



AkiNik

ISSN 2320-7078

JEZS 2013;1 (4): 116-140

© 2013 AkiNik Publications

Received: 28-06-2013

Accepted: 23-07-2013

Shaaban Abd-Rabou

Plant Protection Research
Institute, Agricultural Research
Center, Dokki-Giza, Egypt.
[E-mail: Shaaban59@yahoo.com]

Hassan Ghahari

Department of Plant Protection,
Shahre Rey Branch, Islamic Azad
University, Tehran, Iran.
[E-mail: hghahari@yahoo.com]

Svetlana N. Myartseva

Facultad de Ingeniería y Ciencias,
Universidad Autónoma de
Tamaulipas, 87149 Cd. Victoria,
Tamaulipas, México.
[E-mail: smyartse@uat.edu.mx]

Enrique Ruíz-Cancino

Facultad de Ingeniería y Ciencias,
Universidad Autónoma de
Tamaulipas, 87149 Cd. Victoria,
Tamaulipas, México.
[E-mail: eruiz@uat.edu.mx]

Correspondence:

Shaaban Abd-Rabou
Plant Protection Research
Institute, Agricultural Research
Center, Dokki-Giza, Egypt.
[E-mail:
Shaaban59@yahoo.com]

Iranian Aphelinidae (Hymenoptera: Chalcidoidea)

Shaaban Abd-Rabou*, Hassan Ghahari, Svetlana N. Myartseva & Enrique Ruíz-Cancino

ABSTRACT

Aphelinidae is one of the most important families in biological control of insect pests at a worldwide level. The following catalogue of the Iranian fauna of Aphelinidae includes a list of all genera and species recorded for the country, their distribution in and outside Iran, and known hosts in Iran. In total 138 species from 11 genera (Aberus, Aphelinus, Aphytis, Coccobius, Coccophagoides, Coccophagus, Encarsia, Eretmocerus, Marietta, Myiocnema, Pteroptrix) are listed as the fauna of Iran. Aphelinus semiflavus Howard, 1908 and Coccophagoides similis (Masi, 1908) are new records for Iran.

Key words: Hymenoptera, Chalcidoidea, Aphelinidae, Catalogue.

1. Introduction

Aphelinid wasps (Hymenoptera: Chalcidoidea: Aphelinidae) are important in nature, especially in the population regulation of hemipterans on many different plants. These parasitoid wasps are also relevant in the biological control of whiteflies, soft scales and aphids [44]. Studies on this family have been done mainly in relation with pests of fruit crops as citrus and others. John S. Noyes has published an Interactive On-line Catalogue [78] which includes up-to-date published information on the taxonomy, distribution and hosts records for the Chalcidoidea known throughout the world, including more than 1300 described species in 34 genera at world level. However, there are publications and new data not included in the catalogue that are presented herein. In this article, we gathered all the information on the Aphelinidae known to occur in Iran, in order to offer the most complete set of data on this family.

2. Materials and Methods

Published data on the Iranian Aphelinidae is summarized. Additionally, we include records representing new collections made from different regions of the country. This catalogue comprises the following data: the valid name of the taxa, published records with provincial distribution (see Fig. 1), or when this information is not available – “Iran (no locality cited)” is given, and synonyms of the species. The system, nomenclature, synonymy, and distribution data follow mainly [102, 46, 47, 48, 54, 27, 92, 8, 78, 77].

2.1. Acronyms of Museums and Depositories of Aphelinidae Types

BMNH: British Museum of Natural History, London, UK.

CSS: Cyprus Museum of National History.

EPPRI: Plant Protection Research Institute, Ministry of Agriculture, Dokki, Giza, Egypt.

HMIM: Hayk Mirzayans Insect Museum, Iranian Research Institute of Plant Protection, Tehran.

IEUN: Istituto de Entomologia Agraria, Università degli di Napoli, Portici, Italy.

ISZAF: Istituto Sperimentale per la Zoologia Agraria, Firenze, Italy.

MNCN: Museo Nacional de Ciencias Naturales, Madrid, Spain.

MZH: Zoological Museum of the University of Helsinki; Finnish Museum of Natural History

NMI: National Museum of Ireland.

PPRII: Plant Protection Research Institute, Agriculture Research Center, Egypt

QLD: Queensland Museum South Bank, Australia.

UNLP: Universidad Nacional de La Plata, Argentina.

UNP: Università degli Studi di Napoli, Portici, Italy.

USNMNH: United States National Museum of Natural History, Washington, DC, USA.

UTA: University of Tel Aviv, Israel.

DAMU: Department of Zoology, Aligarh Muslim University, Aligarh, India.

ZSIC: Zoological Survey of India, Calcutta, India.

3. Results

In total, 138 species of Aphelinidae from 11 genera are listed in the fauna of Iran. The list of species is given below alphabetically together with synonymies, hosts and distribution data. Also two genera *Centrodora* Förster, and *Euryischia* Riley included unknown species, therefore we do not consider them as the fauna of Iran.

3.1. Genus *Ablerus* Howard, 1894

Ablerus Howard 1894c. Type species *Centrodora clisiocampae* Ashmead, by original designation.

Azotus Howard 1898c. Type species *Azotus marchali* Howard, by monotypy; synonymy according to Girault 1913b.

Dimacrocerus Brethes 1914. Type species *Dimacrocerus platensis* Brethes 1914, by original designation.

Myocnemella Girault 1913. Type species *Myocnemella bifasciata* Girault 1913, by monotypy; synonymy according to Hayat 1994.

3.1.1. *Ablerus aleuroides* (Hussain & Agarwal, 1994)

Azotus aleuroides Husain & Agarwal 1982b: 157. Holotype male. India, Aligarh, ex. whitefly on *Citrus medica*.

Ablerus aleuroides (Hussain & Agarwal); Hayat 1994.

Distribution in Iran. Mazandaran [2].

Distribution outside Iran. India, Pakistan.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurocanthus spiniferus* Quaintance [2].

3.1.2. *Ablerus amarantus* Girault, 1932

Ablerus amarantus Girault, 1932.

Distribution in Iran. Isfahan [2].

Distribution outside Iran. Australasian and Oriental Regions.

Host in Iran. Hemiptera: Diaspididae: *Quadraspidiotus ceccoonii* (Leonardi) [2]

3.1.3. *Ablerus aonidiellae* Hayat, 1974

Ablerus aonidiellae Hayat, 1974.

Distribution in Iran. Guilan [2].

Distribution outside Iran. India.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella orientalis* (Newstead) [2].

3.1.4. *Ablerus atomon* Walker, 1847

Ablerus atomon (Walker, 1847); *Azotus atomon* (Walker, 1847); *Encyrtus atomon* Walker, 1847; *Ooencyrtus atomon* (Walker, 1847).

Distribution in Iran. Mazandaran [2].

Distribution outside Iran. Argentina, Austria, Azerbaijan, Caucasus, Czech Republic, Egypt, France, Georgia, Germany, Italy, Poland, Russia, Slovakia, Spain, Turkey, USA.

Host in Iran. Hemiptera: Diaspididae: *Pseudaulacaspis pentagona* (Targioni-Tozzetti) [2].

3.1.5. *Ablerus bharathius* Subba Rao, 1984

Ablerus bharathius (Subba Rao, 1984); *Ablerus fumipennis* (Subba Rao, 1984); *Azotus bharathius* Subba Rao, 1984; *Azotus fumipennis* Subba Rao, 1984.

Distribution in Iran. Golestan [2].

Distribution outside Iran. India.

Host in Iran. Hemiptera: Diaspididae: *Melanaspis*

lauristanicus Balachowsky-Kauss [2].

3.1.6. *Ablerus bifasciatus* Girault, 1913

Ablerus bifasciatus (Girault, 1913); *Myocnemella bifasciata* Girault, 1913.

Distribution in Iran. Kerman [2].

Distribution outside Iran. Australasian and Oriental Regions.

Host in Iran. Hemiptera: Diaspididae: *Aspidaspis laperrinei* Balachowsky [2].

3.1.7. *Ablerus celsus* (Walker, 1839)

Ablerus celsus (Walker, 1839); *Azotus britannicus* Alam, 1956; *Azotus celsus* (Walker, 1839); *Pteroptrix celsus* Walker, 1839.

Distribution in Iran. Markazi, Tehran [74, 2]

Distribution outside Iran. Bulgaria, Caucasus, Croatia, Czech Republic, France, Georgia, Italy, Moldova, Russia and adjacent countries (Federation of Independent States), Spain, Turkey, UK, Ukraine, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Epidiaspis leperii* (Signoret), *Parlatoria oleae* (Colvée) [74, 2].

3.1.8. *Ablerus chionaspidis* (Howard, 1914)

Ablerus chionaspidis (Howard, 1914); *Ablerus greatheadi* (Annecke & Insley, 1970); *Ablerus qadrii* (Agarwal, 1964); *Azotus chionaspidis* Howard, 1914; *Azotus greatheadi* Annecke & Insley, 1970; *Azotus qadrii* Agarwal, 1964.

Distribution in Iran. Fars [74, 2].

Distribution outside Iran. China, Egypt, India, Israel, Italy, Japan, Spain, Uganda, former Yugoslavia.

Host in Iran. Hyperparasitoid of *Coccobius reticulatus* (Compere & Annecke) (Aphelinidae) [74, 2].

3.1.9. *Ablerus chrysomphali* (Ghesquière, 1960)

Ablerus chrysomphali (Ghesquière, 1960); *Azotus chrysomphali* Ghesquière, 1960.

Distribution in Iran. Kerman [74, 2], Tehran [2].

Distribution outside Iran. Armenia, Egypt, Georgia, Morocco, Spain, Transcaucasus, Turkmenistan.

Host in Iran. Hemiptera: Diaspididae: *Lepidosaphes pistaciae* (Archangelskaya) (Diaspididae) [2], *Aonidiella orientalis* (Newstead) in citrus orchards [20]. Also, hyperparasitoid of *Physcus testaceus* Masi (Aphelinidae) [2].

3.1.10. *Ablerus perspiciosus* Girault, 1916

Azotus bimaculatus (Khan & Shafee, 1976); *Ablerus kashmirensis* (Narayanan, 1961); *Ablerus perspiciosus* Girault, 1916; *Azotus bimaculatus* Khan & Shafee, 1976; *Azotus kashmiriensis* Narayana, 1961; *Azotus perspiciosus* (Girault, 1916).

Distribution in Iran. Golestan [17], Guilan [59], Mazandaran [2].

Distribution outside Iran. Argentina, China, Egypt, France, India, Israel, Italy, Japan, Thailand, Turkey, USA, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Quadraspidiotus perniciosus* Comstock (Diaspididae) [2, 17], and *Aleurolobus barodensis* (Maskell) (Aleyrodidae), unknown diaspidid [59]. Also, hyperparasitoid of *Encarsia berlesesi* (Howard) and *Aphytis proclia* (Walker) (Aphelinidae) [17].

3.1.11. *Ablerus promacchiae* Viggiani & Ren, 1993

Ablerus promacchiae Viggiani & Ren, 1993.

Distribution in Iran. Isfahan [2].

Distribution outside Iran. China and adjacent countries.

Host in Iran. Hemiptera: Diaspididae: *Parlagena remaudierei* Kaussari [2].

3.2. Genus *Aphelinus* Dalman, 1820

Aphelinus Dalman 1820. Type species *Entedon* (*Aphelinus*) *abdominalis* Dalman, by monotypy.

Agononeurus Westwood 1833. Type species *Agononeurus basalis* Westwood; synonymy according to Thomson 1836.

Myina Nees 1834. Type species *Myina abdominalis* Nees; synonymy according to Thomson 1876.

Eriophilus Haldeman 1851. Type species *Eriophilus mali* Haldeman, by monotypy; synonymy according to Howard 1881.

Mesidia Foerster 1856. Type species *Mesidia pumila* Mayr, by monotypy; as subgenus of *Aphelinus* by Hayat 1983.

Anozus Foerster 1856. Type species *Anozus siphonophorae* Ashmead, by monotypy; synonymy according to Peck 1951.

Meroligodon Rondani 1877. Type species *Encyrtus ultor* Rondani; synonymy according to Boucek 1974.

Mesidiopsis Novicky 1930. Type species *Agononeurus subflavescens* Westwood, by monotypy; synonymy according to Hayat 1990.

Paulianaphelinus Risbec 1957. Type species *Paulianaphelinus mariscusae* Risbec, by monotypy; synonymy according to Polaszek & Hayat 1990.

Indaphelinus Hayat 1990. Type species *Aphelinus ancer* Hayat, by monotypy; as subgenus of *Aphelinus* by Hayat 1990.

3.2.1. *Aphelinus abdominalis* (Dalman, 1820)

Agononeurus basalis Westwood, 1833;

Agononeurus polycyclus Förster, 1861;

Aphelinus abdominalis (Dalman, 1820);

Aphelinus alius Yasnosh, 1963; *Aphelinus basalis* (Westwood, 1833); *Aphelinus bicolor* Yasnosh, 1963;

Aphelinus facialis (Förster, 1841);

Aphelinus flaviceps (Förster, 1841);

Aphelinus flavipes (Förster, 1841);

Aphelinus polycyclus (Förster, 1861);

Aphelinus (*Aphelinus*) *abdominalis* (Dalman, 1820);

Aphelinus (*Aphelinus*) *flavipes* (Förster, 1841);

Encyrtus ultor Rondani, 1848;

Entedon (*Aphelinus*) *abdominalis* Dalman, 1820;

Meroligon ultor (Rondani, 1848);

Myina abdominalis (Dalman, 1820); *Myina facialis* Förster, 1841;

Myina flaviceps Förster, 1841; *Myina flavipes* Förster, 1841.

Distribution in Iran. Mazandaran [41].

Distribution outside Iran. Argentina, Australia, Azerbaijan, Belgium, Brazil, Canary Islands, Channel Islands (British Is), Chile, China, Croatia, Czech Republic, Denmark, Egypt, France, Georgia, Germany, Hungary, India, Iraq, Italy, Japan, Kazakhstan, the Netherlands, Pakistan, Poland, Portugal, Russia and adjacent countries (Federation of Independent States), Slovakia, South Africa, Spain, Sweden, Switzerland, Transcaucasus, Tselinograd Obl, UK, former Yugoslavia, Zimbabwe.

Host in Iran. Hemiptera: Diaspididae: *Macrosiphum euphorbiae* (Thomas) (Hymenoptera: Aphididae) [41].

3.2.2. *Aphelinus albipodus* Hayat & Fatima, 1992

Aphelinus albipodus Hayat & Fatima, 1992.

Distribution in Iran. Kerman [41], Iran (no locality cited) (Zareh et al. 1995).

Distribution outside Iran. Chad, China, India, Japan, Paraguay, Russia, USA.

Host in Iran. Hemiptera: Aphididae, *Diuraphis noxia* (Mordvilko) [106], *Aphis fabae* Scopoli [41].

3.2.3. *Aphelinus argiope* Walker, 1839

Aphelinus argiope Walker, 1839;

Aphelinus (*Mesidia*) *argiope* Walker, 1839;

Coccophagus argiope (Walker, 1839);

Coccophagus argiope (Walker, 1839);

Mesidia argiope (Walker, 1839); *Mesidia pumila* Mayr, 1904;

Myina argiope (Walker, 1839).

Distribution in Iran. Golestan [41].

Distribution outside Iran. Czech Republic, Germany, India, Slovakia, Sweden, UK, Ukraine.

Host in Iran. Hemiptera: Aphididae: *Aphis grossulariae* Kaltenbach [41].

3.2.4. *Aphelinus asychis* (Walker, 1839)

Aphelinus affinis (Förster, 1841); *Aphelinus asychis* Walker, 1839;

Aphelinus brachyptera Kurdjumov, 1913;

Aphelinus brevicealcar Thomson, 1876;

Aphelinus dubia Kurdjumov, 1913;

Aphelinus euthria Walker, 1839;

Aphelinus (*Aphelinus*) *asychis* Walker, 1839; *Myina affinis*, Förster, 1841.

Distribution in Iran. Guilan [41], Tehran [74, 83].

Distribution outside Iran. Angola, Argentina, Australia, Azerbaijan, Brazil, Canary Islands, Chile, China, Colombia, Croatia, Czech Republic, Egypt, France, Georgia, Germany, Greece, Hungary, India, Iraq, Israel, Italy, Japan, Kazakhstan, Mexico, Morocco, Nepal, the Netherlands, Pakistan, Portugal, Russia and adjacent countries (Federation of Independent States), Slovakia, South Africa, Spain, Sweden, Transcaucasus, Turkey, UK, Ukraine, USA.

Host in Iran. Hemiptera: Aphididae: *Chromaphis juglandicola* (Kaltenbach) [83], *Therioaphis maculata* (Buckton), *Aphis craccivora* (Koch) [41].

3.2.5. *Aphelinus desantisi* Hayat, 1972

Aphelinus desantisi Hayat, 1972;

Aphelinus (*Aphelinus*) *desantisi* Hayat, 1972.

Distribution in Iran. Isfahan [41].

Distribution outside Iran. India.

Host in Iran. Hemiptera: Aphididae: *Longiungius pyrrarius* Passerini [41].

3.2.6. *Aphelinus flaviventris* Kurdjumov, 1913

Aphelinus flaviventris Kurdjumov, 1913;

Aphelinus (*Aphelinus*) *flaviventris* Kurdjumov, 1913.

Distribution in Iran. Fars [11, 74], Khuzestan [74], Zanjan [98].

Distribution outside Iran. Azerbaijan, Croatia, Czech Republic, France, Georgia, Hungary, Kazakhstan, Moldova, Romania, Russia and adjacent countries (Federation of Independent States), Spain, Sweden, Transcaucasus, UK, USA, former Yugoslavia.

Host in Iran. Hemiptera: Aphididae: *Diuraphis noxia* (Mordvilko) [11, 74], *Hyadaphis coriandri* (Das) [74]; Hemiptera: Pemphigidae: *Pemphigus spirothecae* Passerini [98].

3.2.7. *Aphelinus gossypii* Timberlake, 1924

Aphelinus gossypii Timberlake, 1924;

Aphelinus kashmiriensis Hayat, 1972;

Aphelinus (*Aphelinus*) *gossypii* Timberlake, 1924;

phelinus (Aphelinus) kashmiriensis Hayat, 1972.

Distribution in Iran. Guilan ^[41].

Distribution outside Iran. Brazil, Guadeloupe, Hawaii, India, Israel, Japan, Nepal, New Zealand, Réunion, South Africa, Tonga, Ukraine, USA.

Host in Iran. Hemiptera: Aphididae: *Aphis gossypii* (Glover) ^[41].

3.2.8. *Aphelinus humilis* Mercet, 1927

Aphelinus humilis Mercet, 1927;

Aphelinus (Aphelinus) humilis Mercet, 1927.

Distribution in Iran. Isfahan ^[41].

Distribution outside Iran. Argentina, Belarus, Chile, Czech Republic, India, Moldova, the Netherlands, Portugal, Slovakia, Spain, Sweden, Ukraine, UK.

Host in Iran. Hemiptera: Aphididae: *Macrosiphum rosae* (Linnaeus) ^[41].

3.2.9. *Aphelinus maidis* Timberlake, 1924

Aphelinus maidis Timberlake, 1924.

Distribution in Iran. Golestan ^[41].

Distribution outside Iran. Hawaii, Malaysia, Myanmar (Burma), Pakistan, Taiwan, Thailand.

Host in Iran. Hemiptera: Aphididae: *Aphis* sp. ^[41].

3.2.10. *Aphelinus mali* Haldeman, 1851

Aphelinus mali (Haldeman, 1851); *Aphelinus mali crocidolomiae* Risbec, 1951; *Aphelinus mali italica* Guercio, 1925; *Aphelinus varicornis* Girault, 1909; *Aphelinus (Aphelinus) mali* (Haldeman, 1851); *Aphidencyrus rosae* (Ashmead, 1886); *Blastothrix rosae* Ashmead, 1886; *Eriophilus mali* Haldeman, 1851.

Distribution in Iran. Mazandaran ^[41], Iran (no locality cited) ^[74].

Distribution outside Iran. Argentina, Australia, Austria, Azerbaijan, Belgium, Bolivia, Brazil, Bulgaria, Canada, Canary Islands, Caucasus, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Ecuador, Egypt, France, Georgia, Germany, India, Indonesia, Iraq, Israel, Italy, Japan, Korea, Lebanon, Malta, Mexico, Moldova, Morocco, Netherlands, New Zealand, Pakistan, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Romania, Russia and adjacent countries (Federation of Independent States), Saudi Arabia, Senegal, Slovakia, South Africa, Spain, Sweden, Switzerland, Tadjikistan, Trinidad & Tobago, Turkey, UK, Ukraine, USA, Uruguay, Uzbekistan, Venezuela, former Yugoslavia, Zambia, Zimbabwe.

Host in Iran. Hemiptera: Pemphigidae: *Eriosoma lanigerum* (Hausmann) ^[74, 41].

3.2.11. *Aphelinus paramali* Zehavi & Rosen, 1989

Aphelinus paramali Zehavi & Rosen, 1989.

Distribution in Iran. Khorasan ^[22].

Distribution outside Iran. Palaearctic and Oriental Regions (Angola, Egypt, Israel).

Host in Iran. Hemiptera: Aphididae: *Aphis pomi* (de Geer) ^[22].

3.2.12. *Aphelinus perpallidus* (Gahan, 1924)

Aphelinus perpallidus Gahan, 1924;

Aphelinus (Mesidia) perpallidus Gahan, 1924.

Distribution in Iran. Mazandaran ^[41].

Distribution outside Iran. Canada, Europe, Israel, South

Africa, USA.

Host in Iran. Hemiptera: Aphididae: *Brevicoryne* sp. ^[41].

3.2.13. *Aphelinus semiflavus* Howard, 1908

Aphelinus brevipennis Girault, 1917;

Aphelinus semiflavus Howard, 1908.

Material examined. Guilan province: Lahijan, 2♀, 16 April 2010, parasitoid of *Aphis craccivora* Koch (Aphididae). **New record for Iran.**

Distribution outside Iran. Argentina, Brazil, Canada, Germany, Hawaii, India, Israel, Russia and adjacent countries (Federation of Independent States), Spain, Turkey, USA.

3.2.14. *Aphelinus varipes* (Förster, 1841)

Aphelinus negritus Howard, 1908;

Aphelinus toxopteraphidis Kurdjumov, 1913;

Aphelinus varipes (Förster, 1841); *Myina varipes* Förster, 1841.

Distribution in Iran. Ardabil ^[69], Fars ^[41, 74], Isfahan ^[41].

Distribution outside Iran. Australia, Azores, Canary Islands, Croatia, Czech Republic, France, Georgia, Germany, Hungary, Israel, Italy, Japan, Kazakhstan, Madeira, Mexico, Morocco, Nepal, Netherlands, Pakistan, Paraguay, Portugal, Russia and adjacent countries (Federation of Independent States), Slovakia, South Africa, Spain, Sweden, Transcaucasus, Turkey, UK, Ukraine, USA, former Yugoslavia.

Host in Iran. Hemiptera: Aphididae: *Diuraphis noxia* (Mordvilko) ^[11, 74, 41], *Aphis gossypii* ^[69].

3.3. Genus *Aphytis* Howard, 1900

Aphytis Howard 1900. Type species *Aphytis chilensis* Howard, by monotypy.

Prospaphelinus De Gregorio 1914. Type species *Aphelinus (Prospaphelinus) silvestrii* De Gregorio, by monotypy; synonymy according to Mercet 1930.

Paraphytis Compere 1925. Type species *Paraphytis vittatus* Compere, by original designation; synonymy according to DeBach & Rosen 1976.

Syediella Shafee 1970. Type species *Syediella maculata* Shafee, by original designation; synonymy according to Hayat 1982.

3.3.1. *Aphytis africanus* Quednau, 1964

Aphytis africanus Quednau, 1964.

Distribution in Iran. Mazandaran ^[41].

Distribution outside Iran. Argentina, Egypt, Israel, Mozambique, South Africa, Swaziland, USA, Zimbabwe.

Host in Iran. Hemiptera: Diaspididae: *Parlatoria zizyphi* (Lucas) ^[41].

3.3.2. *Aphytis aonidiae* (Mercet, 1911)

Distribution in Iran. Guilan ^[59], Hamadan ^[41].

Distribution outside Iran. Argentina, Armenia, Caucasus, Chile, Cyprus, Czech Republic, Egypt, Europe, Georgia, Greece, Hungary, Israel, Italy, Japan, Moldova, Romania, Russia and adjacent countries (Federation of Independent States), Slovakia, Spain, Turkey, Ukraine, USA, Uruguay, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Diaspidiotus perniciosus* (Comstock) ^[41], unknown Diaspididae ^[59].

3.3.3. *Aphytis chrysomphali* (Mercet, 1912)

Aphelinus chrysomphali Mercet, 1912;

Aphelinus quaylei Rust, 1915; *Aphytis chrysomphali* (Mercet, 1912); *Aphytis chrysomphali mazandaranica* (Kiriukhin, 1946); *Aphytis quaylei* (Rust, 1915); *Aphytis silvestrii* (De Gregorio, 1914); *Aphytis (Prospaphelinus) chrysomphali* (Mercet, 1912); *Prospaphelinus silvestrii* De Gregorio, 1914.

Distribution in Iran. East Azarbaijan [26], Golestan [2], Caspian Sea area and southern provinces [74].

Distribution outside Iran. Afghanistan, Algeria, Argentina, Australasian, Australia, Belgium, Bermuda, Brazil, Caribbean (including West Indies), Caucasus, Chile, China, Costa Rica, Cuba, Cyprus, Dominican Republic, Egypt, El Salvador, Fiji, France, French Polynesia, Georgia, Germany, Greece, Guam, Guyana, Haiti, Hawaii, Hungary, India, Indonesia, Israel, Italy, Japan, Lebanon, Malaysia, Mauritius, Mexico, Morocco, New Caledonia, Panama, Peru, Philippines, Puerto Rico, Russia and adjacent countries (Federation of Independent States), Seychelles, Somalia, South Africa, Spain, Surinam, Swaziland, Taiwan, Tanzania, Trinidad & Tobago, Tunisia, Turkey, Ukraine, USA, Uruguay, former Yugoslavia, Zimbabwe.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella aurantii* (Maskell) [74, 2], *Aonidiella citrina* (Coquillett), *Aonidiella orientalis* (Newstead), *Chrysomphalus dictyospermi* (Morgan), *Parlatoria oleae* (Colvee), *Parlatoria zizyphi* (Lucas) [74], *Sphaerolecanium prunastri* (Boyer de Fonscolombe) [26]. Also, *Chartocerus rozanovi* Sugonyaev (Signiphoridae) was reported as the hyperparasitoid of *A. chrysomphali* from Iran [2].

3.3.4. *Aphytis hispanicus* (Mercet, 1912)

Aphelinus argentinus Brèthes, 1916; *Aphelinus bovelli* Malenotti, 1918; *Aphelinus maculicornis hispanica* Mercet, 1912; *Aphytis argentinus* (Brèthes, 1916); *Aphelinus bovelli* (Malenotti, 1918); *Aphytis hispanicus* (Mercet, 1912); *Aphytis (Prospaphelinus) bovelli* (Malenotti, 1918).

Distribution in Iran. Guilan [59], Hamadan [41].

Distribution outside Iran. Algeria, Argentina, Barbados, Brazil, Caucasus, Chile, China, Cook Islands, Czech Republic, Egypt, France, Georgia, Haiti, Hungary, India, Israel, Italy, Jamaica, Lebanon, Mexico, Morocco, Myanmar (Burma), South Africa, Spain, Sweden, Taiwan, Transcaucasus, Trinidad & Tobago, Turkey, USA.

Host in Iran. Hemiptera: Diaspididae: *Diaspidiotus perniciosus* (Comstock) [41], unknown Diaspididae [59].

3.3.5. *Aphytis lepidosaphes* Compere, 1955

Aphytis lepidosaphes Compere, 1955.

Distribution in Iran. Isfahan [41], Iran (no locality cited) [74].

Distribution outside Iran. Argentina, Australia, Brazil, Chile, China, Costa Rica, Cyprus, Ecuador, Egypt, El Salvador, Fiji, France, Greece, Guadeloupe, Hawaii, India, Israel, Italy, Jamaica, Lebanon, Mexico, Myanmar (Burma), New Caledonia, Pakistan, Peru, Philippines, Puerto Rico, South Africa, Spain, Taiwan, Thailand, Trinidad & Tobago, Turkey, USA.

Host in Iran. Hemiptera: Diaspididae: *Chrysomphalus dictyospermi* (Morgan) [41].

3.3.6. *Aphytis libanicus* Traboulsi, 1969

Aphytis libanicus Traboulsi, 1969.

Distribution in Iran. Isfahan [74].

Distribution outside Iran. Egypt, Israel, Italy, Lebanon, Turkey.

Host in Iran. Hemiptera: Diaspididae: *Lepidosaphes*

conchiformis Gmelin [74].

3.3.7. *Aphytis lingnanensis* Compere, 1955

Aphytis lingnanensis Compere, 1955.

Distribution in Iran. Golestan [41].

Distribution outside Iran. Argentina, Australia, Bermuda, Bolivia, Brazil, Caribbean (including West Indies), Chile, China, Costa Rica, Cuba, Cyprus, Egypt, El Salvador, India, Indonesia, Israel, Italy, Jamaica, Japan, Malaysia, Mauritius, Mexico, Morocco, New Caledonia, Pakistan, Peru, Philippines, Puerto Rico, Solomon Islands, South Africa, Spain, Taiwan, Thailand, Trinidad & Tobago, Turkey, Uruguay, USA.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella orientalis* (Newstead) [41].

3.3.8. *Aphytis maculicornis* (Masi, 1911)

Aphelinus maculicornis Masi, 1911; *Aphytis maculicornis* (Masi, 1911); *Aphytis (Prospaphelinus) maculicornis* (Masi, 1911).

Distribution in Iran. Fars, Isfahan, Markazi, Tehran, Caspian Sea area (Modarres Awal 1997).

Distribution outside Iran. Afghanistan, Algeria, Argentina, Armenia, Azerbaijan, China, Egypt, France, Georgia, Greece, India, Iraq, Israel, Italy, Mexico, Morocco, Pakistan, Russia and adjacent countries (Federation of Independent States), South Africa, Spain, Sweden, Tadjhikistan, Transcaucasus, Turkey, Ukraine, USA.

Host in Iran. Hemiptera: Diaspididae: *Aspidiotus hederæ* (Vallot), *Chrysomphalus dictyospermi* (Morgan), *Parlatoria oleae* (Colvee), *Parlatoria pergandii* (Comstock) [74].

3.3.9. *Aphytis melinus* DeBach, 1959

Aphytis melinus DeBach, 1959.

Distribution in Iran. Guilan [59], Mazandaran [41].

Distribution outside Iran. Argentina, Australia, Chile, China, Cyprus, France, Georgia, Greece, India, Israel, Italy, Mexico, Morocco, the Netherlands, Pakistan, Paraguay, Peru, South Africa, Spain, Turkey, Uruguay, USA, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella aurantii* (Maskell) [41], unknown Diaspididae [59].

3.3.10. *Aphytis mytilaspidis* (Le Baron, 1870)

Agonioneurus albidus Westwood, 1837; *Aphelinus albidus* (Westwood, 1837); *Aphelinus mytilaspidis* (Le Baron, 1870); *Aphytis albidus* (Westwood, 1837); *Aphytis diaspidioti* Chumakova, 1957; *Aphytis mytilaspidis* (Le Baron, 1870); *Aphytis mytilaspidis echinocacti* Traboulsi, 1969; *Aphytis mytilaspidis* (Le Baron, 1870); *Aphytis mytilaspidis ficus* Traboulsi, 1969; *Aphytis mytilaspidis hedericola* Traboulsi, 1969; *Aphytis mytilaspidis ulmi* Traboulsi, 1969; *Aphytis variolosum* Alam, 1956; *Aphytis (Prospaphelinus) mytilaspidis* (Le Baron, 1870); *Chalcis (Aphelinus) mytilaspidis* Le Baron, 1870.

Distribution in Iran. Caspian Sea area, Fars, Isfahan, Khuzestan, Semna, Tehran [74], Kerman [104], Lorestan [9, 10], Markazi [74, 9, 10].

Distribution outside Iran. Algeria, Argentina, Azerbaijan, Belgium, Bermuda, Bulgaria, Canada, Caucasus, Chile, China, Croatia, Cyprus, Czech Republic, Egypt, France, Georgia, Germany, Greece, Hungary, India, Indonesia, Iraq, Israel, Italy, Japan, Kazakhstan, Lebanon, Macedonia, Mauritania, Mauritius, Mexico, Moldova, Morocco, Netherlands, New Zealand, Poland, Romania, Russia and adjacent countries (Federation of Independent States), Saudi Arabia, Slovakia,

Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Transcaucasus, Turkey, UK, Ukraine, USA, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Lepidosaphes malicola* Borchsenius, *Parlatoria oleae* (Colvee), *Parlatoria blanchardi* (Targioni Tozzetti) ^[74], *Lepidosaphes pistaciae* (Archangelskaya) ^[104, 74], *Clidaspis asiatica* (Arch) ^[9, 10].

3.3.11. *Aphytis proclia* (Walker, 1839)

Aphelinus proclia Walker, 1839; *Aphytis chowdhurii* (Kaul, 1974); *Aphytis proclia* (Walker, 1839); *Aphytis sugonjaevi* Yasnosh, 1972; *Aphytis zonatus* Alam, 1956; *Centrodora chowdhurii* Kaul, 1974.

Distribution in Iran. Fars, Guilan, Isfahan, Khuzestan, Markazi, Tehran ^[74], Mazandaran ^[74, 16].

Distribution outside Iran. Algeria, Argentina, Austria, Azerbaijan, Bermuda, Bulgaria, Canada, Caucasus, Chile, China, Croatia, Cyprus, Czech Republic, El Salvador, France, Georgia, Germany, Grenada, Hawaii, Hungary, India, Italy, Japan, Kazakhstan, Korea, Macedonia, Mexico, Moldova, Morocco, Myanmar (Burma), Netherlands, Pakistan, Poland, Portugal, Russia and adjacent countries (Federation of Independent States), Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Turkey, UK, USA, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Pseudaulacaspis pentagona* Targioni ^[74, 16], *Aonidiella aurantii* (Maskell), *Aonidiella orientalis* (Newstead), *ChrysoRmphalus dictyospermi* (Morgan), *Parlatoria oleae* (Colvee) ^[74]. Also *Ablerus perspicuosus* Girault (Aphelinidae) was recorded as the hyperparasitoid of *A. proclia* ^[17].

3.4. Genus *Centrodora* Förster, 1878

Centrodora Foerster 1878. Type species *Centrodora amoena* Foerster, by original designation.

Paraphelinus Perkins 1906. Type species *Paraphelinus xiphidii* Perkins, by monotypy; synonymy according to Mercet 1918.

Tumidiscapus Girault 1911. Type species *Tumidiscapus flavus* Girault, by original designation; synonymy according to Hayat 1983.

Plastocharella Girault 1913. Type species *Plastocharella fuscipennis* Girault, by original designation; synonymy according to Hayat 1983.

Microeupelmus Otten 1941. Type species *Microeupelmus acridiphagus* Otten, by original designation; synonymy according to Ferrière 1965.

Pechlaneria Soyka 1948. Type species *Pechlaneria alpina* Soyka, by original designation; synonymy according to Ferrière 1965.

Debachiella Gordh & Rosen 1973. Type species *Debachiella pini* Gordh & Rosen, by original designation; synonymy according to Viggiani 1981.

Oolathron De Santis 1981. Type species *Oolathron mireyae* De Santis, by original designation; synonymy according to Viggiani 1985.

3.4.1. *Centrodora* sp.

Distribution in Iran. Hamadan ^[74].

Host in Iran. Hemiptera: Cicadidae: *Cicadatra ochreatea* (Melichar) ^[74].

3.5. Genus *Coccobius* Ratzeburg, 1852

Coccobius Ratzeburg 1852. Type species *Coccobius*

annulicornis Ratzeburg.

Physcus Howard 1895. Type species *Coccophagus varicornis* Howard, by monotypy; synonymy according to Hayat 1983.

Encyrtophyscus Blanchard 1948. Type species *Physcus flavoflagellatus* De Santis, by original designation; synonymy according to Hayat 1983.

Physculus Yasnosh 1977. Type species *Physculus danzigae* Yasnosh, by original designation; synonymy according to Hayat 1983.

3.5.1. *Coccobius annulicornis* (Ratzeburg, 1852)

Aphelinus annulicornis (Ratzeburg, 1852); *Coccobius annulicornis* Ratzeburg, 1852; *Coccobius testaceus* (Masi, 1909); *Physcus testaceus* Masi, 1909.

Distribution in Iran. East Azarbaijan ^[26], Golestan, Isfahan ^[41].

Distribution outside Iran. Azerbaijan, Caucasus, China, Croatia, Czech Republic, Egypt, France, Georgia, Germany, Hungary, Italy, Lebanon, Moldova, Poland, Romania, Russia and adjacent countries (Federation of Independent States), Slovakia, Spain, Turkey, UK, Ukraine, USA, Uzbekistan, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Chionaspis salicis* (Linnaeus), *Aspidiotus hederæ* (Vallot) ^[74], *Sphaerolecanium prunastri* (Boyer de Fonscolombe) ^[26].

3.5.2. *Coccobius contigaspidis* (Yasnosh, 1968)

Coccobius contigaspidis (Yasnosh, 1968); *Physcus contigaspidis* Yasnosh, 1968.

Distribution in Iran. Kerman ^[20].

Distribution outside Iran. Armenia, Russia and adjacent countries (Federation of Independent States).

Host in Iran. Hemiptera: Diaspididae: *Aonidiella orientalis* (Newstead) in citrus orchards ^[74].

3.5.3. *Coccobius danzigae* (Yasnosh, 1977)

Coccobius danzigae (Yasnosh, 1977); *Physculus danzigae* Yasnosh, 1977.

Distribution in Iran. Kermanshah ^[58].

Distribution outside Iran. Russia and adjacent countries (Federation of Independent States).

Host in Iran. Hemiptera: Diaspididae: *Diaspidiotus gigas* (Thiem & Gerneck) ^[58].

3.5.4. *Coccobius diaspidis* (Howard, 1907)

Coccobius diaspidis (Howard, 1907); *Encarsia diaspidis* Howard, 1907; *Physcus diaspidis* (Howard, 1907).

Distribution in Iran. Kermanshah ^[41].

Distribution outside Iran. South Africa.

Host in Iran. Hemiptera: Diaspididae: *Diaspis boisduvalii* Signoret ^[41].

3.5.5. *Coccobius flaviceps* (Girault & Dodd, 1915)

Coccobius flaviceps (Girault & Dodd, 1915); *Physcus flaviceps* Girault & Dodd, 1915.

Distribution in Iran. West Azarbaijan ^[41].

Distribution outside Iran. Australasian and Oriental Regions.

Host in Iran. Hemiptera: Diaspididae: *Lepidosaphes conchiformis* (Gmelin) ^[41].

3.5.6. *Coccobius flaviventris* (Howard, 1910)

Coccobius flaviventris (Howard, 1910); *Physcus flaviventris* Howard, 1910.

Distribution in Iran. Mazandaran ^[41].

Distribution outside Iran. Pakistan, Philippines, USA.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella aurantii* (Maskell) [41].

3.5.7. *Coccobius fulvus* (Compere & Annecke, 1961)

Coccobius fulvus (Compere & Annecke, 1961); *Coccobius mcdonaldii* Shafee, Siddiqui & Rizvi, 1988; *Physcus albipodus* Agarwal, 1964; *Physcus fulvus* Compere & Annecke, 1961.

Distribution in Iran. Guilan, Khorasan [41].

Distribution outside Iran. Afghanistan, China, France, India, Japan, Taiwan, USA.

Host in Iran. Hemiptera: Diaspididae: *Chionaspis asiatica* Archangelskaya, ex *Aulacaspis rosae* (Bouché) [41].

3.5.8. *Coccobius fusciventris* (Girault, 1913)

Coccobius fusciventris (Girault, 1913); *Physcus fusciventris* Girault, 1913.

Distribution in Iran. Isfahan [41].

Distribution outside Iran. Australasian and Oriental Regions.

Host in Iran. Hemiptera: Diaspididae: *Parlatoria blanchardii* (Targioni-Tozzetti) [41].

3.5.9. *Coccobius indefinitus* (Yasnosh & Myartseva, 1972)

Coccobius indefinitus (Yasnosh & Myartseva, 1972); *Physcus indefinitus* Yasnosh & Myartseva, 1972.

Distribution in Iran. Golestan, Mazandaran [41].

Distribution outside Iran. Armenia, Russia and adjacent countries (Federation of Independent States), Tadjikistan, Turkmenistan.

Host in Iran. Hemiptera: Diaspididae: *Quadraspidiotus zonatus* (Frauenfeldt) [41].

3.5.10. *Coccobius multicolor* (Girault, 1915)

Coccobius multicolor (Girault, 1915); *Physcus multicolor* Girault, 1915.

Distribution in Iran. Mazandaran [41].

Distribution outside Iran. Australasian and Oriental Regions.

Host in Iran. Hemiptera: Diaspididae: *Parlatoria oleae* (Colvee) [41].

3.5.11. *Coccobius nigriceps* (Girault, 1913)

Coccobius nigriceps (Girault, 1913); *Physcus nigriceps* Girault, 1913.

Distribution in Iran. Hamadan [41].

Distribution outside Iran. Australasian and Oriental Regions.

Host in Iran. Hemiptera: Diaspididae: *Lepidosaphes granati* Koroneos [41].

3.5.12. *Coccobius pullus* Prinsloo, 1995

Coccobius pullus Prinsloo, 1995.

Distribution in Iran. Kermanshah [41].

Distribution outside Iran. Namibia (South West Africa), South Africa.

Host in Iran. Hemiptera: Diaspididae: *Melanaspis inopinata* Leonardi [41].

3.5.13. *Coccobius reticulatus* (Compere & Annecke, 1961)

Coccobius reticulatus (Compere & Annecke, 1961); *Physcus gunturensis* Ahmad & Shafee, 1978; *Physcus oriensis* Husain & Agarwal, 1982; *Physcus reticulatus* Compere & Annecke, 1961.

Distribution in Iran. Fars [65, 74, 2].

Distribution outside Iran. India, Oman, Pakistan.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella orientalis*

(Newstead) [65, 74]. Also, *Ablerus chionaspidis* (Howard) (Aphelinidae) was recorded as the hyperparasitoid of *C. reticulatus* [2].

3.5.14. *Coccobius testaceus* Masi, 1909

Aphelinus annulicornis (Ratzeburg, 1852); *Coccobius annulicornis* Ratzeburg, 1852; *Coccobius testaceus* (Masi, 1909); *Physcus testaceus* Masi, 1909.

Distribution in Iran. Chaharmahal & Bakhtiari, Hamadan, Isfahan, Markazi [74], Kerman [104], Tehran [74,2].

Distribution outside Iran. Azerbaijan, Caucasus, China, Croatia, Czech Republic, Egypt, France, Georgia, Germany, Hungary, Italy, Lebanon, Moldova, Poland, Romania, Russia and adjacent countries (Federation of Independent States), Slovakia, Spain, Turkey, UK, Ukraine, USA, Uzbekistan, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: Unknown species [104], *Lepidosaphes malicola* Borchsenius, *Parlatoria olea* (Colvee), *Tecaspis asiatica* Balachowsky [74]. Also, *Ablerus chrysomphali* (Ghesquière) was recorded as the hyperparasitoid of *P. testaceus* [2].

3.5.15. *Coccobius viggianii* (Yasnosh, 1974)

Coccobius viggianii (Yasnosh, 1974); *Physcus* sp.; *Physcus viggianii* Yasnosh, 1974.

Distribution in Iran. Golestan, Kerman [41].

Distribution outside Iran. Palaearctic Region (Europe).

Host in Iran. Hemiptera: Diaspididae: *Leucaspis ulmi* (Linnaeus), and *Lepidosaphes pistaciae* (Archangelskaya) [41].

3.5.16. *Coccobius varicornis* (Howard, 1881)

Coccobius varicornis (Howard, 1881); *Coccophagus varicornis* Howard, 1881; *Physcus varicornis* (Howard, 1881); *Coccobius varicornis* (Howard, 1881); *Coccophagus varicornis* Howard, 1881; *Physcus varicornis* (Howard, 1881).

Distribution in Iran. Kerman, Mazandaran [41], Lorestan, Markazi [9, 10].

Distribution outside Iran. Canada, Italy, Sri Lanka, USA.

Host in Iran. Hemiptera: Diaspididae: *Lepidosaphes ulmi* (Linnaeus) [9, 10], *Parlatoria asiatica* Borchsenius, *Odonaspis secreta* (Cockerell) [41].

3.6. Genus *Coccophagoides* Girault, 1915

Coccophagoides Girault 1915. Type species *Coccophagus abnormicornis* Girault, by original designation.

Diaspiniphagus Silvestri 1927. Type species *Prospalta similis* Masi, by original designation; synonymy according to Mercet 1928.

Primaprospaltella DeBach & La Salle 1981. Type species *Prospalta murtfeldiae* Howard, by original designation; synonymy according to Hayat 1983.

3.6.1. *Coccophagoides similis* (Masi, 1908)

Aphelinus moeris Walker, 1839; *Coccophagoides moeris* (Walker, 1839); *Coccophagoides moeris* (Walker, 1839); *Coccophagoides parvipennis* Ferrière, 1955; *Coccophagoides similis* (Masi); *Coccophagoides similis* (Masi); *Coccophagoides similis* (Masi, 1908); *Coccophagus moeris* (Walker, 1839); *Diaspiniphagus moeris* (Walker, 1839); *Diaspiniphagus similis* (Masi, 1908); *Prospalta similis* Masi, 1908; *Prospaltella ilicis* Mercet, 1921; *Prospaltella silwoodensis* Alam, 1956; *Pteroptrix janius* Walker, 1839.

Material examined. Kermanshah province: Ravansar, 2♀, 1♂, unknown date, parasitoid of *Diaspidiotus ostreaformis*

(Curtis) (Diaspididae). **New record for Iran.**

Distribution outside Iran. Austria, Azerbaijan, Bulgaria, Caucasus, Czech Republic, Egypt, France, Georgia, Germany, Hungary, Italy, Poland, Russia and adjacent countries (Federation of Independent States), Spain, Sweden, Switzerland, Turkey, UK, USA, Uzbekistan.

3.7. Genus *Coccophagus* Westwood, 1833

Coccophagus Westwood 1833. Type species *Entedon scutellaris* Dalman, by monotypy.

Aneristus Howard 1895. Type species *Aneristus ceroplastae* Howard, by monotypy; synonymy according to Hayat 1983.

Paracharitopus Brèthes 1913. Type species *Paracharitopus lecanii* Brèthes, by monotypy; synonymy according to Timberlake 1931.

Ataneostigma Girault 1914. Type species *Ataneostigma pulchra* Girault, by original designation; synonymy according to Hayat 1983.

Prococcophagus Silvestri 1915. Type species *Prococcophagus varius* Silvestri, by original designation; synonymy according to Shafee, Azim & Khan 1985.

Taneostigmoidella Girault 1915. Type species *Taneostigmoidella nympha* Girault, by original designation; synonymy according to Shafee, Azim & Khan 1985.

Onophilus Brèthes 1918. Type species *Onophilus caridei* Brèthes, by monotypy; synonymy according to Mercet 1928.

Parencarsia Mercet 1930. Type species *Coccophagus krygeri* Mercet, by original designation; synonymy according to De Santis 1946.

Heptacritus De Santis 1960. Type species *Coccophagus semiatratus* De Santis, by original designation; synonymy according to Hayat 1983.

Aclerdaephagus Sugonjaev 1969. Type species *Aclerdaephagus planus* Sugonjaev, by original designation; synonymy according to Hayat 1992.

Polycoccophagus Sugonjaev 1976. Type species *Coccophagus rosae* Sugonjaev & Filipjuk, by original designation; as subgenus of *Coccophagus*.

3.7.1. *Coccophagus bivittatus* Compere, 1931

Coccophagus bivittatus Compere, 1931.

Distribution in Iran. Mazandaran [41].

Distribution outside Iran. Argentina, Egypt, India, Israel, Italy, South Africa.

Host in Iran. Hemiptera: Coccidae: *Ceroplastes floridensis* Comstock on citrus [41].

3.7.2. *Coccophagus ceroplastae* (Howard, 1895)

Aneristus ceroplastae Howard, 1895; *Aneristus ceroplastae modesta* (Silvestri, 1915); *Aneristus fumosipennis* Girault, 1915; *Coccophagus ceroplastae* (Howard, 1895); *Coccophagus citri* Agarwal, 1964; *Coccophagus delhiensis* Subba Rao & Rai, 1969; *Coccophagus diaspidis* Agarwal, 1964; *Coccophagus orientalis* Howard, 1896; *Prococcophagus orientalis* (Howard, 1896).

Distribution in Iran. Kerman [41].

Distribution outside Iran. Australia, Bangladesh, Benin, Bermuda, Caribbean (including West Indies), China, Cuba, Dominican Republic, Fiji, France, Haiti, Hawaii, India, Indonesia, Israel, Jamaica, Japan, Malaysia, Mauritius, Micronesia, New Caledonia, Pakistan, Panama, Philippines, Puerto Rico, South Africa, Sri Lanka, Taiwan, USA, Vietnam, Virgin Islands.

Host in Iran. Hemiptera: Coccidae: *Chloropulvinaria aurantii*

Cockerell [41].

3.7.3. *Coccophagus cowperi* Girault, 1917

Coccophagus cowperi Girault, 1917.

Distribution in Iran. Khorasan, Tehran [41].

Distribution outside Iran. Greece, India, Israel, Italy, Morocco, Papua New Guinea, South Africa, Uganda, USA, Venezuela.

Host in Iran. Hemiptera: Coccidae: *Coccus floccifera* Westwood, and *Pulvinaria* sp. [41].

3.7.4. *Coccophagus differens* Yasnosh, 1966

Coccophagus differens Yasnosh, 1966.

Distribution in Iran. Guilan [41].

Distribution outside Iran. Georgia, Moldova, Transcaucasus, Turkey, Ukraine.

Host in Iran. Hemiptera: Coccidae: *Sphaerolecanium prunastri* (Boyer de Fonscolombe) [41].

3.7.5. *Coccophagus lutescens* Compère, 1931

Coccophagus lutescens Compere, 1931.

Distribution in Iran. Kermanshah [41].

Distribution outside Iran. India, Kenya, South Africa.

Host in Iran. Hemiptera: Coccidae: *Ceroplastes sinensis* Del Guercio [41].

3.7.6. *Coccophagus lycimnia* (Walker, 1839)

Aphelinus lycimnia Walker, 1839; *Coccophagus ater* Howard, 1881; *Coccophagus californicus* Howard, 1889; *Coccophagus coccidis* Girault, 1917; *Coccophagus cognatus* Howard, 1881; *Coccophagus corni* Alam, 1956; *Coccophagus lecanii* (Fitch, 1859); *Coccophagus lycimnia* (Walker, 1839); *Coccophagus taxi* Alam, 1956; *Coccophagus vividus* Howard, 1885; *Eulophus scutellaris* Nees, 1834; *Platygaster lecanii* Fitch, 1859.

Distribution in Iran. East Azarbaijan [26], Kerman [104], Lorestan, Markazi [9, 10], Guilan [23, 24], West Azarbaijan [41].

Distribution outside Iran. Argentina, Armenia, Australia, Azerbaijan, Belgium, Bermuda, Brazil, Bulgaria, Canada, Caucasus, Chile, China, Colombia, Croatia, Cuba, Cyprus, Czech Republic, Egypt, El Salvador, France, Georgia, Germany, Greece, Hawaii, Hungary, India, Indonesia, Israel, Italy, Jamaica, Japan, Kazakhstan, Mexico, Moldova, Montenegro, the Netherlands, Peru, Poland, Portugal, Puerto Rico, Romania, Russia and adjacent countries (Federation of Independent States), Serbia, Slovakia, South Africa, Spain, St Vincent & Grenadines, Sweden, Switzerland, Taiwan, Trinidad & Tobago, Turkey, Uganda, UK, Ukraine, USA, Uzbekistan, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Lepidosaphes pistaciae* (Archangelskaya) [104], *Sphaerolecanium prunastri* (Boyer de Fonscolombe) [23, 24, 9, 10, 26]; Hemiptera: Coccidae: Unknown Coccidae [104], *Coccus hesperidum* (Linnaeus), and *Eulecanium coryli* (Linnaeus) [23, 24], *Didesmococcus unifasciatus* (Archangelskaya) [23, 24, 9, 10], *Eulecanium tiliae* (Linnaeus) [9, 10], *Pulvinaria betulae* (Linnaeus) [41].

3.7.7. *Coccophagus proximus* Yasnosh, 1966

Coccophagus proximus Yasnosh, 1966; *Coccophagus proximus* Yasnosh, 1966.

Distribution in Iran. Guilan [41].

Distribution outside Iran. Azerbaijan, Georgia, Moldova, Romania, Turkey.

Host in Iran. Hemiptera: Pseudococcidae: *Planococcus vovae* (Nasonov) [41].

3.7.8. *Coccophagus pseudococci* Compere, 1933

Coccophagus coorgensis Subba Rao & Rai, 1969; *Coccophagus indicus* Agarwal, 1964; *Coccophagus manii* Agarwal, 1964; *Coccophagus pseudococci* Compere, 1933; *Coccophagus zebratulus* Subba Rao & Rai, 1969.

Distribution in Iran. Fars [28, 51].

Distribution outside Iran. Afghanistan, Bangladesh, China, India, Pakistan.

Host in Iran. Hemiptera: Pseudococcidae: *Nipaeococcus viridis* (Newstead) [51], and *Maconellicoccus hirsutus* (Green) [28].

3.7.9. *Coccophagus rusti* Compère, 1928

Coccophagus rusti Compere, 1928.

Distribution in Iran. Semnan [41].

Distribution outside Iran. Israel, Kenya, Mexico, Peru, South Africa, Uganda, USA.

Host in Iran. Hemiptera: Coccidae: *Coccus* sp. [41].

3.7.10. *Coccophagus scutellaris* (Dalman, 1825)

Aphelinus scutellaris (Dalman, 1826); *Caecophagus scutellaris* (Dalman, 1826); *Myina semicircularis* Foerster, 1841; *Coccophagus australiensis* Girault, 1917; *Coccophagus scutellaris* (Dalman, 1826); *Encyrtus scutellaris* (Dalman, 1826); *Entedon scutellaris* Dalman, 1826; *Encyrtus xanthostictus* Ratzeburg, 1852; *Coccophagus lunulatus* Howard, 1894.

Distribution in Iran. Guilan, Mazandaran [41], Kerman [104], East Azarbaijan [41].

Distribution outside Iran. Afghanistan, Afrotropical, Argentina, Australia, Bermuda, Brazil, Canada, Canary Islands, Caucasus, China, Czech Republic, Dominican Republic, Egypt, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Japan, Lebanon, Madeira, Mexico, Morocco, Poland, Portugal, Puerto Rico, Russia and adjacent countries (Federation of Independent States), Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, USA, Uruguay, Venezuela, former Yugoslavia.

Host in Iran. Hemiptera: Coccidae: Unknown Coccidae [104], *Coccus hesperidum* (Linnaeus), *Pulvinaria betulae* (Linnaeus) and *Pulvinaria vitis* (Linnaeus) [41].

3.7.11. *Coccophagus silvestrii* Compere, 1931

Coccophagus silvestrii Compere, 1931.

Distribution in Iran. Alborz [41], Kerman [104].

Distribution outside Iran. Bangladesh, China, Czech Republic, France, India.

Host in Iran. Hemiptera: Coccidae: Unknown Coccidae [104], *Coccus hesperidum* (Linnaeus) [41].

3.8. Genus *Encarsia* Foerster, 1878

Encarsia Foerster 1878: 65–66. Type species: *Encarsia tricolor* Foerster, designation by monotypy.

Aspidiotiphagus Howard 1894a: 229; *Prospalta* Howard 1894b: 6; *Prospaltella* Ashmead 1904a: 126; *Encarsiella* Hayat 1983: 85. For a full list of generic synonyms see Schmidt & Polaszek 2007: 85–86.

3.8.1. *Encarsia acaudaleyrodus* Hayat, 1976

Encarsia acaudaleyrodus Hayat, 1976.

Encarsia acaudaleyrodus Hayat, 1976: 158. Holotype: ♀. ZSIC. India, Rajasthan, Sardar Samand, i.1974 (M. Hayat), ex *Acaudaleyrodus rachipora* (Singh) on *Prosopis juliflora*.

Distribution in Iran. East Azarbaijan, West Azarbaijan [41],

Guilan [89, 93], Isfahan, Mazandaran [1], Khuzestan [105], Iran (no locality cited) [41].

Distribution outside Iran. Egypt, India, Spain (Canary Islands).

Host in Iran. Hemiptera: Aleyrodidae: *Acaudaleyrodus rachipora* Singh [36], *A. rachipora* on *Citrus medica* (Rutaceae) [1], *A. rachipora* on *Ziziphus spinachristi* (Rhamnaceae) [1, 41], *Trialeurodes vaporariorum* on *Cucurbita citrullus* (Cucurbitaceae) [93], *A. rachipora* on *Morus alba* (Moraceae) [42], *Bemisia tabaci* (Gennadius) on cucumber [105], *Tetraleurodes hederarum* Goux on *Hedera helix* (Araceae) [42].

Species group placement. *E. parvella*-group [6].

Comments. *E. acaudaleyrodus* is very similar to *E. mineoi* Viggiani, but in latter species, body is completely yellow except for dark clypeus; flagellar segments longer; middle tibial spur half the length of basitarsus; ovipositor at most slightly longer (1.12 times) than middle tibia, but in *E. acaudaleyrodus* 1.26 times as long as the mid tibia. Extremely similarity of *E. acaudaleyrodus* and *E. mineoi* suggests that these two species are probably sympatric species. Two another species including, *E. americana* (De Bach & Rose) and *E. basicincta* Gahan are also close to *E. acaudaleyrodus*, but the morphological differences of these species were stated by Hayat (1989, 1998).

3.8.2. *Encarsia alemansoori* Rasekh & Polaszek, 2010

Encarsia alemansoori Rasekh & Polaszek, 2010: 225. Holotype: ♀. PPRII. Iran, Fars, Kazeroun, ex *Aleuroclava jasmini* on *Aegle correa*.

Distribution in Iran. Fars [85].

Distribution outside Iran. Endemic to Iran.

Host in Iran. Hemiptera: Aleyrodidae: *Aleuroclava jasmini* (Takahashi) on *Aegle correa* (Rutaceae), *Citrus reticulata*, *Citrus limettioides* (Rutaceae) [85].

Species group placement. *E. perflava*-group [85].

3.8.3. *Encarsia aleurochitonis* (Mercet, 1931)

Encarsia aleurochitonis Mercet, 1931: 663; Hulden, 1986: 17; Tryapitsin *et al.*, 1996: 61.

Prospaltella aleurochitonis Mercet, 1931: 663.

Distribution in Iran. East Azarbaijan, West Azarbaijan [42], Golestan [3], Iran (no locality cited) [36].

Distribution outside Iran. Georgia, Moldavia, Russia, Turkmenistan.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurochiton aceris* Modeer [36, 3], *A. aceris* on *Acer cappadocicum* (Aceraceae), *Aleurochiton pseudoplatani* Visnya on *Euonymus japonicus* (Celastraceae) [36].

Species group placement. *E. lahorensis*-group [6].

Comment. This species was raised from *A. aceris* in Russia, Moldova and Georgia, from *A. acerinus* Haupt in Moldova and from *A. pseudoplatani* in Turkmenistan. The antenna of female is variable with respect to the relative length of the pedicel and the first two funicular segments. One of the most important characteristics for identification of *E. aleurochitonis* is presence of 6-7 setae at fore wing base under submarginal vein.

3.8.4. *Encarsia aurantii* (Howard, 1894)

Coccophagus aurantii Howard, 1894: 231. Syntypes: ♀♀, U.S.A., California, San Gabriel 9.v.1887 (D.W. Coquillett) ex *Aspidiotus aurantii* var. *citrinus*. ? USNM.

Distribution in Iran. East Azarbaijan, West Azarbaijan [42], Fars [65, 74, 1], Guilan [1, 89], Mazandaran [1], Iran (no locality

cited) [74, 36].

Distribution outside Iran. Virtually cosmopolitan.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella aurantii* (Maskell) [36], *Aonidiella citrina* on *Citrus limetta* (Rutaceae), *Lepidosaphes gloverii* on *Citrus medica*, *Parlatoria oleae* on *Olea europaea* (Oleaceae) [1], *Aonidiella orientalis* (Newstead) [74], *A. orientalis* on *Citrus* sp. (Rutaceae) [65,1,42], *A. aurantii* on *Citrus* sp. (Rutaceae), *Jasminum fruticans* (Oleaceae) [42].

Species group placement. *E. aurantii*-group [5].

3.8.5. *Encarsia axacaliae* Abd-Rabou & Ghahari, 2007

Encarsia axacaliae Abd-Rabou & Ghahari, 2007: 163. Holotype female. EPPRI. Isfahan, Najaf-Abad, ex *Axacalia spiranthi* Danzing on *Convolvulus arvensis*.

Distribution in Iran. Isfahan [5].

Distribution outside Iran. Endemic to Iran.

Host in Iran. Hemiptera: Aleyrodidae: *Axacalia spiranthi* Danzing on *Convolvulus arvensis* (Convolvulaceae) [5].

Species group placement. *E. lahorensis*-group.

3.8.6. *Encarsia azimi* Hayat, 1980

Trichapous indicus Azim & Shafee, 1980: 335. Holotype female. ZDAMU. India, Tamil Nadu, Ootacamund, ex aleyrodid on *Nerium* (Apocynaceae). Preoccupied by *Prospaltella indica* Shafee, 1973: 255.

Encarsia adrianae Lopez-Avila, 1987: 425. Holotype female. BMNH. Pakistan, Rawalpindi, iv.1985 ex *B. tabaci* on *Lantana camara* [ex culture UK, Ascot, Silwood Park, ex *B. tabaci*]. Synonymy by Hayat, 1998: 202.

Distribution in Iran. East Azarbaijan, West Azarbaijan [42], Fars [14, 12, 74, 1], Guilan [89], Isfahan [33, 34], Kerman [1], Iran (no locality cited) [36].

Distribution outside Iran. Australia, India, Japan, Pakistan, Italy, Spain, Taiwan, Fujian.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurolobus moundi* (David & Subramaniam), *Bemisia hancocki* Corbett [34,35], *Bemisia afer* (Priesner & Hosny) [36], *Bemisia tabaci* (Gennadius) [14, 74], *B. afer* on *Urtica dioica* (Urticaceae), *Bemisia confusa* Danzig on *Glycyrrhiza glabra* (Leguminosae), *B. tabaci* on *Gossypium hirsutum* (Malvaceae) [12, 1, 42], *B. tabaci* on *Hibiscus esculentum* (Leguminosae) [1,42], *B. tabaci* on *Lycopersicon esculentum* (Solanaceae), *Rosa hemisphaerica* (Rosaceae) [42].

Species group placement. *E. inaron*-group [6].

Comments. *E. azimi* is an oligophagous parasitoid in different regions of Iran, and parasitizes various hosts. The reared parasitoids from different hosts indicated morphological and coloration variations, as head capsule width from *B. confusa* is smaller than from *B. tabaci* and also the latter species smaller than from *B. afer*. Also, mesosoma is pale yellow in the populations from *B. confusa*, but brown in the materials from *B. tabaci* and *B. afer*.

3.8.7. *Encarsia bennetti* Hayat, 1984

Encarsia bennetti Hayat, 1984: 399. Holotype female. BMNH. India, Maharashtra, Nagpur, ex *Aleurocanthus woglumi* Ashby on *Citrus*.

Distribution in Iran. Iran (no locality cited) [36].

Distribution outside Iran. India, Pakistan, Taiwan.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurocanthus woglumi* Ashby [36].

Species group placement. *E. merceti*-group [6].

3.8.8. *Encarsia berleseii* (Howard, 1906)

Prospalta berleseii Howard, 1906: 291. Syntypes ♀♀, USA,

Washington, D.C., vi.1906 ex [*Pseudaulacaspis* as] *Diaspis pentagona* (Targioni). USNM.

Distribution in Iran. East Azarbaijan, West Azarbaijan [42], Golestan [17], Guilan [74, 91, 89], Mazandaran [16, 74, 42, 1], Iran (no locality cited) [36].

Distribution outside Iran. Virtually cosmopolitan; Argentina, Brazil, China, Europe, Japan, Sri Lanka, Uruguay, USA.

Host in Iran. Hemiptera: Diaspididae: *Pseudaulacaspis pentagona* (Targioni) [16, 74, 91, 36], *Chrysomphalus dictyospermi* Morgan on *Cydonia oblonga* (Rosaceae), *Ilex spinigera* (Aquifoliaceae) *Salix alba* (Salicaceae) [42], *C. dictyospermi* on *Citrus aurantium* (Abd-Rabou & Ghahari 2004), *P. pentagona* on *Morus nigra* (Moraceae), *Jasminum fruticans* (Oleaceae), *Citrus sinensis* (Rutaceae) [42]. Also, *Ablerus perspicuosus* Girault (Aphelinidae) was recorded as the hyperparasitoid of *E. berleseii* [17].

Species group placement. *E. berleseii*-group [6].

3.8.9. *Encarsia bimaculata* Heraty & Polaszek, 2000

Encarsia bimaculata Heraty & Polaszek, 2000: 155-157. Holotype female. USNM. India, Tabarbhani (ex culture Gainesville, Florida).

Distribution in Iran. Isfahan [1].

Distribution outside Iran. Australia, Hong Kong, India, Indonesia, Israel, Mexico, Papua New Guinea, Philippines, possibly Sudan, Thailand, USA.

Host in Iran. Hemiptera: Aleyrodidae: *Bemisia argentifolii* on *Magnolia grandiflora* [1].

Species group placement. *E. strenua*-group [6].

3.8.10. *Encarsia cibcensis* Lopez Avila, 1987

Distribution in Iran. Kerman, Khorasan [1], Kermanshah [3], Iran (no locality cited) [36].

Distribution outside Iran. Australia, Pacific Islands, Pakistan, Taiwan.

Host in Iran. Hemiptera: Aleyrodidae: *Aleuroclava neolitsea* on *Calendula arvensis* (Compositae), *Bemisia tabaci* on *Amaranthus retroflexus* (Amaranthaceae) [1], *Bemisia silvatica* Danzig [34, 3].

Species group placement. *E. lahorensis*-group [6].

Comments. *E. cibcensis* is characterized by the distinct bare area near the leading edge of the fore wing distally from the stigmal vein and continuing along the margin towards the hind margin.

3.8.11. *Encarsia citrina* (Craw, 1891)

Coccophagus citrinus Craw, 1891: 25, Syntypes: ♀♀, USA, California, San Gabriel Valley, 1889 [ex *Aspidiotus citrinus*] lost. Neotype ♀ designated by DeBach & Rose, 1981: 671, same data as syntypes. USNM.

Distribution in Iran. East Azarbaijan, West Azarbaijan [42], Guilan [89, 59], Mazandaran [84, 1], Iran (no locality cited) [36].

Distribution outside Iran. Cosmopolitan species.

Host in Iran. Hemiptera: Diaspididae: *Nuculaspis abietis* Schrank [84], *Parlatoria ziziphi* [36], *Lepidosaphes beckii* on *Citrus medica* (Rutaceae), *P. ziziphi* on *Citrus sinensis* [1], *Aonidiella citrina* (Coquillett) on *Camellia* sp. (Teaceae), *L. beckii* on *Prosopis spicigera*, *Leucaspis pusilla* Loew on *Pinus* sp., *Leucaspis riccae* Targioni Tozzetti on *Nerium oleander* (Apocynaceae), *Parlatoria pergandii* Comstock on *Cerasus avium*, *Pinaspis aspidistrae* Signoret on *Chamaerops* sp. [42].

Species group placement. *E. citrina*-group [6].

Comments. *E. citrina* shows morphological variations especially in the relative dimensions of antennal segments.

Difference of morphological characters is probably resulted of host variation.

3.8.12. *Encarsia clypealis* (Silvestri, 1928)

Distribution in Iran. Golestan^[3], Iran (no locality cited)^[36].

Distribution outside Iran. India, Malaysia, Mexico, Pakistan.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurocanthus ziziphi* Priesner & Hosny^[36]; Diaspididae: *Lepidosaphes beckii* (Newman)^[3].

Species group placement. *E. opulenta*-group^[6].

Comments. *E. clypealis* is easily distinguishable from other species of *E. opulenta*-group by the presence of triangular 'tooth' on clypeus in both sexes, and the narrower frontovertex.

3.8.13. *Encarsia dialeurodis* Hayat, 1989

Encarsia dialeurodis Hayat, 1989: 75. Holotype female. BMNH. Paratypes 5 female, ex *Dialeurodes* sp. on *Ficus religiosa*, CIBC, Pakistan, Multan.

Distribution in Iran. Semnan^[3].

Distribution outside Iran. India, Pakistan, Turkmenistan.

Host in Iran. Hemiptera: Aleyrodidae: *Dialeurodes kirkaldyi* (Kotinsky)^[3].

Species group placement. *E. strenua*-group^[6].

3.8.14. *Encarsia dialeuroporae* Viggiani, 1985

Encarsia dialeuroporae Viggiani, 1985b: 84. Holotype female, on slide. IEUN. Pakistan, Peshawar, ex *Dialeuropora decempunctata* (Quaintance & Baker) on *Rosa indica*.

Distribution in Iran. Iran (no locality cited)^[36].

Distribution outside Iran. Afghanistan, Iraq, Pakistan.

Host in Iran. Hemiptera: Aleyrodidae: *Dialeuropora decempunctata* Quaintance & Baker^[36].

Species group placement. *E. lutea*-group^[6].

3.8.15. *Encarsia elegans* Masi, 1911

Encarsia elegans Masi, 1911: 147. Holotype ♀, Italy, Catanzaro, v. ex *Aleurolobus olivinus* (Silvestri). IEUN.

Encarsia bifasciafacies Hayat, 1989: 58. Synonymised by Huang & Polaszek, 1998.

Distribution in Iran. East Azarbaijan, West Azarbaijan^[42], Golestan, Isfahan^[61], Guilan^[3,89], Iran (no locality cited)^[36].

Distribution outside Iran. China, Egypt, India, Italy, Taiwan, Pakistan.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella orientalis* (Newstead)^[36]; Aleyrodidae: *Aleurolobus niloticus* Priesner & Hosny^[61], *A. niloticus* on *Amaranthus blitoides* (Amaranthaceae) and *Euphorbia glomerifera* (Euphorbiaceae), *Aleurolobus olivinus* (Silvestri)^[61], *Siphoninus immaculatus* (Heeger) on *Hedera helix* (Araliaceae)^[42], *Siphoninus immaculatus* (Heeger)^[3].

Species group placement. *E. elegans*-group^[6].

3.8.16. *Encarsia elongata* (Dozier, 1937)

Prospaltella aurantii (Howard): Silvestri, 1929: 902; 1931a: 49.

Coccophagus herndoni Girault, 1935: 3. Name proposed by Girault for material misidentified by Silvestri, ♀♀ Foochow [Fuzhou], Changsha, Soochow [Suzhou]. IEUN.

Prospaltella elongata Dozier, 1937: 128, Holotype female. USNM. USA, New Orleans, ex *Lepidosaphes gloverii* (Packard) on *Euonymus* shrub.

Distribution in Iran. Caspian Sea area^[74], East Azarbaijan^[42], Golestan^[1], Guilan^[89], Iran (no locality cited)^[36].

Distribution outside Iran. China, India, Spain, Italy, Taiwan,

Puerto Rico, USA.

Host in Iran. Hemiptera: Diaspididae: *Lepidosaphes gloverii*^[74], *Chrysomphalus aonidum* (L.)^[36], *C. aonidum* on *Althea officinalis* (Malvaceae), *Euphorbia cyathophora* (Euphorbiaceae), *Chrysomphalus dictyospermi* Morgan on *Lanthana camara* (Verbenaceae)^[42]; Aleyrodidae: *Aleurolobus niloticus* on *Amaranthus blitoides* (Amaranthaceae)^[1].

Species group placement. *E. aurantii*-group^[6].

3.8.17. *Encarsia fasciata* (Malenotti, 1917)

Prospaltella fasciata Malenotti, 1917: 195. Syntype female. ? ISZA. Italy, Florence, ex *Chrysomphalus dictyospermi* on *Sansevieria arborescens*.

Distribution in Iran. Caspian Sea area^[74], East Azarbaijan, West Azarbaijan^[42], Guilan^[91,89], Iran (no locality cited)^[36].

Distribution outside Iran. China, France, Italy, Pakistan, Spain, USA.

Host in Iran. Hemiptera: Diaspididae: *Aonidiella aurantii*, *Aonidiella citrina*^[74], *Pseudaulacaspis pentagona* (Targionii)^[91], *Chrysomphalus dictyospermi* (Morgan)^[74,36], *Chionaspis lepinyei* Ballachowski on *Quercus libani* (Fagaceae), *Chionaspis parastigma* Ballachowski on *Quercus persica* (Fagaceae), *C. dictyospermi* on *Cercis griffithii* (Fabaceae), *Laurus nobilis*, *Malus* sp., *Punica* sp. (Punicaceae)^[42].

Species group placement. *E. aurantii*-group^[6].

3.8.18 *Encarsia formosa* Gahan, 1924

Encarsia formosa Gahan, 1924, 14. Syntypes ♀♀ (no holotype as mentioned by Polaszek *et al.* 1992) [USA] Idaho, Twin Falls. USNM.

Distribution in Iran. Alborz, Fars^[1], East Azarbaijan (Ghahari *et al.* 2011), Golestan, Mazandaran^[74,1], Guilan^[89,93], Isfahan^[74,34,35,1], Markazi^[9,10], Tehran^[74], West Azarbaijan^[1,42], Iran (no locality cited)^[36].

Distribution outside Iran. The species originated in the USA and Canada. It has spread all over the world through introduction (cosmopolitan).

Host in Iran. Hemiptera: Aleyrodidae: *Trialeurodes vaporariorum* Westwood^[74,34,35,36], *Bemisia tabaci* (Gennadius)^[74,34,35], *Aleyrodes singularis*^[9,10], *Aleyrodes loniceriae* Walker on *Solanum melongena* (Solanaceae), *Aleyrodes prolella* on *Raphanus raphanistrum* (Brassicaceae), *Bemisia tabaci* on *Gossypium hirsutum* (Malvaceae), *Trialeurodes vaporariorum* on *Phaseolus vulgaris* var. *contender* (Leguminosae), *B. tabaci* on *Amaranthus spinosus* (Chenopodiaceae), *Trialeurodes vaporariorum* on *Vicia faba* (Leguminosae), *Bemisia tabaci* on *Corchorus olitorius* (Tiliaceae)^[1,42], *Trialeurodes vaporariorum* on *Cucurbita maxima* (Cucurbitaceae)^[93], *Bemisia tabaci* on *Lycopersicum esculentum* (Solanaceae), *Rosa* sp. (Rosaceae), *T. vaporariorum* on *Lycopersicum esculentum* (Solanaceae), *Verbena hybrida* (Verbenaceae)^[42].

Species group placement. *E. luteola*-group^[6].

Comments. *E. Formosa* is a successful agent for biological control of *Trialeurodes vaporariorum* in the greenhouses, *Bemisia tabaci* in the fields, and probably other aleyrodids. *T. vaporariorum* is the main host, but the parasitoid is also known from some other species of whiteflies. *E. Formosa* was introduced into Iran between 1945 and 1950 for control of *T. vaporariorum* and *B. tabaci* in the greenhouses^[94]. This efficient parasitoid is a cosmopolitan species in Iran.

3.8.19. *Encarsia gautieri* (Mercet, 1928)

Encarsia gautieri Mercet: Nikol'skaya & Jasnosh, 1966: 271.

Distribution in Iran. East Azarbaijan [40].

Distribution outside Iran. Azerbaijan, Georgia, Turkey.

Host in Iran. Hemiptera: Aleyrodidae: *Pealius azaleae* (Baker & Moles) on *Azalea pontica* (Ericaceae) [40].

Species group placement. *E. tricolor*-group [47].

3.8.20. *Encarsia gigas* (Chumakova, 1957)

Distribution in Iran. Kermanshah [58].

Distribution outside Iran. Italy, Lebanon.

Host in Iran. Hemiptera: Diaspididae: *Diaspidiotus gigas* (Thiem & Gerneck) [58].

Species group placement. *E. aurantii*-group [6].

3.8.21. *Encarsia hamata* Huang & Polaszek, 1998

Distribution in Iran. Fars [85,86].

Distribution outside Iran. China, Japan.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurolobus marlatti* on *Citrus aurantium*, *Aleuroclava jasmini* on *Citrus reticulata* and *Citrus limettioides* [85,86], *A. jasmini* on *Aegle correa* (Rutaceae) [85], *Bemisia tabaci* (Gennadius) on *Helianthus annuus* (Asteraceae), unknown aleyrodid on *Ziziphus spinachristi* [85].

Species group placement. *E. lutea*-group [6].

3.8.22. *Encarsia inaron* (Walker, 1839)

Aphelinus inaron Walker, 1839: 10. Lectotype female. NMI. [designated by Graham, 1976]; [UK] (Haliday).

Encarsia partenopea Masi, 1909: 32. Holotype female. UNP. Italy, Campania, Portici, ex aleyrodid on *Phillyrea*.

Encarsia indifferents Mercet, 1929: 220. Holotype female. MNCN. Egypt: [?Giza].

Trichaporus aleyrodis Mercet, 1930: 196. Syntype 4♂, 12♀. MNCN. France: ex *A. prolella*.

Encarsia borealis Hulden, 1986: 18. Holotype female. MZH. Finland, Ta, Lammi, ex *Pealius quercus* on *Corylus avellana*.

Distribution in Iran. East Azarbaijan, West Azarbaijan [42], Fars [14, 12, 74, 1], Golestan [74,60], Guilan [89, 93], Isfahan [34, 35, 1], Khuzestan [73], Markazi [9,10], Mazandaran [1], Tehran [74], Iran (no locality cited) [36].

Distribution outside Iran. Palaearctic region; Bulgaria, England, France, Greece, Israel, Italy, Jordan, Egypt, India, North Africa, Pakistan, Taiwan, introduced into North America, almost regions of Asia and Africa.

Host in Iran. Hemiptera: Aleyrodidae: *Acaudaleyrodes citri* Priesner & Hosny [34,35], *Aleyrodes singularis* Danzig [12, 74, 34, 35], *Bemisia tabaci* (Gennadius) [14, 74, 60], *Siphoninus phillyreae* (Haliday) [12, 74, 36], *B. tabaci* on *Gossypium hirsutum* (Malvaceae) [12], *Trialeurodes vaporariorum* Westwood [74, 34, 35, 9, 10], *Aleyrodes singularis* on *Euphorbia pulcherrima* (Euphorbiaceae) [42], *Siphoninus immaculatus* (Heeger) on *Hedera helix* (Araliaceae), *S. phillyreae* on *Ulmus campestris* (Ulmaceae) [1], *S. phillyreae* on *Ulmus carpinifolia* var. *umbraculifera*, *Trialeurodes vaporariorum* on *Rosa beggariana* (Rosaceae) [1,42], *Trialeurodes vaporariorum* on *Cucurbita sativa* (Cucurbitaceae), *T. vaporariorum* on *Cucurbita citrullus* (Cucurbitaceae), *T. vaporariorum* on *Helianthus tuberosus* (Asteraceae) [93], *Neomaskellia andropogonis* Corbett on sugarcane [73].

Species group placement. *E. inaron*-group [6].

Comments. *E. inaron* is a widespread species, and rather efficient parasitoid for control of the *Trialeurodes vaporariorum* in the greenhouses and *Siphoninus phillyreae* in nature. *E. inaron* constitutes a complex of cryptic species,

which morphometric and molecular analysis of the *E. inaron* species-group was detailed studied by Manzari *et al* (2002), and a new species was described as *E. estrellae* Manzari & Polaszek. Addition of the above synonyms, it appears that *E. longicornis* Mercet and *E. siphonini* Silvestri may also constitute the synonyms of *E. inaron*, but further study by advanced taxonomic methods is necessary to confirm this. Different populations of *E. inaron* show color differences, and this variety resulted to ambiguities. Hulden (1986) described *E. borealis* on the base of minor color differences from *E. aleyrodis*. Polaszek *et al.* (1992) and Laudonia & Viggiani (1995) have discussed color variation in this species. Comprehensive studies of the biology of *E. inaron* have been performed in Iran [31,33].

3.8.23. *Encarsia indigoferae* Polaszek & Manzari, 2008

Encarsia indigoferae Polaszek & Manzari, 2008: 134. Holotype female. HMIM. Iran, Sistan & Balouchestan, Chabahar, Nobandian, ex *Aleuromarginatus tephrosiae* Corbett on *Indigofera* sp.

Distribution in Iran. Sistan & Balouchestan [81].

Host in Iran. Hemiptera: Aleyrodidae: *Aleuromarginatus tephrosiae* Corbett on *Indigofera* sp. (Fabaceae) [81].

Distribution outside Iran. Oman.

Species group placement. *E. strenua*-group [81].

3.8.24 *Encarsia inquirenda* (Silvestri, 1931)

Prospaltella inquirenda Silvestri, 1931a: 53. Syntypes female. IEUN. Fukian, Fuzhou, Guik Su; Japan: Okitsu, ex *Chrysomphalus aonidium* and *Parlatoria olea*.

Distribution in Iran. Guilan [59].

Distribution outside Iran. Widespread in the Palaearctic Region.

Host in Iran. Hemiptera: Diaspididae: Unknown species [59].

Species group placement. *E. aurantii*-group [6].

3.8.25. *Encarsia lahorensis* (Howard, 1911)

Prspaltella lahorensis Howard, 1911: 132. Lectotype female. USNM. Pakistan, Lahore, (designated by Hayat, 1981: 466).

Distribution in Iran. Khorasan, Mazandaran [1, 88].

Distribution outside Iran. China, Egypt, India, Italy, Pakistan, Russia and adjacent countries (Federation of Independent States), Taiwan, USA.

Host in Iran. Hemiptera: Aleyrodidae: *Aleyrodes elevatus* Silvestri on *Corchorus trilocularis* (Tiliaceae), *Dialeurodes citri* (Ashmead) on *Citrus bigaradia* (Rutaceae) [88].

Species group placement. *E. lahorensis*-group [6].

Comments. This species is one of the efficient parasitoids of *Dialeurodes citri* and control successfully this pest in citrus plantations like as northern Iran and Mediterranean countries. The females of this parasitoid develop from fertilized eggs that were laid into 3rd and 4th instars of host larvae.

3.8.26. *Encarsia lehri* Yasnosh, 1989

Encarsia lehri Yasnosh, 1989: 112-113; Tryapitzin *et al.* 1996: 65.

Distribution in Iran. Khorasan [40].

Distribution outside Iran. Caucasus, Russia and adjacent countries (Federation of Independent States).

Host in Iran. Hemiptera: Aleyrodidae: *Aleurolobus wuenni* on *Clematis vitalba* (Rununculaceae) [40].

Species group placement. *E. strenua*-group (Polaszek & Manzari 2008).

3.8.27. *Encarsia lipaleyrodes* Krishnan & David, 1996

Encarsia lipaleyrodes Krishnan & David, 1996: 19. Holotype female. India, Padappai, ex *Lipaleyrodes euphorbia* David & Subramaniam on *Phullanthus acidus*.

Distribution in Iran. Kerman^[3].

Distribution outside Iran. India, Pakistan.

Host in Iran. Hemiptera: Aleyrodidae: *Lipaleyrodes euphorbiae* David & Subramaniam^[3].

Species group placement. *E. lahorensis*-group^[48].

Comments. *E. lipaleyrodis* is very close to *E. pseudococci*, but differs from the latter as follow. In *E. lipaleyrodis*, F1 about 1.5 times as long as broad or about 0.75 times of F2; basal cell with 2 setae; body yellow, with anterior margin of midlobe, propodeum, and petiole brown, and T1 of gaster with a dark brown band across base. In *E. pseudococci*, F1 slightly longer than broad and about 0.5 times of F2, or slightly longer; basal cell with 6 setae; body probably completely yellow.

3.8.28 *Encarsia longifasciata* Subba Rao, 1984

Encarsia longifasciata Subba Rao, 1984: 260. Holotype female. BMNH. India, Bangalore, ex blackfly on *Murraya*.

Distribution in Iran. Isfahan^[40], Iran (no locality cited)^[36].

Distribution outside Iran. China, India, Pakistan, Taiwan.

Host in Iran. Hemiptera: Aleyrodidae: *Aleuroclava neolitseae* (Takahashi)^[36], *A. neolitseae* on *Ficus capensis* (Moraceae)^[40].

Species group placement. *E. longifasciata*-group^[6].

3.8.29. *Encarsia longivalvula* Viggiani, 1985

Encarsia longivalvula Viggiani, 1985b: 85. Holotype female. IEUN. Pakistan, Peshawar, ex *Dialeurodes decempunctata* on *Rosa indica*.

Distribution in Iran. Isfahan, Sistan & Baluchestan^[40], Iran (no locality cited)^[36].

Distribution outside Iran. Afghanistan, Iraq, Pakistan, Taiwan.

Host in Iran. Hemiptera: Aleyrodidae: *Dialeuropora decempunctata* (Quaintance & Baker)^[36], *D. decempunctata* on *Eucalyptus camalduleis* (Myrtaceae), *Bemisia tabaci* on *Malva neglecta* (Malvaceae)^[40].

Species group placement. *E. strenua*-group^[6].

3.8.30. *Encarsia lounsburyi* (Berlese & Paoli, 1916)

Prospaltella lounsburyi Berlese & Paoli, 1916: 305. Syntypes female. ? ISZA. Madeira, ex *Chrysomphalus dictyospermi* Morgan.

Distribution in Iran. East Azarbaijan, West Azarbaijan^[42], Guilan^[89], Mazandaran^[1], Iran (no locality cited)^[36].

Distribution outside Iran. Cosmopolitan and widely distributed species.

Host in Iran. Hemiptera: Diaspididae: *Parlatoria asiatica* Borchsenius^[36], *Parlatoria pergandei*^[1, 36], *Parlatoria ziziphi* Lucas on *Hedera helix* (Araliaceae)^[1, 42], *Aspidiotus nerii* Bouche on *Aralia* sp., *Hemiberlesia lataniae* (Signoret) on *Ulmus campestris* (Ulmaceae), *P. asiatica* on *Ephedra* sp., *P. pergandei* on *Althea rosea* (Malvaceae), *Cammelia japonica* (Teaceae)^[42].

Species group placement. *E. citrina*-group^[6].

Comments. *E. lounsburyi* is very close to *E. citrina* (Craw). The main difference between the two species is the number of setae on the submarginal vein, one seta in *E. lounsburyi* but two in *E. citrina*. Also, fore wings of *E. lounsburyi* with longer marginal fringe than *E. citrina*, and petiole with fine sculpture.

3.8.31. *Encarsia lutea* (Masi, 1909)

Prospaltella lutea Masi, 1909: 25. Syntypes 2♀♀. IEUN. Italy, Campania, Portici.

Distribution in Iran. East Azarbaijan, West Azarbaijan^[42], Fars^[14, 12, 74, 1], Golestan^[60], Guilan^[89], Isfahan^[34, 35, 1], Mazandaran^[1], Iran (no locality cited)^[36].

Distribution outside Iran. Italy, Russia and adjacent countries (Federation of Independent States); India, China, Pakistan, Taiwan, Palaearctic region; Australia and adjacent regions.

Host in Iran. Hemiptera: Aleyrodidae: *Aleyrodes proletella* L., *Bulgarialeurodes cotesii* Maskell, *Trialeurodes ricini* (Misra)^[74, 34, 35], *Bemisia tabaci* (Gennadius)^[14, 74, 60, 36], *Trialeurodes ricini* on *Ricinus communis* (Euphorbiaceae)^[12], *Bemisia tabaci* on *Gossypium hirsutum* (Malvaceae)^[12, 1, 42], *Aleurolobus marlatti* Quaintance on *Verbena officinalis* (Verbenaceae) and *Abutilon foliosum* (Malvaceae)^[1, 42], *Aleurocanthus spiniferus* Quaintance on *Ficus capensis* (Moraceae), *A. marlatti* on *Punica granatum* (Punicaceae), *Bemisia ovata* Goux on *Helianthus annuus* (Compositae), *B. tabaci* on *Cucumis sativus* (Cucurbitaceae), *Dialeurodes kirkaldyi* (Kotinsky) on *Juglans regia* (Juglandaceae)^[42].

Species group placement. *E. lutea*-group^[6].

Comments. There exists considerable color variations of *E. lutea*, as two or more species may be involved, but further studies are required to either confirm or refute this. Different populations of *E. lutea*, but populations from Australia and the Pacific Islands differ from each other by a single point mutation in the D2 expansion region of the 28S ribosomal DNA gene region^[19]. Additionally coloration, this species shows variation in the dimensions of the antennal segments, and length of the marginal fringe compared to wing width^[48]. The male of *E. lutea* was collected from eggs of *Heliothis zea* (Boddie) and *Trichoplosia ni* (Hubner) (Noctuidae) in Golestan province, northern Iran. *E. lutea* is the most important parasitoid on *Bemisia tabaci* in cotton fields of Iran^[13, 96].

3.8.32 *Encarsia luteola* Howard, 1895

Encarsia lutea Howard, 1895: 29. Holotype ♀. USNM. USA, Washington, DC.

Encarsia angelica Howard, 1895: 30. Holotype ♂, [USA: California, Los Angeles, (Coquillett)].

Encarsia deserti Gerling & Rivnay, 1984: 439. Holotype ♀, (UTA) syn. n.; Myartseva & Yasnosh, 1992: 19.

Distribution in Iran. Guilan (Sakenin et al. 2006a), West Azarbaijan^[42], Iran (no locality cited)^[36].

Distribution outside Iran. Brazil, Guadeloupe, Mexico, Puerto Rico, USA, Israel, Russia and adjacent countries (Federation of Independent States).

Host in Iran. Hemiptera: Aleyrodidae: *Trialeurodes variabilis* Quaintance^[36], *Trialeurodes lauri* (Signoret) on *Laurus nobilis* (Lauraceae), *T. variabilis* Quaintance on *Cyperus rotundus* (Cyperaceae)^[42].

Species group placement. *E. luteola*-group^[6].

3.8.33. *Encarsia macoensis* Abd-Rabou & Ghahari, 2007

Encarsia macoensis Abd-Rabou & Ghahari, 2007: 165. Holotype female. EPPRI. West Azarbaijan, Maco, ex *Bemisia tabaci* (Genn.) on *Berberis vulgaris*.

Distribution in Iran. West Azarbaijan^[5].

Distribution outside Iran. Endemic to Iran.

Host in Iran. Hemiptera: Aleyrodidae: *Bemisia tabaci* (Gennadius) on *Berberis vulgaris* (family?)^[5].

Species group placement. *E. strenua*-group.

3.8.34. *Encarsia macroptera* Viggiani, 1985

Encarsia macroptera Viggiani, 1985a: 87. Holotype female. IEUN. Pakistan, Peshawar.

Encarsia leptosoma Hayat, 1989: 44. Holotype female. BMNH. India, Punjab.

Distribution in Iran. Isfahan^[40], Iran (no locality cited)^[36].

Distribution outside Iran. India, Pakistan, Turkmenistan.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurolobus moundi* David & Subramaniam^[36], *A. moundi* on *Euphorbia glomerifera* (Euphorbiaceae)^[40].

Species group placement. *E. lahorensis*-group^[6].

Comments. Hayat (1998) examined and compared the paratypes of *E. leptosoma* and *E. macroptera* and determined very slight differences on the number of setae in basal cell and the length of marginal fringe. However, these species are considered synonym and it is appear that advanced taxonomic methods can eliminate the probable doubts.

3.8.35. *Encarsia margaritiventris* (Mercet, 1931)

Distribution in Iran. Ilam (Abd-Rabou et al. 2005a).

Distribution outside Iran. Finland, Moldavia, Poland, Russia and adjacent countries (Federation of Independent States), Turkey.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurotuba jelinekii* Frauenfeld^[3].

Species group placement. *E. inaron*-group^[6].

Comments. Hulden (1986) stated that *E. margaritiventris* is a monophagous parasitoid only on *Aleurochiton aceris* Modeer, but the present survey and other ones^[76,99] indicated that, the species parasitizes another species of whiteflies. This species very similar to *E. inaron*, but differs from the latter by larger size (fore wing 0.84 mm against 0.62 mm for *E. inaron*) and the longer first funicular segment.

3.8.36. *Encarsia maritima* Jasnosh, 1989

Encarsia maritima Jasnosh, 1989: 114-116; Tryapitzin et al. 1996: 66.

Distribution in Iran. Khorasan^[40].

Distribution outside Iran. Caucasus, Russia and adjacent countries (Federation of Independent States).

Host in Iran. Hemiptera: Aleyrodidae: *Aleurolobus wunni* (Ryberg) on *Ranunculus arvensis* (Ranunculaceae)^[40].

Species group placement. *E. strenua*-group^[81].

3.8.37. *Encarsia mineoi* Viggiani, 1982

Encarsia mineoi Viggiani, 1982: 27. Holotype female. IEUN. Libya, Sidi Mesri, ex *B. tabaci*; Abd-Rabou & Viggiani, 1998: 12.

Distribution in Iran. East Azarbaijan, West Azarbaijan^[42], Khorasan^[1], Mazandaran^[1,88].

Distribution outside Iran. Australia, Egypt, Iraq, Israel, Libya, Palestine, Spain, Sudan, Syria.

Host in Iran. Hemiptera: Aleyrodidae: *Acaudaleyrodes rachipora* (Singh)^[88], *A. rachipora* on *Citrus decumana* (Rutaceae)^[1], *Trialeurodes vaporariorum* on *Citrullus colocynthis* (Cucurbitacea)^[1, 42], *Siphoninus immaculatus* (Heeger) on *Populus nigra* (Salicaceae), *Siphoninus phillyreae* on *Fraxinus excelsior* (Oleaceae)^[42].

Species group placement. *E. parvella*-group^[6].

Comments. *E. mineoi* is very closed to *E. acaudaleyrodis* and

perhaps these species are conspecific^[80]. The most reliable difference is the ovipositor length, which is, in *E. mineoi*, shorter than, or up to 1.1 times the length of the middle tibia, and in *E. acaudaleyrodes* 1.2 times as long as the middle tibia^[80]. There are many materials as *E. mineoi* in Israel; with due attention to their host (*Acaudaleyrodes citri*), it is possible that all of them are *E. acaudaleyrodis*. Re-examination of these materials is necessary for final statement. Males of *E. mineoi* were reared by Polaszek et al. (1999) and presumably as hyperparasitoids, from *Trialeurodes vaporariorum*.

3.8.38. *Encarsia mohyuddini* Shafee & Rizvi, 1982

Encarsia mohyuddini Shafee & Rizvi, 1982: 157. Holotype female. ZDAMU. Pakistan, Charsadda, ex *B. tabaci* on *Morus alba*.

Distribution in Iran. Khorasan^[3].

Distribution outside Iran. China, Pakistan.

Host in Iran. Hemiptera: Aleyrodidae: *Bemisia sugonjaevi* Danzig^[3].

Species group placement. *E. singularis*-group^[101].

Comments. Although, Hayat (1989) and Abd-Rabou & Ghahari (2007b) placed *E. mohyuddin* in *E. duorunga*-group, but this species could be assigned to the *E. singularis*-group, having a 4-segmented middle tarsus, plus a narrow fore wing with a long marginal fringe. It can be distinguished from species of *E. singularis*-group by its coloration. The known species in this group (*E. africana*, *E. liliyingae*, *E. singularis*), however, are the parasitoids of armored scales (Diaspididae).

3.8.39. *Encarsia opulenta* (Silvestri, 1928)

Prospaltella opulenta Silvestri, 1928: 30. Syntypes 3♀, 4♂. IEUN. [Vietnam:] Van Phu [Tonkin] ex *Aleurocanthus incertus* Silvestri.

Distribution in Iran. Sistan & Baluchestan^[40].

Distribution outside Iran. China, India, Jamaica, Malaysia, Mexico, Pakistan, Vietnam.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurocanthus spiniferus* (Quaintance) on *Hibiscus cannabinus* (Malvaceae)^[40].

Species group placement. *E. opulenta*-group^[6].

Comments. *E. opulenta* is very similar to *E. brasiliensis*, and on the base of Hayat (1989), these two species may be synonymous. But there are slight differences between them. In *E. brasiliensis*, terga IV - VI or V and VI are brown and flagellar segments are relatively shorter (F2 - F6 each less than 2 times as long as wide), where as in *E. opulenta* terga III - VI are brown to dark brown and flagellar segments are relatively longer. Silvestri (1928) recorded *Ablerus macrochaeta* Silvestri as the hyperparasitoid of *E. opulenta*.

3.8.40. *Encarsia* sp. (nr. *perflava* Hayat, 1989)

Distribution in Iran. Fars^[86].

Host in Iran. Hemiptera: Aleyrodidae: *Aleuroclava jasmini* on *Citrus aurantifolia* and *Citrus paradisi*^[86].

3.8.41. *Encarsia pergandiella* Howard, 1907

Encarsia pergandiella Howard, 1907: 78, Holotype female. USNM. USA, Washington, D.C., ex *Aleyrodes* [probably *Trialeurodes* sp.] on *Xanthium strumarium*.

Encarsia bemisiae De Santis, 1981: 37. Preoccupied by *Encarsia bemisiae* Ishii, 1938. Holotype female. UNLP. Brazil, Sao Paulo, Campinas, *B. tabaci* (Lourencao).

Distribution in Iran. Guilan^[93], Isfahan^[34,35,1], Iran (no locality cited)^[36].

Distribution outside Iran. Australia, Brazil, Colombia, Costa Rica, El Salvador, Grenada, Guadeloupe, Guatemala, Honduras, Israel, Italy, Mexico, Palestina, Puerto Rico, USA, Venezuela.

Host in Iran. Hemiptera: Aleyrodidae: *Trialeurodes vaporariorum* Westwood [45, 34, 35, 36], *T. vaporariorum* on *Hibiscus trionum* (Malvaceae) [1], *Trialeurodes vaporariorum* on *Cucumis sativa* (Cucurbitaceae), *T. vaporariorum* on *Cucurbita citrullus* (Cucurbitaceae), *T. vaporariorum* on *Cucurbita maxima* (Cucurbitaceae), *T. vaporariorum* on *Bidens bipinnata* (Asteraceae), *T. vaporariorum* on *Phaseolus vulgaris* (Fabaceae), *T. vaporariorum* on *Clerodendron bungei* (Verbenaceae), *T. vaporariorum* on *Abutilon teophrasti* (Malvaceae) [93].

Species group placement *E. parvella*-group [48].

Comments. Morphology, biology, and efficiency of this parasitoid on *T. vaporariorum* were studied by Hatami & Ghahari (2000) in Iran. *E. pergandiella* displays considerable variation both in coloration and in the length of antennal segments. This species is similar to *E. mineoi*, 5-segmented tarsal of the middle legs and a bare area near the leading edge of the forewing, but unlike in *E. mineoi*, the metasoma is completely dark brown.

3.8.42. *Encarsia perniciosi* (Tower, 1913)

Prospaltella perniciosi Tower, 1913: 125. ♀♂. MACA, USNM. USA: Amherst (Mass. State Col. Amherst), x.1912 [ex *Quadraspidiotus perniciosus* (Comstock)].

Distribution in Iran. East Azarbaijan, West Azarbaijan [42], Guilan [74, 1, 89], Mazandaran [1], Iran (no locality cited) [36].

Distribution outside Iran. India, Pakistan, China, Taiwan, Russia, USA; nearly cosmopolitan, having been widely introduced.

Host in Iran. Hemiptera: Diaspididae: *Quadraspidiotus perniciosus* Comstock [36, 74], *Q. perniciosus* on *Populus nigra nigra* (Salicaceae), *Robinia viscosa* (Papilionaceae) [1, 42], *Q. perniciosus* on *Hedera helix* (Araliaceae), *Salix alba* (Salicaceae) [42].

Species group placement. *E. aurantii*-group [6].

Comments. *E. perniciosi* is one of the most efficient parasitoid on San Jose scale in different regions of the world. Our examining on different populations of this parasitoid indicated that there is variation in presence/absence of a longitudinal sensillum on F1. The reason of this variation that was seen in surveys of Huang & Polaszek (1998) can be the effect of different biotypes or races of hosts (armored scales) on the parasitoid or speciation of another *Encarsia* species.

3.8.43. *Encarsia porteri* (Mercet, 1927)

Prospaltella citrella Howard subsp. *porteri* Mercet, 1927: 130. Lectotype ♀. MNCN. Chile, San Bernardo "*Prospaltella citrella* subsp. *porteri* Mercet".

Distribution in Iran. Isfahan [34, 35], Iran (no locality cited) [36].

Distribution outside Iran. Holarctic.

Host in Iran. Hemiptera: Aleyrodidae: *Bemisia tabaci* (Gennadius) [34, 35, 90], *Trialeurodes packardii* (Morill) [36], *Trialeurodes vaporariorum* Westwood [90]. Lepidoptera: Noctuidae: eggs of *Heliothis armigera* Huebner on *Gossypium hirsutum* L. (Malvaceae) [90].

Species group placement. *E. lahorensis*-group [6].

Comments. *E. porteri* was originally described as a 'subspecies' of *E. citrella* (Howard), but Polaszek *et al.* (1992) believed that this species is not closely related to *E. porteri*. We have examined the available materials and compared them

to the paratype and many specimens from Chile, and the presence of *E. porteri* in Iran is confirmed. Males of *E. porteri* have been recorded as facultative primary parasitoids in the eggs of various species of Lepidoptera [87, 18]. Biology and efficiency of the parasitoid were studied on *Trialeurodes vaporariorum* and *Bemisia tabaci* in Iran [90], and the results indicated that the second nymphal stage of *B. tabaci* and fourth nymphal stage of *T. vaporariorum* are preferred by the parasitoid. The mated females parasitized both 2nd nymphal stage of *B. tabaci* (or 4th of *T. vaporariorum*) and the eggs of *Heliothis armigera* Huebner (Lepidoptera: Noctuidae), but unmated females parasitized only moth's eggs.

3.8.44. *Encarsia protransvena* Viggiani, 1985

Encarsia protransvena Viggiani, 1985b: 89. Holotype female. IEUN. USA, Florida, Broward County. (C.R.R. Thompson) ex *Dialeurodes kirkaldyi*.

Distribution in Iran. Guilan [89], Isfahan [1], Iran (no locality cited) [36].

Distribution outside Iran. Australia, Cayman Islands, China, Taiwan, Colombia, Egypt, Fiji, French Polynesia, Hawaii, Honduras, Indonesia, Malaysia, Puerto Rico, Spain, Taiwan, USA, Vieques Island.

Host in Iran. Hemiptera: Aleyrodidae: *Trialeurodes packardii* on *Juglans regia* [1], *Dialeurodes kirkaldyi* (Kotinsky) [36].

Species group placement. *E. strenua*-group [6].

Comments. *E. protransvena* can be distinguished from other species of *E. strenua*-group by the shorter ovipositor and third valvulae, more delicate antenna (clava only slightly broader than the funicle), and longer fore wing. The setae of the midlobe of the mesosoma are usually arranged in 4 pairs (rarely 3 or 5), whereas they are almost always arranged in 5 pairs in *E. citri* (Ishii), and the arrangement of setae (shorter and more apical) on the third valvulae is distinct from *E. citri*. The materials of *E. protransvena* from China [54] are nearly identical to those of Iran. The Taiwanese materials have a band of 14 setae in the basal area of the fore wing. Also, five pairs of setae on the midlobe of the mesosoma, which is rarely encountered in specimens from the New World (usually 4 pairs). The Chinese materials agree for all characters with *E. protransvena*, but it has a strongly and densely reticulate vertex, and the basal segment of the clava is more distinctly separated from the following segment. On the other hand, *E. protransvena* is very close to *E. armata* (Silvestri). The main difference between the two species appears to be in the ovipositor length, longer than half the combined length of the thorax and gaster in *E. armata*, shorter in *E. protransvena*. The lack of mandibular teeth in *E. protransvena* is probably an artifact. However, the identification of *E. protransvena* is rather difficult and the species has in the past been confused with *E. strenua*, *E. citri* and *E. armata*. The recent authors' studies on different materials of above species from different regions of the world, indicate that all the 4 species can be considered as distinct species, and these (possibly more) from a subgroup of rather cryptic species within the *strenua*-group. Surely, more materials will be needed to be examined before these can be included or excluded from *E. protransvena* with confidence.

3.8.45. *Encarsia shutovae* Yasnosh, 1973

Encarsia shutovae Yasnosh, 1973a: 582-583. Type data: CSS: Southern Kirgizia. Holotype female, by original designation. Type depository: St. Petersburg (= Leningrad)

Zoological Museum, Academy of Sciences, Russia. Described: both sexes. Illust.

Distribution in Iran. Golestan, Khorasan, Mazandaran [42], Iran (no locality cited) [36].

Distribution outside Iran. Russia and adjacent countries (Federation of Independent States).

Host in Iran. Hemiptera: Aleyrodidae: *Bemisia confusa* Danzig [36], *B. confusa* on *Malva parviflora* (Malvaceae), and *Glycyrrhiza glabra* (Leguminosae), *B. tabaci* on *Vitex pseudo-negundo* (Verbenaceae) [42].

Species group placement. *E. tricolor*-group [47].

3.8.46. *Encarsia smithi* (Silvestri, 1926)

Encarsia smithi Silvestri, 1926: 179. Syntype ♀♀. China, Guangdong ex *Aleurocanthus spiniferus* and *A. woglumi* on *Citrus* sp. IEUN.

Distribution in Iran. Guilan [89].

Distribution outside Iran. China, Fujian, India, Japan, Macao, Maldives, Mexico, Pakistan, Sri Lanka, Taiwan.

Species group placement. *E. smithi*-group [6].

Comments. According to Hayat (1989), the ovipositor is slightly longer than the mid tibia plus basitarsus in *E. smithi*. On the base of several measurements of Huang & Polaszek (1998) on different specimens from China and also our measurements on Iranian ones, the ovipositor slightly (0.85-0.90 times) shorter. Although *E. smithi* is parasitoid of whiteflies, whereas *E. perniciosi* parasitoid of armored scales, but these two parasitoid are very close to each other. There are many slight differences between the species as below. In *E. perniciosi*, head yellow or testaceous; face, mouth margin and occiput brownish, with a distinct dark brown cross-band above toruli; ovipositor about as long as mid tibia. In *E. smithi*, head testaceous yellow; mouth margin and occiput dark brown; ovipositor slightly shorter than mid tibia.

3.8.47. *Encarsia sophia* (Girault & Dodd, 1915)

Coccophagus sophia Girault & Dodd, 1915[238]: 49, 56. Type data: Australia: QLD, Cairns. Syntypes, female. Type depository: Brisbane: Queensland Museum, Queensland, Australia; type no. Hy.2926. Described: female.

Distribution in Iran. Guilan [2, 89], Isfahan [1].

Distribution outside Iran. Cosmopolitan in the old World, introduced in the New World. Australia and adjacent regions; Russia and adjacent countries (Federation of Independent States); Burundi, Cape Verde, China, Hong Kong, India, Indonesia, Ivory Coast, Japan, Morocco, Niger, Sierra Leone, Somalia, Spain, Hawaiian Islands, Pakistan, Sri Lanka, Taiwan, Thailand.

Host in Iran. Hemiptera: Aleyrodidae: *Trialeurodes ricini* on *Ricinus communis* (Euphorbiaceae) [1]. Also, hyperparasitoid of *Tamarixia radiata* (Waterston) (Hymenoptera: Eulophidae) as the parasitoid of *Pseudococcus filamentosus* (Ck.) (Hem: Pseudococcidae) [2].

Species group placement. *E. strenua*-group [81].

3.8.48. *Encarsia tricolor* Foerster, 1878

Encarsia tricolor Foerster, 1878: 66. Holotype male, by monotypy. Described: male.

Prospaltella conjugata Masi, 1909: 146. Type data: Italy: Portici.. Type depository: UNP. Described: female. Synonymy by Mercet, 1930: 193.

Distribution in Iran. Khorasan (Abd-Rabou et al. 2005a).

Distribution outside Iran. Italy, Lebanon, Mediterranean basin, Palestine.

Host in Iran. Hemiptera: Aleyrodidae: *Bemisia salicaria* Danzig [3].

Species group placement. *E. tricolor*-group [6].

3.9. Genus *Eretmocerus* Haldeman, 1850

Eretmocerus Haldeman 1850. Type species *Eretmocerus corni* Haldeman, by monotypy.

Ricinusa Risbec 1951: 403. Type species *Ricinusa aleyrodiphaga* Risbec, by original designation; synonymy according to Ferrière 1965: 170.

3.9.1. *Eretmocerus adustiscutum* Krishnan & David, 1996

Eretmocerus adustiscutum Krishnan & David 1996: 161. Holotype female. IHAY. India, Coimbatore.

Eretmocerus corni; misidentification Hayat 1972: 112.

Eretmocerus paulistis Hempel; misidentification by Khan & Shafee 1980: 368 according to Hayat 1998: 112.

Distribution in Iran. Kerman, Khorasan [4, 7].

Distribution outside Iran. Oriental, Western Palaearctic.

Host in Iran. Hemiptera: Aleyrodidae: *Lipaleyrodes euphorbiae* David & Subramaniam on *Euphorbia pulcherrima* (Euphorbiaceae), *Bemisia tabaci* (Gennadius) complex on *Crataegus microphylla* (Rosaceae) [4, 7].

Species group placement. *Er. californicus*-group [6].

3.9.2. *Eretmocerus breviclavus* Subba Rao, 1984

Eretmocerus breviclavus Subba Rao 1984: 257. Holotype female. NHM. India, Bangalore, ex. blackfly on curry leaves [*Murraya koenigii*]. Hayat 1998: 107.

Distribution in Iran. Golestan [4, 7], Mazandaran [4, 61, 7].

Distribution outside Iran. Oriental and Palaearctic Regions.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurocanthus woglumi* Ashby on *Citrus sinensis* (Rutaceae) [4, 7], *Aleurocanthus zizyphi* Priesner & Hosny on *Ficus carica* (Moraceae) [4, 61, 7].

Species group placement. *Er. longipes*-group [6].

3.9.3. *Eretmocerus cadabae* Viggiani, 1982

Eretmocerus cadabae Viggiani 1982: 30. Holotype female. UNP. Ethiopia: Melka Werer, ex. *Aleuroplatus cadabae*.

Distribution in Iran. East Azarbaijan [42], Guilan [4, 7, 39].

Distribution outside Iran. Afrotropical: Ethiopia, Western Palaearctic.

Host in Iran. Hemiptera: Aleyrodidae: *Aleuroplatus pectiniferus* Quaintance & Baker on *Ficus capensis* (Moraceae) [4, 39, 7, 42].

Species group placement. *Er. cadabae*-group [6].

3.9.4. *Eretmocerus corni* Haldeman, 1850

Eretmocerus corni Haldeman 1850: 110. Syntypes [lost]. USNM. USA, Pennsylvania, White Clay, ex. *Trialeurodes morrilli* on *Impatiens biflora* [Neotype designated by Rose & Zolnerowich 1997: 8], reared from *Asterochiton* sp. on *Impatiens* sp. (Balsaminaceae), White Clay Creek, Pennsylvania, USA.

Eretmocerus corni; misidentification of *Eretmocerus dialeuroloiae* Krishnan & David by Jesudasan et al. 1984 according to Hayat 1998: 109.

Eretmocerus corni; misidentification of *Eretmocerus ampliatus* Rose by Dozier (1932) according to Rose 2000: 14.

Distribution in Iran. Golestan, Khorasan [39].

Distribution outside Iran. Nearctic and Palaearctic (introduced) Regions.

Host in Iran. Hemiptera: Aleyrodidae: *Acaudaleyrodes*

rachipora Singh on *Punica granatum* (Punicaceae), *Trialeurodes packardi* (Morill) on *Fragaria vesca* (Rosaceae) [39].

Species group placement. *Er. californicus*-group [6].

3.9.5. *Eretmocerus debachi* Rose & Rosen, 1992

Eretmocerus debachi Rose & Rosen 1992: 200. Holotype female. USNM. USA, California, Orange County, Viejo, Rancho Mission, ex. *Parabemisia myricae* on valencia orange and lemons [*Citrus* spp., Rutaceae].

Distribution in Iran. Guilan [4, 7], Isfahan [37, 4, 7].

Distribution outside Iran. Nearctic and Palaearctic (introduced) Regions.

Host in Iran. Hemiptera: Aleyrodidae: *Parabemisia myricae* (Kuwana) [37], *P. myrica* on *Citrus bigaradia* (Rutaceae), *P. myricae* on *Citrus aurantifolia* [4, 7].

Species group placement. *Er. paulistus*-group [6].

3.9.6. *Eretmocerus* sp. nr. *delhiensis* Mani, 1941

Eretmocerus delhiensis Mani 1941: 35. Cotypes (2 males). IARI. India, New Delhi, ex. *Neomaskiella bergii* on sugarcane [*Saccharum* sp., Poaceae]; lectotype designated by Hayat 1988: 127.

Eretmocerus mashhoodi Hayat 1972: 102. Holotype female. India, Aligarh, aleyrodes on grass, ZSI; Khan & Shafee 1980: 368; synonymy according to Hayat 1998: 111.

Distribution in Iran. Fars (Rasekh et al. 2010).

Distribution outside Iran. India, Pakistan.

Host in Iran. Hemiptera: Aleyrodidae: parasitoid of *Aleuroclava jasmini* on *Citrus reticulata* (Rasekh et al. 2010).

Species group placement. *Er. californicus*-group [6].

3.9.7. *Eretmocerus diversiciliatus* Silvestri, 1928

Eretmocerus diversiciliatus Silvestri 1914: 366. Holotype female. IESP. Nigeria, Lagos, ex. Aleyrodidae.

Distribution in Iran. Kermanshah [4, 7].

Distribution outside Iran. Afrotropical and Palaearctic Regions.

Host in Iran. Hemiptera: Aleyrodidae: *Aleuroclava similis* (Takahashi) on *Amaranthus retroflexus* (Amaranthaceae) [4, 39, 7].

Species group placement. *Er. diversiciliatus*-group [6].

3.9.8. *Eretmocerus eremicus* Rose & Zolnerowich, 1997

Eretmocerus eremicus Rose & Zolnerowich 1997. Holotype female. USA: Arizona, Phoenix, iii.1991, G. Butler, ex. *Bemisia tabaci* on *Gossypium hirsutum*. USNMNH.

Distribution in Iran. Guilan [93].

Distribution outside Iran. Canary Islands, Egypt (introduced), USA.

Host in Iran. *Trialeurodes vaporariorum* on *Helianthus tuberosus* (Asteraceae) [93].

3.9.9. *Eretmocerus flavus* Krishnan & David, 1996

Eretmocerus flavus Krishnan & David 1996: 32. Holotype female. IHAY. India, Palavanthangal, ex. *Lipaleyrodes euphorbiae* on *Phyllanthus acidus* (Euphorbiaceae).

Distribution in Iran. Isfahan [37, 4, 7].

Distribution outside Iran. Oriental and Palaearctic Regions.

Host in Iran. Hemiptera: Aleyrodidae: *Lipaleyrodes euphorbiae* David & Subramaniam [37], *L. euphorbiae* on *Euphorbia prostrata* (Euphorbiaceae) [4, 7].

An unknown species, *Eretmocerus* sp. nr. *flavus* was reported from Fars Province as the parasitoid of *Aleurolobus marlatti*

on *Citrus aurantium* [86].

Species group placement. *Er. longipes*-group [6].

3.9.10. *Eretmocerus longiscapus* Hayat, 1972

Eretmocerus longiscapus Hayat 1998: 110. Holotype female. NHM. India, Uttar Pradesh, Sasni near Aligarh, ex. *Aleurolobus* sp. near *niloticus* on *Dalbergia sissoo* (Fabaceae). *Eretmocerus haldemani*; misidentification Hayat 1972: 100, according to Hayat 1998: 110.

Distribution in Iran. Khorasan, Semnan [88, 4, 39, 7].

Distribution outside Iran. Oriental and Palaearctic Regions.

Host in Iran. Hemiptera: Aleyrodidae: *Bemisia sugonjaevi* Danzig, *Aleurolobus marlatti* (Quaintance) [88], *A. marlatti* on *Verbena officinalis* (Verbenaceae), *Aleurolobus vitis* Danzig on *Vitis vinifera* (Vitaceae) [4, 40, 7].

Species group placement. *Er. californicus*-group [6].

3.9.11. *Eretmocerus mundus* Mercet, 1931

Eretmocerus mundus Mercet 1931: 396. Type female. MNCN. Spain: Beas de Segura, an *Aleurodes* on eggplant, *Solanum melongena* (Solanaceae); lectotype designated by Rose & Zolnerowich (1998).

Eretmocerus aligarhensis Khan & Shafee 1980: 365. Type ♀. India, Uttar Pradesh, Aligarh, ex. *Aleyrodes* sp. on *Lantana camara*; synonymy according to Hayat 1998: 102.

Eretmocerus corni Masi 1909; Europe: ex aleyrodid on *Cystus salviaefolia* (nec *E. corni* Haldeman 1850).

Eretmocerus longipilus Khan & Shafee 1980: 366. Type female. India, Uttar Pradesh, Aligarh, ex. *Aleyrodes* sp. on *Lantana camara* (Verbenaceae); synonymy according to Hayat 1998: 102.

Eretmocerus masii Silvestri 1934. Type female. Italy: ex. *Bemisia tabaci*; nomen nudum.

Distribution in Iran. Generally distributed including, East Azarbaijan, West Azarbaijan [42], Fars [14, 15, 12, 75, 4, 39, 7], Golestan [74, 60, 4, 39, 7], Isfahan [34, 35], Khuzestan [105], Mazandaran, Tehran [74, 4, 39, 7].

Distribution outside Iran. Argentina, Canary Islands, Egypt, India, Israel, Italy, Kenya, Madeira Islands, Spain, Turkmenistan, USA, Zimbabwe.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurolobus* sp. on *Ziziphus spinachristi* [12], *Bemisia hancocki* Corbett, *Trialeurodes packardi* Morill [34, 35], *Aleyrodes lonicerae* Walker on *Crataegus microphylla* (Rosaceae), *Rosanovia hulthemiae* Danzig on *Ajuga gorganica* (Labiatae) [4, 39, 7], *Bemisia afer* (Priesner & Hosny) on *Cynanchum acutum* (Lauraceae), *Bulgarialeurodes cotesii* (Maskell) on *Rosa canina* (Rosaceae), *Trialeurodes ricini* (Misra) [74], *T. ricini* on *Ricinus communis* (Euphorbiaceae) [12, 42], *Bemisia tabaci* (Gennadius) [13, 75, 74, 34, 35, 60], *B. tabaci* on *Gossypium hirsutum* (Malvaceae) [15, 12, 4, 39, 7, 42], *B. tabaci* on cucumber [105], *B. tabaci* complex on *Hibiscus esculentum* (Malvaceae) [4, 7, 39, 42].

Comments. *Eretmocerus mundus* is the dominant species in almost cotton fields in Iran [96]. Also *E. mundus* included two different strains in Iran which their morphology, biology, efficiency and behaviour was studied by Ghahari et al. (2005) and Ghahari & Ostovan (2006) on *Bemisia argentifolii*.

Species group placement. *Er. mundus*-group [6].

3.9.12. *Eretmocerus neobemisiae* Yasnosh, 1974

Eretmocerus neobemisiae Yasnosh 1974: 713. Holotype female. ZIN. Georgia (former USSR): ex. *Neobemisia atraphaxis*.

Distribution in Iran. Golestan, Guilan [4, 39, 7].

Distribution outside Iran. Palaearctic Region.

Host in Iran. Hemiptera: Aleyrodidae: *Asterobemisia atraphaxuis* (Danzig) on *Atraphaxis spinosa* (Polygonaceae), *Asterobemisia carpini* (Koch) on *Corylus avellana* (Betulaceae) [4, 39, 7].

Species group placement. *Er. paulistus*-group [6].

3.9.13. *Eretmocerus neomaskelliae* Abd-Rabou & Ghahari, 2005

Eretmocerus neomaskelliae Abd-Rabou & Ghahari 2005, in Abd-Rabou et al. 2005: 169. Holotype female. EPPRI. Iran, Mazandaran (northern Iran) Ghaemshahr, on *Neomaskellia bergii* on *Sorghum halepense* (Poaceae).

Distribution in Iran. Mazandaran [4, 39, 7].

Distribution outside Iran. Endemic to Iran.

Host in Iran. Hemiptera: Aleyrodidae: *Neomaskellia bergii* (Signoret) on *Sorghum halepense* (Graminae) [4, 39, 7].

Species group placement. *Er. diversiciliatus*-group [6].

3.9.14. *Eretmocerus nikolskajae* Myartseva, 1973

Eretmocerus nikolskajae Myartseva 1973: 81. Holotype female. ZIN. Turkmenistan [=USSR: Turkmenia], Ashabad, ex. *Bulgarialeurodes cotesii* on rose [*Rosa* sp., Rosaceae] leaves.

Distribution in Iran. East Azarbaijan [42], Golestan [36], Khorasan [4, 39, 7], Mazandaran [4, 39, 7].

Distribution outside Iran. Palaearctic Region.

Host in Iran. Hemiptera: Aleyrodidae: *Bulgarialeurodes cotesii* (Maskell) [37], *B. cotesii* on *Rosa hemisphaerica* and *Rosa canina* (Rosaceae), *Tetralicia erianthi* Danzig on *Ranunculus arvensis* (Ranunculaceae) [4, 39, 7, 42].

Species group placement. *Er. paulistus*-group [6].

3.9.15. *Eretmocerus ostovani* Ghahari & Abd-Rabou, 2005

Eretmocerus ostovani Ghahari & Abd-Rabou 2005, in Abd-Rabou et al. 2005: 170. Holotype female. EPPRI. Iran, Mazandaran, Behshahr, ex. *Aleyrodes elevatus* on *Ficus religiosa* (Moraceae).

Distribution in Iran. Mazandaran [4, 7].

Distribution outside Iran. Endemic to Iran.

Host in Iran. Hemiptera: Aleyrodidae: *Aleyrodes elevatus* Silvestri on *Ficus religiosa* (Moraceae) [4, 39, 42].

Species group placement. *Er. longipes*-group [6].

3.9.16. *Eretmocerus persiangulfus* Abd-Rabou & Ghahari, 2011

Eretmocerus persiangulfus Abd-Rabou & Ghahari, 2011: 171-172. Holotype female. EPPRI. Iran, East Azarbaijan, Arasbaran, ex *Parabemisia myricae* (Kuwana) on *Prunus persica* (L.) (Rosaceae).

Distribution in Iran. East Azarbaijan [7].

Distribution outside Iran. Endemic to Iran.

Host in Iran. Hemiptera: Aleyrodidae: *Parabemisia myricae* (Kuwana) (Homoptera: Aleyrodidae) on *Prunus persica* (L.) (Rosaceae) [7].

Species group placement. *Er. paulistus*-group [7].

3.9.17. *Eretmocerus serius* Silvestri, 1927

Eretmocerus serius Silvestri 1927: 46. Holotype female. IESP. Singapore: ex. *Aleurocanthus woglumi*.

Distribution in Iran. Fars [4, 7], Khusestan [36, 4, 7] (Kocheili 1998; Abd-Rabou et al. 2005b; Abd-Rabou & Ghahari 2011), West Azarbaijan [4, 7, 42].

Distribution outside Iran. USA; Neotropical (introduced) -

Bahamas, Barbados, Cayman Islands, Costa Rica, Cuba, Haiti, Jamaica, Mexico, Panama; Western Palaearctic (introduced) - Oman; Afrotropical (introduced) - Kenya, South Africa; Eastern Palaearctic - China, Japan; Oriental - Bangladesh, India, Indonesia, Malaya, Malaysia, Myanmar (Burma), Pakistan, Singapore, South Korea, Sri Lanka, Thailand, Vietnam; Australasian (introduced) - Guam, Hawaii.

Host in Iran. Hemiptera: Aleyrodidae: *Aleurocanthus spiniferus* (Quaintance) on *Citrus bigaradia* (Rutaceae) [4, 7], *Aleurocanthus woglumi* Ashby on *Citrus aurantium* (Rutaceae), *Bemisia tabaci* (Kocheili 1998), *Bemisia tabaci* on *Hibiscus esculentum* (Malvaceae) [4, 7, 42].

Species group placement. *Er. californicus*-group [6].

3.9.18. *Eretmocerus trialeurodis* Hayat, 1998

Eretmocerus trialeurodis Hayat 1998: 108. Holotype female. NHM. India, Tamil Nadu, Madras [=Chennai], Tambaram, ex. *Trialeurodes ricini* on *Ricinus communis* (Euphorbiaceae).

Distribution in Iran. Kerman [4, 7].

Distribution outside Iran. Oriental and Western Palaearctic Regions.

Host in Iran. Hemiptera: Aleyrodidae: *Trialeurodes ricini* (Misra) on *Ricinus com-munis* (Euphorbiaceae) [4, 7].

Also, an unknown species, *Eretmocerus* sp. nr. *trialeurodis* was recorded from Fars province as the parasitoid of *Aleurolobus marlatti* on *Citrus aurantium* [86].

Species group placement. *Er. californicus*-group [6].

3.10. Genus *Euryischia* Riley, 1889

Euryischia Riley 1889. Type species *Euryischia lestophoni* Riley, by monotypy.

3.10.1. *Euryischia* sp.

Distribution in Iran. East Azarbaijan [68].

Host in Iran. Diptera: Chamaemiidae: Unknown species [68].

3.11. Genus *Marietta* Motschulsky, 1863

Marietta Motschulsky 1863. Type species *Marietta leopardina* Motschulsky, by monotypy.

Perissopterus Howard 1894. Type species *Aphelinus pulchellus* Howard, by original designation; synonymy according to Girault 1916.

Pseudaphelinus Brèthes 1918. Type species *Pseudaphelinus caridei* Brèthe, by original designation; synonymy according to De Santis 1946.

3.11.1. *Marietta leopardina* Motschulsky, 1863

Marietta cheriani (Mani, 1939); *Marietta exitiosa* Compere, 1936; *Marietta habrolepidis* Ghesquière, 1960; *Marietta javensis* (Howard, 1907); *Marietta javensis indi* Girault, 1932; *Marietta leopardina* Motschulsky, 1863; *Perissopterus cheriani* Mani, 1939; *Perissopterus javensis* Howard, 1907.

Distribution in Iran. Sistan & Baluchestan [70].

Distribution outside Iran. Bangladesh, Congo, Egypt, Gambia, Guinea-Bissau, India, Indonesia, Israel, Japan, Kenya, Libya, Madagascar, Malaysia, Mauritius, Morocco, Namibia, Nigeria, Pakistan, Paraguay, Philippines, Saudi Arabia, Singapore, South Africa, Sri Lanka, Zaire.

Host in Iran. Hyperparasitoid of *Encarsia* sp. (parasitoid of *Aleuromarginatus tephrosiae* Corbett) [70].

3.11.2. *Marietta picta* (André, 1878)

Agonioneurus pictus André, 1878; *Aphelinus pictus* (André, 1878); *Marietta picta* (André, 1878); *Marietta zebra*

(Kurdjumov, 1912); *Marietta zebra* (Mercet, 1916); *Perissopterus anglicus* Blood, 1929; *Perissopterus pictus* (André, 1878); *Perissopterus zebra* Kurdjumov, 1912; *Perissopterus zebra* Mercet, 1914; *Perissopterus zebratus* Mercet, 1916.

Distribution in Iran. Fars ^[52, 29], Kerman ^[103, 74, 57], Kordestan ^[2], Tehran ^[74, 97].

Distribution outside Iran. Armenia, Canada, China, Czech Republic, Egypt, France, Georgia, Germany, Greece, Hungary, India, Italy, Kazakhstan, South Korea, Mexico, Moldova, Peru, Romania, Russia and adjacent countries (Federation of Independent States), Slovakia, Spain, Transcaucasus, Turkey, Turkmenistan, UK, Ukraine, former Yugoslavia.

Host in Iran. Hemiptera: Psyllidae: *Agonoscena cisti* (Paton) ^[103]; Pseudococcidae: *Planococcus vovae* (Nasonov) ^[97], *Planococcus ficus* (Signoret) ^[29, 30]. Hyperparasitoid of *Anagyrus pseudococci* (Girault) ^[74], *Anagyrus dactylopii* (Howard) (Encyrtidae) on *Nipaeococcus filamentosus* (Cockerell) (Pseudococcidae) ^[4], *Agonoscena pistaciae* Burckhardt & Lauterer (Psyllidae) ^[57]. In mulberry and citrus gardens, and hyperparasitoid of Braconidae, Encyrtidae, Eulophidae, Pteromalidae, Signiphoridae ^[52].

3.11.3. *Marietta zebra* (Mercet, 1916)

Agonioneurus pictus André, 1878; *Aphelinus pictus* (André, 1878); *Marietta picta* (André, 1878); *Marietta zebra* (Kurdjumov, 1912); *Marietta zebra* (Mercet, 1916); *Perissopterus anglicus* Blood, 1929; *Perissopterus pictus* (André, 1878); *Perissopterus zebra* Kurdjumov, 1912; *Perissopterus zebra* Mercet, 1914; *Perissopterus zebratus* Mercet, 1916.

Distribution in Iran. Hamadan ^[82], Zanjan ^[62, 74].

Distribution outside Iran. Armenia, Canada, China, Czech Republic, Egypt, France, Georgia, Germany, Greece, Hungary, India, Italy, Kazakhstan, Korea, Mexico, Moldova, Peru, Romania, Russia and adjacent countries (Federation of Independent States), Slovakia, Spain, Sweden, Transcaucasus, Turkey, Turkmenistan, UK, Ukraine, former Yugoslavia.

Host in Iran. Hemiptera: Aphalaridae: *Euphyllura olivina* Costa ^[62, 74]; Psyllidae: *Psyllopsis repens* Loginova ^[82].

3.12. Genus *Myiocnema* Ashmead, 1900

Myiocnema Ashmead, 1900: 349. Type species *Myiocnema comperei* Ashmead, by monotypy.

3.12.1. *Myiocnema comperei* Ashmead, 1900

Euryischia aleurodis Dodd, 1917; *Euryischia comperei* (Ashmead, 1900); *Euryischia shakespearei* Girault, 1913; *Myiocnema comperei* Ashmead, 1900.

Distribution in Iran. Mazandaran ^[2].

Distribution outside Iran. Australia, India, Indonesia, USA.

Host in Iran. Hyperparasite of *Encarsia citrina* (Craw) (Aphelinidae) on *Aspidiotus nerii* Bouché (Diaspididae) ^[2].

3.13. Genus *Pteroptrix* Westwood, 1833

Pteroptrix Westwood 1833. Type species *Pteroptrix dimidiatus* Westwood, by monotypy.

Archenomus Howard 1898. Type species *Archenomus bicolor* Howard, by monotypy; synonymy according to Novicky 1928.

Casca Howard 1907. Type species *Casca chinensis* Howard, by original designation; synonymy according to Novitzky 1962.

Artas Howard 1907. Type species *Artas koebelei* Howard, by original designation; synonymy according to Hayat 1983.

Hispaniella Mercet 1911. Type species *Archenopus lauri* Mercet, by original designation; synonymy according to Viggiani 1993.

Pteroptrichoides Fullaway 1913. Type species *Pteroptrichoides perkinsi*, by original designation; synonymy according to Mercet 1928.

Apteroptrix Girault 1915. Type species *Apteroptrix albifemur* Girault, by original designation; synonymy according to Viggiani 1993.

Pseudopteroptrix Fullaway 1918. Type species *Pseudopteroptrix imitatrix* Fullaway, by monotypy; synonymy according to Mercet 1928.

Oa Girault 1929. Type species *Archenomus biguttatus* Girault, by original designation; synonymy according to Viggiani 1993.

Aphelosoma Nikolskaya 1963. Type species *Aphelosoma plana* Nikolskaya, by original designation; synonymy according to Viggiani 1993.

Archenomiscus Nikolskaya 1966. Type species *Pteroptrix maritimus* Nikolskaya; synonymy according to Viggiani 1993.

3.13.1. *Pteroptrix bicolor* Howard, 1898

Archenomus bicolor Howard, 1898; *Archenomus caucasicus* (Yasnosh, 1955); *Pteroptrix bicolor* (Howard, 1898); *Pteroptrix callunae* Alam, 1956; *Pteroptrix caucasica* Yasnosh, 1955; *Pteroptrix caucasicus* Yasnosh, 1955; *Pteroptrix zonatus* Alam, 1956; *Pteroptrix* (*Archenomus*) *caucasicus* Yasnosh, 1955.

Distribution in Iran. East Azarbaijan, Isfahan, Kordestan, Markazi, Tehran ^[74].

Distribution outside Iran. Argentina, Austria, Azerbaijan, Caucasus, China, Czech Republic, Egypt, France, Georgia, Germany, Hungary, Indonesia, Italy, Japan, Kazakhstan, Russia and adjacent countries (Federation of Independent States), Slovakia, Spain, Sri Lanka, Switzerland, Tunisia, Turkey, UK, Ukraine, USA.

Host in Iran. Hemiptera: Diaspididae: *Diaspidiotus prunorum*; Coccidae: *Eulecanium coryli* (Linnaeus) ^[74].

3.13.2. *Pteroptrix bicolor* (Howard, 1898)

Archenomus bicolor Howard, 1898; *Archenomus caucasicus* (Yasnosh, 1955); *Pteroptrix bicolor* (Howard, 1898); *Pteroptrix callunae* Alam, 1956; *Pteroptrix caucasica* Yasnosh, 1955; *Pteroptrix zonatus* Alam, 1959; *Pteroptrix* (*Archenomus*) *caucasicus* Yasnosh, 1955.

Distribution in Iran. Mazandaran ^[41].

Distribution outside Iran. Argentina, Austria, Azerbaijan, Caucasus, China, Czech Republic, Egypt, France, Georgia, Germany, Hungary, Indonesia, Italy, Japan, Kazakhstan, North Africa, Russia and adjacent countries (Federation of Independent States), Slovakia, Spain, Sri Lanka, Switzerland, Tunisia, Turkey, UK, Ukraine, USA.

Host in Iran. Hemiptera: Diaspididae: *Salicicola kermanensis* (Lindinger) ^[41].

3.13.3. *Pteroptrix lauri* (Mercet, 1911)

Archenomus lauri Mercet, 1911; *Hispaniella lauri* (Mercet, 1911); *Pteroptrix lauri* (Mercet, 1911).

Distribution in Iran. Kerman ^[41].

Distribution outside Iran. Azerbaijan, Bulgaria, Caucasus, China, Czech Republic, Georgia, Italy, Moldova, Poland, Russia and adjacent countries (Federation of Independent States), Slovakia, Spain, Turkey, former Yugoslavia.

Host in Iran. Hemiptera: Diaspididae: *Salicicola davatchii*

(Balachowsky & Kaussari) [41].

3.13.4. *Pteroptrix macropedicellata* (Malac, 1947)

Casca macropedicellata Malac, 1947; *Pteroptrix macropedicellata* (Malac, 1947).

Distribution in Iran. East Azarbaijan [26].

Distribution outside Iran. Azerbaijan, Caucasus, Czech Republic, Slovakia.

Host in Iran. Hemiptera: Diaspididae: *Sphaerolecanium prunastri* (Boyer de Fonscolombe) [26].

4. Discussion

The report of 138 species from 11 genera is an advance in the knowledge of the Aphelinidae in Iran. Among the different genera, *Encarsia* with 48 recorded species is more diverse than the others; *Eretmocerus*, *Coccobius*, and *Aphelinus* with 18, 16 and 14 species, respectively, are the following (Fig. 2). However, Iran is a large country with many unexplored and uncollected areas, and undoubtedly many more species must be present. As a comparison, in 2012, 184 species of 12 genera were recorded in Mexico, another country also with a high percentage of arid ecosystems [77]. Also among the Middle East countries, the fauna of Egyptian Aphelinidae was studied well, as 81 species from 11 genera were recorded so far [8]. Most species of Iranian Aphelinidae are distributed widely in

Palearctic and Oriental regions, or are cosmopolitan or nearly so. Since Iran is located on the border of Eastern Palearctic and Western Oriental regions and near to India and Pakistan with rich fauna, diverse fauna of insects is expectable for this country. For example, in the genus *Ablerus* from 11 species – 3 are Palearctic, 2 are cosmopolitan and 6 are Oriental, *Aphelinus* from 14 species – 10 are cosmopolitan or nearly cosmopolitan, *Aphytis* from 11 species – 9 are cosmopolitan or nearly cosmopolitan, *Coccobius* from 16 species – 6 are Palearctic and 6 are Oriental, *Coccophagus* from 11 species – 6 are nearly cosmopolitan, *Eretmocerus* from 18 species – 11 are distributed in the Palearctic region or widely, *Encarsia* from 48 species – 8 species are widely distributed in the world or cosmopolitan, and 13 species are Oriental in their distribution. The following six species are described from Iran, and we suppose that they can be endemic to Iran: *Encarsia alemansoori* Rasekh & Polaszek, 2010, *E. axacaliae* Abd-Rabou & Ghahari, 2007, *E. macoensis* Abd-Rabou & Ghahari, 2007, *Eretmocerus neomaskelliae* Abd-Rabou & Ghahari, 2005, *Er. ostovani* Ghahari & Abd-Rabou, 2005 and *Er. persiangulfus* Abd-Rabou & Ghahari, 2011, even though they were recently described.

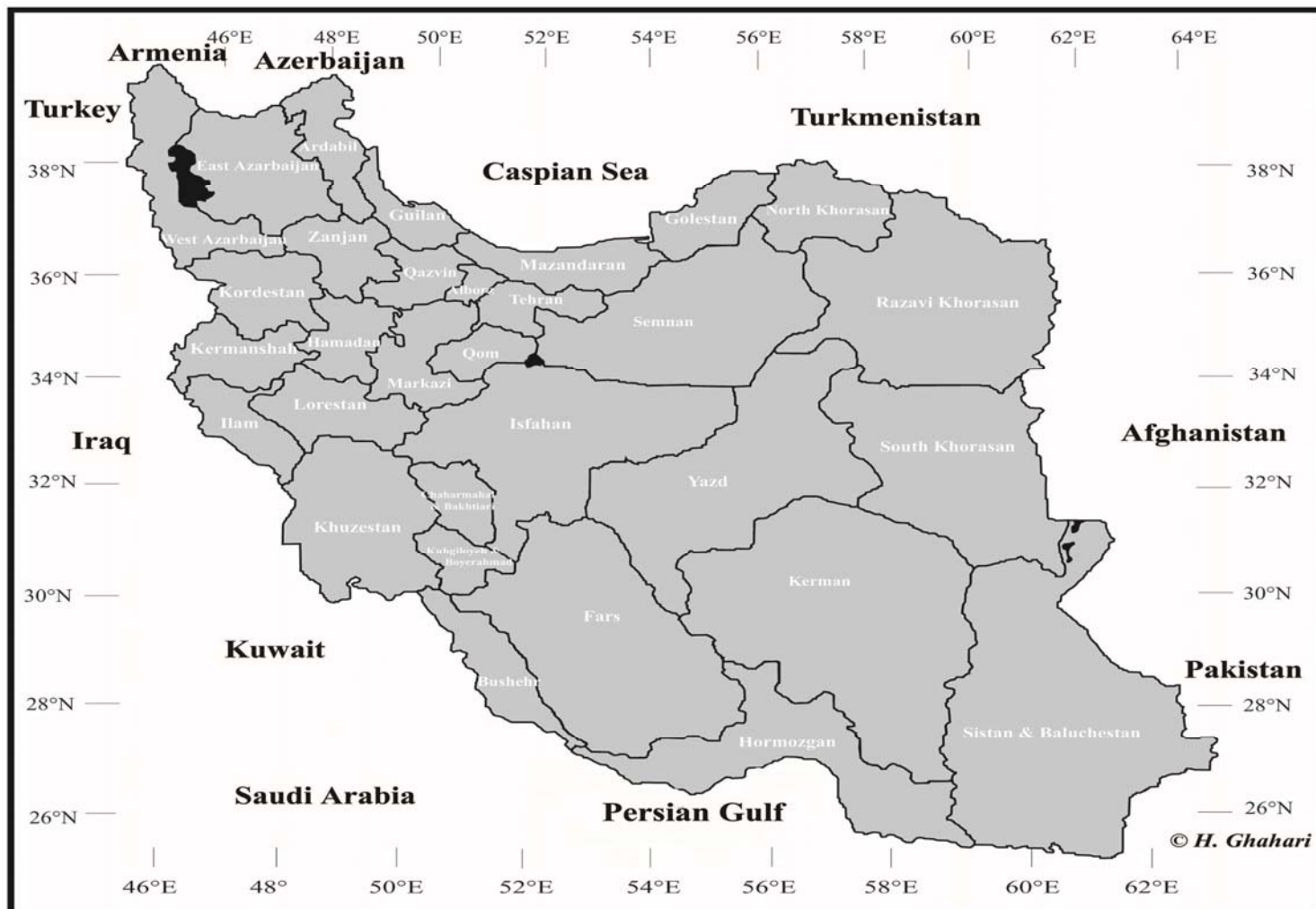


Fig 1: Map of Iran with boundaries of Provinces.

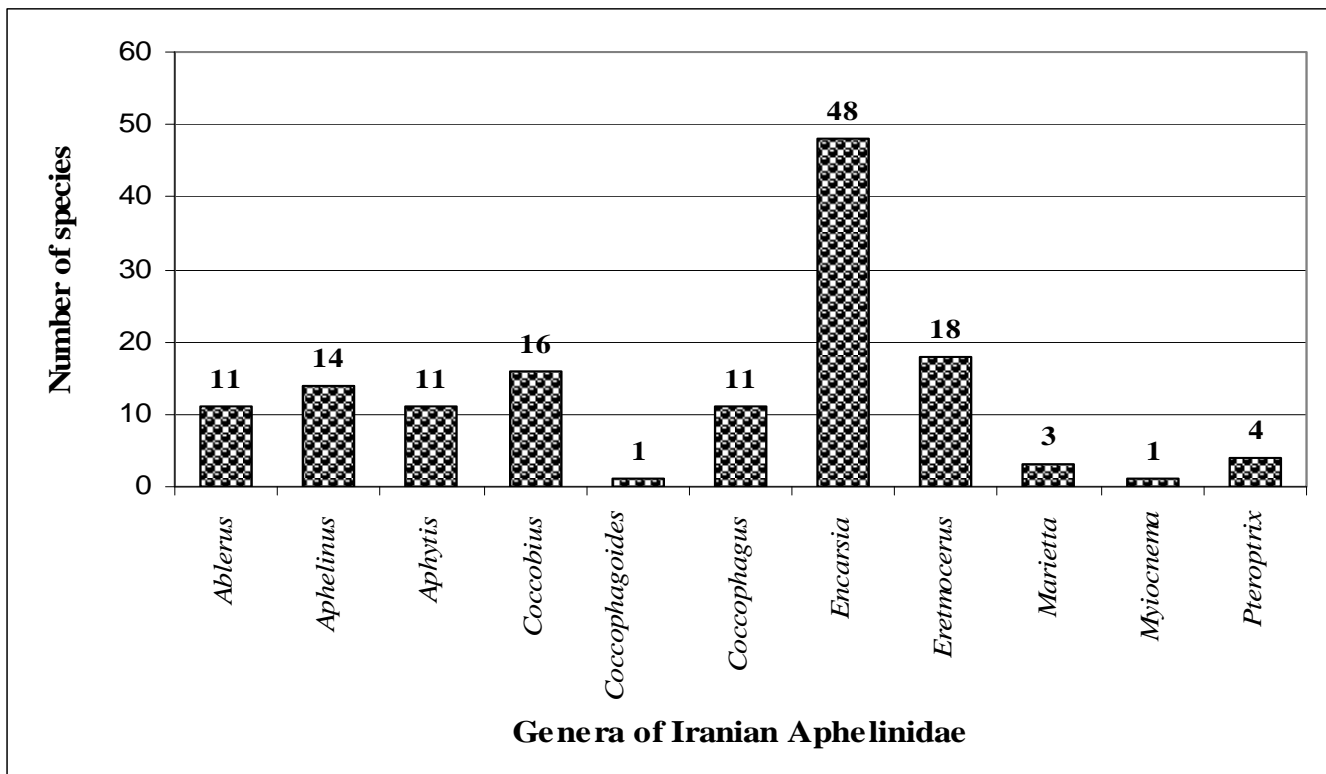


Fig 2: Species diversity of Iranian Aphelinidae.

Aphelinids, especially the members of subfamily Coccophaginae, have an efficient role in biological control of agricultural pests, especially whiteflies and coccids. Among these parasitoids, some species as *Encarsia Formosa*, which is cosmopolitan, is reared for releasing in various agroecosystems to control whiteflies, especially *Trialeurodes vaporariorum* [53]. In Coccophaginae, females are usually endoparasitoids of sternorrhynchous Hemiptera, such as scale insects, mealybugs, and whiteflies. Males of all but a very few species, however, develop in a manner different from females. In most cases, males are hyperparasitoids, developing in or on primary parasitoids, sometimes on conspecific females. Males of heteronomous species are not always hyperparasitic, however, and may develop on other hosts or as ectoparasitoids of the same host as females. In a few species in the subfamily, both sexes develop as primary endoparasitoids [100, 56]. Aphelinids can be powerful parasitoids in nature, if conserved. Conservation biological control involves manipulation of the environment to enhance the survival, fecundity, longevity, and behavior of natural enemies to increase their effectiveness [43, 66]. The best approach to preserving effective biological control by natural enemies is a combination of management tactics. By conserving and protecting natural enemies, we provide an opportunity for them to operate at their full potential as naturally occurring sources of biological control in the agricultural environment [64, 21]. Biological control fits well in combination with other IPM strategies. There are several factors (crop, pest complex, environment, etc.) that can influence the success of beneficial organisms in reducing pest densities to manageable levels. In many situations, the biological control method will need to be utilized in concert with other tactics. Selecting the least disruptive management tactic is recommended by IPM (Integrated Pest Management) and should help conserve natural enemies [32, 72].

5. Acknowledgements

The authors are grateful to G. Evans (Systematic Entomology Laboratory, Beltsville, Maryland, USA), for editing the manuscript, S. Schmidt (Zoologische Staatssammlung München), M. Hayat (Aligarh Muslim University, India), A. Polaszek (Natural History Museum, UK), J. Huang (Fujian Agriculture and Forestry University, China), J.S. Noyes (British Museum of Natural History), V. Yasnosh (Plant Protection Research Institute, Georgia), and H. Ostovan (Fars Science and Research Branch) for providing the necessary papers. This research was supported by Agricultural Research Center (Dokki-Giza, Egypt), Shahre Rey Islamic Azad University, and Universidad Autónoma de Tamaulipas, México.

6. Reference

1. Abd-Rabou S, Ghahari H. A revision of *Encarsia* (Hymenoptera: Aphelinidae) species from Iran. Egyptian Journal of Agricultural Research 2004; 82(2):647-684.
2. Abd-Rabou S, Ghahari H. A list of hyperparasitoids of whiteflies and coccids (Homoptera) in Iran, with special study on Iranian *Ablerus* (Hymenoptera: Aphelinidae). Egyptian Journal of Agricultural Research 2005; 83(1):311-317.
3. Abd-Rabou S, Ghahari H, Huang J, Boucek Z. New records of aphelinid and pteromalid wasps (Hymenoptera: Chalcidoidea: Aphelinidae, Pteromalidae) from Iran. Egyptian Journal of Agricultural Research 2005; 83(4):1619-1623.
4. Abd-Rabou S, Ghahari H, Evans G. Iranian *Eretmocerus*-species (Hymenoptera: Chalcidoidea: Aphelinidae) parasitoids of whiteflies (Sternorrhyncha: Aleyrodidae). Mitteilungen des Internationalen Entomologischen Vereins 2005; 30(3/4):157-176.
5. Abd-Rabou S, Ghahari H. Two new species of the genus *Encarsia* Foerster (Hymenoptera: Aphelinidae) from Iran. Acta Phytopathologica et Entomologica-Hungarica 2007; 42(1):161-167.
6. Abd-Rabou S, Ghahari H. Key to the *Encarsia* species - groups and species - groups *Eretmocerus* with a list of specialists of

- Encarsia* and *Eretmocerus* of the world. Acta Phytopathologica et Entomologica-Hungarica 2007; 42(2):361-366.
7. Abd-Rabou S, Ghahari H. Three new species of *Eretmocerus* Haldeman (Aphelinidae: Hymenoptera) and an Iranian list of the *Eretmocerus* species. Acta Phytopathologica et Entomologica Hungarica 2011; 46(1):165-173.
 8. Abd-Rabou S, Evans G. An annotated list of species of the family Aphelinidae in Egypt with a key to the genera (Hymenoptera: Chalcidoidea). Acta Phytopathologica et Entomologica Hungarica 2011; 46(2):297-309.
 9. Abolmasoumi N, Talebi AA, Rakhshani E, Lotfalizadeh H. Study on faunistic, biodiversity and host rates of (Hym., Aphelinidae) in some parts of Markazi and Lorestan provinces, Iran. Journal of Entomological Research 2009; 2(1):1-12.
 10. Abolmasoumi N, Talebi AA, Rakhshani E, Lotfalizadeh H. Study on faunistic, biodiversity and host rates of (Hym., Aphelinidae) in some parts of Markazi and Lorestan provinces, Iran. Proceedings of 19th Iranian Plant Protection Congress, Iranian Research Institute of Plant Protection, Tehran, 2010, 146.
 11. Ahmadi, AA, Sarafrazi AM. Distribution and natural enemies of Russian wheat aphid, *Diuraphis noxia* (Mordvilko) (Homoptera: Aphididae) in the Fars province. Proceedings of 11th Iranian Plant Protection Congress, University of Guilan 1993, 1.
 12. Ahmadi AA, Ale-Mansoor H. The potential of *Eretmocerus mundus* and *Encarsia lutea* as parasitoids of the cotton whitefly, *Bemisia tabaci* (Gennadius) in Fars province. Proceedings of 12th Iranian Plant Protection Congress, Campus of Agriculture and Natural Resources, University of Tehran, Karaj, 1995, 103.
 13. Ale-Mansoor H. Distribution, host range, and natural enemies of the sweetpotato whitefly, *Bemisia tabaci* (Gennadius) (Homoptera: Aleyrodidae) in Fars province. M.Sc thesis, Department of Entomology, Shiraz University 1992, 227.
 14. Ale-Mansoor H, Ahmadi AA. Natural enemies of cotton whitefly, *Bemisia tabaci* (Gennadius) in Fars province. Proceedings of 11st Iranian Plant Protection Congress 1993, 106.
 15. Ale-Mansoor H, Ahmadi AA. Host-parasitoid interaction between *Eretmocerus mundus* Mercet (Hym, Aphelinidae) a parasitoid of cotton whitefly nymphs, *Bemisia tabaci* (Genn.) in Fars province. Proceedings of 12th Iranian Plant Protection Congress, Campus of Agriculture and Natural Resources, University of Tehran, Karaj, 1995, 101.
 16. Alhosseini H, Mostofi-Pour P. Study on biology of *Pseudoleucaspis pontagona* and determination the natural potential of two parasitoids on this pest in west Mazandaran province. Proceedings of 12th Iranian Plant Protection Congress, Campus of Agriculture and Natural Resources, University of Tehran, Karaj, 1995, 190.
 17. Aliakbar Aghadokht P, Sarailoo MH, Yazdani M, Mottaki E, Polaszek A. New report for wasps fauna for Iran. Proceedings of 19th Iranian Plant Protection Congress, Iranian Research Institute of Plant Protection, Tehran, 2010, 122.
 18. Arretz VP, Lambrot CL, Guerrero MA, Evaluacion del parasitismo sobre los estados inmaduros de la cuncunilla verde del frejol *Rachiplusia nu* Guenee en praderas de alfalfa. Revista Chilena de Entomologia 1985; 12:209-215.
 19. Babcock CS, Heraty JM, De Barro PJ, Driver F, Schmidt S. Preliminary phylogeny of *Encarsia* Forster (Hymenoptera: Aphelinidae) based on morphology and 28S rDNA. Molecular Phylogenetics and Evolution 2001; 18:306-323.
 20. Basij M, Abasipour H, Lotfalizadeh H, Ranjbar S. A new record of *Aonidiella orientalis* parasitoids in southern Kerman. Proceedings of 20th Iranian Plant Protection Congress, University of Shiraz 2012; 96.
 21. Bellows TS, Fisher TW. Handbook of biological control. Academic Press, San Diego, CA 1999, 1046.
 22. Darsuei R, Karimi J, Modarres Awal M. First record of *Aphelinus paramali* Zehavi and Rosen 1989 (Hymenoptera, Aphelinidae), parasitoid of *Aphis pomi* de Geer (Homoptera, Aphididae) in Iran, and its phylogenetic position based on sequence data of ITS2 and COI genes. Entomological Research 2011; 41:194-200.
 23. Davoodi A, Talebi AA, Radjabi Gh, Fathipour Y. Host range of 12 chalcid wasps (Hymenoptera: Chalcidoidea) on soft scales (Hom.: Coccidae) in Tehran and some other areas of Iran. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz 2004; 98.
 24. Davoodi A, Talebi AA, Radjabi Gh, Fathipour Y, Rezaei V, Rakhshani E. An identification of parasitoids and hyperparasitoids of the most common soft scales (Hom: Coccidae) in Tehran and Guilan provinces. Iranian Journal of Agricultural Science 2004; 34(4):887-899.
 25. Ebrahimi E. An introduction to the new six parasitoid wasps for the fauna of Iran. Journal of Entomological Society of Iran 12 & 13 1993; 113.
 26. Ebrahimi A, Lotfalizadeh H, Moghaddam M, Kazemi MH. Parasitoids of *Sphaerolecanium prunastri* (Boyer de Fonscolombe) (Hem.: Diaspididae) in East-Azarbaijan. Proceedings of 20th Iranian Plant Protection Congress, University of Shiraz 2012; 113.
 27. Evans G. Parasitoids (Hymenoptera) associated with whiteflies (Aleyrodidae) of the world. USDA/Animal Plant Health Inspection Service (APHIS) 2007; 173.
 28. Fallahzadeha M, Hesami Sh. Studies of the natural enemies of *Maconellicoccus hirsutus* (Homoptera: Pseudococcidae) in Jahrom region. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz 2004, 47.
 29. Fallahzadeh M, Shojai M, Ostovan H, Kamali K. Natural enemies of *Planococcus ficus* (Homoptera: Pseudococcidae) in Fars province vineyards, Iran. Proceedings of the 18th Iranian Plant Protection Congress, University of Bu-Ali Sina Hamadan, Iran, 2008, 79.
 30. Fallahzadeha M, Japoshvili G, Saghaei N, Daane KM. Natural enemies of *Planococcus ficus* (Homoptera: Pseudococcidae) in Fars Province vineyards, Iran. Biocontrol Science and Technology 2011; 21(4):427-433.
 31. Farrokhi S. An investigation on the biology and efficiency of *Encarsia inaron* (Walker) and *E. formosa* Gahan (Hym: Aphelinidae) on greenhouse whitefly, *Trialeurodes vaporariorum* (Westw.) (Hom: Aleyrodidae). M.Sc. thesis, University of Tehran, Iran, 1996, 130.
 32. Flint ML, Dreistadt SH. Natural enemies handbook, the illustrated guide to biological control. University of California Press, Berkeley, CA 1998, 154.
 33. Ghahari H. Study of three parasitoid species (Aphelinidae) on the greenhouse whitefly, *Trialeurodes vaporariorum* Westwood (Homoptera: Aleyrodidae). M.Sc. thesis, Isfahan University of Technology, Iran, 1999, 180.
 34. Ghahari H, Hatami B. Identification of the natural enemies of whiteflies (Homoptera: Aphelinidae) in Isfahan province. Proceedings of 14th Iranian Plant Protection Congress, Isfahan University of Technology 2000a, 346.
 35. Ghahari H, Hatami B. Study on natural enemies of whiteflies (Homoptera: Aleyrodidae) in Isfahan province. Journal of Entomological Society of Iran 2000; 20(1):1-24 [In Persian, English Summary].
 36. Ghahari H, Abd-Rabou S, Hayat M, Schmit S. Faunistic surveys on *Encarsia* spp. (Chalcidoidea: Aphelinidae) in Mazandaran, Golestan and Isfahan provinces. Proceedings of 16th Iranian Plant Protection Congress 2004; 156.
 37. Ghahari H, Hayat M, Abd-Rabou S, Dovel R. Report of eight parasitoid wasps (Hymenoptera) from Iran. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz, 2004; 159.
 38. Ghahari H, Huang J, Wang H. Biology of a thelytokous biotype of *Eretmocerus mundus* (Hymenoptera: Aphelinidae) on *Bemisia tabaci* (Homoptera: Aleyrodidae). Insect Science 2005; 12:461-465.
 39. Ghahari H, Ostovan H. Morphology, biology, efficiency and

- behaviour of *Eretmocerus mundus* (Hymenoptera: Aphelinidae) parasitoid of *Bemisia argentifolii* (Homoptera: Aleyrodidae). Journal of Agriculture and Natural Resources Science 2006; 13(3):127-140 [In PersIran, English Summary].
40. Ghahari H, Huang J, Abd-Rabou S, Ostovan H, Wang ZH. Contribution to the Iranian Platygasteridae, Eulophidae and Aphelinidae as the parasitoids of whiteflies. Entomological Journal of East China 2006; 15(3):166-170.
 41. Ghahari H, Abd-Rabou S, Hedqvist KJ, Huang J, Ostovan H. A contribution to Iranian Aphelinidae (Hymenoptera: Chalcidoidea). Journal of Biological Control 2010; 24(1):13-16.
 42. Ghahari H, Huang J, Abd-Rabou S. A contribution to the *Encarsia* and *Eretmocerus* (Hymenoptera: Aphelinidae) species from the Arasbaran biosphere reserve and vicinity, northwestern Iran. Archives of Biological Science Belgrade 2011; 63(3):867-878.
 43. Gurr GM, Wratten SD. Integrated biological control: a proposal for enhancing success in biological control. International Journal of Pest Management 1999; 45:81-84.
 44. Hanson PE, LaSalle J. Superfamilia Chalcidoidea, In: Hanson, P.E. & Gauld, I.D. (eds.), Hymenoptera de la Región Neotropical. Memoirs of the American Entomological Society 77. Gainesville, FL, USA, 2006, 304-310.
 45. Hatami B, Ghahari H. Preliminary study on morphology, biology and efficiency of *Encarsia pergandiella* Howard (Hym: Aphelinidae). Journal of Entomological Society of Iran 2000; 19(1 & 2):79-102 [In Persian, English Summary].
 46. Hayat M. The genera of Aphelinidae (Hymenoptera) of the world. Systematic Entomology 1983; 8:63-102.
 47. Hayat M. A revision of the species of *Encarsia* Foerster (Hymenoptera: Aphelinidae) from India and the adjacent countries. Oriental Insects 1989; 23:1-131
 48. Hayat M. Aphelinidae of India (Hymenoptera: Chalcidoidea): A taxonomic revision. Memoirs on Entomology, International 1998; 13: 416.
 49. Heraty JM, Woolley JB, Polaszek A. Catalog of the *Encarsia* of the world pdf. <http://cache.ucr.edu/~heraty/Encarsia.cat.pdf>, 2007; 87.
 50. Heraty JM, Polaszek A, Schauf ME. Systematics and biology of *Encarsia*. Chapter 4, 71-87. In: Gould J, Hoelmer K & Goolsby J. (eds). Classical biological control of *Bemisia tabaci* in the United States. A review of interagency research and implementation. Springer, 2008, 343.
 51. Hesami Sh, Fallahzadeh M. Study on the natural enemies of citrus mealybug, *Nipaecoccus viridis* (Homoptera: Pseudococcidae) in Jahrom, Fars province. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz 2004, 50.
 52. Hesami Sh, Fallahzadeh M. Hyperparasitoids of *Anagyrus* spp. (Hym: Encyrtidae), the parasitoids of mealybugs (Hom: Pseudococcidae) in Fars province. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz 2004b; 56.
 53. Hoddle MS, Van Driesche RG, Sanderson JP. Biology and use of the whitefly parasitoid *Encarsia formosa*. Annual Review Entomology 1998; 43:645-669.
 54. Huang J, Polaszek A. A revision of the Chinese species of *Encarsia* Foerster (Hymenoptera: Aphelinidae): parasitoids of whiteflies, scale insects and aphids (Hemiptera: Aleyrodidae, Diaspididae, Aphidoidea). Journal of Natural History 1998; 32:1825-1966.
 55. Hulden L. The whiteflies (Homoptera: Aleyrodidae) and their parasites in Finland. Notulae Entomologicae 1986; 66:1-40.
 56. Hunter MS, Woolley JB. Evolution and behavioral ecology of heteronomous aphelinid parasitoids. Annual Review Entomology 2001; 46:251-290.
 57. Jalaean M, Basirat M, Joyandeh A. Introduction of natural enemies of the common pistachio psylla (*Agonoscena pistaciae* (Hem: Psyllidae) in Khorasan Razavi province (Iran). Proceedings of 2nd Iranian Pest Management Conference (IPMC), Shahid Bahonar University of Kerman 2011, 56.
 58. Jalilvand K, Fallahzadeh M, Vahedi H, Shirazi M. The first record of two parasitoid species associated with scale insects from Iran. Proceedings of 20th Iranian Plant Protection Congress, University of Shiraz, 2012, 151.
 59. Jamalomid A, Hosseini R, Sahragard A, Hajizadeh J. A faunal study on armored scales (Hem: Diaspididae) parasitoids on citrus trees in eastern part of Guilan province. Proceedings of 20th Iranian Plant Protection Congress, University of Shiraz, 2012, 217.
 60. Karimian Z. Identification of the most important parasitoids of *Bemisia tabaci* (Hom: Aleyrodidae) and determining the trend of parasitism in the cotton crop of Golestan province, Iran. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz, 2004 51.
 61. Karimian Z, Ghahari, H, Abd-Rabou S. Report of two parasitoid wasps (Chalcidoidea: Aphelinidae) from Iran. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz, 2004, 158.
 62. Keyhanian AA, Taghaddosi MV, Farzaneh A. The study of the biology and ecology of olive psyllid (*Euphyllura olivina* Costa) (Hom: Aphalaridae) and of its natural enemies in Tarom Olya Zandjan. Proceedings of 12th Iranian Plant Protection Congress, Campus of Agriculture and Natural Resources, University of Tehran, Karaj, 1995, 191.
 63. Kocheili F. Introduction of two parasitoid wasp of sweetpotato whitefly (*Bemisia tabaci* Gennadius) in Khuzestan province. Proceedings of 13th Iranian Plant Protection Congress, Campus of Agriculture and Natural Resources, University of Tehran, Karaj, 1998, 67.
 64. Kogan M. Integrated Pest Management: historical perspectives and contemporary developments. Annual Review of Entomology 1998; 43:243-270.
 65. Lachiani P, Ahmadi AA. The natural enemies of oriental yellow scale, *Aonidiella orientalis* (Newstead), in citrus orchards of Fars province. Proceedings of 11th Iranian Plant Protection Congress, University of Guilan, 1993, 193.
 66. Landis DA, Wratten SD, Gurr GM. Habitat management to conserve natural enemies of arthropod pests in agriculture. Annual Review of Entomology 2000; 45:175-201.
 67. Laudonia S, Viggiani G. The effect of temperature on the adults colouration of *Encarsia partenopea* (Hymenoptera: Aphelinidae). Bollettino del Laboratorio di Entomologia Agraria 'Filippo Silvestri' 1995; 50:141-146.
 68. Lotfalizadeh H. New record of aphidophagous syrphid flies parasitoids (Dip.: Syrphidae) from Iran. Applied Entomology and Phytopathology 2000; 67(1&2):25.
 69. Lotfalizadeh H. Natural enemies of cotton aphids in Moghan region, northwest of Iran. Proceedings of 15th Iranian Plant Protection Congress, Razi University of Kermanshah 2002; 36.
 70. Manzari S. First report of *Marietta leopardina* Motschulsky (Hymenoptera: Aphelinidae) from Iran. Newsletter of Entomological Society of Iran 2007; 36:2.
 71. Manzari S, Polaszek A, Belshaw R, Quicke DLJ. Morphometric and molecular analysis of the *Encarsia inaron* species-group (Hymenoptera: Aphelinidae), parasitoids of whiteflies (Hemiptera: Aleyrodidae). Bulletin of Entomological Research 2002; 92: 165-175.
 72. Maredia KM, Dakouo D, Mota-Sanchez D. Integrated pest management in the global arena. Cromwell Press, Trowbridge, UK, 2003, 512.
 73. Minaeimoghadam M, Shishehbor P, Askarianzadeh A. Report of two parasitoid wasps on nymph of sugarcane whitefly, *Neomaskellia andropogonis* Corbett (Hom: Aleyrodidae) in Khuzestan. Proceedings of 20th Iranian Plant Protection Congress, University of Shiraz, 2012, 48.
 74. Modarres Awal M. Family Aphelinidae (Hymenoptera), pp. 261-262. In: Modarres Awal, M. (ed.), List of agricultural pests and their natural enemies in Iran. Ferdowsi University Press, 1997, 429.

75. Monsef AA, Amin Gh. Some biology and ecology observations on *Eretmocerus mundus* (Mercet) a hymenopterous parasite on whitefly in Fars province. Proceedings of 12th Iranian Plant Protection Congress, Campus of Agriculture and Natural Resources, University of Tehran, Karaj, 1995; 298.
76. Myartseva SN, Jasnosh VA. Revealing, identifying and characterizing economically important entomophagous species of whitefly pests in Turkeminstan. Ashgabat, Izd. Turkmen Inst. For Scientific and Technical Information NIINTI, 1992.
77. Myartseva SN, Ruiz-Cancino E, Coronado-Blanco JM. Aphelinidae (Hymenoptera: Chalcidoidea) de importancia agrícola en México. Revisión y claves. Serie Avispas Parasíticas de Plagas y otros Insectos No. 8, Universidad Autónoma de Tamaulipas, Ciudad Victoria, Tamaulipas, México, 2012, 413.
78. Noyes JS. Universal Chalcidoidea Database. World Wide Web electronic publication. www.nhm.ac.uk/entomology/chalcidoidea/index.html 2012.
79. Polaszek A, Evans GA, Bennett FD. *Encarsia* parasitoids of *Bemisia tabaci* (Hymenoptera: Aphelinidae, Homoptera: Aleyrodidae): a preliminary guide to identification. Bulletin of Entomological Research 1992; 82:375-392.
80. Polaszek A, Abd-Rabou S, Huang J. The Egyptian species of *Encarsia* (Hymenoptera: Aphelinidae): a preliminary review. Zoologische Mededelingen, Leiden, 1999; 73(6):131-163.
81. Polaszek A, Manzari S. A new species of *Encarsia* (Hymenoptera: Aphelinidae) parasitising *Aleuromarginatus tephrosiae* (Hemiptera: Aleyrodidae) in Iran and Oman. Journal of Hymenoptera Research 2008; 17(2):134-137.
82. Rajabi Mazaher N, Sadeghi SE. Studying biology of *Psyllopsis repens* Log. and identification of its natural enemies in Hamadan province. Proceedings of 17th Iranian Plant Protection Congress, Campus of Agriculture and Natural Resources, University of Tehran, Karaj, 2006, 236.
83. Rakhshani E, Talebi AA, Sadeghi SE, Kavallieratos NG, Rashed A. Seasonal parasitism and hyperparasitism of walnut aphid, *Chromaphis juglandicola* (Kaltenbach) (Hom., Aphididae) in Tehran province. Journal of Entomological Society of Iran 2004; 23(2):1-11.
84. Rasekh B, Hajizadeh J, Barimani Varandi H, Sadeghi SE, Ebrahimi E. The efficiency of *Aspidiotiphagus citrinus* (Hym: Aphelinidae) parasitoid of conifer needle scale in natural Kelardasht condition. Proceedings of 14th Iranian Plant Protection Congress, Isfahan University of Technology 2000; 139.
85. Rasekh B, Polaszek A. New records of *Encarsia* (Hymenoptera: Chalcidoidea: Aphelinidae) parasitising Aleyrodidae (Hemiptera: Sternorrhyncha) in Iran, with the description of a new species. Journal of Hymenoptera Research 2010; 19:223-227.
86. Rasekh B, Alemansoor H, Manzari Sh, Fallahzadeh M, Shojai M. Host range of six parasitoid wasp species (Hymenoptera: Aphelinidae) on citrus whiteflies (Hemiptera: Aleyrodidae) in Fars province, Iran. Proceedings of 19th Iranian Plant Protection Congress, Iranian Research Institute of Plant Protection, Tehran, 2010, 117.
87. Rojas SP. Nota sobre *Prospaltella porteri* Mercet (Hym: Aphelinidae) un nuevo parasito de huevos de Lepidopteros. Revista Chilena de Entomologia 1968; 6:123-125.
88. Sakenin H, Ghahari H, Abd-Rabou S, Hayat S. Record of three parasitoid species (Chalcidoidea: Aphelinidae) from Iran. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz, 2004; 147.
89. Sakenin H, Ghahari H, Abd-Rabou A. The fauna of the parasitoid *Encarsia Foerster* (Chalcidoidea: Aphelinidae) in Guilan province of Iran. Proceeding of 9th ACPP (Arab Congress Plant Protection), Damascus, Syria, November 19-23, 2006, 163.
90. Sakenin H, Ghahari H, Tabari M, Abd-Rabou S. A study on the morphology and biology of the parasitoid *Encarsia porteri* Mercet. Proceeding of 9th ACPP (Arab Congress Plant Protection), Damascus, Syria, November 19-23, 2006, 163.
91. Salehi L, Farivar B. Parasitism of the wasps, *Encarsia berleseii* and *E. fasciata* in Guilan province and mass production of mulberry scale for their rearing. Proceedings of 16th Iranian Plant Protection Congress, 2004, 85.
92. Schmidt S, Polaszek A. The Australian species of *Encarsia Foerster* (Hymenoptera, Chalcidoidea: Aphelinidae), parasitoids of whiteflies (Hemiptera, Sternorrhyncha, Aleyrodidae) and armoured scale insects (Hemiptera, Coccoidea: Diaspididae). Journal of Natural History 2007; 41(33-36):2099-2265.
93. Shahbazvar N, Sahragard A, Manzari Sh, Hosseini R, Hajizadeh J. A faunal study of whiteflies (Hemiptera: Aleyrodidae) and their parasitoids in Guilan province, Iran. Entomofauna 2010; 31(17): 269-284.
94. Shojai M. Resultats de l'étude faunistiques des hymenopteres parasites (Trebrants) en Iran et l'importance de leur utilisation dans la lutte biologique. Proceedings of 1st Iranian Plant Protection Congress, University of Tehran 1986; 25-35.
95. Silvestri F. Contribuzione alla conoscenza degli Aleyrodidae (Insecta: Hemiptera) viventia su Citrus in estremo Oriente e dei loro parassiti. Bollettino del Laboratorio di Zoologia Generale e Agraria del R. Istituto Superiore Agrario in Portici 1928; 21: 20-60.
96. Talebi AA. Natural enemies, population dynamics of *Bemisia tabaci* (Hom: Aleyrodidae) in cotton fields of Varamin and Garmsar, and study on the parasitoid wasps, *Encarsia lutea* and *Eretmocerus mundus* (Hym: Aphelinidae). Ph. D dissertation of Tarbiat Modarres University 1998; 282 pp.
97. Talebi AA, Ameri A, Fathipour Y, Rakhshani, E. Natural enemies of cypress tree Mealybug, *Planococcus vovae* (Nasonov) (Hem., Pseudococcidae), and their parasitoids in Tehran, Iran. Journal of Agricultural Science and Technology 2008; 10: 123-133.
98. Tarasi J, Sadeghi SE, Nabii M Gh, Ebrahimi E. An investigation on the useful arthropods on poplars in Zanjan province. Proceedings of 16th Iranian Plant Protection Congress, University of Tabriz 2004; p. 138.
99. Trjapitzin VA, Myartseva SN, Jasnosh VA. Parasites of whiteflies (Homoptera: Aleyrodidae) of the fauna of Russia and adjacent countries. Entomological reviews 1996; 76:51-74.
100. Viggiani G. Bionomics of the Aphelinidae. Annual Review Entomology 1984; 29: 257-576.
101. Viggiani G, Ren H. Two new aphelinids from China (Hymenoptera: Chalcidoidea). Bollettino del Laboratorio di Entomologia Agraria 'Filippo Silvestri' di Portici 1986; 43:35-39.
102. Yasnosh VA. Hymenoptera II. Chalcidoidea 15. Aphelinidae. Opred. Nasek. Evrop. Chasti SSSR 1978; 1-482.
103. Yazdani A, Mehrnejad MR. The first record of psyllid species and several Hymenoptera parasitoids on pistachio psyllid from Iran. Proceedings of 11th Iranian Plant Protection Congress, University of Guilan 1993; 211.
104. Yazdani A, Radjabi A. The first record of Hymenoptera parasitoids of scale insects on Pistachio in Iran. Proceedings of 11th Iranian Plant Protection Congress, University of Guilan, 1993, 212.
105. Zandi Sohani N, Shishehbor P. Investigation on population dynamics of cotton whitefly *Bemisia tabaci* Gennadius and its parasitoids *Eretmocerus mundus* Mercet and *Encarsia acaudaleyrodidis* Hayat on fall cucumber. Proceedings of 19th Iranian Plant Protection Congress, Iranian Research Institute of Plant Protection, Tehran, 2010, 572.
106. Zareh N, Gonzalez D, Ahmadi A, Esmaili M, Maleki-Milani H, Vafabakhsh J, Salimi Y, Gilstrap F, Sary P, Woolley JB, Thomson FC. A research for the Russian wheat aphid, *Diuraphis noxia* (Mordvilko) (Homoptera: Aphididae), and its natural enemies in Iran. Proceedings of 12th Iranian Plant Protection Congress, Campus of Agriculture and Natural Resources, University of Tehran, Karaj 1995; 12.