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The Moths Fauna (Lepidoptera) of Şile in the Asian Part of Istanbul Province, Turkey (pl. 39)

Thomas Baron

Key Words: Lepidoptera, Noctuoidea, Turkey, Istanbul
Stichworte: Lepidoptera, Noctuoidea, Türkei, Istanbul

Deutsche Zusammenfassung

Der vorliegende Artikel berichtet über die Fangergebnisse von Noctuoiden und anderen Nachtfaltern in Şile, einer Kleinstadt am Schwarzen Meer in Westanatolien / Türkei. Der Ort und der Landkeis Şile sind Teil der Provinz Istanbul. Einige weitere Fangergebnisse des Autors in anderen Teilen der Provinz Istanbul sind ebenfalls aufgeführt.

Betrachtet wurden Arten der Familien Notodontidae, Nolidae, Arctiidae, Lymantriidae, Erebidae, Noctuidae, Sphingidae, Lasiocampidae, Saturniidae, Drepanidae und Thyatiridae. Nicht berücksichtigt wurden Microlepidoptera und Geometridae.

Die Artenliste wurde, wo nötig oder sinnvoll, mit einigen zusätzlichen Angaben angereichert, die allgemeine Verbreitung, ähnliche Arten oder das Vorkommen in Şile und anderen Teilen der Provinz Istanbul kommentieren.

Für jede Art wird mit römischen Ziffern angegeben, in welchem Monat die Fänge erfolgt sind. Hierbei bedeutet (b) Anfang, (m) Mitte und (e) Ende des Monats.

Die Zahl der gefangenen Spezimens wurde als grober Schätzwert für die tatsächliche Häufigkeit verwandt und die Arten dementsprechend in vier Kategorien eingeteilt:

vc – sehr häufig c – häufig
s - vereinzelt r – selten

Es wird deutlich, dass die Fauna Istanbuls derjenigen Rumäniens und mehr noch derjenigen Bulgariens ähnelt, beides Länder, die ebenfalls am Schwarzen Meer liegen. Da Istanbul aber auch mediterranen Einflüssen unterliegt, ist eine stärkere Vertretung des mediterranen Faunenelementes zu beobachten. Nur eine der festgestellten Arten wurde bisher in Bulgarien noch nicht gefunden, für Rumänien sind es einige mehr. Eine deutlich höhere Zahl der Arten aus Şile gelten in beiden Ländern als selten.

Viele der gefangenen Arten werden im folgenden das erste Mal vom türkischen Schwarzmeer gemeldet. Diese sind mit eine Sternchen (*) gekennzeichnet. Von den Arten, die auf der europäischen Seite Istanbuls gefangen wurden, sind 10 Arten neu für die europäische Türkei. Dies wurde durch einen Vergleich mit FAUNA EUROPAEA abgeleitet, einer von der EU unterstützten Internetseite.

Introduction

The author has registered moths in the Turkish town of Şile (pronunciation: Shile). The collection took place from August 1989 until April 1998 intensively and afterwards sporadically. Şile is situated in north-western Anatolia and is part of the Istanbul province.

The animals were attracted by light. Day time collections of species belonging to the considered families as well as findings in other parts of the province are also added. The latter refer to the area of Levent in the European part of Istanbul if not noted otherwise.

The investigation is confined to the superfamily of Noctuoidea (Notodontidae, Nolidae, Arctiidae, Lymantriidae, Erebidae, and Noctuidae) as well as to the families Sphingidae, Lasiocampidae, Saturniidae, Drepanidae und Thyatiridae.

Address of the author:
Thomas Baron, Korukent Sitesi F Blok 5, 80600 Levent - Istanbul, Turkey
e-mail: thomas.r.baron@gmail.com

Despite easy accessibility the Istanbul province seems to be less investigated entomologically than many other areas in Turkey. Apparently, these areas appear more interesting to European entomologists because of the continuously increasing differences to the European fauna while moving to the East and South of the country. Another reason is the very high urbanization of this province. It is difficult to find habitats, which are still intact or at least affected to a limited degree only. It also needs to be noted that local entomologist unfortunately have not played a sufficiently important role in the past in investigating the Turkish moth fauna.

At the same time, a good number of species have the borderline of their distribution range in the Balkans and in western Turkey. Many species known from Turkey have not been found in Thrace or in the Black Sea area of Anatolia so far. Therefore, the analysis of the fauna of Istanbul, on the border of Europe and Asia, proves to be an important mosaic stone for the understanding of the distribution of species in south-eastern Europe and Anatolia.

Geography and Climate[1]

The Istanbul province is situated on the northern shore of the Sea of Marmara and at the same time borders the Black Sea in the north. The Bosporus, a sea strait connecting the Black Sea and the Sea of Marmara and which forms the border line between the two continents Europe and Asia, cuts right through the middle of Istanbul.

To the west the province extends 90 km from the Bosporus. In the east the distance to the neighbouring province amounts to 80 km. Both sides of the southern and middle section of the Bosporus belong to the urban area of Istanbul, a massive conglomeration with 12 to 14 million inhabitants. The utter north of the Bosporus is not urbanized, mainly also because of the military areas existing here.

The town and the surrounding district of Şile are part of Istanbul province. Şile is situated about 35 km from where the Bosporus meets the Black Sea, and lies directly on the shore of the Black Sea. The distance to the centre of Istanbul accounts to about 50 kilometres. The area belongs to the extreme north-western Anatolia, thus, already forming a part of the Asian continent.

Although Şile does lie at the Black Sea it is usually not considered to be a part of the so called 'Black Sea Region', which is known for having a very specific climate with wet and warm summers lacking the summer drought. Climate wise Istanbul and, consequently, also Şile belong to the 'Marmara Region'.

The species registered here are compared to the distribution data in Hacker (1990). Therefore, it should be noted for the sake of better understanding that also in the present publication all areas bordering the Black Sea including also the area east of the Sea of Marmara are treated as Euxinean (Black Sea) area and thus considered as one faunistic region of Turkey.

The whole Marmara region, which stretches from the Aegean coast in the south up to the Black Sea in the north, is characterized by temperate influences of the Black Sea with its wet summers as well as Mediterranean influences for which hot dry summers are typical. Also Istanbul and Şile belong to this transition zone. Within the Marmara region the Mediterranean influence decreases continuously with increased distance from the Mediterranean Sea, so that Black Sea influences already dominate in the locality considered here.

As a consequence the climate of Şile and surroundings is temperate, though with hot but not always uninterruptedly dry summers. Different from locations near the Mediterranean Sea, it occasionally also rains in summer. This can often be observed towards the end of August, when the first, sometimes hefty rain showers accompanied by strong thunder storms are starting to appear. Before that usually, but not necessarily, it stays very dry. Still it normally remains to be warm until October or November. Compared to central Europe the summers also start late. Until mid of June the area often faces relatively cold weather.

In total the amount of annual rainfall does, however, lie significantly below those of the eastern and central Black Sea. Şile and Istanbul lack the mountain range, which is responsible for the specific climate there. In Şile it rains on 125 – 150 days each year and the total amount of rainfall adds up to between 600 and 1000 mm. The average of 749 mm exceeds the figure for Istanbul by 11 %.

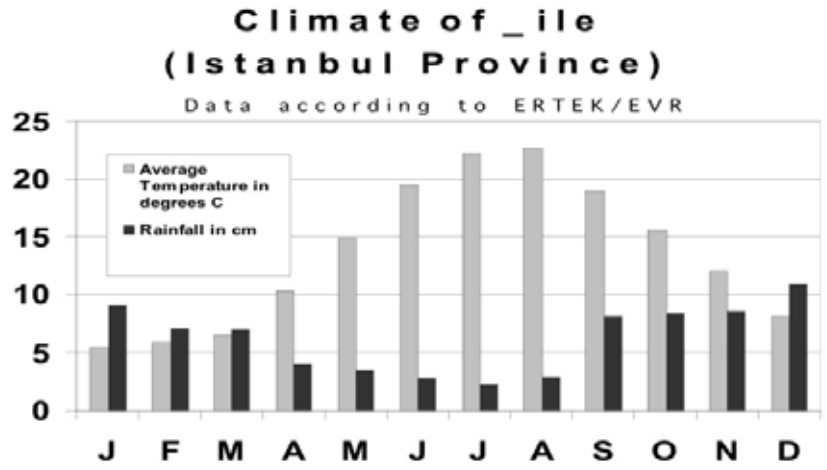
The winters are cold, windy with plenty of rain, partially it also snows. The number of days with snow cover is between one and ten per year. 10 until 30 days of frost are registered annually.

The average time of sunshine per day differs between 9.9 hours (!) in August and 1.6 hours in December.

The average temperature for the whole year is 13.6 °C. This is 1 ° C below the average temperature of Izmit, a city lying east of Istanbul at the utter end of the Sea of Marmara and half a degree below Istanbul (Göztepe). August is the warmest month in Şile with an average temperature of 22.7 ° C, which is 0.7 ° C less than in average experienced in Istanbul.

1 The climatological data are based on Ertek/Evren unless otherwise noted.

The lowest temperature measured between 1938 and 1997 was minus 8.3 ° C, the highest was measured on 12.8.94 with 41° C.



Geology and Soil

The district of Şile has an average altitude of 126 m; the highest peak reaches 480 m above sea level, which is low in comparison to other Turkish provinces.

The district mainly consists of brown forest soil (88%) with a low proportion of chalk. In addition Şile has areas of sand and sand dunes as well as soil with a high content of clay in erosion areas. (ERTEK / EVREN)

Botanical Environment

79 % of the district is covered with secondary forest and bush vegetation. Instead of the original occurrence of Beech (*Fagus*) and Hornbeam (*Carpinus*) today oak trees (*Quercus dschocohesis*, *Quercus pedinculiflora*, *Quercus hartwissiana*) dominate the tree flora. *Fagus* and *Carpinus* can nowadays only be found in less disturbed areas.

Like in Istanbul province in general, also in Şile and its environment the original vegetation over the years has with increasing degree been affected by human activity. Especially within the last 10 years Şile has continuously gained importance as weekend escape for the metropolis of Istanbul. Urbanization and building activity, very often related to weekend houses and holiday accommodation, has been stepped up very intensively. Forest areas and formerly extensive populations of scrubland (pseudomaccie) are increasingly pushed back and fragmented.

The vegetation cover of the district of Şile today consists of 40 % of Oak (*Quercus*), 15 % Beech (*Fagus*), 15 % Hornbeam (*Carpinus*), 10 % Sweet Chestnut (*Castanea sativa*), 4 % various pine trees (Pinaceae) als well as 4 % shrub (pseudomacchie), mainly in the vicinity of the coast. Other trees which are abundant are Alder (*Alnus glutinosa*), Maple (*Acer campestre*), Ash (*Fraxinus excelsior*), Lime (*Tilia tomentosa*), Aspen (*Populus tremula*), Cherry Laurel (*Prunus laurocerasus*), Hazel (*Corylus avellana*), Cornelian Cherry (*Cornus mas*), Medlar (*Mespilus germanica*), Wild Service Tree (*Sorbus torminalis*), Rhododendron (*Rhododendron ponticum*), Daphne (*Daphne pontica*), Common Box (*Buxus sempervirens*) und Common Holly (*Ilex aquifolium*) (Dönmez 1979).

Description of Location and Method of Collection

The collection mainly has been carried out in one location, which lies about one kilometre east of the centre of Şile on a north-eastern slope looking towards the Black Sea. The elevation is about 50 m above sea level. The distance to the coast is roughly 600 m.

For attracting the moths a 200 Watt bulb was used, which had been hanged to a white wall of a house, about 1.5 m above ground. The terrain in front of the building is slightly sloping down. In the vicinity of where the lamp was installed is a grass area surrounded by trees and bushes.

The soil here has a high content of clay, which allows it to soak up and store a lot of water in the wet period of the year while it develops cracks when drying out during the arid months.

The surrounding vegetation consisted of wild grass area, shrub (pseudomacchie) as well as gardens. Common plants near the location were Oak (*Quercus* spec.), Hawthorn (*Crataegus* spec.), Plane (*Platanus* spec.), Hazel (*Corylus avellana*), Aspen (*Populus tremula*), Narrowleaf Ash (*Fraxinus angustifolia*), Walnut (*Julans* spec.), Fig (*Ficus caria*), Blackthorn (*Prunus spinosa*), and fruit trees (White Mulberry, Apple, Plum, Cherry), as well as Erica (*Erica* spec.), Black Berry (*Rubus* spec.), Spanish Broom (*Spartium junceum*) building the pseudomacchie. In addition there has been a small forest of planted pine trees (Pinus) used as a park near the locality. The existing stocks of Beech and Hornbeam within the district are several kilometres away, so that they should not have a significant influence on the species collected.

The location was experiencing a serious change during the period of collection. Originally in the concerned valley there were a few buildings only. Increasing building activity due to the fast growth and expansion of Şile step by step led to the destruction of the vegetation in many parcels of land. This and the consequential increase in the number of lamps available led to a continuous decrease in the efficiency of the collecting activity. Nowadays a productive collection is not any more possible in this locality. Even though the data are not fully comparable due to the different weather conditions and the individual duration of the collection per night, it could be established beyond any doubt that the number of specimens caught has continuously decreased over the considered period.

Analysis of the Moth Fauna of Şile

The investigation was confined to the superfamily of (Notodontidae, Nolidae, Arctiidae, Lymantriidae, Erebidae, and Noctuidae) as well as the families Sphingidae, Lasiocampidae, Saturniidae, Drepanidae, and Thyatiridae.

Geometridae and Microlepidoptera have not been subject of this study.

The total number of registered specimens amounts to about 2300 and comprises 162 species. The collections in Şile were carried out on 136 days.

12 additional species could be monitored in other places of the Istanbul province, mainly in the city area of Istanbul on the European side. The total number of species found, therefore, is 174. Of many species just one or very few specimens have been recorded. It can therefore be assumed that a considerable number of further species exist, which have not been caught just by coincidence. Many further species can be expected in other biotopes and at other plant communities in the district of Şile and Istanbul province in general because the collection has mainly been confined to just one location.

The nights used for collecting have not been homogeneous spread over the months. Therefore the number of specimens per each species can only to a limited degree been used as a reliable measure for their abundance. Nevertheless the significant differences in the number of specimens collected can still give at least a rough indication for its abundance. Therefore, this information is not totally neglected. The 4 different categories were used to indicate abundance.

r - rare	s - sporadic
c - common	vc - very common

Hacker (1990) in total lists 273 species of Noctuidae (Remark: For this comparison the new classification of Noctuoidea Latreille published in 2005 by Fibiger and Lafontaine has not been considered yet) for the Euxenian region. The author has by now caught 133 species in Istanbul, i.e. about half of the number of species listed by Hacker for the whole Black Sea area. Hereof, however, 48 have not yet been shown in Hacker (1990) for this area. Adding them up a number of 321 species for the whole Black Sea area can be calculated, of which 15 % have been added by the present article.

Those species, which have not been shown in Hacker (1990) for the Black Sea, are in the following marked by a star (*). For Notodontidae, Nolidae, Arctiidae, Lymantriidae, Sphingidae, Lasiocampidae, Saturniidae, Drepanidae, and Thyatiridae the distribution maps of De Freina/Witt (1987) have been used as a benchmark. They, however, consider only Trace and Western Anatolia for Turkey. A star (*) here means that the species is not shown for the Asian part of Istanbul province, i.e. the extreme north-western Anatolia. This is the case for 6 species, for which the occurrence hereby is documented.

Most of the registered species do also occur in central Europe, at least in the more southern areas. The number of outright Mediterranean species is relatively limited. With Rumania and Bulgaria equally being located at the Black Sea and with a comparable climate it is not surprising that the analysis shows a high degree of similarity of the fauna of Şile to those of Bulgaria and Rumania. The distance to the Bulgarian border is roughly 120 km from Istanbul, the distance to the Rumanian border about 240 km.

Only one of the species of Noctuidae (according to the definition before the revision by FIBIGER / LAFONTAINE) collected in Istanbul was not registered by BESHKOV (2000) for Bulgaria which is *Caradrina albina* EV. In Rumania it has only been caught twice. (RAKOSY).

According to RAKOSY, there is a complete lack of records for the following species in Rumania: *Pergrapha rorida* FRIV., *Polymixis serpentina* TR., *Spudaea pontica* KLJUSHKO, *Proxenus hospes* FREYER, *Praestilbia armeniaca* STGR., *Catocala eutychea* TR., and *Grammodes bifasciata* PETAG.

A further comparison has been carried out with Fauna Europaea, an internet service initiated and financed by the European Commission. The website lists all known species for each European country (FAUNA EUROPAEA WEB SERVICE). For Turkey the information is restricted to Thrace, being that part of Turkey geographically belonging to Europe. Accordingly, the occurrence of 10 new species for the European part of Turkey can be recorded in this article. (*Eilema complana* L., *Luperina testacea* D. & S., *Dyperygia scabriuscula* L., *Talpophila matura* HUFN., *Melanchra persicariae* L, *Exophila rectangularis* GEYER, *Catephia alchymista* D. & S., *Catocala promissa* D. & S., *Hoplodrina superstes* O., and *Macdunnoughia confusa* STEPH.).

Many of the 47 species, for which the distribution in the European part of Turkey is still unclear, but which are occurring in Şile, thus relatively close to Europe, can probably also still be found in Thrace. These are marked with a plus (+).

Species, which are obviously very common in Şile and are apparently finding optimum conditions, are *Pechipogo plumigeralis* HBN. (in Romania still very rare), *Dysgonia algira* L., a species which is also common in the South of Romania (RAKOSY 1996) as well as in Bulgaria (BESHKOV 2000), *Acronicta rumicis* L., *Talpophila matura* HUFN., *Xestia xanthographa* D.& S. as well as *Leucania putrescens* HBN, of which RAKOSY (1996) only reports one location within Romania.

List of Species

The systematic of Notodontidae, Nolidae, Arctiidae, Lymantriidae, Noctuidae, and Erebidae follows FIBIGER/HACKER (2005). For Lasiocampidae, Saturniidae, Sphingidae, Drepanidae, and Thyatiridae DE FREINA/WITT (1987) is used as basis.

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

Lasiocampidae HARRIS (3 species)

- *Lasiocampa grandis* RGHFR. (c eVIII-mIX)
  - The species was also noted in the city area of Istanbul
- *Lasiocampa trifolii* D. & S. (s eVIII-bIX)
- *Odonestis pruni* L. (r bIX)

Saturniidae BSD. (2 species)

- *Saturnia pavoniella* SCOP. (*) (r bIV)

  This species has only recently been separated from *Saturnia pavonia* L. and it is replacing *S. pavonia* L. in southern Europe. The borders of its exact distribution range have not been completely established. The specimens found in Şile were female and caught at light in April. It is also known to fly by daylight.

  DE FREINA/WITT (1987), who at that time did not separate *S. pavoniella* SCOP. from *S. pavonia* L., in their distribution maps also did not show the species *S. pavonia* L. for Turkey. In FAUNA EUROPAEA, however, *S. pavoniella* SCOP. is listed for Thrace. The record from the Anatolian part of Istanbul shows that *S. pavoniella* SCOP. is, as expected, also present in north-western Anatolia.
- *Perisomena caecigena* KUP. (r bXI)
  - P. caecigena KUP. has been recorded in the vicinity of Karacaköy at the Terkoz lake near the western border of Istanbul province. This record in Thrace was established at the beginning of November.

Sphingidae LATREILLE (4 species)

- *Agrius convolvuli* L. (r mVI, bVIII-eVIII)
  - This Mediterranean species probably has migrated from its southern range into the area. Caterpillars have not been found.

- *Macroglossum stellatarum* L. (c mVI-bX)
    - Besides specimens caught at light, the species is often visible also during daytime in many places of the Istanbul province
- *Hyles livornica* Esp. (r bVI)
- *Daphnis nerii* L. (*) (r eVII)
    - The species was caught at light in the city area of Istanbul. In Şile and Istanbul also caterpillars have been found. De Freina/Witt's (1987) distribution map shows a range including the south coast of Turkey and the Aegean up to the Dardanelle straits, but excludes the Marmara region. Also Bulgaria and Rumania are excluded from the shown distribution.

Drepanidae Meyrick (2 species)
- *Cilix glaucata* Scop. (+) (s eIII-eIX)
    - The separation from *Cilix asiatica* Bang-Haas has been carried out.
- *Watsonalla binaria* Hufn. (r eVIII-eIX)

Thyatiridae J.B.Smith (2 species)
- *Habrosyne pyritoides* Hufn. (r aVIII-eIX)
- *Thyatira batis* L. (r mVII-mVIII

Superfamily Noctuoidea Latreille

Notodontidae Steph. (9 species)

Thaumetopoeinae Aurivillius
- *Thaumetopoea pityocampa* D. & S. (*) (s eVII-mVIII)
    - The species has also been recorded within the city of Istanbul (Levent). The distribution map in De Freina/Witt (1987) does not show the species for the Asian side of Istanbul and the western Black Sea region, but only for the Aegean and Thrace. The records in Şile prove that the species is also distributed in north-western Anatolia

Pygaerinae DUP.
- *Clostera curtula* L. (r bIX)
- *Clostera pigra* Hufn. (r eVIII)

Notodontinae Steph.
- *Furcula bifida* Br. (r eVI)
- *Pheosia tremula* Cl. (r eVIII)
- *Notodonta dromedarius* L. (*) (r bIX)
    - This species has been caught in Şile only once, therefore, seems to be rare in the area. According to the distribution map in De Freina/Witt (1987), the species is distributed all over central Europe and most parts of Southern Europe. For the Turkish Aegean coast and the Marmara area the species is not shown. The record in Şile closes the gap between former records more to the east in Anatolia and the European part of Turkey in the west.
- *Pterostoma palpina* Cl. (r eVIII)

Heterocampinae Neumogen & Dyar
- *Harpyia milhauseri* F. (r mV)
- *Spatalia argentina* D. & S. (r bV, mVII)

Nolidae Bruand

Nolinae Bruand (4 species)
- *Meganola albula* D. & S.(+) (c bVI-bIX)
    - The species has already been found in Istanbul Province before, namely in Kemerburgaz (European side), according to De Freina (1994). In FAUNA EUROPAEA this information has not been considered so far, as it is not listed for the European part of Turkey here.
- *Nola cicatricalis* Tr. (r bIV)
- *Nola chlamitulalis* Hbn. (c bVI-eVIII)
- *Nola aerugula* Hbn. (r eVIII)

Chloephorinae Stainton (3 species)
- *Pseudoips prasinana* L (*fagana* F.) (r bVIII)

- *Bena bicolorana* Fuessly (*prasinana*) L. (r eVIII-mIX)
- Nycteola asiatica Krul. (+) (r eVII, eVIII)

Eariadinae Hampson (1 species)
- *Earias clorana* L.(*)(+) (r bVII)
  - According to Hacker (1990), the species has not been recorded for northern Turkey so far.

Arctiidae Leach
Lithosiinae Billberg (5 species)
- *Eilema complana* L. (c mVI-bIX)
  - In addition to Şile, the species was also collected in Levent in the city of Istanbul. This, apparently, is the first record for the European part of Turkey (see FAUNA EUROPAEA).
- *Eilema lurideola* Zinck. (r eVIII)
  - A single specimen was caught 10 km east of the town Şile, still within the Şile district.
- *Eilema pygmaeola* Dbld. (r eVII-mIX)
- *Eilema caniola* Hbn. (c eVIII-eIX)
  - The species has also been found within the urban area of Istanbul.
- *Eilema sororcula* Hufn. (+) (r mVI-eVI, mIX)

Syntominae H.S. (1 species)
- *Dysauxes famula* Frr. (r mVI-eVIII
  - Also within the city of Istanbul (Levent) the species has been noted several times.

Arctiinae Leach (7 species)
- *Arctia villica* L. (c bVI-eVI)
- *Spiris striata* L (r eVIII-bIX)
- *Euplagia quadripunctaria* Poda (s mVII-bIX)
  - The animals were flying during daytime.
- *Spilosoma lutea* Hufn. (r eVI-mVII)
- *Spilosoma lubricipeda* L (= *mentastri* Esp.) (c mV-mIX)
  - The species was caught also within Istanbul.
- *Tyria jacobaeae* L. (+) (r eVI)
  - This day-active species was caught in Karamandere, close to the town of Şile.
- *Phragmatobia fuliginosa* L. (c eVI-eIX)

Lymantriidae Hampson (3 species)
- *Lymantria dispar* L. (c mVII-eIX)
  - Besides many records at light, the species was also monitored flying during the day, in Şile as well as other parts of Istanbul.
- *Ocneria rubea* D. & S.(*) (+) (s bVI-eVI; mVIII-eIX)
  Also here, the records in Şile enlarge the known range of distribution by proving its existence also at the Turkish Black Sea coast. De Freina/Witt (1987) do not show the species for western Anatolia or the Aegean, but only for the European section of Turkey. In FAUNA EUROPAEA the species is, however, not listed for Turkey.
- *Laelia coenosa* HBN. (*)(+) (r eVII)
  - All 3 specimens have been caught 1995, at the end of August within two days. According to De Freina/Witt (1987), the range of distribution ends at the western border of Turkey. For Turkish Thrace and for western Anatolia no distribution is shown here.

Erebidae Leach
Eublemminae Forbes (3 species)
- *Calymma communimacula* D.& S. (*)(+) (r eVIII)
  - The species has not been shown for the Black Sea region in Hacker (1990) and is also not shown in FAUNA EUROPAEA. It can here for the first time be confirmed for the Black sea area. Also in other parts of Turkey *C. communimacula* D. & S., apparently, has been found rarely.
- *Odice arcuinna* HBN. (+) (s bVI-bIX)
- *Odice suava* HBN. (r bIX)

Herminiinae Leach (5 species)

- *Pechipogo plumigeralis* Hbn.(= *Polypogon crinalis* Tr.)(*) (vc bVI-mX)
  This species, which some authors recently have started to split into *Pechipogo plumigeralis* Hbn. and *Polypogon crinalis* Tr. is very common in Şile. Hacker (1990) did not confirm a distribution at the Turkish Black Sea coast. FAUNA EUROPAEA, however, does list the species for Thrace.
  A separation into *P. plumigeralis* und *P. crinalis* has not been carried out in the present article.
  The species of this complex are very rare in Rumania (Rakosy); the concerned records also are not separately available for the two taxa. For Bulgaria *P. plumigeralis* Hbn. ist reported, but not *P. crinalis* Tr. (Beshkov 2000).
- *Simplicia rectalis* Ev.(*)(+) (r eVI, eVIII-bIX))
  - According to Hacker (1990), only some older records for the Mediterranean area exist. Hereby the species is recorded for the Black Sea region. In the centre of Europe the species flies in July and August (Koch). In the south a 2. generation exists (Hacker 1989) to which the specimens of Şile, all caught at the end of August and the beginning of September, apparently belong. Also in Bulgaria and Rumania the species is known to fly until September (Beshkov, Rakosy).
- *Herminia tarsipennalis* Tr.(+) (r eVIII)
  - The species has been found in Turkey only a few times. In 1990 Hacker (1990) it is still stated that *H. tarsipennalis* Tr. has not been found in Turkey.
- *Herminia tarsicrinalis* Knoch (r bVI-eVI, bVIII)
  - Also this species has been rarely recorded from Turkey. Hacker (1989) mentions the Pontic Mountains. Besides Şile, the species was also noted by the author in the city of Istanbul and in Sapanca / Adapazarı province, 120 km east of Istanbul.
- *Paracolax tristalis* F. (= *derivalis* Hbn.) (r eVI)

Hypeninae H.S. (2 species)
- *Hypena rostralis* L.(*) (r mV, eX)
  - This species, which is not uncommon on the Balkans, was not found in northern Turkey so far.
- *Zekelita antiqualis* Hbn.(*) (r bVI, bVIII)
  - Also this species is hereby for the first time notified from the north of Turkey, although according to Hacker (1989) otherwise common in Turkey.

Phytometrinae Hampson (1 species)
- *Phytometra viridaria* Cl.(*)(+) (r eVIII)
  - The present finding has been a collection at light. Otherwise the species (also) flies during the day. In Bulgaria it is reported to be known only from 2 older records (Beshkov 2000), and it is not known from Thrace so far (FAUNA EUROPAEA).

Aventiinae Tutt (1 species)
- *Laspeyria flexula* D. & S. (r mIX)

Catocalinae BSD. (14 species)
- *Exophila rectangularis* Geyer (*) (s bV, bVII)
  - *E. rectangularis* Geyer has been captured in Levent / Istanbul at light several times.
    According to Hacker (2001), in Turkey the species is only distributed in areas with Mediterranean influence. The above records also prove the existence of the species newly for the European part of Turkey.
- *Lygephila craccae* D. & S. (+) (r bIX)
- *Euclidia glyphica* L. (+) (r bVI-mVI)
  - The species has been collected in Şile and Kurtköy / Istanbul, Asian side during the day.
- *Catephia alchymista* D. & S.(*) (r mVI)
  - One animal from the centre of Istanbul / Levent can be reported. Apparently, this is another new record for the European part of Turkey.
- *Ophiusa tirhaca* Cramer(*) (r eVI)
  - This southern species is known for its migrating habit. It has probably flown in from the Mediterranean area. The specimen was found during daytime resting at a bush.
- *Dysgonia algira* L. (vc mV-bIX)
  - This species is the most common moth in Şile, where it obviously finds optimum conditions for development. According to Beshkov, it is also one of the most common species in Bulgaria.

- *Grammodes stolida* F. (r bVIII-bIX)
- *Grammodes bifasciata* Petag.(*) (s bVII-bIX)
    - The capture newly confirms the occurrence at the Black Sea coast in Turkey.
- *Catocala hymenaea* D. & S. (*) (v mVII-bVIII)
    - The species was apparently found rather seldom in Turkey and has not been reported from the Black Sea. In Şile it is not uncommon.
- *Catocala elocata* Esp. (r bIX-bX)
- Catocala promissa D. & S. (*) (r bVII)
    - *C. promissa* D. & S. has not been reported from the Black Sea in Turkey. Also this species is considered to be rare in Turkey. Besides a capture in the city of Istanbul, the author was also able to collect it in Thrace. The location was İğneada, Kırklareli province, directly at the border to Bulgaria. Both records newly confirm the species for the European part of Turkey. It is known from Bulgaria. (Beshkov)
- *Catocala eutychea* Tr. (r eVI)
- *Catocala nymphagoga* Esp. (+) (r mVII)
- *Minucia lunaris* D. & S. (+) (r mV)

Euteliinae Grote (1 species)
- *Eutelia adulatrix* Hbn. (c mV-mVIII)
    - In Levent within the city of Istanbul the species is common.

Noctuidae Latreille

Plusiinae BSD. (4 species)
- *Macdunnoughia confusa* Steph. (r eVII-bX)
    - This species is active during day and night time. A part of the specimens were collected during the day. It was also found in the European side of Istanbul and can, therefore, also be noted newly for the European part of Turkey.
- *Autographa gamma* L. (vc bV-bX)
- *Diachrysia chrysitis* L. (r bVI-bIX)
    - A separation of *D. stenochrysis* Warren (= *tutti* Kostrowicki) has not been carried out, both were treated as one complex of species.
- *Chrysodeixis chalcites* Esp. (r eVII, mIX)

Eustrotiinae Grote (1 species)
- *Protodeltote pygarga* Hufn. (c bVI-bIX)
    - According to Hacker (1989), mainly the dark form ‘albilinea’ is found in Greece and Turkey. This can not be confirmed for Şile. The specimens caught resemble the illustration in Koch (1984).

Acontiinae Guenée (4 species)
- *Acontia trabealis* Scop. (r mVII-bVIII)
- *Acontia lucida* Hufn. (r eVI-bIX)
- *Aedia funesta* Esp.(*) (+) (c mVI-bIX)
    - Also this common species in Şile, apparently, is hereby recorded from the Turkish Black Sea coast for the first time. In Hacker (1990) it is not listed for northern Turkey and it is also not known from Thrace (FAUNA EUROPAEA).
- *Aedia leucomelas* L. (*)(+) (s mVII-bIX)
    - *A. leucomelas* L. is known from the Black Sea coast of other countries but apparently found near the Turkish Black Sea for the first time. It is also not known from Thrace yet.

Acronictinae Heinemann (4 species)
- *Acronicta tridens* D. & S. (+) (r bVI-bVIII)
    - The species has been separated from *A. psi* L. by genial analysis.
- *Acronicta aceris* L. (r bVII - eVIII)
- *Acronicta rumicis* L. (vc bV-bX)
- *Craniophora pontica* Stgr.(*)(+) (r mVI-bVII)

Metoponiinnae H.S.(1 species)
- *Tyta luctuosa* D.& S. (r eVI-bIX)

Oncocnemidinae Forbes & Franclemont (3 species)

- *Calophasia platyptera* Esp. (r bIX-mIX)
  - In Rumania the species was only found once (Rakosy 1996). In Bulgaria several locations are known, all of them situated at the Black Sea (Beshkov 2000)
- *Omphalophana antirrhinii* Hbn. (+) (r bVI)
- *Praestilbia armeniaca* Stgr. (*) (s mIX-bX)
  - Also this species is new for the area, however, not uncommon in Şile. According to Hacker (2001) it is not very much distributed in Turkey in general, and mostly found in locations with a Mediterranean influence.

Amphipyrinae Guenée (2 species)

- *Amphipyra pyramidea* L. (r bVII, eVIII)
  - One specimen has also been found in the city of Istanbul (Yenilevent).
- *Amphipyra tragopoginis* Cl.(*) (r mVII-eVII)
  - This, apparently, is another new record for the Turkish Black Sea region.

Psaphidinae Grote (1 species)

- *Valeria oleagina* D. & S.(*) (r mIII-bV)
  - Also for this species a record for the Turkish Black Sea was outstanding until now.

Heliothinae Bsd. (3 species)

- *Helicoverpa armigera* Hbn (s mVI-eIX)
- *Heliothis peltigera* D. & S. (r bIX)
- *Schinia scutosa* D.& S.(*) (r bVII, eVIII)
  - A further animal of this new species for the Black Sea was captured in the city area of Istanbul.

Eriopinae H.S. (1 species)

- *Callopistria juventina* Stoll (s bVI-mIX)
  - According to Hacker (1989), the species is mainly distributed in the humid and warm area of the Pontic mountains. In Hacker (1990), however, also one record in the Mediterranean region is mentioned. The capture in Şile confirms the occurrence also in western Turkey. The author was also able to find this species in Sapanca, Adapazarı province, 120 km east of Istanbul. In the meantime it is also known from Thrace (FAUNA EUROPAEA).

Bryophilinae Guenée (2 species)

- *Cryphia tephrocharis* Boursin (*)(+) (r eVIII-eIX)
  - This is another new record for the Turkish Black Sea area. The determination was carried out by checking the genital organs. In Bulgaria the species is known from locations with an elevation of 700 – 1800 m (Beshkov 2000).
- *Cryphia rectilinea* Warr. *) (r eVIII)
  - This finding represents another new record for the Turkish Black Sea. The species was determined by analysing the genitalia.

Xyleninae Guenée (35 species)

The subfamily Xyleninae mainly contains species, which formerly belonged to the subfamily of Amphipyrinae. Based on Hacker's investigations (Hacker 1990) it can be seen that a relatively high number of 17 species of Xyleninae now caught in Şile have not been found at the Turkish Black Sea earlier.

- *Spodoptera exigua* Hbn. (r eVII-eIX)
- *Elaphria venustula* Hbn. (r mVI-mVIII)
- *Caradrina morpheus* Hufn. (+) (r bVI-bIX)
- *Caradrina kadenii* Freyer (*)(+) (r mIX)
  - These captures appear to represent a further new recording for the area.
- *Caradrina albina* Ev. (*)(+) (r bIX-mIX)

  The western border of its distribution is southern Rumania (Rakosy, Hacker 1989). From Thrace and Bulgaria, however, it is not known so far. After two records in Şile, i.e. within the Istanbul province, it is not unlikely to occur also in Thrace and Bulgaria. According to Hacker (1990), the species was also not known so far from the Turkish Black Sea and the Turkish Mediterranean Sea.

The determination could easily be conducted by the wing pattern of the captured fresh specimen. In order to remove any remaining doubt the specimen was dissected. The determination, according to the genitalia, confirmed the result.

- *Caradrina clavipalpis* Scop. (r bVI, eVIII-eIX)
  - The species has been sporadically found in Şile as well as within Istanbul.
- *Hoplodrina ambigua* D. & S. (c bVI-bX)
  - An occurrence of this species could, besides Şile, also be established for the city of Istanbul.
- *Hoplodrina octogenaria* Goeze (= *alsine*s Brahm) (+) (s bVI-mVII)
- *Hoplodrina superstes* O. (r mVI)
  - A specimen caught in the city of Istanbul (Levent) newly proves the occurrence in the European part of Turkey. In FAUNA EUROPAEA the species is not listed for Turkey (European part) so far.
- *Rusina ferruginea* Esp. (+) (r bVI-eVI)
- *Charanyca trigrammica* Hufn. (r eIV-mVI)
- *Proxenus hospes* Freyer(+) (s mVI-mIX)
  - According to Hacker (1986), the species has been found in Istanbul already before (Kurtköy / Asian side).
- *Atethmia ambusta* D. & S.(*) (+) (r eIX)
  - Both specimens, which hereby confirm *A. ambusta* D. & S. for the Black Sea area, have been found at the end of September.
- *Atethmia centrago* Haw. (+) (r mIX-eIX)
- *Dyperygia scabriuscula* L. (r mVI)
  - The one specimen captured in Levent / Istanbul newly establishes the occurrence of the species the European part of Turkey.
- *Trachea atriplicis* L.(*)(+) (r eVI)
  - Also this species is uncommon on the Balkans and in Turkey. It is hereby for the first time recorded from the Black Sea. As it was caught only once it seems to be rather rare in Şile also.
- *Anthracia eriopoda* H.S.(*) (r eVIII)
  - According to Rakosy (1996), this species has been found in Rumania only once. The now proven occurrence in Şile is the first record for the Turkish Black Sea area.
- *Olivenebula subsericata* H.S.(*). (s eVI, bIX-eIX)
  - This finding represents another new recording for the Turkish Black Sea. The species is not uncommon in Şile.
- *Polyphaenis viridis* Villers (= sericata Esp.) (*) (s mVI-eVII)
  - Also this species is recorded for the first time from the Turkish Black Sea and also is not uncommon.
- *Talpophila matura* Hufn. (vc bIX-bX)

  Following *D. algira* L., *A. gramma* L., and *X. xanthographa* D. & S. this is the most common species in Şile. Hacker (1989) notes that it is very common in Greece, but only very scarcely distributed within Turkey. For the Istanbul region this statement, apparently, does not apply. The species was also captured on the European side of Istanbul. In FAUNA EUROPAEA it has not been listed for Turkey (European part) so far.
- *Chloantha hyperici* D. & S. (*) (r mVII-bIX)
  - After this species seems to be relatively common on the Balkans (Hacker 1989) an occurrence in north-western Turkey does not come as a surprise. It is also hereby recorded for the Black Sea for the first time.
- *Euplexia lucipara* L. (r bVI-eVI, eVIII)
  - According to Hacker (1986) and (1985), this species has already been captured in Istanbul before.
- *Oligia latruncula* D. & S. (*)(+) (c bVI-eVI, eVIII-eIX)
  - The separation from O. versicolor BKH. has been carried out by genital analysis.
- *Mesapamea didyma* Esp. (r mVII, bIX-eIX)
  - The determination was carried out checking the genitalia of one of the captured animals and thereby separated from *M. secalis* L. A simultaneous occurrence of *M. secalis* L. in the province is not unlikely.
- *Luperina dumerilii* Dup.(*)(+) (s eVIII-bX)
- *Luperina testacea* D. & S.(*) (r eIX-bX)
  - In addition to Şile, one specimen was also found in the city area of Istanbul on October 6th.

The species is reported to be rare in Bulgaria (Beshkov 2000).

- *Archanara geminipuncta* Haw.(*) (r eVII)
  - The occurrence in Şile could be established by one specimen collected. Until now the species was only reported from the Mediterranean Sea (Hacker 1990). Also some rather few reports from Bulgaria exist (Beshkov 2000).
- *Phlogophora meticulosa* L. (+) (r bV-bVI, eVIII-eIX)
- *Spudaea pontica* Kljutshko (*)(+) (r eIII-bV)
  - The determination of one specimen was confirmed by genital analysis. From Rumania the species has apparently not been recorded so far. It does, however, occur in Bulgaria. In the Balkans the species is replaced to the west by *Spudaea ruticilla* Esp. but the exact borders of its distribution range are apparently unclear so far. The collection in Şile newly proves the occurrence for the Turkish Black Sea area.
- *Agrochola lychnidis* D. & S. (r eX)
- *Conistra vacinii* L. (r eIII)
- *Conistra erythrocephala* D. & S.(*) (r eX)
  - According to the status applying in Hacker (1989), the species has been found in Turkey only rarely. This is the first record for the Black Sea.
- *Jodia croceago* D. & S.(*) (r bIV)
  - This capture seems to be the first proof for the Turkish Black Sea.
- *Phylapora canescens* Dup.(Istanbul) (*) (r eIX-mX)
  - *P. canescens* Dup. has not been known from the Turkish Black Sea so far. The author was able establish two records for the European part of Istanbul city.
- *Polymixis serpentina* Tr.(*)(+) (r bX)
  - The collection of this species at the beginning of October apparently is the first proof for the Turkish Black Sea area.

Hadeninae Guenée (23 species)

- *Orthosia cerasi* F. /(= *stabilis* D. & S.) *) (r eIII-bIV)
  - Besides Şile, the species has also been caught within Istanbul and thereby newly been established for the Black Sea area.
- *Orthosia gothica* L.(*) (r mIII, bV)
  - The species is relatively new for Turkey and has not been noted for the Black Sea area. (Status of Hacker 1989 and Hacker 1990).
- *Perigrapha rorida* Friv.(*) (r eIII-bIV)
  - Also this species has not been reported from the Turkish Black Sea.
- *Egira conspicillaris* L. (+) or E. *tibori* Hreblay (+) (r eIV)
  - Only one specimen of *Egira* spec. could be captured in Şile, which turned out to be a female specimen. The genital analysis of male animals allows the establishment of the species beyond doubt. With the present specimen a clear determination by the female genitalia was not possible. *Egira anatolica* Hering, however, could be excluded. *E. conspicillaris* L. and *E. tibori* Hreblay both are known to exist on the Balkans and in the west of Asia Minor.
- *Anarta trifolii* Hufn. (s eVIII-eIX)
- *Lacanobia w-latinum* Hufn. (+) (r bVI-eIX)
- *Lacanobia suasa* D. & S.(*)(+) (r mVII-eVII)
  - According to Hacker (1990), the species has not been recorded from the Black Sea.
- *Lacanobia oleracea* L. (+) (s bVI-eIX)
- *Lacanobia splendens* Hbn.(*)(+) (r eVI-bIX)
  - The species is relatively new for Turkey and very rare. Hacker (1990) shows a lack of records for Turkey, accordingly, the collection in Şile would be a new record for Turkey. However, Hacker (1989) one year earlier reports one single finding for Turkey. According to Beshkov (2000), also in Bulgaria the species is very rare, it is also not known from Thrace (FAUNA EUROPAEA). In total 3 specimens could be recorded from Şile.
- *Melanchra persicariae* L. (r eIX)
  - The capture of this animal was achieved in Yenilevent in the city area of Istanbul (European part). This northern species requires humid, shady, and wooded biotopes and, therefore, is rather known from mountainous areas in southern Europe. Conspicuous is the late flight time, being the end of September while usually a flight period from May to August is given. According to Beshkov (2000), the species is also rare in Bulgaria, while it seems to be well distributed in Rumania. The border line of its distribution range runs through northern Anatolia. The species is hereby newly established for the European part of Turkey.

- *Mamestra brassicae* L. (r bIX)
- *Sideridis rivularis* F. (+) (r mVII)
- *Hecatera dysodea* D.& S. (r bVII-mVII, bIX-mIX)
- *Hecatera bicolorata* Hufn. (r eVII, bIX)
- *Mythimna vitellina* Hbn. (c eV-bX)
    - *M. vitellina* Hbn. has also been frequently found by the author within Istanbul.
- *Mythimna unipuncta* Haw. (r bI, eVIII-bX)
    - One specimen has been noted in the beginning of January, apparently hibernating through the winter between old wood.
- *Mythimna sicula* Tr.(*)(+) (r eVI))
    - The determination of this species was verified by genital analysis.
- *Mythimna albipuncta* D. & S.(*) (s bV-mV, bIX-mX)
    - Hacker (1990) shows no records for the Black Sea. Two further specimens in addition to those found now in Şile could be reported by the author from the city area of Istanbul (European side).
- *Mythimna ferrago* F. (r eVIII-eIX)
- *Mythimna congrua* Hbn.(*) (c bVI-eIX)
    - Also this species, which is common in Şile, is hereby newly reported for the Black Sea.
- *Mythimna l-album* L.(*) (r eVI, bIX)
- *Leucania putrescens* Hbn. (vc eVIII-bX)
    - M. putrescens Hbn. is one of the most common species in Şile. From Bulgaria Beshkov (2000) is only able to report it from two localities.
- *Leucania loreyi* Dup. (r bIX)

Noctuinae Latreille (18 species)

- *Peridroma saucia* Hbn. (s bVI-mIX)
- *Euxoa temera* Hbn. (+) (r mIX-eIX)
- *Axylia putris* L. (s eVI, eVIII-bIX)
- *Ochropleura plecta* L. (s eVI, eVIII-eIX)
- *Cerastis rubricosa* D. & S. (r eIII-bIV)
    - The species is flying early in the year. The records from Şile are from the end of March until the beginning of April.
- *Noctua comes* Hbn. (s bVI-eIX)
    - Beside Şile, *N. comes* Hbn. has also been captured in the city of Istanbul.
- *Noctua interjecta* Hbn. (r eVII, eIX)
- *Noctua janthina* D. & S. (r mVI-bIX)
    - Also this species has, in addition to Şile, several times been found within Istanbul. The determination was confirmed by S. Beshkov.
- (?) *Noctua tertia* Mentzer, Moberg, Fibiger (r, eVI-mVII)
    - This is a sister species of *N. janthina* D & S., however, the status as a separate species is not finally clarified and the distinction is difficult. Some of the present specimen of the *janthina* /*tertia* – complex seem to be *N. tertia* Mentzer, Moberg, Fibiger. All of these have been collected within the city of Istanbul. One of these specimens has been discussed with S. Beshkov, who shares the supposition that it is *N. tertia.* Until now N. tertia has not been recorded from the European part of Turkey (FAUNA EUROPAEA).
- *Noctua pronuba* L. (s eV-mVII, bIX-eIX)
    - In addition to those from Şile, further findings have been noted directly from within Istanbul.
- *Xestia xanthographa* D. & S. (vc eVIII-eX)
    - A clear separation from *X. cohaesa* H.S. has been possible by genital analysis.
- *Xestia cohaesa* H.S. (*)(+) (r? mIX)
    - The determination of this species has been confirmed by Beshkov. As it has not been separated from X. xanthographa D. & S. during the original investigation a final comment about the abundance of this species in Istanbul is not possible. Within the captured Xestia specimens, however, only one X. cohaesa H.S. has been found.
- *Xestia c-nigrum* L. (s mVIII-bX)
- *Agrotis exclamationis* L. (s mV-bIX)
- *Agrotis bigramma* Esp. (= *crassa* Hbn.) (vc mVII-eIX)
- *Agrotis segetum* D. & S. (c eIV-eIX)
- *Agrotis trux* (HBN.) (r mIX)
    - The separation from other *Agrotis* spec. has been carried out together with S. Beshkov. Ac-

cording to HACKER (1990), the species has not been notified from the Turkish Black Sea coast before.

- *Agrotis puta* HBN. (s bV, bIX-eIX)
  - o A separation from *A. syricola* CORTI & DRAUDT, which possibly is a species of its own, has been carried out together with S. Beshkov who is familiar with both taxa.
- *Agrotis ipsilon* HUFN. (vc eVI-eX)

Final Remarks

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