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A CHECKLIST OF IRANIAN SCOLIIDAE (HYMENOPTERA: VESPOIDEA)

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ABSTRACT: The present work comprises a comprehensive faunistic list of the family Scoliidae (Hymenoptera) have been recorded from Iran so far. It includes 37 species and subspecies in 8 genera (*Proscolia* Rasnitsyn, *Campsomeriella* Betrem, *Campsomeris* Guérin, *Colpa* Dufour, *Dasyscolia* Bradley, *Micromeriella* Betrem, *Megascolia* Betrem and *Scolia* Fabricius) and two subfamilies (Proscoliinae and Scoliinae). Synonymies, local and global distribution data are given.

KEY WORDS: Hymenoptera, Vespoidea, Scoliidae, Checklist, Iran.

Scoliidae is a small family of solitary aculeate wasps belonging to the Vespoidea. They distribute widespread in tropical and warmer temperate zones. The family Scoliidae contains about 560 valid species in 43 valid genera in currently two subfamilies: Proscoliinae and Scoliinae (Osten, 2005b), of which 69 species are present in the western Palaearctic region (Osten, 2000), but only Scoliinae in the Central European (Osten, 1999).

Scoloids have an importance in terms of biological control. There is a worldwide very little information on the hosts of Scoliidae (Schulten, 2007). The scoliid larvae develop as ectoparasitoids of the second and third instars coleopteran larvae (Illingworth, 1919, 1921), usually Scarabeoidea and rarely Curculionoidea inhabiting the soil. For this reason, scoliid wasps have importance in biological balance of scarabeoid and curculionid pests of field crops (Day et al., 1981; Osten, 2005a, b; Gupta & Jonathan, 2003). Additionally scoliids are pollinators of various wild plants (Özbek & Anlaş, 2011).

Studies of the scoliid fauna of Iran have been conducted by various authors, major studies are those by Betrem (1927), Esmaili & Rastegar (1974), Tkalcu (1987), Osten (2000, 2005a, b), Osten et al. (2003), Sakenin et al. (2008, 2010), Fallahzadeh & Saghaei (2010), Makhan (2012), Samin & Bağrıaçık (2013) and many others. The first comprehensive faunistic study of the Iranian scoliid fauna was that by Osten et al. (2003), who recorded 43 scoliid taxa from Iran and neighbouring areas, of which 32 species were reported from Iran alone; several taxonomic problems were presented and solved in this study, in addition to dealing with the co-evolution and biology of scoliids and their hosts. The present study is a compilation of previous records of scoliid species from the fauna of Iran, using all available literatures.

MATERIALS AND METHODS

The published data on Scoliidae family in Iran was summarized in this paper. All the published records with provincial distribution are given together with

synonyms and general distribution. Classification, nomenclature and distribution data of Scoliidae suggested by Osten (2000, 2005a, b) and Fauna Europaea Web Service (2004) have been followed.

RESULTS

In the present study, a total of 37 scoliid species and subspecies in 8 genera and two subfamilies are recorded as the fauna of Iran.

Subfamily Proscoliinae Rasnitsyn, 1977

Genus *Proscolia* Rasnitsyn, 1977

***Proscolia archaica* Rasnitsyn, 1977**

Distribution in Iran: East Azarbaijan (Osten et al., 2003).

Distribution outside Iran: Armenia (Day et al., 1981; Osten & Özbek, 1999), Arazdayan near the Turkish-Iranian border, the river Aras (Osten & Özbek, 1999).

Subfamily Scoliinae Latreille, 1802

Tribe Campsomerini (Osten, 2001)

Genus *Campsomeriella* Betrem, 1941

***Campsomeriella thoracica thoracica* (Fabricius, 1787)**

Scolia thoracica Fabricius, 1787. *Scolia thoracica eriophora* Klug, 1832 (Osten, 2000; Osten et al., 2003).

Distribution in Iran: Alborz (Chahartaghi et al., 2002b), Bushehr, Hormozgan (Betrem, 1927; Osten et al., 2003), Golestan, Guilan, Khuzestan, Lorestan, Sistan & Baluchestan (Osten et al., 2003), East Azarbaijan (Samin & Bagriacik, 2013), Fars (Fallahzadeh & Saghaei, 2010), Kerman (Steinberg, 1962; Osten et al., 2003), Tehran (Chahartaghi Abineh, 2002; Osten et al., 2003).

Distribution outside Iran: Afghanistan, Crete, Cyprus, Dodecanese Is., Iraq, Jordan, Italy, Malta, North Aegean Is., North Africa (Morocco, Egypt), Spain, Syria (Osten, 2000), Greece (Osten, 2000; Osten & Arens, 2004), Oman (Osten, 2005c), Saudi Arabia (Gadallah, 2004), Turkey (Osten & Özbek, 1999; Osten, 2000; Özbek & Anlaş, 2007), UAE (Schulten, 2007). Distributed from Morocco to Iran and from southern Spain through southern Italy, southern Greece to Turkey, one of the most common scoliid wasps in Israel throughout the whole year (Osten, 2002).

Genus *Campsomeris* Guérin, 1838

***Campsomeris* sp.**

Distribution in Iran: Iran (no locality cited) (Esmaili & Rastegar, 1974).

Genus *Colpa* Dufour, 1841

***Colpa (Colpa) klugii* (Van der Liden, 1827)**

Scolia klugii Van der Linden, 1827.

Distribution in Iran: Guilan, Hormozgan (Osten et al., 2003), Iran (no locality cited) (Osten, 2000).

Distribution outside Iran: Albania, Balkans, Croatia, Pakistan, Portugal, Ukrain (Osten, 2000), Greece (Osten, 2000; Osten & Arens, 2004), Turkey (Madl, 1997; Osten & Özbek, 1999; Osten, 2000; Anlaş & Çevik, 2004; Tezcan et al., 2004; Özbek & Anlaş, 2007, 2011).

***Colpa (Crioscolia) moricei* (Saunders, 1901)**

Scolia (Trielis) moricei Saunders, 1901.

Distribution in Iran: Sistan & Baluchestan (Osten et al., 2003; Osten, 2002, 2005a).

Distribution outside Iran: Afghanistan (Osten, 2005a), Algeria, Israel (Osten, 2000, 2002, 2005a), Egypt, Turkey (Osten, 2000), Tajikistan (Osten, 2002; 2005a), Turkmenistan (Steinberg, 1962; Osten, 2000, 2002, 2005a).

Colpa (Colpa) sexmaculata (Fabricius, 1781)

Scolia interrupta Fabricius, 1782; *S. sareptana* Eversmann, 1849.

Distribution in Iran: Ardabil (Samin & Bagriacik, 2013), East Azarbaijan (Sakenin et al., 2008; Samin & Bagriacik, 2013), West Azarbaijan (Sakenin et al., 2010; Samin & Bagriacik, 2013).

Distribution outside Iran: Azerbeidjan (Steinberg, 1962), Central Europe, North Africa. Portugal to Balkan and Turkey to Southern Russia (Osten, 2000), Czech Republic, Slovakia (Bogusch, 2007), Greece (Osten & Arens, 2004; Shedl, 2010), Turkey (Tezcan et al., 2004).

Colpa (Heterelis) quinquecincta (Fabricius, 1793)

Scolia quinquecincta Fabricius, 1793; *Tiphia villosa* Fabricius, 1793; *Colpa continua* Lepelletier, 1845; *Elis villosa* Saussure & Sichel, 1964.

Distribution in Iran: Alborz, East Azarbaijan (Steinberg, 1962; Osten et al., 2003), Fars, Tehran (Osten et al., 2003), Golestan, Kerman (Osten et al., 2003 under *C. (Heterelis) quinquecincta* and *C. (Heterelis) quinquecincta quinquecincta f. abdominalis* (Spinola, 1806)), Khorasan (Osten et al., 2003 under *C. (Heterelis) quinquecincta quinquecincta f. abdominalis*), Mazandaran (Osten et al., 2003; Samin & Bagriacik, 2013), Kordestan (Sakenin et al., 2010), Sistan and Baluchestan (Osten et al., 2003 under *Colpa (Heterelis) quinquecincta rudaba* (Kirby, 1889)), Iran (no locality cited) (Osten, 2005a).

Distribution outside Iran: Afghanistan, Armenia (Osten et al., 2003), Greece (Osten & Arens, 2004; Schedl, 2010), Kazakhstan, Kirgizstan, Tajikistan, Turkmenistan (Osten, 2005a), Israel, Morocco, Portugal, the Balkans, Ukraine (Osten, 2000), Slovakia (Bogusch, 2007), South Europe except Iberian Peninsula (Tüzün, 2004), Turkey (Madl, 1997; Osten & Özbek, 1999; Tüzün & Bağriacık, 2000; Tüzün, 2004; Anlaş & Çevik, 2004; Tezcan et al., 2004; Osten, 2005a; Japoshvili & Karaca, 2010; Özbek & Anlaş, 2007, 2011).

Comments: This form was considered the synonym of *C. quinquecincta armeniaca* Steinberg, 1962 and *C. quinquecincta rudaba* (Kirby, 1889) by (Osten, 2000, 2005b).

Colpa (Heterelis) quinquecincta f. abdominalis (Spinola, 1806)

Scolia abdominalis Spinola, 1806; *Campsoscolia (Campsoscolia) armeniaca* Steinberg, 1962.

Distribution in Iran: Golestan, Kerman, Khorasan, Tehran (Tkalcu, 1987 as *C. qu. rudaba*).

Distribution outside Iran: Azerbaijan, Turkmenistan (Steinberg, 1962), Mediterranean region to Israel (Osten, 2000), Greece (Osten & Arens, 2004), Turkey (Madl, 1997; Osten & Özbek, 1999). Widespread in the eastern Mediterranean region to Iran and Turkmenistan, southern Italy, Israel (Osten, 2002).

Colpa (Heterelis) quinquecincta rudaba (Kirby, 1889)

Elis rudaba Kirby, 1889; Misidentified as *Campsomeris erigone* Bingham, 1897 (Tkalcu, 1987).

Distribution in Iran: Sistan and Baluchestan (Osten et al., 2003).

Distribution outside Iran: Pakistan (Osten, 2000)

Genus *Dasyscolia* Bradley, 1951***Dasyscolia ciliata araratrica (Radoskovsky, 1890)***

Tiphia ciliata Fabricius, 1787 [nominotypical subspecies]. *Dielis araratrica* Radoskovsky, 1890 (Osten, 2000; Osten et al., 2003).

Distribution in Iran: Alborz (Chahartaghi et al., 2002b), Ardabil (Sakenin et al., 2010), Chaharmahal and Bakhtiari, Isfahan (Osten et al., 2003), Fars (Osten et al., 2003; Fallahzadeh & Saghaei, 2010), Golestan, Hamadan, Khorasan, Khuzestan, Mazandaran (Steinberg, 1962; Osten et al., 2003), Tehran (Chahartaghi Abineh, 2002; Osten et al., 2003), Iran (no locality cited) (Esmaili & Rastegar, 1974).

Distribution outside Iran: Greece (Osten & Arens 2004), Israel (Bodenheimer, 1937 as *Dasyscolia araratrica*; Osten, 2000, 2002), Turkey (Bradley, 1950; Osten & Özbek, 1999; Osten, 2000, 2002; Anlaş & Çevik, 2004; Tezcan et al. 2004; Özbek & Anlaş, 2007, 2011).

***Dasyscolia ciliata ciliata* (Fabricius, 1787)**

Tiphia ciliata Fabricius, 1787 [nominotypical subspecies]. *Scolia aurea* Fabricius, 1793. *Colpa rufa* Lepeletier, 1845 (Osten, 2005b).

Distribution in Iran: Fars (Fallahzadeh & Saghaei, 2010).

Distribution outside Iran: Balearic Is., Greece, Malta, North Africa (Egypt, Morocco), Portugal, Spain (Osten & Arens, 2004).

Genus *Micromeriella* Betrem, 1972***Micromeriella aureola aureola* (Klug, 1832)**

Scolia aureola Klug 1832. *Scolia fasciatella* Gerstaecker, 1862.

Distribution in Iran: Hormozgan, Sistan and Baluchestan (Osten et al., 2003).

Distribution outside Iran: Oman (Osten, 2005c), Saudi Arabia (Gadallah, 2004), Sudan, Morocco and Canary Island (Osten, 2000), UAE (Schulten, 2007 as *Lobhargita aureola aureola*). This subspecies is rather common in the Sahel area of the Afrotropical region, the Palaearctic area, and the Arabian Peninsula (Schulten, 2007 as *Lobhargita aureola aureola*).

***Micromeriella hyalina angulata* (Morawitz, 1888)**

Dielis angulata Morawitz, 1888. *Campsomeris angulata* (Morowitz, 1888) (in Steinberg, 1962).

Distribution in Iran: Bushehr, East Azarbaijan, Fars, Hormozgan, Kerman, Khurasan, Sistan and Baluchestan (Steinberg, 1962; Osten et al., 2003), Iran (no locality cited) (Osten, 2000).

Distribution outside Iran: Afghanistan, Pakistan (Osten et al., 2003), Israel (Osten, 2000, 2002), Kazakhstan, Uzbekistan (Osten, 2005a), Turkmenistan (Osten, 2000, 2002; Osten et al., 2003), Turkey (Osten & Özbek, 1999; Özbek & Anlaş, 2011).

Tribe *Scoliini* Osten, 2001**Genus *Megascolia* Betrem, 1928*****Megascolia bidens* (Linnaeus, 1767)**

Sphex bidens (Linnaeus, 1767).

Distribution in Iran: East Azarbaijan (Sakenin et al., 2010), Mazandaran, Semnan, West Azarbaijan (Samin & Bagriacik, 2013).

Distribution outside Iran: Balearic Islands, Dodecanese Islands, Portugal, Near East (including Asian Turkey, Georgia, Armenia, Azerbaijan, Lebanon, Russia, Syria, Israel, Jordan, Arabian Peninsula, Iraq), North Africa, Israel (Bodenheimer, 1937; Osten, 2002), Algeria, Morocco, Tunisia (Osten, 2002).

***Megascolia (Regiscolia) maculata maculata* (Drury, 1773)**

Sphex maculata Drury, 1773. *Scolia flavifrons* (Fabricius, 1775). *Triscolia flavifrons haemorrhoidalis* Fabricius, 1787. *Scolia haemorrhoidalis* Eversmann, 1849. *Scolia (Lacosi) versicolor* Saussure, 1859.

Distribution in Iran: Bushehr, Isfahan, Guilan, Hormozgan, Khuzestan, Lorestan, Sistan and Baluchestan (Osten et al., 2003), East Azarbaijan (Sakenin et al., 2010), Fars (Osten et al., 2003; Fallahzadeh & Saghaei, 2010), Golestan (Tkalcu, 1987; Osten et al., 2003), Mazandaran (Osten et al., 2003; Samin & Bagriacik, 2013), Semnan (Makhan, 2012), Tehran (Chahartaghi Abineh, 2002; Osten et al., 2003), Iran (no locality cited) (Esmaili & Rastegar, 1974 as *M. flavifrons haemorrhoidalis*).

Distribution outside Iran: Entire Mediterranean region, ranging from France to Greece, Eastern Mediterranean to Turkmenistan (Osten, 2000). Albania, Austria, Bosnia and Herzegovina, Bulgaria, Crete, Croatia, Cyclades Is., Dodecanese Is., France, Iraq, Hungary, Macedonia, North Africa, Romania, Russia South, Turkmenistan, Slovenia, Czech Republic (Bogusch et al., 2011), South parts of the Mediterranean region, South European subspecies reaches Central Europe, Turkey to Central Asia (Macek et al., 2010), Greece (Osten & Arens, 2004; Schedl, 2010), Israel (Bodenheimer, 1937 as *Megascolia flavifrons haemorrhoidalis*; Osten, 2002), Italy (Schedl, 2007), Slovakia (Bogusch, 2007), Turkey (Tkalcu, 1987; Madl, 1997; Osten & Özbek, 1999; Osten, 2000; Anlaş & Çevik, 2004; Tezcan et al., 2004; Japoshvili & Karaca, 2010; Özbek & Anlaş, 2007, 2011).

***Megascolia (Regiscolia) rubida* (Gribodo, 1893)**

Triscolia haemorrhoidalis var. *rubida* Gribodo 1893; *Scolia insignis* Saussure, 1858.

Distribution in Iran: Iran (no locality cited) (Steinberg, 1962; Osten et al., 2003), Iran (no locality cited) (Osten, 2000).

Distribution outside Iran: Afghanistan (Osten, 2000; Osten et al., 2003), India (Kumar, 2012), Kazakhstan (Osten et al., 2003), Kirgizstan, Uzbekistan (Osten, 2005a; Osten et al., 2003), Pakistan (Osten et al., 2003; Kumar, 2012), Tadzikistan (Osten, 2005a), Turkmenistan (Osten, 2000; Kumar, 2012).

Genus *Scolia* Fabricius, 1775***Scolia (Scolia) aenigmatica* Betrem, 1928**

Distribution in Iran: Khorasan (Steinberg, 1962), Qazvin (Osten et al., 2003), Tehran (Osten, 2005a), Iran (no locality cited) (Betrem, 1935; Osten, 2005a).

Distribution outside Iran: Afghanistan, Pakistan, Turkmenistan (Osten, 2005a; Osten et al., 2003), Azerbeidjan, Iraq, Tadzhikistan, Uzbekistan (Osten, 2005a), Turkey (Osten, 2000; Özbek & Anlaş, 2007).

***Scolia (Scolia) aenigmatica mesopotamica* Betrem, 1935**

Distribution in Iran: East Azarbaijan, Golestan, Mazandaran (Steinberg, 1962; Osten et al., 2003).

Distribution outside Iran: Iraq (Osten et al., 2003), Mesopotamia, Transcaucasia (Betrem, 1935).

***Scolia (Discolia) affinis* Guérin, 1838**

Scolia affinis Guérin, 1838. *Scolia (Lacosi) jurinei* Saussure, 1855. *Scolia (Discolia) aureipennis* Lepeletier: Saussure & Sichel, 1864. *Scolia (Scolia) aureipennis* Lepeletier: Betrem, 1928; *Scolia (Discolia) jurinei* Saussure: Betrem & Bradley, 1964; *Scolia jurinei* Saussure: Bradley, 1974.

Distribution in Iran: Isfahan, Semnan (Samin & Bagriacik, 2013).

Distribution outside Iran: Ranges from Sri Lanka north through India and Bangladesh and eastward into Southeast Asia (Krombein, 1978), Bangladesh, India, Myanmar, Nepal, Pakistan (Kumar, 2012).

***Scolia (Scolia) anatoliae* Osten, 2004**

Scolia (Scolia) anatoliae Osten 2004: 204-208. *Scolia boeberi* Klug, 1805. *Scolia erythrocephala boeberi* Klug, 180. *Scolia eiyythrocephala infuscata* (Klug 1832). *Scolia kasakhstanica* (Steinberg, 1962).

Distribution in Iran: Fars (Fallahzadeh & Saghaei, 2010), Tehran (Osten et al., 2003 as *Scolia (Scolia) boeberi* Klug, 1805; Osten, 2004; Osten, 2005a).

Distribution outside Iran: Crete, Dodecanese Is., Kazakhstan, Kirgistan, Syria, Turkey, Turkmenistan, Uzbekistan (Osten & Özbek, 1999; Osten, 2004; Özbek & Anlaş, 2007, 2011).

***Scolia (Scolia) asiella* Betrem, 1935**

Distribution in Iran: Golestan, Sistan and Baluchestan (Osten et al., 2003), Iran (no locality cited) (Osten, 2000).

Distribution outside Iran: Armenia (Osten et al., 2003), Greece (Osten & Arens, 2004), Turkey (Betrem, 1935; Osten & Özbek, 1999; Osten, 2000; Anlaş & Çevik, 2004; Tezcan et al., 2004; Özbek & Anlaş, 2007, 2011).

***Scolia (Scolia) boeberi* Klug, 1805**

? *Elis (Trielis) fedtschenki* Saussure, 1880. ? *Scolia dejiani kasakhstanica* Steinberg, 1962.

Distribution in Iran: Tehran (Osten et al., 2003).

Distribution outside Iran: Crete, Rhodes, Turkey to Uzbekistan (Osten, 2000), Greece (Schedl, 2010; Osten & Arens, 2004), Turkey (Osten et al., 2003), Turkmenistan (Betrem, 1935).

***Scolia (Scolia) concolor* Eversmann, 1849**

Scolia incana Nagy, 1970.

Distribution in Iran: Kerman (Steinberg, 1962; Osten, 2005a), Khorasan (Osten et al., 2003).

Distribution outside Iran: China, Kazakhstan, Kyrgyzstan, Tadzhikistan (Nagy & Rumania, 1970; Osten, 2005a), Mongolia (Nagy & Rumania, 1970), Turkmenistan, Uzbekistan (Steinberg, 1962; Nagy & Rumania, 1970; Osten, 2005a), Turkey (Özbek & Anlaş, 2007).

***Scolia erivanensis* Radoskovski, 1879**

Distribution in Iran: Alborz (Esmaili & Rastegar, 1974), East Azarbaijan (Osten et al., 2003).

Distribution outside Iran: Armenia (Osten, 2000; Osten et al., 2003), Turkey (Osten & Özbek, 1999; Osten, 2000; Osten et al., 2003).

***Scolia (Scolia) erythrocephala barbariae* Betrem, 1935**

Distribution in Iran: East Azarbaijan, Khorasan (Osten et al., 2003).

Distribution outside Iran: Algeira (Betrem, 1935), Greece (Osten, 2000; Osten & Arens, 2004; Schedl, 2010), Israel (Osten, 2002), Morocco (Betrem, 1935; Osten, 2000), Tunisia (Betrem, 1935; Osten, 2000), Turkey (Osten & Özbek, 1999; Osten, 2000; Özbek & Anlaş, 2007, 2011).

***Scolia (Scolia) fallax* Eversmann, 1849**

Scolia galbula (Pallas, 1771) (Misidentification by Betrem, 1935; Steinberg, 1962; Osten et al., 2003); *Scolia syriacola* Betrem, 1935. *Scolia moreana* Muche, 1962. *Scolia tricolor* Bradley, 1972. *Scolia popovi* Steinberg, 1962.

Distribution in Iran: Alborz (Chahartaghi et al., 2002a), East Azarbaijan (Osten et al., 2003; Sakenin et al., 2008), Golestan, Kordestan (Osten et al., 2003), Fars (Osten et al., 2003; Fallahzadeh & Saghaei, 2010), Mazandaran (Samin & Bagriacik, 2013), Tehran (Chahartaghi Abineh, 2002; Osten et al., 2003), West Azarbaijan (Sakenin et al., 2010), Iran (no locality cited) (Osten, 2005a).

Distribution outside Iran: Eastern Mediterranean region to Turkmenistan (Osten, 2000). Bulgaria, Cyprus, Israel, from Ukraine to Urals (Osten, 1999; Tüzün, 2004), Armenia (Osten, 1999; Osten et al., 2003; Tüzün, 2004), Azerbaijan (Osten et al., 2003; Osten, 2005a), Georgia, Turkmenistan (Osten, 2005a), Greece (Osten, 1999; Osten & Arens, 2004; Tüzün, 2004), Israel (Osten, 1999, 2002), Turkey (Madl, 1997; Osten & Özbek, 1999; Osten et al., 2003; Tüzün, 2004; Anlaş & Çevik, 2004; Tezcan et al., 2004; Özbek & Anlaş, 2007, 2011).

***Scolia (Scolia) flaviceps flaviceps* Eversmann, 1846**

Scolia erythrocephala flaviceps Eversmann, 1846.

Distribution in Iran: East Azarbaijan (Osten et al. 2003; Samin & Bagriacik, 2013), Fars, (Fallahzadeh & Saghaei, 2010; Osten et al., 2003), Golestan, Guilan, Hormozgan, Mazandaran (Osten et al., 2003), Tehran (Chahartaghi Abineh, 2002; Osten et al., 2003).

Distribution outside Iran: Crete, Iraq, Tadzhikistan, Turkmenistan, Uzbekistan, Central Asia, Cyprus, Transcaucasia (Osten, 1999), Greece (Osten & Arens, 2004; Schedl, 2010), Ranges from southern France, Italy, the Balkan, until the eastern Mediterranean Region including Egypt to the Caspian Sea (Osten, 2000), Turkey (Madl, 1997; Osten & Özbek, 1999; Osten, 2000, 2004; Özbek & Anlaş, 2011), Turkmenistan (Osten, 2004).

***Scolia (Scolia) flaviceps mangichlakensis* Radoskovsky, 1879**

Scolia flaviceps var. *mangichlakensis* (Radoskovsky, 1879). *Scolia mangichlakensis* Radoskovsky, 1879.

Distribution in Iran: Golestan, Khorasan, Sistan and Baluchestan (Osten et al., 2003), Iran (no locality cited) (Osten, 2005a).

Distribution outside Iran: Cyprus, Daghestan, Kazakhstan, Turkmenistan (Osten, 2000, 2005a), Iraq, Jordan, Syria (Osten, 1999), Israel (Osten, 1999, 2000, 2002, 2005a), Turkey (Osten 1999; Osten, 2000, 2005a).

***Scolia (Scolia) flaviceps quettaensis* (Cameron, 1908)**

Scolia quettaensis Cameron, 1908. *Scolia erythrocephala schmidtii* Betrem 1928. *Scolia erythrocephala quettaensis* (Cameron, 1908).

Distribution in Iran: Bushehr, Hormozgan, Kerman, Khorasan, Khuzestan, Sistan and Baluchestan (Osten et al., 2003), Fars (Steinberg, 1962), Southern Iran (no locality cited) (Osten, 2000).

Distribution outside Iran: Afghanistan, Iraq, UAE (Osten et al., 2003), Oman (Osten, 2005c), Pakistan (Osten, 2000, 2002), Saudi Arabia (Gadallah, 2004).

***Scolia (Scolia) fuciformis* (Scopoli, 1786)**

Scolia insubrica Scopoli, 1786. *S. amabilis* Eversmann, 1849.

Distribution in Iran: Alborz (Chahartaghi et al., 2002a), Khuzestan (Sakenin et al., 2008), West Azarbaijan (Sakenin et al., 2010). Fars, Golestan (Osten et al., 2003), Iran (no locality cited) (Esmaili & Rastegar, 1974 under *Scolia (Scolia) insubrica* Scopoli, 1786).

Distribution outside Iran: The Balkans, Egypt, Italy (Osten, 2000, 2002; Tüzün, 2004), East Mediterranean Region, South France, Turkey to the Caspian Sea (Osten, 2000, 2002), Greece (Osten & Arens, 2004), Turkey (Osten & Özbek, 1999; Tüzün, 2004; Tezcan et al., 2004; Özbek & Anlaş, 2007, 2011).

***Scolia (Scolia) galbula* (Pallas, 1771)**

Vespa galbula Pallas, 1771. *Vespa tricolor* Pallas, 1771. *Scolia quadricincta* Scopoli, 1786. *Scolia bifasciata* Rossi, 1790. *Scolia dejeani dejani* Linden, 1829. *Scolia trifasciata* Vogrin, 1954. *Scolia moreana elisabethae* Muehe, 1962. *Discolia kugleri* Nagy, 1979.

Distribution in Iran: Alborz (Chahartaghi et al., 2002a), East Azarbaijan (Sakenin et al., 2008), Fars, Mazandaran, Tehran (Osten et al., 2003), Kermanshah (Osten et al., 2003; Sakenin et al., 2010), North western Iran (Osten, 2005a).

Distribution outside Iran: Azerbaijan, Georgia, Transcaucasia (Osten, 2005a), France, Italy, former Yugoslavia, Hungary, Ukraine, Bulgaria, Cyprus, Caucasus, Egypt (Osten, 1999; Tüzün, 2004), Greece (Osten, 1999; Tüzün, 2004; Osten & Arens, 2004; Schedl, 2010), Israel (Osten, 2002), Turkey (Hamon, 1993 as *S. moreana elisabethae*; Osten & Özbek, 1999; Osten, 1999, 2000; Anlaş & Çevik, 2004; Tüzün, 2004; Tezcan et al. 2004; Özbek & Anlaş, 2007, 2011).

***Scolia (Discolia) hirta hirta* (Schränk, 1781)**

Apis hirta Schränk, 1781. *Spheg bicincta* Scopoli, 1786. *Scolia cincta* Klug, 1805. *Scolia ahlus* Nagy, 1967. *Scolia mongolina* Nagy, 1970.

Distribution in Iran: East Azarbaijan (Steinberg, 1962), Golestan (Betrem, 1935; Steinberg, 1962; Osten et al., 2003), Guilan, West Azarbaijan (Samin & Bagriacik, 2013), Khorasan, Mazandaran, Tehran (Betrem, 1935; Osten et al., 2003), Iran (no locality cited) (Betrem, 1935; Esmaili & Rastegar, 1974).

Distribution outside Iran: Entire Mediterranean region, western Palaearctic from Germany, Poland, Sweden (Osten, 2000), South and East Europa, a part of Middle Europa, North Africa, Kazakhstan, Lebanon, Turkmenistan, South Russia, Ukraine. From Portugal to Kazakhstan and Siberia (Osten, 1994, 1997), Czech Republic, Slovakia (Bogusch, 2007), Greece (Osten & Arens, 2004; Schedl, 2010), Israel, Jordan (Osten, 2002), Italy (Schedl, 2007), Turkey (Osten & Özbek, 1999; Tüzün & Bağriacik, 2000; Anlaş & Çevik 2004; Tüzün, 2004; Tezcan et al., 2004; Japoshvili & Karaca, 2010; Özbek & Anlaş, 2007, 2011).

***Scolia (Scolia) persica* Betrem, 1935**

Distribution in Iran: Bushehr (Osten et al., 2003), Iran (no locality cited) (Betrem, 1935).

Distribution outside Iran: Endemic to Iran (Betrem, 1935; Osten et al., 2003).

***Scolia (Scolia) popovi* Steinberg, 1962**

Distribution in Iran: Sistan and Baluchestan (Steinberg, 1962), Iran (no locality cited) (Osten et al., 2003; Osten, 2005a).

Distribution outside Iran: Turkmenistan (Steinberg, 1962; Osten, 2005a).

***Scolia (Scolia) sexmaculata sexmaculata* (O. F. Müller, 1766)**

Vespa sexmaculata O. F. Müller, 1766. *Scolia quadripunctata* Fabricius, 1775. *Scolia biguttata* Fabricius, 1787. *Scolia violacea* Panzer, 1799. *Scolia syriaca* Klug, 1832. *Scolia hispanica* Betrem, 1935. *Scolia beirutii* Betrem, 1935. *Scolia montana* Steinberg, 1962. *Scolia dionysopolis* Tkalcu, 1988.

Distribution in Iran: Alborz (Esmaili & Rastegar, 1974; Osten et al., 2003), East Azarbaijan (Osten et al., 2003; Samin & Bagriacik, 2013), Golestan, Khorasan, Kordestan, Markazi, Mazandaran, Qom (Osten et al., 2003), Fars, (Fallahzadeh & Saghaei, 2010), Tehran (Chahartaghi Abineh, 2002; Osten et al., 2003), West Azarbaijan (Samin & Bagriacik, 2013).

Distribution outside Iran: Albania, Andorra, Austria, Balearic Is., Bosnia and Herzegovina, Bulgaria, Channel Is., Corsica, Croatia, Cyclades Is., France, Kazakhstan, Kyrgyzstan, Hungary, Macedonia, Malta, Moldova, North Aegean Is., North Africa, Portugal, Romania, Russia Central, Russia East, Russia South, Slovakia, Slovenia, Spain, Switzerland, Turkmenistan, Ukraine, former Yugoslavia. Common in the Mediterranean Region, Germany, England (Isle of Wight) (Osten, 2000), Czech Republic (Macek et al., 2010; Bogusch et al., 2011), Greece (Osten & Arens, 2004; Schedl, 2010), Israel (Osten, 2002), Italy (Schedl, 2007), South and Central Europe, Middle East (Macek et al., 2010), Turkey (Madl, 1997; Osten & Özbek, 1999; Tüzün & Bağrıaçık, 2000; Anlaş & Çevik, 2004; Tezcan et al., 2004; Tüzün, 2004; Japoshvili & Karaca, 2010; Macek et al., 2010; Özbek & Anlaş, 2007, 2011).

***Scolia (Scolia) sexmaculata orientalis* (Steinberg, 1962)**

Scolia quadripunctata orientalis Steinberg, 1962. *Scolia sexmaculata steinbergi* Betrem, 1964; Betrem & Bradley, 1964.

Distribution in Iran: Fars (Osten et al., 2003; Fallahzadeh & Saghaei, 2010), Guilan (Osten et al., 2003), Tehran (Chahartaghi Abineh, 2002), Iran (no locality cited) (Osten, 2005a).

Distribution outside Iran: Georgia, Turkmenistan (Steinberg, 1962; Osten, 2005a).

***Scolia (Scolia) sinensis* Saussure, 1846**

Scolia indica Uchida, 1925.

Distribution in Iran: Iran (no locality cited) (Osten, 2005a).

Distribution outside Iran: China, Korea (Osten, 2005a; Kumar, 2012), India, Tajikistan (Kumar, 2012), Pakistan (Steinberg, 1962; Osten, 2005a; Kumar, 2012), Turkmenistan, Uzbekistan (Steinberg, 1962; Osten, 2005a).

***Scolia (Discolia) turkestanica* Betrem, 1935**

Scolia vollenhoveni Saussure, 1880.

Distribution in Iran: Alborz (Chahartaghi et al., 2002a), Bushehr, Fars, Golestan, Hormozgan, Kerman (Steinberg, 1962; Osten et al., 2003), Sistan and Baluchestan (Betrem, 1935; Steinberg, 1962; Osten et al., 2003; Osten, 2005a).

Distribution outside Iran: Armenia, Iraq (Osten et al., 2003), Kirgistan, Tadzhikistan (Osten, 2005a), Turkey (Osten & Özbek, 1999; Osten et al., 2003; Osten, 2005a; Özbek & Anlaş, 2007, 2011), Turkmenistan, Uzbekistan (Osten et al., 2003; Osten, 2005a).

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