



New distribution records of the family Gasteruptionidae (Hymenoptera, Evaniidae) in Iran

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ABSTRACT. We provide new findings on the distribution of 13 species of the family Gasteruptionidae (Hymenoptera, Evaniidae) collected at 17 sampling localities in Fars and Hormozgan Provinces, south of Iran. The specimens were collected using Malaise traps during 2013–2019. Two species, *Gasteruption sericeipes* Kieffer, 1911 and *G. syriacum* Szépligeti, 1903 are new additions to the Iranian wasp fauna. Furthermore, 10 species are new provincial records. With the present additions, the total number of gasteruptionids recorded from Hormozgan, Fars and Iran is currently raised to 2, 14 and 29 species, respectively. For each species, provincial distribution in Iran and overall distribution, as well as the flight period, are presented and discussed together with the available references.

Key words: New record, Malaise trap, Palaearctic region, fauna, carrot wasp, Iran

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Introduction

The family Gasteruptionidae currently includes more than 500 species placed in two subfamilies: Gasteruptioninae (four genera) (Macedo, 2009, 2011; Zhao et al., 2012; Tan et al., 2016) and Hyptiogastrinae (two genera) (Jennings & Austin, 2002). In the Palaearctic region, all known gasteruptionids belong to Gasteruptioninae and the genus *Gasteruption* Latreille, 1796 (van Achterberg & Talebi, 2014; Tan et al., 2021). Biologically, adult gasteruptionids can be found on flowers and may feed on nectar or both nectar and pollen (Jennings & Austin, 2004), while the larvae are known as secondary cleptoparasites on food stored by solitary bees, after consuming the egg or larva of the bee (Zhao et al. 2012; van Achterberg, 2013; Parslow et al., 2020; Tan et al., 2021).

Historically, the first study on gasteruptionids in Iran dates back to about 129 years ago when *Gasteruption pedemontanum* (Tournier, 1877) [now *G. caucasicum* (Guérin-Méneville, 1844)] was recorded from Astrabad [now Gorgan, Golestan Province] in northern Iran

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(Semenow, 1892). Subsequent contributions increased the number of reported species from the country to seven valid species (Hedwig, 1957; Tirgari, 1975; Samin & Bagriacik, 2012). Recently, van Achterberg & Talebi (2014), in a revision of the Iranian and Turkish *Gasteruption*, reviewed all previous reports, described 15 species from Iran and Turkey, and finally catalogued 23 species from Iran. This monograph is the basic reference for identification of *Gasteruption* species of Iran. Furthermore, Lotfalizadeh et al. (2017) included four other species and listed 27 species of *Gasteruption* from the country. More recently, van Achterberg (2019b) listed from Iran *G. zarudnyi* Semenov-Tian-Shanskij & Kostylev, 1928, a senior synonym of *G. phragmiticola* Saure, 2006.

Currently, most of the published studies on the Iranian gasteruptionid fauna are from northern provinces and none of the studies focused specifically on southern regions of the country. Only four *Gasteruption* species were hitherto known from Fars Province (van Achterberg & Talebi, 2014; Ceccolini, 2016; Lotfalizadeh et al., 2017), whereas no Gasteruptionidae have been recorded from Hormozgan Province. The purpose of this paper is to add to our knowledge of the gasteruptionid wasp fauna from southern Iran.

Material and methods

The specimens were collected using Malaise traps at 17 sampling sites with four elevation levels in different habitats at Fars and Hormozgan Provinces, in southern Iran during 2013–2019. The altitude and climatic characteristics of the sampling sites are: First, about 2000 meters above the sea level (Dasht-e Arzhan: mountainous area with moderate cold winters and mild summers), Secondly, about 1300–1700 meters above the sea level (Dodej, Farough, Estahban, Kherameh (three sites), Shiraz, Maharloo and Fasa (three sites): relatively rainy mild winters, and hot dry summers), thirdly, about 800 meters above the sea level (Kazeroon (two sites) and Larestan (two sites): hot semi-arid climate), and fourthly, about 200 meters above the sea level (Sar Kahnan: hot desert climate). For the identification, van Achterberg & Talebi (2014) and Saure et al. (2017) were used, along with information on the type series of previously described species gathered by the third author. Identifications were confirmed by the third author. The terminology of Zhao et al. (2012) and van Achterberg & Talebi (2014) is followed. The voucher specimens are deposited at the Insect Collection of Jahrom Branch, Islamic Azad University, Iran (JIAU) and the Institute of Biodiversity and Ecosystem Research, Sofia, Bulgaria (IBER). The photos were taken using a Zeiss AxioCam ERc 5s with three light sources with a halogen lamp (manual) mounted on stereomicroscope Zeiss Stemi-2000C. Digital images obtained were processed and edited with Adobe Photoshop CS6.

Results

A total of 13 *Gasteruption* species were collected from different regions of Fars and Hormozgan Provinces. The list of species and their distributional data are given as below:

Gasteruption Latreille, 1796

Gasteruption aff. *aciculatum* van Achterberg, 2014

Material examined: 1♂: IRAN, Fars, Maharloo, Posht Par (29°19'08.0" N, 52°51'07.0" E), 1480 m a.s.l., almond orchard, *Prunus dulcis* (Mill.) (Rosaceae), 22.IX.2015, leg. M. Sadeghi.

Remark: *Gasteruption aciculatum* was described from a single female collected in Turkey (van Achterberg & Talebi, 2014), and has not been reported thereafter. The available male probably is *G. aciculatum* but more specimens are needed to ascertain the species status.

Gasteruption coriacoxale van Achterberg, 2014

Material examined: 1♀: IRAN, Fars, Kherameh, Char Tag (29°30'42.0" N, 53°18'55.0" E), 1588 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 12.VI.2013, leg. E. Izadi.

Distribution in Iran: Alborz, Fars, Qazvin, Tehran (van Achterberg & Talebi, 2014), East Azarbaijan (Lotfalizadeh et al., 2017).

General distribution: This species was recently described from various localities in Iran and Turkey (van Achterberg & Talebi, 2017).

Remark: According to Özbek & van Achterberg (2020), *G. coriacoxale* prefers a continental climate at 1000–2000 m a.s.l. The present record of *G. coriacoxale* from Fars Province and previous records from other parts of Iran (van Achterberg & Talebi, 2014; Lotfalizadeh et al., 2017) are in these altitude ranges.

Gasteruption aff. *corniculigerum* Enderlein, 1913

Material examined: 1♀, IRAN, Fars: Kherameh, Posht Par (29°19'08.0" N, 52°51'07.0" E), 1480 m a.s.l., almond orchard, *Prunus dulcis* (Mill.) (Rosaceae), 12.VI.2013, leg. M. Sadeghi; 1♀, 19.VI.2013; 1♂, 25.VI.2013; 1♀, Fars: Larestan (27°31'55.04" N, 54°26'01.36" E), 820, m .a.s.l., *Eucalyptus* plantation (Myrtaceae), 05.V.2013, leg. A. Falahatpisheh; 1♀, Fasa (28°54'47.0" N, 53°39'25.0" E), 1348 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), leg. S. Azadi; 1.IV.2013; 1♂ Kherameh (29°30'42.0" N, 53°18'55.0" E), 1588 m a.s.l., pomegranate orchard, *P. granatum*, 15.VI.2013, leg. E. Izadi; 2♂♂, 31.V.2013.

Remark: *Gasteruption corniculigerum* is known from the Oriental and Palaeartic parts of China (Zhao et al., 2012; Tan et al., 2021). The species is identified as *G. aff. corniculigerum* because the ovipositor sheath is damaged in our females and males are in poor condition.

Gasteruption diversipes (Abeille de Perrin, 1879)

Material examined: 2♂♂, IRAN, Fars: Kazeroon (29°40'12.0" N, 51°35'35.0" E), 831 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 12.XI.2015, leg. M. Sadeghi.

Distribution in Iran: West Azarbaijan (Samin & Bagriacik, 2012), Fars (new record).

General distribution: This Western Palaeartic species is known from most of Europe, more numerous and widespread in the south of the continent (Austria, Belgium, Bosnia and Hercegovina, Bulgaria, Croatia, Czech Republic, Finland, France + Corsica, Germany, Greece + Crete, Hungary, Italy + Sardinia and Sicily, Macedonia, Montenegro, Netherlands, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland) and also recorded from Iran and Turkey (van Achterberg & Talebi, 2014; van Achterberg, 2019a, 2019b; Wiśniowski, 2020; Bogusch, 2021).

Remark: This species was recorded from plants of the family Apiaceae (Wall 1994; Bogusch, 2021), while we collected it with a Malaise trap from a pomegranate orchard (family Lythraceae).

***Gasteruption aff. diversipes* (Abeille de Perrin, 1879)**

Material examined: 1♂, IRAN, Fars: Kherameh (29°30'51.0" N, 53°18'40.0" E), 1595 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 18.V.2013, leg. E. Izadi; 1♂, 24.VI.2013; 1♀, 1♂ Kherameh (29°28'44.0" N, 53°20'21.0" E), 1594 m a.s.l., pomegranate orchard, *P. granatum*, 2.VI.2013, leg. E. Izadi, 1♂, 1♀, Larestan (27°31'55.04" N, 54°26'01.36" E), 820 m a.s.l., *Eucalyptus* plantation (Myrtaceae), 11.VII.2013, leg. A. Falahatpisheh.

Remark: The species is identified as *G. aff. diversipes* because the ovipositor sheath was damaged in the females and male specimens were also in poor condition.

***Gasteruption dolichoderum* Schletterer, 1889**

Material examined: 1♀, IRAN, Hormozgan: Sar Kahnan (27°24'55.0"BN, 57°07'37.0"BE), 215 m a.s.l., mixed lime and mango garden, 4.VI.2013, leg. T. Tavakoli; 1♀, 1.VII.2013; 2♂♂, 10.IX.2013; 1♂, 29.X.2013; 1♀, Fars: Estahban, Gordeh (29°09'53.0" N, 53°52'56.0" E), 1659 m a.s.l., fig garden, *Ficus carica* L. (Moraceae), 21.VII.2015, leg. M. Sadeghi; 1♂, Kazeroon, Zavali (29°32'53.0" N, 51°46'23.0" E), 829 m a.s.l., alfalfa field, *Medicago sativa* L. (Fabaceae), 27.V.2016, leg. M. Sadeghi.

Distribution in Iran: Alborz, Kerman, Tehran ([van Achterberg & Talebi, 2014](#)), Fars, Hormozgan (**new record**).

General distribution: *Gasteruption dolichoderum* is distributed in the Palaearctic (Greece + Crete and Rhodes, Morocco, Turkey, Syria, Jordan, Iran, Israel, Russia, Turkmenistan, Tajikistan, Uzbekistan) and Oriental regions (India) ([van Achterberg & Talebi, 2014](#); [van Achterberg, 2019a](#)).

Remark: The present record of *G. dolichoderum* from southern Iran and previous record from the north of the country ([van Achterberg & Talebi, 2014](#)) show the wide distribution of this species on the Iranian plateau at different altitudes and habitats.

***Gasteruption heminitidum* van Achterberg, 2014**

Material examined: 1♂, IRAN, Fars: Estahban, Gordeh (29°09'53.0" N, 53°52'56.0" E), 1659 m a.s.l., fig garden, *Ficus carica* L. (Moraceae), 21.VII.2015, leg. M. Sadeghi.

Distribution in Iran: Alborz, Qazvin, Tehran ([van Achterberg & Talebi, 2014](#)), Fars (**new record**).

General distribution: This species was recently described from northern provinces of Iran ([van Achterberg & Talebi, 2014](#)). Currently, it is an endemic of Iran.

***Gasteruption henseni* van Achterberg, 2014**

Material examined: 1♂, IRAN, Hormozgan: Sar Kahnan (27°24'55.0" N, 57°07'37.0" E), 215 m a.s.l., mixed lime and mango garden, 29.X.2013, leg. T. Tavakoli.

Distribution in Iran: East Azarbaijan ([Lotfalizadeh et al., 2017](#)), Hormozgan (**new record**).

General distribution: This species was originally described from Turkey ([van Achterberg & Talebi, 2014](#)) and subsequently recorded from Iran ([Lotfalizadeh et al., 2017](#)).

Remark: According to [Özbek & van Achterberg \(2020\)](#), *G. henseni* is a species from mountainous habitats between 1700–2200 m a.s.l., whereas we collected it at 215 m a.s.l. Occurrence of this species in Hormozgan with hot desert climate compared to other reports

from Irano-Anatolian region (van Achterberg & Talebi, 2014; Lotfalizadeh et al., 2017; Özbek & van Achterberg, 2020) with much higher altitude and different climates reveals the further spread of this species in other climatic zones.

Gasteruption minutum (Tournier, 1877)

Material examined: 2♂♂ IRAN, Fars: Fasa (28°53'06.0" N, 53°40'36.0" E), 1311 m a.s.l., alfalfa field, *Medicago sativa* L. (Fabaceae), 30.V.2013, leg. S. Azadi; 1♂, Fasa (28°54'47.0" N, 53°39'25.0" E), 1348 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 2.VI.2013, leg. S. Azadi; 1♂, Kherameh (29°30'51.0" N, 53°18'40.0" E), 1595 m a.s.l., pomegranate orchard, *P. granatum*, 18.V.2013, leg. E. Izadi.

Distribution in Iran: Isfahan, Kerman (van Achterberg & Talebi, 2014), East Azarbaijan and West Azarbaijan (Lotfalizadeh et al., 2017).

General distribution: This Palaearctic species occurs in Europe (Austria, Belgium, Croatia, Czech Republic, France, Germany, Greece, Italy + Sicily, Montenegro, Poland, Portugal, Russia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom) and Asia (Iran, Turkey, Kyrgyzstan, Kazakhstan, Mongolia, China) (van Achterberg & Talebi, 2014; van Achterberg, 2019a, 2019b; Wiśniowski, 2020; Bogusch, 2021).

Remark: Adults of this species visit flowers of plant families Apiaceae, Asteraceae and Saxifragaceae (Wall 1994; Bogusch, 2021), whereas we collected it with Malaise traps from pomegranate orchards (family Lythraceae) and alfalfa field (family Fabaceae).

Gasteruption opacum (Tournier, 1877)

Material examined: 1♀, IRAN, Fars: Kherameh, Char Tag (29°30'42.0" N, 53°18'55.0" E), 1588 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 27.V.2013, leg. E. Izadi; 1♂, 12.VI.2013; 1♂, 25.VI.2013; 1♂, 3♀♀, 12.VI.2013; 2♀♀, Kherameh (29°30'51.0" N, 53°18'40.0" E), 1595 m a.s.l., pomegranate orchard, *P. granatum*, 18.V.2013, leg. E. Izadi; 1♂, 31.V.2013; 1♀, 24.VI.2013.

Distribution in Iran: Alborz, North Khorasan, Tehran (van Achterberg & Talebi, 2014), East Azarbaijan, West Azarbaijan (Lotfalizadeh et al., 2017), Fars (new record).

General distribution: *Gasteruption opacum* is mainly a Euro-Mediterranean species occurring in most of Europe, with most finds from south and central Europe (Austria, Belgium, Bulgaria, Croatia, Czech Republic, France + Corsica, Germany, Greece + Carpathos and Crete, Hungary, Italy + Sardinia and Sicily, Montenegro, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Ukraine) (van Achterberg & Talebi, 2014; van Achterberg, 2019a, 2019b; Wiśniowski, 2020; Bogusch, 2021). It was also recorded from Iran, Syria and Turkey as well as Tunisia (van Achterberg & Talebi 2014; Bogusch, 2021).

Gasteruption schmideggeri van Achterberg & Saure, 2014

Material examined: 3♂♂, IRAN, Fars: Larestan, Karamostaj (27°31'55.0" N, 54°26'01.0" E), 810 m a.s.l., alfalfa field, *Medicago sativa* L. (Fabaceae), 20.V.2015, leg. Sh. Rezaei.

Distribution in Iran: Qazvin (van Achterberg & Talebi, 2014), Fars (new record).

General distribution: This eastern Mediterranean species has been recorded from Greece and the Middle East (Iran, Jordan, Syria and Turkey) (van Achterberg & Talebi, 2014; Özbek & van Achterberg, 2020).

Remark: This species was recorded from up to 2200 m a.s.l. at different habitats in Turkey (Özbek & van Achterberg, 2020), while we found it from a much lower altitude and in a hot semi-arid area.

Gasteruption sericeipes Kieffer, 1911 (Figs 1-2)

Material examined: 2♂♂, IRAN, Fars: Dasht-e Arzhan (29°39'39.0" N, 51°59'03.0" E), 2152 m a.s.l., peach garden, *Prunus persica* (L.) (Rosaceae), 28.VI.2019, leg. Sh. Rezaei; 1♀, Shiraz, Bustan-e Jannat (29°36'52.0" N, 52°28'09.0" E), 1584 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 31.VIII.2019, leg. Sh. Rezaei; 1♀, 25.VI.2019.

Distribution in Iran: Fars (new record).

General distribution: Recorded from Pakistan and United Arab Emirates (Saure et al., 2017).

Diagnosis: The species is only defined by the key characters given by Saure et al. (2017). In the female the apical pale part of the ovipositor sheath is short, 0.2–0.3 × as long as the hind basitarsus; similar as in the North African *G. saharense* Benoit, 1984, but *G. sericeipes* has the hind basitarsus of the female partly ivory and rather slender (entirely brown and rather stout in *G. saharense*), the propodeum and the hind coxa are dark brown or black (orange-brown) and the lateral lobe of the mesoscutum has a satin sheen (rather shiny).

Remark: Iran represents the northwestern limit of this species distribution. Diagnosis, description and morphological variation of this species are provided by Saure et al. (2017).

Gasteruption syriacum Szépligeti, 1903 (Figs 3-4)

Material examined: ♀, IRAN, Fars: Kherameh, Char Tag (29°30'42.0" N, 53°18'55.0" E), 1588 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 12.VI.2013, leg. E. Izadi; 1♂, 25.VI.2013; 1♀, Kherameh (29°30'51.0" N, 53°18'40.0" E), 1595 m a.s.l., pomegranate orchard, *P. granatum*, 15.VI.2013, leg. E. Izadi; 1♂, 24.VI.2013; 1♂, 25.VI.2013; 1♂, Shiraz, Bustan-e Jannat (29°36'52.0"N, 52°28'09.0"E), 1584 m a.s.l., pomegranate orchard, *P. granatum*, 2.VI.2014,



Figures 1-2. *Gasteruption sericeipes* Kieffer, 1911, 1. Female; 2. Male.

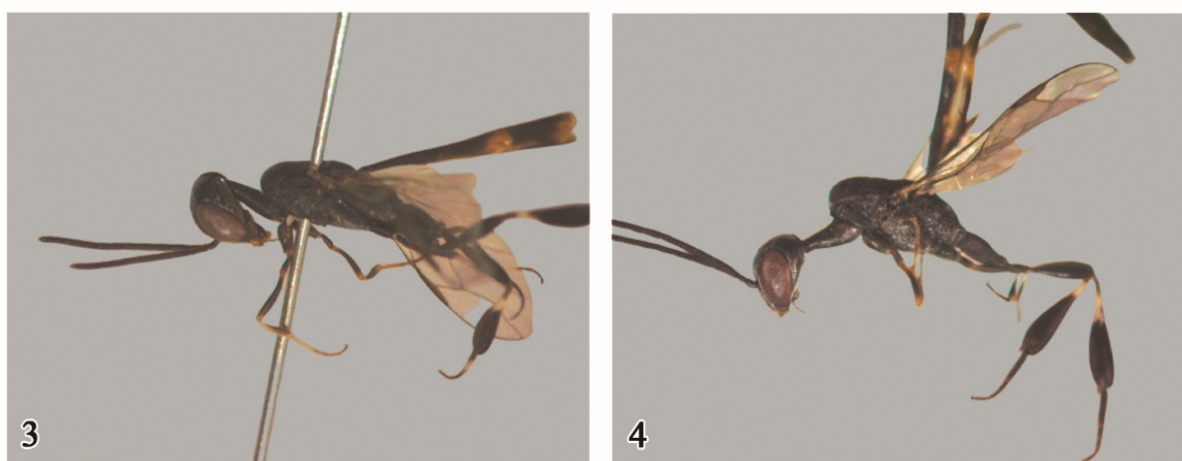
leg. Sh. Rezaei; 1♂, 11.VII.2014; 2♂♂, 13.V.2014; 1♀, 8.VIII.2014; 1♂, 2.VII.2019; 1♀, Estahban, Gordeh (29°09'53.0" N, 53°52'56.0" E), 1659 m a.s.l., fig garden, *Ficus carica* L. (Moraceae), 8.VIII.2015, leg. M. Sadeghi; 1♀, Faroogh (29°58'06.0" N, 53°02'56.0" E), 1675 m a.s.l., grape garden, *Vitis vinifera* L. (Vitaceae), 19.IV.2013, leg. F. Farzaneh; 1♀, Maharloo, Posht Par (29°19'08.0" N, 52°51'07.0" E), 1480 m a.s.l., almond orchard, *Prunus dulcis* (Mill.) (Rosaceae), 22.IX.2015, leg. M. Sadeghi; 2♂♂, Dasht-e Arzhan (29°39'39.0" N, 51°59'03.0" E), 2152 m a.s.l., peach garden, *Prunus persica* (L.) (Rosaceae), 20.VI.2019, leg. Sh. Rezaei.

Distribution in Iran: Iran: Fars (new record).

General distribution: *Gasteruption syriacum* is a Mediterranean species occurring in southeastern Europe (Serbia and some other countries of the southern and eastern Balkans) (see Žikić et al., 2014) and the Middle East (Cyprus, Lebanon, Syria and Turkey) (van Achterberg & Talebi, 2014; Özbek & van Achterberg, 2020).

Diagnosis: Diagnosis and synonymy of this species are provided by van Achterberg & Talebi (2014). Apex of ovipositor sheath with distinct white or ivory band, 2–3 × as long as hind basitarsus; head flat in front of occipital carina, without any depression; antesternal carina narrow and hardly lamelliform; temple nearly straight in dorsal view, directly narrowed behind eye; vertex and frons rather shiny, at least with satin sheen and very finely and densely punctulate; propleuron elongate, 0.9–1.1 × as long as distance between tegula and anterior border of mesoscutum, resulting in a long neck; mesoscutum with separate punctures; mesoscutum medio-posteriorly densely punctate or more or less rugulose; hind basitarsus often with ivory band, but band sometimes absent; mandible and ventral part of clypeus orange-brown. In male third antennal segment 1.3–1.5 × as long as second segment, and fourth antennal segment 2–3 × as long as third segment and 1.3 × as long as second and third segments combined.

Remark: *Gasteruption syriacum* was recorded from up to 2200 m a.s.l. at different habitats in Turkey (Özbek & van Achterberg, 2020). We collected it with Malaise traps from different plant families (Lythraceae, Moraceae, Rosaceae and Vitaceae) at the heights between about 1500 to 2150 m a.s.l.



Figures 3–4. *Gasteruption syriacum* Szépliget, 1903, **3.** Female; **4.** Male.

***Gasteruption tournieri* Schletterer, 1885**

Material examined: 1♂, IRAN, Fars: Faroogh (29°58'06.0" N, 53°02'56.0" E), 1675 m a.s.l., grape garden, *Vitis vinifera* L. (Vitaceae), 19.IV.2013, leg. F. Farzaneh.

Distribution in Iran: Iran: East Azarbaijan (Samin & Bagriacik 2012), Fars (**new record**).

General distribution: This Palaearctic species is known from most of Europe (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, France + Corsica, Greece, Germany, Hungary, Italy + Sardinia and Sicily, Macedonia, Moldova, Montenegro, Netherlands, Poland, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland, Ukraine, doubtfully in the United Kingdom), the Middle East (Iran, Israel, Jordan, Syria and Turkey), and Central Asia (Tajikistan) (van Achterberg & Talebi 2014; van Achterberg, 2019a; Wiśniowski, 2020; Bogusch, 2021).

Remark: Adults of this species visit flowers of Apiaceae Asteraceae and Rhamnaceae (Wall 1994; Bogusch, 2021), whilst we collected it with Malaise trap from a grape garden (family Vitaceae). It prefers warm, dry and steppe-like areas (Özbek & van Achterberg, 2020; Bogusch, 2021).

***Gasteruption undulatum* (Abeille de Perrin, 1879)**

Material examined: 2♂♂, IRAN, Fars: Bustan-e Jannat (29°36'52.0" N, 52°28'09.0" E), 1584 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 2.VI.2014, leg. Sh. Rezaei.

Distribution in Iran: Iran: East Azarbaijan (Lotfalizadeh et al., 2017), Guilan (Samin & Farzaneh, 2016), Fars (**new record**).

General distribution: *Gasteruption undulatum* is a Western Palaearctic species which occurs in most of Europe, especially widespread in central and southern Europe (Austria, Belgium, Bulgaria, Croatia, Czech Republic, Finland, France + Corsica, Germany, Greece, Hungary, Italy + Sardinia, Netherlands, Poland, Portugal, Serbia, Slovakia, Spain, Switzerland, Ukraine) and also in Algeria, Iran, Turkey, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan (van Achterberg & Talebi, 2014; Lotfalizadeh et al., 2017; van Achterberg, 2019a; Wiśniowski 2020; Bogusch, 2021).

Remark: Adults of the species visit flowers of Apiaceae and Fabaceae (Wall, 1994; Bogusch, 2021), whereas we collected it with Malaise trap from a pomegranate orchard (family Lythraceae). This species is restricted to warmer regions of Czech Republic and Slovakia (Bogusch, 2021) and prefers warm and dry habitats in steppes and open areas with continental climate at altitudes from 150 to 1200 m in Turkey (Özbek & van Achterberg, 2020). We also found it in a similar area with relatively rainy mild winters and hot dry summers, at an altitude of about 1500 m a.s.l.

***Gasteruption zarudnyi* Semenov-Tian-Shanskij & Kostylev, 1928**

Material examined: 1♀, IRAN, Fars: Fasa (28°54'29.0" N, 53°39'35.0" E), 1343 m a.s.l., pomegranate orchard, *Punica granatum* L. (Lythraceae), 13.VI.2013, leg. S. Azadi; 1♂ Kherameh, Dodej (29°34'23.0" N, 52°59'42.0" E), 1675 m a.s.l., pistachio orchard, *Pistacia vera* L. (Anacardiaceae), 26.VII.2015, leg. M. Sadeghi.

Distribution in Iran: Iran: Fars (van Achterberg & Talebi 2014 as *G. phragmiticola* Saure, 2006).

General distribution: This Western Palaearctic species is known from central and south Europe (Czech Republic, Germany, Greece, Hungary, Russia, Slovakia) as well as Turkey, Iran and Afghanistan (Saure, 2006; van Achterberg & Talebi 2014; van Achterberg, 2019a, 2019b).

Discussion

Prior to our study, only four gasteruptiid species i.e. *G. coriacoale* van Achterberg, 2014, *G. hastator* (Fabricius, 1804), *G. schlettereri* Magretti, 1890 and *G. zarudnyi* Semenov-Tian-Shanskij & Kostylev, 1928 (as *G. phragmiticola* Saure, 2006) were documented from Fars Province, southern Iran (van Achterberg & Talebi, 2014; Ceccolini, 2016; Lotfalizadeh et al., 2017), whilst no Gasteruptiidae was previously recorded from Hormozgan Province. In the current study, two species, *G. sericeipes* and *G. syriacum* are added to the Iranian wasp fauna. In addition, 10 species (i.e. *G. diversipes*, *G. dolichoderum*, *G. heminitidum*, *G. minutum*, *G. opacum*, *G. schmideggeri*, *G. sericeipes*, *G. syriacum*, *G. tournieri*, and *G. undulatum*) in Fars Province and two species (i.e. *G. henseni* and *G. dolichoderum*) in Hormozgan Province are new provincial records. Therefore, their presence in southern Iran extends the known distribution of these species in the Iranian plateau. The results of the present study and several recent papers of gasteruptiids have increased the recorded species to 2, 14 and 29 in Hormozgan, Fars and Iran, respectively. It seems the fauna of gasteruptiid wasps in the Fars Province is rich and diverse, since nearly half of the known Iranian species (14 species, 48%) have been reported from this area. So far, 70, 30, 36 and 29 species of *Gasteruption* have been reported in the Palearctic region, Europe, Turkey and Russia, respectively (van Achterberg & Talebi, 2014; van Achterberg, 2019a, 2019b, Özbek & van Achterberg, 2020; Bogusch, 2021). While comparing these numbers with that of species reported from Iran, which is a large country with various geographical regions and great variety of habitats, and the fact that many parts of Iran have not been sampled, it is likely that additional species will be discovered. Based on our findings from capturing with Malaise traps, the adult flight activity of gasteruptiid wasps in Fars and Hormozgan Provinces, is relatively long and starts in April and continues until November. The long flight period of these wasps, especially in the Fars Province, is probably due to the great diversity of climate, altitude and habitat of this area. The adult flight periods of the current known *Gasteruption* species are summarized in Table 1. Although there are differences in the flight periods and the time of their capture, most of them were trapped in the second half of May to the end of June.

Gasteruption diversipes was previously collected in July to September (van Achterberg & Talebi, 2014), while we collected it at November in a hot semi-arid area. We also found *G. henseni* at the second half of October from a hot and dry area (Sar Kahnan), while it had been reported from a cold and humid area (Arasbaran) in late May (Lotfalizadeh et al., 2017). The flight period of *G. syriacum* was recorded from July to September in Turkey (van Achterberg & Talebi, 2014; Özbek & van Achterberg, 2020), whereas our data showed a longer flight period, frequently from April to September. Three species, *G. tournieri*, *G. undulatum* and *G. zarudnyi* were collected in few numbers in April, June and July, respectively, while in previous studies more activity flight periods were recorded for them (van Achterberg & Talebi, 2014; Özbek & van Achterberg, 2020). Malaise trapping is one of the most widely used and effective methods for the large-scale collecting Hymenoptera (Darling & Packer, 1988; Campos et al., 2000; van Achterberg, 2009; Karlsson et al., 2020; Skvarla et al., 2021). This method is often used to study the diversity of Hymenoptera and Diptera (Skvarla et al., 2021). According to Noyes (1989) surveys of Hymenoptera should be conducted using as wide a variety of methods as possible because every method undoubtedly has at least one advantage over any other. For instance, the main advantage of sweeping over Malaise trapping is that it is possible to sample a larger number of habitats, whereas Malaise traps have a distinct advantage in wet conditions where sweeping may be totally impossible. Each method will also sample a slightly different part of the fauna from any other.

Table 1. The adult flight period of the current known *Gasteruption* species in Iran.

Species / Month	IV	V	VI	VII	VIII	IX	X	XI
<i>G. aff. aciculatum</i>						■		
<i>G. coriacoaxale</i>			■					
<i>G. aff. corniculigerum</i>	■	■	■					
<i>G. diversipes</i>								■
<i>G. aff. diversipes</i>		■	■	■				
<i>G. dolichoderum</i>		■	■	■	■	■	■	
<i>G. heminitidum</i>				■				
<i>G. henseni</i>							■	
<i>G. minutum</i>		■	■					
<i>G. opacum</i>		■	■					
<i>G. schmideggeri</i>		■						
<i>G. sericeipes</i>			■		■			
<i>G. syriacum</i>		■	■	■	■	■		
<i>G. tournieri</i>		■						
<i>G. undulatum</i>			■					
<i>G. zarudnyi</i>					■			

However, species of *Gasteruption* are being frequently captured by Malaise and window traps. These trapping methods can increase the knowledge of this group, while they can be used even in regions, where it is difficult to use netting (mountains, forests or rocky or sloped habitats) (Bogusch, 2021).

In recent years, the majority of gasteruptionid wasp collecting in Iran have been performed using Malaise traps (e.g., van Achterberg & Talebi, 2014; Lotfalizadeh et al., 2017; current study) and therefore, the biology and host association of Iranian species remain unknown and should be further investigated.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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گزارش‌های جدید خانواده (Hymenoptera, Evanioidea) Gasteruptionidae از ایران

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چکیده: در مقاله حاضر، یافته‌های جدیدی از پراکنش ۱۳ گونه از زنبورهای خانواده (Hymenoptera, Evanioidea) Gasteruptionidae جمع‌آوری شده از ۱۷ منطقه استان‌های فارس و هرمزگان در جنوب ایران ارائه می‌شود. نمونه‌ها با استفاده از تله مالیز طی سال‌های ۱۳۹۲ تا ۱۳۹۸ جمع‌آوری شد. دو گونه *Gasteruption sericeipes* Kieffer, 1911 و *G. syriacum* Szépligeti, 1903 برای اولین بار از ایران گزارش می‌شوند. همچنین ۱۰ گزارش جدید استانی نیز ثبت شد. با در نظر گرفتن نتایج این تحقیق، مجموع گونه‌های گزارش شده این خانواده از هرمزگان، فارس و ایران به ترتیب به ۲، ۱۴ و ۲۹ گونه افزایش یافت. برای هر گونه، پراکنش استانی در ایران، پراکنش عمومی و همچنین دوره پرواز، همراه با منابع موجود ارائه و بحث شده است.

واژگان کلیدی: گزارش جدید، تله مالیز، پالئارکتیک، فون، زنبور، ایران