



A survey on sphingidae (lepidoptera) species of south eastern Turkey with new distributional records

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Abstract

This paper provides comments on the Sphingidae species of south eastern Turkey by the field surveys are conducted between in 2015-2017. A total of 15 species are determined as a result of the investigations from Batman, Diyarbakır and Mardin provinces. With this study, the number of sphinx moths increased to 13 in Batman, 14 in Diyarbakır and 8 in Mardin. Among them, 7 species for Batman, 4 species for Diyarbakır and 1 species for Mardin are new record. For each species, original reference, type locality, material examined, distribution in the world and in Turkey, and larval hostplants are given. Adults figures of *Smerinthus kindermanni* Lederer, 1852; *Marumba quercus* ([Denis & Schiffermüller], 1775); *Rethera komarovi* (Christoph, 1885); *Macroglossum stellatarum* (Linnaeus, 1758); *Hyles euphorbiae* (Linnaeus, 1758) and *H. livornica* (Esper, [1780]) are illustrated.

Article info

History:

Received:10.06.2019

Accepted:20.12.2019

Keywords:

Fauna,
Hawk moths,
New records,
Sphingidae,
Turkey.

1. Introduction

The Sphingidae family classified in the Sphingoidea Superfamily and species of the family are generally known as “sphinx” or “hawk moths”. The sphinx moths are among the most familiar and best known of moths and are found worldwide, but have the most biodiversity in the tropics, Africa and Asia. The adults of the family fly by day, by night, or in the crepuscular period but the majority of the family are active at night. Species in the family are small to very large moths in size and have strong-narrow wings that allow them to fly fast with a rapid wingbeat. The sphinx has a well-developed tongue as a rule rather than as an exception, extreme length being exhibited by some Sphingini. The labial palps are usually large in most of the Macroglossinae, often reduced in the Sphinginae. The antenna is rarely bipectinate, usually rather swollen, tapering at the tip which is often hooked. In common, larva of the sphinx has characteristically a conspicuous horn, is probably one of the most familiar amongst the Lepidoptera, at the rear end. And, the larvae of some species can be very destructive to agricultural crops and ornamental plantings [1].

The sphinx of over 1500 species occurring on all continents except Antarctica [2]. A total of 96 taxa are known in the western Palearctic region [3]. In the Turkish fauna, 36 species are known in this family [4-

18, 22-24]: *Acherontia atropos* (Linnaeus, 1758); *Agrius convolvuli* (Linnaeus, 1758); *Akbesia davidi* (Oberthür, 1884); *Clarina kotschy* (Kollar, [1849]); *C. syriaca* (Lederer, 1855); *Daphnis nerii* (Linnaeus, 1758); *Deilephila elpenor* (Linnaeus, 1758); *D. porcellus* (Linnaeus, 1758); *D. suellus* Staudinger, 1878; *Dolbina elegans* A. Bang-Haas, [1913]; *Hemaris croatica* (Esper, [1779]); *H. tityus* (Linnaeus, 1758); *H. dentata* (Staudinger, 1887); *H. syra* (Daniel, 1939); *Hippotion celerio* (Linnaeus, 1758); *Hyles euphorbiae* (Linnaeus, 1758); *H. gallii* (Rottemburg, 1775); *H. hippophaes* (Esper, [1789]); *H. livornica* (Esper, [1780]); *H. nicaea* (Prunner, 1798); *H. siehei* (Püngeler, 1903); *H. vespertilio* (Esper, [1780]); *H. zygophylli* (Ochsenheimer, 1808); *Laothoe populeti* (Bienert, [1870]); *Macroglossum stellatarum* (Linnaeus, 1758); *Marumba quercus* ([Denis & Schiffermüller], 1775); *Mimas tiliae* (Linnaeus, 1758); *Proserpinus proserpinus* (Pallas, 1772); *Rethera brandti* O.Bang-Haas, 1937; *R. komarovi* (Christoph, 1885); *Smerinthus kindermanni* Lederer, 1852; *S. ocellatus* (Linnaeus, 1758); *Sphingonaepiopsis gorgoniades* (Hübner, [1819]); *S. ligustri* Linnaeus, 1758; *Sphinx pinastri* Linnaeus, 1758; *Theretra alecto* (Linnaeus, 1758).

On the Sphingidae family, limited number of investigations have made in the east and southeast of Turkey. The majority of the studies carried out in recent years in the region are as follows: Ünlü and

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Kornoşor [22] reported that Sphingidae family is represented by 10 species in Şanlıurfa province. Akın [13] gave 13 species (9 new records) from Bitlis province. Gözüaçık et al. [16] presented 8 species (2 new records) from Iğdır province. Seven and Çakır [17] discovered 8 species (5 new records) from Elazığ province. And, Seven [14] added 2 sphinx moths in 2016 to the fauna of Batman and in 2019 determined 5 species (3 new records) from the province [15]. However, Kemal and Seven [24] diagnosed 7 species (1 new records) from Siirt province. In this paper, 15 species are given from the south eastern Turkey and among them 7 species for Batman, 4 species for Diyarbakır and 1 species for Mardin province are found for the first time.

2. Materials and Methods

The field surveys were conducted between in 2015-2017 from south eastern Anatolia in Diyarbakır, Batman and Mardin provinces (Figure 1, 2). The surveys were carried out in 10 localities with 14 field studies (Table 1). The specimens were collected using

an insect net in the daytime until sunset and UV light traps used at night. The captured samples were tagged after pinning. And, diagnosed after being softened and stretched in the laboratory.



Figure 1. Studied provinces in the south east of Turkey

Figures of the samples and habitats were taken with Fujifilm Finepix HS30EXR camera. The materials are protected and stored in the Biology Laboratory of Batman University and the special collection of the author.

Table 1. Data of collection places, habitat types, altitudes, coordinates and dates

Province	Locality	Habitat	Altitude	Coordinate	Date
Diyarbakır	Silvan, Demirkuyu	Oak forest	860 m	38°10'47"N 41°09'04"E	15.08.2016, 24.06.2017
	Silvan, Demirkuyu road	Steppe	720 m	38°08'38"N 41°10'38"E	04.06.2016, 19.04.2017
	Bismil, Arıkgöl	Riverside	525 m	37°50'10"N 40°51'25"E	12.06.2015
Batman	Sason, Kelhasan Mt.	Oak forest	1160 m	38°18'26"N 41°23'37"E	12.06.2015
	Batı Raman	Valley	570 m	37°47'07"N 41°03'25"E	22.05.2015, 14.06.2016, 17.07.2017
	Batı Raman, Creek road	Riverside	510 m	37°46'08"N 41°04'21"E	14.06.2016
	Kozluk	Rocky mountainous	850 m	38°11'59"N 41°28'12"E	30.09.2017
	Centre	Anthropogenic	570 m	37°54'17"N 41°07'44"E	03.07.2017
Mardin	Savur	Sparse oak field	840 m	37°33'20"N 40°54'33"E	12.04.2016,
	Savur, Hisarkaya 12 km SW	Moorland	750 m	37°38'03"N 40°53'39"E	15.05.2017



Figure 2. Habitats. **a.** Batman, Kozluk, 850 m, 30.09.2017; **b.** Batman, Batı Raman, 570 m, 14.06.2016

The following sources were used for the design and writing of the species in the results section.
Identification: Freina and Witt [19], D'Abbrera [20], Holloway [1], Pittaway [3], Leraut [21], Kitching [2].
Range in the world: Pittaway [3]. **Hostplants:** Pittaway [3], Akkuzu et al. [12]. **Distribution in Turkey:** Akkuzu et al. [12], Gözüaçık et al. [16], Koçak and Kemal [18], Ünlü and Kornoşor [22], Seven and Çakır [17], Seven [15], Tiftikci and Kornoşor [23], Kemal and Seven [24].

3. Results

In this study, 15 species identified in 3 subfamilies from the research area are presented below. For each species, original reference, type locality, material examined, distribution in the world and in Turkey, and larval hostplants are given. Also, new distributional records are mentioned.

FAMILY Sphingidae Latreille, [1802]

SUBFAMILY Smerinthinae Grote & Robinson, 1865
 TRIBE Smerinthini Grote & Robinson, 1865

GENUS *Laothoe* Fabricius, 1807

Laothoe populeti (Bienert, [1870])

Smerinthus populeti Bienert, 1870, Lepid. Ergeb. Reise Persien: 33. Type locality: [Iran,] Meschhet [Mashhad]; [Iran,]?? Charlog.

Material. 1♂ Batman, Sason, Kelhasan Mt., 1160 m, 12.06.2015; 1♂ Diyarbakır, Silvan, Demirkuyu road, 720 m, 19.04.2017.

Range. Caucasia, eastern Turkey, north-east Iraq and western Turkmenistan [3].

Distribution in Turkey. Southwest, central, east and southeast Anatolia [16-18].

Hostplants. *Populus* and *Salix* spp. [3].

Comments: The species is new discovered from Batman and Diyarbakır provinces.

GENUS *Smerinthus* Latreille, [1802]

Smerinthus kindermanni Lederer, 1852 (Figure 3. a)

Smerinthus kindermanni Lederer, 1853, Verh. zool.-bot. Ver. Wien (Abhandlungen) 2: 92. Type locality: Argana Maden [Maden, north of Ergani, Turkey].

Material. 2♂♂ Batman, Kozluk, 850 m, 30.09.2017; 1♀ Diyarbakır, Bismil, Arıkgöl, 525 m, 12.06.2015.

Range. Turkey, Cyprus, Caucasus, Levant, northern Iraq, Iran, central Asia, Asia [3].

Distribution in Turkey. Central, east and southeast Anatolia [12, 15, 18, 22].

Hostplants. *Salix* and *Populus* spp. [3].

GENUS *Marumba* Moore, [1882]

Marumba quercus ([Denis & Schiffermüller], 1775) (Figure 3. b)

Sphinx quercus [Denis & Schiffermüller], 1775, Ankündigung syst. Werkes Schmett. Wienergegend: 41, 244. Type locality: Vienna district, Austria.

Material. 2♂♂ 1♀ Batman, Sason, Kelhasan Mt., 1160 m, 12.06.2015; 1♀ Diyarbakır, Silvan, Demirkuyu, 860 m, 15.08.2016, 2♂♂ 1♀ Mardin, Savur, 840 m, 12.04.2016; 4♂♂ Mardin, Savur, Hisarkaya 12 km SW, 750 m, 15.05.2017.

Range. Southern and central Europe, Turkey, Crimea, Transcaucasia, western Kazakhstan Levant, Middle East, southern Turkmenistan [3].

Distribution in Turkey. West, south, southeast and central Anatolia [12, 15, 17, 18, 23, 24].

Hostplants. *Quercus* spp. [3].

TRIBE Sphingulini Rothschild & Jordan, 1903

GENUS *Dolbina* Staudinger, 1887

Dolbina elegans A. Bang-Haas, [1913]

Dolbina elegans elegans A. Bang-Haas, 1912, Dt. ent. Z. Iris 26: 229. Type locality: Iskenderun, 'northern Syria' [southern Turkey].

Material. 1♂ Batman, Batı Raman, 570 m, 22.05.2015. Range. Europe, Balkans, Turkey, Levant and Middle East [3].

Distribution in Turkey. South, east and southeast Anatolia [12, 17, 18, 24].

Hostplants. *Fraxinus*, *Olea*, *Syringa*, *Phillyrea* [3, 12]. Comments: The species is new discovered from Batman province.

TRIBE Ambulycini Butler, 1876

GENUS *Akbesia* Rothschild & Jordan, 1903

Akbesia davidi (Oberthür, 1884)

Smerinthus davidi Oberthür, 1884, Bull. Soc. ent. Fr. 1884: 12. Type locality: Asia Minor.

Material. 1♂ Diyarbakır, Silvan, Demirkuyu, 860 m, 24.06.2017.

Range. Turkey, Levant, Transcaucasia, Middle East [3].

Distribution in Turkey. Southeast and east Anatolia [12, 18, 22].

Hostplants. *Pistacia* spp. [3].

SUBFAMILY Sphinginae Latreille, [1802]

TRIBE Acherontiini Boisduval, [1875]

GENUS *Agrius* Hübner, [1819]

Agrius convolvuli (Linnaeus, 1758)

Sphinx convolvuli Linnaeus, 1758, Syst. Nat. (Edn 10) 1: 490. Type locality: [Europe].

Material. 2♂♂ Batman, Batı Raman, 570 m, 14.06.2016; 1♂ Batman, Batı Raman, Creek road, 510 m, 14.06.2016.

Range. Western Palaearctic [3].

Distribution in Turkey. West, southwest, south, central, southeast and east Anatolia [12, 16, 18, 22, 23].

Hostplants. *Convolvulus*, *Calystegia*, *Ipomoea*, *Convolvulaceae*, *Zygophyllum dumosum* [3, 12].

Comments: The species is new discovered from Batman province.

GENUS *Acherontia* [Laspeyres], 1809

Acherontia atropos (Linnaeus, 1758)

Sphinx atropos Linnaeus, 1758, Syst. Nat. (Edn 10) 1: 490. Type locality: Europe.

Material. 1♀ Batman, Kozluk, 850 m, 30.09.2017.

Range. Mediterranean, North Africa, Middle East, Cyprus, Turkey, Transcaucasia, north-eastern Iran, Asia, Canary Islands [3].

Distribution in Turkey. West, northwest, central, southeast and northeast Anatolia [12, 18].

Hostplants. *Solanaceae*, *Lycium europaeum*, *Lycium barbarum*, *Hyoscyamus*, *Atropa belladonna*, *Nicotiana tabacum* and *Datura stramonium* [3].

Comments: The species is new discovered from Batman province.

SUBFAMILY Macroglossinae Harris, 1839

TRIBE Macroglossini Harris, 1839

GENUS *Rethera* Rothschild & Jordan, 1903

Rethera komarovi (Christoph, 1885) (Figure 3. c)

Deilephila komarovi Christoph, 1885, in Romanoff, Mémoires sur les Lépidoptères 2: 169. Type locality: Ashkhabad, near Germob [Ashkhabad, Turkmenistan].

Material. 1♂ Diyarbakır, Silvan, Demirkuyu, 860 m, 15.08.2016; 3♂♂ Batman, Batı Raman, 570 m, 14.06.2016; 1♂ 17.07.2017.

Range. South-east Europe, Turkey, Caucasia, Lebanon, Middle East, Central Asia [3].

Distribution in Turkey. Central, east, southeast and northeast Anatolia [12, 18].

Hostplants. Unknown, but probably *Rubia* and *Galium* spp. [3].

Comments: The species is new discovered from Batman and Diyarbakır provinces.

GENUS *Clarina* Tutt, 1903

Clarina kotschyi (Kollar, [1849])

Deilephila kotschyi Kollar, [1849], in Kollar & Redtenbacher, Denkschr. Akad. Wiss. Wien 1: 53. Type locality: Schiraz [Shiraz, Iran].

Material. 1♂ Diyarbakır, Silvan, Demirkuyu, 860 m, 15.08.2016; 1♂ Batman, Batı Raman, 570 m, 17.07.2017.

Range. The Iranian plateau, Mesopotamia, Turkey [3]. Distribution in Turkey. East and southeast Anatolia [12, 17, 18, 24].

Hostplants. *Vitis vinifera*, *Parthenocissus* spp. and *Ampelopsis* spp. [3].

Comments: The species is new discovered from Batman province.

GENUS *Macroglossum* Scopoli, 1777

Macroglossum stellatarum (Linnaeus, 1758) (Figure 3. d)

Sphinx stellatarum Linnaeus, 1758, Syst. Nat. (Edn 10) 1: 493. Type locality: Unspecified [Europe].

Material. 3♂♂ Batman, Centre, 570 m, 03.07.2017; 1♂ Batman, Batı Raman, 570 m, 22.05.2015; 1♀ Mardin, Savur, 840 m, 12.04.2016; 1♂ Mardin, Savur, Hisarkaya 12 km SW, 750 m, 15.05.2017.

Range. Europe, north Africa, Central Asia, Far East, Middle East [3].

Distribution in Turkey. All regions of Anatolia [12, 17, 18, 22-24].

Hostplants. *Galium* spp. and *Rubia* spp [3].

Comments: The species is new discovered from Mardin province.

GENUS *Hyles* Hübner [1819]

Hyles euphorbiae (Linnaeus, 1758) (Figure 3. e)

Celerio euphorbiae conspicua Rothschild & Jordan, 1903, Novit. zool. 9 (Suppl.): 720. Type locality: Beirut, Syria [Lebanon].

Material. 2♂♂ 1♀ Diyarbakır, Silvan, Demirkuyu road, 720 m, 04.06.2016.

Range. Levant, Syria, southern Turkey, Armenia, northern Iraq, north-western Iran, south-western mountains of Saudi Arabia [3].

Distribution in Turkey. All regions of Anatolia [12, 15, 18, 22, 24].

Hostplants. *Euphorbia* spp. [3, 12].

Hyles hippophaes (Esper, [1789])

Sphinx hippophaes Esper, 1789, Die Schmetterlinge (Suppl.) (Abschnitt 2): 6, pl. 38, figs 1-3. Type locality: Wallachei, Milkowfluss bei Foran [Wallachia region, southern Romania].

Material. 1♂ Batman, Batı Raman, 570 m, 22.05.2015; 1♂ 14.06.2016; 1♂ Batman, Batı Raman, Creek road, 510 m, 14.06.2016.

Range. Europe, Balkans, Turkey [3].

Distribution in Turkey. Central, east and southeast Anatolia [12, 18].

Hostplants. *Hippophae rhamnoides*, *Elaeagnus angustifolia* [3].

Comments: The species is new discovered from Batman province.

Hyles livornica (Esper, [1780]) (Figure 3. f)

Sphinx livornica Esper, 1780, Die Schmetterlinge 2: 87, 88, 196. Type locality: Italy, [Livorno].

Material. 3♂♂ 2♀♀ Batman, Centre, 570 m, 03.07.2017; 1♂ Batman, Batı Raman, Valley, 570 m, 22.05.2015, 5♂♂ 2♀♀ Mardin, Savur, Hisarkaya 12 km SW, 750 m, 15.05.2017.

Range. Throughout the region [3].

Distribution in Turkey. All regions of Anatolia [12, 18, 22-24].

Hostplants. *Rumex*, *Polygonum* and *Asphodelus* [3].

GENUS *Deilephila* [Laspeyres], 1809

Deilephila porcellus (Linnaeus, 1758)

Sphinx porcellus Linnaeus, 1758, Syst. Nat. (Edn 10) 1: 492. Type locality: Unspecified [Europe].

Material. 1♀ Diyarbakır, Silvan, Demirkuyu road, 720 m, 04.06.2016.

Range. Exception of the southern half of the Iberian Peninsula, northern Scotland and northern Scandinavia, widespread throughout the region [3].

Distribution in Turkey. West, central, south and east Anatolia [12, 18].

Hostplants. *Galium* spp [3].

Comments: The species is new discovered from Diyarbakır province.

GENUS *Theretra* Hübner, [1819]

Theretra alecto (Linnaeus, 1758)

Sphinx alecto Linnaeus, 1758, Syst. Nat. (Edn. 10) 1: 492. Type locality: India.

Material. 1♂ Diyarbakır, Silvan, Demirkuyu, 860 m, 15.08.2016.

Range. Europe, Balkans, Caucasia, Transcaucasia, Middle East, central Asia, Levant, Asia [3].

Distribution in Turkey. South, west and east Anatolia [12, 18, 22, 23].

Hostplants. *Vitis* spp., *Parthenocissus* spp., *Parthenocissus quinquefolia* [3].

Comments: The species is new discovered from Diyarbakır province.

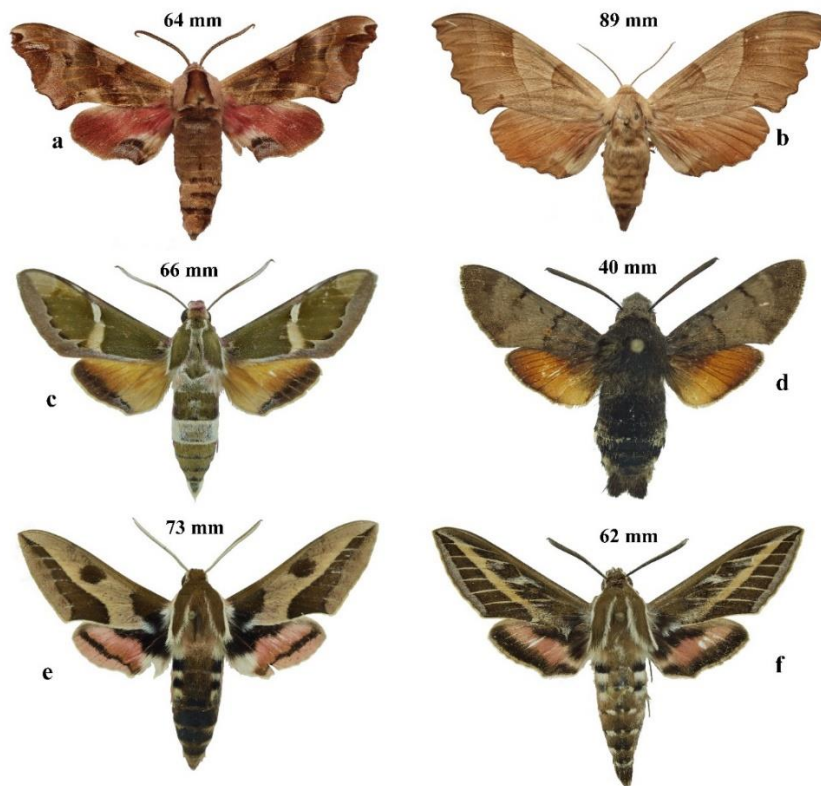


Figure 3. Adults of the species: **a.** *Smerinthus kindermanni* Lederer, 1852; **b.** *Marumba quercus* ([Denis & Schiffermüller], 1775); **c.** *Rethera komarovi* (Christoph, 1885); **d.** *Macroglossum stellatarum* (Linnaeus, 1758); **e.** *Hyles euphorbiae* (Linnaeus, 1758); **f.** *Hyles livornica* (Esper, [1780])

4. Discussion and Conclusion

In the Sphingidae family, 36 species are known from Turkey. In the present study, a total of 15 species, approximately 42 % are determined as a result of the researches from Batman, Diyarbakır and Mardin provinces. Before the study, 6 species are known in Batman [14-15, 18], 10 in Diyarbakır and 7 in Mardin [18]. And consequently, the number of sphinx moths increased to 13 in Batman, 14 in Diyarbakır and 8 species in Mardin (Table 2).

Table 2. Number of the sphinx species in the researches areas (Known species: Data for the species found in the literature from the area; Found species: Samples collected in this study; New records: New species for the provinces)

	Batman	Diyarbakır	Mardin
Known species	6	10	7
Found species	11	9	3
New records	7	4	1
Total	13	14	8

Acherontia atropos (Linnaeus, 1758); *Agrius convolvuli* (Linnaeus, 1758); *Clarina kotschy* (Kollar, [1849]); *Dolbina elegans* A. Bang-Haas, [1913]; *Hyles hippophaes* (Esper, [1789]); *Laothoe populeti* (Bienert, [1870]) and *Rethera komarovi* (Christoph, 1885) species are new found in Batman province.

Deilephila porcellus (Linnaeus, 1758); *Laothoe populeti* (Bienert, [1870]); *Rethera komarovi* (Christoph, 1885) and *Theretra alecto* (Linnaeus, 1758) species are new determined from Diyarbakır province.

Macroglossum stellatarum (Linnaeus, 1758) is new discovered from Mardin province.

Confirmations of the previous records: Some species have been known from the provinces, gathered again from the field. In this investigations in south eastern Turkey, confirm the presence of the following species:

Batman: *Hyles livornica* (Esper, [1780]); *Macroglossum stellatarum* (Linnaeus, 1758); *Marumba quercus* ([Denis & Schiffmüller], 1775) and *Smerinthus kindermanni* Lederer, 1852.

Diyarbakır: *Akbesia davidi* (Oberthür, 1884); *Clarina kotschy* (Kollar, [1849]); *Hyles euphorbiae* (Linnaeus, 1758); *Marumba quercus* ([Denis & Schiffmüller], 1775) and *Smerinthus kindermanni* Lederer, 1852.

Mardin: *Hyles livornica* (Esper, [1780]), *Marumba quercus* ([Denis & Schiffmüller], 1775).

In the study area, subfamily of Smerinthinae is represented by 5 (%33) species. And, number of the Sphinginae species is 2 (% 13) and Macroglossinae species is 8 (% 54) (Figure 4).

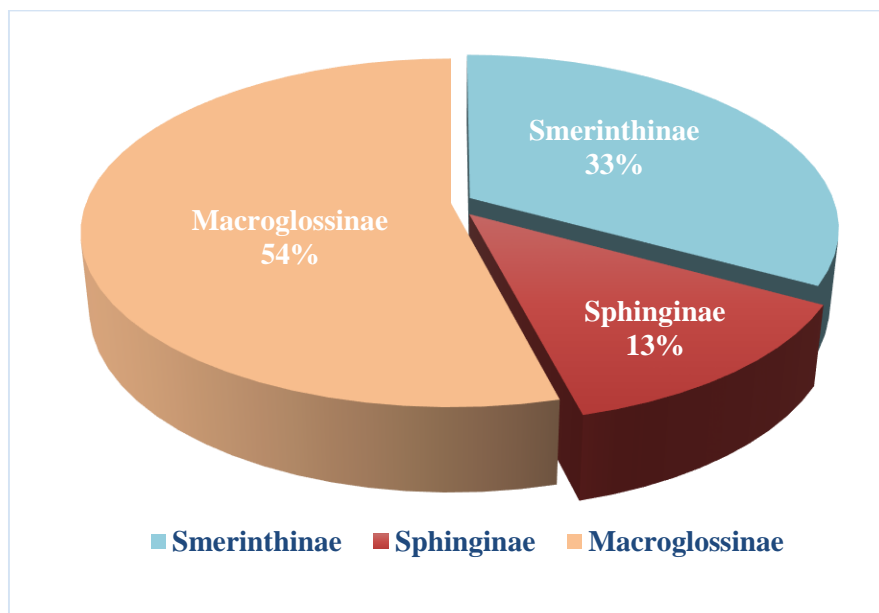


Figure 4. Proportions of the subfamilies from the study region (according to 15 species)

Further studies and resources are needed for the determining of the Lepidoptera species in Turkey, which has a rich insect fauna. Increasing the support of the researches will contribute to the biological richness of the Turkish fauna.

References

- [1] Holloway J.D., The moths of Borneo. Part 3. Superfamily Bombycoidea: Families Lasiocampidae, Eupterotidae, Bombycidae, Brahmaeidae, Saturniidae, Sphingidae. Malayan Nature Society, Kuala Lumpur, (1987).
- [2] Kitching I.J. and Cadiou J.M., Hawkmoth of the world: An Annotated and Illustrated Revisionary Checklist (Lepidoptera: Sphingidae), Ithaca: Cornell University Press, (2000).
- [3] Pittaway A.R., The Hawkmoths of the Western Palearctic. Harley Books, London, (1993).
- [4] Daniel F., Zygaenidae-cymatophoridae. In: Lepidopteren-fauna von Marasch in Türkisch Nordsyrien (Sphingidae: pp. 67-71) (Eds.: L. Osthelder and E. Pfeiffer). *Mitt. Munch. Ent. Ges.*, 22 (1932) 52-82.
- [5] Daniel F., Zygaenidae-hepialidae. In: Lepidopteren-fauna von Marasch in Türkisch Nordsyrien (Sphingidae: pp. 94-95) (Eds.: L. Osthelder and E. Pfeiffer). *Mitt. Münch. Ent. Ges.*, 29 (1939) 84-103.
- [6] Bang-Haas O., Neubeschreibungen und Berichtigungen der Palaarktischen Makrolepidopteren fauna, XXXVI. *Ent. Z. Frankf. a. M.*, 52 (1938) 177-180.
- [7] Kansu I.A., The preliminary list of Lepidoptera faune of Turkey. V. *Bitki Koruma Bulteni*, 3 (1963) 208-223.
- [8] Freina J.J. de., Beitrag zur systematischen Erfassung der Bombyces-und Sphinges-fauna Kleinasiens, Würzburg. *Atalanta*, 10 (1979) 175-224.
- [9] Kornoşor S. and Sertkaya E., Faunistic Investigations on Sphingidae (Lepidoptera) Species in the Eastern Mediterranean Region. *3rd Congress of Entomology*, Turkey, Ankara (1996).
- [10] Mol T. and Avcı M., Marmara Bölgesinin Bazı Sphingidae Türleri. I.U. *Orman Fakültesi*, 47A (1997) 15-29.
- [11] Danner F., Eitschberger U. and Surholt B., Die schwärmer der westlichen palaearktis. Bausteine zur einer revision (Lepidoptera: Sphingidae) - Textband. *Herbipoliana*, 4 (1998) 1-368.
- [12] Akkuzu E., Ayberk H. and Inac S., Hawk moths (Lepidoptera, Sphingidae) of Turkey and their zoogeographical distribution. *J. env. biol.*, 28-4 (2007) 723-730.
- [13] Akın K., Contributions to the lepidoptera fauna of Mutki (Bitlis) I. Sphingidae. *BEU Journal of Science*, 1-1 (2012) 45-49.
- [14] Seven E., New Records for the Lepidoptera Fauna of Batman Province. *International Ecology Adnan Aldemir Symposium*, Turkey, (2016).
- [15] Seven E., First comprehensive faunistic list on the Lepidoptera species of Batman province (Southeastern Turkey). *Munis Entomology & Zoology*, 14-2 (2019) 439-447.
- [16] Gözüaçık C., Akın K., Seven E. and Türkoğlu M., Contributions to Lepidoptera Fauna of Iğdır Province: Sphingidae. *International Iğdır Congress On Multidisciplinary Studies*, Turkey, (2018).
- [17] Seven E. and Çakır A., A Faunistic Study on the Hawk Moths (Sphingidae, Lepidoptera) of Maden District (Elazığ Province, East Turkey). *1st International Engineering and Technology Symposium*, Turkey, (2018).
- [18] Koçak A.Ö. and Kemal M., A synonymous and distributional list of the species of the Lepidoptera of Turkey. *Centre for Entomological Studies, Memoirs*, 8 (2018) 1-487.
- [19] Freina J.J. de. and Witt T.J., Die Bombyces und Sphinges der Westpalaearktis (Insecta, Lepidoptera) Band 1. München, (1986).
- [20] D'Abbrera B., Sphingidae Mundi: Hawk Moths of the World. Faringdon, (1987).
- [21] Leraut P., Moths of Europe, Vol. 1, Saturnids, Lasiocampids, Hawkmoths, Tiger Moths. N.A.P. Editions, (2006).
- [22] Unlu Z. and Kornoşor S., Şanlıurfa ilinin Sphingidae (Lepidoptera) faunasının belirlenmesi, I. *Bitki Koruma Kongresi*, Türkiye, (2004).
- [23] Tiftikci P. and Kornoşor S., Faunistic Studies on Sphingidae (Lepidoptera) Species in Çanakkale Province. ÇOMU, *Journal of Graduate School of Natural and Applied Sciences*, (2016) 58-67.
- [24] Kemal M. and Seven E., List of the Nocturnal Lepidoptera of Şirvan with new faunal records to Siirt Province and Turkey (SE Turkey). *Cesa News* 13 (2008) 1-2..