

Hawk moths (Lepidoptera: Sphingidae) of Turkey and their zoogeographical distribution

E. Akkuzu^{*1}, H. Ayberk² and S. Inac³

*eakkuzu@hotmail.com

¹Faculty of Forestry, Kafkas University, Artvin-08000, Turkey

²Faculty of Forestry, Istanbul University, Istanbul -34473, Turkey

³Faculty of Forestry, Kahramanmara Sutcu Imam University, Kahramanmaraş -46100, Turkey

(Received: April 13, 2006 ; Revised received: November 03, 2006 ; Accepted: December 06, 2006)

Abstract: The family Sphingidae (Lepidoptera) has 63 species in the western Palaearctic Region of the world. Thirtyfour out of 63 species present in Turkey either permanently or temporarily. The subfamilies Smerinthinae, Sphinginae and Macroglossinae are consisted of 7, 4, and 23 species respectively. Ten out of 34 species were captured in the field. Available knowledge of Sphingidae of Turkey was evaluated and summarized with this study as well.

Key words: Sphingidae, Zoogeography, Turkey

PDF file of full length paper is available with author

Introduction

The single family, Sphingidae is most diverse in tropical regions, but the large, fast-flying moths are familiar insects throughout the world (Daly *et al.*, 1998). Sphingidae (Lepidoptera) species are called "hawk moths" or "sphinx". The hawk moths are medium to large-sized, heavy-bodied moths with characteristics of bullet-shaped bodies and long, blade-like wings. Hawk moths are strong fliers, which can reach 40-50 km/hr.

Hawk moths are represented by about 1000 species all over the world (Carter, 1992). Out of 1000, 63 species are distributed in western Palaearctic Region in which Turkey is located (Pittaway, 1993).

The faunistics of Hawk moths has been carefully investigated in Turkey for a long time. The objectives of this study were to investigate the Sphingidae fauna of Turkey and summarize available knowledge of previously recorded Sphingidae species in Turkey.

Materials and Methods

This study was conducted in Turkey (39° 90' N, 35° 00' E) between the years of 2002 and 2005. Ten Sphingidae species were collected in the field by light traps and sweep nets. Details concerning the captured species in the field and the other species previously recorded in Turkey were also taken from the literature (Acatay, 1943 and 1959; Akbulut *et al.*, 2003; Bang-Haas, 1938; Bodenheimer, 1941; Buxton, 1916; Daniel, 1932 and 1939; Danner *et al.*, 1998; Ebert, 1969; Eichler, 1971; Eisenstein, 1984; Freina, 1979 and 1988; Freina and Geck, 2003; Graves, 1914 and 1926; Guneyi and Sengün, 1972; Hariri, 1971; Kalali, 1976; Kansu, 1963; Kernbach, 1958; Kornosor and Sertkaya, 1996; Lattin, 1951;

Mathew, 1881; Milyanovskii, 1959; Mol and Avci, 1997; Mol *et al.*, 2003; Pittaway, 1982, 1993 and 1996; Rebel, 1903; Rothschild and Jordan, 1903; Wiltshire, 1957). Collection and preservation techniques used in this research were based mainly on Canakcioglu (1993), Ecevit and Mennan (2000) and Schauff (1986).

Collection dates of hawk moths given in the results section refer to either the dates of collection of adult hawk moths in the field or to the dates when the hawk moths which had been collected in the larval or pupal stage in the field passed to the adult stage in the laboratory conditions.

Results and Discussion

The following list of the Sphingidae of Turkey is based mainly on the generic classification taken from Pittaway (1993). Species under tribes are arranged in alphabetical order.

Subfamily SMERINTHINAE Grote and Robinson, 1865.

Tribe Smerinthini Grote and Robinson, 1865.

Laothoe populi (Linnaeus, 1758), Poplar hawk moth. *Sphinx populi* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1: 489. Type locality: Sweden.

Recorded in Çanakkale (Gelibolu) (Mathew, 1881; Rebel, 1903). On *Populus nigra* and *P. canadensis*: Istanbul (Belgrad Forest), 13.viii.1957 (Acatay, 1959). In Ankara (City center, Keçiören, Hacikadin, Etlik, Atatürk Forest Farm), Bursa (City center), İçel (Erdemli), Samsun (City center) (Kansu, 1963). In Isparta (Aksu), Konya (Akşehir), Amasya, Kahramanmaraş (Agabeyli), Tokat/Sivas (Camlıbel), Erzurum, Kars (Sarıkamis) (de

Freina, 1979). In Adana (Duzici, Pozanti) (Kornosor and Sertkaya, 1996). In Hakkari (Pittaway, 1996). In Istanbul (Belgrad Forest), 20.vi.1995; in Tekirdag (Saray), 23.vi.1996 (Mol and Avci, 1997). In Mugla (Fethiye-Butterflies Valley) (Mol et al., 2003). Daniel (1939), Pittaway (1993) and Danner et al. (1998) also recorded this species in Turkey.

Major host plants in the world: *Populus* sp and *Salix* sp

We found this species on *Populus nigra*: Afyon (Sincanli), 12.vii.2002; on *Salix babylonica*: Istanbul (Bahcekoy), 24.vi.2003; in Kütahya (City center), 10.vii.2003; in Istanbul (Kemerburgaz), 01.vii.2004; in Ankara (Golbasi), 19.vii.2004.

Marumba quercus [(Denis and Schiffmüller), 1775], Oak hawk moth. *Sphinx quercus* [Denis and Schiffmüller], 1775, *Ankündigung syst. Werkes Schmett. Wienergegend*: 41, 244. Type locality: Vienna district, Austria.

Recorded in Kahramanmaras (Daniel, 1939). In Konya (Aksehir), Amasya, Amasya (Borabay) (de Freina, 1979). In Adana (Duzici, Pozanti) (Kornosor and Sertkaya, 1996). In Istanbul (Belgrad Forest), 17.vi.1995; in Kocaeli (Izmit, Kefken), 02.vi.1997 (Mol and Avci, 1997). In Düzce (Beciyorukler), 04.vii.2001 (Akbulut et al., 2003). Bang-Haas (1938) also recorded this species in Turkey.

Major hostplants in the world: *Quercus* sp

We collected this species in Sakarya (Hendek), 29.vi.2002; in Istanbul (Bahcekoy), 02.vii.2004.

Mimas tiliae (Linnaeus, 1758), Lime hawk moth. *Sphinx tiliae* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1: 489. Type locality: Unspecified [Europe].

Recorded in Istanbul (Kefelikoy) (Guneyi and Sengün 1972). In Konya (Aksehir) (de Freina, 1979).

Major hostplants in the world: *Tilia*, *Ulmus*, *Alnus*, and *Prunus*.

We found this species on *Tilia argentea*: Istanbul (Bahcekoy), 21.vii.2002; on *Tilia argentea*: Istanbul (Belgrad Forest), 10.vii.2003.

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

Recorded in Kahramanmaras (Daniel, 1932 and 1939). In Ankara (City center), Nigde (City center) (Kansu, 1963). In Konya (Aksehir), Tokat/Sivas (Camlibel) (de Freina, 1979). In Adana (Balcali, Duzici, Haciali, Kadirli, Pozanti) (Kornosor and Sertkaya, 1996).

Major hostplants in the world: *Salix* sp

Smerinthus ocellata (Linnaeus, 1758), Eyed hawk moth. *Sphinx ocellata* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1: 489. Type locality: Unspecified [Europe].

Recorded on *Populus nigra* and *P. canadensis*: Istanbul (Belgrad Forest), 15.viii.1957 (Acatay, 1959). In Ankara (City center) (Kansu, 1963). In Istanbul (Kefeliköy) (Güneyi and Sengun, 1972). In Isparta (Aksu), Konya (Aksehir), Tokat/Sivas (Camlibel) (de Freina, 1979). In Istanbul (Belgrad Forest), 12.viii.1996 (Mol and Avci, 1997).

Major hostplants in the world: *Salix*, *Populus* and *Malus*.

We found this species in Istanbul (Sariyer), 03.viii.2002; in Sakarya (Adapazari), 10.vii.2004. Tribe Sphingulini Rothschild and Jordon, 1903.

Dolbina elegans A. Bang-Haas, 1912, Ash hawk moth. *Dolbina elegans elegans* A. Bang-Haas, 1912, *Dt. ent. Z. Iris* 26: 229. Type locality: Iskenderun, 'Northern Syria' [Southern Turkey].

Recorded in Isparta (Aksu) (de Freina, 1979). In Adana (Pozanti), 21.vii.1995 (Kornosor and Sertkaya, 1996).

Major hostplants in the world: *Fraxinus*, *Olea*, *Syringa*, and *Phillyrea*.

Tribe Ambulycini Butler, 1876.

Akbesia davidi (Oberthur, 1884), David's hawk moth. *Smerinthus davidi* Oberthur, 1884, *Bull. Soc. ent. Fr.* 1884: 12. Type locality: Asia Minor.

Recorded in Kahramanmaras (Daniel, 1939). In Southeastern Turkey (de Freina and Geck, 2003). In Sanliurfa (Ceylanpinar, Viransehir) (Unlu and Kornosor, 2005).

Major hostplants in the world: *Pistacia atlantica* and *P. palaestina*.

Subfamily SPHINGINAE Latreille [1802].

Tribe Sphingini Latreille [1802].

Sphinx ligustri (Linnaeus, 1758), Privet hawk moth. *Sphinx ligustri* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1: 490. Type locality: Unspecified [Europe].

Recorded in Izmir (Bornova) (Kansu, 1963). In Konya (Aksehir), Tokat/Sivas (Camlibel), Erzurum (Palandoken Mountains), Kars (Sarikamis) (de Freina, 1979). In Mugla (Fethiye-Butterflies Valley) (Mol et al., 2003). This species was also recorded in Eastern Turkey (Danner et al., 1998).

Major hostplants in the world: *Ligustrum*, *Ribes*, *Rubus idaeus*, *Spiraea*, *Sorbaria sorbifolia*, *Arunco silvestris*, *Malus domestica*, *Fraxinus excelsior*, *Syringa*, *Viburnum opulus*, *Lonicera*, and *Symphoricarpos*.

Sphinx pinastri (Linnaeus, 1758), Pine hawk moth. *Sphinx pinastri* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1: 492. Type locality: Unspecified (Europe).

Recorded in Kahramanmaraş, (Daniel, 1932 and 1939). In Burdur (Aglasun), Isparta (Aksu), Konya (Akşehir), Amasya (Borabay), Tokat/Sivas (Camlibel) (de Freina, 1979). In Adana (Pozanti) (Kornosor and Sertkaya, 1996). This species was also recorded in Southern Turkey (Kernbach, 1958).

Major hostplants in the world: *Pinus silvestris*, *P. strobus*, *P. cembra*, *Larix sibirica*, *L. decidua* and *Picea abies*.

Tribe Acherontiini Boisduval (1875).

Acherontia atropos (Linnaeus, 1758), Death's Head hawk moth. *Sphinx atropos* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1: 490. Type locality: Europe.

Recorded in Canakkale (Gelibolu) (Mathew, 1881). In Kahramanmaraş (Daniel, 1932; de Freina, 1979). In Izmir (Bornova) and Samsun (City center) (Kansu, 1963). In Adana (Balcali, Haciali, Pozanti), Icel (Tarsus) (Kornosor and Sertkaya, 1996). On *Fraxinus* sp and *Nerium* sp: Istanbul (Florya) and Trabzon (Acatay 1943). On *Fraxinus* sp: In Istanbul (Belgrad Forest) (Mol and Avci, 1997). In Mugla (Fethiye- Butterflies Valley) (Mol *et al.*, 2003).

Major hostplants in the world: *Solanum tuberosum*, *S. dulcamara*, *Ligustrum*, *Datura*, *Cannabis*, *Atropa*, *Lycium*, *Philadelphus*, *Nicotiana*, *Nerium*, *Olea*, *Schrebera alata*, *Stachytarpetta indica*, *Clerodendron*, *Tecomaria*, *Tecoma*, *Withania*, *Hoslundia* and *Fraxinus*.

Agrius convolvuli (Linnaeus, 1758), Convolvulus hawk moth. *Sphinx convolvuli* Linnaeus, 1758, *Syst. Nat.* (Edn 10) 1: 490. Type locality: (Europe).

Recorded in Canakkale (Gelibolu) (Mathew, 1881; Rebel, 1903). In Artvin (Murgul), Bursa (Karacabey), Kocaeli (Izmit) (Kansu, 1963). In Balıkesir (Gonen), Konya (Akşehir) (de Freina, 1979). In Istanbul (Kefelikoy) (Guneyi and Sengun, 1972). In Adana (Balcali, Dogankent, Duzici, Haciali, Kadiri), Icel (Tarsus) (Kornosor and Sertkaya, 1996). In Duzce (Duzorman Forest Depot), 04.viii.2001 (Akbulut *et al.*, 2003). In Mugla (Fethiye- Butterflies Valley) (Mol *et al.*, 2003). In Sanliurfa (Ceylanpinar, Viransehir) (Unlu and Kornosor, 2005).

Major hostplants in the world: *Convolvulus*, *Calystegia*, *Ipomoea*, Convolvulaceae, and *Zygophyllum dumosum*.

We found this species in Istanbul (Belgrad Forest), 27.vii.2002; Sakarya (Adapazari), 16.viii.2003.

Subfamily MACROGLOSSINAE Harris, 1839.

Tribe Dilophonotini Burmeister, 1878.

Hemaris croatica (Esper, 1800), Olive Bee hawk moth. *Sphinx croatica* Esper, 1800, *Die Schmett.* (Suppl.) (Abschnitt 2): 33, pl. 45, Fig. 2. Type locality: Karlstadt (Karlovac, Croatia).

Recorded in Canakkale (Gelibolu) (Mathew, 1881). In Kahramanmaraş (Daniel, 1932). In Konya (Akşehir), Kahramanmaraş (Agabeyli), Amasya, Malatya (de Freina, 1979).

Major hostplants in the world: *Scabiosa*, *Cephalara* and *Asperula*.

Hemaris dentata (Staudinger, 1887), Anatolian Bee hawk moth. *Macroglossa ducalis* var. *dentata* Staudinger, 1887, *Stettin. ent. Ztg* 48: 66. Type locality: Aintab near Antiochia (Gaziantep, near Hatay, Turkey; however, the specimen label specifies 'Gjaurdagh' as the collection locality, which are the present-day Nur Mountains just north of Hatay).

Recorded in Southern Turkey as far west as the Toros Mountains. Confirmed localities are the Nur Mountains (near Hatay), Ala Mountains (near Nigde) and Anamas Mountains (near Egirdir) (de Freina 1988), as well as Kayseri (Tekir-Sihli), Mount Palaz (near Antalya), Ilica (near Suleymanli), Mount Nemrut (near Adiyaman) and Elazig (Harput) (Rothschild and Jordan, 1903). Major hostplants in the world: *Cephalaria*.

Hemaris fuciformis (Linnaeus, 1758), Broad-bordered Bee hawk moth. *Sphinx fuciformis* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 493. Type locality: Europe.

Recorded in Kahramanmaraş (Daniel, 1932 and 1939). In Kars (Sarıkamis) (de Freina, 1979).

Major hostplants in the world: *Lonicera*, *L. xylosteum*, *L. tatarica*, *L. caerulea*, *L. caprifolium*, *Symphoricarpos rivularis*, and *Knautia arvensis*.

Hemaris tityus (Linnaeus, 1758), Narrow-bordered Bee hawk moth. *Sphinx tityus* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 493. Type locality: Unspecified (Europe).

Recorded in Denizli (Pamukkale) (de Freina, 1979).

Major hostplants in the world: *Scabiosa*, *Succisa pratensis*, *Knautia arvensis*, *Galium verum*, *Lonicera xylosteum* and *Symphoricarpos rivularis*.

Tribe Macroglossini Harris, 1839.

Clarina kotschy (Kollar, 1849), Grapevine hawk moth. *Deilephila kotschy* (Kollar, 1849), in Kollar and Redtenbacher, *Denkschr. Akad. Wiss. Wien* 1: 53. Type locality: Schiraz (Shiraz, Iran).

This species was reported to distribute in Eastern and Central Turkey (Danner *et al.*, 1998). This species is also distributed from Northern Turkey south to Northern and Western Syria, Lebanon and Israel (Eisenstein, 1984).



Major hostplants in the world: *Vitis vinifera*, *Parthenocissus* sp, and *Ampelopsis* sp.

Daphnis nerii (Linnaeus, 1758), Oleander hawk moth. *Sphinx nerii* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 490. Type locality: Unspecified (Europe).

Recorded in Istanbul (Lattin, 1951). In Ankara (City center), Antalya, Icel (Tarsus), Adana (Seyhan), Osmaniye (Kansu, 1963). In Konya (Aksehir), Kahramanmaraş (Agabeyli) (de Freina, 1979). In Adana (Balcali, Duzici, Kadirli) (Kornosor and Sertkaya, 1996). On *Nerium* sp: in Turkey (Bodenheimer, 1941). On *Nerium* sp: in Istanbul (Buyukada), 27.vii.1996 (Mol and Avci, 1997). In Mugla (Fethiye- Butterflies Valley) (Mol et al., 2003). This species is found in Turkey (Ebert, 1969).

Major hostplants in the world: *Nerium oleander*, *Vinca*, *Acoканthera*, *Gardenia*, *Carissa*, *Rauwolfia*, *Taberna*, *Mangifera*, and *Adenium multiflorum*.

We collected *D. nerii* in Istanbul (Sariyer), 02.viii.2002; in Istanbul (Ataturk Arboretum), 15.viii.2002; in Istanbul (Bahcekoy), 01.vii.2004.

Deilephila elpenor (Linnaeus, 1758), Large Elephant hawk moth. *Sphinx elpenor* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 491. Type locality: Unspecified (Europe).

Recorded in Isparta (Aksu), Konya (Aksehir) (de Freina, 1979). In Duzce (City center), 14.vii.2001 (Akbulut et al., 2003). In Mugla (Fethiye- Butterflies Valley) (Mol et al., 2003).

Major hostplants in the world: *Vitis*, *Parthenocissus*, *Epilobium*, *Chamaenerion angustifolium*, *Clarkia*, *Galium*, *Calla palustris*, *Impatiens*, *Fuchsia*, and *Menyanthes*.

Deilephila porcellus (Linnaeus, 1758), Small Elephant hawk moth. *Sphinx porcellus* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 492. Type locality: Unspecified (Europe).

Recorded in Isparta (Aksu), in Konya (Aksehir), Antalya/ Konya, Amasya, Amasya (Borabay), Tokat/Sivas (Camlibel), Erzurum (Palandoken Mountains) (de Freina 1979). In Adana (Pozanti), 02.vi.1994 (Kornosor and Sertkaya, 1996). Major hostplants in the world: *Galium* sp.

Hippotion celerio (Linnaeus, 1758), Silver-striped hawk moth. *Sphinx celerio* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 491. Type locality: Unspecified (Europe).

Recorded in Icel (Tarsus), Adana (Seyhan) (Kansu, 1963). On *Vitis* sp: Icel (Namrun) (Kornosor and Sertkaya, 1996).

Major hostplants in the world: *Vitis*, *Galium*, *Epilobium*, *Linaria*, *Daucus*, *Rumex*, *Lonicera*, *Fuchsia*, *Impatiens*, *Galium verum*, *Colocasia esculenta* and *Parthenocissus*.

We captured this species in Istanbul (Sariyer), 19.vi.2002; in Istanbul (Beykoz), 02.vii.2003.

Hyles centralasiae (Staudinger, 1887), Foxtail-lily hawk moth. *Deilephila euphorbiae* var. *centralasiae* Staudinger, 1887, *Stettin. ent. Ztg* 48: 64. Type locality: Samarkand (Uzbekistan).

This species was recorded in Eastern Turkey (Danner et al., 1998), the Eastern Toros Mountains and Southern Turkey (Daniel, 1932).

Major hostplants in the world: *Eremurus*, *E. anigapterus*, *E. stenophyllus*, *E. sogriganus*, *E. inderiensis* and *E. ambigans*.

Hyles euphorbiae (Linnaeus, 1758), Spurge hawk moth. *Sphinx euphorbiae* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 492. Type locality: Unspecified (Europe).

Recorded in Kahramanmaraş (Daniel, 1932 and 1939). In Ankara (City center, Etimesgut, Kecioren), Bingol (City center), Adana (Seyhan), Tokat (Kansu, 1963). In Denizli (Pamukkale), Burdur (Aglasun), Antalya (Dosemealti, Cubuk Bogazi), Isparta (Aksu), Konya (Aksehir), Amasya, Amasya (Borabay), Tokat/Sivas (Camlibel), Kars (Kagizman, Sarikamis), Igdir (de Freina, 1979). In Adana (Balcali, Dogankent, Duzici, Kadirli, Pozanti) (Kornosor and Sertkaya, 1996). In Canakkale (Gelibolu) (Mathew, 1881). In Canakkale (City center) (Buxton, 1916). In Canakkale (Gelibolu), 16.vii. 1996; In Yalova (Cinarcik), 19.ix.1996 (Mol and Avci, 1997). In Mugla (Fethiye-Butterflies Valley) (Mol et al., 2003). In Sanliurfa (Ceylampinar, Viransehir) (Unlu and Kornosor, 2005).

Major hostplants in the world: *Euphorbia*, *Mercurialis annua*, *Polygonum aviculare*, *Vitis* and *Fuchsia*.

Hyles gallii (Rottemburg, 1775), Bedstraw hawk moth. *Sphinx gallii* Rottemburg, 1775, *Naturforscher, Halle* 7: 107. Type locality: Germany. This species is found in Northern Turkey (Eichler, 1971; Danner et al., 1998).

Major hostplants in the world: *Galium* and *Epilobium*.

Hyles hippophaes (Esper, 1789), Seathorn hawk moth. *Sphinx hippophaes* Esper, 1789, *Die Schmett.* (Suppl.) (Abschnitt 2): 6, pl. 38, Fig. 1-3. Type locality: Wallachei, Milkowfluss bei Foran (Wallachia region, Southern Romania).

Recorded in Ankara, Elazig (Keban), Nigde (City center) (Kansu, 1963). In Adana (Pozanti), 27.ix.1994 (Kornosor and Sertkaya, 1996). This species is found in Western Turkey (Pittaway, 1982), Southeastern and Eastern Turkey (Daniel, 1932 and 1939).

Major hostplants in the world: *Hippophae rhamnoides* and *Elaeagnus angustifolia*.

Hyles livornica (Esper, 1780), Striped hawk moth. *Sphinx livornica* Esper, 1780, *Die Schmett.* 2: 88. Type locality: Germany.

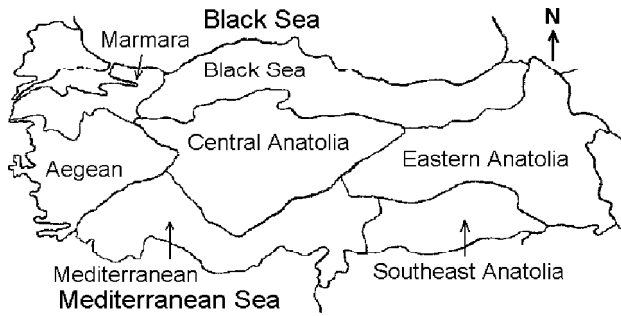


Fig. 1: Geographical regions of Turkey

Recorded in Ankara (City center), Artvin (Murgul), Icel (Mersin), Istanbul (Cayirova), Izmir (Bornova), Samsun, Urfa (Kansu, 1963). In Canakkale (Gelibolu) (Mathew, 1881). In Istanbul (Sariyer) (de Lattin, 1951). In Adana (Balcali, Dogankent, Duzici, Hacyali, Kadirli, Pozanti), Icel (Tarsus) (Kornosor and Sertkaya, 1996). In Canakkale (Ayvacic), 04.v.1996 (Mol and Avci, 1997). In Mugla (Fethiye- Butterflies Valley) (Mol *et al.*, 2003). In Sanliurfa (Ceylampinar, Viransehir) (Unlu and Kornosor, 2005). This species is found in Turkey (Pittaway, 1993).

Major hostplants in the world: *Rumex*, *Polygonum* and *Asphodelus*. We found this species in Istanbul (Sariyer), 02.vi.2002; in Istanbul (Bahcelievler), 09.v.2003. In Afyon (City center), 28.v.2003.

Hyles nicaea (de Prunner, 1798), Greater Spurge hawk moth. *Sphinx nicaea* de Prunner, 1798, *Lepid. Pedemontana*: 86. Type locality: Nice, Alpes-Maritimes (Southern France).

Hariri (1971) recorded this species in Southern Turkey. In Tokat/Sivas (Camlibel), Erzurum (Palandoken Mountains), Kars (de Freina, 1979).

Major hostplants in the world: *Euphorbia*, *E. nicaeensis*.

Hyles vespertilio (Esper, 1780), Bat hawk moth. *Sphinx vespertilio* Esper, 1780, *Schmetterlinge* 2: 178. Type locality: Verona, Northern Italy. Milyanovskii (1959) recorded this species in Western Turkey.

Major hostplants in the world: *Epilobium* sp.

Hyles zygophylli (Ochsenheimer, 1808), Bean-caper hawk moth. *Sphinx zygophylli* Ochsenheimer, 1808, *Schmetterlinge Europa* 2: 226. Type locality: Southern Russia (Turkestan).

Recorded in Kars (Kagizman) (de Freina, 1979). This species was recorded in Western Turkey (Danner *et al.*, 1998).

Major hostplants in the world: *Zygophyllum*, *Zygophyllum fabago*.

Macroglossum stellatarum (Linnaeus, 1758), Hummingbird hawk moth. *Sphinx stellatarum* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 493. Type locality: Unspecified (Europe).

Recorded in Kahramanmaras (Daniel, 1932). In Ankara (City center, Aydos, Etimesgut, Mamak), Balikesir (Manyas), Bingol (City center), Eskisehir (City center), Gaziantep, Hatay (Iskenderun), Icel (Alata, Cavuslu), Istanbul (Goztepe), Konya (Aksehir), Kilis, Sakarya (Adapazari), Tokat, Yalova (Termal) (Kansu, 1963). In Canakkale (Gelibolu) (Mathew, 1881). In Canakkale (Buxton, 1916). In Canakkale (Gelibolu) (Graves, 1926). In Istanbul (Bebek, Büyükdere, Emirgan, Rumelikavagi) (de Lattin, 1951). In Istanbul (Kefelikoy) (Guneyi and Sengun, 1972). In Adana (Balcali, Dogankent, Duzici, Hacyali, Kadirli, Pozanti) (Kornosor and Sertkaya, 1996). In Düzce (City center), 06.vi.2001; in Duzce (Gumuspinar), 24.vi.2001; in Duzce (Guzeldere Waterfall), 01.vii.2001; in Duzce (Golyaka), 14.vii.2001; in Duzce (Tatlidere), 18.vii.2001; in Duzce (Cicekli), 25.vii.2001; in Duzce (Cumayeri), 20.viii.2001; in Duzce (Kabalak), 05.ix.2001. (Akbulut *et al.*, 2003). In Mugla (Fethiye- Butterflies Valley) (Mol *et al.* 2003). In Sanliurfa (Ceylampinar, Viransehir) (Unlu and Kornosor, 2005).

Major hostplants in the world: *Galium*, *Rubia*, *Carduus*, *Phlox*, *Petunia*, *Aster*, *Centaurea*, and *Stellaria*.

We collected this species in Istanbul (Bahcekoky), 04.vi.2002; in Istanbul (Belgrad Forest), 15.vi.2002; in Istanbul (Kemerburgaz), 31.vi.2002; in Sakarya (Hendek), 12.vi.2002; in Sakarya (City center), 04.vii.2002; In Afyon (City center), 05.viii.2002; Istanbul (Sariyer), 09.vi.2003; Istanbul (Rumelikavagi), 04.viii.2003; in Sakarya (Hendek), 21.viii.2003; in Afyon (Suhut), 05.ix.2003; in Ankara (Golbasi), 14.viii.2004; in Afyon (City center), 12.vi.2005.

Proserpinus proserpina (Pallas, 1772), Willowherb hawk moth. *Sphinx proserpina* Pallas, 1772, *Spicilegia Zool. quibus novae... et obscurae anim. species... illustrantur* 1: 26. Type locality: Francofurtum ad Moenum, Germania (Frankfurt am Main, Germany).

Recorded in Istanbul (Belgrad Forest) (Graves, 1914). In Adana (Pozanti), 11.v.1995 (Kornosor and Sertkaya, 1996). Kalali (1976) recorded this species in Turkey.

Major hostplants in the world: *Epilobium hirsutum*, *E. angustifolium*, *E. palustre*, *E. rosmarinifolium*, *E. montanum*, *Oenothera biennis* and *Lythrum salicaria*.

Rethera brandti O. Bang-Haas, 1937, Lesser Madder hawk moth. *Rethera brandti brandti* O. Bang-Haas, 1937, *Ent. Z., Frankf. a. M.* 50: 562. Type locality: Elburz (Alborz) Mountains, Northern Iran.

This species is recorded in Southeast Turkey (Wiltshire, 1957).

Major hostplants in the world: Not known.

Rethera komarovi (Christoph, 1885), Madder hawk moth. *Deilephila komarovi* Christoph, 1885, in Romanoff, *Mem. Lepid.* 2: 169. Type locality: Ashkhabad (Ashkhabad, Turkmenistan).

Table - 1: Regional distribution of the Hawk moths of Turkey

Species	Geographic regions						
	1	2	3	4	5	6	7
<i>Laothoe populi</i> (L.)	✓	✓	✓	✓	✓	-	✓
<i>Marumba quercus</i> (Den. and Schiff.)	-	✓	✓	✓	-	-	✓
<i>Mimas tiliae</i> (L.)	-	✓	-	✓	-	-	-
<i>Smerinthus kindermanni</i> Led.	-	-	✓	✓	-	✓	✓
<i>Smerinthus ocellata</i> (L.)	-	✓	✓	✓	-	-	✓
<i>Dolbina elegans</i> A. Bang-Haas	-	-	-	-	-	-	✓
<i>Akbesia davidi</i> (Oberthür)	-	-	-	-	-	✓	✓
<i>Sphinx ligustri</i> (L.)	✓	-	✓	✓	✓	-	-
<i>Sphinx pinastri</i> (L.)	-	-	✓	✓	-	-	✓
<i>Acherontia atropos</i> (L.)	✓	✓	✓	-	-	-	✓
<i>Agrius convolvuli</i> (L.)	✓	✓	✓	✓	-	✓	✓
<i>Hemaris croatica</i> (Esp)	-	✓	✓	✓	✓	-	✓
<i>Hemaris dentata</i> (Stgr.)	-	-	-	✓	✓	✓	✓
<i>Hemaris fuciformis</i> (L.)	-	-	-	-	✓	-	✓
<i>Hemaris tityus</i> (L.)	✓	-	-	-	-	-	-
<i>Clarina kotschy</i> (Koll.)	-	-	✓	✓	✓	-	-
<i>Daphnis nerii</i> (L.)	✓	✓	-	✓	-	-	✓
<i>Deilephila elpenor</i> (L.)	✓	-	✓	✓	-	-	✓
<i>Deilephila porcellus</i> (L.)	-	-	✓	✓	✓	-	✓
<i>Hippotion celerio</i> (L.)	-	-	-	-	-	-	✓
<i>Hyles centralasiae</i> (Stgr.)	-	-	-	-	✓	-	✓
<i>Hyles euphorbiae</i> (L.)	✓	✓	✓	✓	✓	✓	✓
<i>Hyles gallii</i> (Rott.)	-	-	✓	-	-	-	-
<i>Hyles hippophaes</i> (Esp)	✓	-	-	✓	✓	✓	✓
<i>Hyles livornica</i> (Esp)	✓	✓	✓	✓	-	✓	✓
<i>Hyles nicaea</i> (Prunner)	-	-	✓	✓	✓	-	✓
<i>Hyles vespertilio</i> (Esp)	✓	-	-	-	-	-	-
<i>Hyles zygophylli</i> (Och.)	✓	-	-	-	✓	-	-
<i>Macroglossum stellatarum</i> (L.)	✓	✓	✓	✓	✓	✓	✓
<i>Proserpinus proserpina</i> (Pall.)	-	✓	-	-	-	-	✓
<i>Rethera brandti</i> O. Bang-Haas	-	-	-	-	-	✓	-
<i>Rethera komarovi</i> (Christ.)	✓	-	✓	✓	✓	-	✓
<i>Sphingonaepiopsis gorgoniades</i> (Hbn.)	-	-	-	-	-	-	✓
<i>Theretra alecto</i> (L.)	✓	✓	✓	✓	✓	✓	✓

Geographic Regions:

1. Aegean
2. Marmara
3. Black Sea
4. Central Anatolia
5. Eastern Anatolia
6. Southeast Anatolia
7. Mediterranean

Symbols:

- ✓ P Recorded
- Not recorded

Recorded in Ankara (City center) (Kansu, 1963). In Western and Central Turkey (Daniel, 1932; de Freina and Witt, 1987), Southern Turkey (Hariri, 1971) and Eastern Turkey (Daniel 1979). In Konya (Aksehir), Amasya, Tokat/Sivas (Camlibel) (de Freina, 1979).

Major hostplants in the world: *Rubia* and *Galium* sp.

Sphingonaepiopsis gorgoniades (Hubner, 1819), Gorbion hawk moth. *Proserpinus gorgoniades* Hübner (1819), *Verz. bekannter Schmett.*: 132. Type locality: Southern Volga, Russia.

Recorded in Kahramanmaras (Daniel, 1932) and Southern Turkey (Hariri, 1971).

Major hostplants in the world: *Galium* sp.

Theretra alecto (Linnaeus, 1758), Levant hawk moth. *Sphinx alecto* Linnaeus, 1758, *Syst. Nat.* (Edn. 10) 1: 492. Type locality: India.

Recorded in Kahramanmaras (Daniel, 1932; de Freina, 1979). In Agri (City center), Ankara (City center, Ataturk Forest Farm, Etimesgut), Antalya (City center, Alanya), Elazig (Keban), Gaziantep (City center), Icel (City center, Alata, Tarsus), Izmir (Bornova), Kahramanmaras, Kilis, Adana (Seyhan, Kozan, Karaisali), Osmaniye, Sinop (Ayancik) (Kansu, 1963). In Canakkale (Gelibolu) (Mathew, 1881). In Adana (Balcali, Duzici, Kadiri, Pozanti) (Komosor and Sertkaya, 1996). In Istanbul (Bahcekoy), 05.ix.1995 (Mol and Avci, 1997). In Sanliurfa (Ceylaminar, Viransehir) (Unlu and Komosor, 2005).

Major hostplants in the world: *Vitis* and *Parthenocissus* sp

We found this species in Istanbul (Sariyer), 17.ix.2002; in Istanbul (Rumelikavagi), 29.viii.2003.

The Sphingidae (Lepidoptera) has 34 species in 3 subfamilies (Smerinthinae, Sphinginae and Macroglossinae) in Turkey. Turkey has seven geographical regions which are Aegean (Western Turkey), Marmara (Northwestern Turkey), Black Sea (Northern Turkey), Central Anatolia, Eastern Anatolia, Southeast Anatolia and Mediterranean (Southern Turkey) regions (Fig. 1). Out of 34 species, 15 species were recorded from Aegean, 13 from Marmara, 19 from Black Sea, 21 from Central Anatolia, 15 from Eastern Anatolia, 10 from Southeast Anatolia and 26 from Mediterranean Region (Table 1). While *Hyles euphorbia*, *Macroglossum stellatarum* (L.) and *Theretra alecto* (L.) were recorded from all seven regions, *Dolbina elegans* A. Bang-Haas, *Hemaris tityus* (L.), *Hippotion celerio* (L.), *Hyles gallii* (Rott.), *Hyles vespertilio* (Esp), *Rethera brandti* O. Bang-Haas and *Sphingonaepiopsis gorgoniades* (Hbn.) were only from one region (Table 1).

Laothoe populi (L.), *Marumba quercus* (Den. and Schiff.), *Mimas tiliae* (L.), *Smerinthus kindermannii* Led., *Smerinthus ocellata* (L.), *Dolbina elegans* A. Bang-Haas, *Sphinx ligustri* (L.), *Sphinx pinastri* (L.) and *Acherontia atropos* (L.) damage on forest trees.

The rest of the hawk moths only feed on herbicous plants, flowers and fruit trees.

Zoogeographical standpoints: 23 species are European, 4 are Asia Minor, 6 are Central and Western Asia and 1 is Southern Asia originated species.

Acknowledgments

We thank Dr. Torul Mol, Dr. Erdal Selmi and Dr. Tamer Oymen for comments on earlier drafts of the manuscript.

References

- Acatay, A.: Istanbul cevresi ve bilhassa belgrad ormani'ndaki zararlı orman böcekleri, mücadeleleri ve isletme üzerine tesirleri, Ziraat vekaleti, Y.Z.E. Calismalarından, Sayı: 142, Ankara (1943).
- Acatay, A.: Pappelschadlinge in der Turkei. *Anz. f. Schadl.*, **32**, 129-134 (1959).
- Akbulut, S., B. Yuksel and A. Keten: The lepidoptera (Insecta) fauna of Duzce province, Turkey. *Turk. J. Zool.*, **27**, 257-268 (2003).
- Bang-Haas, O.: Neubeschreibungen und Berichtigungen der Palaarktischen Makrolepidopteren fauna, XXXVI. *Ent. Z. Frankf a M.*, **52**, 177-180 (1938).
- Bodenheimer, F.S.: Turkiye entomolojisi, I. Entomolojiye giris, Ziraat vekaleti yayinlari, Sayı, 527, Nebat Hastaliklari, 6, Ankara (1941).
- Buxton, A.J.: Lepidoptera at dardanelles. *Entomologist's Rec. J. Var.*, **28**, 213-217 (1916).
- Canakcioglu, H.: Böceklerin toplanma - Preperasyon-muhafaza ve Teshisi Y.U. Orman Fakultesi Yayinlari: 3768/422, Istanbul (1993).
- Carter, D.: Butterflies and Moths, Dorling Kindersley, New York, USA (1992).
- Daly, H.V., J.T. Doyen and A.H. Purcell III: Introduction to Insects Biology and Diversity, Oxford University Press, New York (1998).
- Daniel, F.: Zygaenidae-cymatophoridae. In: Lepidopteren-fauna von Marasch in Türkisch Nordsyrien (Sphingidae: pp. 67-71) (Eds.: L. Osthelder and E. Pfeiffer). *Mitt. Münch. Ent. Ges.*, **22**, 52-82 (1932).
- 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**, 84-103 (1939).
- Danner, F., U. Eitschberger and B. Surholt: Die schwärmer der westlichen palaearktis. Bausteine zur einer revision (Lepidoptera: Sphingidae) - Textband. *Herbipoliana*, **4**, 1-368 (1998).
- Ebert, G.: Afghanische Bombyces und Sphinges. 3. Sphingidae (Lepidoptera). Ergebnisse der 2. Deutschen Afganistan-Expedition (1966) der Landessammlungen für Naturkunde in Karlsruhe. *Reichenbachia*, **12**, 37-53 (1969).
- Ecevit, O. and S. Mennan: Entomoloji'de Laboratuvar Yontemleri, Ondokuz Mayıs Universitesi Yayini, No. 35, Samsun (2000).
- Eichler, F.: *Celerio gallii tibetanica* sp n. sowie Bemerkungen zur Art (Lepidoptera, Sphingidae). *Ent. Abh. Mus. Tierk. Dresden*, **38**, 315-324 (1971).
- Eisenstein, I.: Bibleland Hawkmoths, 80 pls Hebrew, Tel Aviv, Israel (1984).
- Freina, J.J. de: Beitrag zur systematischen Erfassung der Bombyces-und Sphinges-fauna Kleinasiens, Atalanta, Wurzburg, **10**, 175-224 (1979).
- Freina, J.J. de: Bemerkungen Über Das Fragliche Artrecht von *Hemaris dentata* (Staudinger, 1887) (Lepidoptera: Sphingidae). *Nota Lepid.*, **11**, 182-186 (1988).
- Freina, J.J. de and M. Geck: Studien zur Ökologie, Biologie, Verbreitung und Geographischen Variabilität von *Akbesia davidi* (Oberthur, 1884) (Lepidoptera: Sphingidae). *Nachr Ent. Ver. Apollo*, N.F. **23**, 167-180 (2003).
- Freina, J.J. De and T.J. Witt: Die Bombyces und Sphinges der Westpalaearktis, 1, 708. pp. 46 pls. Munich (1987).
- Graves, P.P.: Collecting in Turkey, Mainly near constantinople in 1913, *Entomologist's. Rec. J. Var.*, **26**, 17-21 (1914).



- Graves, P.P.: Additions to the Lepidoptera of the Constantinople District. *Entomologist*, **59**, 249-253, 262-265 (1926).
- Guneyi, N. and A. Sengun: 1964-1969 Yillarında Kefeliköy'de Toplanmış Kelebek Turleri. I. Gunduz Kelebekleri, II. Gece Kelebekleri, *Ist. Univ. Fen Fak. Mecm.*, **37**, 119-123, 125-128, Tab. (1972).
- Hariri, G. el.: A List of The Recorded Insect Fauna of Syria 2: iii, Aleppo. University of Aleppo, Syria (1971).
- Kalali, G.H.: A list of Lepidoptera from province of Khorasan (Iran). *J. Ent. Soc.*, **3**, 131-135 (1976).
- Kansu, I.A.: The preliminary list of Lepidoptera faune of Turkey. V. *Bitki Koruma. Bulteni.*, **3**, 208-223 (1963).
- Kernbach, K.: Über einige palaarktische Sphingidenarten und -unterarten (Lep. Sphingidae). *Dt. Ent. Z. (N.F.)*, **5**, 376-381 (1968).
- Kornosor, S. and E. Sertkaya: Dogu Akdeniz Bolgesi Sphingidae (Lepidoptera) Turleri Uzerinde Faunistik Arastirmalar, Türkiye 3. Entomoloji Kongresi, 24-28 Eylul 1996, Ankara. pp. 448-454 (1996).
- Lattin, G. De: Turkische Lepidopteren-II. Istanbul University, Faculty of Science Bulletin-B, **16**, 45-73 (1951).
- Mathew, G.F.: List of Lepidoptera observed in the neighborhood of Gallipoli Turkey in 1878. *Entomologist's mon Mag.*, **18**, 10-13, 29-32, 92-100 (1881).
- Milyanovskii, E.S.: The adaptive coloration of *Celerio vespertilio* Esp (Lepidoptera: Sphingidae) moths and caterpillars (in Russian). *Ent. Obozr.*, **38**, 223-224 (1959).
- Mol, T. and M. Avci: Marmara Bolgesinin Bazi Sphingidae Turleri. *I.U. Orman Fakultesi*, **47A**, 15-29 (1997).
- Mol, T., M. Avci and I. Dutkuner: Fethiye-Kelebekler Vadisi Florasi ve Lepidoptera Faunasi, *I.U. Orman Fakultesi*, **53A**, 15-24 (2003).
- Pittaway, A.R.: *Hyles hippophaes hippophaes* (Esper) (Lepidoptera: Sphingidae). *Entomologist's Gaz 1 pl*, **33**, 97-98 (1982).
- Pittaway, A.R.: The Hawk moths of the western palaeartic, 13 pls London, Colchester, U.K. (1993).
- Pittaway, A.R.: Observations on the hostplant preferences of *Laothoe populi* (Linnaeus, 1758) (Lepidoptera: Sphingidae). *Entomologist*, **115**, 124-128 (1996).
- Rebel, H.: Studien über die Lepidopterenfauna der Balkanlander I. (Bulgarien, Ostrumelien). *Annln. Naturh. Mus. (Wien)*, **18**, 123-347 (1903).
- Rothschild, W. and K. Jordan: A revision of the Lepidopterous Family Sphingidae, *Novit Zool 9* (Suppl.): i-cxxxv, 67 pls (1903).
- Schauff, M.E.: Collecting and preserving insects and mites. Systematic entomology laboratory, USDA National Museum of Natural History, NHB-168, Washington D.C. 20560, USA (1986).
- Unlu, Z. and S. Kornosor: Viransehir ve ceylanpınar ovalari'nda saptanan heterocera (Lipidoptera) Turleri, GAP IV. Tarim Kongresi, 21-23, Eylul, Sanliurfa. pp. 264-268 (2005).
- Wiltshire, E.P.: The Lepidoptera of Iraq, 17 pls, London, U.K. (1957).