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An Annotated Catalogue of the Iranian Scelionidae (Hymenoptera: Platygastroidea)

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Abstract

Scelionid wasps (Hymenoptera: Platygastroidea: Scelionidae) are relatively important to biological control as several species have been imported to control Lepidoptera and Hemiptera. Catalogue of Iranian Scelionidae based on detailed study of all published data is presented. Fifty four species from eight genera including, *Anteris* FÖRSTER (1 species), *Gryon* HALIDAY (3 species), *Scelio* LATREILLE (5 species), *Sparasion* LATREILLE (3 species), *Paratelenomus* DODD (2 species), *Psix* KOZLOV & LÊ (4 species), *Telenomus* HALIDAY (14 species), *Trissolcus* ASHMEAD (22 species), and two subfamilies (Scelioninae, Telenominae) are currently recognized as occurring in Iran. Also, the subfamily Teleasinae has recently been reported but with no record of genus or species.

Key words: Hymenoptera, Platygastroidea, Scelionidae, Parasitoid, Host, Catalogue, Iran.

Zusammenfassung

Scelioniden (Hymenoptera: Platygastroidea: Scelionidae) spielen eine relativ große Rolle in der Bekämpfung von Lepidoptera und Hemiptera und werden deshalb auch importiert. Vorliegender Katalog umfasst alle publizierten Angaben iranischer Scelionidae, die

nachgewiesenen 54 Arten verteilen sich auf nachfolgende Gattungen *Anteris* FÖRSTER (1 Art), *Gryon* HALIDAY (3 Arten), *Scelio* LATREILLE (5 Arten), *Sparasion* LATREILLE (3 Arten), *Paratelenomus* DODD (2 Arten), *Psix* KOZLOV & LÊ (4 Arten), *Telenomus* HALIDAY (14 Arten), *Trissolcus* ASHMEAD (22 Arten), sowie die zwei Unterfamilien Scelioninae, Telenominae die derzeit aus dem Iran bekannt sind.

Introduction

Egg parasitoids are specialized to develop in the eggs of other insects and spiders [or invertebrates]. Insect eggs are nutrient-rich large cells that do not feed and release feces and consequently lack intense long-range odors that can be exploited by their enemies. Additionally, many insect eggs develop rapidly, except when they enter diapause, from a nutrition source to a complex embryo and might therefore be present only for 2-3 days (HINTON 1981; WAJNBURG & HASSAN 1994; FATOUROS et al. 2008). Many eggs are well protected physically and/or chemically (HILKER & MEINERS 2002) because immobility and exposure of them to enemies and environmental influences make them vulnerable. Some insects make their eggs less accessible by hiding them in plant tissue or by covering them with physical devices like hairs, feces, scales, or secretion (HINTON 1981; HILKER 1994). Maternally incorporated or applied toxins provide protection against enemies (BEZZERIDES et al. 2004). Furthermore, insect host eggs are able to enhance transcription of some immunity-related genes in response to parasitism (ABDEL-LATIEF & HILKER 2008). Consequently, egg parasitoids have to face many challenges when searching and finding their small and inconspicuous hosts (GODFRAY 2004; FATOUROS et al. 2008).

Scelionidae are primary, solitary, endoparasitoids of insect eggs of most major orders and occasionally spider eggs. Members of this large family are surprisingly diverse in appearance, depending on the shape and size of the host egg from which they emerge: cylindrical to depressed, elongated and spindle-shaped to short, squat and stocky (MASNER 1993). All scelionid wasps are parasitoids of the eggs of other arthropods, that is, females lay their own eggs within the eggs of other species of insects or spiders. The wasp larva that hatches consumes the contents of the host egg and pupates within it. A wide range of taxa serve as hosts: besides spiders, insect hosts include grasshoppers and crickets (Orthoptera sensu stricto), praying mantids (Mantodea), webspinners (Embiidina), true bugs (Hemiptera: both Heteroptera and Auchenorrhyncha), lacewings (Neuroptera), beetles (Coleoptera), flies (Diptera) and butterflies and moths (Lepidoptera). The host range of species and genera varies from those that are specific to one host to those, such as *Telenomus* spp., that are known to parasitize species in four different insect orders. Many hosts of scelionids are economically important pests in agriculture, forestry, human health and veterinary; the gypsy moth (*Lymantria dispar* LINNAEUS), migratory locust (*Locusta migratoria* LINNAEUS), sunn pest (*Eurygaster integriceps* PUTON), kissing bugs (*Triatoma* spp., *Rhodnius* spp.), and horse flies (*Tabanus* spp.) are examples. A number of species have been used as biological control agents with notable success (ORR 1988; KONONOVA 1992; MASNER 1995; AUSTIN et al. 2005; ASGARI 2011). The description of Scelionidae species began by LINNAEUS (1758), and the first genus was described by LATREILLE (1802). The group was first catalogued on a worldwide basis by DALLA TORRE (1898), and most recently by JOHNSON (1992). The dominant figure in the early 20th century was JEAN-JACQUES KIEFFER (1857-1925), whose

posthumously published monograph (1926) brought together descriptions and keys to nearly all taxa known from around the world. Kieffer divided the family into five subfamilies: Telenominae, Baeinae, Teleasinae, Scelioninae, and Platygasterinae (the last one now is classified as a separate family). MUESEBECK & WALKLEY (1956) began the process of stabilizing the nomenclature by designating and tabulating the type species of all genera. The most significant progress in the systematics of the group was made in the landmark paper by MASNER (1976), that included new keys to the world fauna; a critical assessment of the identity and status of described genera with extensive synonymies, based upon an examination of type species; and a phylogenetically-based reclassification of the family into three subfamilies and 19 tribes.

The world catalogue on the Proctotrupoidea and the Platygastroidea by JOHNSON (1992) does not provide country-wise distribution data. Till date there exists no compiled list of the scelionid species of Iran, exception the checklists of *Telenomus* (SAMIN et al. 2010d) and *Trissolcus* (GHAHARI et al. 2011). Hence, as a part of understanding the indigenous diversity of this important group, a checklist of the Scelionidae of Iran, with all available host data and distribution records is presented in this paper.

Materials and Methods

The published data on the family Scelionidae in Iran are summarized. The catalogue comprises the following data: the valid taxa name, published records with provincial distribution (see Fig. 1), synonyms, host records in Iran, and general distribution. The system, nomenclature, synonymy, and distribution data follow mainly JOHNSON (1992, 2010), KONONOVA (1992), KONONOVA & KOZLOV (2008), SAMIN et al. (2010d), and GHAHARI et al. (2011). For later additions and changes, the exact references are given.

Results

In total 54 species of Scelionidae from 8 genera and 2 subfamilies are listed as the fauna of Iran. The list of species with synonymies, distribution data, and hosts recorded in Iran are given below.

Family *Scelionidae* (HALIDAY, 1840)

Subfamily *Scelioninae* FÖRSTER, 1856

Genus *Anteris* FÖRSTER, 1856

Anteris simulans KIEFFER, 1908

Distribution in Iran: Kerman (SAMIN et al. 2011b), West Azarbaijan (SAMIN et al. 2011a).

General distribution: Azerbaijan, Denmark, Germany, Republic of Moldavia, Russia, Ukraine (KOZLOV 1987; KONONOVA 1992; JOHNSON 2010).

Genus *Gryon* HALIDAY, 1833

Gryon fasciatum (PRIESNER, 1951)

Hadronotus fasciatus PRIESNER, 1951; *Gryon fasciatus* KOZLOV & KONONOVA, 1989.

Distribution in Iran: Golestan (SAKENIN et al. 2008a; SAMIN et al. 2010c).

General distribution: Egypt (PRIESNER 1951), Romania (POPOVICI 2004), France, Moldavia, Russia, Turkey, Ukraine (KONONOVA & KOZLOV 2008).

Host in Iran: Hemiptera: Pentatomidae: *Eurygaster integriceps* PUTON (SAKENIN et al. 2008a; SAMIN et al. 2010c).

Gryon monspeliense (PICARD, 1924)

Hadronotus monspeliensis PICARD, 1924; *Hadronotus afanasievi* MEIER, 1949; *Hadronotus telengai* RJACHOVSKY, 1959; *Gryon afanasievi* KOZLOV, 1963; *Hadronotellus monspeliensis* SZABO, 1966.

Distribution in Iran: Alborz (IRANIPOUR et al. 1998), Hamadan, Lorestan, Markazi, Tehran (RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010c), Isfahan (SAMIN & ASGARI 2012b), Iran (no locality cited) (RADJABI 2000).

General distribution: Azerbaijan, Belgium, Bulgaria, Italy, Romania, Russia, Ukraine (KONONOVA & KOZLOV 2008), France (PICARD 1924), Turkey (LODOS 1982).

Host in Iran: Hemiptera: Pentatomidae: *Eurygaster integriceps* PUTON (RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010c), *Dolycoris baccarum* LINNAEUS (KHANJANI 2003; SAMIN et al. 2010c; SAMIN & ASGARI 2012b).

Gryon pedestre (NEES, 1834)

Teleas pedestris NEES, 1834; *Prosocantha pedestris* THOMSON, 1859; *Hoplogryon subtilis* KIEFFER, 1908; *Hoplogryon bacilliger* KIEFFER, 1908; *Hadronotellus pedestre* KIEFFER, 1917; *Hadronotus pedestre* KIEFFER, 1926; *Trimorus baciliger* MASNER, 1965; *Trimorus pedestris* SZABO, 1966; *Trimorus subtilis* SUNDHOLM, 1967; *Gryon pedestre* MINEO, 1979.

Distribution in Iran: Isfahan (SAMIN & ASGARI 2012b), Tehran (MODARRES AWAL 1997; SAMIN et al. 2010c).

General distribution: Denmark (KIEFFER 1926), Scotland (KIEFFER 1908).

Host in Iran: Hemiptera: Pentatomidae: *Dolycoris penicillatus* HORVÁTH (MODARRES AWAL 1997; SAMIN et al. 2010c; SAMIN & ASGARI 2012b), *Eurygaster integriceps* PUTON (MODARRES AWAL 1997; SAMIN et al. 2010c).

Genus *Scelio* LATREILLE, 1805

Scelio flavibarbis (MARSHALL, 1874)

Aleria flavibarbis MARSHAL, 1874.

Distribution in Iran: Golestan (SAMIN & ASGARI 2012a), Isfahan (SAMIN & ASGARI 2012b), Khuzestan (KHAJEHZADEH & GHAZAVI 2000; KHAJEHZADEH 2002, 2004; SAKENIN et al. 2008b; GHAHARI et al. 2009; SAMIN et al. 2011a, 2012).

General distribution: Corsica (MARSHAL 1874), Bulgaria, Kazakhstan, Russia Ukraine (KONONOVA & KOZLOV 2008).

Host in Iran: Orthoptera: Acrididae: *Locusta migratoria* (LINNAEUS) (KHAJEHZADEH & GHAZAVI 2000; KHANJANI 2003; GHAHARI et al. 2009; SAMIN & ASGARI 2012b).

***Scelio nitens* BRUES, 1906**

Distribution in Iran: Isfahan (SAKENIN et al. 2008b; GHAHARI et al. 2009).

General distribution: South Africa (BRUES 1906).

Host in Iran: Orthoptera: Acrididae: *Locusta migratoria* (LINNAEUS) (GHAHARI et al. 2009).

***Scelio poecilopterus* PRIESNER, 1951**

Distribution in Iran: Sistan & Baluchestan (SAMIN et al. 2011b).

General distribution: Turkmenistan (KOZLOV & KONONOVA 1983).

***Scelio remaudierei* FERRIÈRE, 1952**

Distribution in Iran: Golestan (GHAHARI et al. 2009), Isfahan (SAMIN & ASGARI 2012b), Kermanshah (SAMIN et al. 2011a), Khuzestan (SAMIN et al. 2012).

General distribution: Widely distributed in Afrotropical and Palaearctic Regions (FERRIÈRE 1952; KOZLOV 1978).

Host in Iran: Orthoptera: Acrididae: *Locusta migratoria* (LINNAEUS) (GHAHARI et al. 2009).

***Scelio zolotarevskyi* FERRIÈRE, 1930**

Distribution in Iran: Mazandaran (SAKENIN et al. 2008b; GHAHARI et al. 2009).

General distribution: Madagascar and adjacent regions (FERRIÈRE 1930).

Host in Iran: Orthoptera: Acrididae: *Locusta migratoria* (LINNAEUS) (GHAHARI et al. 2009).

Genus *Sparasion* LATREILLE, 1802

***Sparasion emarginatum* KIEFFER, 1906**

Sparasion emarginatus KIEFFER, 1926.

Distribution in Iran: Khorasan (SAMIN et al. 2011b).

General distribution: Azerbaijan, Russia, Ukraine (JOHNSON et al. 2008).

***Sparasion punctatissimum* KIEFFER, 1906**

Sparasion punctatissimus KIEFFER, 1926.

Distribution in Iran: Khorasan (SAMIN et al. 2011b).

General distribution: Austria, Italy, Russia, Ukraine (JOHNSON et al. 2008).

***Sparasion subleve* KIEFFER, 1906**

Sparasion sublevis KIEFFER, 1926.

Distribution in Iran: Khorasan (SAMIN et al. 2011b).

General distribution: Italy, Tajikistan (JOHNSON et al. 2008).

Subfamily *Telenominae* THOMSON, 1860

Genus *Paratelenomus* DODD, 1914

Paratelenomus saccharalis (DODD, 1914)

Telenomus saccharalis DODD, 1914; *Liophanurus saccharalis* KIEFFER, 1926.

Distribution in Iran: Khuzestan (SAMIN et al. 2012).

General distribution: Widely distributed in southern Palaearctic, Africa, tropical Asia and northern Australia (JOHNSON 1992; KONONOVA & KOZLOV 2008).

Paratelenomus striativentris (RISBEC, 1950)

Microphanurus striativentris RISBEC, 1950; *Archiphanurus striativentris* BIN & COLOZZA, 1988.

Distribution in Iran: Khuzestan (SAMIN et al. 2012).

General distribution: Sub-Saharan Africa and southern India (KOZLOV & KONONOVA 1983; RAJMOHANA 2006).

Genus *Psix* KOZLOV & LÊ, 1976

Psix abnormis KOZLOV & LÊ, 1976

Distribution in Iran: Golestan (SAMIN & ASGARI 2012a), Khorasan (SAMIN et al. 2011b).

General distribution: Afghanistan, Africa and part of the Palaearctic Region (KOZLOV & KONONOVA 1983).

Psix lacunatus JOHNSON & MASNER, 1985

Distribution in Iran: Isfahan (SAMIN & ASGARI 2012b), Kerman (SAMIN et al. 2011b).

General distribution: Australia, Pakistan, Taiwan (JOHNSON & MASNER 1985), India (RAJMOHANA 2006).

Comment: *Psix* is most diverse in the Ethiopian, Oriental and Australian Regions, and also a few species in Palearctic and Nearctic Regions (JOHNSON & MASNER 1985).

Psix saccharicola (MANI, 1941)

Telenomus saccharicola MANI, 1941; *Telenomus saccharicola* MANI & SHARMA, 1982; *Psix saccharicola* JOHNSON & MASNER, 1985; *Psix saccharicola* RAJMOHANA, 2006; *Psix saccharicola* RAJMOHANA & TALUKDAR, 2010; *Psix saccharicola* SINGH, JOHNSON & RAMAMURTHY, 2012.

Distribution in Iran: Kerman (MEHRNEJAD 2013).

General distribution: India.

Host in Iran: Hemiptera: Pentatomidae: *Acrosternum arabicum* WAGNER, *Brachynema germari* (KOLENATI) (MEHRNEJAD 2013).

Psix striaticeps (DODD, 1920)

Telenomus striaticeps DODD, 1920; *Microphanurus carinifrons* FOUTS, 1934; *Microphanurus striaticeps* NIXON, 1935; *Trissolcus striaticeps* MASNER, 1965; *Trissolcus carinifrons* BIN, 1974; *Trissolcus foutsii* MASNER, 1976; *Aporophlebeus striaticeps* MINEO, 1979.

Distribution in Iran: Kordestan (SAMIN et al. 2011a).

General distribution: Africa and Oriental Region (JOHNSON 1992), India (RAJMOHANA 2006).

Comment: HASHEMI RAD et al. (2002), and HASHEMI RAD (2008) reported *Psix* sp. from Kerman as the parasitoid of some Pentatomidae including, *Acrosternum heegeri* FIEBER, *Brachynema signatum* JAKOVLEV, *Croantha ornatula* (HERRICH-SCHAEFFER), *Graphosoma lineatum* (LINNAEUS). We suppose that the mentioned species is *P. striaticeps*.

Genus *Telenomus* HALIDAY, 1833

***Telenomus acrobates* GIARD, 1895**

Phanurus acrobates KIEFFER, 1926.

Distribution in Iran: Chaharmahal & Bakhtiari (GHAHARI et al. 2010), East Azarbaijan (SAMIN et al. 2010a, d), Isfahan (SAMIN & ASGARI 2012b), Tehran (SHAHPOURI ARANI et al. 2005; SAMIN et al. 2010d).

General distribution: France (GIARD 1895), Italy (KIEFFER 1926), Romania (FABRITIUS 1974), Azerbaijan, Moldova, Ukraine, Kazakhstan, Central Asia, Russia (North Caucasus, East Siberia) (KOZLOV & KONONOVA 1983; KONONOVA 1995), Japan (RYU & HIRASHIMA 1985).

Host in Iran: Neuroptera: Chrysopidae: *Chrysoperla carnea* (STEPHENS) (SHAHPOURI ARANI et al. 2005; TALEBI et al. 2005; GHAHARI et al. 2010; SAMIN et al. 2010d; SAMIN & ASGARI 2012b).

***Telenomus angustatus* (THOMSON, 1860)**

Phanurus angustatus THOMSON, 1860; *Telenomus tabani* MAYR, 1879; *Telenomus coccivorus* MAYR, 1879; *Phanurus coccivorus* BRUES, 1908; *Phanurus tabani* BRUES, 1908; *Prophanurus tabani* KIEFFER, 1912; *Prophanurus coccivorus* KIEFFER, 1912; *Telenomus oophagus* BOLDARUYEV, 1969; *Pseudotelenomoides stratiomyidarum* SZABO, 1976; *Telenomus praetabani* SZABO, 1978.

Distribution in Iran: Sistan & Baluchestan (SAMIN et al. 2011b).

General distribution: Austria, Sweden, Hungary, Romania, Russia (KOZLOV & KONONOVA 1983; JOHNSON 1984; SAMIN et al. 2010b).

Host in Iran: Egg parasitoid of *Chrysops* (*Petersenychrysops*) *hamatus* LOEW (Diptera: Tabanidae) (SAMIN et al. 2011b).

***Telenomus benefactor* CRAWFORD, 1911**

Microphanurus benefactor KIEFFER, 1926.

Distribution in Iran: Khorasan (SAMIN et al. 2011b).

General distribution: Afrotropical, Palearctic, and Oriental Regions (KOZLOV & KONONOVA 1983; JOHNSON 1984).

***Telenomus beneficiens* (ZEHTNER, 1896)**

Ceraphron beneficiens ZEHTNER, 1896; *Phanurus beneficiens* DODD, 1914; *Phanurus beneficiens* var. *abdominaris* ISHIDA, 1917.

Distribution in Iran: Kerman (SAMIN et al. 2011b).

General distribution: Java, Korea, Pakistan, Taiwan (JOHNSON 2010; SAMIN et al. 2010d).

Host in Iran: Parasitoid of *Scirpophaga novella* (FABRICIUS) (Lepidoptera: Pyralidae) (SAMIN et al. 2010d, 2011b).

***Telenomus busseolae* GAHAN, 1922**

Platytenomus hylas NIXON, 1935; *Platytenomus busseolae* MASNER, 1965.

Distribution in Iran: East Azarbaijan (SAMIN et al. 2010a, d), Golestan (SAMIN & ASGARI 2012a), Isfahan (SAMIN & ASGARI 2012b), Khuzestan (ABBASIPOUR et al. 1991; ABDUL RAZZAGH 1995; SHARIFIFAR 2000; ABBASIPOUR 2004; JAMSHIDNIA et al. 2009; SAYAD MANSOUR et al. 2011; SAMIN et al. 2010d, 2011a, 2012).

General distribution: Israel (KOZLOV & KONONOVA 1983), Bangladesh, Cameroon, Egypt, Ghana, Greece, Iran, Iraq, Kenya, Mauritius, Nigeria, Reunion, Senegal, South Africa, Sudan, Uganda (POLASZEK & KIMANI 1990).

Host in Iran: Lepidoptera: Noctuidae: *Sesamia nonagrioides* LEFEVBRE (ABBASIPOUR et al. 1991; ABDUL RAZZAGH 1995; ABBASIPOUR 2004; JAMSHIDNIA et al. 2009; SAMIN et al. 2010d; SAYAD MANSOUR et al. 2011; SAMIN & ASGARI 2012b), *Sesamia cretica* LEDERER (NAREHI et al. 2004; JAMSHIDNIA et al. 2009; SAMIN et al. 2010d).

***Telenomus chloropus* (THOMSON, 1861)**

Phanurus chloropus THOMSON, 1861; *Telenomus sokolowi* MAYR, 1897; *Telenomus mayri* SOKOLOV, 1904; *Prophanurus Sokolowi* KIEFFER, 1912; *Telenomus tischleri* NIXON, 1939; *Telenomus sokolovi* MEIER, 1940.

Distribution in Iran: Alborz (SAMIN et al. 2010b), East Azarbaijan (SAMIN et al. 2010a, d), Isfahan (SHOJAI 1968; MODARRES AWAL 1997; SAMIN et al. 2010c, d; SAMIN & ASGARI 2012b), Khorasan (SAMIN et al. 2011b), Mazandaran (MOHAGHEGH NEYSHABOURI 1993; SAMIN et al. 2010c, d), Tehran (SHOJAI 1968; MODARRES AWAL 1997; SAMIN 2010; SAMIN et al. 2010b, c, d, 2011c), Iran (no locality cited) (RADJABI 2000).

General distribution: Ukraine (KIEFFER 1926), Turkey (LODOS 1961), England (JAVAHERY 1968), Armenia, Azerbaijan, Georgia, Kazakhstan, Moldova, Russia (European part, Altai, Far East) (KOZLOV & KONONOVA 1983; KONONOVA 1995), Ireland (O'CONNOR & MINEO 2009), France, Hungary, Spain, Sweden, Japan, USA (Mississippi) (JOHNSON 1984).

Host in Iran: Hemiptera: Pentatomidae: *Eurygaster integriceps* PUTON (SHOJAI 1968; SAMIN et al. 2010b, c, d, 2011c; SAMIN & ASGARI 2012b), *Eurygaster testudinaria* (GEOFFROY) (MOHAGHEGH NEYSHABOURI 1993; SAMIN et al. 2010c, d), *Dolycoris baccarum* LINNAEUS (KHANJANI 2003; SAMIN et al. 2010c, d).

***Telenomus chrysopae* ASHMEAD, 1893**

Phanurus chrysopae KIEFFER, 1926.

Distribution in Iran: East Azarbaijan (SAMIN et al. 2010a, d), Golestan (SAMIN et al. 2010d), Isfahan (RAKHSANI et al. 2008; SAMIN et al. 2010d).

General distribution: Palearctic, Nearctic, and Oriental Regions (JOHNSON 1992, 2010).

Host in Iran: Egg parasitoid of *Chrysoperla* sp. (Neuroptera: Chrysopidae) (RAKSHANI et al. 2008; SAMIN et al. 2010d), and *Catolaccus* sp. (Hymenoptera: Pteromalidae) (SAMIN et al. 2010d).

***Telenomus dignus* GAHAN, 1925**

Phanurus matsumurai ISHIDA, 1931.

Distribution in Iran: Kerman (SAMIN et al. 2010d, 2011b).

General distribution: China, Formosa, Japan, Java, Korea, Philippines (RYU & HIRASHIMA 1985; JOHNSON 2010), Pakistan (ISHTIAQ 2002), India (RAJMOHANA 2006).

Host in Iran: Parasitoid of *Scirpophaga* sp. (Lepidoptera: Pyralidae) (SAMIN et al. 2010d).

***Telenomus heydeni* MAYR, 1879**

Telenomus giraudi KIEFFER, 1906; *Prophanurus giraudi* KIEFFER, 1912; *Prophanurus heydeni* KIEFFER, 1912.

Distribution in Iran: West Azarbaijan (PARVIZI & JAVAN MOGHADDAM 1988; SAMIN et al. 2010d, 2011a). Isfahan (SAMIN & ASGARI 2012b), Iran (no locality cited) (RADJABI 2000).

General distribution: Austria (MAYR 1879), Germany (KIEFFER 1926), Kazakhstan, Moldavia, Russia, Trans-Caucas (KOZLOV & KONONOVA 1983), Turkey (LODOS 1982).

Host in Iran: Parasitoid of *Lixus incanescens* BOHEMAN (Coleoptera: Curculionidae) (PARVIZI & JAVAN MOGHADDAM 1988; SAMIN et al. 2010d).

***Telenomus minimus* ASHMEAD, 1893**

Phanurus minimus KIEFFER, 1926.

Distribution in Iran: Guilan, Mazandaran (MODARRES AWAL 1997; SAMIN et al. 2010d).

General distribution: USA (Virginia) (ASHMEAD 1893), Moldavia, Russia (KOZLOV & KONONOVA 1983)

***Telenomus phalaenarum* (NEES & ESENBECK, 1834)**

Teleas phalaenarum NEES VON ESENBECK, 1834; *Prophanurus phalaenarum* KIEFFER, 1912; *Asolcus phalaenarum* SZABO, 1976.

Distribution in Iran: Kermanshah (SAMIN et al. 2010d, 2011a).

General distribution: Palaearctic (JOHNSON 1992).

***Telenomus politus* (THOMSON, 1861)**

Phanurus politus THOMSON, 1861.

Distribution in Iran: Isfahan (SAMIN & ASGARI 2012b), Tehran (MODARRES AWAL 1997; SAMIN et al. 2010c, d).

General distribution: Sweden (THOMSON 1861), Russia (KOZLOV 1978).

Host in Iran: Hemiptera: Pentatomidae: *Eurygaster integriceps* PUTON (MODARRES AWAL 1997; SAMIN et al. 2010c, d; SAMIN & ASGARI 2012b).

***Telenomus remus* NIXON, 1937**

Distribution in Iran: Sistan & Baluchestan (SAMIN et al. 2011b).

General distribution: India, Malaysia, Taiwan (JOHNSON 2010).

***Telenomus sechellensis* KIEFFER, 1910**

Telenomus sechellensis KIEFFER, 1912; *Telenomus truncativentris* DODD, 1920; *Microphanurus sechellensis* KIEFFER, 1926; *Trissolcus sechellensis* MANI & SHARMA, 1982.

Distribution in Iran: Khuzestan (SAMIN et al. 2010d, 2011a, 2012).

General distribution: African, and Oriental Region (JOHNSON 1992).

Genus *Trissolcus* ASHMEAD, 1893

***Trissolcus agriope* (KOZLOV & LÊ, 1976)**

Aporophlebus agriope KOZLOV & LÊ, 1976.

Distribution in Iran: Kerman (HASHEMI RAD et al. 2000a, b, 2002; HASHEMI RAD 2008; GHAHARI et al. 2011; MEHRNEJAD 2013).

General distribution: Turkmenistan (KOZLOV & KONONOVA 1983).

Host in Iran: Hemiptera: Pentatomidae: *Brachynema* sp. (HASHEMI RAD et al. 2000a, b, 2002; GHAHARI et al. 2011), *Acrosternum arabicum* WAGNER, *Brachynema germari* (KOLENATI) (MEHRNEJAD 2013).

***Trissolcus basalis* (WOLLASTON, 1858)**

Telenomus basalis WOLLASTON, 1858; *Telenomus maderensis* WOLLASTON, 1858; *Telenomus megacephalus* ASHMEAD, 1895; *Telenomus megalcephalus* SCHULZ, 1906; *Telenomus piceipes* DODD, 1920; *Liophanurus megacephalus* KIEFFER, 1926; *Microphanurus basalis* NIXON, 1935; *Asolcus basalis* DELUCCHI, 1961; *Trissolcus basalis* MASNER, 1965; *Trissolcus maderensis* MASNER, 1965; *Trissolcus piceipes* MASNER, 1965; *Asolcus lodosi* SZABO, 1981.

Distribution in Iran: East Azarbaijan (SAMIN et al. 2010a; GHAHARI et al. 2011), Golestan (SAMIN & ASGARI 2012a), Hamadan, Lorestan, Markazi (SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; IRANIPOUR et al. 1998; SAMIN et al. 2010c; GHAHARI et al. 2011), Isfahan (MEHRAVAR et al. 2000; SAMIN et al. 2010c; SAMIN & ASGARI 2012b), Kermanshah (SAMIN et al. 2011a), Khorasan (SAMIN et al. 2011b), Khuzestan (SAMIN et al. 2012), Tehran (SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; IRANIPOUR et al. 1998; SAMIN 2010; SAMIN et al. 2010c, 2011c; GHAHARI et al. 2011), Zanzan (TAGHADDOSI & RAJABI 1998; SAMIN et al. 2010c), Iran (no locality cited) (RADJABI 2000).

General distribution: Afrotropical, Australasian, Nearctic, Neotropical, Oriental, and Palearctic Regions (JOHNSON 1992).

Host in Iran: Hemiptera: Pentatomidae: *Aelia acuminata* (LINNAEUS), *Apodiphus amygdali* (GERMAR), *Carpocoris fuscipinus* (BOHEMAN) (SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010c; SAMIN & ASGARI 2012b), *Dolycoris baccarum* LINNAEUS, *Eurygaster integriceps* PUTON (SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010c, 2011b, c), *Eurygaster maura* (LINNAEUS) (KHANJANI 2003; SAMIN et al. 2010c), *Nezara viridula* (LINNAEUS) (KHANJANI 2006; SAMIN et al. 2010c).

***Trissolcus circus* KOZLOV & LÊ, 1976**

Distribution in Iran: Tehran (SAMIN et al. 2010b).

General distribution: Russia (KOZLOV & LÊ 1988).

***Trissolcus crypticus* CLARKE, 1993**

Distribution in Iran: Sistan & Baluchestan (SAMIN et al. 2011b; GHAHARI et al. 2011).

General distribution: Pakistan (CLARKE 1993).

Host in Iran: Hemiptera: Pentatomidae: *Nezara viridula* (LINNAEUS) (GHAHARI et al. 2011).

Comment: *T. crypticus* as a sibling species of *T. basalis*, was introduced from Pakistan into Australia and Hawaii as a strain of *T. basalis*, and widely released for the biological control of *N. viridula* (GHAHARI et al. 2011).

***Trissolcus delucchii* KOZLOV, 1968**

Distribution in Iran: Alborz (IRANIPOUR et al. 1998; GHAHARI et al. 2011), Khuzestan (MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011), Tehran (SAMIN et al. 2010c).

General distribution: Afghanistan, Armenia, Tajikistan, Turkey, Turkmenistan (KOZLOV & KONONOVA 1983), Japan (RYU & HIRASHIMA 1984).

Host in Iran: Lepidoptera: Noctuidae: *Sesamia nonagrioides* LEFEVBRE (MODARRES AWAL 1997). Hemiptera: Pentatomidae: *Eurygaster integriceps* PUTON, *Eurygaster maura* (LINNAEUS) (KHANJANI 2003; SAMIN et al. 2010c; GHAHARI et al. 2011).

Comment: In the checklist of MODARRES AWAL (1997), *Sesamia nonagrioides* Lefevbre (Lepidoptera: Noctuidae) was reported as the host of *T. delucchii* in Khuzestan province. This report is incorrect as no Lepidoptera are confirmed hosts of *Trissolcus* spp. Almost all the data in the above checklist were adapted from original papers and those concerning *T. delucchii* were misquoted from SHOJAI (1989) (GHAHARI et al. 2011).

***Trissolcus djadetshko* (RJACHOVSKY, 1959)**

Microphanurus djadetshko RJACHOVSKY, 1959; *Asolcus djadetshko* VIKTOROV, 1964.

Distribution in Iran: Ardabil (SAMIN et al. 2010a), East Azarbaijan (GHAHARI et al. 2011; HEJAZI et al. 2011; NOZAD & IRANIPOUR 2010), Golestan (SAMIN & ASGARI 2012a), Isfahan (SAMIN & ASGARI 2012b), Kerman (SAMIN et al. 2011b), Khuzestan (SAMIN et al. 2012), Mazandaran (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011), Tehran (SAMIN 2010; SAMIN et al. 2010b), West Azarbaijan (SAMIN et al. 2011a; SHAFAEI et al. 2011).

General distribution: Armenia, Azerbaijan, Kazakhstan, Moldova, Russia (European part, Altai, Primorskii krai), Ukraine, Uzbekistan, Mongolia (KOZLOV & LÊ 1988; KONONOVA 1995), Turkey (KOÇAK & KILINÇER 2000, 2003), Romania (POPOVICI 2004).

Host in Iran: Hemiptera: Pentatomidae: *Eurydema ornatum* (LINNAEUS) (SAKENIN et al. 2008a; SAMIN et al. 2010c; SAMIN & ASGARI 2012b; GHAHARI et al. 2011), *Eurygaster integriceps* PUTON (SAMIN et al. 2010b).

***Trissolcus dryope* (KOZLOV & LÊ, 1976)**

Aporophlebus dryope KOZLOV & LÊ, 1976.

Distribution in Iran: Isfahan (SAMIN & ASGARI 2012b), Kerman (HASHEMI RAD et al. 2000b, 2002; GHAHARI et al. 2011).

General distribution: Moldavia (KOZLOV & KONONOVA 1983).

Host in Iran: Hemiptera: Pentatomidae: *Acrosternum* sp. (HASHEMI RAD et al. 2002; SAMIN & ASGARI 2012b; GHAHARI et al. 2011), *Brachynema* sp. (HASHEMI RAD et al. 2002; GHAHARI et al. 2011).

***Trissolcus esmailii* RADJABI, 2001**

Distribution in Iran: Fars (RADJABI 2001; SAMIN et al. 2010c; GHAHARI et al. 2011), Isfahan (SAMIN & ASGARI 2012b).

General distribution: Endemic to Iran.

Host in Iran: Hemiptera: Pentatomidae: *Dolycoris baccarum* LINNAEUS (RADJABI 2001; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Eurygaster integriceps* PUTON (RADJABI 2001; SAMIN et al. 2010c; GHAHARI et al. 2011).

***Trissolcus festivae* (VIKTOROV, 1964)**

Asolcus festivae VIKTOROV, 1964.

Distribution in Iran: Alborz (IRANIPOUR et al. 1998), Ardabil (SAMIN et al. 2010a; GHAHARI et al. 2011), Golestan (SAMIN & ASGARI 2012a), Isfahan (SAMIN & ASGARI 2012b), Kerman (SAMIN et al. 2011b), Markazi, Qazvin, Zanjan (RADJABI 1994; MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011), Tehran (RADJABI 1994; MODARRES AWAL 1997; SAMIN 2010; SAMIN et al. 2010b, c, 2011c; GHAHARI et al. 2011).

General distribution: Armenia, Azerbaijan, Kazakhstan, Moldova, Mongolia, Russia (North Caucasus, European part, Altai), Turkmenistan, Ukraine, Uzbekistan (KOZLOV & LÊ 1988; KOZLOV & KONONOVA 1983), Romania (FABRITIUS 1974), Turkey (TARLA 1997).

Host in Iran: Hemiptera: Pentatomidae: *Eurydema ornatum* LINNAEUS (RADJABI 1994; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Eurygaster integriceps* PUTON (RADJABI 1994; SAMIN et al. 2010b, c, 2011c; GHAHARI et al. 2011).

***Trissolcus grandis* (THOMSON, 1861)**

Telenomus grandis THOMSON, 1861; *Telenomus nigripes* THOMSON, 1861; *Telenomus frontalis* THOMSON, 1861; *Telenomus nigrata* THOMSON, 1861; *Telenomus nigratus* DALLA TORRE, 1898; *Aphanurus nigripes* KIEFFER, 1912; *Aphanurus grandis* KIEFFER, 1912; *Aphanurus nigrata* KIEFFER, 1912; *Aphanurus frontalis* KIEFFER, 1912; *Microphanurus nigripes* KIEFFER, 1926; *Microphanurus grandis* KIEFFER, 1926; *Microphanurus nigratus* KIEFFER, 1926; *Microphanurus frontalis* KIEFFER, 1926; *Asolcus grandis* DELUCCHI, 1961; *Asolcus nixomartini* JAVAHERY, 1968; *Asolcus silwoodensis* JAVAHERY, 1968; *Trissolcus nigripes* FERGUSON, 1978; *Trissolcus nixomartini* FERGUSON, 1978; *Trissolcus silwoodensis* FERGUSON, 1978; *Telenomus nigripes* FERGUSON, 1984; *Telenomus nixomartini* FERGUSON, 1984; *Telenomus silwoodensis* FERGUSON, 1984.

Distribution in Iran: Alborz (SAMIN et al. 2010b), Ardabil (FATHI et al. 2011), Chaharmahal & Bakhtiari (NOORBAKHS & RAZAVI 1995; HAGHSHEENAS 2004), East Azarbaijan (SAMIN et al. 2010a; GHAHARI et al. 2011; HEJAZI et al. 2011; NOZAD & IRANIPOUR 2010), Golestan (SAMIN & ASGARI 2012a), Ilam, Kermanshah, Kordestan (SAMIN et al. 2011a), Isfahan (SAMIN & ASGARI 2012b), Kerman, Khorasan, Sistan & Baluchestan (SAMIN et al. 2011b), Khuzestan (SAMIN et al. 2012), Mazandaran (SAMIN et al. 2010b), Qazvin (NURI et al. 2011), Tehran (SAMIN 2010; SAMIN et al. 2010b, 2011c), West Azarbaijan (SAMIN et al. 2011a; SHAFAEI et al. 2011), Generally distributed (MODARRES AWAL 1997; SAMIN et al. 2010c), Iran (no locality cited) (RADJABI 2000).

General distribution: Denmark (THOMSON 1861), Armenia, Kazakhstan, Middle Asia, Moldova, Russia (South of Far East), Ukraine (KOZLOV & KONONOVA 1983; KONONOVA 1995), Belgium (DEBAUCHE 1947), Syria (REMAUDIÈRE & SKAF 1963), Morocco (VOEGELÉ 1964), England (JAVAHERY 1968), Romania (FABRITIUS 1974), Italy (VIGGIANI & MINEO 1974), Turkey (KOÇAK 2007), Iraq (ALI 2011).

Host in Iran: Hemiptera: Pentatomidae: *Aelia acuminata* (LINNAEUS), *Apodiphus amygdali* (GERMAR) (ZOMORRODI 1962; SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; ASGARI et al. 1995; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Eurygaster integriceps* PUTON (ZOMORRODI 1962; SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; ASGARI et al. 1995; SAMIN et al. 2010b, c, 2011b, c; GHAHARI et al. 2011; FATHI et al. 2011; NURI et al. 2011; SAMIN & ASGARI 2012b), *Graphosoma lineatum* (LINNAEUS) (ZOMORRODI 1962; SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; ASGARI et al. 1995; SAMIN et al. 2010b, c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Carpocoris fuscipinus* (BOHEMAN), *Dolycoris baccarum* (LINNAEUS) (ZOMORRODI 1962; SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; ASGARI et al. 1995; SAMIN et al. 2010c; GHAHARI et al. 2011), *Eurygaster maura* (LINNAEUS) (KHANJANI 2003; SAMIN et al. 2010c; GHAHARI et al. 2011), *Podisus maculiventris* (SAY) (ALLAHYARI & AZMAYESH FARD 2002; SAMIN et al. 2010c; GHAHARI et al. 2011), *Andrallus spinidens* (FABRICIUS) (SAMIN et al. 2010b; GHAHARI et al. 2011), *Perillus bioculatus* (FABRICIUS) (SAMIN et al. 2011b).

***Trissolcus manteroi* (KIEFFER, 1909)**

Telenomus Manteroi KIEFFER, 1909; *Aphanurus Manteroi* KIEFFER, 1912; *Microphanurus manteroi* KIEFFER, 1926.

Distribution in Iran: Mazandaran (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011), West Azarbaijan (SAMIN et al. 2011a).

General distribution: Italy (KIEFFER 1909), Armenia, Moldavia, Turkmenistan (KOZLOV & KONONOVA 1983), Turkey (KOÇAK & KILINÇER 2000, 2003), Romania (POPOVICI 2004).

Host in Iran: Hemiptera: Pentatomidae: *Carpocoris coreanus iranensis* (TAMANINI), *Dolycoris penicillatus* HORVÁTH (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011).

***Trissolcus mentha* KOZLOV & LÊ, 1977**

Distribution in Iran: Alborz (IRANIPOUR et al. 1998), Kerman (HASHEMI RAD et al. 2002), Tehran (SAMIN et al. 2010c).

General distribution: Uzbekistan (KOZLOV 1978), Turkey (KAYA et al. 2009).

Host in Iran: Hemiptera: Pentatomidae: *Eurygaster integriceps* PUTON (IRANIPOUR et al. 1998; SAMIN et al. 2010c; GHAHARI et al. 2011), *Apodyphus amygdali* (GERMAR) (HASHEMI RAD et al. 2002).

***Trissolcus* sp. near *mitsukurii* ASHMEAD, 1904**

Distribution in Iran: Kerman (HASHEMI RAD et al. 2000b).

Host in Iran: Hemiptera: Pentatomidae: *Brachynema* spp. (HASHEMI RAD et al. 2000b).

***Trissolcus pseudoturesis* (RJACHOVSKY, 1959)**

Microphanurus pseudoturesis RJACHOVSKY, 1959; *Microphanurus rossicus* RJACHOVSKY, 1959; *Asolcus pseudoturesis* VIKTOROV, 1964.

Distribution in Iran: Khuzestan (SAMIN et al. 2012), Kordestan (SAMIN et al. 2011a), Mazandaran (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011).

General distribution: Moldavia, Mongolia, Russia, Ukraine (KOZLOV & KONONOVA 1983), Romania (FABRITIUS 1974), Turkey (KOÇAK & KILINÇER 2003).

Host in Iran: Hemiptera: Pentatomidae: *Eurygaster integriceps* PUTON, *Eurygaster testudinaria* (GEOFFROY) (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011).

***Trissolcus radjabii* IRANIPOUR, 2010**

Distribution in Iran: Alborz, East Azarbaijan, Kerman, Tehran (IRANIPOUR & JOHNSON 2010; GHAHARI et al. 2011).

General distribution: Endemic to Iran.

Host in Iran: Hemiptera: Pentatomidae: *Apodiphus amygdali* GERMAR on *Platanus* sp., and *Pistachio* sp. (IRANIPOUR & JOHNSON 2010; GHAHARI et al. 2011).

***Trissolcus rufiventris* (MAYR, 1908)**

Telenomus rufiventris MAYR, 1907; *Prophanurus rufiventris* KIEFFER, 1912; *Dissolcus rufiventris* KIEFFER, 1926; *Microphanurus anitus* NIXON, 1939; *Asolcus rufiventris* MASNER, 1959.

Distribution in Iran: Alborz (IRANIPOUR et al. 1998; SAMIN et al. 2010b; GHAHARI et al. 2011), East Azarbaijan (SAMIN et al. 2010a; GHAHARI et al. 2011; HEJAZI et al. 2011), Hamadan, Lorestan, Markazi, Mazandaran (MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011); Isfahan (MEHRAVAR et al. 2000; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), Kerman (SAMIN et al. 2011b), Kermanshah (SAMIN et al. 2011a), Khuzestan (SAMIN et al. 2012), Tehran (MODARRES AWAL 1997; SAMIN 2010; SAMIN et al. 2010b, c, 2011c; GHAHARI et al. 2011), West Azarbaijan (SHAFAEI et al. 2011), Iran (no locality cited) (RADJABI 2000).

General distribution: Morocco (VOEGELÉ 1964), Romania (FABRITIUS 1974), Middle Asia, Moldova, Mongolia, West Kazakhstan, West Europe, Russia, Ukraine (North Caucasus, European part, Altai), Africa (KOZLOV & KONONOVA 1983; KONONOVA 1995), Turkey (TUATAY et al. 1972; KOÇAK 2007), Iraq (ALI 2011).

Host in Iran: Hemiptera: Pentatomidae: *Aelia furcula* Fieber (SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Dolycoris penicillatus* HORVÁTH (SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010c; GHAHARI et al. 2011), *Eurygaster integriceps* PUTON (SHOJAI 1968; MARTIN et al. 1969; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010b, c, 2011c; GHAHARI et al. 2011).

***Trissolcus saakowi* (MAYR, 1903)**

Telenomus saakowi MAYR, 1903; *Microphanurus saakowi* KIEFFER, 1926.

Distribution in Iran: Alborz (IRANIPOUR et al. 1998; GHAHARI et al. 2011).

General distribution: Turkmenistan (MAYR 1903), Armenia, Russia, Tajikistan, Ukraine (KOZLOV & KONONOVA 1983)

Host in Iran: Hemiptera: Pentatomidae: *Apodiphus* sp. (IRANIPOUR et al. 1998; GHAHARI et al. 2011).

***Trissolcus semistriatus* (NEES, 1834)**

Teleas semistriatus NEES, 1834; *Telenomus ovulorum* THOMSON, 1861; *Telenomus semistriatus* MAYR, 1879; *Aphanurus semistriatus* KIEFFER, 1912; *Microphanurus semistriatus* KIEFFER, 1926; *Microphanurus alexeevi* MEIER, 1949; *Microphanurus schtepetelnikovae* MEIER, 1949; *Asolcus semistriatus* MASNER, 1959.

Distribution in Iran: Alborz (IRANIPOUR et al. 1998; SAMIN et al. 2010b; GHAHARI et al. 2011), Ardabil (MODARRES AWAL 1997; SAMIN et al. 2010a, c; GHAHARI et al. 2011), Chaharmahal & Bakhtiari (HAGHSHENAS 2004; SAMIN et al. 2010c; GHAHARI et al. 2011), East Azarbaijan (SAMIN et al. 2010a; GHAHARI et al. 2011; HEJAZI et al. 2011; NOZAD & IRANIPOUR 2010), Fars, Hamadan, Lorestan, Markazi (MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011), Golestan (SAMIN & ASGARI 2012a), Ilam, Kermanshah, Kordestan (SAMIN et al. 2010a, 2011a), Isfahan (MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), Kerman, Sistan & Baluchestan (SAMIN et al. 2011b), Khorasan (MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN et al. 2011b), Khuzestan (SAMIN et al. 2011a, 2012), Mazandaran (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011), Qazvin (NOORI & ASGARI 2000; GHAHARI et al. 2011; NURI et al. 2011), Tehran (MODARRES AWAL 1997; SAMIN 2010; SAMIN et al. 2010b, c, 2011c), West Azarbaijan (SAMIN et al. 2010a, 2011a; SHAFAEI et al. 2011), Zanjan (TAGHADDOSI & RAJABI 1998; SAMIN et al. 2010c; GHAHARI et al. 2011), Iran (no locality cited) (RADJABI 2000).

General distribution: Armenia, Austria, Azerbaijan, Denmark, France, Germany, Moldova, Russia (European part, Altai, Primorskii krai), Ukraine (KOZLOV & KONONOVA 1983; KONONOVA 1995), England (JAVAHERY 1968), Portugal (GRAHAM 1984), Romania (FABRITIUS 1974), Turkey (LODOS 1961), Morocco (VOEGELÉ 1964), Iraq (ALI 2011).

Host in Iran: Hemiptera: Pentatomidae: *Aelia acuminata* (LINNAEUS), *Apodiphus amygdali* (GERMAR) (ALEXANDROV 1948a, b; VAEZI 1950; ZOMORRODI 1962; MARTIN et al. 1969; SAFAVI 1974; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Dolycoris baccarum* LINNAEUS (ALEXANDROV 1948a, b; VAEZI 1950; ZOMORRODI 1962; MARTIN et al. 1969; SAFAVI 1974; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010b, c; GHAHARI et al. 2011;

SAMIN & ASGARI 2012b), *Eurygaster integriceps* PUTON (ALEXANDROV 1948a, b; VAEZI 1950; ZOMORRODI 1962; MARTIN et al. 1969; SAFAVI 1974; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010b, c, 2011b, c; GHAHARI et al. 2011; NURI et al. 2011; SAMIN & ASGARI 2012b), *Carpocoris fuscipinus* (BOHEMAN) (ALEXANDROV 1948a, b; VAEZI 1950; ZOMORRODI 1962; MARTIN et al. 1969; SAFAVI 1974; RADJABI & AMIR NAZARI 1989; SAMIN et al. 2010c; GHAHARI et al. 2011), *Eurygaster maura* (LINNAEUS) (KHANJANI 2003; GHAHARI et al. 2011), *Graphosoma lineatum* (LINNAEUS) (SAMIN et al. 2010c; ASGARI & SAHRAGARD 2002; GHAHARI et al. 2011), *Carpocoris pudicus* (PODA), *Holcostethus sphacelatus* (FABRICIUS) (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b).

***Trissolcus simoni* (MAYR, 1879)**

Telenomus Simoni MAYR, 1897; *Asolcus scutellaris* MASNER, 1958; *Microphanurus vassilievi* VIKTOROV, 1960; *Asolcus simoni reticulatus* DELUCCHI, 1961; *Asolcus reticulatus* DELUCCHI, 1963; *Asolcus simoni* DELUCCHI, 1961; *Asolcus reticulatus reticulatus* VIKTOROV, 1964; *Trissolcus reticulatus reticulatus* VIKTOROV, 1967.

Distribution in Iran: Alborz (SAMIN et al. 2010b; GHAHARI et al. 2011), Ardabil (SAMIN et al. 2010a; GHAHARI et al. 2011), Golestan (IRANIPOUR et al. 1998), Isfahan (MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), Kerman (SAMIN et al. 2011b), Khuzestan (SAMIN et al. 2011a, 2012), Mazandaran (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011), Tehran (MODARRES AWAL 1997; SAMIN 2010; SAMIN et al. 2010b, c, 2011c; GHAHARI et al. 2011).

General distribution: Austria (KIEFFER 1926), Azerbaijan, Russia (European part), Ukraine (KOZLOV & KONONOVA 1983), Morocco (VOEGELÉ 1964), Syria (REMAUDIÈRE & SKAF 1963), Romania (FABRITIUS 1974), Turkey (KOÇAK & KILINÇER 2003).

Host in Iran: Hemiptera: Pentatomidae: *Aelia acuminata* (LINNAEUS), *Dolycoris baccarum* LINNAEUS (SHOJAI 1968; MODARRES AWAL 1997; SAMIN et al. 2010b; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Aelia melanota* (FIEBER) (SAKENIN et al. 2008a; GHAHARI et al. 2011), *Apodiphus amygdali* (GERMAR), *Carpocoris fuscipinus* (BOHEMAN) (SHOJAI 1968; MODARRES AWAL 1997; GHAHARI et al. 2011), *Eurydema ornatum* LINNAEUS (SHOJAI 1968; MODARRES AWAL 1997; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Eurygaster integriceps* PUTON (SHOJAI 1968; MODARRES AWAL 1997; GHAHARI et al. 2011; SAMIN et al. 2011c).

***Trissolcus tumidus* (MAYR, 1879)**

Telenomus tumidus MAYR, 1879; *Aphanurus tumidus* KIEFFER, 1912; *Microphanurus tumidus* KIEFFER, 1926; *Asolcus tumidus* DELUCCHI, 1961.

Distribution in Iran: Fars, Isfahan, Tehran, Zanjan (MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011), West Azarbaijan (SAMIN et al. 2011a).

General distribution: Austria (KIEFFER 1926), Georgia, Kazakhstan, Ukraine (KOZLOV & KONONOVA 1983), Europe, Japan, Morocco (RYU & HIRASHIMA 1984).

Host in Iran: Hemiptera: Pentatomidae: *Aelia acuminata* (LINNAEUS), *Apodiphus amygdali* (GERMAR), *Carpocoris fuscipinus* (BOHEMAN), *Dolycoris baccarum*

LINNAEUS, *Eurygaster integriceps* PUTON (SHOJAI 1968; ZOMORRODI 1962; SAMIN et al. 2010c; GHAHARI et al. 2011).

***Trissolcus vassilievi* (MAYR, 1903)**

Telenomus Vassilliewi MAYR, 1903; *Microphanurus vassilliewi* KIEFFER, 1926; *Microphanurus vassilievi* MEIER, 1940; *Trissolcus (Microphanurus) vassilievi* RJACHOVSKY, 1959; *Asolcus vassilievi* DELUCCHI, 1961.

Distribution in Iran: Alborz (IRANIPOUR et al. 1998; GHAHARI et al. 2011), Chaharmahal & Bakhtiari (HAGHSHEENAS 2004; SAMIN et al. 2010c), East Azarbaijan (SAMIN et al. 2010a; HEJAZI et al. 2011), Fars, Hamadan, Kermanshah, Lorestan, Markazi (MODARRES AWAL 1997; SAMIN et al. 2010c; GHAHARI et al. 2011), Golestan (SAMIN & ASGARI 2012a), Isfahan (MODARRES AWAL 1997; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), Kerman (MODARRES AWAL 1997; SAMIN et al. 2010c, 2011b; GHAHARI et al. 2011), Khorasan (SAMIN et al. 2011b), Khuzestan (SAMIN et al. 2012), Kordestan (MANSOUR GHAZI & RADJABI 2000; SAMIN et al. 2010c, 2011a; GHAHARI et al. 2011), Mazandaran (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011), Qazvin (NOORI & ASGARI 2000; SAMIN et al. 2010c; GHAHARI et al. 2011), Tehran (MODARRES AWAL 1997; SAMIN 2010; SAMIN et al. 2010b, 2011c; GHAHARI et al. 2011), West Azarbaijan (SHAFAEI et al. 2011), Zanzan (TAGHADDOSI & RAJABI 1998; SAMIN et al. 2010c; GHAHARI et al. 2011), Iran (no locality cited) (RADJABI 2000).

General distribution: Turkey (LODOS 1961), Syria (REMAUDIÈRE & SKAF 1963), Morocco (VOEGELÉ 1964), Armenia, Moldova, Russia (European part, North Caucasus, European part), Central Asia, Mongolia, Turkey, Ukraine (KOZLOV & KONONOVA 1983; KONONOVA 1995), Iraq (ALI 2011).

Host in Iran: Hemiptera: Pentatomidae: *Aelia acuminata* (LINNAEUS), *Apodiphus amygdali* (GERMAR), *Carpocoris fuscispinus* (BOHEMAN), *Dolycoris baccarum* Linnaeus, *Eurygaster integriceps* PUTON (ALEXANDROV 1948a, b; VAEZI 1950; ZOMORRODI 1962; SHOJAI 1968; MARTIN et al. 1969; SAFAVI 1974; FARID 1985; RADJABI & AMIR NAZARI 1989; ASGARI et al. 1995; SAMIN et al. 2010c; GHAHARI et al. 2011), *Graphosoma lineatum* (LINNAEUS) (ALEXANDROV 1948a, b; VAEZI 1950; ZOMORRODI 1962; SHOJAI 1968; MARTIN et al. 1969; SAFAVI 1974; FARID 1985; RADJABI & AMIR NAZARI 1989; ASGARI et al. 1995; SAMIN et al. 2010b, c; GHAHARI et al. 2011), *Eurygaster maura* (LINNAEUS) (KHANJANI 2003; SAMIN et al. 2010b, c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b), *Carpocoris mediterraneus* (TAMANINI), *Graphosoma semipunctatum* (FABRICIUS) (SAKENIN et al. 2008a; SAMIN et al. 2010c; GHAHARI et al. 2011; SAMIN & ASGARI 2012b).

***Trissolcus volgensis* (VIKTOROV, 1964)**

Asolcus reticulatus volgensis VIKTOROV, 1964; *Trissolcus reticulatus volgensis* VIKTOROV, 1967; *Trissolcus volgensis* KOZLOV, 1968; *Trissolcus volgensis* SAFAVI, 1968; *Trissolcus volgensis* VOEGELÉ, 1969; *Trissolcus volgensis* FABRITIUS, 1972; *Trissolcus volgensis* KOZLOV & LÊ, 1977; *Trissolcus volgensis* KOZLOV, 1978; *Trissolcus volgensis* KOZLOV & KONONOVA, 1983; *Trissolcus volgensis* KONONOVA, 1995; *Trissolcus volgensis* PETROV, 2013.

Distribution in Iran: Kerman (MEHRNEJAD 2013).

General distribution: Russia, Japan.

Host in Iran: Hemiptera: Pentatomidae: *Acrosternum arabicum* WAGNER, *Brachynema germari* (KOLENATI) (MEHRNEJAD 2013).

Subfamily Telenosinae ASHMEAD, 1902

This subfamily was recorded for the fauna of Iran by RAHNAMAYE-SHAHSAVARI et al. (2011) as a short report, but without notifying genus and species.

Discussion

This catalogue included 54 scelionid species of Iran which of them two genera *Trissolcus* and *Telenomus* with 22 and 14 species, respectively are the most diverse genera (Fig. 2). The scelionid wasps are the powerful parasitoids of Pentatomidae and Scutelleridae and judging from the several papers on Iranian Scelionidae (see references), among the different species of the mentioned families, *Dolycoris baccarum* and *Eurygaster integriceps* are most common hosts for several scelionids. Although the species diversity of Iranian Scelionidae was studied rather well, the biology of these parasitoids was poorly studied in Iran. However, the study of their biology is very important for establishment of successful biological control programs. The biology of several large genera of Scelionidae have been reviewed in detail as part of contemporary taxonomic studies (*Telenomus* by JOHNSON (1984), *Ceratobaeus* by IQBAL & AUSTIN (2000), and *Scelio* by DANGERFIELD et al. (2001)), and these include many aspects that relate more generally to other members of the family. In addition, several texts on Hymenoptera provide useful overviews of platygastroid biology (MASNER 1993, 1995, GODFRAY 1994; GAULD & BOLTON 1996; QUICKE 1997). The most detailed biological studies have been undertaken on scelionids that are used as, or have potential for use as, biological control agents, for example, *Trissolcus*, *Telenomus*, and *Scelio*. As a consequence, information is strongly biased toward the Telenominae, and care should be taken in extrapolating from these taxa to other members of the Scelionidae that are associated with different hosts (AUSTIN et al. 2005).

The apparent hierarchical nature of platygastroid host relationships makes them an ideal group for studying host switching and the possible biological attributes that may have been involved in each case. This requires a solid phylogenetic hypothesis for the group, which is currently lacking. Development of a robust set of higher-level relationships should be a priority for platygastroid systematists: Only then will it be possible to answer fundamental questions as to which groups are monophyletic, what are the limits to their host relationships, and at what point on the phylogeny has host switching occurred (AUSTIN et al. 2005).

However the results of this work and also GHAHARI & BUHL (2011) indicate that the fauna of Iranian Platygastroidea (Scelionidae with 54 species and Platygastriidae with 17 species) is very diverse. Since these insects are parasitoids of several agricultural pests, conservation of these natural enemies will result to decreasing pests' population density. Of course with attention to various geographical regions and climates in Iran, we expect that some other species of Platygastroidea remain to be discovered.



Fig. 1: Map of Iran with boundaries of Provinces.

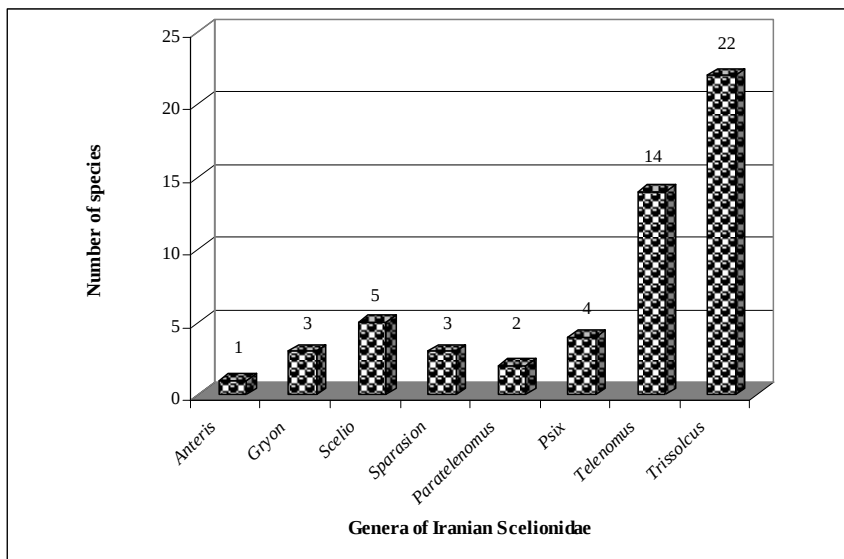


Fig. 2: Species diversity of different genera of Iranian Scelionidae.

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