



ESI

## An annotated checklist of Iranian Cephidae (Hymenoptera: Symphyta: Cephoidea)

Mahir Budak<sup>1\*</sup>, Ertan M Korkmaz<sup>1</sup> and Hassan Ghahari<sup>2</sup>

<sup>1</sup> Department of Molecular Biology and Genetics, Faculty of Science, Cumhuriyet University, 58140 Sivas, Turkey.

<sup>2</sup> Department of Plant Protection, Yadegar-e- Imam Khomeini (RAH) Shahre Rey Branch, Islamic Azad University, Tehran, Iran.

**ABSTRACT.** The fauna of Cephidae (Hymenoptera: Symphyta: Cephoidea) is reported from Iran based on literature records and specimens collected. Totally, 15 species and subspecies of six genera, *Calameuta* Konow (three species), *Cephus* Latreille (five species), *Phylloecus* Newman (two species), *Pachycephus* Stein (two subspecies), *Syrista* Konow (one species) and *Trachelus* Jurine (two species), are listed. *Phylloecus niger* (Harris, 1776), *Pachycephus smyrnensis smyrnensis* Stein, 1876 and *Trachelus libanensis* (André, 1881) are recorded from Iran for the first time.

**Key words:** Stem borers, new records, distribution, catalogue, Iran

**Received:**

22 January, 2018

**Accepted:**

21 January, 2019

**Published:**

27 January, 2019

**Subject Editor:**

Attila Haris

**Citation:** Budak, M., Korkmaz, E. M. & Ghahari, H. (2018) An annotated checklist of Iranian Cephidae (Hymenoptera: Symphyta: Cephoidea). *Journal of Insect Biodiversity and Systematics*, 4 (4), 293–305.

### Introduction

The Cephidae is a relatively well-known phytophagous family of Hymenoptera and commonly referred as stem-boring sawflies because their larvae bore and feed in the stems or twigs of various plants including grasses, shrubs, berry canes and trees (Shanower & Hoelmer, 2004; Budak et al., 2011). This family is the only representative of the Cephoidea comprising roughly 165 species in three subfamilies and 25 genera (Benson, 1935, 1946; Smith & Schmidt, 2009; Taeger et al., 2010; Budak et al., 2011; Wei & Xiao, 2011). Most species occur in the Northern Hemisphere, but several species have been reported in the Southern Hemisphere or from the tropics (Smith &

Schmidt, 2009). On the other hand, this family is quite numerous, copiously, richly represented in East Asia where nearly about one third of the identified species and half the known genera are endemic (Wei & Nie, 2007; Liu et al., 2018).

A number of cephid species are economically important pests causing severe losses particularly in cereal grains, and occasionally in many edible fruits, ornamental trees and shrubs of the Rosaceae (Benson, 1968; Shanower & Hoelmer, 2004; Korkmaz et al., 2010a; Wei & Smith, 2010). We have only few papers on the Iranian cephids; these papers shall be completed with further studies based on collecting

Corresponding author: Mahir Budak, E-mail: [mbudak@cumhuriyet.edu.tr](mailto:mbudak@cumhuriyet.edu.tr)

Copyright © 2018, Budak et al. This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 1&□4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

results (Behdad, 1982; Ghadiri, 1994; Khalaf, 1995; Shahrokhi & Zare, 1995; Ghadiri & Safai, 2001; Esmaili et al., 2006; Khanjani, 2006). The aim of the present paper is to catalogue of all the data on the Iranian Cephidae together with introducing of three new country records.

### Material and methods

We processed all available literature on the Iranian cephids and the results are digested in the present paper. The materials of new records were collected by Malaise traps and sweeping. The following keys were applied to identify the specimens: Benson, 1946, 1951, 1968; Muche, 1981; Zhelochovtsev, 1988; Jansen 1998; Liston & Jacobs 2012.

Electronic World Catalog of Symphyta was consulted for valid names and distribution data (Taeger et al., 2018). The provinces of Iran are shown in the Fig. 1.

### Results

A checklist of Cephidae of Iran are resulted the presence of 15 species and subspecies within six genera. Two species and one subspecies, *Pachycephus smyrnensis smyrnensis* Stein, 1876, *Trachelus libanensis* (André, 1881) and *Hartigia nigra* (Harris, 1776), are newly recorded from Iran. The list of species is given below alphabetically including synonymies and distribution data.

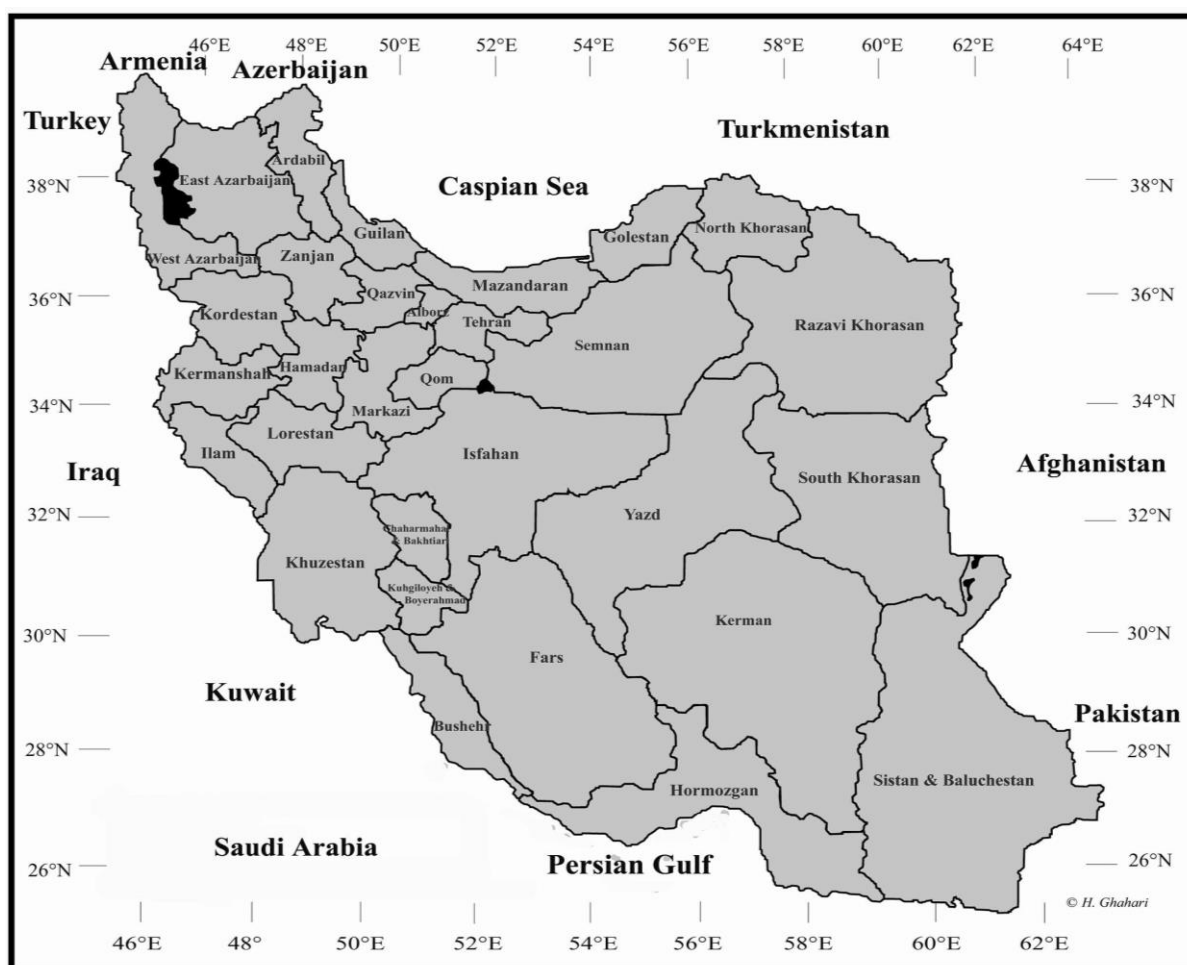


Figure 1. Map of Iran with boundaries of provinces.

**Superfamily Cephoidea Newman, 1834****Family Cephidae Newman, 1834****Subfamily Cephinae Newman, 1834****Tribe Cephini Newman, 1834****Genus Calameuta Konow, 1896*****Calameuta* (*Calameuta*) *filiformis* (Eversmann, 1847)**

*Cephus quadricinctus* Dahlbom, 1835; *Cephus filiformis* Eversmann, 1847; *Cephus elongatus* Vollenhoven, 1858 Vollenhoven, 1858; *Cephus arundinis* Giraud, 1863; *Cephus marginatus* Kowall, 1864; *Cephus erberi* Damianitsch 1866; *Cephus vagabundus* Mocsáry, 1886; *Cephus grombcewskii* Jakovlev, 1892; *Calameuta rugosa* Dovnar Zapolskij, 1931; *Cephus infernalis* Dovnar Zapolskij, 1926; *turanicus* Dovnar Zapolskij, 1931; *Calameuta atrata* Dovnar-Zapolskij, 1931; *Calameuta turanicus* Dovnar-Zapolskij, 1931; *Calameuta amurensis* Gussakovskij, 1935; *Calameuta filiformis amurensis* Gussakovskij, 1935.

**Distribution in Iran:** East Azarbaijan (Gussakovskij, 1935; Khayrandish et al., 2017), Guilan (Khayrandish et al., 2017), Lorestan (Khayrandish & Ebrahimi, 2018), Northern Iran (no locality cited) (Klima, 1937; Dadurian, 1962; Benson, 1968; Schedl, 2009; Taeger et al., 2018).

**General distribution:** Palaearctic species. Austria, Belgium, China, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Iran, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lebanon, Morocco, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine.

**Host plants:** *Arhenatherum*, *Calamagrostis*, *Elytrigia*, *Phalaris*, *Phragmites* (all Poaceae) (Taeger et al., 1998).

***Calameuta* (*Calameuta*) *grombcewskii* (Jakowlew, 1891)**

*Calameuta grombcewskii* Jakowlew, 1891; *Cephus grombcewskii* Jakowlew, 1891;

*Calameuta grombcewskii* (Jakowlew, 1891); *Cephus grombcewskii* Jakowlew, 1891; *Calameuta* (*Calameuta*) *filiformis grombcewskii* (Jakowlew, 1891); *Calameuta grombtschewskii* (Jakowlew, 1891); *Calameuta grombcewskii* (Jakowlew, 1891).

**Distribution in Iran:** Alborz, Qazvin (Khayrandish et al., 2017), East Azarbaijan (Sakenin et al., 2008), Golestan (Taeger et al., 2018), Mazandaran (Samin & Farzaneh, 2016; Khayrandish et al., 2017).

**General distribution:** Middle Eastern species. Iran, Kazakhstan, Turkmenistan, Tajikistan, Uzbekistan.

**Host plants:** Unknown.

**Comments:** *C.* (*Calameuta*) *grombcewskii* was reported as the prey of *Tolmerus atricapillus* (Fallén, 1814) (Diptera: Asilidae) by Sakenin et al. (2008).

***Calameuta* (*Calameuta*) *idolon* (Rossi, 1794)**

*Ichneumon idolon* Rossi, 1794; *Cephus mittrei* Guerinmeneville, 1844; *Cephus bellieri* Sichel, 1860; *Cephus variegatus* Stein, 1876; *Monoplopus apicicornis* Pic, 1916.

**Distribution in Iran:** Guilan, Qazvin (Khayrandish et al., 2017), Iran (no locality cited) (Benson, 1968; Schedl, 2009; Korkmaz et al., 2010a).

**General distribution:** European and Middle Eastern species. Albania, Algeria, Armenia, Bulgaria, Croatia, Cyprus, France, Greece, Hungary, Italy, Jordan, Portugal, Serbia and Montenegro, Spain, Turkey, Ukraine.

**Host plants:** Unknown.

**Genus *Cephus* Latreille, 1802*****Cephus brachycercus* Thomson, 1871**

*Cephus pallipes* Eversmann, 1847; *Cephus brachycercus* Thomson, 1871; *Cephus punctulatus* Konow, 1896; *Cephus brachycercus* var. *tibialis* Dovnar-Zapolskij, 1926.

**Distribution in Iran:** West Azarbaijan (Ghahari & Huang, 2012).

**General distribution:** Palaearctic species. Austria, Belgium, China, Croatia, Czech Republic, Estonia, Finland, France, Germany, Hungary, Italy, Japan, Morocco, Netherlands, Norway, Poland, Russia, Slovakia, Sweden, Switzerland, Turkey, Ukraine.

**Host plants:** Unknown.

**Comments:** *Norbanus scabriculus* (Nees, 1834) (Hymenoptera: Pteromalidae) was recorded as the parasitoid of *C. brachycercus* in West Azarbaijan (Ghahari & Huang, 2012).

***Cephus fumipennis* Eversmann, 1847**

*Cephus carbonarius* Jakowlew, 1891.

**Distribution in Iran:** Northern Khorasan (Samin & Farzaneh, 2016).

**General distribution:** China, Europe, Kazakhstan, Russia, Tajikistan, Turkey (Taeger et al., 2018).

**Host plants:** *Phalaris* (Poaceae) (Taeger et al., 1998).

***Cephus nigrinus* Thomson, 1871**

*Cephus pallipes* Stephens, 1835; *Cephus nigrinus* Thomson, 1871.

**Distribution in Iran:** Iran (no locality cited) (Burggraaf-van Nierop & van Achterberg, 1990; Taeger et al., 2018).

**General distribution:** European and Middle Eastern species. Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Hungary, Iran, Italy, Luxembourg, Macedonia, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Syria, Turkey, Ukraine.

**Host plants:** *Milium*, *Poa* (Poaceae) (Taeger et al., 1998).

***Cephus pygmaeus* (Linnaeus, 1767)**

*Sirex pygmaeus* Linné, 1767; *Tenthredo longicornis* Fourcroy, 1785; *Tenthredo polygonus* Gmelin, 1790; *Tenthredo polyona* Gmelin, 1790; *Banchus spinipes* Panzer,

1801; *Banchus viridator* Fabricius, 1805; *Cephus subcylindricus* Gravenhorst, 1807; *Cephus leskii* Lepeletier, 1823; *Cephus flavisternum* Costa, 1882; *Cephus clypealis* Costa, 1894; var. *Cephus pygmaeus* var. *palaestinus* PIC, 1918; *tanaiticus* Donvar-Zapolskij, 1926; *notatus* Kokujev, 1910.

**Distribution in Iran:** Alborz (Farahbakhsh, 1961; Ghadiri, 1993, 1994, 2000; Khanjani, 2006; Esmaili et al., 2006; Khayrandish et al., 2017; Khayrandish & Ebrahimi, 2018), East Azarbaijan, Isfahan, Kuhgiluyeh & Boyerahmad, Lorestan, Qom, Razavi Khorasan (Khayrandish & Ebrahimi, 2018), Fars (Nemati & Pezhman, 2014; Khayrandish & Ebrahimi, 2018), Golestan (Chevin, 1985; Khayrandish & Ebrahimi, 2018), Markazi and other northern and central provinces (Farahbakhsh, 1961; Behdad, 1982; Khanjani, 2006; Esmaili et al., 2006; Modarres Awal, 2012), Qazvin (Khayrandish et al., 2017; Khayrandish & Ebrahimi, 2018), Tehran (Farahbakhsh, 1961; Behdad, 1982; Ghadiri, 1993, 1994, 2000; Khanjani, 2006; Esmaili et al., 2006; Modarres Awal, 2012; Khayrandish et al., 2017; Khayrandish & Ebrahimi, 2018), Northern Iran (no locality cited) (Gussakovskij, 1935; Ushinskij, 1936; Dadurian, 1962; Benson, 1968; Shanower & Hoelmer, 2004; Schedl, 2009).

**General distribution:** Holarctic species. Algeria, Austria, Belgium, Bulgaria, Canada, China, Croatia, Czech Republic, Denmark, Egypt, Estonia, France, Germany, Great Britain, Greece, Hungary, Iran, Iraq, Israel, Italy, Latvia, Luxembourg, Macedonia, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, USA.

**Host plants:** Wheat and sometimes barley (Farahbakhsh, 1961; Esmaili et al., 2006; Modarres Awal, 2012), *Avena sativa* L., *Bromus secalinus* L., *Hordeum vulgare* L., *Secale cereale* L. and *Triticum aestivum* L. (Poaceae) (Farahbakhsh, 1961; Ghadiri,

1993; Modarres Awal, 2012; Khayrandish & Ebrahimi, 2018); *Avena*, *Bromus*, *Elytrigia*, *Hordeum*, *Phleum*, *Secale*, *Triticum* (Poaceae) (Taeger et al., 1998).

**Comments:** *Aprostocetus forsteri* (Walker, 1847) and *Necremnus tidius* (Walker, 1839) (Hymenoptera: Eulophidae) have been recorded by Yefremova et al. (2007), *Elachertus fenestratus* Nees, 1834 (Hymenoptera: Eulophidae) by Sahragard (1977) and Behdad (1982) and *Elachertus proteoteratis* Howard, 1885 by Esmaili et al. (2006) as the parasitoids of *C. pygmeus*. Additionally, *Cantharis melaspis* Chevrolat, 1854 (Coleoptera: Cantharidae) is the predator of *C. pygmeus* (Khanjani, 2006).

#### ***Cephus spinipes* (Panzer, 1800)**

*Cephus cultratus* auct.; *Astatus spinipes* (Panzer, 1800); *Banchus spinipes* Panzer, 1800 [not 1801]; *Cephus spinipes* (Panzer, 1800) [not 1801]; *Cephus cultratus* Eversmann, 1847; *Cephus pilosulus* Thomson, 1871; *Cephus cultratus* forma *pilosulus* Thomson, 1871; *Cephus affinis* Kokujev, 1910; *Cephus exilis* Kokujev, 1910.

**Distribution in Iran:** Tehran (Samin et al., 2010).

**General distribution:** European and Middle Eastern species. Austria, Belgium, Bulgaria, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Italy, Kyrgyzstan, Luxembourg, Macedonia, Netherlands, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine.

**Host plants:** *Dactylis*, *Phleum* (Poaceae) (Taeger et al., 1998).

**Comments:** *C. spinipes* has been reported as the prey of *Rhadinus unguinus* Loew (Diptera: Asilidae) by Samin et al. (2010).

#### **Genus *Trachelus* Jurine, 1807**

##### ***Trachelus libanensis* (André, 1881) (Fig. 2)**

*Cephus libanensis* André, 1881; *Ateuchopus armenius* Konow, 1896; *Trachelus armenius*

(Konow, 1896); *Atenchopus libanensis* var. *intermedius* Pic, 1917.

**Material examined:** East Azarbaijan province, Kaleybar (in wheat field), 38°53'N 47°05'E, 2♂, leg. M. Havaskary, 28.V.2013. **New record for Iran.**

**General distribution:** East Mediterranean and Middle Eastern species. Armenia, Cyprus, Georgia, Israel, Lebanon, Russia, Syria, Turkey.

**Host plants:** *Triticum* (Poaceae) (Taeger et al., 1998).

**Host records in Iran:** Unknown.

**Comments:** *Trachelus libanensis* is a pest on wheat (Altnayar, 1975, Miller et al., 1993; Korkmaz et al., 2010b) but its population density is very low in Iran.

##### ***Trachelus tabidus* (Fabricius, 1775)**

*Sirex tabidus* Fabricius, 1775; *Tenthredo longicollis* Frucroy, 1785; *Trachelus haemorrhoidalis* Jurine, 1807; *Cephus mandibularis* Lepeletier, 1823; *Cephus nigrinus* Lepeletier, 1823; *Calameuta johnsoni* Ashmead, 1900.

**Distribution in Iran:** Alborz, Qazvin (Khayrandish et al., 2017; Khayrandish & Ebrahimi, 2018), Fars (Khalaf, 1995; Modarres Awal, 2012; Khayrandish et al., 2017; Khayrandish & Ebrahimi, 2018), Tehran (Farahbakhsh, 1961; Behdad, 1982; Modarres Awal, 2012; Ghahari et al., 2010; Khayrandish et al., 2017; Khayrandish & Ebrahimi, 2018), and probably other northern and central provinces (Farahbakhsh, 1961; Modarres Awal, 2012), Iran (no locality cited) (Shanower & Hoelmer, 2004).

**General distribution:** Holarctic species. Algeria, Austria, Belgium, Bulgaria, Croatia, Cyprus, Egypt, France, Germany, Great Britain, Greece, Iraq, Israel, Italy, Libya, Morocco, Netherlands, Portugal, Romania, Russia, Slovakia, Spain, Switzerland, Syria, Tunisia, Turkey, Ukraine, USA.

**Host plants:** Wheat (*Triticum aestivum*) and sometimes barley (*Hordeum vulgare*) (Farahbakhsh, 1961; Modarres Awal, 2012); *Avena*, *Hordeum*, *Secale*, *Triticum* (Poaceae) (Taeger et al., 1998).

**Comments:** *Panstenon oxylus* (Walker, 1839) (Hymenoptera: Pteromalidae) has been recorded as the parasitoid of *T. tabidus* in wheat field (Ghahari et al., 2010).

### Tribe Hartigiini Enslin, 1914

#### Genus *Phylloecus* Newman, 1823

##### *Phylloecus niger* (M. Harris, 1779) (Fig. 3)

*Sirex nigra* Harris, 1776; *Astutus satyrus* Panzer, 1801; *Cerobactrus major* Costa, 1860; *Cephus brachyptera* Damianitsch, 1866; *Cephus helleri* Taschenberg, 1871; *Cephus glabellifer* Thomson, 1871; *Phylloecus rubi* Perris, 1873; *Cephus albomaculata* Stein, 1876; *Phylloecus giraudi* Schlechtendal, 1880; *Cephus fumipennis* André, 1881; *Cephosoma syringae* Gradl, 1881; *Phylloecus cruciatus* Costa, 1894.

**Material examined:** Guilan province, Astara (Sheykh-Mahalleh), 38°22'N 48°41'E, 1♀, leg. S. Ashkani, 6.VII.2012. **New record for Iran.**

**General distribution:** European and Holomediterranean species. Algeria, Armenia, Austria, Belgium, Bulgaria, China, Croatia, Czech Republic, Estonia, France, Germany, Great Britain, Greece, Hungary, Italy, Luxembourg, Macedonia, Morocco, Netherlands, Poland, Russia, Serbia and Montenegro, Slovakia, Spain, Sweden, Switzerland, Tunisia, Turkey, Ukraine.

**Host plants:** *Rosa*, *Rubus* (Rosaceae) (Taeger et al., 1998).

##### *Phylloecus* nr. *xanthostoma* (Eversmann, 1847)

*Cephus xanthostoma* Eversmann, 1847; *Cerobactrus facialis* Costa, 1864; *Macrocephus ulmariae* Schlechtendal, 1878; *Phyllaecus giraudi* Schlechtendal, 1880; *Hartigia*

*semenovi* Dovnar-Zapolskij, 1931; *Hartigia jakovlevi* Dovnar-Zapolskij, 1931.

**Distribution in Iran:** Alborz, Guilan (Khayrandish et al., 2017).

**General distribution:** Holomediterranean and Middle Eastern species. Algeria, Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Netherlands, Norway, Poland, Russia, Spain, Sweden, Switzerland, UK, Ukraine.

**Host plants:** *Filipendula* (Rosaceae) (Taeger et al., 1998).

#### Genus *Syrista* Konow, 1896

##### *Syrista parreyssii* (Spinola, 1843)

*Cephus parreysi* Spinola, 1843; *orientalis* Tischbein, 1852; *spectabilis* Stein, 1876; *Macrocephus robustus* Mocsáry, 1883; *Cephus parreyssi* (Sic!) var. *rufiventris* Jakovlev, 1888. Primary homonym of *Cephus rufiventris* Cresson, 1880.

**Distribution in Iran:** Alborz (Chevin, 1985; Khayrandish et al., 2017), Mazandaran, Qazvin (Khayrandish et al., 2017), Southern Khorasan (Shahrokhi & Zare, 1995; Abai, 2009; Modarres Awal, 2012), Tehran and other northern provinces (Farahbakhsh, 1961; Chevin, 1985; Behdad, 1988; Wei, 2008; Abai, 2009; Modarres Awal, 2012), Iran (no locality cited) (Wei & Smith, 2010; Taeger et al., 2018).

**General distribution:** Holomediterranean and Middle Eastern species. Albania, Armenia, Azerbaijan, Bulgaria, Croatia, Cyprus, Greece, Israel, Italy, Jordan, Macedonia, Serbia and Montenegro, Slovenia, Spain, Turkey, Turkmenistan

**Host plants:** Barberry, dog-rose and other roses (Farahbakhsh, 1961; Modarres Awal, 2012); larvae of *S. parreyssii* attack to newly grown twigs of *Berberis* sp. (Berberidaceae) (Shahrokhi & Zare, 1995).

**Comments:** Larvae of *Syrista parreyssi* are parasitized by Braconidae and Eurytomidae (Hymenoptera) and rate of parasitism is 25-80% (Shahrokhi & Zare, 1995).



**Figure 2.** *Trachelus libanensis* (André, 1881) (♂).



**Figure 3.** *Phylloecus niger* (M. Harris, 1779) (♀).

**Tribe Pachycephini Benson, 1946****Genus *Pachycephus* Stein, 1876*****Pachycephus smyrnensis smyrnensis* J.P.E.F. Stein, 1876 (Fig. 4)**

*Cephus smyrnensis* Stein, 1876; *Pachycephus* (*Pachycephus*) *smyrnensis smyrnensis* J.P.E.F. Stein, 1876; *Pachycephus aeneo-varius* Kohl, 1905; *Pachycephus aeneovarius* Kohl, 1905; *Pachycephus aenovarius* Kohl, 1905; *Pachycephus brevis* Ghigi, 1915; *Spatulocephus sanctus* Pic., 1916; *Spatulocephus sanctus* var. *notativentris* Pic, 1916.

**Material examined:** West Azarbaijan province, Piranshahr (Kulij), 36°37'N 45°12'E, 2♀, leg. N. Samin, 19.V.2011. **New record for Iran.**

**General distribution:** East-Mediterranean and Middle Eastern species. Armenia, Bulgaria, Cyprus, Greece, Israel, Lebanon, Macedonia, Romania, Syria, Turkey.

**Host plants:** Unknown.

***Pachycephus smyrnensis persicus* Gussakovskij, 1935**

*Pachycephus persicus* Gussakovskij, 1935; *Pachycephus* (*Pachycephus*) *smyrnensis persicus* Gussakovskij, 1935.

**Distribution in Iran:** Lorestan [= Luristan], (Gussakovskij, 1935; Benson, 1968), Iran (no locality cited) (Scheibelreiter, 1978; Taeger et al., 2018).

**General distribution:** East Mediterranean and Middle Eastern species. Azerbaijan, Iran, Lebanon, Turkey.

**Host plants:** Unknown.

**Discussion**

Study of specimens collected from Iranian provinces revealed the presence of 15 species and subspecies in six genera (Fig. 5). Two species and one subspecies, *Pachycephus smyrnensis smyrnensis*, *Trachelus libanensis* and *Phylloecus niger* are new records for Iran. In Turkey as adjacent country of Iran, totally 25 species of

Cephidae have been recorded (Korkmaz et al., 2010a). Since Iran is a large country comprising various geographical regions and climates, we expect that number of recorded species of Cephidae will be increased; because most areas of Iran have not been sampled systematically so far; so more faunistic studies are necessary in order to find new data (new records and probably new species).

Additionally, all the 15 species have been reported from only 17 of the 31 Iranian provinces. Among them, Alborz and Qazvin with five recorded species have the highest diversity following by East Azarbaijan, Guilan and Tehran provinces with four species. Exact localities for one species (*Cephus nigrinus* Thomson, 1871) are unknown - Iran (no locality cited). No sampling has been done in southern regions of Iran but a diverse fauna of Cephidae is expected in these areas.

Previous studies on the fauna of Iranian Cephidae are very limited and most of investigations are focused on the biology of *Cephus pygmeus* (e.g., Sahragard, 1977; Behdad, 1982; Ghadiri, 1994; Ghadiri & Safai, 2001; Esmaili et al., 2006; Khanjani, 2006). Additionally, one study was done on biology and control of the wheat stem sawfly, *Trachelus tabidus* by Khalaf (1995), as an important pest on wheat and barley (Farahbakhsh, 1961; Modarres Awal, 2012). Also, the biology of *Syrista parreyssii* was studied by Shahrokhi & Zare (1995) and mentioned as the pest of barberry, dog-rose and other roses (Farahbakhsh, 1961; Modarres Awal, 2012). With exception of three species, *C. pygmeus*, *T. tabidus* and *S. parreyssii*, the host plants are unknown for most of the Iranian species which can be suggested to the researchers for this topic in future.

**Acknowledgments**

The authors are grateful to H. Chevin (17 rue des Marguerites, F - 78330 Fontenay-le-



Fleury, France) who had effective role in this project, K. Beneš (Kreuzmannova 14, CZ-31800 Plzeň, Czech Republic) and D.R. Smith (National Museum of Natural History, USA) for editing the manuscript, and G.F. Turrisi (University of Catania, Italy) for providing some papers. This study was supported by Islamic Azad

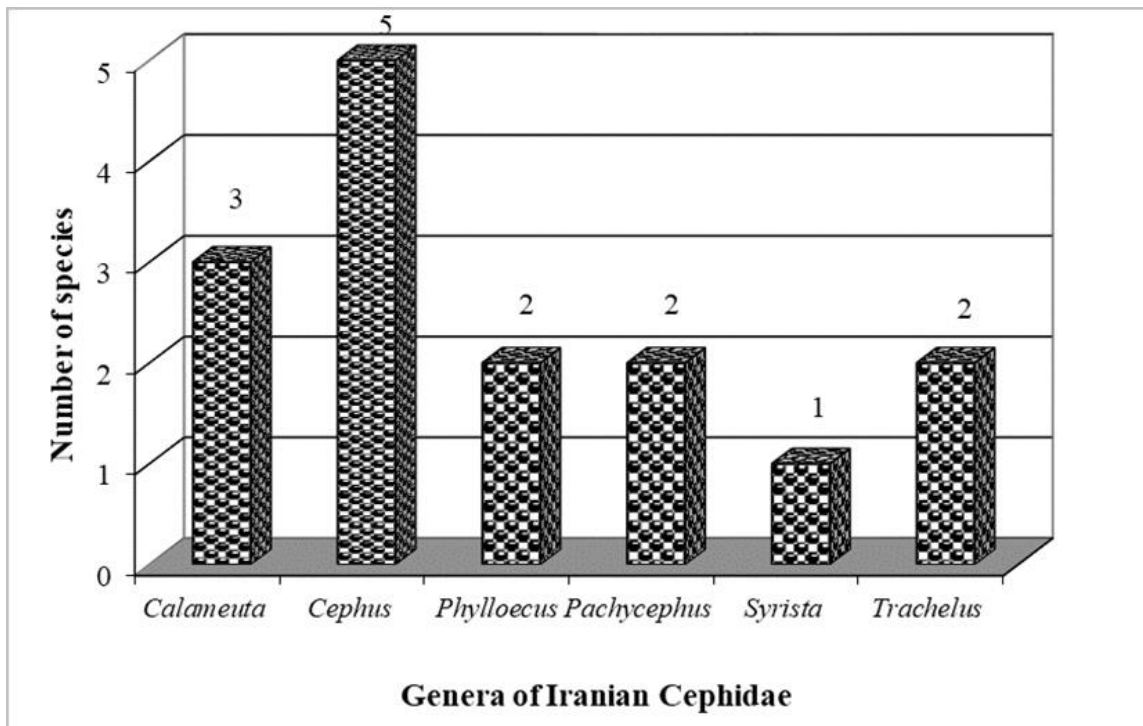
University (Yadegar-e- Imam Khomeini (RAH) Shahre Rey Branch) and Cumhuriyet University.

**Conflict of Interests**

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



**Figure 4.** *Pachycephus smyrnensis smyrnensis* J.P.E.F. Stein, 1876 (♀).



**Figure 5.** Species diversity of Iranian Cephidae (Hymenoptera).

## References

- Abai, M. (2009) *List of pests of forest trees and shrubs of Iran*. Iranian Research Institute of Plant Protection, Tehran. 150 pp.
- Altnayar, G. (1975) Studies on distribution, bio-ecology, crop losses and control methods of wheat stem sawfly [(*Cephus pygmaeus* (L) and (*Trachelus tabidus* (F), (Hym: Cephidae)] in grain crops in Konya province, Turkey. Research publications: No.30. Plant Protection Res. Inst., Ankara. [in Turkish, English summary]
- Behdad, E. (1982) *Pests of field crops in Iran*. Plant Pests and Diseases Research Institute, Iafahan. 589 pp. [in Persian]
- Behdad, E. (1988) *Pests and diseases of forest trees and shrubs of Iran*. Sepehr Press, Tehran. 807 pp. [in Persian]
- Benson, R.B. (1935) On the genera of the Cephidae, and the erection of a new family Syntexidae (Hymenoptera, Symphyta). *Annals and Magazine of Natural History*, 16, 535–553.  
<https://doi.org/10.1080/00222933508655081>
- Benson, R.B. (1946) Classification of the Cephidae (Hymenoptera Symphyta). *Transactions of the Royal Entomological Society of London*, 96, 89–108.  
<https://doi.org/10.1111/j.1365-2311.1946.tb00445.x>
- Benson, R.B. (1951) Hymenoptera, Symphyta. *Handbooks for the Identification of British Insects*, 6(2a), 1–49.
- Benson, R.B. (1968) Hymenoptera from Turkey, Symphyta. *Bulletin of the British Museum (Natural History) Entomology*, 22, 111–207.  
<https://doi.org/10.5962/bhl.part.9952>
- Budak, M., Korkmaz, E.M. & Basibuyuk, H.H. (2011) A molecular phylogeny of the Cephinae (Hymenoptera, Cephidae) based on mtDNA COI gene: a test of traditional classification. *Zookeys*, 130, 363–378.  
<https://doi.org/10.3897/zookeys.130.1466>
- Burggraaf-van Nierop, Y.D. & van Achterberg, C. (1990) De Cephidae en Argidae van Nederland (Hymenoptera). *Zoologische Bijdragen* (Leiden), 39, 1–66.
- Chevin, H. (1985) Contribution à la faune de l'Iran 26. Hyménoptères Symphytes. *Nouvelle Revue d'Entomologie. Nouvelle Série, Paris* [1984], 347–351.
- Dadurian, H.B. (1962) On the Sawflies and the Horntails of Armenian SSR (Insecta: Hymenoptera: Symphyta). *Academy of Sciences of Armenian SSR Zoological Institute, zoological paper*, 12, 63–98.
- Esmaili, M., Mirkarimi, A.A. & Azmayesh Fard, P. (2006) *Agricultural entomology, destructive insects, mites, rodents, milks and their control*. University of Tehran Press. 550 pp. [in Persian]
- Farahbakhsh, Gh. (1961) Cephidae (Hymenoptera). In: Farahbakhsh, Gh. (ed.), *A checklist of economically important insects and other enemies of plants and agricultural products in Iran*. Tehran, Iran, Department of Plant Protection, Ministry of Agriculture Publication, p. 111.
- Ghadiri, V. (1993) Surveying of infestation and damage of cereal sawfly (*Cephus pygmaeus* L.) in various cultivars of wheat and barley. *Journal of the Entomological Society of Iran*, 12 & 13, 4–5.
- Ghadiri, V. (1994) Studies on the biological features of cereal sawflies (*Cephus pygmaeus* L.) in Karadj district. *Journal of the Entomological Society of Iran*, 14, 27–33.
- Ghadiri, V. (2000) Research of fenitrothion effect (used on sunn pest) on reduction of population density of cereal sawfly (*Cephus pygmaeus* L.). *Journal of Agricultural Sciences, Islamic Azad University*, 6(3), 57–63.
- Ghadiri, V. & Safai, N. (2001) Effect of plant density on infestation of wheat by cereal stem sawfly (*Cephus pygmaeus* L.). *Seed and Plant*, 17, 286–293.
- Ghahari, H., Huang, J., Ostovan, H. & Rastegar, J. (2010) Notes on the Iranian fauna of Pteromalidae (Hymenoptera). *Efflatounia*, 10, 21–25.
- Ghahari, H. & Huang, J. (2012) A study of the Pteromalidae (Hymenoptera: Chalcidoidea) from western and northwestern Iran. *Archives of Biological Sciences*, 64, 353–357.  
<https://doi.org/10.2298/ABS1201353G>
- Gussakovskij, V.V. (1935) Insectes Hyménoptères, Chalastogastra 1. *Fauna SSSR*, 2(1), 1–453.

- Jansen, E. (1998) Die Gattung *Hartigia* Schiodte 1838 in Europa. In: Taeger, A. & Blank, S.M. (eds.), *Pflanzenwespen Deutschlands (Hymenoptera, Symphyta) Kommentierte Bestandsaufnahme*. Goecke & Evers, Keltern, pp. 301–318.
- Khalaf, J. (1995) The biology and control of wheat stem sawfly (*Trachelus tabidus*) in Fars province. *Proceedings of 12<sup>th</sup> Iranian Plant Protection Congress*, p. 18.
- Khanjani, M. (2006) *Field Crop Pests in Iran*. Third edition, Bu-Ali Sina University. 719 pp. [in Persian]
- Khayrandish, M., Talebi, A.A. & Blank, S.M. (2017) Checklist of sawflies (Hymenoptera: Symphyta) from Iran. *Journal of Insects Biodiversity and Systematics*, 3(3), 165–227.
- Khayrandish, M. & Ebrahimi, E. (2018) Sawflies (Hym.: Symphyta) of Hayk Mirzayans Insect Museum with four new records for the fauna of Iran. *Journal of Entomological Society of Iran*, 37(4), 381–404.  
<https://doi.org/10.22117/jesi.2018.115354>
- Klima, A. (1937) Cephidae. Syntexidae, In: Hedicke, H. (ed.), *Hymenopterorum Catalogus. Vol. 2*. W. Junk, 's-Gravenhage. pp. 1–53.
- Korkmaz, E.M., Budak, M., Hastaoğlu Örgen, S., Bağda, E., Gençer, L., Ülgentürk, S. & Basibuyuk, H.H. (2010a) New records and a checklist of Cephidae (Hymenoptera: Insecta) of Turkey with a short biogeographical consideration. *Turkish Journal of Zoology*, 34, 203–211.  
<https://doi.org/10.3906/zoo-0812-19>
- Korkmaz, E.M., Örgen, S.H., Gençer, L., Ülgentürk, S. & Başibüyük, H.H. (2010b) Determination of some wheat pests and their parasitoids in wheat fields of Central Anatolia Region. *Türkiye Entomoloji Dergisi*, 34, 361–377.
- Liston, A.D. & Jacobs, H.J. (2012) Review of the sawfly fauna of Cypress, with descriptions of two new species. *Zoology in the Middle East*, 56, 67–84.  
<https://doi.org/10.1080/09397140.2012.10648943>
- Liu, L., Choi, J.-K., Lee, J.-W. & Wei, M. (2018) A new genus and new species of Hartigiinae (Hymenoptera: Cephidae) from South Korea with a key to genera of Korean Cephidae. *Entomological News*, 127(4), 336–342.  
<https://doi.org/10.3157/021.127.0405>
- Miller, R.H., El-Masri, S. & Al-Jundi, K. (1993) Plant density and wheat stem sawfly (Hymenoptera: Cephidae) resistance in Syrian wheats. *Journal Bulletin of Entomological Research*, 83, 95–102.  
<https://doi.org/10.1017/S0007485300041821>
- Modarres Awal, M. (2012) Cephidae, In: Modarres Awal, M. (ed.), *List of agricultural pests and their natural enemies in Iran, third edition*. Ferdowsi University Press, p. 486.
- Muche, H. (1981) Die Cephidae der Erde (Hymenoptera: Cephidae). *Deutsche Entomologische Zeitschrift*, 28, 234–295.
- Nemati, S. & Pezhman, H. (2014) Comparing the pests and natural enemies fauna and determining the prevailing species in wheat fields under no-tillage and conventional tillage systems in Marvdasht region (Fars province, Iran). *Applied Researches in Plant Protection*, 3(1), 1–17.
- Sahragard, A. (1977) Bioecology of *Cephus pigmaeus* L. *Proceedings of the 6th Iranian Plant Protection Congress*, p. 61.
- Sakenin, H., Raheb, J., Imani, S., Havaskary, M., Shirdel, F. & Mohseni, H. (2008) A preliminary survey on dipteran predators and parasitoids and Odonata in Iranian rice fields. *Proceedings of National Conference of Agronomical Rice Breeding, Qaemshahr Islamic Azad University*, 26–27 November, 14 pp. [in Persian, English summary]
- Samini, N., Sakenin, H., Imani, S. & Shojai, M. (2010) A contribution to the knowledge of robber flies (Diptera: Asilidae) from Tehran province and vicinity, Iran. *Journal of Biological Control*, 24(1), 42–46.
- Samini, N. & Farzaneh, M.H. (2016) A faunistic study on some families of Hymenoptera from Iran. *Wuyi Science Journal*, 32, 44–51.
- Schedl, W. (2009) Die Pflanzenwespen von Syrien (Hymenoptera: Symphyta) - ein Überblick. *Linzer biologische Beiträge*, 41(2), 1609–1630.

- Scheibelreiter, C.K. (1978) The poppy-cephid *Pachycephus smyrnensis* Stein (Hymenoptera: Cephidae). *Zeitschrift für Angewandte Entomologie*, 86(1), 19–25.  
<https://doi.org/10.1111/j.1439-0418.1978.tb01906.x>
- Shahrokhi, M.B. & Zare, A. (1995) The biology of barberry sawfly *Syrista parreyssii* Spinola (Hym.: Cephidae) in Khorasan province. *Proceedings of 12<sup>th</sup> Iranian Plant Protection Congress*, p. 270.
- Shanower, T.G. & Hoelmer, K.A. (2004) Biological Control of Wheat Stem Sawflies: Past and Future. *Journal of Agricultural and Urban Entomology*, 21, 197–221.
- Smith, D.R. & Schmidt, S. (2009) A new subfamily, genus, and species of Cephidae (Hymenoptera) from Australia. *Zootaxa*, 2034, 56–60.
- Taeger, A., Altehofer, E., Blank, S.M., Jansen, E., Kraus, M., Pschorn-Walcher, H. & Ritzau, C. (1998) Kommentare zur Biologie, Verbreitung und Gefährdung der Pflanzenwespen Deutschlands (Hymenoptera, Smphyta). In: Taeger, A. & Blank, S.M. (eds), *Pflanzenwespen Deutschlands (Hymenoptera, Symphyta)*. Kommentierte Bestandsaufnahme. Goecke & Evers, Keltern. 364 + 3 pp.
- Taeger, A., Blank, S.M. & Liston, A.D. (2010) World catalog of Symphyta (Hymenoptera). *Zootaxa*, 2580: 1–1064.  
<https://doi.org/0.11646/zootaxa.2580.1.1>
- Taeger, A., Liston, A.D., Prous, M., Groll, E.K., Gehroldt, T. & Blank S.M. (2018) *ECatSym – Electronic World Catalog of Symphyta (Insecta, Hymenoptera)*. Program version 5.0 (19 Dec 2018), data version 40 (23 Sep 2018). – Senckenberg Deutsches Entomologisches Institut (SDEI), Müncheberg. Available from: <https://sdei.de/ecatsym/> [Accessed: 20th December 2018]
- Ushinskij, A.V. (1936) Materialy k faune Tenthredinodea Turkmenskoy SSR. *Byulleten turkmenskoy zoologicheskoy stantsii, Ashkhabad and Baku*, 1, 103–115.
- Wei, M. (2008) On the genus *Syrista* Konow, with the description of a new species from China (Hymenoptera: Cephidae). *Entomological News*, 118(5), 450–458.  
[https://doi.org/10.3157/0013-872X\(2007\)118\[450:OTGSKW\]2.0.CO;2](https://doi.org/10.3157/0013-872X(2007)118[450:OTGSKW]2.0.CO;2)
- Wei, M.C. & Smith, D.R. (2010) Review of *Syrista* Konow (Hymenoptera: Cephidae). *Proceedings of the Entomological Society of Washington*, 112, 302–316.  
<https://doi.org/10.4289/0013-8797-112.2.302>
- Wei, M.C. & Nie, H.Y. (2007) Two new genera of Cephidae (Hymenoptera) from eastern Asia. *Acta Zootaxonomica Sinica*, 32, 109–113.
- Wei, M. & Xiao, M. 2011. A new genus and new species of Cephidae (Hymenoptera) from China with a key to genera of Hartigiini s. str. *Japanese Journal of Systematic Entomology*, 17(2), 185–191.
- Yefremova, Z., Ebrahimi, E. & Yegorenkova, E. (2007) The subfamilies Eulophinae, Entedoninae and Tetrastichinae in Iran, with description of new species (Hymenoptera: Eulophidae). *Entomofauna*, 28(30), 405–440.
- Zhelochovtsev, A.N. (1988) Order Hymenoptera. Suborder Symphyta (Chalastogastra). In: Medvedev, G.S. (ed.), *Keys to the Insects of the European Part of the USSR. Volume 3, Hymenoptera. Part 6. Symphyta*. E.J. Brill Academic Publisher, Leiden, pp. 1–432 [English translation, printed in 1994].

## چکلیست مشروح زنبورهای خانواده Cephidae (Hymenoptera: Symphyta: Cephoidea) ایران

ماهیر بوداک<sup>۱\*</sup>، ارتان ام کرکماز<sup>۱</sup> و حسن قهاری<sup>۲</sup>

۱ گروه زیست‌شناسی مولکولی و ژنتیک، دانشکده علوم، دانشگاه کوموری، ۵۸۱۴۰ سیواس، ترکیه.

۲ گروه گیاهپزشکی، واحد یادگار امام خمینی (ره) شهر ری، دانشگاه آزاد اسلامی، تهران، ایران.

\* پست الکترونیکی نویسنده مسئول مکاتبه: [mbudak@cumhuriyet.edu.tr](mailto:mbudak@cumhuriyet.edu.tr)

تاریخ دریافت: ۰۲ بهمن ۱۳۹۶، تاریخ پذیرش: ۰۱ بهمن ۱۳۹۷، تاریخ انتشار: ۰۷ بهمن ۱۳۹۷

**چکیده:** فون زنبورهای خانواده Cephidae (Hymenoptera: Symphyta: Cephoidea) براساس منابع و نمونه‌های جمع‌آوری شده معرفی شد. در مجموع، ۱۵ گونه و زیرگونه متعلق به شش جنس، *Calameuta* Konow (سه گونه)، *Cephus* Latreille (پنج گونه)، *Phylloecus* Newman (دو گونه)، *Pachycephus* Stein (دو گونه)، *Syrista* Konow (یک گونه) و *Trachelus* Jurine (دو گونه) ذکر گردید. گونه‌های *Pachycephus smyrnensis* *Phylloecus niger* (Harris, 1776) و *Trachelus libanensis* (André, 1881) و *smyrnensis* Stein, 1876 برای اولین بار از ایران گزارش شدند.

**واژگان کلیدی:** ساقه‌خوار، گزارش‌های جدید، پراکنش، کاتالوگ، ایران