



## The faunistic studies on Vespidae species (Hymenoptera: Vespoidea) of Adana province, Turkey

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### Abstract

This study was performed with 1296 specimens of Vespidae collected from Adana province and its districts in 2017 during June and October. At the end of the study, 24 species and subspecies were collected from the subfamilies Vespinae, Polistinae and Eumeninae. *Vespa crabro* Linnaeus, 1758; *Vespula (Paravespula) vulgaris* (Linnaeus, 1758); *Polistes (Polistes) associus* Kohl, 1898; *Polistes (Polistes) biglumis* (Linnaeus, 1758); *Allodynerus floricola floricola* (de Saussure, 1853); *Eumenes pomiformis* (Fabricius, 1781); *Ancistrocerus longispinosus* (de Saussure, 1855); *Ancistrocerus parietum* (Linnaeus, 1758) and *Symmorphus (Symmorphus) gracilis* (Brullé, 1833) were reported as new records for Adana province. In this study, it is aimed to contribute to the Vespidae fauna of Adana province.

**Key words:** social wasps, systematic, Vespinae, Polistinae, Eumeninae

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## Adana ili Vespidae türleri (Hymenoptera: Vespoidea) üzerine faunistik araştırmalar

### Özet

Bu çalışma 2017 yılı Haziran - Ekim aylarında Adana il merkezi ve ilçelerinden toplanan 1296 Vespidae örneği ile gerçekleştirilmiştir. Çalışma sonunda Vespinae, Polistinae ve Eumeninae altfamilyalarından toplam 24 tür ve alttür toplanmıştır. *Vespa crabro* Linnaeus, 1758; *Vespula (Paravespula) vulgaris* (Linnaeus, 1758); *Polistes (Polistes) associus* Kohl, 1898; *Polistes (Polistes) biglumis* (Linnaeus, 1758); *Allodynerus floricola floricola* (de Saussure, 1853); *Eumenes pomiformis* (Fabricius, 1781); *Ancistrocerus longispinosus* (de Saussure, 1855); *Ancistrocerus parietum* (Linnaeus, 1758) ve *Symmorphus (Symmorphus) gracilis* (Brullé, 1833) Adana ili Hymenoptera faunası için yeni kayıttır. Bu çalışmayla Adana ili Vespidae faunasına katkı sağlanması amaçlanmıştır.

**Anahtar kelimeler:** sosyal yaban arıları, sistematik, Vespinae, Polistinae, Eumeninae

### 1. Introduction

Vespidae species are represented by 250 genera and six subfamilies, and these subfamilies are Euparagiinae, Eumeninae, Masarinae, Stenogastrinae, Polistinae and Vespinae [1]. Vespidae is organized into six extant subfamilies. Three subfamilies comprise solitary wasps: Euparagiinae, once and diverse group of which only one genus remainstoday with ten nearctic species; Masarinae, which feed on flower pollen and the highly species-rich subfamily Eumeninae, or potter wasps. The three other subfamilies are Stenogastrinae, primitively social wasps from Southeast Asia; Polistinae, or paperwasps, the most diverse group of social wasps and Vespinae, including yellow jackets and hornets [2, 3].

A total of 269 species and 32 subspecies in 53 genera of the subfamilies Vespinae, Polistinae, Eumeninae and Masarinae have been recorded from Turkey. The type localities of 73 species and 16 subspecies of this family are located in Turkey; 56 species and 11 subspecies are endemic for Turkish fauna [4, 5, 6, 7].

The Adana province, which was selected as the study area, is in the Eastern portion of Turkey's Mediterranean Region. To the south, the province is bounded a 160 km shoreline of the Mediterranean Sea. Adana province has a

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characteristically Mediterranean climate, with summers that are dry and warm, and winters that are rainy and mild. Average annual precipitation is 625 mm, while the coldest month is January, the warmest month is August. Turkey is notably rich in terms of ophiolitic rock and endemism. The ultramafic rocks are present throughout Turkey except for the eastern and south eastern part of the country. They are abundantly found in Kütahya, Balıkesir, Antalya, Muğla, Hatay and Adana regions in Amanos Mountains, in Eastern Taurus, north and northeast of Mersin and between Niğde and Adana, in Aladağ massive and thousands of kilometer square land from Adana to Erzincan. Also, they are locally distributed between Ankara and Çanakkale regions [8]. The dominant form of vegetation is maquis scrub, while terebinth, heather, phyllrea, mastic, cercis, sycamore, wild olive and oleander plants are also widely distributed in the region. Tree species such as pine, oak, fir, juniper and cedar are observed at altitudes of between 800–2000 meters, while alpine prairies dominate after the 2000-meter point.

In Turkey, comprehensive faunistic studies on the family of Vespidae are extremely limited. Tüzün and Tanyolaç [9] gave the records of the Aegean region Vespidae species and determined their distribution areas. Yıldırım and Özbek [10, 11, 12] conducted research on the species of Eastern Anatolia Vespinae and Polistinae. Yıldırım [4] also gave a list of all of Turkey according to the distribution of species and species of Vespidae geographic region.

In this study, it was aimed a systematic evaluation of the Vespidae species in order to contribute to existing knowledge on fauna, species distribution areas and biodiversity.

## 2. Materials and methods

In this study, 1296 Vespidae specimens was evaluated which were collected within the province of Adana and its districts between June and October 2017. The specimens were caught using insect nets between 09:00 AM and 06:00 PM during the day, and the captured specimens were place inside killing jars containing a mixture of potassium cyanide (KCN<sub>3</sub>) and gypsum, which were then placed in cardboard boxes together with labels indicating the location, coordinates, altitude, date of collection and the name of the collector. For each species, the characteristics of the habitat as well as certain ecological features, such as the plant sources of nutrition were noted. The specimens converted to museum material were examined based on their morphologies, color and patterns. Examinations were made using a LEICA (EZ4)-brand stereo microscope.

The control and identification of the specimens was carried out based on the methods applied in Tüzün & Tanyolaç [9], Yıldırım & Kojima [13], Yıldırım [4], Yıldırım & Gusenleitner [5] and Fateryga [14]. When noting the types of materials examined, information was provided for each species on the total number of specimens collected, the location and altitude at which they were collected, the date of collection, and the sex of the specimens. Furthermore, information was also garnered on the distribution of the relevant species in Turkey and the Palaearctic Region.

The abbreviations for regions are given as follows: AE= Aegean, BS= Black Sea, CA= Central Anatolia, EA= Eastern Anatolia, MA= Marmara, MD= Mediterranean, SA= Southeastern Anatolia Regions.

## 3. Results

### Subfamily Vespinae

Genus *Vespa* Linnaeus, 1758

*Vespa crabro* Linnaeus, 1758

**Material Examined:** Adana: Ceyhan, 212 m, 23.VII.2017, 1♀, Kozan, 371 m, 16.VIII.2017, 2♀♀, Feke, 364 m, 18.VIII.2017, 2♀♀, Yumurtalık, 14 m, 25.VIII.2017, 1♀, Ceyhan, 72 m, 26.VIII.2017, 1♀, Ceyhan, 78 m, 2.IX.2017, 1♀, Feke, 364 m, 19.IX.2017, 1♀, 2♂♂ Saimbeyli, 570 m, 20.IX.2017, 2♀♀, Aladağ, 542 m, 23.IX.2017, 3♀♀, Karaisalı, 306 m, 24.IX.2017, 2♀♀, Pozanti, 1036 m, 24.IX.2017, 4♀♀ (Totally 22 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD Regions [4].

**Distribution in the Palaearctic Region:** Europe, Russia, Iran, Caucasus, Turkmenistan, Kazakhstan, Taiwan, Mongolia, China, Japan, Korea [14].

**Remarks:** This species is new record for Adana province.

*Vespa orientalis* Linnaeus, 1771

**Material Examined:** Adana: Karataş, 13 m, 14.VI.2017, 3♀♀, Ceyhan, 33 m, 22.VI.2017, 3♀♀, Kozan, 304 m, 13.VII.2017, 6♀♀, 2♂♂, Feke, 557 m, 14.VII.2017, 7♀♀, İmamoğlu, 86 m, 18.VII.2017, 3♀♀, Sarıçam, 317 m, 19.VII.2017, 3♀♀, Yüreğir, 42 m, 24.VII.2017, 2♀♀, Yumurtalık, 20 m, 26.VII.2017, 4♀♀, Karataş, 8 m, 27.VII.2017, 6♀♀, Feke, 580 m, 14.VIII.2017, 5♀♀, Kozan, 342 m, 15.VIII.2017, 4♀♀, 2♂♂, Kozan, 371 m, 16.VIII.2017, 3♀♀, İmamoğlu, 94 m, 17.VIII.2017, 2♀♀, Saimbeyli, 884 m, 19.VIII.2017, 6♀♀, Sarıçam, 337 m, 24.VIII.2017, 3♀♀, Yumurtalık, 14 m, 25.VIII.2017, 6♀♀, 3♂♂, Çukurova, 48 m, 30.VIII.2017, 4♀♀, Seyhan, 58 m, 31.VIII.2017, 3♀♀, Ceyhan, 78 m, 2.IX.2017, 8♀♀, 4♂♂, Kozan, 371 m, 18.IX.2017, 2♀♀, 6♂♂, Feke, 364 m, 19.IX.2017, 6♀♀, Saimbeyli, 570 m, 20.IX.2017, 3♀♀, Seyhan, 326 m, 21.IX.2017, 5♀♀, Karataş, 24 m, 22.IX.2017, 4♀♀, Aladağ, 225 m, 23.IX.2017, 4♀♀, İmamoğlu, 278 m, 23.IX.2017, 3♀♀, Karaisalı, 306 m, 24.IX.2017, 8♀♀ (Totally 133 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Eastern and Southern Europe, Cyprus, Iraq, Syria, Iran, Russia, Caucasus, North Africa, Somalia, Lebanon, Jordan, Israel, Saudi Arabia, Yemen, Oman, UAE, Kazakhstan, Afghanistan, Pakistan, Central Asia [14].

**Genus *Vespula*** Thomson, 1869

***Vespula (Paravespula) germanica*** (Fabricius, 1793)

**Material Examined:** Adana: Ceyhan, 32 m, 12.VI.2017, 14♀♀, Yumurtalık, 24 m, 13.VI.2017, 6♀♀, 2♂♂, Karataş, 13 m, 14.VI.2017, 5♀♀, Karaisalı, 317 m, 15.VI.2017, 8♀♀ 3♂♂, Seyhan, 312 m, 18.VI.2017, 10♀♀, Çukurova, 27 m, 19.VI.2017, 4♀♀, Kozan, 284 m, 20.VI.2017, 7♀♀, İmamoğlu, 85 m, 21.VI.2017, 3♀♀, Ceyhan, 33 m, 22.VI.2017, 10♀♀, 5♂♂ Kozan, 316 m, 10.VII.2017, 5♀♀, Feke, 364 m, 11.VII.2017, 4♀♀, Saimbeyli, 950 m, 12.VII.2017, 5♀♀, Kozan, 304 m, 13.VII.2017, 5♀♀, Feke, 557 m, 14.VII.2017, 6♀♀, Feke, 603 m, 15.VII.2017, 4♀♀, Kozan, 356 m, 16.VII.2017, 5♀♀, Tufanbeyli, 1470 m, 17.VII.2017, 2♀♀, İmamoğlu, 86 m, 18.VII.2017, 4♀♀, Sarıçam, 312 m, 19.VII.2017, 3♀♀, Seyhan, 33 m, 20.VII.2017, 4♀♀, Çukurova, 30 m, 21.VII.2017, 3♀♀, 2♂♂, Ceyhan, 156 m, 22.VII.2017, 2♀♀, Yüreğir, 42 m, 24.VII.2017, 3♀♀, Feke, 580 m, 14.VIII.2017, 4♀♀, Kozan, 342 m, 15.VIII.2017, 5♀♀, Saimbeyli, 884 m, 19.VIII.2017, 3♀♀, Çukurova, 48 m, 30.VIII.2017, 4♀♀, 2♂♂ Seyhan, 58 m, 31.VIII.2017, 5♀♀, Ceyhan, 154 m, 1.IX.2017, 2♀♀, Ceyhan, 78 m, 2.IX.2017, 2♀♀, Ceyhan, 37 m, 3.IX.2017, 12♀♀, Saimbeyli, 570 m, 20.IX.2017, 8♀♀, 5♂♂, Seyhan, 326 m, 21.IX.2017, 3♀♀, Karataş, 24 m, 22.IX.2017, 9♀♀, Aladağ, 225 m, 23.IX.2017, 11♀♀, İmamoğlu, 278 m, 23.IX.2017, 6♀♀, Pozanti, 1036 m, 24.IX.2017, 2♀♀ (Totally 270 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Syria, Iraq, Iran, Russia, Caucasus, North Africa, Jordan, Lebanon, Israel, Afghanistan, Pakistan, Central Asia, Kazakhstan, Mongolia, Taiwan, China, Korea [14].

***Vespula (Paravespula) vulgaris*** (Linnaeus, 1758)

**Material Examined:** Adana: Kozan, 316 m, 10.VII.2017, 1♀, Feke, 557 m, 14.VII.2017, 2♀♀, Feke, 603 m, 15.VII.2017, 1♀, Tufanbeyli, 1470 m, 17.VII.2017, 3♀♀ (Totally 7 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Albania, Austria, Azerbaijan, Belarus, Belgium, Bosnia & Herzegovina, Bulgaria, Caucasus, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, India, Iran, Ireland, Israel, Italy, Japan, Kazakhstan, Krygyzstan, Korea, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxemburg, Macedonia, Moldova, Mongolia, Netherlands, Norway, Pakistan, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Syria, United Kingdom, Ukraine. [15].

**Remarks:** This species is new record for Adana province.

**Genus *Dolichovespula*** Rohwer, 1916

***Dolichovespula (Metavespula) sylvestris*** (Scopoli, 1763)

**Material Examined:** Adana: Ceyhan, 156 m, 22.VII.2017, 2♀♀, Kozan, 342 m, 15.VIII.2017, 2♀♀ (Totally 4 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Syria, Iran, North Africa, Russia, Caucasus, Afghanistan, Pakistan, Central Asia, Kazakhstan, Mongolia, China [14].

## Subfamily Polistinae

**Genus *Polistes*** Latreille, 1802

***Polistes (Polistes) associus*** Kohl, 1898

**Material Examined:** Adana: Ceyhan, 32 m, 12.VI.2017, 4♀♀, Yumurtalık, 24 m, 13.VI.2017, 6♀♀, Karataş, 13 m, 14.VI.2017, 5♀♀, Karaisalı, 317 m, 15.VI.2017, 6♀♀, Seyhan, 312 m, 18.VI.2017, 6♀♀, Kozan, 284 m, 20.VI.2017, 7♀♀, Ceyhan, 33 m, 22.VI.2017, 7♀♀, Kozan, 316 m, 10.VII.2017, 5♀♀, Feke, 364 m 11.VII.2017 7♀♀, Kozan 304 m 13.VII.2017 5♀♀, Feke 557 m 14.VII.2017 6♀♀, Feke 603 m 15.VII.2017, 4♀♀, 2♂♂, Kozan, 356 m, 16.VII.2017, 7♀♀, Ceyhan, 156 m, 22.VII.2017, 5♀♀, 2♂♂, Feke, 580 m, 14.VIII.2017, 4♀♀, Kozan, 342 m, 15.VIII.2017, 5♀♀, Saimbeyli, 884 m, 19.VIII.2017, 3♀♀, Çukurova, 48 m, 30.VIII.2017, 6♀♀, Ceyhan, 154 m, 1.IX.2017, 2♀♀, Ceyhan, 78 m, 2.IX.2017, 8♀♀, Saimbeyli, 570 m, 20.IX.2017, 5♀♀, Seyhan, 326 m, 21.IX.2017, 3♀♀, Karataş, 24 m, 22.IX.2017, 9♀♀ (Totally 129 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD Regions [4].

**Distribution in the Palaearctic Region:** Southern Europe, Israel, Azerbaijan, China [16].

**Remarks:** This species is new record for Adana province.

***Polistes (Polistes) biglumis*** (Linnaeus, 1758)

**Material Examined:** Adana: Ceyhan, 33 m, 22.VI.2017, 2♀♀, Kozan, 316 m, 10.VII.2017, 1♀, Feke, 364 m, 11.VII.2017, 1♀, Kozan, 304 m, 13.VII.2017, 1♀, 1♂ (Totally 6 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** BS, CA, EA, MA, MD Regions [4].

**Distribution in the Palaearctic Region:** Europe, Iran, Russia, Caucasus, Northern Africa, Kazakhstan [17].

**Remarks:** This species is new record for Adana province.

***Polistes (Polistes) dominula*** (Christ, 1791)

**Material Examined:** Adana: Ceyhan, 32 m, 12.VI.2017, 7♀♀, Yumurtalık, 24 m, 13.VI.2017, 6♀♀, Karataş, 13 m, 14.VI.2017, 5♀♀, Seyhan, 312 m, 18.VI.2017, 10♀♀, Çukurova, 27 m, 19.VI.2017, 4♀♀, Kozan, 284 m, 20.VI.2017, 7♀♀, İmamoğlu, 85 m, 21.VI.2017, 3♀♀, Ceyhan, 33 m, 22.VI.2017, 11♀♀, 4♂♂, Kozan, 316 m, 10.VII.2017, 5♀♀, Feke, 364 m, 11.VII.2017, 4♀♀, Kozan, 304 m, 13.VII.2017 5♀♀, Feke, 557 m, 14.VII.2017, 3♀♀, Feke, 603 m, 15.VII.2017, 4♀♀, 2♂♂, Kozan, 356 m, 16.VII.2017, 5♀♀, 2♂♂, İmamoğlu, 86 m, 18.VII.2017, 4♀♀, Sarıçam, 312 m, 19.VII.2017, 3♀♀, Seyhan, 33 m, 20.VII.2017, 4♀♀, Çukurova, 30 m, 21.VII.2017, 5♀♀, Ceyhan, 156 m, 22.VII.2017, 6♀♀, 2♂♂, Feke, 580 m, 14.VIII.2017, 5♀♀, Kozan, 342 m, 15.VIII.2017, 6♀♀, Saimbeyli, 884 m, 19.VIII.2017, 3♀♀, Çukurova, 48 m, 30.VIII.2017, 6♀♀, Ceyhan, 154 m, 1.IX.2017, 2♀♀, Ceyhan, 78 m, 2.IX.2017, 2♀♀, Saimbeyli, 570 m, 20.IX.2017, 5♀♀, 3♂♂, Seyhan, 326 m, 21.IX.2017, 3♀♀, Karataş, 24 m, 22.IX.2017, 7♀♀, 1♂, Aladağ, 225 m, 23.IX.2017, 5♀♀, İmamoğlu, 278 m, 23.IX.2017, 2♀♀ (Totally 161 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Cyprus, Syria, Iran, Russia, Caucasus, North Africa, Jordan, Israel, Afghanistan, Pakistan, Central Asia, Kazakhstan, Mongolia, China [14].

*Polistes (Polistes) gallicus* (Linnaeus, 1767)

**Material Examined:** Adana: Ceyhan, 32 m, 12.VI.2017, 14♀♀, Karaisalı, 317 m, 15.VI.2017, 11♀♀, Çukurova, 27 m, 19.VI.2017, 5♀♀, Kozan, 284 m, 20.VI.2017, 7♀♀, İmamoğlu, 85 m, 21.VI.2017, 3♀♀, Ceyhan, 33 m, 22.VI.2017, 15♀♀, 2♂♂, Kozan, 316 m, 10.VII.2017, 9♀♀, Saimbeyli, 950 m, 12.VII.2017, 5♀♀, 1♂, Kozan, 304 m, 13.VII.2017, 7♀♀, Kozan, 356 m, 16.VII.2017, 8♀♀, Tufanbeyli, 1470 m, 17.VII.2017, 3♀♀, İmamoğlu, 86 m, 18.VII.2017, 4♀♀, Sarıçam, 312 m, 19.VII.2017, 3♀♀, Seyhan, 33 m, 20.VII.2017, 4♀♀, Çukurova, 30 m, 21.VII.2017, 5♀♀, Ceyhan, 156 m, 22.VII.2017, 2♀♀, 3♂♂, Yüreğir, 42 m, 24.VII.2017, 3♀♀, Kozan, 342 m, 15.VIII.2017, 8♀♀, 2♂♂, Saimbeyli, 884 m, 19.VIII.2017, 3♀♀, Çukurova, 48 m, 30.VIII.2017, 6♀♀, 1♂, Seyhan, 58 m, 31.VIII.2017, 5♀♀, Ceyhan, 154 m, 1.IX.2017, 4♀♀, Ceyhan, 78 m, 2.IX.2017, 5♀♀, 2♂♂, Ceyhan, 37 m, 3.IX.2017, 12♀♀, Saimbeyli, 570 m, 20.IX.2017, 13♀♀, 1♂, Seyhan, 326 m, 21.IX.2017, 3♀♀, Aladağ, 225 m, 23.IX.2017, 11♀♀, İmamoğlu, 278 m, 23.IX.2017, 6♀♀, Pozantı, 1036 m, 24.IX.2017, 6♀♀ (Totally 260 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Cyprus, Iran, Russia, Caucasus, North Africa, Ethiopia, Jordan, Israel, Afghanistan, Pakistan, Turkmenistan, Mongolia, Kyrgyzstan, Kazakhstan [14].

*Polistes (Polistes) nimpha* (Christ, 1791)

**Material Examined:** Adana: Karataş, 13 m, 14.VI.2017, 2♀♀, Ceyhan, 33 m, 22.VI.2017, 6♀♀, 2♂♂, Kozan, 304 m, 13.VII.2017, 6♀♀, Feke, 557 m, 14.VII.2017, 4♀♀, İmamoğlu, 86 m, 18.VII.2017, 3♀♀, Yüreğir, 42 m, 24.VII.2017, 4♀♀, Yumurtalık, 20 m, 26.VII.2017, 4♀♀, 1♂, Karataş, 8 m, 27.VII.2017, 3♀♀, Feke, 580 m, 14.VIII.2017, 5♀♀, Kozan, 342 m, 15.VIII.2017, 6♀♀, Yumurtalık, 14 m, 25.VIII.2017, 7♀♀, Ceyhan, 78 m, 2.IX.2017, 8♀♀, 2♂♂, Kozan, 371 m, 18.IX.2017, 6♀♀, Feke, 364 m, 19.IX.2017, 6♀♀, Seyhan, 326 m, 21.IX.2017, 5♀♀, Karataş, 24 m, 22.IX.2017, 4♀♀, Aladağ, 225 m, 23.IX.2017, 4♀♀, İmamoğlu, 278 m, 23.IX.2017, 3♀♀ (Totally 91 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Iraq, Iran, Russia, Caucasus, Europe, North Africa, Jordan, Israel, Pakistan, Kyrgyzstan, Kazakhstan, Mongolia, China [14].

### Subfamily Eumeninae

**Genus** *Allodynerus* Blüthgen, 1938

*Allodynerus delphinalis* (Giraud, 1866)

**Material Examined:** Adana: Feke, 603 m, 15.VII.2017, 1♀, Ceyhan, 43 m, 28.VII.2017, 1♂, Ceyhan, 38 m, 29.VIII.2017, 1♀ (Totally 3 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD Regions [4].

**Distribution in the Palaearctic Region:** Europe, Iran, Russia, Caucasus, North Africa, Lebanon, Central Asia, Kazakhstan, China, Korea, Japan [14].

*Allodynerus floricola floricola* (de Saussure, 1853)

**Material Examined:** Adana: Feke, 364 m, 11.VII.2017, 1♀, İmamoğlu, 86 m, 18.VII.2017, 1♀, Saimbeyli, 884 m, 19.VIII.2017, 1♀ (Totally 3 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, CA, EA, MD Regions [4].

**Distribution in the Palaearctic Region:** Europe, Cyprus, Armenia, Russia (Crimea), North Africa, Jordan [14].

**Remarks:** This species is new record for Adana province.

**Genus** *Ancistrocerus* Wesmael, 1836

*Ancistrocerus auctus* (Fabricius, 1793)

**Material Examined:** Adana: Ceyhan, 212 m, 23.VII.2017, 1♀, Kozan, 342 m, 15.VIII.2017, 1♀ (Totally 2 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD Regions [4].

**Distribution in the Palaearctic Region:** Europe, Syria, Iraq, Iran, Russia, Caucasus, Jordan, Israel, Central Asia, Kazakhstan [14].

*Ancistrocerus longispinosus* (de Saussure, 1855)

**Material Examined:** Adana: Feke, 557 m, 14.VII.2017, 1♀, Tufanbeyli, 1470 m, 17.VII.2017, 1♀ (Totally 2 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** MD Region [4].

**Distribution in the Palaearctic Region:** Mediterranean areas of Europe, North-West Africa [13].

**Remarks:** This species is new record for Adana province.

*Ancistrocerus parietum* (Linnaeus, 1758)

**Material Examined:** Adana: Saimbeyli, 950 m, 12.VII.2017, 1♀, Feke, 557 m, 14.VII.2017, 1♀, Feke, 603 m, 15.VII.2017, 1♀, Tufanbeyli, 1470 m, 17.VII.2017, 1♀, Yumurtalık, 20 m, 26.VII.2017, 1♀, Feke, 580 m, 14.VIII.2017, 1♂, Kozan, 342 m, 15.VIII.2017, 1♂ (Totally 7 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Iran, Russia, Caucasus, North Africa, Central Asia, Kazakhstan, Mongolia, China, Korea [14].

**Remarks:** This species is new record for Adana province and Mediterranean Region.

**Genus** *Antepipona* de Saussure, 1855

*Antepipona orbitalis ballioni* (F. Morawitz, 1867)

**Material Examined:** Adana: Yumurtalık, 24 m, 13.VI.2017, 2♀♀, İmamoglu, 85 m, 21.VI.2017, 2♀♀, Ceyhan, 33 m, 22.VI.2017, 1♀, 1♂, Kozan, 356 m, 16.VII.2017, 2♀♀, İmamoglu, 86 m, 18.VII.2017, 2♀♀, Yüreğir, 42 m, 24.VII.2017, 2♀♀, Yumurtalık, 17 m, 25.VII.2017, 2♀♀, Ceyhan, 43 m, 28.VII.2017, 3♀♀, Kozan, 342 m, 15.VIII.2017, 3♀♀, 2♂♂, Feke, 364 m, 18.VIII.2017, 3♀♀, 1♂, Saimbeyli, 884 m, 19.VIII.2017, 6♀♀, Çukurova, 48 m, 30.VIII.2017, 2♀♀, Aladağ, 225 m, 23.IX.2017, 3♀♀ (Totally 37 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** EA, MA, MD Regions [4].

**Distribution in the Palaearctic Region:** Russia, Ukraine, Caucasus, Kazakhstan, Mongolia [14].

**Genus** *Delta* de Saussure, 1855

*Delta unguiculatum unguiculatum* (de Villers, 1789)

**Material Examined:** Adana: Ceyhan, 33 m, 22.VI.2017, 1♀, Feke, 557 m, 14.VII.2017, 1♀, Ceyhan, 156 m, 22.VII.2017, 1♂, Karataş, 8 m, 27.VII.2017, 1♀, Feke, 580 m, 14.VIII.2017, 1♂, Çukurova, 48 m, 30.VIII.2017, 1♀ (Totally 6 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Cyprus, Syria, Iran, Russia, Caucasus, North Africa, Lebanon, Israel, Saudi Arabia, Central Asia [14].

**Genus** *Eumenes* Latreille, 1802

*Eumenes coarctatus lunulatus* Fabricius, 1804

**Material Examined:** Adana: İmamoglu, 85 m, 21.VI.2017, 1♀, Ceyhan, 33 m, 22.VI.2017, 2♀♀, Kozan, 356 m, 16.VII.2017, 1♀, İmamoglu, 86 m, 18.VII.2017, 1♀, Ceyhan, 212 m, 23.VII.2017, 1♀, Yüreğir, 42 m, 24.VII.2017, 1♂, Yumurtalık, 17 m, 25.VII.2017, 1♀, Karataş, 8 m, 27.VII.2017, 1♀, 1♂ (Totally 10 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Cyprus, Syria, Iran, Russia, Caucasus, North Africa, Jordan, Israel, Central Asia, Kazakhstan, Mongolia, China, Japan [14].

*Eumenes dubius dubius* de Saussure, 1852

**Material Examined:** Adana: Saimbeyli, 950 m, 12.VII.2017, 1♀, Feke, 557 m, 14.VII.2017, 1♀, Yumurtalık, 17 m, 25.VII.2017, 1♀, Karataş, 8 m, 27.VII.2017, 1♂, Ceyhan, 43 m, 28.VII.2017, 1♀, Feke, 580 m, 14.VIII.2017, 1♀, Kozan, 342 m, 15.VIII.2017, 1♂, Kozan, 371 m, 16.VIII.2017, 1♀ (Totally 8 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Cyprus, Syria, Iraq, Iran, Russia, Caucasus, North Africa, Jordan, Lebanon, Israel, Kazakhstan, Turkmenistan, Tajikistan [18].

*Eumenes mediterraneus* Kriechbaumer, 1879

**Material Examined:** Adana: Ceyhan, 33 m, 22.VI.2017, 1♀, Yumurtalık, 17 m, 25.VII.2017, 1♀ (Totally 2 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD, SA Regions [4].

**Distribution in the Palaearctic Region:** Europe, Cyprus, Syria, Iraq, Iran, Russia, Caucasus, North Africa, Jordan, Lebanon, Israel, Saudi Arabia, Yemen, UAE, Oman, Afghanistan, Pakistan, Central Asia, Kazakhstan, Mongolia, China, Korea [14].

*Eumenes pomiformis* (Fabricius, 1781)

**Material Examined:** Adana: Karataş, 13 m, 14.VI.2017, 2♀♀, Ceyhan, 33 m, 22.VI.2017, 2♀♀, Feke, 364 m, 11.VII.2017, 2♀♀, Feke, 557 m, 14.VII.2017, 2♀♀, Kozan, 356 m, 16.VII.2017, 3♀♀, Sarıçam, 312 m, 19.VII.2017, 3♂♂, Seyhan, 33 m, 20.VII.2017, 2♀♀, Ceyhan, 212 m, 23.VII.2017, 1♀, 1♂, Feke, 364 m, 18.VIII.2017, 2♀♀,

Saimbeyli, 884 m, 19.VIII.2017, 2♀♀, Yumurtalık, 20 m, 27.VIII.2017, 1♀ (Totally 23 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD Regions [4].

**Distribution in the Palaearctic Region:** Europe, North Africa, Russia, Caucasus, Lebanon, UAE, Central Asia, Kazakhstan, China, Korea [18].

**Remarks:** This species is new record for Adana province.

**Genus** *Euodynerus* Dalla Torre, 1904

*Euodynerus (Euodynerus) dantici* (Rossi, 1790)

**Material Examined:** Adana: Feke, 364 m, 11.VII.2017, 1♀, Feke, 557 m, 14.VII.2017, 1♀, Ceyhan, 43 m, 28.VII.2017, 1♀, İmamoğlu, 94 m, 17.VIII.2017, 1♀, Saimbeyli, 903 m, 22.VIII.2017, 1♀, 1♂, Yumurtalık, 14 m, 25.VIII.2017, 1♀ (Totally 7 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, EA, MA, MD Regions [4].

**Distribution in the Palaearctic Region:** Russia, Europe, North Africa, Caucasus, Syria, Jordan, Lebanon, Israel, Iran, Afghanistan, Central Asia, Kazakhstan, Mongolia, China, Korea, Japan, Taiwan [14].

**Genus** *Rhynchium* Spinola, 1806

*Rhynchium oculatum hebraeum* Giordani Soika, 1952

**Material Examined:** Adana: Ceyhan, 32 m, 12.VI.2017, 1♀, Karataş, 13 m, 14.VI.2017, 1♀, Seyhan, 36 m, 18.VI.2017, 1♀, Kozan, 284 m, 20.VI.2017, 2♀♀, Kozan, 316 m, 10.VII.2017, 2♂♂, Feke, 364 m, 11.VII.2017, 1♀, Kozan, 304m, 13.VII.2017, 1♀, 1♂, Feke, 557m, 14.VII.2017, 2♀♀, Feke, 603 m, 15.VII.2017, 1♀, Kozan, 356 m, 16.VII.2017, 2♀♀, Sarıçam, 312 m, 19.VII.2017, 1♀, Seyhan, 33 m, 20.VII.2017, 2♀♀, Ceyhan, 156 m, 22.VII.2017, 2♀♀, Ceyhan, 212 m, 23.VII.2017, 1♀, 2♂♂, Yüreğir, 42 m, 24.VII.2017, 1♀, Yumurtalık, 17 m, 25.VII.2017, 1♀, Yumurtalık, 20 m, 26.VII.2017, 1♀, Karataş, 8 m, 27.VII.2017, 1♀, Ceyhan, 43 m, 28.VII.2017, 2♀♀, 1♂, Ceyhan, 38 m, 29.VII.2017, 5♀♀, Feke, 580 m, 14.VIII.2017, 4♀♀, Kozan, 342 m, 15.VIII.2017, 5♀♀, Kozan, 371 m, 16.VIII.2017, 2♀♀, İmamoğlu, 94 m, 17.VIII.2017, 3♀♀, Feke, 364 m, 18.VIII.2017, 3♀♀, Saimbeyli, 884 m, 19.VIII.2017, 2♀♀, Saimbeyli, 903 m, 22.VIII.2017, 4♀♀, Sarıçam, 337 m, 24.VIII.2017, 3♀♀, Yumurtalık, 14 m, 25.VIII.2017, 3♀♀, Ceyhan, 72 m, 26.VIII.2017, 4♀♀, 2♂♂ Yumurtalık, 20 m, 27.VIII.2017, 4♀♀, Karataş, 42 m, 28.VIII.2017, 3♀♀, Ceyhan, 38 m, 29.VIII.2017, 2♀♀, Çukurova, 48 m, 30.VIII.2017, 4♀♀, Seyhan, 58 m, 31.VIII.2017, 4♀♀, Ceyhan, 154 m, 1.IX.2017, 3♀♀, Ceyhan, 78 m, 2.IX.2017, 3♂♂, Kozan, 371 m, 18.IX.2017, 1♀, Karaisalı, 306 m, 24.IX.2017, 1♀, 4♂♂ (Totally 99 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, MD Regions [4].

**Distribution in the Palaearctic Region:** Mediterranean area, Jordan [16].

**Genus** *Symmorphus* Wesmael, 1836

*Symmorphus (Symmorphus) gracilis* (Brullé, 1833)

**Material Examined:** Adana: Yumurtalık, 17 m, 25.VII.2017, 1♀, Ceyhan, 43 m, 28.VII.2017, 1♀, Saimbeyli, 884 m, 19.VIII.2017, 1♀, Yumurtalık, 14 m, 25.VIII.2017, 1♂ (Totally 4 specimens, leg. Samet Eray Yalnız).

**Distribution in Turkey:** AE, BS, CA, MD Regions [4].

**Distribution in the Palaearctic Region:** Europe, Syria, Iran, Russia, Caucasus, Lebanon, Israel, Kazakhstan, Turkmenistan, Tajikistan [14].

**Remarks:** This species is new record for Adana province.

Table 1. Previously recorded Vespidae species and literatures in Adana province, Turkey

Subfamily	Species Name	Literature
Vespinae	<i>Vespa orientalis</i> (Linnaeus, 1771)	Yıldırım & Özbek, 1999
	<i>Vespula (Paravespula) germanica</i> (Fabricius, 1793)	Yıldırım & Özbek, 1992
	<i>Dolichovespula (Metavespula) sylvestris</i> (Scopoli, 1763)	Yıldırım & Özbek, 1999
Polistinae	<i>Polistes (Polistes) dominula</i> (Christ, 1791)	Yıldırım & Özbek, 1999
	<i>Polistes (Polistes) gallicus</i> (Linnaeus, 1767)	Yıldırım & Özbek, 1999
	<i>Polistes (Polistes) nimpha</i> (Christ, 1791)	Yıldırım & Özbek, 1999
Eumeninae	<i>Allodynerus delphinalis</i> (Giraud, 1866)	Giordani Soika, 1970
	<i>Ancistrocerus auctus</i> (Fabricius, 1793)	Yıldırım & Özbek, 1996
	<i>Antepipona orbitalis ballioni</i> (F. Morawitz, 1867)	Yıldırım & Gusenleitner, 2012
	<i>Delta unguiculatum unguiculatum</i> (de Villers, 1789)	Giordani Soika, 1970
	<i>Eumenes coarctatus lunulatus</i> Fabricius, 1804	Yıldırım & Gusenleitner, 2012
	<i>Eumenes dubius dubius</i> de Saussure, 1852	Yıldırım & Kojima, 1999
	<i>Eumenes mediterraneus</i> Kriechbaumer, 1879	Yıldırım & Kojima, 1999
	<i>Euodynerus (Euodynerus) dantici</i> (Rossi, 1790)	Giordani Soika, 1970
	<i>Rhynchium oculatum hebraeum</i> Giordani Soika, 1952	Giordani Soika, 1970

#### 4. Conclusions and discussion

This is the first such comprehensive study of its kind to be conducted in the Adana province. The 1296 specimens collected during the study were subjected to faunistic, systematic and ecologic evaluation, and a total of 24 species were identified that belonged to the Vespinae, Polistinae and Eumeninae subfamilies of the Vespidae family.

A phenological evaluation of the collected specimens revealed that specimen density was lowest in the month of June and highest in the months of July and August due to the low-precipitation in humid Mediterranean climate. Since Vespinae and Eumeninae species generally prefer warm and moderately humid environments, they had the longest period of activity between the months of June and October. Polistinae species are generally found in warmer and more arid environments, for this reason, they tend to be more active from June to August. The Vespinae and Polistinae species were observed to have the highest species diversity and population density in the month of July. The field studies also revealed a higher prevalence of female individuals, indicating that the females engaged in flight more often than males. While Vespidae species are generally encountered at altitudes of between 8–1470 meters, the highest frequency of specimens was observed between 212 and 980 meters. These species generally prefer plants that are 1.5–2.0 meters from the ground, such as *Malus sylvestris*, *Echinops* sp., *Morus* sp., *Tamarix* sp., *Helianthus* sp., *Prunus* sp., *Polygonum* sp., *Rubus* sp., *Vitis vinifera*, *Mentha* sp. and *Astragalus* sp. Samples were also collected from *Quercus* sp. and *Pinus* sp.

Based on the study results, the following nine species of the Hymenoptera fauna were recorded for the first time in the province of Adana: *Vespa crabro* Linnaeus, 1758 and *Vespula (Paravespula) vulgaris* (Linnaeus, 1758) from the Vespinae subfamily; *Polistes (Polistes) biglumis* (Linnaeus, 1758) and *Polistes (Polistes) associus* Kohl, 1898 from the Polistinae subfamily and *Allodynerus floricola floricola* (de Saussure, 1853), *Ancistrocerus longispinosus* (de Saussure, 1855), *Ancistrocerus parietum* (Linnaeus, 1758), *Eumenes pomiformis* (Fabricius, 1781) and *Symmorphus (Symmorphus) gracilis* (Brullé, 1833) from the Eumeninae subfamily. *Ancistrocerus parietum* (Linnaeus, 1758) constitutes a newly identified record for Turkey's Mediterranean Region.

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