New Noctuoidea taxa from the Silver Coast of Bulgaria (Insecta: Lepidoptera)

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Abstract
Three new Noctuoidea subspecies are described as local endemics from the Silver Coast, part of the Bulgarian North Black Sea Coast: Eutelia adoratrix platinea ssp. n., Lacanobia praedita canescens ssp. n. and Hadena adriana petergyulaii ssp. n. They are characterised by a pale forewing ground colour corresponding to the colour of the calcareous sediments dominating their habitats. These new subspecies, in comparison with the nominotypical taxa, show greater differences in external appearance than in the female and male genitalia, including the everted vesica. Furthermore, the new subspecies cannot be separated from the nominotypical subspecies by DNA barcoding.

Key words: new subspecies, Euteliidae, Noctuidae, genitalia, barcoding, endangered habitat.

Introduction
The Silver Coast (Srebristiyat Bryag in Bulgarian) is that part of Bulgaria’s northern section of the Black Sea coast located in the general area of the town of Balchik and Cape Kaliakra. Formerly within the territory of Romania (Coasta de Argint) it extends 26 kilometres, along the coast of present day Bulgaria and is a part of the geographical area of Dobrogea. Though rarely used in ordinary speech, the name describes well the dominant landscape of white, calcareous sediments forming spectacular cliffs. The rocks are Sarmatian limestone sediments, covered with up to 15 m of loess in some places. The habitat is classified as Western-Pontic petrophytic, or Ponto-Sarmatic steppe, which is a southermost variety of the Pontic steppes with numerous Mediterranean and regional endemic plants (Tzonev et al. 2015). This habitat was largely destroyed in ancient times and is now fragmented and limited mainly to the sea coast and the slopes of dry river valleys, where the marl or limestone bedrock is exposed.
Two botanical associations within this steppe biotope are known from the area: *Paeonio tenuifoliate– Koelerietum brevis*, typical for flat terrain at the edge of the Dobrogea plateau and *Alysso caliacaee–Artemisietum lerchianae*, with limited distribution on the eastern and southern slopes of mounds on the steep slopes of terraces facing the sea, consisting of loose Sarmatian limestone and clay. The later type has proved to be the most important from a lepidopterological point of view. Unfortunately, it is also the most endangered, because of its location. In the recent years tourist infrastructure, especially golf courses and holiday complexes, has had a strong negative impact. The insertion of a large wind farm at Kaliakra has permanently destroyed much of the former association (*Paeonio tenuifoliae–Koelerietum brevis*) habitat, leaving ruderal steppe with a drastically altered floral composition.

The unique nature of the area has attracted the attention of entomologists for a long time. The most prominent worker was Aristide Caradja who published several contributions dedicated to Balchik and its surrounding areas (Caradja 1930, 1931, 1932, 1934). The noctuid taxa described by him are summarized in Popescu-Gorj (1964) and also listed below. Other works are by Abadjiev & Beshkov (2007), Beshkov (1993, 1997, 2000, 2017), Beshkov et al., (1999), Beshkov (1998), Hacker & Gyulai (2013).

The moth fauna of the Silver Coast demonstrates a close relationship with that of the Crimean Peninsula. A number of species, which in Bulgaria are known as montane, are established here too. The moths described from there comprise the following taxa: *Autophila asiatica argentea* (Caradja, 1930), *Auchmis detersa argentea* (Caradja, 1932), *Oncocnemis michaelorum* (Beshkov, 1997), *Cardarcrina pertinax argentea* Caradja, 1930, *Dichagyris melanura albida* (Caradja, 1931), *Dichagyris renigera argentina* (Caradja, 1930), *Dichagyris flavina pretiosa* (Caradja, 1931), *Agrotis obesa nivea* (Caradja, 1932) (= *Agrotis obesa scytha* (Alphéraky, 1889) and *Meganola albula nivalis* (Caradja, 1934), all of which are local endemics. Most of them were described by the Romanian entomologist Aristide Caradja (Caradja, 1930, 1931, 1932, 1934). All of the taxa described by him (except for *Dichagyris flavina pretiosa*) are silver-white, as are the rocks themselves and in the majority this is reflected in their names. Other interesting and rare species found in the region are: *Triodia amasinius dobrogensis* (Caradja, 1932), *Paracossulus thirps* (Hübner, 1818), *Thetidia smaragdaria volgata* (Guenée, 1858) (unpublished data), *Nychiodes waltheri* Wagner, 1919, *Eupithecia variostrigata* Alphéraky, 1876, *Lemonia balcanica* (Herrich-Schäffer, 1847), *Lasiocampa quercus* (Linnaeus, 1758), *Sphingonaepiopsis gorgoniades* (Hübner, 1819), *Hyles gallii* (Rottemburg, 1775), *Hyles hippophaes* (Esper, 1789), *Pandessa robusta* (Walker, 1858), *Clitie syriaca* (Bugnion, 1837), *Panchrysia deaurata* (Esper, 1877), *Oxicesta geographica* (Fabricius, 1787), *Cryptia ochsi* (Boursin, 1940), *Nycotobrya amasina* (Draudt, 1931), *Acontia titanias* (Esper, 1798), *Pyrrhia purpora* (Hübner, 1817), *Helivictoria victorina* (Sodoffsky, 1849), *Myceteroplus puniceago* (Boisduval, 1840), *Athetis lepigone* (Möschler, 1860), *Photetes morrisii* (Morris, 1837), *Oxytripia orbiculosa noctivolans* (Pinker, 1980), *Anarta odontites* (Boisduval, 1829), *Hadena persimilis persimilis* Hacker, 1996, *Euxoa cos crimaea A. Bang-Haas, 1906, Euxoa conspicua* (Hübner, 1827), *Rhychia arenacea* (Hampson, 1907), *Nola cristatula* (Hübner, 1793), *Nycteris sicalana* (Fuchs, 1899), etc. The region is the only locality in the Balkan Peninsula for *Thetidia smaragdarria volgata*. For *Sphingonaepiopsis gorgoniades*, *Pandessa robusta*, *Oxytripia orbiculosa noctivolans* and *Hadena persimilis persimilis* the region represents the only locality in Bulgaria (Abadjiev & Beshkov, 2007). The presence of several species, such as *Lasiocampa quercus*, *Dichagyris candeliasequa* ([Denis & Schiffermüller], 1775) and *Euxoa conspicua*, which on the Balkans have xeromontane or mountain distribution, is also of interest. *Oncocnemis michaelorum* is the only coastal representative of the genus in the Old World.

Collected specimens with unusually pale colouration have been attracting our attention for more than a decade. Some of the taxa described below were so strikingly different from the typical forms that only genitalia examination and in a further step DNA barcodes confirmed their association with known species.

### Material and methods

Adults were collected at artificial light (160 watt MV bulb powered by generator and portable light traps with an 8 or 15 watt actinic or 368 nm “Blacklight” white tube and 8 watt “Blacklight” black tube, both powered by 12 volt batteries), mostly pinned in the field and transported wet to the laboratory, then set and dried. A leg for molecular analysis was taken from each of several specimens. The genitalia were dissected following Fibiger (1997) and Goater in Fibiger (1997) and mounted on slides with Euparal. The examination of external morphology, dissections and measurements were performed under a
stereomicroscope Stemi 2000-C (Zeiss) with an ocular scale. The moths were photographed with a Sony DSChX400v digital camera using scattered natural daylight illumination. The genitalia (with the exception of phalli) were photographed with an Amplival (Carl Zeiss Jena) trinocular compound microscope equipped with plan achromate objectives, a projecting eyepiece and a Canon EOS 2000D DSLR camera. Prior mounting, the phalli were pinned on a curved entomological pin No. 0 or 1 with tip inserted through the proximal opening of the phallic tube in a way that they do not touch any surface, and submerged in Euparal essence in a small petri dish (ϕ=15 mm, h=6 mm). The dish was glued with a drop of Euparal mountant to a microscope slide and put under the abovementioned compound microscope modified after Hammond (1996) and with camera lucida attached. This system allowed orientation of the phallus in certain positions without any deformation and production of comparable drawings. The drawings were traced with pencil, then transferred to tracing paper with ink and digitised. All figures were edited with Photoshop (Adobe) software.

DNA barcoding is based on two specimens of each suspected subspecific taxon within Eutelia adoratrix, Lacanobia praedita and Hadena adriana collected at the Silver Coast, supplemented by additional data of the involved species and nearest neighbours from our own sources or public data available in BOLD (Barcode of Life Data Systems v. 4.0. http://www.boldsystems.org; Ratnasingham & Hebert, 2007). In order to obtain the 658 base-pair long DNA barcode segment of the mitochondrial COI gene (cytochrome c oxidase I), samples (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-NOCTBULG Noctuoidea - Black Sea Coast” dx.doi.org/10.5883/DS-NOCTBULG in BOLD. 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 Neighbour-joining tree of the successfully sequenced new taxa together with nearest neighbors was constructed using MEGA 6 (Tamura et al., 2013) under the Kimura 2-parameter model for nucleotide substitutions.

Finally for each species a Barcode Identification Number (BIN) is provided. This is automatically calculated for records in Bold Data Systems that are compliant with the DNA Barcode standard (Ratnasingham & Hebert, 2013).

All specimens of the new taxa are preserved in the collections of the National Museum of Natural History in Sofia, Bulgaria (NMNHS), Institute of Biodiversity and Ecosystem Research in Sofia, Bulgaria (IBER), Tiroler Landesmuseum Ferdinandeum, Naturwissenschaftliche Sammlungen, Hall, Austria (TLMF), the collection of Péter Gyulai, Miskolc, Hungary (PCPG) and in the Hungarian Natural History Museum, Budapest, Hungary (HNHM). Additionally, material from the collection of the Zoological Museum, Copenhagen was studied.

Results

Family Euteliidae

Genus Eutelia Hübner, 1823

Eutelia adoratrix adoratrix (Staudinger, 1892) (Fig. 1F–H, 2 B, 3 C, D, 4 B, 5)

Material examined: 1 ♂, Albania, Ionian Sea Coast, Dhermi district, Ilia, St. Theodor monastery, 140 m, N 40.1311°, E 19.6558°, 15.v.2017, leg. S. Beshkov & A. Nahirnić (NMNHS); 1 ♀, Albania, Mali I Luxxherise Mts., 2 km southeast of Suhë, 430 m, N 40.0866°, E 20.2711°, 4.vii.2015, leg. B. Zlatkov, D. Chobanov & G. Hristov (NMNHS); 1 ♀, Albania, Berat region, Polican district, Ibrollara – Vale, 217 m, N 40.5600°, E 20.0938°, 10.viii.2016, leg. S. Beshkov & A. Nahirnić (NMNHS); 1 ♀, Albania, Gjirokaster region, Muzini, the road to Dhrovin, 389 m, N 39.9144°, E 20.2016°, 12.vii.2018, leg. S. Beshkov & A. Nahirnić (NMNHS); Albania, Korça region, Devollil gorge, Strelcë, 755 m, N 40.7216°, E 20.5208°, 5.vi.2016, leg. S. Beshkov & A. Nahirnić, genitalia slide No. 2/15.1.2021 (NMNHS); 2 ♂, North Macedonia, Skopje region, Treska, 31.vii.1942, leg. K. Tuleschkow (NMNHS); 1 ♂, Bulgaria, Southern Pirin Mts., Kalimantsi, 400 m, 2.vi.2002, leg. M. Langourov & D. Chobanov (NMNHS); 1 ♂, Turkey, Akşehir, 35 km southwest of Çetince, 1200 m, leg. J. Junnilainen (NMNHS); 1 ♂, Turkey, Black Sea region, Artvin
Eutelia adoratrix platinea ssp. n.

**Holotype.** ♀, pinned, genitalia on slide, with 3 printed labels: “BULGARIA, N Black Sea Coast // Kaliakra Cape, Bolata area // 40 m N43.3845° E28.4692° // 29.v.2019 // leg. B. Zlatkov, O. Sivilov & R. Bekchiev” “NMNHS // Gen. prep. // ♂ // No. 1/17.12.2020” “HOLOTYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard], genitalia slide with 2 labels: “HOLOTYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, 2021 // Bulgaria, N Black Sea Coast // Kaliakra Cape, Bolata area // 40 m N43.3845° E28.4692° // 29.v.2019 // leg. B. Zlatkov, O. Sivilov & R. Bekchiev” [red paper] “NMNHS // Gen. prep. // ♂ // No. 1/17.12.2020 // B. Zlatkov 2020 Euparal” (NMNHS)

**Paratypes.** 1 ♂, pinned, with two printed labels: “Bulgaria, N Black Sea Coast // Bolata near Cape Kaliakra // 42m, N43.3876, E028.4725 // 11.vi.2019 // leg. S. Beshkov & A. Nahirmić” “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (NMHM); 1 ♀, ibid. (NMNHS); 1 ♂, the same two labels and additional: “Bulgaria, Black Sea Coast // Balgarevo, Dalboka area // 80 m N43.3994° E28.3963° // 2021 // leg. B. Zlatkov & O. Sivilov” “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (PCPG); 1 ♀, pinned, genitalia on slide, the same two labels and additional printed: “NMNHS // Gen. prep. // ♀ // No. 1/12.1.2021”, genitalia slide with two labels: “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (TLMF); 3 ♀, ibid. (NMNHS); 1 ♂, the same two labels and additional printed: “BCBZ 0493” (NMNHS); 1 ♂, pinned, with two printed labels: “Bulgaria, Black Sea Coast // Balgarevo, Dalboka area // 80 m N43.3994° E28.3963° // 15.viii.2011, light // leg. B. Zlatkov & O. Sivilov” “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (IBER); 1 ♀, the same two labels and additional: “NMNHS // Gen. prep. // ♀ // No. 2/17.12.2020”, genitalia slide with two labels: “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (HNHM); 1 ♂, pinned, genitalia on slide, the same two labels and additional printed: “NMNHS // Gen. prep. // ♂ // No. 2/17.12.2020”, genitalia slide with two labels: “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard], genitalia slide with 2 labels: “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (NMNHS); 1 ♂, pinned, genitalia on slide, the same two labels and additional printed: “NMNHS // Gen. prep. // ♂ // No. 1/15.1.2021”, genitalia slide with two labels: “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard], genitalia slide with 2 labels: “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (NMNHS); 1 ♂, pinned, genitalia on slide, the same two labels and additional printed: “NMNHS // Gen. prep. // ♂ // No. 12/17.12.2020 // B. Zlatkov 2021 Euparal” (NMNHS); 1 ♂, pinned, genitalia on slide, the same two labels and additional printed: “NMNHS // Gen. prep. // ♂ // No. 17.12.2020”, genitalia slide with 2 printed labels: “BULGARIA, N Black Sea Coast // Kaliakra Cape, Bolata area // 40 m N43.3845° E28.4692° // 29.v.2019 // leg. B. Zlatkov, O. Sivilov & R. Bekchiev” “NMNHS // Gen. prep. // ♀ // No. 1/15.1.2021” “Paratypes // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, 2021” [red cardboard], genitalia slide with 2 labels: “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (NMNHS); 1 ♂, pinned, genitalia on slide, the same two labels and additional printed: “NMNHS // Gen. prep. // ♂ // No. 17.12.2020”, genitalia slide with 2 labels: “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (HNHM); 1 ♂, pinned, with 2 printed labels: “BULGARIA, Black Sea Coast // Kaliakra Cape, Bolata area // 40 m N43.3845° E28.4692° // 26.vi.2017 // leg. B. Zlatkov & D. Chobanov” “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, 2021” [red cardboard] (TLMF); 1 ♀, pinned, with 2 printed labels: “BULGARIA, Black Sea Coast // Kaliakra Cape, Bolata area // 40 m N43.3861° E28.4725° // 3.vi.2017 // leg. B. Zlatkov, D. Kaynarov & J. Kamacho” “PARATYPE // Eutelia adoratrix platinea // Zlatkov, Beshkov & Huemer, 2021” [red cardboard] (ZMUC).

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Figure 1. Habitus of Eutelia adoratrix. A–E. E. adoratrix platinea ssp. n., holotype ♂ (A) and paratypes ♂ (B), ♀ (C), ♂ (D), ♀ (E), all from Bulgaria, Black Sea Coast. F–H. E. adoratrix adoratrix from various locations: ♂, Turkey, Pontic Mountains (F); ♀, Iran, Alborz (=Elburs) mountains (G); ♀, Albania, Gjirokaster Region (H). Scale bar 10 mm, all to scale.

Eutelia adoratrix (Staudinger, 1892) is reported in Bulgaria from single localities in the south-western part of the country, summarized in Beshkov (2000). In Europe it is presented in the Balkan Peninsula south of Bulgaria and along the Dalmatian coast, as well as in Crimea (Fibiger et al. 2010). All specimens examined
by the present authors from south-western Bulgaria, North Macedonia, Greece, Albania, Turkey and Iran are obfuscated like the nominotypical *Eutelia adoratrix* (Type locality: Beyrouth [Lebanon]). From the Silver Coast *Eutelia adoratrix* is mentioned for the first time in Abadjiev & Beshkov (2007). Later on Beshkov (2017) reported and illustrated a couple of the unusual *Eutelia adoratrix* specimens and stated that “specimens from the Black Sea coast differ in colour, being unusually light and bright – a characteristic of the fauna of the Balchik-Kavarna area”. Coordinates and collecting data there are confused, they are corrected here.

Figure 2. Male genitalia (without phallus). A. *Eutelia adoratrix platinea* ssp. n., holotype, Bulgaria, Black Sea Coast. B. *E. adoratrix adoratrix*, Albania, Ionian Sea Coast. C. *Lacanobia praedita canescens* ssp. n., holotype, Bulgaria, Black Sea Coast. D. *L. praedita praedita*, Kazakhstan, Almaty Province. E. *Hadena adriana petergyulaii* ssp. n., holotype, Bulgaria, Black Sea Coast. F. *H. adriana adriana*, Albania, Korça Region. Scale bar 1 mm, all to scale.
**Derivatio nominis.** Derived from the chemical element platinum (Pt), a silver-white precious metal, reflecting the pale background colour of the wings of the new taxon. The word is Latinised (from platinum, derived from the Spanish term platino) and should be treated as a feminine adjective in nominative.

**Figure 3.** Phallus with everted vesica of *Eutelia adoratrix*. A, B. *E. adoratrix platinea* ssp. n., holotype, Bulgaria, Black Sea Coast, right (A) and dorsal (B). C, D. *E. adoratrix adoratrix*, Albania, Ionian Sea Coast, right (C) and dorsal (D). Scale bar 1 mm, all to scale.
Description
Adult (Fig. 1 A–E). Sexual dimorphism detected only in antennae. Head. Frons and vertex covered with beige scales with white tips. Antennae in males with basal ca. 0.75 length plumose, the rest filiform; in female whole antennae filiform. Labial palps porrect, basal palpomere pale brown with black line distally, medial and distal palpomeres white with brown suffusion. Proboscis well-developed. Thorax. Dorsally and ventrally covered with beige scales with white tips. Patagia with black basal line. Legs pale brown with white annulations distally on tibiae and tarsomeres. Wings: Forewing length in males 12.9–13.7 mm (mean 13.3 ± 0.3, n=8), in females 11.9–13.5 mm (mean 12.7 ± 0.4, n=12); upperside background pale brown to whitish with darker basal and terminal areas; basal area pale brown with reddish suffusion, antemedial line whitish, doubled, with grey brown parallel lines within and black border distally; postmedial line distinct, doubled, whitish, with grey brown lines within, basally bordered with black, with parallel brown line basally; median fascia absent; subterminal line white, interrupted with grey and reddish scales; termen pale ash grey; reniform stigma white, indistinct, other stigmata absent; terminal line white; cilia whitish, spotted with dark grey and pale brown; underside pale grey with white costa, postmedial line distinct, dark grey, subterminal line white, expressed in anal angle area, discal spot well defined. Hindwing upperside white, with broad dark grey marginal area; discal spot reduced; transverse line whitish; terminal line white, cilia whitish, spotted with dark grey; underside with distinct black discal spot, grey postmedial line and reddish brown subterminal line. Abdomen. Pale grey. Male genitalia (Fig. 2 A): uncus anchor-shaped, with acute arms, tegumen narrow, juxta cup-shaped, vinculum broad and short; valvae short, subtriangular, costal margin with bar-shaped editum, saccus very large, with long parallel-sided setose process, cecus short and broad, reversed triangular, apex and subventral crest setose; phallos (Fig. 3 A, B) straight, tubular, vesica not distinctly separated from phallic tube, with five diverticula, short cylindrical basal part and longer apical part curved to right; ductus ejaculatorius inserted at left, with peg-like cornutus in middle area dorsally and two small conical diverticula dorsally and ventrally at insertion area. Basal part of vesica with thickened longitudinally plicate cuticle on left side and narrow belt of numerous short cornuti at right side; apical part of vesica bears short wide diverticulum pointed apically and ending with large curved cornutus, and small lateral diverticulum. Female genitalia (Fig. 4 A): ovipositor shortly conical, papillae anales round, densely setose, apophyses posteriores fine, with medium length; eighth segment sclerotised, with complex lateral double pouches; ostium bursae (antrum) funnel-shaped, with lateral invaginations; posterior part of ductus bursae sclerotised, anterior part membranous, appendix bursae membranous, bending ventrally and directed to left, terminating in ductus seminalis; posterior part of corpus bursae coiled, with sclerotised lateral walls, fundus bursae ovoid, membranous, with smaller and larger hemispherical signa on left side with sharp spiculi.

Variation. Specimens with more or less paler forewing upperside background.

Diagnose
The new taxon can be easily recognised from the nominotypical one by the pale, often whitish background of the body and wings; in ssp. adoratrix it is dark tobacco-brown; E. adoratrix platinea ssp. n. is with much more contrast wing pattern. Minor differences in male genitalia can be detected: the plate of sacculus is narrower and parallel-sided in E. adoratrix platinea ssp. n., while in E. adoratrix adoratrix it is wider and widened distally. The female genitalia are indistinguishable at a subspecific level.

Molecular data
Eutelia adoratrix platinea ssp. n. cannot be separated from the nominotypical subspecies by DNA barcode (Fig. 5) and clusters in the same BIN: BOLD:AEF9213. The intraspecific average distance of the barcode region in E. adoratrix is 0.17%, the maximum distance 0.34% (p-dist) (n=5). The minimum distance to the nearest European neighbour E. adulatrix is 4.52%.

Biology and habitat
Steep slopes along the sea coast between Topola Village and Bolata area (Fig. 12 A). E. adoratrix platinea ssp. n. is not found in the area between Balchik Town and Touzlata where the majority of the endemic forms for the Silver Coast occur. The moths fly from the beginning of May (4.v.2012) to the third decade of August (24.viii.2012) and are attracted to artificial light in the first hours of the darkness. Pre-imaginal stages not known.
Figure 4. Female genitalia (ventral view). A. Eutelia adoratrix platinea ssp.n., paratype, Bulgaria, N Black Sea Coast. B. E. adoratrix adoratrix, Albania, Korça Region. C. Lacanobia praedita canescens ssp. n., paratype, Bulgaria, N Black Sea Coast. D. Hadena adriana petergyulaii ssp. n., paratype, Bulgaria, N Black Sea Coast. E. H. adriana adriana, North Macedonia, Veles Region. Scale bar 1 mm, all to scale.
Figure 5. Neighbour-joining tree of *Eutelia adoratrix* and the closest European species *E. adulatrix* in BOLD.

Family Noctuidae

Subfamily Noctuinae

Genus *Lacanobia* Billberg, 1820

*Lacanobia praedita praedita* (Hübner, 1813) (Fig. 2 D, 6 E, F, 7 C, D, 8)

Material examined: 1 ♂, Turkey, Black Sea region, Artvin province, Yusefeli, road to Sangööl 630 m, 20.vii.1995, leg. S. Beshkov & J. Gelbrecht (NMNHS); 1 ♂, Kazakhstan, Almaty region, Taukum Sands, 3 km west of Topar, 363 m, N 45.0365°, E 74.9757°, 31.v.2015, leg. F. Konstantinov & N. Simov (NMNHS); 1 ♂, Kazakhstan, Almaty region, Ili river valley, 11 km east of Nura, 760 m, N 43.5567°, E 78.6081°, 28.vi.2016, leg. B. Zlatkov & D. Chobanov.

*Lacanobia praedita canescens* ssp. n.

**Holotype.** ♂, pinned, genitalia on slide, with 4 printed labels: “BULGARIA, N Black Sea Coast // Kaliakra cape // 70 m N43.3792° E28.4539°// 4.V.2012, at light // leg. B. Zlatkov & O. Sivilov” “BCBZ 0489” “NMNHS // Gen. prep. // ♂ // No. 1/11.12.2020” “HOLOTYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard]; genitalia slide with 2 labels: “HOLOTYPUS // Lacanobia praedita // canescens // Zlatkov, // Beshkov & Huemer. // 2021 // BULGARIA, N Black Sea Coast // Kaliakra cape // 70 m N43.3792° E28.4539°// 4.V.2012, at light // leg. B. Zlatkov & O. Sivilov” [red paper] “NMNHS // Gen. prep. // ♂ // No. 1/11.12.2020 // B. Zlatkov 2020 Euparal” (NMNHS)

**Paratypes.** 1 ♂, pinned, with two printed labels: “Bulgaria, N Black Sea Coast // Bolyata near Cape Kaliakra // 42m, N43.3876, E028.4725 // 11.VI.2019 // leg. S. Beshkov & A. Nahirnić” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (TLMF); 1 ♂ pinned, with two printed labels: “NE Bulgaria, North Black Sea// Coast, “Strelbishteto” between // Balchik and Kavarna Towns, // 2 km to Tuzlata from Balchik // 02.VI.1999, S. Beshkov // S. Abadjiev & M. Langourov // leg. at 160W MVL & light trap” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (HNHM); 1 ♂ pinned, with two printed labels: “Bulgaria, Northern Black // Sea Coast, between Balchik // and Kavarna towns, 2 km to // Touzlata from Balchik, // 03.VII.2003, S. Beshkov // & J. Nowacki leg.” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (PCPG); 1 ♂ pinned, with 3 printed labels: “Bulgaria, Northern Black // Sea Coast, between Balchik // and Kavarna towns, 2 km to // Touzlata from Balchik, // N43.24.263; E028.12.521 // MH KN43 CJ; 28-30.vi.2003. // S. Beshkov & H. Beck leg.” “Gen. prep. 8/11.II.2015 // S. Beshkov. // ♂ genitalia with // everted vesica Euparal” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard], genitalia slide with 2 labels: “Gen. prep. 8/11.II.2015 // S. Beshkov. Bulgaria, Northern // Black Sea Coast, between Balchik // and Kavarna towns, 2 km to // Touzlata from Balchik, 60m, N43.24.263; // E028.12.521; 28-30.VI.2003, // S. Beshkov & H. Beck leg.” “PARATYPUS // Lacanobia praedita // canescens// Zlatkov, // Beshkov // &
“NEW NOCTUOIDEA TAXA FROM THE SILVER COAST OF BULGARIA”

Hue, 2021” (NMNHS); 1 ♂ pinned, with two printed labels: “Bulgaria, N Black Sea Coast, // between Balchik and Kavarna // towns, 2 km to Touzlata from // Balchik, 77m, // N43.4057°, E028.2103° // 16.VII.1988, S. Beshkov leg.” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (NMNHS); 1 ♂, pinned, with 3 printed labels: “Bulgaria, Northern Black // Sea Coast, between Balchik // and Kavarna towns, 2 km to // Touzlata from Balchik, // 31.V.2003, S. Beshkov & // Ph. Fastre leg.” “NMNHS // Gen. prep. // ♂ // No. 1.16.12.2020” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard]; genitalia slide with 2 labels: “PARATYPUS // Lacanobia praedita canescens Zlatkov, // Beshkov & Huemer, // 2021 // Bulgaria, Northern Black // Sea Coast, between Balchik // and Kavarna towns, 2 km to // Touzlata from Balchik, // 31.V.2003, S. Beshkov & // Ph. Fastre leg.” [red paper] “NMNHS // Gen. prep. // ♂ // No. 1.16.12.2020 // B. Zlatkov 2020 Euparal” (NMNHS); 1 ♂, pinned, with 2 printed labels: “Bulgaria, Northern Black // Sea Coast, between Balchik // and Kavarna towns, 2 km to // Touzlata from Balchik, // 07.VI.2003, S. Beshkov & // Ph. Fastre leg.” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (NMNHS); 1 ♀, pinned, with 3 printed labels: “Bulgaria, N Black Sea Coast // Region, // between Balchik and // Kavarna towns, 2 km to // Touzlata from Balchik, // 130m, // N43°24′21″ // E28°12′28″ // 21.VI.2007 // S. Beshkov // & B. Zlatkov leg. at light trap” [red paper] “NMNHS // Gen. prep. // ♀ // No. 1.7.1.2021” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard]; genitalia slide with 2 labels: “PARATYPUS // Lacanobia praedita canescens Zlatkov, // Beshkov & Huemer, // 2021 // BULGARIA, N Black Sea Coast // Region, between Balchik and // Kavarna towns, 2 km to // Touzlata from Balchik, // 130m, // N43.4058° E028.2078° // 21.VI.2007 // S. Beshkov // & B. Zlatkov leg. at light trap” [red paper] “NMNHS // Gen. prep. // ♂ // No. 1.7.1.2021 // B. Zlatkov 2020 Euparal” (NMNHS); 1 ♀ pinned, with two printed labels: “NE Bulgaria, the Black Sea // Coast between Balchik and // Kavarna near Touzlata //100 m N43°24′21″ E28°12′28″ // 21.06.2007 at lamp // leg. B. Zlatkov & S. Beshkov” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (NMNHS); 1 ♂, pinned, with two printed labels: “Bulgaria, Black Sea Coast // Balgarevo, Dalboka area // 80 m N43.3994° E28.3963° // 15.viii.2011, light // leg. B. Zlatkov & O. Sivilov” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (IBER); 1 ♂, pinned, with two printed labels: “Bulgaria, Black Sea Coast // N Balchik, Topola vill., // coast // 65 m N43.4095° E28.2635° // 2.Ⅵ.2017 // leg. B. Zlatkov, D. Kaynarov & // J. Camacho” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard] (IBER); 1 ♂, ibid. (HNHM); 1 ♂, the same two labels and additional: “BCBZ 0488” (NMNHS); 1 ♂, pinned, with two printed labels: “NE Bulgaria, Black Sea Coast // Kaliakra Cape, UTM: PJ10 // 60 m N43°22′45″ E28°27′14″ // 24.VIII.2012, at light // leg. B. Zlatkov & O. Sivilov” “PARATYPUS // Lacanobia praedita canescens // Zlatkov, Beshkov & Huemer, 2021” [red cardboard] (IBER).

**Lacanobia praedita** (Hübner, 1813) is known in Bulgaria only from Black Sea Coast, Balchik (Caradja, 1932; 1934; Popescu-Gorj, 1964; Slivov, 1976 [1977]; Beshkov, 1993; Beshkov, 1998; Beshkov, Nowacki & Palka, 1999; Beshkov, 2000; Abadjiev & Beshkov, 2007). According to Beshkov (2000) specimens from Balchik form an isolated colony at the extreme edge of the range of the species, and look somewhat different in appearance from the other ones. For comparison one specimen from the Silver Coast is illustrated there together with a specimen from Turkey, Pontic Mountain. Specimen from Balchik is illustrated also in Hacker et al. (2002). *Lacanobia praedita* is a Ponto-Caspian-Turkestanian species, in Europe known also from the grassy steppe zones in southeastern Russia, Ukraine, Moldova and Romania (Hacker et al., 2002). Specimens from Romania illustrated in monochrome in Popescu-Gorj (1959) from Vasile Roaita (the old name of the town Eforie Sud) and in Rakosy (1996) from Galati, E Romania looks more closely to the nominotypical *L. praedita* than to the new subspecies.

**Derivatio nominis.** Derived from the Latin verb canesco: to become covered in white; canescens is a present participle in nominative.

**Description**

Adult (Fig. 6 A–D). Sexual dimorphism not detected. Head. Vertex and frons covered with whitish scales, frons with black spots near eyes sometimes connected with transverse black line. Antennae filiform. Labial palps whitish with grey suffusion. Proboscis well developed. Thorax dorsally and ventrally covered with whitish scales. Patagia with medial transverse thin black line. Legs whitish with scattered grey scales.
Figure 6. Habitus of *Lacanobia praedita*. A–D. *L. praedita canescens* ssp. n., holotype ♂ (A) and paratypes ♀ (B), ♂ (C, D), all from Bulgaria, Black Sea Coast. E, F. *L. praedita praedita*: ♂, Kazakhstan, Almaty Province (E); ♀, Turkey, Pontic Mountains (F). Scale bar 10 mm, all to scale.

Wings: Forewing length in males 13.7–14.9 mm (mean 14.2 ± 0.4, n=13), in females 13.7–15.0 mm (mean 14.3 ± 0.4, n=5); upperside mainly pale grey; costal area very pale grey, costa with 3–4 blackish spots; basal area pale grey with black basal streak; antemedial line white, bordered with black distad; medial field pale grey, darker than rest of wing; postmedial line white, bordered with black basad; large very pale grey streak projecting obliquely from orbicular stigma to postmedial line; subterminal area very pale grey with darker area along white subterminal line with sharply defined W-mark; orbicular and reniform stigmata pale grey with darker markings within; claviform stigma absent; terminal line white, cilia pale grey; underside whitish with grey postmedial line and discal spot. Hindwing white with pale grey discal spot, postmedial line, marginal area and veins; cilia white; underside pearly white with pale grey postmedial line and discal spot. Abdomen pale grey. Male genitalia (Fig. 2 C): uncus relatively short, acute, curved ventrally, tegumen and vinculum broad, juxta heart-shaped; valvae slightly asymmetrical, right one with more protruding distal end of sacculus; valva with broad basal and narrower distal part; harpe elongate, well-developed, with triangular distal end and thin acute process pointed ventral; two costal extensions arise from common plate: proximal more elongate, flabellate, and distal short, nearly triangular; cucullus well separated, with corona. Phallus (Fig. 7 A, B) nearly straight, with hemispherical coecum; vesica protruded from ventral side of phallic tube, with short cylindrical basal, large medial and long cylindrical helicoid apical part ending with ductus ejaculatorius; basal part with membranous diverticulum at left side; medial part with long diverticulum.
emerging apically and pointed dorsad, adorned with short stout cornuti; apical part with bundle of ca. 23 needle-like cornuti and weakly sclerotised area; whole vesica apart of basal part and its diverticulum covered with minute spiculi. Female genitalia (Fig. 4 C): papillae anales weakly sclerotised, setose; apophyses short; seventh sternite with deep median incision; ostium with rounded anterior margin; ductus bursae relatively short, sclerotised; appendix bursae coiled dorsally, with rugose sclerotised plate, ductus seminalis inserted apically; corpus bursae ovoid, with four longitudinal signa consisting of slightly sclerotised granules.

**Variation.** None.

**Figure 7.** Phallus with everted vesica of *Lacanobia praedita.* A, B. *L. praedita canescens* ssp. n., holotype, Bulgaria, Black Sea Coast, right (A) and dorsal (B). C, D. *L. praedita praedita,* Kazakhstan, Almaty Province, right (C) and dorsal (D). Scale bar 1 mm, all to scale.
Diagnose

*Lacanobia praedita canescens* ssp. n. is readily distinguished from the nominotypical subspecies by the general colour, which is pale grey; in *ssp. praedita* it is pale olive-grey to brownish-grey. Neither male nor female genitalia demonstrate reliable differences.

Molecular data

*Lacanobia praedita canescens* ssp. n. cannot be reliably separated from the nominotypical subspecies by DNA barcode (Fig. 8) and clusters in the same BIN: BOLD:ABX0858. The intraspecific average distance of the barcode region in *L. praedita* is 0.71%, the maximum distance 1.39% (p-dist) (n=5). The minimum distance to the nearest neighbour *L. atlantica* from North America is 4.76%, to the morphologically related European *Lacanobia blenna* (Hübner, 1824) is 5.2%.

**Figure 8.** Neighbour-joining tree of *Lacanobia praedita* and the closest species *L. blenna* from Europe and *L. atlantica* from N America in BOLD.

Biology and habitat

Steep slopes and terraces along the sea coast from Balchik – Tuzlata to Bolata area, northern of Cape Kaliakra (Fig. 12 B). The moths fly from the beginning of May (04.v.2012) to the third decade of August (24.viii.2012) and are attracted to artificial light. Pre-imaginal stages are not known.

Genus Hadena Schrank, 1802

*Hadena adriana adriana* (Schawerda, 1921) (Fig. 2 F, 4 E, 9 D–H, 10 C, D, 11)

**Material examined.** 1 ♂, Albania, Korça region, Zvezdë, the road to Prespa lake, 1088 m, N 40.7330°, E 20.880278°, 3.vi.2018, leg. S. Beshkov & A. Nahirnić, genitalia slide No. 1/10.12.2020 (NMNHS); 1 ♂, Albania, Gjirokaster Region, Lunxhërisë, between Mai Çajup and Erind village, N 40.1826°, E 20.1659°, 07.vi.2018, leg. S. Beshkov & A. Nahirnić, genitalia slide No. 1/8.12.2020 (NMNHS); 1 ♂, North Macedonia, Skopje region, Suva Planina, Kozjak Venec, 1070 m, N 41.8908°, E 21.2239°, 30.v.2019, leg. S. Beshkov & A. Nahirnić, genitalia slide No. 2/10.12.2020 (NMNHS); 1 ♂, 1 ♀, North Macedonia, Veles region, Sveti Ilia Monastery, 486 m, N 41.7061°, E 21°8097, 29.iv.2016, leg. S. Beshkov & A. Nahirnić (NMNHS); 1 ♀, ibid., genitalia slide No. 1/11.1.2021 (NMNHS); 1 ♀, Greece, Peloponnesse, Kiviari near Argos, 130 m, N 37.5064°, E 22.7264°, 22.iv.2009, leg. S. Beshkov, J. Buszko & B. Zlatkov (NMNHS).

*Hadena adriana petergyulaii* ssp. n.

**Holotype.** ♂, pinned, genitalia on slide, with 3 printed labels: “BULGARIA, Black Sea Coast // Kaliakra Cape, Bolata area // 40 m N43.3845° E28.4692° // 29.v.2019 // leg. B. Zlatkov, O. Sivilov & R. Bekchiev” “NMNHS // Gen. prep. // ♂ // No. 1/7.12.2020” “HOLOTYPE // Hadena adriana petergyulaii // Zlatkov, Beshkov & Huemer, // 2021” [red cardboard], genitalia slide with 2 labels: “HOLOTYPE // Hadena adriana // petergyulaii // Zlatkov, Beshkov & // Huemer, 2021 // BULGARIA, Black Sea Coast // Kaliakra
Drenowski (1936) and Drenowski (1939) reported from Alibotoush Mts “Harmodia armeriae Bsd. (= gueneei Stgr.), det. Rbl. [Rebel]). More likely these reports concern Hadena adriana adriana (Schawerda, 1921) (Beshkov, 2000), or even H. gueneei (Staudinger, 1901). The present authors have never seen H. adriana adriana (Schawerda, 1921) from Bulgaria. H. compta armeriae (Guennée, 1852) differs clearly from H. adriana and H. gueneei in the structure of everted vesica (in H. adriana and H. gueneei the diverticulum lacks a cornutus, in H. compta armeriae a large cornutus is present), and in female genitalia; they belong to different species groups. Hacker (1996) accepted H. adriana Schawerda as a bona sp. with Ponto-Mediterranean range. The type locality of H. adriana is Croatia, Zengg. There is no doubt that the specimens from the Balkan Peninsula known in the past under the name Hadena adrianae are actually H. adriana. The only certain report of Hadena (Hadena) adriana (Schawerda, 1921) for Bulgaria is: 1 female, Black Sea, Coast E of Kavarna, Cape Kaliakra, 16.v.2010 (gen. prep. H. Hacker 21855w) (leg. B. Benedek)” (coll. P. Gyulai); 1 female, Black Sea coast, Kaliakra, 15.vi.2012 (leg. P. Gyulai & A. Garai)” (coll. P. Gyulai). Note. Both of these females are unusually pale with whitish-ochreous ground colour on forewing and body hair. New record for the fauna of Bulgaria (cf. Beshkov, 2000; Hacker et al., 2002); already known from the Mediterranean Basin and Crimea” (Hacker & Gyulai, 2013). The specimens from Kaliakra look rather different from all other Hadena species and its association to H. adriana was only possible after examination of genitalia. However, their pale colouration reminds to some degree the “ab.” puengeleri described by Schawerda (1921). Another pale but not ochreous form, “ab.” staideri, was also recognised by the author (op. cit.). Comparing the two pale forms, “ab.” puengeleri and H. adriana peterygulaii, it is obvious that the darker markings are different, the outlines of the stigmata of the Silver Coast specimens are sharper defined and the basal area is remarkably darker while the marginal area is less ochreous-brownish suffused than in the “ab.” puengeleri (L. Ronkay, pers. comm.). On the Balkan Peninsula H. adriana is well presented in the south of Bulgaria (Greece) and west from Central North Macedonia through Albania, Montenegro and Croatia along the Adriatic Sea coast. In the East the nearest locality is in Crimea. The first certain record for
Crimea is that of Klyuchko & Rutjan (2005) for Karadag Natural Reserve. The nearest localities to Kaliakra (Karadag in Crimea and Drenovo in North Macedonia) are both ca. 560 km in a straight line.

**Derivatio nominis.** The new taxon is named on the famous Hungarian expert on Noctuidae Dr Peter Gyulai (Miskolc, Hungary) who first took our attention to these remarkable *Hadena* specimens. The word is a masculine noun in dative

![Figure 9. Habitus of *Hadena adriana*. A–C, *H. adriana peteryulaii* ssp. n., holotype ♂ (A) and paratypes ♂ (B), ♂ (C), all from Bulgaria, Black Sea Coast. F–H, *H. adriana adriana* from various locations: ♂, Albania, Korça Region (D); ♂, Montenegro, Rumija Mountains (E); ♀, Montenegro, Rumija Mountains (F); ♂, North Macedonia, Suva Planina (G); ♀, Greece, Peloponnese (H). Scale bar 10 mm, all to scale.](image-url)
Description
Adult (Fig. 9 A–C). Sexual dimorphism detected only in antennae. Head. Vertex and frons covered with pale ochreous scales, frons with grey spots near eyes. Antennae in males shortly ciliate, in females filiform. Labial palps pale ochre with grey spot laterally. Proboscis well developed. Thorax. Dorsally and ventrally pale ochre, tegulae with grey spot basally and scattered grey scales distally. Legs pale ochre, tibiae scattered with grey, tarsomeres with wide grey basal ring. Wings: Forewing length in males 13.5–14.0 mm (mean 13.8
± 0.2, n=4, in females 14.1 mm (n=1); upperside colour mainly pale ochreous, pattern elements ill-defined; basal field without markings; orbicular and reniform stigma as background, faintly bordered with orange and grey scales, claviform stigma absent; postmedial line as background, basally bordered with grey; subterminal and terminal lines absent; subterminal area with ill-defined orange spots; cilia as background with grey in the tornal area; underside uniformly pale ochre. Hindwings pale ochre with pale grey marginal area and veins; cilia pale ochre; underside pale ochre with rudimentary pale grey discal spot. Abdomen. Pale ochre. Male genitalia (Fig. 2 E): uncus short, weakly sclerotised, tegumen relatively narrow, vinculum broad with large saccus; juxta with trapezoidal central part and well-developed vallum penis forming horseshoe-shaped sclerite with small spines in dorsal portions; valva broad, process of sacculus relatively small, triangular; harpe narrow; costal extension flap-like, round, with slightly undulate margin; cucullus small, nearly round, well separated, with corona. Phallus (Fig. 10 A, B) straight, cylindrical, with rounded coecum, apically with semi-membranous ventral side plicated longitudinally and with small carina on left side. Vesica simple, ovoid, with apical membranous diverticulum, elongated stout dorso-lateral irregularly shaped cornutus composed of two joined cornuti, and bundle of ca. 65 needle-like cornuti located ventro-laterally at right. Ductus ejaculatorius inserted ventro-laterally at left. Whole vesica apart from the extreme basal area covered with minute scobination. Female genitalia (Fig. 4 D): ovipositor slender, papillae anales well sclerotised, with few setae, apophyses with medium length; ostium bursae narrow elliptical; ductus bursae membranous, fused with appendix bursae on left side along entire length; appendix bursae elongate ovoid, well sclerotised, with scobination, ductus seminalis inserted apically; corpus bursae relatively small, globular, with single longitudinal ventral signum consisting of slightly sclerotised granules.

**Variation.** None.

**Diagnose**

*Hadena adriana petergyulaii* ssp. n. is readily separated from forms of the nominotypical subspecies by the ochre background colour of the entire body, including wings; in ssp. *adriana* the forewings usually are grey with an ivory median field, sometimes grey areas are paler, but never ochre with orange suffusion and thin grey lines; compared to “ab.” *puengeleri* the darker markings are different, the outlines of the stigmata of *H. adriana petergyulaii* are sharper defined and the basal area is remarkably darker while the marginal area is less ochreous-brownish suffused than in the “ab.” *puengeleri*. No reliable differences in the genitalia between the subspecies were found.

**Molecular data**

*Hadena adriana petergyulaii* ssp. n. cannot be reliably separated from the nominotypical subspecies by DNA barcode (Fig. 11) and clusters in the same BIN: BOLD:ACI8497. The intraspecific average distance of the barcode region in *H. adriana* is 0.4%, the maximum distance 0.64% (p-dist) (n=7). The minimum distance to the nearest neighbour *H. confusa* is 3.69%.

**Figure 11.** Neighbour-joining tree of *Hadena adriana* and the closest species *H. confusa* in BOLD.
Biology and habitat
Steep slopes and the plateau of the sea coast on the northern side of Cape Kaliakra, on both sides of Bolata Dere bay (Fig. 12 C). From the taxa described here Hadena adriana petergyulaii ssp. n. has the most restricted area of occupancy. The host plant seems to be Silene spp., most likely Silene italic a (L.) Pers., species noticed in the habitat of the new subspecies. Another possibility for a host plan could be Silene caliacrae D. Jord. & P. Pan., an endemic plant to the Black Sea Coast of Bulgaria, inhabiting rocky areas and growing in rock cracks. The moths fly from mid-May (16.v.2010) to mid-June (15.vi.2012) and are attracted to artificial light. Pre-imaginal stages are not known.

Figure 12. Habitats in the Northern Black Sea Coast of Bulgaria. A. Cliff of the southern coast of Kaliakra Cape, a typical habitat of Eutelia adoratrix platinea ssp. n. B. Tuzlata area near Balchik with loose deposits (marl). Lacanobia praedita canescens ssp. n. is found frequently in this type of habitat. C. View to Bolata area. The type locality of Hadena adriana petergyulaii ssp. n. with reddish limestones.

Discussion
The use of electric lamps with an enhanced UV spectrum and powered by a mobile energy source (generator, battery) is a relatively new technique in the lepidopterological research of the area. It has allowed for the discovery of certain species not collected previously or collected in very low numbers, and to set the traps in specific habitats, sometimes with difficult access, such as rock-terraces and sea cliffs. Some of these habitats
have survived only because of their inaccessibility. The majority of easily accessible habitats, however, have mostly been damaged or completely destroyed by the creation of golf courses, holiday complexes and wind farms. This is the reason for the possible extinction of some species, e.g. Paracossulus thrips and Oncocnemis michaelorum, which have not been found for a long time despite considerable searching.

The taxa described here are easily recognisable at a glance, due to their unusual habitus preventing any confusion with the other subspecies. It is even possible to associate them only by habitus with certain locality and habitat, unlike other subspecies that can be named in accordance to the locality. The populations of all three new subspecies are isolated by several hundred kilometers from the closest other populations of the same species and form marginal, probably relic populations. The divergence seems to be a rather recent one and the taxa described here are differentiated to a subspecific level, because the differences in the genitalia are minor and the DNA barcode shows no distance to the nominotypical subspecies. In general, we adhered to a concept which seems to be more or less a tradition in the European Noctuidae taxonomy: a (geographically separated) population distinguished by external characters, but without any, or with only a very small difference in the genitalic morphology and DNA barcode is considered as a subspecies. The status of a population as a separate taxon often is an arbitrary one, particularly in allopatric populations, therefore we apply the diagnosability version of the phylogenetic species concept, if a species concept can be formulated at all (Cracraft 1997, Zachos 2016).

What is a separate taxon and what is not (species or subspecies) is not an easy decision, especially in allopatric populations (Mutane et al. 2012). Presence of pale specimens among the other “typical” is not surprising considering the pale colour of the surrounding rocks and herbaceous vegetation, but when all individuals constantly demonstrate similar pattern, this can be an indication for a certain degree of divergence. It can be easily assumed that the pale colouration is a result of a strong selective pressure leading to mimicking the habitat. Indeed, the whitish Eutelia adoratrix platinea ssp. n. and Lacanobia praedita canescens ssp. n. are found in areas with whitish rocks, and Hadena adriana petergyulaii ssp. n. is found only on rusty rocks. All specimens from every one of the described subspecies express similar colouration, therefore we propose that this character may be genetically determined in the population and is not an ephemeral one.

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