

A first overview of the fauna of Chloropidae of Iran (Diptera, Acalyptratae)

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Abstract: We present recent findings of Chloropidae in Iran and a first list of the Iranian species of this family. It includes 20 genera and 50 species (39 identified to species level), recorded up until 2014. Some European distribution records not included in *Fauna Europaea* are added. The courtship behavior of *Polyodaspis sulcicollis* is described for the first time.

Key words: Chloropidae, Diptera, distribution, Iran, mating behavior

1. Introduction

The family Chloropidae is one of the more species-rich families of Diptera. These flies are widely distributed and found in all zoogeographical regions except Antarctica.

Adults vary in color, shape, and size; their length is between 0.7 and 10 mm. They are usually yellowish with more or less extensive black or reddish markings, or are mainly or entirely black. Ismay and Nartshuk (2000) published the latest count or estimate of species in the family with about 2600 described valid species, of which more than 500 are known from the Palearctic region. As of this year, a total of 85 articles and books have been published with descriptions of new genera and species.

The larvae are phytophagous on vegetative or reproductive parts of monocots (Poaceae, Cyperaceae, Juncaceae, Juncaginaceae, Zingiberaceae, Typhaceae, and 6 other families); some produce galls or areinquilines in galls of other species; some species develop in single seeds (caryopses of grasses). The larvae of a few species attack dicots, while others are phytosaprophagous or saprophagous in stems and fruits or in plant galls; only a few are coprophagous. Species of certain taxa develop as predators of root aphids (Pemphigidae), thrips (Thysanoptera), egg masses of spiders, whip spiders (Amblypygi), praying mantids, locusts, and moths. It is unresolved whether species reared from mushrooms are fungivorous or saprophagous, or are predators of fungivorous insect larvae or nematodes. Certain groups develop in brood cells of bees (Apidae) or thread-waisted wasps (Sphecidae). The extremely specialized species of the genus *Batrachomyia* Krefft are parasites of frogs in

Australasia. Species of some genera (*Hippelates* Loew, *Liohippelates* Duda, *Siphunculina* Rondani) are well-known vectors of bacterial diseases and are attracted to human and animal eyes and wounds. The ancient Romans called the young damaged caryopses of grain "frit", a term which Linnaeus used in 1758 as the scientific name for the harmful frit-fly, *Oscinella frit* L., which is widely used as the vernacular name for the whole fly family. Considerable literature exists on the agricultural pests in this family, including the gout fly, *Chlorops pumilionis*, and the wheat stem flies, *Meromyza saltatrix* and *M. americana*.

1.1. Published records on Iranian Chloropidae

Afshar (1938) was the first Persian entomologist to report a chloropid pest species, *Chlorops pumilionis*, from Iran. Later researchers, although not specialists in this family, reported some widely distributed species from Iran in their books on applied entomology. Behdad (1993), Modarres Awal (1997), and Khanjani (2005) tried to collate these records for inclusion in their books. We could not find some papers and books cited by them; thus, their citations are not repeated here. Before 2001, no one had seriously focused their interest on all Chloropidae of Iran. Abivardi (2001) summarized all aspects of Iranian entomology based on an impressive Iranian bibliography, but without a chloropid article.

Earlier studies in Iran have not covered the Chloropidae systematically. This paper presents new discoveries and the first rather limited Iranian overview, dealing with 20 genera and 50 species. The genera and species are arranged alphabetically within 2 subfamilies, disregarding their phylogenetic order. In view of the extremely

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diverse Iranian landscapes and habitats, we are sure that many more species of Chloropidae await discovery and identification in this country, especially if Malaise traps and colored pan traps are used for a whole year in faunistic surveys. Based on comparison with the well-investigated Central European countries, we estimate that at least 200 species of Chloropidae may be found in Iran. Similar overviews have been made recently for adjacent countries such as Turkey (Nartshuk, 2012) and Greece (Nartshuk, 2010), both with numbers of species close to the number found in this paper. In addition, Nartshuk (2010) expected to find a number of Greek species similar to that of our expectations. Finally, 31 identified and 2 unidentified species were recorded from southwestern Saudi Arabia (belonging to the Palearctic region) (Dawah and Abdullah, 2006). This paper records many genera and species not yet found in Iran.

2. Materials and methods

Six agricultural sites close to 5 cities in the province of Fars (central Iran) were selected for collecting Chloropidae. The distance between the most northern and southern sites, Abadeh and Lar, is 213 km; the distance between the most western and eastern localities, Shiraz and Darab, is 430 km. Three collection methods were used: 1) one Malaise trap was placed in 2009 near Jahrom (= Dscharom) from 2 July until 10 September, altogether 60 days; 2) a yellow pan trap filled with water and detergent (diameter 30 cm, depth 20 cm, height above ground 1.5 m) was placed in 2009 and 2010 for 2 periods of 11 weeks altogether near Abadeh; 3) sweep net samples were taken at different localities on 10 dates: 2 swept gardens contained pomegranate trees (*Punica granatum* L.) and orange trees (*Citrus aurantium* L.) respectively, 6 were taken from wheat fields, and 1 from an alfalfa field. All samples are listed in the Table. Both

types of traps were emptied at intervals of exactly 7 days. They were positioned in the center of large-area crops of alfalfa (*Medicago sativa* L.) and wheat (*Triticum aestivum* L.), respectively. The field with the Malaise trap was surrounded by date palm plantations (*Phoenix dactylifera* L.) and citrus orchards. The exact collecting data for each chloropid species are mentioned below in an abbreviated form: site, year, month, date. The data are presented to demonstrate when species were on the wing. Geographical coordinates and altitudes were taken from Google Earth. Undescribed or unidentified species are provisionally in the collection of the third author; all other material is in the private collection of the first author.

3. Results and discussion

3.1. Subfamily Oscinellinae

3.1.1. *Aphanotrigonum* Duda, 1932

1. *Aphanotrigonum cinctellum* (Zetterstedt, 1848)

Record from Iran: Nartshuk, 1984. Nartshuk and Andersson (2013) added *Oscinis fasciella* Zetterstedt, 1855 as a junior synonym of *A. cinctellum*. "*A. fasciellum*" is known as a very abundant species in inland and coastal saline habitats (von Tschirnhaus, 1981). Thus, a more extensive list of country records is given.

Distribution: British Is., Bulgaria, Czech Republic, Canary Is., Danish mainland, Estonia, Germany, Hungary, Italian mainland, Latvia, Norwegian mainland, Poland, Romania, Russia Central, Russia East, Russia Northwest, Russia South, Slovakia, Spanish mainland, Sweden, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Near East, North Africa, Oriental Region (Nartshuk, 2013a), France mainland, The Gambia/West Africa (von Tschirnhaus, 1981). Additional material collected on Mallorca (Spain) by M.v.T., deposited in the M.v.T. collection, Bielefeld.

Table. Overview of all original samples from the province of Fars. Abbreviations are self-explanatory and are used in the text. Dates of trap exposure in brackets; subsequent dates of emptying are separated by a comma and subsequent methods by a semicolon.

Locality	Latitude	Longitude	Elevation	Crop	Date of emptying	Biotope	Collecting method
Close to city	North	East	m a.s.l.		Year month days		
A Abadeh	31°09'34"	52°40'26"	1995	<i>Medicago</i>	2009 (iv 28-) v 5; 2010 (v 27-) vi 3, 10, 17, 24, vii 1, 8, 15, 22, 29, viii 5	Field	PT Pan trap
D Darab	28°45'17"	54°31'45"	1117	<i>Triticum</i>	2009 vii 16; 2010 iii 30, iv 4, 20, v 22	Field	Sw Sweep net
J Jahrom	28°30'56"	53°31'27"	1043	<i>Medicago</i>	2009 (vii 2-) vii 9, 16, 23, 30, viii 6, 13, 20, 27, ix 3, 10	Field	MT Malaise trap
Ja Jahrom	28°30'31"	53°34'21"	1044	<i>Punica</i>	2010 iv 2	Garden	Sw Sweep net
K Kherameh	29°30'02"	53°20'02"	1581	<i>Medicago</i>	2009 iv 16, v 17	Field	Sw Sweep net
L Lar	27°41'53"	54°19'29"	823	<i>Triticum</i>	2010 iv 11	Field	Sw Sweep net
S Shiraz	29°34'56"	52°32'43"	1521	<i>Citrus</i>	2009 iv 25; 2010 iv 5	Garden	Sw Sweep net

2–4. *Aphanotrigonum* spp.

Three undescribed species in Iran: Bazyar, 2011: *Aphanotrigonum* sp. 1, J 2009: 1♀ vii 16, 7♂10♀ ix 3. *Aphanotrigonum* sp. 2, J 2009: 3♀ ix 3. *Aphanotrigonum* sp. 3, J 2009: 1♂2♀ viii 6.

3.1.2. *Elachiptera* Macquart, 1835

5. *Elachiptera bimaculata* (Loew, 1845)

New record from Iran: Bazyar, 2011. D 2010: 2♂1♀ v 22; J 2009: 17♂17♀ vii 30, 5♂3♀ ix 10.

Distribution: Azores, Bulgaria, Canary Is., Corsica, Croatia, Cyprus, Dodecanese Is., French mainland, Greek mainland, Italian mainland, Macedonia, Madeira, Malta, Portuguese mainland, Russia East, Russia South, Sicily, Spanish mainland, the Netherlands, Ukraine, Yugoslavia, Near East, North Africa (Nartshuk, 2013a), Romania (Georghiou, 1977), Turkey (Civelek and Tezcan, 2005; Nartshuk, 2012), Mediterranean Is. (Nartshuk, 2013b), Israel (Rivnay and Zimmermann-Gries, 1950; Kaplan, 1977), Morocco (Bleton and Fieuzet, 1943). The record of Weipert (1993) for Germany is a misidentification of *E. austriaca* Duda, 1932 (Weipert, personal communication).

6. *Elachiptera cornuta* (Fallén, 1820)

Record from Iran: Parchami-Araghi and Akbari-Noshad, 1997.

Distribution: Austria, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Moldova, Norwegian mainland, Poland, Romania, Russia Kaliningrad Region, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Near East, North Africa (Nartshuk, 2013a).

3.1.3. *Lasiochaeta* Corti, 1909

7. *Lasiochaeta pubescens* (Thalhammer, 1898)

Records from Iran: Nartshuk, 1984 (as *Melanochaeta pubescens*; for generic transfer and species characters compare Nartshuk and von Tschirnhaus (2012)); Deeming and Al-Dhafer, 2012.

Distribution: Austria, Azores, Belarus (doubtful), Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Croatia, Czech Republic, Danish mainland, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Macedonia, Madeira, Malta, Poland, Romania, Russia East, Russia South, Slovakia, Spanish mainland, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Near East, North Africa (Nartshuk, 2013a); Balearic Is., Corsica, Sardinia, Maltese Is. (Nartshuk, 2013b); may well be found in Arabia (Deeming and Al-Dhafer, 2012); common and widely distributed species in the southern Palearctic Region, from Azores and Madeira

to Afghanistan, recently spreading as far north as northern Germany (Nartshuk and von Tschirnhaus, 2012). From England, it was first recorded by Collin (1946).

3.1.4. *Lipara* Meigen, 1830

8. *Lipara lucens* Meigen, 1830

Record from Iran: Karimpour, 2013.

Distribution: Albania, Austria, Belarus, Belgium, Britain, Bulgaria, Croatia, Czech Republic, Denmark, England, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Macedonia, Malta, Moldova, Norway, Poland, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, the Netherlands, Ukraine, “Yugoslavia”; Turkey, Israel, Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, Nearctic Region (Nartshuk, 1984, 2013a).

3.1.5. *Oscinella* Becker, 1909

9. *Oscinella alopecuri* Mesnil in Balachowsky and Mesnil, 1935

Records from Iran: Mansoor-Ghaazi and Radjabi, 2000; Kubik and Bartak, 2008.

The taxon was described based on larval characters in a key in Balachowsky and Mesnil (1935: 922). It is still unresolved whether *O. alopecuri* is a valid species or a synonym of one of the many other taxa in the *O. frit* complex.

Distribution: French mainland, Macedonia, Russia Central, Russia South, Slovakia, Slovenia, Ukraine, Yugoslavia, Near East (doubtful) (Nartshuk, 2013a).

10. *Oscinella frit* (Linnaeus, 1758)

Records from Iran: Behdat, 1993; Narchuk et al., 1989; Rajabi-Mazhar et al., 2004; Alikhani et al., 2012; Rabieh et al., 2012. Bazyar, 2011. J 2009: 1♀ vii 16; L 2010: 1♂ iv 11.

Distribution: Albania, Austria, Azores, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Canary Is., Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Madeira, Moldova, Norwegian mainland, Poland, Portuguese mainland, Romania, Russia Kaliningrad Region, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, Afrotropical Region, Australasian Region, East Palearctic, Near East, Nearctic Region, Neotropical Region, North Africa, Oriental Region (Nartshuk, 2013a).

11. *Oscinella nitidissima* (Meigen, 1838)

Records from Iran: Narchuk et al., 1989; Mansoor-Ghaazi and Radjabi, 2000.

Distribution: Albania, Austria, Azores, Belarus, Belgium, British Is., Bulgaria, Canary Is., Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Latvia,

Lithuania, Macedonia, Madeira, Malta, Poland, Russia Kaliningrad Region, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Vatican City, Yugoslavia, East Palearctic, Near East, Nearctic Region (Nartshuk, 2013a).

12. *Oscinella pusilla* auctt., nec Meigen, 1830

Nartshuk (1997) studied 2 syntypes in museums of Vienna and Paris and found out that neither belongs to the sibling species of *O. frit* treated under the name *pusilla* as an agricultural pest since Meigen's time. Recently, Nartshuk and Andersson (2013: 131) summarized the taxonomical problem, which should be solved by fixing a neotype. This action requires a decision by the ICZN.

Records from Iran: Narchuk et al., 1989; Mansoor-Ghaazi and Radjabi, 2000; Bazyar, 2011. A 2010: 2♀ viii 5; D 2010: 1♂2♀ iv 20; J 2009: 1♂ vii 30, 4♀ vii 23, 1♂2♀ vii 16.

Distribution: Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Canary Is., Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Madeira, Moldova, Norwegian mainland, Poland, Romania, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Near East (Nartshuk, 2013a).

13. *Oscinella* sp.

Z.B. collected 2 females and 4 males of this peculiar undescribed species with pale ochreous third antennal segment (flagellomere) similar to several Afrotropical species.

Undescribed species: Bazyar, 2011. J 2009: 2♂ vii 16, 2010: 2♂2♀ viii 5.

3.1.6. *Polyodaspis* Duda, 1933

The authors do not follow Cherian (2012), who synonymized *Polyodaspis* with *Anacamptoneurum* Becker, 1903 without considering the different shape of the flagellomere and the peculiar protrudable abdominal odor sacs (with papillae) of all male *Polyodaspis* spp. Such odor organs are not known in the genus *Anacamptoneurum*.

14. *Polyodaspis laevicola* (Becker in Becker and Stein, 1913)

Should probably be placed in the genus *Lasiambia* Anonymous, 1937 (Evenhuis et al., 2008). Narchuk (1970) investigated the female holotype and did not exclude the possibility that the taxon is a junior synonym of *P. sulcicollis*. Nartshuk (2011) later compared it (partly misspelling the name as *laevicollis*) with her new species *P. palpata*, which means that it is now considered a valid species. More details to enable a correct identification are given under *P. sulcicollis*.

Record from Iran: Nartshuk, 1984.

15. *Polyodaspis sulcicollis* (Meigen, 1838)

Record from Iran: Nartshuk, 1984. Nartshuk (2012) recently published a key to the Palearctic *Polyodaspis* species including 5 taxa that had been synonymized with *P. ruficornis*. In her Turkish overview (Nartshuk, 2012), she added a new species, *P. splendida*, to this key. Hence, as many specimens as possible should be collected or reared (from conifer cones, nuts, dicot flower heads, or plant stems, e.g., *Orobanchae*) in the future to clarify the Iranian fauna of *Polyodaspis* species.

On 1 April 1997, M.v.T. observed that thousands of males attracted females by rapid wing-waving combined with the extrusion of abdominal terminal sac-like odor organs. The display took place in direct sunlight, with the males quickly running around on single whitish limestones on the forest floor of scattered *Pinus* forest in the mountains of the Greek island of Rhodes (36°11'N, 27°54'E). In comparable Iranian forests in the Alborz mountain range, this hitherto unknown phenomenon could possibly be observed, along with the subsequent egg-laying into fallen conifer cones, flower heads, or other substrates from which the species has been reared.

Distribution: Austria, British Is., Bulgaria, Crete, Croatia, Cyprus, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Greek mainland, Hungary, Italian mainland, Malta, Moldova, Russia Central, Russia East, Russia Northwest, Russia South, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Near East, North Africa (Nartshuk, 2013a).

3.1.7. *Trachysiphonella* Enderlein, 1936

16. *Trachysiphonella ruficeps* (Macquart, 1835)

This species was treated by authors in recent years mostly as *T. pygmaea* (Meigen, 1838) or as *T. flavella* (Zetterstedt, 1848). Both taxa are now treated as synonyms (by Nartshuk and Andersson, 2013) of the oldest name for the darkest variety of this very variable and abundant species. The larval development of all species in the genus is completely unknown.

Records from Iran: Alikhani et al., 2012; Rabieh et al., 2012.

Distribution, including that of the recently synonymized taxon *pygmaea*: Austria, Belarus, Belgium, British Is., Bulgaria, Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Hungary, Italian mainland, Latvia, Lithuania, Macedonia, Malta, Poland, Romania, Russia, Central Russia, Northwest Russia, South Russia, Sardinia, Sicily, Slovakia, Slovenia, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Near East (Nartshuk, 2013a). M.v.T. collected it also in Catalonia (Spain), Corfu and Sciathos (Greece), Gomera and Tenerife (Canary Is.).

17. *Trachysiphonella scutellata* (von Roser, 1840)

Records from Iran: Alikhani et al., 2012; Rabieh et al., 2012; Bazyar, 2011: J 2009: 3♂16♀ vii 30, 1♂2♀ vii 9, 6♀ vii 16.

Distribution: Austria, Belarus, Belgium, British Is., Bulgaria, Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Poland, Romania, Russia Central, Russia East, Russia Northwest, Russia South, Sardinia, Sicily, Slovakia, Slovenia, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic (Nartshuk, 2013a).

3.1.8. *Tricimba* Lioy, 1864

18. *Tricimba cincta* (Meigen, 1830)

New record from Iran: Bazyar, 2011: J 2009: 2♂3♀ vii 30, 1♀ ix 3, 2010: 1♂5♀ viii 5.

Distribution: Albania, Austria, Belarus, Belgium, British Is., Bulgaria, Canary Is., Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Norwegian mainland, Poland, Russia Central, Russia North, Russia Northwest, Russia South, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Near East, Nearctic Region (Nartshuk, 2013a).

19. *Tricimba humeralis* (Loew, 1858)

Records from Iran: Nartshuk, 1984; Bazyar, 2011: D 2010: 1♂1♀ iii 3; J 2009: 59♂57♀ vii 16, 29♂37♀ vii 30.

Distribution: Austria, Azores, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Canary Is., Croatia, Cyprus, Czech Republic, French mainland, Germany, Hungary, Italian mainland, Malta, Norwegian mainland, Poland, Russia Central, Russia East, Russia South, Sardinia, Sicily, Slovakia, Spanish mainland, Sweden, Switzerland, Ukraine, Yugoslavia, East Palearctic, Near East, North Africa (Nartshuk, 2013a).

3.2. Subfamily Chloropinae

3.2.1. *Assuania* Becker, 1903

20. *Assuania thalhammeri* (Strobl, 1893)

Records from Iran: Nartshuk, 1984; Deeming and Al-Dhafer, 2012.

Distribution: Andorra, Austria, Bulgaria, Corsica, Cyprus, French mainland, Greek mainland, Ireland, Spanish mainland (Nartshuk, 2013a); widespread in countries bordering the Mediterranean and Black Sea, extending eastwards to Israel and Afghanistan (Deeming and Al-Dhafer, 2012).

3.2.2. *Chlorops* Meigen, 1830

21. *Chlorops hypostigma* Meigen, 1830

First record from Iran: Bazyar, 2011: S 2010: 1♀ iv 5.

Distribution: Austria, Belarus, Belgium, British Is., Bulgaria, Czech Republic, Danish mainland, Estonia, Faroe

Is., Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Norwegian mainland, Poland, Romania, Russia Central, Russia North, Russia Northwest, Russia South, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, East Palearctic (Nartshuk, 2013a).

22. *Chlorops pannonicus* Strobl, 1893

Record from Iran: Nartshuk, 1984.

Distribution: Austria, Czech Republic, Estonia, Germany, Hungary, Italian mainland, Moldova, Poland, Russia Central, Russia East, Russia South, Sardinia, Sicily, Slovakia, Sweden, Ukraine, Yugoslavia, East Palearctic, Near East (Nartshuk, 2013a).

23. *Chlorops persicus* (Duda, 1933)

Records from Iran: Duda, 1932–1933; Nartshuk, 1984; Alikhani et al., 2012; Rabieh et al., 2012.

Distribution: Middle Asia including Afghanistan.

24. *Chlorops pumilionis* (Bjerkander, 1778)

Records from Iran: Davatchi, 1954; Behdad, 1993; Modarres Awal, 1997; Nartshuk, 1984; Alikhani et al., 2012; Rabieh et al., 2012.

Distribution: Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Canary Is., Corsica, Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Moldova, Norwegian mainland, Poland, Romania, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, East Palearctic, Near East (Nartshuk, 2013a).

3.2.3. *Cryptonevra* Lioy, 1864

25. *Cryptonevra flavitarsis* (Meigen, 1830) Records from Iran: Karimpour, 2013.

Distribution: Austria, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, England, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Poland, Romania, Russia, Slovakia, Sweden, Switzerland, the Netherlands, Ukraine, "Yugoslavia"; Morocco, Mongolia, China, Israel, Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, Nearctic Region (Nartshuk, 1984, 2013a), Spain (Ebejer, 2006).

3.2.4. *Diplotoxa* Loew, 1863

26. *Diplotoxa messoria* (Fallén, 1820)

Records from Iran: Alikhani et al., 2012; Rabieh et al., 2012.

Distribution: Holarctic species, in the Palearctic from the British Is. to the Far East of Russia (Nartshuk and Andersson, 2013).

3.2.5. *Eurina* Meigen, 1830

27. *Eurina lurida* Meigen, 1830

Records from Iran: Nartshuk, 1984; Narchuk et al., 1989.

Distribution: Albania, Austria, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Corsica, Croatia, Danish mainland, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Norwegian mainland, Portuguese mainland, Russia South, Spanish mainland, Sweden, the Netherlands, Ukraine, East Palearctic, Near East (Nartshuk, 2013a).

3.2.6. *Homalura* Meigen, 1826

28. *Homalura sarudnyi* Becker, 1910

Records from Iran: Duda, 1932–1933; Nartshuk, 1984.

Distribution: Israel (Kaplan, 1977).

3.2.7. *Lagaroceras* Backer, 1903

29. *Lagaroceras andalusiicum* (Strobl, 1899)

Records from Iran as *Parectecephala andalusiaca*: Duda, 1932–1933; Nartshuk, 1984. The transfer to the genus *Lagaroceras* was published by Deeming (2011).

Distribution: Croatia, French mainland, Italian mainland, North Africa, Spanish mainland (Nartshuk, 2013a), Arabic Emirates (Deeming, 2011), Hungary (Dely-Draskovits, 2001), Israel (Kaplan, 1977).

30. *Lagaroceras* sp.

Undescribed species: Bazayar, 2011. J 2009: 2♀ vii 16.

3.2.8. *Lasiosina* Becker, 1910

31. *Lasiosina herpini* (Guérin-Meneville, 1843).

Records from Iran: Nartshuk, 1984; Radjabi et al., 1997; Alikhani et al., 2012; Rabieh et al. (2012) recorded it as *Lasiosina cinctipes* (Meigen, 1830).

Distribution: Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Croatia, Czech Republic, Danish mainland, European Turkey, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Moldova, Norwegian mainland, Poland, Romania, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Near East, North Africa (Nartshuk, 2013a).

32. *Lasiosina paralittoralis* Dely-Draskovits, 1981

Records from Iran: Alikhani et al., 2012; Rabieh et al., 2012.

Distribution: Israel (Dely-Draskovits, 1981).

33–35. *Lasiosina* spp.

Three unidentifiable species: Bazayar, 2011. *Lasiosina* sp. 1. J 2009: 1♀ vii 30. *Lasiosina* sp. 2. D 2010: 1♀ v 22. *Lasiosina* sp. 3. J 2009: 1♂ vii 16.

3.2.9. *Meromyza* Macquart, 1835

36. *Meromyza facialis* Fedoseeva, 1962

Records from Iran: Modarres Awal, 1997; Radjabi et al., 1997.

Distribution: Hungary, Poland, Russia South, Ukraine, Near East (Nartshuk, 2013a).

37. *Meromyza nigriventris* Macquart, 1835

Records from Iran: Nartshuk, 1984; Nartshuk and Fedoseeva, 2011; Alikhani et al., 2012; Rabieh et al., 2012; Bazayar, 2011. A 2009: 4♂5♀ v 5, 2010: 1♂ vi 3; D 2010: 17♂10♀ v 22; J 2009: 1♂4♀ vii 30, 1♀ vii 23; K 2009: 3♂ iv 16; L 2010: 1♂ iv 11.

Distribution: Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Corsica, Croatia, Czech Republic, Danish mainland, Estonia, Finland, Germany, Hungary, Italian mainland, Russia Kaliningrad Region, Latvia, Lithuania, Macedonia, Moldova, Norwegian mainland, Poland, Romania, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, East Palearctic, Nearctic Region (Nartshuk, 2013a).

38. *Meromyza saltatrix* (Linnaeus, 1761)

Records from Iran: Behdad, 1993; Modarres Awal, 1997.

Distribution: Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Hungary, Ireland, Italian mainland, Russia Kaliningrad Region, Latvia, Lithuania, Macedonia, Moldova, Norwegian mainland, Poland, Romania, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, Ukraine, Yugoslavia, East Palearctic, Nearctic Region (Nartshuk, 2013a).

39. *Meromyza* sp.

Unidentified species: Bazayar, 2011. A 2010: 1♀ vi 3.

3.2.10. *Metopostigma* Becker, 1903

40. *Metopostigma pleskei* Becker, 1910

Record from Iran: Nartshuk, 1984, following the study of the type by Nartshuk (1970).

41. *Metopostigma polonicum* (Schnabl, 1884)

Records from Iran: Nartshuk, 1984; Narchuk et al., 1989.

Distribution: French mainland, Hungary, Poland, Slovakia, Switzerland, East Palearctic (doubtful) (Nartshuk, 2013a).

42. *Metopostigma* sp.

Undescribed species: Bazayar, 2011. J 2009: 1♂ vii 30, 2♂ vii 16.

3.2.11. *Platycephala* Fallén, 1820

43. *Platycephala isinensis* Kubík & Barták, 2008

Records from Iran: Kubik and Barták, 2008; Rabieh et al., 2012.

44. *Platycephala scapularum* (Becker, 1907).

Record from Iran: Nartshuk, 1984.

Distribution: Algeria, Israel, Iran, Mongolia, Morocco, Tunisia, Egypt, Libya (Nartshuk, 1984). A recent record of this rare species from an inland lake in Morocco was published by Pârvu et al. (2006).

3.2.12. *Thaumatomyia* Zencker, 183345. *Thaumatomyia elongatula* (Becker, 1910)

Records from Iran: Rajabi-Mazhar, et al., 2004; Sadeghi et al., 2007.

Distribution: Austria, Corsica, Czech Republic, French mainland, Germany, Hungary, Italian mainland, Moldova, Poland, Russia South, Slovakia, Switzerland, the Netherlands, Ukraine (Nartshuk, 2013a).

46. *Thaumatomyia glabra* (Meigen, 1830)

Records from Iran: Alikhani et al., 2012; Rabieh et al., 2012.

Distribution: Austria, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Hungary, Italian mainland, Latvia, Lithuania, Macedonia, Malta, Moldova, Norwegian mainland, Poland, Romania, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, Yugoslavia, Nearctic Region (Nartshuk, 2013a).

47. *Thaumatomyia notata* (Meigen, 1830)

Records from Iran: Radjabi et al., 1997; Alikhani et al., 2012; Rabieh et al., 2012. Bazyar, 2011. A 2009: 1♀ v 5, 2010: 1♀ vi 3; D 2010: 5♂9♀ v 22; ; J 2009: 1♂ vii 16, 3♂3♀ vii 30, 3♂5♀ vii 9, 1♀ vii 23; K 2009: 4♂4♀ iv 16; S 2009: 6♂11♀ iv 25, 2010: 6♂3♀ iv 5.

Distribution: Albania, Austria, Azores, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Canary Is., Corsica, Croatia, Cyprus, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland, Italian mainland, Latvia, Lithuania, Macedonia, Malta, Moldova, Norwegian mainland, Poland, Romania, Russia Kaliningrad Region, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Sardinia, Sicily, Slovakia, Slovenia, Spanish mainland, Sweden,

Switzerland, the Netherlands, Ukraine, Yugoslavia, Afrotropical Region, Near East, North Africa, Oriental Region (Nartshuk, 2013a).

48. *Thaumatomyia rufa* (Macquart, 1835)

Record from Iran: Nartshuk, 1984.

Distribution: Austria, Belarus, Belgium, Bosnia and Herzegovina, British Is., Bulgaria, Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Hungary, Italian mainland, Latvia, Lithuania, Norwegian mainland, Poland, Russia, Russia Central, Russia East, Russia North, Russia Northwest, Russia South, Sicily, Slovakia, Slovenia, Spanish mainland, Sweden, Switzerland, the Netherlands, Ukraine, East Palearctic, Near East (Nartshuk, 2013a), Cyprus and further Mediterranean Islands (Nartshuk, 2010 and 2013b), Japan, China, Mongolia (Kanmiya, 2006 [and further authors]), Korea (Ryu, 1994; Nartshuk and Yang, 2011 [and further authors]).

49. *Thaumatomyia sulcifrons* (Becker, 1907)

Records from Iran: Nartshuk, 1984; Dawah and Abdullah, 2006; Alikhani et al., 2012; Deeming and Al-Dhafer, 2012; Rabieh et al., 2012. Bazyar, 2011. A 2009: 4♀ v 5, 2010: 1♀ vi 3; D 2010: 1♀ iv 4, 11♂15♀ v 22; J 2009: 10♂17♀ vii 30, 7♂7♀ vii 16, 1♂1♀ vii 23, 1♂3♀ vii 9; K 2009: 2♂5♀ iv 16.

Distribution: Saudi Arabia and Europe (Spain, southern France, Hungary, Yugoslavia, Bulgaria, USSR, Southern European Territory with Canary Islands), Trans-Caucasus, Kazakh SSR, Soviet Middle Asia, southern East Siberia, Palestine, Iran, Afghanistan, Mongolia, China; North Africa: Algeria, Tunisia (Nartshuk, 2013a). Israel, Yemen (Deeming and Al-Dhafer, 2012), Morocco (Dawah and Abdullah, 2006).

50. *Thaumatomyia* sp.

Undescribed species: Bazyar (2011). S 2009: 1♂1♀ iv 25.

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