

***Mesophleps oxycedrella* (Lepidoptera: Gelechiidae) in association with *Juniperus excelsa* (Cupressaceae) in Bulgaria**

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Abstract. *Mesophleps oxycedrella* (Millière, 1871) is recorded for the first time in Bulgaria, feeding on female cones of *Juniperus excelsa* M.-Bieb. Photographs of the moth and female genitalia are provided.

Key words: new record, distribution, faunistics.

Introduction

The Greek juniper *Juniperus excelsa* M.-Bieb is among the plant species with limited distribution in Bulgaria. It is known only from three localities in the southwestern part of the country. The most representative communities are found in “Tisata” Reserve on the slopes of Kresna Gorge. The other two are located in “Izgorialoto gyune” Reserve (above Krichim city) and near Asenovgrad city (Rhodope Mt.). A few lepidopteran species using *J. excelsa* as a larval host plant have been recorded so far: *Gelechia senticetella* (Staudinger, 1859) (in fact *Gelechia obscuripennis* (Frey, 1880), see Huemer 2019), *Pammene mariana* (Zerny, 1920) (Zlatkov 2008) and *Lithophane (Prolitha) lapidea* (Hübner, 1808) (Beshkov 1996). One of them, *G. senticetella*, is considered a major insect pest on this tree species in Bulgaria (Mirchev et al. 1995, Georgiev et al. 1996). During a study of the insect fauna trophically connected with *J. excelsa* three female moths of *Mesophleps oxycedrella* (Millière, 1871) emerged from the collected female cones (also called fruits or galbuli). This species has not previously been recorded from Bulgaria.

Material and Methods

One hundred and ninety-six ripe female cones of *J. excelsa* were collected from “Tisata” Reserve” (UTM: 34 T 679265.09 m E, 4622765.67 m N, 25.iv.2019, leg. G. Zaemdzhikova and D. Doychev). They were stored in plastic containers in laboratory conditions in the Laboratory of Entomology in University of Forestry (Sofia) till emergence of moths. The moths were set and stored at the collection of the National Museum of Natural History, Sofia. The genitalia of the moths were dissected and mounted after Robinson (1976), then photographed through an Amplival (Carl Zeiss Jena) compound microscope

equipped with a digital camera Canon EOS 1300d. One of the moths was photographed under a stereomicroscope Stemi 2000c (Zeiss) with the same camera.

Results and Discussion

Familia Gelechiidae Stainton, 1854

***Mesophleps oxycedrella* (Millière, 1871)**

One moth emerged on 06.v.2019 and the others on 07.v.2019 and 13.v.2019. There is one more specimen that emerged the previous year on 20.ii.2018 (the collected material is from the same locality). The species is easily recognised by its wing pattern (Fig.1): this is the only species of the genus with large markings on the forewings (Li & Sattler 2012). Its identity was confirmed by the structure of the female genitalia with medially incised sterigma (Fig. 2). The head is ochreous with porrect brown palps and long filiform antennae. The thorax and forewings are also ochreous, the latter with several brown markings, the hindwings are brownish grey with incised termen. The forewing length of the examined specimens vary significantly: 3.36–5.93 mm (mean 4.71, n=3). The abdomen is grey. The female genitalia are characterised by the shape of sterigma. The biology of *M. oxycedrella* is thoroughly described by Millière (1859–1871). According to him, the larva feeds on the soft tissue of the female cone. It leaves the cone through a hole and pupates on the ground. The moth emerges usually in early July. According to other authors however, the larva does not leave the cone and pupates within, since exuvia hanging from the holes were observed (Ribes Escolà & Askew 2009, Piskunov & Solodovnikov 2016). The pupation within the cone is corroborated by our results.

The known host plants of the species are *Juniperus macrocarpa* Sibth. & Sm., *J. oxycedrus* L., *J. phoenicea* L. (Li & Sattler 2012), *J. excelsa* M.-Bieb., *J. foetidissima* Willd. (Piskunov & Solodovnikov 2016), *Tetraclinis articulata* (Vahl) Mast. (Ben Jamaa & Roques 1999), *J. turbinata* Guss. (Dionisio et al. 2013), *J. thurifera* L. (Roques et al. 1984) and *Cupressus sempervirens* L. (Cupressaceae) (Ben Jamaa & Roques 1999, Roganović 2007, Roques et al. 1999). Thus, two microlepidopteran species feeding into the galbuli of *J. excelsa* in Bulgaria are already known: *M. oxycedrella* and *Pammene mariana*.

M. oxycedrella is a new addition to the Bulgarian fauna. The published records of the species are from Spain, southern France, Italy, Portugal, Sicily, Corsica, Sardinia, Canary Islands, Croatia (Li & Sattler 2012, Piskunov & Solodovnikov 2016, Requena 2009), Balearic islands (Ferriz et al. 2006), Ukraine (Crimea, Savchuk & Kajgorodova 2017), Western Caucasus (Piskunov & Solodovnikov 2016), Montenegro (Roganović 2007), Albania, Greece, Malta (Roques et al. 1999), Turkey (Tosun 1976), Algeria (Roques et al. 1984), Tunisia (Ben Jamaa & Roques, 1999), Morocco (Requena 2009). Other observations published in an internet site originate from Croatia and Germany. Although the latter record does not fit the expected distribution of the species, the specimen seems correctly identified (Rennwald 2020), and is probably a case of an accidental introduction.

According to Roques et al. (1999) *M. oxycedrella* never attacks more than 1% of *Cupressus sempervirens* seed cones in the third year of development. The moth was observed in 0.6% of the cones in Malta and 4.3% of the cones in Turkey. A stronger attack was reported from Montenegro – 8% of the cones (Roganović 2007). Our results showed that the damage of the galbuli is insignificant – 1.5% of the collected material from “Tisata” Reserve. As reported by Fertin (2010) *Mesophleps oxycedrella* may directly affect the natural regeneration of *Juniperus thurifera*.

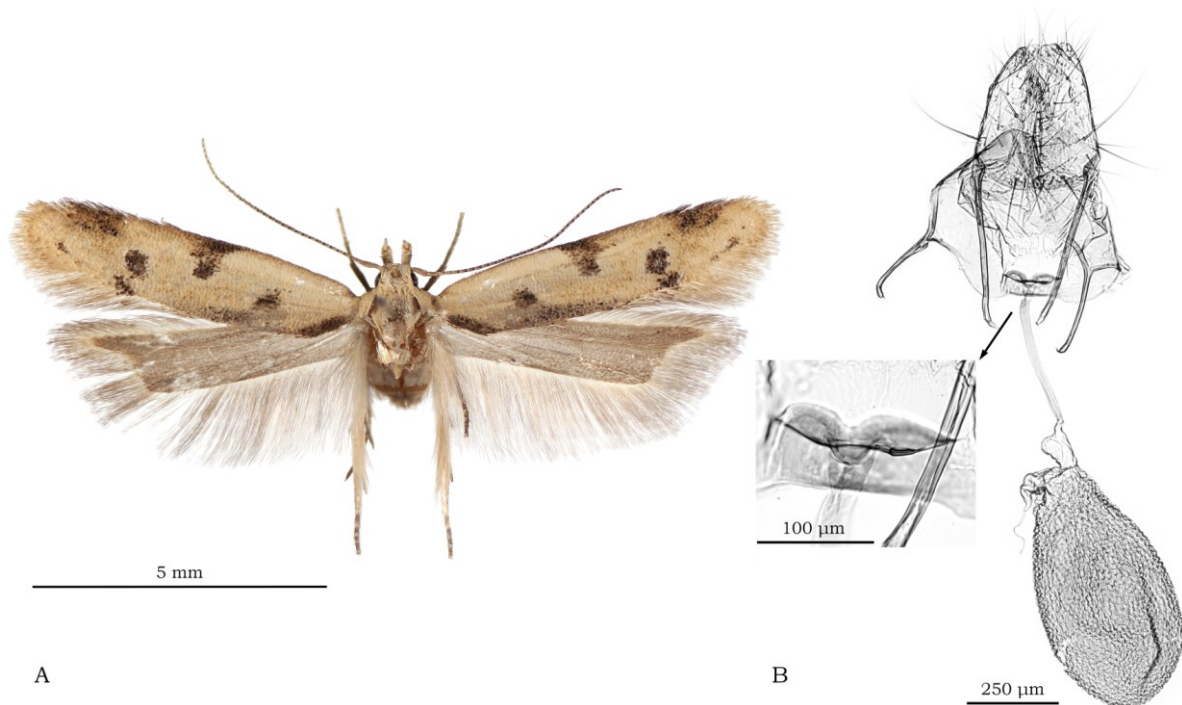


Fig. 1. Adult of *Mesophleps oxycedrella*. A - female, Kresna Gorge, e.l. 20.ii.2018. B - female genitalia of the same specimen, inset: detail of sterigma.

Acknowledgements. The authors thank Ole Karsholt (Copenhagen, Denmark) for the important and useful comments on an earlier version of the manuscript.

References

- Ben Jamaa, M. & Roques, A. (1999) Survey of Insect Impact on Seed Cones of Two Species of Cupressaceae, *Cupressus sempervirens* L. and *Tetraclinis articulata* Mast. in Tunisia. *Arab Journal of Plant Protection*, 17 (2): 107-112.
- Beshkov, S. (1996) Description of the larva of *Lithophane lapidea* (Hübner, [1808]) (Lepidoptera: Noctuidae: Ipimorphinae). *Esperiana*, 4: 95-97.
- Dionisio, M., García, R. & Gullón, E. (2013) Aportaciones para un Catálogo de Lepidoptera y flora del Parque Natural de la Breña y Marismas de Barbate (Cádiz, Andalucía, España). *Boletín de la SAE*, 21: 12-21.
- Ferriz, I., Honey, M. & Riddiford, N. (2006) EIs Heteroeers del pare natural de ses Salines d'Eivissa i Formentera (Illes Balears). *Bolleti de la Societat d'Historia Natural de les Balears*, 49: 199-209.
- Fertin, H. (2010) *Etat des lieux et evaluation de la dynamique des thuriferaies dans les Alpes Françaises*. Spécialité Gestion des Milieux Naturels AgroParisTech FIF-ENGREF Nancy Agrocampus ouest INHP Angers, 182 p.
- Georgiev, G., Mirchev, P. & Tsankov, G. (1996) Bioecological features of *Gelechia senticetella* Stgr., Lepidoptera: Gelechiidae and optimal terms for control in Bulgaria. *Nauka za gorata*, 1: 72-77 (in Bulgarian, English summary).
- Huemer, P. (2019) DNA-Barcoding und Faunistik: Erstnachweise von Schmetterlingen (Lepidoptera) für Italien. *Gredleriana*, 19: 87-94.
- Li, H. & Sattler, K. (2012) A taxonomic revision of the genus *Mesophleps* Hübner, 1825 (Lepidoptera: Gelechiidae). *Zootaxa*, 3373: 1-82.

- Millière, P. (1859–1871) *Iconographie et description de chenilles et Lépidoptères inédits* 1: 1-424, pls 1-50 (1859-1864); 2: 1-506, pls 51-100 pls (1864-1868); 3: 1-488, 101-154 pls (1869-1874). Paris.
- Mirchev, P., Tsankov, G. & Georgiev, G. (1995) Morphological peculiarities of *Gelechia senticetella* Stgr. (Lepidoptera: Gelechiidae) an insect of prickly juniper, new to Bulgaria. In: Tsankov, G. (ed.): *Proceedings of the Third national conference of entomology, Sofia, Bulgaria, 18–20 September 1995*, pp. 216-221 (in Bulgarian, English summary).
- Piskunov, V. I. & Solodovnikov, I. A. (2016) To Fauna of Gelechiid Moths (Lepidoptera: Gelechiidae) of Caucasus and Transcaucasia Part 2. *Biyalogiya*, 90 (1): 34-56.
- Rennwald, E. (2020) Verbreitung. In: *Lepiforum E.V. (Ed.) (2019): Mesophleps oxycedrella* (Millière, 1871). Available at: http://www.lepiforum.de/lepiwiki.pl?Mesophleps_Oxycedrella (Accessed on 28 March 2020)
- Requena, E. (2009) Aproximació a la fauna dels gelèquids de Catalunya i Balears (Lepidoptera: Gelechiidae). *Treballs de la Societat Catalana de Lepidopterologia*, 16: 5-77.
- Ribes Escolà, A. & Askew, R. R. (2009) Chalcidoidea (Hymenoptera) reared from fruits of *Juniperus phoenicea*, with descriptions of three new species. *Boletín Sociedad Entomológica Aragonesa*, 45: 109-121.
- Robinson, G. (1976) The preparation of slides of Lepidoptera genitalia with special reference to the Microlepidoptera. *Entomological Gazette*, 27: 127-132.
- Roganović, D. (2007) Insects of cypress cones (*Cupressus sempervirens* L.) in Montenegro. *Šumarstvo*, 1-2: 67-79 (in Serbian, English abstract).
- Roques, A., Markalas, S., Roux, G., Pan, Y., Sun, J. & Raimbault, J. (1999) Impact of insects damaging seed cones of cypress, *Cupressus sempervirens*, in natural stands and plantations of southeastern Europe. *Annals of Forest Science, Springer Verlag/EDP Sciences*, 56 (2): 167-177.
- Roques, A., Raimbault, J. P. & Goussard, F. (1984) La colonisation des cônes et galbules des genévriers méditerranéens par les insectes et acariens et son influence sur les possibilités de régénération naturelle de ces essences. *Ecologia Mediterranea*, 10: 147-169.
- Savchuk, V. V. & Kajgorodova, N. S. (2017) New data on fauna and biology of Lepidoptera of Crimea. *Caucasian entomological bulletin*, 13(1): 111-124.
- Tosun, I. (1976) Untersuchungen über die in nadelwäldern der türkischen mittelmeer region schädlichen insecten, die parasite und predatoren ihrer wichtigsten arten. *Istanbul üniversitesi Orman fakültesi dergisi*, 218-253 (in Turkish, German summary).
- Zlatkov, B. (2008). Several new Leafrollers for Bulgaria and the Balkan Peninsula (Lepidoptera, Tortricidae). *Atalanta*, 39 (1–4): 321-326.