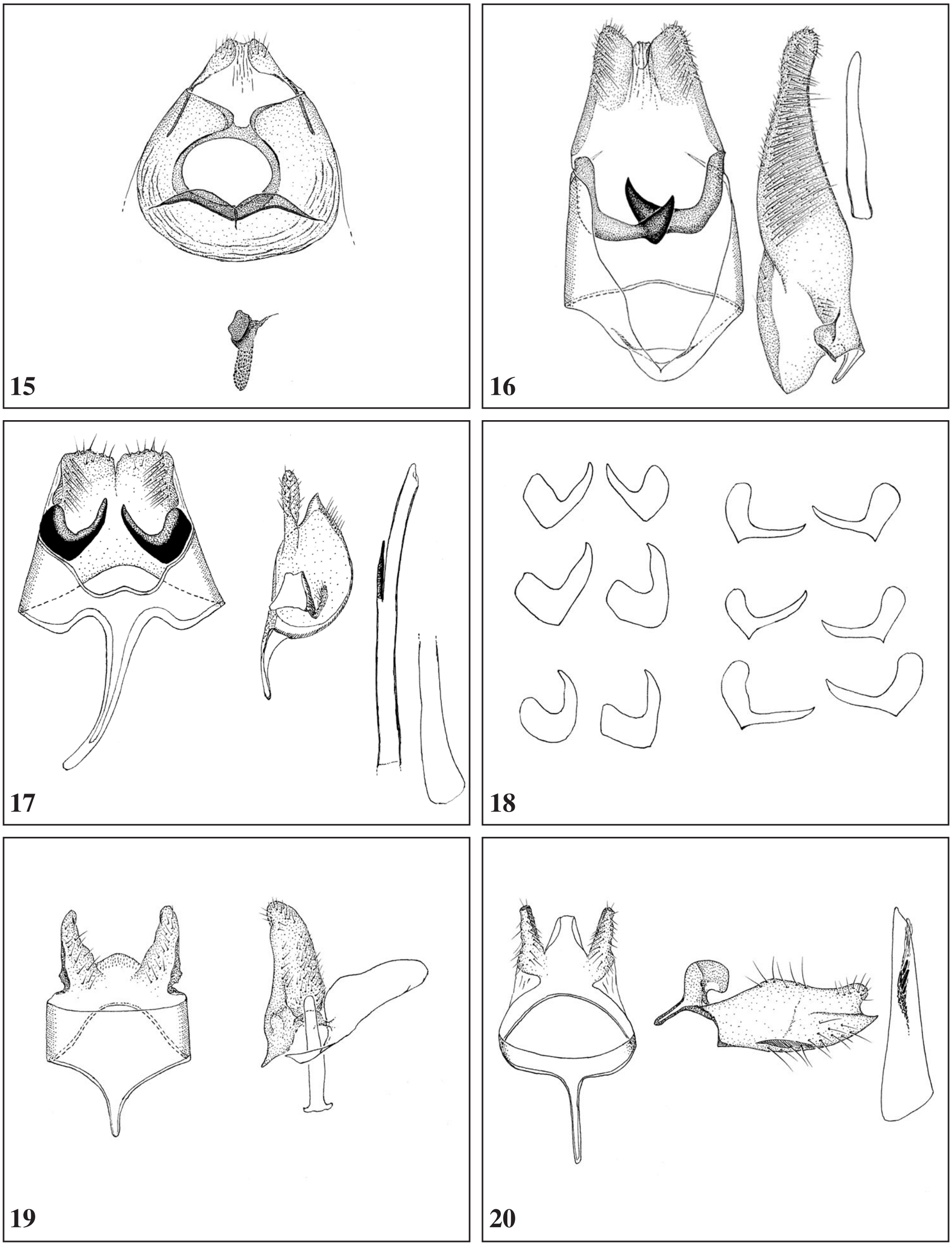
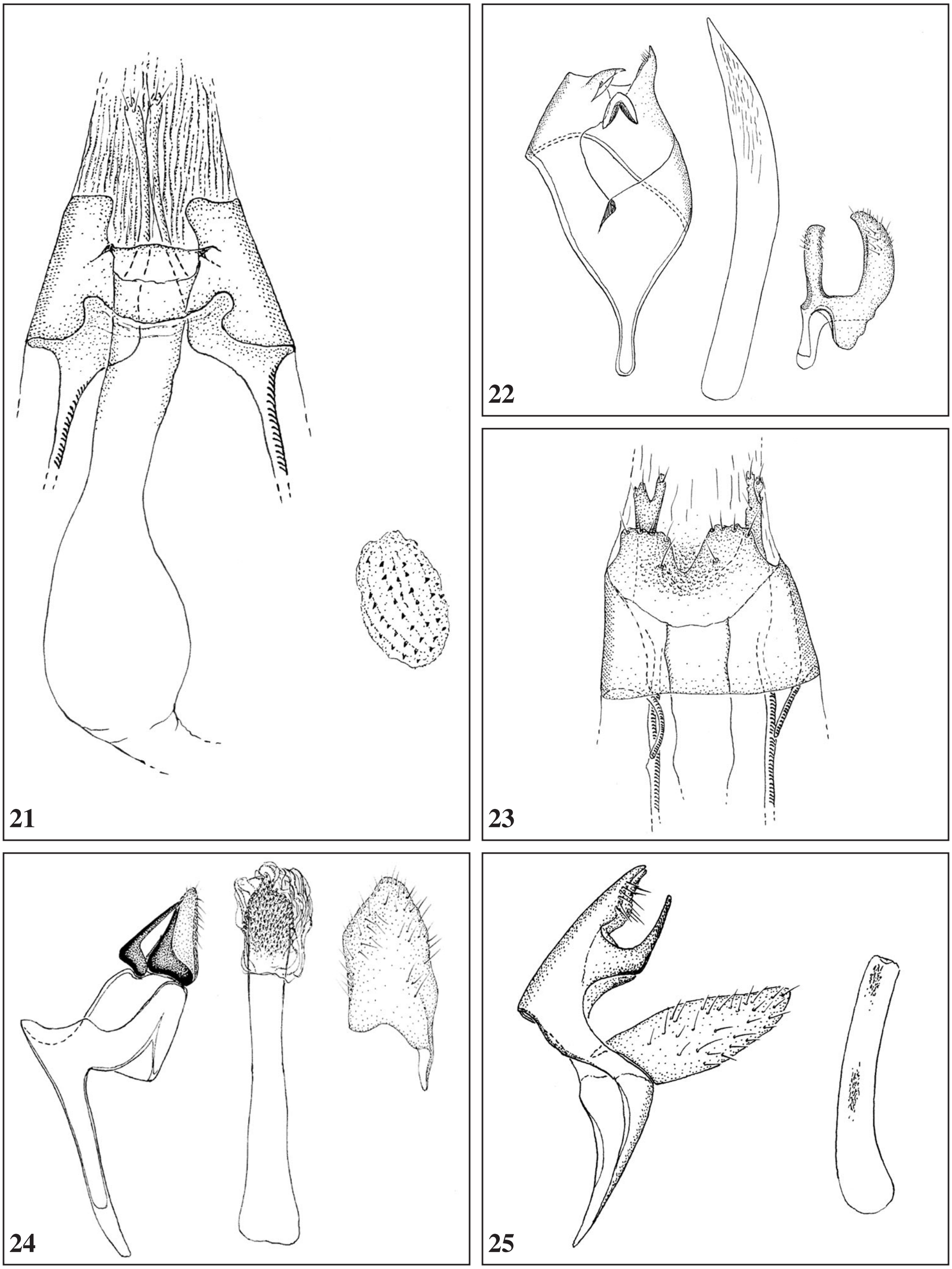
Figs 9-14.– 9. *Dinica nepalica* Gaedike, sp. n., holotype. **10.** *Elatobia rufarea* Gaedike, sp. n., holotype. **11.** *Proterospastis meyi* Gaedike, sp. n., holotype. **12.** *Tinea caucasicola* Gaedike, sp. n., holotype. **13.** *Eudarcia topoliacola* Gaedike, sp. n., male genitalia. **14.** *Novotinea cretica* Gaedike, sp. n., male genitalia.



Figs 15-20.– 15. *Novotinea cretica* Gaedike, sp. n., female genitalia. **16.** *Hapsifera tadjikistana* Gaedike, sp. n., male genitalia. **17.** *Nemapogon paracyprica* Gaedike, sp. n., male genitalia. **18.** Gnathos arms left rows *N. paracyprica*, right rows *N. cyprica* Gaedike, 1986. **19.** *Neurothaumasia hackeri* Gaedike, sp. n., male genitalia. **20.** *Neurothaumasia kaschmirella* Gaedike, sp. n., male genitalia.



Figs 21-25.– 21. *Neurothaumasia kaschmirella* Gaedike, sp. n., female genitalia. **22.** *Dinica nepalica* Gaedike, sp. n., male genitalia. **23.** *Elatobia rufarea* Gaedike, sp. n., female genitalia. **24.** *Tinea caucasicola* Gaedike, sp. n., male genitalia. **25.** *Proterospastis meyi* Gaedike, sp. n., male genitalia.

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New data on Pterophoridae of Oman. Part 2 (Lepidoptera: Pterophoridae)

P. Ya. Ustjuzhanin, V. N. Kovtunovich, A. N. Streltzov
& A. K. Ustjuzhanina

Abstract

Three Pterophoridae species are reported as new for the fauna of Oman. To the 17 previously known species from Oman (USTJUZHANIN *et al.,* 2019) we have added three more: *Agdistis hakimah* Arenberger, 1985, *Exelastis montischristi* (Walsingham, 1897) and *Exelastis pumilio* (Zeller, 1873). We provide photos of the adult and male genitals of the rare and little studied species *A. hakimah* and give data on the distribution of all the listed species.
KEY WORDS: Lepidoptera, Pterophoridae, biodiversity, new date, Oman.

Nuevos datos sobre Pterophoridae de Omán. Parte 2
(Lepidoptera: Pterophoridae)

Resumen

Se registran tres especies de Pterophoridae como nuevas para la fauna de Omán. De las 17 especies previamente conocidas de Omán (USTJUZHANIN *et al.,* 2019) añadimos tres más: *Agdistis hakimah* Arenberger, 1985, *Exelastis montischristi* (Walsingham, 1897) y *Exelastis pumilio* (Zeller, 1873). Proporcionamos fotos del adulto y genitalia del macho de la rara y poco estudiado especie *A. hakimah* y damos datos sobre la distribución de todas las especies listadas.
PALABRAS CLAVE: Lepidoptera, Pterophoridae, biodiversidad, nuevos datos, Omán.

Introduction

Examining the specimens collected in spring and autumn of 2019 in southern Oman by O. Pak and E. Ivanova, we found eight Pterophoridae species, three of them proved to be new for the fauna of the country. Consequently, the Pterophoridae fauna of Oman currently includes 20 species. The studied specimens are deposited in the collection of the Zoological Institute St. Petersburg, Russia (ZISP) and in the Collection of P. Ustjuzhanin and V. Kovtunovich (Novosibirsk and Moscow, Russia, CUK).

List of species (the species new to the fauna of Oman are marked with *)

**Agdistis hakimah* Arenberger, 1985 (Figs 1-3)
Agdistis hakimah Arenberger, 1985. *Fauna Saudi Arabia*, **7**: 166, figs 5, 12-13
Type locality: Hakimah near Abu Arish, SAUDI ARABIA

Material examined: S. OMAN, Dhofar Govern., 28 km W Salalah, 200 m, 16º59’N 53º49’E, 1 ♂, 28-VIII-2019, E. Ivanova leg.

Distribution: Saudi Arabia, Yemen, Bahrain (GIELIS, 2003). **New species for Oman**.

Agdistis omani Arenberger, 2008
Agdistis omani Arenberger, 2008. *Z. ArbGem. öst. Ent.,* **60**(2): 82, figs 1-3
Type locality: W of Salalah, OMAN

Material examined: S. OMAN, Dhofar Govern., Shalim Wa Juzor Al Hallaniyyat env., near Ashgul vil., env., 18º07’N, 55º42’E, 253 m, 1 ♂, 14-IV-2019, O. Pak leg.

Distribution: Oman.

Deuterocopus socotranus Rebel, 1907
Deuterocopus socotranus Rebel, 1907. *Lep. Sokotr*.: 85, fig. 37
Type locality: W Socotra [YEMEN]

Material examined: S. OMAN, Dhofar Govern., near Rakhyut vil., 16º45’N, 53º24’E, 30 m, 2 ex., 27-VIII-2019, O. Pak leg.; Dhofar Govern., 28 km W Salalah, 16º59’N, 53º49’E, 200 m, 1 ♂, 28-VIII-2019, O. Pak & E. Ivanova leg.

Distribution: Middle East (Yemen, Oman), SE Asia, Africa, Australia.

Megalorhipida leucodactylus (Fabricius, 1794)
Pterophorus leucodactylus Fabricius, 1794. *Ent. syst.*, **3**(2): 346
Type locality: Americae meridionalis [VIRGIN ISLANDS]
= *Pterophorus defectalis* Walker, 1864. *Cat. Lep. Het. B. M.*, **30**: 943
Type locality: SIERRA LEONE
= *Pterophorus congrualis* Walker, 1864. *Cat. Lep. Het. B. M.*, **30**: 943
Type locality: South Hindostan [INDIA]
= *Pterophorus oxydactylus* Walker, 1864. *Cat. Lep. Het. B. M.*, **30**: 943
Type locality: Ceylon [SRI LANKA]
= *Aciptilia hawaiiensis* Butler, 1881. *Ann. Mag. nat. Hist.*, (5)7: 408
Type locality: Uoluolu, Maui, Hawaii Islands [USA]
= *Trichoptilus ochrodactylus* Fish, 1881. *Can. Ent.*, **13**: 142
Type locality: Texas, USA
= *Trichoptilus centetes* Meyrick, 1886. *Trans. Ent. Soc. London*, **1886**: 16
Type locality: Port Moresby, NEW GUINEA
= *Trichoptilus compsochares* Meyrick, 1886. *Trans. Ent. Soc. London*, **1886**: 16
Type locality: St. Vicent, CAPE VERDE ISLANDS
= *Trichoptilus adelphodes* Meyrick, 1887. *Trans. Ent. Soc. London*, **1887**(3): 266
Type locality: AUSTRALIA
= *Trichoptilus ralumensis* Pagenstecher, 1900. *Zoologica*, **29**: 239
Type locality: Kalum, BISMARCK ISLANDS
= *Trichoptilus derelictus* Meyrick, 1926. *Trans. Ent. Soc. London*, **74**: 276
Type locality: Galapagos Islands ECUADOR
= *Megalorhipida palaestinensis* Amsel, 1935. *Mitt. Zool. Mus. Berlin*, **20**: 293, pl. 10, fig. 27
Type locality: Palestina, Jerusalem [ISRAEL]

Material examined: S. OMAN, Dhofar Govern., near Rakhyut vil., 16º45’N, 53º24’E, 30 m, 1 ♂, 27-VIII-2019, O. Pak leg.; Dhofar Govern., 28 km W Salalah, 16º59’N, 53º49’E, 200 m, 1 ♀, 28-VIII-2019, O. Pak & E. Ivanova leg.

Distribution: Widespread throughout tropical and subtropical regions.

Exelastis ebalensis (Rebel, 1907)
Alucita ebalensis Rebel, 1907. *Lep. Sokotr*.: 84, pl. 1
Type locality: Ma'alle Ebene, Aden [YEMEN]
= *Exelastis caroli* Gielis, 2008. *Zoöl. Meded. Leiden*, **82**(6): 48, figs 6, 16
Type locality: 18 km S Malindi, Watamu, KENYA

Material examined: S. Oman, Dhofar Govern., 28 km W Salalah, 16º59'N, 53º49'E, 200 m, 1 ♀, 28-VIII-2019, O. Pak & E. Ivanova leg.

Distribution: Yemen, Oman, Kenya, Ghana.

*****Exelastis montischristi* (Walsingham, 1897)
Pterophorus montischristi Walsingham, 1897. *Proc. zool. Soc. London*, **1897**: 59
Type locality: Santo Domingo, Monte Christi, DOMINICAN REPUBLIC
= *Pterophorus cervinicolor* Barnes & McDunnough, 1913. *Cont. nat. Hist. Lep. N. Amer*., **2**(4): 185, pl. 4, fig. 10
Type locality: Florida, USA

Material examined: Oman, Dhofar W of Salalah, 17º01'N, 53º55'E, 120 m, 1 ♂, 2 ♀♀, 06-IX-2013, D. Agassiz leg.; Dhofar Govern., 6 km N Rakhyut vil., near Ashgul vil., env., 16º48'N, 53º26'E, 87 m, 1 ♀, 23-VIII-2019; Dhofar Govern., 6 km N Rakhyut vil., Ashgul vil., env., 16º47'N, 53º25'E, 830 m, 1 ♀, 26-VIII-2019; Dhofar Govern., 28 km W Salalah, 16º59'N, 53º49'E, 200 m, 1 ♀, 28-VIII-2019, O. Pak & E. Ivanova leg.

Distribution: Rep. S. Africa, Eswatini (= Swaziland), Tanzania, Dem. Rep. Congo, Malawi, Kenya, Namibia, Ethiopia, Zambia, Zimbabwe, Nigeria; USA, Virgin Islands, Martinique, Grenada, Jamaica, Puerto Rico, Brazil, Galapagos Islands, Bahamas, Barbados, Cayman Islands, Ecuador: Galapagos Islands, Haiti (DE PRINS & DE PRINS, 2020); Oman. **New species for Oman**.

**Exelastis pumilo* (Zeller, 1873)
Mimeseoptilus pumilio Zeller, 1873. *Verh. zool.-bot. Ges. Wien*, **23**: 324
Type locality: Dallas, Texas, USA
= *Marasmarcha liophanes* Meyrick, 1886: 19
Type locality: Saint-Denis, RÉUNION ISLAND [FRANCE]
= *Mimaesoptilus gilvidorsis* Hedemann, 1896 *nec* Zeller, 1877. *Stettin. ent. Ztg*., **57**: 8
Type locality: St. Croix, VIRGIN ISLANDS [USA]

Material examined: S. Oman, Dhofar Govern., near Rakhyut vil., 16º45'N, 53º24'E, 30 m, 2 ♀♀, 27-VIII-2019, O. Pak leg.

Distribution: Chad, The Gambia, Tanzania, Mali, Zimbabwe, Eswatini, Rep. S. Africa, Seychelles, Reunion Island, Madagascar, Nigeria, Kenya (DE PRINS & DE PRINS, 2020), Sierra Leone; Nepal, Cambodia, Myanmar, Philippines, New Guinea; USA, Argentina, Brazil, Ecuador, Bolivia, Colombia, Suriname, Costa Rica, Cuba, Puerto Rico, Guadeloupe, Mexico, Jamaica, Virgin Islands, Fatu-Hiva, Guam, Palau (USTJUZHANIN *et al*., 2019). **New species for Oman**.

Cosmoclostis lanceata (Arenberger, 1986)
Pselnophorus lanceatus Arenberger, 1985. *Fauna Saudi Arabia*, **7** (1985): 169, figs 9, 16
Type locality: Faifan, near Gizan, SAUDI ARABIA
= *Cosmoclostis gorbunovi* Ustjuzhanin & Kovtunovich, 2011. *Amurian Zool. J*., **3**(4): 356, pl. 4, figs 4, 6, 8
Type locality: West Shewa, 2 km S of Ambo, ETHIOPIA

Material examined: S. Oman, Dhofar Govern., near Rakhyut vil., 16º45'N, 53º24'E, 30 m, 3 ex., 27-VIII-2019, O. Pak leg.; Dhofar Govern., 28 km W Salalah, 16º59'N, 53º49'E, 200 m, 6 ex., 28-VIII-2019, O. Pak & E. Ivanova leg.

Distribution: Saudi Arabia, Yemen, Oman, Ethiopia.

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BIBLIOGRAPHY

AMSEL, H. G., 1935.– Neue palästinensische Lepidopteren.– *Mitteilungen aus dem Zoologischen Museum in Berlin*, **20**(2): 271-319, pls 1-10.

ARENBERGER, E., 1986.– Contribution to the distribution of the Pterophoridae in Saudi-Arabia.– *Fauna of Saudi Arabia*, **7** (1985): 165-171.

ARENBERGER, E., 2008.– Pterophoridae aus dem Oman mit der Beschreibung einer neuen *Agdistis* (Lepidoptera).– *Zeitschrift der Arbeitsgemeinschaft österreichischer Entomologen*, **60**: 81-86.

BARNES, W. & MCDUNNOUGH, J. H., 1913.– Some apparently new Lepidoptera from southern Florida.– *Contributions to the Natural History of the Lepidoptera of North America*, **2**(4): 166-195, pls 1-4.

BUTLER, A. G., 1881.– Descriptions of new species of Lepidoptera in the collection of the British Museum.– *Annals and Magazine of Natural History*, (5) **7**: 31-37, pl. 4.

DE PRINS, J. & DE PRINS, W., 2020.– AfroMoths. Online database of Afrotropical moth species (Lepidoptera). Available from: http://www.afromoths.net.

FABRICIUS, J. C., 1794.– *Entomologia Systematica emendata et aucta. Secundum Classes, Ordines, Genera, Species, Adjectis synonymis, Locis, observationibus, descriptionibus*, **3**(2): 349 pp. Hafniae.

FISH, C., 1881.– Pterophoridae.– *Canadian Entomologist*, **13**: 70-74, 140-143.

GIELIS, C., 2003.– Pterophoroidea & Alucitoidea.– *World Catalogue of Insects,* **4**: 198 pp. Apollo Books, Stenstrup.

GIELIS, C., 2008.– Ten new species of Afrotropical Pterophoridae (Lepidoptera).– *Zoölogische Mededelingen, Leiden*, **82**(6): 43-57.

HEDEMANN, W., 1896.– Beitrag zur Kenntnis der Microlepidopteren-Fauna von Dänisch-Westindien, II.– *Stettiner Entomologische Zeitung*, **57**: 3-11.

MEYRICK, E., 1886.– On the classification of the Pterophoridae.– *Transactions of the entomological Society of London*, **1886**(1): 1-21.

MEYRICK, E., 1887.– Descriptions of some exotic Micro-Lepidoptera.– *Transactions of the entomological Society of London*, **1887**(3): 269-280.

MEYRICK, E., 1926.– On Micro-Lepidoptera from the Galapagos Islands and Rapa.– *Transactions of the entomological Society of London*, **74**(2): 269-278.

PAGENSTECHER, A., 1900.– Die Lepidopterenfauna des Bismarck-Archipels.– *Zoologica*, **12**(29): 1-268, pls 1-2.

REBEL, H., 1907.– Lepidopteren aus Südarabien und von der Insel Sokotra.– *Denkschriften Mathematischen-Naturwissenschaftlichen Klasse der Kaiserlichen Akademie der Wissenschaften,* **71**: 83-87, 117. (final date of publication of volume 71 in 1931).

USTJUZHANIN, P. Y., KOVTUNOVICH, V. N., GORBUNOV, O. G. & KEMAL, A., 2011.– On the fauna of the plume moths (Lepidoptera, Pterophoridae) of Ethiopia.– *Amurian Zoological Journal*, **3**(4): 354-357, pl. 4.

USTJUZHANIN, P., KOVTUNOVICH, V., SALDAITIS A. & USTJUZHANINA, A., 2019.– New data on plume moths (Lepidoptera: Pterophoridae) of Oman.– *Zoology in the Middle East*, **65**: 75-78. http://dx.doi.org/10.1080/09397140.2018.1540159.

USTJUZHANIN, P., KOVTUNOVICH, V. & STRELTZOV, A., 2019.– To the Pterophoridae fauna (Lepidoptera, Pterophoridae) of Myanmar (Burma).– *Ecologica Montenegrina*, **22**: 152-156.

WALKER, F., 1864.– *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum. Tineites*, **30**: i-iv, 837-1096.

WALSINGHAM, L., 1897.– Revision of the West-Indian Micro-Lepidoptera, with descriptions of new species.– *Proceedings of the Zoological Society of London*, 1897(1): 54-183.

ZELLER, P. C., 1873.– Beiträge zur Kenntnis der nordamericanischen Nachtfalter, besonders der Mikrolepidopteren. Zweite Abtheilung.– *Verhandlungen der kaiserlich-königlichen zoologisch-botanischen Gesellschaft in Wien*, **23**: 201-334.

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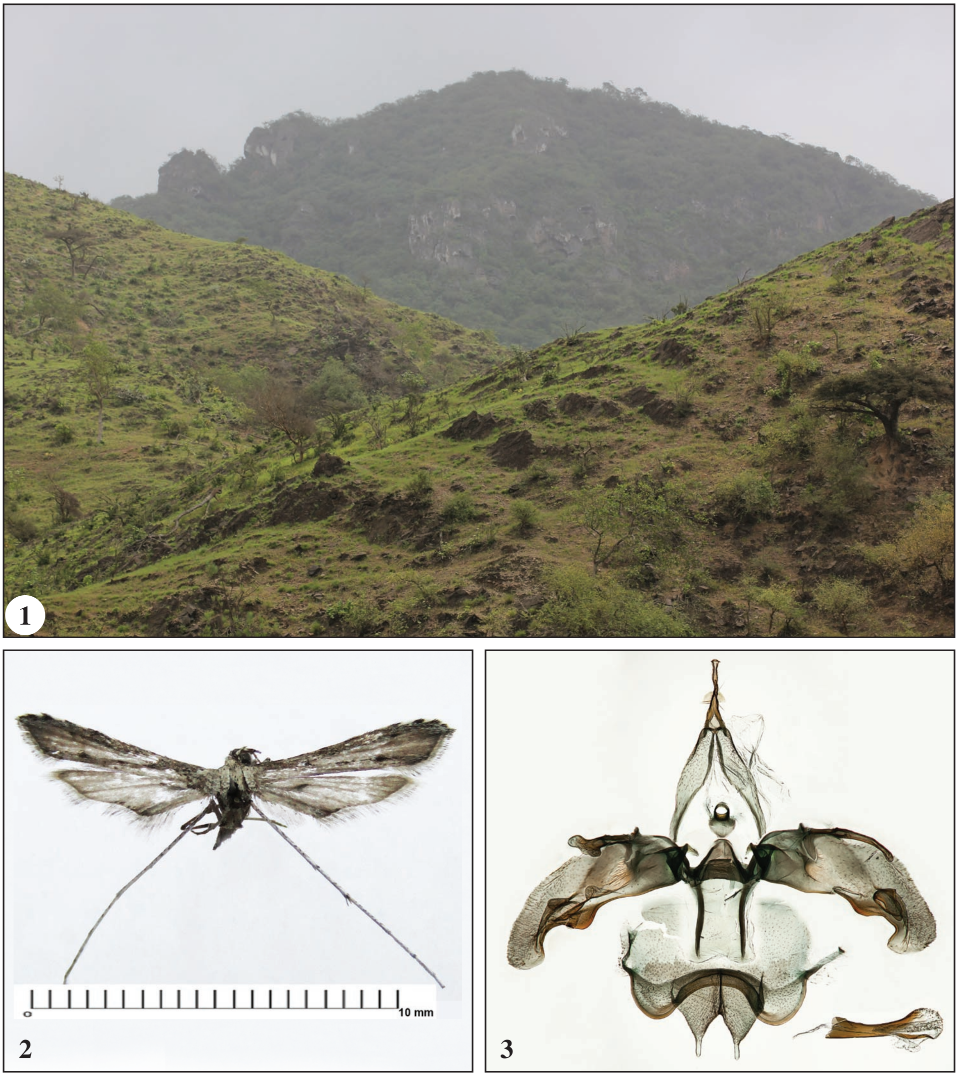

Figs 1-3.– 1. Biotope: S. Oman, Dhofar Govern., near Rakhyut vil. Photo O. Pak. **2-3.** *Agdistis hakimah* Arenberger, 1985. **2.** Adult male. **3.** Male genitalia.

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Metzneria neli Huemer, sp. n., a new species hitherto mixed with *M. tristella* Rebel, 1901 (Lepidoptera: Gelechiidae)

P. Huemer

Abstract

Metzneria neli Huemer, sp. n., a new species of the family Gelechiidae, is described from France and Spain and adults of both sexes and genitalia are figured. The new species differs both morphologically and in the DNA barcode from all other known representatives of the genus. It was formerly mixed with *Metzneria tristella* Rebel, 1901, and therefore this species is re-described here in detail.
KEY WORDS: Lepidoptera, Gelechiidae, *Metzneria*, new species, France, Spain.

Metzneria neli Huemer, sp. n., una nueva especie hasta ahora mezclada con *M. tristella* Rebel, 1901 (Lepidoptera: Gelechiidae)

Resumen

Metzneria neli Huemer, sp. n., una nueva especie de la familia Gelechiidae, se describe en Francia y España y se representan los adultos de ambos sexos y la genitalia. La nueva especie difiere tanto morfológicamente como en el código de barras del ADN de todas las demás representantes conocidas del género. Anteriormente se mezcló con *Metzneria tristella* Rebel, 1901, por lo que aquí esta especie se vuelve a describir en detalle.
PALABRAS CLAVE: Lepidoptera, Gelechiidae, *Metzneria*, nueva especie, Francia, España.

Introduction

Metzneria Zeller, 1839 is a diverse genus of mainly Palearctic Gelechiidae, covering 24 described species in Europe (HUEMER & KARSHOLT, 2020). Additional taxa attached to this genus and mainly originating from Africa require revisionary work but have been questioned as congeneric (ENGLERT, 1974), whereas two species from North America (HODGES, 1983) have been introduced from Europe. *Metzneria*, contrary to several other European Gelechiidae, with the review of ENGLERT (1974), gained early attention. This paper was one of the first generic revisions of Western Palearctic Gelechiidae following a modern attempt, which, beside examination of type material, also included detailed studies of male genitalia. It is therefore not surprising that only five additional species have been described from Europe since, three of them finally turned out as synonyms of already named taxa.

Metzneria tristella Rebel 1901, originally described from Cuenca (Spain), is one of the species firstly revised by ENGLERT (1974). The seemingly unmistakable male genitalia were illustrated, but adults were not figured, and female genitalia remained unknown. These shortcomings may be responsible for the subsequent misinterpretation of the species in a later study, with description of the biology, the female sex and a new record for France (NEL, 1994). Later genetic data of alleged

M. tristella were published based on these French records (HUEMER *et al*., 2020). However, a detailed morphological assessment of a potential new species from Spain led to the suspicion that in fact this taxon could be the true *M. tristella*. Examination of the lectotype of *M. tristella* fully supported this revised identification. Conversely, the species from France, previously identified as *M. tristella*, turned out to be undescribed. It differs from *M. tristella* and other congeners by phenotypic appearance, genitalia morphology and DNA barcodes and is here introduced as new species.

Material and methods

Specimens: Material used in this study was traditionally set and dried or, particularly more recently, pinned and subsequently spread. Earlier genitalia preparations followed standard techniques (ROBINSON, 1976) more recent slides were adapted for the male genitalia of Gelechiidae by the "unrolling technique" as described by PITKIN (1986).

DNA barcoding is based on 208 European specimens of *Metzneria* from 24 species, the majority originating from own samples, partially supplemented by public data from BOLD. DNA samples to obtain the 658 base-pair long barcode segment of the mitochondrial COI gene (cytochrome c oxidase I) (from dried legs) were prepared according to the prescribed standards and processed at the Canadian Centre for DNA Barcoding (CCDB, Biodiversity Institute of Ontario, University of Guelph) using the standard high-throughput protocol described in deWAARD *et al.* (2008). Further details including complete voucher data and images can be accessed in the public dataset "DS-METZNERI *Metzneria* - new species" dx.doi.org/10.5883/DS-METZNERI in the Barcode of Life Data Systems (BOLD systems v. 4.0. http://www.boldsystems.org (RATNASINGHAM & HEBERT, 2007). Intra- and interspecific distances of DNA barcode fragment were calculated using analytical tools of BOLD with the Kimura 2-parameter model of nucleotide substitution. A Neighbor-joining tree of the successfully sequenced 24 species was constructed using MEGA 6 (TAMURA *et al.*, 2013) under the Kimura 2-parameter model for nucleotide substitutions.

For each species, a Barcode Identification Number (BIN) is provided, which is automatically calculated for records in Bold Data Systems that are compliant with the DNA Barcode standard (RATNASINGHAM & HEBERT, 2013).

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

Abbreviations of collections:

NHMV = Naturhistorisches Museum, Vienna, Austria
RCTM = Research collection of Toni Mayr, Feldkirch, Austria
TLMF = Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria

Results

MOLECULAR ANALYSIS

DNA sequencing resulted in a full barcode fragment of 658 bp for 159 specimens and 49 sequences > 540 bp. Sequences of the COI barcode region of analysed nominal species reveal moderate intraspecific but significantly higher interspecific genetic distances. Mean distances within species are 0.90% with a maximum of 2.56%. However, species with an exceptional intraspecific divergence are to be re-assessed for potential cryptic diversity. Interspecific distances are much higher with 5.83% on average, ranging from minimum 1.12% to maximum 9.25% distance to the nearest neighbor (Table 1). All species, except for the morphologically well separated species pair *M. fulva* Labonne, Huemer, Thibault & Nel, 2019 and *M. torosulella* (Rebel, 1893) group in one or several unique BINs thus clearly supporting the specific status of *M. tristella* and the newly described *M. neli* (fig. 1).

Table 1.– Intraspecific mean K2P (Kimura 2 Parameter) divergences, maximum pairwise distances, nearest species, nearest neighbor and distance to nearest neighbor (in %).

Species	Mean Intra-sp	Max Intra-sp	Nearest Species	Distance to NN
Metzneria aestivella	0.7	1.98	*Metzneria castiliella*	7.86
Metzneria agraphella	N/A	0	*Metzneria lappella*	9.25
Metzneria aprilella	2.13	4.62	*Metzneria ehikeella*	5.72
Metzneria artificella	2.56	4.62	*Metzneria diffusella*	6.78
Metzneria campicolella	1.75	2.18	*Metzneria castiliella*	8.23
Metzneria castiliella	0.73	1.43	*Metzneria aprilella*	6.08
Metzneria diffusella	1.73	2.83	*Metzneria neuropterella*	5.46
Metzneria ehikeella	1.45	3.81	*Metzneria metzneriella*	4.39
Metzneria fulva	0.16	0.16	*Metzneria torosulella*	1.12
Metzneria hilarella	0.25	0.64	*Metzneria staehelinella*	5.91
Metzneria intestinella	0.93	0.93	*Metzneria tristella*	6.18
Metzneria lappella	0.31	0.96	*Metzneria ehikeella*	6.55
Metzneria littorella	0.25	0.62	*Metzneria riadella*	7.69
Metzneria metzneriella	1.79	4.37	*Metzneria ehikeella*	4.39
Metzneria neli	2.19	2.19	*Metzneria metzneriella*	5.06
Metzneria neuropterella	1.56	4.12	*Metzneria diffusella*	5.46
Metzneria paucipunctella	0.6	1.88	*Metzneria ehikeella*	5.6
Metzneria riadella	0.31	0.31	*Metzneria littorella*	7.69
Metzneria santolinella	1.29	2.03	*Metzneria ehikeella*	4.91
Metzneria staehelinella	N/A	0	*Metzneria ehikeella*	4.54
Metzneria subflavella	N/A	0	*Metzneria metzneriella*	5.87
Metzneria tenuiella	0	0	*Metzneria ehikeella*	8.41
Metzneria torosulella	0.74	0.74	*Metzneria fulva*	1.12
Metzneria tristella	0.16	0.16	*Metzneria metzneriella*	5.61

Taxonomic conclusions

Metzneria neli Huemer, sp. n.

Material examined: Holotype ♂, “NEL Jacques Mt-Coudon, VAR e.l. m. 15-05-1996 % *Centaurea intybaceus*” “BC TLMF Lep 06937” “P. Huemer GEL 1313 ♂” (TLMF). Paratypes: FRANCE, BdR, la Ciotat, rte des Crètes, 1 ♂, 15-V-1993, leg. J. Nel (gen. slide 0963 J.N.); ditto, but 1 ♂, 17-V-1993 (gen. slide 0948 J.N.); ditto, but 1 ♀, 8-VI-1993 (gen. slide 0972 J.N.); ditto, but 1 ♂, 1 ♀, 11-VI-1993; ditto, but 1 ♂, 13-VI-1993; ditto, but 2 ♂♂, 14-VI-1993; ditto, but 1 ♂, 15-VI-1993; ditto, but 1 ♀, 16-VI-1993; ditto, but 1 ♀, 18-VI-1993; ditto, but 1 ♀, 19-VI-1993; ditto, but 1 ♀, 20-VI-1993 (gen. slide 01132 J.N.); ditto, but 1 ♀, 23-VI-1993; ditto, but 1 ♀, 27-VI-1993; ditto, but 1 ♂, 21-VI-1995; Var, Mt-Faron, 1 ♂, 17-VI-1996 e.l. (*Centaurea intybaceus*), leg. J. Nel; BdR, la Ciotat, Brusquièras de Cassis, 1 ♀, 26-IV-2003, leg. J. Nel (gen. slide GEL 1317 ♀ P. Huemer) (TLMF).

Excluded from type series: SPAIN, Alicante, Agost, 1 ♀, 21-VI-2019, leg. F. Graf, DNA Barcode ID TLMF Lep 26268 (Research collection Friedmar Graf).

Description: Adult (figs 2-3). Head pale ochreous; antenna serrate in male, filiform in female, greyish brown, weakly annulated; labial palpus dark greyish brown, with pale ochreous mottling, particularly at upper surface of segment 2, segment 2 thickened with appressed scales, segment 3 about half length of segment 2, distinctly thickened from appressed dorsal scale brush; thorax and tegula pale ochreous with some dark mottling. Forewing length ♂ 6.6-7.2 mm (n=5), ♀ 7.2-7.6 mm (n=5). Forewing upper side greyish brown, light orange-yellow line along fold, short orange-yellow streaks and patches along veins, particularly at discal spot and along subcostal area and wing base, oblique transverse streak at end of cell extended to costa; stigmata black, first in distal part of fold, plical and discal spots widely separated; termen weakly concave, terminal line fuscous; fringes light greyish, with distinct dark grey fringe line and dark grey apices. Hindwing narrow, grey, fringes ochreous-grey without fringe line. Underside of forewings without lighter costal spot and distinctly divided fringes.

Male genitalia (fig. 8): Uncus with rounded lateral humps; tegumen much wider than long, anterior margin weakly emarginated; pedunculi small; valva basally narrow, distal part strongly dilated to about twice width, convex dorsal and nearly straight ventral margin, with tooth-like apex pointed ventrad; sacculus evenly thorn-shaped; saccus sub-triangular, short; phallus stout, about 3 times longer than wide, subapical area with band like structure covered with spinules, apex with finger-shaped narrow projection, vesica with two moderately long and one shorter cornuti.

Female genitalia (fig. 11): Papilla analis broadly sub-oval, weakly setose; apophysis anterioris about three times length of papilla analis, rod-like, with forked posterior end; segment VIII ventromedially and dorsomedially membranous without modifications, posterior edge with long and stiff setae; entrance of membranous ductus bursae with irregular shortly funnel-shaped colliculum; corpus bursae small, membranous without any modifications.

Diagnosis: *Metzneria neli* Huemer, sp. n. from genitalia morphology is most closely related to *M. tristella*. It differs from that species by several characters of adult phenotype, i.e. the scale brush of the third segment of labial palpus, the comparatively broad and serrated antenna of the male, and the overall the lighter ground colour of the forewing with lighter and more extended orange-yellowish markings, the concave terminal excavation and the presence of a distinct fringe line. Male and female genitalia are in fact much more similar to *M. tristella* but particularly differ in the male. *Metzneria neli* Huemer, sp. n. is characterized i.e. by the comparatively longer narrow base of the valva, the evenly thorn-shaped sacculus and the phallus with long apical projection. Particularly the shape of the sacculus is unique in the genus. The much stronger and longer setae on the posterior edge of segment VIII of *M. neli* sp. n. seem to be of diagnostic value in the overall very similar female genitalia but variation is insufficiently known.

Molecular data: BIN: BOLD:ABX1726. The intraspecific average distance of the barcode region is 1.45% (p-dist) (n=2). A unique specimen from Spain corresponding with *M. neli* sp. n. from external appearance is 2.25% distant (BIN: BOLD:AEB4629) and is considered as likely conspecific. The distance to the nearest neighbor *M. metzneriella* Stainton, 1851 is 5.06%.

Distribution: Currently only known from few localities in southern France and from the above mentioned single barcoded specimen from Spain but most likely more widely distributed on the Iberian Peninsula.

Bionomics: The larva lives in the flower and sead heads of *Cheirolophus intybacea* (Lam.) Dostál where it hibernates (NEL, 1994).

Remarks: A unique specimen from Spain is considered conspecific with *M. neli* from external appearance and the similarity of the DNA barcode. However, in absence of further morphological support it is only tentatively attached to this species and not included in the type series. Following Nel (1994) the number of cornuti varies from 0 to 3.

Derivatio nominis: The new species is dedicated to Dr. Jacques Nel (La Ciotat, France), eminent Lepidopterist and collector of the type series.

Metzneria tristella Rebel, 1901

Metzneria (*Parasia*) *tristella* Rebel, 1901. *Dt. ent. Z., Iris*, **13**(2): 164

Material examined: Lectotype ♂, here designated: “Stgr. 900 Cuenca” *“Metz. tristella* Rbl. Type” *“tristella* 6212 Rbl. E. Jäckh 1971 % MUS. VIND. 723” (NHMV).

Other material: SPAIN, Aragon, Lake Riba-Roja, Mequienca, 1 ♂, 1-2-V-2000, leg. J. Ortner (gen. slide GEL 1312 ♂ P.H., DNA Barcode TLMF Lep 28251); Castilia - La Mancha, N Cuenca, 1065 m, 40º06.54’N, 02°10.0’W, 2 ♀♀, 17-V-2012, leg. T. Mayr (gen. slide GEL 1316 ♀ P.H., DNA Barcode TLMF Lep 25480, DNA Barcode TLMF Lep 25481) (TLMF, RCTM).

Description Adult (figs 4-5): Head fuscous to greyish brown; antenna filiform, dark greyish brown, weakly annulated; labial palpus greyish brown, lighter at upper surface of segment 2, segment 2 thickened with appressed scales, segment 3 about half length of segment 2, weakly thickened; thorax and tegula fuscous with few lighter scales. Forewing length ♂ 5.8–7.0 mm (n=2), ♀ 5.2–5.6 mm (n=2). Forewing upper side dull brownish grey, orange-brown line along fold, short orange-brown streaks along veins, particularly along discal spot and at subcosta; stigmata black, first in distal part of fold, plical and discal spots widely separated; terminal line fuscous; fringes fuscous, without fringe line. Hindwing narrow, grey, concolorous fringes without fringe line. Underside of wings without any markings.

Male genitalia (figs 9-10): Uncus with lateral humps; tegumen much wider than long, anterior margin weakly emarginated; pedunculi small; valva with short and narrow base, strongly dilated distal part of about twice width, convex dorsal and nearly straight ventral margin, with tooth-like apex pointed ventrad; sacculus thorn-shaped, with particularly broad base and abruptly narrowed apex; saccus sub-triangular, short; phallus stout, about 3 times longer than wide, subapical area with band like structure covered with spinules, apex with short sub-triangular projection and vesica with two moderately long cornuti.

Female genitalia (fig. 12): Papilla analis broadly sub-oval, weakly setose; apophysis anterioris about three times length of papilla analis, rod-like, with forked posterior end; segment VIII ventromedially and dorsomedially membranous without modifications, posterior edge with short setae; entrance of membranous ductus bursae with irregularly funnel-shaped colliculum; corpus bursae small, membranous without any modifications.

Diagnosis: Easily separated from other congeneric species y the dull colour of the forewing. For other diagnostic characters see above.

Molecular data: BIN: BOLD:ADM8252. The intraspecific average distance of the barcode region is 0.16% (p-dist) (n=2). The minimum distance to the nearest neighbor *M. metzneriella* is 5.81%.

Distribution: Proved specimens originate from Spain, whereas records from Portugal (CORLEY *et al.*, 2000) and Tunisia (NEL, 1994) require verification.

Bionomics: The larva has been recorded from *Cheirolophus sempervirens* Pomel (CORLEY *et al.*, 2000) but it remains uncertain if this record refers to *M. tristella* or to another related species.

Remarks: *Metzneria tristella* was described from an unspecified number of specimens collected nearby Cuenca (REBEL, 1901). The re-examined lectotype was designated by ENGLERT (1974) in order to fix the identity of the species and conserve stability of nomenclature (figs 6-7, 10).

Acknowledgments

The author is particularly grateful to Paul D. N. Hebert and the staff at the Canadian Centre for DNA Barcoding for sequence analysis and support with BOLD. Several DNA barcodes from this platform were generated by various colleagues, i.e. Kai Berggren, Marko Mutanen, Andreas Segerer and Friedmar Graf. Stefan Heim kindly helped with photographic work. Antonio Vives is thanked for editorial tasks, Toni Mayr and Sabine Gaal-Haszler for important loans. Last but not least Jacques Nel is gratefully acknowledged for his continuous support in many aspects.

BIBLIOGRAPHY

DEWAARD, J. R., IVANOVA, N. V., HAJIBABAEI, M. & HEBERT, P. D. N., 2008.– Assembling DNA Barcodes:

Analytical Protocols. Pp. 275-293.– *In* C. C. MARTIN (ed.). *Methods in Molecular Biology: Environmental Genomics*: 364 pp. Humana Press Inc., Totowa. https://doi.org/10.1007/978-1-59745-548-0_15.

ENGLERT, W. D., 1974.– Revision der Gattung *Metzneria* Zeller (Lepid., Gelechiidae) mit Beiträgen zur Biologie der Arten.– *Zeitschrift für angewandte Entomologie*, **75**: 381-421.

CORLEY, M. F. V., GARDINER, A. J., CLEERE, N. & WALLIS, P. D., 2000.– Further additions to the Lepidoptera of Algarve, Portugal. (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **28**(111): 245-319.

HODGES, R. W., 1983.– *Check List of the Lepidoptera of America North of Mexico*: 284 pp. E. W. Classey limited and The Wedge Entomological Research Foundation, London.

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

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

NEL, J., 1994.– *Metzneria tenuiella* (Mann, 1864) et *M. tristella* Rebel, 1901, espèces nouvelles pour la France (Lepidoptera, Gelechiidae).– *Bulletin de la Société entomologique de France*, **99**(4): 385-388.

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

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

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

REBEL, H., 1901.– Neue palaearctische Tineen.– *Deutsche Entomologische Zeitschrift Iris*, **13**(2): 161-188.

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

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

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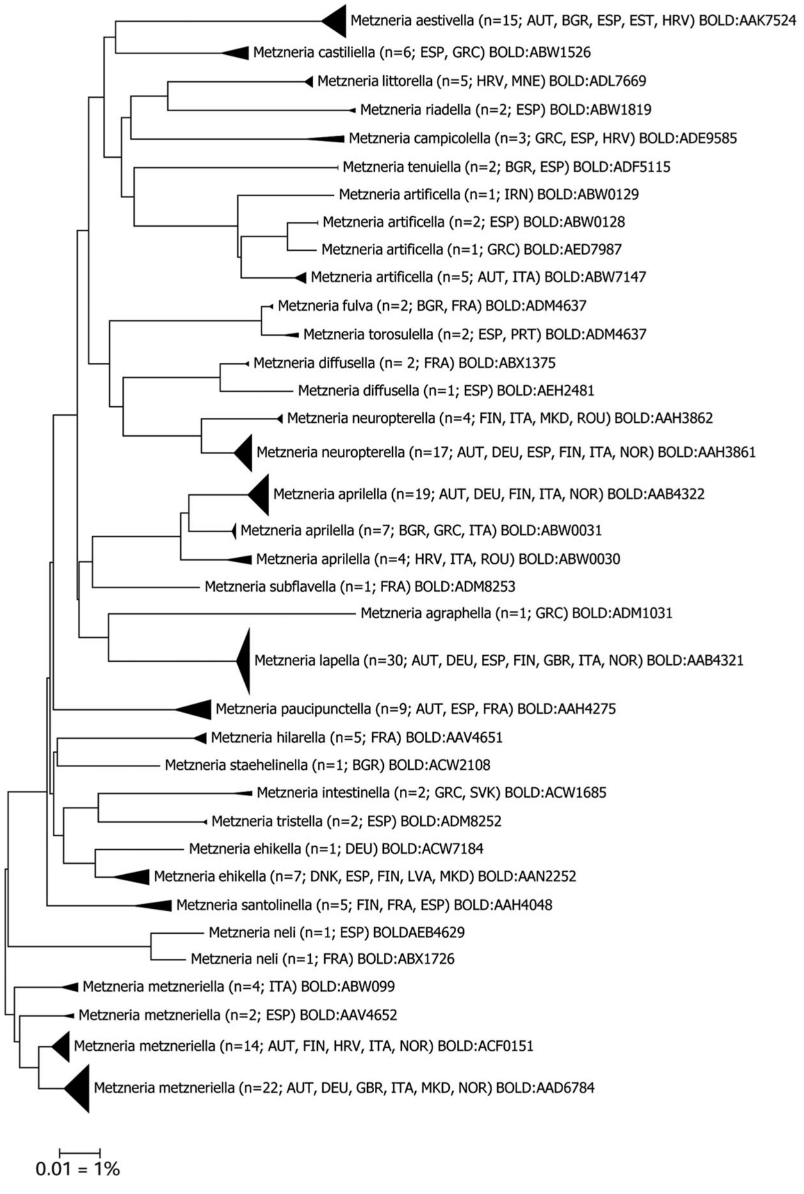
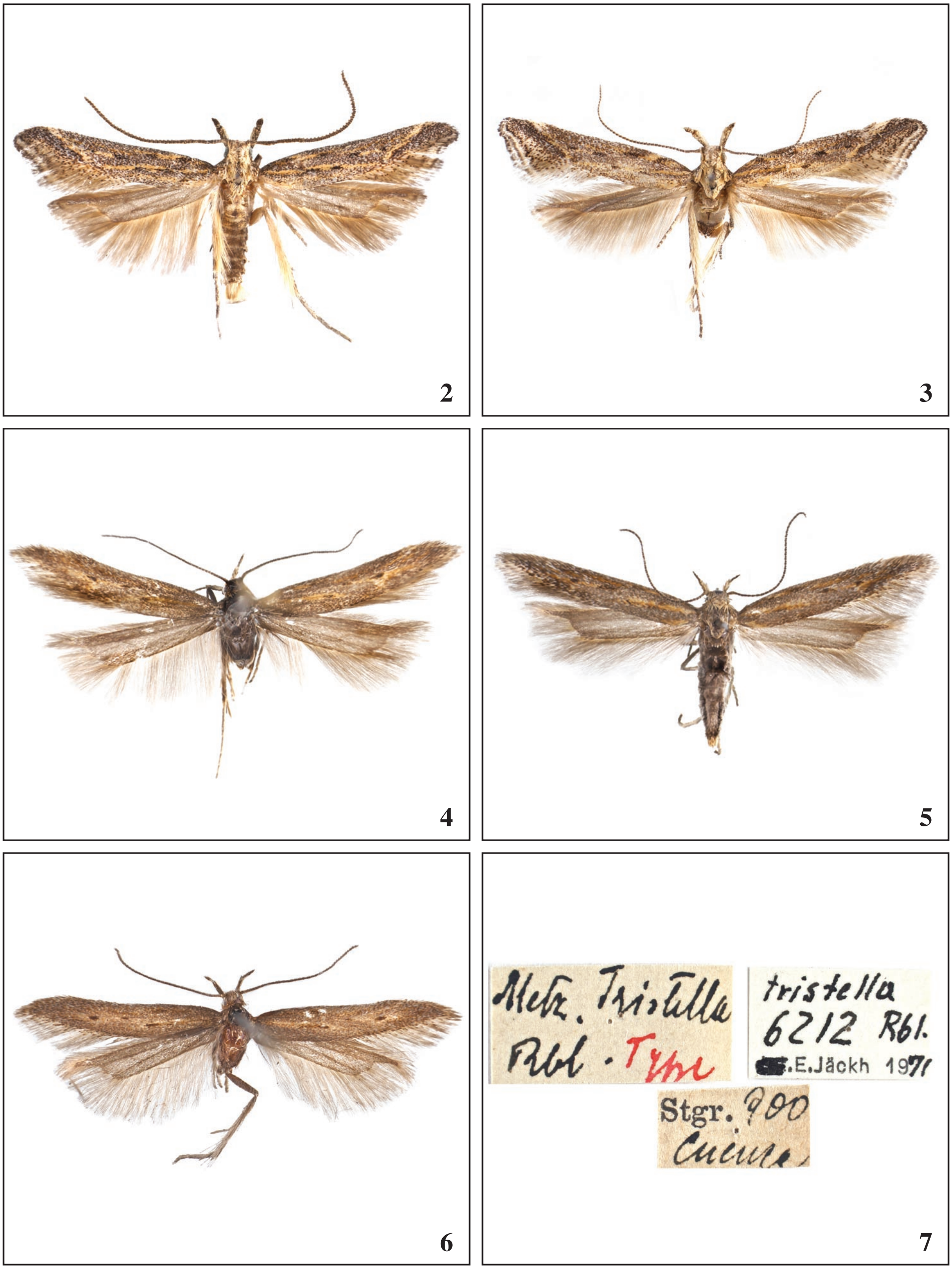


Fig. 1.– Neighbor-Joining tree of European *Metzneria* species (Kimura 2 parameter). Note: the scale bar only applies to internal branches between species. Width of triangles represent sample size, depth the genetic variation within the cluster. Source: DNA Barcode data from BOLD (Barcode of Life Database, cf. RATNASINGHAM & HEBERT, 2007).

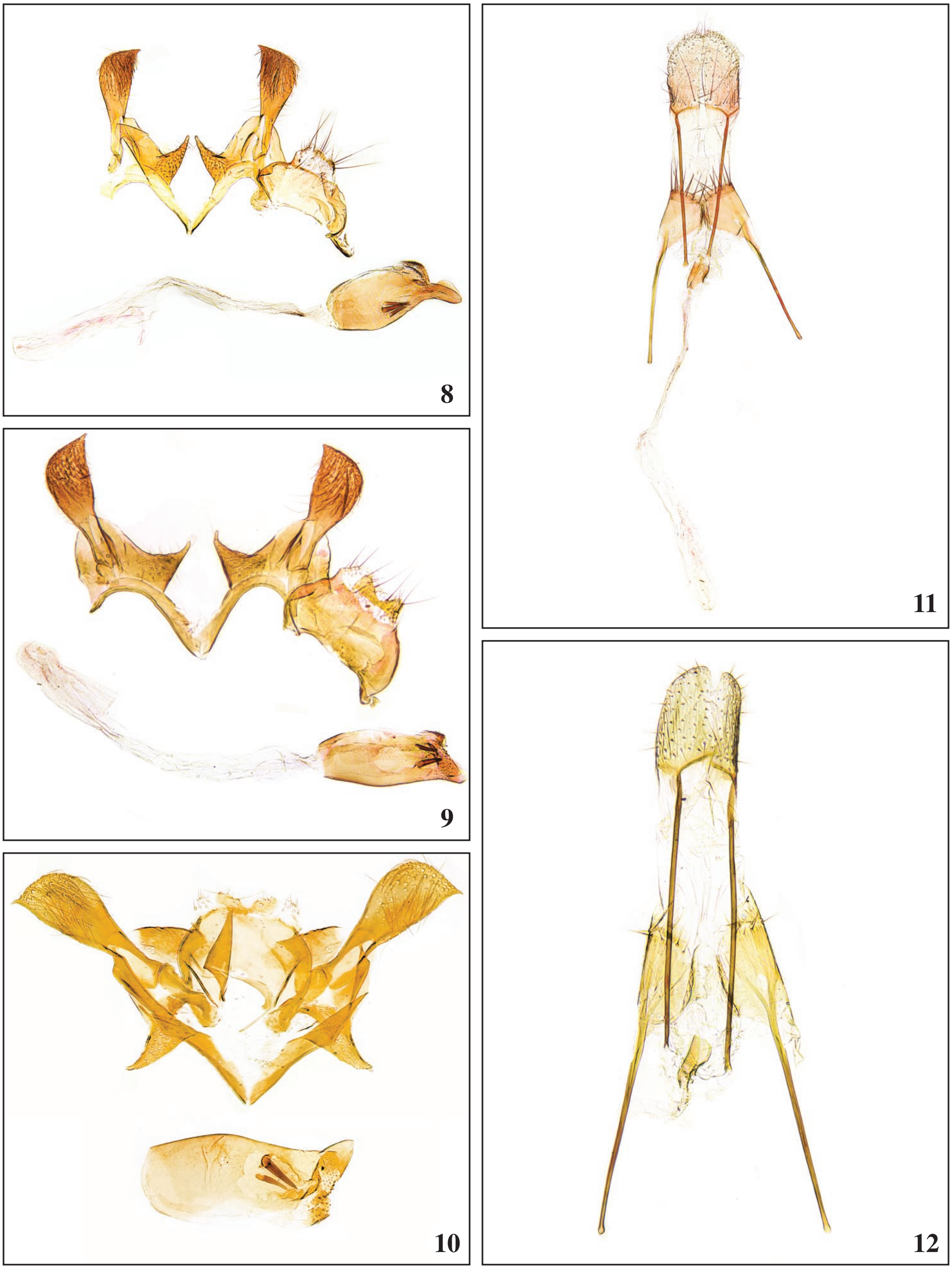


Metz. Tristella
Rbl. Type

tristella
6212 Rbl.
[redacted].E.Jäckh 1971

Stgr. 900
Cuenca

Figs 2-7.– Adults: **2.** *Metzneria neli* Huemer, sp. n., ♂, paratype. **3.** *Metzneria neli* Huemer, sp. n., ♀, paratype. **4.** *Metzneria tristella* Rebel, 1901, ♂. **5.** *Metzneria tristella* Rebel, 1901, ♀. **6.** *Metzneria tristella* Rebel, 1901, ♂, lectotype. **7.** *Metzneria tristella* Rebel, 1901, ♂, lectotype labels.



Figs 8-12.– 8-10. Male genitalia: **8.** *Metzneria neli* Huemer, sp. n., holotype. **9.** *Metzneria tristella* Rebel, 1901, **10.** *Metzneria tristella* Rebel, 1901, lectotype. **11-12.** Female genitalia: **11.** *Metzneria neli* Huemer, sp. n., paratype. **12.** *Metzneria tristella* Rebel, 1901.

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Especialización trófica de dos morfoespecies de *Chloridea virescens* (Fabricius, 1777) en el cultivo de tabaco negro en Pinar del Río, Cuba (Lepidoptera: Noctuidae, Heliothinae)

F. L. Rodríguez-Espinosa, Y. Santana-Baños, J. Pacheco-Escobar, M. A. Martínez-Rivero, I. G. López-Muraira & J. F. Gómez-Leyva

Resumen

Mediante la identificación taxonómica integrativa se describen dos morfoespecies del género *Chloridea* Duncan [& Westwood], 1841 que afectan al tabaco negro en la provincia de Pinar del Río, Cuba. Se recolectaron larvas de último instar en dos poblaciones con diferente hábito alimenticio: la primera afectando la yema terminal del tallo y la segunda a los órganos reproductivos del tabaco. Las larvas fueron caracterizadas por la coloración y ornamentación cuticular, así como por 11 caracteres morfológicos de la quetotaxia. La confirmación de la taxonomía molecular se realizó mediante secuenciación del gen mitocondrial de la citocromo oxidasa I (mtCOI), identificando a *Chloridea virescens* (Fabricius, 1777) como única especie para ambas poblaciones, con variabilidad morfológica y divergencia genética asociadas al nicho trófico, sugiriendo una especiación simpátrica.

PALABRAS CLAVES: Lepidoptera, Noctuidae, Heliothinae, taxonomía, variabilidad morfológica, gen COI, Cuba.

Trophic specialization of two morphospecies *Chloridea virescens* (Fabricius, 1777) in the dark tobacco crop in Pinar del Río, Cuba (Lepidoptera: Noctuidae, Heliothinae)

Abstract

Through integrative taxonomic identification, two morphospecies of the genus *Chloridea* Duncan [& Westwood], 1841, that affect black tobacco in the province of Pinar del Río, Cuba, are described. Last instar larvae were collected in two populations with different eating habits: the first affecting the terminal bud of the stem and the second affecting the reproductive organs of tobacco. The larvae were characterized by cuticular coloration and ornamentation, as well as by 11 morphological characters of chaetotaxy. The confirmation of the molecular taxonomy was carried out by sequencing the mitochondrial gene for cytochrome oxidase I (mtCOI), identifying *Chloridea virescens* (Fabricius, 1777) as the only species for both populations, with morphological variability and genetic divergence associated with the trophic niche, suggesting a sympatric speciation.

KEY WORDS: Lepidoptera, Noctuidae, Heliothinae, taxonomy, morphological variability, genetic variability, gen COI, Cuba.

Introducción

El tabaco (*Nicotiana tabacum* L.), es una planta herbácea y perenne, de la familia de las solanáceas, nativa de América tropical y de cuyas hojas se produce la mayor parte del tabaco que se consume en el mundo. La industria tabacalera en Cuba representa uno de los principales rubros económicos por la calidad de exportación de sus productos (CORTÉS *et al*., 2019). Por lo anterior, resulta de interés mantener el incremento en el rendimiento de este cultivo, el cual se ve afectado por numerosas plagas insectiles, entre los que destaca *C. virescens* (Fabricius, 1777) como gusano cogollero del tabaco y plaga clave de este cultivo, provocando importantes daños, en la calidad de las hojas cosechadas y demuestra un difícil control. Recientemente, se evidenciaron cambios en los parámetros biológicos de dos poblaciones de esta especie, sobre el tabaco negro, los cuales estuvieron condicionados por un compartimento de ambas poblaciones por el nicho trófico (RODRÍGUEZ *et al*., 2018).

Para Cuba el género *Chloridea* Duncan [& Westwood], 1841 está representado por *Chloridea virescens* (Fabricius, 1777)*, Chloridea subflexa* (Guenée, 1852) y *Chloridea tergemina* (Felder & Rogenhofer, 1874) (RIVAS & MARTÍNEZ, 2015). Sin embargo, solo las especies *C. virescens* y *C. tergemina* están presentes en tabaco, de las trece especies que actualmente componen este género (POGUE, 2013). Sin embargo, presentan características morfológicas similares que dificultan su identificación taxonómica en el estado larval.

La manera correcta para la clasificación de las tres especies, se describen en las claves de HALLMAN (1978), la cual se basa en la morfología de la larva, del diseño alar y de los genitales del macho. Según este autor, en el último estadio larval, el único carácter morfológico radica en los tubérculos dorsales de los segmentos abdominales uno y dos (A_1 y A_2), que son por lo menos 2,5 veces más altos que los tubérculos dorsales de los segmentos vecinos en *C. tergemina* y de igual tamaño en *C. virescens* y *C. subflexa*. Estas dos últimas se diferencian por la presencia de microespinas en la base de los tubérculos dorsales del octavo segmento abdominal (A_8) en *C. virescens*, que están ausentes en *C. subflexa*; por lo que estas dos especies son semejantes en todas sus fases de desarrollo lo que dificulta su correcta identificación, sobre todo si se encuentran sobre un mismo hospedante (HALLMAN, 1978; POGUE, 2013). No obstante, *C. subflexa* es conocida como especialista de plantas del género *Physalis* (OPPENHEIM *et al*., 2017), la cual comparte el 99 % de similitud genética con *C. virescens* (CHO *et al*., 2008); mientras que *C. tergemina* es poco conocida y con distribución en América del Sur en plantas de la familia Solanaceae (POGUE, 2013).

Cuando se estudian organismos con morfología similar y pobres en caracteres morfológicos para la identificación, la clasificación taxonómica puede ser difícil. Ante esta situación, en los últimos años se propone la taxonomía integrativa como un nuevo enfoque y un concepto más riguroso para la delimitación de poblaciones y especies, con la utilización combinada de datos morfológicos, biológicos, ecológicos, etológicos y moleculares, entre otros (DINCĂ *et al*., 2011).

El objetivo del presente trabajo fue realizar un análisis de los caracteres morfológicos en dos poblaciones de larvas del género *Chloridea* de último instar con diferentes hábitos alimenticios que afectan al tabaco negro cultivado en la provincia de Pinar del Río, Cuba, así como el análisis de las secuencias para el gen de la citocromo oxidasa I (mtCOI) para la identificación taxonómica.

Materiales y métodos

Se recolectaron 246 larvas de último instar de plantas de tabaco del cultivar (Habana-92) del municipio San Juan y Martínez (N22º 17’ 3,84”, W83º 50’ 9,096”) de la provincia de Pinar del Río en muestreos desarrollados, a través del método de “recorrido itinerante” y se trasladaron al Laboratorio de Entomología de la Universidad de Pinar del Río. Estas se colocaron individualmente en envases de cristal con aireación y se colocó alimento de la zona de la planta donde se recolectó para su alimentación.

Caracterización morfológica de larvas de último estado

Las larvas se separaron en dos grupos: Grupo A, presentes en hojas del cogollo; Grupo B, presentes en los órganos reproductivos (flores y frutos). Luego se individualizaron para su descripción empleando caracteres como la coloración general de la cutícula; presencia y coloración de las líneas dorsales, subdorsales y laterales, así como la forma, coloración y diferencias en la altura de los tubérculos dorsales (base de las setas, fundamentalmente en los segmentos abdominales uno, dos y ocho) para lo cual se emplearon las claves o descriptores señalados por HALLMAN (1978), GILLIGAN & PASSOA (2014) y RIVAS & MARTÍNEZ (2015).

Para la descripción se utilizaron 179 larvas provenientes de cogollo y 67 de las estructuras reproductivas de plantas de tabaco. Se extrajo el complejo hipofaringeal y las mandíbulas de la cabeza, mientras que para la quetotaxia larval se siguió la terminología de *Chloridea virescens* descrita por GILLIGAN & PASSOA (2014). Todas las observaciones morfológicas, patrones de coloración, medidas y fotografías de macro y microestructuras se registraron con microscopio estereoscopio marca Zeiss Modelo DV20. Se describieron 11 caracteres morfológicos: diente interno mandibular (1- Presente; 2- ausente); complejo hipofaringeal (1- espinoso en la región distal; 2- liso dorsalmente); forma de la base de la seta D_1 en segmento A_8 (1- Chalaza; 2- Pinacula); forma de la base de la seta D_1 en segmentos A_1 y A_2 (1- Chalaza; 2- Pinacula); altura de la base en la seta D_1 respecto a la D_2 en segmentos A_1 y A_2 (1- Mayor; 2- Igual); microespinas en la seta D_1 en segmento A_8 (1- Presentes; 2- ausentes); microespinas en la setas D_1 en segmentos A_1 y A_2 (1- Presente; 2- ausente); posición de la seta L_1 de acuerdo a línea imaginaria que pasa por la mitad del espiráculo en el segmento A_4 (1- debajo; 2- en el centro); forma de la base de la seta SD_1 en los segmentos abdominales (1- en forma de chalaza; 2- en forma de pinácula); conexión por microespinas de la seta SD_1 y L_1 (1- conectadas; 2- no conectadas); CM-11: Franjas subdorsales (1- presentes; 2- ausentes).

Se empleó discriminante canónico para determinar las variables (caracteres morfológicos) que permiten la diferenciación de los grupos morfológicos formados. Se construyeron tablas de contingencia para conocer el número de individuos que cumplen cada criterio de medida con el propósito de caracterizarlos y compararlos con las claves disponibles. Los análisis estadísticos se realizaron con el paquete estadístico INFOSTAT (2016).

Caracterización molecular mediante el gen mtCOI

Se escogieron ocho muestras por grupo (cinco yema apical y tres de los órganos reproductivos), las que se depositaron individualmente en tubo de ensayo con etanol al 75 %. La extracción del DNA genómico se realizó empleando el método de DOYLE & DOYLE (1990). La amplificación del gen de la citocromo oxidasa que codifica la subunidad I del DNA mitocondrial (mtCOI) se realizó empleando los cebadores HCO2198 (5’-TAAACTTCAGGGTGACCAAAAAATCA-3’) y LCO1490 (5’-GGTCAACAAATCATA-AAGATATTGG-3’) descritos por FOLMER *et al*. (1994). Todas las reacciones de PCR se realizaron en volumen final de 25 µl que contienen, 1.5 mM $MgCl_2$, 0.2 mM de cada dNTP’s, 10 pM de cada cebador; 0.2 U de Taq DNA Polimerasa y 100 ng de DNA genómico.

Las condiciones de PCR fueron: desnaturalización de 5 min a 95ºC, seguido por 40 ciclos (1 min a 95ºC de desnaturalización, 1 min a 60ºC de alineación, 1 min a 72ºC de extensión) y un último ciclo de 5 min a 72ºC de extensión. Los programas de amplificación se efectuaron en un Termociclador programable (SelectCycler: MultiGene™ Mini Personal Thermal Cycler). Los productos amplificados se visualizaron en gel de agarosa en SB (Borato de sodio 10 mM) al 1,8 % y se purificaron siguiendo el protocolo Kit PureLink® (Invitrogen™), de acuerdo a las instrucciones del fabricante. Los electroferogramas obtenidos con los productos de PCR fueron analizados empleando el programa BioEdit 7.0.5.3 y las secuencias generadas fueron comparadas mediante la herramienta BLASTn (www.ncbi.nlm.nih.gov/blast). Los nucleótidos obtenidos se ensamblaron y alinearon usando el programa CLUSTAL W (THOMPSON *et al*., 1994), con accesiones de *C. virescens* y tres secuencias como grupos extras: dos disponibles en el GeneBank (*C. subflexa* y *Spodoptera frugiperda* (Smith, 1797)) y una disponible en el laboratorio y recolectada sobre tomatillo (*Physalis philadelphica*). (*C. subflexa*). Se calculó la matriz de las distancias evolutivas por el método de Pairwise y se realizó un análisis filogenético mediante el método Máxima Verosimilitud, usando el modelo de Kimura dos parámetros, que generó un dendrograma con un soporte de topología interna por análisis de re-muestreo de 1.000 réplicas (bootstrap) empleando software MEGA 6 (TAMURA *et al*., 2013).

Resultados y discusión

Caracterización morfológica de larvas de último instar

Las larvas presentaron diferencias fenotípicas de acuerdo con el órgano de la planta donde se recolectaron: grupo A proveniente yema apical: Larvas de color verde claro con tonalidades amarillentas en la región abdominal. Se distinguen con facilidad los segmentos abdominales, los que poseen una franja espiracular blanquecina o amarillenta; los tubérculos dorsales (base de las setas) D_1 en la región abdominal, son de mayor altura que D_2 en A_1 y A_2.

Grupo B colectadas en flores y fruto: La coloración general de la cutícula puede ser verde, parda, grisácea o castaña. En las larvas se distinguen dos puntos negros u oscuros en el dorso de los segmentos A_1, A_2 y A_8, que coinciden con la base de la seta D_1, los que son de mayor altura respecto a la base de la seta D_2. Presentan dos líneas de color oscuro o castaño en la región subdorsal a ambos lados del cuerpo y banda espiracular de coloración blanquecina.

La caracterización a priori de las larvas, según su ubicación en la planta, aportó elementos básicos para el diagnóstico presuntivo al nivel de campo. Se observó una diversidad mayor variabilidad en la coloración general de la cutícula no descritas anteriormente eportadas para *C. virescens* en Cuba sobre tabaco (MÉNDEZ, 2003) y sobre hojas de garbanzo (PÉREZ & SURIS, 2012), en las zonas central y oriental de Cuba.

Independiente al órgano de la planta, se evidenció que la altura de la seta de D_1, era superior en la base en D_2 en los segmentos abdominales A_1 y A_2, ambas en forma de chalaza y más elevadas que las del resto de los segmentos abdominales. Este es el único carácter morfológico utilizado por HALLMAN (1978) en Colombia para clasificar a *C. tergemina* y *C. virescens* en tabaco.

El análisis discriminante mostró que 10 caracteres morfológicos, de los 11 descritos en la quetotaxia, resultaron significativos con valores de $p > 0,0001$ y permitieron discriminar los especímenes agrupados en los dos grupos. Solo, la posición que ocupa la seta L_1 en relación con una línea horizontal imaginaria trazada por el centro del espiráculo en el segmento A_4, no fue significativa con un valor de un valor de $p > 0.0001$ (Tabla 1).

Tabla 1.– Significancia de los caracteres morfológicos descritos en la quetotaxia.

Caracteres morfológicos	**F**	**p-valor**
Diente interno mandibular	34.83	<0.0001
Complejo hipofaringeal	28.81	<0.0001
Forma de la base de la seta D1 en A8	26.72	<0.0001
Forma de la base de las setas D1 en los segmentos A1 y A2 abdominal	23.75	<0.0001
Altura de la base de la seta D1 respecto a la de D2 en los segmentos A1 y A2	13.29	<0.0001
Microespinas en la base de las setas D1 en A8	21.25	<0.0001
Microespinas en la base de las setas D1 en los segmentos A1 y A2	11.22	<0.0001
Posición de la seta L1 respecto a una línea imaginaria que pasa por el centro del espiráculo en A4	1.83	0.1456
Forma de las setas SD1 en los segmentos abdominales	15.31	<0.0001
Conexión de las setas SD1 y L1 por microespinas	15.99	<0.0001
Franjas subdorsales	27.51	<0,0001

La función discriminante indicó la importancia de la clasificación a priori de las larvas en grupos y por órgano de la planta donde se recolectó, con una tasa del 0 % de error aparente; lo que confirma la importancia de las variables utilizadas en la separación de los individuos. Este análisis permitió la reclasificación de las larvas de último instar (L6) en cada grupo, según su ubicación inicial, como resultado de la caracterización a priori (Tabla 2).

Tabla 2.– Clasificación de las larvas de último instar (L6) por grupo.

Grupo	A	B	Total	Error (%)
A	179	0	179	0
B	0	67	67	0
Total	179	67	246	0

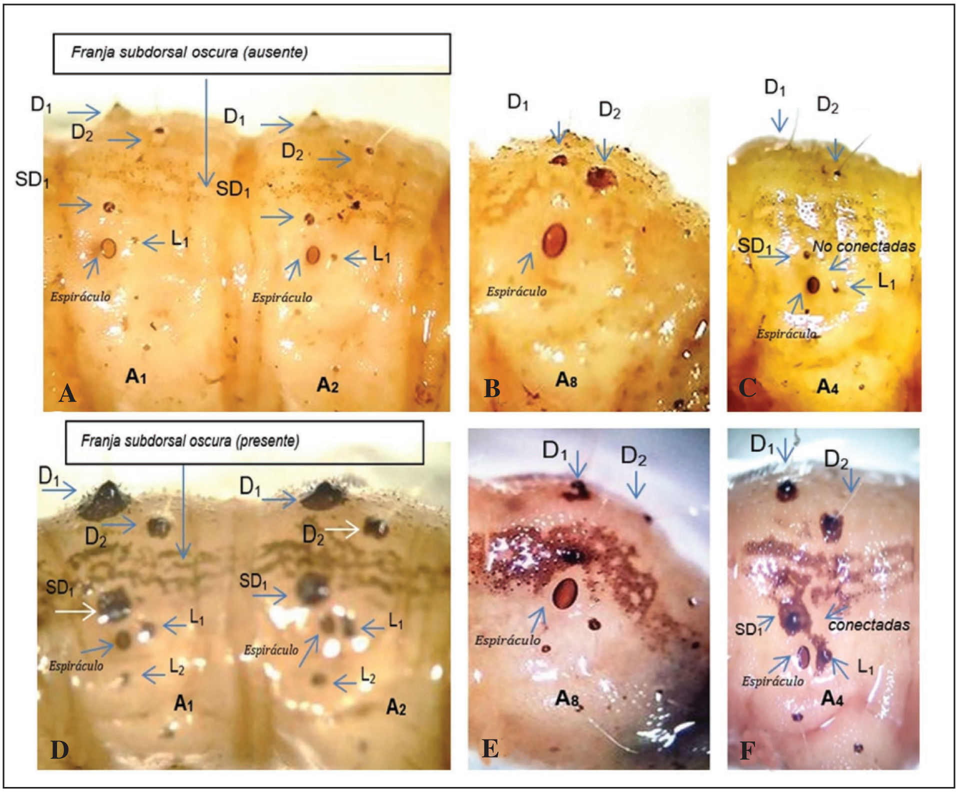

Figura 1.– Representación de las setas y segmentos abdominales de una larva del Grupo A: **A.** segmentos A1 y A2, **B.** segmentos A8; **C.** segmentos A4, Setas, dorsales (D1 y D2), subdorsales (SD1), laterales (L1). Representación de las setas y segmentos abdominales de una larva del Grupo B: **D.** segmentos A1 y A2, **E.** segmentos A8, **F.** segmentos A4: Setas, dorsales (D1 y D2), subdorsales (SD1), laterales (L1 y L2).

Por lo tanto, todos los individuos agrupados en el Grupo A fueron semejantes en el 90 % de los caracteres morfológicos evaluados, al igual que lo fueron los del Grupo B, pero en el 100 % de los 10 caracteres que resultaron significativos en el análisis de discriminante. No obstante, los individuos de estos dos grupos fueron diferentes en cinco de estos caracteres (50 %) lo que destaca la validez de las variables seleccionadas para discriminar entre larvas sobre tabaco y sugirió la posibilidad de dos posibles especies. Sin embargo, en el resto de los caracteres sus especímenes fueron similares e indicó, que los individuos que se agrupan en A y B están relacionados. Los principales caracteres morfológicos que separan a las larvas de estos en dos grupos fueron:

Grupo A: la base de la seta D_1 en los segmentos A_1, A_2 y A_8 tiene forma de Chalaza, sin presencia de microespinas, que puede llegar a ser de mayor tamaño respecto a la base de la seta D_2 en estos segmentos, para el 80 % de las larvas (Figura 1A, B); además, la seta SD_1 tiene la base en forma de pinácula y no se conecta con la seta L_1 en los segmentos abdominales (Figura 1 C); no presentan una franja oscura en la parte subdorsal a ambos lados del cuerpo.

Grupo B: la base de la seta D_1 en los segmento A_1, A_2 y A_8 es fuertemente cónica en forma de chalaza, que está cubierta totalmente con microespinas y es evidente la diferencia entre la altura de la base de las setas D_1 y D_2, en estos tres segmentos, que llega a ser más de dos veces el tamaño en D_1 respecto a D_2 (Figura 2A, B); la base de la seta SD_1 es una chalaza esclerosada que se conecta a través de microespinas con la base de la seta L_1 desde A_3 hasta A_7 (Figura 2C); se observa una franja oscura en la región subdorsal a ambos lados del cuerpo.

POGUE (2013) y GILLIGAN & PASSOA (2014) describieron a *C. virescens* con la base de la seta dorsal D_1 fuertemente cónica en forma de chalaza y cubierta por microespinas pequeñas en los segmentos A_1, A_2 y A_8, lo cual coincide solo con el Grupo B, el cual también se corresponde con larvas recolectadas en los órganos reproductivos.

Por tanto, quedó una interrogante: ¿las larvas agrupadas en el Grupo A, se clasifican como *C. tergemina* u otra especie?, pues HALLMAN (1978), no hace referencia a la presencia o no de microespinas en esta especie; aunque sí señala que en el octavo segmento abdominal están desprovistas de estas en *C. subflexa*, la cual es especialista de plantas del género *Physalis* (OPPENHEIM *et al*., 2017). Por las consideraciones anteriores, se procedió a integrar estos resultados con estudios moleculares, al no contar con suficientes criterios morfológicos, para establecer una correcta clasificación de las larvas del Grupo A y confirmar si las larvas del Grupo B pertenecen a *C. virescens*.

Caracterización molecular mediante el gen mtCOI

Los 680 nucleótidos obtenidos de la secuenciación parcial de del gen mtCOI de los grupos A y B, mostraron un 99 % de homología entre ambos grupos morfológicos y de estos con accesiones de *C. virescens* registradas en el GenBank, lo que confirmó la identidad taxonómica de *C. virescens* en todas las muestras.

La distancia genética entre los individuos de los Grupo A y B fue de un 1 %, e indicó la existencia de relaciones intraespecífica entre los individuos que agrupan (HAUSMANN *et al*., 2011); mientras que estos mostraron relaciones interespecíficas con las accesiones de *C. virescens* de Brasil (con una distancia genética del 3,0 % los dos morfotipos), *C. subflexa* (6,0 % Grupo A y 7,0 % Grupo B) y con *S. frugiperda* (11.0 % el Grupo A y 12,0 % el Grupo B) (MITCHELL & GOPURENKO, 2016).

El análisis filogenético por el método de Máxima Verosimilitud coincidió con los resultados obtenidos en el análisis de la distancia genética y generó un dendrograma con tres taxones: uno para cada grupo extra; y otro donde las accesiones de *C. virescens* del Genbank y las de Cuba, formaron un clúster con soporte muy fuerte. (Figura 2). No obstante, se observó divergencia genética entre las accesiones, al interior del clúster de *C. virescens*. Este resultado, indicó que los especímenes de los Grupos A y B de *C. virescens*, están más estrechamente relacionados a las de Chile, Costa Rica y Estados Unidos. Resultados similares fueron obtenidos en Chile (SANTOS-ZAMORANO *et al*., 2017). Sin embargo, las accesiones de los dos grupos se agruparon de forma independiente con un buen so-

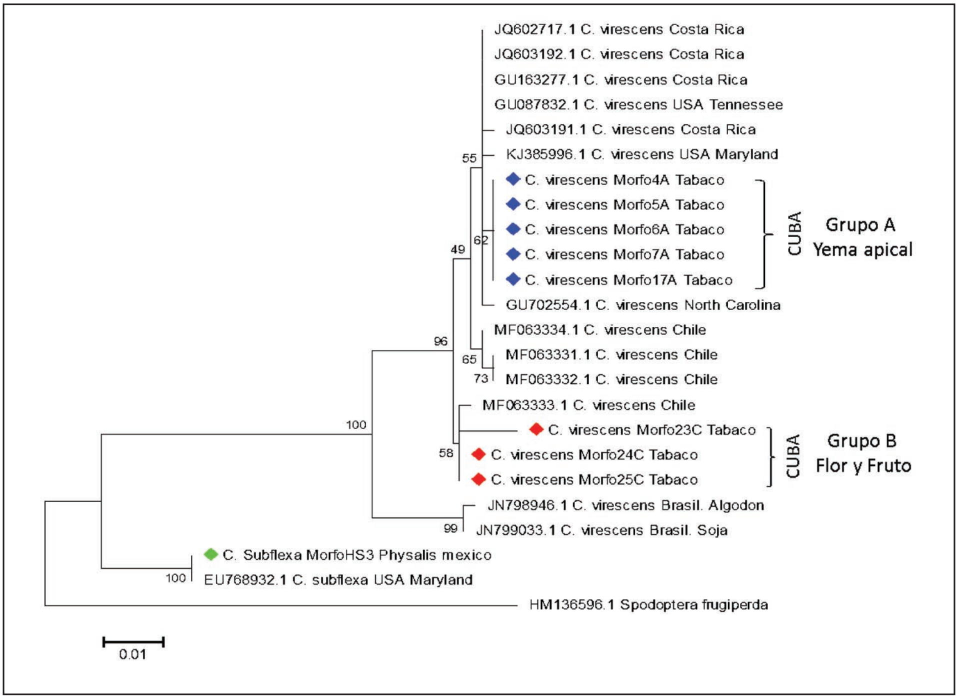

Figura 2.– Árbol filogenético construido por el método de máxima verosimilitud, basado en el modelo Kimura 2-p, sobre la base de la secuencia para el gen del DNA mitocondrial de la citocromo oxidasa que codifica la subunidad I (mtCOI). Corchetes denotan grupos diferentes para Cuba.

porte, resultado que sugirió que los individuos que agrupan pertenecen a dos linajes diferentes dentro *C. virescens*.

El hecho de que los resultados mostraron divergencia genética al interior del clúster de *C. virescens*, reafirma la validez e importancia del gen mtCOI como un marcador molecular útil para distinguir entre especies similares o crípticas (MARTÍNEZ-ROSAS *et al*., 2016). Por tanto, se propone por primera vez para Cuba la presencia de dos morfoespecies de *C. virescens* sobre el cultivo del tabaco negro, teniendo en cuenta las diferencias entre los caracteres morfológicos y la existencia de divergencia genética entre ellos; por lo que será necesario valorar la actual estrategia de manejo sobre el cultivo de tabaco

Conclusiones

Se confirma a *C. virescens* como única especie que afecta al cultivo del tabaco negro en Pinar del Río, Cuba, compuesta por dos morfoespecies que presentan una alta variabilidad morfológica y divergencia genética en larvas del último instar y hábitos alimenticios diferenciales asociadas a la yema terminal del tallo y los órganos reproductivos del tabaco negro.

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BIBLIOGRAFÍA

CORTÉS, E. J., TUTA, L. T. & GARCÍA, D., 2019.– Análisis de la evolución de la industria tabacalera en Ciego de Ávila, Cuba.– *Universidad & Ciencia,* **8**(1): 164-174.

CHO, S., MITCHELL, A., MITTER, C., REGIER, J., MATTHEWS, M. & ROBERTSON, R., 2008.– Molecular phylogenetics of Heliothine moths (Lepidoptera: Noctuidae: Heliothinae) with comments on the evolution of host range and pest status.– *Systematic Entomology,* **33**: 581-594.

DINCĂ, V., DAPPORTO, L. & VILA, R., 2011.– A combined genetic-morphometric analysis unravels the complex biogeographical history of *Polyommatus icarus* and *Polyommatus celina* Common Blue butterflies.– *Molecular Ecology*, **20**(18): 3921-3935.

DOYLE, J. J. & DOYLE, J. L., 1990.– Isolation of plant DNA from fresh tissue.– *Focus*, **12**:13-15.

FOLMER, O., BLACK, M., HOEH, W., LUTZ, R. & VRIJENHOEK, R., 1994.– DNA primers for amplification of mitocondrial cytocrome c oxidase subunit I from diverse metazoan invertebrates.– *Molecular Biology and Biotechnology*, **3**(5): 294-299.

GILLIGAN, T. M. & PASSOA, S. C., 2014.– Key to frequently named lepidopteran larvae intercepted, or potentially encountered, at us ports.– *Lepintercept*: 35. http://idtools.org/id/leps/lepintercept/LepIntercept_LarvalKey.pdf.

HALLMAN, G., 1978.– Clave taxonómica para las especies de *Heliothis* (Lepidoptera: Noctuidae) en Colombia.– *Revista Colombiana de Entomología*, **4**(3-4): 61-69.

HAUSMANN, A., HASZPRUNAR, G. & HEBERT, P. D. N., 2011.– DNA Barcoding the Geometrid Fauna of Bavaria (Lepidoptera): Successes, surprises, and questions.– *Plos One*, **6**(2): 1-9.

MARTÍNEZ-ROSAS, R., ARAUJO-RUIZ, K., CAMBRÓN-CRISANTOS, J. M. & VEGA-ORTÍZ, H. E., 2016.– Caracterización morfológica y molecular de larvas de *Grapholita packardi* (Zeller, 1875) y *Grapholita prunivora* (Walsh, 1868) (Lepidoptera: Tortricidae) de importancia económica.– *Entomología Mexicana*, **3**: 961-968.

MÉNDEZ, A., 2003.– Aspectos biológicos sobre *Heliothis virescens* (Fabricius) (Lepidoptera: Noctuidae) en la Empresa Municipal Agropecuaria "Antonio Guiteras" de la zona norte de la provincia de Las Tunas.– *Revista de Fitosanidad*, **7**(3): 21-25.

MITCHELL, A. & GOPURENKO, D., 2016.– DNA barcoding the Heliothinae (Lepidoptera: Noctuidae) of Australia and utility of DNA barcodes for pest identification in *Helicoverpa* and relatives.– *Plos One*, **11**(8): 1-18.

OPPENHEIM, S. J., GOULD, F. & HOPPER, K. R., 2017.– The genetic architecture of ecological adaptation: intraspecific variation in host plant use by the lepidopteran crop pest *Chloridea virescens*.– *Heredity*, **120**: 234-250.

PÉREZ, J. C. & SURIS, M., 2012.– Ciclo de vida y reproducción de *Heliothis virescens* (F.) (Lepidoptera: Noctuidae) sobre garbanzo.– *Revista de Protección Vegetal*, **27**(2): 85-89.

POGUE, M. G., 2013.– Revised status of *Chloridea* Duncan [and Westwood, 1841], for the *Heliothis virescens* species group (Lepidoptera: Noctuidae: Heliothinae) based on morphology and three genes.– *Systematic Entomology*, **38**: 523-542.

RIVAS, A. & MARTÍNEZ, M. A., 2015.– *Heliothis tergeminas* (Felder y Rogenhofer), nueva especie plaga en el cultivo del tabaco en Cuba.– *Revista Protección Vegetal*, **30**: 77-80.

RODRÍGUEZ, F. L., MARTÍNEZ, M. A. & GÓMEZ, J. F., 2018.– Parámetros biológicos y tabla de vida de dos poblaciones de *Chloridea virescens* (Fabricius) (Lepidoptera: Noctuidae) asociadas al tabaco negro.– *Revista Protección Vegetal*, **33**(2): 1-7.

SANTOS-ZAMORANO, B., HUANCA-MAMANI, W. & VARGAS, H. A., 2017.– Genetic divergence of the pest moth *Chloridea virescens* (Noctuidae: Heliothinae) feeding on a newly documented host plant in the Atacama Desert of Northern Chile.– *Journal of the Lepidopterists' Society*, **71**(4): 274-278.

TAMURA, K., STECHER, G., PETERSON, D., FILIPSKI, A. & KUMAR, S., 2013.– MEGA6: Molecular Evolutionary Genetics Analysis version 6.0.– *Molecular Biology and Evolution*, **30**(12): 2725-2729.

THOMPSON, J. D., HIGGINS, D. G. & GIBSON, T. J., 1994.– CLUSTAL W. Improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position specific gap penalties and weight matrix choice.– *Nucleic Acids Research*, **22**: 4673-4680.

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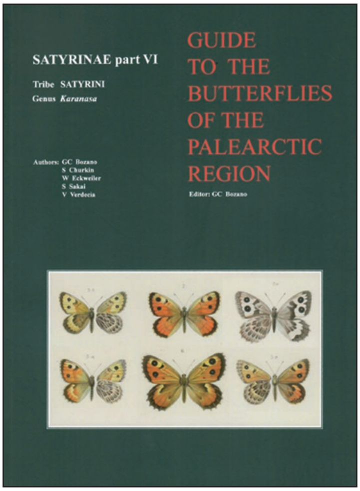

SATYRINAE part VI
Tribe SATYRINI
Genus *Karanasa*

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GUIDE TO THE BUTTERFLIES OF THE PALEARCTIC REGION

Editor: GC Bozano

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Guide to the Butterflies of the Palaearctic Region: Satyrinae part VI
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Tenemos en nuestras manos, una nueva publicación de la interesante serie sobre los Rhopalocera de la Región Paleártica; en esta ocasión se trata de la familia Nymphalidae Swainson, 1827 y más concretamente de la subfamilia Satyrinae Boisduval, 1836.

La subfamilia Satyrinae Boisduval, 1836, está incluida dentro de la familia Nymphalidae Swainson, 1827 y en esta ocasión se trata el género asiático: *Karanasa* Moore, 1893, así como todas las subespecies consideradas por los autores.

Se presentan fotografías a todo color de los adultos y de las principales subespecies consideradas como válidas en este trabajo e igualmente de todas las especies aparecen fotografías de la genitalia del macho y en algunas ocasiones dibujos de esta aclaratorios, así como algún otro detalle anatómico que pueda permitir despejar dudas.

Es muy interesante la descripción de nuevas taxas, que incrementa la importancia del trabajo, a saber: *Karanasa haarlovi hindukushil* Eckweiler, 2021, *Karanasa kirgizorum rubescens* Eckweiler, 2021, *Karanasa hoffmanni weissi* Eckweiler, 2021, *Karanasa wilkinsi bogdanovi* Churkin, 2021 y *Karanasa decolorata lau* Bozano, 2021.

La calidad no ha decaído en este nuevo fascículo de esta interesante serie, que sin duda alguna poco a poco se va considerando como un clásico y, por lo tanto, no puede faltar en ninguna biblioteca especializada, por otra parte, queremos felicitar a la Editorial por la excelente labor realizada y la calidad de la impresión de la serie.

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New data on distribution and molecular genetics of *Lignyoptera fumidaria* (Hübner, [1825]) (Lepidoptera: Geometridae)

S. A. Knyazev, A. U. Gabdullina & I. A. Makhov

Abstract

The rare and little known late-autumn species *Lignyoptera fumidaria* (Hübner, [1825]) is reported from Katon-Karagai National Park (Eastern Kazakhstan) for the first time. The present record is the second in Eastern Kazakhstan. The general species' distribution provided. Species' habitats in Katon-Karagai district of Eastern Kazakhstan are illustrated. Molecular data on the specimens from Kazakhstan studied for the first time.

KEY WORDS: Lepidoptera, Geometridae, *Lignyoptera, fumidaria*, Biodiversity, Katon-Karagai, Kazakhstan.

Nuevos datos sobre la distribución y genética molecular de *Lignyoptera fumidaria* (Hübner, [1825]) (Lepidoptera: Geometridae)

Resumen

Se cita por primera vez la rara y poco conocida especie otoñal *Lignyoptera fumidaria* (Hübner, [1825]) del Parque Nacional Katon-Karagai (este de Kazajstán). El presente registro es el segundo en el este de Kazajstán. Se proporciona la distribución general. Se ilustran los hábitats de la especie en Katon-Karagai distrito del este de Kazajstán. Por primera vez, se estudian los datos moleculares sobre especímenes de Kazajstán.

PALABRAS CLAVE: Lepidoptera, Geometridae, *Lignyoptera, fumidaria*, biodiversidad, Katon-Karagai, Kazajstán.

Introduction

The general data on the Lepidoptera of Katon-Karagai National Park not revised at this moment. Some information about moths, collected on the territory of the Park presented in the local reports and annals of the nature of the park. Also, late-autumn species complex was never studied here. At the middle of October 2020, a short series of *L. fumidaria* (Hübner, [1825]) was collected by the second author in two localities on the right coast of Bukhtarma river and these findings confirm the presence of this species in the Eastern Kazakhstan and expand its range by 180 km to the East. This species has previously been recorded in Kazakhstan by the single male near Serebryansk town also one male was reported from Russian Altai (VASILENKO, 2001). The main distribution of the species very local on the South of Europe and European part of Russia (SKOU & SIHVONEN, 2015; BELJAEV & MIRONOV, 2019).

Material and methods

Moths were collected by standard method using butterfly net at the daytime. The mounted specimens were photographed by the camera Canon EOS 5D Mark II with Canon 100 mm USM macro lens. The photos of the genitalia were performed using a Nikon SMZ1500 stereoscopic microscope, Nikon D700 camera fitted with LV-TV adapter and Helicon software (Helicon Remote 3.8.1; Helicon Focus 6.7.1).

For molecular genetic analysis the legs were used. The lysis reaction proceeded overnight. DNA extraction was carried out using the QIAamp DNA Mini Kit (QIAGEN, Germany), according to the manufacturer‘s protocol. DNA elution was performed with 150-l elution buffer. Amplification of a 658-bp long COI fragment was performed using the primers HCO2198 (5’-TAAACTTCAGGGTGACCAAAAAATCA-3’; FOLMER *et al*., 1994) and LCO1490, (5’-GGTCAACAAATCATAAAGATATTGG-3’ FOLMER *et al*., 1994). The PCR profile used for this marker was as follows: 95ºC for 3 min, 95ºC for 30 sec, 50ºC for 45 sec, 72ºC for 1 min, (step 2-4 cycled 34 times), 72ºC for 10 min.

All specimens deposited in the collection of Zoological Institute RAS (ZISP, Saint Petersburg, Russia) and in private collection of Svyatoslav Knyazev (SKO, Omsk, Russia).

Lignyoptera fumidaria (Hübner, [1825]) (figs 2-6)
Geometra fumidaria Hübner, [1825] 1796. *Samml. Eur. Schmett., Geometrae*: pl. 101, figs 520, 521.
Type locality: Europe (syntype(s) lost).

Material examined: EAST KAZAKHSTAN, Katon-Karagai district, 4,5 km. N of Sogornoye vill., right bank of Bukhtarma river (Fig. 1), 2 ♂♂, 15-X-2020, 49º15’09.7”N 85º21’22.0”E, h= 690 m a.s.l., A. U. Gabdulina (SKO); 1 ♂, 21-X-2020 in the same locality, A. U. Gabdulina (SKO); 3 ♂♂, 22-X-2020, East Kazakhstan, Katon-Karagai district, 8 km NE of Katon-Karagai, right bank of Bukhtarma river, 49º12’35.4”N 85º42’56.1”E, h= 840 m a.s.l., A. U. Gabdullina (SKO).

Fig. 1.– Habitat of *Lignyoptera fumidaria* in Eastern Kazakhstan, Katon-Karagai district, 4,5 km. N of Sogornoye vill., right bank of Bukhtarma river, 15-X-2020 (photo by A. U. Gabdullina).

Additional material examined: Hungary, Budaörs, Huszonnégyökrös-hegy, 1 ♂, 16-XI-2006, O. Pekarsky & G. Petrányi (ZISP); Hungary, 1 ♂, coll. of Maksimov (ZISP); Russia, Taganrog, 1 ♂, 16-X-1874, coll. Alphéraky. (ZISP); Sarepta, 1 ♂, coll. Erschov. (ZISP); Spask, 1 ♂, coll. Eversmann (ZISP); Poland, Petrokovskaya Province [Poland, Łódź voivodeship], 1 ♂, Isaak. (ZISP); Crimea, Simferopol surroundings, Livenskiye Dubki, 3 ♂♂, 21-X-1906 (ZISP); Hungary [Uungarn], Svábhegy, 1 ♀, 12-XI-[1]924 (ZISP); Hungaria (ZISP); 1 ♂, Coll. Acad. Petrop. (ZISP); 1 ♂, coll. Bramson, ex mater. Mus. Acad. Petrop. (ZISP); Hungary [Hungarn], 1 ♂, coll. of Grand Duke Nikolai Mikhailovich (ZISP); Budaörs, Csilihegyek Uhrik, 1 ♂, 10-XI-[1]929 (ZISP); 1 ♂, Hungaria, coll. Erschov (ZISP).

Bionomics: Late-autumn species. In European part of its distribution the adults occur from late September to mid-December (SKOU & SIHVONEN, 2015). In East Kazakhstan imago occur from the beginning to the middle of October. The males fly in a daytime on rocky steppe shores and rocky slopes of Bukhtarma river with predominance of steppe grasses, *Rosa sp*., *Spiraea sp*., *Juniperus sp*. The air temperature on the days when the species was found was +9+16ºC, wind speed near 4 m/s. Females are wingless and have not yet been found in East Kazakhstan.

Distribution: *Lignyoptera fumidaria* (Hübner, [1825]) distributed very locally in Europe (Austria, Hungary, Bulgaria), south of European part of Russia (from Crimea to South Ural), Altai Republic in Russia and Altai mountains in Eastern Kazakhstan.

Molecular data: Only two COI sequences of *L. fumidaria* from Hungary are available in the GenBank base. Both of these sequences are identical. Barcode sequences of the second species of the genus, *L. thaumastaria* Rebel, 1901, is not yet available. Analysis of barcodes revealed some intraspecific polymorphism in our specimens: (GenBank accessnumbers: MW737411; MW737412) three sites differ. It also was found a deep difference between European moths and specimens from Kazakhstan: the minimal genetic distance is 6% (see COI substitutions in Table 1). The degree of this divergence considerably exceeds the ‘standard’ 2.7-3.0% DNA barcoding threshold commonly used as a tentative indicator for species distinctness of the taxa compared (LAMBERT *et al*., 2005; LUKHTANOV *et al*., 2015). Nevertheless, no morphological differences were found (both in external morphology and genitalia structure - figs 2-8). Such divergence can be explained of the presence of mitochondrial haplotypes. Similar genetic patterns are known among Geometridae: in *Alcis repandata* (Linnaeus, 1758) (MÜLLER *et al*., 2019), *Epirrita autumnata* (Borkhausen, 1794) (KVIE *et al*., 2013), *Biston panterinaria* (Bremer & Grey, 1853) (CHENG *et al*., 2016).

Table 1.– COI 5’ substitutions in *L. fumidaria* collected in East Kazakhstan. Localities and ID (GenBank) of barcode are provided in parentheses.

Nucleotide site	1	11	31	34	50	59	61	70	81	130	145	202	217	229	250	274	276	281	282	283
Lignyoptera fumidaria - Hungary (Pest megye, Csiki-hegyek; Budapest: HM393738; HM910662)	A	C	C	T	C	T	A	T	A	A	T	C	G	G	T	T	C	T	T	C
Lignyoptera fumidaria - Kazakhstan, Katon-Karagai district, Sogornoye vill. Vicinity, Bukhtarma river	G	T	T	A	T	C	T	C	C	T	C	A	A	A	C	C	A	A	C	T
Nucleotide site	284	292	298	322	352	364	367	388	391	401	427	445	454	472	529	538	542	595	628	646
Lignyoptera fumidaria - Hungary (Pest megye, Csiki-hegyek; Budapest: HM393738; HM910662)	T	C	A	A	T	T	T	G	C	C	T	C	A	A	C	G	C	C	G	T
Lignyoptera fumidaria - Kazakhstan, Katon-Karagai district, Sogornoye vill. Vicinity, Bukhtarma river	C	T	T	G	C	C	C	A	T	T	C	T	G	G	T	A	T	T	A	C

Discussion

New records of *Lignyoptera fumidaria* in Katon-Karagai National Park expand the range of the species in Kazakhstan by 180 km to the East. Analyzing the general distribution of the species it can be assumed that it can also be found in the steppe regions of the South of Western Siberia and in the Kazakh uplands in vast territories between the Southern Urals and Altai mountains. The morphological identity and molecular data confirm the relationship of remote eastern population with European populations.

Aknowledgments

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BIBLIOGRAPHY

BELJAEV, E. A. & MIRONOV, V. G., 2019.– Geometridae.– *In* S. YU. SINEV (ed.). *Catalogue of the Lepidoptera of Russia. Edition 2*: 235-281. Zoological Institute RAS, St. Petersburg.

CHENG, R., JIANG, N., YANG, X., XUE, D., LIU, S. & HAN, H. 2016.– The influence of geological movements on the population differentiation of *Biston panterinaria* (Lepidoptera: Geometridae).– *Journal of Biogeography*, **43**: 691-702.

FOLMER, O., BLACK, M., HOEH, W., LUTZ, R. & VRIJENHOEK, R., 1994.– DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates.– *Molecular Marine Biology and Biotechnology,* **3**: 294-299.

KVIE, K. S., HOGNER, S., AARVIK, L., LIFJELD, J. T. & JOHNSEN, A., 2013.– Deep sympatric mtDNA divergence in the autumnal moth (*Epirrita autumnata*).– *Ecology and Evolution*, **3**(1): 126-144.

LAMBERT, D. M., BAKER, A., HUYNEN, L., HADDRATH, O., HEBERT, P. D. N. & MILLAR, C. D., 2005.– Is a largescale DNAbased inventory of ancient life possible?- *Journal of Heredity,* **96**(3): 279-284.

LUKHTANOV, V. A., DANTCHENKO, A. V., VISHNEVSKAYA, M. S. & SAIFITDINOVA, A. F., 2015.– Detecting cryptic species in sympatry and allopatry: analysis of hidden diversity in *Polyommatus (Agrodiaetus)* butterflies (Lepidoptera: Lycaenidae).– *Biological Journal of the Linnean Society,* **116**(2): 468-485.

MÜLLER, B., ERLACHER, S., HAUSMANN, A., RAJAEI, H., SIHVONEN, P. & SKOU, P., 2019.– Ennominae II.– *In* A. HAUSMANN, P. SIHVONEN, H. RAJAEI & P. SKOU (Eds). *Geometrid Moths of Europe*, **6**: 906 pp. Brill, Leiden.

SKOU, P. & SIHVONEN, P., 2015.– Ennominae 1.– *The Geometrid moths of Europe*, **5**: 657 pp. Brill, Leiden.

VASILENKO, S. V., 2001.– New and little-known geometrid moths (Lepidoptera, Geometridae) from Russian Altai.– *Zoological Journal,* **80**(5): 538-544. (In Russian).

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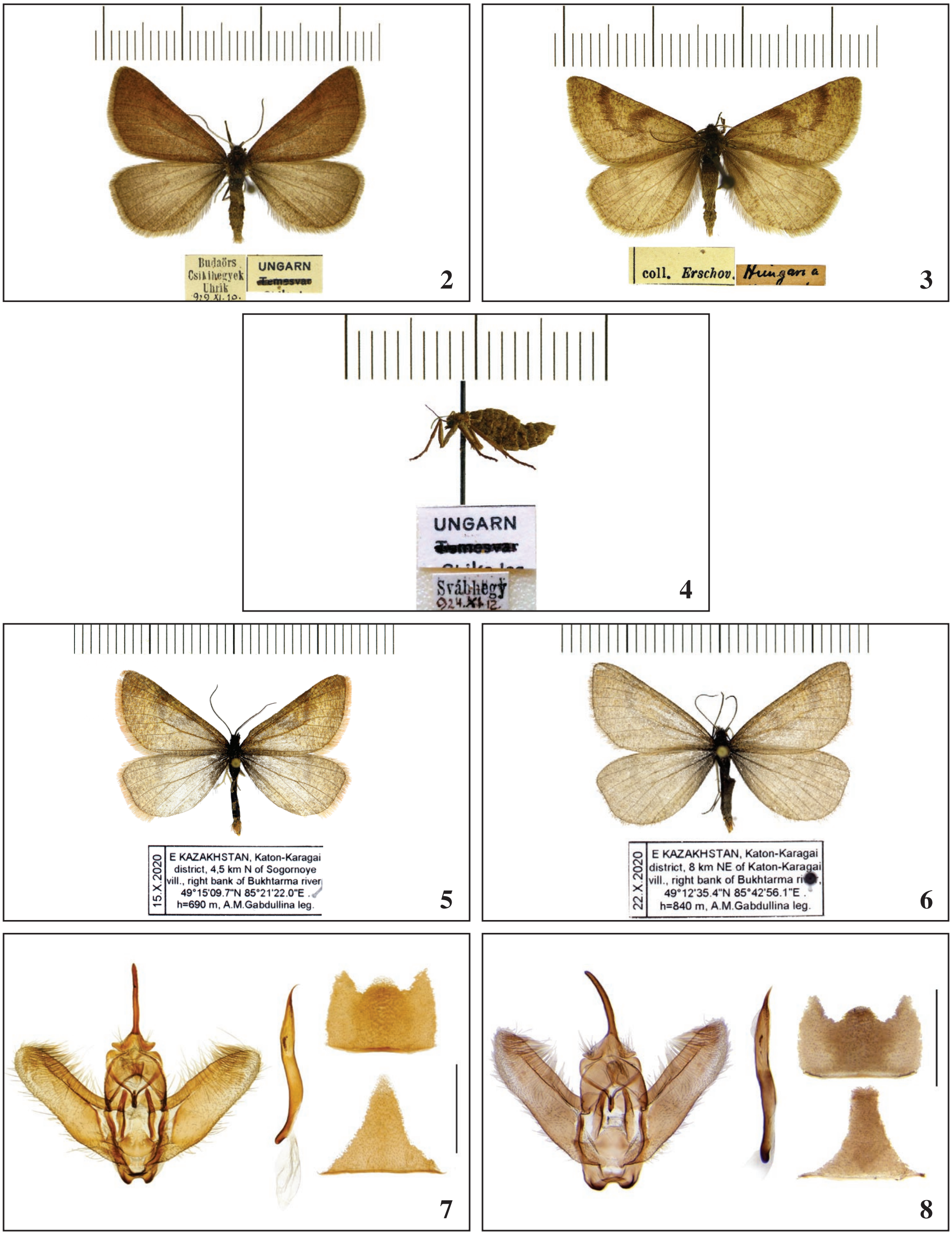

Figs 2-8.– **2.** *Lignyoptera fumidaria*, adult, male, Hungary (ZISP). **3.** *Lignyoptera fumidaria*, adult, male, Hungary (ZISP). **4.** *Lignyoptera fumidaria*, adult, female, Hungary (ZISP). **5.** *Lignyoptera fumidaria*, adult, male, Eastern Kazakhstan (SKO). **6.** *Lignyoptera fumidaria*, adult, male, Eastern Kazakhstan (SKO). **7.** Genitalia of *Lignyoptera fumidaria*, male, Eastern Kazakhstan. **8.** Genitalia of *Lignyoptera fumidaria*, male, Hungary.

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To the fauna of Pterophoridae of Bolivia with a description of three new species (Lepidoptera: Pterophoridae)

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Abstract

The article describes three Pterophoridae species from Bolivia which are new to science: *Hellinsia swammerdami* Ustjuzhanin & Kovtunovich, sp. n., *Hellinsia sergeii* Ustjuzhanin & Kovtunovich, sp. n. and *Hellinsia aymara* Ustjuzhanin & Kovtunovich, sp. n. Nine Pterophoridae species are reported from Bolivia for the first time: *Lioptilodes rionegroicus* Gielis, 1991, *Lioptilodes zapalaicus* Gielis, 1991, *Stenoptilodes gilvicolor* (Zeller, 1877), *Exelastis phlyctaenias* (Meyrick, 1911), *Hellinsia chalupi* Gielis, 2013, *Hellinsia emmorus* (Walsingham, 1915), *Hellinsia yalae* Gielis, 2013, *Adaina bolivari* (Căpuşe, 1987) and *Adaina hodias* (Meyrick, 1908).
KEY WORDS: Lepidoptera, Pterophoridae, biodiversity, new species, new data, Bolivia.

La fauna de Pterophoridae de Bolivia con descripción de tres especies nuevas (Lepidoptera: Pterophoridae)

Resumen

El artículo describe tres especies de Pterophoridae de Bolivia las cuales son nuevas para la ciencia: *Hellinsia swammerdami* Ustjuzhanin & Kovtunovich, sp. n., *Hellinsia sergeii* Ustjuzhanin & Kovtunovich, sp. n. y *Hellinsia aymara* Ustjuzhanin & Kovtunovich, sp. n. Se citan nueve especies de Pterophoridae como nuevas para Bolivia por primera vez: *Lioptilodes rionegroicus* Gielis, 1991, *Lioptilodes zapalaicus* Gielis, 1991, *Stenoptilodes gilvicolor* (Zeller, 1877), *Exelastis phlyctaenias* (Meyrick, 1911), *Hellinsia chalupi* Gielis, 2013, *Hellinsia emmorus* (Walsingham, 1915), *Hellinsia yalae* Gielis, 2013, *Adaina bolivari* (Căpuşe, 1987) y *Adaina hodias* (Meyrick, 1908).
PALABRAS CLAVE: Lepidoptera, Pterophoridae, biodiversidad, nuevas especies, nuevos datos, Bolivia.

Introduction

Information on Bolivia’s Pterophoridae was considered in the works of GIELIS (2003, 2006, 2011, 2013), KOVTUNOVICH *et al*. (2016), USTJUZHANIN & KOVTUNOVICH (2018). In the materials on Pterophoridae, collected by V. Sinyaev and his assistants in Bolivia, we found three species new to science, and 9 species previously unknown for the fauna of this country. As a result, the Pterophoridae fauna of Bolivia now comprises 53 species.

Material and methods

The Pterophoridae were collected at night and in the twilight, using light traps. The studied specimens are deposited in the collection of the Zoological Institute St. Petersburg, Russia (ZISP) and in the Collection of P. Ustjuzhanin and V. Kovtunovich, Novosibirsk and Moscow, Russia, (CUK). The holotypes and paratypes of the new species are deposited in the collection of Zoological Institute, St. Petersburg, Russia (ZISP).

List of species

Lioptilodes rionegroicus Gielis, 1991
Lioptilodes rionegroicus Gielis, 1991. *Zool. Verh. Leiden*, **269**: 20
Type locality: ARGENTINA, Rio Negro, San Carlos de Bariloche

Material examined: Bolivia, Santa Cruz, Amboro Nat. Park, 17º 59,2' S, 63º 59,8' W, 1800 m, 1 ♂, 05-XI-2010, V. Sinyaev & O. Romanov leg.; Lago Titicaca, 3 ♂♂, 1 ♀, 11-I-2010, V. Sinyaev, S. Sinyaev & A. Zamesov leg.; La Paz, Santa Rosa de Lima, 16º 23.6'S, 67º 41.8' W, 1550 m, 1 ♀, 20-22-X-2010, V. Sinyaev & O. Romanov leg.

Distribution: Argentina, Chile, Peru, Bolivia. **New species for Bolivia**.

Lioptilodes zapalaicus Gielis, 1991
Lioptilodes zapalaicus Gielis, 1991. *Zool. Verh. Leiden*, **269**: 18
Type locality: ARGENTINA, Neuquen, Zapala, El Marucho.

Material examined: Bolivia, Sierra Siberia, 18 km SE Pojo, 17º 50.6' S, 64º 41.8' W, 2500 m, 1 ♂, 15-I-2010, V. Sinyaev, S. Sinyaev & A. Zamesov leg.

Distribution: Argentina, Chile, Peru, Bolivia. **New species for Bolivia**.

Stenoptilodes gilvicolor (Zeller, 1877)
Platyptilia gilvicolor Zeller, 1877. *Hor. Soc. Ent. Ross*., **13**: 462
Type locality: COLOMBIA, Bogota

Material examined: Bolivia, Cotapata, 16º 16,8' S, 67º 52,6' W, 3210 m, 1 ♂, 6-7-I-2010, V. Sinyaev, S. Sinyaev & A. Zamesov leg.

Distribution: Chile, Colombia, Bolivia. **New species for Bolivia**.

Exelastis phlyctaenias (Meyrick, 1911)
Marasmarcha phlyctaenias Meyrick, 1911. *J. Bombay nat. Hist. Soc*., **21**(1):106
Type locality: SRI LANKA

Material examined: Bolivia, Santa Cruz, 11 km NE Tatarenda, 19º 50.3' S, 63º 43.5' W, 680 m, 1 ♂, 27-XII-2009, V. Sinyaev, S. Sinyaev & A. Zamesov leg.

Distribution: Sri Lanka, Oman, Philippines, Tanzania, Malawi, Madagascar, Reunion Island, Ethiopia, Ghana, Virgin Islands, Bolivia. **New species for Bolivia**.

Hellinsia chalupi Gielis, 2013
Hellinsia chalupi Gielis, 2013. *Boln Soc. ent. aragon.*, **53**: 99
Type locality: ARGENTINA, Tucuman, Alto de San Agustin

Material examined: BOLIVIA, Santa Cruz, La Higuera, 18º 47.7' S, 64º 12.1' W, 2050 m, 1 ♂, 19-20-XII-2009, V. Sinyaev, S. Sinyaev & A. Zamesov leg.

Distribution: Argentina, Bolivia. **New species for Bolivia**.

Hellinsia emmorus (Walsingham, 1915)
Pterophorus emmorus Walsingham, 1915. *Biol. C.-Am. Lep. Ins. Het*., **4**: 441
Type locality: MEXICO, Veracruz, Orizaba

Material examined: Bolivia, 9,3 km SE Coroico, 16º 14.7'S, 67º 39.6' W, 1980 m, 1 ♀, 02-03-I-2010, V. Sinyaev, S. Sinyaev & A. Zamesov leg.

Distribution: Mexico, Guatemala. Honduras, Bolivia. **New species for Bolivia**.

Hellinsia yalae Gielis, 2013
Hellinsia yalae Gielis, 2013. *Boln Soc. ent. aragon.*, **53**: 97
Type locality: ARGENTINA, Jujuy, Yala

Material examined: BOLIVIA, La Paz, Santa Rosa de Lima, 16º 23.6'S, 67º 41.8' W, 1550 m, 1 ♂, 20-22-X-2010, V. Sinyaev & O. Romanov leg.

Distribution: Argentina, Bolivia. **New species for Bolivia**.

***Hellinsia swammerdami* Ustjuzhanin & Kovtunovich, sp. n.** (Figs 1, 2)

Type material: Holotype, ♂, BOLIVIA, near Lagunillas, 18º 15.5' S, 64º 10.9'W, 1524 m, 17-XII-2009, V. Sinyaev, S. Sinyaev & A. Zamesov leg. (ZISP gen. prep.1956). Paratypes: BOLIVIA, 1 ♂, same data as holotype (CUK); 7 km SW Mataral, 18º 09.2' S, 64º 15.8'W, 1524 m, 6 ♂♂, 15-16-XII-2009 (CUK gen. prep. 349, 350), (ZISP gen. prep.1957); 7,7 km SW Comarapa, 1 ♂, 10-XII-2009, 17º 58.2' S, 64º 34.7'W, 1833 m, V. Sinyaev, S. Sinyaev & A. Zamesov leg. (CUK); 8,3 km W Mataral, 18º 07.7' S, 64º 17.1'W, 1661 m, 1 ♂, 19-I-2010, V. Sinyaev, S. Sinyaev & A. Zamesov leg. (CUK).

Description: Head, thorax and tegulae pale. Labial palpi brown, apically tapered, twice shorter than longitudinal eye diameter. Antennae pale brown. Wingspan 15-16 mm (holotype 16 mm). Fore wings grey. Alternating dark brown and white horizontal lines along costal edge above cleft. Fringe inside cleft basally white, medially and distally mixed with brown hairs. Both lobes of fore wing clarified with white scales. Small blurred brown spot at cleft base. Hind wings and fringe on all three lobes unicolorous grey. Hind legs pale yellow. Spurs on hind legs of unequal length.

Male genitalia: Valves narrow, long, asymmetric. Saccular process on left valve thick. Rod-like, with two processes distally and medially. Saccular process on right valve narrow, straight, without any spikes or protrusions, slightly extended basally. Saccus horseshoe-like. Aedeagus thick, short, almost straight. Cornutus long, slightly wavy, about half of aedeagus in length, distally noticeably narrowing. Anellus arms relatively short, of unequal length, right one noticeably longer than left. Uncus narrow, arched, apically acute. Gnathos expressed as robust oval bump densely covered with tiny spikes.

Diagnosis: The species is characterized by the special shape of the gnathos, there is no analogous structure in other species.

Flight period: December, January.

Distribution: Bolivia.

Etymology: The species is named after the famous Dutch naturalist, founder of the science of entomology Jan Swammerdam (1637-1680).

***Hellinsia sergeii* Ustjuzhanin & Kovtunovich, sp. n.** (Figs 3, 4)

Type material: Holotype ♂, BOLIVIA, La Paz, Santa Rosa de Lima, 16º 23.6'S, 67º 41.8' W, 1550 m, 20-22-X-2010, V. Sinyaev & O. Romanov leg. (ZISP gen. prep. 1958). Paratype, BOLIVIA, Santa Cruz Department, near Lagunillas, 19º 50.3' S, 63º 43.5' W, 1477 m, 1 ♂, 25-26-XII-2009, V. Sinyaev, S. Sinyaev & A. Zamesov leg. (CUK).

Description: Head, thorax and tegulae ocher-yellow. Labial palpi thin, 1,5 times longitudinal eye diameter. Antennae yellow. Wingspan 30 mm. Fore wings unicolorous, ocher-yellow, without pattern. Costal edge of fore wing darkened with brown scales up to cleft base. Fringe pale. Hind wings the same as forewings: ocher yellow. Hind legs pale yellow.

Male genitalia: Valves asymmetric, left one noticeably wider than right one. Saccular process on left valve long, almost reaching top of valve. Sacculus with small spike at base of right valve. Anellus arms short, of unequal length, right one noticeably longer than left one. Apices of Anellus arms beak-shaped, acute. Saccus arched. Uncus narrow, thin, apically acute. Aedeagus slightly shorter than valve, smoothly curved medially.

Diagnosis: In the yellowish color of the wings, the new species resembles *Hellinsia crescens* (Meyrick, 1926), but differs in the smaller size and the absence of the spots and dots on the wings. In the male genitalia, in the saccular process on the left valve, the new species is also similar to *H. crescens*, but in the new species the process almost reaches the valve top, while in *H. crescens*, it hardly extends beyond the middle of the valve.

Flight period: October, December.

Distribution: Bolivia.

Etymology: The species is named after the brother of the first author, Sergei Ustjuzhanin, who instilled in me a love of entomology in my childhood.

Hellinsia aymara **Ustjuzhanin & Kovtunovich, sp. n.** (Figs 5, 6)

Type material: Holotype, ♂, Bolivia, 9,3 km SE Coroico, 16º 14.7’ S, 67º 39.6’ W, 1980 m, 02-03-I-2010, V. Sinyaev, S. Sinyaev & A. Zamesov leg. (ZISP gen. prep. 1959).

Description: Head, thorax and tegulae pale brown. Labial palpi brown, thalf longitudinal eye diameter. Antennae transversely striated. Wingspan 15 mm. Fore wings pale brown. Longitudinal dark brown stroke along costal edge, above cleft base. Small blurred brown spot at cleft base. Hind wings unicolorous, pale brown. Fringe on all wings grey. Hind legs pale brown.

Male genitalia: Valves asymmetric, left one noticeably wider than right one. Saccular process on left valve bent at right angle to inner edge of valve. Saccular process on right valve shaped as simple straight cord. Anellus arms thin, equal in length. Saccus arched. Uncus narrow, thin, apically acute. Aedeagus almost straight, half valve lenght valve, distally with needle-like cornutus.

Diagnosis: In the male genitalia, in the hook-curved saccular process on the left valve and in the simple straight cord on the right valve, the new species is similar to *Hellinsia pseudobarbata* Gielis, 1999, from which it differs in the asymmetric valves (the left one is wider than the right one), and in the anellus arms equal in length, while in *H. pseudobarbata* the valves are of equal width, and the anellus arms are different in length.

Flight period: January.

Distribution: Bolivia.

Etymology: The species is named after the Indian people of Aymara, who live in the west of South America including Bolivia.

Adaina bolivari (Căpuşe, 1987)
Paravinculia bolivari Căpuşe, 1987. *Fauna hipógea y hemiedáfica de Venezuela y de otros países de América del Sur*, **1**(18): 185
Type locality: VENEZUELA, Parque Nacional Rancho Grande

Material examined: Bolivia, La Paz, Santa Rosa de Lima, 16º 23.6’ S, 67º 41.8’ W, 1550 m, 1 ♂, 20-22-X-2010, V. Sinyaev & O. Romanov leg.

Distribution: Venezuela, Ecuador, Brazil, Bolivia. **New species for Bolivia**.

Adaina hodias (Meyrick, 1908)
Marasmarcha hodias Meyrick, 1908. *Trans. ent. Soc. London,* **1908**: 492
Type locality: BRAZIL, São Paulo

Material examined: Bolivia, near Lagunillas, 18º 15.5’ S, 64º 10.9’ W, 1524 m, 1 ♀, 17-XII-2009, V. Sinyaev, S. Sinyaev & A. Zamesov leg.

Distribution: Brazil, Costa Rica, Mexico, Venezuela, Ecuador, Bolivia. **New species for Bolivia**.

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We express our deep gratitude to V. Sinyaev and his assistants: S. Sinyaeva, A. Zamesov, O. Romanov (Moscow, Russia), for providing materials for examination. We also thank S. Reshetnikov (Novosibirsk, Russia) for photographs of the adult specimens. The authors are grateful to A. Ustjuzhanina (Tomsk, Russia) for language improvements.

BIBLIOGRAPHY

CĂPUŞE, I., 1987.– Un nouveau sclérite dans l'armature génitale mâle chez un ptérophoride du Venezuela (*Paravinculia bolivari* n. g., n. sp.).– *Fauna hipógea y hemiedáfica de Venezuela y de otros países de América del Sur,* **1**(18): 183-187, 2 figs.

GIELIS, C., 1991.– A taxonomic review of the Pterophoridae from Argentina and Chile.– *Zoologische Verhandelingen Leiden*, **269**: 1-164, figs 1-178.

GIELIS, C., 2003.– Pterophoroidea & Alucitoidea (Lepidoptera).– *World Catalogue of Insects*, **4**: 1-198.

GIELIS, C., 2006.– Review of the Neotropical species of the family Pterophoridae, part I: Ochyroticinae, Deuterocopinae, Pterophorinae (Platyptiliini, Exelastini, Oxyptilini) (Lepidoptera).– *Zoologische Mededelingen,* **80-2**(1): 1-290.

GIELIS, C., 2011.– Review of the Neotropical species of the family Pterophoridae, part II: Pterophorinae (Oidaematophorini, Pterophorini).– *Zoologische Mededelingen,* **85**: 589-824.

GIELIS, C., 2013.– Review of the Neotropical species of the family Pterophoridae, part IV: Additions from Argentina, Bolivia, Chile and Uruguay (Lepidoptera).– *Boletín de la Sociedad Entomológica Aragonesa,* **53**: 95-109.

KOVTUNOVICH, V. N., USTJUZHANIN, P. YA., MARQUEZ, M. & USTJUZHANINA, A. K., 2016.– Five new species of the Genus *Singularia* Arenberger, 1988 (Lepidoptera: Pterophoridae).– *European Journal of Taxonomy,* **247**: 1-11.

MEYRICK, E., 1908.– Notes and descriptions of Pterophoridae and Orneodidae.– *Transactions of the Entomological Society of London*, **1907**: 471-511.

MEYRICK, E., 1911.– Descriptions of Indian Microlepidoptera.– *Journal of the Bombay natural History Society*, **21**(1): 104-106.

USTJUZHANIN, P. YA. & KOVTUNOVICH, V. N., 2018.– Species list of Pterophoridae of Bolivia with new records (Lepidoptera: Pterophoridae). - *SHILAP Revista de lepidopterología,* **46**(183): 497-500.

WALSINGHAM, L., 1915.– Insecta. Lepidoptera-Heterocera: Tineina, Pterophorina, Orneodina, and Pyralidina and Hepialina (part.).– *Biologia Centrali-Americana,* **4**: i-xii, 1-482 pp., 10 plates.

ZELLER, P. C., 1877.– Exotische Microlepidoptera.– *Horae Societatis Entomologicae Rossicae,* **13**: 3-493, 6 pls.

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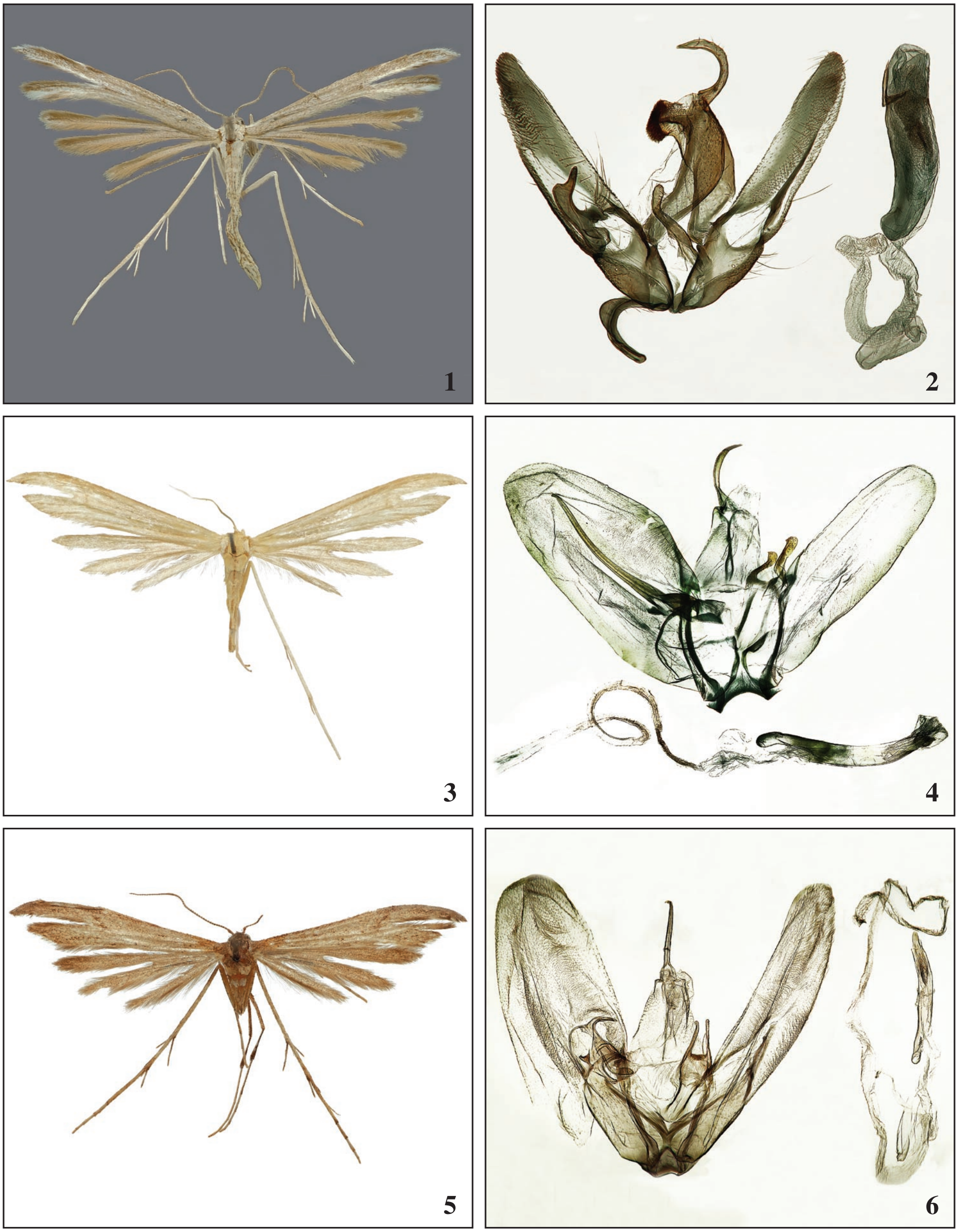

Figures 1-6.– 1-2. *Hellinsia swammerdami* Ustjuzhanin & Kovtunovich, sp. n. **1.** Adult (Holotype, ZISP). **2.** Male genitalia (Holotype, ZISP gen. prep.1956). **3-4.** *Hellinsia sergeii* Ustjuzhanin & Kovtunovich, sp. n. **3.** Adult (Holotype, ZISP). **4.** Male genitalia (Holotype, ZISP gen. prep. 1958). **5-6.** *Hellinsia aymara* Ustjuzhanin & Kovtunovich, sp. n. **5.** Adult (Holotype, ZISP). **6.** Male genitalia (Holotype, ZISP gen. prep. 1959).

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A new species of *Anorthoa* Berio, 1980 from Vietnam (Lepidoptera: Noctuidae, Orthosiini)

B. Benedek & B. Tóth

Abstract

A new species of *Anorthoa* Berio, 1980 is described from Vietnam, thus the number of the species in this genus is raised to ten. The new taxon bears striking differences in the female genitalia, compared to closely related species.
KEY WORDS: Lepidoptera, Noctuidae, Orthosiini, *Anorthoa*, new species, taxonomy, Vietnam, China, Taiwan.

Una nueva especie de *Anorthoa* Berio, 1980 de Vietnam (Lepidoptera: Noctuidae, Orthosiini)

Resumen

Se describe una nueva especie de Vietnam de *Anorthoa* Berio, 1980, por lo tanto el número de especies en este género ascienden a diez. El nuevo taxón tiene diferencias sorprendentes en la genitalia de la hembra, comparada con la especie relativamente próxima.
PALABRAS CLAVE: Lepidoptera, Noctuidae, Orthosiini, *Anorthoa*, nueva especie, taxonomía, Vietnam, China, Taiwán.

Introduction

Anorthoa Berio, 1980 is a genus in the subfamily Hadeninae, tribe Orthosiini (BERIO, 1980, 1985). According to RONKAY *et al*. (2001), it is closely related to the genera *Perigrapha* Lederer, 1857 and *Harutaeographa* Yoshimoto, 1993, in particular, the *rama*-lineage of the latter. The genus has contained nine known species, they can be separated into three lineages. The proper taxonomic interpretation of these lineages is still disputable. Latest additions of the taxonomy of the genus were given by RONKAY *et al*. (2010) and OWADA *et al*. (2015). Present paper contains the description of a new species found recently in Vietnam, thus the number of species in the genus is raised to ten.

Material and methods

Abbreviations used:

ASZK = private collection of Attila Szabó (Kiskunfélegyháza, Hungary)
BBT = private collection of Balázs Benedek (Törökbálint, Hungary)
HNHM = Hungarian Natural History Museum (Budapest, Hungary)
HT = holotype
PT = paratype
TB = genitalia preparation of Balázs Tóth

Specimens were collected by using artificial light and were examined using modern dissection standards for Lepidoptera genital preparation. Genitalia were stained with eosin. Adults were photographed with an Olympus Camedia 7070 digital camera, genitalia slide with an Olympus DP70 photographic microscope, using the software DPController and DPManager. Images were adjusted and plates were prepared with the software Adobe Photoshop CS6.

Checklist of the genus

Anorthoa Berio, 1980
Type-species: *Anorthoa munda* ([Denis & Schiffermüller], 1775)

munda-group

A. munda ([Denis & Schiffermüller], 1775)
A. plumbeata (Hreblay & Ronkay, 1998)
A. fabiani (Hreblay & Ronkay, 1998)
A. polymorpha Ronkay, Ronkay, Gyulai & Hacker, 2010
***A. dudi* Benedek & Tóth, sp. n.**

angustipennis-group

A. angustipennis (Matsumura, 1926)
A. semifusca Ronkay, Ronkay, Gyulai & Hacker, 2010

rubrocinerea-group

A. rubrocinerea Hreblay & Ronkay, 1998
A. changi Ronkay & Ronkay, 2001
A. biborka Ronkay, Ronkay, Gyulai & Hacker, 2010

***Anorthoa dudi* Benedek & Tóth, sp. n.** (figs 1, 4)

Type material: Holotype 1 (&) (Figs 1, 4), "VIETNAM, Kon Tum prov., Ngoc Linh mt, 1700 m, February 2017, leg. local collector", slide No. TB2038f (coll. ASZK).

Diagnosis: Externally, the new species (Fig. 1) differs from the related species *A. polymorpha* (Fig. 2) and *A. fabiani* (Fig. 3) by its slightly larger size (wingspan of *A. polymorpha* and *A. fabiani* females 43-44 mm, sp. n. 45 mm) and broader, apically less acute but more rounded forewing shape. The female genitalia of the new species (Fig. 4) differ from those of the two related species by the configuration of its appendix bursae which is much shorter and not helicoid, but terminally ovoid, sack-like, and more sclerotized than in the other two species. (Figs 5 and 6, respectively)

Description external morphology of adult (Fig. 1): Wingspan of female holotype 45 mm, forewing length 22 mm. Female antenna filiform. Forewing broad, triangular with rounded apex. Ground colour of frons, thorax and forewing unicolorous ochreous-brown, abdomen darker: fumous brownish-grey. Forewing with very sparse reddish-brown irroration being slightly denser on marginal field than on rest of the wing; ground colour decorated with two faded, reddish-brown subterminal patches: one of them at costa subapically, other on vein M2. Basal line marked with two, antemedian fascia by three tiny black dots on veins; postmedian fascia more distinct, marked by one black dot on each vein from M1 to dorsum. Terminal line represented by blurred greyish patches between veins. Orbicular spot invisible. Reniform very small, slightly darker than ground colour, lunular in shape. Forewing cilia short, with same colour as forewing. Ground colour of hindwing fumous brownish-grey, same as of abdomen, darker than forewing, veins and discal spot darker than ground colour, latter oblong, somewhat lunular; basal and apical thirds of cilia somewhat lighter than ground colour of wing, ochreous-brown, the basal third the lightest, pale yellowish; medial third with same colour as hindwing. Underside of forewing darker than upper side, ground colour like upper side of hindwing, postmedian fascia represented by dark patches on all veins, marginal field somewhat lighter than rest of the wing, terminal line like on upper side, no further pattern. Hindwing underside lighter than its upper side, ground colour like that of forewing upper side, discal spot prominent, postmedian fascia and terminal line like those of forewing underside.

Female genitalia (Fig. 4): Papillae anales oblong, not sclerotised, rather small and moderately setose with two small, digitiform projections at the edges. Apophyses anteriores short but thick, apophyses posteriores longer and narrower thinner than apophyses anteriores. Ostium bursae broad, flattened. Antrum large, broad, oblong in shape, terminally slightly widening, heavily sclerotized. Ductus bursae short, much less sclerotized than antrum, membranous, medially contracted. Appendix bursae huge, sack-like, pyriform in shape, gelatinous and strongly ribbed, its connection to the ductus and cervix covered with a heavily sclerotized and ribbed plate. Cervix bursae small, conical in shape, membranous but ribbed. Corpus bursae ovoid, membranous with two shorter and two longer, longitudinally directed, narrow signum bands, whole surface with shallow longitudinal ribs.

Male unknown.

Distribution and bionomics: The new species are known only from its type-locality. The preimaginal stages and the foodplant are unknown.

Etymology: The new species is dedicated to Ms. Zsuzsanna Valentin-Bodor.

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BIBLIOGRAPHY

BERIO, E., 1980.– Modificazioni al sistema delle Hadeninae e Cuculliinae Italiane attualmente seguito (Lepidoptera - Noctuidae).– *Annali del Museo civico di Storia Naturale Giacomo Doria,* **83**: 1-19.

BERIO, E., 1985.– Lepidoptera. Noctuidae I. Generalitá, Hadeninae, Cuculliinae.– *Fauna d'Italia*, **22**: 970 pp. Edizione Calderini, Bologna.

HREBLAY, M. & RONKAY, L., 1998.– Noctuidae from Nepal - Moths of Nepal, Part 5.– *Tinea,* **15** (Supplement 1.): 113-310.

HREBLAY, M. & RONKAY, L., 1998.– Noctuidae from Nepal - Moths of Nepal, Part 5.– *Tinea,* **15** (Supplement 1.): 113-310.

HREBLAY, M., 1996.– Neue paläarktische Taxa aus der Gattung *Perigrapha* Lederer, 1857 (Lepidoptera, Noctuidae).– *Esperiana,* **4**: 65-94.

OWADA, M., WU, S., FU, C-M., HUANG, H-Y. & YAMAMOTO, M., 2015.– *Anorthoa plumbeata* (Hreblay & Ronkay, 1998), stat. nov. (Noctuidae, Hadeninae), a bona species endemic to Taiwan, with notes of immature stages.– *Tinea,* **23**(3): 171-176.

RONKAY, G. & RONKAY, L., 2001.– New Noctuidae taxa from Taiwan and the adjacent regions (Lepidoptera), II.– *Acta Zoologica Academiae Scientiarium Hungaricae,* **47**(4): 371-398.

RONKAY, L., YELA, J. L. & HREBLAY, M., 2001.– Hadeninae II.– *Noctuidae Europeae*, **5**: 452 pp.

RONKAY, G., RONKAY, L., GYULAI, P. & HACKER, H., 2010.– New Orthosiini (Lepidoptera, Noctuidae, Hadeninae) species and genera from the wide sense Himalayan region.– *Esperiana,* **15**: 127-221.

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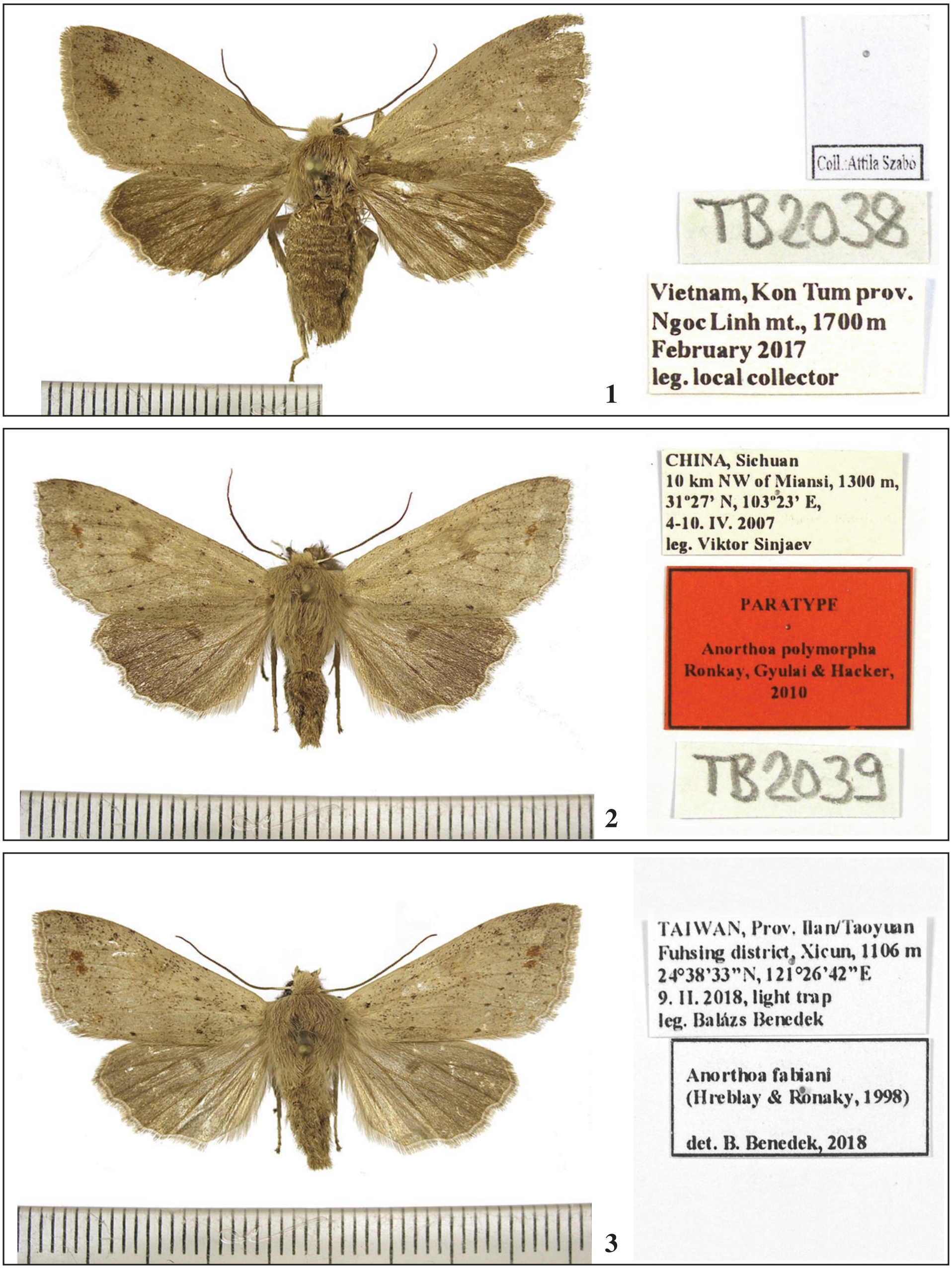
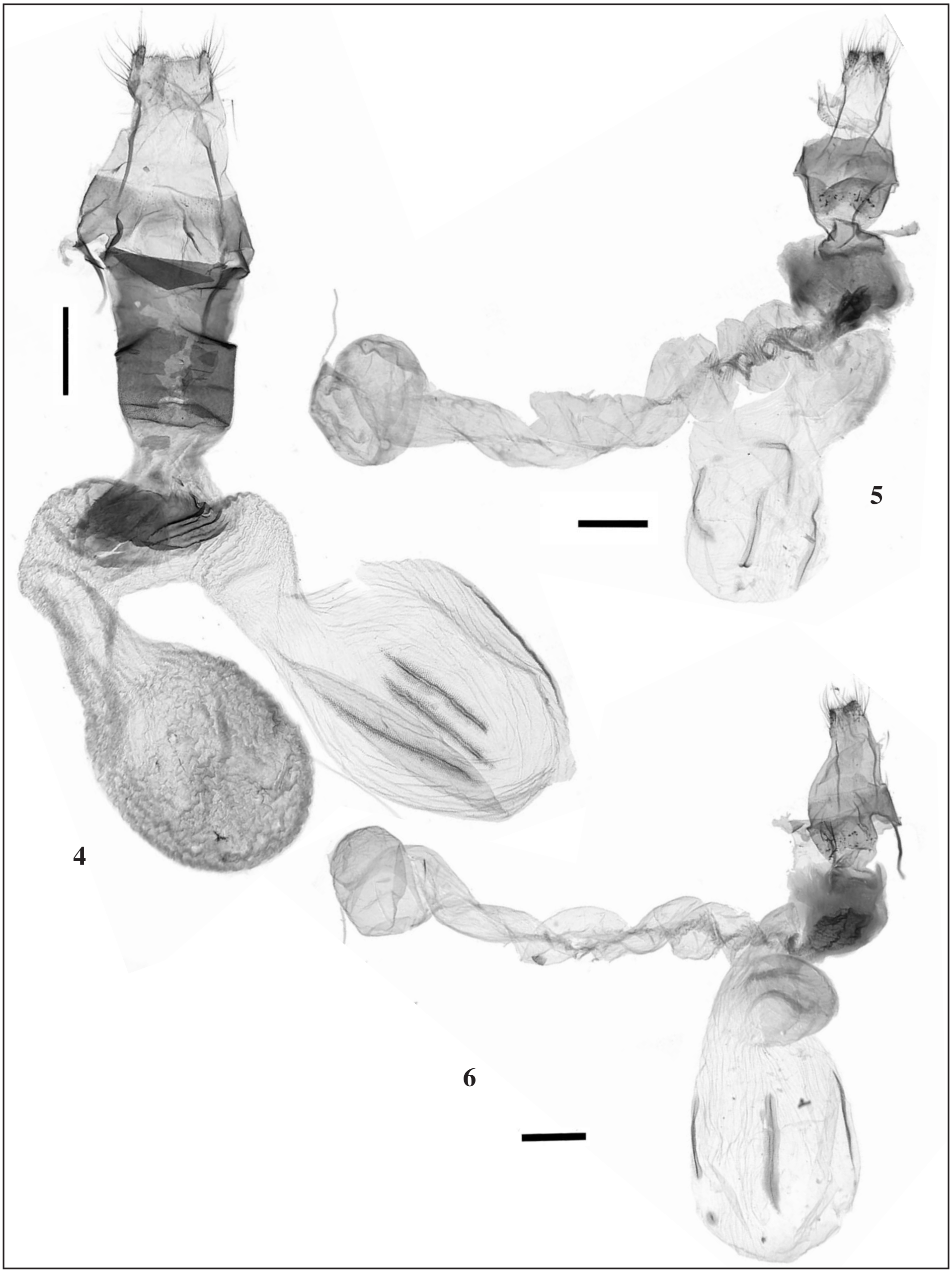


Figures 1-3.– Adults of *Anorthoa* spp. from Southeast Asia and their labels. **1.** *Anorthoa dudi* Benedek & Tóth, sp. n. **2.** *Anorthoa polymorpha* Ronkay, Ronkay, Gyulai & Hacker, 2010. **3.** *Anorthoa fabiani* (Hreblay & Ronkay, 1998). Photos by Balázs Tóth.



Figures 4-6.– Female genitalia of *Anorthoa* spp. from Southeast Asia. **4.** *Anorthoa dudi* Benedek & Tóth, sp. n. (TB2038f). **5.** *Anorthoa polymorpha* Ronkay, Ronkay, Gyulai & Hacker, 2010 (TB2039f). **6.** *Anorthoa fabiani* (Hreblay & Ronkay, 1998) (TB2040f). Scale bar: 1 mm. Photos by Balázs Tóth.

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

P. Huemer

Abstract

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

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

Resumen

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

Introduction

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

Material and methods

Specimens: Material used in this study was traditionally set and dried or pinned and subsequently spread. Genitalia preparations followed standard techniques (ROBINSON, 1976), adapted for the male genitalia of Gelechiidae by the "unrolling technique" as described by PITKIN (1986).

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

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

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

Results

MOLECULAR ANALYSIS

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

TAXONOMY

Scrobipalpa antoniovivesi Huemer, sp. n.

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

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

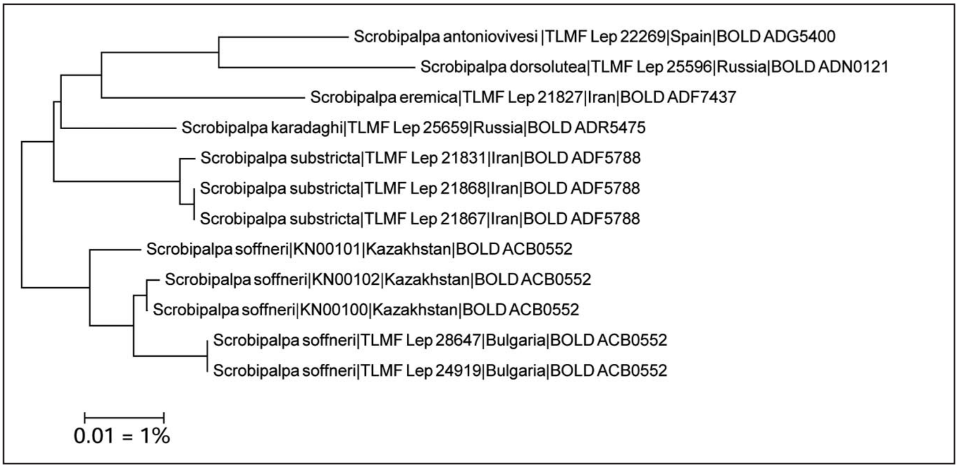


Fig. 1.– Neighbor-Joining tree of *Scrobipalpa antoniovivesi* Huemer, sp. n. and it´s nearest species (Kimura 2 parameter). Source: DNA Barcode data from BOLD (Barcode of Life Database, cf. RATNASINGHAM & HEBERT, 2007).

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

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

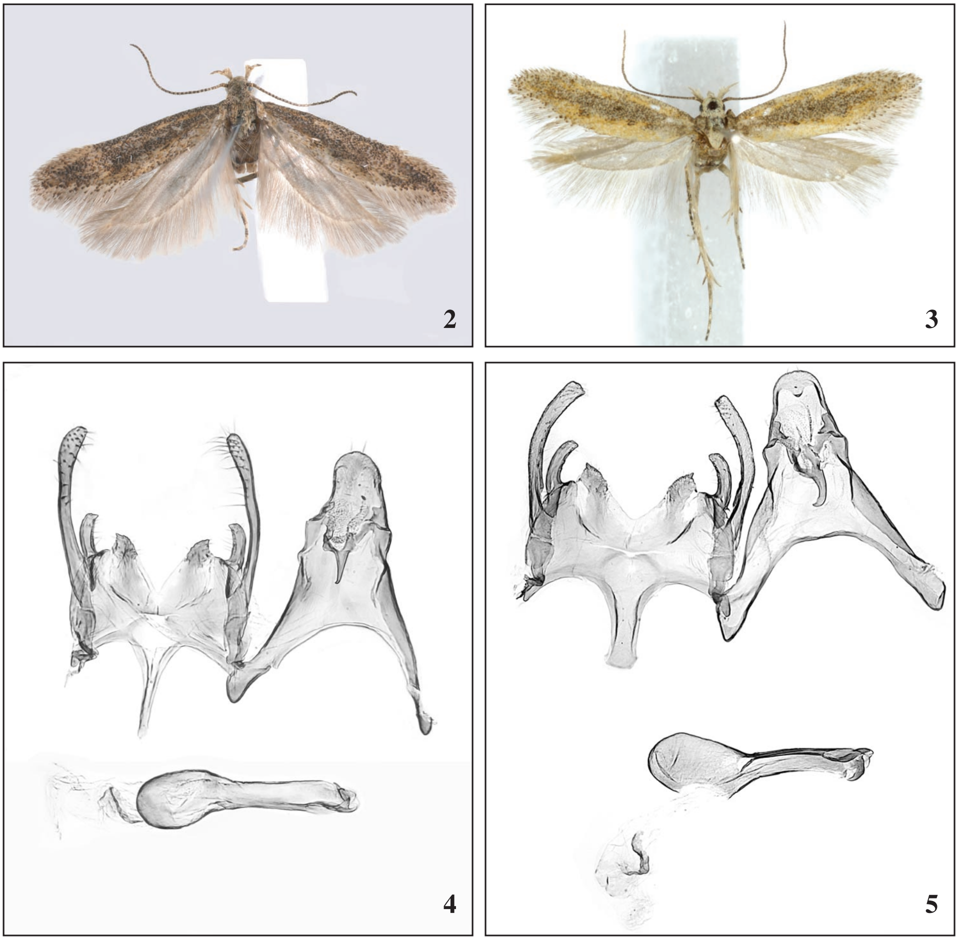
Female genitalia: Unknown.

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

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

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

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



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

Discussion

A basic requirement for the description of new species is the availability of modern generic revisions. Such a pre-requisite is already available for the vast majority of European Lepidoptera, but unfortunately parts of the family Gelechiidae still lack revisionary attempts. However, though it is expected that a considerable number of cryptic species in this family remains unnamed so far (HUEMER *et al*., 2020) new descriptions should only be introduced after thorough revisionary work.

This is particularly true for descriptions of new species from unique specimens, which should normally be avoided, due to possible intraspecific variability, but also in view of eventual abnormalities of genitalia structures. In critical cases, the aim is therefore to always sample additional material, a requirement which often cannot be achieved. In the case of *S. antoniovivesi* Huemer, sp. n. too, no further specimen has yet been discovered, despite an intensive search in various collections.

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

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The author is particularly grateful to Dr. Paul D. N. Hebert and the staff at the Canadian Centre for DNA Barcoding for sequence analysis and support with BOLD. Dr. Joaquin Baixeras kindly helped in obtaining collecting permits. Stefan Heim and Geert Brovad supported the work with their photographic skills. Finally, Dr. Antonio Vives is thanked for editorial tasks.

BIBLIOGRAPHY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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Una nueva especie del género *Abraxas* Leach, [1815] del Monte Langgaliru, de la isla de Sumba (Indonesia) (Lepidoptera: Geometridae, Ennominae)

A. Expósito-Hermosa

Resumen

Se describe *Abraxas* (*Calospilos*) *delcampoe* Expósito, sp. n., con ejemplares del Monte Langgaliru isla de Sumba (Indonesia). Se proporcionan imágenes del adulto y genitalia del macho.
PALABRAS CLAVE: Lepidoptera, Geometridae, Ennominae, Abraxini, *Abraxas, Calospilos,* especie nueva, Sumba, Indonesia.

A new species of the genus *Abraxas* Leach, [1815] from Mount Langgaliru, Sumba Islands (Indonesia) (Lepidoptera: Geometridae, Ennominae)

Abstract

Abraxas (*Calospilos*) *delcampoe* Expósito, sp. n., with exemplars from Mount Langgaliru, Sumba Island (Indonesia). Images of the adult and genitalia of the male are provided.
KEY WORDS: Lepidoptera, Geometridae, Ennominae, Abraxini, *Abraxas, Calospilos,* new species, Sumba, Indonesia.

Introducción

No son frecuentes, sino, más bien, escasas las especies pertenecientes a *Abraxas* Leach, [1815], que portan alas translúcidas. Una de ellas y, tal vez, la más significativa, por la casi total ausencia de diseño en sus alas, es, sin duda, la *Abraxas* (*Calospilos*) *membranacea* Warren, 1894 que fue descrita de Oinainissa en la isla de Timor.

Hemos podido estudiar dos series, con morfología externa parecida: una de Timor (18 ejemplares) y otra de Sumba (5 ejemplares). La del Monte Molo en la Isla de Timor se corresponde, muy bien, con la descripción de la *A. membranacea*, pero la del Monte Langgaliru del centro de la isla de Sumba muestra evidentes diferencias con la especie precedente. Por lo que seguidamente se analiza y procede a su descripción como una especie nueva.

Abreviaturas utilizadas

AEH Colección de Andrés Expósito Hermosa, Móstoles (Madrid), España.

Resultados

Abraxas (*Calospilos*) *delcampoe* Expósito, sp. n.

Holotipo ♂: Indonesia, Mt. Langgaliru, Isla de Sumba, II-2016, colector local. (Preparación de genitalia AEH3333). Paratipos 3 ♂♂, Indonesia, Mt. Langgaliru, Isla de Sumba, II-2016 y 1 ♂, Mt. Langgaliru, Isla de Sumba,VIII-2016, colector local (Preparación de genitalia AEH3335). Todos los ejemplares y preparaciones de genitalia quedan depositados en la colección del autor AEH.

Descripción (Figs. 1 y 2): La expansión alar de los machos es de 33-35 mm, mientras que, en la descripción de *A. membranacea* Warren, 1894 es de 30-38 y en la serie del Monte Molo es de 30-36 mm (Figs. 3 y 4). Las alas son extremadamente translúcidas y brillantes con el fondo de las mismas, en general, de tono más oscuro que en *A. membranacea* acentúandose, el oscurecimiento, más hacia la costa y termen de ambas alas. Total ausencia de bandas y líneas verticales, y presencia de una pequeña mancha discal débil en ambas alas, con falta de fovea. El reverso, al ser las alas translúcidas; es semejante, pero las manchas discales están algo más marcadas. Patagia de tono ocre y no blanquecino como en *A. membranacea.* En el anverso del abdomen las pequeñas manchas negras están muy marcadas y resaltan bastante bien sobre el fondo ocre, el reverso es muy parecido al anverso y no es blanquecino como en *A. membranacea*. Cabeza similar a *A. membranacea.* Antenas bipectinadas pero con los flagelos muy largos (este caracter separa inmediatamente a los machos de las dos especies).

Hembra desconocida.

Genitalia del macho (Figs. 5 y 6): La cápsula presenta un uncus alargado más ancho en su zona central que en; la zona distal y más redondeada que en *A. membranacea* (Fig. 7). Falta de gnathos. La costa de las valvas son más gruesas en *A. membranacea* asi como la valvula que es denticular en la nueva especie. La concavidad de sinus es menor en *A. membranacea*. Parte distal del sacculus muy puntiagudo. Las valvas de la figura 5, están abiertas y presentan, al abrirlas, algún desgarro, mientras que la de la figura 6, las valvas se hallan abatidas. Juxta subtriángular irregular. Aedeagus tubular y delgado; más recto en *A. membranacea,* la vesica sin cornuti y coecum penis más corto en la nueva especie. Saccus ovoideo.

Se asigna la nueva especie, así como a *A. membranacea* Leach, [1815], por los caracteres de su morfología interna, al subgénero *Calospilos* Hübner, [1825] (INOUE, 1970: 204; HOLLOWAY, 1994).

Distribución: Solo se la conoce del Monte Langgaliru, Isla de Sumba, Indonesia.

Etimología: Se dedica esta especie nueva a la Dra. Marta del Campo Velasco y se la denomina como *delcampoe*.

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BIBLIOGRAFÍA

HOLLOWAY, J. D., 1994.– The Moths of Borneo, part 11: Geometridae, Ennominae.– *Malayan Nature Journal*, **47**: 1-309, 19 pls.

HÜBNER, J., 1816-[1825].– *Verzeichniss bekannter Schmettlinge (sic)*: 431 pp. Augsburg.

INOUE, H., 1970.– Geometridae of the eastern Nepal based on the collection of the lepidopterological research expedition to Nepal Himalaya by the Lepidopterological Society of Japan in 1963. Part I: Genera *Abraxas* Leach and *Arichanna* Moore.– *Special Bulletin of the Lepidopterological Society of Japan*, **4**: 203-239.

LEACH, W. E., [1815].– Entomology.– *In* BREWSTER. *Edinburgh Encyclopaedia*, **9**(1): 57-172.
WARREN, W., 1894.– New Genera and Species of Geometridae.– *Novitates zoologicae,* **1**: 366-534.

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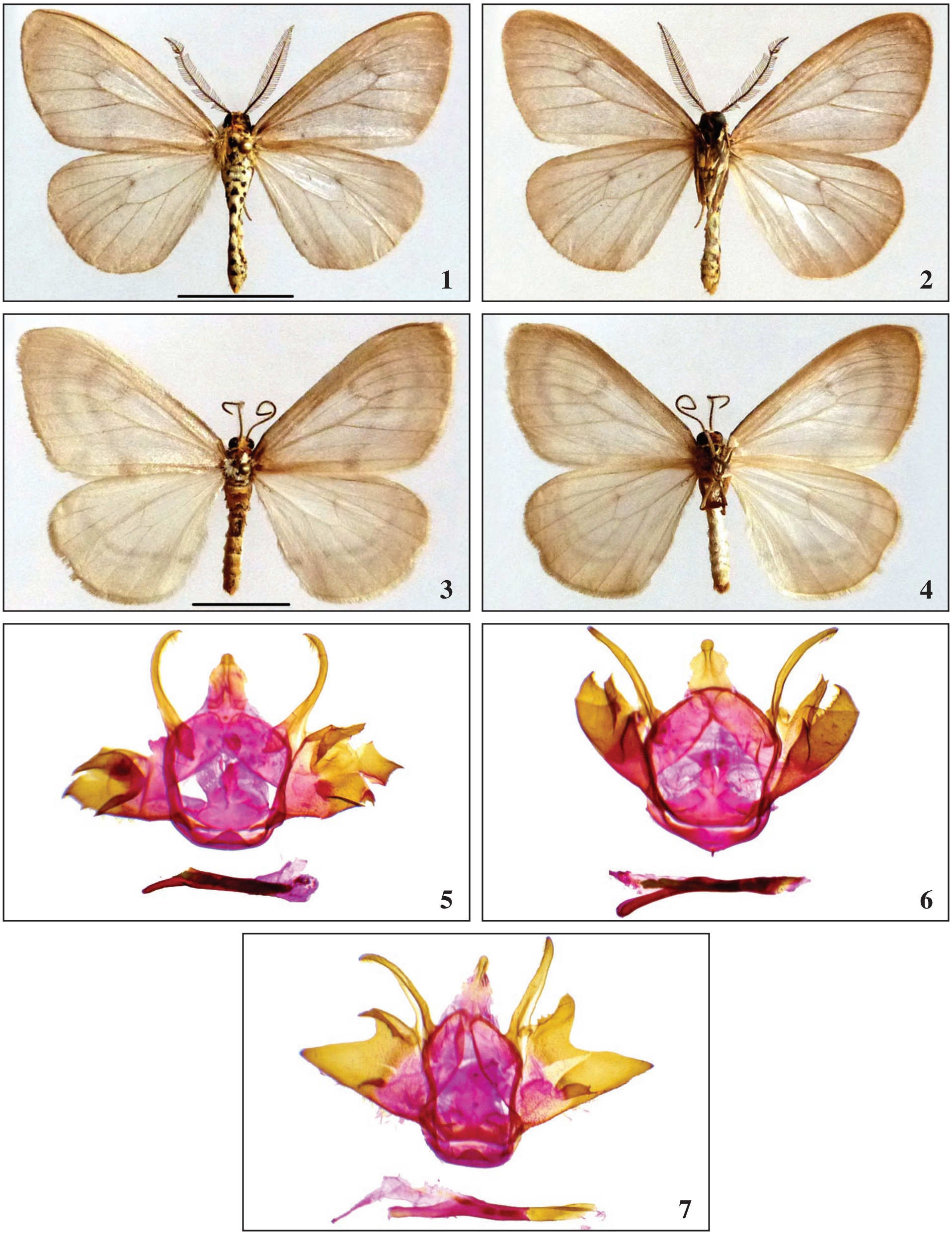

Figs. 1-7.– 1-2, 5-6.– 1. *Abraxas* (*Calospilos*) *delcampoe* Expósito, sp. n., Mt. Langgaliru, Isla de Sumba, Indonesia. **1.** Paratipo ♂, anverso. **2.** Reverso. **5**. Holotipo ♂, preparación de genitalia AEH3333 **6**. Paratipo ♂, preparación de genitalia AEH3335. **3-4, 7.** *Abraxas* (*Calospilos*) *membranacea* Warren, 1894, Mt. Molo, Isla de Timor, Indonesia. **3.** Anverso. **4.** Reverso. **7.** ♂, preparación de genitalia AEH3334. (Escala 1 cm).

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A new *Oncocnemis* Lederer, 1853 taxon from Europe (Lepidoptera: Noctuidae)

S. V. Beshkov

Abstract

A new taxon *Oncocnemis michaelorum srnkai* Beshkov, ssp. n. is described from the Balkan Peninsula, Bulgaria. The new subspecies, in comparison with the other European members of the *Oncocnemis confusa* (Freyer, [1839]) species group, shows differences both in outward appearance and in the female and male genitalia, including the everted vesica. *Oncocnemis michaelorum srnkai* Beshkov, ssp. n. is a local endemic race, found in three localities close to each other ca. 30 km NW of Sofia. It is abundant in the type locality.
KEY WORDS: Lepidoptera, Noctuidae, *Oncocnemis,* new subspecies, Bulgaria.

Un nuevo *Oncocnemis* Lederer, 1853 de Europa (Lepidoptera: Noctuidae)

Resumen

Se describe un nuevo taxon *Oncocnemis michaelorum srnkai* Beshkov, ssp. n. de la Península Balcánica, Bulgaria. La nueva subespecie, en comparación con otros miembros europeos del grupo de especies de *Oncocnemis confusa* (Freyer, [1839]), ambos muestran diferencias en el aspecto externo y en la genitalia de las hembras y machos, incluyendo el vesica evertida. *Oncocnemis michaelorum srnkai* Beshkov, ssp. n. es una raza endémica local, encontrada en tres localidades cercanas cada una de ellas a 30 kilómetros al NO de Sofía. Es abundante en la localidad de tipo.
PALABRAS CLAVE: Lepidoptera, Noctuidae, *Oncocnemis,* nueva subespecie, Bulgaria.

Introduction

Oncocnemis Lederer, 1853 is a large genus containing about 20 Palaearctic and 90 Nearctic species. The majority of the species are associated with xerothermic habitats. Most of the Palaearctic species inhabit xeromontane and eremic regions in Central Asia and the Middle East. Most of the species are local, often occurring in relatively small areas of a more or less continuous biotope. On the other hand, they are regularly frequent in these places, sometimes appearing in masses. The moths are excellent flyers, coming regularly to light (RONKAY & RONKAY, 1995). In Europe there are seven species (FIBIGER *et al.,* 2011). Most of them reach Europe only in restricted areas west of the Ural Mts. *Oncocnemis exacta* Christoph, 1887 is found in the Rostov district (FIBIGER *et al.,* 2010). One subspecies of *Oncocnemis nigricula* (Eversmann, 1847) - *Oncocnemis nigricula eberti* Agenjo, 1985 occupies a small part of Northern Spain. A single female specimen of *Oncocnemis confusa* (Freyer, [1839]) has been reported from the Cluj district, Transylvania in Romania (RÁKOSY, 1998, 2000). In the Balkan Peninsula there is one species - *Oncocnemis michaelorum* Beshkov, 1997. Nominotypical *Oncocnemis michaelorum michaelorum* Beshkov, 1997 is a local endemic for the “Silver Coast” - the coastal area between Balchik Town and Cape Kaliakra, Bulgarian North Black Sea Coast (BESHKOV, 1997).

In August 2019 friends and colleagues from the Slovak Republic, Zdenko Tokár and Lubomir Srnka, sent to the present author (SB) a picture of an *Oncocnemis* species for identification. The first impression of SB was that they had found dark specimens of *Oncocnemis michaelorum* Beshkov. One male specimen was dissected, Gp.♂ Z. Tokár No 13638, vesica not everted. The large ventral cornuti field has a few very strong and long bulbed spines, as in *Oncocnemis michaelorum*, and the appearance of the moths eliminate the possibility of being conspecific with *Oncocnemis confusa*. This *Oncocnemis* was collected by the Slovak colleagues in the area between Slivnitsa and Dragoman towns, ca 420 km distant in a straight line from the only known locality of *Oncocnemis michaelorum.* Later on SB visited that area (between Slivnitsa and Dragoman towns, Tri Ushi Hills, above Aldomirovsko Blato Swamp, 745 m, N42.90339, E22.98595) on 4-IX-2019, but without finding *Oncocnemis* species. In 10-VIII-2020 and 12-VIII-2020 SB & Ana Nahirnić-Beshkova spent two nights at near the same locality. On 14-VIII-2020 SB spent a night collecting on Tchepun Hill above Dragoman Town. SB spend two more nights in August 2020 in the area between Beledie Han and the area between Slivnitsa and Dragoman towns - one alone on 16-VIII-2020 and one together with Viktor Gashtarov on 22-VIII-2020. Four different localities were covered as were used three light traps and lamps with a generator. Above Kostinbrod Town in the easternmost three (Beledie Han village surroundings, above Lyulyaka Chalet, 847 m, N42.89910, E23.16802; above Beldie Han Village, 775 m, N42.89210, E023.15772; near Ponor village, 949 m, N42.91642, E23.12922) from six localities *Oncocnemis* specimens were not collected. These localities and one additional (Buchin Prohod) were repeated in August, 2021, some of them twice. Localities where *Oncocnemis* was found are listed below.

Material and methods

The collecting methods involved two or three portable light traps with an 8 watt “Blacklight” white tube (368 nm) and 8 watt “Blacklight” black tube, both powered by 12 volt 9Ah batteries, as well as a Finnish “tent trap” with a 160 watt MV bulb at the top of the pole and a 20 watt (368 nm) black light over the catching pot below. An additional 20 watt (368 nm) lamp was also positioned about 70m from the tent trap. The distance between the Finnish “tent trap” and the light traps, as well as between the light traps themselves, was sometime more than 1 km, as they were deployed with different outlooks wherever possible. On 16-VIII-2020 and 22-VIII-2020 four different localities were covered per night with distances between traps from 1.5 to 6 km. All traps ran throughout the night.

Genitalia were mounted on glass slides in Euparal after staining with a 2% Merbromin solution. All genitalia slides were photographed with a Zeiss stereo microscope Stemi 2000-C with Canon EOS 70D digital camera; everted vesica and female genitalia were photographed in alcohol before mounting on glass in Euparal. When two or three items are included as one figure (including Figs 59a, b; 60a, b; 61a, b; 62a, b; 63a, b; 64a, b) they were photographed together as one frame. Insects and collecting localities were photographed with a Sony DSChX400v digital camera; the scale line is 1 cm. Unless indicated otherwise, illustrated specimens were collected by S. Beshkov (SB) and together with the genitalia slides are part of the collection of the author in NMNHS. All trips were self-financed by the author and undertaken in his own time.

Oncocnemis michaelorum srnkai Beshkov, ssp. n.

Type material Holotype, 1 ♂ (Fig. 1): Bulgaria, Sofia Region, Dragoman distr., Tchepun Hill, below Petrovski Krust summit, 1167 m, 14-VIII-2020, N42.94797, E022.95211 (T.L.), SB leg. at light, Gen. prep. 1./30.8.2020, SB, male genitalia (Fig. 21) with everted vesica (Figs 22-23). Holotype and genitalia slide are with additional label on red paper: “HOLOTYPE//*Oncocnemis michaelorum*//*srnkai* Beshkov, 2021// SHILAP volume 49”. Paratypes: same as holotype, 77 ♂♂ (Figs 2-6), Gen. preps SB 1./28.8.2020 (Figs 24-25), 1./29.8.2020 (Figs 26-27), 2./29.8.2020 (Figs 28-29), 2./09.9.2020 (Figs 30-31), male genitalia with everted vesica, and 7 ♀♀ (Figs 7-9), Gen. preps SB 1./14.9.2020 (Figs 53-54), 1./15.9.2020 (Figs 65-66), 2./16.9.2020 (Figs 51-52); Ibid, 10-VIII-2021, SB & A. Nahimić-Beshkova leg, 30 ♂♂ and 4 ♀♀. Bulgaria, Sofia Region, between Slivnitsa and Dragoman towns, Tri Ushi Hills, above Aldomorovsko Blato Swamp, 739 m, N42.90403, E022.98705, 10-VIII-2020, S. Beshkov & Ana

Nahirnić-Beshkova leg., 1 ♂ (Fig. 10) and 1 ♀; Ibid, 12-VIII-2020, 17 ♂♂ and 7 ♀♀; Dragoman, 3 km SE, 700 m, N42º54'08", E22º59'19", 18-VIII-2019, 3 ♂♂ and 1 ♀, leg. and in coll. Lubomir Srnka, Gp. ♀ Z. Tokár No 13638, vesica not everted; Ibid, 12-VIII-2021, 4 spp.; above Kostinbrod Town, between Ponor and Bezden villages, 913 m, N42.91343, E023.09819, 22-VIII-2020, S. Beshkov & V. Gashtarov leg., 2 ♂♂ in coll. V. Gashtarov (Sofia). Ibid, 7-VIII-2021, 2 ♂♂, leg. and in coll. L. Srnka. Holotype and many paratypes are deposed in the collection of S. Beshkov in the collection of National Museum of Natural History, Sofia (NMNHS). 8 ♂♂ and 2 ♀♀ are deposited in the collection of Dr. Antonio Vives / Museo Nacional de Ciencias Naturales (Madrid, Spain). Some of the paratypes will be distributed to important European museums and collections. Paratypes and slides with their genitalia are with additional label on red paper: PARATYPE//*Oncocnemis michaelorum*//*srnkai* Beshkov, 2021// SHILAP, volume 49.

Description: Wingspan 29 mm (holotype), paratypes male and female 28-31mm, average ~29 mm. Palpi, frons, thorax and forewings grey to ash grey with ochreous and brick-like scales. Probosculus well developed, brownish. Antennae dark brown with light scales, segments almost square, ciliate in males. Length of the cilia ca 0.8 of the antennae width. Female antennae filiform with white and blackish transverse bands as the whitish ones are ca. 2 times wider than the blackish ones. Tegulae forms a brick-coloured patch of scales, at their end between the thorax and abdomen surrounded with long lighter hair (Fig. 6). Abdomen ash grey, posteriorly with ochreous scales in males and unicolour in females. Forewings with rather diffuse pattern, antemedial, medial and postmedial lines double, dark brown to blackish, sinuous with dark patches on the outer margin. Subterminal line dentate, ochreous. Terminal line well defined, ochreous, cilia the same colour or lighter than the wing colour. Basal part of the forewings in the inner part creamy, the same colour as the hindwings. Claviform stigma not well defined, just as a small light area basally below the orbicular stigma. Orbicular stigma more or less clear, rounded, unicolourous, light creamy-ochreous and the light coloration continues diffusely below to the inner margin. Reniform stigma more or less clear, irregular, unicolourous, light creamy-ochreous and the light coloration continues diffusely below to the inner margin. Orbicular and reniform stigmas separated by a blackish square patch formed by the medial line, which can continue to the outer margin. Hindwings dirty whitish to creamy in females with black veins and black scales. Transversal lines and discal spot almost indistinct. Marginal field broad, conspicuous, dark brown to blackish. Terminal line well defined yellowish-ochreous, cilia dark brown proximally and yellowish-ochreous distally. Underside (Figs 3, 5) both wings dirty creamy-whitish with conspicuous dark marginal area. Transversal lines and discal spot almost indistinct. Terminal line and cilia as above.

Male genitalia: Valvae lancetolate with almost parallel margins and slightly curved costal margin, cucullus with triangular apex, angled at ca. 45º. Harpe arcuate, relatively short, and broad, bearing a strong, claw-like extension. Holotype (Fig. 21) measures as follows in mm: harpe length/width 0.6/0.2, claw-like extension 0.15, uncus 1.1, length of the valva 3.1. In some specimens (Gen. prep. 1./28.8.2020 (Fig. 24) even shorter and wider: harpe 0.55/0.25, length of the valva 3.0, in Gen. prep. 1./29.8.2020 (Fig. 26): harpe 0.6/0.25, length of the valva 3.15. Aedeagus slightly curved sinusoidally, length 4.1-4.5, in holotype (Figs 22-23) it is 4.1. Everted vesica (Figs 22-31) slightly longer than the length of the aedeagus. In basal part it is twisted about 170º laterally and very slightly axially so lies in a plane and runs parallel to the aedeagus, slightly curved externally in its middle. In the ventral side there are several very big cornuti, 7 in holotype with large bulbous bases, followed by 6-7 more big cornuti mainly in the proximal part and many smaller ones. Dorsal part of the vesica in its outer part is covered by many small cornuti. Basal part of the vesica with one field of very small and thin cornuti and with another on the dorsal side with bigger cornuti, continuing with many smaller ones to the apex. Terminal cornutus is long and thin, irregular, with a large bulbous base, surrounded with very long bristles (Figs 22-31). In holotype (Figs 22-23) measurements as follows in mm: big cornuti 1.05 with the bulbus apical tuft 1.0, apical cornutus 0.5, vesica length 4.4. In some specimens (Gen. prep. 1./28.8.2020) (Figs 24-25) big cornuti 1.0 with the bulbus, apical tuft 0.7, apical cornutus 0.5, vesica length 4.7; in Gen. prep. 1./29.8.2020 (Figs 26-26): big cornuti 1.2 with bulbs, apical tuft 1.1, apical cornutus 0.5, vesica length 4.5.

Female genitalia (Figs 51-54): Typical for the group but more similar to *O. michaelorum michaelorum* (Figs 55-56) than to *O. confusa* (Figs 57-58). Ovipositor lobes roughly spiny and with tuft of long hair. Dimension in mm: ductus 0.65-0.7; dorsal plate 1.6-1.75; ventral plate 1.25-1.3;

ductus with plate to 8ht abdominal segment: 3.0-3.2; length of the bursa longitudinally: 3.5-4.2. Bursa copulatrix irregular, almost as wide as long. Appendix bursae long and narrow.

Differential diagnosis: The new subspecies is very similar to its relatives, closer to *O. michaelorum michaelorum* (Figs 11-15) then to *O. confusa* (Figs 16-20). *Oncocnemis michaelorum srnkai* ssp. n. can be easily separated from *O. michaelorum michaelorum* by wing colour; *O. michaelorum srnkai* ssp. n. is more strongly contrasting and colorful, grey to ash grey with ochreous and brick-like tints, whereas *O. michaelorum michaelorum* is unicolourous silverish (Figs 11-13). *Oncocnemis confusa* is less contrasting and more unicolorous (Figs 16-19). Male genitalia of *Oncocnemis michaelorum srnkai* ssp. n. differs with lanceolate almost parallel valvae margins and slightly curved costal margin, cuculus with triangular apex, angled at ca. 45º (Figs 21, 24, 26, 28, 30). In both *O. michaelorum michaelorum* (Figs 32-34) and *O. confusa* (Figs 37, 39, 42) the valvae are more arcuate, narrow distally and with more pointed cucullus. Length of the valva in mm: *O. michaelorum srnkai* ssp. n. 3.0-3.15, in *O michaelorum michaelorum* 3.0-3.25, in *O. confusa* 2.4-3.1. Harpe in *O. michaelorum srnkai* ssp. n. is short and wide, more robust, 0.55-0.6/0.2-0.25, in *O. michaelorum michaelorum* 0.6-0.7/0.2 and in *O. confusa* 0.55-0.8/0.16. Aedeagus is 4.0-4.2 in *O. michaelorum srnkai* ssp. n., 3.7-4.2 in *O. michaelorum michaelorum* and 3.3-4.0 in *O. confusa.* Everted vesica in *O. michaelorum srnkai* ssp. n. lies almost in a plain, those of *O. michaelorum michaelorum* and *O. confusa* are twisted axially. Vesica of *O. michaelorum srnkai* ssp. n. and *O. michaelorum michaelorum* are equal - 4.4-4.7 mm, in *O. confusa* usually remarkably smaller - 3.2-3.5 but exceptionally to 4.9 mm (Gen. prep 3./29-8-2020). The differences in the dimensions and the spatial structure are demonstrated in figs 45-50 where everted vesica of these three taxa, as well as of *Oncocnemis confusa persica* Ebert, 1978 are photographed together in the same positions in isopropanol. Spatial configuration of elastic membranous structures, however, depends also on pressure used for everting them, which also depends on the aperture of the vesica ejaculatorius, and even in manipulations performed in the same way results can be different (see figs 45-50). During copulation, however, the position of the vesica must be different because the vesica ejaculatorius is in the main tube and in the aedeagus. The biggest cornuti of *O. michaelorum srnkai* ssp. n. and *O. michaelorum michaelorum* are equal 1.0-1.2 mm, in *O. confusa* usually remarkably smaller 0.6 but exceptionally 0.9 mm (Gen. prep 3./29-8-2020, Figs 37-38). The apical tuft in *O. michaelorum srnkai* ssp.n. is 0.7-1.1mm, in *O. michaelorum michaelorum* 1.0 mm, in *O. confusa* 0.75-0.8 mm; The apical cornutus in *O. michaelorum srnkai* ssp.n. is 0.5 mm, in *O. michaelorum michaelorum* 0.5-0.55 mm, in *O. confusa* 0.3-0.55 mm. The female genitalia of *O. michaelorum srnkai* ssp. n. differs from these of *O. confusa* by its shorter ductus bursae (0.65-0.7 in *O. michaelorum srnkai* ssp. n. and 1.0 in *O. confusa*) and the shape of the bursa copulatrix (Figs 59-64). The apendix bursae is thinner in *O. michaelorum srnkai* ssp. n.; *O. michaelorum michaelorum* has longer and thinner appendix bursae (Figs 65-66). The dorsal and ventral plates in *O. confusa* are smaller (Figs 59-64). The differences in the dimension and the spatial structure are illustrated on figs 65-66 where equally inflated female genitalia of the three taxa are photographed together in the same positions in isopropanol, which however do not represent the natural positions in the insects' abdomens.

Distribution: *Oncocnemis michaelorum srnkai* Beshkov, ssp. n. is known from a small area in Bulgaria, NW from Sofia: Tchepun Hill, below Petrovski Krust summit, 1167m, N42.94797, E022.95211 (Fig. 67) and two more localities in the Tri Ushi Hills. In all three localities *Artemisia alba* Turra is well represented. Habitat type: Mountain petrophytic steppes 02E1. Relationships with habitat classifications: EUNIS: E1.21 Helleno-Balkan [*Satureja montana* L.] steppes; PAL. CLASS.: 34.311 Helleno-Balkan savory steppes; HD 92/43: 62A0 Eastern sub-Mediterranean dry grasslands (*Scorzoneretalia villosae*) (TZONEV, DIMITROV & GUSSEV, 2015). *Oncocnemis michaelorum srnkai* ssp. n. in the type locality is synchronic with *Narraga tessularia* (Metzner, 1845), *Charissa mutilata* (Staudinger, 1878), *Phibalapteryx virgata* (Hufnagel, 1767), *Cucullia formosa* Rogenhofer, 1860, *Cucullia santonici* (Hübner, [1813]), *Craniophora pontica* (Staudinger, 1879), *Hadena drenowskii drenowskii* (Rebel, 1930), *Chersotis elegans* (Eversmann, 1837). The other localities and more species which are syntopic and synchronic with *O. michaelorum srnkai* ssp. n. are listed and illustrated in BESHKOV & NAHIRNIĆ-BESHKOVA (2021).

Fig. 67.– Type locality of *Oncocnemis michaelorum srnkai* Beshkov, ssp. n.: Tchepun Hill, below Petrovski. Krust summit, 1167 m.

Molecular data: Two legs from two paratypes from the type locality were sent to Dr Axel Hausmann (Munich, Germany) with numbers: BC SB Lep 0500, male (Fig. 4) and BC SB Lep 0501, female (Figs 8-9). On 16-02-2021 Dr Hausmann wrote: "The two Noctuidae are DNA (Fig. 68) barcoded now: both are *Oncocnemis michaelorum*". The BOLD TaxonID Tree is presented below. *Oncocnemis michaelorum srnkai,* ssp. n. is not included, because there are no differences from *O. michaelorum*.

Project: Stoyan Beshkov's Collection of Lepidoptera - NMNHS [NMNHL]
Date: 5-July-2010
Data Type: Nucleotide
Distance Model: Kimura 2 Parameter
Codon Positions: 1st, 2nd, 3rd

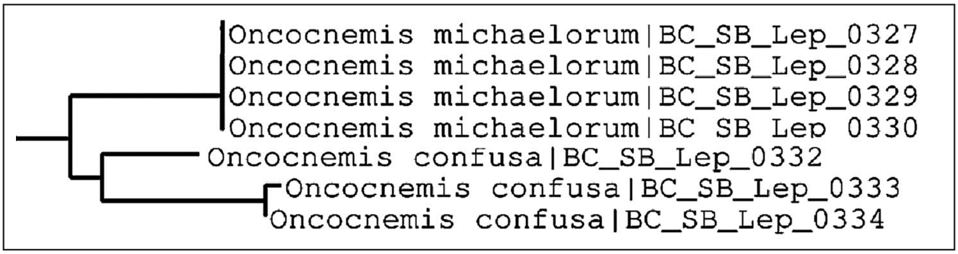

Fig. 68.– Barcode TaxonID Tree.

Etymology: The new taxon is named after the famous Slovak collector Mr. Lubomir Srnka (Lehota pod Vtáènikom, SK) who first found this remarkable *Oncocnemis*.

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I am glad to thank Mr. Zdenko Tokár (Šala, SK) and Mr. Lubomir Srnka (Lehota pod Vtáčnikom, SK) for sharing their finding with me, Dr Zoltan Varga (Debrescen, HU) and Dr Laszlo Ronkay (Budapest, HU) for confirming the new subspecies and their comments, Dr Axel Hausmann (Munich, D.) for the molecular data, Mrs. Ana Nahirnić-Beshkova and Mr. Viktor Gashtarov (Sofia, BG) for their assistance in the field and Dr Mark Shaw (Edinburgh, Scotland, UK) for linguistic corrections.

BIBLIOGRAPHY

BESHKOV, S., 1997.– A new noctuid moth from Bulgaria*: Oncocnemis confusa michaelorum* subsp. n. (Lepidoptera: Noctuidae).– *Phegea*, **25**(4): 153-161.

BESHKOV, S. & NAHIRNIĆ-BESHKOVA, A., 2021.– *Paracossulus thrips* (Hübner, 1818) (Lepidoptera) re-discovered in Bulgaria with notes of some other surprising findings in Dragoman Natura 2000 Protected area.– *The Entomologist's Record and Journal of Variation*, **133**(1): 22-30.

FIBIGER, M., RONKAY, L., YELA, J. L. & ZILLI, A., 2010.– Rivulinae-Phytometrinae, and Micronoctuidae, including Suplement to Noctuidae Europeae, vols 1-11.– *Noctuidae Europeae*, **12**: 451 pp. Entomological Press, Sorø.

RÁKOSY, L., 1998.– *Oncocnemis confusa* (Freyer, [1839]) eine neue Gattung und eine neue Art fur die Fauna Rumaniens (Lepidoptera, Noctuidae).– *Entomologica romanica*, **3**: 33-34.

RÁKOSY, L., 2000.– Erstmals nach 1980 aus Siebenbürgen gemeldete Großschmetterlingsarten, p. 233-242.– *In* H. HELTMANN & H. KILLYEN (Eds).– *Naturwissenschaftliche Forschungen über Siebenbürgen,* **4**: 354 pp.

RONKAY, G. & RONKAY, L., 1995.– Cuculliinae II.– *Noctuidae Europeae*, **7**: 224 pp. Entomological Press, Sorø.

TZONEV, R., DIMITROV, M. & GUSSEV, CH., 2015.– 02E1 Mountain petrophytic steppes, p.131-134.– *In* V. BISERKOV *et al*. (Eds).– *Red Data Book of the Republic of Bulgaria. Natural habitats,* **3**: 458 pp. Bulgarian Academy of Sciences and Ministry of Environment and Water, Sofia.

FIBIGER, M., YELA, J. L., ZILLI, A., VARGA, Z., RONKAY, G. & RONKAY, L., 2011.– Checklist of the quadrifid Noctuoidea of Europe: 23-44.– *In* T. J. WITT & L. RONKAY (Eds). Lymantriinae and Arctiinae. *Noctuidae Europaeae,* **13***:* 1348 pp. Entomological Press, Sorø.

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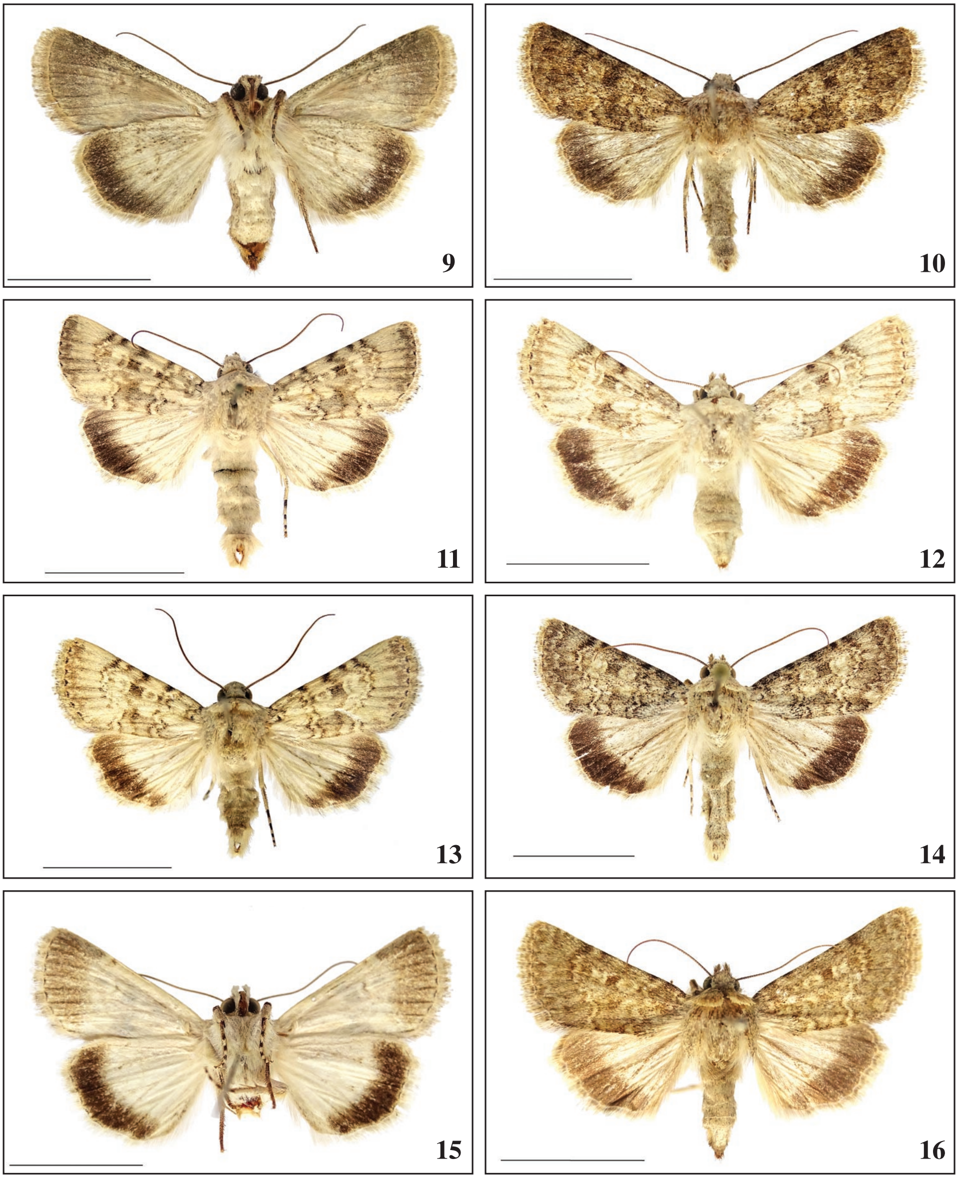
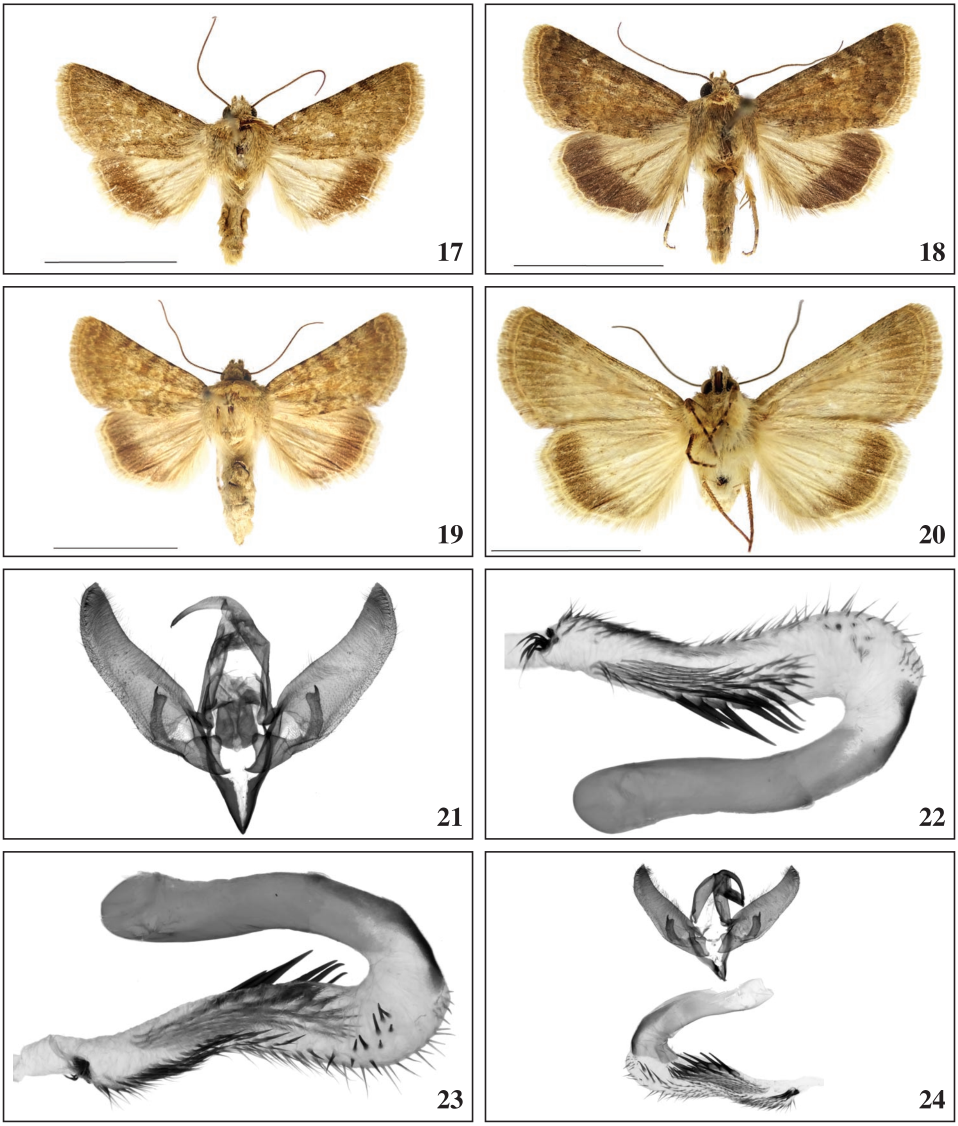
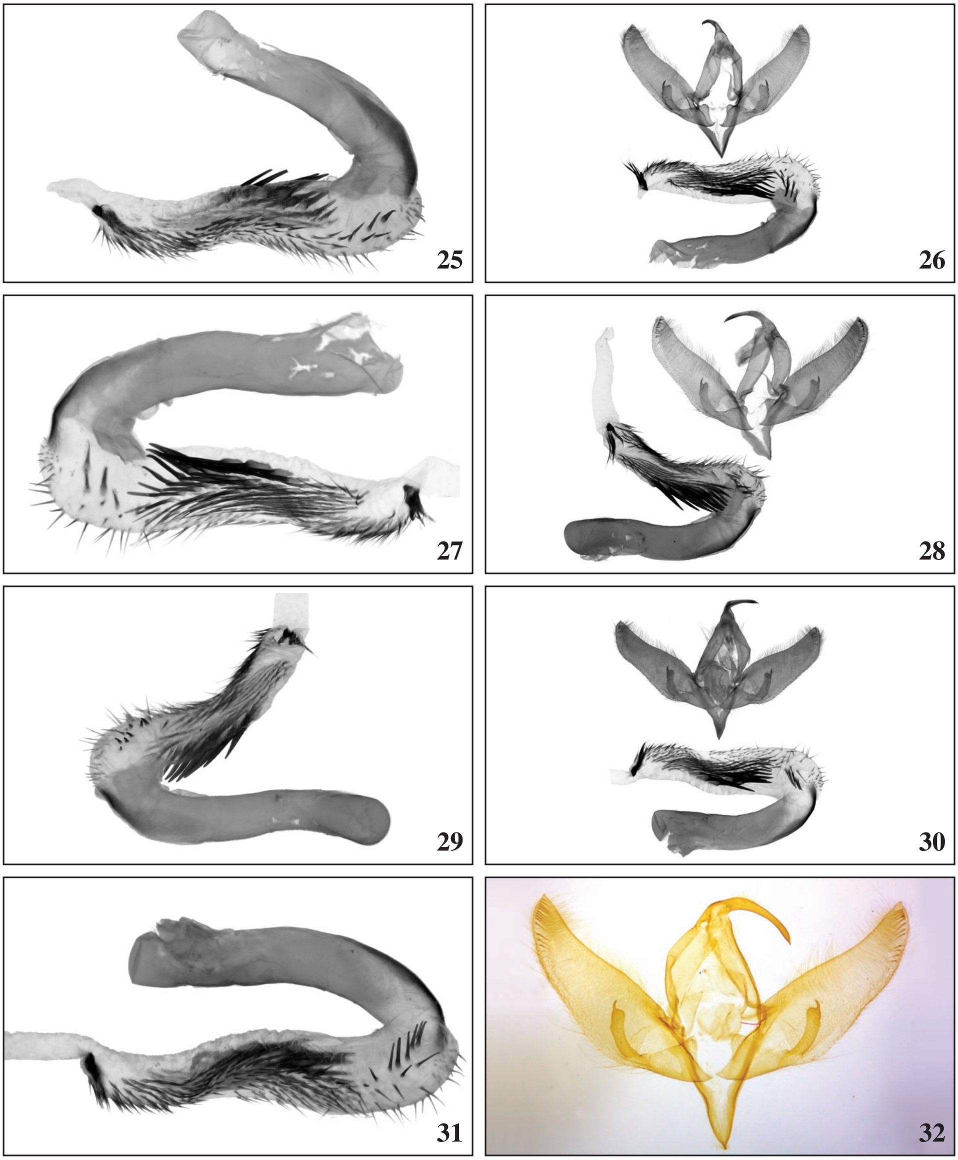
Figs 1-8.– *Oncocnemis michaelorum srnkai* Beshkov, ssp. n. **1.** ♂. Holotype, Tchepun, 14-VIII-2020, Gen. prep. 1./30-8-2020, SB. **2.** ♂, ups. Paratype, Tchepun, 14-VIII-2020. **3.** ♂, unds. Paratype, Tchepun, 14-VIII-2020. **4.** ♂. Paratype, Tchepun, 14-VIII-2020, BC SB Lep 0500. **5.** ♂. Paratype, Tchepun, 14-VIII-2020. **6.** ♂. Paratype, Tchepun, 14-VIII-2020. **7.** ♀. Paratype, Tchepun, 14-VIII-2020, Gen. prep. 1./14.9.2020, SB. **8.** ♀, ups. Paratype, Tchepun, 14-VIII-2020, BC SB Lep 0501.



Figs 9-16.– 9. *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., ♀, unds. Paratype, Tchepun, 14-VIII-2020, BC SB Lep 0501. **10.** ♂. Paratype, above Aldomirovsko blato, 10-VIII-2020. **11-15.** *Oncocnemis michaelorum michaelorum* Beshkov, 1997. **11.** ♂. Paraype, Balchik-Tuzlata, 10-VIII-1996. **12.** ♀, ups. Balchik-Tuzlata, 15-VIII-2004, Gen. prep. 2./15.9.2020, SB. **13.** ♂. Balchik-Tuzlata, 15-VIII-2004. **14.** ♂. Paratype, Balchik-Tuzlata, 23-VIII-1996, Gen. prep. 2./30.8.020, SB. **15.** ♀, unds. Balchik-Tuzlata, 15-VIII-2004, Gen. prep. 2./15.9.2020, SB. **16.** *Oncocnemis confusa*, ♀. E Turkey, Prov. Van, near Guseldere, 2450 m, 31-VII-2001, Gen. prep. 1./16.9.2020, SB.



Figs 17-24.– 17. *Oncocnemis confusa*, ♂. E Turkey, Prov. Van, Baklatepe, 2100 m, 29-VII-2001, Gen. prep. 3./30.8.2020, SB. **18.** *Oncocnemis confusa persica*, ♂. Iran, Prov. Tehran, Elburz Mts, 10 km S of Semsak, Deezin, 2000 m, 11-VII-2000, B. Benedek leg., Gen. prep. 1.31.8.2020, SB. **19.** *Oncocnemis confusa*, ♀ ups. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 2./14.9.2020, SB. **20.** *Oncocnemis confusa*, ♀ unds. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 2./14.9.2020, SB. **21-24.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n. **21.** holotype, male genitalia. Tchepun, 14-VIII-2020, Gen. prep. 1./30.8.2020, SB. **22.** holotype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./30.8.2020, SB. **23.** holotype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./30.8.2020, SB. **24.** paratype, male genitalia with everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./28.8.2020, SB.



Figs 25-32.– 25-31. *Oncocnemis michaelorum srnkai* Beshkov, ssp. n. **25.** paratype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./28.8.2020, SB. **26.** paratype, male genitalia with everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./29.8.2020, SB. **27.** paratype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./29.8.2020, SB. **28.** paratype, male genitalia with everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 2./29.8.2020, SB. **29.** paratype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 2./29.8.2020, SB. **30.** paratype, male genitalia with everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 2./09,9,2020, SB. **31.** paratype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 2./09.9.2020, SB. **32.** *Oncocnemis michaelorum michaelorum* holotype, male genitalia. Balchik-Tuzlata, 10-VIII-1996, Gen. prep. 7./04.9.1996, SB.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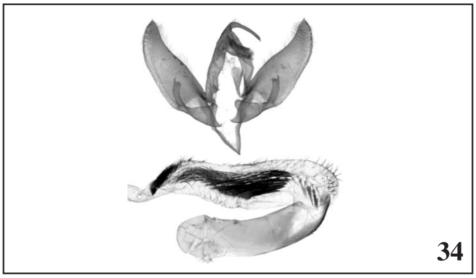
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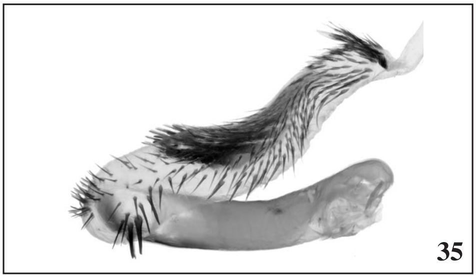
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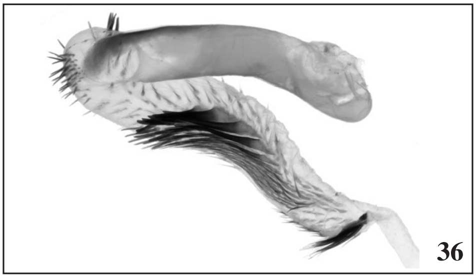
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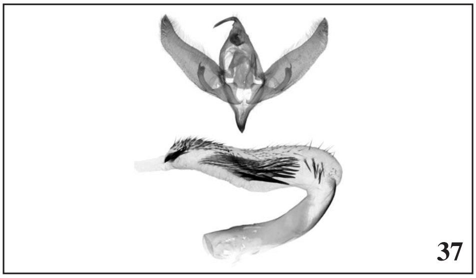
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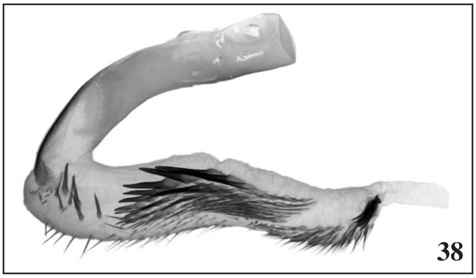
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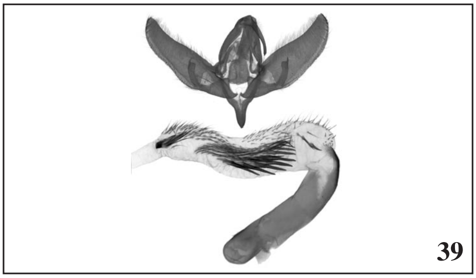
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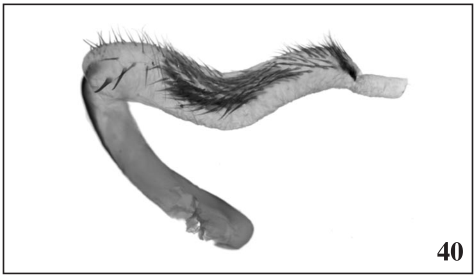
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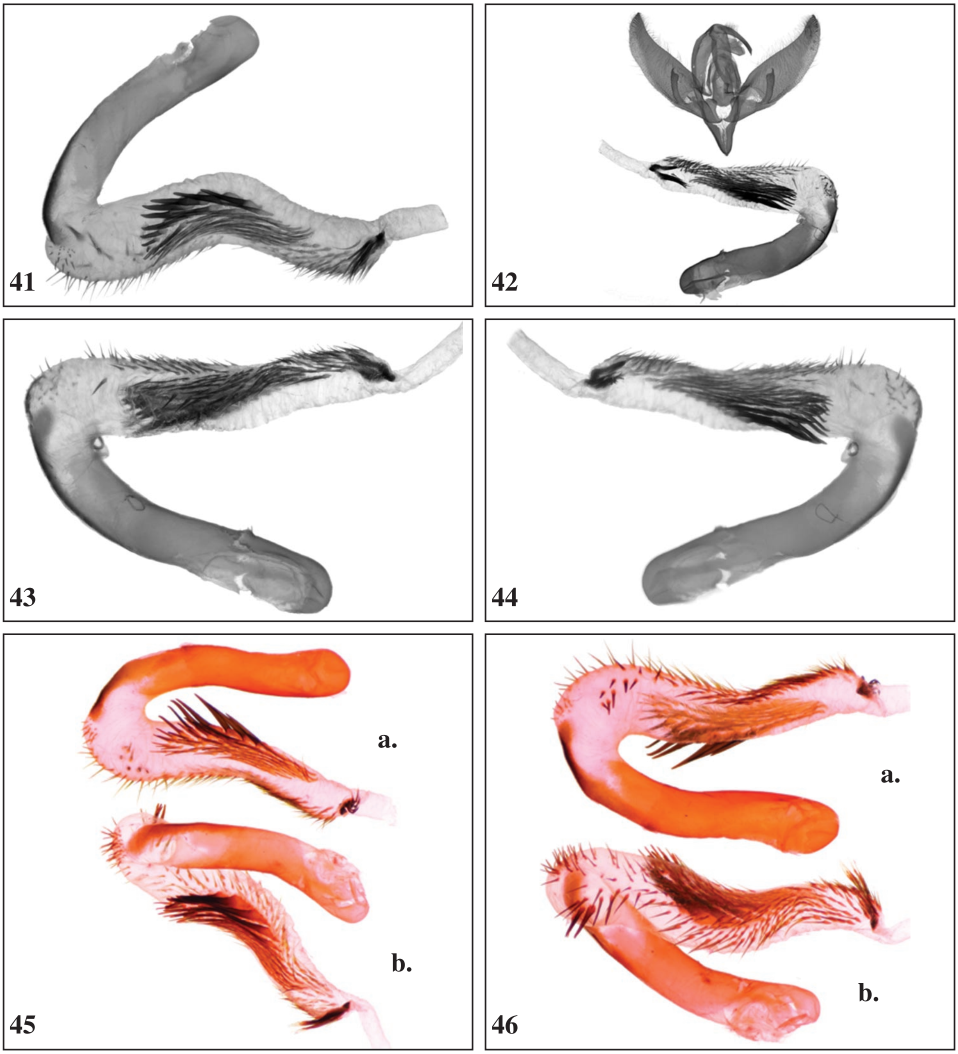
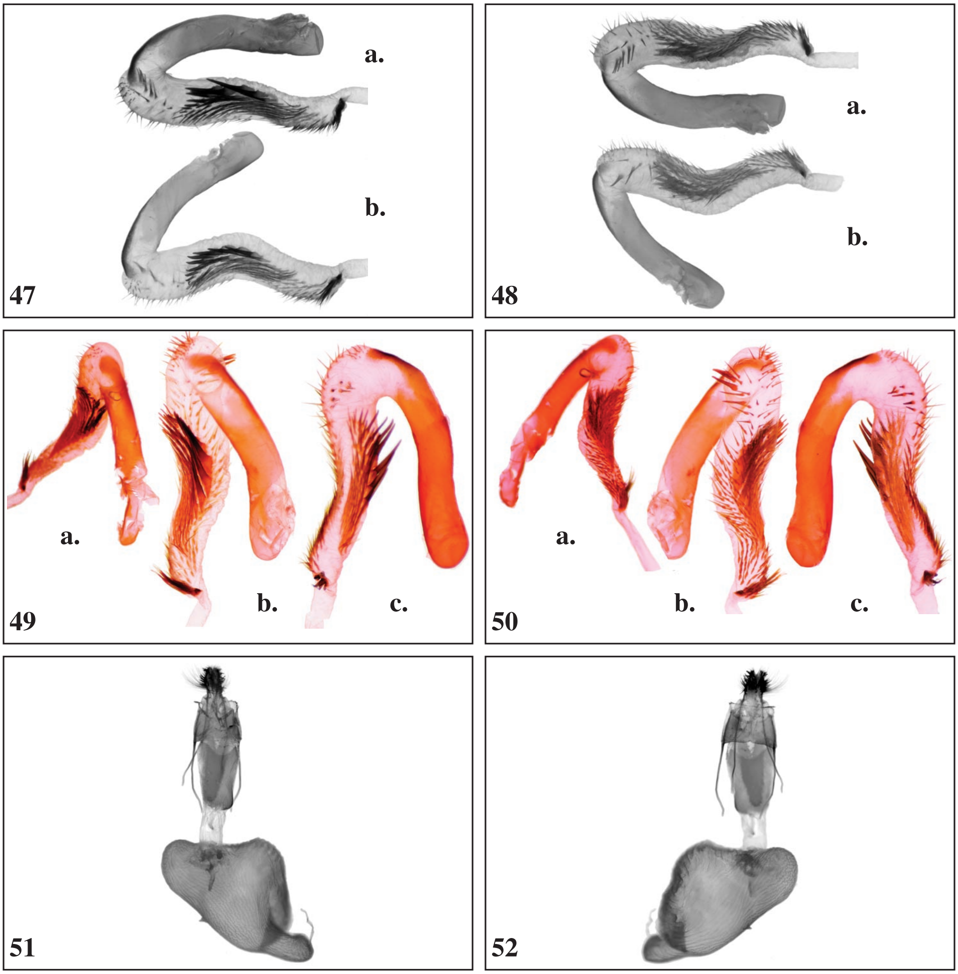
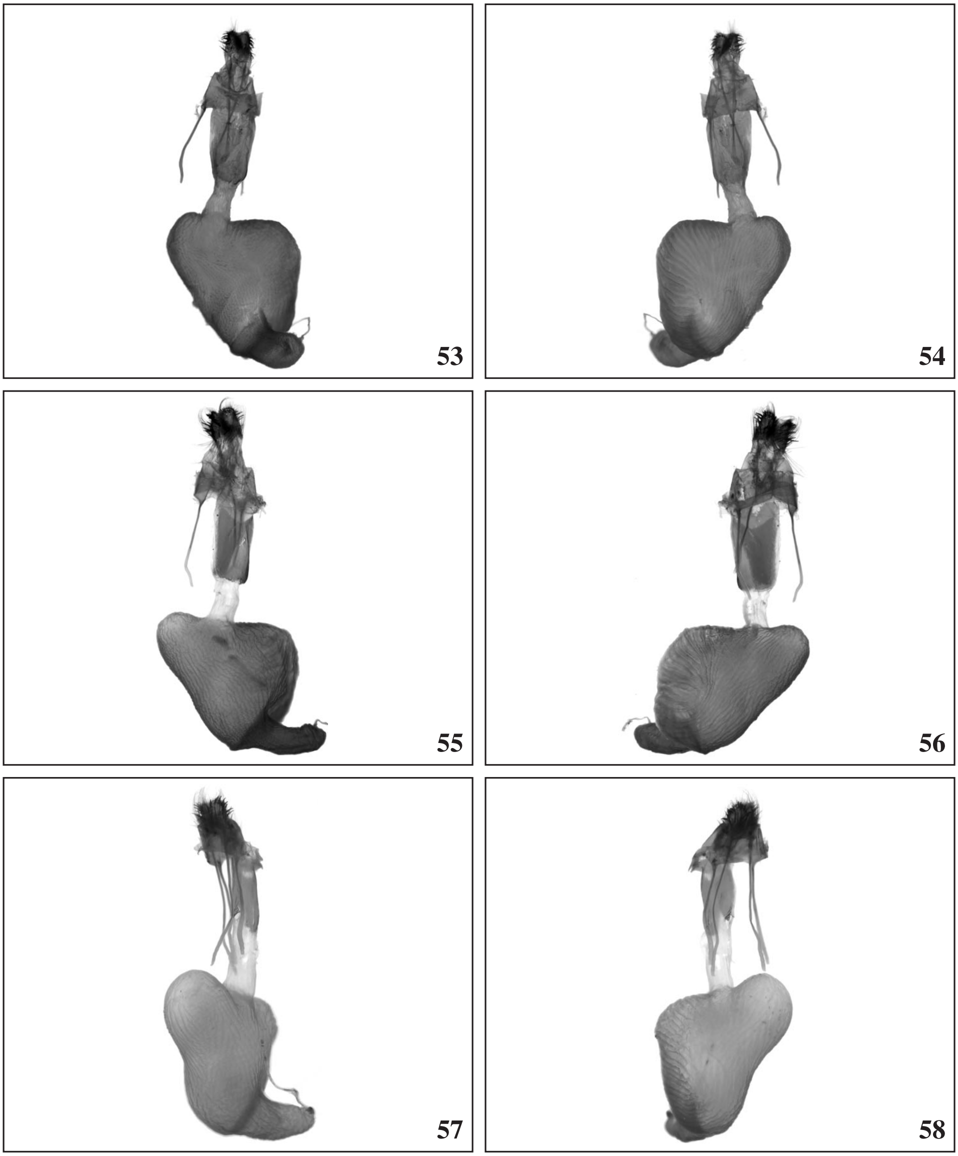
Figs 33-40.– 33-36. *Oncocnemis michaelorum michaelorum* **33.** holotype, everted vesica. Balchik-Tuzlata, 10.8.1996, Gen. prep. 7./04.9.1996, SB. **34.** paratype, male genitalia with everted vesica. Balchik-Tuzlata, 23-VIII-1996, Gen. prep. 2./30.8.2020, SB. **35.** paratype, everted vesica. Balchik-Tuzlata, 23-VIII-1996, Gen. prep. 2./30.8.2020, SB. **36.** paratype, everted vesica. Balchik-Tuzlata, 23-VIII-1996, Gen. prep. 2./30-.8.2020, SB. **37-40.** *Oncocnemis confusa.* **37.** male genitalia with everted vesica. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 3./29.8.2020, SB. **38.** everted vesica. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 3./29.8.2020, SB. **39.** male genitalia with everted vesica. Turkey, Prov. Erzurum, S above Ispir, 2030 m, 28-VII-2001, Gen. prep. 1./09-IX-2020, SB. **40.** *Oncocnemis confusa*, everted vesica. Turkey, Prov. Erzurum, S above Ispir, 2030 m, 28-VII-2001, Gen. prep. 1./09.9.2020, SB.



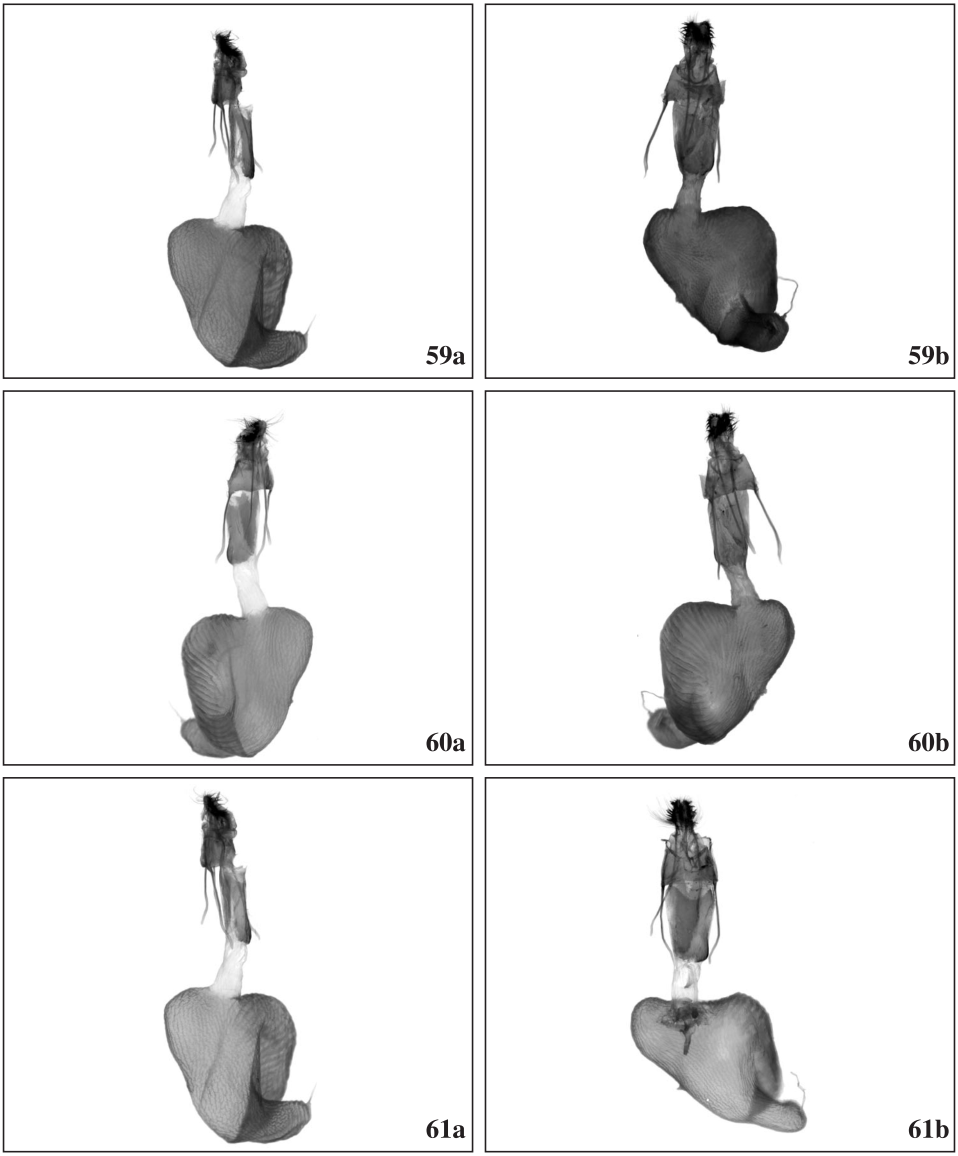
Figs 41-46.– 41. *Oncocnemis confusa*, everted vesica. Turkey, Prov. Erzurum, S above Ispir, 2030 m, 28-VII-2001, Gen. prep. 1./09.9.2020, SB. **42.** *Oncocnemis confusa persica*, male genitalia with everted vesica. Iran, Prov. Tehran, Elburz Mts, 10 km S of Semsak, Deezin, 2000 m, 11-VII-2000, B. Benedek leg., Gen prep. 1./31.8.2020, SB. **43.** *Oncocnemis confusa persica*, everted vesica. Iran, Prov. Tehran, Elburz Mts, 10 km S of Semsak, Deezin, 2000 m, 11-VII-2000, B. Benedek leg., Gen prep. 1./31.8.2020, SB. **44.** *Oncocnemis confusa persica*, everted vesica. Iran, Prov. Tehran, Elburz Mts, 10 km S of Semsak, Deezin, 2000 m, 11-VII-2000, B. Benedek leg., Gen prep. 1./31.8.2020, SB. **45a.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., holotype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./30.8.2020, SB; **b.** *Oncocnemis michaelorum michaelorum*, paratype, everted vesica. Balchik-Tuzlata, 23-VIII-1996, Gen. prep. 2./30.8.2020, SB. **46a.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., holotype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./30.8.2020, SB; **b.** *Oncocnemis michaelorum michaelorum* Beshkov, paratype, everted vesica. Balchik-Tuzlata, 23-VIII-1996, Gen. prep. 2./30.8.2020, SB.



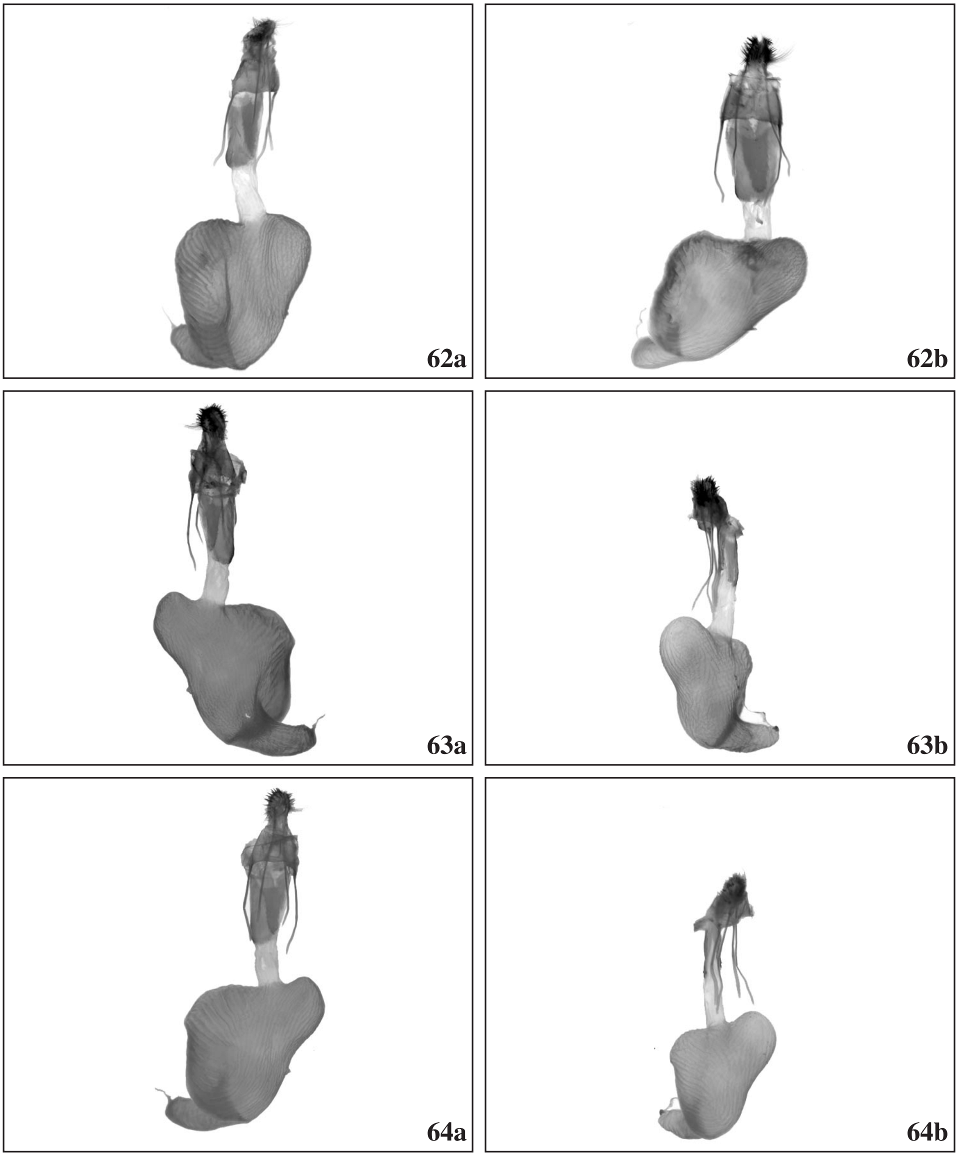
Figs 47-52.– 47a. *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 2./09.9.2020, SB; **47b.** *Oncocnemis confusa*, everted vesica. Turkey, Prov. Erzurum, S above Ispir, 2030 m, 28-VII-2001, Gen. prep. 1./09.9.2020, SB. **48a.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 2./09.9.2020, SB; **48b.** *Oncocnemis confusa*, everted vesica. Turkey, Prov. Erzurum, S above Ispir, 2030 m, 28-VII-2001, Gen. prep. 1./09.9.2020, SB. **49a.** *Oncocnemis confusa*, everted vesica. E Turkey, Prov. Van, Baklatepe, 2100 m, 29-VII-2001, Gen. prep. 3./30.8.2020, SB; **49b.** *Oncocnemis michaelorum michaelorum*, paratype, everted vesica. Balchik-Tuzlata, 23-VIII-1996, Gen. prep. 2./30.8.2020, SB; **49c.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., holotype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./30.8.2020, SB. **50a.** *Oncocnemis confusa*, everted vesica. E Turkey, Prov. Van, Baklatepe, 2100 m, 29-VII-2001, Gen. prep. 3./30.8.2020, SB; **50b.** *Oncocnemis michaelorum michaelorum*, paratype, everted vesica. Balchik-Tuzlata, 23-VIII-1996, Gen. prep. 2./30.8.2020, SB; **50c.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., holotype, everted vesica. Tchepun, 14-VIII-2020, Gen. prep. 1./30.8.2020, SB. **51.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 2./16.9.2020, SB. **52.** *Oncocnemis michaelorum srnkai* ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 2./16.9.2020, SB.



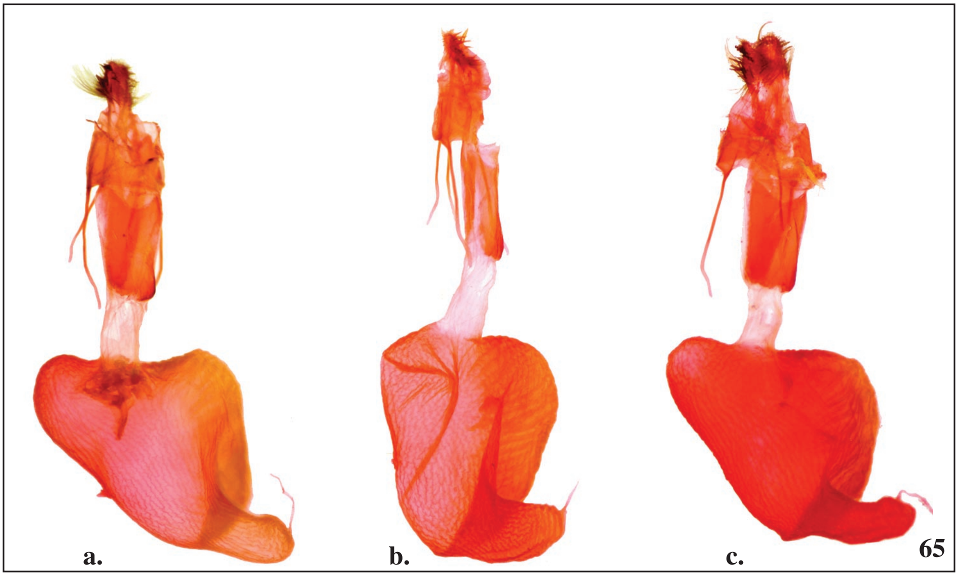
Figs 53-58.– 53. *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 1./14.9.2020, SB. **54.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 1./14.9.2020, SB. **55.** *Oncocnemis michaelorum michaelorum,* female genitalia. Balchik-Tuzlata, 15-VIII-2004, Gen. prep. 2./15.9.2020, SB. **56.** *Oncocnemis michaelorum michaelorum,* female genitalia. Balchik-Tuzlata, 15-VIII-2004, Gen. prep. 2./15.9.2020, SB. **57.** *Oncocnemis confusa*, female genitalia. E Turkey, Prov. Van, near Guseldere, 2450 m, 31-VII-2001, Gen. prep. 1./16.9.2020, SB. **58.** *Oncocnemis confusa*, female genitalia. E Turkey, Prov. Van, near Guseldere, 2450 m, 31-VII-2001, Gen. prep. 1./16.9.2020, SB.



Figs 59-61.– 59a. *Oncocnemis confusa*, female genitalia. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 2./14.9.2020, SB; **59b.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 1./14.9.2020, SB. **60a.** *Oncocnemis confusa*, female genitalia. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 2./14.9.2020, SB; **60b.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 1./14.9.2020, SB. **61a.** *Oncocnemis confusa*, female genitalia. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 2./14.9.2020, SB; **61b.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 2./16.9.2020, SB.



Figs 62-64.– 62a. *Oncocnemis confusa*, female genitalia. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 2./14.9.2020, SB; **62b.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 2./16.9.2020, SB. **63a.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 2./16.9.2020, SB; **63b.** *Oncocnemis confusa*, female genitalia. E Turkey, Prov. Van, near Guseldere, 2450 m, 31-VII-2001, Gen. prep. 1./16.9.2020, SB. **64a.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 2./16.9.2020, SB; **64b.** *Oncocnemis confusa*, female genitalia. E Turkey, Prov. Van, near Guseldere, 2450 m, 31-VII-2001, Gen. prep. 1./16.9.2020, SB.



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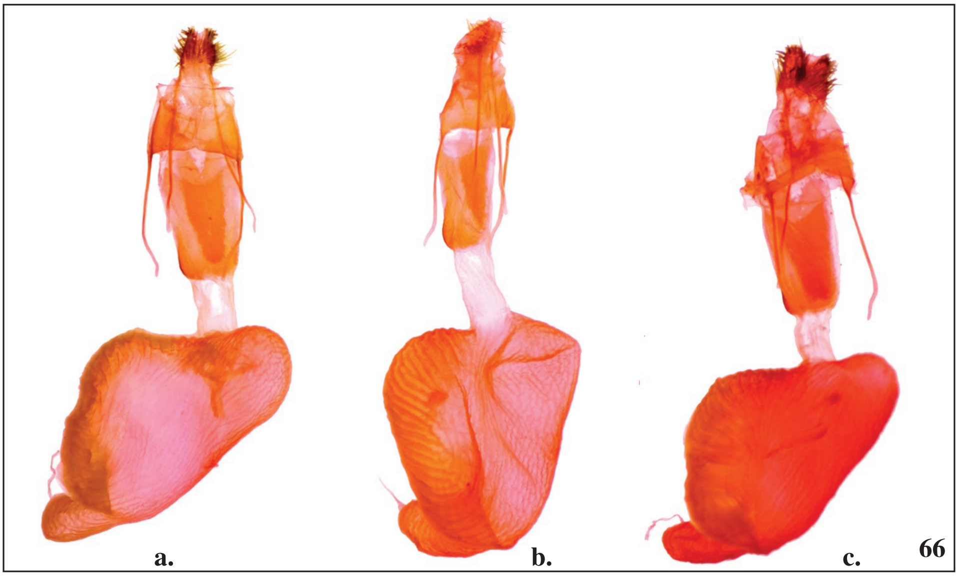

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Figs 65-66.– 65a. *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 1./15.9.2020, SB; **65b.** *Oncocnemis confusa*, female genitalia. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 2./14.9.2020, SB; **65c.** *Oncocnemis michaelorum michaelorum,* female genitalia. Balchik-Tuzlata, 15-VIII-2004, Gen. prep. 2./15.9.2020, SB. **66a.** *Oncocnemis michaelorum srnkai* Beshkov, ssp. n., paratype, female genitalia. Tchepun, 14-VIII-2020, Gen. prep. 1./15.9.2020, SB; **66b.** *Oncocnemis confusa*, female genitalia. Turkey, Prov. Erzurum, below Golurt Pass, 2000 m, 05-VIII-2001, Gen. prep. 2./14.9.2020, SB; **66c.** *Oncocnemis michaelorum michaelorum,* female genitalia. Balchik-Tuzlata, 15-VIII-2004, Gen. prep. 2./15.9.2020, SB.

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: *"Faúnula Lepidopterológica Ibérica, Baleárica 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 sinonímico de los Lepidoptera de la Península Ibérica, de Ceuta, de Melilla y de las islas Azores, Baleares, Canarias, Madeira y Salvajes (Insecta: Lepidoptera)*" (A. VIVES MORENO, 2014)". Esta lista es necesaria para este Proyecto Científico de SHILAP y para nuevas autorizaciones.

6.– Es obligatorio publicar en *SHILAP 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 sinonímico de los Lepidoptera de la Península Ibérica, de Ceuta, de Melilla y de las islas Azores, Baleares, Canarias, Madeira y Salvajes (Insecta: Lepidoptera)* (A. VIVES MORENO, 2014)". This list is necessary for this Scientific Project of SHILAP and for new authorizations.

6.– It's obligatory to publish in *SHILAP Revista de lepidopterología*, the new species or subspecies that are discovered and to remit to SHILAP **a part of the TYPE material**, for later incorporation into the Lepidoptera Collection of the National Museum Natural Sciences, Madrid, Spain.

7.– All members are kindly reminded of the obligation to be duly authorized for collecting Lepidoptera, with scientific purposes, in Spain and that it is forbidden all type of commercial activity, with the captured material.

8.– To know about the scientific aims of SHILAP and to commit to pay the expenses of participation in this Scientific Project, that the Board of Directors considers at any given moment.

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Colour analysis for distinguishing closely related species of the subgenus *Mesembrynus* Hübner, [1819] *Zygaena* (*M.*) *minos* ([Denis & Schiffermüller], 1775) and *Zygaena* (*M.*) *purpuralis* (Brünnich, 1763) (Lepidoptera: Zygaenidae)

G. Buntebarth & A. Nahirnić-Beshkova

Abstract

The wing colours and patterns of the genus *Zygaena* are limited and mainly red and black. This fact creates problems to distinguish closely related species by visual inspection. The aim of this study is to report differences in spectral reflectance of the wings between *Zygaena (Mesembrynus) minos* ([Denis & Schiffermüller], 1775) and *Zygaena (Mesembrynus) purpuralis* (Brünnich, 1763). The Pteridine Erythropterin is the pigment which creates the red wing colour of these species and its photo-sensitivity leads to its depletion during the lifetime of the moths. Both species show some different reflectance in the Transcaucasia but cannot be distinguished in the European region. It seems that a spatial vertical distribution can explain the findings rather than a horizontal one.

KEY WORDS: Lepidoptera, Zygaenidae, spectral light reflectance, pigments, pteridine, Georgia.

Análisis del color para distinguir las especies relativamente próximas del subgénero *Mesembrynus* Hübner, [1819] *Zygaena* (*M.*) *minos* ([Denis & Schiffermüller], 1775) y *Zygaena* (*M.*) *purpuralis* (Brünnich, 1763) (Lepidoptera: Zygaenidae)

Resumen

Principalmente los colores de las alas y de los dibujos del género *Zygaena* se limitan a los rojos y negros. Este hecho crea problemas para distinguir las especies relativamente próximas por inspección visual. El objetivo de este estudio es informar sobre la diferencia en el espectro reflectante de las alas entre *Zygaena (Mesembrynus) minos* ([Denis & Schiffermüller], 1775) y *Zygaena (Mesembrynus) purpuralis* (Brünnich, 1763). La pteridina eritropoyetina es el pigmento que crea el color rojo de las alas de estas especies y su fotosensibilidad se reduce durante la vida de los Zygaenidae. Ambas especies muestran alguna diferencia reflectante en la Transcaucasia pero no pueden distinguirse en la región europea. Vemos que una distribución vertical espacial puede explicar las conclusiones en vez de una horizontal.

PALABRAS CLAVE: Lepidoptera, Zygaenidae, reflectante luz espectral, pigmentos, pteridina, Georgia.

Introduction

Zygaena purpuralis complex has always been problematic. Wing pattern and wing colour are variable and thus altogether many subspecies have been described in Western Palaearctic where this complex is distributed. Species can be distinguished by their genitalia, larvae and hostplant. For most of the time a few species, i. e. *Zygaena (Mesembrynus) purpuralis* (Brünnich, 1763), and *Zygaena (Mesembrynus) minos* ([Denis & Schiffermüller], 1775), *Zygaena (Mesembrynus) diaphana*

Staudinger, 1887 and *Zygaena (Mesembrynus) pimpinellae* Guhn, [1913] have been recognized. Since NAUMANN *et al*. (1983) only the two species *Z. purpuralis* and *Z minos* were accepted. A few subspecies of *Z. minos* were raised to the species level again, i. e. *Zygaena (Mesembrynus) pseudorubicundus* Klír & Naumann, 2002 as reported by HOFMANN & TREMEWAN (2010) and just recently *Z. diaphana* and *Zygaena (Mesembrynus) smirnovi* Christoph, 1884 (NAHIRNIĆ, 2019). Nevertheless, unresolved relations remain in *Z. minos*, *Z. diaphana* and *Z. smirnovi* (NAHIRNIĆ, 2019). Similar problems occur with *Z. purpuralis*. HOFMANN & TREMEWAN (1996) consider 18 taxa as good subspecies. However, subdivision to subspecies is still not satisfactory. Some of the isolated taxa are *Zygaena purpuralis villosa* Burgeff, 1914 and *Zygaena purpuralis tirabzona* Sheljuzhko, 1936 which are similar to each other and have slightly different genitalia than all other taxa of *Z. purpuralis* and that difference is constant. Tips of the lobe of the uncus are flattened and in lamina dorsalis lower opening is smaller. Biology is unknown, neither larvae nor hostplants have ever been described which may contribute to clearing the status of these taxa and their relation within the *Z. purpuralis* complex. All Georgian *Z. purpuralis villosa* are collected at biotopes with abundant *Thymus* sp. at altitudes between 1000 and 2200 m. They are distributed in north-eastern Turkey and Georgia.

The colourful wings of insects inspirit scientists since more than 100 years to understand the diversity in colour and patterns (HOPKINS, 1896; WIELAND & SCHÖPF, 1925; ILSE, 1928). A progress has been reported by DAUMER (1966) with a comparison of human and insect vision. LAND & NILSSON (2006) reviewed in detail the properties of the photoreceptors of insects. Whereas green and blue vision is common for insects and humans, the red colour cannot be seen by many insects and the humans cannot realize ultraviolet light with wavelengths shorter than 400 nm (deep indigo). This fact encouraged scientists to study the UV vision of butterflies and moths in detail. MEYER-ROCHOW & EGUCHI (1983) report about physically produced UV-reflection of scales which also can create eyespot elements not visible for humans (YANG *et al*., 2004). Wing patterns which are only visible in the UV-range can even be gender specific and depend also on the geographic latitude (MEYER-ROCHOW & JÄRVILEHTO, 1997).

Two different physical phenomena are to be considered. One group of colours is based on the reflectance of pigments, i. e. the property of an aggregated chemical compound. Another group of colours is based on structural elements, i. e. the property of thin layers resulting a metallic lustre as a consequence of the interference of light or a special structure of the surface of scales reflecting UV light only.

The wings of *Zygaena (Mesembrynus) minos* ([Denis & Schiffermüller], 1775) and *Zygaena (Mesembrynus) purpuralis* (Brünnich, 1763) are covered by red and black pigments without metallic lustre or reflectance of UV light of wavelengths shorter than 370 nm. The soluble red pigment coincides with the property of Erythropterin as first investigations on both species resulted (BUNTEBARTH, 2004, 2018). This group of chemical compounds which are called Pteridines was intensively studied by W. Pfleiderer and co-workers on several butterflies (PFLEIDERER, 1987). The black pigment is insoluble and belongs to the group of Melanins.

The goal of this study is to examine whether both species can be distinguished by their light reflectance and whether the reflectance can support a subdivision of populations at different regions.

Material and methods

The colour of wings is usually described applying a more or less detailed qualitative scale. The impression of a colour is, however, not a physical quantity and depends on the light source and the individual observer. In order to quantify the wing colour, the spectral analysis is applied. The colour of wings is determined at monochromatic light. The reflectance was measured in the range of ultraviolet (370 nm) to red (700 nm) at a wavelength width of 0.5 nm using the Shimadzu UV/VIS-spectrometer V260 with integrating sphere. The reflectance was measured separately at the upper and lower side of the hindwings. The size of the incident light beam was constant with 3x5.5 mm. The investigations were done at 22 males and 13 females of *Z. purpuralis* and at 21 males and 9 females of *Z. minos* which are collected in the Transcaucasian region of Georgia and in Central Europe. Specimens of *Z. minos* from Transcaucasia belong to *Zygaena minos ingens* Burgeff, 1926, while those of *Z. purpuralis* from the same region belong to *Z. purpuralis villosa*. Their male adults and genitalia are illustrated on Fig. 1.

The locations in Georgia are given in BUNTEBARTH *et al*. (2011) and the European species are collected in Austria, Germany, Hungary, and Switzerland. Genitalia dissections were done according to ROBINSON (1976). Genitalia are mounted in Euparal on slides. Determination and nomenclature are done according to NAUMANN (1972), NAUMANN *et al*. (1983) and NAHIRNIĆ (2019).

The wing colour is a property of pigments which are soluble in a buffer of pH = 10 (0,05 mol $Na_2CO_3/NaHCO_3$) and they are considered as Erythropterin (BUNTEBARTH, 2004). The depleted cyst of the scales appear light brown/orange coloured and remain on the hindwings from which their reflectance is also determined within the spectrum from 370 nm to 700 nm. Fig. 2a shows an untreated hind wing and a hindwing after extraction the red pigments (Fig. 2b). The same hindwings are shown at a magnification of 225x at Fig. 2c and Fig. 2d. The latter show the remaining cysts of the scales which appear light brown/orange coloured.

Results

The spectral distribution of the reflectance of one pair of hindwings is shown at Fig. 3. The qualitative trend is the same for both investigated species. Slight changes occur at the violet/indigo range where the maximum reflection varies between 380 and 440 nm. A further characteristic mark is the point of the steepest increase of the reflectance, i. e. the inflexion point, the maximum of the first derivative of the reflectance with respect to the wavelength. Fig. 3a illustrates the spectral distribution of a *Z. minos ingens* subspecies with the corresponding colour as an example.

The maximum reflectance at ca. 400 nm and the inflexion point are marked at Fig. 3b for illustrating their determination. The first derivative of the reflectance passes zero at the maximum and its maximum results the inflexion point. The gray monotonous increase of the reflectance with the wavelength (Fig. 3a) results the reflectance of the hindwings after extraction the red pigments. The slight steeper increase between orange and red explains the orange-coloured picture at Fig. 2b and Fig. 2d. The relation between the wavelength of the reflectance maximum with respect to the inflexion point varies at specimens of the same species as Fig. 5 demonstrates. The Transcaucasian subspecies *Z. minos ingens* and *Z. purpuralis villosa* can be distinguished (Fig. 5a). Specimens of *Z. minos ingens* show in mean a shift of the indigo/violet maximum to shorter wavelengths than that of *Z. purpuralis villosa*. Additionally, the cluster of the inflexion point is shifted to orange whereas that of *Z. purpuralis villosa* is orange-red. The linear trend at Fig. 5a shows the same slope of both species. The reason of the stretched data distribution instead of cluster is due to the fact that age and intensity of the colour vary. Old specimens are bleached by the sun or exposed to natural abrasion. Fig. 5c demonstrates with the imagines that the intensity of the wing pattern varies remarkably. The violet maximum of pale specimens is shifted to longer wavelengths and the inflexion point to shorter ones. The same characteristic can be realized at Fig. 5b which shows European specimens of *Z. minos* and *Z. purpuralis*. The trend calculated at Fig. 5a is copied to Fig. 5b and demonstrates that both species coincide with *Z. purpuralis villosa* and that the European specimens of *Z. minos* and *Z. purpuralis* cannot be distinguished by reflectance properties.

Discussion

The colour analysis is based on the human vision. Colour vision of insects is physically possible due to their three or more photoreceptors (LAND & NILSSON, 2006). However, some authors state that each photoreceptor has its own function (SCHERER & KOLB, 1987). These problems are not solved here. It is reported how the spectral distribution of the reflectance varies with the species and with the condition of individual specimens. It is stated that the characteristic property which yields the colour is the concentration of the Pteridine Erythropterin on the wings of these species. Minor contribution of further Pteridines is possible, but not found yet. Additional pigments, first of all the black ones, are not soluble and belong to the group of Melanins (LINZEN, 1967). The spectral distribution allows the conclusion that the low value at ca. 500 nm and the steep increase at yellow/orange are properties of Pteridine. The high absorption at ca. 500 nm (blue green) is the complementary colour of orange and exaggerates the reflectance at orange, if exposed to sun light. The elevated absorption at blue green of the Pteridine is also measured at the dissolved pigments (BUNTEBARTH, 2004). Whereas the average of the inflexion point of *Z. minos ingens* has a value of ca. 595 nm, the mean of the European specimens of *Z. minos* is at 600 nm (Fig. 5). It agrees with the findings by (MEYER-ROCHOW & JÄRVILEHTO, 1997) that the colour appears to be brighter as the higher the geographic latitude is. However, *Z. purpuralis* does not show any difference between the investigated European and Transcaucasian subspecies. They neither can be distinguished from European *Z. minos*. The slight change of the reflectance is due to the change of the Pteridine composition. The reason can be manifold, e. g. variation of the mean annual temperature and its amplitude, humidity, length of winter and summer as well as accompanying vegetation change. The present climate in Georgia is subdivided into the maritime climate in Western Georgia and the continental one in Eastern Georgia. *Zygaena minos ingens* flies at altitudes below 1000 m in Eastern Georgia. Only a few old specimens were found within the Kolchis triangle (BUNTEBARTH *et al*., 2011). *Zygaena purpuralis villosa* is mainly abundant at altitudes above 1000 m. The investigated 26 specimens were collected mainly at altitudes above 1000 m (19:7), where *Z. minos ingens* has not been found.

Zygaena minos ingens has the same genitalia, larva, and biology like most populations of *Z. minos* from Europe. *Zygaena minos ingens* and *Z. minos dagestana* Sheljuzhko, 1936 are geographically isolated from other populations of *Z. minos* by the Black Sea and the Caucasus. Possible scenario is that during the Pleistocene *Z. minos* migrated to the south and one of the regions it reached was Transcaucasia which was possible by low-land connection when the level of Black Sea was lower. For example, during the Last Glacial Maximum, ca. 25 000 - 18 000 BP, the surface of the Black Sea was lower for at least 100 m (YANKO, 1990). *Z. minos ingens* have probably been isolated in Transcaucasian refugia since at least the last Pleistocene interglacial period. The past climate within the geographic latitudes between 40ºN and 50ºN passed an optimum with temperatures of 1.2 K to 2.5 K above the present-day values between 7,000 B.P. to 5,500 B.P. (FRENZEL *et al*., 1992). During this climate optimum the humidity decreased within the mentioned range of latitudes and had also consequences in the phytocenosis. After a long stable level of the Black Sea at 40 m below the present level, the level of the Mediterranean Sea increased at about 7,200 B.P. and the dry valleys of the Dardanelles and the Bosporus were flooded (VAN ANDEL & SHACKLETON, 1982) which limited the migration of the mentioned *Zygaena* species at least.

As demonstrated at Fig. 5c, the condition of the specimens can vary remarkably and they are gradually bleached by the sunlight during their lifetime. This bleaching results from the deterioration of Erythropterin. Fig. 5 supports the assumption.

It can be concluded that the light reflectance can be helpful in separation subspecies or species from each other. It can be used as a supplementary method which can indicate direction of taxonomic research, especially when the biology of the taxa is not known. Reasons of regional variations, however, are not detectable. Speculations on the effect of climate, elevation of mountainous regions or latitude of populations fail, because all cases can be proven with counter-examples.

A more detailed feature is shown at Fig. 4 as an example. The reflectance of the upper wing (blue) approaches closer to the reflectance of the depleted wing (green) than that of the lower wing (red). The lower side of the wings is less exposed to the sunlight. Therefore, the Erythropterin concentration is higher at the lower side than at the upper side. The depletion of colour is also accompanied by a shift of the inflexion point to shorter wavelengths and a shift of the violet maximum to longer wavelengths. Both effects coincide with spectral distribution of the wings which are pale and at least without red pigments, so that he reflection of the cyst of the wings is going to dominate the spectral distribution displaying its own properties.

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BIBLIOGRAPHY

BUNTEBARTH, G., 2004.– Zur Variation der Zusammensetzung von Farbpigmenten (Pteridine) auf Lepidopteren, insbesondere bei Pieriden und Zygaeniden.– *Entomologie heute*, **16**: 201-216.

BUNTEBARTH, G., 2018.– Farbunterschiede bei nahestehenden Arten des Genus *Zygaena* (Lepidoptera: Zygaenidae).– *Entomologie heute*, **30**: 55-66.

BUNTEBARTH, G., DIDMANIDZE, E. & PETROV, V., 2011.– Beitrag zur Verbreitung des Genus *Zygaena* (Lepidoptera: Zygaenidae) in Georgien während der letzten 100 Jahre.– *Entomologie heute*, **23**: 79-92.

DAUMER, K., 1966.– Wie sieht die Biene Farben?, p. 70-74.– *In* D. BURKHARDT, W. SCHLEIDT & H. ALTNER (Eds). *Signale in der Tierwelt*: 150 pp. Moos Verlag, München.

FRENZEL, B., PÉCSI, M. & VELICHKO, A. A., 1992.– A*tlas of Paleoclimates and Paleoenvironments of the Northern Hemisphere, Late Pleistocene – Holocene*: 153 pp. Geographical Research Institute Budapest and Gustav Fischer Verlag, Stuttgart.

HOFMANN, A. & TREMEWAN, W. G., 1996.– *A systematic Catalogue of the Zygaeninae (Lepidoptera: Zygaenidae)*: 251 pp. Harley Books, Colchester.

HOFMANN, A. F. & TREMEWAN, W. G., 2010.– A revised check-list of the genus *Zygaena* Fabricius, 1775 (Lepidoptera: Zygaenidae, Zygaeninae), based on the biospecies concept.– *Entomologist's Gazette*, **61**: 119-131.

HOPKINS, F. G., 1896.– The pigments of the Pieridae: a contribution to the study of excretory substances which function in ornament.– *Philosophical Transactions of the Royal Society, London*, **186B**: 661-682.

ILSE, D., 1928.– Über den Farbensinn der Tagfalter.– *Zeitschrift für vergleichende Physiologie*, **8**: 658-692.

LAND, M. F. & NILSSON D.-E., 2006.– *Animal eyes*: 221 pp. Oxford University Press, Oxford.

LINZEN, B., 1967.– Zur Biochemie der Ommochrome - Unterteilung, Vorkommen, Biosynthese und physiologische Zusammenhänge.– *Naturwissenschaften*, **54**(11): 259-267.

MEYER-ROCHOW, V. B. & EGUCHI, E., 1983.– "Flügelfarben, wie sie die Falter sehen" - a study of UV- and other colour patterns in Lepidoptera.– *Annotationes zoologicae japonenses*, **56**(2): 85-99.

MEYER-ROCHOW, V. B. & JÄRVILEHTO, M., 1997.– Ultraviolet colours in *Pieris napi* from northern to southern Finnland: artic females are the brightest!- *Naturwissenchaften*, **84**: 165-168.

NAHIRNIĆ, A., 2019.– *Zygaena diaphana* Staudinger, 1887 bona species (Lepidoptera: Zygaenidae).– *SHILAP Revista de lepidopterología*, **47**(186): 341-347.

NAUMANN, C. M., 1982.– Zur Kenntnis der von Hans Burgeff beschriebenen Taxa des Zygaena-purpuralis-Komplexes (Lepidoptera, Zygaenidae).– *Entomofauna*, **3**: 411-437.

NAUMANN, C. M., RICHTER, G. & WEBER, U., 1983.– Spezifität und Variabilität im *Zygaena purpuralis*-Komplex (Lepidoptera, Zygaenidae).– *Theses Zoologicae*, **2**: 1-263.

PFLEIDERER, W., 1987.– Chemistry of pteridins, p. 29-80.– *In* W. LOVENBERG & R. A. LEVINE (Eds). *Unconjugated pteridins in neurobiology: basic and clinical aspects*: I-X, 218 pp. Taylor & Francis, London.

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

SCHERER, C. & KOLB, G., 1987.– Behavioral experiments on the visual processing of colour stimuli in *Pieris brassicae* L. (Lepidoptera).– *Journal of Comparative Physiology A*, **160**: 645-656.

VAN ANDEL, T. H. & SHACKLETON, J. C., 1982.– Late Paleolithic and Mesolithic Coastlines of Greece and the Aegean.– *Journal of Field Archaeology*, **9**: 445-454.

WIELAND, H. & SCHÖPF, C., 1925.– Über den gelben Farbstoff des Zitronenfalters (*Gonepteris rhamni*).– *Berichte der Deutschen Chemischen Gesellschaft*, **58**: 2178-2183.

YANG, M., PYÖRNILÄ, A. & MEYER-ROCHOW, B., 2004.– UV-reflectivity of parafocal eyespot elements on butterfly wings in normal and abnormal specimens.– *Entomologica Fennica*, **15**: 34-40.

YANKO, V. V., 1990.– Stratigraphy and paleogeography of marine Pleistocene and Holocene deposits of the southern seas of the USSR.– *Memorie della Società Geologica Italiana*, **44**: 167-187.

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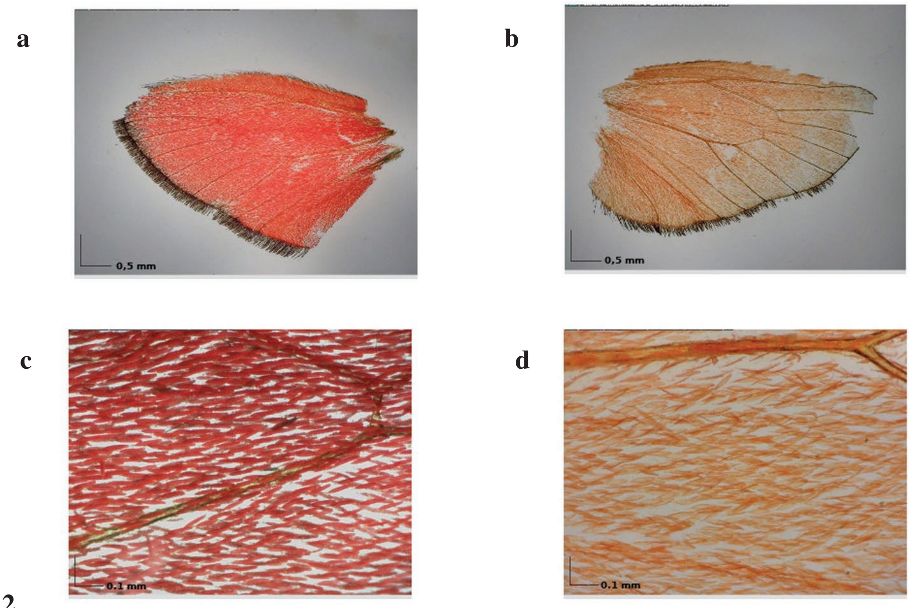

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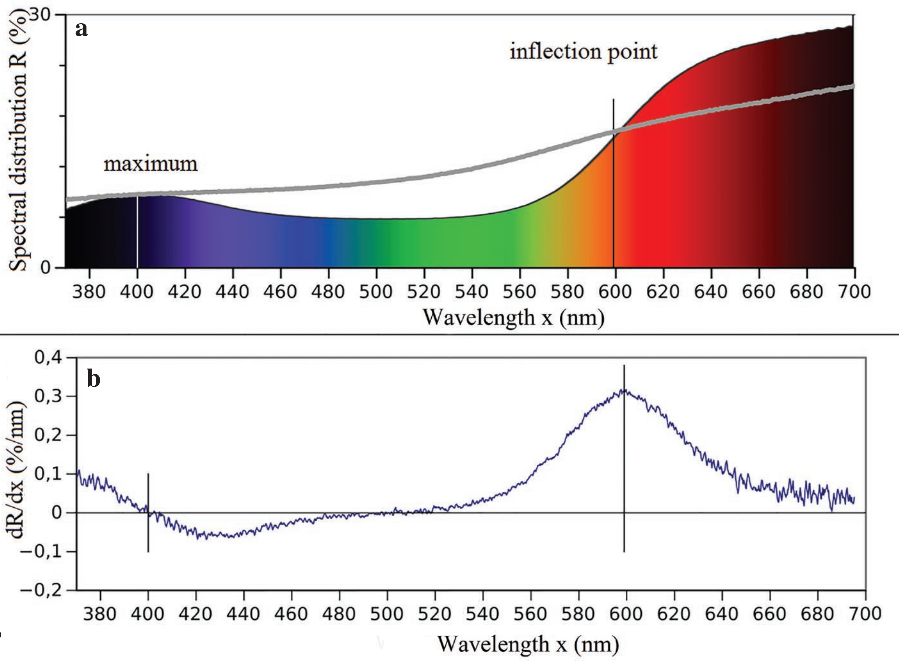
Figures 1-2.– 1. Example of *Zygaena purpuralis villosa* (upper row) and *Zygaena minos ingens* (lower row) with their lamina dorsalis and uncus. **2.** Hindwing of *Zygaena minos*; **a**) untreated; **c**) magnified (225x); **b**) without Pteridin; **d**) magnified (225x).



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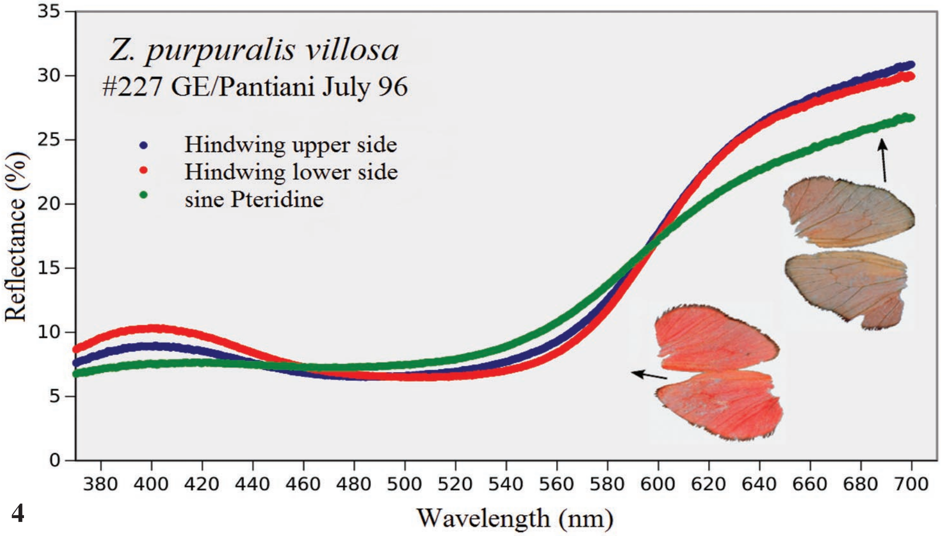

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Figures 3-4.– 3. a) Spectral reflectance of *Zygaena minos ingens* with the spectral distribution of the wings and the reflectance without the Pteridin pigments as gray function; **b**) the first derivation of the spectral distribution with respect to the wavelength and the mark at the maximum reflectance at 400 nm and at the inflexion point. **4.** Spectral reflectance of hindwings of a male specimen *Z. purpuralis villosa* at the upper and lower side and the reflectance after extraction the Pteridines.

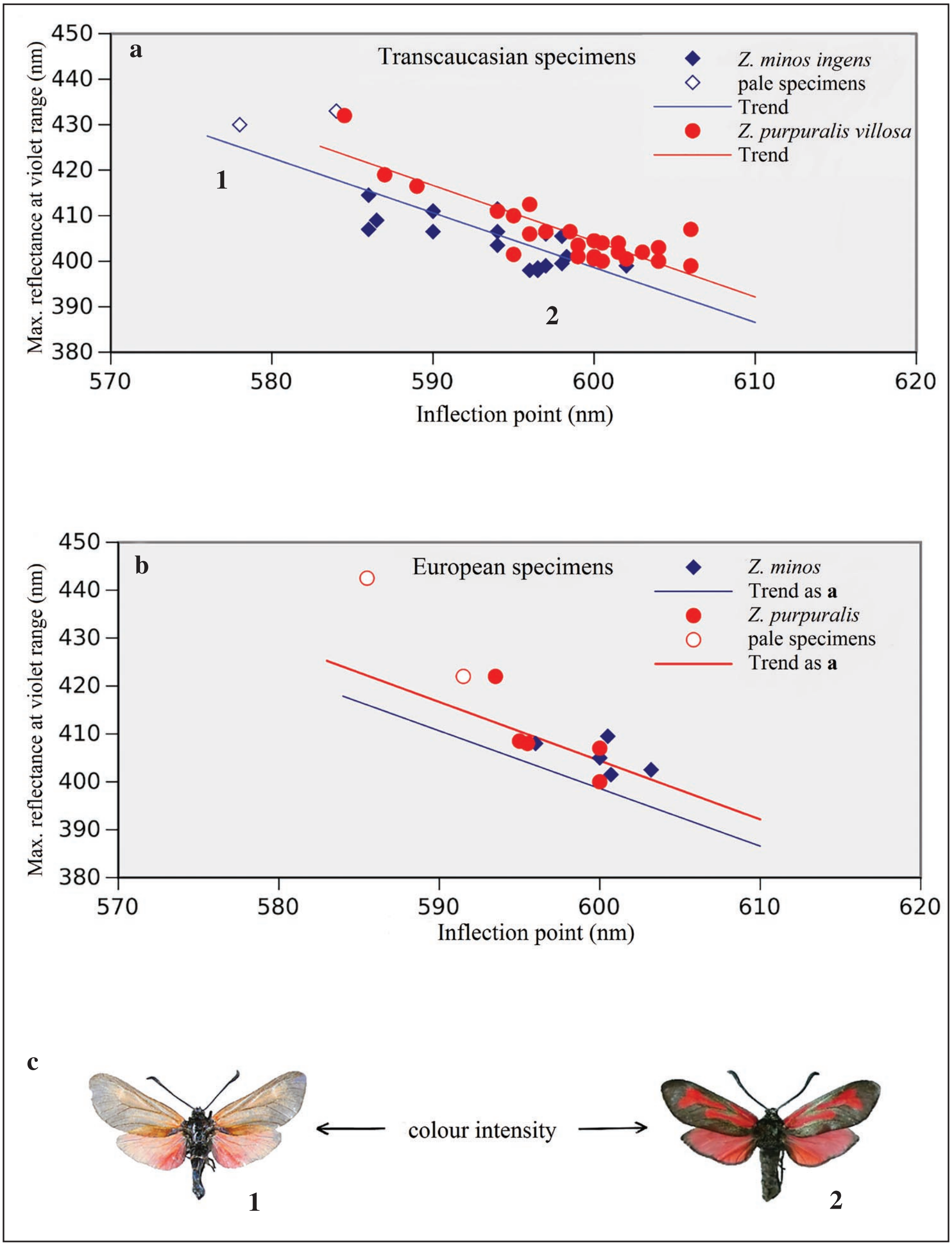

Figure 5.– Colour properties of *Zygaena minos* and *Zygaena purpuralis;* **a**) the maximum reflectance at ca. 400 nm with respect to the wavelength of the inflexion point of Transcaucasian subspecies; the straight lines show the trend; **b**) the same display format of European species is applied; the trends calculated at panel **a**) are copied to panel **b**); **c**) demonstrates the effect of colour depletion with marks in panel **a**).

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What is *Evergestis pazukii* Alipanah, 2018? (Lepidoptera: Crambidae, Glaphyriinae)

S. K. Korb

Abstract

Basing on morphology and mtDNA COI sequence data concluded: *Evergesris kopetdagensis* Kuznetzov, 1958 = *E. pazukii* Alipanah, 2018, syn. n. Distribution of *E. kopetdagensis* seemed to be quite wide and covers the area from Van Province in Turkey to Tajikistan and Kyrgyzstan; it is possible that this species occurs also in Turkey eastwards of Van Province, West Afghanistan and Uzbekistan.

KEY WORDS: Lepidoptera, Crambidae, Glapyriinae, *Evergestis pazukii*, new synonym.

¿Qué es *Evergestis pazukii* **Alipanah, 2018?**
(Lepidoptera: Crambidae, Glaphyriinae)

Resumen

Basándonos sobre morfología y secuencia del mtDNA COI cloncuimos: *Evergesris kopetdagensis* Kuznetzov, 1958 = *E. pazukii* Alipanah, 2018, syn. n. La distribución de *E. kopetdagensis* debe de ser más amplia y cubre un área desde la provincia de Van en Turquía hasta Tayikistán and Kirguistán; es posible que esta especie también se encuentre en el este de la provincia de Van en Turquía, oeste de Afganistán y Uzbekistán.

PALABRAS CLAVE: Lepidoptera, Crambidae, Glapyriinae, *Evergestis pazukii*, nueva sinonimia.

Introduction

In 2018 from “Iran, Mâzandarân Prov.: Baladeh, Yush, 2100 m” described *Evergestis pazukii* Alipanah, 2018 (ALIPANAH *et al*., 2018: 27-30, figs 16-17). When described, it was compared to *E. russulatalis* (Hampson, 1900) even if “the original description of *E. russulatalis*, and additional information and illustrations provided by AMSEL (1952) were not so informative to undoubtly identify this species” (loc. cit.). Types of *E. russulatalis* seemed to be lost, as ALIPANAH *et al*. (2018) stated. Under such conditions, the description of a new species looks rather dubious, because in fact it was compared with an unclear taxon (the type material of which has not been preserved). Luckily in 2020 *E. pazukii* was sequenced (KIZILDAĞ, 2020) what gives me ability to check its status and position both by morphology and by DNA barcode.

There is not only *E. russulatalis* can be considered as closely related species to *E. pazukii*. In 1958 *E. kopetdagensis* Kuznetzov, 1958 from “Ai-Dere” in Turkmenistan have been described (KUZNETZOV, 1958). Later it was recorded from Tajikistan and Kyrgyzstan (KORB, 2018); a subspecies *E. kopetdagensis sinevi* Korb, 2018 described from “Kyrgyzstan, Bishkek env., near Ala-Too, 42º47’33.00” N, 74º41’38.36” E, 982 m”. The type material of both *E. kopetdagensis kopetdagensis* and *E. kopetdagensis sinevi* is preserved and available in the Zoological Institute of the Russian Academy of Sciences (St.-Petersburg, Russia) (KORB, 2018; MUNROE, 1970). When described, *E. pazukii* was not compared to *E. kopetdagensis*. To clarify the status and position of *E. pazukii* I compare it herein to *E. kopetdagensis*.

Materials and methods

Traditional methods are used to compare morphological characters; studied specimens deposited in collections of the Zoological Institute of the Russian Academy of Sciences (St.-Petersburg, Russia) and author (Bishkek, Kyrgyzstan). The following sequences were used for DNA comparison: *E. pazukii* - MN259518 (KIZILDAĞ, 2020), *E. kopetdagensis* - MW748223 (paratype of *E. kopetdagensis sinevi*).

DNA sampling and sequencing made using processes and protocols described in HUEMER *et al*. (2014). The length of COI sequence obtained for this analysis is 658 sites.

Results

MORPHOLOGY COMPARISON

External morphology of *E. kopetdagensis kopetdagensis*, *E. kopetdagensis sinevi* and *E. pazukii* are similar (figs 1-4). *E. kopetdagensis sinevi* differs from both *E. pazukii* and *E. kopetdagensis kopetdagensis* by darker ground color (it is the main diagnostic feature of this subspecies). *E. kopetdagensis kopetdagensis* and *E. pazukii* in their wing pattern and coloration are very similar if not identical.

The male genitalia of *E. kopetdagensis kopetdagensis*, *E. kopetdagensis sinevi* and *E. pazukii* have no differences (figs 5-9).

mtDNA COI SEQUENCE COMPARISON

There are only two differences (p-distance 0.003) between compared COI sequences in the following sites:

```
            ....|....| ....|....| ....|....| ....|....| ....|....|
                   410        420        430        440        450
MW748223    CTACATTTAG CAGGAATTTT ATCCATTTTA GGAGCTATTA ATTTTATTAC
MN259518    CTACATTTAG CAGGAATTTC ATCCATTTTA GGAGCTATTA ATTTTATTAC

            ....|....| ....|....| ....|....| ....|....| ....|....|
                   460        470        480        490        500
MW748223    TACCATTATT AAAATGCGAA TTAATGGATT ATCATTTGAT CAAATACCTT
MN259518    TACCATTATT AATATGCGAA TTAATGGATT ATCATTTGAT CAAATACCTT
```

Discussion and conclusion

Analysis of external features showed minimal differences between *E. kopetdagensis kopetdagensis* and *E. pazukii*. There are no differences in the structure of the male genitalia. The COI sequence of both species has differences of only 2 nucleotides (p-distance 0.003); this is less than the generally accepted species p-distance of 0.02 (HEBERT *et al*., 2003). Based on these facts, I conclude that *E. kopetdagensis* and *E. pazukii* are conspecific:

Evergesris kopetdagensis Kuznetzov, 1958 = *E. pazukii* Alipanah, 2018, **syn. n.**

Distribution of *E. kopetdagensis* seemed to be quite wide: from Van Province in Turkey (loc.: Baºkale) through North Iran and South Turkmenistan to Tajikistan and Kyrgyzstan. It is possible that this species occurs also in Turkey eastwards of Van Province, West Afghanistan and Uzbekistan.

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BIBLIOGRAPHY

ALIPANAH, H., KHODADAD, M., RAJAEI, H. & HASELI, M., 2018.– Taxonomic study of the genus *Evergestis* Hübner, 1825 (Lepidoptera: Crambidae: Glaphyriinae) in Iran with description of a new species.– *Zootaxa*, **4420**(1): 1-33.

HEBERT, P. D. N., CYWINSKA, A., BALL, S. L. & DE WAARD, J. R., 2003.– Biological identifications through DNA barcodes.– *Proceedings of the Royal Society of London B*, **270**: 313-321.

HUEMER, P., MUTANEN, M., SEFC, K. M. & HEBERT, P., 2014.– Testing DNA barcode performance in 1000 species of European Lepidoptera: large geographic distances have small genetic impacts.– *PLoS One*, **9**(12): e115775.

KIZILDAĞ, S., 2020.– The first DNA barcoding records of three *Evergestis* Hübner, [1825] species in Turkey with molecular evaluations (Lepidoptera: Crambidae, Glaphyriinae).– *SHILAP Revista de lepidopterología*, **48**(190): 289-297.

KORB, S. K., 2018.– A new subspecies of *Evergestis kopetdagensis* Kuznetzov, 1958 (Lepidoptera: Pyralidae) from Kyrgyzstan and Tajikistan.– *Caucasian Entomological Bulletin*, **14**(1): 87-89 [in Russian].

KUZNETZOV, V. I., 1958.– Zwei Arten Der Gattung *Evergestis* Hb. (Lepidoptera, Pyralidae) aus West Kopet-Dagh (Turkmenien)).– *Entomologitscheskoje Obozrenie*, **37**(4): 929-932 [in Russian].

MUNROE, E., 1970.– Types of Nymphulinae, Scopariinae, Cybalomiinae, Odontiinae, Evergestinae, and Pyraustinae (Lepidoptera: Pyralidae) in the Zoological Institute, Academy of Sciences of the USSR, Leningrad, with selections of lectotypes.– *Canadian Entomologist*, **102**(8): 1025-1035.

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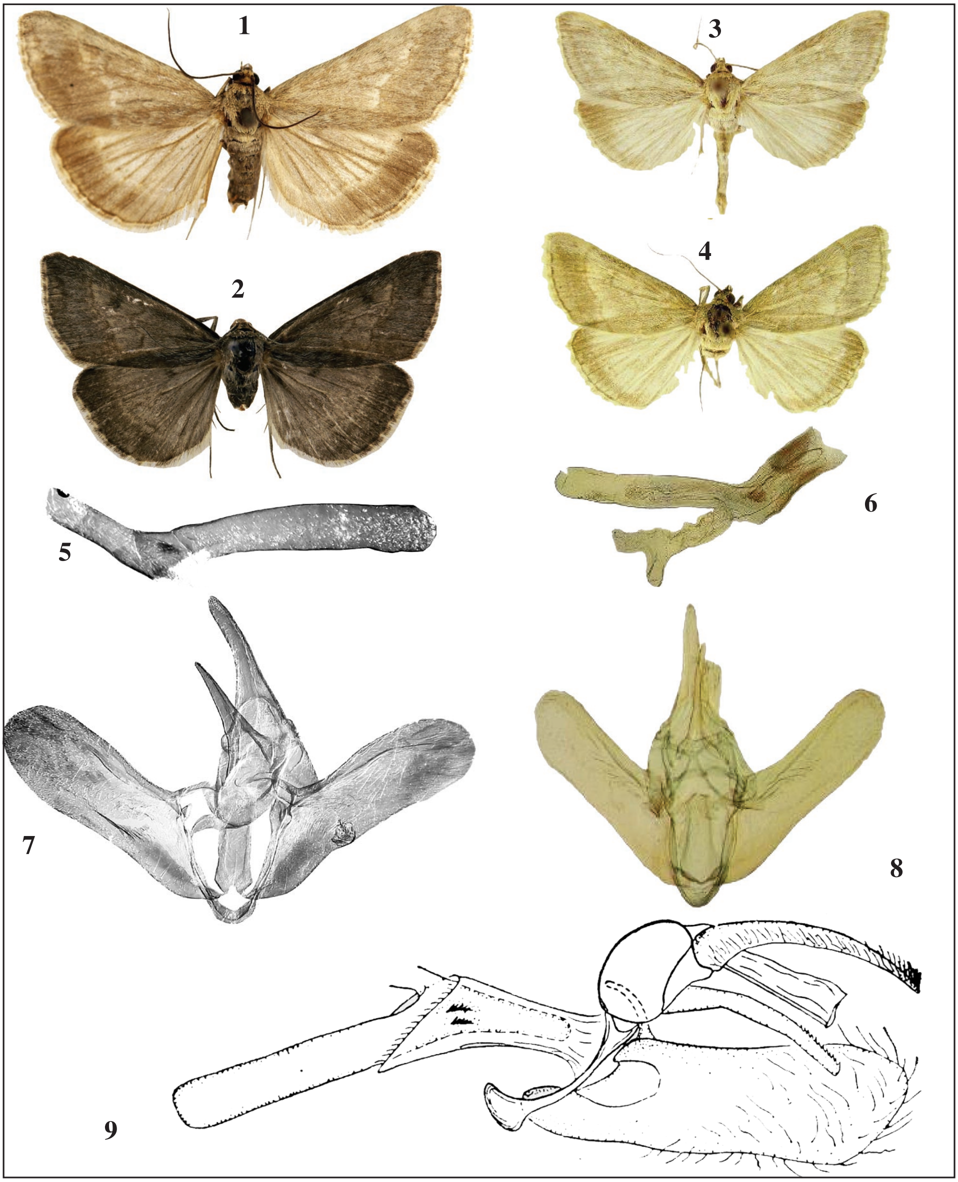

Figs 1-9.– *Evergestis kopetdagensis* Kuznetzov, 1958. **1.** *E. kopetdagensis kopetdagensis* Kuznetzov, 1958, lectotype, upperside. **2.** *E. kopetdagensis sinevi* Korb, 2018, holotype, upperside. **3.** *E. pazukii* Alipanah, 2018, holotype, upperside. **4.** *E. pazukii* Alipanah, 2018, paratype, upperside. **5.** *E. kopetdagensis sinevi* Korb, 2018, paratype, aedoeagus. **6.** *E. pazukii* Alipanah, 2018, aedeagus, paratype. **7.** *E. kopetdagensis sinevi* Korb, 2018, male genitalia, aedeagus removed, paratype. **8.** *E. pazukii* Alipanah, 2018, male genitalia, aedeagus removed, paratype. **9.** *E. kopetdagensis kopetdagensis* Kuznetzov, 1958, male genitalia, type specimen. (Figs 3, 4, 6, 8 by ALIPANAH *et al*., 2018; fig. 9 by KUZNETZOV, 1958.)

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New and interesting records of Lepidoptera from the southern Amur Region, Russia (Insecta: Lepidoptera)

E. S. Koshkin

Abstract

The paper presents data about new records of 21 rare species of Lepidoptera from nine families in the Russian part of the Southern Amur Region (the Khabarovsk Krai and the Jewish Autonomous Oblast'). One genus and species (*Siglophora sanguinolenta* (Moore, 1888) was first discovered in Russia. In addition, *Pryeria sinica* Moore, 1877, *Stauropus basalis* Moore, 1877, *Catocala eminens* Staudinger, 1892, and *Acrodontis kotshubeji* Sheljuzhko, 1944 are provided for the Khabarovsk Krai for the first time. *Stauropus basalis* was also first found in the Jewish Autonomous Oblast'. The second locality of *Xylena formosa* (Butler, 1878) in Russia is given. The presence of *Rhodinia jankowskii* (Oberthür, 1880) on the territory of the Khabarovsk Krai was confirmed. The new localities of seven species are the northernmost in their ranges. A new record of *Marumba jankowskii* (Oberthür, 1880) from the vicinity of the Malmyzh village is the north-easternmost within the species range.
KEY WORDS: Insecta, Lepidoptera, new records, distribution, Amur, Russia.

Nuevos e interesantes registros de Lepidoptera del sur de la Región de Amur, Rusia (Insecta: Lepidoptera)

Resumen

El trabajo presenta los datos sobre los nuevos registros de 21 especies raras de Lepidoptera de nueve familias en el sur de la parte rusa de la región de Amur (el Krai de Jabárovsk y el Óblast Autónomo Judío). En Rusia se descubren, por primera vez, un género y una especie (*Siglophora sanguinolenta* (Moore, 1888). En suma, *Pryeria sinica* Moore, 1877, *Stauropus basalis* Moore, 1877, *Catocala eminens* Staudinger, 1892 y *Acrodontis kotshubeji* Sheljuzhko, 1944 se presentan por primera vez para el Krai de Jabárovsk. *Stauropus basalis* también fue encontrado en el Óblast Autónomo Judío. En Rusia se da la segunda localidad de *Xylena formosa* (Butler, 1878). En el territorio del Krai de Jabárovsk, se confirma la presencia de *Rhodinia jankowskii* (Oberthür, 1880). Se alcanza su rango más septentrional de las localidades de siete especies. Un nuevo registro de *Marumba jankowskii* (Oberthür, 1880) en las cercanías del pueblo de Malmyzh, es el alcance más al norte de la especie.
PALABRAS CLAVE: Insecta, Lepidoptera, nuevos registros, distribución, Amur, Rusia.

Introduction

The Southern Amur Region is located in the south of the Russian Far East in the southern part of the Amur River basin on the territory of three administrative regions: the Amur Oblast', the Jewish Autonomous Oblast' and the Khabarovsk Krai. The study area is completely located in the zone of subboreal broad-leaved and coniferous broad-leaved mixed forests, characterized by a high level of biodiversity. Together with Primorye (the Primorsky Krai), the Southern Amur Region is the richest region for biota in the mainland of the Russian Far East (RICHTER, 1961).

Currently, the fauna of different groups of Macroheterocera in certain areas of the Southern Amur Region, especially in the vicinity of Khabarovsk, is well studied (DUBATOLOV & DOLGIKH, 2007, 2009, 2010; DUBATOLOV *et al.*, 2012, 2013, 2014; KOSHKIN & NOVOMODNYI, 2008; KOSHKIN, 2009, 2014; DUBATOLOV, 2015a; and so on). Later, these data were used in the preparation of the Catalogs of Lepidoptera of the Russian Far East and Russia (BELJAEV *et al*., 2016; SINEV, 2019).

However, new data on the distribution of Lepidoptera have recently been obtained, which are explained as the insufficient knowledge of the fauna of certain areas of the Amur River basin, and the dynamics of ranges of some species, including those related to climate changes. This paper provides information on new records of some rare species from different families of Lepidoptera from some areas of the Southern Amur Region, especially from Bikin District (the Khabarovsk Krai).

Moth’s specimens were collected mainly at night using light traps (including automatic) with 250-watt mercury-tungsten lamp and LepiLed UV lamp. All material presented in paper is collected by the author, unless otherwise indicated, and deposited in the collection of the author (Russia, Khabarovsk).

List of collecting localities in the Southern Amur Region (Fig. 16)

Durmin: Russia, Khabarovsk Krai, Imeni Lazo District, 25 km SE Durmin village, upper reach of Durmin River, 47º54’ N, 136º02’ E, 205 m, coniferous broad-leaved mixed forest.

Ekaterino-Nikol’skoe: Russia, Jewish Autonomous Oblast, Oktyabr’sky District, 2 km N Ekaterino-Nikol’skoe village, 47º47’ N, 130º58’ E, 70 m, broad-leaved forest.

Malmyzh: Russia, Khabarovsk Krai, Nanaisky District, 19 km NE Malmyzh village, 49º55’56.1” N, 136º59’33.5” E, 110 m, coniferous broad-leaved mixed forest.

Podkhorenok Chetvertyy: Russia, Khabarovsk Krai, Vyazemsky District, 30 km SE Vyazemsky city, Podkhorenok Chetvertyy River, 47º15’29” N, 134º50’8” E, 400 m, cedar broad-leaved forest.

Shivki: Russia, Khabarovsk Krai, Bikin District, 8 km SE Boitsovo village, upper reach of Shivki River, vicinity of Shivki science station (Institute of Water and Ecology problems FEB RAS), 46º55’ N, 134º23’ E, 165 - 205 m, coniferous broad-leaved mixed forest.

Solntsepek: Russia, Khabarovsk Krai, Bikin District, 4,3 km SE Boitsovo village, vicinity of Mount Bolshoi Solntsepe, 46º57’06.5” N, 134º22’11.2” E, 154 m, oak forest.

Soyuznoe: Russia, Jewish Autonomous Oblast, Oktyabrsky District, 1 km N Soyuznoe village, 47º54’56.34” N, 130º54’27.36” E, 77 m, broad-leaved forest.

New records of some rare species of the moths in the Russian part of the Southern Amur Region

ZYGAENIDAE

Pryeria sinica Moore, 1877 (Fig. 1)

Material: 1 ♂, 20-IX-2020, Shivki, collected during day.

Distribution: Russia: Khabarovsk Krai (Bikin District, new record), Primorsky Krai; Japan; Korea; China (including Taiwan) (BELJAEV *et al*., 2016; SINEV, 2019).

Remarks: The first record for the Khabarovsk Krai and the northernmost locality within the species range.

LASIOCAMPIDAE

Syrastrenopsis moltrechti Grünberg, 1914

Material: 45 ♂♂, 27 ♀♀, 18-24-IX-2020, Shivki.

Distribution: Russia: southern part of the Khabarovsk Krai, Primorsky Krai; Korea; Northeast China (BELJAEV *et al*., 2016; SINEV, 2019).

Remarks: Previously in the Khabarovsk Krai this species was found near Khabarovsk (DUBATOLOV & DOLGIKH, 2007).

SATURNIIDAE

Rhodinia fugax (Butler, 1877)

Material: 1 ♂, ex pupa 24-IX-2011, Shivki (leg. A. I. Korobitsyna & M. V. Kryukova); 2 ♀♀, 23-24-IX-2020, Shivki, 1 empty cocoon on tree branch, 13-XII-2020, Podkhorenok Chetvertyy (leg. A. Yu. Oleynikov).

Distribution: Russia: southwestern part of the Khabarovsk Krai, Primorsky Krai; Japan; Korea; Northeast China (BELJAEV *et al*., 2016; SINEV, 2019).

Remarks: Previously in the Khabarovsk Krai the species was provided with winter photos of empty cocoons from the Shivki River basin and a single female from the vicinity of Khabarovsk (DUBATOLOV & KURENSHCHIKOV, 2005; DUBATOLOV & DOLGIKH, 2010). The Russian Far East is inhabited by the subspecies *Rh. fugax diana* (Oberthür, 1886).

Rhodinia jankowskii (Oberthür, 1880)

Material: 10 ♂♂, 16-17-IX-2017, Shivki; 17 ♂♂, 7 ♀♀, 18-24-IX-2020, Shivki; 7 ♂♂, Solntsepek, 21-IX-2020.

Distribution: Russia: Khabarovsk Krai (Bikin District, confirmed records), Primorsky Krai; Japan; Korea (BELJAEV *et al*., 2016; SINEV, 2019).

Remarks: Species was indicated for Bikin District (Khabarovsk Krai) by IZERSKII (1999). In later articles and books (e.g., BELJAEV *et al*., 2016; SINEV, 2019) this species was never mentioned for the Khabarovsk Krai. New records are the northernmost ones within the species range and confirm the habitation of *Rh. jankowskii* in this region.

SPHINGIDAE

Marumba jankowskii (Oberthür, 1880)

Material: 3 ♂♂, 23-25-VI-2017, Durmin; 1 ♂, 3-VI-2020, Malmyzh.

Distribution: Russia: southeastern part of Amur Oblast', Jewish Autonomous Oblast', southern part of the Khabarovsk Krai, the Primorsky Krai; Japan; Korea; North-Eastern China (BELJAEV *et al*., 2016; SINEV, 2019).

Remarks: A new record from the vicinity of the Malmyzh village is the north-easternmost one within the species range. Previously in the Khabarovsk Krai species was found near Khabarovsk only (DUBATOLOV & DOLGIKH, 2007).

NOTODONTIDAE

Stauropus basalis Moore, 1877 (Figs 10, 11)

Material: 1 ♂, 7-VI-2010, Ekaterino-Nikol'skoe; 2 ♂♂, 8-9-VI-2010, Soyuznoe; 3 last instar larvae on *Lespedeza bicolor* Turcz. (Fabaceae), 22-IX-2020, Solntsepek.

Distribution: Russia: southern parts of the Jewish Autonomous Oblast' and the Khabarovsk Krai (new records), southern part of the Primorsky Krai, South Sakhalin; Japan; Korea; China (including Taiwan); Vietnam (SCHINTLMEISTER, 2008; BELJAEV *et al*., 2016; SINEV, 2019).

Remarks: This species is first recorded in the Khabarovsk Krai and the Jewish Autonomous Oblast'. New finds are the northernmost within the species range. The appearance of larva and pupa is shown in figures 10-11. The pupa is the overwintering stage.

Hupodonta corticalis Butler, 1877

Material: 3 ♂♂, 1 ♀, 27-31-VII-2011, Durmin.

Distribution: Russia: southern part of the Khabarovsk Krai, the Primorsky Krai; Japan; Korea; China; Myanmar; Thailand; Vietnam (SCHINTLMEISTER, 2008).

Remarks: Earlier in the Khabarovsk Krai species was found near Khabarovsk only (DUBATOLOV & DOLGIKH, 2007; DUBATOLOV *et al*., 2012).

Phalerodonta bombycina (Oberthür, 1880)

Material: 2 ♂♂, 19-23-IX-2020, Shivki; 1 ♂, 1 ♀, 21-IX-2020, Solntsepek.

Distribution: Russia: southern part of the Khabarovsk Krai, Primorsky Krai; Korea; East China (SCHINTLMEISTER, 2008).

Remarks: Previously in the Khabarovsk Krai this species was provided with a single male from the vicinity of Khabarovsk (DUBATOLOV *et al*., 2013).

Phalera flavescens (Bremer & Grey, 1853)

Material: 1 ♀, 4-VIII-2020, Shivki.

Distribution: Russia: Bikin District of the Khabarovsk Krai (DUBATOLOV *et al*., 2013), Primorsky Krai, Sakhalin Island; Japan; Korea; China; Taiwan; Myanmar; Thailand; Laos; Vietnam (SCHINTLMEISTER, 2008).

Remarks: The new record is the second in the Khabarovsk Krai and the northernmost in the species range. Earlier this species was found near Lesopil'noe village (southernmost part of Bikin District). The indication of *Ph. flavescens* for the Amur Oblast' (Blagoveshchensk) (SCHINTLMEISTER, 2008) is questioned (DUBATOLOV *et al*., 2013).

EREBIDAE

LYMANTRIINAE

Numenes disparilis Staudinger, 1887

Material: 1 ♀, 5-VIII-2020, Shivki.

Distribution: Russia: southern part of the Khabarovsk Krai, Primorsky Krai; Japan; Korea; China (BELJAEV *et al*., 2016).

Remarks: Earlier in the Khabarovsk Krai this species was found in the upper reaches of the Durmin River only (KOSHKIN, 2011).

EREBINAE

Catocala eminens Staudinger, 1892

Material: 1 ♀, 6-VIII-2020, Shivki.

Distribution: Russia: Khabarovsk Krai (Bikin District, new record), Primorsky Krai; Korea; China (KONONENKO, 2010).

Remarks: A first record for the Khabarovsk Krai and the northernmost locality within the species range. It is probably mistakenly written in Kononenko's book (KONONENKO, 2010) that *C. eminens* inhabits the south of the Khabarovsk Krai and the Primorsky Krai in Russia. At the same time, map 235 in the same book shows the distribution of this species only in the south of Primorsky Krai (northward to Khanka Lake). In later books, where the sections about Noctuoidea were written by Kononenko, only the south of Primorsky Krai is included in the range of *C. eminens* in Russia (BELJAEV *et al*., 2016; SINEV, 2019).

Catocala actaea Felder & Rogenhofer, 1874

Material: 2 ♂♂, 1 ♀, 7-VIII-2020, Shivki.

Distribution: Russia: southern part of the Khabarovsk Krai, Primorsky Krai; Japan; Korea; China (KONONENKO, 2010).

Remarks: Previously in the Khabarovsk Krai this species was provided with three specimens from the Bolshekhekhtsirsky and Botchinsky Nature Reserves (DUBATOLOV & DOLGIKH, 2009, 2010; DUBATOLOV, 2015b).

Catocala nivea Butler, 1877

Material: 1 ♂, 8-VIII-2013, Durmin; 4 ♂♂, 4 ♀♀, 26-28-VIII-2017, 2 ♂♂, 4-6-VIII-2020, 3 ♂♂, 18-20-IX-2020, Shivki.

Distribution: Russia: southern part of the Khabarovsk Krai, Primorsky Krai; Japan; Korea; China (including Taiwan); North India (Sikkim); Nepal (KONONENKO, 2010).

Remarks: Previously in the Khabarovsk Krai this rare species was provided with single specimens from the vicinities of Khabarovsk and Bikin (DUBATOLOV & DOLGIKH, 2009).

TOXOCAMPINAE

Lygephila lupina (Graeser, 1890) (Fig. 2)

Material: 1 ♂, 3-VIII-2020, Shivki.

Distribution. Russia: southern part of the Khabarovsk Krai (DUBATOLOV *et al*., 2012), Primorsky Krai; China (PEKARSKY, 2016).

Remarks: Previously in the Khabarovsk Krai this species was indicated as *L. mirabilis* (Bryk, 1948) from the vicinity of Khabarovsk (DUBATOLOV *et al*., 2012). *L. mirabilis* was synonymized with *L. lupina* by PEKARSKY (2016).

NOCTUIDAE

Mimeusemia persimilis Butler, 1875 (Figs 12, 13)

Material: 1 ♂, ex pupa: 12-I-2012, Durmin.

Distribution: Russia: southern parts of the Amur Oblast' (KOSHKIN & BEZBORODOV, 2009) and the Khabarovsk Krai, Primorsky Krai, South Kuriles (Kunashir); Japan; Korea; China (including Taiwan) (KONONENKO, 2010; BELJAEV *et al*., 2016).

Remarks: Previously in the Khabarovsk Krai this species was provided with two males from the vicinities of Khabarovsk (NOVOMODNY, 2000; DUBATOLOV *et al*., 2014). According to my observations in the basin of the upper reaches of the Durmin River, host plant of larvae is *Vitis amurensis* Rupr. (Vitaceae). The appearance of larva and pupa is shown in figures 12-13. Pupation takes place on the ground. The pupa is the overwintering stage.

Teratoglaea pacifica Sugi, 1958 (Fig. 3)

Material: 1 ♂, 17-IX-2017, Shivki.

Distribution: Russia: southern part of the Khabarovsk Krai, Primorsky Krai, South Sakhalin; Japan; Korea; China (KONONENKO, 2016; TITOVA, 2018).

Remarks: Previously in the Khabarovsk Krai this rare species was found in the Bolshekhekhtsirsky and Botchinsky Nature Reserves (DUBATOLOV & DOLGIKH, 2009; DUBATOLOV, 2015b).

Xylena formosa (Butler, 1878) (Figs 4, 14)

Material: 1 ♂, 18-IX-2020, Shivki.

Distribution: Russia: Khabarovsk Krai; Japan; Korea; China (DUBATOLOV & DOLGIKH, 2009; KONONENKO, 2016).

Remarks: The second record on the territory of Russia and the Khabarovsk Krai. Previously this very rare species was found in vicinity of Khabarovsk only (DUBATOLOV & DOLGIKH, 2009). The appearance of *X. formosa* is extremely similar to *X. confusa* Kononenko & Ronkay, 1998, but differs well from it by the structure of the male genitalia (Fig. 14).

Amphipyra jankowskii Oberthür, 1884 (Fig. 5)

Material: 2 ♂♂, 3-7-VIII-2020, Shivki.

Distribution: Russia: southern part of the Khabarovsk Krai, Primorsky Krai; Korea; China (KONONENKO, 2016).

Remarks: Previously in the Khabarovsk Krai this species was found near Khabarovsk only (DUBATOLOV *et al*., 2013).

Diarsia ruficauda (Warren, 1909) (Fig. 6)

Material: 1 ♂, 6-VIII-2020, Shivki.

Distribution: Russia: southern part of the Khabarovsk Krai, Primorsky Krai, Kuril Islands (Kunashir); Japan; Korea; China (BELJAEV *et al*., 2016; RYBALKIN, 2020).

Remarks: Previously in the Khabarovsk Krai this species was found near Khabarovsk only (DUBATOLOV, 2015a).

NOLIDAE

Siglophora sanguinolenta (Moore, 1888) (Figs 7, 8, 15)

Material: 2 ♂♂, 1 ♀, 5-7-VIII-2020, Shivki.

Distribution: North India, Nepal, Korea (North and South), China (including Taiwan), Philippines (KONONENKO *et al*., 1998).

Remarks: Genus and species provided for the territory of Russia for the first time. Previously the northernmost location in the species range was known to be in the vicinity of Wonsan City (southern part of North Korea) (NATIONAL INSTITUTE OF BIOLOGICAL RESOURCES OF KOREA, 2020). The identification of the species was confirmed by the appearance and genitalic structures (Figs 7, 8, 15) (KONONENKO & HAN, 2007). The number of collected specimens, their good condition, and the growth of the host plant (*Quercus mongolica* Fisch. ex Ledeb.) (SOHN *et al*., 2017: 498) suggest the naturalization of *S. sanguinolenta* in the south of the Russian Far East.

GEOMETRIDAE

Acrodontis kotshubeji Sheljuzhko, 1944 (Fig. 9)

Material: 2 ♂♂, 18-IX-2020, 9-X-2020, Shivki; 1 ♂, 21-IX-2020, Solntsepek.

Distribution: Russia: Khabarovsk Krai (Bikin District, new record), southern part of the Primorsky Krai; Japan, Korea (BELJAEV *et al*., 2016; SINEV, 2019).

Remarks: The first record for the Khabarovsk Krai and the northernmost locality within the species range.

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BIBLIOGRAPHY

BELJAEV, E. A., ANIKIN, V. V., BARYSHNIKOVA, S. V., DUBATOLOV, V. V., EFETOV, K. A., KONONENKO, V. S., KOVTUNOVICH, V. N., KOZLOV, M. V., LVOVSKY, A. L., NEDOSHIVINA, S. V.,

PONOMARENKO, M. G., SINEV, S. YU., STRELTZOV, A. N., TSHISTJAKOV, YU. A., USTYUZHANIN, P. YA., YAKOVLEV, R. V. & ZOLOTUHIN, V. V., 2016.– *Annotated catalogue of the insects of Russian Far East. Lepidoptera*, **2**: 812 pp. Dal'nauka, Vladivostok. (in Russian).

DUBATOLOV, V. V., 2015a.– *Furcula bifida* (Notodontidae), *Somena pulverea* (Lymantriidae) and other new findings of macromoths (Insecta, Lepidoptera, Macroheterocera) in the Nature Reserve Bolshekhekhtsyrskii and its environs in 2014-2015.– *Amurian Zoological Journal*, **7**(3): 261-266. (in Russian).

DUBATOLOV, V. V., 2015b.– Macroheterocera, excluding Geometridae (Lepidoptera) of coniferous forests of the Nature Reserve Botchinskii and its environs (summer and autumn aspects).– *Amurian Zoological Journal*, **7**(4): 332-368. (in Russian).

DUBATOLOV, V. V. & DOLGIKH, A. M., 2007.– Macroheterocera (excluding Geometridae and Noctuidae) of the Bolshekhekhtsirskii Nature Reserve (the Khabarovsk suburbs).– *Zhivotnyi mir Dal'nego Vostoka*, **6**: 105-127. (in Russian).

DUBATOLOV, V. V. & DOLGIKH, A. M., 2009.– Noctuids (Insecta, Lepidoptera, Noctuidae) of the Bolshekhekhtsyrskii Nature Reserve (Khabarovsk suburbs).– *Amurian Zoological Journal*, **1**(2): 140-176. (in Russian).

DUBATOLOV, V. V. & DOLGIKH, A. M., 2010.– New records of macromoths (Insecta, Lepidoptera, Macroheterocera) in the Bolshekhekhtsyrskii Nature Reserve (Khabarovsk suburbs).– *Amurian Zoological Journal*, **2**(2): 136-144. (in Russian).

DUBATOLOV, V. V. & KURENSHCHIKOV, D. K., 2005.– A record of *Rhodinia fugax diana* (Lepidoptera, Saturniidae) from the southern part of the Khabarovskii Krai Province.– *Zhivotnyi mir Dal'nego Vostoka*, **5**: 121-122. (in Russian).

DUBATOLOV, V. V., DOLGIKH, A. M. & PLATITSYN, V. S., 2012.– New findings of macromoths (Insecta, Lepidoptera, Macroheterocera) in the Nature Reserve Bolshekhekhtsyrskii (Khabarovsk suburbs) in 2011.– *Amurian Zoological Journal*, **4**(1): 32-49. (in Russian).

DUBATOLOV, V. V., DOLGIKH, A. M. & PLATITSYN, V. S., 2013.– New findings of macromoths (Insecta, Lepidoptera, Macroheterocera) in the Nature Reserve Bolshekhekhtsyrskii in 2012.– *Amurian Zoological Journal*, **5**(2): 166-175. (in Russian).

DUBATOLOV, V. V., DOLGIKH A. M. & PLATITSYN, V. S., 2014.– *Neothosea suigensis* (Limacodidae), *Catocala musmi* (Noctuidae) and other new findings of macromoths (Insecta, Lepidoptera, Macroheterocera) in the Bolshekhekhtsyrskii Nature Reserve and its environs in 2013.– *Amurian Zoological Journal*, **6**(1): 77-80. (in Russian).

IZERSKII, V. V., 1999.– *Bombycoid Lepidoptera (fam. Bombycidae, Endromididae, Lasiocampidae, Brachmaeidae, Saturniidae, Sphingidae) and Notodontids (fam. Notodontidae) of Siberia and the Russian Far East*: 160 pp. Gnozis, Kiev. (in Russian).

KONONENKO, V. S., 2010.– *Noctuidae Sibiricae. Micronoctuidae, Noctuidae: Rivulinae-Agaristinae (Lepidoptera),* **2**: 475 pp. Entomological Press, Sorø.

KONONENKO, V. S., 2016.– Noctuoidea Sibiricae. Part 3. Noctuidae: Cuculliinae-Noctuinae, part (Lepidoptera).– *Proceedings of the Museum Witt Munich,* **5**: 1-497.

KONONENKO, V. S., AHN, S. B. & RONKAY, L., 1998.– *Illustrated Catalogue of Noctuidae in Korea (Lepidoptera). Insects of Korea. Series 3*: 507 pp. Korea Research Institute of Bioscience and Biotechnology & Center for Insects Systematics, Seoul.

KONONENKO, V. S. & HAN, H. L., 2007.– *Atlas genitalia of the Noctuidae in Korea (Lepidoptera). Insects of Korea. Series 11*: 464 pp. Korean Natonal Arboretum & Center for Insects Systematics, Seoul.

KOSHKIN, E. S., 2009.– First data on the butterfly fauna (Lepidoptera, Diurna) of the Bolshie Churki and the Daur Mountain Ranges (Russia, Jewish Autonomous Oblast).– *Amurian Zoological Journal*, **1**(1): 72-75. (in Russian).

KOSHKIN, E. S., 2011.– New record of *Numenes disparilis* Staudinger, 1887 (Lepidoptera, Lymantriidae) from Khabarovskii krai.– *Amurian Zoological Journal*, **3**(4): 376-377. (in Russian).

KOSHKIN, E. S., 2014.– New records of butterflies (Lepidoptera, Papilionoidea) from Middle Amur region of Evreiskaya Avtonomnaya Oblast, Russia.– *Euroasian Entomological Journal*, **13**(1): 74-78. (in Russian).

KOSHKIN, E. S. & BEZBORODOV, V. G., 2009.– First record of *Mimeusemia persimilis* Butler, 1875 (Lepidoptera, Noctuidae, Agaristinae) from Amurskaya oblast.– *Far Eastern Entomologist*, **202**: 6.

KOSHKIN, E. S., & NOVOMODNYI, E. V., 2008.– Fauna of the butterflies (Lepidoptera, Diurna) of the Khabarovsk city and its vicinities.– *A. I. Kurentsov's Annual Memorial Meetings*, **19**: 66-83. (in Russian).

NATIONAL INSTITUTE OF BIOLOGICAL RESOURCES OF KOREA, 2020.– *Siglophora sanguinolenta*

(Moore, 1888). Available from https://species.nibr.go.kr/endangeredspecies/rehome/redlist/redlist_view.jsp?link_gbn=ex_search&rlcls_sno=1412&link_gbn=ex_search&rlcls_sno=1412&1=1&page_count=191. (in Korean).

NOVOMODNY, E. V., 2000.– *Mimeusemia persimilis* Butler, 1875.– *Red Data Book of Khabarovsk Territory. Rare and Endangered Species of Plants and Animals. Second Edition*: 420-421. IWEP FEB RAS, Khabarovsk. (in Russian).

PEKARSKY, O., 2016.– Taxonomic notes on the *Lygephila vulcanea* (Butler, 1881) species-group (Lepidoptera, Erebidae, Toxocampinae).– *Zootaxa*, **4121**(1): 95-100. DOI: 10.11646/zootaxa.4121.1.10.

RICHTER, G. D., 1961.– *Far East. Physical geography*: 440 pp. Izd. AN SSSR, Moscow. (in Russian).

RYBALKIN, S. A., 2020.– On the knowledge of Lepidoptera of Kunashir Island, Russia.– *Amurian Zoological Journal*, **12**(2): 98-105.

SCHINTLMEISTER, A., 2008.– *Palaearctic Macrolepidoptera. Notodontidae,* **1**: 482 pp. Apollo Books, Stenstrup.

SINEV, S. YU. (ed.), 2019.– *Catalogue of the Lepidoptera of Russia. Edition 2*: 448 pp. Zoological Institute RAS, St. Petersburg. (in Russian).

SOHN, J.-CH., KIM, N.-H. & CHOI, S.-W., 2017.– Morphological and functional diversity of foliar damage on *Quercus mongolica* Fisch. ex Ledeb. (Fagaceae) by herbivorous insects and pathogenic fungi.– *Journal of Asia-Pacific Biodiversity*, **10**: 489-508.

TITOVA, O. L., 2018.– New records of Lepidoptera (Tineidae, Crambidae, Erebidae, Nolidae, Noctuidae) from the Kholmskii Raion of Sakhalin Island, Russia, with notes on autumnal imago activity.– *Euroasian Entomological Journal*, **17**(4): 248-254. (in Russian).

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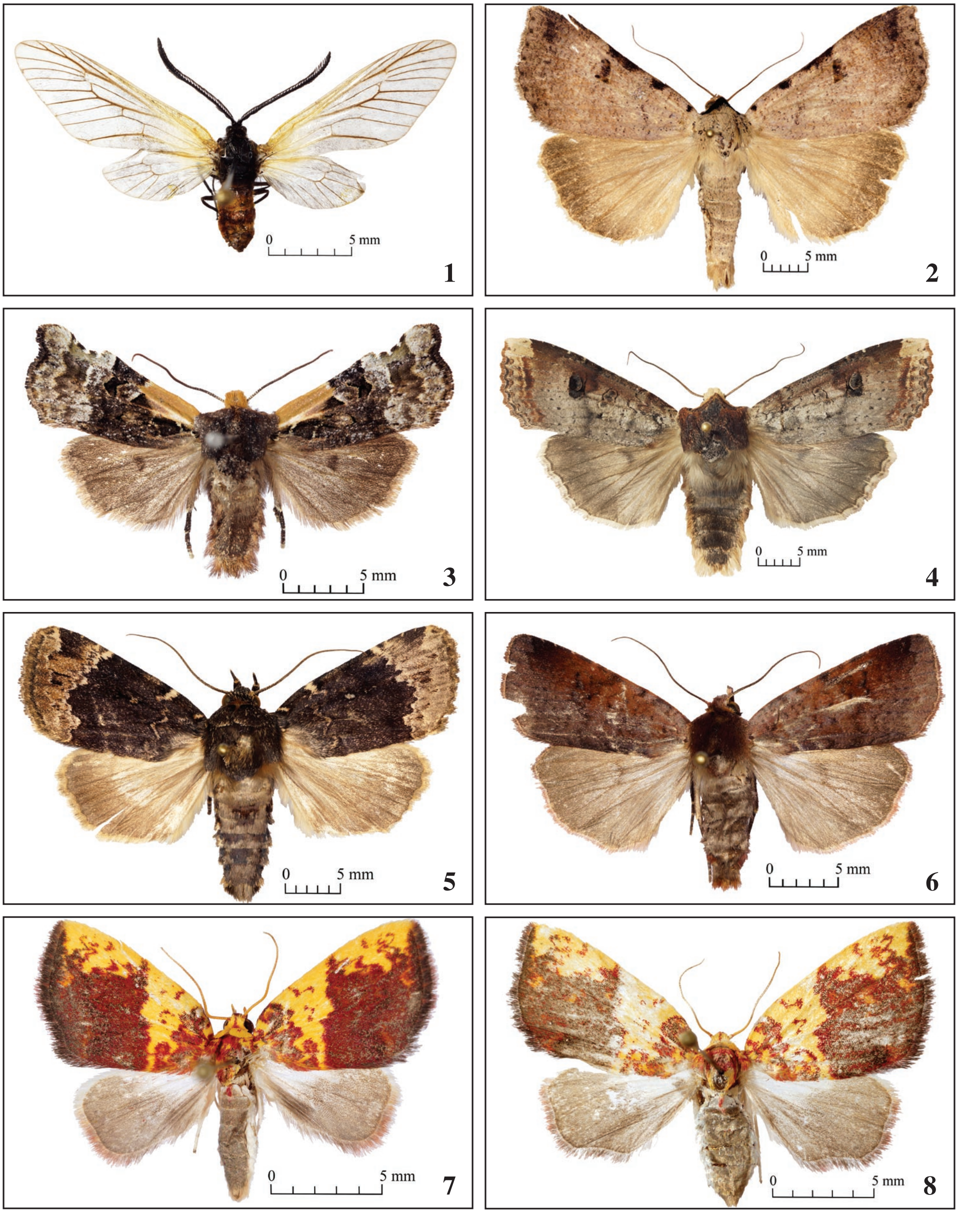
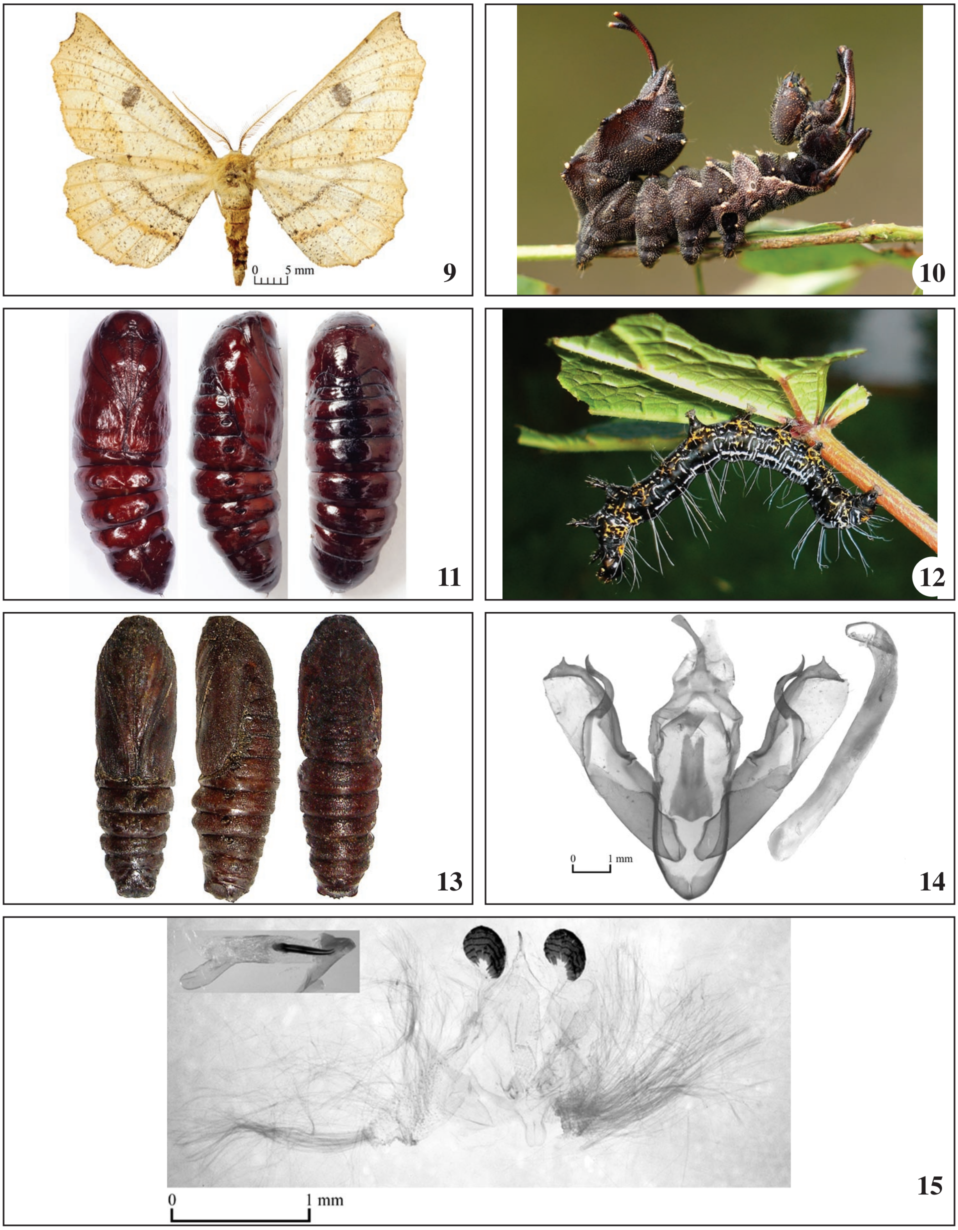


Figs 1-8.– Adults, upperside: **1.** *Pryeria sinica* Moore, 1877, ♂, 20-IX-2020, Shivki; **2.** *Lygephila lupina* (Graeser, 1890), ♂, 3-VIII-2020, Shivki; **3.** *Teratoglaea pacifica* Sugi, 1958, ♂, 17-IX-2017, Shivki; **4.** *Xylena formosa* (Butler, 1878), ♂, 18-IX-2020, Shivki; **5.** *Amphipyra jankowskii* Oberthür, 1884, ♂, 3-VIII-2020, Shivki; **6.** *Diarsia ruficauda* (Warren, 1909), ♂, 6-VIII-2020, Shivki; **7.** *Siglophora sanguinolenta* (Moore, 1888), ♂, 7-VIII-2020, Shivki; **8.** *S. sanguinolenta*, ♀, 5-VIII-2020, Shivki.



Figs 9-15.– 9. *Acrodontis kotshubeji*, ♂, 18-IX-2020, Shivki. Preimaginal stages: **10-11.** *Stauropus basalis* Moore, 1877, 22-26-IX-2020, Solntsepek (**10** - last instar larva on *Lespedeza bicolor*, **11** - pupa in different projections); **12-13.** *Mimeusemia persimilis* Butler, 1875, 5-VIII-2011, Durmin (**12** - last instar larva on *Vitis amurensis*, **13** - pupa in different projections). **14-15.** Male genitalia: **14.** *Xylena formosa* (Butler, 1878), 18-IX-2020, Shivki; **15.** *Siglophora sanguinolenta* (Moore, 1888), 7-VIII-2020, Shivki.

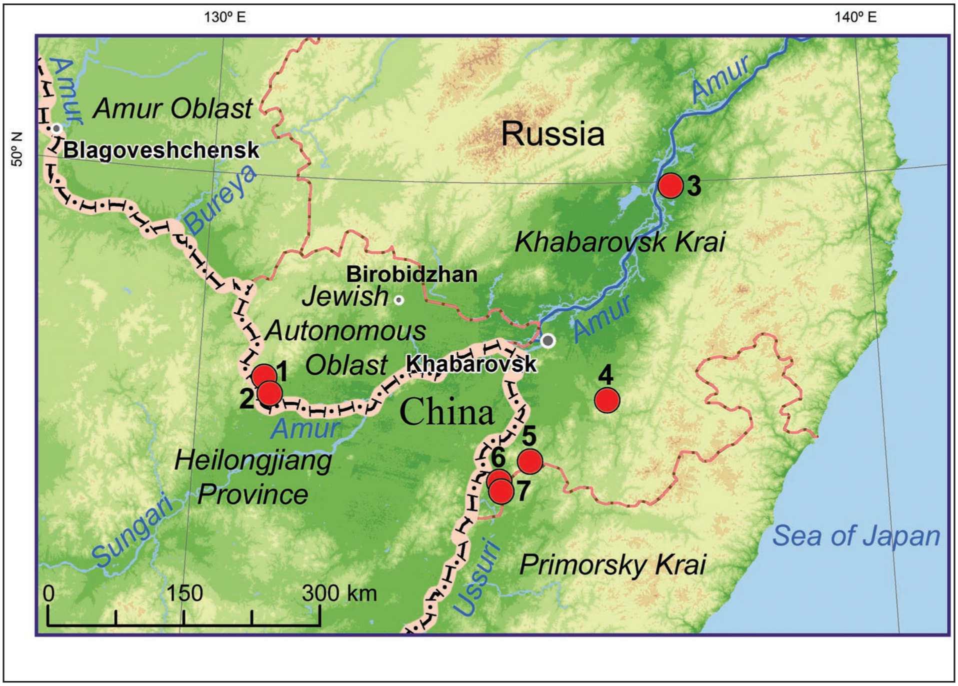


Fig. 16.– Map of collecting localities (red circles) in the Southern Amur Region: **1.** Soyuznoe, **2.** Ekaterino-Nikol'skoe, **3.** Malmyzh, **4.** Durmin, **5.** Podkhorenok Chetvertyy, **6.** Solntsepek, **7.** Shivki.

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Descripción de una nueva especie de *Caryocolum* Gregor & Povolný, 1954, descubierta en España y otros datos de interés (Lepidoptera: Gelechiidae)

J. Gastón, P. Huemer & A. Vives Moreno

Resumen

Se describe *Caryocolum molinai* Gastón, Huemer & Vives, sp. n. nueva especie para España. Se realiza el análisis del gen mitocondrial Citocromo oxidasa I (COI), ADN código de barras, para el género *Paramegacraspedus* Gastón & Vives, 2021 se saca fuera y se establece una nueva sinonimia y una nueva combinación.

PALABRAS CLAVE: Lepidoptera, Gelechiidae, *Caryocolum*, nueva sinonimia, nueva combinación, nueva especie, España.

Description of a new species of *Caryocolum* Gregor & Povolný, 1954, discovered in Spain and other data of interest (Lepidoptera: Gelechiidae)

Abstract

Caryocolum molinai Gastón, Huemer & Vives sp. n., a new species from Spain is described. An analysis of the DNA barcode (mitochondrial Cytochrome oxidase I (COI) gene) for the genus *Paramegacraspedus* Gastón & Vives, 2021 is carried out and a new synonymy and a new combination is established.

KEY WORDS: Lepidoptera, Gelechiidae, *Caryocolum*, new synonymy, new combination, new species, Spain.

Introducción

El presente artículo forma parte y es continuación de los trabajos iniciados sobre la fauna de Lepidoptera de España (GASTÓN & VIVES MORENO, 2020a, 2020b, 2021; VIVES MORENO & GASTÓN, 2019, 2020). En el presente trabajo se proporcionan nuevos datos que amplían y enriquecen la biodiversidad de la fauna de España, con la descripción de una nueva especie del género *Caryocolum* Gregor & Povolný, 1954 (Gelechiidae) localizada en dos biotopos del centro de España, en las provincias de Segovia y Soria. Al igual que las otras ocasiones, el material estudiado procede de colecciones particulares y de los fondos del Museo Nacional de Ciencias Naturales de Madrid, España (MNCN).

En nuestro anterior trabajo (GASTÓN & VIVES MORENO, 2021), designamos el nuevo género *Paramegacraspedus* Gastón & Vives, 2021 con la especie tipo *Megacraspedus sinevi* Vives & Gastón, 2020. Los análisis moleculares realizados con el holotipo no confirman esa hipótesis y por lo tanto es necesario establecer la siguiente nueva combinación: *Megacraspedus* Zeller, 1839 (= *Paramegacraspedus* Vives & Gastón, 2021), **nueva sinonimia**.

Material y métodos

El material utilizado para el estudio se ha obtenido mediante muestreos nocturnos y diurnos, con trampas de luz actínica distribuidas en los biotopos apropiados y disponiendo de las autorizaciones de las diferentes regiones afectadas. 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.

Las secuencias del código de barras de ADN se basan en un segmento de 658 pares de bases del gen mitocondrial COI (citocromo c oxidasa 1). Las muestras de tejido de ADN (patas secas) se prepararon de acuerdo con las normas prescritas y se procesaron con éxito en el Centro Canadiense de Código de Barras de ADN (CCDB, Instituto de Biodiversidad de Ontario, Universidad de Guelph) para obtener códigos de barras de ADN utilizando el protocolo estándar de alto rendimiento descrito en DEWAARD *et al*. (2008). Se consideraron para el análisis 67 especímenes del grupo de especies de *Caryocolum leucomelanella* con una longitud de secuencia >550 pb, de los cuales 60 especímenes tienen un código de barras completo de 658 pb. Estas secuencias cubren 11 especies europeas del grupo de especies. Los detalles, incluidos los datos completos de los ejemplares y las imágenes de estos especímenes, pueden consultarse en el conjunto de datos público “Lepidoptera of Europe - *Caryocolum* sp. n. - Spain [DS-CARYSPAI]” en el “Barcode of Life Data Systems” (BOLD; RATNASINGHAM & HEBERT, 2007). Las secuencias se enviaron finalmente a GenBank.

Los grados de variación intra e interespecífica de los fragmentos del código de barras de ADN se calcularon según el modelo de Kimura de 2 parámetros de sustitución de nucleótidos utilizando las herramientas analíticas de los sistemas BOLD v. 4.0. (http:// www.boldsystems.org). El cálculo de la distancia intraespecífica se normalizó además con las herramientas de cálculo de BOLD para reducir el sesgo en el muestreo a nivel de especie. Se construyó un árbol de unión de vecinos de los datos de los códigos de barras de ADN de los taxones del centro y sureste de Europa utilizando MEGA 6 (TAMURA *et al*., 2013) bajo el modelo de parámetros Kimura 2 para las sustituciones de nucleótidos.

La preparación de los órganos genitales 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 ©.

Abreviaturas

AV	Antonio Vives
JG	Javier Gastón
MNCN	Museo Nacional de Ciencias Naturales, Madrid, España
prep. gen.	preparación de genitalia
sp. n.	especie nueva
TLMF	Tiroler Landesmusem Ferdinandeum, Innsbruck, Austria

Resultados

GELECHIIDAE

Caryocolum molinai Gastón, Huemer & Vives, sp. n.

Material estudiado: Holotipo, 1 ♂, ESPAÑA, SEGOVIA, Casla (Sierra de Arcones), 1.150 m, 29-VIII-2021, J. Gastón leg., prep. gen. 8755JG, depositado en el Museo Nacional de Ciencias Naturales, en Madrid, España (MNCN).

Paratipos 10 ♂♂ y 1 ♀: 3 ♂♂, ESPAÑA, SEGOVIA, Casla (Sierra de Arcones), 1.150 m, 7-IX-2018, J. Gastón leg. y col., prep. gen. 8623JG, 8629JG, 8630JG; 1 ♂, ídem, J. Gastón leg., TLMF col., prep.

gen. 8638JG; 1 ♀, ídem, ADN número de secuencia genética TLMF Lep 30974, prep. gen. 8631JG; 1 ♂, ídem, 29-VIII-2021, J. Gastón leg. y col., prep. gen. 8756JG; 1 ♂, ídem, 9-IX-2021, J. Gastón leg. y col.; 2 ♂♂, ídem, prep. gen. 8779JG, 8786JG; 2 ♂♂, SORIA, Aldehuela de Calatañazor, 1.125 m, 19-VIII-2020, J. Gastón leg. y col., ADN número de secuencia genética TLMF Lep 30597 y 30598, prep. gen. 8309JG, 8326JG.

Descripción del macho (fig. 2): Envergadura, 10,55 mm (n=11). Cabeza bien desarrollada con pelos escamiformes de color ocre claro compactos en la frente y en la zona alta del epicráneo que se tornan a negros en las órbitas oculares. Palpos labiales bien desarrollados, con el segundo segmento dirigido hacia el frente y levemente curvado hacia la parte superior; se presenta densamente cubierto pelos escamiformes de color ocre muy claro, excepto por su parte superior donde los pelos son negros; tercer segmento delgado, afilado y muy curvado hacia la parte superior, recubierto de pelos escamiformes muy cortos de color negro. Antenas filiformes recubiertas de pequeñas cerdas de color negro; la parte final del escapo presenta una minúscula mancha blanca. Tórax recubierto de escamas de color gris muy oscuro excepto la parte superior central donde las escamas son de color ocre; tégulas recubiertas de escamas de color ocre muy claro, similares a las de la frente y epicráneo. Abdomen recubierto de las mismas escamas que el tórax, aunque levemente más claras. Tanto el fémur como la tibia en los tres pares de patas están recubiertos de pelos de color negro, exceptuando las tibias del tercer par que están anilladas de escamas blanquecinas. Alas anteriores ligeramente apuntadas; escamas del fondo de las alas negras, algo más claras a lo largo del margen interno; hay cuatro manchas blancas o blanquecinas situadas una cerca de la base del ala, otra en el centro del ala y dos en el extremo, junto a la costa y el termen, que en algunos casos se fusionan; la macha más próxima a la base del ala es ligeramente oblicua y se remata por su parte costal con escamas de color marrón-rojizo. Las alas posteriores son de color gris claro uniforme.

Genitalia del macho (fig. 4): Uncus ancho con el extremo redondeado; tegumen levemente trapezoidal; gnathos pequeño y poco ostensible. Valvas con la base ancha y joroba dorsal ligeramente aplanada y redondeada; larga parte distal abruptamente apuntada con el ápice redondeado. Sacculus esbelto relativamente alargado, aunque algo menor que la valva, rematado en su extremo con un pequeño gancho poco perceptible. Vinculum potente, característico del género, con sendos procesos mediales apuntados y procesos laterales conspicuos y afilados dirigidos simétricamente hacia el centro. Saccus de base triangular y extremo alargado tanto como la longitud del uncus-tegumen. Phallus largo y recto.

Descripción de la hembra (fig. 3): Envergadura, 9 mm (n=1). La morfología de las hembras no difiere de la de los machos.

Genitalia de la hembra (figs 5, 5a, 5b): Segmento VIII trapezoidal y muy esclerotizado con el margen anterior claramente arqueado; ostium bursae cercado lateralmente por sendos pliegues cuyos extremos posteriores giran 90º hacia las paredes del VIII segmento; antrum trapezoidal muy esclerotizado con la base anterior hendida en su parte central; papilas anales de bien desarrolladas aunque poco esclerotizadas; apófisis posteriores de mucha longitud alcanzando la parte posterior del ductus bursae; papilas anteriores muy cortas y robustas; ductus bursae con un par de escleritos laterales esclerotizados en su parte posterior de una longitud similar a las apófisis anteriores; ductus bursae alargado y membranoso; corpus bursae ovoidal, membranoso y con un signum de mediano tamaño con forma de gancho ubicado en el entronque de la bursa y el ductus.

Diagnosis molecular: Las secuencias de la región del código de barras COI revelaron bajas distancias genéticas intraespecíficas, pero significativamente más altas entre especies en el grupo de especies de *C. leucomelanella*, según la definición de HUEMER (1988) (Tabla 1). La divergencia media normalizada dentro de las especies es del 0,66% (SE 0,02), mientras que la distancia mínima entre especies es del 2,67% y la distancia media dentro del grupo de especies es del 5,03%. Todas las especies, excepto *C. lamai*, se agrupan dentro de un mismo número de índice de código de barras (BIN) (véase RATNASINGHAM & HEBERT, 2013), pero el BIN de un espécimen desviado de *C. molinai* aún no se ha calculado en BOLD y puede ser diferente, ya que la distancia intraespecífica del código de barras es relativamente alta, con un máximo de 1,62% en la nueva especie. Sin embargo, las dos únicas secuencias que ya se atribuyen al BIN BOLD:AEI2483 son genéticamente homogéneas y sin distancia intraespecífica.

Tabla 1.– Divergencias medias intraespecíficas K2P (Parámetro Kimura 2), distancias máximas entre pares, especies más cercanas y distancia a la especie más cercana (distancias en %) en el grupo de especies de *Caryocolum leucomelanella*.

Especies	**Media Intra-Sp**	**Max Intra-Sp**	**Especies cercanas**	**Distancia a NN**
Caryocolum arenariella	0.68	1.08	*Caryocolum messneri*	2.67
Caryocolum dianthella	0.63	0.97	*Caryocolum lamai*	2.94
Caryocolum habeleri	0.43	0.78	*Caryocolum improvisella*	3.33
Caryocolum improvisella	0.31	0.46	*Caryocolum messneri*	3.15
Caryocolum lamai	0.80	1.44	*Caryocolum dianthella*	2.94
Caryocolum leucomelanella	0.78	2.03	*Caryocolum mazeli*	3.79
Caryocolum leucothoracellum	0.10	0.31	*Caryocolum molinai*	3.94
Caryocolum mazeli	0.68	1.08	*Caryocolum molinai*	3.62
Caryocolum messneri	0.99	1.71	*Caryocolum arenariella*	2.67
Caryocolum schleichi	0.77	0.77	*Caryocolum improvisella*	3.30
Caryocolum molinai	1.08	1.62	*Caryocolum dianthella*	3.09

C. molinai se agrupa claramente por separado de todos los demás congéneres con el espécimen más cercano, un espécimen de *C. dianthella*, a una distancia del 3,09% (Tabla 1, Fig. 1). Sin embargo, desde el punto de vista de la morfología de la genitalia del macho, está más cerca de los taxones fuera del complejo *C. schleichi* sin una valva bifurcada, con *C. leucothoracellum* como la especie genéticamente más cercana a una distancia mínima del 3,94%.

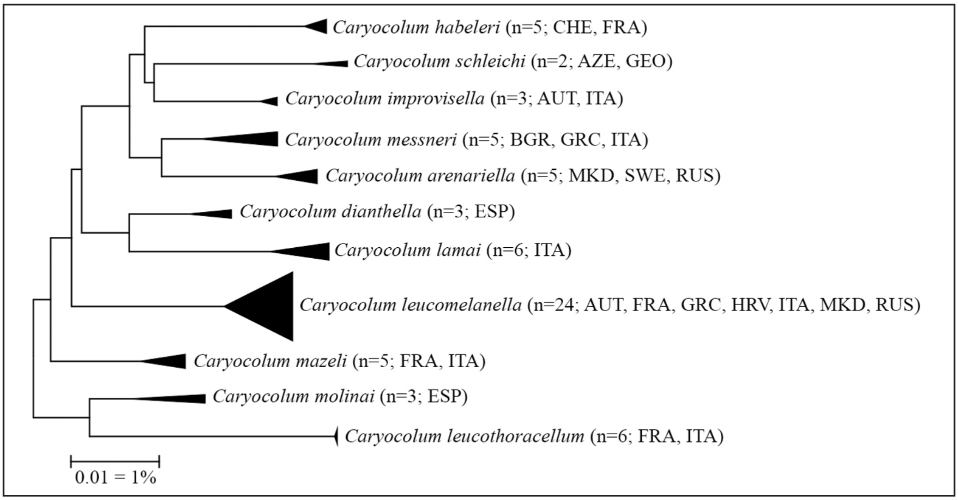

Figura 1.– Árbol filogenético Neighbour-Joining de las especies del grupo de especies de *Caryocolum leucomelanella* (parámetro Kimura 2, construido con MEGA 6 cf. TAMURA *et al*., 2013), sólo se consideran las secuencias (>500 pb). Nota: la barra de escala solo se aplica a las ramas internas entre especies. La anchura de los triángulos representa el tamaño de la muestra, la profundidad la variación genética dentro del grupo. Fuente: Datos de códigos de barras de ADN de BOLD (base de datos de códigos de barras de la vida, cf. RATNASINGHAM, 2018).

Biología: Desconocida. No se conocen los estados inmaduros ni las plantas nutricias de las orugas. Los adultos han sido capturados desde mediados de agosto hasta la primera semana de septiembre, por lo que se supone que solo dispone de una generación a finales del verano.

Distribución: Hasta el momento se conocen dos poblaciones situadas en las provincias de Segovia y Soria, en el centro de España y en cotas que oscilan entre los 1.120 a 1.170 m., en el piso bioclimático supramediterráneo (RIVAS-MARTÍNEZ, 1987). La vegetación predominante en ambos biotopos está constituida básicamente por bosques de sabina albar (*Juniperus thurifera* L.) y encina (*Quercus ilex* L.).

Etimología: Se dedica esta especie a Tomás Molina, entusiasta colega con quien el primero de los autores ha compartido experiencias lepidopterológicas.

Detalles: Especie con una genitalia muy próxima a *Caryocolum leucothoracellum* (Klimesch, 1953), que no está presente en la Península Ibérica, aunque sí desde Francia e Italia hasta Hungría, con una única cita en Marruecos (HUEMER & KARSHOLT, 2010). Las diferencias entre ambas son patentes en su genitalia; en los machos el tamaño y forma del borde de las valvas es el carácter más notorio, así como la joroba que se presenta más pronunciada en *C. leucothoracellum,* y la ausencia en esta especie de los procesos laterales conspicuos y apuntados hacia el centro del vinculum; en las hembras, los pliegues que bordean el ostium son bien diferentes, ya que en *C. leucothoracellum* se dirigen de forma convergente hacia el margen posterior del VIII segmento, mientras que en *C. molinai* giran bruscamente hacia las paredes laterales de dicho segmento. Las apófisis anteriores son más largas en *C. leucothoracellum.* Siguiendo a VIVES MORENO (2014), la nueva especie hay que colocarla delante de *Caryocolum dianthella* (Chrétien, 1925).

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No podemos terminar este trabajo sin agradecer la colaboración y la ayuda prestada por las siguientes personas e Instituciones: a las Direcciones Generales de Medio Ambiente de Castilla y León por las autorizaciones concedidas allí donde se han desarrollado los muestreos, en parte, dentro del Proyecto Científico de SHILAP, a Francisco Javier Conde de Saro por su ayuda lingüística y a la Dra. Amparo Blay, Conservadora de Entomología, en el Museo Nacional de Ciencias Naturales (Madrid, España), que siempre ha estado dispuesta a ayudarnos en cuantas consultas la hemos solicitado.

BIBLIOGRAFÍA

CHRÉTIEN, P., 1925.– La légende de *Graellsia isabellae*. Appendice.– *Amateur Papillons*, **2**: 241-247.

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

GASTÓN, J. & VIVES MORENO, A., 2020a.– Contribución al conocimiento de los Lepidoptera de España con la descripción de cuatro nuevas especies para nuestra fauna y otras citas de interés (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **48**(190): 307-324.

GASTÓN, J. & VIVES MORENO, A., 2020b.– Descripción de cuatro nuevas especies y otras citas de interés para la fauna de Lepidoptera de España (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **48**(191): 545-564.

GASTÓN, J. & VIVES MORENO, A., 2021.– Un género y tres nuevas especies para España, con otras interesantes informaciones lepidopterológicas para la fauna española. Descripción de la hembra de *Agnoea revillai* Gastón & Vives, 2020 y creación de un nuevo género *Paramegacraspedus* Gastón & Vives, gen. n. (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **49**(193): 149-158.

GREGOR, F. & POVOLNÝ, D., 1954.– Systematische und zoogeographische Studie über die Gruppe der Arten *Gnorimoschema* Busck mit Rücksicht auf die richtige Diagnostik des Schädlings *Gnorimoschema ocellatellum* Boyd.– *Zoologické a Entomologické Listy*, **3**: 83-96.

HUEMER, P., 1988.– A taxonomic revision of *Caryocolum* (Lepidoptera: Gelechiidae).– *Bulletin of the British Museum of Natural History (Entomology)*, **57**: 439-571.

HUEMER, P. & KARSHOLT, O., 2010.– Gelechiidae II (Gelechiinae: Gnorimoschemini).– *Microlepidoptera of Europe*, **6**: 586 pp. Apollo books, Stenstrup.

KLIMESCH, J., 1953.– Die an Caryophyllaceen lebenden europäischen *Gnorimoschema* Busck (= *Phthorimaea* Meyr.)-Arten.– *Zeitschrift des Wiener Entomologischen Gesellschaft*, **38**: 225-239. 272-282, 311-319.

RATNASINGHAM, S., 2018.– *BOLD Barcode of Life Data System, version 4*. Available from http://www.boldsystems.org (Accessed on 20 January 2021).

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

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

RIVAS-MARTÍNEZ, S., 1987.– *Memoria del mapa de series de vegetación de España 1: 400.000*: 268 pp. ICONA, Madrid.

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

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

VIVES MORENO, A., 2014.– *Catálogo sistemático y sinonímico de los Lepidoptera de la Península Ibérica, de Ceuta, de Melilla y de las islas Azores, Baleares, Canarias, Madeira y Salvajes (Insecta: Lepidoptera)*: 1184 pp. Suplemento de SHILAP Revista de lepidopterología, Improitalia, Madrid.

VIVES MORENO, A. & GASTÓN, J., 2019.– Contribución al conocimiento de los Lepidoptera de España. Cinco nuevas especies para nuestra fauna (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **47**(186): 317-324.

VIVES MORENO, A. & GASTÓN, J., 2020.– Cinco nuevas especies para la fauna de España y otras interesantes informaciones lepidopterológicas para España y Sudán (Insecta: Lepidoptera).– *SHILAP Revista de lepidopterología*, **48**(192): 717-731.

ZELLER, P. C., 1839.– Versuch einer naturgemäßen Einheilung der Schaben.– *Isis von Oken*, **1839**: 167-220.

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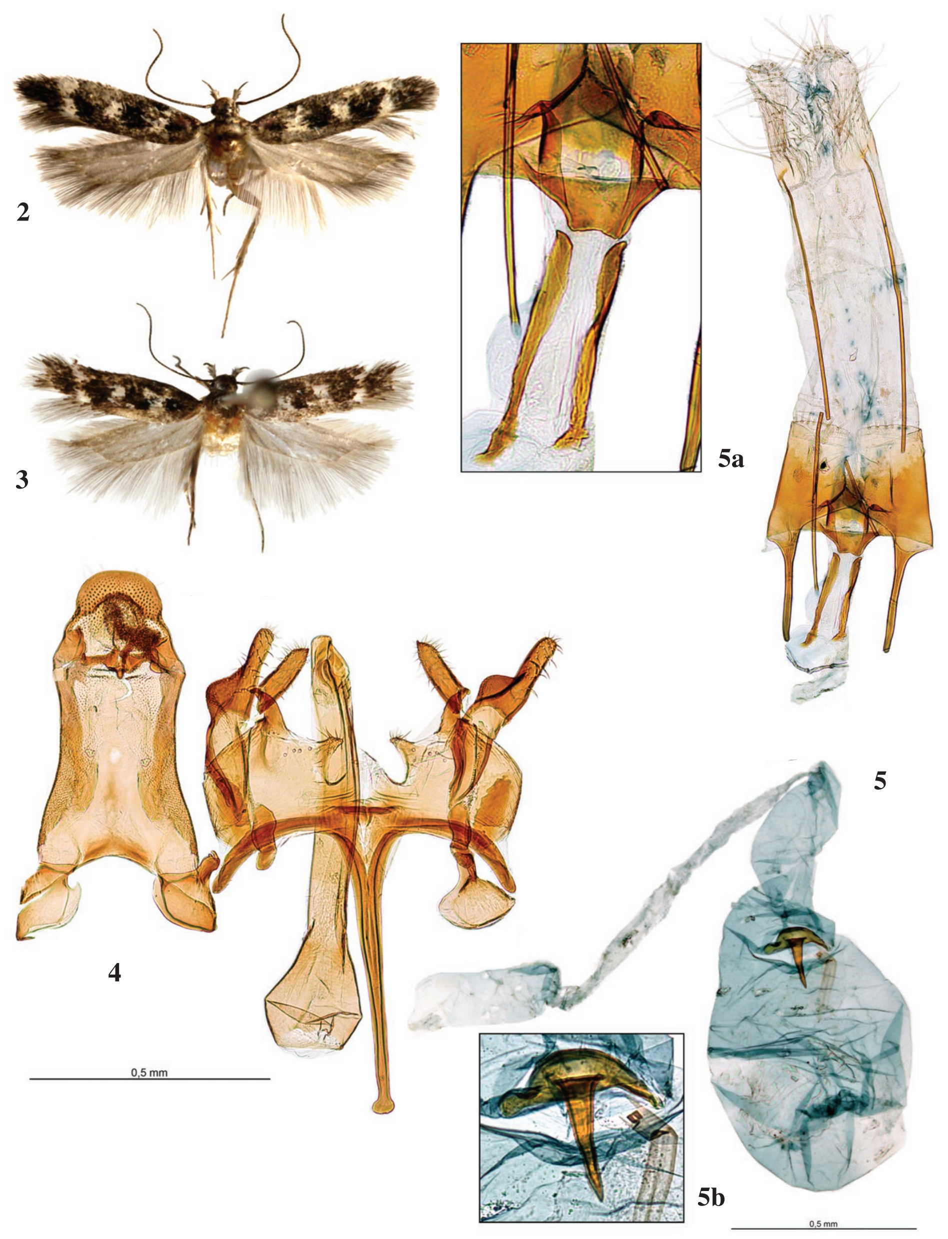

Figs 2-5.– *Caryocolum molinai* Gastón, Huemer & Vives, 2021, adultos y genitalias. **2.** Holotipo ♂, Casla, Segovia, España; **3.** Paratipo ♀, Casla, Segovia, España; **4.** Holotipo, genitalia del macho, prep. gen. 8755JG; **5.** Paratipo, genitalia de la hembra, prep. gen. 8631JG; **5a.** ídem, detalle del ostium y antrum; **5b.** ídem, detalle del signum.

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Notes from Old World Crambinae (II). New species of *Chilo* Zincken, 1817 (Lepidoptera: Pyraloidea)

G. Bassi

Abstract

Three new species of *Chilo* Zincken, 1817 are described and illustrated: *Chilo agassizi* Bassi, sp. n. from Tanzania, *Chilo barpak* Bassi, sp. n. from Nepal and *Chilo gumaensis* Bassi, sp. n from Botswana.

KEY WORDS: Lepidoptera, Pyraloidea, Crambinae, distribution, new species, Botswana, Nepal, Tanzania.

Notas de Crambinae del Viejo Mundo. Nuevas especies de *Chilo* Zincken, 1817 (Lepidoptera: Pyraloidea)

Resumen

Se describen y representan tres nuevas especies del género *Chilo* Zincken, 1817: *Chilo agassizi* Bassi, sp. n. de Tanzania, *Chilo barpak* Bassi, sp. n. de Nepal y *Chilo gumaensis* Bassi, sp. n de Botsuana.

PALABRAS CLAVE: Lepidoptera, Pyraloidea, Crambinae, distribución, nuevas especies, Botsuana, Nepal, Tanzania.

Introduction

Among the large genera of subfamily Crambinae, *Chilo* Zincken, 1817 probably is the best known due to the economic importance of some of its members as pests of cultivated Poaceae.

BŁESZYŃSKI (1962, 1970) taxonomically treated all of the species known to him, but he did not propose new combinations for the species included in the genus that did not belong to it.

Among the valuable material of *Chilo* forwarded to me for study by D. J. L. Agassiz (Weston-Super-Mare, United Kingdom) and O. Karsholt (Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark), and in the material of my own collection I discovered three new species, which I describe here.

Material and methods

Genitalia preparations were made following ROBINSON (1976). The terminology of the genitalia follows BŁESZYŃSKI (1970), KLOTS (1970) and KRISTENSEN (2003). Genitalia photographs were taken with a Canon S120 digital camera. The habitus photos were made with a Nikon D300 digital camera. The images were enhanced with Adobe Photoshop Elements.

The following abbreviations are used:

CDA - Dr. David J. L. Agassiz research collection, Weston-Super-Mare, United Kingdom
CGB - Graziano Bassi research collection, Avigliana, Italy

m - meter(s)
ZMUC - Zoological Museum collection, Natural History Museum of Denmark, Copenhagen, Denmark.

Taxonomy

Chilo Zincken, 1817. *Germ. Mag*., **2**: 36

Type species: *Tinea phragmitella* Hübner, [1805]. *Samml. Eur. Schmett., Tineae*: figs 297-298

Chilo is the main genus of the tribe Chiloini, which includes another ten genera. It is distributed worldwide and its origin is in the Old World. Many species have metallic scales on the forewing. It is well characterized in male and female genitalia, but, being an old "store-genus", some of the fifty-eight species actually listed (see NUSS *et al*., 2021), should be reassigned to other genera of the Haimbachiini tribe. Since BŁESZYŃSKI 's revision (1970) only the Chinese fauna was taxonomically treated (WANG & SUNG, 1981).

Chilo agassizi Bassi, sp. n.

Holotype 1 ♂: Tanzania, Tanga Pangani [05º25'S 38º58'E], 14-VII-2000, DJL Agassiz [leg.], GS 5490 GB, CDA.

Description (Fig. 2): Wingspan 17 mm. Labial palpi 5 X eye diameter, off-white sprinkled with brown. Maxillary palpi concolorous with labial palpi. Antenna strongly serrate, pale brown with costa white. Frons rounded, slightly produced, brown. Ocelli small. Chaetosemata minute. Vertex white. Patagium and tegulae yellow brown. Thorax white. Forewing subtriangular, with rounded apex and termen oblique; ground color off-white with costa and veins pale brown; without bright metallic scales; cell with a suboval black dot; terminal margin with seven black dots; fringes of single available specimen damaged; underside yellow brown. Hindwing white suffused with pale yellow; fringes white; underside yellow brown. Foreleg bronze brown; mid and hind leg golden yellow; tibial spurs stout, inner slightly longer than outer.

Male genitalia (Fig. 9): Uncus and gnathos about of equal lengths, lightly sclerotized, slightly curved and pointed apically. Tegumen as long as valva, with thickened edge. Vinculum thin, rounded and moderately produced dorsally. Juxta membranous. Pseudosaccus well developed. Valva subtriangular, with pars basalis well developed and cucullus rounded, both densely clothed with bristles. Phallus larger than valva, ventral arm spoon-shaped, with strong ventral tooth; vesica with large patch of stout cornuti.

Female unknown.

Biology: Unknown.

Diagnosis: The adult of *C. agassizi* Bassi, sp. n. is a small *Chilo* without shiny metallic scales on the forewing and with a well demarcated suboval dot in the cell, unlike all other Afrotropical congeners. The male genitalia are very distinctive and unlike those of other *Chilo*; the hyper-developed phallus is reminiscent of that of *C. saccariphagus* (Bojer, 1856), but the latter is a large species (wingspan: 26-30 mm) and its male genitalia have the valva without pars basalis and without strong apical bristles, and the phallus is with smaller cornuti and without ventral arm.

Etymology: The species is named after its collector, DJL Agassiz, well-known microlepidoptera specialist.

Chilo barpak Bassi, sp. n.

Holotype 1 ♂: Nepal, Central, 15 km S[outh] Barpak, Baluuea [Baluwa], 850 m, 10-VII-1998, leg. M. Fibiger, GS 4572 GB, ZMUC.

Description (Fig. 1): Wingspan 29 mm. Labial palpi 4.5 X eye diameter, brown sprinkled with black; upper border yellow basally; apex slightly downcurved, black. Maxillary palpi yellow sprinkled with brown. Antenna strongly serrate, brown with costa bronze brown. Frons conical, strongly produced, yellow. Ocelli and chaetosemata small. Vertex blackish brown medially, yellow laterally. Patagium yellow medially, black laterally. Tegulae black, distally sprinkled with yellow. Thorax yellow. Forewing subrectangular, with rounded apex and termen almost straight; ground color as in fig. 1, black at base with dorsum and veins yellow; without bright metallic scales; black subdorsal dot distinct; seven large terminal dots white bordered black; terminal line brown; fringes with short scales bronze brown with pale brown line basally and long scales damaged in available specimen; underside brown, paler distally and with costa yellow. Hindwing brown; fringes pale bronze brown with pale brown line basally; underside brown, paler than in forewing. Fore and hindleg damaged in available specimen; midleg yellow with darker shadow on outer side; outer side of tarsi annulated with dark brown; tibial spurs stout, inner longer than outer.

Male genitalia (Figs 5, 6): Gnathos longer than uncus, both stout, curved and pointed apically. Tegumen short, with thickened edge and ventrally sclerotized below gnathos. Vinculum thin, rounded. Juxta subrectangular, with slightly asymmetrical arms, both with strong apical tooth facing inwards. Pseudosaccus moderate. Valva subtriangular, with pars basalis moderate and cucullus rounded. Phallus with phallobase with bulbose projection, ventral arms traceable but not free; vesica with large patch of small and medium-sized cornuti.

Female: Unknown.

Biology: Unknown.

Diagnosis: *Chilo barpak* Bassi, sp. n. is similar in wingspan to *Chilo infuscatellus* Snellen, 1890, but its habitus (Fig. 1) is darker, without bright metallic scales on the forewing and with more contrasted terminal dots. The male genitalia are somewhat similar to those of *C. ceylonicus* Hampson, 1896, *C. crypsimetalla* (Turner, 1911) and *C. infuscatellus*, but differ in the shape of the juxta, which is subovate with arms of equal length in *C. crypsimetalla*, and in the phallus, which is distally enlarged and without cornuti in *C. ceylonicus* and medially bulged and with a single strong cornutus in *C. infuscatellus*.

Etymology: The name refers to the type locality and is treated as a noun in apposition.

Chilo gumaensis Bassi, sp. n.

Holotype 1 ♀, Botswana, Okavango West, Guma Lagoon Camp, 980 m, 3-XII-2010, 18º57’41’’S, 22º22’24’’E, G. Bassi leg., 58410 Collection Bassi, CGB. Paratypes: 2 ♀♀, same data as holotype, GS 5270 and 6885 GB, CGB.

Description (Fig. 3): Wingspan: 27 mm (holotype), 27 and 28 mm (paratypes). Labial palpi 4 X eye diameter, yellow brown sprinkled with dark brown; apex slightly downcurved. Maxillary palpi yellow brown sprinkled with dark brown. Antenna simple, brown with costa pale brown sprinkled with black, especially basally. Frons conical, strongly produced and pointed, brown. Ocelli and chaetosemata minute. Vertex yellow brown, paler in medially. Patagium yellow brown. Tegulae brown, paler distally. Thorax brown with whitish suffusion distally. Forewing elongated, with pointed apex and termen strongly oblique; ground colour brown; with a rather large black dot in cell; postmedial fascia broken, ill defined, oblique; without bright metallic scales; with seven small black terminal dots; brown fringes slightly paler basally; underside ivory yellow. Hindwing bright white, with pale yellow suffusion apically; fringes white; underside white pale-yellow costa. Legs brown, paler on inner side; tibial spurs small, inner longer than outer. Abdomen with each tergite creamy white tinged with rufous distally; sternites bright white.

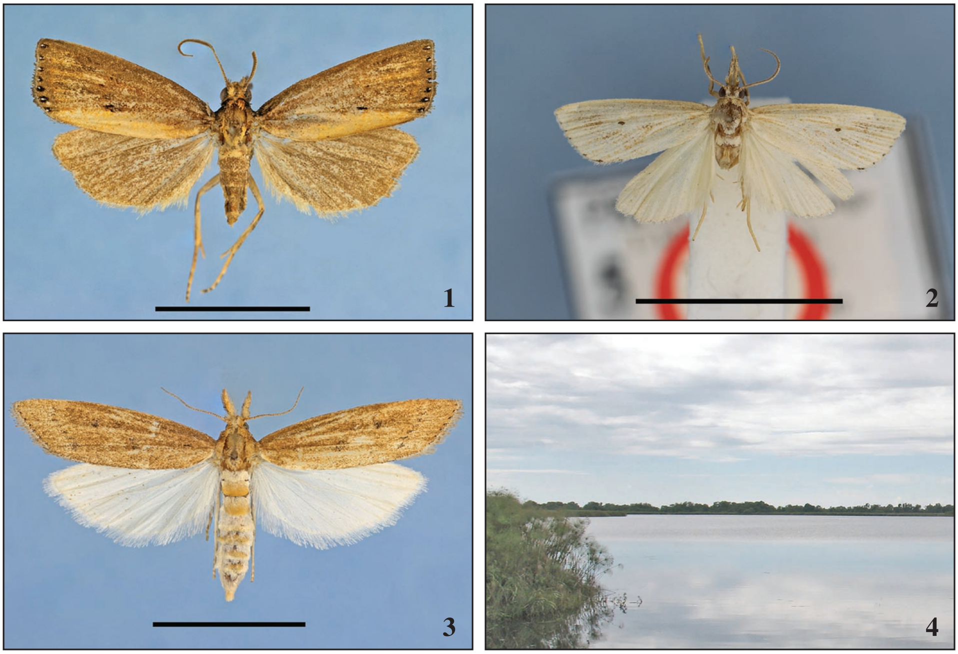
Female genitalia (Figs 7, 8): Papillae anales slightly concave, densely covered with setae. Apophyses posteriores half as long as apophyses anteriores, both narrow and medially slightly curved. Abdominal segment VIII moderately sclerotized, narrowing ventrally. Seventh sternum membranous. Ostium bursae slightly concave. Ductus bursae 2/3 as long as corpus bursae, folded at 1/3, wrinkled distally; basal third more sclerotized, slightly bulged and with two minutes teeth laterally. Ductus seminalis branching off in fold of ductus bursae. Corpus bursae membranous, slightly bulged in basal half.

Male unknown.

Biology: Unknown. The adults were attracted to actinic artificial light in the riparian vegetation of the Guma Lagoon (Fig. 4).

Diagnosis: In the adult female of *C. gumaensis* Bassi, sp. n. (Fig. 3) the yellow brown forewing with oblique postmedial fascia associated with bright white hindwing are unlike any other Afrotropical *Chilo*. The female genitalia with the ductus sclerotized basally and the long corpus bursae without signum is somewhat similar to those the Palearctic *C. pulverosellus* Ragonot, 1885 and the Neotropical *C. chiriquitensis* (Zeller, 1877), but it is easily distinguishable on the basis of the two lateral teeth proximally in the ductus bursae.

Etymology: The specific name refers to the lagoon in the Okavango delta where the species was collected.



Figs 1-4.– 1. *Chilo barpak* Bassi, sp. n., holotype. **2.** *Chilo agassizi* Bassi, sp. n., holotype. **3.** *Chilo gumaensis* Bassi, sp. n., holotype. **4.** Habitat of *Chilo gumaensis* Bassi, sp. n. (photo G. Bassi, Dec. 4, 2010) (Scale bars = 10 mm).

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I thank Dr David J. L. Agassiz (Weston-Super-Mare, United Kingdom), Mr Ole Karsholt, (Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark), for providing material on study, Dr B. Landry (Muséum d'Histoire Naturelle, Geneva, Switzerland) for reviewing the English text and for his valuable suggestions, and to Dr Antonio Vives (E.T.S. de Ingeniería Agronómica, Alimentación y Biosistemas, Madrid, Spain) for translating the abstract into Spanish.

BIBLIOGRAPHY

BŁESZYŃSKI , S., 1962.– Studies on the Crambidae (Lepidoptera). Part XXXVI. On some species of the genus *Chilo* Zincken.– *Acta Zoologica Cracoviensia,* **7**(7): 107-133.

BŁESZYŃSKI , S., 1970.– A revision of the world species of *Chilo* Zincken.– *Bulletin of the British Museum (Natural History) Entomology series,* **25**(4): 101-195.

HÜBNER, J., 1796-[1838].– *Sammlung europäischer Schmetterlinge*: 449 pp., 789 pls. Augsburg.

KLOTS, A. B., 1970.– Lepidoptera: 115-130.– *In* S. L. TUXEN (Ed.). *Taxonomist's glossary of genitalia in insects*: 359 pp. Munksgaard, Copenhagen.

KRISTENSEN, N. P., 2003.– Skeleton and muscles: adults.– *In* N. P. KRISTENSEN (Ed.). Lepidoptera, moths and butterflies. Vol. 2. Morphology, physiology, and development.– *Handbook of Zoology*, **4**(36): 39-131. Walter de Gruyter, Berlin, New York.

NUSS, M., LANDRY, B., MALLY, R., VEGLIANTE, F., TRÄNKNER, A., BAUER, F., HAYDEN, J., SEGERER, A., SCHOUTEN, R., LI, H., TROFIMOVA, T., SOLIS, M. A., DE PRINS, J. & SPEIDEL, W., 2003-2021.- Global Information System on Pyraloidea. Available from www.pyraloidea.org.

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

WANG, P.-Y. & SUNG, S.-M., 1981.– Study of the genus *Chilo* Zincken from China (Lepidoptera: Pyralidae, Crambinae).– *Acta Zootaxonomica Sinica,* **6**(1): 85-95.

ZINCKEN, J. L. T. E., 1817.– Die Linneischen Tineen in ihre natürlichen Gattungen aufgelösst [sic] und beschrieben.– *Magazin der Entomologie,* **2**: 24-113.

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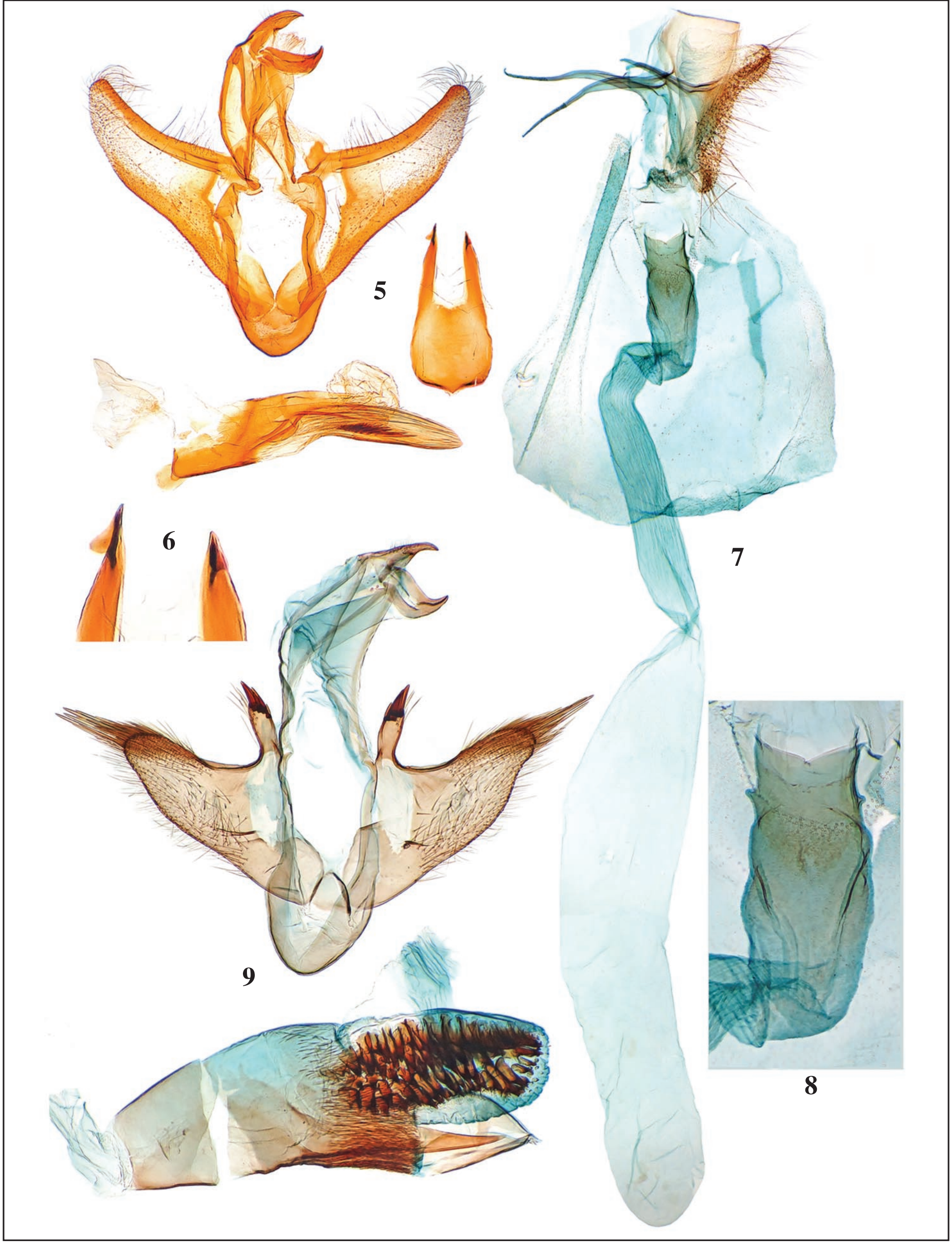

Figs 5-9.– *Chilo* sp. genitalia. **5.** *Chilo barpak* Bassi, sp. n., holotype, male genitalia with juxta and phallus extracted. **6.** The same, apex of juxta strongly magnified. **7.** *Chilo gumaensis* Bassi, sp. n., paratype GS 5270 GB, female genitalia. **8.** The same, ostium bursae and basal part of ductus bursae magnified. **9.** *Chilo agassizi* Bassi, sp. n., holotype, male genitalia.

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New record of *Caloptilia cuculipennella* (Hübner, 1796) in Belarus (Lepidoptera: Gracillariidae)

A. V. Sinchuk, N. V. Sinchuk & S.V. Baryshnikova

Abstract

Caloptilia cuculipennella (Hübner, 1796) was first discovered on the territory of Belarus. It is assumed that this species is distributed throughout the country. *Fraxinus excelsior* L., is indicated as a host plant. This species is the 7th representative of the genus *Caloptilia* Hübner, [1825] for the fauna of Belarus.
KEY WORDS: Lepidoptera, Gracillariidae, *Caloptilia cuculipennella*, Belarus.

Nuevo registro de *Caloptilia cuculipennella* (Hübner, 1796) en Bielorrusia (Lepidoptera: Gracillariidae)

Resumen

Caloptilia cuculipennella (Hübner, 1796) se descubre, por primera vez, para el territorio de Bielorrusia. Se asume que esta especie se distribuye por todo el país. Se demuestra que su planta nutricia es *Fraxinus excelsior* L. Esta es la séptima especie del género *Caloptilia* Hübner, [1825] para la fauna de Bielorrusia.
PALABRAS CLAVE: Lepidoptera, Gracillariidae, *Caloptilia cuculipennella*, Bielorrusia.

Introduction

Extensive genus *Caloptilia* Hübner, [1825] (Lepidoptera: Gracillariidae) has over 300 species of the world fauna and is represented in Europe by approximately 25 species (DE PRINS & DE PRINS, 2006-2019). At present, six species of Gracillariidae of the genus *Caloptilia* are known for the territory of Belarus: *Caloptilia populetorum* (Zeller, 1839) (ARIKO & SAUTKIN, 2017), *Caloptilia rufipennella* (Hübner, 1796) (EVDOSHENKO, 2016; PROKOPOVICH, 2008), *Caloptilia alchimiella* (Scopoli, 1763) (KUZNETSOV & BARYSHNIKOVA, 1998; MERZHEEVSKAYA *et al*., 1976; SETRAKOVA, 2014), *Caloptilia stigmatella* (Fabricius, 1781) (PRÜFFER, 1947), *Caloptilia hemidactylella* ([Denis & Schiffermüller], 1775) (ARIKO, & SAUTKIN, 2017; EVDOSHENKO, 2016; PISANENKO *et al*., 2019), and recently recorded *Caloptilia roscipennella* (Hübner, 1796) (SINCHUK *et al*., 2020). The inspection of various tree species for searching new mining Lepidoptera in Belarus has revealed another species of this genus, *Caloptilia cuculipennella* (Hübner, 1796), trophically related to common ash.

Fraxinus excelsior L. (Oleaceae) is an important forest-forming species in Belarus. Ash forests are valuable not only as a source of exceptionally high-quality wood and by-products, but also as a powerful regulator of biosphere processes, an accumulator of huge reserves of deposited carbon, an object of environmental biodiversity, an invaluable recreational resource (ZVYAGINTSEV & SAZONOV, 2005).

The natural range of the common ash tree covers almost all of Europe with the exception of the northernmost and southernmost parts, from the Atlantic coast in the West to the Volga river in the East. The northernmost point of its natural range is in Norway, approximately 64º North latitude. The southern border reaches 37º North latitude in Iran (CHUMAKOVA & VASIL'EV, 1984). The largest areas of ash forests within the Russian plain are concentrated in Ukraine, Belarus, and the southern Baltic States. Belarus is located in the Central part of the ash tree range and the climate conditions throughout its territory are quite favorable for the growth of this breed.

In the "Catalog of Lepidoptera of the Russian Empire" for the North-Western provinces (Estonia, Livonia, Courland, Pskov, Mogilev provinces. Vitebsk, Vilna, Kovno, Grodno and Minsk provinces and Poland are almost not processed, Pskov province is very poorly studied and only in places) the species *Coriscium cuculipennellum* Hb. (= *Caloptilia cuculipennella* (Hübner, 1796)) (ERSHOV & FIELD, 1870) is specified. However, there is no specific indication that the moth is located within the modern borders of Belarus (figure 1). At the moment, the spread is recorded in neighboring countries: Lithuania, Latvia, Poland, Ukraine, and Russia (DE PRINS & DE PRINS, 2006-2019).

In addition to *C. cuculipennella*, *Gracillaria syringella* (Fabricius, 1794) was previously recorded as a phyllophage of *Fraxinus excelsior* L. on the territory of Belarus (SAUTKIN & EVDOSHENKO, 2013).

Material and methods

Inspections were conducted in green spaces in all regional centers and some other localities of Belarus in 2020. The leaf blades found to be damaged by insects were collected in sealed plastic bags with a Zip-Lock of various sizes. The material, damaged by phyllophage, was herbarized (SKVORTSOV, 1977). Identification of pests by damaged leaf blades was carried out using specialized keys (ELLIS, 2001-2020; PITKIN *et al.*, 2019).

This article is based on the material of damaged leaves of common ash (figure 2) from Gomel, N52.429889, E31.025869 (accuracy: 29 meters), collected on 19-IX-2020 (leg. A. V. Sinchuk, N. V. Sinchuk). The herbarium is kept in the personal collection of A. V. Sinchuk.

Results

Identification by damages on leaves (figure 2: A, B) allowed us to establish a new species of phytophagy, *Caloptilia cuculipennella*, for Belarus, whose caterpillars feed on common ash. When a large number of damages are formed on one leaf, its deformation becomes noticeable (figure 2: C). After leaving the mines, the caterpillars feed under the curved edge of the leaf, which leads to its skeletonization. In the later stages, pupation occurs in the formed rollers (figure 2: D).

At present, this phyllophage is recorded in all neighboring countries: Lithuania (IVINSKIS, 2004), Latvia (KARSHOLT & NIEUKERKEN, 2013), Poland (KARSHOLT & RAZOWSKI 1996), Ukraine (KUZNETSOV & BARYSHNIKOVA, 1998), and Russia (BARYSHNIKOVA, 2019). Among host plants, in addition in the world are known: *Fraxinus americana* L., *F. angustifolia oxycarpa* (M. Bieb. Ex Willd.) Franco & Rocha Alonso, *F. anomala* Torr. Ex S. Wats., *F. chinensis rhynchophylla* Hance, *F. excelsior* L., *F. latifolia* Bebth., *F. nigra* Marshall, *F. ornus* L., *F. pennsylvanica* Marshall, *F. quadrangulata* Michx., *F. sogdiana* Bunge; *Jasminum* sp.; *Ligustrum ovalifolium* Hassk., *L. vulgare* L.; *Phillyrea* sp.; *Syringa vulgaris* L. (ELLIS, 2001, 2020; DE PRINS & DE PRINS, 2016).

The following species of ash trees are found in Belarus: *F. pennsylvanica*, *F. mandshurica* Rupr. (FEDORUK, 1972), *F. excelsior, Fraxinus angustifolia oxycarpa* (FEDORUK, 1985). *Fraxinus pennsylvanica* and *Fraxinus excelsior* have the largest area of growth (figure 3). There are 31 populations of *F. pennsylvanica* were counted on an area of 10.7 ha in the administrative regions of the country (figure 3: A). For *F. excelsior*, 65914 populations were recorded in an area of 34871.8 ha. The largest areas of growth of the species are concentrated in Vitebsk (8455.4 ha) and Gomel (8416.4 ha) regions, the smallest - in Grodno region (2345.8 ha) (figure 3: B) (MASLOVSKY *et al.*, 2019).

Also, among the potential host plants for Belarus, we can specify *Ligustrum vulgare* and *Syringa vulgaris* (FEDORUK, 1972). At the same time, 146 populations on an area of 34.1 ha in 25 administrative regions of Belarus have been taken into account for common lilac. By the occupied area, most common lilacs grow in the Brest region. However, due to the widespread use of lilac as a gardening plant, targeted studies are needed to better assess the distribution of *S. vulgaris* in Belarus (MASLOVSKY *et al*., 2019). The area and density of privet growth are not specified at the moment.

Based on the above, it can be assumed that the species *C. cuculipennella* can be distributed throughout the territory of Belarus and can be found not only on ash, but also on other representatives of the Oleaceae family growing there.

Conclusions: A new phyllophagous species *Caloptilia cuculipennella* (Hübner, 1796), which was identified by damages on leaves of common ash, is first recorded Belarus.

It is quite probable that the range of this species covers the entire territory of Belarus. Its host plants may include *F. excelsior, Fraxinus angustifolia oxycarpa* and *F. pennsylvanica, Syringa vulgaris* and *Ligustrum vulgare* grown in Belarus. The common ash, *Fraxinus excelsior*, is presumably the principal host plant.

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BIBLIOGRAPHY

ARIKO, YU. N. & SAUTKIN, F. V., 2017.– Hidden phyllophagous arthropods - pests of tree and shrub plants of the Central Botanical Garden of the National Academy of Sciences of Belarus.– *Biological Autumn 2017*: *Towards the Year of Science in Belarus: Abstracts of the International Scientific Conference of Young Scientists*: 239-241. (in Russian).

BARYSHNIKOVA, S. V., 2019.– Family Gracillariidae.– *Catalog of Lepidoptera (Lepidoptera) of Russia*: 36-43. St. Petersburg (in Russian).

CHUMAKOVA, A. V. & VASIL'EV, N. G., 1984.– *Ash tree*: 101 pp. Moscow. (in Russian).

DE PRINS, J. & DE PRINS, W., 2006-2019.– *Global Taxonomic Database of Gracillariidae (Lepidoptera). World Wide Web electronic publication*. Available from http://www.gracillariidae.net.

ELLIS, W. N., 2001-2020.– *Plant Parasites of Europe: leaf miners, galls and fungi*. Available from https://bladmineerders.nl.

ERSHOV, N. G. & FIELD, A. A., 1870.– Catalog of the Lepidoptera of the Russian Empire.– *Horae Societatis Entomologicae Rossicae variis sermonibus in Rossia usitatis editae,* **4**: 130-205. (in Russian).

EVDOSHENKO, S. I., 2016.– Structure of the complex of mining insects of Norway maple (*Acer platanoides*) in green plantations of Brest Polesie.– *Scientific aspirations* (*Nauchnyye stremleniya*), **20**(4): 57-61. (in Russian).

FEDORUK, A. T., 1972.– *Introduced trees and shrubs of the western part of Belarus*: 192 pp. Minsk. (in Russian).

FEDORUK, A. T., 1985.– *Experience in the introduction of woody deciduous plants in Belarus*: 160 pp. Minsk. (in Russian).

IVINSKIS, P., 2004.– *Lepidoptera of Lithuania: Annotated Catalogue*: 380 pp. Vilnius.

KARSHOLT, O. & RAZOWSKI, J., 1996.– *The Lepidoptera of Europe: a distributional checklist*: 380 pp. Stenstrup.

KARSHOLT, O. & NIEUKERKEN, E. J., 2013.– *Lepidoptera, Moths. Fauna Europaea* version 2017.06. Available from https://fauna-eu.org.

KUZNETSOV, V. I. & BARYSHNIKOVA, S. V., 1998.– Brief catalog of mining moths of the family Gracillariidae (Lepidoptera) of the fauna of Russia and neighboring countries.– *Proceedings of the Zoological Institute,* **274**: 1-60. (in Russian).

MASLOVSKY, O. M., LEVKOVICH, A. V., SYSOY, I. P., KOLESNIKOVA, M. P., RODIONOV, P. A., CHUMAKOV, L. S., SHIMANOVICH, R. V., GRIGORIEVA, K. S., GIRYAEV, A. S. & PUGACHEVSKY, A. V., 2019.– *State cadastre of flora of the Republic of Belarus. Fundamentals of the inventory. Initial survey 2002–2017*: 599 pp. Minsk. (in Russian).

MERZHEEVSKAYA, O. I., LITVINOVA, A. N. & MOLCHANOVA, R. V., 1976.– *Lepidoptera of Belarus (Catalog)*: 132 pp. Minsk. (in Russian).

PISANENKO, A., SVITRA, G. & PISKUNOV, V., 2019.– *Checklist of Lepidoptera recorded from Belarus*: 128 pp. Copenhagen.

PITKIN, B., ELLIS, W., PLANT, C. & EDMUNDS, R., 2019.– *The leaf and stem mines of British flies and other insects (Coleoptera, Diptera, Hymenoptera and Lepidoptera)*. Available from http://www.ukflymines.co.uk/index.php.

PROKOPOVICH, T. V., 2008.– About the species composition of pests of urban green stands.– *Proceedings of BSTU. Forestry,* (1): 388-391. (in Russian).

PRÜFFER, J., 1947.– *Studia nad motylami Wileñszczyny.* 489 pp. Toruñ.

SAUTKIN, F. V. & EVDOSHENKO, S. I., 2013.– Gracillariid moths (Lepidoptera: Gracillariidae) - pests of ornamental trees and shrubs of green spaces in Belarus. Part 2: Subfamilies Glacillariinae, Orniginae, Phyllocnistinae.– *Vesnik of Yanka Kupala State University of Grodno. Series 5. Economics. Sociology. Biology,* (1): 151-159. (in Russian).

SETRAKOVA, E. M., 2014.– The current state of knowledge of the taxonomic composition of phyllophagous insects of oak (*Quercus robur* L.) in Belarus.– *Proceedings of the Belarusian State University*, **9**(2): 236-245. (in Russian).

SINCHUK, A. V., BUGA, S. V. & BARYSHNIKOVA, S. V., 2020.– First record of the walnut leaf miner *Caloptilia roscipennella* (Lepidoptera: Gracillariidae) in Belarus, with a note on synonymy.– *Zoosystematica Rossica*, **29**(1): 122-127.

SKVORTSOV, A. K., 1977.– *Herbarium. Methodology and technique manual*: 199 pp. Moscow. (in Russian).

ZVYAGINTSEV, V. B. & SAZONOV, A. A., 2005.– Mass drying of common ash in Belarus.– *Sustainable Development of Forests and Rational Use of Forest Resources: Proceedings of the International Scientific and Practical Conference*: 225-227. (in Russian).

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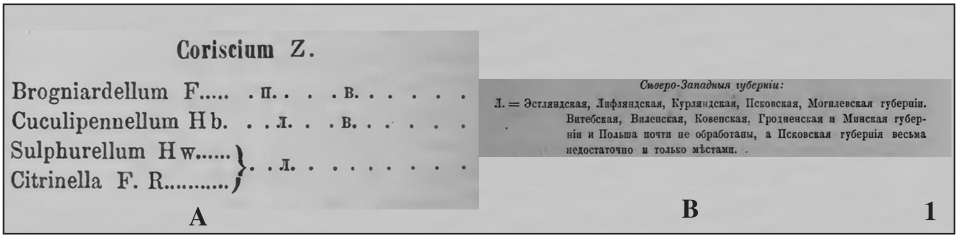
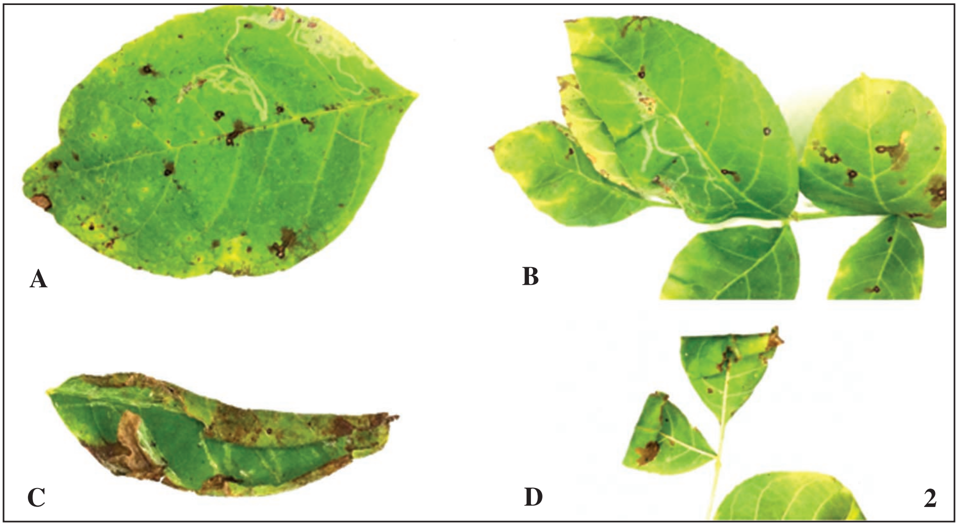


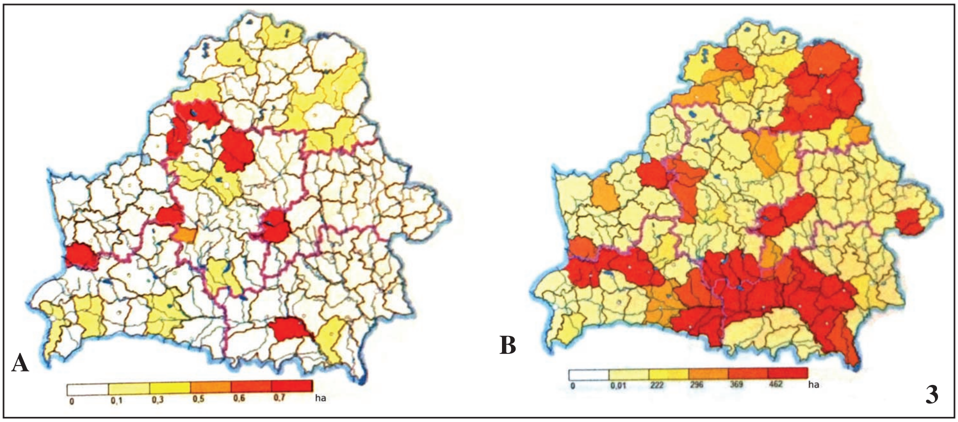
Coriscium Z.

Brogniardellum F..... . п. . . . в. . . . . . .
Cuculipennellum Hb. . . л. . . в. . . . . . .
Sulphurellum Hw......} . . л. . . . .
Citrinella F. R..........}

Сѣверо-Западныя губерніи:

Л. = Эстляндская, Лифляндская, Курляндская, Псковская, Могилевская губерніи. Витебская, Виленская, Ковенская, Гродненская и Минская губерніи и Польша почти не обработаны, а Псковская губернія весьма недостаточно и только мѣстами.





Figures 1-3.– 1. The first reference to the presence of *Caloptilia cuculipennella* (Hübner, 1796) for the North-Western provinces of the Russian Empire (ERSHOV & FIELD, 1870); **A.** Species of the genus *Coriscium* (p. 186); **B.** Explanation of the abbreviation L. (p. 135). **2.** Damaged leaf blades of *Fraxinus excelsior* L. by larvae of *Caloptilia cuculipennella* (Hübner, 1796): **A.-B.** Mines on leaf blades; **C.** deformed leaf from formed damages; **D.** Leaf rollers for pupation. **3.** Occupied area of *F. pennsylvanica* (**A**) and *F. excelsior* (**B**) by administrative regions of Belarus (MASLOVSKY *et al*., 2019).

NOTICIAS GENERALES / *GENERAL NEWS*

SHILAP REVISTA DE LEPIDOPTEROLOGÍA* EN LOS ÍNDICES DE IMPACTO INTERNACIONALES 2020 / SHILAP REVISTA DE LEPIDOPTEROLOGIA *IN THE INTERNATIONAL IMPACT INDEXES 2020*.–** Según SCOPUS (ELSEVIER) en su Índice SJR 2020 de *SCImago Journal Rank*, aparecemos con un **Indicador SJR de 0,338** FI, **Índice H: 12**, **Categoría: 101/145 (Q3, Ciencia de los Insectos)**. Según WEB OF SCIENCES (CLARIVATE ANALYTICS) en su Índice JCR 2020 de *Journal Citation Reports*, aparecemos con un **Índice de Impacto de 0,438** FI, **Categoría: 97/104 (Q4, Entomología)**, el **Índice de Inmediatez de 0,155**, el **Eigenfactor de 0,00015** y la **Categoría Eigenfactor: Ecología y Evolución.** **/** *According to SCOPUS (ELSEVIER) in their Index SJR 2020 of* SCImago Journal Rank*, we appear with a* ***SJR Indicator of 0,338 *FI,* ***H Index: 12****,* ***Rank: 101/145 (Q3, Insect Science)****. According to WEB OF SCIENCE (CLARIVATE ANALYTICS) in their Index JCR 2020 of* Journal Citation Reports, *we appear with an* ***Impact Index of 0,438*** *FI,* ***Rank: 97/104 (Q4, Entomology)****, the* ***Inmediacy Index of 0,155****, the* ***Eigenfactor of 0,00015*** *and the* ***Eigenfactor Category: Ecology and Evolution***.**- DETALLES /** ***DETAILS*****:** SHILAP; Apartado de correos, 331; E-28010 Madrid; ESPAÑA / *SPAIN* (E-mail: avives1954@outlook.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: avives1954@outlook.es).

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Infurcitinea maura Petersen, 1962 new to Spain and Europe (Lepidoptera: Tineidae)

D. Grundy & T. S. T. Muus

Abstract

Infurcitinea maura Petersen, 1962 was recorded new to Europe. On 20-III-2020 a male specimen was trapped at the International Centre on Bird Migration (CIMA), Tarifa (Cádiz, Spain).

KEY WORDS: Lepidoptera, Tineidae, *Infurcitinea maura*, first record, Spain, Europe.

Infurcitinea maura Petersen, 1962 nueva para España y Europa (Lepidoptera: Tineidae)

Resumen

Infurcitinea maura Petersen, 1962 se registra como nueva para Europa. El 20-III-2020 se capturó un ejemplar macho en el Centro Internacional de Migración de Aves (CIMA), Tarifa (Cádiz, España).

PALABRAS CLAVE: Lepidoptera, Tineidae, *Infurcitinea maura*, primer registro, España, Europa.

Introduction

In the last ten years various new species of microlepidoptera have been described or discovered in the Iberian Peninsula. The occurrence of various species in both the North African region and Spain suggests an even higher number of species are possible in this area.

A single male specimen of *Infurcitinea maura* Petersen, 1962, was recorded by the first author at a light trap near Tarifa (Cádiz, Spain) in a small sheltered coastal valley in Mediterranean coastal scrub habitat with *Pistacia lentiscus* L., *Olea europea* L. and *Eucalyptus sp.* trees and bushes. This moth was recorded as an unknown Tineidae species at first, so, as a result it was sent to the second author for identification.

The first author has recorded Lepidoptera (both macro-moths and micro-moths) in Andalusia annually since 2013 and for over 100 nights per year since 2018. The main aim of this recording has been to enthuse local recorders living in the region and particularly to the study of micro-moths (which are less well studied). Particular aims of study have been to look at the moth fauna of the humid cork oak forests in the "Parque Natural de los Alcornocales" and of drier coastal Mediterranean scrub and sand dune habitats in the "Parque Natural del Estrecho". CIMA, located at (36STE68; latitude 36.016388º, longitude -5.587290º, 53 m), is a particularly valuable coastal location as it is an environmental research station with accommodation and land that encourages survey. Interestingly this moth was actually recorded during covid restrictions in Spain when the first author was not able to survey moths away from the site. Andalusia in general and CIMA in particular are situated at the edge of Europe, very close to North Africa and an excellent area for studying possible new colonist and migrant species affected by climate change.

Material and methods

This species was recorded on a cloudy night with heavy rain and winds changing from East to West as a weather front arrived during the night. Studies of moths in this area are not well researched yet, but this weather front appeared to bring in some potential migrant species of moth such as 31 *Plutella xylostella* (Linnaeus, 1758), *Trichoplusia ni* (Hübner, [1803]), *Heliothis peltigera* ([Denis & Schiffermüller], 1775) and *Spodoptera cilium* Guenée, 1852 not recorded on previous or following nights. The moths trapped on this night were attracted using 6 wooden Skinner style moth traps using a mixture of 125 watt Mercury Vapour, 15 watt Actinic and 2 watt LED lights, running from dusk to dawn.

Material examined

Infurcitinea maura Petersen, 1968
Infurcitinea maura Petersen, 1968. *Ann. Mag. Nat. Hist*., (13) **4**: 559

Material examined: SPAIN, CÁDIZ, “CIMA”, Tarifa [in gelatine capsule], 20-III-2020, leg D. Grundy, Genitalia slide TM1242 (coll. T. Muus).

Description: Wingspan 7-8 mm. Frons light brownish; antennae brownish grey, annulated with white. Forewing dark greyish brown with white or pale ochreous markings; fringe indistinct and irregularly chequered. The female has not been described.

Genitalia (♂) (Fig 2): Characterized by a valva that is dorsally supported by a u-shaped apodeme with small spines. Basal half of the valva is broad, dorsally convex and towards apex more pointed, curved and blunt with a costal protrusion. The latter seems to be a variable feature, as it shows a very slender protrusion in the type specimen where it is quite broad in our specimen. Likewise, saccus rounded (present material) to curved inwards (PETERSEN, 1962) Uncus rounded and hyaline with thin bristles. Aedeagus indistinct; anellus simple. *I. toechophila* (Walsingham, 1908), is a more distinctly marked species, that might be confused with *I. maura*. The male genitalia of *I. toechophila* has the valva broad with a straight costal edge, strongly sclerotized and basally with two thin apically bristled processes but it lacks the costal protrusion in the apical area.

Figures 1-2.– 1. *Infurcitinea maura* (Petersen), male in light trap, CIMA, Tarifa, Spain, 20-III-20, D. Grundy. **2.** Male genitalia Gen. prep. TM1242 ♂ T. Muus.

Discussion

The species has been described from Tangier, Morocco. A total of fifteen male specimens were collected by Walsingham in the first half of 1902, from April till the first half of June (PETERSEN, 1962). GAEDIKE (2009) reported a male specimen in the Zoological Museum, Copenhagen (Denmark), collected in Forêt de Mamora, near Rabat around 25-26 April 1989 (note that Tangier is usually visible across the Straits from CIMA and is only 32 kms away, while the nearest Moroccan coast is only 14 kms away.). The species has not been listed as part of the European fauna (GAEDIKE, 2015). The present record is now considered the first for Europe.

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BIBLIOGRAPHY

GAEDIKE, R., 2009.– New or poorly known Tineidae from Mauretania, Morocco, Algeria, and Tunisia (Lepidoptera).– *Beiträge zur Entomologie*, **59**(2): 489-512.

GAEDIKE, R., 2015.– Tineidae I (Dryadaulinae, Hapsiferinae, Euplocaminae, Scardiinae, Nemapogoninae and Meessiinae).– *In* M. NUSS, O. KARSHOLT & P. HUEMER. *Microlepidoptera of Europe*, **7**: 308 pp., 6 pls. Brill, Leiden, Boston.

PETERSEN, G., 1962.– New and rare Tineids (Lepidoptera: Tineidae) in the Collections of the British Museum (Nat. Hist.).– *Annals and Magazine of Natural History*, (13) **4**: 529-539.

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