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A Checklist for the Superfamilies Noctuoidea, Bombycoidea, Lasiocampoidea, Drepanoidea, Axioidea, Zygaenoidea and Cossoidea (Lepidoptera) of the Turkish province of Mugla in south-western Anatolia, Turkey

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Abstract

This article presents a checklist of lepidopteran species from the province of Mugla in south-western Turkey, comprisig the super-families Noctuoidea, Bombycoidea, Lasiocampoidea, Drepanoidea, Axioidea, Zygaenoidea and Cossoidea. The region has scarcely been investigated before.

The majority of species have been recorded at light in Turunc near Marmaris. The research involved numerous nights during all seasons. The data are supplemented by findings from a number of additional locations within the province. While most species are reported by the author, existing records from literature are also included. Comments are added where deemed useful to discuss distribution, flight time, taxonomy or behaviour.

In total 299 species are included. Two of them, *Polymixis culoti* (Schawerda, 1921) and *Conistra rubricans* Fibiger, 1997, are new for Turkey.

Key words: Lepidoptera, Noctuoidea, Bombycoidea, Turkey

Zusammenfassung

Der vorliegende Artikel dokumentiert die Lepidopteren-Arten der Provinz Mugla in der südwestlichen Türkei. Diese Region ist bisher diesbezüglich kaum untersucht worden. Berücksichtigt werden die Überfamilien Noctuoidea, Bombycoidea, Lasiocampoidea, Drepanoidea, Axioidea, Zygaenoidea und Cossoidea.

Der überwiegende Teil der Ergebnisse wurde mittels Lichtfang in Turunc bei Marmaris erzielt. Die Untersuchung umfasste eine größere Anzahl von Nächten, die über alle Jahreszeiten verteilt waren. Ergänzt werden die Angaben durch Fänge von weiteren Lokationen in der betreffenden Provinz. Während die meisten Meldungen auf den Autor zurückgehen, wurden zusätzlich auch Angaben aus der Literatur berücksichtigt. Die

Artenliste wird durch Kommentare zur Verbreitung, Flugzeit, Taxonomie und Angaben zum Verhalten einzelner Arten ergänzt.

Insgesamt konnten 299 Arten aufgenommen werden. Zwei Arten werden erstmalig für die Türkei gemeldet, nämlich *Polymixis culoti* (Schawerda, 1921) und *Conistra rubricans* Fibiger, 1997.

Introduction

The province of Mugla is located in south-western Anatolia and is well known for holiday centres such as Bodrum, Datca, Marmaris and Fethiye. Although the area is much visited by tourists, south-western Anatolia has largely been ignored in regard to nocturnal Turkish Lepidoptera. In addition the Greek Aegean islands have also not been well investigated.

For this reason a number of taxonomical and faunistic questions have not, as yet, been satisfactorily answered. There are, for example, numerous cases where the distribution of more eastern taxa westwards or western taxa extending eastwards involve this area. In part, they are replaced by a sister species somewhere in the area. The exact distributions in many instances were therefore unclear. Questions in regard to possible sympatry of taxa have also remained unanswered. Filling the knowledge gap related to the Aegean region would also help the likely future re-evaluation and revision of some species populations in eastern Europe, Anatolia, and of the Eastern Mediterranean Islands. There are also examples where the centre of distribution has been misinterpretated due to lack of data from the area, as in the case of the abundant *Polyploca korbi* Rebel, 1901 (see comments under this species).

As a first step in investigating the area, a list of 168 species of macro-moths from Mugla Province in south-western Turkey, predominantly from Turunc near Marmaris, has been published by Baron (2014) following extensive collection of data. This article covered Noctuoidea, Bombycoidea, Lasiocampoidea, Drepanoidea and Axioidea.

Fritsch et al (2014), published a similar list for the Greek Aegean island of Samos. This provided a further important cornerstone to our knowledge, also adding some further "surprises". In the latter work 334 species are mentioned for the island (excluding the Geometridae).

From 2014 until the end of May 2018 an additional 398 nights, yielding over 7900 specimens and covering the same location in Turunc have now been evaluated. Thus, in total, over 12400 moths were determined. Although the earlier investigation already included extensive evaluation over several years during all seasons and totalling 456 nights, many additional species can now be added to the list. It should be noted that these figures do not include activities in other the locations mentioned.

Unlike the first article, available records for Zygaenidae and Cossidae are included in the present paper.

The present species list includes taxonomic and faunistic annotations where considered necessary or deemed helpful. All data obtained on the flight periods of the captured species are included, which often adds to current knowledge.

For a number of interesting findings or for species that are difficult to determine images have been provided.

Locations and Observation Techniques

Mugla Province borders Antalya Province to the east and Aydin Province to the north. It also shares borders with the provinces of Burdur and Denizli. Mugla Province occupies the south-western corner of Anatolia. The Geek islands of Leros, Kalymnos, Kos, Nisyros, Tilos, Symi and Rhodos face the coast of this province.

The main location of this investigation is close to the sea at an elevation of 100 metres above Turunc in the district of Marmaris. For a detailed description refer to Baron (2014).

Three more locations in Mugla Province, which allowed for some light collection and accounted for a significant number of further species, are as follows:

1. South side of Girdev Lake, 1750 m, near Seki in the district of Seydikemer, Mugla Province, Turkey (Fig. 1-3). The newly created district of Seydikemer had been part of Fethiye district until 2012. The lake is located in the Ak Daglari Range, west of Fethiye and east of Elmali, Antalya Province. These mountains belong to the Western Taurus mountain range, with the highest peak of this part of the range being Uyluk Tepe, also called Ak Dag, at an altitude slightly in excess of 3000 m.

The size of the lake varies according to season and partly dries out in summer. It is surrounded by reed-beds and wet meadows and encircled by mountain slopes, with the highest peak here, Eren Dagi, reaching just under 2700 m. There is a high diversity of plant life. The slopes are steep in places but allow for grazing in most areas. Overgrazing, probably for many decades or perhaps even centuries has however shaped the landscape, with thorny plants, which are immune to grazing, very widespread. Many other plant species are found in single stands only, often on rocks or slopes, where goats and sheep cannot easily reach them. The plains and the lake are highly eutrophied. Despite these problems the area is unique, as wetlands, especially in southern Turkey, are rare and strongly threatened.

Juniperus excelsia is scattered on the slopes and is especially numerous around the northern extension of the lake. Aside from this tree, no arboreal vegetation exists on the slopes. On the plains, where a number of scattered farm houses exist, various fruit trees, such as apples (*Malus* sp.), pears (*Pyrus* sp.), walnut trees (*Juglans regia*), and *Salix* and *Populus* species are found, all likely to have been introduced by man. The area is regularly covered in snow in winter. In spring and summer it is very green, in contrast with nearby areas at low altitudes, which dry out already in May, but is very arid in the second half of summer and autumn. During this period all vegetation dries out, except for the wet plains. The first snow on the slopes can be expected in November or December. As a result the vegetation does not recover before winter resulting in a climatic pattern which is likely to seriously influence the biodiversity in this location.

2. Some kilometres to the south is "Subasi Yaylasi", a mountain pasture at 2000 to 2050 m altitude. A creek passes through this pasture. These meadows are eutrophied due to livestock dung. The rocky and very dry slopes support a sparse vegetation, which is further impacted by intense grazing pressure by flocks of goats and sheep.

3. Agla Köyü is a village at an altitude of 900 m above Köycegiz, Köycegiz District. The village is located in a valley where flowing water from the mountains allows for small scale agriculture. The highest peak above Agla Köyü is Sandras Dagi at an altitude of close to 2300 m, and is part of the Boncuk Dagi Range. In contrast to the village itself, the surrounding hills are very dry and are covered in pine trees without any undergrowth. In the valley the vegetation is variable, including many different kinds of trees, bushes and agricultural crops. Undisturbed biotopes do not exist here and it is therefore not possible to envision the area in the absence of anthropogenic influences. Two nights of light collection yielded a high number of species, showing that the area has high biodiversity. Initial results indicate the presence of many northern generalists, which cannot be found in the harsh environment at sea level.

The observation techniques employed have been detailed in Baron (2014). However, greater emphasis was placed on late night and early morning observations. Zygaenidae were caught by hand-net. Records obtained by methods other than by light attraction are annotated in the checklist.

Published records for Mugla Province

It has already been noted in Baron (2014) that the province of Mugla has generally been excluded from lepidopterological research in Turkey as far as nocturnal groups are concerned. All relevant references found in the literature are included in the check-list.

Hacker, Kuhna & Gross (1986) list three locations: Güllük / Milas, 20 m, Esen / Fethiye, now district of Seydikemer, 20 m as well as 25 km south of Dalaman with a total of only two species´ records specifically mentioned: One is *Eublemma ragusana* (Freyer, 1844), which has not yet been recorded by the author and the other is *Thysanoplusia daubei* (Boisduval, 1840).

Mol et al. (2003) published a list of Lepidoptera species for Kelebek Vadisi (Butterfly Valley) near Faralya Köyü / Fethiye, now province of Seydikemer, in the eastern part of Mugla Province at sea level. Twenty-two species belonging to the families treated in this paper are mentioned, of which three are additions to the species list: *Acherontia atropos* (Linnaeus, 1758), *Deilephila elpenor* (Linnaeus, 1758) and *Sphinx ligustri* Linnaeus, 1758. For the Zygaenidae *Zygaena fausta* (Linnaeus, 1767) is included here but it does not appear to occur in Turkey and surrounding countries (Naumann et al. 1999) and is therefore omitted. The remaining records are mentioned in the check-list below.

Baisch et al. (1998) provide 13 records for Mugla Province, of which four have not been recorded by the author. Their record of *Hadena tephroleuca asiatica* (F. Wagner, 1931) from Bagyaka near Akkaya / Mugla District (500 m, 27.V.1992, leg.: Malicky) has been omitted as the species is known to fly only at higher elevations (Hacker 1996c). In addition, the distribution map given by Hacker does not include the species for the western third of Turkey.

De Bros (1991) published results of his expedition to Antalya Province in the summer of 1964. To the west he included a location in the Ak Daglari Range called "Kuruova", an alpine meadow, between Akdag and "Yumrudag" at an altitude of 2300 m, sampled on 24.VII.1964. This location is directly above Subasi Yaylasi (see previous chapter), the

latter also explicitly referred to in his report and map. His findings in this location are included here, thereby adding four species to the checklist.

Discussion

Two species in the current list are new for Turkey: *Polymixis culoti* (Schawerda, 1921) and *Conistra rubricans* Fibiger, 1997.

In Baron (2014) three taxa were included which had not been reported for Europe before, although a number of Greek islands are extremely close to the mainland. Of these, *Polyploca korbi* Rebel, 1901 has in the meantime been recorded on Samos (Fritsch et al. 2014). The current checklist now includes eight species so far unknown for Europe, these being *Plecoptera inquinata* (Lederer, 1857) and *Polyphaenis propinqua* (Staudinger, 1898) (see Baron 2014) as well as *Parascotia robiginosa* (Staudinger, 1892), *Valeria kartalea* Kuhna & Schmitz, 1997, *Luperina rjabovi* (Klyuchko, 1967), *Polymixis chrysographa* (Wagner, 1931), *Conistra rubricans* Fibiger, 1997 and *Hadena pseudoclara* Hacker, 1996.

Four species, namely (*Dryobotodes monochroma* (Esper, [1790]), *Agrochola kindermannii* (Fischer v. Röslerstamm, 1838), *Conistra ligula* (Esper, 1791) and *Hadena compta armeriae* (Guenee, 1852)), were mistakenly included in the first checklist (Baron, 2014) and have to be erased. Details are discussed in the comments under the respective species.

The total number of macro-moth species belonging to the superfamilies covered and found at the predominant location in Turunc, is 225.

Twenty-eight species were only recorded once. The number of singletons, thus even exceeded the 25 in Baron (2014). This seems to clearly indicate that further additional species can be expected to be found in the area.

Sixty-three species can be added to the Mugla checklist based on the author's observations in other locations within the province, especially from localities at higher altitudes.

Records from existing literature account for only eleven further species. However, it is possible that obscure literature may have been overlooked.

A total of 299 macro-moth species are thus now known for Mugla Province, with Geometridae not included at this point. This is a significant number as, except for the list published in Baron (2014), hardly any records for Mugla Province have thus far appeared in the literature to date.

Possibly more species records are available in determined and undetermined material of museum or private collections but a systematic investigation in this regard has not been carried out.

The determination of the material was not always easy. In many cases specimens had to be dissected and genitalia analysed. For a number male specimens this also required the eversion of the vesica. In total 229 dissections of genitalia were carried out.

Another factor which increases the difficulty of any faunistic investigation in the area is the insufficient currrent knowledge of distribution patterns for many known taxa in the

Aegean region. In several cases extensive efforts were required in order to become familiar with "difficult" taxonomic groups, such as *Caradrina* Ochsenheimer, 1816 or *Euxoa* Hübner [1821], for example.

At the same time it is far from clear that the taxonomic grouping of populations into species and sub-species in Anatolia as currently understood, is clear-cut and stable. The author is of the view that additional material is likely to result in some re-evaluations within the difficult species groups.

The present study did not generally target evaluating specimens at sub-specific level, but in some cases appropriate comments have been made.

Explanations relevant to the Species List

The current checklist includes all records obtained by the author to the end of May 2018, with a few important findings added later. All species which had already been included in the first species list (Baron 2014) are shown in regular typeface, whereas newly added species are shown in boldface.

Those taxa included in the original analysis have only been commented on in cases where there are important new findings or new locations. Locations already mentioned in Baron (2014) are not repeated here. In such cases a comment such as "also recorded in ..." indicates that locations for this species have already been noted in the earlier article.

The majority of species' references for Mugla Province given in this publication are from the author and are not elaborated upon. For records from Mugla Province accessed from other sources citations are invariably provided.

For all species the flight period shown behind the name has been updated and is based on all available data. In those cases where the species has only been recorded from Turunc (or any other location near sea level) the altitude is not explicitly mentioned. If the species has also been caught at other altitudes the respective data are always shown for each altitude. Therefore "100m" always refers to Turunc or locations at a similar altitude.

Months are indicated by Latin numbers, with the letters "b", "m" and "e" indicating the beginning, middle or end of the particular month. So as to present only available data no extrapolations have been made in order to infer the likely flight period. Whenever a continuous flight period is mentioned it indicates that the species has actually been found during the whole period.

The reference source for the systematics of Noctuoidea (excluding Notodonidae) is the checklist of the quadrifid Noctuoidea of Europe compiled by Fibiger (in: Witt & Ronkay 2011). Zygaenidae are listed according to Naumann et al. (1999) and the other families are based on de Freina & Witt (1990) and de Freina & Witt (2001).

Hacker's extensive list of Turkish Noctuidae (Hacker 1990), including many taxonomic and faunistic comments, is still the most important reference for Noctuidae in Turkey despite now being nearly 30 years old, and despite the fact that the taxonomic status of many taxa has changed. Consequently it is referred to in many of the comments below.

List of Species

Superfamily C o s s o i d e a Leach [1815]

C o s s i d a e Leach [1815] (6 species)

***Parahypopta caestrum* (Hübner, [1808])** (mV-eV)
Only two specimens have been collected in Turunc. *P. caestrum* is also reported for Samos (Fritsch et al. 2014), Rhodos (Bender 1963) and has been found in neighbouring Antalya Province (de Freina 1994).

***Cossus cossus* (Linnaeus, 1758)** (1750m: mVI)
Girdev Lake / Seki.

***Zeuzera pyrina* (Linnaeus, 1761)** (eVI, mVI-mVII)
Turunc. Also known from Rhodos (Bender 1963), Samos (Fritsch et al. 2014) and Alanya / Antalya Province (de Freina 1994)

***Paropta paradoxum* (Herrich-Schäffer, [1851])** (mVI-mVII, bVIII-mIX) (fig. 4)
The species in Turunc has a long flight period during the summer months. De Freina & Witt (1990) only mention bIV-bVII.

P. paradoxum has been described from Izmir and is known from Rhodos (de Freina & Witt 1990), Karpathos (Yakovlev 2011), and with one specimen from Samos (Fritsch et al. 2014). The distribution is extending to northern Africa, Near East and the Arabian Peninsula (Hacker 2016).

The female is significantly larger than the male and is looking rather differently.

***Dyspessa emilia* (Staudinger, 1878)** (2000-2050m: mVI) (fig. 5)
Two specimens of a *Dyspessa* species have been captured on Subasi Yaylasi above Gömbe / Kas on the border of Antalya and Mugla Province in 2016 and one further specimen in the same location in 2017. There is a variation in appearance and wingspan (20 mm, 25 mm, 26 mm). After careful comparison with illustrations in Yakovlev & Witt (2007) they have been identified as *D. emilia*.

Against *D. aphrodite* Yakovlev & Witt, 2007, described from southern Greece, the current specimens have been verified by comparing the male antennae of both species as described in Yakovlev & Witt (2007). This species, however, is very close to *Dyspessa emilia* Yakovlev & Witt (2007) and maybe replaces the latter species in Europe as no European distribution is known for *D. emilia* after *D. aphrodite* has been split off.

Also the original description of Staudinger (1879: page 347-348) has been checked for the determination and matches the specimens well. The only exception is the statement of Staudinger concerning "Eintönig helle Beine", i.e. the uniformly light coloured legs as the legs of the present specimens are white and brown ringed, which is mentioned as a characteristic of *D. salicicola* (Eversmann, 1848) according to the original description of this species (Eversmann 1848).

D. salicicola is distributed from southern Europe through Asia Minor further to the east (de Freina & Witt 1990). In Turkey it inhabits the northern part of Western Anatolia according to the distribution map in the same source, whereas the distribution map of *D. emilia* shows a distribution only for the southern part of Western Anatolia.

Another species reported from a near location is *D. artemis* Yakovlev, 2008, which has been reported from Kohu Dagi south of Elmali, 1300 m in Antalya Province on 12.V.1989 (Yakovlev 2008). Based on the same source, it looks rather different.

De Bros (1991) has reported *S. pallidata* Staudinger, 1892 from Kuruova (2300 m) above Subasi Yaylasi / Gömbe / Kas on Mugla / Antalya province border. This taxa has been synonymised with *D. ulula* (see de Freina & Witt 1990) being a lighter coloured form of this species (pictured for instance in Yakovlev 2005) but nowadays again considered as a valid species. It is not unlikely that this record de facto refers to *E. emilia* which flies very close by on Subasi Yaylasi.

In general *Dyspessa* specimens are rather variable and male genitalia are close to each other. It appears from the study of literature that the relationship between known taxa and populations is not fully resolved. This view is supported by new descriptions in recent times. Yakovlev (2005) described two new species from existing *D. salicicola* material, one of them from northern Turkey, Istanbul Province and another five new species from Turkey in 2008 (Yakovlev 2008).

***Dyspessa ululа* (Borkhausen, 1790)** (mIII-mV)

The species is rather abundant in Turunc. Also known from Rhodos (Bender 1963) Samos (Fritsch et al. 2014). In spring 2018 black-coloured rather than green-coloured specimens were recorded at light in Turunc.

Zygaenoidea Latreille, 1809

Zygaenidae Latreille, 1809 (7 species)

***Zygaena punctum* Ochsenheimer, 1808** (550m: bV, bVI. 1540m: eVI)

This widespread species has been found locally abundant above Turunc at 550m altitudon a forest clearing where also its host plant *Eryngium* (Naumann et al. 1991) is growing. A further location is Marmaris / above Bayirköy, 350m.

Flight time (bV) is rather early compared to the eV-mVIII shown in de Freina & Witt (2001). At the beginning of June only very worn specimens can still be found.

Also recorded from below Dirimli Pass, 3km SE Altinyayla / Burdur, 1540m, a location very close to Mugla province border, on 21.VI.2017.

***Zygaena viciae* ([Denis & Schiffermüller], 1775)** (1500m/1700m: eVI)

Found at Tuzla Beli Pass, 1500m, 22.VI.2017 (border of Mugla and Denizli Province) as well as 4km NW Yesilbayrak/Seki /Mugla 1700m, 20.VI.2017 near border of Mugla / Antalya Province.

***Zygaena filipendulae* (Linnaeus, 1758)** (1500m/1750m: mVI)

Locations recorded are Girdev Lake / Seki, 1750m, gravel road Seki to Girdev Lake, 1500m, 3km, south east of Altinyayla / Burdur below Dirimli Pass (1540m) near Burdur / Mugla province border and Tuzla Beli Pass / Fethiye (1500m) on the Mugla / Denizli border.

***Jordanita budensis* (Speyer & Speyer, 1858)** (1650m: eIV)

Found close to the gravel road from Seki to Girdev Lake, 1650m, on 30.IV.2016. The species flies very early in the year, according to Naumann et al. (1991) about one month earlier than similar species. For certain determination the genitalia need to be checked and the determination has been confirmed in comparison with the illustration in Naumann et al. (1991).

***Jordanita anatolica* (Naufock, 1929)** (40m: aV)

Western end of Turunc, 40m, several specimens flying on a very small grass plot. The determination was confirmed by checking the male genitalia in comparison to Naumann et al. (1991). A further specimen could be found above Turunc / Road crossing Icmeler, Dereözü, Turunc, 350m.

***Adscita obscura* (Zeller, 1847)** (120m: mIV)

A female specimen has been detected sitting on a flower on a slope between Hisarönu and Orhaniye (120m) / Marmaris.

The control of the genitalia is required for certain determination (de Freina & Witt 2001) which has been carried out in comparison with the same source. From neighbouring Antalya Province a male with the following data can be reported, the determination also confirmed by the genitalia: Gedelme Yaylasi / Ovacik / Kemer, 700m, 4.V.2002.

The species has been described from Rhodos (de Freina & Witt 2001).

***Adscita statices* (Linnaeus, 1758)** (1500m: mVI)

Captured at Tuzla Beli pass, 1500m, Fethiye / Border of Denizli and Mugla Province as ssp. *drenowski* Alberti, 1939. The determination was confirmed by checking the male genitalia according to Naumann et al. (1991).

L i m a c o d i d a e Duponchel, 1845 (1 species)

***Hoyosia cretica* (Rebel, 1906)** (mV)

Two specimens only, on the same day for Turunc (14.V.2015). Within the region the species is also known from Canakkale and Antalya Province (de Freina 1994) as well as Samos (Fritsch et al. 2014) and Rhodos (de Freina & Witt 1990).

Superfamily L a s i o c a m p o i d e a Harris, 1841

L a s i o c a m p i d a e Harris, 1841 (6 species)

***Malacosoma neustria* (Linnaeus, 1758)** (eV-bVI)

This species has only been seen twice in Turunc. The specimens were chocolate-brown without any traces of the usual pattern on the forewing, a form named as *f. unicolor* Tutt, 1913 (de Freina & Witt 1987). Also from Samos most specimens are reported to look like this (Fritsch et al. 2104). Another record by Mol et al. (2003) from Kelebek Vadisi / Faralya Köyü / Fethiye.

***Malacosoma castrensis* (Linnaeus, 1758)**

Caterpillars have been found on 1.V.2016 at Girdev Lake at 1900m on a thorny flat Fabaceae shrub. The species is known from Beydaglari, the neighbouring mountain range to the east in Antalya Province (Saklikent 1950-2100m, see de Freina 2012).

Trichiura verenae Witt, 1981 (eXI)

Eriogaster rimicola ([Denis & Schiffermüller], 1775) (eXI)

***Lasiocampa eversmanni* (Eversmann, 1843)**

Caterpillars have been found at Girdev Lake, 1900m on 1.V 2016, feeding on the same Fabaceae plants together with *M. castrensis*. In Europe local and rare (de Freina & Witt 1987).

***Phylodesma tremulifolia* (Hübner, [1810])** (900m: bIX)

Agla Köyü / Köycegiz, 900m. Also known from Antalya Province (de Freina 1999).

Superfamily B o m b y c o i d e a Latreille, 1802

B r a c h m a e i d a e Swinhoe, 1892 (1 species)

Lemonia balcanica (Herrich-Schäffer, 1847) (120m: eXI. 1750m: bX-mX)

In addition to Bodrum (Baron 2014) also several specimens at Girdev Lake.

S a t u r n i i d a e Boisduval, 1837 (2 species)

***Saturnia pyri* ([Denis & Schiffermüller], 1775)** (100m: eIII, mIV-eIV, 1750m: bV)

S. pyri has come to light regularly in 2016 in Turunc, while not being present during the other years. Also flying at Girdev Lake (1750m). It has been found on Rhodos (Bender 1963) and is also known from Antalya Province (Alanya, see de Freina 1983).

Perisomena caecigena (Kupido, 1825) (eX-mXI, bXII)

In addition to Bodrum (Baron 2014) three more locations: Gavuragili / Esen / Fethiye / Mugla, 100m, 6.XI.2015. Kapikiri / Bafa Lake / Milas / Mugla, 50m, (18.XI.2015) and just one single very worn specimen in Turunc on 8.XII.2017.

S p h i n g i d a e Latreille [1802] (15 species)

Agrius convolvuli (Linnaeus, 1758) (eVIII-bIX, eIX)
Also recorded by Mol et al. (2003) from Kelebek Vadisi / Faralya Köyü / Fethiye.

***Acherontia atropos* (Linnaeus, 1758)**
Recorded by Mol et al. (2003) from Kelebek Vadisi / Faralya Köyü / Fethiye.

***Sphinx ligustri* (Linnaeus, 1758)**
Recorded by Mol et al. (2003) from Kelebek Vadisi / Faralya Köyü / Fethiye.

***Sphinx pinastri* (Linnaeus, 1758)** (900m: bIX)
Agla Köyü / Köycegiz 900m. The species has been reported from the mountains in Antalya Province also (de Freina 2012).

Marumba quercus ([Denis & Schiffermüller], 1775) (mV-eVI, mVII, bVIII-bIX, mXII)

***Mimias tiliae* (Linnaeus, 1758)** (900m: bIX)
Agla Köyü / Köycegiz, 900m.

***Lathoe populi* (Linnaeus, 1758)** (1750m: mVI)
Girdev Lake, 1750m. Recorded also by Mol et al. (2003) from Kelebek Vadisi / Faralya Köyü / Fethiye.

Macroglossum stellatarum (Linnaeus, 1758) (mI, bII-mV, bVI, bVII, bVIII-eXII)

Daphnis nerii (Linnaeus, 1758) (mIV, mVII, eIX)
Also recorded by Mol et al. (2003) from Kelebek Vadisi / Faralya Köyü / Fethiye.

***Rethera komarovi* (Christoph, 1885)** (1750m-2050: mVI)
This species is not rare at Girdev Lake 1750m. Two specimens have been recorded at Subasi Yaylasi, 2050m, above Gömbe / Kas in the same mountain range, a location directly at the border of Mugla and Antalya Provinces. Both places are above 1500m, which is up to which the species flies in Europe according to de Freina & Witt (1987) and Rougeot (1983).

***Hyles euphorbiae* (Linnaeus, 1758)** (100m: eIII-bIV, mVIII, eX-bXI, 1750m: mVI. 2300m: eVII))
Eitschberger, Danner & Surholt (1998) describe *H. cretica* Eitschberger, Danner & Surholt, 1998 from Crete. Fritsch et al. (2014) report this taxon for Samos. Newer researches show that *H. cretica* is no valid species but could be a hybrid of *H. euphorbiae* with *H. tithymali* (Boisduval, 1834) (see for example Mende et al. 2016). In the present study no distinction has been made and results are summarised under *H. euphorbiae*.

In addition to Turunc the species has also been found at Girdev Lake, 1750m and records exists from Mol et al. (2003): Kelebek Vadisi, Faralya Köyü / Fethiye and from de Bros (1991): Kuruova (2300m) above Subasi Yaylasi / Gömbe / Kas on Mugla / Antalya province border.

Hyles livornica (Esper, 1780) (mIII-bVIII, mIX-mXI)
Also recorded by Mol et al. (2003) from Kelebek Vadisi / Faralya Köyü / Fethiye.

Hippotion celerio (Linnaeus, 1758) (bVII-mVII, mX, mXI)

***Deilephila elpenor* (Linnaeus, 1758)**
Recorded by Mol et al. (2003) from Kelebek Vadisi / Faralya Köyü / Fethiye.

***Deilephila porcellus* (Linnaeus, 1758)** (1750m: mVI)
The species has been rather abundant at Girdev Lake, 1750m in 2016 and 2017

Superfamily D r e p a n o i d e a Boisduval, 1828

D r e p a n i d a e Boisduval, 1828 (2 species)

T h y a t i r i n a e J.B. Smith, 1893

Asphalia ruficollis (Fabricius, 1787) (eII-bIV)
Besides Bodrum also found in Turunc, not rare in some years.

Polyploca korbi Rebel, 1901 (bIII-mIV, mV)
The species is very common during its flight time. Also locally abundant on Samos (Fritsch et al., 2014). The centre of distribution was assumed to be in eastern Anatolia (László et al 2007) but the current data suggest that the distribution hotspot may be rather in the Aegean´s.

C i m e l i i d a e Chrétien (1 species)

Axia nesiota Reisser, 1962 (bXI-bI)

Superfamily N o c t u o i d e a Latreille, 1809

N o t o d o n t i d a e Stephens, 1829 (4 species)

T h a u m e t o p o e i n a e Aurivillius, 1889

***Thaumetopoeia pityocampa* ([Dennis & Schiffermüller], 1775)** (bIX, eX, mXII-eXII)
Also *T. pityocampa* flies in Turunc. In some years a significant amount of caterpillar nests can be seen in the pine trees along the roads. Also Kelebek Vadisi / Faralya Köyü / Fethiye (Mol et al. 2003).

The taxon *T. wilkinsoni* Tams, 1924 was separated for the populations from Cyprus and this name later applied for all populations in Turkey but the status remains unclear (Salvato et al. 2002).

Thaumetopoeia solitaria (Freyer, 1838) (bIX-mXI)

P h a l a e r i n a e Butler, 1886

Peridea korbi (Rebel, 1918) (bIII-bIV)

H e t e r o c a m p i n a e Neumogen & Dyar, 1894

Harpyia milhauseri (Fabricius, 1775) (bIII, eIII-mIV, bV, eVI, bIX, mX)
Mostly in spring but also found during the second half of the year. De Freina & Witt (1987) mention a partial second generation in warm areas which seems to be the case here.

N o l i d a e Bruand, 1846 (7 species)

N o l i n a e Bruand, 1846

Meganola togatulalis (Hübner, [1796]) (100m: mV, bX. 900m: bIX)
Also Agla Köyü / Köycegiz.

***Nola harouni* (Wiltshire, 1951)** (100m: eIV, mX-eX. 900m: bIX)
A few times in Turunc and also in Agla Köyü / Köycegiz, 900m.

The species is described from Iraq and is known from southern Turkey, Greece including Rhodos and Near East (Fibiger & Karsholt 1998) as well as Bulgaria (Fauna Europaeae).

Nola cicatricalis (Treitschke, 1835) (bIII, eIII-mIV, mV)
Known from neighbouring Antalya Province (de Freina 1994).

***Nola chlamitulalis* (Hübner, [1813])** (100m: bVIII, eIX- bX. 900m: bIX)
Several records for Turunc and also in Agla Köyü / Köycegiz. A number of male specimens have been dissected to separate this species from the following one. Important criteria in this respect were the length of the aedeagus compared to its width as well as the spines at its tip (Fibiger et al. 2009). One male from Mugla Province / Fethiye is included under material analysed in Hacker et al. (2012) with the label "Ölüdeniz, Südtürkei, 8.6.1972", being in the ZSM in Munich.

Nola subchlamydula Staudinger, 1871 (eIII)
Confirmed by checking the male genitalia in comparision to Fibiger et al. (2009). The record of Baron (2014) from the beginning of October has to be erased.

C h l o e p h o r i n a e Stainton, 1859

Bena bicolorana (Fuessly, 1775) (eIX)
The flight time in Baron (2014) was mistakenly shown as eX.

E a r i a d i n a e Hampson, 1912

Earias insulana (Boisduval, 1833) (bV-eV, bX, eX-mXII)

E r e b i d a e Leach, [1815]

S c o l i o p t e r y g i n a e Herrich-Schäffer, [1852] (1 species)

***Scoliopteryx libatrix* (Linnaeus, 1758)** (1750m: mVI)
Girdev Lake / Seki, 1750m.

R i v u l i n a e Grote, 1895 (1 species)

Zebeeba falsalis (Herrich-Schäffer, 1839) (eV, bIX-mIX)
Additional records from Turunc.

H y p e n i n a e Herrich-Schäffer, [1851] (5 species)

***Zekelita antiqualis* (Hübner [1800 -1809])** (500 m: eV)
Found only once in Turunc on 19.V. 2018. Also recorded in Bagyaka near Akkaya / Mugla district, 500m, leg.: Malicky by Baisch et al. (1998).

Hypena obsitalis (Hübner, [1813]) (bII, eIV, mX-eX)

Hypena palpalis (Hübner, 1796) (bIII, bIV)

Hypena lividalis (Hübner, 1796) (eIV, mV, bXII)

***Hypena munitalis* Mann, 1861** (2050 m: mVI)
Above Girdev Lake, 2050m two specimens have been observed during daytime flying off, while disturbed. So far known more frequently from central, north and north-east Anatolia as well as Lebanon and Israel (Hacker 2001). Hacker (1990) lists the species for Mediterranean Turkey as reported only before 1925. Baisch et al. (1998) report findings for Palaz Dagi / Antalya and Mersin. The current record confirms the species for the Mediterranean area further to the west. Not included in Hacker (1989) for Greece, but Hacker (2001) then reports it for Europe as very rare on the Balkans including Greece. Now also known for Samos (Fritsch et al. 2014).

L y m a n t r i i n a e Hampson, [1893] (3 species)

***Leucoma salicis* (Linnaeus, 1758)**

Several poplar trees (*Populus* sp.) are planted at Girdev Lake, apparently feeding the caterpillars of this species. Imagines have been observed with a very slow flight during daylight with mimicrying flying fluff of poplar trees to an astonishing extent. The species is rather abundant. It may have introduced by men together with the trees. Known also from Antalya Province (de Freina 1999).

Lymantria dispar (Linnaeus, 1758) (bV - bVII)

Though present every year, abundance varies highly from year to year peaking in 2017 in Turunc. Already at the end of March numerous newly hatched caterpillars were flying with the wind on silk threads. The species is known for mass development in certain years.

An interesting defence is worth to be noted: Wasps early in the morning often successfully attack and capture moths resting at the house wall with some managing to fly off in time and escape. It was repeatedly observed that the male *L. dispar*, while resting, are successfully distracting wasps with its upstanding large antenna without seeing the need to move. As a consequence the wasps fly off, continuing to look for other prey.

The species was also found at Girdev Lake, 1750m, mVI. Also Kelebek Vadisi / Faralya Köyü / Fethiye (Mol et al. 2003).

***Euproctis chrysorrhoea* (Linnaeus, 1758)** (eVI)

In total 15 specimens recorded in Turunc, all of them only in 2016.

A r c t i i n a e Leach, [1815] (12 species)

Arctiini Leach [1815]

***Phragmatobia fuliginosa* (Linnaeus, 1758)** (100m: eVI.900m: bIX, 1750m: eIV, mVI

This species has only once been seen in Turunc. Also in Agla Köyü / Köycegiz, 900m and abundant at Girdev Lake, 1750m. Fritsch et al. (2014) report it to be widespread on Samos.

***Phragmatobia placida* (Frivaldsky, 1835)** (1750m: eIV-bV)

Known to prefer wet habitats (de Freina & Witt 1987), *P. placida* is flying at Girdev Lake, 1750m.

Arctia villica (Linnaeus, 1758) (100m: eIII-mV. 1750m: bV, mVI)

Also in recorded in Hisarönü / Marmaris, 20m, at Girdev Lake, 1750m and Kelebek Vadisi / Faralya Köyü / Fethiye (Mol et al. 2003). Mostly in the second half of the night.

***Chelis maculosa* (Gerning, 1870)** (1750m: bV)

Known for the southern part of Europe and extending until eastern Asia, the species prefers limestone (de Freina & Witt 1987). From literature it is known for Antalya / Beydagları / Saklikent, end of VII at 1950-2100m (de Freina 2012), determined here as *Chelis maculosa sultana* (Schwingenschuss, 1938). One specimen at Girdev Lake, 1750m.

Euplagia quadripunctaria (Poda, 1761) (mV, mVI-mVII, bVIII-mX. 900m: bIX)

Further locations: Kocabahce / Bozburun, 10m, Agla Köyü / Köycegiz 900m, and a record from Kelebek Vadisi / Faralya Köyü / Fethiye by Mol et al. (2003).

***Utetheisa pulchella* (Linnaeus, 1758** (eVIII, bIX, bXI-mXI, bXII)

Several records in Turunc.

Lithosiini Billberg, 1820

***Paidia cinerascens* Herrich-Schäffer, 1847** (bIX)

Distribution known as to comprise southern Greece, also Samos, in Europe as well as the Turkish Mediterranean coast and Israel (Witt & Ronkay 2011). Requires warm and wet habitats with gorges (de Freina & Witt 1987). Known to fly in Turkey from mVI-mIX (de Freina 2006). This small species has been found in Agla Köyü / Köycegiz.

Eilema muscula (Staudinger, 1899) (100m: mV-mVI, bX. 900m: bIX)
Also Agla Köyü / Köycegiz, bIX.

Eilema caniola (Hübner, 1808) (eIII-eV, mX-mXI, bVII)
Also Hisarönü / Marmaris bV.

Eilema costalis (Zeller, 1847) (100m: eVIII-mX, bXI. 900m: bIX)
Also Agla Köyü / Köycegiz confirmed by dissection of male and female specimens.

***Eilema complana* (Linnaeus, 1758)** (1750m: bX)
Girdev Lake. Southern distribution bordered by Mediterranean Sea (Ebert 1997a).

Syntomini Herrich-Schäffer [1846]

Dysauxes famula (Freyer, 1836) (100m: eIV, mV-eV, bIX, eIX-mX, 900m: bIX, 1750m: bX).
Also Agla Köyü / Köycegiz and Girdev Lake / Seki.

H e r m i n i i n a e Leach [1815] (4 species)

***Orectis massiliensis* (Milliere, [1864])** (mX-eX, mXI, bXII) (fig. 6-7)
There has been substancial confusion in literature as to the number of species of the genus in Europe and the synonymy relations of the taxa. Therefore older distribution data have to be analysed carefully. According to current knowledge there are two species, being *Orectis proboscidata* (Herrich-Schäffer, [1851]), the larger species and *Orectis massiliensis* (Milliere, [1864]), syn: *O. euprepiata* Dannehl, 1933 (see Zilli 1994), the smaller species.

Specimens are illustrated in Fibiger et al. (2010) where the smaller specimens correctly are named *O. massiliensis*. The text part of this publication, according to the wingspan data provided, wrongly shows *O. massiliensis* as the larger species. Correctly allocated, *O. proboscidata* accordingly measures 23-29 mm and *O. massiliensis* 18-22 mm.

O. massiliensis has a "North Mediterranean" distribution (Fibiger et al. 2010) and according to the distribution map it includes Crete and the Peleponnes in Greece.

The capture of a small series of specimens in Turunc confirms its presence in Turkey and Mugla Province. The wingspan of the obtained specimens is between 16 and 21 mm.

O. massiliensis is considered to be a rare species, inhabiting gallery woods (Fibiger et al. 2010), or "river and stream valleys" as Zilli (1994) describes it, which, however, in this form do not exist in Turunc. There are gorges close by, where flowing water dries out in summer. An increased humidity and perhaps even remains of surface water in very few places may be present during the whole year or at least for the better part of the year. Said to come to light rarely (Fibiger et al. 2010), but the current records have been achieved by these means.

Idia calvaria ([Denis & Schiffermüller], 1775) (eVI, mXI-eXI)

Nodaria nodosalis (Herrich-Schäffer, [1851]) (eIV-bV, bVI, eX, eXI)
Also Hisarönü / Marmaris, 5.V.2015.

Pechipogo plumigeralis (Hübner, [1825]) (mIV-mV, bVII-mVII, eVIII, bIX, bX)
Also Dalyan / Köycegiz, 0m, 15.V.1992 (Baisch et al. 1998).

H y p e n o d i n a e Forbes, 1954 (2 species)

***Hypenodes anatolica* Schwingenschuss, 1938** (eVIII)
Illustrated in Fibiger et al. (2010) with the data: Gelibolu, 15km N Marmaris / Mugla, 23.VIII.2002", leg. W. Mey.

***Micronoctua karsholti* Fibiger, 1997** (bV-bVIII, eVIII-bIX, bX-eX)(fig. 8)
This species has only been detected in Turunc after checking Micro-Lepidoptera under the microscope as it is unexpectedly small, with a wingspan of about 7mm. Being familiar with

the species it is not difficult to identify it in vivo. The species is not rare in Turunc and it has a rather long flight time (see above).

M. karsholti is described from Antalya Province and known from other locations of the Turkish Mediterranean / Aegean coast as well as Cyprus and the Greek islands of Samos, Kos, Rhodos and Crete. In Mugla Province Cetibeli Gec and Degirmenyani are also mentioned as well as "Torunc", which appears to be misspelled and corresponds to Turunc. The altitude mentioned is 650 to 750m which would relate to the highest peak(s) above Turunc. (all see Fibiger 1997b). Schacht (2017) shows one specimen from Marmaris, Yalanci Bogaz from 19.IX.2003.

The systematic position of Micronoctuidae has been determined by Zahiri et al.(2011).

T o x o c a m p i n a e Guenee, 1852 (6 species)

Lygephila craccae ([Denis & Schiffermüller], 1775) (eIV, eVI-mVII, bVIII-eIX, mX, eXI)

Also Agla Köyü / Köycegiz 900m. Baisch et al. (1998) report the species also from Cetibeli Pass 70m / Cetibeli / Marmaris (leg.: Malicky).

Tathorhynchus exsiccata (Lederer, 1855) (mII, eIII, eIV, mX, bXII-bI)

Autophila limbata (Staudinger, 1871) (mIII-mIV)

(*Autophila asiatica* (Staudinger, 1888))

This rare species has been found by the author on the island of Rhodos (Lindos 10.V. 2010). The determination was ensured by dissection of the female specimen and comparison with Goater et al. (2003). The species is sporadically known from Bulgaria, Macedonia, Greece and distributed further through Asia Minor to the east (Hacker 1989a) and also on Samos (Fritsch et al. 2014). After being confirmed for Rhodos it can be expected for adjacent areas of the Turkish coast also.

Autophila einsleri Amsel, 1935 (eIII, eV) (fig. 9)

Synonym: *A. luxuriosa* Schwingenschuss, 1939; for discussion see Hacker (2001) and Ronkay et al (2014).

This species is discussed in Boursin (1940) which is a key source for this difficult genus in Asia Minor and adjacent areas.

Also this species is considered to be rare. It is known from Turkey eastwards to the Levante and Turkestan and has also been found on Cyprus (Hacker 2001). No records for known for Greece.

Confirmed for Turunc by two female specimens only. One specimen has been dissected and the genitalia compared with Ronkay et al. (2014).

Autophila anaphanes Boursin, 1940 (eII-eIV, mV-eV)

Apopestes spectrum (Esper, [1787]) (bIII)

B o l e t o b i i n a e Grote, 1895 (16 species)

***Parascotia detersa* (Staudinger, 1892)** (eIX) (fig. 10)

Only a singleton specimen at light in Turunc on 27.IX.2016. Interesting is the date as this species is considered as univoltine and known to fly from V - VII (Fibiger et al. 2010). Hybernation of the species during the summer is one possibly for the appearance at the end of the summer. The larva is"expected to feed on fungi" (Fibiger et al. 2010) in line with other species of the genus. Thus it would be depending on an environment which, in the area under investigation is only available from XI to III.

The known distribution comprises the "south easternmost" Peleponnes and Crete in Greece, Cyprus (Fibiger et al. 2010), in Turkey the Mediterranean coastal strip starting from Canakkale in the European part of Turkey (Hacker 2001), inner Anatolia as well as the south-east (Hacker 1990) and further east to Iran (Fibiger et al. 2010). According to the same source it is the largest

species in the group with 25-31 mm. The specimen captured in Turunc, however, only measures 23 mm.

***Parascotia robiginosa* (Staudinger, 1892)** (bVII) (fig. 11)

Again, only one specimen, a female, has been found in Turunc. It was attracted by actinic light, which was rarely used. It is not unlikely that the species avoids strong light.

The determination has been verified with the text and illustration in Staudinger (1892). The locations of the type specimens are Amasya, "Hadjin" (in the location of current Naimbeyli, 50 km NW of Kahramanmaras) and "Marasch" (Kahramanmaras). The wingspan of Staudinger´s specimens is between 19 to 22mm, whereas the capture from Turunc measures 26mm and thus is is substantially larger.

In the original description flight data from mid VII to end VII are provided, while the present record is from slightly earlier (8.VII. 2017). Hacker (1990) lists this taxon for Mediterranean Turkey, Anatolia and Hakkari area. Lepiforum.de includes a record (E. Friedrich) from the district of Alanya, 750m in Antalya Province. Also found on Cyprus (Hacker & Lödl, 1988).

In the discussion of the genus *Parascotia* Hübner, [1815] Fibiger et al. (2010) refer to *P. robiginosa* as a synonym of *P. fuliginaria* (Linnaeus, 1761) without mentioning any further details or reference source. Under the headline of *P. fuliginaria*, however, *P. robiginosa* is not listed within the synonyms of the species (Fibiger et al. 2010). It is also not included in the list of "Taxa, previously regarded as a valid species" (Fibiger et al. 2010). Therefore the quality of this statement could not be evaluated.

The flight period of both taxa does not match. *P. fuliginaria*, in the north and middle of Europe, already flies from late V to VII (Fibiger et al. 2010) while *P. robiginosa* much more to the south, in Anatolia and even locations close to the Mediterranean´s is recorded from beginning to end of VII. Fibiger et al. (2010) also confirm that *P. fuliginaria* inhabits higher elevation in southern Europe. Together with the new record in Turunc, the known distribution of *P. robiginosa* is between 100m to 1400m altitude (Baisch et al. 1998).

The appearance of both taxa differs strongly and Hacker & Derra (1984) illustrated the genitalia of the taxa which are clearly and to a high extent different from each other. Based on these illustrations the taxa cannot be synonyms and *P. robiginosa* needs to be treated as a separate species. The genitalia also show strong differences to *P. detersa* as well as to the other European species, *P. nisseni* Turati, 1905, which inhabits a disjunct area in northern Africa and western Europe, eastwards to Italy (Fauna Europaeae).

***Odice suava* (Hübner [1813])** (2300m: eVII)

Kuruova (2300m) above Subasi Yaylasi / Gömbe / Kas on Mugla / Antalya province border, determined by Claude Dufay as reported by de Bros (1991).

***Eublemma candidana* (Fabricius, 1794)** (mVI) (fig 12-13)

One record for Turunc on 29.VI.2015.

While widely distributed in south-western Europe, in south-eastern Europe the species inhabits locations closer to the Mediterranean Sea. Further to the east it is extending until Central Asia (Fibiger et al. 2010). It is known from Mediterranean Turkey (Hacker, 1990) but not very widespread in the country (Hacker 1989a). Also reported from Samos, eV and mVI (Fritsch et al. 2014).

The species belongs to the *E. viridula* (Guenee, 1841)-group with seven species in Europe (Fibiger et al. 2010). In order to confirm the determination and separate it from its close relatives the captured male specimen has been dissected. Especially *E. viridula* could potentially inhabit the area and Hacker (1990) lists the species for Mediterranean Turkey (recorded only before 1925) but questions whether *E. viridula* is really distributed here. Fibiger et al. (2010) state that "Outside Europe, the species is unknown."

Accordingly, five of the possible species could be clearly excluded. It appears, however, that *E. candidana* shares very similar male genitalia with *E. zillii* Fibiger, Ronkay & Yela, 2010, being only recently described from Crete (Fibiger et al. 2010). When comparing, surprisingly,

in many characters which supposedly distinguish *E. candidana* and *E. zillii* the present material rather resembles the genitalia shown for *E. zillii* in this source. This is for example true for the length of the uncus, the shape of the valva, shape and length of the ampulla as well as the shape of the aedeagus, although the sclerotisation close to the vesica is like in *E. candidana* as pictured in the mentined source.

Because *E. zillii*, as pictured in Fibiger et al. (2010), has a distinct wing pattern compared to the other species in the group there is no doubt that the present specimen needs to be allocated to *E. candidana*. A general evaluation of the situation based on one specimen is not possible. Investigation of additional material from the Eastern Mediterranean´s and Crete might be useful to clarify the relation of *E. candidana* and *E. zillii*.

Eublemma parva (Hübner [1808]) (bIII, mV-eV, mVI-mVII, eVIII-eIX, eX, eXI)

Eublemma cochylioides (Guenée, 1852) (bVI-mVII, bX, bXI-mXI)

Eublemma ostrina (Hübner, [1808]) (mIII-bIV, bV-eV, bX)

***Eublemma purpurina* ([Denis & Schiffermüller], 1775)** (mVI)

Girdev Lake, 1750m.

***Eublemma amoena* (Hübner, [1803])** (mVI)

Girdev Lake, 1750 m.

***Eublemma parallela* (Freyer, 1842)** (2000m: mVI) (fig. 14)

While according to Hacker (1989a) there was no confirmed report for Europe, the species has afterwards said to be reported for Serbia as mentioned in Beshkov (2000). Fibiger et al. (2010), however, confirm distribution in Europe for "only south Ural and adjacent area" and from there eastward into Iran.

Hacker (1990) only lists the species for Anatolia and Eastern areas of Turkey. Concrete locations found in literature are much further to the east (Tokat, Erzincan, Erzurum, see Hacker 1996b), Yozgat (Hacker 1992b). Lepiforum (2017) shows a specimen from Ürgüp/Nevsehir, Fibiger et al. (2010) illustrate a specimen from Kayseri. All specimens in above sources have been found at altitudes between 1500 and 2500m.

The specimen from Subasi Yaylasi on the border of Mugla and Antalya Province at an altitude of 2000m appears to be the first report for the Mediterranean region of Turkey. Depending on the validity of the record from Serbia the present record might represent the most westerly known population.

The moth has been attracted by light despite strong moonlight.

***Eublemma polygramma* (Duponchel, 1842)** (2300m: eVII)

Kuruova (2300m) above Subasi Yaylasi / Gömbe / Kas on Mugla / Antalya province border, determined by Claude Dufay (de Bros 1991). This species has until recently not been separated from *E. pudorina*. (Fibiger et al. 2010, see also Hacker 1990, where *E. pudorina* is mentioned as "var." under *E. polygramma*). Both inhabit similar biotopes but *E. polygramma* is more widespread and the more southern species (Fibiger et al. 2010). Therefore it is likely that the record in the Ak Daglari range indeed refers to *E. polygramma*.

Eublemma scitula (Rambur, 1833) (eVI, mVIII, mX)

***Honeyania ragusana* (Freyer, 1845)** (20m: eV)

One record in Hacker, Kuhna & Gross (1986) in Esen / Seydikemer east of Fethiye.

Metachrostis dardouini (Boisduval, 1840) (eIII)

Metachrostis velox (Hübner, [1813]) (mIX-eX)

Metachrostis velocior (Staudinger, 1892) (bV-bVI, eVI, eVIII, bIX-bXI)

E r e b i n a e Leach [1815] (18 species)

Catephia alchymista ([Denis & Schiffermüller], 1775) (eIII-mVI, eVIII, mIX)

Pandesma robusta (Walker, [1858]) (eVIII, mIX, mX-eX, eXI)

Zethes insularis Rambur, 1833 (mIII-bIV, eIV-eV, eVI-mVII, mIX-mX)
Also Bagyaka near Akkaya / Mugla district, 500 m, 27.V.1992, leg.: Malicky according to Baisch et al. (1998).

Catocala nymphaea (Esper, [1787]) (bV-eVI, mVII)

Catocala eutychea (Treitschke, 1835) (eIV-eVI)

Catocala disjuncta (Geyer, [1828]) (mV, bVI-mVII)

Catocala separata (Freyer, 1848) (eV-mVII)

Catocala conversa (Esper, [1787]) (mVI-eVII)
Also Kelebek Vadisi / Faralya Köyü / Fethiye (Mol et al. 2003).

Catocala nymphagoga (Esper, [1787]) (eIV-mVII)
One stray specimen from eVIII was deleted from the fight time.

Catocala hymenaea ([Denis & Schiffermüller], 1775) (mV-eV, mVI)

Catocala coniuncta (Esper, [1787]) (100m: mVIII-eX, 900m: bIX)
Also Agla Köyü / Köycegiz, 900 m. The spelling of the name follows Fibiger et al. (2010).

Catocala elocata (Esper, [1787]) (100m: bX, mXII, 900m: bIX)
Also Agla Köyü / Köycegiz, 900 m and according to Mol et al. (2003) Kelebek Vadisi/Faralya Köyü/Fethiye.

Ophiusa tirhaca (Cramer, 1777) (100m: bIII-eV, mVI-eVI, mVII, mVIII-bIX, eIX-eXI, mXII. 900m: bIX)
Also Kocabahce / Bozburun / Mugla, 10m: eVIII, Agla Köyü / Köycegiz, 900m.

***Minucia lunaris* ([Denis & Schiffermüller], 1775)** (bIII-mIV)
Few captures in Turunc. An additional recording between Camli and Cetibeli / Marmaris. In south-eastern Anatolia the species is replaced by *M. bimaculata* Osthelder, 1933 (Hacker 1989a).

***Clythie syriaca* (Bugnion, 1837)** (eVII)
Over all the years only one specimen at light at July 27th, 2017.

Besides the Balkans, the species is known from all regions of Turkey (Hacker 1990), including Antalya and Izmir Provinces (Hacker 2001) and also Kos (Hacker 1989a) and Samos in Greece (Fritsch et al. 2014), further extending into the Levante (Hacker 2001).

Dysgonia torrida (Guenée, 1852) (mIV, mV-bVII, mVIII, bX-eX)
Several additional records have been confirmed by dissection of the male genitalia by selecting specimens which clearly exceed the size of normal *D. algira* specimens.

Dysgonia algira (Linnaeus, 1767) (100m: mIV-bVII, eVII, mVIII-eX. 900m: bIX))
Also Agla Köyü / Köycegiz, 900m and according to Mol et al. (2003), Kelebek Vadisi / Faralya Köyü / Fethiye.

Grammodes stolida (Fabricius, 1775) (mVI-eVI, mVIII-mX)

A n o b i n a e Holloway, 2005 (1 species)

Plecoptera inquinata (Lederer, 1857) (100m: bV, mVI, mVII, bX. 900m: bIX)
More or less continuous collection data from the beginning of May to the beginning of October in Turunc do not allow a clear conclusion in respect of the number of generations. The species has also been found at 900m altitude in Agla Köyü / Köycegiz.

For the allocation of *Plecoptera* to sub-family see Zahiri et al. (2011).

E u t e l i i d a e Grote, 1882 (1 species)

Eutelia adulatrix (Hübner, [1813]) (bIII, eIII-eV, mVII, bVIII, eIX, eX-mXI)

N o c t u i d a e Latreille, 1809

P l u s i i n a e Boisduval, [1828] (7 species)

Trichoplusia ni (Hübner, [1803]) (mII, bIII-mVII, mVIII, bIX, eIX-mXI, mXII-eXII)

Thysanoplusia daubei (Boisduval, 1840) (bXI, bXII)
Also found eV at 25km south of Dalaman, 20m (Hacker, Kuhna & Gross 1986).

Thysanoplusia circumscripta (Freyer, 1831) (mV, mIX-bX, eX-bXI, eXII)

Ctenoplusia accentifera (Lefebvre, 1827) (mIV-eIV, mV, bX, eX, mXI-eXI)

Chrysodeixis chalcites (Esper, [1789]) (100m: bI, bIII-mVII, bVIII-eXII, 900m: bIX, 1750m: mVI)
Also in Agla Köyü (900m) and at Girdev Lake (1750m)

Autographa gamma (Linnaeus, 1758) (mII-eVI, mVII, bVIII-eXII)

***Cornutiplusia circumflexa* (Linnaeus 1767)** (500m: eV)
A record from Bagyaka near Akkaya / Mugla district, 500m, leg.: Malicky (Baisch et al. 1998).

E u s t r o t i i n a e Grote, 1882 (2 species)

Pseudozarba bipartita (Herrich-Schäffer, 1850) (eVI, mVII, mVIII-bX, bXI)

Acontiola moldavicola (Herrich-Schäffer, 1851) (mIV, bVI, eVI)

A c o n t i i n a e Guenée, 1841 (4 species)

Stenoecia dos (Freyer, 1838) (bIV)

Acontia lucida (Hufnagel, 1766) (eIII-mIV, bV, eV-bVII, bIX, eIX-bX)
Also Hisarönü / Marmaris.

Aedia funesta (Esper, [1766] (mIV-eIV)
A further record from literature: Bagyaka near Akkaya / Mugla district, 500m, 27.V.1992, leg.: Malicky (Baisch et al. 1998).

Aedia leucomelas (Linnaeus, 1758) (bX-mX)

A c r o n i c t i n a e Heinemann, 1859 (6 species)

***Simyra dentinosa* Freyer, 1839** (1750m: eIV-bV)
On Girdev Lake / Seki at light as well as caterpillars on *Euphorbia* sp. mVI.

Records also exist for the Dodecanese island of Symi which is in close vicinity of Datca / Mugla in bIV (Hacker 1989a) as well as Samos (Fritsch et al. 2014).

***Acronicta psi* (Linnaeus, 1758)** (900m: bIX)
Agla Köyü / Köycegiz. The separation from *A. tridens* ([Denis & Schiffermüller], 1775) has been confirmed by dissection of one male specimen.

***Acronicta euphorbiae* ([Denis & Schiffermüller], 1775)** (1750m: eIV-bV, mVI)
Girdev Lake / Seki.

***Acronicta rumicis* (Linneaus, 1758)** (1750m: bV)
Girdev Lake / Seki.

***Acronicta aceris* (Linneaus, 1758)** (100m: mVIII. 500m: eV)
As *Acronicta aceris taurica* (Staudinger, 1901) reported for Bagyaka near Akkaya / Mugla district, 500 m, 27.V.1992, leg.: Malicky according to Baisch et al. (1998). Finally also confirmed for Turunc on 18.VIII.2018 towards the morning with one fresh specimen.

***Acronicta megacephala* ([Denis & Schiffermüller], 1775)** (1750m: mVI)
Girdev Lake / Seki.

M e t o p o n i n a e Herrich-Schäffer, [1851] (1 species)

***Tyta luctuosa* ([Denis & Schiffermüller], 1775)** (1650 m: eIV)
Above Seki / Seydikemer, 1650m, dirt road towards Girdev Lake, 30.IV. 2016, flying in daytime.

C u c u l l i i n a e Herrich-Schäffer, [1850] (5 species)

***Cucullia umbratica* (Linnaeus, 1758)** (1750m: mVI)
Girdev Lake / Seki.

Cucullia calendulae Treitschke, 1835 (bXI-bIII, eIII-mIV)
Further male specimens (in total six) from Turunc have been dissected and checked for *C. chamomillae* ([Denis & Schiffermüller], 1775), however, all were confirmed to be *C. calendulae*.

***Shargacucullia verbasci* (Linnaeus, 1758)** (100m: eII-bIII, eIII)
A further *Shargacucullia* taxon could be confirmed for Turunc. The species is also distributed above Girdev Lake / Seki. Caterpillars have been found mVI at 1800m on *Verbascus* sp..

Shargacucullia thapsiphaga Treitschke, 1826 (eIII, mIV)

Shargacucullia blattariae (Esper, [1790]) (bIII; eIII-mIV)

O n c o c n e m i d i n a e Forbes & Franclemont, 1954 (4 species)

***Calophasia platyptera* (Esper, [1788])** (bIV-mIV)
Only three specimens in Turunc. The similar species *C. barthae* F. Wagner, 1929 could be excluded.

Pamparama acuta (Freyer, 1837) (mIII-mIV)

Omphalophana anatolica (Lederer, 1857) (mIII-bV)

***Amephana dalmatica* (Rebel, 1919)** (bIV)

This rather locally distributed species, known from southern and western Balkans (Ronkay & Ronkay 1995) as well as southern and western areas of Turkey (Hacker 1990), could be confirmed for Turunc with three captures in 2017. It is not known from the Greek islands (see for instance Hacker 1989a).

A m p h i p y r i n a e Guenée, 1837 (5 species)

Amphipyra effusa (Boisduval, [1828]) (bI-eV, mX-mXI, bXII-eXII)

Also listed for Dalyan, 0m, 25.V.1992 and Cetibeli Pass, 70m, 26.V.1992, both leg.: Malicky (Baisch et al. 1998).

***Amphipyra pyramidea* (Linnaeus, 1758)** (900m: bIX)

Agla Köyü / Köycegiz 6.IX.2016. The male genitalia have been checked to separate it from *A. berbera* Rungs, 1949.

***Amphipyrina tragopoginis* (Clerck, 1759)** (1750m: mX)

Girdev Lake / Seki.

***Amphipyra stix* Herrich-Schäffer, 1850 (bIX)**

This rare species (Hacker 1989a) is distributed on the Balkan Peninsula, especially the south, Turkey, Armenia, Iran, Lebanon and Israel (Fibiger & Hacker 2007). In Greece also known from Samos (Fritsch et al. 2014). It has been found in Turunc just once on 9.IX.2017.

Amphipyra micans Lederer, 1857 (mV-eV, mVI-eVI, eV, eVI, mVII)

P s a p h i d i n a e Grote, 1896 (4 species)

Asteroscopus syriaca (Warren, 1910) (eI-eII)

***Valeria kartalea* Kuhna & Schmitz, 1997 (eII)** (fig. 15)

This distinct species was only being described in 1997 from a single male specimen. One male has been captured in Turunc on 27.II.2017.

No information about female specimens are given in Ronkay et al. (2011) and only male genitalia are illustrated here. It appears that female specimens have not been obtained to date; at least no documentation of the female has been traced in literature.

The type specimens are from much further to the east, namely two locations in Gaziantep Province, collected mid and end of March. Noctuidae.de pictures two specimens from Termessos National Park in Antalya Province from March, 13th.

Ronkay et al. (2011) have synonymised a population from the "higher ranges of the Golan Heights in Israel" also pictured in Bold (2017). It seems that *V. kartalea* is distributed in the Mediterranean influenced area along the south coast of Turkey continuing into the Levante and flies very early in the year.

***Allophyes asiatica* (Staudinger, 1891)** (mXII-eXII, mI) (fig. 16)

In total only four specimens have been observed. The identity of the species was confirmed by dissecting male specimens and comparing with the illustrations in Boursin (1953) and Ronkay et al. (2011) Further species in Asia Minor are *A. benedictina* (Staudinger, 1891) and *A. metaxys* Boursin 1953 which are allopatric except for some areas in south-eastern Anatolia, contrary to Ronkay et al. (2011) who erroneously state "south-western parts of Asia Minor". A further *Allophyes* species, *A. cretica* Pinker & Reisser, 1978 is apparently endemic to Crete.

A. oxyacanthae (Linnaeus, 1758) can be easily separated from the above mentioned species by the completely different structure of the male antenna (see Boursin 1953)

Xylocampa mustapha (Oberthür, 1910) (bI-mIV, mX, eXII)

H e l i o t h i n a e Boisduval, [1828] (3 species)

***Heliothis nubigera* Herrich-Schäffer, 1851** (eIII, bV-mV)
Found in Turunc only a few times.

Heliothis peltigera ([Denis & Schiffermüller], 1775) (100m: bIII-bVI, eVI-mVII, bVIII, bIX-bX, eX-mXII. 1750m: eIV. 2740m: eVII))
Also at Girdev Lake / Seki and reported by de Bros (1991) from Yumruk Dagi / north-east above Subasi Yaylasi / Gömbe, 2740m for eVII.

Helicoverpa armigera (Hübner, [1808]) (100m: eIII-eV, bVI-mVI, bVIII-eXII. 900m: bIX. 1750m: bX)
Also Agla Köyü / Köycegiz, Girdev Lake / Seki and according to Mol et al. (2003) Kelebek Vadisi / Faralya Köyü / Fethiye.

C o n d i c i n a e Poole, 1995 (1 species)

***Condica viscosa* (Freyer, [1831])** (eX)
Another singleton from Turunc captured on 21.X.2016. The species is known from the southernmost areas in Europe inclusive of Cyprus and Crete, northern Africa to the Arabian Peninsula (Fibiger & Hacker 2007) and in Turkey from the Mediterranean area and the south-east (Hacker 1990).

E r i o p i n a e Herrich-Schäffer [1851] (1 species)

Callopistria latreillei (Duponchel, 1827) (mIII-eV, eVI, mVII, mIX, mX-eXII)

B r y o p h i l i n a e Guenée, 1852 (6 species)

***Cryphia algae* (Fabricius, 1775)** (900m: bIX)
Although genitalia of around 20 specimens from Turunc were checked, *Cryphia algae* as the sister species of *C. ochsi* has not been detected here. It could, however, be confirmed for Mugla in Agla Köyü / Köycegiz. It flies sympatric with *C. ochsi* in this location. According to Hacker (1990) *C. algae* is less widely distributed in Anatolia than its sister species, but still known from all regions of Turkey.

Fritsch et al. (2014) report the species from the hills in Samos. Also the data in Hacker (1989a) support the view that in Southern Turkey and the Aegean's this species rather avoids the hottest locations on sea level whereas in other locations both species fly parallel.

Cryphia ochsi Boursin, 1940 (100m: eVI-mVII, bVIII-mX. 900m: bIX)
Also in Agla Köyü / Köycegiz.

Bryophila rectilinea (Warren, 1909) (mVIII-bIX, eIX)

Bryophila tephrocharis Boursin, 1953 (100m: mV-bVII, bVIII-bIX. 900m: bIX)
Also Agla Köyü / Köycegiz.

***Bryophila felina* (Eversmann, 1852)** (mVII) (fig. 17-18)
In summer 2018 a female specimen of the *Bryophila ereptricula* ([Denis & Schiffermüller], 1775)-complex has been captured.

The genitalia have been checked and compared with Fibiger et al. (2010). Although there are some differences to the picture in in this source, the ribs in the ductus bursae and its lengh,

the form of the appendix bursae and the bursa sac point to *B. felina* versus *B. ereptricula*.

B.ereptricula and *E. felina* have only been separated recently by Pekarsky (Fibiger et al. 2010) and cannot be distinguished by external features.

B. ereptricula is distributed in Europe and North Africa, but the eastern border of its range is unknown (Fibiger et al. 2010). The same source reports *B. felina* from Central and Eastern Europe, Caucasus, Sardinia in Italy, Lebanon as well as Hakkari in Turkey. Also for this species the borders of distribution are still unknown. The current record is the first for the Aegean region.

Nyctobrya amasina (Draudt, 1931) (100m: eVI, mVII-eVII, mVIII-eIX. 900m: bIX)
Also Agla Köyü / Seki confirmed by check of male genitalia.

X y l e n i n a e Guenée, 1837 (66 species)

Spodoptera exigua (Hübner, [1808]) (100m: mIII-eV, mVI-eVI, bVIII-mXII. 900m: bIX. 1750m: bV, mVI, mX)
Also Agla Köyü / Köycegiz, Kapikiri / Bafa Lake / Milas, 100m (mXI) and Girdev Lake / Seki.

Spodoptera cilium (Guenée, 1852) (100m: bIII, eIII-mXII)
Also from Kocabahce / Datca, 0m, eVIII and Gavuragili / Esen / Fethiye, bXI, 100m.

Spodoptera littoralis (Boisduval, 1833) (100m: mIII, bV, mVI-eVI, bIX-eXII. 900m: bIX)
Also Gavuragili / Esen / Fethiye, 100m (bXI) and Agla Köyü / Köycegiz.

***Caradrina kadenii* Freyer, 1836** (900m: bIX)
Agla Köyü / Köycegiz.

***Caradrina aspersa* Rambur, 1834** (900m: bIX)
Agla Köyü / Köycegiz, 3 specimens.

***Cararina syriaca* Staudinger, 1892** (mVIII) (fig. 19)
One fresh single female was caught on August 13th, 2018 in Turunc. The specimen was found in a hide inside the house. It can not be decided as to whether it was attracted to this place by light or had chosen this place for hibernation.

This species is known from the Levante and Eastern Turkey. The most western records are from Alanya / Antalya Province and Ankara Province. In addition it has been found on Rhodos / Greece (Hacker 2004). The current finding is the first record for western Turkey and confirms its presence in the Aegean region.

According to Hacker (2004) the wingspan of the species varies between 23-27 mm. The specimen from Marmaris, however, is surprisingly large and measures 33 mm which gives this moth a far larger appearance as usual for Caradrini.

While the species is known to fly from IX to X, the specimen from Turunc has been obtained already in the middle of August. In the southern part of its area of distribution the species seems to have an additional generation in spring.

***Caradrina suscianja* (von Mentzer, 1981)** (2000m: mVI) (fig. 20-21)
Three specimens belonging to the *Caradrina* (*Paradrina*) *selini*-species group have been collected at Subasi Yaylasi above Gömbe / Kas on the border of Mugla and Antalya Province at an altitude of 2000m on 18.VI.2016, which apparently belong to two different species.

One male specimen after comparing with the original description, with specimens in Zoologische Staatssammlung in Munich originating from Adana Province, which have been used by H. Hacker for the *Caradrini* revision, and also personal consultation with Hermann Hacker (9/2017) can be assigned to *C. suscianja cilicia* (Hacker, 1992). This taxon is described in Hacker (1992b). The appearance fits rather well. The genitalia are not fully, but more or less in line (e-mail H. Hacker 10/2017). The wingspan with 31mm is slightly larger than the 25-30 mm mentioned in the Caradrina revision (Hacker 2004) and the original description (Hacker 1992b).

C. suscianja cilicia has been captured in neighbouring Antalya Province east of Antalya and is "widespread but uncommon in Asia Minor" (Hacker 2004). De Bros (1991) reports a subspecies of *Caradrini selini* Boisduval, 1840, determined by Charles Boursin for end of VII from

Kuruova (2300m), directly above Subasi Yaylasi. This record should also refer to *C. suscianja cilicia* but the following taxon, although not looking like a typical *C. selini*, cannot be excluded. *C. selini* itself, according to today's knowledge, is not expected in the area in question (Hacker 2004).

The nominate subspecies of *C. suscianja* flies on the Balkans and is rather distinct in appearance compared to *C. suscianja cilicia*.

***Caradrina* spec.** (2000m: mVI) (fig. 21-22)

Two smaller Caradrini, one male and one female, were captured in the same location and the same night as the previously listed species. They represent a different taxon but according to the male genitalia, apparently also belong to the *Caradrina selini*-species group. These specimens could, however, at this point not clearly be identified down to species level. The colour of the forewings is rather yellowish and the wingspan is, with 27 mm for both of them, smaller than the preceeding species. The male genitalia are distinctively different from the *C. suscianja* specimen from the same location. Further investigations are necessary for clarification.

Caradrina flavirena Guenée, 1852 (100m: bIII-mV, bIX-mIX. bX-mX. 900m bIX. 1750m: bV)

Also Agla Köyü / Köycegiz as well as Girdev Lake / Seki. The species flies in "low altitudes ... as well as some semi-arid areas." (Hacker 2004).

Two male specimens from Girdev Lake have been dissected but no difference can be recognised in appearance and in respect of the male genitalia, the specimens are a little larger than average. The altitude is higher than expected for the species but the area is very arid during summer and autumn and influenced by the near Mediterranean Sea. It can also not be excluded that the species flies in during warmer months from lower altitudes into adequate habitats without actually over-wintering. In literature there are a number of records for subalpine and even alpine distribution (for instance Hacker 2004).

Caradrina levantina Hacker, 2004 (bX, eX-bXI)

Caradrina clavipalpis (Scopoli, 1763) (100m: bIII-eV, mVI-bVII, bVIII, eVIII, mIX, bX-bXI, eXI. 900m: bIX. 2000m: mVI)

Also Agla Köyü / Seki and Subasi Yaylasi / above Gömbe / Kas on Mugla / Antalya border on 18.VI..

Hoplodrina ambigua ([Denis & Schiffermüller], 1775) (100m: bIII, mIV-bVI, mIX-bXI. 1750m: mVI, bX-mX)

Also from Girdev Lake / Seki.

Proxenus hospes (Freyer, 1831) (bIV, mV-eV)

***Gortyna flavago* ([Denis & Schiffermüller], 1775)** (1750m: bX)

Girdev Lake / Seki. Known from nearly all countries in Europe, but in Turkey this species has only been found "very rarely in the Pontus and Taurus mountain chains" (Hacker 2001).

Luperina dumerilii (Duponchel, 1826) (eX)

***Luperina rjabovi* (Klyuchko, 1967)** (1750m: bX) (fig. 24)

Several specimens were found at Girdev Lake / Seki. One male specimen has been dissected for confirming the determination and was compared to the genitalia illustration in Hacker (1990).

According to the same source the distribution comprises central and eastern Anatolia. Zilli et al. (2005) add western Turkey, however no records are yet known from Europe.

The sister species *Luperina taurica* (Klyuchko, 1967) is known from Ukraine, Georgia until Kazakhstan (Zilli et al. 2005).

***Nonagria typhae* (Thunberg, 1784)** (1750m: bX)

Recorded from Girdev Lake / Seki. The species is known from places with standing water but rarely recorded from Turkey (Hacker 2001). One of their host plants, *Typha* sp., can be found at Girdev Lake.

Apparently, the species can also inhabit low altitudes in the Mediterranean's, if adequate habitats exist, as a record from the seashore of Saroz Bay at Vakif / Kesan / Edirne Province (9.VII.2011) from the author shows.

***Oria musculosa* (Hübner, [1808])** (mV-eV)

Twice in Turunc. Also known from Greek islands in the Aegean's (Hacker 1989a) including Rhodos (Bender 1963). The species prefers calcareous soil (Forster & Wohlfahrt 1971).

Anthracia eriopoda (Herrich-Schäffer, [1851]) (100m: bIX-eX. 900m: bIX)

Also Agla Köyü / Köycegiz.

***Mormo maura* (Linnaeus, 1758)** (mV)

Found in Turunc only once on 11.V.2018. While Forster & Wohlfahrt (1971) report a flight period from VII to IX (same in Ronkay et al. 2001) and Hacker (2001) mentions June, this moths can apparently been looked out for already from May on.

It is well known to prefer lake and river banks (for instance Ronkay et al. 2001) which definitely are not available anywhere in the vicinity.

Polyphaenis propinqua (Staudinger, 1898) (eIV-bVII)

It has been noticed that one of the male genitalia of *P. propinqua* pictured in Hacker (2001) is labelled "Cetibeli pass". This apparently refers to Cetibeli village on the road between Marmaris and Gökova, therefore representing another record for Mugla Province in addition to the records shown in Baron (2014)

The European sister species *P. sericata* (Esper, 1787) is widespread in Greece but not so in Turkey (Hacker 1989a). Baron (2008) lists it for the Black Sea coast on the Asian part of Istanbul Province on the Asian side. In Hacker (1990) the species is shown for Anatolia and the Mediterranean area of Turkey. One Mediterranean record is known from Baisch et al. (1998) where *Polyphaenis viridis* (de Villers, 1789), a synonym of *Polyphaenis sericata* (Esper, 1787), is wrongly mentioned for Cetibeli / Marmaris. The same record is later shown by Hacker as *P. propinqua* (see beginning of the comment).

Before accepting the distribution of *P. sericata* as reported in Hacker (1990) the original material should be checked as to whether also here rather *P. propinqua* was involved.

The distribution of *P. sericata* in Greece seems to be rather focussed on northern Greece with some scattered locations in the south (Hacker 1989a and distribution map in Fibiger & Hacker 2007). In the Aegean Sea it is reported from the Cycladic island of Tinos (Hacker 1989a). Also the findings on Samos have been classified as *P. sericata* (Fritsch et al. 2014).

The question as to the exact border of distribution of *P. sericata* and *P. propinqua* in Turkey and the Aegean's seem to be unanswered. The specimens found in the Marmaris area apparently represent the most western distribution referred to in literature so far.

P. propinqua which can normally be rather easily distinguished from its close relative by the wing pattern unless very worn, should be further looked for in the Aegean's and all records of *P. sericata* in the area should also be checked for *P. propinqua*.

***Olivenebula subsericata* (Herrich-Schäffer [1861])** (900m: bIX)

Agla Köyü / Köycegiz bIX. This species is known from nearby Rhodos (Hacker 1989a).

Chloantha hyperici ([Denis & Schiffermüller], 1775) (bIII-bVII, eVIII, eX-mXI)

Phlogophora meticulosa (Linnaeus, 1758) (mIII-eIII, mX, bXI-eXI)

Apamea sicula (Turati, 1909) (eIII-bV, eV)

***Apamea syriaca* Osthelder, 1933** (1750m: mVI)
Girdev Lake / Seki mVI.

Mesapamea secalis (Linnaeus, 1758) (mX)

Mesapamea secalella (Remm, 1983) (100m: mVIII, bIX, eIX, mX. 900m: aIX)
Also Agla Köyü / Köycegiz. Determined according to the female genitalia.

***Sesamia cretica* Lederer, 1857** (0 m: eV)
A record from literature: Dalyan / Köycegiz, 0m, leg. Malicky (Baisch et al. 1998).

Episema tersa ([Denis & Schiffermüller], 1775) (100m: mX-bXI. 1750m: bX)
Also Girdev Lake / Seki.

***Episema korsakovi* (Christoph, 1885)** (1750 m: bX)
Girdev Lake / Seki. The species is "very local" in Europe, where is is known from the Balkans and also from north of the Black Sea (Ronkay et al. 2001), but more widespread in Turkey (Hacker 2001).

***Ulochlaena hirta* (Hübner, [1813])** (1750m: mX)
Girdev Lake / Seki. This late-flying species, on the wing from X-XII (Beshkov 2000), has been found in the Mediterranean region in Turkey only before 1925 (Hacker 1990) and is hereby reconfirmed. In general widespread and abundant in Turkey (Hacker 2001).

***Atethmia centrago* (Haworth, 1809)** (bXI)
Also this species is "widespread and abundant" in Turkey (Hacker 2001) and, except so far for the Mediterranean area, shown for all other regions in Turkey (Hacker 1990). Not many locations are known in Greece (Hacker 1989a).

Only once in Turunc on November, 7th, 2017.

Sunira circellaris (Hufnagel, 1766) (mXII)

Agrochola lychnidis ([Denis & Schiffermüller], 1775) (eXI-eII)

***Anchoselis lactiflora* (Draudt, 1934)** (1750m: bX)
Recorded at Girdev Lake / Seki.

The species is known in Europe from higher altitudes in Macedonia and Greece and from South Eastern Turkey and Lebanon (Hacker & Moberg 1989). As the most western records in Turkey mentioned in the latter source are from Ermenek / Karaman Province, the now confirmed existence in Mugla Province extends the distribution much further to the west, thus substantially narrowing the gap between the Anatolian populations and the European ones in Greece.

Also the altitude of the capture at Girdev Lake is outside of the known range of the species of 700 - 1500m in Anatolia (Hacker & Moberg 1989).

***Anchoselis deleta* (Staudinger, 1882)** (1750m: bX)
Girdev Lake / Seki.
The determination was confirmed by checking the male genitalia in comparison to Boursin (1953b). The sister species *A. thurneri* Boursin, 1953 is a Balkan endemic (Hacker, 1989a).

A. deleta flies in Greece and Bulgaria as well as Turkey, Armenia, Iraq and Azerbaijan (Ronkay et al. 2001) and is not very abundant (Ronkay et al. 2001). Fritsch et al. (2014) report it from Samos. Hacker (1990) does not list the species for the Mediterranean Region of Turkey but Noctuidae.de pictures specimens from Termessos National Park in the adjacent province of Antalya.

Anchoselis rupicapra (Staudinger, 1879) (mX, bI)

Anchoselis consueta (Herrich-Schäffer, [1852]) (100m: eXI-mI. 1750m: mX)
Due to a conceptual misinterpretation Baron (2004) erroneously lists both, *A. kindermannii* (Fischer v. Röslerstamm, 1838) and *A. consueta* (Herrich-Schäffer, [1852]) for Turunc. All specimens captured are in fact *A. consueta*, so that *A. kindermannii* is deleted from the distri-

bution list. Several dissection of male specimens have been carried out, all are clearly are *A. consueta* when compared to Beshkov (2000).

The taxonomical evaluation of *A. kindermannii* and *A. consueta* in literature is a bit confusing. Hacker (1996) discusses the situation thoroughly with the currently valid result that there are two species. *A. kindermannii* is the European and *A. consueta* the Asian species. Beshkov (2000) shows male genitalia of both species. While Witt & Ronkay (2011) accept Hackers concept, Ronkay et al. (2001) at that time still followed a different interpretation. According to the latter *A. kindermannii* would be the Asian species. As a result the illustrations concerning *A. kindermannii* in Ronkay et al. (2001) according to the currently valid interpretation actually refer to *A. consueta*. Therefore, for records where any doubt may arise, it is advisable to indicate which concept is used. In this context it would be interesting to learn as to whether the records of *A. kindermannii* on Samos (Fritsch et al. 2014) actually refer to *A. consueta* which is not unlikely. In any case, with the Dodecanese Islands very close to the Turkish mainland, a distribution of *A. consueta* on Greek islands is very likely.

In addition to Turunc the species has now been recorded also at Girdev Lake / Seki where it was abundant in X.2017.

***Anchoselis luteogrisea* (Warren, 1911)** (1750m: bX-mX) (fig. 25)

This taxon is closely related to *A. litura* (Linnaeus, 1761). Formerly considered to be a subspecies of the latter, *A. luteogrisea* is now recognised as a good species (Fibiger et al. 2010). It is representing the group in Anatolia and in the eastern neighbour countries of Turkey (Hacker 1990), whereas *A. litura* is the European taxon, also known from northern Africa. Ronkay et al. (2017) also list *A. litura* for "Western Turkey" but do not give any details.

According to Ronkay et al. (2017) the recognition of *A. luteogrisea* as a separate species is more a matter of concept than scientific necessity.

Beshkov (2016), however, has confirmed the sympatric distribution of both species for Bulgaria, Wegner (2011) for the Greek mainland and Beshkov & Narhirnic (2018) for Albania and the Republic of Macedonia. Another record from Greece is from the Aegean Island of Samos, close to the Anatolian coastline (Fritsch et al. 2014).

Both species show only very minor differences in the male genitalia. Also the wing-pattern is equal, while the main difference is in the colouration of the forewings (Fibiger et al. 2010, also illustrations in Ronkay et al. 2001).

Two female specimens have been captured at Girdev Lake. They are relatively dark in colour and cannot be identified with certainty according to their wing colouration but have been allocated to *A. luteogrisea* for zoo-geographical reasons. According to the status in Hacker (1990) no earlier records of *A. luteogrisea* in the Mediterranean area of Turkey have been traced in literature.

Anchoselis helvola (Linnaeus, 1758) (bXII-eXII)

Anchoselis macilenta (Hübner, [1809] (bI-mI, bII, mXII)

Frivaldskyola mansueta (Herrich-Schäffer, 1850) (100m: eX, eXI-mI, 1750m: mX)

Also at Girdev Lake / Seki.

Xanthia castanea (Osthelder, 1933) (eXI, bXII, eI-eIV)

***Conistra* (Hübner, [1821])**

Conistra ligula (Esper, 1791) was erroneously listed in Baron (2014) and has to be deleted. This species is also not to be expected in the ecosystem in question .

***Conistra veronicae* (Hübner, [1813])** (eII-aIII, eIII) (fig. 26)

Hacker (1990) lists this species in Turkey only for Kizilcahamam / Ankara. In addition the taxon *C. metria* Boursin, 1940 is reported by this source from Sivas, Erzincan, Bitlis, Hakkari, Bilecik and Antalya. *C. metria* has been synonymised with *C. veronicae* in the meantime (Fibiger et al. 2010, page 211) and already before that, most of the Turkish specimens have been reassigned to *C. veronicae* (Hreblay, 1992). A few specimens are pictured under *C. metria* in Hacker (1990).

Istanbul can be added to the range of distribution as the author captured one typical *C. veronicae* from Istanbul (European side, above Ortaköy, 6.XII.1997) which is not included in the checklist in Baron (2008).

For Turunc only a small series of female *C. veronicae* could be collected which share the typical appearance of this taxon. The female genitalia, which are more diagnostic than the male ones, have been checked and are in line *C. veronicae* (Fibiger, 1997 and Ronkay et al. 2001).

***Conistra rubricans* Fibiger, 1997** (aI-aIII, eIII) (fig. 27-28)

Also this species belongs to the subgenus *Conistra* (Hübner, [1821]) and the *C. vacinii* (Linnaeus, 1761)-species group together with *C. veronicae* and *C. ligula* among others (Ronkay et al. 2001). It has been described from Cyprus and in the original description Fibiger is assuming the species to be endemic to Cyprus (Fibiger 1997). Ronkay et al. (2001) also confirm that to that date is was only known from Cyprus.

A closer investigation of the good series from Turunc leads to the conclusion that they are different from *C. veronicae* and conspecific with *C. rubricans*. It appears that the current record is the first documented for anywhere outside of Cyprus and this adds a further species to the list of Turkish Noctuidae.

The specimens are rather stable in wing-pattern and for the current location can easily be distinguished from *C. veronicae* by wing-pattern, wing shape and larger size (31-34 mm) compared to 29-30mm for *C. veronicae* in this location. The appearance of this insect is in line with the original description (Fibiger 1997).

Male and female specimens have been dissected. Both also fully match the illustrations and the description of the genitalia in the same source. The valve, clasper and anchor-shaped juxta is broader than in *C. veronicae*. While the differences in the male genitalia of the related *Conistra* species are rather small, the differences in female genitalia, especially the shape of the sclerotisation of the appendix bursae are more apparent on first sight.

It cannot be excluded that *C. rubricans* is more widely distributed in areas along the Turkish Mediterranean coast but has been overlooked due to its early flight time or misinterpreted as *C. veronicae* when encountered.

***Jodia croceago* ([Denis & Schiffermüller], 1775)** (bIII)

Just one specimen recorded in Turunc.

***Lithophane lapidea* (Hübner, [1808])** (mXI, bXII, mI-eI, eII) (fig. 29)

Several specimens were captured in Turunc. The separation of this winter moth from the more western sister species *L. leauteri* (Boisduval, 1829) has been confirmed by comparing the male genitalia (Ronkay et al. 2001).

***Xylena vetusta* (Hübner, [1813])** (1750m: eIV-bV, mX)

Girdev Lake / Seki. *X. vetusta* is not widely distributed in Turkey and prefers wet locations (Hacker 1990), or wet meadows (Ebert 1997b).

Dryobota labecula (Esper, [1788]) (mXII-bIII, bIV)

Dryobotodes eremita (Fabricius, 1775) (eX, mXI, bXII-mXII)

***Dryobotodes servadeii* Parenzan, [1982]** (eX-bXI, bI)

After recognising some inconsistencies, the author has re-evaluated the small series of *Dryobotodes* specimens captured in Turunc and apparently those, which have previously been listed as *D. monochroma* (Esper, [1790]) (see Baron 2014) are wrongly determined. They do in fact all belong to *D. servadeii*. Therefore *D. monochroma* has to be deleted from the list of species in Turunc / Marmaris and Kumlubük / Marmaris. Consequently its distribution in Turkey remains to be in doubt (see Hacker 1990).

The comparison is based on Beshkov (2016) where the differences in genitalia and wing pattern of both species are excellently explained in detail. The determination of the specimens as *D. servadeii* has been confirmed by Beshkov himself (email communication I/2017). Beshkov (2016) also points to the fact that the male genitalia in Ronkay et al (2001) "from Greece are in fact *D. servadeii servadeii*" and that the comparison in the text is therefore carried out on basis

of this taxon and the the subspecies of *D. servadeii* in Cyprus and thereby misleading. It needs to be paid attention to the fact that the illustration of the imagines in the same source also contains mistakes (for details, see Beshkov, 2016).

Dryobotodes carbonis (F. Wagner, 1931) (eIX-bII)

Dryobotodes tenebrosa (Esper, [1789]) (eX-bI)

***Antitype jonis* (Lederer, 1865)** (1750m bX)
One female specimen from Girdev Lake / Seki.

The similar European *Antitype suda* (Geyer, [1832]) is not known from Turkey (Hacker 2001, Ronkay et al. 2001).

Ammoconia senex (Geyer, [1828]) (100m: bXI. 1750m: bX-mX)
Also Girdev Lake / Seki.

Aporophyla australis (Boisduval, 1829) (100m: eX-bI. 1750m: mX)
Also found in Kapikiri / Bafa Lake / Milas, 50m, mXI and at Girdev Lake / Seki.

Aporophyla nigra (Haworth, 1809) (eX-mII)

Aporophyla canescens (Duponchel, 1826) (eX-eXI)
Also in Kapikiri / Bafa Lake / Milas, 50m, mXI.

***Polymixis manisadjiani* (Staudinger, 1882)** (100m: bXI. 1750m: bX) (fig. 30)
Confirmed, both for Girdev Lake / Seki and Turunc. In the latter location just one specimen could be observed during many years of investigation. A separate ssp. *samomontensis* Fibiger, Yela, Zilli & Ronkay, 2010, looking distinctly different and described for Samos, is considered by Fibiger et al. (2010) as an isolated population. The latter may be in question due to the fact the species has now been confirmed for a location on sea level in the Aegean's. Additionally the adjacent Dilek Peninsula on the Turkish mainland, only two kilometres distant from Samos, rises to an elevation of above 1200 m which should mountainous species easily give the possibility to cross the straits between Samos and the mainland. Further investigation in the area might be fruitful.

Polymixis serpentina (Treitschke, 1825) (100m: eX-mXI. 1750m bX))
Also Girdev Lake / Seki.

Two specimens from Turunc, male and female, have been dissected and the genitalia have been compared with Pekarsky (2012) in order to exclude *P. iatnana* Hacker, 1996. All specimens from Turunc are relatively dark compared to the lighter grey colour of *P. iatnana*. This taxon has been raised from sub-species to species rank by Pekarsky (2012). The same source also mentions *P. serpentina* from Rhodos.

P. iatnana, earlier known as a Cyprus endemic, has reportedly also been found on Samos (Fritsch et al. 2014) while *P. serpentina* was not confirmed for this location.

As a consequence of *P. iatnana* being distributed on Samos, this species should also be expected on the adjacent Turkish mainland and *P. serpentina* perhaps sympatrically on Samos. If both is not the case this might also have consequences for the status of this taxa. Further investigation in the Aegean´s would be useful.

Polymixis rufocincta (Geyer, [1828]) (mXI-bII)

Polymixis bischoffi (Herrich-Schäffer, 1850) (eX-mXII)
As only a limited number of specimens have been dissected, the flight time shown above is likely to include also some data which actually refer to the next species.

***Polymixis culoti* (Schawerda, 1921)** (mXI, mXII)
The fact that *Polymixis bischoffi* and *P. culoti* have been found to fly sympatrically on Samos island (Fritsch et al. 2014) has been an incentive to investigate additional specimens of the *Polymixis bischoffi* / *culoti*-complex. As a result, in addition to *P. bischoffi* several specimens of *P. culoti* could be identified by dissecting male specimens, about one third of those checked by random. The result has been shared with and confirmed also by Beshkov (email XII/2014).

P. culoti is a European species distributed on the Dalmatian coast and the Balkans and is also known from Crete (Ronkay et al. 2001). The species was so far not known for any location outside Europe (Ronkay et al. 2001) and the present records, therefore, are the first for Turkey and for Asia.

***Polymixis chrysographa* (Wagner, 1931)** (100m: eXI. 1750m: bX-mX) (fig. 31-32)
Girdev Lake / Seki and just one specimen in Turunc on 22.XI.2017. The determination of one specimen from each location has been confirmed by checking the male genitalia in comparison to Hacker et al. (1986). In Turkey the species is distributed in Anatolia, the Taurus range and south-eastern Anatolia (Hacker & Ronkay 1992). It is rather unexpected in a low altitude environment like in Turunc but maybe flown in from further away.

Polymixis trisignata (Ménétriés, 1848) (mXI-bII)
Kapikiri / Bafa Gölü / Milas, 50m (mXI), as an additional location.

H a d e n i n a e Guenée, 1837 (32 species)

Panolis flammea ([Denis & Schiffermüller], 1775) (bIII, eIII-bIV)

***Orthosia incerta* (Hufnagel, 1766)** (eII)
One single specimen has been found in Turunc at 100m altitude on 27.II.2017. According to Ronkay et al. (2001) *O. incerta* is "appearing in the more arid regions only in the higher mountains", and flight time is shown as III-V.

Orthosia miniosa ([Denis & Schiffermüller], 1775) (mIII-bIV)

Orthosia cerasi (Fabricius, 1775) (bI, mII-mIV)

***Orthosia dalmatica* (F. Wagner, 1909)** (bIV, bV)
The very similar *O. dalmatica* is known to fly sympatrically with *O. cerasi* in the eastern Mediterranean's.

By dissecting further specimens, in addition to the already confirmed *O. cerasi*, not unexpectedly, also *O. dalmatica* was now confirmed for Turunc, one male and one female. The majority of specimens in the sample is *O. cerasi*, although *O. dalmatica* is thought to be more abundant in the Balkans and Asia Minor (Hacker 2001).

Orthosia cruda ([Denis & Schiffermüller], 1775) (eII-eIII)

A series of specimens has also now been collected also in Turunc. These are clearly in line with what has described as ssp. *illustris* Hreblay, 1993. This taxon is distributed according to Hreblay (1993) at the southern slopes of the Taurus mountain chain in Anatolia. They are looking quite distinct from the nominate subspecies, and also differently from the specimens obtained from Bodrum. The latter do not resemble ssp. *illustris*. The question is whether these two close locations harbour two different taxa. Also Ronkay et al. (2001) doubt the status as subspecies but are not elaborating the reason in detail.

Perigrapha rorida (Frivaldsky, 1835) (bII, eII-mIV)

Egira tibori Hreblay, 1994 (bIII-eIV)
According to the result of the genitalia examinations (see under following species) *E. tibori* is a very abundant species in Turunc.

***Egira anatolica* (Hering, 1933)** (bIII)
More than 20 male genitalia with everted vesica have been checked. All proved to be *E. tibori* with one exception. One of the larger specimens investigated, captured on 10.III.2016, is *E. anatolica*, flying sympatrically with *E. tibori* in Turunc. The comparison was based on Beshkov (2000) and Beshkov (2014). This species has not been found in the Turkish Mediterranean area according to Hacker (1990) but it is not unexpected. Few specimens have been reported among the abundant *E. tibori* also on Samos island (Fritsch et al. 2014).

***Tholera decimalis* (Poda, 1761)** (bX)

Girdev Lake / Seki. One male specimen was dissected to confirm the determination in comparison to the similar but smaller species *T. hilaris* (Staudinger, 1901) according to Hacker et al. (2002). Both taxa are known to fly sympatrically in the eastern part of Turkey (Rakosy 1996). *T. decimalis* is very abundant at Girdev Lake.

***Anarta pugnax* (Hübner, [1824])** (mVI) (fig. 33)

Several specimens have been captured at Girdev Lake / Seki. Based on the dissection of one of the males, *Anarta pugnax* sub-species intermedia (Pinker, 1980) could be confirmed. The male genitalia are clearly different from those of the nominate sub-species. The comparison was based on the illustration in Hacker (1989b).

This species is known from Mediterranean influenced areas and widespread in western Europe (Hacker et al. 2002), less so in Eastern Europe. There has been just one report for Bulgaria (Beshkov 2000) and it is not included in Hacker's survey of Greece (Hacker 1989a). Known from most regions of Turkey as defined by Hacker (1990) but in addition to being absent in the Black Sea area also unknown from the Mediterranean's. In addition, no record west of Ankara has been described in literature. The detection at Girdev Lake in Mugla Province is therefore surprising and extends the distribution of the species in Asia Minor substantially.

Flight time is known as III-V and VIII (Hacker et al. 2002) compared to the collection data of mid of June for several specimens at Girdev Lake.

***Anarta trifolii* (Hufnagel, 1766)** (100m: mV, eVI, mVIII-eVIII, eIX)

Only few records from Turunc.

***Pachetra sagittigera* (Hufnagel, 1766)** (1750m: eIV-bV, mVI)

Girdev Lake / Seki.

***Lacanobia w-latinum* (Hufnagel, 1766)** (1750m: mVI)

Found at Girdev Lake / Seki, 1750 m. This species is known from several areas in Turkey but before the present record, it has not been reported from the Mediterranean Region (see Hacker 1990).

***Lacanobia oleracea* (Linneaus, 1758)** (1750m: mVI)

Record from Girdev Lake / Seki, 1750m.

***Hecatera dysodea* ([Denis & Schiffermüller], 1775)** (100m: bIX. 900m bIX)

Despite many years of investigation, only one specimen has finally been recorded in Turunc in 2017. Also found in Agla Köyü / Köycegiz, 900m.

***Hadena adriana* (Schawerda, 1921)** (bIV) (fig. 34)

This species has been wrongly listed in Baron (2014) as *Hadena compta armeriae* (Guenee, 1852). However, the latter taxon has no Mediterranean distribution (Hacker 1996c). The species distributed in the Mediterranean's has been misinterpreted in older literature. What has earlier been considered to be *H. armeriae* (Guenee, 1852) (see for instance Hacker 1989a) and then *H. compta armeriae* is in fact a separate species, namely *H. adriana* (new status by Hacker 1996c).

Both species are similar but can be clearly separated by the description in Hacker et al. (2002) and Hacker 1996c and differ clearly in size.

H. adriana is an eastern Mediterranean species and known to fly in IV and V "usually at medium height" (Hacker et al. 2002). It has been found in Turunc only two times, maybe normally flying on higher elevations above Turunc.

The wingspan is 33 mm for both specimens, which seems to be slightly larger than the usual size. According to literature *H. compta* ([Denis & Schiffermüller], 1775) measures 21-29 mm (Hacker et al. 2002), compared to *H. adriana* with 28-32 mm (Hacker 1996c).

***Hadena pseudoclara* Hacker, 1996** (2000m: mVI) (fig. 35)

One female specimen belonging to *Hadena* has been collected at Subasi Yaylasi above Gömbe / Kas, 2000 m, directly on the border of Antalya and Mugla Province, which shares similarity with *Hadena caesia* ([Denis & Schiffermüller], 1775) and *Hadena clara* (Staudinger, 1901).

However, the forewings are much narrower than of these two species. *H. caesia* is known with a separate subspecies from mainland Greece and from north-eastern Turkey while *H. clara*, again, is known with different sub-species from mainland Greece and from eastern Turkey, westwards reaching until Konya Province. No records in the Aegean's or Taurus mountains are known.

When checking Hacker's (1996c) *Hadena* revision, the specimen's fore- and hindwings surprisingly are very closely matching *H. pseudoclara pseudoclara* as illustrated in plate P number 6. Also the wing-shape is fully in line. Specimens known from this taxon, however, have a wingspan of 27 to 29 mm whereas the present specimen from Ak Mountains measures 32 mm.

The similar subspecies *levantina* Gyulai & Hacker, 2013 from Syria, Iran and Israel (Hacker & Gyulai, 2013) is reaching a wingspan of 28-31 mm, while wing colouration, pattern and shape show differences. Therefore the current specimen is accepted to belong to the nominate subspecies of *H. pseudoclara*. According to Hacker (1996c) the variability of the species is less than *H. clara clara*.

The finding in the Ak Daglari (Ak Mountains) is remarkable as the species' known distribution is in eastern Turkey, with the Aladag range in Nigde being the nearest known record. The known range of this taxon is hereby substantially extended to the west.

***Hadena perplexa* ([Denis & Schiffermüller], 1775)** (500m: eV)

This species is reported from Bagyaka near Akkaya / Mugla district, 500 m, leg.: Malicky by Baisch et al. (1998).

***Hadena silenes* (Hübner, [1822])** (1750m: mVI) (fig. 36)

Only in recent times has the species complex around *H. silenes* been split into the two species, *H. silenes* and *H. sancta* (Hacker 1996c). According to Hacker's revision, both have a distinct distribution where *H. silenes* is the more southerly species, being distributed on the Iberian Peninsula, North-Africa and southern Turkey. Only in a few areas syntopic distribution is known, which in Turkey applies to the provinces Adana and Icel (Hacker 1996c).

H. sancta seems to fly in an earlier season (III-V), compared to III-VI for the southern *H. silenes*.

One specimen was collected on 18.VI.2018 at Girdev Lake / Seki, 1750m, which in wing colouration matches the taxon *Hadena silenes* ssp. *variegata* (F. Wagner, 1929) very well. This subspecies is distributed from Turkey to the east (Hacker 1996c, Hacker et al. 2002). The specimen has rather narrow forewings (see also Hacker 1996c), which is also typical for ssp. *variegata* versus the nominate subspecies.

***Hadena sancta* (Staudinger, 1859)** (1750m: bV) (fig. 37)

One dark specimen of the *Hadena silenes-sancta*-complex (male) has been captured on 1.V.2016 at Girdev Lake / Seki,

1750 m, i.e. earlier in the year but the same location where *H. silenes variegata* was recorded on 18.VI the year before. Both measure 31 mm wingspan. Comparing the two rather differently coloured specimens, the following differences can be confirmed, which according to Hacker et al. (2002) distinguish the light *H. silenes* from darker *H. sancta*.

- Forewing in *H. silenes* is greyish, in *H. sancta* brownish. (As *H. silenes variegata* is more clearly greyish, the difference becomes even more obvious.)

- *H. sancta* is more uniformly coloured.

- Pale subterminal field in *H. silenes*, not the case for *H. sancta*.

- Orbicular stigma smaller in *H. sancta*.

- Clear white border of orbicular and reniform stigmata in *H. silenes*, not so in *H. sancta*..

- Basal part of hindwing lightens up clearly in *H. sancta*, less obvious in *H. silenes*.

- Hacker (1996c) adds the contrasting black and white fringes, not so in *H. sancta*.

The determination of both specimens as being *H. silenes* and *H. sancta* is also been confirmed by Hacker (pers. comment X.2017).

The result is that, similar to the situation in the eastern Taurus mountains, also the western Taurus houses a sympatric distribution of both sister species. Zoo-geographically this fits rather well into the distribution pattern of this group.

Whether the specimens flying in the western Taurus also belong to *H. sancta turka* Kocak, 1991(smaller, broader wings, uniform greyish-brownish and less clear wing pattern, see Hacker 1996c) cannot be decided without other material.

Mythimna vitellina (Hübner, [1808]) (100m: eIII-eV, eVIII, mIX-eX. 1750m: eIV-bV, mVI, bX-mX)
Also Girdev Lake / Seki, very abundant.

Mythimna unipuncta (Haworth, 1809) (100m: bI-eI, bIII-eV, bIX-eIX, mX-mXII. 1750m: mVI, bX)
Also Girdev Lake / Seki.

Mythimna sicula (Treitschke, 1835) (mIII-bIV)

Mythimna prominens (Walker, 1856) (mIII-eIII, mV, mVI, mIX, mX-eXII)

Mythimna languida (Walker, 1858) (bI-mI, bII-mV, mVIII, bIX-eXII)

***Mythimna albipuncta* ([Denis & Schiffermüller], 1775)** (1750m: eIV, mVI, bX-mX)
Girdev Lake / Seki.

Mythimna ferrago (Fabricius, 1787) (100m: eIX-mX. 1750m: mVI, bX)
Also Girdev Lake / Seki.

Mythimna l-album (Linnaeus, 1767) (bIII-bV, mX-eXI, bXII)

Leucania putrescens (Hübner, [1824]) (eIX-bXI)

Leucania herrichii Herrich-Schäffer, 1849 (100m: eIX, mX-eX. 900m: bIX)
Also Agla Köyü / Köycegiz.

Leucania loreyi (Duponchel, 1827) (100m: eII-mIII, bIV-mIV, mV-eV, mVI, mVIII-eVIII, eIX-bXI, bXII 1750m: eIV-bV, bX)
Also Girdev Lake / Seki.

N o c t u i n a e Latreille, 1809 (29 species)

Peridroma saucia (Hübner, [1808]) (100m: bI, eI, eII, eIII-bIV, eIV-eV, mVI, bX, eX-eXI, mXII-eXII. 1750: eIV)
Also Girdev Lake / Seki.

Euxoa conspicua (Hübner**, [1827]) (syn.: *E. agricola* (Boisduval, 1829)** (eVII)
Kuruova (2300 m) above Subasi Yaylasi / Gömbe / Kas on Mugla / Antalya province border, determined by Charles Boursin (see de Bros 1991).

***Euxoa hilaris* (Freyer, 1838)** (2000m: mVI. 2300m: eVII) (fig. 38)
The exact taxonomic relation between several taxa including *E. hilaris*, *E. derrae* Hacker, 1985 and *E. rjabovi* Kozhantshikov 1929 is "unsolved" (Hacker 2001, see for instance also Fibiger 1997a). The specimens and also the male genitalia show a high degree of variation (Hacker 1985c). According to current taxonomical status they are listed as separate species.

E. derrae was described from Greece (Hacker 1985c), by the way as subspecies of *E. inclusa* Corti 1931 a further taxon of the group. According to current reporting, the latter is endemic to this country.

E. rjabovi's records in Anatolia are from further to the north-east.

E. hilaris is described from the Istanbul area (Hacker 2001). Their habitat are mountains above timber line (Hacker 2001). Due to the lack of mountains with biotopes above the timber line in the vicinity of Istanbul this origin seems unlikely or at least extremely imprecise. Such hab-

itats only exist much further to the east or south-east, when thinking for example of the mountains south of Bolu or Bursa's Uludag. In any case, it seems clear that the location needs to be addressed to Asian Turkey, rather than to Trace. Consequently, also HACKER (1990) does not mention the species for Europe. Fauna Europaeae, however, includes the species for European Turkey which appears to be wrong, as well as European Russia, which cannot be evaluated here.

E. hilaris (or *E. hilaris* group) is reported to be widespread in Turkey (HACKER 2001) but due to the uncertain distribution, data of the involved species need to be considered with caution.

In line with the approach in HACKER (2001), the current specimens are allocated to the taxon *E. hilaris* "for practical reasons" being the oldest name. Also the area fits into the distribution of this taxon as currently shown in literature.

Two males of this group have been found on Subasi Yaylasi above Gömbe / Kas on the border of Mugla and Antalya Province. The species surprisingly has already been found in the area. DE BROS (1991) reports it for Kuruova, a meadow above Subasi Yaylasi (2300m). According to the same source, the species was determined by Charles BOURSIN.

Euxoa temera (HÜBNER, [1808]) (100m: mX-bXI. 1750m: bX)
Also recorded from Girdev Lake / Seki.

***Euxoa distinguenda* (LEDERER, 1857)** (1750m: bX)
Several specimens have been collected at Girdev Lake / Seki. The determination has also been confirmed by BESHKOV (email communication I/2017). Known from most areas but so far not from the Mediterranean Region (HACKER 1990). In southern areas "at middle and higher altitudes, usually above the timber line." (HACKER 2001).

***Euxoa diaphora* BOURSIN, 1928 (?)** (1750m: bX) (fig. 39)
One male specimen has been collected at Girdev Lake /Seki on 1.X.2016, which is illustrated here.

The separation of this taxon from *E. segnilis* (DUPONCHEL, 1836) is very difficult. Also the male genitalia are very similar (FIBIGER 1997a). The determination cannot confirmed here with certainty.

HACKER (1990) stated that the taxonomic relationship in this taxonomically difficult group are not fully resolved. FIBIGER (1997a) assumes that both taxa represent two "highly variable sibling species which occur sympatrically in some areas, rather than one species with a balanced polymorphism".

Agrotis bigramma (ESPER, [1790]) (100m: eIII, mIX-eX. 900m: bIX)
Also Agla Köyü / Köycegiz.

***Agrotis exclamationis* (LINNAEUS, 1758)** (1750m: eIV, mVI, mVI)
Girdev Lake / Seki.

Agrotis segetum ([DENIS & SCHIFFERMÜLLER], 1775) (100m: bI, bII, eII-eIV, mV-bVI, eVI, eVIII-eXII. 900m: bIX. 1750m: bV, mVI, mX. 2000m: mVI)
Recorded also in Agla Köyü / Köycegiz, at Girdev Lake / Seki and Subasi Yaylasi, above Gömbe / Kas on Mugla / Antalya border.

***Agrotis herzogi* REBEL, 1911** (bXI-mXI)
Several fresh specimens have been accounted for in Turunc in 2014, and only in that year. The species is known to migrate and may not be present in the area continuously. This desert and semi-desert species (HACKER 2001) is known from northern Africa and the Arab Peninsula. In Europe, few records from the mainland and Mediterranean islands including Cyprus (HACKER 2001), Rhodos (HACKER 1989a) and Samos (FRITSCH et al. 2014) are known.

Agrotis trux (HÜBNER, [1824]) (100m: bX-mXI, 1750m: bX)
Also Girdev Lake / Seki.

Agrotis puta (HÜBNER, [1803]) (eII-eIV, mV, mVII, eVIII, eIX-mXI)

Agrotis catalaunensis (Millière, 1873) (eIII, bX)

Agrotis ipsilon (Hufnagel, 1766) (100m: mIII-eV, mVI, mVIII, bIX-eXII. 900m: bIX. 1750m: bV, mVI, mX)
Also records from Gavuragili / Esen / Fethiye, 100m, Kapikiri / Bafa Gölü / Milas, 50 m, Agla Köyü / Köycegiz and Girdev Lake / Seki.

Agrotis spinifera (Hübner [1803]) (syn.: *A. biconica* Kollar, [1844] (bIV-eIV, mVI-eVI, eVIII, eIX- eX)

***Dichagyris flammatra* (Hübner [1813])** (eVII)
Kuruova (2300 m) above Subasi Yaylasi / Gömbe/ Kas on Mugla / Antalya Province border, determined by Charles Boursin (see de Bros (1991)).

Ochropleura leucogaster (Freyer, [1831]) (100m: mX. 1750m: bX-mX, eXI)
Also at Girdev Lake / Seki.

***Chersotis margaritacea* (de Villers, 1789)** (bX)
Girdev Lake / Seki.

Noctua pronuba (Linnaeus, 1758) (100m: mIV-bVI, eVI, mX-bXII. 1750m: bX)
Also at Girdev Lake / Seki and listed by Mol et al. (2003) for Kelebek Vadisi / Faralya Köyü / Fethiye.

Noctua comes (Hübner, [1813]) (mIV-eV, mVI-mVII, mVIII, bIX-bXII, eXII)
Also Kelebek Vadisi / Faralya Köyü / Fethiye (Mol et al. 2003).

***Noctua interjecta* Hübner, [1803]** (bVII-mVII)
Only two recordings in Turunc.

Noctua janthina [Denis & Schiffermüller], 1775-*tertia* Mentzer, Moberg & Fibiger, 1991-complex (100m: mV-mVII, mVIII-mXI. 900m: bIX))
Also Agla Köyü / Köycegiz.

Divaena haywardi (Tams, 1926) (100m: mV, eVI-mVII, eIX-mX. 900m: bIX 1750m: mVI)
Additionally to be reported for both, Agla Köyü / Köycegiz and Girdev Lake / Seki.

Epilecta linogrisea ([Denis & Schiffermüller], 1775) (100m: bVIII. 900m: bIX)
Also Agla Köyü / Köycegiz.

Xestia xanthographa ([Denis & Schiffermüller], 1775) (bX, eX-mXI)

Xestia cohaesa (Herrich-Schäffer, [1849]) (bX, eX-bXI)

***Xestia c-nigrum* (Linnaeus, 1758)** (100m: mV, 1750m: mVI, aX)
Abundant at Girdev Lake / Seki. One specimen was also coming to light in Turunc on May, 19th, 2018.

***Eugnorisma chaldaica* (Boisduval, 1840)** (1750m: bX) (fig. 40)
E. buraki Kocak, 1983 and *E. caerulea* (Wagner, 1932) are synonyms of *E. chaldaica* (Fibiger 1997a, S. 171).

Fibiger (1990) reports the species from areas north of the Black Sea to Central Asia but also Turkey (still as *E. buraki*).

Hacker (1990), also as *E. buraki*, specifies by mentioning Anatolia and eastern areas of Turkey. According to Varga et al. (2015) the species is distributed from Central and Eastern Anatolia to the east.

The current finding of several specimens at Girdev Lake / Seki confirms the species for Mediterranean Turkey and South-western Anatolia.

The species has a characteristic "reddish-brown" ground colour and a "rosy-grey or pinkish shade" (Varga & Ronkay 1987).

***Eugnorisma insignata* (Lederer, 1853)** (1850m: bX) (fig. 41)

The species is flying at Girdev Lake / Seki sympatrically with *E. chaldaica*.

E. insignata is widespread all over Turkey (Hacker 1986) but not known from the Mediterranean Region (Hacker 1990).

The determination has been carried out according to Varga & Ronkay (1987) whose description matches the captured specimens very well. As far as the specimens pictured in Fibiger (1997a) and Fibiger et al. (2010) (all from Russia) is concerned, the the similarity is to a much lesser degree and the related pictures also have a rather in-homogeneously look when compared with each other. Illustration 48 on plate 13 comes closest to the specimens from Mugla Province.

Also Varga et al. (2015) show many differently looking specimens. According to this source this species is highly variable also on population level and therefore refrain from defining sub-species.

Conclusions

The presented checklist is the first extensive species list for the macro-moths of Mugla Province and south-west Anatolia.

Based on the current data it is clear that the area boasts an impressive biodiversity, despite the fact that the climate is rather harsh, being very hot and very dry during most parts of the year.

However, the list is far from being comprehensive. Only a very limited number of locations have been investigated. Any serious collecting in additional habitats should lead to the detection of many further unrecorded species.

The species composition documented for Turunc reveals a biodiversity pattern which extends along the Turkish Aegean coast to the north and the Turkish Mediterranean coast to the east, as well as across the Greek Aegean islands. At higher altitudes in the hinterland of Mugla Province, however, species composition changes rapidly, with Middle Anatolian influences increasing. Currently the amount of data emanating from a few locations at higher altitudes, as included in the present article, is limited. Only a few sporadic surveys were carried out. Consequently, a large number of additional species can be expected from these uplands following further research.

Some of the material used in the current article suggests that, especially on the higher slopes of the Ak Daglari Range, very interesting populations from a zoogeographical point of view probably exist. Also the higher elevations of the Boncuk Dagi Range further to the west, which are separated from the Ak Daglari Range by a deep valley and with the highest peaks reaching nearly 2300 metres, can be expected to be a very fruitful target for exploration. At the moment this area is, as far as is known, completely unexplored.

Unfortunately, for various reasons, current circumstances do not favour such field investigations.

The result is that the area in question, like Turkey in general, may remain relatively poorly investigated, without much progress currently or to be expected in the near future.

It is true that the country's Macro-moth fauna has attracted a lot of attention in the past, especially towards the end of the last century when many European lepidopterists visited

the country. The species list for Turkey was significantly added to during this time and numerous species were described as new to science.

Despite this it should be noted that, from a taxonomic, and especially from a faunistic point of view, the lepidopteran biodiversity in this huge country must be regarded as being still widely unexplored, especially when particular regions, provinces, districts or single ecosystems are considered. Distances are very large and a mosaic of strikingly different ecosystems, and many separate mountain ranges, exist. Finally, many possible interesting locations are remote and not easy to access.

Turkey is apparently an evolutionary hotspot for Noctuoidea, where radiation of species has taken place in recent evolutionary history. Species richness and a large number of subspecies and local forms for many species groups is evidence for this.

Is is hoped that any pessimistic views about future taxonomic and faunistic research in the country are unfounded, that efforts will be stepped up and that more local expertise will be developed in the future.

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Illustrations

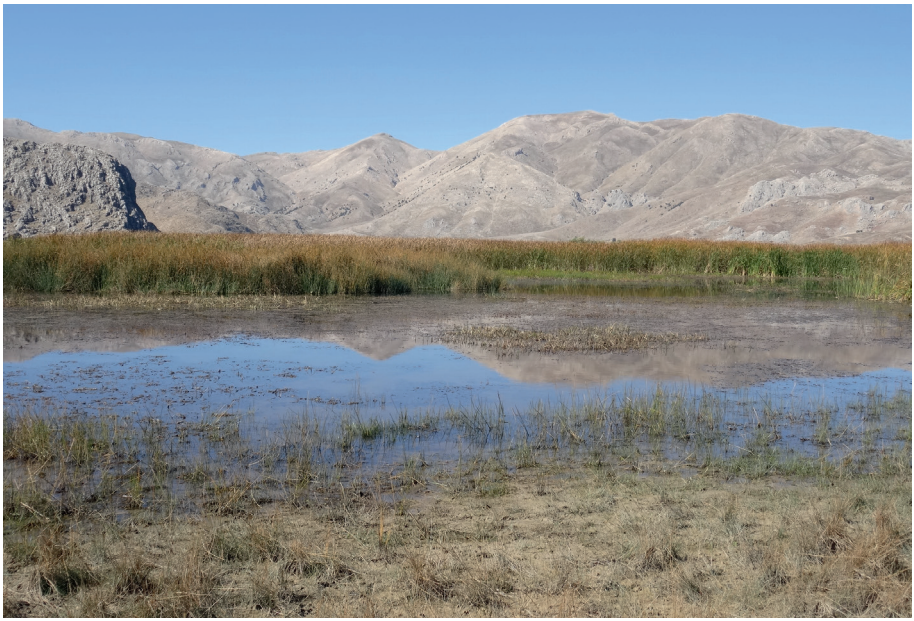

Fig. 1 Girdev Lake, Seki, Mugla Province, 3.X.2016

Fig. 2 Girdev Lake, Seki, Mugla Province, 15.VI.2016

Fig. 3 Girdev Lake, Seki, Mugla Province, 19.X.2017

Fig. 4 *Paropta paradoxum* (Herrich-Schäffer, [1851]), female, Turkey/Mugla/Marmaris/ Turunc, 100m, 26.VI.2015

Fig. 5 *Dyspessa emilia* (Staudinger, 1878), 25mm, Turkey/Antalya-Mugla Province Border/above Gömbe/Subasi Yaylasi, 2050m, 20.VI.2017

Fig. 6 *Orectis massiliensis* (Milliere, [1864]), male, Turkey/Mugla/Marmaris/Turunc, 100m, 31.X.2017

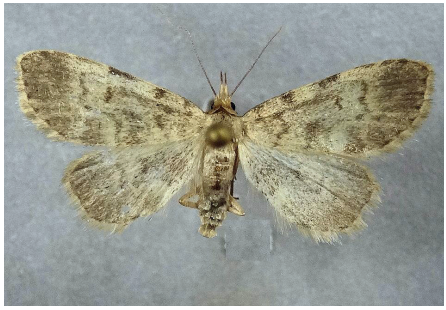

Fig. 7 *Orectis massiliensis* (Milliere, [1864]), female, Turkey/Mugla/Marmaris/Turunc, 100m, 13.XI.2017

Fig. 8 *Micronoctua karsholti* Fibiger, 1997, Turkey/Mugla/Marmaris/Turunc, 100m, 8.VII.2017

Fig. 9 *Autophila einsleri* Amsel, 1935, female, Turkey/Mugla/Marmaris/Turunc, 100m, 27.V.2016

Fig. 10 *Parascotia detersa* (Staudinger, 1892), 23mm, Turkey/Mugla/Marmaris/Turunc, 100m, 27.IX.2016

Fig. 11 *Parascotia robiginos*a (Staudinger, 1892), 26mm, Turkey/Mugla/Marmaris/Turunc, 100m, 8.VII.2017

Fig. 12 *Eublemma candidana* (Fabricius, 1794), male, Turkey/Mugla/Marmaris/Turunc, 100m, 19.VI.2015

Fig. 13 *Eublemma candidana* (Fabricius, 1794), male genitalia, Turkey/Mugla/Marmaris/Turunc, 100m, 19.VI.2015

Fig. 14 *Eublemma parallela* (Freyer, 1842), Turkey/Antalya-Mugla province border/above Gömbe/Subasi Yaylasi, 2000m, 18.VI.2016

Fig. 15 *Valeria kartalea* Kuhna & Schmitz, 1997 male, 43mm Turkey/Mugla/Marmaris/Turunc, 100m, 27.II.2017

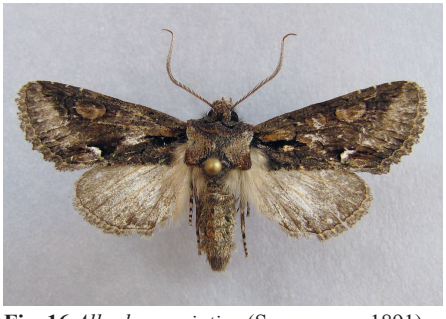

Fig. 16 *Allophyes asiatica* (Staudinger, 1891), Turkey/Mugla/Marmaris/Turunc, 100m, 18.I.2017

Fig. 17 *Bryophila felina* (Eversmann, 1852), female, Turkey/Mugla/Marmaris/Turunc, 100m, 14.VII.2018

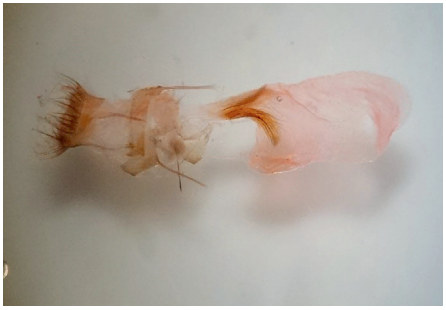

Fig. 18 *Bryophila felina* (Eversmann, 1852), female genitalia, Turkey/Mugla/Marmaris/ Turunc, 100m, 14.VII.2018

Fig. 19 *Caradrina syriaca* (Staudinger, 1892), female, 33mm, Turkey/Mugla/Marmaris/ Turunc, 100m, 13.VIII.2018

Fig. 20 *Caradrina sucianja cilicia* (Hacker, 1992), male, 31mm, Turkey/Antalya-Mugla province border/above Gömbe/Subasi Yaylasi, 2000m, 18.VI.2016

Fig. 21 *Caradrina sucianja cilicia* (Hacker, 1992), male genitalia, Turkey/Antalya-Mugla province border/above Gömbe/Subasi Yaylasi, 2000m, 18.VI.2016

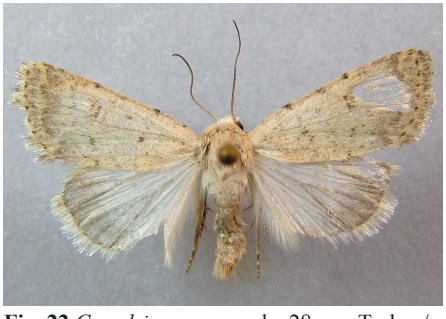

Fig. 22 *Caradrina* spec., male, 28mm, Turkey/ Antalya-Mugla province border/above Gömbe/ Subasi Yaylasi, 2000m, 18.VI.2016

Fig. 23 *Caradrina* spec., female, 27mm, Turkey/Antalya-Mugla province border/above Gömbe/Subasi Yaylasi, 2000m, 18.VI.2016

Fig. 24 *Luperina rjabovi* (KLYUCHKO, 1967), Turkey, /Mugla/Seki/Girdev Lake, 1750m, 1.X.2016

Fig. 25 *Agrochola luteogrisea* (WARREN, 1911) Turkey/Mugla/Seki/Girdev Lake, 1750m, 1.X.2016

Fig. 26 *Conistra veronicae* (HÜBNER, [1813]), female, Turkey/Mugla/Marmaris/Turunc, 100m, 22.III.2016

Fig. 27 *Conistra rubricans* FIBIGER, 1997, female, Turkey/Mugla/Marmaris/Turunc, 100m, 23.II.2017

Fig. 28 *Conistra rubricans* FIBIGER, 1997, male, Turkey/Mugla/Marmaris/Turunc, 100m, 31.XII.2016

Fig. 29 *Lithophane lapidea* (HÜBNER, [1808]) Turkey/Mugla/Marmaris/Turunc, 100m, 18.I.2017

Fig. 30 *Polymixis manisadjani* (Staudinger, 1882), Turkey/Mugla/Marmaris/Turunc, 100m, 2.XI.2016

Fig. 31 *Polymixis chrysographa* (Wagner, 1931), male, Turkey/Mugla/Seki/Girdev Lake, 1750m, 1.X.2016

Fig. 32 *Polymixis chrysographa* (Wagner, 1931), male, Turkey/Mugla/Marmaris/Turunc, 100m, 22.XI.2017

Fig. 33 *Anarta pugnax* (Hübner, [1824]), Turkey/Mugla/Seki/Girdev Lake, 1750m, 12.VI.2016

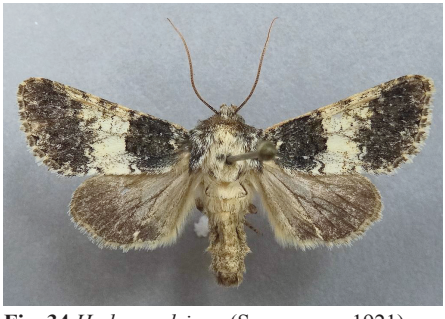

Fig. 34 *Hadena adriana* (Schawerda, 1921), Turkey/Mugla/Marmaris/Turunc, 100m, 4.IV.2012

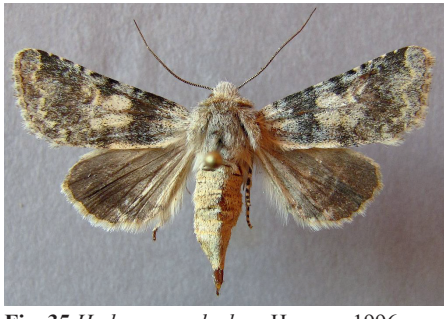

Fig. 35 *Hadena pseudoclara* Hacker, 1996, 32mm, Turkey/Antalya-Mugla province border/ above Gömbe/Subasi Yaylasi, 2000m, 18.XI.2016

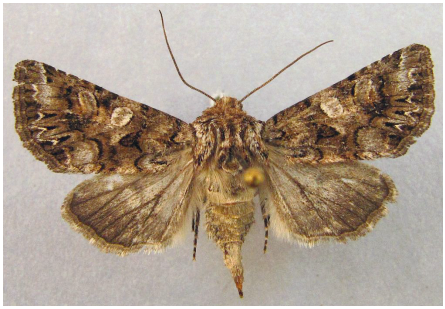

Fig. 36 *Hadena sancta* (Staudinger, 1859), 31mm, Turkey/Mugla/Seki/Girdev Lake, 1750m 1.V.2016

Fig. 37 *Hadena silenes* (Hübner, [1822]), 31mm, Turkey, Mugla/Seki/Girdev Lake, 1750m 18.VI.2017

Fig. 38 *Euxoa hilaris* (Freyer, 1838), 34mm, Turkey/Antalya-Mugla province border/above Gömbe/Subasi Yaylasi, 2000m, 18.VI.2016

Fig. 39 *Euxoa diaphora* (?) Boursin, 1928, Turkey/Mugla/Seki/Girdev Lake, 1750m, 1.X.2016

Fig. 40 *Eugnorisma chaldaica* (Boisduval, 1840), Turkey/Mugla/Seki/Girdev Lake 1750m, 1.X.2016

Fig. 41 *Eugnorisma insignata* (Lederer, 1853), Turkey/Mugla/Seki/Girdev Lake 1750m, 1.X.2016