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INTERESTING RECORDS OF SOME RARE MOTHS IN CROATIA, BOSNIA AND HERZEGOVINA AND MONTENEGRO

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Abstract

In this paper, we present records of 15 new or rarely documented moth species from Croatia, Bosnia and Herzegovina, and Montenegro. Four species are reported for the first time in Croatia: *Rhodostrophia discopunctata*, *Dryobotodes servadeii*, *Spodoptera littoralis, and Xylocampa mustapha*. For three additional species, we provide either the first recent records or evidence of significant range expansion: *Thysanoplusia daubei*, *Ctenoplusia accentifera,* and *Tathorhynchus exsiccata*. One species, *Enterpia laudeti*, is newly recorded for Montenegro, while six species are newly documented for Bosnia and Herzegovina: *Pachypasa otus*, *Ochropleura leucogaster*, *Hadena adriana*, *Xylocampa mustapha*, *Plusidia cheiranthi,* and *Autophila limbata*. We also include new records of the invasive species *Hyphantria cunea* in Bosnia and Herzegovina. All previous records of *Xylocampa areola* from Croatia most likely refer to *X. mustapha*, indicating that *X. mustapha* is likely the sole representative of this genus in the eastern Adriatic region.

KEY WORDS: Lasiocampidae, Noctuidae, Erebidae, Geometridae, distribution, diversity, first records

Introduction

In this paper, we present an overview of moths recorded in the northern Balkans, including Croatia, Bosnia and Herzegovina, and Montenegro. The recorded species belong to rarer moths and represent either the first records of these species in the mentioned countries or the first recent findings after a long period. In some cases, they are only temporary migrants to this area. Regardless, the publication of such findings is crucial for

monitoring the state of nature and changes in the composition of moth species in the northwestern area of the Balkan Peninsula.

Materials and Methods

This report covers our observations from the 2020 - 2024 period. Two light-trapping methods were used. The main method used in Croatia involved a pyramid-shaped collecting tent comprising a metal frame and two 15W UV lamps (604 mm) connected to a 12 V battery and covered with a white canvas. Six such traps were used, distanced about 10 m apart. The second method, used in all three countries, involved the use of two 6W 12V portable "Heath"-pattern moth traps fitted with actinic UV-A lamps (350-400 nm), which were set at dusk and left on site until the following morning. One to three portable heath moth traps were used per locality and night. In addition, we also used UV-A lamps (350-400 nm), in the Klek settlement, Croatia, where a 100W mercury light bulb put on a terrace was used to attract moths. In the Dubrovnik area, moth records reported in this manuscript were made by visiting streetlights in Gornji Brgat and on Mount Srđ.

The android application and digital platform *Biologer* were used to record field data during this research (Popović *et al.*, 2020). The specimens were identified and are stored in the collection of T. Koren. Genitalia dissection was performed for the genera *Xylocampa* and *Dryobotodes* using standard protocols.

Results and Discussion

In total, records for 15 new or rarely documented moth species for Croatia, Bosnia and Herzegovina, and Montenegro are presented. For each species, the locality name, coordinates, dates, number of examined specimens, and the collector are documented. Additionally, notes on the significance of each record are provided.

Lasiocampidae

***Pachypasa otus* (Drury, [1773])** (Fig. 1A)

New records: Bosnia and Herzegovina, Stolac, Provalja waterfall, 43.090451° N, 17.962056° E, 77 m a.s.l., 29.07.2023, 1 ex., leg. D. Kulijer

Notes: This is predominantly a Mediterranean species found on the Balkan Peninsula, extending along the eastern Adriatic coast from the shores of Istria and Kvarner through the coastal areas of Dalmatia down to Albania, North Macedonia, Greece, Bulgaria, and Romania (Koren, 2012; Prozorov *et al.*, 2022). It is generally considered a rare species that is seldom encountered. According to current knowledge, the species has never been recorded in Bosnia and Herzegovina, making the observation from Stolac the first documented sighting in the country. Nevertheless, the finding was not unexpected, as the coastal and sub-Mediterranean regions of Bosnia and Herzegovina closely resemble those in Croatia, and many previously unrecorded Mediterranean species have been found there in recent years (Koren & Kulijer, 2020; Koren & Martinović, 2020).

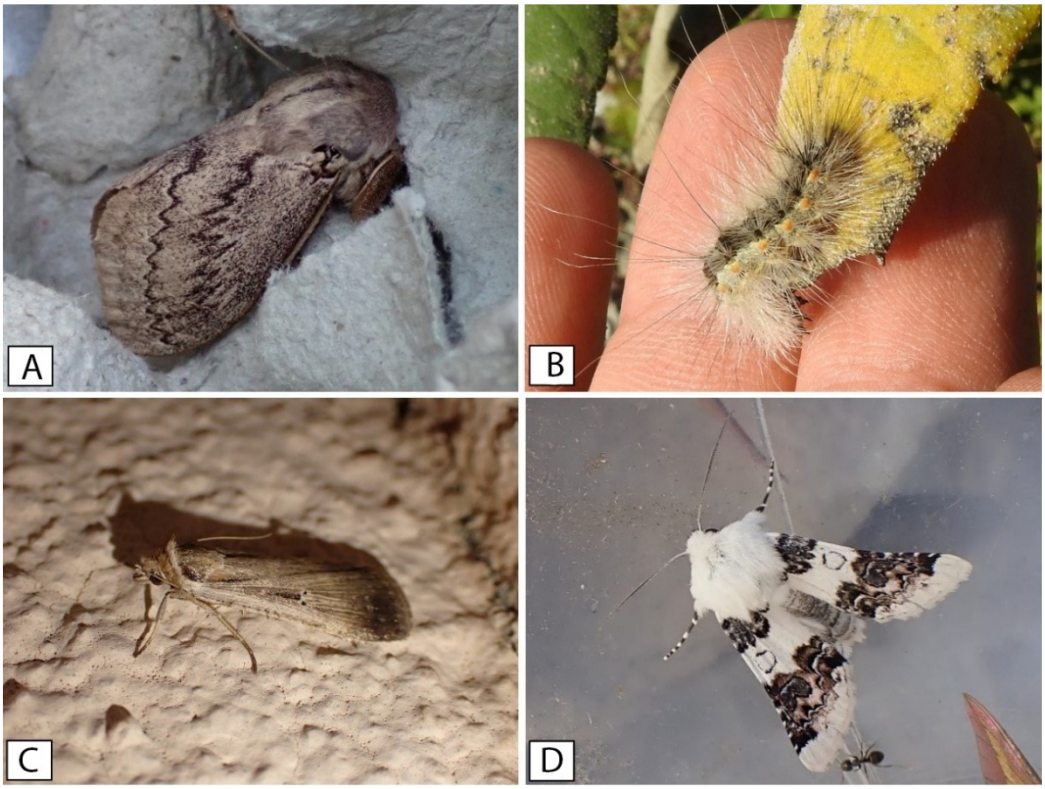

Figure 1. A- *Pachypasa otus* from Stolac, photo: D. Kulijer, B- *Hyphantria cunea* from Doboj, Čivčije Bukovičke, photo: D. Kulijer, C- *Tathorhynchus exsiccata* from Dubrovnik, Srđ, photo: M. Martinović, D- *Enterpia laudeti* from Montenegro, Rudinice, photo: D. Kulijer.

Erebidae

***Hyphantria cunea* (Drury, 1773)** (Fig. 1B)

New records: Bosnia and Herzegovina, Bijeljina, Eko visitor center "Jezera", 44.782722° N, 19.307184° E, 85 m a.s.l., 28.08.2020, 1 ex. (caterpillar), A. Đukić, det. A. Trajković; Bosnia and Herzegovina, Doboj, Čivčije Bukovičke, 44.792361° N, 18.05736° E, 130 m a.s.l., 02.10.2020, 1 ex. (caterpillar), D. Kulijer, , det. A. Trajković; Bosnia and Herzegovina, Srbac, Donja Dolina, 45.127222° N, 17.4325° E, 88 m a.s.l., 15.07.2023, 1 ex., D. Kulijer; Bosnia and Herzegovina, Gradiška, Laminci Lake, 45.102322° N, 17.325097° E, 92 m a.s.l., 14.07.2023, 1 ex., D. Kulijer.

Notes: *Hyphantria cunea* is a polyphagous pest native to North America, which began spreading across Europe in the mid-20th century (Nakonechna *et al.*, 2019). Although *H. cunea* is not a new species for Bosnia and Herzegovina, it is known from agricultural literature and is also covered by legal regulations in this area (SL NRBiH, 1958, Todorović, 1953;1981). However, it is missing from lepidopterological literature, including the latest published checklist of moths of Bosnia and Herzegovina (Lelo, 2004), and the overview of the species distribution in Europe (Nakonechna *et al.*, 2019). For this reason, we include here several detailed records of

the species for Bosnia and Herzegovina. Records are primarily limited to the northern part of the country, near the border with Croatia, but it is likely that the species is more widely distributed in the country.

***Autophila limbata* (Staudinger, 1871)**

New records: Bosnia and Herzegovina, Blagaj, Eko Centar, 43.253230° N, 17.908842° E, 72 m a.s.l., 06.04.2024, 1 ex., D. Kulijer

Notes: This is one of four species of the genus *Autophila* present on the eastern Adriatic coast including *Autophila anaphanes* Boursin, 1940, *A. dilucida* (Hübner, [1808]), and *A. ligaminosa* (Eversmann, 1851) (Goater *et al.*, 2003). All four species are known from Croatia, with *A. limbata* being the most recently recorded (Habeler, 2003). *A. limbata* is active in early summer, enters aestivation, reactivates in autumn before hibernating, and re-emerges in early spring (Goater *et al.*, 2003). It has a Mediterranean-Iranian distribution and in Europe it is present in the Mediterranean area, including the Balkan Peninsula (Goater *et al.*, 2003). None of the species of the genus *Autophila* have so far been recorded in Bosnia and Herzegovina and accordingly, this is the first record for the country. Species identification was confirmed through examination of the male genitalia.

***Tathorhynchus exsiccata* (Lederer, 1855)** (Fig. 1C)

New records: Croatia, Dubrovnik, Mount Srđ, around a streetlight, 42.649272° N, 18.111688° E, 390 m a.s.l., 23.12.2022, obs. M. Martinović.

Notes: This Erebidae species is easily recognizable, primarily due to the dark basal and interstigmatal streaks on its forewings. It is a palaeotropical-subtropical species with resident populations in the Canary Islands, North Africa, and across tropical and subtropical regions worldwide. In Europe, it is regarded as an immigrant, reaching as far north as Britain; the records from Croatia likely also fall within this category. To date, this species has been recorded in Croatia only twice, both occurrences originating from southern Dalmatia: Gruž, Dubrovnik (Gravosa) (Schwingenschuss & Wagner, 1925), and Mlini (Burgermeister, 1964). The new record from Croatia comes from the winter period, suggesting that this may be the time when the species migrates, similar to its behavior in Great Britain (Goater *et al.*, 2003). However, this is also the time of year when nocturnal moths are the least studied, which likely explains the very low number of observations of this species in Croatia overall.

Noctuidae

***Amphipyra berbera* Rungs, 1949**

New records: Bosnia and Herzegovina, Ozren Mt., Gornja Paklenica, Paraghost klub, 44.628551°N, 18.170071° E, 610 m a.s.l., 11.08.2023, 1 ex., leg. D. Kulijer

Notes: This is one of the two species of the genus *Amphipyra* for which confirmation of identification requires an examination of genital structures. Excellent guidance for distinguishing them is provided on the website https://mothdissection.co.uk/. According to current knowledge, this species has not yet been recorded in Bosnia and Herzegovina (Lelo, 2004; Fibiger *et al.*, 2007).

***Ochropleura leucogaster* (Freyer, [1831])**

New records: Bosnia and Herzegovina, Neum, Babin Do, 42.940186° N, 17.678511° E, 180 m a.s.l., 09.09.2023, 2 ex., leg. D. Kulijer.

Notes: This is a relatively common species in the Mediterranean and sub-Mediterranean regions of the eastern Adriatic (Fibiger, 1990). It inhabits open, dry, warm areas ranging from sea level up to approximately 1200 m.

It has two generations, active from March to April and August to November (Fibiger, 1990). In Europe, its distribution is mostly Mediterranean, with the south of England being the most northern distribution point (Fibiger, 1990). Since the species is relatively common in the coastal areas of Croatia (Koren, 2020; 2022), its occurrence was expected in Bosnia and Herzegovina, where it has not been recorded in previous studies (Lelo, 2004). Additional findings of this species from the Mediterranean region of the country are anticipated in the future.

***Enterpia laudeti* (Boisduval, 1840)** (Fig. 1D)

New records: Montenegro, Rudinice, 43.0686° N, 18.8625° E, 965 m a.s.l., 08.06.2024, 1 ex., D. Kulijer; Montenegro, Rudinice, Etno village Izlazak, 43.06569° N, 18.8644° E, 992 m a.s.l., 09.06.2024, 1 ex., D. Kulijer

Note: In Europe, this species can only be confused with *Enterpia roseocandida* Hacker, 1996, which is present in the European part of Turkey (Hacker *et al.*, 2002). It is an univoltine species with adults flying from April to May. It is a predominantly steppe species, commonly found in rocky habitats at medium to high altitudes (Hacker *et al.*, 2002). In Europe, this species occurs in four disjunct and isolated small areas: central Spain, the southwestern Alps, the Balkans, and the northern Turkish mountains toward the Black Sea. The records from Montenegro expand the known range of the Balkan population. Recently the species has also been recorded in Serbia (Beshkov, 2017). To the best of our knowledge, there are no previous records of this species in Montenegro (Carnelutti *et al.*, 1991; Beshkov & Nahirnić, 2020; Beshkov & Nahirnić-Beshkova, 2021), and it can be considered a new species for the country (Beshkov, pers. comm).

***Hadena adriana* (Schawerda, 1921)**

New records: Bosnia and Herzegovina, Blagaj, Eko Centar, 43.253230° N, 17.908842° E, 72 m a.s.l., 06.04.2024, 1 ex., D. Kulijer

Note: This is a relatively common species in the Mediterranean and sub-Mediterranean regions of the eastern Adriatic coastline (Hacker *et al.*, 2002). Although its presence in the area is known, individual findings available in the literature are very scarce, most of them originating from Krk Island (Habeler, 2003). In previous research, the species has not been recorded in Bosnia and Herzegovina, likely due to its early flight period and restriction to the Mediterranean part of the country, making this the first recorded occurrence in that country.

***Spodoptera littoralis* (Boisduval, 1833)** (Fig. 2A)

New records: Croatia, Dubrovnik, Gornji Brgat, Church of St. Anne, 42.6445° N, 18.158198° E, 130 m a.s.l., 12.10.2024, 1 ex., obs. M. Martinović; 28.10.2024, 1 ex., leg. M. Martinović; Croatia, Klek, 42.946851° N, 17.563347° E, 16 m a.s.l., 26.10.2024, 1 ex., obs. D. Kulijer

Notes: This is an Afrotropical and subtropical species, which in Europe occurs naturally only in the southernmost regions. It has a strong migration potential. Records also exist from central and northern Europe but are likely due to imports or escapes from greenhouses. So far, this species has not been recorded in Croatia. During the autumn of 2024, the first specimen was observed beneath a light at Brgat Church in Dubrovnik, quickly followed by additional observation from the same locality as well as from Klek. This is a new species for the moth fauna of Croatia and the second member of the genus *Spodoptera* recorded in the country. Based on our findings, it is unclear whether this represents a permanent range expansion of the species or merely a migratory wave that we happened to record. Since this species is an agricultural pest, it is essential to determine its status in the future and continue monitoring its potential spread within the country and the region.

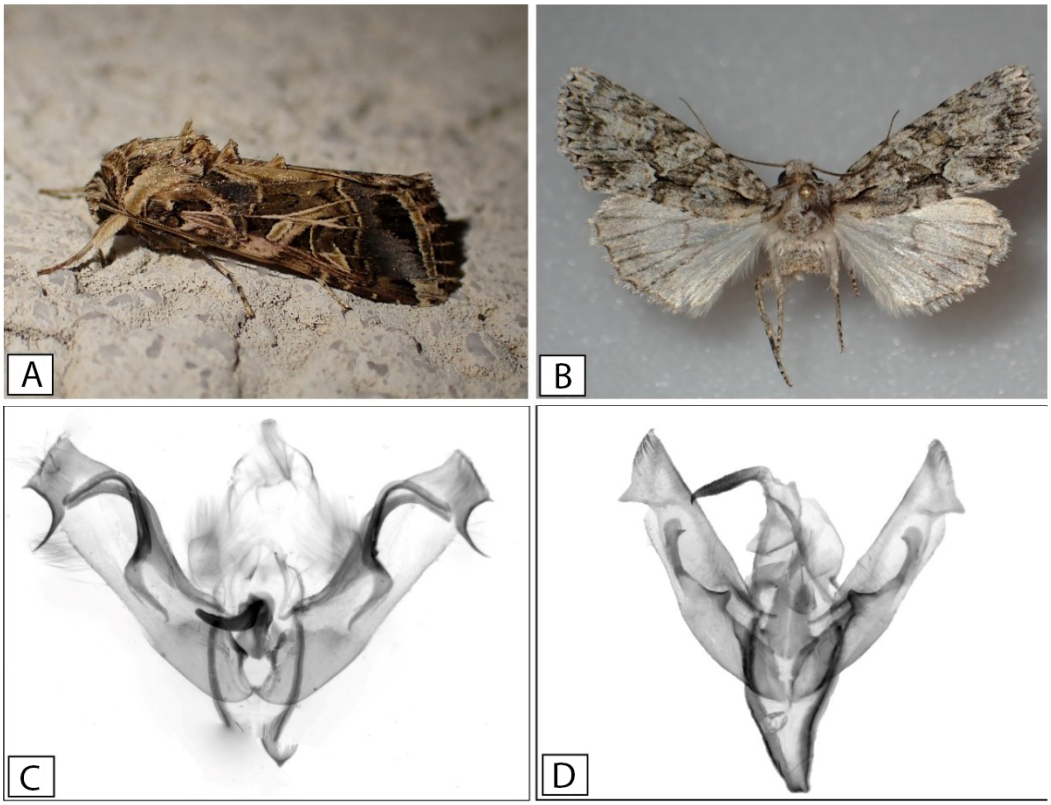

Figure 2. A- *Spodoptera littoralis* from Dubrovnik, Gornji Brgat, photo: M. Martinović, B- *Dryobotodes servadeii* from Mt. Biokovo, Podglogovnik, photo: T. Koren, C- same specimen, male genitalia, D- *Xylocampa mustapha* from Neum, Konštar, male genitalia, photo: T. Koren.

***Dryobotodes servadeii* Parenzan, 1982** (Fig. 2B,C)

New records: Croatia, Biokovo Nature Park, Podglogovnik, gravel road through hollows and small oak groves, 43.25808° N, 17.105373° E, 1100 m a.s.l., 12.10.2023, 1 ex., T. Koren

Note: This species is quite similar to other species of the genus *Dryobotodes*, resembling *Dryobotodes eremita* (Fabricius, 1775) in coloration and comparable in size to *Dryobotodes monochroma* (Esper, 1790). Until recently, there was considerable confusion in correctly identifying these species, even in the main reference literature for the identification of European noctuid moths (Ronkay *et al*., 2001). Notably, in this publication, specimens of *D. servadeii* and *D. monochroma* were mistakenly mixed in the illustrations (Beshkov, 2016).

Recent studies based on specimens from Serbia have clarified the situation and established additional characteristics for distinguishing these species (Beshkov, 2016). Following this, a specimen collected on Biokovo was identified, standing out from other *D. monochroma* specimens collected at the same time and location, particularly in the coloration of its wings. The identification was confirmed through genitalia dissection (Fig. 2C).

To date, only a few populations of *D. servadeii* are known across Europe, with a relatively small number of specimens recorded. It appears that *D. servadeii* is not so rare in Italy, the central and southern Balkans, including Greece, southern Serbia, southern Bulgaria, and North Macedonia (Beshkov, 2016). As previously assumed (Beshkov, 2016), the species indeed inhabits the western Balkans, including Croatia, and, according to the specimens present on the Lepiforum website, Slovenia as well (Lepiforum e.V., 2024).
On the other hand, *D. monochroma* is a relatively common and widespread species along the Adriatic coast of Croatia (authors, pers. obs.). In the future, a detailed analysis of all previously collected specimens of these species in public and private collections is necessary, along with the collection of additional specimens, to accurately determine their distribution and assess their rarity in the region.

***Xylocampa mustapha* (Oberthür, 1910)** (Fig. 2D)

New records: Bosnia and Herzegovina, Klek peninsula, Opuće, 42.930833° N, 17.569521° E, 4 m a.s.l., 26.02.2021, 1 ex., leg. D. Kulijer; Bosnia and Herzegovina, Neum, Konštar, 42.930187° N, 17.658165° E, 174 m a.s.l., 02.01.2024, 5 ex., legl. D. Kulijer, Croatia, Dubrovnik, Otok Lokrum, macchia near botanical garden, 42.626231° N, 18.120237° E, 251 m a.s.l., 22.04.2014, 3 ex., leg. T. Koren, Croatia, Veli Lošinj, South part, Grgošćak, Pogled, 44.503806° N, 14.505806° E, 227 m a.s.l., 13.03.2015, 5 ex., leg. T. Koren.

Note: The previous records of *Xylocampa areola* (Esper, 1789) on the eastern Adriatic coast, including those published by the authors, belong to the species *X. mustapha*. This conclusion was confirmed by examining the male genitalia from all mentioned locations (Ronkay *et al.*, 2011). Based on current knowledge, it is likely that *X. areola* does not occur in this region and published records should therefore be regarded as questionable (Galvagni, 1921; Kučinić *et al.*, 1998; Gomboc, 2019; Koren, 2020; 2022; Gomboc & Sule, 2022).

***Ctenoplusia accentifera* (Lefèbvre, 1827)** (Fig. 3A)

New records: Croatia, Desne-Kula Norinska, karstic slopes partially burned during forest fires, 43.050517° N, 17.56537° E, 84 m a.s.l., 05.09.2020, 1 ex., 08.09.2020, 1 ex., leg. T. Koren; Croatia, Opuzen, Neretva River Delta, 43.024933° N, 17.46245° E, 1 m a.s.l., 30.10.2020, 1 ex., leg. T. Koren; Croatia, Smrden Grad ruins, maquis edge and small grassland patches, 42.950376° N, 17.565465° E, 225 m a.s.l., 01.11.2020, 1 ex., leg. T. Koren.

Note: Previous records from Croatia originate exclusively from the southernmost part of Dalmatia, specifically Dubrovnik and its immediate surroundings (Rebel, 1919; Schwingenschuss & Wagner, 1925). The most recent available observation of the species also comes from Dubrovnik, dating between 1958 and 1963 (Burgermeister, 1964). In his work, the author states that the species is becoming increasingly common in the region each year, observed throughout the years in both Mlini and Komolac, and is not rare in April or October. He even mentions that the species is attracted to light shortly after nightfall and readily comes to bait (Burgermeister, 1964). However, our experience differs significantly. Based on current knowledge, this species is considered rare among nocturnal moths. Even in Dalmatia, during this study, no more than a single specimen was recorded per location on any given night. It is possible that the species remains abundant at those previously mentioned localities, but these sites were not included in this study. Our findings extend the known distribution of the species further north, now encompassing the Neretva River Delta. Additional research in other parts of Dalmatia and the coastal region will likely yield further records of this species.

Figure 3. A- *Ctenoplusia accentifera* from Desne-Kula Norinska, photo: T. Koren, B- *Plusidia cheiranthi* from Dabarsko polje, Ponikva ponor, photo: D. Kulijer, C- *Thysanoplusia daubei* from Tuštevac, photo: T. Koren, D- *Rhodostrophia discopunctata* from Papuk, Poljanice, photo: T. Koren.

***Plusidia cheiranthi* (Tauscher, 1809)** (Fig. 3B)

New records: Bosnia and Herzegovina, Dabarsko Polje, Ponikva Ponor, 43.054257° N, 18.24051° E, 497 m a.s.l., 12.06.2024, leg. D. Kulijer.

Notes: The distribution of this species in Europe ranges from St. Petersburg through the Baltic region, western Poland, and northeastern Germany, extending to the Czech Republic and Slovakia and reaching as far as the Pacific Coast (Goater *et al.*, 2003). The southern boundary of its range in Europe lies in the southeastern Alps and the northern half of the Balkans (Goater *et al.*, 2003). The closest records to this one from Bosnia originate recently from North Macedonia (Beshkov *et al.*, 2024), Montenegro, and Slovenia (Lepiforum e.V., 2024). According to current knowledge in Europe, this species has a highly fragmented range, with isolated populations that are gradually disappearing (Lepiforum e.V., 2024). Accordingly, the discovery of new populations, such as the one presented in this work, is of global importance. This is a new species for Bosnia and Herzegovina.

***Thysanoplusia daubei* (Boisduval, 1840)** (Fig. 3C)

New records: Croatia, Klek settlement, 42.94681° N, 17.5634° E, 16 m a.s.l., 19.09.2020, 1 ex., obs. D. Kulijer; Croatia, Tuštevac, west of the village, partially overgrown karstic grassland, 42.98691° N, 17.504182° E, 52 m a.s.l., 28.10.2020, 1 ex. leg. T. Koren; Croatia, Opuzen, Neretva River delta, 43.024933° N, 17.46245° E, 1 m a.s.l., 30.10.2020, 1 ex. leg. T. Koren; Croatia, west of the Smrden grad ruins, karstic slopes with bushes and grasslands, 42.956290° N, 17.553779° E, 260 m a.s.l., 21.09.2021, 1 ex. leg. T. Koren; Croatia, Smrden grad ruins, maquis edge and grassland patches, 42.950376° N, 17.565465° E, 225 m a.s.l., 21.09.2021, 1 ex. leg. T. Koren; Croatia, Vid-Metković, the edge of the reed bed, 43.072500° N, 17.638056° E, 1 m a.s.l., 22.09.2021, 1 ex. leg. T. Koren; Croatia, Nature Park Biokovo, Ravna Vlaška, meadows, rocky terrains, and small groves, 43.280605° N, 17.094857° E, 1100 m a.s.l., 19.06.2024, 1 ex. leg. T. Koren; Croatia, Donji Kamenjak, Plovanije, partially overgrown karstic grassland, 44.783218° N, 13.909533° E, 27 m a.s.l., 16.06.2024., 1 ex., 16.10.2024, 1 ex., leg. T. Koren; Croatia, Dubrovnik, Gornji Brgat, Church of St. Anne, 42.64461° N, 18.158175° E, 251 m a.s.l., 28.10.2024, 1 ex., leg. M. Martinović.

Notes: During this research, we recorded this species at a total of nine localities. To our knowledge, there are no published observations for Croatia of this species in the literature. However, it is important to note that the species' presence in Croatia has been known for over a century. This is evidenced by a specimen collected on 30th September 1936, at the locality "Dalmatia, Gravosa-Zaton" by H. Fabigan, housed in the ZSM "Klimesch-Sammlung" collection. However, the record was not included in the book series Noctuidae Europaeae, in which the map for Croatia is empty and the closest records are from Greece (Goater *et al*., 2003).

Our findings suggest that the species is still present in Croatia and that its distribution is much wider than previously understood. In addition to southern Dalmatia, its range includes the Neretva River Delta, the slopes of Mount Biokovo, and extends as far north as southern Istria and Cape Kamenjak. Interestingly, the species was not recorded in previous studies conducted in the Lower Kamenjak area (Koren, 2022), but during this research, two specimens were collected there.

Despite the increased number of records, it remains unclear whether this species has established permanent populations in Croatia or if its presence is the result of temporary migrations. With the exclusion of specimens observed around streetlights, the natural habitat matches those reported in the literature, mainly xerothermic shrublands and lightly wooded areas, including Mediterranean maquis and coastal habitats (Goater *et al*., 2003). Given that the species has now been recorded at multiple localities over several years, and in the seemingly suitable habitat, there is a strong likelihood that it is a permanent member of Croatia's fauna.

Geometridae

***Rhodostrophia discopunctata* Amsel, 1935** (Fig. 3D)

New records: Croatia, Nature Park Papuk, Poljanice, meadows and forest edge below Turjak peak, 45.462444° N, 17.644136° E, 363 m a.s.l., 25.06.2024, 2 ex., leg. T. Koren.

Note: Until now, three species of the genus *Rhodostrophia* were known in Croatia – *Rhodostrophia calabra* (Petagna, 1786) and *R. vibicaria* (Clerck, 1759), which are widely distributed, and *R. sieversi* (Christoph, 1882). The occurrence of the third species is based on one historical specimen stored in the Natural History Museum in Zagreb from the Dubrovnik area (Mihoci, 2012). This represents the sole report of this species in all of Europe (Hausmann, 2004). Here we report on the finding of a fourth species, *Rhodostrophia discopunctata* Amsel, 1935.

This is an univoltine species that flies from early May to mid-June, and exceptionally until the end of July in mountainous areas. The host plants for the larvae are unknown. Adult individuals are easily disturbed from vegetation, sometimes actively flying during the day, and are also attracted to light. It is a xerothermophilic species inhabiting grasslands and open forests at altitudes ranging from 0 to 1200 m (Hausmann, 2004).

The distribution of this Eastern Mediterranean moth in Europe is limited to the Balkan Peninsula, but it is absent from the Peloponnese and all Greek islands. Outside Europe, it is present in Turkey, the Levant, western Transcaucasia, and northern Iraq (Hausmann, 2004). The closest populations to the newly discovered population on Mt. Papuk are located in eastern Serbia (Hausmann, 2004; HabiProt, 2014-2022). According to current knowledge, the finding on Papuk represents the westernmost record of this species in Europe and significantly expands its known range westward (Hausmann, 2004). The finding of this species in the Poljanice area on Papuk represents the first record for the fauna of Croatia.

Since this species is not known for migrations, the population on Mt. Papuk is most likely of relic character, representing a remnant of a once broader distribution. The Papuk area still harbors relatively well-preserved meadow habitats, which have become a rarity in continental Croatia, especially in Slavonia, which is historically known for intensive agriculture. Consequently, it is unlikely that the species will be recorded at many more sites within the country.

Conclusions

In this contribution to the knowledge of moths in three countries, Croatia, Bosnia and Herzegovina, and Montenegro, we present records of species whose presence in these countries has not been previously documented or was primarily based on older historical records. Most species were recorded in southern Croatia and the Mediterranean part of Bosnia and Herzegovina, highlighting the importance of monitoring moths in these areas, as they are the first regions to experience migratory, invasive, and range-expanding species due to climate change. Additionally, several findings were made through incidental observations or by visiting public lighting in urban areas, further emphasizing the importance of citizen science in gathering data on biodiversity. Records of *X. areola* in Croatia are considered erroneous, and only *X. mustapha* is likely present in this area. The species *Dryobotodes servadeii* has also been confirmed in Croatia, bridging the gap in its distribution between the eastern Balkans and Slovenia, where the species is also known to occur. The record of *Rhodostrophia discopunctata* from northern Croatia is particularly significant, as the population on Mt. Papuk likely represents a relic population and is currently the westernmost population of this species in Europe. Further research in these countries will undoubtedly contribute to a better understanding of moth diversity in the region.

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ЗАНИМЉИВИ ПОДАЦИ О РЕТКИМ ВРСТАМА ЛЕПТИРА ЗА ХРВАТСКУ, БОСНУ И ХЕРЦЕГОВИНУ И ЦРНУ ГОРУ

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Извод

У овом раду представљамо податке о 15 нових или ретко документованих врста лептира за Хрватску, Босну и Херцеговину и Црну Гору. У Хрватској су први пут забележене три врсте: *Rhodostrophia discopunctata*, *Dryobotodes servadeii* и *Spodoptera littoralis*. За три додатне врсте пружамо или прве недавне налазе или доказе о значајном проширењу дистрибуције за: *Thysanoplusia daubei*, *Ctenoplusia accentifera* и *Tathorhynchus exsiccata*. Врста, *Enterpia laudeti*, је нова за Црну Гору, а шест је нових за Босну и Херцеговину: *Pachypasa otus*, *Ochropleura leucogaster*, *Hadena adriana*, *Xylocampa mustapha*, *Plusidia cheiranthi* и *Autophila limbata*.

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