

Contributions to knowledge of the geometrid fauna of Bulgaria and Greece, with four species new for the Greek fauna (Lepidoptera: Geometridae) (plate 12)

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Abstract

During a tour led by the authors to Bulgaria and Greece in March, 2013, a total of 19 geometrid species were observed at five localities. *Biston achyra* WEHRLI, 1936, *Agriopis marginaria* (FABRICIUS, 1776), *A. leucophaearia* ([DENIS & SCHIFFERMÜLLER], 1775) and *Erannis ankeraria* (STAUDINGER, 1861) were found for the first time in Greece. An entirely new habitat type is included to the biotope range of *E. ankeraria*, arousing the possibility of this species being widespread in the Mediterranean countries. The authors hope that these observations will encourage attention to the exploration of the populations, thereby contributing to the more efficient protection of this species.

Checklists are given to each collecting events.

Key words: *Biston*, *Agriopis*, *Erannis*, Bulgaria, Greece, new data, oak woodland, *macchia*-scrub, soil types

Introduction

Biston achyra WEHRLI, 1936 was described from Asia Minor and subsequently found in Ukraine (KOSTJUK, 1990), the Levant (KOSTJUK, 1991) and Russia (SINEV, 2008). This species can be distinguished from its relative *B. strataria* (HUFNAGEL, 1767) by its considerably smaller size, more elongated forewing, and the presence of discal spot on the hindwing.

Agriopis marginaria (FABRICIUS, 1776) and *A. leucophaearia* ([DENIS & SCHIFFERMÜLLER], 1775) are both frequent and widespread in Europe. The former species is distributed from the Iberian Peninsula to the Urals and the Caucasus Mts., and is also present in Asia Minor. The latter taxon can be found throughout Europe except for the far north, as well as in North Africa, Near East, Russian Far East, Manchuria and Japan.

Erannis ankeraria (STAUDINGER, 1861) is a Natura 2000 species and is included in the Annex II of the Habitats Directive (LÁSZLÓ & RONKAY, 2004; VARGA, 2010). Distribution is disjunct; from Italy to Asia Minor (sspec. *syriaca* WEHRLI, 1924), and in rather small and isolated populations across the Carpathian Basin and the Balkan Peninsula. The ♂♂ of *E. ankeraria* are easily distinguished from those of the similar species *Agriopis marginaria* (FABRICIUS, 1776), which occurs with it, by the lack of antennal rami, by the monochromatic fringe (i.e. without black dots) and by the shape of the two narrow, blackish crosslines on the forewing. For more detailed comparison, see BESHKOV & ZLATKOV (2011). The ♀♀ of *E. ankeraria* are whitish with conspicuous black pattern, unlikely to be confused with those of any other species occurring in the same period of the year. Investigation on *E. ankeraria* has been accelerated in the last few years. Several semi-isolated populations have been found in northern Hungary (T. KOROMPAI, *pers. comm.*), and it has also been found recently in Bulgaria (BESHKOV & ZLATKOV, 2011).

Material and methods

Portable light traps with TL 8W tubes were placed in different vegetation patches in each collecting site, and were operated from dusk to dawn. One 2 m x 2.5 m white sheet was illuminated by a TL 8W tube from dusk till approx. 21:00 (local time).

Specimens of *E. ankeraria* were also searched for with head-lamps in deciduous oak woodland at several collecting sites during the operation of the sheet.

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Records with field observations and brief characterisation of the collecting sites

All specimens were collected on sheet or by the light traps unless stated otherwise.

Bulgaria, Blagoevgrad county, Pirin Mts., 3 km SW of Stara Kresna, valley of river Struma, 230m, N41°45,641' E23°09,267'. Plane forest close to the river, dominated by *Platanus orientalis*. The slopes are covered by xerothermic oak woodland with scattered open areas, and steep rocky hillsides. Oak forests on lithosol with granite bedrock (pl. 12, fig. 1).

Species observed on 8.III.2013:

- Alsophila aescularia* ([DENIS & SCHIFFERMÜLLER], 1775): 1 ♂.
- Dasycorsa modesta* (STAUDINGER, 1879): 3 ♂♂.
- Apocheima hispidaria* ([DENIS & SCHIFFERMÜLLER], 1775): 3 ♂♂.
- Lycia hirtaria* (CLERCK, 1759): 4 ♂♂.
- Biston strataria* (HUFNAGEL, 1767): 1 ♂.
- Agriopis marginaria* (FABRICIUS, 1776): 1 ♂.
- Agriopis bajaran* ([DENIS & SCHIFFERMÜLLER], 1775): 5 ♂♂.
- Erannis ankeraria* (STAUDINGER, 1861): 4 ♂♂ in oak woodland and on stone boulder. The specimens appeared to be freshly emerged as their pattern and fringes were intact.
- Aleucis distinctata* (HERRICH-SCHÄFFER, 1839): 1 ♂♂.

Species observed at 13.III.2013:

- Eupithecia quercetica* PROUT, 1938: 1 ♀.
- Dasycorsa modesta* (STAUDINGER, 1879): 14 ♂♂ altogether. 5 specimens were observed on a cherry tree (*Cerasus avium*) sucking nectar from the blossoms. When an attempt was made to dislodge them, they flew towards the ground and sought shelter among the fallen leaves.
- Lycia hirtaria* (CLERCK, 1759): 1 ♂ and 1 ♀; the latter was located at night while flying among the grass.
- Agriopis bajaran* ([DENIS & SCHIFFERMÜLLER], 1775): 1 ♂.
- Erannis ankeraria* (STAUDINGER, 1861): 1 ♂ was observed on a cherry tree (*Cerasus avium*) sucking nectar from the blossoms. When disturbed, it flew towards the ground and sought shelter among the fallen leaves.
- Aleucis distinctata* (HERRICH-SCHÄFFER, 1839): 5 ♂♂.

Greece, Thessalia / Thessaly region, Olympos Mts., 5 km ENE of Karya, 822 m, N40°00,501' E22°28,111'
9.III.2013.

Deciduous forest on the sides of a deep, wide valley, dominated by several species of *Quercus*, with some *Platanus orientalis* and *Castanea sativa*, and with small patches of evergreen Mediterranean scrub (*macchia*) (pl. 12, fig. 2). Schistic bedrock with limestone.

- Alsophila aescularia* ([DENIS & SCHIFFERMÜLLER], 1775): At least 5 ♂♂, one of which was collected. See the Discussion for remarks.
- Agriopis marginaria* (FABRICIUS, 1776): 2 ♂♂, one of them was observed (but not collected) at night while resting on a shrub. New for the fauna of Greece.
- Apocheima hispidaria* ([DENIS & SCHIFFERMÜLLER], 1775): 2 ♂♂.
- Apocheima pilosaria* ([DENIS & SCHIFFERMÜLLER], 1775): 4 ♂♂.

Greece, Steria Ellada / Central Greece region, Parnassos Mts., 3 km NW of Eleonas, 690m, N38°33,601' E22°23,340'. 10.III.2013. *Macchia*-scrub on reddish, leached soil (*terra rossa*), with bare limestone rocks (pl. 12, fig.3).

- Alsophila aescularia* ([DENIS & SCHIFFERMÜLLER], 1775): 5 ♂♂. See the Discussion for remarks.
- Cyclophora puppillaria* (HÜBNER, 1799): 1 ♂ and 2 ♀♀.
- Coenotephria ablutaria* (BOISDUVAL, 1840): 3 ♂♂ and 22 ♀♀.
- Eupithecia quercetica* PROUT, 1938: 1 ♂ and 5 ♀♀.
- Dasycorsa modesta* (STAUDINGER, 1879): 5 ♂♂.
- Apocheima hispidaria* ([DENIS & SCHIFFERMÜLLER], 1775): 3 ♂♂.
- Chemerina caliginearia* (RAMBUR, 1833): More than 100 ♂♂ observed, 57 of them collected. 1 ♀ was also attracted to a light trap.
- Agriopis marginaria* (FABRICIUS, 1776): 2 ♂♂. New for the fauna of Greece.
- Agriopis bajaran* ([DENIS & SCHIFFERMÜLLER], 1775): 2 ♂♂.
- Erannis ankeraria* (STAUDINGER, 1861): 15 ♂♂. The majority of the specimens were more-or-less worn; a handful of them were intact. Therefore we think that the observation was made in the second half of the

flight period of the species. A released moth flew towards the ground and landed on a rock (pl. 12, fig. 4) instead of flying into the shrubs. New for the fauna of Greece.

Menophra berenicidaria (TURATI, 1924): 1 ♂.

Charissa variegata (DUPONCHEL, 1830): 11 ♂♂ and 2 ♀♀.

Greece, Kentriki Makedonia / Central Macedonia region, Pieria Mts., 1 km SW of Skotina, 703 m, N40°12,071' E22°13,660'. 11.III.2013. Narrow and deep valley, with *Platanus orientalis* forest close to the stream, and deciduous oak woodland with open areas on the upper valley side (pl. 12, fig. 5). The bedrock is mica-schist.

Alsophila aescularia ([DENIS & SCHIFFERMÜLLER], 1775): At least 5 ♂♂ observed, two of which were collected. See the Discussion for remarks.

Chloroclysta siterata (HUFNAGEL, 1767): 2 ♀♀.

Apocheima hispidaria ([DENIS & SCHIFFERMÜLLER], 1775): 1 ♂.

Apocheima pilosaria ([DENIS & SCHIFFERMÜLLER], 1775): 5 ♂♂.

Biston strataria (HUFNAGEL, 1767): 2 ♂♂.

Agriopsis leucophaearia ([DENIS & SCHIFFERMÜLLER], 1775): 2 ♂♂ in oak woodland. New for the fauna of Greece.

Greece, Thraki / Thrace region, Lesitse Mts., 4 km ESE of Kirki, 144 m, N40°57,737' E25°50,310'. 12.III.2013. A broad, shallow river valley with various habitats. Remains of plane (*Platanus orientalis*) forest close to the river. On the slopes, patches of deciduous xerothermic oak woodland scattered among arable land. Open meadows are also present among the forest patches. A few steep hillsides with bare rocks and some small fragments of *macchia* scrub can also be found (pl. 12, fig. 6). The bedrock is limestone.

Alsophila aescularia ([DENIS & SCHIFFERMÜLLER], 1775): Ca. 10 ♂♂ observed but not collected. See the Discussion for remarks.

Orthonama obstipata (FABRICIUS, 1794): 1 ♂.

Coenotephria ablutaria (BOISDUVAL, 1840): 1 ♀.

Dasycorsa modesta (STAUDINGER, 1879): 2 ♂♂, one of them on sugar bait.

Apocheima hispidaria ([DENIS & SCHIFFERMÜLLER], 1775): 3 ♂♂.

Apocheima pilosaria (DENIS & SCHIFFERMÜLLER, 1775): 1 ♂.

Lycia hirtaria (CLERCK, 1759): Ca. 10 ♂♂ observed and 2 collected.

Biston achyra WEHRLI, 1936: 3 ♂♂ in patches of oak woodland. New for the fauna of Greece.

Chemerina caliginearia (RAMBUR, 1833): 17 ♂♂.

Agriopsis marginaria (FABRICIUS, 1776): 2 ♂♂. New for the fauna of Greece.

Agriopsis leucophaearia ([DENIS & SCHIFFERMÜLLER], 1775): 2 ♂♂. The specimens were somewhat worn. New for the fauna of Greece.

Erannis ankeraria (STAUDINGER, 1861): 1 worn ♂. New for the fauna of Greece.

Discussion

According to KOSTJUK (2001), the populations of *Alsophila aescularia* are very isolated in Greece. However, in our experiences we found the species in all localities, at least five ♂♂ at each site. It seems likely that it is present in the majority of the forested areas in Greece.

Specimens of *Biston achyra* came to the light traps operating in patches of deciduous oak woodland. The occurrence at locality near Kirki is the westernmost population in the distributional area of the species known to date. We think that the distribution of this taxon is poorly known, and that searching for it in adjacent territories of Greece, European Turkey and perhaps South-eastern Bulgaria could be successful.

All *Agriopsis* specimens were caught by the light traps, except for one resting ♂ *A. marginaria* which we saw after dusk. This species seems to be widespread in Greece, and we found it at each collecting site except the one near Skotina. *Agriopsis leucophaearia*, in contrast, was found only at the two northern Greek collecting sites, in deciduous oak woodland, and was not seen south of the Pieria Mts.

Some earlier data of *Agriopsis marginaria* have not been published until now:

Greece, Florina, Kristalopigi, 1000m, 17.iv.1987, leg. & coll. P. SKOU, 2 specimens and

Greece, Ioanina, Asfaka, 500m, 20.iv.1987, leg. & coll. P. SKOU (SKOU, *pers. comm.*) 1 specimen.

New for the fauna of Greece. These localities are situated in the Pindos Mountains, in the north-western part of the country.

Erannis ankeraria specimens were collected only by the light traps; the illuminated sheet as well as the active searching were ineffectual. However, searching has been successful for several years in the habitats of the Northern Hungarian Range (T. KOROMPAL, *pers. comm.*). At the Kresna Gorge, near village of Stara Kresna,

one specimen was observed feeding on the blossoms of a cherry tree: similar nectar-sucking behaviour was reported by RONKAY (1997). This observation, as well as the catches at light, confirmed the existence of the species in Bulgaria (BESHKOV & ZLATKOV, 2011). However, *E. ankeraria* was collected in Greece for the first time, from two localities: near Eleonas (Central Greece region) and Kirki (Thrace region). The first of these sites is situated in the western foothills of Parnassos Mts., close to the Gulf of Corinth. Hitherto, this is the southernmost known population of the species in the Balkan Peninsula, also in Europe. The altitude of occurrence is unusually high there, nearly 700 m; the majority of the European collecting sites are between 200 m and 300 m. a.s.l. The vegetation is surprisingly different from that of other populations of the species: at the Eleonas collecting site, the slopes are covered by *macchia*-scrub, and the deciduous oaks are very rare or even absent. We suppose that, if still present, they cannot be primary host plants because of the apparently abundant moth population (15 ♂♂ observed); this role could be played by evergreen oaks such as *Quercus coccifera*, which dominate this plant community. It is an interesting question whether *E. ankeraria* is as widespread in Greece as the *macchia*-scrub vegetation. Location of the imago is problematic, due to:

1. the short flight-time in an unusually early period of the year;
2. the fact that ♂♂ come to light mainly after midnight, and
3. the particular population dynamics, comprising long latent periods and rare, short, local outbreaks (VARGA, 2010).

Searching for the easily distinguishable larvae would seem to be a more promising technique: in late spring, it can be beaten from the canopy of the host plant during the day (T. KOROMPAI, *pers. comm.*, observed in Hungary). The collecting-site near Kirki is a well-known collecting place of some rare or poorly known Noctuid moths, e.g. *Griposia pinkeri* KOBES, 1973. This location is more like the other habitats of *E. ankeraria* than the one at Eleonas. The altitude is relatively low, and the natural vegetation is dominated by xerothermic deciduous oak forests, with scattered open meadows, rocks and even fragments of *macchia*-scrub. Situated relatively close to the Greek-Turkish border, this population may have zoogeographic significance as it could be a link between the other populations of Balkan Peninsula and those of Asia Minor.

In general it can be stated that the habitat spectrum of *E. ankeraria* is broader than previously was thought. The species can be present in xerothermic deciduous oak woodland as well as evergreen *macchia*-scrub. The soil type can also be variable: leached, calcareous or volcanic soils (see BESHKOV & ZLATKOV, 2011 for the last) are all convenient; the bedrock comprises volcanic (dacite), plutonic (granite) as well as sedimentary (limestone, dolomite) rocks. As the range of potential habitats of the species is highly extended not only in Greece, but in most of the Mediterranean countries, a thorough investigation is required to recognise the exact distribution of *E. ankeraria*.

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References

- BESHKOV, S. & ZLATKOV, B. (2011): *Desertobia ankeraria* (STAUDINGER, 1861) (Lep.: Geometridae): A new genus and species for the Bulgarian fauna. The Entomologist's Record and Journal of Variation. **123**: 163-169.
- KOSTJUK, A. (1991): Beitrag zur Geometridenfauna Palästinas: Die Spanner der Klapperich-Ausbeute aus Jordanien (Lepidoptera: Geometridae). Mitteilungen der Münchner Entomologischen Gesellschaft. **81**: 111-163.
- KOSTJUK, A. (2001): Introduction. Archiearinae, Orthostixinae, Desmobathrinae, Alsophilinae, Geometrinae. In: A. KOSTJUK (ed.): The Geometrid Moths of Europe 1: 282 pp.
- KOSTJUK, I. Yu. (1990): Geometridae. In: Efetov, K. A., Budashkin, Yu. I.: Babochki Kryma [The Lepidoptera of Crimea – in Russian]. Simferopol, 111 pp.
- LÁSZLÓ, M. Gy. & RONKAY, L. (2004): Anker-araszoló (*Erannis ankeraria*). In: KvVM Természetvédelmi Hivatal: Fajmegőrzési tervek [Angoran Umber (*Erannis ankeraria*). In: Office for Nature Conservation of the Ministry of Environment: Projects for species conservation – in Hungarian]. Környezetvédelmi és Vízügyi Minisztérium, Természetvédelmi Hivatal, 17 pp.
- RONKAY, L. (1997): Nemzeti biodiverzitás-monitorozó rendszer VII. Lepkék [National system of biodiversity monitoring; Part VII: Lepidoptera – in Hungarian]. Magyar Természettudományi Múzeum, Budapest, 71 pp.
- SINEV, S. Y. (ed.) (2008): Catalogue of the Lepidoptera of Russia. St. Petersburg- Moscow: KMK Press, 425 pp.
- VARGA, Z. (ed.) (2010): Magyarország nagylepkéi / The Macrolepidoptera of Hungary. Heterocera Press, Budapest, 253 pp.