

## A CHECKLIST OF IRANIAN VESPINAE (HYMENOPTERA: VESPOIDEA: VESPIDAE)

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**Abstract** – A checklist of Iranian Vespinae (Hymenoptera: Vespidae) is presented. The list is based on a detailed study of all available published data. Nine vespine species from three genera (*Vespa* Linnaeus, *Vespula* Thomson, *Dolichovespula* Rohwer) are currently recognized as occurring in Iran.

**Key words:** Hymenoptera, Vespidae, Vespinae, checklist, Iran

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### INTRODUCTION

Vespine wasps (Hymenoptera: Vespoidea: Vespidae) are the largest and best-known eusocial wasps (Wilson, 1971). The subfamily includes true hornets (the genus *Vespa*), and the “yellowjackets” (genera *Dolichovespula* and *Vespula*). The remaining genus, *Provespa*, is a small, poorly-known group of nocturnal wasps from southeast Asia (Carpenter, 1987; Dubatolov and Milko, 2004).

The first work on Iranian vespine was carried out in 1905 by Buysson (1905). Several other studies were done including those by Pérez (1910), du Buysson (1912), Morice (1921), Birula (1925a, b, 1930), Bequaert (1931), Blüthgen and Gusenleitner (1970), Guiglia (1977), Archer (1981, 1992), Dubatolov et al. (2003), Abd-Rabou et al. (2005), Abbasi et al. (2008), Sakenin et al. (2010). In addition to the mentioned original papers on Iranian Vespidae, two checklists have been prepared on this taxon so far (Modarres Awal, 1997; Ebrahimi and Carpenter 2008).

Iran covers an area of about 1,648,000 km<sup>2</sup>. Altitudinally, it ranges from 28 m below sea-level on

the shores of the Caspian Sea to the 5770 m of Mt. Damavand. Climatically, there is the contrast between the humid, almost jungle-like forests of the south Caspian and the arid, in places lifeless deserts of Dasht-e Lut; the temperature ranges from a winter low of -35°C in the north-west to a summer high of 50°C on the Persian Gulf. As a result of these major topographical, geological and climatic variations, Iran is rich in animal and plant diversity (Fig. 1). The objective of this paper to summarize all the data on Iranian Vespinae.

### MATERIALS AND METHODS

The published data on the Vespinae subfamily in Iran was summarized. The checklist comprises the following data: the valid taxa name, published records with provincial distribution and general distribution. Iranian provinces are given in alphabetical order in the lists.

### RESULTS

The present work includes 9 vespine species from 3 genera. The list of species is given below in alphabetical order.

## Subfamily Vespinae Laicharting

**Genus *Dolichovespula* Rohwer, 1916**

Syn.: *Pseudovespula* Bischoff, 1931; *Boreovespula* Blüthgen, 1943; *Metavespula* Blüthgen, 1943.

***Dolichovespula media* (Retzius, 1783)**

Syn.: *Vespa geerii* Lepeletier, 1836; *Vespa crassa* Herrich-Schäffer, 1841; *Vespa similis* Schenck, 1853; *Vespa rufoscutellata* Schenck, 1853; *Vespa flavicincta* Schenck, 1853; *Vespa media* var. *lineolata* Pérez, 1910; *Vespula media media* var. *lugubris* Birula, 1927; *Dolichovespula media* var. *conjugens* Paul, 1943; *Dolichovespula media sugare* Ishikawa, 1969; *Dolichovespula borealis* Lee, 1986.

**Distribution in Iran:** East Azerbaijan (Sakenin et al., 2010), Hamadan (Abd-Rabou et al., 2005).

**General distribution:** Europe except the extreme south; Asia, south and east to Southern Siberia, Mongolia, China, Korea, and Japan (Carpenter and Kojima, 1997).

***Dolichovespula omissa* (Bischoff, 1931)**

Syn.: *Vespa tripunctata* Schenk, 1861; *Vespula norvegica saxonica* morpha *ingrica* Birula, 1930; *Vespa omissa* Bischoff, 1931; *Vespula ingrica* ('Birula') Bequaert, 1932.

**Distribution in Iran:** Iran: No locality cited (Pekkarinen and Huldén, 1995).

**General distribution:** Southern Scandinavia, Central Europe, Turkey, Caucasus: Georgia (Kobakhidze, 1962, as *Vespula* (*Dolichovespula*) *ingrica* Bir.), SW Iran (Pekkarinen and Huldén, 1995). Russia: European part (Tobias, 1978) (including St.-Petersburg vic.), SW Siberia (Dubatolov, 1998).

***Dolichovespula saxonica* (Fabricius, 1793)**

Syn.: *Vespa bavarica* von Schrank, 1802; *Vespa tri-*

*dens* Schenck, 1853; *Vespula norvegica saxonica* morpha *monticola* Birula, 1930; *Dolichovespula saxonica nipponica* Yamane, 1975; *Dolichovespula saxonica kamtschatkensis* Eck, 1983; *Dolichovespula saxonica nigrescens* Eck, 1983.

**Distribution in Iran:** East Azerbaijan (Ghahari et al., 2007; (Sakenin et al., 2010), West Azerbaijan (Abd-Rabou et al., 2005).

**General distribution:** Western Europe, Asia Minor, Caucasus: Georgia (Kobakhidze, 1962), E Kazakhstan, Mongolia, China, Korea, Japan: Hokkaido, Honshu, north from Fukushima Pref. Russia: European part, Siberia, east to Upper Kolyma and Kamchatka, Komandorskie Is., Sakhalin, Kuriles (Yamane, 1975; Tobias, 1978; Eck, 1983; Kurzenko, 1995; Dubatolov, 1998).

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

Syn.: *Vespa parietum* Harris, 1776; *Vespa holsatica* Fabricius, 1793; *Vespa frontalis* Latreille, 1802; *Vespa campanaria* Fowler, 1833; *Vespa pilosella* Costa, 1858; *Vespa anglica* Smith, 1843; *Vespa sylvestris* [!] var. *sumptuosa* du Buysson, 1905; *Dolichovespula xinjiangensis* Lee, 1986.

**Distribution in Iran:** East Azerbaijan (Ebrahimi and Carpenter, 2008), Guilan, Khuzestan (Archer, 1981), Kohgiluyeh and Boyer-Ahmad (Castro and Dvořák, 2009), Mazandaran (Abd-Rabou et al., 2005; Ebrahimi and Carpenter, 2008), Tehran (Archer, 1981; Ebrahimi and Carpenter, 2008), West Azerbaijan (Birula, 1930; Archer, 1981; Blüthgen and Gusenleitner, 1970).

**General distribution:** North-West Africa, Western Europe, north to the Arctic Circle (Pekkarinen and Huldén, 1995), Asia Minor, Armenia, Iran, Afghanistan, Pakistan, India: Kashmir, Kyrgyzstan, Kazakhstan, Mongolia, China (Carpenter and Kojima, 1997). Russia: southern regions of the European part, N Caucasus, S Siberia to Transbaikalia (Tobias, 1978; Kurzenko, 1995; Dubatolov, 1998).

**Genus *Vespa* Linnaeus, 1758**

Syn.: *Macrovespa* Dalla Torre, 1904; *Nyctovespa* van der Vecht, 1959

***Vespa crabro* Linnaeus, 1758**

Syn.: *Vespa vexator* Harris, 1776; *Vespa crabro major* Retzius, 1783; *Vespa crabro germana* Christ, 1791; *Vespa crabroniformis* Smith, 1852; *Vespa crabro* var. *borealis* Radoszkowski, 1863; *Vespa crabro* var. *anglica* Gribodo, 1892; *Vespa oberthuri* du Buysson, 1902; *Vespa flavo-fasciata* Cameron, 1903; *Vespa crabro* var. *tartarea* du Buysson, 1905; *Vespa crabro* var. *altaica* Pérez, 1910; *Vespa crabro* var. *caspica* Pérez, 1910; *Vespa crabro nigra* Birula, 1925a; *Vespa crabro vulgata* Birula, 1925a; *Vespa crabro meridionalis* Birula, 1925a; *Vespa crabro chinensis* Birula, 1925a; *Vespa crabro* var. *birulai* Bequaert, 1931; *Vespa crabro* var. *gribodoi* Bequaert, 1931.

**Distribution in Iran:** East Azerbaijan (Sakenin et al., 2010), Guilan (Pérez, 1910; Morice, 1921; Ebrahimi and Carpenter 2008), Golestan (Ebrahimi and Carpenter, 2008), Khuzestan (Abd-Rabou et al., 2005), Mazandaran (Ebrahimi and Carpenter, 2008).

**General distribution:** Asia east to Japan and south to Iran, China, and Taiwan; British Isles, Europe except extreme north and south; introduced into North America (Carpenter and Kojima, 1997).

***Vespa orientalis* Linnaeus, 1771**

Syn.: *Vespa turcica* Drury, 1773; *Vespa quadripunctata* Forskål, 1775; *Vespa crabro fusca* Christ, 1791; *Vespa aegyptiaca* Vallot, 1802; *Vespa jurinei* de Saussure, 1854; *Vespa orientalis aegyptiaca* André, 1884; *Vespa orientalis* var. *zavattarii* Guiglia and Capra, 1933; *Vespa orientalis* var. *somalica* Giordani Soika, 1934; *Vespa orientalis arabica* Giordani Soika, 1957.

**Distribution in Iran:** Ardabil, Bushehr (Ebrahimi and Carpenter, 2008), East Azerbaijan (Ebrahimi and Carpenter, 2008; Sakenin et al., 2010), Fars

(Guiglia, 1977; Ebrahimi and Carpenter, 2008), Ghazvin (Morice, 1921; Ebrahimi and Carpenter, 2008), Golestan, Hamadan, Hormozgan (Ebrahimi and Carpenter, 2008), Isfahan (Blüthgen and Gusenleitner, 1970), Kerman (Blüthgen and Gusenleitner, 1970; Ebrahimi and Carpenter, 2008), Kermanshah (Ebrahimi and Carpenter, 2008), Khorasan (Blüthgen and Gusenleitner, 1970; Guiglia, 1977; Ebrahimi and Carpenter, 2008), Khuzestan (Buysson 1912; Ebrahimi and Carpenter, 2008), Kohgiluyeh and Boyer-Ahmad (Ebrahimi and Carpenter, 2008), Kordestan (Ebrahimi and Carpenter, 2008), Lorestan (du Buysson, 1912; Ebrahimi and Carpenter, 2008), Markazi (Ebrahimi and Carpenter, 2008), Mazandaran (Guiglia, 1977), Qom (Ebrahimi and Carpenter, 2008), Sistan and Baluchestan (Blüthgen and Gusenleitner, 1970; Ebrahimi and Carpenter, 2008), Tehran (du Buysson, 1912; Blüthgen and Gusenleitner, 1970; Ebrahimi and Carpenter, 2008), Zanjan (Abbasi et al., 2008).

**General distribution:** Arabian Peninsula; Northern Africa; Southeast of Europe; Asia east to India, Nepal and China (Xinjiang); introduced into Madagascar and Mexico (Carpenter and Kojima, 1997).

**Genus *Vespula* Thomson, 1869**

Syn.: *Pseudovespa* Schmiedeknecht, 1881; *Paravespula* Blüthgen, 1938; *Allovespula* Blüthgen, 1943; *Rugovespula* Archer, 1982.

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

Syn.: *Vespa maculata* Scopoli, 1763; *Vespa macularis* Olivier, 1792.

**Distribution in Iran:** East Azerbaijan, Fars (Ebrahimi and Carpenter, 2008), Ghazvin, Guilan (Morice, 1921), Isfahan (Lehr et al., 2007; Ebrahimi and Carpenter, 2008), Kerman (Ebrahimi and Carpenter, 2008), Kermanshah (du Buysson, 1912; Morice, 1921), Khorasan (Blüthgen and Gusenleitner, 1970; Guiglia, 1977; Ebrahimi and Carpenter, 2008), Kohgiluyeh and Boyer-Ahmad, Kordestan, Lorestan, Markazi, Mazandaran, Qom, Sistan and Baluchestan,



Fig. 1. Map of Iran with boundaries of provinces.

Tehran, West Azerbaijan (Ebrahimi and Carpenter, 2008), Zanzan (Abbasi et al., 2008).

**General distribution:** Asia east to Korea and south to northern India; Europe; Northern Africa; introduced into many regions of the world: Iceland, New Zealand, Australia, Ascension island, South Africa, Canada, Chile, Argentina, USA (Carpenter and Kojima, 1997).

#### *Vespula rufa* (Linnaeus, 1758)

Syn.: *Vespa schrenckii* Radoszkowski, 1861; *Vespa sibirica* André, 1884; *Vespa rufa* var. *intermedia* du Buysson, 1905; *Vespula rufa grahami* Archer, 1981; *Vespula obscura* Lee, 1986; ? *Vespula yichunensis* Lee, 1986.

**Distribution in Iran:** East Azerbaijan (Sakenin et al., 2010), Kordestan (Abd-Rabou et al., 2005).

**General distribution:** Europe except extreme south; Turkey, Georgia, through Siberia to Nepal, Russian Far East, Korea, and Japan (Carpenter and Kojima, 1997).

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

Syn.: *Vespa sexcincta* Panzer, 1799; *Vespa communis* de Saussure, 1857; *Vespa alascensis* Packard, 1870; *Vespa westwoodii* Shipp, 1893; *Vespa vulgaris* var. *pseudogermanica* Stolfa, 1932.

**Distribution in Iran:** Kermanshah (Abd-Rabou et al., 2005).

**General distribution:** Europe except extreme south; Asia south to Kazakhstan, Mongolia, Kashmir, Northern China, east to Korea and Japan; introduced into Iceland, New Zealand, and Australia (Carpenter and Kojima, 1997).

## DISCUSSION

In total, nine vespine species are listed in this paper as fauna of Iran. As we mentioned in the introduction, Iran is a large country with various geographical regions so that diverse fauna of Vespinae is expected. Although several faunistic surveys were done in different regions of Iran by many researchers, it is possible that a few other new vespine will be discovered in the future. Therefore, continuing faunal samplings is necessary in Iran, especially in un-sampled regions. Also, application of new taxonomic methods (e.g. behavioral characters, electrophoresis, DNA sequencing and etc.) for an even more precise identification of Iranian specimens is suggested. The understanding of the evolutionary history of the Vespinae has changed greatly as new techniques and trends have developed. Many studies have only looked at behavioral characters (Greene, 1979) or a combination of behavioral and morphological characters in estimating phylogeny (Carpenter, 1987). The evolutionary history of the Vespinae has also been examined using techniques that do not rely on morphological or behavioral characters: protein electrophoresis (Varvio-Aho et al., 1984) and DNA sequencing (Schmitz and Moritz, 1990). The above-mentioned taxonomic studies, together with research into the biology and behavior of Iranian vespine specimens will result in new and interesting data for science.

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