

Collection records of Noctuoidea and Bombycoidea (Lepidoptera) from a Location near Marmaris in South-Western Anatolia, Turkey

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Stichworte: Lepidoptera, Noctuoidea, Bombycoidea, Westanatolien, Türkei

Deutsche Zusammenfassung

Der Artikel fasst die Fangergebnisse des Autors in Turunç zusammen, einem kleinen Urlaubsort am Mittelmeer nahe Marmaris in der Südwesttürkei. Gegenstand der Untersuchung sind die taxonomischen Gruppen Noctuoidea, Bombycoidea, Drepanoidea und Axioidea. Die Fänge erfolgten überwiegend am Licht.

Diese Region der Türkei ist trotz leichter Erreichbarkeit erstaunlich schlecht erforscht. Es gibt für die Provinz Mugla bisher fast keine Daten für Nachtfalterfänge.

Die Untersuchung fand über alle Jahreszeiten und an insgesamt 456 Tagen statt. Es wurde anhand der insgesamt über 4400 registrierten Individuen eine grobe Klassifizierung der Häufigkeit vorgenommen. Insgesamt konnten 168 Arten festgestellt werden.

Die Zahl von Arten, die trotz derart langer Anstrengungen nur einmal festgestellt wurden, ist mit 25 relativ hoch. Es daher zu erwarten, dass einige weitere hier nicht aufgeführte Arten vorkommen.

Für eine Reihe der festgestellten Spezies existieren bisher nur wenige Nachweise aus der Türkei. Eine Art ist neu für das Land. Weiterhin kann bei einigen nahverwandten Arten ein Beitrag zur Klärung von Verbreitungsgrenzen geleistet werden, die z.T. gerade in Kleinasien unklar sind.

Durch das vor allem in Sommer extrem heiße und trockene Klima und den milden Winter fliegen einige Arten früher als bekannt. Viele hingegen fliegen später in den Herbst und Winter hinein, so dass eine ganze Reihe von in der Literatur nicht bekannten Flugzeiten aufgezeigt werden kann.

Weitere Relevanz erhält die vorliegende Analyse dadurch, dass die zu Europa gehörende griechische Dodekanes Insel Rhodos nur 36 km Luftlinie entfernt liegt und die Inseln z.T. in unmittelbarer Nähe des türkischen Festlands liegen.

Von den 168 festgestellten Arten sind die Hälfte, genau 85 von der Inselgruppe der Dodekanes bisher nicht bekannt, davon drei Arten gar nicht für Europa gemeldet.

1. Introduction

This article summarises the collection records of the author in Turunç, a small Mediterranean sea-side resort close to the town of Marmaris in Western Anatolia, Turkey.

The investigation has been carried out mainly in one location and during all seasons. A number of recordings also from other locations in the Mugla Province are mentioned.

The specimens have mainly been attracted by light.

The taxonomic groups Noctuoidea, Bombycoidea, Drepanoidea and Axioidea have been covered in this research.

In total 160 species have been identified for Turunç with another 8 species recorded in other parts of Mugla Province, giving a total 168 species in all.

Even though the area is easily accessible from Europe, the extent of its coverage in literature is close to nil.

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However, the area is interesting, especially in regard to the eastward distribution of known European Mediterranean species, of Palaearctic species to the south and of tropical and Mid Eastern species to the north-west. The existing study monitors the appearance of imagines in this region continuously over a longer period. This especially includes the period from late autumn through the active winter months into early spring, a time which is usually very under-represented in collection records for the Mediterranean area.

The location under investigation lies in Asia Minor, roughly at the point where the Aegean coast and the Mediterranean coast meet in Western Anatolia. The Greek Dodecanese island group is close by. The distance from Rhodos to Turunç is only 36 km, and the nearest point between Rhodos and the Bozburun Peninsula on the Anatolian coast is just 18 km. Symi is only 5.5 km from the Bozburun Peninsula. These short distances clearly represent no effective separation for most of the flora and fauna. With Rhodos and Symi very close by, the present study is of relevance in the analysis of the European moth fauna. A comparison of the catch compared to known records from the Dodecanese Islands is therefore included.

The study also shows that the flight time of many species in the area extends beyond their so far known and documented flight period, on account of the extreme climate in the location.

2. Geography and Climate

The village of Turunç is located at 36°46' N and 28°15' E. The area is part of the district of Marmaris in the Province of Muğla in south-western Anatolia. Other well-known cities in the Province are Fethiye, Bodrum and Datça. Adjacent Provinces are Antalya, Denizli, Aydın and Burdur.

Marmaris is usually regarded as the point where the Aegean and the Turkish Mediterranean coasts meet, though the exact point differs from one source to the other. The city is located on a peninsula extending to the south-west. South-west of Marmaris, the peninsula itself divides into two separate peninsulas. The northern one, the partly very narrow Datça Peninsula stretches a further 70 km into the Aegean Sea. The southern one, the Bozburun or Resadiye Peninsula extends into the south-west towards the Greek islands of Rhodos and Symi, which are part of the Dodecanese group.

Turunç is located on the eastern part of the Bozburun Peninsula, close to Marmaris and İçmeler, just 9 km from Marmaris. Antalya lies 220 km to the east, while Izmir is another 220 km to the north-west. Turunç is 36 km from Rhodos and 37 km from Symi.

While officially Turunç has 1,650 inhabitants, there is a big difference between winter, when the population is probably less, and summer when the population is increased by tourists and holidaymakers. Marmaris, as the closest town has 66,000 inhabitants including the adjacent İçmeler (TÜRKİYE VE ORTA DOĞU AMME İDARESİ ENSTITÜSÜ, figures for 2013).

Marmaris has a climate with characteristics of the Aegean and the Turkish Mediterranean coasts. The summers are hot and very arid, while the winters are moderately temperate with very occasional frost or hailstorm, but a lot of rain.

The annual average rainfall is 1021 mm (IKIEL 2004; while HESSELBARTH, VAN OORSCHOT & WAGENER (1995) give 1246 mm) compared to 868 mm for Fethiye, 710 mm for Bodrum, both also in Muğla Province. Hence Marmaris is not only the town with the highest annual rainfall on the Turkish Aegean coast but at the same time experiences one of the highest amounts of precipitation in the whole of Turkey, only topped by some areas on the Black Sea coast and the Taurus mountains (IKIEL, 2004; HESSELBARTH, VAN OORSCHOT & WAGENER, 1995). A lot of precipitation can happen in a very short time, as in November 2013 when 216 mm of rain was measured in 24 hours (local daily media). For December 10th to 11th, 1992 Marmaris holds the Turkey record for the most precipitation in a 24 hours period with 466 mm of rain (METEROLOJİ GENEL MÜDÜRLÜĞÜ).

Turunç differs from Marmaris though, due to the topographic structure. It can rain in Marmaris when Turunç receives no rain, and vice versa. The high encircling mountains often result in thunderstorms and torrential rain, as humid and warm air from the sea meets the mountain barrier close to the coast, moving up and building dense clouds around the mountain peaks. Therefore, Turunç, although no separate figures exist, may receive rather more rain throughout the year compared to Marmaris.

This may not be apparent to the holiday visitor. During the summer months the area is very arid. From April or May on the vegetation will dry out. The last rains are in May or sometimes June and normally can only be expected to resume in mid October. In the middle of summer there is very rarely any rain.

The temperature and sunshine statistics have been evaluated for all relevant figures in comparing Izmir and Antalya which are both very close, as statistics were only available on Province basis. The town of Muğla as

Province centre for Marmaris is at an altitude of 600 m, further away from the sea and consequently has a very different climate from that of Marmaris.

Based on this, the estimated average temperature for the coldest month, January, is 10° C to 11° C with an average low of about 6° C. The hottest months are July for Izmir and August for Antalya with both 28° C average temperature and an average (!) highest daily temperature of 33° and 34° respectively. The long-time high for Izmir is 43° and 45° for Antalya.

The average (!) daily sunshine is between 10 and 12 hours from June to September.

For a very detailed evaluation of historic and current weather patterns, a study by HESSELBARTH et al. (1995) is recommended.

3. Geology and Soil

Geologically the area is characterised by a karstic topography, very irregular coastline and steep slopes rising out of the Aegean Sea with surprisingly high mountain tops so near the coast. Open water, like lakes and rivers are inhibited by the karstic structure, which results in water penetrating the ground very fast, even during heavy rains.

Turunç is right on the sea-side with a small gravel beach. The small bay is bordered on both sides by rocky mountain slopes extending into the sea. High mountains encircle the village from the other three sides. The highest mountain on the Bozburun Peninsula, the slope starting from Turunç, is Palamut Tepesi. Its top, on which there is a forest fire watch tower and antennae, reaches an altitude of 880 m., less than 3.5 km from the shoreline in Turunç. Another peak reaching nearly 700 m is less than 2 km from the centre of Turunç.

The location forms a shelter against strong winds unless coming directly from the south-east. However, there is the possibility of flash floods, and plenty of water is available for nature during spring, autumn and winter. At the same time there is also some availability of ground water in summer, thus different from many other places along the Aegean coast in Turkey and on the Greek islands in the area.

4. Natural Environment

The mountainous structure of the Bozburun and Datça Peninsulas is not suitable for agriculture, except in a few valleys and the plains near the shore, and until recently the population density was very low, with little employment except in the olive yards., Tourism has allowed a faster development and growth of villages and towns along the shore, especially near the beaches (DOGANER, 1999).

As a result, the Bozburun and the Datça Peninsulas are still relatively well preserved compared to other areas on the Turkish Aegean and Mediterranean coasts. Another contributing factor for this is the topographical situation. Most of the mountain slopes are difficult to access or even completely inaccessible. This has helped preserve the partly unique flora and fauna of the area to date.

So far, the extent of destruction by human activity is comparatively low and fauna and flora is relatively undisturbed. However, it should be kept in mind that, like most of the Mediterranean coastal areas, the environment has been shaped by human influence through many civilisations (deforestation, goat grazing, olive tree plantations). Doubtless, the composition of the present Lepidoptera fauna must have been affected massively over time.

At present, the south-western part of the Bozburun Peninsula consists of karstic mountains, generally treeless but partly covered by shrubs. In its north-eastern part however, where Turunç lies, the slopes are covered by arboreal vegetation, in natural undisturbed areas strongly dominated by the pine tree *Pinus brutia* (DOGANER, 1999), at altitudes above 100 m.

Characteristic trees and bushes in lower altitudes in the area are: *Quercus coccifera*, *Ceratonia siliqua*, *Genista* (?) *acanthoclada*, *Cistus salviifolius*, *Cistus creticus*, *Lavandula stoechas* and *Nerium oleander*, the latter preferring gorges but being common also in gardens. *Laurus nobilis* and *Arbutus andrachne* are also typical of the gorges and tend grow in slightly higher altitudes.

Smaller plants usually survive the hot summer in the form of bulbs or roots, like *Urginea maritima*, *Asphodelus* spp., *Orchis anatolica* and other orchid species. Others are annual and endure the drought in the form of seeds, like the very common *Anacyclus clavatus* and numerous other flowering plants.

In disturbed areas macchia develops. The more gentle mountain slopes are covered by olive trees, where the land-owners clean trees and bushes to a certain extent, but which otherwise host a significant variety of smaller plants.

It is interesting to note that the mountain slopes directly adjacent to Turunç are already part of the Marmaris National Park which covers 33,350 hectare (T.C. ÇEVRE VE ORMAN BAKANLIĞI, 2008). However, how much the National Park status contributes anything to the protection of nature is difficult to decide. Sadly enough, some damaging activities like offloading waste, hunting or Jeep safaris are not prevented.

The pebble beach in Turunç has no natural vegetation left owing to tourist activities. The small coastal plain of about 3 to 4 square km is covered by human inhabitation, gardens and a little agriculture. Some surrounding slopes are covered by olive trees. Where olives are harvested the cultivation is rather extensive. No herbicides or fertilizer or other chemicals are used to protect the olive trees, and no irrigation is carried out. Only other upcoming bushes and trees are cleared out from time to time so that the ground flora, developing especially in winter and spring, is undisturbed.

5. Historical collection records

Lepidopterological expeditions within Turkey, referred to in literature, have in the past tended to concentrate on areas in the eastern parts of the country and in the mountainous regions.

The natural reason clearly is that these areas are populated by higher numbers 'unusual' taxa compared to the European fauna, while the area under investigation, as part of the Mediterranean is more like other southern European countries, thus less interesting at first sight. A number of recently recognised species in the Eastern Mediterranean may modify this view.

At present, however, there are hardly any records published for Mugla Province or even for the whole coastal area between Izmir and Antalya. HACKER, KUHN & GROSS (1986) list three locations, one close to Bodrum airport, one near Dalaman and one east of Fethiye with two species specifically mentioned for Mugla Province. One is *Eublemma ragusana* FREYER, 1844 near Fethiye, which is not listed in this article and the other is *Trichoplusia daubei* BOISDUVAL, 1840.

There is one local publication, MOL, AVCIL & DUTKUNER (2003), which gives a list of Lepidoptera species for a locality from the eastern part of Mugla Province, close to Fethiye, at sea level. However, only 21 species of moths are included. Besides those mentioned in the present article, the following species are included: *Acherontia atropos* LINNAEUS, 1758, *Deilephila elpenor* LINNAEUS, 1758, *Laothoe populi* LINNAEUS, 1758 and *Malacosoma neustria* LINNAEUS, 1758. No other publications about the Province could be traced.

The area may be visited by European entomologists simply because it is a popular holiday destination. This implies that visits tend to take place in summer or early autumn, exactly the period during which nature, including insect life, is mostly dormant because of the drought and the summer heat.

6. Description of Location and Method of Collection

During this survey, moth findings have been recorded on 456 nights, although there has been no systematic approach as to the number of hours of light trapping per night. The figure also includes a number of nights when only one or a few specimens were noted, which reduces the average number of specimens per day to some extent.

The investigation was carried out mainly between the years 2011 to 2014, with a total of 12 days of records added from 1994, 1995 and 1997.

The insects were counted at light. In cases where more than 10 individuals of any species were observed on a single night, a maximum figure of 10 was used for the statistics, as it was seen to be difficult and ineffective to try counting higher numbers. Thus, the number of common species in some cases may have been slightly underestimated.

In general the moths were not anaesthetised or killed, but when specimens could not be determined immediately in situ, samples were retained. In addition, a number of voucher specimens were collected as deemed necessary. It may be remarked also that geckos at the lamp were responsible for some losses.

Generally the specimens were caught at a single site 1 km outside Turunç, at an altitude of 90 m on a rocky slope. The adjacent area is surrounded by an olive grove, which hosts a variety of smaller plant species and bushes. Other trees and bushes growing in the direct vicinity are *Quercus coccifera*, *Ceratonia siliqua*, *Cistus salviifolius*, *Cistus creticus*, *Nerium oleander* and a few fruit trees including *Prunus* species and *Punica granatum*.

The moths were attracted by light at a house wall. A 160 W Osram mercury vapour lamp was used. In addition,

a fluorescent 8 W Sylvania black light, F8W, BL350 tube was used occasionally.

Records from other locations in Mugla Province are also included. Those mentioned in the text more than once are:

- Mugla Prov. / Marmaris / 2km south-east of Turunç, between Turunç and Kumlubük / Öğretmenler Sitesi, 30 m, in the text referred to as Kumlubük.
- Mugla Prov. / Bodrum / Yalikhavak / 500 m north-east of Gökçebel, 120m
- Mugla Prov. / Fethiye / Ölüdeniz / 1.5 km north of Ovacik, 340 m

Heavy wind or rain prevents any collecting activity during many nights in winter. On the other hand, during late spring, summer and early autumn even a cloudy sky is exceptional, but clear skies and moonlight also reduce the collection success. It has been noted that during the many hot days from mid June to mid October the number of moths coming to light shortly after dusk can be very low and then gradually increases later in the night. On very hot nights insect life apparently comes to a stand-still. Most specimens come to light in April, May, October and November. All in all the efficiency of light trapping measured by the number of specimens is not high and especially in summer the animals fly off readily.

7. Evaluation of Turunç records

In total 4444 specimens of 157 species have been collected in Turunç; three more species were caught after the statistical evaluation had already been finalised.

In addition eight species from other parts of Mugla Province have been added, of which five are from Gökçebel / Bodrum. The total number of listed species therefore amounts to 168.

Although the moths have been recorded during all seasons and distributed over a considerable number of days caution has been applied to interpret the data statistically, for instance in estimating the abundance of species and the abundance of moths per month.

- Σ The nights used for trapping and the time spent have been according to convenience, and to some extent on the weather.
- Σ The same is true for monthly distribution of collecting nights. Broken down to season the percentage has been as follows
 - Winter (XII-II): 13 %
 - Spring (III-V): 32 %
 - Summer (VI-VIII): 21 %
 - Autumn (IX-XI): 34 %
- Σ Weather patterns make collecting more difficult in the winter months, when many nights are unfavourable for light trapping
- Σ In the middle of summer the efficiency of collecting is lower because nights are cloudless and there is more light pollution from increased tourist activities
- Σ The collecting has often tended very much to concentrate on the early hours of the night. This leads to an underestimation of the abundance of species which more likely fly later at night. This factor is probably less important in winter, where flight intensity after midnight becomes very low due to falling temperatures. In summer, however, often there is no flight during and directly after dawn and the flight intensity sometimes increases later, when temperatures become cooler and more tolerable.
- Σ Some species do not come to light as freely as others, or do not settle down as easily. Some may not prefer the light source used in the investigation. Examples are the *Autophila* species, which have been shown to favour less intense light or fluorescent light. This behaviour has been found also in Turunç
- Σ Some species such as *Eublemma* species are more easily overlooked than others
- Σ Some species prefer to settle down further from the lamp and then might not been located so easily, as for example, *Metachrostis* species.
- Σ The abundance of some species apparently changes dramatically from year to year. Samples collected in only a few years cannot show this effect.

Despite the fact that sampling has been rather irregular, an attempt has been made to provide an estimate abundance. Four categories for species abundance are used:

- Σ very common: a single species represents 3 % or more of the total catch
- Σ abundant: a single species accounts for at least 1 % but less than 3 %
- Σ uncommon: more than 0.125 but less than 1%
- Σ rare: less than 0.125 % of the total number of recorded specimens, i.e. fewer than five specimens

Based on this, 66 species can be considered rare, 25 of which being singletons, 70 infrequent, 16 abundant and 8 very common.

One species, *Axis nesiota* REISSER, 1962, appears to be a new record for Turkey.

The most common species have been *Spodoptera ciliatum* with 8.8 % of the total catch, *Catocala nymphagoga* (6.0 %), *Caradrina flavirena* (5.2 %), *Catocala eutychea* (4.8 %), *Thaumetopoea solitaria* (4.5 %). The five most common species therefore account for nearly 30 % of the total registered specimens.

An interesting finding in the area is that the flight dates of many species are outside their known flight period elsewhere. Due to the hot climate, some spring species appear earlier and many autumn species appear later than given in the literature. These observations have been noted in the list of species below.

For easy comparison with the fauna of Greek Dodecanese islands, species which have been reported from these islands in FAUNA EUROPAEAE are marked with an asterisk after the name. For those which HACKER (1989) has confirmed, a '+' is added.

85 of the listed species for Turunç have not been recorded on the Dodecanese islands, either by HACKER (1989), or in FAUNA EUROPAEAE. Above that, FAUNA EUROPAEAE lists most of them as being 'absent' from these islands instead of marking 'no data' when it is obvious that some are surely to be found there, like *Macroglossum stellatarum*. Apparently 'absent' has been marked here erroneously for what should read 'no data'.

The other 83 species listed here have also been observed in the Dodecanese.

The species of the the Bozburun Peninsula should be expected to correspond to the ones on Rhodos and the other islands, and it is likely, that many of them will be found there in the future.

According to the literature, three species from Turunç have not yet been confirmed for Europe: *Polyplocia korbi* (though BOLDSYSTEMS shows one European record), *Polyphaenis propinqua* and *Plecoptera inquinata*.

8. Classification Used

Recently, the classification of the investigated faunistic groups, especially those which are now placed in the super-family Noctuoidea, has changed radically. Ongoing molecular analysis is likely to result in more changes.

Here, the classification of the Noctuoidea follows the series Noctuidae Europaeae, edited by FIBIGER, modified by the implications of ZAHIRI et al. (2007) and YELA et al. (2011). The most important change is in the former family Noctuidae LATREILLE, which is now split into Noctuidae LATREILLE and Erebidae LEACH, and in which the former Arctiidae LEACH and Lymantriidae HAMPSON placed as subfamilies of Erebidae. Additionally, Nolidae BRUAND and Euteliidae GROTE are raised to family rank within Noctuoidea. Notodontidae STEPHENS, are also included in Noctuoidea, although they are accepted as genetically more distant (ZAHIRI et al. 2007).

For the other families considered here, the taxonomy used by DE FREINA & WITT (1987) is followed.

Synonyms have only been given where there have been recent name changes and the former name was used in important literature, in order to avoid confusion and for easier reference.

9. List of Species

For each species the flight period observed is noted by a number in Roman letters for the month and a letter indicating the beginning (b), the middle (m), or the end of the month (e).

The flight periods shown have not been completed even if it is obvious that the species in question continues to fly between two shown records and has just by chance not been caught, in order not to manipulate original data.

Species listed, normally refer to the mainly investigated location in Turunç. Other locations from Mugla Province are explicitly mentioned in the text, where necessary. The information about abundance refers only to Turunç and is omitted for species that have not been recorded in Turunç.

Superfamily Bombycoidea LATREILLE

Lasiocampidae HARRIS (2 species)

Eriogaster rimicola DENIS & SCHIFFERMÜLLER, 1775 (eXI)

Several specimens were recorded from Gökçebel in the district of Bodrum (120 m).

Trichiura verena WITT, 1981 (eXI)
(pl. 1, fig.1)

Also recorded in Gökçebel / Bodrum, at an altitude of 120 m.

T. verena is distributed in Asia Minor and the south-eastern Balkans (DE FREINA & WITT 1987) and apparently also on Cyprus (see pictures FRIEDRICH, E. in LEPIFORUM.DE).

DE FREINA & WITT record the species at medium high and higher altitudes and also INDE FREINA(1986) no location is mentioned near the Mediterranean coast.

The determination of the specimens in comparison to *T. crataegi* LINNAEUS, 1758 was confirmed by reference to DE FREINA & WITT (1987).

Lemoniidae HAMPSON (1 species)

Lemonia balcanica HERRICH-SCHÄFFER, 1843 (eXI)
(pl. 1, fig.3)

One male from Gökçebel / Bodrum (120m). A worn specimen in which the typical discoidal markings are obliterated, and only traces are recognisable on the left fore-wing.

L. balcanica is distributed from the Balkan countries eastwards to Iran (ROUGEOT & VIETTE, 1984). FAUNA EUROPAEAE lists Greece, the European part of Turkey, but states the species to be absent from the Greek islands.

Despite the worn state of the specimen, other possible *Lemonia* species for the region can be excluded. Only *L. pia* PÜNGELER, 1902, from much further east (Kahramanmaraş, Kars) and the Dead Sea in Israel have any similarity (see e.g. illustrations in <BOLDSYSTEMS> and the description in WITT, 1979).

The flight time of *L. balcanica* is given in literature as August to October (DE FREINA & WITT, 1987; ROUGEOT & VIETTE, 1984; BESHKOV, 2014), but the capture in Bodrum is dated November 25th.

Sphingidae LATREILLE (7 species)

Agrius convolvuli LINNAEUS, 1758 (rare; eVIII)

Recorded only once.

Hippotion celerio LINNAEUS, 1758 * (rare; mX)

A single specimen recorded.

Macroglossum stellatarum LINNAEUS, 1758 (very common; bII-eIII, bVI, bVIII-eXII)

Majority of records from Turunç, Gökçebel / Bodrum and Ovacık / Fethiye are from day sightings, but a few specimens have been recorded at light. Abundance evidently varies from year to year, and the species has been virtually absent in the first half of 2014. It is usually common throughout Turkey.

Hyles livornica ESPER, 1780 (infrequent; eIII-mIV, bV-eV, mVI-eVI, eVII, mXI)

Hyles euphorbiae LINNAEUS, 1758 * (rare; mVIII)

H. euphorbiae was only once observed at the light in Turunç.

Daphnis nerii LINNAEUS, 1758 (rare; mIV, mVII, eIX)

D. nerii is resident in Turunç; the fully grown caterpillar was found close to its food plant in mid May.

Marumba quercus DENIS & SCHIFFERMÜLLER, 1775 (infrequent; eVI, mVII, bVIII, eVIII-bIX)

The area of distribution extends from southern Europe to Persia and Morocco (DE FREINA & WITT, 1987). As this species has been caught regularly, it can be assumed that it is resident also in the area of investigation.

Saturniidae BOISDUVAL (1 species)

Perisomena caecigena KUPIDO, 1825 (eX)

One specimen was found in Gökçebel / Bodrum (120m).

Superfamily Drepanoidea BOISDUVAL

Cimeliide CHRÉTIEN (1 species)

(Synonym: Axiidae REBEL)

Axia nesiota REISSER, 1962 (infrequent; bXI-bXII, eXII-bl)

DE FREINA & WITT (1987) give southern Greece and the island of Crete as area of distribution but do not mention Turkey. According to the same publication, *A. nesiota* has been caught in September and October only, while the records from this area extend throughout the late autumn until the beginning of January. *A. nesiota* was originally considered to be endemic to Crete but then also found on the Peloponnes and Middle Greece (HACKER, 1989, p. 192, under *Ammonoconia REISSERI*). One comment in LEPIFORUM.DE reports a finding on the Greek island of Samos (FRITSCH, D., 7.12.2008).

In Turunç *A. nesiota* is not rare and is a new record for the Turkish fauna.

Drepanidae MEYRICK (2 species)

Thyatirinae J.B.SMITH

Asphalia ruficollis FABRICIUS, 1787 (bIII)

All records are from Gökçebel / Bodrum.

Polyploca korbi REBEL, 1901 (common; mIII-mV)

(pl. 1, fig.3)

According to LÁSZLÓ et al. (2007) 'the species is distributed from Anatolia (eastwards of Ankara) throughout eastern Turkey to the western part of Iran' (p. 257). The same publication, however, cites a record from Uludag / Bursa in western Anatolia which contradicts this statement.

In FAUNA EUROPAEAE *P. korbi* is not included. BOLDSYSTEMS, however, shows one specimen from the Greek Aegean island of Samos.

P. korbi is not uncommon in Turunç. In total 69 specimens were counted during the period of investigation. The finding provides evidence that *P. korbi* can also be found close to the Aegean coast in Western Anatolia, so that also the record for Samos is not surprising. It may also be expected to occur on other islands such as Rhodos.

The caterpillar feeds on oak (*Quercus* spp.) and the species is usually found from medium to higher elevations (LÁSZLÓ et al., 2007). A similar species is *Achlya flavicornis* LINNAEUS, which feeds on beech (*Fagus* spp.) and is therefore restricted to cooler habitats. *P. korbi* is 'hardly distinguishable externally from its close relatives, *P. laororshanae* and *P. latens*.' (LÁSZLÓ et al., 2007, p. 256). *P. laororshanae* LÁSZLÓ, RONKAY, RONKAY & WITT, 2006 is a Levantine species known from Israel, while *P. latens* LÁSZLÓ, RONKAY, RONKAY & WITT, 2007 is known from Azerbaijan.

The identity of this species was confirmed by comparing the male genitalia of one specimen (23.III 2012 m) with the illustrations in LÁSZLÓ, RONKAY, RONKAY & WITT (2007).

Superfamily Noctuoidea LATREILLE

Notodontidae STEPHENS (3 species)

Thaumetopoeinae AURIVILLIUS

Thaumetopoeia solitaria FREYER, 1838 (very common; bIX, eIX-mXI)

o According to DE FREINA & WITT (1987), *P. solitaria* flies later in the year than *P. pityocampa* DENIS & SCHIFFER-MÜLLER, 1775 in August to September, while *P. pityocampa* flies from mid-May to August. Due to the hot and dry climate in the area under investigation early specimens of *P. solitaria* do not start to fly until September, but then the species is on the wing until mid-November!

P. solitaria differs from *P. pityocampa* in the shape of the frons (see DE FREINA & WITT, 1987 p. 286, figs.). The determination has also been confirmed by examination of the genitalia of a male specimen (Turunç 15.11.2013 m). *T. solitaria* is more like the more northern *P. processionea* LINNAEUS, 1758 but not sympatric.

T. solitaria is distributed from the Balkans eastwards to Persia (DE FREINA & WITT, 1987) and prefers karstic hot habitats, as in Turunç.

Phalaerinae BUTLER

Peridea korbi REBEL 1918 (rare; bIII-bIV)
(pl. 1, fig.4)

o It is possibly confusing that REBEL gave the name *korbi* to this species in 1918 after he had previously given the same name to another species, in 1901 (see *Polyphoca korbi* REBEL 1901).

P. korbi can be separated from *P. anceps* GOEZE, 1781 easily by differences in the antenna, as described in DE FREINA & WITT (1987) and its distribution is extending further south and further east as far as Syria and Iraq (DE FREINA & WITT, 1987).

Heterocampinae NEUMOGEN & DYAR

Harpyia milhauseri FABRICIUS, 1775 (infrequent; eIII-mIV)

Nolidae BRUAND (5 species)

Nolinae BRUAND

Meganola togatalis HÜBNER, 1796 (rare; bX)

Just one specimen has been obtained.

Nola cicatricalis TREITSCHKE, 1835 (infrequent; eIII-bIV)

N. cicatricalis is known from southern Europe, Asia Minor and Syria flying from III – V. with a second generation later in the year (DE FREINA & WITT, 1987).

According to the distribution map provided by FIBIGER, RONKAY, STEINER, & ZILLI (2009), *N. cicatricalis* does not seem to inhabit areas close to the Mediterranean coast of Spain, Italy and the Balkans. FAUNA EUROPAEAE on the other hand shows this species for Gibraltar, but absent from the whole of Greece. DE FREINA (1994) gave two records of *N. cicatricalis* from Antalya Province, one from an altitude of 350 m and another one of 5 m (Alanya). LEPIFORUM shows a caterpillar and pupa of this species from Rhodos (FRITSCH, D. 8.7.2008).

The specimens have also been compared and differentiated from the relatively newly recognised species *N. ronkayorum* BESHKOV, 2006 (BESHKOV, 2006).

Nola subchlamydula STAUDINGER, 1871 (rare, aX)

N. subchlamydula is widespread in Southern Europe and also known from the southern parts of central Europe, from Turkey, Crete (DE FREINA & WITT, 1987) and with one record from Lebanon (HACKER, 2001).

In Turunç *N. subchlamydula* has only been recorded once, on 1. X. 2014. It seems that there is a second generation when climate allows. The usual flight time is known to be end of April to July (DE FREINA & WITT, 1987). EBERT (2004) reports a partial second generation under breeding conditions. *N. subchlamydula* has been captured several times at sea level in Antalya Province in April, May and June, but also September (DE FREINA 1994).

EBERT (1994) describes the species as rarely coming to light, and mainly sedentary.

Eriadinae HAMPSON

Earias insulana BOISDUVAL, 1833 (infrequent; mV, bX, eX, mXI-eXI)
(pl. 1, figs 5-7)

E. insulana is very variable (see also HACKER, 2001). The green, as well as different yellow forms have been observed. Three forms are illustrated here.

Chloephorinae STAINTON

Bena bicolorana FUESSLY, 1775 * (rare; eX)
(Synonym: *Bena prasinana* auctt. nec. LINNAEUS)

Just one specimen of *B. bicolorana* has been noted.

Erebidae LEACH

Arctiinae LEACH (6 species)

Lithosiini BILLBERG

Eilema caniola HÜBNER, 1808 (common; eIII-eV, mX-mXI)

The Mediterranean species *E. caniola* is bivoltine, according to WITT & RONKAY (2011), in the southern Mediterranean area even trivoltine.

Individual specimens are often very similar to *E. costalis*. Especially for the autumn records not all specimens at the lamp could be safely separated immediately for the statistics. However, it seems that in autumn *E. costalis* is considerably more abundant than *E. caniola*, while in spring *E. caniola* is common. In autumn, *E. caniola* apparently flies for a longer period than *E. costalis*.

Most authors show a flight time from V-VI and VIII to XI, but in the Aegean area the flight apparently starts much earlier in spring and ends much later in autumn. This corresponds better with the statement in WITT & RONKAY (2011), who give April to November, though the first records from Turunç are as early as the end of March.

E. caniola has been confirmed by genital analysis.

Eilema costalis ZELLER, 1847 * (common; eVIII-mX)

(Synonym: *Eilema morosina* HERRICH-SCHÄFFER, 1848)

This *Eilema* species is also abundant in Turunç, though in general it is said to be local (WITT & RONKAY, 2011). *E. costalis* is known from the Balkans eastwards to Eastern Turkey and has been recorded also from Rhodos, Samos and Crete (WITT & RONKAY, 2011).

Literature shows a flight time from VII - IX (DE FREINA & WITT, 1987; WITT & RONKAY, 2011). In the area under investigation the species has so far been found for certain until November 3rd. Unlike *E. caniola*, it is univoltine and is not found in spring.

E. costalis has been confirmed also by checking the male genitalia (Turunç, 6.10.2012).

Eilema muscula STAUDINGER, 1899 * (rare; bX)

(pl. 1, fig.8)

A single male of this third *Eilema* species has been caught.

E. muscula can be found from Rhodos along the Turkish Aegean and south coast eastwards to Iraq and prefers a landscape including gorges (DE FREINA & WITT, 1987). WITT & RONKAY (2011) also mention Rhodos and add two other records from Europe: Samos and Strymon Delta in mainland Greece. This source also mentions countries adjacent to Turkey in the east as extension to its distribution range.

Syntomini HERRICH-SCHÄFFER

Dysauxes famula FREYER, 1836 * (rare; eIX-mX)

Arctiini LEACH (2 species)

Arctia villica LINNAEUS, 1758 * (rare; eIII-eIV)

As *A. villica* comes to light mostly after midnight, it might be more abundant than the records indicate. The species has also been found in Kumlubük.

Euplagia quadripunctaria PODA, 1761 * (common; mVI-bVII, mVIII-eVIII, eIX-bX)

Besides Turunç *E. quadripunctaria* has also been recorded in Gökçebel / Bodrum and Köycegiz / Toparlar Kanyon.

E. quadripunctaria is also the insect that given the name to Kelebek Vadisi (Butterfly Valley) in Fethiye / Mugla as well as the Valley of Butterflies in Rhodos, famous as a tourist attraction. In both places it is found in large numbers.

Lymantriinae HAMPSON (one species)

Lymantria dispar LINNAEUS, 1758 (common; eV- bVII)

Rivulinae GROTE (1 species)

Zebeeba falsalis HERRICH-SCHÄFFER, 1839 * (rare; mIX)
(pl. 1, fig.9)

Z. falsalis is found in southern Europe and North Africa (BERIO, 1991) and eastwards to Turkey and Syria (HACKER, 1989). HACKER gives records for Turkey only from the Mediterranean area (HACKER, 1990), one finding from Antalya Province (500 m) was mentioned specifically in HACKER (1997a), and another one from Gelibolu Peninsula near Çanakkale HACKER (1983).

Z. falsalis generally seems to be rare in the area around Turunç with only one record, in mid September.

Eublemininae FORBES (7 species)

Eublemma ostrina HÜBNER, 1808 * + (rare; mIII-bIV, bV, bX)

Eublemma parva HÜBNER 1808 * + (infrequent; eVIII-mIX, eX)

Eublemma scitula RAMBUR, 1833 * (rare; mVIII)

Only one specimen has been recorded.

Eublemma cochylioides GUENÉE, 1852* + (infrequent; eVI, bVII-mVII, bX, bXI-mXI)

Metachrostis velocior STAUDINGER, 1892 * + (infrequent; eV, bVI, eVI, eVIII, bIX-mX, bXI)

Metachrostis species come to artificial light, but they behave rather inconspicuously and settle calmly somewhat outside the centre of the light, where they are easily overlooked. Some specimens have also been found at rest during the day, so perhaps the three species are more common than the records suggest.

Most of the specimens of *M. velocior* were recorded in 2011. Its abundance can apparently change from year to year.

M. velocior is known to fly from V-VII and IX-X (HACKER, 1989). In Turunç a single worn specimen was caught in the beginning of November (3.XI). Also the specimens caught at the end of August (27.VIII and 30.VIII) are outside of the time frame given in the literature. HACKER (1989) states that there are two generations. The November record suggests the possibility of at least a partial third generation in the area studied.

M. velocior is reported to be much less abundant and more local than *M. velox* (HACKER, 1989; KRAVCHENKO et al., 2007b), but in Turunç it is much more common than the smaller *M. velox*, as far as captures have indicated.

While the appearance of both moths is rather similar, the two species can be easily distinguished in the field by the substantial size difference, *M. velocior* having a wider wingspan of 24-26 mm compared to 18 – 19 mm in *M. velox* (BERIO, 1991).

Metachrostis velox HÜBNER, 1813 (rare; mIX-eX)

Like *M. velocior*, this species also favours very hot rocky slopes in low altitudes. The flight time is V-VII and VIII-X, in two generations (HACKER, 1989).

Metachrostis dardouini BOISDUVAL, 1840 (rare; eIII)

M. dardouini occurs only sporadically in Turkey (HACKER, 1989) and is only known from the Mediterranean coast and eastern Anatolia (HACKER, 1990). It is also rare and local in Israel (KRAVCHENKO et al. 2007b). According to HACKER (1989), the flight time of the first generation starts in April, but the single specimen from Turunç was captured even earlier, on March, 25th.

The area of distribution is reported to range from southern Europe in the west to Afghanistan (HACKER, 1989) and Turkmenistan (HACKER, 2001) in the east.

Herminiinae LEACH (3 species)

Idia calvaria DENIS & SCHIFFERMÜLLER, 1775 (rare; mXI-eXI)
(pl. 1, fig.10)

I. calvaria shows regional variability. Illustrations of most specimens in literature do not resemble those from Turunç, but one specimen shown in FIBIGER, RONKAY, YELA & ZILLI (2010) from Alanya / Antalya has the same appearance. Also LEPIFORUM.DE illustrates one from Cyprus (FRIEDRICH, E.) which is also similar.

According to FIBIGER, RONKAY, YELA & ZILLI (2010), variation in wing pattern in Europe is 'remarkably low', but high in south-western Asia. From Kahramanmaraş a different subspecies *meridionalis* OSTHELDER 1940 has been described, the validity of which has not finally been decided.

FIBIGER, RONKAY, YELA & ZILLI (2010) state that this moth 'in southern localities' flies from late May to mid July and mid August to the beginning of October. In Turunç it is on the wing until the end of November. Only two specimens have been observed, both in November, the latest on the 25th.

Nodaria nodosalis HERRICH-SCHÄFFER, 1851 (rare; eIV)
(pl. 1, fig.11)

N. nodosalis has been recognised in Turunç just once. The insect shows tropical distribution. According to HACKER (1990) it has not been collected in Turkey since 1925.

Pechipogo plumigeralis HÜBNER, 1825 (infrequent; bV, bVII, eVIII, bIX, bX)
(Synonym: *P. crinalis* TREITSCHKE, 1829)

Interestingly, in Turunç this species has more often been flushed in day time than taken at light, although is very frequent at light in northern Turkey.

A similar species, *P. simplicicornis* ZERNY, 1935 is shown in FAUNA EUROPAEAE to occur in Europe in Spain and Romania. FIBIGER, RONKAY, YELA & ZILLI (2010) consider the latter country to be included erroneously. *P. simplicicornis* is not to be expected in Turkey.

Hypheninae HERRICH-SCHÄFFER (3 species)

Hyphenia obsitalis HÜBNER, 1813 * + (rare; bII, eIV, mX-eX)

Hyphenia lividalis HÜBNER, 1796 * (rare; mV, bXII)
(pl. 1, fig.12)

H. lividalis has subtropical and tropical distribution including Mediterranean countries, and flies from III-VII and VIII-XI according to HACKER (1989). One specimen in Turunç was caught on December, 6th.

Hyphenia palpalis HÜBNER, 1796 (rare; bIV)

H. palpalis was just observed once (4.4.2014). It inhabits southern Europe from France, eastwards to Asia Minor and Afghanistan (HACKER, 1989).

Catocalinae BOISDUVAL (24 species)

Lygephila craccae DENIS & SCHIFFERMÜLLER, 1775 * (infrequent; mVII, mVIII, mIX)

All specimens seen have been carefully checked for *L. viciae* HÜBNER, 1822. *L. viciae* has been found in Turkey once in Erzurum (HACKER, 1990, page 706).

L. craccae, however, is widespread throughout Turkey (HACKER 1990). GOATER, RONKAY & FIBIGER (2003) explicitly mention its presence on Rhodos. The moth is on the wing from III-X (HACKER, 1989, KRAVCHENKO et al., 2004)

Tathorhynchus exsiccata LEDERER, 1855 + (rare; eIII, eIV, mX, bXII-bl)

L. exsiccata is an Asian and African species which reaches the southern-most areas in Europe and Asia Minor.

Autophila limbata STAUDINGER, 1871 (rare; mIII-blV)
(pl. 1, figs 13, 14)

Specimens of *A. limbata* were identified according to wing pattern and the shape of the fore-wing. One doubtful female specimen with partly faded wing markings was confirmed by examination of the genitalia (Turunç 15.3.2012 f), in comparison with illustrations in GOATER, RONKAY & FIBIGER (2003).

A. limbata ranges across southern Europe through Asia Minor to Iran and Iraq. It flies from VI-VII and X-IV in one generation with a summer diapause (GOATER, RONKAY & FIBIGER, 2003).

In Turunç the March specimens are very fresh and apparently newly hatched, which suggests that the new generation of imagines emerges earlier than shown in literature. The species has also been found in Kumlubük.

Autophila anaphanes BOURSIN, 1940 + (rare; mIII-eIII)
(pl. 1, figs 15, 16)

A. anaphanes has been caught at fluorescent light or settled on a window with diffuse light from inside the house, but has not come to the strong mercury vapour lamp. In literature it is said not to be attracted by light very much (HACKER, 1989; GOATER, RONKAY & FIBIGER, 2003), and hence it is probably more frequent than it seems.

According to HACKER (1989) the imago emerges in May and flies until April the following year with a diapause in summer and another one in winter. The specimens collected in March in Turunç were all very fresh and evidently hatch much earlier than this.

A. anaphanes is known to occur in the Balkans and in Mediterranean Turkey. BOURSIN (1940) also mentions Rhodos, with a question mark, but its occurrence there has been confirmed by HACKER (1989). KRAVCHENKO et al. (2004) add Israel, Lebanon and Cyprus.

Apopestes spectrum ESPER, 1787 (bIII)

A. spectrum is known to fly from IV to III the following year, with two diapauses in summer and in winter, as with the two *Autophila* species above.

It has been recorded from Gökçebel / Bodrum (120 m), where it was caught inside a house at the beginning of March. It was in better condition than would be expected if the animal had been on the wing for nearly a year.

The species is not attracted much by light (HACKER, 1990), so no clear statement about the abundance of this species can be made.

According to FAUNA EUROPAEAE *A. spectrum* is absent from all the Greek islands except Crete. It should be noted that the Bodrum Peninsula is very close to Kos, just 4 km of sea separate the Turkish mainland from the Greek island, so that it would not be a big surprise to find the species also on Kos and some of the other islands.

Catephia alchymista DENIS & SCHIFFERMÜLLER, 1775 * (infrequent; eIII-mV)

C. alchymista is known to fly from V-VII with a possible second generation in VIII-IX. Much like many other species described here, it also starts to fly much earlier, from end of March on.

Aedia funesta ESPER, 1766 (rare; mIV)

HACKER (1989) shows a flight time for Greece of V-VII for the first generation, but the only specimen found in Turunç was seen as early as April, 16th.

Aedia leucomelas LINNAEUS, 1758 (rare; aX-mX)

A. leucomelas is known in Turkey only from the warm coastal areas close to the Black Sea and the Mediterranean Sea (HACKER, 1989; also HACKER, 1990). According to the first source the imagines are on the wing from III to VI and from VIII to IX. The only record in Turunç is later, on October 15th.

Zethes insularis RAMBUR, 1833 * + (infrequent; mIII-bIV, bV, mVII, mIX, bX)

Two similar species are known in eastern Turkey, namely *Z. brandti* JANZON, 1977 and *Z. narghisa* BRANDT, 1938, both of which are slightly, but clearly, different.

Pandesma robusta WALKER, 1858 (rare; mIX, eXI)
(pl. 1, fig.17)

P. robusta is a tropical species, illustrated in HACKER (1989). It is rarely found in Europe, where it is probably only immigrant (HACKER 1989).

Ophiusa tirhaca CRAMER, 1777 * + (infrequent; mIII-eIII, eIV-mV, mVII, mVIII, bIX, eIX-eX, mXI)

Dysgonia algira LINNAEUS, 1767 + (infrequent; bV, eV, bVI-mVI, bVII, eVII, mVIII-mX)

The wing patterns of captured specimens were checked carefully, for features indicative of *D. torrida* GUENÉE, 1852, but all, with one exception, have proved to be *D. algira*. The identification of one male was confirmed by checking the genitalia (1.10.2014 m).

Dysgonia torrida GUENÉE, 1852 *

(rare; aX)

D. torrida is widespread in hot areas of Africa and Asia and is known in Europe and Turkey from the southern-most areas (HACKER, 2001). It has also been found on the Dodecanese island group (FAUNA EUROPAEAE). The wing pattern is only slightly different from that of *D. algira* (for details see e.g. HACKER (1989)). Only one male has been captured. The genitalia (1.10.2014 m) were checked against the illustrations in BERIO (1991) and HACKER (1989)

Grammodes stolida FABRICIUS, 1775 *

(infrequent; mVIII-eVIII, bIX-mIX, bX-mX)

Catocala nymphaea ESPER, 1787

(infrequent; mV-eVI, mVII)

In addition to Turunç, *C. nymphaea* was also caught in Gökçebel / Bodrum.

Catocala eutychea TREITSCHKE, 1835 * +

(very common; bV-mVI)

C. eutychea has also been found in Ovacik / Fethiye, where it was also abundant.

A sister species, *C. mariana* RAMBUR, 1858 occurs on the Iberian Peninsula (GOATER, RONKAY & FIBIGER, 2003) and Morocco (NOCTUIDAE.DE).

Catocala disjuncta GEYER, 1828 * +

(rare; eVI-mV, mVII)

C. disjuncta is known from the European Mediterranean area and Asia Minor. In Greece it is widespread (HACKER, 1989). In Turunç the species had been recorded only twice during the period of investigation, until the first half of July 2014, when another 7 specimens were observed.

Catocala separata FREYER, 1848 *

(rare; mVII)

(pl. 1, fig.18)

C. separata is a rather darker sister species to *C. disjuncta*. Details of the differences are shown in HACKER (1998). The distribution seems to be restricted to southern Greece and the Aegean coast, some parts of the Balkan Peninsula and from southern Turkey to the Levant, but is still 'imperfectly known' (GOATER, RONKAY & FIBIGER, 2003). This moth prefers oak forests close to the sea (HACKER, 2001).

Generally *C. separata* is more rare than *C. disjuncta* (GOATER, RONKAY & FIBIGER, 2003), and in Turunç just one specimen of *C. separata* has been captured.

Catocala hymenaea DENIS & SCHIFFERMÜLLER, 1775 +

(rare; mVI)

C. hymenaea inhabits an area which extends from south-eastern Europe to Central Asia (BERIO, 1991). For places, it is said to be rather rare (for the Balkans, see HACKER, 1989; for the area between Volga and Ural, see GOATER, RONKAY & FIBIGER, 2003; for Turkey, see (HACKER, 2001). In Turkey HACKER (1990) mentions Anatolia, south-eastern Turkey and a record from before 1925 from the Mediterranean. For the Turkish Black Sea area there are several findings from Sile near Istanbul (BARON, 2008).

According to GOATER, RONKAY & FIBIGER (2003), *C. hymenaea* flies in June and July, sometimes from June on into early August (BARON, 2008). The presence of the species in Turunç can be confirmed, with one record in mid June.

Catocala conversa ESPER, 1787 * +

(infrequent; mVI-eVII)

Catocala nymphagoga ESPER, 1787 +

(very common; bV-bVII, eVIII)

Catocala conjuncta ESPER, 1787 * +

(infrequent; mVIII-eVIII, mIX-eX)

Catocala elocata ESPER, 1787 * +

(rare; bXI)

In Turunç just one specimen was recorded on November, 8th, compared to a flight time given by HACKER (2001) from June to autumn.

Plecoptera inquinata LEDERER, 1857

(rare; bV, mVI, mVII, bX)

(pl. 2, fig.1)

HACKER (1989) does not mention *P. inquinata* for Greece. In his later publication about Turkey it is reported

from all regions (HACKER, 1989), but mainly found in the southern parts (HACKER, 2001). It is also known from the Near East as far as Iran (HACKER, 2001). FAUNA EUROPÆAE and GOATER, RONKAY & FIBIGER (2003) do not include this species for Europe. Having found it directly at the Aegean coast in Turunç, at least it occurs at the ‚doorstep‘ to Europe.

The flight time reported in literature is V and X for Israel, where it is said to be rare. (KRAVCHENKO et al., 2004). HACKER (2001) refers to two generations, one in ‚early spring and summer‘ and one in autumn.

Euteliidae GROTE (1 species)

Eutelia adalatrix HÜBNER, 1813 * + (infrequent; eIII-mV, eX)

Noctuidae LATREILLE

Plusiinae BOISDUVAL (6 species)

Trichoplusia ni HÜBNER, 1803 * (infrequent; eIII-eIV, mV-eV, eVI, mVII, mVIII, eIX-bX, eX, eXI)

Thysanoplusia circumscripta FREYER, 1831 (infrequent; mIX-bX, eX-bXI)

Thysanoplusia daubei BOISDUVAL, 1840 (rare; bXI)

T. daubei is known in Turkey from areas with Mediterranean climate (HACKER, 1990). Previously, it has only been found ‚south of the Taurus chain‘ (HACKER, 2001). However, there is one record for Mugla Province from south of Dalaman from eV (HACKER, KUHNA & GROSS, 1986).

Ctenoplusia accentifera LEFEBVRE, 1827 (rare; aX, eX, eXI)

Chrysodeixis chalcites ESPER, 1789 * + (very common; bI, mIII-mIV, mV, bVI-mVII, bVIII-mXII)

Autographa gamma LINNAEUS, 1758 * + (common; bIII-bV, eV, mVIII, eVIII, mIX-eXII)

Eustrotiinae GROTE (2 species)

Pseudozarba bipartita HERRICH-SCHÄFFER, 1850 (infrequent; eVIII-bX, bXI)

P. bipartita is known throughout the Mediterranean area, especially in very hot and dry areas (FIBIGER, RONKAY, STEINER & ZILLI, 2009).

According to HACKER (2001), the only Turkish record was one from Antalya. Having established its existence in Turunç, it is not unlikely that *P. bipartita* occurs also on Rhodos or Symi, though FAUNA EUROPÆAE states this species to be absent from the Dodecanese Islands. The food plant is unknown (FIBIGER, RONKAY, STEINER & ZILLI, 2009).

P. bipartita was common in 2012 in Turunç; apparently abundance changes from year to year.

HACKER (2001) gives VI-VII and early autumn as flight time; in Turunç the first records are at the end of August and the latest record is November 4th.

Acontiola moldavicola HERRICH-SCHÄFFER, 1851 + (rare; mIV, eVI)

A. moldavicola was only captured twice in the study area.

The distribution extends from Italy in the west, to Syria and Iraq in the east (FIBIGER, RONKAY, STEINER & ZILLI, 2009). In Turkey it is uncommon and known so far only from central Anatolia (HACKER, 1990). According to (FIBIGER, RONKAY, STEINER & ZILLI, 2009), it is also rather rare in Italy and the Balkans. These authors remark that the moth is also active by day and visits flowers. This has not been observed in Turunç.

HACKER (1989) gives the flight period from V – VII. The earliest confirmation of this species for Turunç, attracted to light, was April 13th, again a very early date.

Acontiinae GUENÉE, (1 species)

Acontia lucida HUFNAGEL, 1766 * + (infrequent; eIII-mIV, eV-bVII, eIX-bX)

In addition to Turunç, *A. lucida* was also found in Ovacik / Fethiye.

Cuculliinae HERRICH-SCHÄFFER (3 species)

Cucullia calendulae TREITSCHKE, 1835 + (rare; mXII, bII-eII, eIII)
(Synonym: *wredowi* O.G. COSTA, 1835)

C. calendulae is distributed around the Mediterranean Sea and eastwards to Afghanistan (RONKAY & RONKAY, 1994), especially in low-lying, hot areas (HACKER 1989, see under *C. wredowi*) flying throughout the winter months.

C. chamomillae DENIS & SCHIFFERMÜLLER, 1775 is very similar, and only to be separated for certain by the genitalia. According to EBERT (1994), the presence of this species is also confirmed for the area around the Mediterraneans as well as Crete.

The identity of *C. calendulae* here has been confirmed by examination of the male genitalia (Turunç 14.12.2012 m) in comparison with the illustration in BERIO (1995) (shown under *C. wredowi*).

Shargacucullia blattariae ESPER, 1790 (rare; eIII-aIV)

S. blattariae is known from southern Europe and Asia Minor (HACKER, 1989). There has been some confusion as to whether it occurs in Turkey. HACKER (1989) does mention Asia Minor, however, HACKER (1990) stated that there have been no records for Turkey but only from the Balkans and southern Russia. For Asia Minor he reports the similar *S. barthae* BOURSIN, 1933.

According to RONKAY & RONKAY (1994) *S. blattariae* and *S. barthae* are separate species and both of them can be expected in Asia Minor. *S. blattariae* is said to be 'relatively widespread in ... western Turkey'. According to the same source, the two species can usually be distinguished at once by their wing patterns as described in detail in this source. As *S. barthae* is unknown from Europe, details about its bionomics are not mentioned, although a comparative description, with illustrations of the imagines and the male genitalia is included.

All records of *S. BARTHAE* in Turkey named by BOURSIN (1933) are from much further east. The distribution is 'As far as known ... from Anatolia to Iraq, North Iran and the Levante' (HACKER, 2001) on 'usually limestone mountains'.

Shargacucullia thapsiphaga TREITSCHKE, 1826 (rare, mIV)
(Synonym: *S. lanceolata* VILLERS, 1789 nomen dubium)

S. thapsiphaga is known from central and southern Europe and Asia Minor from medium altitudes, where the foodplant, *Verbascum* species, grow (HACKER, 1989). For Turkey HACKER (1990) shows more southern areas as range of its distribution including the Mediterranean area. It can be noted that *Verbascum* spp., can be found slightly higher in the hills around Turunç, although they have not been found at the altitude where the light trapping has taken place,

A very similar taxon from higher elevations (HACKER 2001) is *S. thapsiphaga* subsp. *anceps* STAUDINGER, 1882. The imagines as illustrated in RONKAY & RONKAY (1994) look only slightly different from nominate *S. thapsiphaga*. This subspecies has been reported from most areas in Turkey but not from the Mediterranean area. There have been discussions in literature as to whether this is a good species or just a subspecies of *S. thapsiphaga* (HACKER, 1989; EBERT, 1994). RONKAY, RONKAY & GYULAI (2011) now treat it as a subspecies of *S. thapsiphaga*.

Oncocnemidinae FORBES & FRANCLEMONT (3 species)

Omphalophana anatolica LEDERER, 1857 * + (infrequent; mIII-bIV, bV)

Pamparama acuta FREYER, 1837 (rare; mIII-mIV)
(pl. 2, fig.2)

P. acuta is reported from all main regions of Turkey. It is distributed from the European part of Turkey to Iran and the Levant. HACKER (1989) does not show the species in his overview of Greece, but it has since been discovered on Samos (HACKER, 2001; see also FAUNA EUROPAEAE; RONKAY & RONKAY, 1995). RONKAY & RONKAY (1995) mention that nearly all the existing records are from Turkey.

Xylocampa mustapha OBERTHÜR, 1910 (infrequent; bI, eII, bIII-mIII, bIV, mX, eXII)

X. mustapha is known from North Africa and in Europe eastwards from Italy. In Turkey and the Near and Middle East the subspecies *Xylocampa mustapha hethitica* KOBES & PINKER, 1976 flies. (HACKER, 2001)

The Mediterranean *X. areola* ESPER, 1798 is a sister species to *X. mustapha*.

HACKER (1989) does not show the species for Greece. In Turkey it is known from all regions except from the north (HACKER, 1990). BESHKOV (2000) only cites an old record from literature for Bulgaria. It is stated to be

absent from the Dodecanese (FAUNA EUROPAEAE), though in the authors opinion, again, it is not unlikely to be present on Rhodos. Further to the east, records from Iraq, Lebanon, Israel, Palestine and Jordan are known (HACKER, 2001).

The flight time given by HACKER (2001) is I-IV, in one generation. However, published records suggest that the flight time is much longer, and maybe there could be more than one generation. The foodplants are *Lonicera* species (probable, according to HACKER, 2001), and as this food plant is available also during summer, at least in gardens, it seems possible.

Stenoecia dos FREYER, 1838 (bIV)
(pl. 2, fig.3)

S. dos is listed in RONKAY & RONKAY (1995) under Oncocnemidinae, though in the past, it was considered to belong in Heliiothinae (FIBIGER & HACKER, 2005). It has so far only been found in Turkey and Macedonia, and it seems to be a very rare species (HACKER, 1989). In Mugla Province the moth has been observed in Kizilbucak (new name: Bozbük) near Milas / Mugla on 9.4.96 flying in daytime in a flowery meadow. HACKER (1989) gives V-VI as flight time, but the record of the author is substantially earlier, in early April.

Amphipyrinae GUENÉE, (2 species)

Amphipyra effusa BOISDUVAL, 1828 (infrequent; ml-el, ell, eIII, mIV-elV, mV-eV, mX-bXI bXII-eXII)
(pl. 2, fig.4)

A. effusa occurs in southern Europe, North Africa and Asia Minor, but is said to be rare in Turkey (HACKER, 1989), and flying only in the more southern areas (HACKER, 1990). HACKER (1989) gives VI-XII as flight time. De VRIEZE mentions the species for Spain also for December and for April.

In Turunç *A. effusa* is not very rare and comes to light sporadically during the whole year without interruption except for the very hot summer months. The reason for its disappearance in summer seems to be due to a migration into higher altitudes during this time (HACKER, 1989).

Both the typical brown form and in the lighter beige one are found in Turunç. The beige form has been observed from end of December until the end of April (20.1.,23.1.,31.1.,21.2., 21.12, 18.4.). It seems that this form is more common in the cooler months, together with the regular form, while in warmer months it is rarer or even absent.

A. effusa is said to be univoltine (HACKER, 2001). However, considering its continuous presence throughout the year and the fact that in winter lighter coloured forms appear together with the brown ones, perhaps there are more generations than one.

Amphipyra micans LEDERER, 1857* (rare; mVI-eVI, mVII)

Psaphidinae GROTE (1 species)

Asteroscopus syriaca WARREN, 1910 (infrequent; el-mII)
(pl. 2, fig.5)

A. syriaca has been reported from the Balkans, Anatolia, as well as eastern and south-eastern Turkey, but not from the Mediterranean coast (HACKER, 1990). In NOCTUIDAE.DE, however, one specimen from Antalya is illustrated. *A. syriaca* flies after midnight (RONKAY & RONKAY, 1995) and is generally very rare (HACKER, 1989) or local (RONKAY & RONKAY, 1995).

RONKAY & RONKAY (1995) give mX-bXII as the flight time and HACKER (1989) X-XII, in Turunç the species flies in January and February. The flight time in winter and late at night is probably the reason why the species has been overlooked in Mediterranean influenced areas.

Whether the specimens from the Aegean coast belong to the subspecies from the Balkans or the one in the southern parts of Central Turkey (see RONKAY & RONKAY, 1995) is uncertain at present because of a lack of comparative material.

Besides Turunç, the species has also been recorded from Kumlubük near Turunç.

The southern limit of distribution of the similar *A. sphinx* HUFNAGEL, 1766 lies further north, extends through northern Greece, through Turkey and into the Caucasian Region (HACKER, 1989). HACKER (1990) only cites one old record from before 1925 for the Turkish Mediterranean region for this species. Details are not given, this record may be from higher altitudes, as the habitat is described as 'bordered by semi-arid grasslands and macchia' (RONKAY & RONKAY, 1995).

Heliethinae BOISDUVAL (2 species)

Heliethis peltigera DENIS & SCHIFFERMÜLLER, 1775 * + (infrequent; bIII-mIV bV-bVI, bVII-mVII, mVIII, bX, eX)

Helicoverpa armigera HÜBNER, 1808 * + (infrequent; mIV, mVI, mVIII-bX, eX, mXI-eXI)

Eriopinae HERRICH-SCHÄFFER (1 species)

Callopistria latreillei DUPONCHEL, 1827 (infrequent; mIV, mV-eV, eX, mXI-eXII)

Bryophilinae GUENÉE, (4 species)

Cryphia ochsi BOURSIN, 1940 * (infrequent; bVIII-mX)

C. ochsi is known to be distributed in the Mediterranean area eastwards to Iran and in parts its range it is common (FIBIGER, RONKAY, STEINER & ZILLI, 2009). In general, *C. ochsi* is probably more widespread in Turkey (HACKER, 1990) than its sister species *C. algae* FABRICIUS, 1775.

C. ochsi is very variable, and can be distinguished from *C. algae* with certainty only by dissection of the genitalia, which show very clear differences in both sexes.

C. ochsi and *C. algae* fly together in many areas. As older records did not distinguish between them, the exact borders of distribution are not clear, especially in the south-eastern part of its range (FIBIGER, RONKAY, STEINER & ZILLI, 2009).

For Turunç a number of specimens have been analysed (16.VIII 2012 (f); 27.VIII 2012 (m); 4.X 2012 (m); 4.IX 2013 (f); 7.IX 2013 (f); 23.IX 2013 (f), 29.IX 2014 (m) and it seems, that the habitat under discussion is populated exclusively by *C. ochsi*.

The author has found both species to be sympatric in north-eastern Turkey (Kurtulmus Köyü / Ordu), the findings confirmed by examination of the male genitalia (*C. ochsi* 26.VII 2013 (m) and *C. algae*, 25.VII 2013, (m))

FIBIGER, RONKAY, STEINER & ZILLI (2009) give the flight time as eVI-IX, HACKER (2001) as VIII-X. The current analysis shows records in line with those for the Levant.

The also similar *C. pallida* BETHUNE-BAKER, 1894 inhabits the western Mediterranean area (FIBIGER, RONKAY, STEINER & ZILLI, 2009). Records for Greece are doubtful (FIBIGER, RONKAY, STEINER & ZILLI, 2009) and there are none for Turkey (HACKER, 1990)

Bryophila tephrocharis BOURSIN, 1953 (infrequent; eV-bVII, mVIII-bIX)

B. tephrocharis BOURSIN is found in the Balkans, Asia Minor and Near East as far as Iran (FIBIGER, RONKAY, STEINER & ZILLI, 2009).

The population flying in Turunç is a rather uniform and very typical looking form, and the determination of nearly all specimens is easy. One male specimen (18.9.2014) has been rechecked by study of the genitalia.

The flight time shown in HACKER (1989), V-IX, can be confirmed. In 2012 the species was common in Turunç. It was very abundant at light in a rocky dry habitat near the seaside at Kocabahçe, 2.5 km north-west of Bozburun at the tip of Bozburun Peninsula at the end of August 2014.

Bryophila rectilinea WARREN, 1905 * (infrequent; mVIII-eVIII, eIX)

B. rectilinea has been found in the Balkans and in Turkey on the Mediterranean coast and in Anatolia (HACKER, 1990). FIBIGER, RONKAY, STEINER & ZILLI (2009) add the Levant and Iraq to the east. The identity of the specimens in Turunç has been confirmed by examination of the male genitalia (19.8.2012, m; 25.8.2012 m).

Nyctobrya amasina DRAUDT, 1931 (infrequent; mVII-eVII, eVIII, bIX)

N. amasina replaces its western sister species *N. muralis* FORSTER 1771 in the Balkans and Asia Minor (HACKER, 1990). The exact border of distribution of both species is still uncertain and there is a need for specimens to be checked in the Balkans and Asia Minor (see e.g. FIBIGER, RONKAY, STEINER & ZILLI, 2009). Although *N. muralis* is mentioned in the literature for Asia Minor, it does not seem to inhabit the area. One of the Turunç specimens has been dissected and it belongs to *N. amasina* as expected (Turunç, 22.8.2012, m; in comparison with illustrations in HACKER (1989) and RAKOSY (1996).

It is worth mentioning that the author has also examined one specimen from north-eastern Turkey, Kurtulmus Köyü, Ordu Province, an area which has a similar climate to that of Central Europe. However, it also turned

out to be *N. amasina* (Ordu/Kurtulmus 21.7.2013, f)

Xyleninae GUENÉE (40 species)

Spodoptera exigua HÜBNER, 1808 + (very common; eIII-mIV, bV-mV, eVI, bVIII-bXI, bXII)

Spodoptera cilium GUENÉE, 1852 (very common; eIII-mVII, mVIII-bXI, eXI-mXII)

This is a widespread tropical species and in Turkey it occurs only in the southernmost areas (HACKER, 1989), so here it can be considered to be at the northern limit of its distribution. In Turunç the species is very abundant. It has been recorded by the author also from Gököy / Bodrum.

Spodoptera littoralis BOISDUVAL, 1833 * + (infrequent; mIII, eIX-mXI)

Caradrina flavirena GUENÉE, 1852 * + (very common; eIII-bV, bIX-bXI)

C. flavirena has also been observed in Ovacik / Fethiye. It is very common in Turunç.

Caradrina levantina HACKER, 2004 (rare; bX, eX)

This newly described species is known from eastern Mediterranean countries. In the original description HACKER (2004) mentions Italy, Greece mainland, Crete, the south-east coast of Turkey and Israel. It flies from V-VI and VIII-X. It is said to be especially common near the coast. *C. levantina* often flies together with *C. flavirena* (FIBIGER & HACKER, 2007) and does so in Turunç,

The occurrence *C. levantina* has been confirmed by checking the male genitalia in comparison with those of *C. flavirena* and *C. clavipalpis*. While the imago can easily be separated from *C. flavirena*, *C. clavipalpis* is said occasionally to have small forms, which then are difficult to distinguish from *C. levantina* (HACKER, 2004). The male genitalia, however, are clearly different, whereas those of *C. flavirena* are rather similar, probably an indication of a closer relationship between this and *C. levantina*.

Caradrina clavipalpis SCOPOLI, 1763 (infrequent; eIII-eIV, bV, bVIII, mX-bXI, eXI)

Hoplodrina ambigua DENIS & SCHIFFERMÜLLER, 1775 * + (infrequent; mIV-eV, eIX-bXI)

Proxenus hospes FREYER, 1831 * + (rare; bIV, eV)

P. hospes is known in Europe from areas close to the Mediterranean and Black Sea coasts (HACKER, 1989). The same is true for Turkey (HACKER, 1990), but it is absent from the Levant (HACKER, 2001). *P. hospes* was recorded just once (Turunç 2.4.2014).

Anthracia eriopoda HERRICH-SCHÄFFER, 1851 (infrequent; bIX-eX)

Polyphaenis propinqua STAUDINGER, 1898 (common; eIV-mVI, eVI-bVII)
(pl. 2, fig.6)

P. propinqua is a sister species to *P. sericata* ESPER, 1787, which according to HACKER (1989) is abundant in the Balkans and especially also Greece but not widely distributed in Turkey. From Turkey *P. sericata* is known from the Mediterranean region, Central Anatolia (HACKER, 1990), and the Black Sea near Istanbul, where it is not rare (BARON, 2008).

According to FIBIGER & HACKER (2007) there is another similar but distinct species, *P. propinqua* STAUDINGER, 1898, which occurs in southern Turkey, Lebanon, Syria, Jordan, Israel and Palestine. This species and its genitalia are illustrated by HACKER (2001) who states that it flies from IV to VI.

The genitalia of one male specimen, taken on 31.IV.2011 have been checked, and it turns out to be *P. propinqua*, based on a comparison of illustrations in HACKER (2001). The other specimens caught in Turunç resemble the one which was dissected and can be separated easily on habitus from specimens from north-western Turkey.

In Turunç *P. propinqua* was common in 2014, whereas only a few species were found during 2012 and 2013.

Having confirmed the presence of *P. propinqua* in south-western Turkey, the author believes that this species should be looked for on the adjacent Greek islands.

Chloantha hyperici DENIS & SCHIFFERMÜLLER, 1775 * + (infrequent; eIII-mIV, bVII, eVIII, eX-mXI)

Phlogophora meticulosa LINNAEUS, 1758

(rare; mX, mXI)

Apamea sicula TURATI, 1909 * +

(rare; eIII-bIV, eIV-bV)

A. sicula is one of several species in the *A. monoglypha* HUFNAGEL, 1766 complex. For more information on the rather confusing situation in literature, see ZILLI, RONKAY & FIBIGER (2005).

Compared to the similar *A. syriaca* OSTHELDER, 1933, *A. sicula* typically inhabits lower altitudes, and therefore hotter habitats (HACKER, 1989). ZILLI, RONKAY & FIBIGER (2005) refer to 'coastal hilly areas'. *A. monoglypha* has its southern limit of distribution in Greece and southern Turkey, but in those areas it can only be expected in mountain and alpine habitats (HACKER, 1989).

A. sicula is known from Sicily, the Balkans, Asia Minor and Libya (ZILLI, RONKAY & FIBIGER, 2005).

According to HACKER (1989) *A. sicula* flies from May onwards, although one specimen is mentioned for end of April. ZILLI, RONKAY & FIBIGER (2005) give April and May as flight time. In Turunç *A. sicula* has been observed from the end of March onwards.

The small series of specimens collected correspond well with the illustrations in ZILLI, RONKAY & FIBIGER (2005) and NOCTUIDAE.DE.

A. sicula has also been found in Kumlubük near Turunç.

Mesapamea secalis LINNAEUS, 1758 *

(rare; mX)

M. secalis can be distinguished from its sister species *M. secalella* REMM, 1983 only by examination of the genitalia. In Turkey both species exist, but their distribution is not well investigated and remains unclear.

According to HACKER (1989), in the south *M. secalis* is more common than *M. secalella*, which prefers higher altitudes

In Turunç, the presence of both species has been confirmed by examining the genitalia. From 5 animals checked, 3 proved to be *M. secalis* and 2 *M. secalella*. The confirmed specimens of *M. secalis* were: Turunç 11.10.2013 (f), 15.10.2013 (f), 19.10.2013 (f).

Mesapamea secalella REMM, 1983

(rare; mVIII, mX)

(Synonym: *M. didyma* ESPER, 1788)

The following records for Turunç were confirmed by examining the genitalia (Turunç 16.8.2012, m; 17.10.2012, f) For Turkey HACKER (1990) was only able to confirm the presence of *M. secalella* on the Black Sea coast. BARON (2008) also found this species near the Black Sea in Istanbul Province.

The flight time according to HACKER (1989) is VI-VIII for *M. secalella* and VII-bX for *M. secalis*, which seems to indicate that *M. secalis* continues to fly later in the year than *M. secalella*. One record of the current investigation, however, is for mid October, the same as for *M. secalis* in Turunç, so that the flight time does not seem to assist in separating the two sister species.

FAUNA EUROPAEAE shows the species to be absent from the Greek islands, while the same source confirms *M. secalis* for the Dodecanese island group. However, the author believes that *M. secalella* is likely to be found on Rhodos and probably some of the other islands.

Luperina dumerilii DUPONCHEL, 1826 +

(rare; eX)

L. dumerilii is known from the whole Mediterranean area except for the eastern part of North Africa (HACKER, 2001). It is widespread and abundant in Greece (HACKER, 1989). HACKER'S survey for Turkey shows it for Mediterranean region only (HACKER, 1990), while BARON (2008) adds the north-western Black Sea coast near Istanbul to its range there.

L. dumerilii has been observed in Turunç just once. The author has also found it on the Greek island of Lesbos (eIX).

The close relative *L. diversa* STAUDINGER, 1892 is known from Turkey, Armenia, Iran, Cyprus and the Levant (HACKER, 2001). The Turunç specimen has been compared with illustrations in HACKER (2001) and NOCTUIDAE.DE as well as RONKAY & VARGA (1985), where the taxon *L. diversa* has been raised to bona species, and is *L. dumerilii*.

Episema tersa DENIS & SCHIFFERMÜLLER, 1775

(infrequent; mX-eX)

E. tersa is distributed from southern Europe to Asia Minor and Central Asia (HACKER, 1989).

The species is variable, and there are specimens with partly or nearly completely reduced wing markings. Other features of wing pattern are constant.

E. glaucina ESPER, 1789 is very similar and can fly together with *E. tersa* in the same habitat (HACKER, 1989). Both taxa are easily distinguished as described in BOURSIN (1951) and also HACKER & WEIGERT (1986), however separation is possibly difficult for the faded forms. *E. glaucina* has not been detected in Turunç.

Spudaea pontica KLJUTSHKO, 1968

(infrequent; bIII-bIV, bXII)

(Synonym: *Xanthia castanea* OSTHELDER, 1933)

FIBIGER & HACKER (2005) proposed the acceptance of this well-known name according to the ICZN (2000), because few entomologists know the name *S. castanea* OSTHELDER, 1933, which was shown by HACKER (2001) to be the oldest name of this taxon.

S. pontica is known from the Balkans, areas north of the Black Sea, Turkey and Lebanon (RONKAY, YELA & HREBLAY 2001) as well as Israel (KRAVCHENKO et al., 2008a). According to HACKER (1989) it flies from January to May, in Israel from II-IV (KRAVCHENKO et al., 2008a).

Nearly all specimens at Turunç were caught from the beginning of March to the beginning of April. However, one specimen was captured at the beginning of December. Its presence has also been confirmed for Gökçebel / Bodrum.

Agrochola lychnidis DENIS & SCHIFFERMÜLLER, 1775 +

(common; ell, eXI-bII)

This very variable insect is by far the most common *Agrochola* species in the winter months

Agrochola rupicapra STAUDINGER, 1879

(infrequent; mX, bI)

A. rupicapra ranges from the Balkans throughout all regions of Turkey, Armenia, Iraq (RONKAY, YELA & HREBLAY 2001 and HACKER, 1990) and Israel (KRAVCHENKO et al., 2008a). It is rather local (RONKAY, YELA & HREBLAY 2001). FAUNA EUROPAEAE mentions it for Greece but not for any of the Greek islands.

The imago flies from X-XI (HACKER, 1989), in Israel IX-II is reported (KRAVCHENKO et al., 2008a). In Turunç the species has been found in mid October, with one late specimen on January 2nd.

Agrochola kindermannii FISCHER V. RÖSLERSTAMM, 1838

(infrequent; eXI-bI)

(Synonym: *Agrochola wolfschlaegeri* auct.)

In the past, the taxon *A. kindermannii* from Turkey and Lebanon was separated from *A. wolfschlaegeri* BOURSIN, 1953 from south-eastern Europe. At present, *A. wolfschlaegeri* is regarded as a synonym of *A. kindermannii* (see BESHKOV, 2000; FAUNA EUROPAEAE).

Flight time for both taxa is shown as IX – XII in RONKAY, YELA & HREBLAY (2001). In Turunç this period extends until the beginning of January.

Agrochola helvola LINNAEUS, 1758

(infrequent; bXII-eXII)

RAKOSY (1996) reports the imago from mid August to October. Further south, for Greece HACKER (1989) gives IX to XI. In Turunç the species been observed right up to the end of December. This corresponds with the information for Israel: X-XII (KRAVCHENKO et al., 2008a).

Agrochola macilenta HÜBNER, 1809

(rare; mXII)

HACKER (1989) reports the presence of *A. macilenta* only in the north of Greece. In Turkey it inhabits 'especially mountain chains surrounding the Anatolian plains and steppes' (HACKER, 2001). For Israel KRAVCHENKO et al. (2008a) indicate medium and higher elevations. According to HACKER (2001) *A. macilenta* flies from IX-XII.

The one specimen from Turunç seems to have been outside its typical habitat.

Agrochola circellaris HUFNAGEL, 1766

(rare; mXII)

(pl. 2, fig.7)

A. circellaris inhabits nearly the whole of Europe, except for very southern areas like southern Spain, southernmost Italy and southern Balkans (RONKAY, YELA & HREBLAY 2001). Likewise in Greece this species has only

been found in the north (HACKER, 1989). In Turkey it is known from different regions but not from the south (HACKER, 1990). Further east it extends to Siberia and Central Asia.

One specimen has been collected in Turunç on 20.12.2012 and the determination is without doubt. Compared to the general pattern of distribution, the finding in Turunç is surprising. It may be the species has been overlooked in the past because it flies in mid winter, or perhaps the specimen flew in from more humid and mountain habitats, which do exist in Mugla Province. In FAUNA EUROPAEAE one record for Corsica is shown, which also is beyond the expected southern limit of distribution.

In Europe, the moth is known to fly until end of November (EBERT, 1997b). For Greece HACKER (1990) shows IX-XI, but according to RONKAY, YELA & HREBLAY (2001) it can also fly in the second half of winter. The Turunç record is from middle of December

Agrochola mansueta HERRICH-SCHÄFFER, 1850 + (infrequent; bl-ml, eX, eXI-eXII)

A. mansueta has been found in Turunç and Gökçebel / Bodrum.

This species is distributed from Greece, including Rhodos (HACKER, 1989) to Armenia and Iran. Usually it is found at medium and higher altitudes (RONKAY, YELA & HREBLAY 2001) and is normally rare.

Agrochola consueta HERRICH-SCHÄFFER, 1852 (rare, mXII)
(pl. 2, fig.8)

A. consueta was described from 'Constantinople', which can be interpreted as the European part of Istanbul (FIBIGER & HACKER, 2005) and is consequently shown in FAUNA EUROPAEAE for the European part of Turkey. HACKER (1989, 1990) does not list this species for Greece or Turkey.

In Turunç one rather worn male specimen has been collected. Its identity was confirmed by checking the male genitalia (20.12.12, m) against the illustrations of those of this species from Antalya Province and those of *A. kindermannii* in BESCHKOV (2000). The determination has also been confirmed personally by Stoyan BESHKOV.

Conistra ligula ESPER, 1791 (rare; bXII, el)

HACKER (1989) stated that the presence of *C. ligula* in Turkey was confirmed only recently because of possible confusion in the past with *C. vaccinii* LINNAEUS, 1761. According to the same author (1990), *C. ligula* has so far only been found in eastern Turkey.

The specimens in Turunç are clearly *C. ligula*. The identity of one male from Turunç (6.12.2013) has been confirmed by examining the genitalia. In total four specimens were recorded, with one from Kumlubük near Turunç.

Dryobota labecula ESPER, 1788 (common; bl-ell, bIV)

D. labecula is common from the beginning of January until the end of February. During that time it is often the most common species. One specimen was caught at the beginning of April, outside the known flight period, which is probably exceptional.

In literature (e.g. in RONKAY, YELA & HREBLAY 2001) the flight time is reported to be from October to sometimes February. It has also been recorded from Kumlubük near Turunç.

Dryobotodes eremita FABRICIUS, 1775 (rare; bXII-mXII)

D. eremita sometimes looks very like *D. monochroma* (see also RONKAY, YELA & HREBLAY 2001). Two male specimens have been confirmed as *D. eremita* by examination of the genitalia (Turunç, 1.12.2013, m; 5.12.2013, m) by comparison with the illustrations in BERIO (1985), RAKOSY (1996) and BESHKOV (2000).

According to RONKAY, YELA & HREBLAY (2001) the moth flies from VIII-bXI. However, the records from Turunç are later, from early to mid December.

Dryobotodes monochroma ESPER, 1790 (infrequent; eX-bXI)

D. monochroma is distributed between the Mediterranean Sea in the south to southern Romania and the Black Sea area in the north (HACKER, 1989). A very similar species, *D. servadeii* PARENZAN, 1982, was recognised quite recently (illustrated in BESHKOV, 2000)

Although there is a slight difference in appearance, *D. monochroma* can easily be confused with *D. servadeii*, so that the exact limits of distribution of the two species are not clear. HACKER (1990) was unsure whether *D. monochroma* exists at all in Asia Minor, or whether it might be replaced by *D. servadeii*.

The discovery of *D. monochroma* in Turunç was confirmed by examination of the male genitalia (Turunç, 5.11.1997, m) in comparison with those of *D. servadeii* using the illustrations in BESHKOV (2000) and also with those of the more widespread *D. eremita*.

D. monochroma can therefore be confirmed as part of the Turkish fauna.

RONKAY, YELA & HREBLAY (2001) note that the species flies until the end of October. Here, apart from one specimen, six records are from the first week of November. *D. monochroma* has also been observed in Kumlubük near Turunç.

Dryobotodes carbonis F. WAGNER, 1931 (infrequent; eIX-eXII, mI-el)

D. carbonis can be found in southern Europe apart from Spain, in all parts of Turkey, except for the north (HACKER 1990) and eastwards to Iraq. It is reported to occur at altitudes between 300 m – 1800 m and to be rather local. Where it flies, however, it may be abundant (RONKAY, YELA & HREBLAY 2001). The flight time is from IX to XII (HACKER, 1990).

D. carbonis has been found in Turunç as well as Gökçebel / Bodrum. It seems to be abundant in both places, but evidently occurs at considerably lower altitude than that given in the literature. In Turunç it has been found until the end of January.

Dryobotodes tenebrosa ESPER, 1789 (infrequent; eX-mXI, mXII)
(pl. 2, fig.9)

In addition to Turunç, there are also records from Gökçebel / Bodrum. The identity of one specimen has been confirmed by checking the male genitalia (Turunç 10.11.2013, m).

Ammoconia senex GEYER, 1828 * + (rare; bXI)

There is one record of a male specimen from beginning of November from Kumlubük near Turunç. HACKER (1989) reported the species from Rhodos.

The rather similar *A. reisseri* RONKAY & VARGA, 1984, (illustrated by HACKER, 1989 and RONKAY, YELA & HREBLAY 2001), occurs in Crete and has been found also in the very south of the Peloponnes (HACKER 1990, RONKAY, YELA & HREBLAY 2001).

The genitalia of the only specimen (male) from Kumlubük have been checked and compared with the illustrations of both species in HACKER (1989), and it is clearly confirmed as *A. senex* (6.VII 1997 m).

Aporophyla australis BOISDUVAL, 1829 * + (common; eX-bl)

A. australis is the second most common winter species after *Agrochola lychnidis*. It has also been found in Gökçebel / Bodrum.

Aporophyla nigra HAWORTH, 1809 (infrequent; eX-bXI, eXI-bl)

According to HACKER (1989 and 2001) this species flies from IX to XII, in Crete also in January (HACKER, 1989). In Turunç too, the flight time extends until January. *A. nigra* was also observed in Gökçebel / Bodrum.

Aporophyla canescens DUPONCHEL, 1826 * + (eX - bXI)

A. canescens has been captured once in Kumlubük near Turunç, with another record from Gökçebel / Bodrum

Polymixis serpentina TREITSCHKE, 1825 * + (infrequent; eX-mXI)

Polymixis rufocincta GEYER, 1828 + (infrequent; mXI-bl, el)

The flight time in Greece is listed as X-XII (HACKER, 1989), but in Turunç the species continues to be on the wing until the end of January. HACKER (1989) knows it mainly from medium altitudes.

Polymixis bischoffi HERRICH-SCHÄFFER, 1850 * (common; eX-mXI, bXII)

P. bischoffi is only recorded from southern Turkey (HACKER, 2001) apart from one report from the Aegean island of Samos (HACKER, 2001, see also RONKAY, YELA & HREBLAY 2001). The European sister species *P. culoti* SCHAWERDA, 1921 is endemic to the southern Balkan area (HACKER, 1989) and not known from Turkey.

The identity of this species was confirmed by examination of the genitalia (Turunç, 5.11.2013, m) in comparison with illustrations in HACKER (1989, table 17).

Polymixis trisignata MÉNÉTRIÉS, 1848 (infrequent; eXI-ml)

P. trisignata has been captured in Turunç as well as Gökçebel / Bodrum. This moth is known from south-eastern Europe, Near and Middle East (HACKER, 2001). According to RONKAY, YELA & HREBLAY (2001) it usually flies at an altitude of 300-1800 m from eIX-eXII.

There has been considerable taxonomic confusion concerning *P. trisignata* (RONKAY, YELA & HREBLAY 2001). The close relative *P. leuconota* FRIVALDSKY, 1841 is now considered to be endemic to Crete. Formerly the latter name, attributed to HERRICH-SCHÄFFER, 1850 was used for the more widespread current *P. trisignata*. This needs to be kept in mind, when studying literature (for instance HACKER (1989), HACKER (1990) and RAKOSY (1996)). For more details, it is recommended to check the explanations given in RONKAY, YELA & HREBLAY (2001).

A similar, recently described species from Cyprus is *Polymixis aphrodite* FIBIGER, 2007. The males have dark hind-wings compared to the lighter ones of *P. trisignata*.

Hadeninae GUENÉE (17 species)

Panolis flammea DENIS & SCHIFFERMÜLLER, 1775 (rare; eIII-bIV)

Records of *P. flammea* in Turkey are scarce. (see HACKER & WEIGERT, 1986; RONKAY, YELA & HREBLAY 2001)..

Orthosia cruda DENIS & SCHIFFERMÜLLER, 1775 (bIII)

O. cruda was found in Gökçebel / Bodrum

Orthosia cerasi FABRICIUS, 1775 (infrequent; bl, eIII-bIV)

(Synonym: *O. stabilis* DENIS & SCHIFFERMÜLLER, 1775)

(pl. 2, figs 10, 11)

Older literature treated *O. dalmatica* F. WAGNER, 1909 as a synonym of *O. cerasi* (BESHKOV, 2000, HACKER, 1990). Now *O. dalmatica* is an accepted sister species to *O. cerasi* (RONKAY, YELA & HREBLAY 2001). These authors state that it has been found on the Balkans and in Crete. HACKER (2001) adds western Turkey, and states that *O. dalmatica* is dominant on the Balkans and Asia Minor compared to *O. cerasi*.

A series of five specimens from Kumlubük and Turunç have been dissected. Unfortunately only females were available. Although their dark purplish colour, contrasting fringes and dark hind-wings suggested that they might be *O. dalmatica* (see also the original description by F. WAGNER, 1909), they all proved to be *O. cerasi*: (Kumlubük 4.4.1994 f, Kumlubük 4.4.1994b f; Turunç 20.3.2014 f; Turunç 6.3.2013 f; Turunç 3.4.2012 f). The comparison was made using the illustrations in RONKAY, YELA & HREBLAY (2001) and the conclusion was confirmed by S. BESHKOV.

Orthosia miniosa DENIS & SCHIFFERMÜLLER, 1775 (rare; eIII-bIV)

This species was also found in Kumlubük near Turunç.

Perigrapha rorida FRIVALDSKY, 1835 (infrequent; bII, eII, mIII-mIV)

A similar species, *P. sellingi* FIBIGER, HACKER & MOBERG, 1996 described in FIBIGER, HACKER & MOBERG (1995) is endemic to Crete.

P. rorida has also been found in Kumlubük near Turunç.

Egira tibori HREBLAY 1994 (very common; mIII-mIV)

E. tibori is known from Bulgaria, Greece and Turkey (RONKAY, YELA & HREBLAY 2001) Macedonia (BESHKOV 2014), Israel, Jordan and Lebanon (KRAVCHENKO et al., 2007a). In an addendum to NOCTUIDAE EUROPAEAE volume 12, (FIBIGER, RONKAY, YELA & ZILLI, 2010) it is stated that *E. tibori* "is local and infrequent everywhere, except on Samos, where, in spring 2010, it was found commonly in the mountainous areas of the island. This is the first record of *E. tibori* from the archipelago along the Anatolian coast".

This information apparently has not been incorporated in FAUNA EUROPAEAE. Here the species is said to be absent from the North Aegean islands.

The sister species *E. conspicillaris* LINNAEUS, 1758 is found in Central and southern Europe, Morocco, Algeria and parts of Turkey (RONKAY, YELA & HREBLAY 2001). According to HACKER (2001) the records of *E. conspicillaris* in Anatolia may all refer to *E. tibori*.

The exact limits of distribution of both species in the east of their range and in Anatolia are not exactly clear,

due to their similarity. *E. tibori* and *E. conspicillaris* can only be distinguished by examination of the male genitalia. It is important to check the shape and number of diverticula on the everted vesica.

Two other close relatives, *E. anatolica* M. HERING, 1933 and *E. fatima* HREBLAY 1994 are also very similar and again, for certain determination the genitalia should be investigated. *E. anatolica*, described from Turkey ranges from southern Europe to Turkmenistan, and *E. fatima* is known from eastern Turkey (HREBLAY 1994). *E. bulgarica* BESHKOV, 2000 has been synonymised with *E. anatolica*.

The everted vesica of the male genitalia of the following specimens from Turunç was checked, and in all cases they were *E. tibori*: 3.IV.2012 (m), 3.IV.2012 (m), 2.IV.2012 (m), 4.IV.2012 (m), 16.IV.2012 (m), 23.III.2014 (m), 7.IV.2014 (m), 20.III.2014 (m). For illustrations of the genitalia HREBLAY (1994), BESHKOV (1999) and BESHKOV (2000) were used. The occurrence of *E. tibori* on the Turkish Aegean coast can therefore be confirmed. The species has also been found in Kumlubük near Turunç.

Hadena compta DENIS & SCHIFFERMÜLLER, 1775 (rare; bIV)

H. compta occurs from the Iberian Peninsula through the whole of Europe to Japan (EBERT, 1998), also in North Africa (KRAVCHENKO et al., 2008a).

Hadena armeriae GUENÉE, 1852 is treated as a subspecies of *H. compta* by FIBIGER & HACKER (2005). However S. BESHKOV (pers. comm.) believes that it is indeed a separate species.

In HACKER (1989), where the two taxa were treated as separate species, the flight time for *H. armeriae* was shown to start earlier, from April, whereas *H. compta* starts to fly from May onwards. *H. armeriae* is stated to prefer very dry and hot habitats and is found at medium altitudes, whereas *H. compta* seems to fly in habitats at higher altitude (HACKER, 1989). *H. armeriae* has been reported from Italy, southern Balkans, Asia Minor and further to the east until Lebanon, Iran and southern Russia (HACKER, 1989), in Turkey only from the Mediterranean area (HACKER, 1990).

The only specimen collected in Turunç appears to belong to the taxon *armeriae*.

Mythimna vitellina HÜBNER, 1808 * + (infrequent; eIII, mIV-eV, eVIII, mIX-eIX, mX)

M. vitellina was recorded in Turunç, and also observed in Ovacik / Fethiye.

Mythimna sicula TREITSCHKE, 1835 * (rare; mIII-bIV)

The discussion as to whether *M. sicula* and *M. scirpi* DUPONCHEL, 1836 are two separate species is ongoing. *M. sicula*, to which the Turunç and Kumlubük specimens are attributed, is more local, prefers 'xerophilous and thermophilous' areas and can be found, on limestone grounds' (HACKER, RONKAY & HREBLAY 2002). It is also widespread in Israel (KRAVCHENKO, 2007a).

Mythimna prominens WALKER, 1856 (rare; eIII, mIX, mX, bXI)
(Synonym: *M. hispanica* BELLIER, 1863)

This is an African species, which also inhabits Greece and the south coast of Turkey (HACKER, 1989).

Mythimna languida WALKER, 1858 * + (very common; bI, mIII-eV, bIX, eIX-bXII, eXII)

The variable *M. languida* is very common in Turunç. Except for the very hot summer months the moth can be observed throughout the year. It inhabits the Balkans and southern Turkey and its range extends to Egypt and the Arabian Peninsula. The illustration in HACKER (1989) of *Aletia consanguis* GUENÉE, is actually *M. languida* as HACKER (2001) corrects.

Mythimna ferrago FABRICIUS, 1787 (rare; eIX-bX)

Mythimna l-album LINNAEUS, 1767 * + (rare; bXI)

Pseudaletia unipuncta HAWORTH, 1809 * + (infrequent; eIII-bIV, bV, eV, mX-mXII)

Leucania putrescens HÜBNER, 1824 * + (infrequent; bX-mX, aXI)

According to HACKER, RONKAY & HREBLAY (2002) *L. putrescens* flies from July to September, but adds that the flight time is delayed by 2 months in Tunisia. The latter period seems to apply to the situation in Turunç.

Leucania herrichii HERRICH-SCHÄFFER, 1849 (rare; eIX, mX-eX)

L. herrichii, which is distributed from Bulgaria (BESHKOV, 2000), Macedonia (BESHKOV, pers. comm.), Greece, Turkey and Cyprus to Armenia, Iraq and Palestine (HACKER, 1989) and further to Turkmenistan (HACKER, RONKAY & HREBLAY 2002) is similar to *L. putrescens* though readily distinguished on superficial features.

L. herrichii is most frequently found in medium altitudes (HACKER, 1989; HACKER, RONKAY & HREBLAY 2002). In Israel, where it is rare, it is found in the coastal plains (KRAVCHENKO et al., 2007a).

In Turunç this species has been observed only three times.

Leucania loreyi DUPONCHEL, 1827 + (infrequent; bIV-mIV, mV, mVIII, eIX-bX)

Noctuinae LATREILLE (17 species)

Peridroma saucia HÜBNER, 1808 * + (infrequent; bl, el, eII, eIII, eIV-bV, bX, eX, eXI, eXII)

Euxoa temera HÜBNER, 1808 (rare; mX-eX)

Agrotis bigramma ESPER, 1790 * + (infrequent; eIII, eIX-eX)
(Synonym: *A. crassa* HÜBNER, 1803)

Agrotis segetum DENIS & SCHIFFERMÜLLER, 1775 * + (infrequent; bIV, eV, eVIII, eIX-eXI, mXII-eXII)

Agrotis trux HÜBNER, 1824 * + (infrequent; bX)

Agrotis puta HÜBNER, 1803 * + (common; bIII-eIV, mV, mVII, eVIII, eIX-mXI)

A. puta was also found in Gökçebel / Bodrum.

Agrotis catalaunensis MILLIÈRE, 1873 + (rare; bX)
(Synonym: *A. syricola* CORTI & DRAUDT, 1933)
(pl. 2, fig.12)

A. catalaunensis has only recently been accepted as a species distinct from *A. puta*. It is known from Greece, Bulgaria, Italy, the Levant (HACKER, 2001), Macedonia (BESHKOV, pers. comm.) and North Africa. For Turkey, records in the southern and eastern parts of the country are known (HACKER, 1990).

Among numerous records of *A. puta* in the study area, only one clearly recognisable *A. catalaunensis* has been found, so it is evidently much rarer or comes in from a different ecosystem in the surroundings. As the female are more similar to that of *A. puta* than the male, it cannot be excluded that a few females may have been overlooked. The identity of the specimen was confirmed by Stoyan BESHKOV.

Agrotis ipsilon HUFNAGEL, 1766 * + (common; mIII-eV, mVIII, bIX-bXII)

Agrotis biconica KOLLAR, 1844 * + (infrequent; mIV-eIV, eVIII, eIX-bX, eX)
(Synonym: *A. spinifera* HÜBNER, 1808)

A. biconica is distributed in the tropics and subtropics of Africa and Asia and reaches its northern limit of distribution here.

Ochropleura leucogaster FREYER, 1831 (rare; mX)

O. leucogaster flies in two generations, the second one ending in IX according to HACKER (1989). The only specimen captured in Turunç was taken in mid October.

Noctua pronuba LINNAEUS, 1758 * + (infrequent; mIV-eV, eVI, mX-bXII)

Noctua comes HÜBNER, 1813 * + (common; mIV-eV, mVII, bX-mXI, eXII)

N. comes is abundant in Turunç. It is widespread on the Balkans (HACKER, 1989) and Turkey (HACKER, 1990). It starts to fly from mid April in Turunç and then until the end of December.

FIBIGER (1993) shows a much more restricted period from VI-X, while KRAVCHENKO et al. (2006) report this univoltine species from May to December. This corresponds well with the situation in Turunç although the first

specimens were recorded earlier in the year. It has also been seen in Gökçebe / Bodrum.

Noctua janthina DENIS & SCHIFFERMÜLLER, 1775 - **tertia** MENTZER, MOBERG & FIBIGER, 1991 complex *
(infrequent; eV, mVI, mVII, mVIII-eVIII, mIX, bX-eX, mXI)

In the last decade of the 20th century the well known *Noctua janthina* was split into two species, *N. janthina* being a more southern species and the one widespread in Central Europe being *N. janthe* BORKHAUSEN, 1792. In due course a third species, *N. tertia*, has been recognised.

N. janthina is widespread in the Balkans and Turkey (HACKER 1990), while *N. tertia* seems to have a more restricted area of distribution in the southern Balkans and western Turkey (FIBIGER, 1993).

Some authorities accept the existence of three species as described by FIBIGER (1993). On the other hand, strong doubts still persist as to whether the complex consists of two or three species (e.g. PLONTKE, R. et al., 2005). In practise, it is also very difficult to distinguish all specimens of *N. janthina* and *N. tertia* due to their variability. In this study *N. janthina* and *N. tertia* are treated as one unit. There are specimens which appear to resemble *N. janthina* and others which look like *N. tertia*, so if there are really two species, it appears that both may exist in Turunç.

The imagines are known to fly from VII-IX (FIBIGER, 1993). In Turunç again, they appear earlier and continue to fly to a later date.

Divaena haywardi TAMS, 1926 * (rare; bX-mX)
(pl. 2, fig.13)

D. haywardi is mainly known from medium altitudes in the Balkans, Asia Minor, Crimea Peninsula and Cyprus (HACKER, 1989). It is not clear whether it inhabits lower altitudes in Turunç or has flown in. The fact that only two specimens have been captured, suggests that they might have come from another habitat nearby, perhaps from the higher altitudes around Turunç.

Epilecta linogrisea DENIS & SCHIFFERMÜLLER, 1775 (rare; bVIII)

Xestia xanthographa DENIS & SCHIFFERMÜLLER, 1775 * + (infrequent; bX, eX-mXI)

In the older records in literature there is no separation between the two very similar species *X. xanthographa* and *X. cohaesa*. *X. cohaesa* is reported to be more abundant in the southern areas than *X. xanthographa* (HACKER, 1989).

The same source gives VIII-X as flight time for *X. xanthographa*. In Turunç, however, it flies until mid November.

The following specimens have been verified as *X. xanthographa* by examination of the male genitalia and consulting the illustrations in HACKER (1989): (Gökçebe / 1.11.2005a m; Gökçebe / 1.11.2005b m; Turunç 11.11.2013a m; Turunç 11.11.2013b m; Turunç 11.11.2013c m).

The frequency of this and the following species has been compared, mainly based on external features, and *X. xanthographa* appears to be much more abundant than *X. cohaesa*.

Xestia cohaesa HERRICH-SCHÄFFER, 1849 (infrequent; bX, eX-bXI)

The presence of *Xestia cohaesa* is confirmed from Italy, the Balkans eastwards to Iran and Iraq (FIBIGER, 1993). *X. cohaesa* has been captured in Turunç as well as Gökçebe / Bodrum. The identity of one specimen has been confirmed by examination of the male genitalia (Turunç 9.10.2013, m).

A third species is possible for the area, *X. palaestinensis* KALCHBERG, 1897, which has not yet been recorded. It is known for Greece and south-eastern Turkey (HACKER, 1989).

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Literature

BARON, N. T. (2008): The Moths Fauna (Lepidoptera) of Sile in the Asian Part of Istanbul Province, Turkey – *Esperia* 14: 454-558

- BERIO, E. (1985): Noctuidae I – Bologna
- BERIO, E. (1991): Noctuidae II – Bologna
- BESHKOV, S. (1999): *Egira tabori* HREBLAY 1994 - A New Species for the European Fauna (Lepidoptera: Noctuidae: Hadeninae) – *Historia Naturalis Bulgarica* **10**: 77-83
- BESHKOV, S. (2000): An Annotated Systematic and Synonymic Checklist of the Noctuidae of Bulgaria – *Neue Entomologische Nachrichten*, **49**: 1-300
- BESHKOV, S. (2006) *Nola ronkayorum* sp. n., a new species from Bulgaria and Turkey - *Phegea* **34** (1): 17-32
- BESHKOV, S. (2014): Contribution on the Macrolepidoptera of the Republic of Macedonia with a Report of One New Genus and Four New Noctuidae Species for the Country – *Entomologist's Rec. J. Var.* **126**: 175-185
- BOURSIN, CH. (1933): Beiträge zur Kenntnis der „Noctuidae-Trifidae“ X, Neue *Cucullia* und *Athetis* von Marasch in Türkisch Nord-syrien, von der Expedition L. OSTHELDER und E. PFEIFFER – *Mitt. Münch. Ent. Ges.* **23**: 8 - 26, Taf. 1-6
- BOURSIN, Ch. (1940): Beiträge zur Kenntnis der „Agrotidae-Trifinae“ XXIII, Neue palaearktische Arten und Formen mit besonderer Berücksichtigung der Gattung *Autophila* Hb. – *Mitt. Münch. Ent. Ges.* **30**: 474-543
- BOURSIN, Ch. (1951): Beiträge zur Kenntnis der Agrotidae-Trifinae XLVII, Eine seit 175 Jahren verkannte Europäische *Derthisa*-Art – *Zeitschr. d. Wiener Entomol. Ges.* **36**: 44-51
- DOGANER, S (1999): Bozburun Yarimadası: Coğrafi ortam ve insan – *Coğrafya Dergisi* **7**: 29-56
- EBERT, G. (Hrsg.) (1994): Die Schmetterlinge Baden-Württembergs, Band 4, Nachfalter 2, – Stuttgart
- EBERT, G. (Hrsg.) (1997a): Die Schmetterlinge Baden-Württembergs, Band 5, Nachfalter 3, – Stuttgart
- EBERT, G. (Hrsg.) (1997b): Die Schmetterlinge Baden-Württembergs, Band 6, Nachfalter 4, – Stuttgart
- EBERT, G. (Hrsg.) (1998): Die Schmetterlinge Baden-Württembergs, Band 7, Nachfalter 5, – Stuttgart
- FIBIGER, M. (1990): Noctuidae Europaeae, Vol. 1, Noctuinae I – Sorø
- FIBIGER, M. (1993): Noctuidae Europaeae, Vol. 2, Noctuinae II – Sorø
- FIBIGER, M. (1997): Noctuidae Europaeae, Vol. 3, Noctuinae III – Sorø
- FIBIGER, M. & HACKER, H. (2005): Systematic List of the Noctuoidea of Europe – *Esperiana*. **11**: 93-182
- FIBIGER, M. & HACKER, H. (2007): Noctuidae Europaeae, Vol. 9, Amphipyriinae, Condicinae, Eriopiinae, Xyleninae (part) – Sorø
- FIBIGER, M., HACKER, H. & MOBERG, A. (1995): *Orthosia sellingi* FIBIGER, HACKER, MOBERG, a new species in Europe in the *Orthosia rorida* (FRIVALDSZKY, 1835) group (Noctuidae, Hadeninae) - including a synonymisation of *O. ganimetae* KORNOŠOR & LÖDL, 1990 to *O. rorida* FRIV. syn. n. – *Nota lepid.* **18**: 203-112
- FIBIGER, M. & LAFONTAINE, J. D. (2005): A Review of the Higher Classification of the Noctuoidea (Lepidoptera) with Special Reference to the Holarctic Fauna – *Esperiana* **11**: 7-92
- FIBIGER, M. & RONKAY, L. (1991): New *Autophila* taxa from Sicily and Turkey (Lepidoptera, Noctuidae) – *Annales Historico-Naturales Musei Nationalis Hungarici* **83**: 135-137
- FIBIGER, M., RONKAY, L. STEINER, A. & ZILLI, A. (2009): Noctuidae Europaeae, Pantheinae, Dilobinae, Acronictinae, Eustrotiinae, Nolinae, Bagisarininae, Acontinae, Metoponiinae, Heliolithinae and Bryophilinae – Sorø
- FIBIGER, M., RONKAY, L., YELA, J. L. & ZILLI, A. (2010): Noctuidae Europaeae, Vol. 12: Rivulinae, Boletobiinae, Hypenodinae, Araeopteroininae, Eublemininae, Hermiiniinae, Hypeninae, Phytometrinae, Euteliinae, and Micronoctuinae – Sorø
- FORSTER, W. & WOHLFAHRT, T. (1960): Die Schmetterlinge Mitteleuropas, Bd. 3, Spinner und Schwärmer – Stuttgart
- FORSTER, W. & WOHLFAHRT, T. (1971): Die Schmetterlinge Mitteleuropas, Bd. 4, Eulen (Noctuidae) – Stuttgart
- FREINA de, J. (1979): 1. Beitrag zur systematischen Erfassung der Bombyces- und Sphinges-Fauna Kleinasiens – *Atalanta* **10**: 175-224
- FREINA de, J. (1983): 4. Beitrag zur systematischen Erfassung der Bombyces- und Sphinges-Fauna Kleinasiens – *Mitt. Münch. Ent. Ges.* **72**: 57 – 127.
- FREINA de, J. (1986): Über die Verbreitung von *Trichiura verena* WITT 1981 (Lepidoptera, Lasiocampidae) – *Mitt. Münch. Ent. Ges.* **35**: 11-114
- FREINA de, J. (1994): 9. Beitrag zur systematischen Erfassung der Bombyces- und Sphinges-Fauna Kleinasiens – *Atalanta* **25**: 317-349
- FREINA de, J. & PIATKOWSKI, H.-J. (2006): Beitrag zur Erfassung der Heterocerer Griechenlands – *Entomologische Zeitschrift*, **116**: 243-260
- FREINA de, J. & WITT, T.J. (1987): Die Bombyces und Shinges der Westpalaearktis, Vol. 1 – München
- GOATER, B., RONKAY, L. & FIBIGER, M. (2003): Noctuidae Europaeae, Vol. 10, Catocalinae, Plusiinae – Sorø
- HACKER, H. (1983): Faunistische Beiträge zur Noctuidenfauna des Mittelmeergebietes (Lepidoptera: Noctuidae) – *Neue Entomologische Nachrichten* **6**: 43-57
- HACKER, H. (1985): Erster Beitrag zur systematischen Erfassung der Noctuidae der Türkei – *Atalanta* **17**: 1-25
- HACKER, H. (1985): Dritter Beitrag zur Erfassung der Noctuiden der Türkei – *Neue Entomologische Nachrichten* **15**: 1-67
- HACKER, H. (1986): 2. Beitrag zur Erfassung der Noctuidae der Türkei – *Spixiana*. **9**: 25 – 81
- HACKER, H. (1987a): Siebenter Beitrag zur systematischen Erfassung der Noctuidae der Türkei – *Atalanta* **18**: 121-167
- HACKER, H. (1987b): Achter Beitrag zur systematischen Erfassung der Noctuidae der Türkei – *Atalanta* **18**: 339 - 369
- HACKER, H. (1988): Berichtigungen und Nachträge zu verschiedenen Arbeiten zur Fauna der Noctuidae (Lepidoptera) der Türkei – *Atalanta* **18**: 371-372
- HACKER, H. (1989): Die Noctuidae Griechenlands (Lepidoptera, Noctuidae) – *Herbipoliana*, Bd. 2
- HACKER, H. (1990): Die Noctuidae Vorderasiens (Lepidoptera) - *Neue Entomologische Nachrichten* **27**: 1-707
- HACKER, H. (1998): Ergänzungen zu Die Noctuidae Vorderasiens III – *Esperiana* **6**: 185-212
- HACKER, H. (2001): Fauna of the Nolidae and Noctuidae of the Levante with descriptions and taxonomic notes – *Esperiana* **8**: 7-398
- HACKER, H. (2004): Revision of the genus *Caradrina* OCHSENHEIMER, 1816, with notes on other genera of the tribus Caradrini (Lepidoptera, Noctuidae). — *Esperiana* **10**: 7-690
- HACKER, H., KUHNA, P. & GROSS, F.-J. (1986): 4. Beitrag zur Erfassung der Noctuidae der Türkei – *Mitt. Münch. Ent. Ges.* **76**: 79-141
- HACKER, H. & LÖDL, M. (1988): Taxonomisch und faunistisch bemerkenswerte Funde aus der Sammlung PINKER im Naturhistori-

- schen Museum Wien. Neunter Beitrag zur systematischen Erfassung der Noctuidae (Lepidoptera) der Türkei – Zeitschrift der Arbeitsgemeinschaft Österr. Entomologen **40**: 65-82
- HACKER, H., RONKAY, L. & HREBLAY M. (2002): Noctuidae Europaeae, Vol. 4: Hadeninae I – Sorø
- HACKER, H. & WEIGERT L. (1986): Sechster Beitrag zur systematischen Erfassung der Noctuidae der Türkei – Neue Entomologische Nachrichten **19**: 133-188
- HESELBARTH, G., OORSCHOT van, H. & WAGENER, S. (1995): Die Tagfalter der Türkei, Bd. 1 – Bocholt
- HREBLAY M. (1994): New Taxa of the Tribe Orthosiinae, IV – Acta Zoologica Academiae Scientiarum Hungaricae **40**: 241-252
- IKIEL, C. (2004): Mugla'nın Coğrafi Özellikleri – ÇINAR, A: Mugla Kitabı, İzmir, 15-25
- KOCH, M. (1984): Schmetterlinge, 1. einbändige Auflage – Leipzig
- KÜRSCHNER, H., RAUS, T. & VENTER, J. (1987): Pflanzen der Türkei, 2. Edition – Wiesbaden
- KRAVCHENKO, V.D., FIBIGER, M., MOOSER, J., JUNNILA, A. & MÜLLER, G.C. (2007a): The Hadeninae of Israel (Lepidoptera: Noctuidae) – Shilap Revta. lepid. **35** (140): 441–454
- KRAVCHENKO, V.D., FIBIGER, M., MOOSER, J., JUNNILA, A. & MÜLLER, G.C. (2007b): The Eublemminae of Israel (Lepidoptera: Erebiidae) – Shilap Revta. lepid. **35** (140): 513-519
- KRAVCHENKO, V.D., FIBIGER, M., MOOSER, J., JUNNILA, A. & MÜLLER, G.C. (2008a): The Israeli species of the subtribe Xylenina (Lepidoptera: Noctuidae, Xyleninae) – Shilap Revta. lepid. **36** (141): 9-17
- KRAVCHENKO, V.D., FIBIGER, M., MOOSER, J., JUNNILA, A. & MÜLLER, G.C. (2008b): The tribes Prodeniini and Caradrini of Israel (Lepidoptera: Noctuidae, Xyleninae) – Shilap Revta. lepid. **36** (141): 133-143
- KRAVCHENKO, V.D., FIBIGER, M., MOOSER, J., MÜLLER, G.C. (2006): The Noctuidae of Israel (Lepidoptera: Noctuidae) – Shilap Revta. lepid. **34** (136): 353-370
- KRAVCHENKO, V.D., FIBIGER, M., MÜLLER, G. & RONKAY, L. (2005): The Cucullinae of Israel (Lepidoptera: Noctuidae) - Shilap Revta. lepid. **33** (129): 83-95
- KRAVCHENKO, V.D., MÜLLER, G.C., ORLOV, O.B. & SEPLAYARSKY, V.N. (2004): The Catocalinae (Lepidoptera: Noctuidae) of Israel - Russian Entomological Journal **13** (3): 1-12
- LÁSZLÓ, G.M., RONKAY, G., RONKAY, L. & WITT, T. (2007): The Thyatiridae of Eurasia Including the Sundaland and New Guinea (Lepidoptera) – Esperiana **13**: 7-683
- MOL, T., AVCI, M. & DUTKUNER, I. (2003): Fethiye - Kelebekler Vadisi Florası ve Lepidoptera Faunası – I.U.Orman Fakültesi, **53A**, 15-24
- MÜLLER, G.C., KRAVCHENKO, V. D., REVAY, E. E. & SPEIDEL, W. (1990): The Nolidae of Jordan: Distribution, Phenology and Ecology – Entomofauna **31** (8): 69-84
- PEREZ-GUERRERO, S., REDONDO, A.J. & YELA J.L. (2011): Local abundance patterns of noctuid moths in olive orchards: Lifehistory traits, distribution type and habitat interactions – Journal of Insect Science **11**: 1-19
- PLONTKE, R. et al. (2005): Zweifel an der Artberechtigung von *Noctua janthe* (BORKHAUSEN, 1792) und *Noctua tertia* (v. MENTZER, Moberg & FIBIGER, 1991) im Komplex "*janthina*" (Lep., Noctuidae) – Entomologische Nachrichten und Berichte, **49**: 33-38
- RAKOSY, L. (1996): Die Noctuiden Rumäniens – Linz
- RONKAY, L. & FABIAN, G.Y. (1990): Contributions to the Noctuidae fauna of Turkey – Annales Historico-Naturales Musei Nationalis Hungarici **81**: 115-123
- RONKAY, G. & RONKAY, L. (1994): Noctuidae Europaeae, Vol. 6, Cucullinae I – Sorø
- RONKAY, G. & RONKAY, L. (1995): Noctuidae Europaeae, Vol. 7, Cucullinae II – Sorø
- RONKAY, G., RONKAY, L. & GYULAI, P. (2011): The Witt Catalogue, Vol. 5, Cucullinae and Psaphidinae – Budapest
- RONKAY L. & VARGA, Z. (1985): *Luperina diversa* (STAUDINGER, 1891) bona species, mit der Beschreibung zwei neuer Subspecies – Annales Historico-Naturales Musei Nationalis Hungarici **77**: 20 -216
- RONKAY, L., YELA J. L. & HREBLAY M. (2001): Noctuidae Europaeae, Vol. 5: Hadeninae II – Sorø
- ROUGEOT, P. C. & VIETTE P. (1983): Die Nachtfalter Europas und Nordafrikas, Teil , Schwärmer und Spinner – Keltner
- T.C. ÇEVRE VE ORMAN BAKANLIĞI, MUĞLA A VALLIĞI İLL ÇEVRE VE ORMAN MÜDÜRLÜĞÜ (2008): Mugla 2007 Yılı İl Çevre ve Durum Raporu
- VRIEZE de, M. (2003): Contribution to the knowledge to the Noctuidae from Spain. Observations and collecting trips from September 1986 till December 2001 (Lepidoptera, Noctuidae) – Phegea **31-2**: 61-79
- WAGNER, F. (1909): Einige neue Lepidopterenformen – Entomologische Zeitschrift **23** (4): 17-19
- WITT, T. (1979): *Lemonia pia friedeli* n. spp. – Zeitschrift der Arbeitsgemeinschaft Österr. Entomologen **31**: 17-20
- WITT, T. (1983): Die Verbreitung von *Peridea korbi* (REBEL 1918) – Nachrichtenblatt Bayerischer Entomologen **32** (1): 28-30
- WITT, T. J. & RONKAY, L. (2011): Noctuidae Europaeae, Vol.13, Lymantriinae and Arctiinae – Sorø
- YELA, J. L. & ZAHIRI, R. in cooperation with WAHLBERG, N., RONKAY, L., ZILLI, A. (2011): Phylogenetic overview of Noctuidae, in Witt, T. & RONKAY, L. (ed): Noctuidae Europaeae, Vol. **13**: 17-22
- YEN, S.-H. & MINET, J. (2007): Cimelioidea: A New Superfamily Name for the Gold Moths (Lepidoptera: Glossata) – Zoological Studies **46** (3): 262-271
- ZAHIRI, R., HOLLOWAY, J. D., Kitching, I., LAFONTAINE, D., MUTANEN, M. & WAHLBERG, N. (2007): Molecular phylogenetics of Erebiidae (Lepidoptera, Noctuoidea) – Systematic Entomology, **37**: 104-127
- ZILLI, A., RONKAY, L. & FIBIGER, M. (2005): Noctuidae Europaeae, Vol. 8, Apameini – Sorø

Websites

- Barcode of Life Data Systems (BOLD): WEB-Site, available under: www.boldsystems.org, status: 30.6.2014
- De JONG, Y.S.D.M. (ed.): (2013) Fauna Europaea version 2.6.2 Web Service available online at <http://www.faunaeur.org>, 29.8.2013
- LEPIFORUM e.V. (ed): www.lepiforum.de Web-Site, status 20.6.2014
- T.C. ORMAN VE SU ISLERI BAKANLIĞI, METEOROLOJİ GENEL MÜDÜRLÜĞÜ, Web-Site www.dmi.gov.tr, status 18.7.2014
- TÜRKIYE VE ORTA DOĞU AMME IDARESİ ENSTITÜSÜ: www.yereinet.org.tr, status 21.7.2014
- SCHACHT, B.: (ed.): www.noctuidae.de Web-Site, status 13.10.2013

Plate 1

BARON, Thomas: Collection records of Noctuoidea and Bombycoidea (Lepidoptera) from a Location near Marmaris in South-Western Anatolia, Turkey

1. *Trichiura verena* WITT, Gökçebel, Bodrum, TK., 26.XI 2006, male, leg. et coll. BARON
2. *Lemonia balcanica* HERRICH-SCHÄFFER, Gökçebel, Bodrum, TK., 25.XI 2006, male, leg. et coll. BARON
3. *Polyploca korbi* REBEL 1901, Turunç, Marmaris, TK, 23.III 2012, male, leg. et coll. BARON
4. *Peridea korbi* REBEL 1918, Turunç, Marmaris, TK, 28.III 2013, male, leg. et coll. BARON
5. *Earias insulana* BOISDUVAL, Turunç, Marmaris; TK, 11.XI 2013, leg. et coll. BARON
6. *Earias insulana* BOISDUVAL, Turunç, Marmaris; TK, 17.XI 2013, leg. et coll. BARON
7. *Earias insulana* BOISDUVAL, Turunç, Marmaris, TK, 28.XI 2012, leg. et coll. BARON
8. *Eilema muscula* STAUDINGER, Turunç, Marmaris, TK, 9.X 2013, leg. et coll. BARON
9. *Zebeeba falsalis* HERRICH-SCHÄFFER, Turunç, Marmaris, TK, 18.IX 2013, leg. et coll. BARON
10. *Idia calvaria* DENIS & SCHIFFERMÜLLER, Turunç, Marmaris, TK, 15.XI 2012, female, leg. et coll. BARON
11. *Nodaria nodosalis* HERRICH-SCHÄFFER, Turunç, Marmaris, TK, 25.IV 2013, leg. et coll. BARON
12. *Hypena lividalis* HÜBNER, Turunç, Marmaris, TK, 6.XII 2012, leg. et coll. BARON
13. *Autophila limbata* STAUDINGER, Turunç, Marmaris, TK, 13.III 2012, female, leg. et coll. BARON
14. *Autophila limbata* STAUDINGER, Turunç, Marmaris, TK, 13.III 2012, US, female, leg. et coll. BARON
15. *Autophila anaphanes* BOURSIN, Turunç, Marmaris, TK, 13.III 2012, leg. et coll. BARON
16. *Autophila anaphanes* BOURSIN, Turunç, Marmaris, TK, 13.III 2012, US, leg. et coll. BARON
17. *Pandesma robusta* WALKER, Turunç, Marmaris, TK, 17.XI 2013, leg. et coll. BARON
18. *Catocala separata* FREYER, Turunç, Marmaris, TK, 15.VII 2013, leg. et coll. BARON

Plate 1

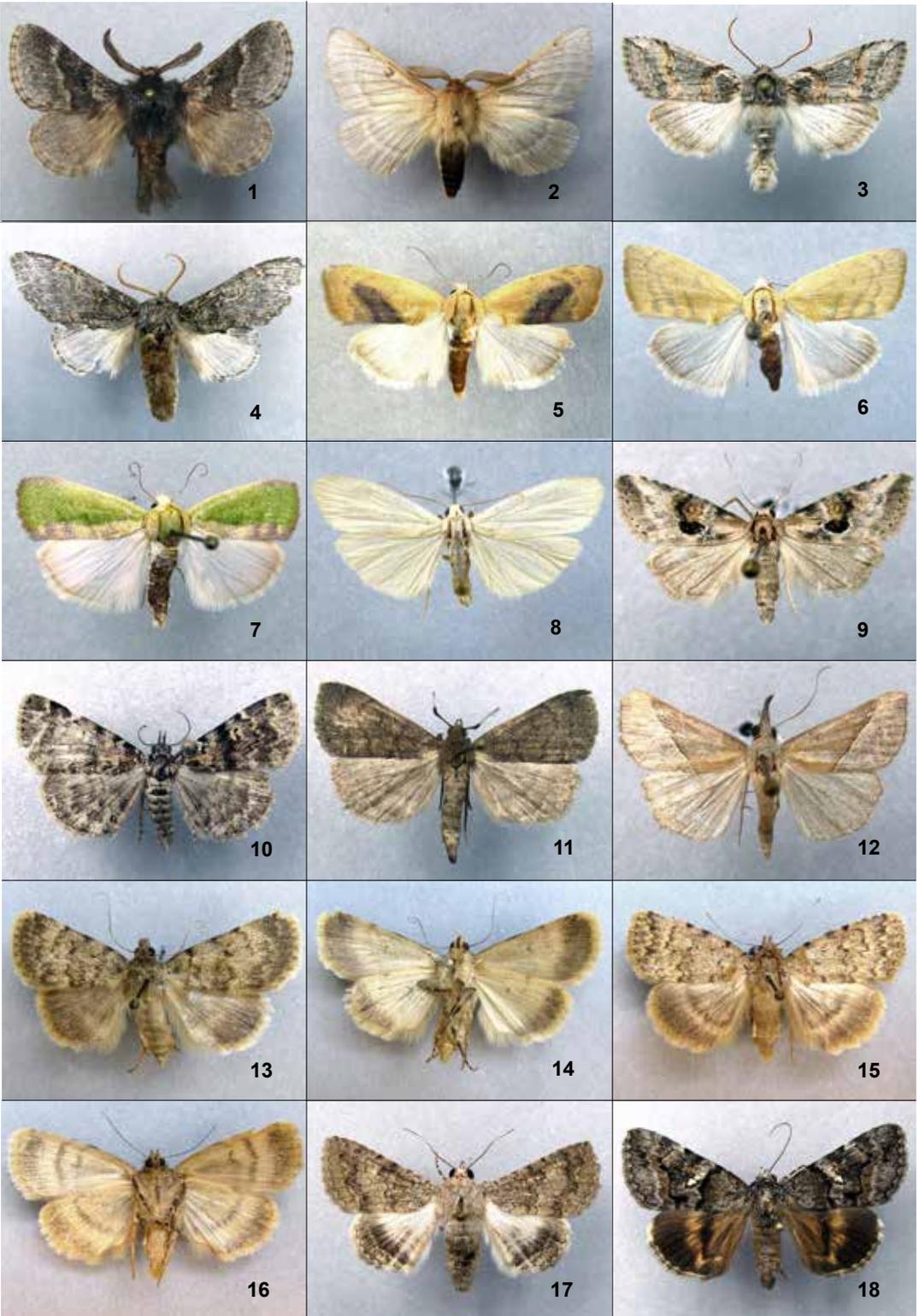
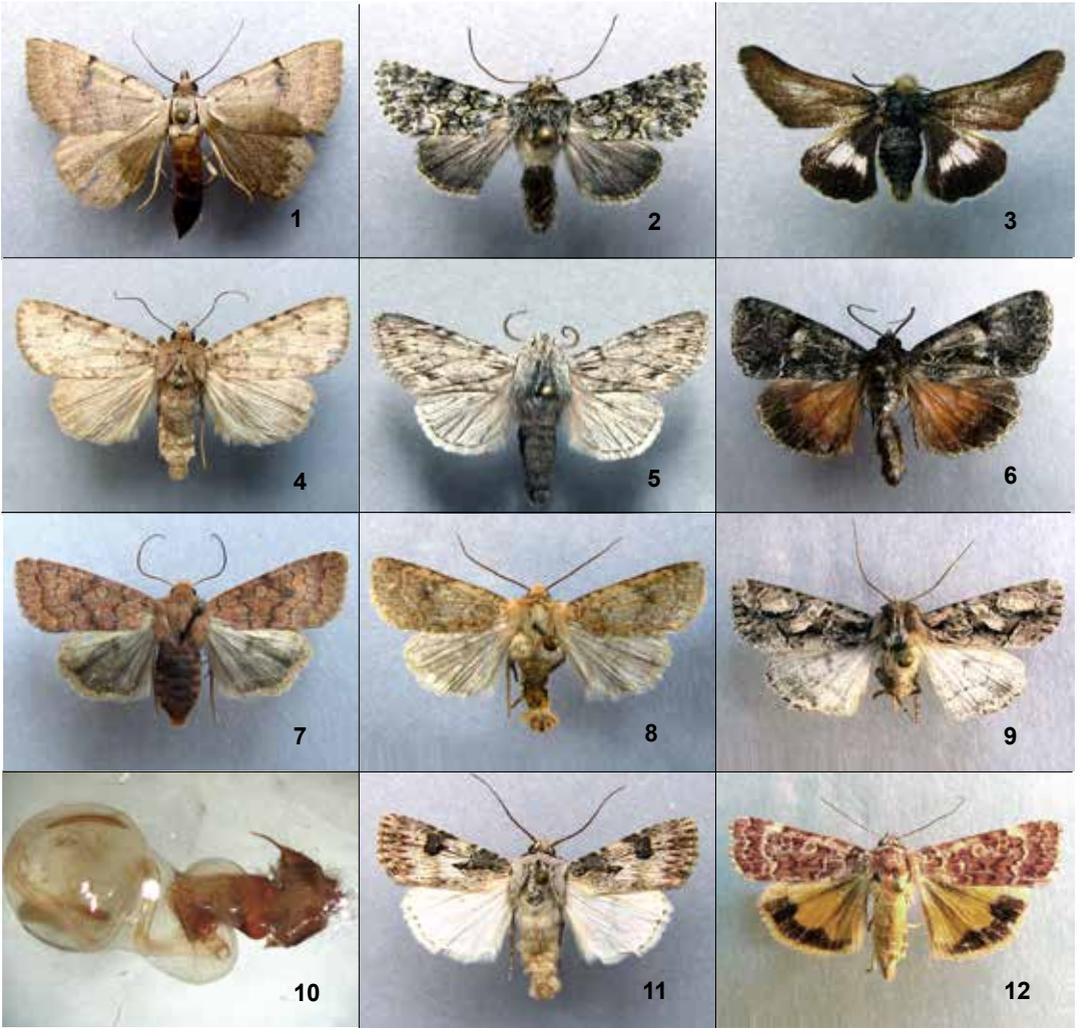


Plate 2

BARON, Thomas: Collection records of Noctuoidea and Bombycoidea (Lepidoptera) from a Location near Marmaris in South-Western Anatolia, Turkey

1. *Plecoptera inquinata* LEDERER, Turunç, Marmaris, TK, 20.VI 2012, leg. et coll. BARON
2. *Pamparoma acuta* FREYER, Turunç, Marmaris, TK, 23.III 2014, eg. et coll. BARON
3. *Stenoecia dos* FREYER, Kizilbucak, Milas, TK, 9.IV 1996, leg. et coll. BARON
4. *Amphipyra effusa* BOISDUVAL, Turunç, Marmaris, TK, 21.XII 2012, leg. et coll. BARON
5. *Asteroscopus syriaca* WARREN, Turunç, Marmaris, TK, 27.I 2012, leg. et coll. BARON
6. *Polyphaenis propinqua* STAUDINGER, Turunç, Marmaris, TK, 29 IV 2014, male, leg. et coll. BARON
7. *Agrochola circellaris* HUFNAGEL, Turunç, Marmaris, TK, 20.XII 2012, female, leg. et coll. BARON
8. *Agrochola consueta* HERRICH-SCHÄFFER, Turunç, Marmaris, TK, male, 20 XII 2012
9. *Dryobotodes tenebrosa* ESPER, Turunç, Marmaris, TK, 13.X 2011, male, leg. et coll. BARON
10. *Orthosia cerasi* FABRICIUS, Turunç, Marmaris, TK, 3.IV 2012, female, leg. et coll. BARON
11. *Orthosia cerasi* FABRICIUS, Turunç, Marmaris, TK, 3.IV 2012, female genitalia, leg. et coll. BARON
12. *Agrotis catalaunensis* MILLIÈRE, Turunç, Marmaris, TK, 6.X 2012, male, leg. et coll. BARON
13. *Divaena haywardi* TAMS, Turunç, Marmaris, TK, 13.X 2013, female, leg. et coll. BARON

Plate 2





Turunç Habitat 7. IV 2014



Turunç Habitat 29. VI 2014