

Orijinal araştırma (Original article)

***Chelostoma* Latreille (Hymenoptera: Megachilidae, Osminii) species occurring in Turkey with their zoogeographic characterization**

Hikmet ÖZBEK ^{1*}

Summary

On the basis of about 1000 bee specimens have been collected by more than 30 professional and amateur entomologists or various visitors since 1959, a synthesis is presented of the present knowledge of the *Chelostoma* fauna of Anatolia from faunistic and zoogeographical points of view. Twenty-five species have been noted occurring in Anatolia. Among them *Chelostoma diodon* Schletterer 1889 is the most common and abundant species. The *Chelostoma* fauna of Anatolia seems to present a relatively high diversity, if compared to the total 49 species worldwide and 40 species in Palaearctic. For the zoogeographical analysis, 25 *Chelostoma* species have been considered and the main chorological categories are represented as follows: Holarctic Region (2), European (6), SW-Asiatic (7), E-Mediterranean (1), Turanian (2), Turano-European (2), Centralasiatic-European (1) and Anatolian endemics (4). Moreover, type localities of 12 species are Anatolia; two species are Armeno -E-Anatolian endemics. Species in the Holarctic, European and Turano-European chorotypes (10 species) are most probably European origine and spread to Anatolia from Europa. The remaining species were originated in Anatolia and were spread from here to neighboring countries.

Key words: Megachilidae, Hymenoptera, Osminii, *Chelostoma*, fauna, chorotype, Turkey

Anahtar sözcükler: Megachilidae, Hymenoptera, Osminii, *Chelostoma*, fauna, korotip, Türkiye

Introduction

The osmiine bees (Megachilidae, Osmiini) constitute a tribe within the family Megachilidae, which is one of the nine currently recognized families of bees (Engel, 2005; Michener, 2007; Michez et al., 2009). The osmiine bees which comprise 15 genera and roughly 1160 species worldwide, occur on all continents except South America, Australia and Antarctica. They are especially diversified in mediterranean and desertic climates of southern Africa, southwestern North America and the Palaearctic. With 10 genera and about 700 species, the Palaearctic osmiine bee fauna is particularly diverse (Michener, 2007; Müller, 2010).

The osmiine bees have special importance for their often spectacular and very diverse nest building behaviours as well as for their close relationships with flowering plants (Müller et al., 1997; Müller 2010; Cane et al., 2007; Sedivy et al., 2008). Several *Osmia* species in Europe (e.g. *O. cornuta* Latreille), Asia [e.g. *O. cornifrons* (Radoszkowski)] and North America (e.g. *Osmia lignaria* Say) are commercially used to pollinate the flowers of fruit trees (Bosch & Kemp, 2002). The outstanding diversity with respect to

¹Atatürk University, Faculty of Agriculture, Plant Protection Department, 25240, Erzurum, Turkey

*Sorumlu yazar (Corresponding author) e-mail: hozbek@atauni.edu.tr

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both species number and biology renders the Osmini a most suitable model group for the study of the evolution of nesting biology and flower preferences in bees in general (Müller et al., 2010).

The genus *Chelostoma* consist of slender, black heriadiform bees, with sculpture more attenuated and less coarsely than genus *Heriades* Spinola (Michener, 2007). It is distributed both in the Palaearctic and the Nearctic region; one single species reaches the Oriental region. Currently, there are 49 described *Chelostoma* species worldwide, 40 of which occur in the Palaearctic (Müller, 2010). According to Müller (2010) at least 14 palaeartic species are still undescribed.

The diversity in climatic and ecological conditions in Turkey has led to many speciation events in Anatolia (Asian Turkey, also known as Asia Minor). Additionally, the geographical position of Anatolian peninsula, a large bridge between east and west, and a natural door, in the past as in the present, for migrations of floras, faunas and humans from Asia to Europe, and vice versa. Because of this rich biodiversity, in the last two centuries, many professional and amateur entomologists, from various European countries, had visited Anatolia and collected so many specimens in different groups of insects, including wild bees, and housed them in different museums and private collections. Two bee specialists had visited Anatolia, in 19th century, and collected many bees and, besides known species, they described several new species from Anatolia in the genus *Chelostoma* (Friese, 1899; Schletterer, 1889). The first *Chelostoma* species described from Anatolia (Amasya), *C. diodon*, was described by Schletterer in 1889. At the same time Schletterer described two more species, *C. mocsaryi* and *C. handlirschi* from Anatolia, but their type localities not only Anatolia, the first one has type materials from Croatia (Hrvatska) and Ukraine, the second one has type materials from Italy and Romania in addition to Anatolia. Later, Benoist described four species from Anatolia (Benoist, 1928, 1935). In 1970s and 1980s, Warncke made many field trips to Anatolia and collected enormous amount of material and described several new species (Warncke, 1991). Recently, Schwarz and Gusenleitner (2000) described one new species from Anatolia. As native entomologist, author has collected many specimens since 1960s and prepared a preliminary list of Turkish *Chelostoma*, which is the only native contribution; with his coauthor van der Zanden (Özbek & Zanden, 1992).

The present contribution is mainly based on about 1000 bee-samples that have been collected from Anatolia by more than 30 professional and amateur entomologists or visitors since 1959 and deposited in different museums and private collections in various European countries and in the USA. Andreas Müller (Zürich, Switzerland) kindly provided me all the data related to these samples and I am particularly indebted with him. Additionally, the author's specimens collected in various localities of the country were also included. Most of the specimens were determined or conformed by Andreas Müller, the rest of them by Gijs van der Zanden (Netherlands) and Klaus Warncke (Germany). The data related to distribution, nesting biology and flower preferences were taken from Müller and the lists of the subgenera and species were followed after Müller (2010) too. The recorded material for each species was given in provinces in alphabetical order. For each specimen following order took place: province (bold type), locality, altitude if available, date of collecting, number of specimens as female and male, name of collector, the place or collector that specimen was deposited and the name of the scientist determining the specimens (last two items are in parenthesis). Literature was given in text for the species described from Turkey. The zoogeographical characterization is based on the chorotype classification of the Near East fauna which was proposed by Vigna-Taglianti et al. (1999).

Abbreviations:

AMNH: American Museum of Natural History, New York-United States

EMET: Atatürk University, Faculty of Agriculture, Entomology Museum, Erzurum-Turkey

RMNH: Nationaal Natuurhistorisch Museum Naturalis, Leiden-The Netherlands

OLML: Oberösterreichisches Landesmuseum, Linz-Austria

Species accounts

1. *Chelostoma (Chelostoma) diodon* Schletterer, 1889

1889 *Chelostoma diodon* Schletterer, Zoologisches Jahrbuch für Systematik, 4: 627. Type material: Lectotype f, by designation of A. Müller (unpublished), "Amasia" [Turkey], NMW (Wien); paralectotype m.-Combination *Heriades diodon* (Schletterer) in Dalla Torre (1896: 376).

Material: Adana: Hasanbeyli, 07-14.VI.1979, 1 ♀, Leg. Warncke, (OLML), (Warncke). Adıyaman: Kuyucak, 08.VII.1998 1 ♀, Leg. Snizek, (OLML), (A. Müller); Kuyucak, 08.VI.1998, 1 ♀, Leg. Ma. Halada (Schwarz), (A. Müller); Kahta, Karadut, 1000 m, 01.VI.2001, 2 ♀♀ Leg. K. Denes sen, (OLML), (A. Müller); Karadut, Nemrut dağı, 09.VI.1998, 1 ♀, Leg. Ma. Halada (Schwarz), (A. Müller). Amasya: 500 m, 22-24.V.1959, 2 ♂♂, 500 m, 11. V.1962, 3 ♂♂, Leg. Guichard and Harv, (London) (A. Müller). Antalya: Akseki 10 km N, 24. V.1998, 1 ♂, Leg. Ma. Halada (A. Müller); Akseki, Irmasan geçidi, 27.V.2001, 1 ♀, 1 ♂ Leg. Snizek, (Schwarz), (A. Müller); Korkuteli, 18 km S, 1290 m, 17. V.1996, 2 ♀♀, Leg. O. Berg, (Oistein Berg), (Zanden); Korkuteli, 18 km S, Karamar, 1290 m, 17.v.1996, 1 ♂, Leg. O. Berg, (RMNH), (A. Müller); Finike, 50-100 m, 07.IV.1962, 1 ♀, 1 ♂, Leg. Guichard and Harv, (London) (A. Müller); Finike-Kaş Rd, 300 m, 10.IV.1962, 1 ♂, Leg. Guichard and Harv, (London) (A. Müller); Termessos, 350 m, 01.V.2000, 2 ♀♀, Leg. Merz and Senay, (A. Müller) (A. Müller); 6 km E, Saklıkent, 01.VI.2009, 5 ♀♀, Leg. Ascher, J. Rozen, H. Özbek, (AMNH), (A. Müller); Saklıkent, 25.VI.2009, 1 ♀, 1 ♂, Leg. Ascher, J. Rozen, H. Özbek, (AMNH), (A. Müller); Saklıkent, Şeklik Mevkii, 03.VI.2009, 6 ♀♀, 1 ♂, Leg. Ascher, J. Rozen, H. Özbek, (AMNH), (A. Müller); 7 km S of Antalya, 24.V.2009, 1 ♀, Leg. Ascher, J. Rozen, H. Özbek, (AMNH), (A. Müller); Altın Yaka, 31.V.2009, 1 ♀, Leg. Ascher, J. Rozen, H. Özbek, (AMNH), (A. Müller); Kargın, ?? km S of Kargın, 24.V.2009, 1 ♀, Leg. Ascher, J. Rozen, H. Özbek, (AMNH), (A. Müller); Saklıkent, 25. V.2009, 5 ♂♂, Leg. Ascher, J. Rozen, H. Özbek, (AMNH), (A. Müller); 10 km W of Antalya, 25. V..2009, 1 ♀, Leg. Ascher, J. Rozen, H. Özbek, (AMNH), (A. Müller). Aydın: Bafa Gölü, 19. IV.1996, 3 ♀♀, Leg. Hartman, (A. Müller) (A. Müller); 09. IV.1996, 3 ♀♀, 19.IV.1996, 3 ♀♀, 09. IV.1996, 4 ♀♀, Leg. P. Hartman, (P. Hartman), (A. Müller); Burdur: 900 m, 27. IV.1960, 2 ♂♂, Leg. Epping, (OLML Wancke), (Wancke). Hakkari: Beytüşşebap, 13. VI.1984, 1 ♀, Leg. Warncke, (OLML, Warncke), (Wancke). Hatay: Bademli, 6 km W, Hassa, 860 m, 36° 48' 42" N, 36°28' 32" E, 1 ♀, Leg. H. Özbek, (EMET) (A. Müller); İskenderun, 02.V.2002, 3 ♀♀, Leg. Kantner, (OLML), (A. Müller); İslahiye, Fevzipaşa, 13 km N, 10.V.2002, 1 ♀, Leg. Kantner, (OLML), (A. Müller); Belen-Pass, Amanus Dağları, 12.V.1975, 1 ♀ Leg. Warncke, (OLML) (Warncke). İzmir: Bozdağ, ?. VI.1990, 2 ♀♀, Leg. Witzgal, (OLML), (Warncke). Konya: Bozkır, 1200 m, 04. VI.1993, 1 ♀, Leg. Risch, (Risch), (A. Müller). İzmir: Ödemiş, Bozdağ,?.VI.1990 2 ♀♀, Leg. Witzgall, (OLML, Warncke), (Warncke). Konya: Akşehir, 30 km S of Akşehir, 24. VI.1998, 2 ♀♀, Leg. Ma. Halada (Schwarz), (A. Müller). Mersin: Akova, 1215 m, 24.V.2005, 1 ♀, Leg. E. Scheuchl, (Scheuchl), (A. Müller); Mersin, 745 m, 24.V.2005, 1 ♀, Leg. E. Scheuchl, (Scheuchl), (A. Müller); Kuzucebelen, 28.V.1998, 1 ♀, Leg. Ma. Halada (Schwarz), (A. Müller); Şahmurlu, 970 m, 6 ♀♀, Leg. E.Scheuchl, (Scheuchl), (A. Müller); Mut, 40 km E Mut, Cornelek, 18.VI.1997, 10 ♀♀, Leg. Ma. Halada (Schwarz), (A. Müller); 29.V.1996, 68 ♀♀, Leg. Ma. Halada (Schwarz), (A. Müller); Erdemli, Aydınlar, 27.V.1992, 1 ♀, Leg. V. Nemeç, (Schwarz), (A. Müller); Erdemli, 30 km N Erdemli, Aslanlı, 17.VI.1998, 12 ♀♀. Leg. Ma. Halada (Schwarz), (A. Müller); Anamur, Kazancı, Abanoz, 1200 m, 11.V.1991, 2 ♀♀, Leg. H. Teunissen (RMNH); 09.V.1991, 2 ♀♀, 3 ♂♂; 22.V.1991, 2 ♀♀; 10.V.1991, 2 ♀♀; 04.V.1991, 1 ♀ Leg. H. Teunissen (Leiden) (A. Müller); Gülnar 10 km SE, 6' 25" N 33'30" E, 1180 m, 25.V.1983, 1 ♀, Leg. Hutterer (M. Schwarz); Namrun, 1200 m, 16.VI-3.VII.1979, ♀, Leg. Warncke, (OLML), (Warncke); Silifke, Uzuncaburç, 1200 m, 20.V.2002, 1 ♂, Leg. Degen, (A. Müller), (A. Müller); Silifke, Uzuncaburç, 100 m, 20.V.1990, 2 ♀♀, Leg. C. Schmid-Egger, (OLML), (Warncke); Silifke, Uzuncaburç, 25.V.1996, 4 ♀♀, Leg. Ma. Halada (Schwarz), (A. Müller); Silifke, Boğusak, 28.III.1998, 2 ♀♀, Leg. Snizek, (Schwarz), (A. Müller); Taşucu, 500 m, 1 ♂, Leg. Lucas, (OLML), (Warncke); Mut, Cornelek, 40 km E Mut, 29.V.1996, 1 ♀, Leg. Halada, (A. Müller), (A. Müller); Gülek, Gülek Boğazı, 12.III.1909, 1 ♂, Leg. Holz, (Frankfurt), (A.

Müller). Muğla: Knidos, 18.IV.1981, 2 ♀♀, Leg. Warncke, (OLML), (Warncke), Ula, Mezarlık, 700 m, 17.IV.1962, 1 ♂, Leg. Guichard and Harv, (London), (A. Müller). Osmaniye: 850 m, 13.V.2002, 1 ♀, Leg. J. Rozen, (AMNH), (A. Müller); Aslanlı Beli, 970 m, 13.V.2002, 2 ♀♀, 1 ♂, Leg. H. Özbek (EMET) (H. Müller). Şırnak: 20 km NW, 1500 m, 05.VI.1980, 1 ♀, Leg. Warncke, (OLML), (Warncke). Tokat: Turhal 25 km N, 500 m, 01.VI.1988, 1 ♀, Leg. H. Wiering, (Amsterdam). Van: Erdemli, Agdinla, 27.V.1992, 2 ♀♀, Leg. Nemeč, (OLML, Warncke), (A. Müller).

Distribution: Europe: Greece; Southwestern Asia: Cyprus, Israel, Jordan, Syria, and Turkey.

Chorotype: Although this species recorded in Greece could be included in SW-Asiatic chorotype.

Nesting biology-Nesting site: Old dried wood (Mavromoustakis, 1951).

Flower preferences: Oligolectic on Asteraceae with a clear preference for Asteroideae (based on Sedivy et al., 2008, and on one additional pollen sample (A. Müller, unpublished)).

2. *Chelostoma (Chelostoma) emarginatum* (Nylander, 1856)

Material: Adiyaman: Kuyucak, 08.VI.1998, 1 ♀, Leg. M. Halada, (Schwarz), (A. Müller). Amasya: 1600 ft, 22-24.V.1959, 2 ♀♀, Leg. Guichard, (London), (A. Müller). Ankara: Elmadağ, 5000 ft, 21.V.1960, 1 ♀, Leg. Guichard and Harv, (London), (A. Müller); Kızılcahamam, 110 m, 16.V.1977, 1 ♀, Leg. Holzschun and Resch, (OLML, Warncke), Warncke; Kazan, 14.V.2005, 1 ♀, 2 ♀♀, Leg. E. Scheuchl, (Scheuchl), (A. Müller). Antalya: Saklıkent, 1050-1700 m, 1 ♂, Leg. H. Teunissen, (RMNH), (A. Müller); Akseki, 10 km N Akseki Geçidi, 24.V.1998, 3 ♀♀, Leg. M. Halada, (OLML), (A. Müller); Akseki, 1100 m, 06.V.1991, 1 ♀, Leg. H. Teunissen, (Leiden), (A. Müller); Akseki, Irmasan Geçidi, 27.V.2001, 1 ♀, 1 ♂, Leg. Snizek, (Schwarz), (A. Müller); Irmasan Geçidi, 2300 m, 2.VI.1996, 1 ♂, Leg. Snizek, (Schwarz), (A. Müller); Akseki, Teke Geçidi, 25.V.2001, 1 ♀, Leg. Snizek, (Schwarz), (A. Müller); Altinyaka, 1100 m, 28.V.2009, 1 ♀, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Altinyaka, 36.5559E 30.35005N, 1010 m, 22.V.2009, 1 ♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Finike, 50-100 m, 07.IV.1962, 1 ♂, Leg. Guichard and Harv, (London), (A. Müller). Aydın: Bafa Gölü, 20.IV.1981, 1 ♀, Leg. Warncke, (OLML, Warncke), Warncke. Bingöl: 17 km E, 09.V.2002, 1 ♂, Leg. J. Rozen and H. Özbek, (AMNH), (Müller). Bursa: Bursa-Mudanya yolu, 28.IV.1962, 1 ♀, Leg. Guichard and Harv, (London), (A. Müller), Karacabey, 80 m, 29.IV.1962, 1 ♀, 11 ♂♂, Leg. Guichard and Harv, (London), (A. Müller); Uludağ, 500 m, 26.IV.1962, 1 ♀, 5 ♂♂, Leg. Guichard and Harv, (London), (A. Müller). Bilecik: NW, 26.IV.1993, 1 ♂, Leg. A. Koch, (Schwarz), (A. Müller). Çanakkale: 39°34'/26°28', 16.V.1981, 1 ♀, Leg. Guichard and Ressler, (Schwarz), (A. Müller). Çorum: İskilip, 700 m, 1 ♂, Leg. Guichard and Harv, (London), (A. Müller). Erzincan: Pülümür, Pülümür pass, 19.V.1990, 1 ♀, Leg. Risch, (Risch), (A. Müller); 1800 m, 19.V.2007, 1 ♂, Leg. E. Hajdaj, (Oistein Berg), (A. Müller). Hakkari: Şemdinli, 1700 m, 12.VI.1981, ♂, Leg. Warncke, (OLML, Warncke), Warncke. İstanbul: Büyükdere, 10.IV.1972, 1 ♂, Leg. ?, (OLML Warncke) (Warncke). Konya: Akşehir, 15.III.1909, 1 ♂, Leg. Korb, (OLML, Warncke), Warncke; Beyşehir, ca. 1200 m, 24.V.2005, 1 ♀, Leg. Risch, (Risch), (A. Müller); Güneysınır, Gurağaç, 1020 m, 02.VI.2002, 1 ♀, Leg. M. Kesdek, (EMET), (A. Müller); Seydişehir, ca. 1200 m, 25.V.1990, 1 ♀, Leg. Risch, (Risch), (A. Müller). Mersin: Anamur, Kazancı, Abanoz, 1100-1200 m, 09.V.1991, 1 ♀, Leg. H. Teunissen, (RMNH), (A. Müller); Kazancı, Abanoz, 1200 m, 02.V.1991, 1 ♂, Leg. H. Teunissen, (RMNH), (A. Müller); Kazancı, Abanoz, 1100-1200 m, 09.V.1991, 1 ♀, Leg. H. Teunissen, (RMNH), (A. Müller); Mut, Çömelek, 40 km E of Mut, 29.V.1996, 5 ♀♀, Leg. M. Halada, (OLML), (A. Müller); Çömelek, 40 km E of Mut, 29.V.1996, 37 ♀♀, 1 ♂, Leg. M. Halada, (Schwarz), (A. Müller); Akova, 24.V.2005, 1 ♀, Leg. E. Scheuchl, (Scheuchl), (A. Müller). Muğla: Fethiye, Fethiye- Ortaca yolu, 200 m, 15.IV.1962, 1 ♀, Leg. H. Teunissen, (RMNH), (A. Müller). Osmaniye: Zorkun Yaylası, 1500 m, 24.VI.1990, 5 ♀♀, 1 ♂, Leg. B. Arı, (EMET), (A. Müller). Samsun: Bafra, 100 ft, 05.V.1959, 2 ♂♂, Leg. Guichard, (London), (A. Müller); Engiz, 27.V.1959, 1 ♀, Leg. Guichard, (London), (A. Müller); Engiz, 100 ft, 10.V.1959, 1 ♀, Leg. Guichard, (London), (A. Müller); Şanlıurfa: Halfeti, 3-5.V.1994, 1 ♀, Leg. D. Kenes, (Schwarz), (A. Müller). Şırnak:

04.VI.1977, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke). Yozgat: Saraykent, 1300 m, 12.VI.2001, 1 ♀, Leg. K. Denes sen., (OLML), (A. Müller).

Distribution-Europe: Almost all European countries. Southwestern Asia: Iran and Turkey.

Chorotype: although it's easternmost record being Iran it could be included in European chorotype.

Nesting biology: unknown.

Flower preferences: Oligolectic on *Ranunculus* (Ranunculaceae) and possibly also on closely related genera (Amiet et al., 2004; Sedivy et al., 2008).

3. *Chelostoma (Chelostoma) florisomne* (Linnaeus, 1758)

Material: Ankara: 1606 m, 18.VI.2006, 1 ♀, Leg. Gülcü and Scheuct, (Turkey), (A. Müller). Artvin: Ardanuç, Ferhatlı, 13.V.2000, 2 ♀♀, Leg. Ö. Çalmaşur; Borçka, 12.V.2000, 3 ♀♀, Leg. Ö. Çalmaşur, (EMET), (A. Müller); Yusufeli, Kınalıçam, 600 m, 21.V.2002, 1 ♀, Leg. H. Özbek, (EMET), (A. Müller). Bolu: Abant Gölü, 14.VI.2000, 2 ♀♀, Leg. Denes, (OLML), (A. Müller); Bolu civarı, 810N, 13°26.685E, 850 m, 26.V.2003, 1 ♂, Leg. Schneider, (OLML), (A. Müller). Erzurum: Şenkaya, Ormanlı, 1800 m, 20.VI.1994, 4 ♀♀, Leg. E. Yıldırım, (EMET), (A. Müller). Konya: Akşehir, ??, 1900, 13 ♀♀, Leg. Kob, (ZS München), (A. Müller). Samsun: Engiz, 27.V.1959, 1 ♀, Leg. Guichard, (London), (A. Müller); Engiz, 100 ft, 10.V.1959, 1 ♀, Leg. Guichard, (London), (A. Müller). Yozgat: Saraykent, 1300 m, 12.VI.2001, 1 ♀, Leg. K. Denes sen., (OLML), (A. Müller).

Distribution: almost all European countries and Turkey.

Chorotype: European.

Nesting biology-Nesting site: Preexisting cavities: insect burrows and drilled borings in dead wood; hollow stems (e.g. Phragmites, Triticum) and drilled borings in stems; clay walls; glass tubes. Nesting material: Cell partitions and nest plug made of mud. Small pebbles, sand grains, small snail shells and other particles are embedded in the outer plug surface. Nectar is added to the mud for the construction of partitions and plug. (Banaszak and Romasenko, 2001; Müller, 2010)

Flower preferences: Oligolectic on *Ranunculus* (Ranunculaceae) and possibly also on closely related genera (Amiet et al., 2004; Sedivy et al., 2008; Westrich, 1989).

4. *Chelostoma (Chelostoma) lucens* (Benoist, 1928)

1928 *Heriades lucens* Benoist, Annales de la Société Entomologique de France, 97: 418. Type material: Lectotype f, by designation of G. van der Zanden (A. Müller, unpublished), "Asie mineure: Taurus" [Turkey], MNHN (Paris).

Material: Antalya: Termessos, 24.V.2009, 5 ♀♀, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Saklıkent, 6 km E of Saklıkent, 01.VI.2009, 2 ♀♀, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Kumluca, 540 m, 28.V.2002, 1 ♀, Leg. Degen, (A. Müller), (A. Müller). Diyarbakır: Silvan, 600 m, 17.VI.1995, 13 ♀♀, Leg. E. Yıldırım, (EMET), (A. Müller). Mersin: Tarsus, Çamlıyayla, 1400 m, 25.V.1992, 1 ♀, Leg. H. Özbek; (EMET), (A. Müller); Erdemli, 30 km N Erdemli, Aslanlı, 17.VI.1998, 5 ♀♀, Leg. M. Halada, (Schwarz), (A. Müller); Erdemli, Aydınlar, 06.VI.1996, 1 ♀, Leg. Snizek, (Schwarz), (A. Müller); Silifke, Uzuncaburç, 28.V.1996, 3 ♀♀, Leg. M. Halada, (Schwarz), (A. Müller).

Distribution: Bulgaria and Greece (Rhodos, Samos) Cyprus?, Israel?, Jordan, Turkey.

Chorotype: E-Mediterranean.

Nesting biology: unknown.

Flower preferences: *C. lucens* is probably oligolectic on Dipsacaceae as are its closest relatives (Müller, 2010).

5. *Chelostoma (Chelostoma) dolosum* (Benoist, 1935)

1935 *Heriades dolosa* Benoist, Bulletin de la Société Entomologique de France, 40: 279. Type material: Lectotype f, by designation by Zanden (A. Müller, unpublished), "Asie mineure: Brousse" [Turkey], MNHN (Paris).

Material: Adiyaman: Karadut, 50 km NE of Adiyaman, 1000 m, 01.V.2001, 1 ♀, Leg. Denes, (A. Müller), (A. Müller). Antalya: Akseki, 1100 m, 06.V.1991, 2 ♀♀, Leg. Teunissen, (RMNH), (A. Müller). Gaziantep: 30 km W of Gaziantep, 30.V.1998, 2 ♀♀, Leg. Halada, (A. Müller), (A. Müller). Hakkari: Tanin, Tanin geçidi, 2300 m, 19.V.1989, 1 ♂, Leg. Warncke, (M. Schwarz), (A. Müller); Suvari Halil Geçidi, 1900m, 01.VI.1980, 2 ♂♂, Leg. M. Schwarz, (M. Schwarz), (A. Müller); Şemdinli, 1700 m, 12.VI.1981, 1 ♂, Leg. Warncke, (M. Schwarz), (A. Müller). Konya: Seydişehir, W of Seydişehir, 1200 m, 25.V.1990, 1 ♂, Leg. Risch, (RMNH), (A. Müller). Mersin: Anamur, Abanoz, Anamur-Kazancı yolu, 1100-1200 m, 1 ♂, Leg. Teunissen, (A. Müller), (A. Müller).

Distribution: Turkey.

Chorotype: Anatolian endemic.

Nesting biology: unknown.

Flower preferences: unknown.

6. *Chelostoma (Chelostoma) mocsaryi* Schletterer, 1889

1889 *Chelostoma mocsaryi* Schletterer, Zoologisches Jahrbuch für Systematik, 4: 622. Type material: Syntypes mm, "Dalmatien (Spalato), Süd-Russland (Krim), Kleinasien (Amasia, Aphrodisias), [Croatia, Ukraine, Turkey], NMW (Wien) and HNHM (Budapest).-Combination *Heriades mocsaryi* (Schletterer) in Dalla Torre and Friese (1895: 69).

Material: Adana: Karatepe, 17.VI.1984, 3 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke). Ankara: Kızılcahamam, Soğuksu, 1300 m, 14.VI.2001, 1 ♂, Leg. K. Denes sen., (OLML), (A. Müller). Aydın: Bafa Bölü, 17.IV.1996, 1 ♂, Leg. P. Hartman, (P. Hartman), (A. Müller); Kuşadası, 10-16.IV.1974, 1 ♀, Leg. W. H.Gravestain, (Leiden), (A. Müller). Amasya: 1600 ft, 22.V.1959, 1 ♀, 1 ♂, Leg. Guichard, (London), (A. Müller). Antalya: Akseki, İmasan Geçidi, 1300 m, 02.VI.1996, ♂, Leg. Snizek, (M. Schwarz), (A. Müller); İmasan Geçidi, 27.V.2001, 1 ♂, Leg. Snizek, (M. Schwarz), (A. Müller); Saklıkent 6 km E, 01.VI.2009, 1 ♀, 1 ♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Saklıkent, 25.V.2009, 1 ♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Saklıkent, 31.V.2009, 1 ♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Doyran, 25.V.2009, 1 ♀, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller). Artvin: Ardanuç, Ferhatlı, 13.V.2000, 1 ♀, Leg. Ö. Çalmaşur, (EMET), (A. Müller); Oruçlu, 600 m, 21.V.1997, 1 ♂, Leg. L. Gültekin, (EMET), (A. Müller), Yusufeli, Kınalıçam, 900 m, 1 ♂, Leg. Özbek, (EMET), (A. Müller). Bursa: Karacabey, 80 m, 30.IV.1962, 1 ♂, Leg. Guichard and Harv, (London), (A. Müller). Erzincan: Pülümür Pass, ca. 1000 m, 19.V.1990, 1 ♂, Leg. Risch, (Risch), (A. Müller); 10 km E of Erzincan, 1210 m, 06.VI.1981, 1 ♂, Leg. K. Warncke, (OLML, Warncke), (Warncke); Sakaltutan Geçidi, 30 km, NW Erzincan, 1700 m, 13.VI.1988, 1 ♂, Leg. H. Wiering, (Amsterdam), (A. Müller). Erzurum: İspir, İspir-İkizdere Rd., 1700 m, 02.VI.1962, 1 ♂, Leg. Guichard and Harv, (London), (A. Müller); Olur, Süngübayır, 1800 m, 21.V.1994, ♂, Leg. İ. Aslan, (EMET), (A. Müller); Oltu, Başaklı, 1700, 29.V.1993, ♂, Leg. H. Özbek, (EMET), (A. Müller); Oltu, Sarısaz, 1300 m, 10.V.1997, 1 ♀, Leg. L. Gültekin, (EMET), (A. Müller); Şenkaya, Turnalı, 1750 m, 08.VIII.1997, 1 ♀, Leg. E. Yıldırım, (EMET), (A. Müller); Şenkaya, Turnalı, 1700, 25.VI.1991, 2 ♀♀, Leg. E. Yıldırım, (EMET), (A. Müller); Uzundere, Dikyar, 1300 m, 24.V.1994, 1 ♂, Leg. İ. Aslan, (EMET), (A. Müller). Hakkari: 25 km N of Hakkari, 2200 m, 30.V.1980, 1 ♂, Leg. Kraus, (OLML, Warncke), (Warncke); Uludere, 05.VI.1977, 2 ♀♀, 1 ♂, Leg. Kraus, (OLML, Warncke), (Warncke); 5 km, N of Hakkari, 1450 m, 11.VI.1981, ♀, Leg. K. Warncke, (OLML, Warncke), (Warncke); Beytüşşebap, 1300 m, 02.VI.1980, 1 ♀, Leg. Warncke, (OLML), (A. Müller);

Yüksekova, 25 km NW Yüksekova, 2200 m, 30.V.1989, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Yüksekova, Oramar, 5 km N Oramar, 1450 m, 6 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke); 8 km N of Oramar, 1500 m, 10.VI.1981, 2 ♀♀, Leg. Kraus, (OLML, Warncke), (Warncke); 8 km N of Oramar, 1500 m, 10.VI.1981, 2 ♀♀, Leg. Warncke, (OLML), (A. Müller); Varagöz, Sat Dağı, 17.VI.1984, 2 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke); Varagöz, Sat Dağı, 1700 m, 15.VI.1984, 6 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke); Yüksekova, Zapsuyu, 40 km N Yüksekova, 09.VI.1981, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Şemdinli, 1700, 12.VI.1981, ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Hatay: İslahiye, Fevzipaşa, 10.v.2002, 3 ♀♀, 1 ♂, Leg. Kantner, (OLML), (A. Müller). Gaziantep: 30 km W Gaziantep, 30.V.1998, 8 ♀♀, Leg. M. Halada, (OLML), (A. Müller); Kars: Karakurt, 10 km E, 1460 m, 01.VI.1988, 1 ♀, 1 ♂, Leg. Warncke, (OLML), (A. Müller); Karakurt, 10 km, E, 1460 m, 01.VI.1988, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Kayseri: Yeşilhisar, 23.V.1972, 3 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke). Konya: Bozkır, ca. 1200 m, 04.VI.1993, 1 ♀, 2 ♂♂, Leg. Risch, (Risch), (A. Müller). Nevşehir: Ürgüp, 11.VI.1973, ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Ürgüp, 1400 m, 30.V.2001, ♀, Leg. K. Denes sen., (OLML), (A. Müller); Kapadokya, 13.VI.1998, 2 ♂♂, Leg. Halada, (M. Schwarz), (A. Müller). Mersin: Silifke, E İmamali, N Demircili, 1 ♂, Leg. Schmid-Egger, (Schmid-Egger), (A. Müller). Muğla: Fethiyue, Ölüdeniz, 500 m, 19.V.1986, 2 ♀♀, Leg. Guichard, (London), (A. Müller). Osmaniye: Hasanbeyli, 18.VI.1991, 1 ♀, Leg. Kuorna, (OLML), (A. Müller). Şırnak: 04.vi.1977, 2 ♀♀, Leg. Warncke, (OLML), (Warncke). Van: Baskale, 30 km S, 1700 m, 09.VI.1981, 1 ♂, Leg. K. Warncke, (OLML, Warncke), (Warncke).

Distribution: Bulgaria, France, Greece, Croatia (Hrvatska), Italy, Italy (Sicily), Russian Federation, Slovenia, Ukraine; Caucasus, Israel, Turkey.

Chorotype: European. Amasya (Turkey) is one of the type localities besides Croatia and Ukraine.

Nesting biology-Nesting site: Preexisting cavities: insect burrows in dead wood, hollow stems (Banaszak and Romasenko, 2001; A. Gogala, personal communication).

Flower preferences: Oligolectic on *Ornithogalum* (Hyacinthaceae) (Gogala, 1999; Sedivy et al., 2008).

7. *Chelostoma (Foveosmia) campanularum* (Kirby, 1802)

Material: Ankara: 1070 m, 18.vi.2006, ♂, Leg. E. Scheuchl, (Scheuchl), (A. Müller). Erzurum: Tafta, 26.VIII.1981, 2 ♀♀, 2 ♂♂, Leg. Ozbek, (EMET), (Zanden).

Distribution: All European countries, Northern Africa: Algeria, Turkey, Extralimital: Nearctic (Canada, USA) [Introduced].

Chorotype: Holarctic.

Nesting biology-Nesting site: Preexisting cavities: insect burrows in dead wood; hollow stems (e.g. Phragmites). Nesting material: Cell partitions and nest plug made of mud. Small pebbles are added to the outside of the plug. (Banaszak and Romasenko, 2001; Müller, 2010)

Flower preferences: Oligolectic on *Campanula* (Campanulaceae) and possibly also on closely related genera (Amiet et al., 2004; Sedivy et al., 2008; Westrich, 1989).

8. *Chelostoma (Foveosmia) josefi* Schwarz and Gusenleitner, 2000

2000 *Chelostoma josefi* Schwarz & Gusenleitner, Entomofauna (Ansfelden), 21: 160. Type material: Holotype m, "Hakkari: 22 km S Beytüşşebap, 1300m" [Turkey], Schwarz Collection (Ansfelden); paratypes m, ff. Material: no material has been found after type locality (Hakkari).

Distribution-Turkey.

Chorotype: Anatolian endemic.

Nesting biology: unknown.

Flower preferences: unknown.

9. *Chelostoma (Foveosmia) styriacum* Schwarz & Gusenleitner, 1999

Material: Ankara: Soğuksu, 80 km N of Ankara, 1300 m, 14.VI.2001, 1 ♀, 1 ♂, Leg. Denes, (A. Müller), (A. Müller).

Distribution-Europe: Albania, Bulgaria, Greece, Hungari, Romania, Slovak Republik. Southwestern Asia: Turkey.

Chorotype: European.

Nesting biology: unknown.

Flower preferences: Oligolectic *Campanula* (Campanulaceae) and possibly also on closely related genera (Sedivy et al., 2008).

10. *Chelostoma (Foveosmia) foveolatum* (Morawitz, 1868)

Material: Amasya: 1400 ft, 31.V.1959, 1 ♂, Leg. Guichard and Harv, (London), (A. Müller); 500 m, 11.V.1962, 5 ♂♂, Leg. Guichard and Harv, (London), (A. Müller). Antalya: 7 km SW, ...571 N; 30 59 704 E, 26.V.2009, 1 ♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Kemer 7 km SW, 14.V.1996, 2 ♀♀, 1 ♂, Leg. Oistein Berg, (Oistein Berg), Zanden; Karacaören Brj., 23.V.2009, 1 ♀, 1 ♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Pamukcu, 23.V.2009, 2 ♀♀, 6 ♂♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Altinyaka, 1010 m, 28.V.2009, 5 ♀♀, 6 ♂♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Termessos, 24.V.2009, ♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Saklıkent, Şeklik Mevkii, 03.VI.2009, 1 ♀, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller). Aydın: ?? 40°N; 27°59'42"E, 707 m, 25.V.2006, 1 ♂, Leg. E Scheuch, (Scheuch), (A. Müller); Paşayaylası, 47°N; 27°53'44"E, 1151 m, 1 ♂, Leg. E Scheuch, (Scheuch), (A. Müller); Bafa Gölü, 20.IV.1981, 3 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke); Kuşadası, 1500 m, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Bolu: Abant Gölü, 21.VI.1993, 1 ♀, (M. Schwarz), (A. Müller); Mengen, Yenice, 11.VI.2001, 3 ♂♂, Leg. Snizek, (M. Schwarz), (A. Müller). Denizli: 1557 m, 08.VI.2006, 1 ♂, Leg. Çobanoğlu and Scl, (Turkey), (A. Müller). Erzurum: Tortum-Narman Geçidi (Kireçli), 2200 m, 1 ♂, Leg. H. Özbek, (EMET), (Zanden). Hatay: Bademli, 6 km W of Hassa, 860 m, 36 48 42 N 36 28 32 E, 1 ♂, Leg. H. Özbek, (EMET), (A. Müller). Gümüşhane: Zigana Geçidi 5 km S, 1600 m, 17.VI.1988, 1 ♂, Leg. H. Wiering, (Amsterdam), (A. Müller); Zigana Village, 1200 m, 25.V.1962, 1 ♂, Leg. Guichard and Harv, (London), (A. Müller). İzmir: Efes, 24.IV.1981, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Manisa: 35 km S, 38°20'N; 28°24'E, 900 m, 30.VI.2006, 1 ♂, Leg. Halada, (OLML), (A. Müller). Mersin: Namrun, Kilit 1200 m, 29.V.-06.VI.1979, 3 ♂♂, Leg. Holzschuh and Resch, (OLML, Warncke), (Warncke). Muğla: Knidos, 18.IV.1981, 4 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke). Rize: 1800 m, 31.VII.1983, 2 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke); İkizdere, Ovit Pass, 1500 m, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Sivas: Gürün, 10 km S, 1500-1700 m, 30.VII.-02.VIII.1983, 1 ♂, Leg. H. Wiering, (Amsterdam), (A. Müller). Trabzon: Zigana Gağı, Gökpınar, 4200 ft, 14.VII.1960, 2 ♀♀, Leg. Guichard and Harv, (London), (A. Müller). Yozgat: Saraykent, 1300 m, 12.V.2001, 2 ♂♂, Leg. Denes sen. (OLML), (A. Müller).

Distribution: Almost all of the European countries, Turkey.

Chorotype: European.

Nesting biology: unknown.

Flower preferences: Oligolectic *Campanula* (Campanulaceae) and possibly also on closely related genera (Amiet et al., 2004; Sedivy et al., 2008).

11. *Chelostoma (Foveosmia) garrulum* (Warncke, 1991)

1991 *Osmia (Foveosmia) garrula* Warncke, Linzer Biologische Beiträge, 23: 270. Type material: Holotype f, "20 km W Sarıkamış/Kars, in 2200 m" [Turkey], OLML (Linz); paratypes mm, ff.

Material: Artvin: Yusufeli, Altıparmak, 1100 m, 05.VII.1994, 2 ♀♀, ♂, Leg. E. Yıldırım; (EMET), (A. Müller). Bayburt: 1552 m, 02.VII.2006, 1 ♀, Leg. E. Scheuchl, (Scheuchl) (A. Müller). Erzurum: Tafta, 21.VII.1981, 1 ♀, Leg. Özbek, (OLML, Warncke), (Warncke); Tafta, 1900 m, 27.VII.1981, 2 ♂♂, ♀, Leg. Özbek, (EMET), (A. Müller; Pasinler, Çalıyazi, 2300 m, 13.VII.1997, 1 ♀, 1 ♂, Leg. E. Yıldırım, (EMET), (A. Müller); Olur, yeşilbağlar, 29.VII.2003, 1 ♀, 1 ♂, Leg. H. Özbek, (EMET) (A. Müller); Oltu, Çamlıbel, 1600 m, 26.VII.1996, ♀, Leg. H. Özbek, (EMET k), (A. Müller); Oltu, Çamlıbel, 1700 m, 14.VII.1996, 1 ♀, Leg. E. Yıldırım, (EMET), (A. Müller); Oltu, Başaklı, 1700 m, 28.VII.1992, 3 ♀♀, 5 ♂♂, Leg. Ö. Çalmaşur, (EMET), (A. Müller); Oltu, 22 km WSW, 08.VII.2007, 2 ♂♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Aşkale, Kopgeçidi, 5000 ft, 22.VII.1960, 1 ♀, Leg. Guichard and Harv, (London), (A. Müller); Narman, Kireçli Geçidi, 1900 m, 27.VII.1986, 1 ♀, Leg. Ebmer, (RMNH), (A. Müller). Hakkari: Oramar, 1500 m, 16.VI.1984, 2 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke); Beytüşşebap, Süvarihalil Geçidi, 2300 m, 02.VIII.1982, ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Vargöz, Sat Dağı, 1700 m, 29.VI.1985, 1 ♂, Leg. Schacht, (OLML, Warncke), (Warncke). Kars: Sarıkamış, Aras Vadisi, Karakurt 20 km E, 12.VI.1977, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Sarıkamış, 20 km W, 2200 m, 01.VIII.1983, 2 ♂♂, 2 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke); Sarıkamış, 20 km W, 2200 m, 11.VIII.1982, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Sarıkamış, 20 km W, 2200 m, 06.VIII.1979, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Rize: S, 2000 m, 31.VII.1983, 7 ♀♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke).

Distribution: Armenia and Turkey.

Chorotype: Turanian. Type locality is Kars (Turkey).

Nesting biology: unknown.

Flower preferences: Oligolectic on *Campanula* (Campanulaceae) and possibly also on closely related genera (Sedivy et al., 2008).

12. *Chelostoma (Foveosmia) isabellinum* (Warncke, 1991)

1991 *Osmia (Foveosmia) isabellina* Warncke, Linzer Biologische Beiträge, 23: 272. Type material: Holotype f, "10 km W Uludere/Hakkari" [Turkey], OLML (Linz); paratypes mm, ff.

Material: Gaziantep: 30 km W, 30.V.1998, 2 ♀♀, Leg. Halada, (A. Müller), (A. Müller). Mardin: Midyat, 40 km E, 900 m, 25.V.1983, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Hakkari: Uludere, 10 km W, 1000 m, 04.VI.1980, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Uludere, 10 km W, 1000 m, 04.VI.1980, 1 ♀, Leg. Schwarz, (Schwarz), (A. Müller). Hatay: Amanus Dağları, Belen Geçidi, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Yayladağı, 11.VI.1998, 1 ♀, 1 ♂, Leg. Halada, (A. Müller), (A. Müller). Kahramanmaraş: 700 m, 02.VI.1983, 2 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke). Mersin: Silifke, Uzuncaburç, 28.V.1996, 1 ♀, Leg. Halada, (A. Müller), (A. Müller).

Distribution: Israel and Turkey.

Chorotype: SW-Asiatic. Type locality is Hakkari.

Nesting biology: unknown.

Flower preferences: Probably oligolectic on *Campanula* (Campanulaceae) and possibly also on closely related genera (Sedivy et al., 2008).

13. *Chelostoma (Foveosmia) torquillum* (Warncke, 1991)

1991 *Osmia (Foveosmia) torquilla* Warncke, Linzer Biologische Beiträge, 23: 271. Type material: Holotype f, "Suvari-Halil-Pass in 2300 m östl. Beytüşsebab/Hakkari" [Turkey], OLML (Linz); paratypes mm, ff.

Material: Bitlis: Ahlat, 18.VIII.1972, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Nemrut Dağı, 2850 m, 08.VIII.1986, 2 ♀♀, Leg. Warncke, (A. Müller), (A. Müller); Nemrut Dağı, 2300 m, 15.VIII.1991, 1 ♀, 1 ♂, Leg. Warncke, (Schwarz), (A. Müller). Hakkari: Vargös, Sat Dağı, 1650 m, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Vargös, Sat Dağı, 2000 m, 06.VIII.1982, 1 ♂, Leg. Warncke, (A. Müller), (A. Müller); Vargös, Sat Dağı, 2000 m, 06.VIII.1982, 4 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke); Vargös, Sat Dağı, 1700 m, 2 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke); Vargös, Sat Dağı, 1650 m, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Sat Dağı, Gavaruk Gölü, 2600-2800 m, 05.VIII.1982, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Sat Dağı, Sat Gölü, 2800 m, 07.VIII.1983, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Süvarihalil Geçidi, 2900 m, 11.VIII.1983, 4 ♀♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Beytüşsebab, Süvarihalil Geçidi, 2300 m, 03.VIII.1982, 2 ♀♀, 5 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke); Uludere, Tanin Geçidi, 2200 m, 01.VIII.1982, 2M, Leg. Warncke, (OLML, Warncke), (Warncke); Tanin Geçidi, 2300-3600 m, 14.VIII.1978, 2 ♀♀, Vargös, Sat Dağı, 1650 m, 1 ♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Serpil, Cilo Dağı, 1800 m, 08. VIII.1982, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Serpil, Cilo Dağı, 1800 m, 07.VIII.1982, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Altın Dağları, 2600-3000 m, 18.VIII.1979, 4 ♀♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Yüksekova, 15 km N of Hakkari, 11.VIII.1979, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Yüksekova, 25 km, NW, 2200 m, 30.V.1980, 2 ♀♀, Leg. Schwarz, (Schwarz), (A. Müller). Kars: Sarıkamış, 2200 m, 06.VIII.1979, 2 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke); Paslı, 50 km S of Kars, 01.VII.1997, 1 ♂, Leg. Halada, (Schwarz), (A. Müller). Kayseri: Erciyes Dağı, 2400 m, 03.VIII.1979, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Konya: Seydişehir W, 1800 m, 04.VIII.1991, 5 ♀♀, 4 ♂♂, Leg. Warncke, (Schwarz), (A. Müller).

Distribution-Southwestern Asia: Turkey.

Chorotype: Anatolian endemic. Type locality is Hakkari.

Nesting biology: unknown.

Flower preferences: unknown.

14. *Chelostoma (Foveosmia) bytinskii* (Mavromoustakis, 1948)

Material: Gaziantep: 30 km W of Gaziantep, 30.V.1998, 7 ♀♀, 11 ♂♂, Leg. Halada, (A. Müller), (A. Müller). Hatay: Amanos Mt, Belen Geçidi, 600 m, 12.V.1975, 2 ♀♀, Leg. Warncke, (OLML), (Warncke). Kahramanmaraş: 700 m, 02.VI.1983, 2 ♀♀, 1 ♂, Leg. Warncke, (OLML), (Warncke).

Distribution-Southwestern Asia: Israel, Jordan, Syria, and Turkey.

Chorotype: SW-Asiatic.

Nesting biology: unknown.

Flowerpreferences: Oligolectic *Campanula* (Campanulaceae) and possibly also on closely related genera (Sedivy et al., 2008).

15. *Chelostoma (Foveosmia) forcipatum* (Benoist, 1928)

1928 *Heriades forcipata* Benoist, Bulletin du Muséum d'Histoire Naturelle Paris, 34: 334. Type material: Lectotype m, by designation of D.B. Baker (Warncke, 1991: 275), "Taurus" [Turkey], MNHN (Paris).-Combination *Osmia (Foveosmia) forcipata* (Benoist) in Warncke (1991: 275).

Material: Gaziantep: 30 km W, 30.V.1998, 1 ♀, Leg. Halada, (Müller), (Müller). Hatay: 30 km S, 800 m, 09.VI.1993, 1 ♂, Leg. Schulz, (Risch), (Müller); Yayladağı, 11.VI.1998, 1 ♂, Leg. Halada, (Müller), (Müller). Kahramanmaraş: 700 m, 02.VI.1983, 2 ♀♀, Leg. K. Warncke, (OLML, Warncke), (Warncke). Muğla: Knidos, 18.IV.1998, 4 ♀♀, 3 ♂♂, Leg. K. Warncke, (OLML, Warncke), (Warncke). Şırnak: 04.VI.1977, 1 ♀, Leg. K. Warncke, (OLML, Warncke), (Warncke).

Distribution: Greece, Israel and Turkey.

Chorotype: Although it occurs in Greece it could be included in SW-Asiatic chorotype. Type locality is Taurus mts (Turkey).

Nesting biology: unknown.

Flower preferences: unknown.

16. *Chelostoma (Foveosmia) galeridum* (Warncke, 1991)

1991 *Osmia (Foveosmia) galerida* Warncke, Linzer Biologische Beiträge, 23: 274. Type material: Holotype m, "Anamuryon/Icel" [Turkey], OLML (Linz); paratypes mm, ff.

Material: Antalya: 27.V.1997, 1 ♂, Leg. Guichard, (London), (A: Müller); 27.V.1997, 1 ♂, Leg. Guichard, (A. Müller), (A: Müller); Aspendos, 25.IV.1984, 2 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke); Kale, Myra, 16.IV.1981, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke). Mersin: Anamur, 22.IV.1984, 3 ♀♀, 10 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke).

Distribution-Southwestern Asia: Turkey.

Chorotype: Anatolian endemic. Type locality is İçel (Mersin).

Nesting biology: unknown.

17. *Chelostoma (Foveosmia) maidli* (Benoist, 1935)

1935 *Heriades maidli* Benoist, Bulletin de la Société Entomologique de France, 40: 279. Type material: Lectotype m, by designation of G. van der Zanden (A. Müller, unpublished), "Asie mineure: Olympa, Broussa" [Turkey], MNHN (Paris).-Combination *Osmia (Foveosmia) maidli* (Benoist) in Warncke (1991: 276).

Material: Antalya: Kaş, Lykien Theater, 10.IV.1998, 2 ♂♂, Leg. W. Arens, (W. Arens), (A. Müller); Kaş, Lykien Patara Geçidi W, 11.IV.1998, 1 ♂, Leg. W. Arens, (W. Arens), (A. Müller). Erzurum: Horasan, Aras Vadisi, 16.V.1973, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke); Pasinler, Çalıyazı, 2300 m, 13.VII.1997, 1 ♂, Leg. E. Yıldırım, (Özbek), (A. Müller). Hakkari: Sat Dağı, Gavanik Gölü, 2900 m, 05.VIII.1983, 2 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke); Sat Dağı, Gevria geçidi, 2700-3100 m, Leg. 1 ♂, Warncke, (OLML, Warncke), (Warncke); Altın Dağları, 2600-3000 m, 13.VIII.1979, 1 ♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke, Kars: Paslı, 50 km S of Kars, 01.VII.1997, 2 ♀♀, Leg. Halada, (Schwarz), (Müller); Sarıkamış, Karakurt, 10 km E, 1500 m, 28.V.1983, 2 ♀♀, 2 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke); Sarıkamış, Karakurt, 10 km E, 1460 m, 01.VI.1988, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Sarıkamış, 20 km W, 2200 m, 11.VIII.1982, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke). Van: Başkale, Güzeldere Geçidi, 2500 m, 12.VII.1984, 1 ♂, Leg. Ebmer, (RMNH), (A. Müller).

Distribution-Southwestern Asia: Israel, Syria, and Turkey.

Chorotype: SW-Asiatic.

Nesting biology: unknown.

Flower preferences: Probably oligolectic on Campanulaceae (A. Müller, unpublished, based on 2 pollen samples from 2 different localities).

18. *Chelostoma (Foveosmia) schlettereri* (Friese, 1899)

Material: Gaziantep: 30 km W, 30.V.1998, 11 ♀♀, 6 ♂♂, Leg. Halada, (Müller), (Müller).

Distribution-Europe: Greece? Southwestern Asia: Israel, Jourdan, Syria, and Turkey.

Chorotype: although it probably occurs in Greece it could be treated in SW-Asiatic chorotype.

Nesting biology: unknown.

Flower preferences: unknown.

19. *Chelostoma (Foveosmia) distinctum* (Stöckert, 1929)

Material: Ankara: Soğuksu, 80 km N Ankara, 1300 m, 14.VI.2001, 1 ♂, Leg. Denes, (A. Müller), (A. Müller); Soğuksu, 1300 m, 14.VI.2001, 3 ♂♂, Leg. K. Denes sen, (OLML), (A. Müller); 1070 m, 18.VI.2006, 2 ♂♂, Leg. E. Scheuchl, (Scheuchl), (A. Müller); 1606 m, 18.VI.2006, 2 ♂♂, Leg. E. Scheuchl, (Scheuchl), (A. Müller). Artvin: Yusufeli, Altıparmak, 1100 m, 5.VII.1994, 1 ♀, Leg. E. Yıldırım, (EMET), (A. Müller). Erzurum: Oltu, Başaklı, 40.29 N; 41.48 E, 1500 m, 03.VII.2001, 1 ♂, Leg. J. Rozen, (AMNH), (A. Müller); Oltu, 22 km, WSW Oltu, 07.VII.2007, 1 ♀, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller). Kastamonu: 1314 m, 18.VI.2006, 1 ♀, Leg. E. Scheuchl, (Scheuchl), (A. Müller). Kayseri: 1680 m, 20.VI.2006, 1 ♂, leg. Gulcü and Scheuchl, (Turkey), (A. Müller). Trabzon: Zigana Dağı, 4200 ft, 14.VII.1960, 2 ♂♂, Leg. Guichard and Harv, (London), (A. Müller). Yozgat: Saraykent, 1300, 12.VI.2001, 1 ♀, Leg. K. Denes sen, (OLML), (A. Müller).

Distribution-Europe: distributed in all of the European countries; Caucasus, Israel and Turkey.

Chorotype: European.

Nesting biology-Nesting site: Preexisting cavities: insect burrows and drilled borings in dead wood; hollow stems; old galls of *Diplolepis mayri* Schld. on *Rosa*. Nesting material: Cell partitions and nest plug made of mud (Banaszak and Romasenko, 2001; Müller, 2010).

Flower preferences: Oligolectic on *Campanula* (Campanulaceae) and possibly also on closely related genera (Amiet et al., 2004; Sedivy et al., 2008; Westrich, 1989).

20. *Chelostoma (Gyrodromella) orientale* Schletterer, 1890

Material: Friese (1911) recorded this species from Turkey, since that time no material has been found.

Distribution: Armenia and Turkey

Chorotype: Turanian.

21. *Chelostoma (Gyrodromella) handlirschi* Schletterer, 1889

1889 *Chelostoma handlirschi* Schletterer, Zoologisches Jahrbuch für Systematik, 4: 624. Type material: Syntypes m(m), f(f), "Nord-Italien, Ungarn (Mehadia), Kleinasien" [Italy, Romania, Turkey], NMW (Wien) and HNHM (Budapest).-Combination *Heriades handlirschi* (Schletterer) in Dalla Torre and Friese (1895: 69).

Material: no material has been found.

Distribution-Europe: Albania?, Bulgaria?, Macedonia?, Hungary?, Italy, Romania, Slovak Republic?, Turkey.

Chorotype: Turano-European. Type localities are Italy, Romania and Turkey.

Nesting Behaviour: unknown.

Flower Preferences: probably oligolectic on Campanulaceae (A. Müller, unpublished, based on one pollen sample).

22. *Chelostoma (Gyrodromella) hebraeum* (Benoist, 1935)

Material: Gaziantep: 30 km W, 30.V.1998, 2 ♂♂, Leg. Halada, (Müller), (Müller). Hakkari: Beytüşşebap, 1300 m, 13.VI.1984, 1 ♀, 2 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke). Kahramanmaraş: Göksu, 1450-1600 m, 18.VI.1986, 1 ♂, Leg. M. Bologna, (RMNH), (A. Müller).

Distribution: Israel and Turkey.

Chorotype: SW-Asiatic.

Nesting Behaviour: unknown.

Flower Preferences: probably oligolectic on Campanulaceae (A. Müller, unpublished, based on one pollen sample).

23. *Chelostoma (Gyrodromella) proximum* Schletterer, 1889

Material: Artvin: Ardanuç, 01.IX.1973, 3 ♀♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Ardanuç, Akarsu, 600 m, 7.VII.1994, 1 ♂, Leg. H. Özbek, (EMET), (A. Müller); Yusufeli, Altıparmak, 1100 m, 05.VII.1994, 1 ♂, Leg. E. Yıldırım, (EMET), (A. Müller); Yusufeli, Kınalıçam, 600 m, 21.V.2002, 1 ♂, Leg. H. Özbek, (EMET), (A. Müller). Erzurum: 1850 m, 20.VII.1970, 1 ♂, Leg. H. Özbek, (EMET), (A. Müller); Palandöken, 2200 m, 13.VII.1997, 1 ♂, Leg. E. Yıldırım, (EMET), (A. Müller); 2200 m, 02.VIII. 1994, 1 ♂, Leg. E. Yıldırım, (EMET), (A. Müller); Palandöken, 2300 m, 1.VII.1990, 1 ♂, Leg. I. Aslan, (EMET), (A. Müller); Çat, Çirişli Pass, S 30 km from Çat, 2000–2100 m, 12.VII.2001, 1 ♀, Leg. H. Özbek; Horasan, Aras Vadisi, 14.VI.1973, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Narman, Kireçli Mt, 02.VII.2000, 1 ♂, Leg. C. Güçlü, (EMET), (A. Müller); Oltu, 1300 m, 11.VIII.1977, 3 ♂♂, Leg. H. Özbek, (EMET), (A. Müller); Oltu, Başaklı, 1700 m, 28.VII.1992, 1 ♂, Leg. H. Özbek, (EMET), (A. Müller); Oltu, 22 km WSW, 08.VII.2007, 1 ♂, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Şenkaya, Tunalı, 1750 m, 28.VII. 1993, 2 ♀♀, 6 ♂♂, Leg. E. Yıldırım, (EMET), (Zanden); Tortum, Pehlivanlı, 1300 m, 12.VII.1992, 5 ♂♂, Leg. E. Yıldırım, (EMET), (A. Müller), Tortum, Pehlivanlı, 29.VI.1990, 1 ♂, Leg. E. Yıldırım, (EMET), (A. Müller). Kars: Sarıkamış, 20 km W, 2150 m, 4-6.VII.1985, 1 ♂, Leg. Schwarz, (OLML, Warncke), (Warncke). Rize: 1800 m, 31.VII.1983, 3 ♀♀, 2 ♂♂, Leg. Warncke, (OLML, Warncke), (Warncke); Tatos, Gaglan, 1400 m, 2 ♂♂, Leg. ?, (OLML, Warncke), (Warncke).

Distribution: Germany, Russian Federation, Ukraine; Caucasus, Northern Asia, Turkmenistan, Iran and Turkey.

Chorotype: Turano-European.

Nesting Behaviour: unknown.

Flower Preferences: probably oligolectic on Campanulaceae (A. Müller, unpublished, based on 4 pollen samples from 3 different localities).

24. *Chelostoma (Gyrodromella) rapunculi* (Lepelletier, 1841)

Material: Aksaray: Ihlara, Vadisi, 27 km SE, 38.14N, 34.18E, 18.VII.1998, 1 ♂, Leg. C. Schmid-Egger, (Schmid-Egger), (A. Müller). Ankara: 1070 m, 18.VI.2006, 1 ♀, Leg. E. Scheuchl, (Scheuchl), (A. Müller); 18°N; 32°38'11", 1113 m, 18.VI.2006, 1 ♂, Leg. E. Scheuchl, (Scheuchl), (A. Müller). Aydın: Paşayaylası, ?? 10°N; 27°54'00"E, 1151 m, 03.VI.2006, 1 ♀, 1 ♂, Leg. E. Scheuchl, (Scheuchl), (A. Müller). Bitlis: Tatvan, 30.VI.1993, 6 ♀♀, Leg. K. Denes, (OLML), (A. Müller); Tatvan, 30.VI.1993, 2 ♀♀, Leg. K. Denes, (Müller), (A. Müller); Nemrut Dağı, 15.VIII.1991, 1 ♂, Leg. Warncke, (Schwarz), (A. Müller). Bursa: 25.VI.1964, 1 ♂, Leg. Grünwaldt, (ZS München) (A. Müller). Erzincan: Refahiye, 15 km W

of Erzincan, 1600 m, 1 ♂, Leg. Halada, (Schwarz), (Müller). Erzurum: 2000 m, 06.VII.2000, 1 ♀, Leg. Halada, (Schwarz), (A. Müller); Atatürk University Campus, 1850 m, 21.VIII.1996, 1 ♂, Leg. E. Yıldırım, (EMET); (Zanden); Oltu, Çamlıbel, 1700 m, 14.VII.1996, 1 ♂, Leg. E. Yıldırım, (EMET); (Zanden). Hatay: Bademli, 6 km W Hassa, 860 m, 13.V.2002, 1 ♂, Leg. H. Özbek, (EMET), (A. Müller). Kars: Paslı, 50 km of Kars, 01.VII.1997, 1 ♂, Leg. Halada, (Schwarz), (A. Müller). Konya: Akşehir, 30 km S, 24.vi.1998, 1 ♀, 11 ♂♂, Leg. Halada, (Schwarz), (A. Müller); Akşehir, 10 km S, 25.VI.1998, 1 ♂, Leg. Halada, (Schwarz), (A. Müller). Rize: 1736 m, 02.VII.2006, 1 ♂, Leg. E. Scheuchl, (Scheuchl), (A. Müller). Van: Gevaş, 29.VI.1993, 4 ♀♀, Leg. K. Denes, (OLML), (A. Müller); Gevaş, 29.VI.1993, 4 ♀♀, Leg. K. Denes, (Müller), (A. Müller); Gevaş, 29.VI.1993, 14 ♀♀, 2 ♂♂, Leg. Halada, (Schwarz), (A. Müller); Gevaş, 29.VI.1993, 2 ♀♀, Leg. Jirousek, (Schwarz), (A. Müller). Sivas: Yarıhisar, 02.VI.1993, 1 ♀, Leg. Halada, (Schwarz), (A. Müller).

Distribution-Europe: all European countries, Algeria, Morocco. Kyrgyzstan, Kazakhstan, Mongolia, Russia Federation, Turkmenistan, Uzbekistan, Israel and Turkey. Extralimital: Nearctic (Canada, USA) [Introduced].

Chorotype: Holarctic.

Nesting Behaviour-Nesting site: preexisting cavities: insect burrows and drilled borings in dead wood or bark; hollow stems (e.g. *Phragmites*) and drilled borings in stems; glas tubes. Nesting material: Cell partitions and nest plug made of mud. Small pebbles, sand grains and other particles are embedded in the outer plug surface. Nectar is added to the mud for the construction of partitions and plug (Müller, 2010).

Flower preferences: Oligolectic *Campanula* (Campanulaceae) and possibly also on closely related genera (Amiet et al., 2004, Sedivy et al., 2008, Westrich, 1989).

Subgenus uncertain

Chelostoma ventrale was formerly treated as a member of the subgenus *Foveosmia* (Michener, 2007; Ungricht et al., 2008). However, a recent phylogenetic analysis of the genus *Chelostoma* on a worldwide scale (Sedivy et al., 2008) revealed that this species does not belong to *Foveosmia*. Its phylogenetic position could not be resolved with certainty. Depending on the analysis, the species was either sister to the subgenus *Gyrodromella* or sister to the clade *Gyrodromella*+*Chelostoma*.

25. *Chelostoma ventrale* Schletterer, 1889

Material: Adıyaman: Karadut, 50 km NE of Adıyaman, 1000 m, 01.VI.2001, 4 ♀♀, 3 ♂♂, Leg. K. Denez, (OLML), (A. Müller); Nemrut Dağı, 50 km NE of Kanta, 2-14.VI.1996, 1 ♀, Leg. P. Jelinek, (A. Müller), (A. Müller); Nemrut Dağı, 50 km NE of Kahta, 2-14.VI.1996, 2 ♀♀, Leg. P. Jelinek, (OLML), (A. Müller); Nemrut Dağı, Karadut, 02.vii.1993, 1 ♀, Leg. Ma. Halada, (Schwarz), (A. Müller). Ankara: Soğuksu, 80 km N of Ankara, 1300 m, 14.VI.2001, 2 ♂♂, Leg. K. Denez sen., (OLML), (A. Müller), Soğuksu, 80 km N of Ankara, 1300 m, 14.VI.2001, 2 ♂♂, Leg. K. Denez jun., (OLML), (A. Müller), 1190 m, 17.VI.2006, 1 ♂, Leg. E. Scheuchl, (Scheuchl) (Scheuchl). Antalya: Manavgat, 75 m, 28.IV.1998, 1 ♂, Leg. Oorschot, (Amsterdam), (A. Müller); Korkuteli, 2 km E, 900 m, 17.V.1996, 4 ♀♀, 2 ♂♂, Leg. Oistein Berg, (Oistein Berg), (Zanden); Saklıkent, 2-4 km E, 31.V.2009, 1 ♀, Leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller); Saklıkent, 6 km E, 01.VI.2009, 2 ♂♂, leg. J. Rozen, H. Özbek, J. Ascher, (AMNH), (A. Müller). Amasya: 1600 ft, 22.V.1959, ♂, Leg. Guichard, (London), (A. Müller). Artvin: Borçka, 41.08 N 42.01 E, 1 ♂, Leg. J. Rozen, H. Özbek, (AMNH), (A. Müller). Bitlis: 20 km SW, 23.VI.1997, 2 ♀♀, Leg. Ma. Halada, (Schwarz), (A. Müller); Tatvan, 30.VI.1993, 1 ♂, Leg. K. Denez, (OLML), (A. Müller); Tatvan, 30.VI.1993, 1 ♂, Leg. K. Kenez, (A. Müller), (A. Müller); Tatvan, 30.VI.1993, 2 ♀♀, 1 ♂, Leg. Ma. Halada, (Schwarz), (A. Müller). Burdur: 1150 m, 1 ♀, Leg. E. Scheuchl, (Scheuchl) (Scheuchl). Erzincan: Refahiye, 8 km N, 1700 m, 15.VII.1984, 1 ♀, Leg. A. W. Ebmer, (RMNH), (A. Müller). Hakkari: Şemdinli, 1700 m, 12.vi.1981, 1 ♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke); Uludere, 900 m, 05.VI.1977, 1 ♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Isparta: Yalvaç, Sultan Dağı, 05.VII.1993, 1 ♀, Leg. Jirousek, (Schwarz), (A. Müller). İzmir: 10 km NE, 38°20' N 28°04', 03.VII.2006, 5 ♀♀, Leg. Halada,

(OLML), (A. Müller. Karaman: Madenşehir, 23.VI.1984, 1 ♀, Leg. Warncke, (OLML, Warncke), (Warncke). Kayseri: Develi, Bakırağı, 16.VI.1998, 1 ♂, Leg. Ma. Halada, (Schwarz), (A. Müller); ????. 13° N;35°29'53", 1800 m, 20.VI.2006, 1 ♀, Leg. Scheuchl, (Scheuchl), (A. Müller). Konya: Bozkır, ca. 1200 m, 04.VI.1993, 1 ♂, Leg. Risch, (Risch), Müller; Bozkır, 26.V.1998, 1 ♂, Leg. Ma. Halada, (Schwarz), (A. Müller); Akşehir, 10 km S, 25.VI.1998, 1 ♀, 2 ♂♂, Leg. J. Halada, (Schwarz), (A. Müller). Kütahya: 30 km N, 13. VI.2000, 1 ♀, Leg. Ma. Halada, (Schwarz), (A. Müller). Malatya: 800 m, 31.V.1983, 4 ♀♀, 1 ♂, Leg. Warncke, (OLML, Warncke), (Warncke). Mersin: Mut 40 km E, Cornelek, 18. VI.1997, 1 ♀, Leg. Halada, (OLML), (A. Müller); Mut 40 km E, Cornelek, 29.V.1996, 2 ♀♀, 2 ♂♂, Leg. Halada, (Schwarz), (A. Müller); Mut 40 km E, Cornelek, 18. VI.1997, 1 ♂, Leg. Ma. Halada, (Schwarz), (A. Müller); Silifke, Uzuncaburç 30 km N of Silifke, 28.V.1996, 1 ♀, Leg. Ma. Halada, (Schwarz), (A. Müller); Kuzucabelen, 28. V.1998, 1 ♀, 3 ♂♂, Leg. Ma. Halada, (Schwarz), (A. Müller). Nevşehir: Ürgüp, 11.VI.1977, 2 ♀♀, Leg. Warncke, (OLML, Warncke), (Warncke); Ürgüp, 30 km E of Nevşehir, 1400 m, 30.V.2001, 1 ♀, 1 ♂, Leg. K. Kenez jun., (OLML), (A. Müller); Ürgüp, 30 km E of Nevşehir, 1400 m, 30.v.2001, 1 ♀, 1 ♂, Leg. K. Kenez sen., (OLML), (A. Müller); Ürgüp, Kapadokya, 13.VI.1998, 4 ♀♀, 2 ♂♂, Leg. Ma. Halada, (Schwarz), (A. Müller); Ürgüp, 10 km W, 15. VI.1998, 1 ♂, Leg. Ma. Halada, (Schwarz), (A. Müller); Göreme, 23.VI.1993, 1 ♀, 1 ♂, Leg. Jirousek, (Schwarz), (A. Müller). Osmaniye: Aslanlı Beli, 970 m, 1 ♂, 13.V.2002, Leg. H. Özbek, (EMET), (A. Müller); Hasanbeyli, 30 km S of Osmaniye, 10.vi.1998, 1 ♀, Leg. Ma. Halada, (Schwarz), (A. Müller); Hasanbeyli, 18.VI.1991, 1 ♂, Leg. Kourna, (OLML), (A. Müller). Sakarya: Karasu, 28.VI.1998, 1 ♀, Leg. J. Halada, (A. Müller), (A. Müller); Karasu, 28.vi.1998, 1 ♀, Leg. J. Halada, (Schwarz), (A. Müller) Karasu, 28. VI.1998, ♀, Leg. J. Halada, (OLML), (A. Müller). Tokat: Turhal, 5 km N, 500 m, 01.VI.1988, 1 ♀, Leg. H. Wiering, (Amsterdam), (A. Müller). Yozgat: Saraykent, 70 km E of Yozgat, 1300 m, 2 ♀♀, 4 ♂♂, Leg. K. Kenez, (OLML), (A. Müller).

Distribution: almost all European countries, Jordan, Syria, and Turkey.

Chorotype: Centralasiatic-European.

Nesting biology: unknown.

Flower preferences: Oligolectic on Asteroideae (Asteraceae) (Sedivy et al., 2008).

Faunistic and Zoogeographical Remarks and Discussion

Following chorotypes were recognized for Anatolian *Chelostoma*:

Holarctic: these chorotype is represented with two species, *Chelostoma campanularum* and *C. rapunculi*. Although *C. campanularum* has wide distribution in Europe and in Asia Continent it is present only in Ankara and Erzurum. It can be considered a rare species; only five samples have been collected so far in two provinces, Ankara and Erzurum. On the contrary of the first species, *C. rapunculi* is a widespread both in Europe and in Turkey. Both of them were introduced to USA and Canada.

European: there are six species in this chorotype; *Chelostoma emarginatum*, widespread and abundant in Europe as well as in Turkey. *C. florisomne* is very common in Europe, occurs almost all the European countries, whereas in Turkey it is not very common, only in northeren (including north of Erzurum) and central part of Anatolia materials have been collected. Its easternmost record is Erzurum Province. *C. mocsaryi* is widespread species both in Europe and in Turkey. *C. styriacum* contrary to previous species it is not a common species in Europe, so far it has been recorded from seven countries. It is very rare in Turkey; only two specimens have been collected from Ankara Province. *C. foveolatum* and *C. distinctum* are widespread species both in Europe and in Turkey. Erzurum is the easternmost records of *C. foveolatum* but *C. distinctum* reached to Iran. Species in European chorotype were most probably European origin in time they spread eastward to Anatolia.

SW-Asiatic: seven species included in this chorotype: *Chelostoma diodon* is the most common and abundant species occurring in Turkey. It is more abundant in wormer locations of the country, mostly

southern parts. *C. isabellinum*, type locality is Hakkari; additional material was collected from south-east provinces. *C. bytinskii* is not a widespread species; materials have been collected only from southeatrnr provinces, such as Hatay, Kahramanmaraş, and Gaziantep. These provinces are northernmost records of this species. *C. forcipatum*, type locality is Taurus mts, quite abundant species; materials have been collected from Gaziantep, Hatay, Kahramanmaraş, Muğla and Şırnak. *C. maidli*, type locality is Bursa; it has been recorded from Antalya, Erzurum, Hakkari, Kars and Van provinces. *C. schlettereri* is not a widespread species, recorded only in Gaziantep Province. *C. hebraeum* is not a widespread species, recorded from Gaziantep, Hakkari and Kahramanmaraş provinces. Three of these seven species have type localities in Anatolia. Species in the SW-Asiatic chorotype have a not large distribution area, actually the faunistic knowledge of these areas is not well known.

E-Mediterranean: this chorotype is represented only by one species, *Chelostoma lucens*. Type locality of this species is Taurus mts., and is not a widespread species; materials have been collected from Antalya, Diyarbakır and Mersin provinces.

Turanian: this chorotype is represented by two species, *Chelostoma garrulum* and *C. orientale*. The type locality of the first species is Anatolia (Kars) that of second one is Armenia. *Chelostoma garrulum* is quite abundant species; materials have been collected from Artvin, Bayburt, Erzurum, Hakkari, Kars, and Rize provinces. Concerning to *C. orientale* no material has been found since description (Schletterer, 1890). With present knowledge both of these species known from only Armenia and Turkey, here regarded as "Armeno -E-Anatolian endemics".

Turano-European: this chorotype is represented by two species, *Chelostoma proximum* and *C. handlirschi*. The first one has been known from northeastern part of Anatolia, Artvin, Erzurum, Kars and Rize; it is more abundant in Erzurum Province. *C. handlirschi* is one of the earliest described species; its type localities are Italy, Romania and Turkey. Since the description of the species (Schletterer, 1889) no material has been found in Anatolia.

Centralasiatic-European: This chorotype is represented by only one species, *Chelostoma ventrale*, which is widespread and abundant in Anatolia as well as in Europe.

Anatolian endemics: there are four species as Anatolian endemic, which comprises 16% of the *Chelostoma* fauna of Anatolia. *C. dolosum*, type locality is Bursa; it is a widespread species, since the time of description (Benoist, 1935) a lot of materials have been collected from Adıyaman, Antalya, Gaziantep, Hakkari, Konya and Mersin provinces. Interestingly, many *Chelostoma* specimens have been collected in eastern Anatolia, especially in Erzurum and Kars provinces; no material has been encountered belonging to *C. dolosum*. This situation reveals that this species prefers warmer localities. Type locality of *C. josefi* is Hakkari; no material has been collected since description of the species (Schwarz and Gusenleitner, 2000). *C. torquillum*, type locality is Hakkari, it is very abundant in Hakkari Province, additionally, many materials have been collected in various provinces, such as Bitlis, Kars, Kayseri and Konya, since it has been described (Warncke, 1991). *C. galeridum*, type locality is Anamur (İçel). It is not and abundant species, after description (Warncke, 1991) few materials have been collected only from Antalya and Mersin (İçel) provinces.

Of the 25 species indicated above, four are Anatolian endemics, thus conforming Anatolia as being an important center of endemic speciation.

Species in the Holarctic, European and Turano-European chorotypes (10 species) are most probably European origine and spread to Anatolia from Europe. The rest of the species in different chorotypes are probably Anatolian origen and spread from Anatolia to the neighboring countries.

With present knowledge we came to the conclusion that 25 *Chelostoma* species occurs in Turkey. Among them *C. diodon* is the most common and abundant species (about 210 specimens). *C. emarginatum*, *C. mocsaryi*, *C. foveolatum* and *C. ventrale* follow this species. The *Chelostoma* fauna of

Anatolia seems to present a relatively high diversity, if compared to the total 49 species worldwide and 40 species in Palaearctic. About 50% of the world total number known so far and more than 60% of Palaearctic are present in Anatolia. Moreover, type localities of 12 species are Anatolia or some of the type materials are from Anatolia.

From a faunistic point of view, the knowledge of the area is probably still far from being complete. Of course, there are some provinces that field trips have not been conducted or at least not in right time visited. Although *Chelostoma* species occurring in Turkey were included in eight chorotypes it has to be emphasized that incomplete and fragmentary nature of the faunistic and taxonomic knowledge, allows us to give only a preliminary rough analysis of the fauna. Moreover, it is not easy at present to correctly evaluate the distribution of the species to date considered as endemic, without a better knowledge of the fauna of adjacent areas such as, particularly, the Middle East and Caucasus.

Two early described species, *Chelostoma handlirschi* and *C. orientale* (Schletterer, 1889, 1890), the first one has type localities Italy, Romania and Turkey, the second one has type locality Armenia, since the description no material has been found in Turkey. There is a possibility that both of these species are extinct in Anatolia, because, as most of the other countries, in Turkey the destruction and loss of habitat has increased dramatically in last 30-40 years. Since 1960s I have observed that many biotops at the country were drastically modified or fully destroyed during around 50 years.

Özet

Türkiye'deki *Chelostoma* Latreille (Hymenoptera: Megachilidae, Osminii) türleri ve bunların zoocoğrafik karakterleri

1959'dan günümüze kadar 30'dan fazla profesyonel ve amatör entomoloji uzmanları veya değişik ziyaretçiler tarafından Anadolu'dan toplanan 1000 civarındaki *Chelostoma* örneği faunal ve zoocoğrafik yönden değerlendirilmiştir. Yirmibeş türün Anadolu'da bulunduğu belirlenmiş, bunlardan en yaygın ve yoğun olanının *Chelostoma diodon* Schletterer 1889 olduğu gözlenmiştir Dünyada bulunan toplam 49 ve Palearktik Bölge'deki 40 türle karşılaştırıldığında; Anadolu'nun *Chelostoma* çeşitliliği yönünden oldukça zengin olduğu görülmektedir. Zoocoğrafik analiz yönünden 25 *Chelostoma* türü değerlendirmeye alınmış ve sekiz temel korolojik kategori sıralanmıştır: Holarktik Bölge (2), Avrupa (6), GB-Asya (7), D-Akdeniz (1), Turanian (2), Turano-Avrupa (2), Merkeziyasya-Avrupa (1) ve Anadolu endemik (4). Ayrıca iki tür Armeno-D-Anadolu endemik durumundadır. Oniki türün de tip lokalitesinin Anadolu olduğu görülmüştür. Holarktik, Avrupa ve Turano-Avrupa korotiplerine giren türlerin (10 tür) büyük olasılıkla Avrupa orijinli oldukları ve oradan Anadoluya yayılmış oldukları düşünülmektedir. Değişik korotiplere ait geri kalan türlerin ise Anadolu orijinli olup buradan çevreye yayıldıkları muhtemeldir.

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