

<https://doi.org/10.25221/fee.395.3>

<http://zoobank.org/References/03D6A3F8-7C91-4BE9-BC96-CCC384B397AC>

REVISED CHECKLIST OF THE GENUS *CERCERIS* (HYMENOPTERA: CRABRONIDAE) OF IRAN

M. Sadeghi^{1,2)}, M. Fallahzadeh^{3,*}, H. Ostovan²⁾, T. Ljubomirov⁴⁾, Sh. Hesami²⁾

1) *Department of Entomology, Fars Science and Research Branch, Islamic Azad University, Fars, Iran.*

2) *Department of Entomology, Shiraz Branch, Islamic Azad University, Shiraz, Iran.*

3) *Department of Entomology, Jahrom Branch, Islamic Azad University, Jahrom, Iran.*

**Corresponding author, E-mail: mfalahm@yahoo.com*

4) *Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Science, Sofia, Bulgaria.*

Summary. A revised checklist of 53 Iranian species and subspecies of the genus *Cerceris* Latreille, 1802 (Crabronidae) is provided. One species, *C. fimbriata* (Rossi, 1790), is newly recorded from Iran.

Key words: digger wasps, Apoidea, Crabronidae, Cercerini, *Cerceris*, distribution, fauna, new record, Iran.

М. Садехи, М. Фаллахзаде, Х. Остован, Т. Любомиров, Ш. Хесами.
Ревизованный список видов рода *Cerceris* (Hymenoptera: Crabronidae)
Ирана // Дальневосточный энтомолог. 2019. N 395. С. 14-22.

Резюме. Приводится ревизованный список 53 иранских видов и подвидов рода *Cerceris* Latreille, 1802 (Crabronidae). Впервые для Ирана указывается *C. fimbriata* (Rossi, 1790).

INTRODUCTION

Within the subfamily Philanthinae (Hymenoptera: Crabronidae), the tribe Cercerini Lepelletier de Saint Fargeau, 1845 is one of the largest tribes including about 907 species known in the world fauna (Pulawski, 2019). *Cerceris* Latreille, 1802 is the largest genus in Cercerini with over 867 species (Pulawski, 2019). The first comprehensive review of this genus in the Palaearctic was made by Schletterer (1887, 1889). Later, Kazenas (1984, 2001a) keyed species of *Cerceris* from Central Asia, whereas Schmidt (2000) revised and keyed the species of the Western Palaearctic. Moreover, Kazenas (2001b) reviewed their biology.

The first record of Iranian *Cerceris* was given by Schletterer (1887). In the following years, a number of species have been described or reported for the country. Recently, Jahantigh *et al.* (2017) listed 33 species of *Cerceris* from Iran. Here, we provide a revised list of species and subspecies from Iran and add one species to the fauna of this country.

All available literature sources were examined since 1887 to 2018. Surveys in 2015 and 2017 using some Malaise traps in the southern regions of Iran (Eghlid, Estahban, Jahrom,

Khafri, Kherameh, Khonj, Maharloo, Marvdasht, Noor Abad, Sar Kahnan) resulted in finding of some species of *Cerceris*. For identification, keys to the Central Asian and Western Palearctic species were used (Kazenas, 1984, 2001a; Schmidt, 2000). Material is deposited in the Department of Entomology, Shiraz Branch, Islamic Azad University, Shiraz, Iran and the Institute of Biodiversity and Ecosystem Research, Sofia, Bulgaria. Nomenclature and classification were taken from Kazenas (1984, 2001a), Schmidt (2000) and Pulawski (2019). The species are arranged alphabetically.

LIST OF THE IRANIAN SPECIES AND SUBSPECIES

Genus *Cerceris* Latreille, 1802

Cerceris abacta Shestakov, 1915

DISTRIBUTION IN IRAN. Fars (Atbaei *et al.*, 2014).

Cerceris albofasciata albofasciata (Rossi, 1790)

DISTRIBUTION IN IRAN. Ardabil (Samin *et al.*, 2015).

Cerceris angustata angustata F. Morawitz, 1893

DISTRIBUTION IN IRAN. South Khorasan (Schmidt, 2000).

Cerceris arenaria arenaria (Linnaeus, 1758)

DISTRIBUTION IN IRAN. East Azerbaijan (Ghazi-Soltani *et al.*, 2010b; Dollfuss, 2018; Samin *et al.*, 2018).

Cerceris bracteata Eversmann, 1849

DISTRIBUTION IN IRAN. West Azerbaijan (Samin & Bagriacik, 2016).

Cerceris bupresticida bupresticida Dufour, 1841

DISTRIBUTION IN IRAN. Ardabil, East Azerbaijan, Fars, Golestan, Mazandaran Qazvin, South Khorasan, Tehran (de Beaumont, 1957; Schmidt, 2000; Rezaei & Fallahzadeh, 2015; Sadeghi *et al.*, 2016; Dollfuss, 2018; present study).

Cerceris cheskesiana Giner Mari, 1945

DISTRIBUTION IN IRAN. Fars (Sadeghi *et al.*, 2016; present study).

Cerceris circularis circularis (Fabricius, 1804)

DISTRIBUTION IN IRAN. Ardabil (de Beaumont, 1957; Schmidt & Bitsch, 1997).

Cerceris circularis dacica Schletterer, 1887

DISTRIBUTION IN IRAN. Qazvin (Morice, 1921).

Cerceris circularis magnifica Schletterer, 1887

DISTRIBUTION IN IRAN. Ardabil, Qazvin (Morice, 1921; de Beaumont, 1957).

***Cerceris conica* Shestakov, 1918**

DISTRIBUTION IN IRAN. Lorestan (Schmidt, 2000; Dollfuss, 2018).

***Cerceris deserticola* F. Morawitz, 1890**

DISTRIBUTION IN IRAN. Fars (Atbaei *et al.*, 2015).

***Cerceris dispar* Dahlbom, 1845**

DISTRIBUTION IN IRAN. Fars, Golestan, Kerman, Qazvin (de Beaumont, 1957; Schmidt & Bitsch, 1997; Schmidt, 2000; Sadeghi *et al.*, 2016; Dollfuss, 2018; present study).

***Cerceris dorsalis* Eversmann, 1849**

DISTRIBUTION IN IRAN. Kordestan (Sakenin *et al.*, 2010).

***Cerceris ephippium* R. Turner, 1912**

DISTRIBUTION IN IRAN. Sistan-o Baluchestan (Sakenin *et al.*, 2011).

***Cerceris eryngii eryngii* Marquet, 1875**

DISTRIBUTION IN IRAN. East Azerbaijan, Fars, Golestan, Hamadan, Kermanshah, Mazandaran, Qazvin, West Azerbaijan (de Beaumont, 1957; Schmidt, 2000; Sakenin *et al.*, 2011; Atbaei *et al.*, 2015; Samin *et al.*, 2015; Dollfuss, 2018; Ghahari, 2018).

***Cerceris euryanthe palaestina* de Beaumont, 1959**

DISTRIBUTION IN IRAN. Fars (Schmidt, 2000).

***Cerceris fimbriata* (Rossi, 1790)**

MATERIAL EXAMINED. Iran: Kazerun (Zavali), 29°32'53"N, 51°46'23"E, 828m), 1.IX.2017, 1♀, leg. M. Sadeghi.

DISTRIBUTION. Iran (**new record**): Fars. – Afghanistan, Armenia, Europe, Georgia, Israel, Kazakhstan, Mongolia, N Africa, Pakistan, Russia, Syria, Tajikistan, Turkey, Turkmenistan, Uzbekistan (Kazenas 1984, 2001a, Schmidt 2000, Pulawski 2019).

***Cerceris fimbriata pallidopicta* Radoszkowski, 1877**

DISTRIBUTION IN IRAN. Golestan, Kerman (Dollfuss, 2018).

***Cerceris flavicornis* Brullé, 1833**

DISTRIBUTION IN IRAN. Mazandaran (Dollfuss, 2018).

***Cerceris flavilabris flavilabris* (Fabricius, 1793)**

DISTRIBUTION IN IRAN. Alborz, Fars, Golestan, Guilan, Khorasan-e Razavi, Mazandaran, Qazvin, Tehran (de Beaumont, 1957; Schmidt & Bitsch, 1997; Schmidt, 2000; Ebrahimi, 2005, 2014; Atbaei *et al.*, 2015; Dollfuss, 2018; Ghahari, 2018).

***Cerceris gaetula* de Beaumont, 1951**

DISTRIBUTION IN IRAN. Fars (Atbaei *et al.*, 2014).

***Cerceris gaetula aegyptiaca* K. Schmidt, 2000**

DISTRIBUTION IN IRAN. Fars ((Sadeghi *et al.*, 2016; present study).

***Cerceris gusenleitneri* K. Schmidt, 2000**

DISTRIBUTION IN IRAN. Alborz (Schmidt, 2000).

***Cerceris hathor* Pulawski, 1983**

DISTRIBUTION IN IRAN. Hormozgan, Kerman (Dollfuss, 2018).

***Cerceris integra* F. Morawitz, 1894**

DISTRIBUTION IN IRAN. Kerman (Dollfuss, 2018).

***Cerceris lunata* Costa, 1867**

DISTRIBUTION IN IRAN. Golestan, Kerman (Dollfuss, 2018; Samin *et al.*, 2018).

***Cerceris media* Klug, 1835**

DISTRIBUTION IN IRAN. Ardabil, Kerman, Kermanshah (Ebrahimi, 2014; Dollfuss, 2018).

***Cerceris odontophora* Schletterer, 1887**

DISTRIBUTION IN IRAN. Sistan-o Baluchestan (de Beaumont, 1957, 1960; Bohart & Menke, 1976; Schmidt & Bitsch, 1997; Schmidt, 2000).

***Cerceris pharaonum* Kohl, 1898**

DISTRIBUTION IN IRAN. Sistan-o Baluchestan (de Beaumont, 1970; Bohart & Memke, 1976).

***Cerceris pulchella* Klug, 1845**

DISTRIBUTION IN IRAN. Kerman (Sakenin *et al.*, 2010).

***Cerceris quadricincta quadricincta* (Panzer, 1799)**

DISTRIBUTION IN IRAN. Alborz, East Azerbaijan, Ilam, Khorasan-e Razavi, Lorestan, Mazandaran (de Beaumont, 1957; Schmidt & Bitsch, 1997; Schmidt, 2000; Ghazi-Soltani *et al.*, 2010a, 2010b, 2010c; Ebrahimi, 2014; Dollfuss, 2018; Ghahari, 2018).

***Cerceris quadrifasciata* (Panzer, 1799)**

DISTRIBUTION IN IRAN. Isfahan (Ghahari, 2018).

***Cerceris rubida conjuncta* Schletterer, 1887**

DISTRIBUTION IN IRAN. Ardabil, Golestan, Qazvin (Schletterer, 1887; de Beaumont, 1957).

***Cerceris rubida pumilio* Giner Mari, 1945**

DISTRIBUTION IN IRAN. Without exact locality (Schmidt, 2000).

***Cerceris rubida rubida* (Jurine, 1807)**

DISTRIBUTION IN IRAN. Ardabil, Fars, Qazvin (Schmidt & Bitsch, 1997; Schmidt, 2000; Rezaei & Fallahzadeh, 2015; Sadeghi *et al.*, 2016; present study).

***Cerceris ruficornis* (Fabricius, 1793)**

DISTRIBUTION IN IRAN. West Azerbaijan (Samin & Bagriacik, 2016).

***Cerceris rybyensis rybyensis* (Linnaeus, 1771)**

DISTRIBUTION IN IRAN. Alborz, East Azerbaijan, Guilan, Mazandaran (Schmidt & Bitsch, 1997; Schmidt, 2000; Abd-Rabou *et al.*, 2005; Ghazi-Soltani *et al.*, 2010a, 2010b; Sakenin *et al.*, 2010; Samin *et al.*, 2010; Ghahari *et al.*, 2014; Samin & Bagriacik, 2015).

***Cerceris sabulosa sabulosa* (Panzer, 1799)**

DISTRIBUTION IN IRAN. Alborz, Ardabil, East Azerbaijan, Fars, Guilan, Khorasan-e Razavi, Mazandaran, Qazvin, West Azerbaijan (Morice, 1921; de Beaumont, 1957, 1970; Schmidt, 2000; Ebrahimi, 2005; Sakenin *et al.*, 2010; Ebrahimi, 2014; Atbaei *et al.*, 2015; Rezaei & Fallahzadeh, 2015; Samin & Bagriacik, 2016; present study).

***Cerceris schaeuffelei* de Beaumont, 1970**

DISTRIBUTION IN IRAN. Khuzestan, Fars, Sistan-o Baluchestan (de Beaumont, 1970; Bohart & Memke, 1976; Schmidt, 2000).

***Cerceris schlettereri* Radoszkowski, 1888**

DISTRIBUTION IN IRAN. Without exact locality (de Dalla Torre, 1897).

***Cerceris shestakoviana* Gussakovskij, 1952**

DISTRIBUTION IN IRAN. Golestan (Dollfuss, 2018).

***Cerceris solitaria* Dahlbom, 1845**

DISTRIBUTION IN IRAN. Hormozgan (Ebrahimi, 2014).

***Cerceris spectabilis* Radoszkowski, 1886**

DISTRIBUTION IN IRAN. Golestan, Sistan-o Baluchestan (Schletterer, 1887; de Beaumont, 1970; Bohart & Memke, 1976; Schmidt, 2000).

***Cerceris specularis specularis* A. Costa, 1867**

DISTRIBUTION IN IRAN. East Azerbaijan, Fars, Golestan, Lorestan (Atbaei *et al.*, 2015; Dollfuss, 2018; present study).

***Cerceris spinipectus accola* Kohl, 1916**

DISTRIBUTION IN IRAN. Fars, Golestan, Guilan, Kermanshah, Khorasan (Schmidt, 2000; Sakenin *et al.*, 2010; Ebrahimi, 2014; Atbaei *et al.*, 2015).

***Cerceris straminea komarovii* Radoszkowski, 1886**

DISTRIBUTION IN IRAN. Khuzestan, South Khorasan (de Beaumont, 1970; Bohart & Menke, 1976; Schmidt, 2000; Dollfuss, 2018).

***Cerceris stratiotes* Schletterer, 1887**

DISTRIBUTION IN IRAN. East Azerbaijan (Dollfuss, 2018).

***Cerceris tetradonta* Cameron, 1890**

DISTRIBUTION IN IRAN. Khuzestan (Schmidt, 2000).

***Cerceris tricolorata tricolorata* Spinola, 1839**

DISTRIBUTION IN IRAN. East Azerbaijan, Kerman, Sistan-o Baluchestan, Tehran (de Beaumont, 1957; Ghazi-Soltani *et al.*, 2010c; Ebrahimi, 2014; Dollfuss, 2018).

***Cerceris tuberculata tuberculata* (de Villers, 1789)**

DISTRIBUTION IN IRAN. Alborz, Mazandaran, Qazvin, South Khorasan, Yazd (de Beaumont, 1957, 1970; Bohart & Memke, 1976; Schmidt & Bitsch, 1997; Schmidt, 2000; Lehr *et al.*, 2007; Hayat *et al.*, 2008; Ebrahimi, 2014; Ghahari *et al.*, 2014).

***Cerceris turneri* Shestakov, 1918**

DISTRIBUTION IN IRAN. Charmahal-o Bakhtiari (Turner, 1912; Shestakov, 1918; Bohart & Memke, 1976).

***Cerceris vagans* Radoszkowski, 1877**

DISTRIBUTION IN IRAN. Fars, Hormozgan, Qazvin, South Khorasan, Tehran (de Beaumont, 1957, 1970; Schmidt, 2000; Atbaei *et al.*, 2015; Rezaei & Fallahzadeh, 2015; Fallahzadeh *et al.*, 2018; present study).

***Cerceris* spp.**

RECORDS IN IRAN. Undetermined species of *Cerceris* have been recorded from East Azerbaijan, Khorasan-e Razavi, Qazvin, South Khorasan (Morice, 1921; Beaumont, 1970; Ghazi-Soltani *et al.*, 2010c; Rasekh Adel *et al.*, 2011, 2012).

DISCUSSION

During the course of the three years study period, 10 species of *Cerceris* were collected and identified. Among them, one species, *C. fimbriata* (Rossi, 1790) is first record for the Iranian insect fauna. A total of 53 valid species/subspecies are now known from Iran, i.e. about 18.74% of the Palaearctic fauna. A comparison of the number of Iranian *Cerceris* species with those recorded for other countries such as Russia (with 62 species/subspecies, Antropov *et al.*, 2017) and Kazakhstan (with 51 species/subspecies, Kazenas, 1984) indicates that the fauna of this genus in Iran is relatively poorly known. Species of *Cerceris* have been recorded from only 24 of 31 Iranian provinces. Among them, Fars with 17 recorded species/subspecies has the highest diversity, followed by Golestan and Qazvin provinces with 12 and 11 species/subspecies, respectively. Kordestan, Hamadan, Charmahal-o Bakhtiari, Ilam, Yazd and Isfahan provinces with only one recorded species/subspecies have the lowest number of recorded species.

So far as their biology is known, members of *Cerceris* are ground nesting (Kazenas, 2001b). The majority reported sites have been sand clay or gravel clay, generally on level ground, and often near dirt roads, paths, or structures such as brick walls or walls of buildings (Bohart & Menke 1976; Ebrahimi, 2005). Currently, no data are available about biology and behavior of species of *Cerceris* in Iran. Further investigations on distribution, biology and behavior of species of this genus, should be supported.

ACKNOWLEDGMENTS

We are most grateful to Dr. Wojciech J. Pulawski (California Academy of Science, USA) for his careful reading and helpful comments that substantially improved the present paper. The research was supported by Islamic Azad University, Shiraz Branch, Shiraz, Iran and Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Sofia, Bulgaria. In the later institution it was a part of the project ANIDIV 2 (Population structure, species diversity and associations of animals in natural and influenced ecosystems) – chapter 24: Investigations of the Hymenopteran fauna (Insecta: Hymenoptera) of Turkey and the Middle East.

REFERENCES

- Abd-Rabou, S., Ghahari, H., Mauss, V. & Plant, J. 2005. New records of Apidae, Andrenidae, Sphecidae and Vespidae (Hymenoptera) from Iran. *Egyptian Journal of Agricultural Research*, 83: 1613–1618.
- Antropov, A.V., Astafurova, Yu.V., Belokobylskij, S.A., Byvaltsev, A.M., Danilov, Yu.N., Dubovikoff, D.A., Fadeev, K.I., Fateryga, A.V., Kurzenko, N.V., Lelej, A.S., Levchenko, T.V., Loktionov, V.M., Mokrousov, M.V., Nemkov, P.G., Proshchalykin, M.Yu., Rosa P., Sidorov, D.A., Sundukov, Yu.N., Yusupov, Z.M. & Zaytseva, L.A. 2017. *Annotated Catalogue of the Hymenoptera of Russia. Volume I. Symphyta and Apocrita: Aculeata*. Zoological Institute RAS, St Petersburg. 475 pp. (Proceedings of the Zoological Institute RAS, Supplement 6).
- Atbaei, M., Fallahzadeh, M. & Ljubomirov, T. 2014. A contribution to the fauna of Crabronidae (Hymenoptera, Apoidea) in southern Fars Province, Iran. *21st Iranian Plant Protection Congress, Urmia University, 23-26 August 2014, Urmia, Iran*, p. 761.
- Atbaei, M., Fallahzadeh, M. & Ljubomirov, T. 2015. A contribution to the fauna of Crabronidae (Hymenoptera, Apoidea) in South-Western Iran. *Journal of Insect Biodiversity*, 3(11): 1–30. DOI: <https://doi.org/10.12976/jib/2015.3.11>
- Bohart, R.M. & Memke, A.S. 1976. *Sphecid Wasps of the World. A generic revision*. University of California Press, Berkeley, Los Angeles, London. 695 pp.
- de Beaumont, J. 1957. Sphecidae du nord de l'Iran (Hym.). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 30: 127–139.
- de Beaumont, J. 1960. Sphecidae de l'île de Rhodes (Hym.). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 33: 1–26.
- de Beaumont, J. 1970. Sphecidae de l'Iran (Hym.) (Résultats de voyages entomologiques de Willi Richter, Stuttgart, en Iran, en 1954 et 1956). *Stuttgarter Beiträge zur Naturkunde aus dem Staatlichen Museum für Naturkunde in Stuttgart*, 220: 1–18.
- de Dalla Torre, C. 1897. *Catalogus Hymenopterorum hucusque descriptorum systematicus et synonymicus. Volumen VIII: Fossores (Sphegidae)*. Guilelmi Engelmann, Lipsiae. I-VIII + 749 pp.
- Dollfuss, H. 2018. The sphecid wasps of the genus *Cerceris* Latreille, 1802 of the "Biologiezentrum Linz"– collection in Linz, Austria, from the Palearctic Region (part I). (Hymenoptera, Apoidea, Crabronidae). *Linzer Biologische Beiträge*, 50 (2):1125–1170.

- Ebrahimi, E. 2005. An identification guide to the Sphecidae of Iran (Insecta, Hymenoptera). *Journal of Entomological Society of Iran*, 24(2): 109–135.
- Ebrahimi, E. 2014. The list of Hymenoptera in the Hayk Mirzayans insect museum. Suborder Apocrita, superfamily Apoidea (Spheciformis series), families Ampulicidae, Sphecidae, Crabronidae. In: Askari H., Farazmand H., Hosseini Nezhad A., Manzari S., Mirabolfathi M., Mofidi-Neyestanak M., Morovati M., Zand E. & Zare, R. (Eds.), *Insects of Iran. Publication No. 20*. Iranian Research Institute of Plant Protection, Tehran. 62 pp.
- Fallahzadeh, M., Ljubomirov, T., Tavakoli Roodi, T. & Saghaei, N. 2018. A further contribution to the Crabronidae fauna (Hymenoptera, Apoidea, Spheciformes) of southern Iran. *Transactions of the American Entomological Society*, 144(3): 625–637. DOI: <https://doi.org/10.3157/061.144.0312>
- Ghahari, H. 2018. A faunistic study on digger wasps of Iran (Hymenoptera). *Natura Somo-gyiensis* 32: 125–32.
- Ghahari, H., Hayat, R., Lavigne, R. & Ostovan, H. 2014. An annotated checklist of Iranian Asilidae (Insecta: Diptera: Brachycera: Asilioidea). *Linzer Biologische Beiträge*, 46: 1379–1446.
- Ghazi-Soltani, G., Iranipur, S. & Ebrahimi, E. 2010a. The wasps of family Sphecidae (Hymenoptera), subfamilies Larrinae, Astatinae, Pemphredoninae, Nyssoninae and Philanthinae in East Azarbaijan province. *Iranian Journal of Plant Protection Science*, 41: 179–186.
- Ghazi-Soltani, G., Khaghaninia, S. & Shahim, K. 2010b. An introduction to sphecid wasps of Horand forest-Iran. *Munis Entomology and Zoology*, 5: 636–641.
- Ghazi-Soltani, G., Ebrahimi, E., Iranipur, S. & Farshbaf Pour Abad, R. 2010c. Sphecid wasps from East Azerbaijan province, Iran (Hymenoptera: Sphecidae). *Munis Entomology and Zoology*, 5: 796–803.
- Hayat, R., Ghahari, H., Lavigne, R. & Ostovan, H. 2008. Iranian Asilidae (Insecta: Diptera). *Turkish Journal of Zoology*, 32: 175–195.
- Jahantigh, F., Rakhshani, E., Mokhtari, A., & Ramroodi, S. 2017. Catalogue of Ampulicidae, Crabronidae and Sphecidae of Iran (Hymenoptera, Apoidea). *Zootaxa*, 4307: 1–96. DOI: <https://doi.org/10.11646/zootaxa.4307.1.1>
- Kazenas, V.L. 1984. *The digger wasps Cerceris of Central Asia and Kazakhstan*. Nauka Kazakhskoy SSR, Alma Ata, 232 pp. [In Russian]
- Kazenas, V.L. 2001a. A key to the identification of *Cerceris* Latreille (Hymenoptera, Sphecidae) of Kazakhstan and Middle Asia. *Tethys Entomological Research*, 3: 105–124.
- Kazenas, V.L. 2001b. *Fauna and biology of sphecid wasps (Hymenoptera, Sphecidae) of Kazakhstan and Central Asia*. Kazgos INTI, Almaty. 333 pp. [In Russian]
- Lehr, P., Ghahari, H. & Ostovan, H. 2007. A contribution to the robber flies of subfamilies Stenopogoninae and Asilinae (Diptera: Asilidae) from Iran. *Far Eastern Entomologist*, 173: 1–14.
- Morice, F. 1921. Annotated lists of Aculeate Hymenoptera (except Heterogyna) and Chrysids recently collected in Mesopotamia and North-West Persia. *The Journal of the Bombay Natural History Society*, 27: 816–828.
- Pulawski, W.J. 2019. Catalog of Sphecidae. Available at: http://www.calacademy.org/research/entomology/Entomology_Resources/Hymenoptera/sphecidae/Genera_and_species_PDF/introduction.htm (Accessed 18 May 2018).
- Rasekh Adel, M., Namaghi, H. & Hussein, M. 2011. Biodiversity of pollinator bees (Hym: Apoidea) in onion and alfalfa fields of Mashhad and Chenaran. *2nd Iranian Pest Management Conference (IPMC). 14 & 15 September 2011*. Kerman: 85.
- Rasekh Adel, M., Sadegi Namaghi, H. & Hosseini, M. 2012. Biodiversity of Apoidea (Insecta: Hymenoptera) associated with onion and alfalfa fields in Mashhad and Chenaran regions. *Iranian Journal of Plant Protection Science*, 43: 191–199. [In Persian]

- Rezaei, S. & Fallahzadeh, M. 2015. New data on the digger wasps (Hymenoptera, Apoidea: Crabronidae) in Southern Iran. *Far Eastern Entomologist*, 303: 1–18.
- Sadeghi, M., Fallahzadeh, M., Ostovan H., Ljubomirov, T. & Hesami S. 2016. New records of nine crabronid wasps (Hymenoptera: Crabronidae) from Iran. *Proceedings of 22nd Iranian Plan Protection Congress, 27-30 August, Karaj, College of Agriculture and Natural Resources, University of Tehran, Karaj, Iran*, p. 431.
- Sakenin, H., Samin, N. & Bagriacik, N. 2010. A contribution to the aculeate Hymenoptera (Insecta) from Iran. *Efflattounia*, 10: 15–20.
- Sakenin, H., Samin, N., Bagriacik, N. & Rastegar, J. 2011. A study of the Sphecidae (Hymenoptera) from various regions of Iran. *Calodema*, 161: 1–4.
- Samin, N. & Bagriacik, N. 2016. A study on Crabronidae and Megachilidae (Hymenoptera: Apoidea) from West Azarbaijan province, Northwest of Iran. *Entomofauna*, 37: 493–504.
- Samin, N., Nemkov, P. & Bagriacik, N. 2018. New records of Crabronidae and Sphecidae (Hymenoptera: Apoidea) from Iran. *Calodema*, 651: 1-4.
- Samin, N., Sakenin, H. Bagriacik, N. & Monaem, R. 2015. A study on Sphecidae and Crabronidae from Iran (Hymenoptera: Apoidea). *Entomofauna*, 36: 193–200.
- Schmidt, K. 2000. Bestimmungstabelle der Gattung *Cerceris* Latreille, 1802 in Europa, dem Kaukasus, Kleinasien, Palästina und Nordafrika (Hymenoptera, Sphecidae, Philanthinae). *Stapfia*, 71: 1–325.
- Schmidt, K. & Bitsch, J. 1997. Sous-famille des Philanthinae. In: Bitsch, J., Barbier, I., Gayubo, S., Schmidt, K. & Ohl, M. (Eds), *Faune de France. France et régions limitrophes. 82 Hymenopteres Sphecidae d'Europe occidentale. Volume 2*. Fédération Française des Sociétés de Sciences Naturelles, Paris. pp. 283-372.
- Shestakov, A. 1918. Matériaux pour servir a une faune des guêpes du genre *Cerceris* Latr. (Hymenoptera, Crabronidae). *Annuaire du Musée Zoologique de l'Académie des Sciences de Russie*, 22: 118–166. [In Russian and Latin]
- Schletterer, A. 1887. Die Hymenopteren-Gattung *Cerceris* Latr. mit vorzugsweiser Berücksichtigung der paläarktischer Arten. *Abteilung für Systematik, Geographie und Biologie der Tiere*, 2: 349–510.
- Schletterer A. 1889. Nachträgliches über die Hymenopteren-Gattung *Cerceris* Latr. *Zoologische Jahrbücher. Abtheilung für Systematik, Geographie und Biologie der Thiere*, 4: 879–904.
- Turner, R. 1912. A monograph of wasps of the genus *Cerceris* inhabiting British India. With notes on other Asiatic species. Part II. *The Journal of the Bombay Natural History Society*, 21: 794–819, plates C-D.