

## An Annotated Checklist of the Jumping Plant-lice (Hemiptera: Psylloidea) of Iran

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### ABSTRACT

A revised checklist to the species of Psylloidea (Hemiptera) from Iran is presented based mainly on literature records, along with some new information on host plant data, distribution and natural enemies. The list includes 95 identified species 26 genera of 5 families, of which one species, *Cacopsylla ambigua* (Foerster), is newly recorded for the Iranian fauna and five species are only provisionally identified. Another eight species have been listed for Iran that are identified only to genus. The families Aphalaridae and Homotomidae with 27 and 2 species are the most and the least species-rich families, respectively. The predatory mite *Erythraeus* (E.) *garmasarius* Saboori *et al.* (Acarina: Trombidiformes: Erythraeidae) is reported for the first time from psyllids.

**Key words:** Palearctic, distribution, biogeography, host plant, psyllids, pest species, natural enemies.

### INTRODUCTION

Psyllids or jumping plant-lice with about 3800 described species worldwide, are highly host-specific phloem-feeding insects, in particular as immatures (Burckhardt, *et al.*, 2014). Some psyllids are pests on cultivated plants (Burckhardt, 1994) and among them, those which transmit the causal agents of serious plant diseases have major economic importance. In Iran the most important psyllid pests occur on pistachio, citrus, olive and pear.

Psylloidea comprises eight families (Burckhardt and Ouvard, 2012); five of them are known to occur in Iran (i.e. Aphalaridae, Homotomidae, Liviidae, Psyllidae and Triozidae). The last comprehensive treatment from psyllids of Iran (Burckhardt, Lauterer, 1993) lists 89 species, of which one is a likely misidentification and one a wrong citation, and eight unidentified species. This paper is over 20 years old and, in parts, out-dated. One species mentioned by Burckhardt (1985) is not listed in Burckhardt and Lauterer (1993) and some species were added since then (Bové *et al.*, 2000; Asadi *et al.*, 2009; Hesami *et al.*, 2014; Manzari and Sahragard, 2014) bringing

the number to 94 identified species. Furthermore, there have been many changes in psyllid taxonomy (Burckhardt and Ouvrard, 2012) making an updated checklist of Iranian psyllids desirable.

In this paper all identified species of psyllids previously reported from Iran are listed along with their host plants; one additional species is recorded here for the first time and new distributional data for some species are presented. Some information on natural enemies is also appended.

## MATERIAL AND METHODS

The checklist summarises literature records of Iranian psyllids. Additional information comes from a field survey of several localities in NE Iran in 2013-2014. The psyllids were collected with a sweep net or directly from the plants using an aspirator. The collected material is deposited in the insect collection of the Department of Plant Protection, Ferdowsi University of Mashhad, Iran. The classification accords with Burckhardt and Ouvrard (2012), the nomenclature, host information and distribution with Ouvrard (2013). The plant names follow The Plant List (2013). The psyllids were identified by D. Burckhardt, the predatory mite by A. Saboori (University of Tehran) and the hymenopterous parasitoids were identified by H. Lotfaliazdeh (Azarbaijan-e-Sharghi Agricultural and Natural Resources Research Center).

## RESULTS AND DISCUSSION

Previously, 94 species of jumping plant-lice were recorded from Iran, two of which were doubtful (*Cacopsylla saliceti* (Foerster) and *Trioza remota* Foerster). Here we added the following species, which is recorded for the first time from Iran and indicated by an asterisk (\*): *Cacopsylla ambigua* (Foerster), bringing the total of psyllid taxa from Iran to five families, 27 genera and 95 species; 90 confirmed as well as five provisionally identified. The families Aphalaridae and Triozidae with each 27 and 25 species are the most species-rich, followed by Liviidae and Psyllidae with 22 and 19 species, respectively. Incidentally, Homotomidae with only two recorded species is the least species-rich family. We also listed additional localities for 21 previously recorded species. Furthermore, the predatory mite, *Erythraeus* (E.) *garmsaricus* Saboori et al., 2004 is reported for the first time from psyllids, i.e. *Syntomoza unicolor*. The psyllid which was a new host for this predatory mite is marked with double asterisks (\*\*).

The Iranian psyllid fauna is a mix of Palaearctic elements (such as *Bactericera nigricornis*, *B. perrisii*, *Trioza dichroa* and *T. urticae*), south-western and central Asian elements (such as many *Colposcencia* spp., *Cyamophila glycyrrhizae*, *Psyllopsis securicola* and *Syntomoza unicolor*) and a remarkable number of endemic species (*Aphalara loginovae*, *Brachystetha loginovae*, *Colposcencia agnata*, *C. cavillosa*, *C. paula*, *Craspedolepta remaudierei*, *Cacopsylla iranica*, *Egeirotrioza corporosa*, *E. gemina*, *E. justa*). Among the Iranian psyllids of cultivated plants, the economically most important ones are the pear psyllids (*Cacopsylla bidens*, *C. permixta*, *Cacopsylla pyri* and *C. pyricola*), the Asian citrus psyllid (*Diaphorina citri*), the olive psyllids (*Euphyllura*

*pakistanica* and *E. straminea*) and pistachio psyllid (*Agonoscena pistaciae*). Some species (e.g. *Bactericera tremblayi*) can occasionally cause damage on cultivated plants.

## Checklist

### Family: Aphalaridae

#### Subfamily: Aphalarinae

##### ***Aphalara loginovae* Burckhardt and Lauterer, 1993**

Recorded from Tehran (Burckhardt and Lauterer, 1993).

Host plant unknown.

##### ***Aphalara freji* Burckhardt and Lauterer, 1997**

Recorded from Mazandaran (Burckhardt and Lauterer, 1993, as *Aphalara polygoni* Förster).

Host plants. *Polygonum* spp. (Polygonaceae).

##### ***Brachystetha loginovae* Baeva and Alekseev, 1991**

Recorded from Sistan-Va-Baluchestan (Baeva and Alekseev, 1991; Burckhardt and Lauterer, 1993).

Host plants. *Halimiphyllum* sp., *Zygophyllum* spp. (Zygophyllaceae).

##### ***Caillardia accola* Loginova, 1978**

Recorded from Kerman (Loginova, 1978; Gegechkori and Loginova, 1990; Burckhardt and Lauterer 1993).

Host plants. *Haloxylon persicum* Bunge (Amaranthaceae).

##### ***Caillardia azurea* Loginova, 1956**

Recorded from Tehran (Burckhardt and Lauterer, 1993).

Host plants. *Haloxylon* spp. (Amaranthaceae).

##### ***Caillardia dilatata* Loginova, 1978**

Recorded from Hormozgan, Sistan-Va-Baluchestan (Loginova, 1978; Burckhardt and Lauterer, 1993).

Host plants. *Hammada* spp. (Amaranthaceae).

##### ***Caillardia inedita* Loginova, 1978**

Recorded from Tehran (Burckhardt and Lauterer, 1993).

Host plants. *Haloxylon* spp. (Amaranthaceae).

##### ***Caillardia robusta* Loginova, 1956**

Recorded from Iran without further information (Gegechkori and Loginova, 1990; Burckhardt and Lauterer, 1993).

Host plants. *Haloxylon* spp. (Amaranthaceae).

***Colposcения agnata* Burckhardt and Lauterer, 1993**

Recorded from Hormozgan, Kerman, Sistan-Va-Baluchestan (Burckhardt and Lauterer 1993).

Host plant unknown.

***Colposcения aliena* (Löw, 1881)**

Recorded from Tehran (Loginova, 1972; Burckhardt and Lauterer, 1993).

Material examined. 3 ♂♂, 6 ♀♀, Khorasan-e-Razavi, Kalat, 27.5.2014, *Tamarix* sp. (A. Zendedel); 1 ♂, 1 ♀, Khaf, 23.10.2014, *Tamarix* sp. (A. Zendedel); 1 ♀, Salehabad, 23.10. 2014, *Tamarix* sp. (A. Zendedel).

Host plants. *Tamarix* spp. (Tamaricaceae).

***Colposcения cavillosa* Burckhardt and Lauterer, 1993**

Recorded from Hormozgan (Burckhardt and Lauterer, 1993).

Host plant unknown.

***Colposcения elegans* (De Bergevin, 1932)**

Recorded from Sistan-Va-Baluchestan (Burckhardt and Lauterer, 1993).

Host plants. *Tamarix* sp. (Tamaricaceae).

***Colposcения kiritshenkoi* Loginova, 1960**

Recorded from Khuzestan (Gegechkori and Loginova, 1990; Burckhardt and Lauterer, 1993).

Material examined. 1 ♂, 1 ♀, Khorasan-e-Razavi, Kalat, 27.5.2014, *Tamarix* sp. (A. Zendedel).

Host plants. *Tamarix* spp. (Tamaricaceae).

***Colposcения paula* Burckhardt and Lauterer, 1993**

Recorded from Hormozgan (Burckhardt and Lauterer, 1993).

Host plant unknown.

***Colposcения vicina* Loginova, 1960**

Recorded from Khorasan-e-Razavi (Burckhardt and Lauterer, 1993; Malenovský et al., 2012).

Host plants. *Tamarix* spp. (Tamaricaceae).

***Craspedolepta bulgarica* Klimaszewski, 1961**

Recorded from Tehran (Burckhardt and Lauterer, 1993).

Host plants. *Achillea* spp. (Asteraceae).

***Craspedolepta convexa* Baeva, 1970**

Recorded from Kerman, Sistan-Va-Baluchestan (Burckhardt and Lauterer, 1993).

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Host plants. *Artemisia* spp., *Artemisia chamaemelifolia* Vill. (Asteraceae).

***Craspedolepta pontica* Dobreanu and Manolache, 1962**

Recorded from Mazandaran (Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Host plants. *Achillea* spp. (Asteraceae).

***Craspedolepta remaudierei* Burckhardt and Lauterer, 1993**

Recorded from Kerman (Burckhardt and Lauterer, 1993).

Host plants. *Artemisia cina* Berg ex Poljakov (Asteraceae).

***Craspedolepta tadshikistanica* Baeva, 1970**

Recorded from Kerman (Burckhardt and Lauterer, 1993).

Host plants. *Artemisia baldshuanica* Krasch. and Zaprjag. (Asteraceae).

***Crastina myricariae* Loginova, 1964**

Recorded from Tehran (Burckhardt and Lauterer, 1993).

Host plants. *Myricaria germanica* (L.) Desv. (Tamaricaceae).

***Crastina tamaricina* (Loginova, 1960)**

Recorded from Khorasan-e-Razavi (Burckhardt and Lauterer, 1993).

Host plants. *Tamarix* spp. (Tamaricaceae).

***Rhodochlanis bicolor* (Scott, 1880)**

Recorded from Golestan, Khuzestan (Burckhardt and Lauterer, 1993; Seljak, 2006).

Host plants. *Petrosimonia* spp., *Salicornia* spp., *Salsola* spp., *Suaeda* spp. (Amaranthaceae).

**Subfamily: Rhinocolinae**

***Agonosцена bimaculata* Mathur, 1973**

Recorded from Kerman, Sistan and Balouchistan (Davatchi, 1958, as *Agonosцена aff. menozzii*; Burckhardt and Lauterer, 1993).

Host plants. *Pistacia khinjuk* Stocks, *P. atlantica* Desf. (Anacardiaceae).

***Agonosцена pegani* Loginova, 1960**

Recorded from Kerman (Gegechkori and Loginova, 1990; Burckhardt and Lauterer, 1993).

Host plants. *Peganum harmala* L. (Nitrariaceae).

***Agonosцена pistaciae* Burckhardt and Lauterer, 1989**

Recorded from Kerman, Khorasan-e-Razavi, Kordestan, Markazi, Qazvin, Semnan, Sistan-Va-Balouchistan, Tehran, Yazd, (Burckhardt and Lauterer, 1989; Burckhardt

and Lauterer, 1993; Dezanian and Sahragard, 2000; Mehrnejad, 2001, 2002, 2003; Mehrnejad and Emami, 2005; Smith *et al.*, 2005; Jalaeian *et al.*, 2011; Mehrnejad *et al.*, 2011; Sadeghi *et al.*, 2012).

Material examined. 8 ♂♂, 12 ♀♀, Khorasan-e-Razavi, Kalat, 27.V.2014, *Pistacia* sp. (A. Zendedel); 5 ♀♀, Khaf, 27.6.2013, *Pistacia vera* L. (A. Zendedel).

Host plants. *Pistacia atlantica* Desf., *P. vera* L., *Pistacia* sp. (Anacardiaceae).

Remarks. *A. pistaciae* is native to Iran and constitutes the most serious pistachio pest throughout the pistachio-producing areas of the country.

Natural enemies: We found a large population of the parasitoid *Prionomitus mitratus* (Hymenoptera: Encyrtidae) on the pistachio psyllid. This former was previously reported as parasitoid of *A. pistaciae* on *Pistacia vera* L. by Dezanian and Sahragard (2000) in Damghan (Semnan province).

### ***Megagonoscena viridis* (Baeva, 1963)**

Recorded from Hormozgan, Fars, Sistan-Va-Baluchestan (Burckhardt and Lauterer, 1993).

Host plants. *Pistacia atlantica* Desf., *P. vera* L. (Anacardiaceae).

## **Family: Homotomidae**

### **Subfamily: Homotominae**

#### ***Homotoma caroliquarti* Burckhardt and Lauterer, 1993**

Recorded from Kerman, Khorasan-e-Razavi (Davatchi, 1958, as *H. ficus*; Burckhardt and Lauterer, 1993).

Host plant. Probably *Ficus carica* L. (Moraceae).

#### ***Homotoma ficus* (Linnaeus, 1758)**

Recorded from Fars, Mazandaran (Burckhardt, 1989; Burckhardt and Lauterer, 1993).

Host plant. *Ficus carica* L. (Moraceae).

## **Family: Liviidae**

### **Subfamily: Euphyllurinae**

#### ***Diaphorina aegyptiaca* Puton, 1892**

Recorded from Sistan and Baluchestan (Burckhardt and Lauterer, 1993).

Host plants. *Cordia* spp. (Boraginaceae).

#### ***Diaphorina chobauti* Puton, 1898**

Recorded from Alborz, Fars, Golestan, Kerman, Khorasan-e-Razavi, Kohgiluyeh-Va-Boyer-Ahmad, Khorasan-e-Shomali, Tehran, Sistan-Va-Baluchestan (Gegechkori and Loginova, 1990, as *D. propinqua* Löw; Burckhardt and Lauterer, 1993).

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Host plants. *Convolvulus* spp. (Convolvulaceae).

Comments. Burckhardt and Lauterer (1993) observed considerable variation in the shape and coloration of the forewing and the shape of the genal processes among Iranian *D. chobauti* and noted that immatures from Iran differed from those from the Mediterranean region. A taxonomic revision is required to test whether this is a complex of closely related species.

***Diaphorina citri* Kuwayama, 1908**

Recorded from Sistan-Va-Balouchestan (Bové *et al.*, 2000); Hormozgan and Kerman (Hasanpour *et al.*, 2009).

Host plants. *Citrus* spp., *Murraya* spp. (Rutaceae).

Natural enemies. *Psyllaephagus stenopsyllae* (Hymenoptera: Encyrtidae) (Motamednia *et al.*, 2014).

Remarks. The Asian citrus psyllid, *Diaphorina citri*, causes serious damage to citrus plants by removing large quantities of sap, by secreting honeydew is a substrate of sooty mould on leaves and shoots and, most importantly, by acting as vector of *Candidatus* Phytoplasma, the causal agent of huanglongbing (citrus greening disease)

***Diaphorina enormis* Loginova, 1978**

Recorded from Hormozgan (Loginova, 1978; Burckhardt and Lauterer, 1993).

Host plant Perhaps *Leptadenia* sp. (Apocynaceae).

***Diaphorina luteola* Loginova, 1978**

Recorded from Bushehr, Hormozgan, Kerman, Sistan-Va-Balouchestan (Loginova, 1978; Burckhardt and Lauterer, 1993).

Host plant. *Solanum sepicula* Dunal (Solanaceae).

***Diaphorina lycii* Loginova, 1978**

Recorded from Golestan, Fars, Kerman, Khorasan-e-Razavi, Khorasan-e-Jonubi (Burckhardt and Lauterer, 1993).

Host plants: *Lycium* spp. (Solanaceae).

***Diaphorina putonii* Löw, 1879**

Recorded from Tehran (Burckhardt, 1984; Burckhardt, 1989).

Host plant. *Thymelaea hirsuta* (L.) Endl. (Thymelaeaceae).

***Diaphorina tamaricis* Loginova, 1978**

Recorded from Fars, Khorasan-e-Razavi, Khuzestan, Sistan Va-Balouchestan, Tehran, (Burckhardt and Lauterer, 1993).

Host plants. *Tamarix* spp. (Tamaricaceae).

***Diaphorina zygophylli* Loginova, 1978**

Recorded from Fars, Kerman, Kohgiluyeh-Va-Boyer-Ahmad (Burckhardt and Lauterer, 1993).

Host plants: *Halimiphyllum* spp., *Zygophyllum* spp. (Zygophyllaceae).

***Eremopsylloides amirabilis* Loginova, 1964**

Recorded from Sistan-Va-Baluchestan (Gegechkori and Loginova, 1990; Burckhardt and Lauterer, 1993).

Host plants: *Calligonum* sp. (Polygonaceae).

***Euphyllura pakistanica* Loginova, 1973**

Recorded from Fars (Asadi et al., 2009).

Host plants: *Olea europaea* L. (Oleaceae).

Natural enemy. *Psyllaephagus zdeneki* Noyes and Fallahzadeh (Hymenoptera: Encyrtidae) (Noyes and Fallahzadeh, 2005).

Comments. The olive psyllid, *Euphyllura pakistanica*, is one of the most important pests of olive orchards in Iran.

***Euphyllura straminea* Loginova, 1973**

Recorded from Iran without further details (Halperin et al., 1982; Önuçar and Ulu 1991; Burckhardt and Lauterer, 1993); Guilan, Qazvin, Zanjan (Asadi et al., 2009).

Host plant: *Olea europaea* L. (Oleaceae).

***Pachypsyllloides errator* Loginova, 1970**

Recorded from Khorasan-e-Jonubi (Burckhardt and Lauterer 1993).

Host plants: *Calligonum* spp. (Polygonaceae).

Comments. The single female at hand was provisionally attributed to this species.

***Psyllopsis fraxini* (Linnaeus, 1758)**

Recorded from Kerman (Rübsaamen, 1902; Burckhardt and Lauterer, 1993).

Host plants: *Fraxinus* spp. (Oleaceae).

Comments. This record may be a misidentification and needs verification (Burckhardt and Lauterer, 1993).

***Psyllopsis narzykulovi* Baeva, 1964**

Recorded from Fars (Hesami et al., 2014).

Material examined: 1 ♀, Khorasan-e-Razavi, Akhlamad, 30.52014, sweeping (A. Zendedel).

Host plants: *Fraxinus angustifolia* Vahl (Oleaceae).

***Psyllopsis machinosus* Loginova, 1963**

Recorded from Tehran (Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi et al., 2012).



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Material examined: 1 ♂, 1 ♀, Khorasan-e-Razavi, Akhlamad, 30.5.2014, sweeping (A. Zendedel).

Host plants: *Fraxinus* spp. (Oleaceae).

***Psyllopsis repens* Loginova, 1963**

Recorded from Kerman, Semnan (Loginova, 1963, 1968; Ggechkori and Loginova, 1990; Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Host plants: *Fraxinus angustifolia* Vahl (Oleaceae).

***Psyllopsis securicola* Loginova, 1963**

Recorded from Kerman, Tehran (Loginova, 1963; Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Host plants: *Fraxinus angustifolia* Vahl (Oleaceae).

**Subfamily: Liviinae**

***Camarotoscena fulgidipennis* Loginova, 1975**

Recorded from Alborz, Fars, Tehran, Yazd (Loginova 1975; Gegechkori and Loginova, 1990; Burckhardt and Lauterer, 1993; Burckhardt and Mifsud, 2003); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Host plants: *Populus* spp. (Salicaceae).

***Camarotoscena hoberlandti* Vondráček, 1952**

Recorded from Alborz, Tehran (Burckhardt and Lauterer, 1993).

Material examined: 1 ♂, Khorasan-e-Razavi, Azghad, 3.8.2014, sweeping, (A. Zendedel).

Host plants: *Populus* spp. (Salicaceae).

***Livia junci* (Schrank, 1789)**

Recorded from Iran without details (Loginova, 1962, 1972b; Mathur, 1975, as *Livia juncorum* (Latreille, 1798)) Fars, Guilan (Ossiannilsson, 1992; Burckhardt and Lauterer, 1993, as *L. juncorum* (Lauterer)).

Host plants: *Juncus* spp. (Juncaceae).

Comments. Heslop-Harrison (1949) reported the species from Iraqui Kurdistan and assumed its occurrence in Iran. It is not clear whether the references of Loginova (1962, 1972b) and Mathur (1975) are based on material that the authors examined or whether they misinterpreted Heslop-Harrison's report.

***Syntomoza unicolor* (Loginova and Parfentiev, 1958) \*\***

Recorded from Khuzestan (Burckhardt and Lauterer, 1993, as *Camarotoscena unicolor* Loginova).

Material examined: 1 ♂, 7 ♀♀, Kalat, 27.5.2014, *Populus euphratica* Olivier (A. Zendedel).

Host plants: *Populus euphratica* Olivier (Salicaceae).

Natural enemies. We found some second instar larvae of the predatory mite *Erythraeus (E.) garmsaricus* Saboori et al., 2004 (Acarina: Trombidiformes: Erythraeidae), actively feeding on *S. unicolor* immatures. This is the first record of this predatory mite from a psyllid species.

### Family: Psyllidae

#### Subfamily: Acizziinae

##### ***Acizzia jamatonica* (Kuwayama, 1908)**

Recorded from Guilan (Manzari and Sahragard, 2014).

Host plants. *Albizia julibrissin* Durazz (Fabaceae).

#### Subfamily: Psyllinae

##### ***Cacopsylla ambigua* (Foerster, 1848)\***

Recorded from Asia temperate, Europe (including Germany, Denmark, Sweden, Greece, Greenland, Great Britain, Hungary, Norway, Slovenia), Japan, Russia (Ouvrard, 2014).

Material examined: 1 ♂, 2 ♀♀, Khorasan-e-Razavi, Khaf, 2.V.2014, *Salix* sp. (A. Zendedel).

Host plants. *Salix* spp. (Salicaceae).

Comments. This is the first record of the species from Iran.

##### ***Cacopsylla bidens* (Šulc, 1907)**

Recorded from Iran without further details (Burckhardt and Hodkinson, 1986) and from Alborz, Tehran, Azerbaijan-e-Gharbi (Burckhardt and Lauterer, 1993; Zeidan-Gèze and Burckhardt, 1998); Azerbaijan-e-Sharghi (Ahmadi et al., 2012).

Material examined: 2 ♂♂, 2 ♀♀, Khorasan-e- Razavi, Zoshk, 7. X. 2013, sweeping (A. Zendedel).

Host plants. *Pyrus* spp. (Rosaceae).

##### ***Cacopsylla crataegi* (Schrank, 1801)**

Recorded from Mazandaran (Burckhardt and Lauterer, 1993).

Host plants: *Crataegus* sp. (Rosaceae).

##### ***Cacopsylla incerta* (Baeva, 1972)**

Recorded from Mazandaran (Burckhardt and Lauterer, 1993 , as *C. incerta* (Loginova)).

Host plant: *Rhamnus lycioides* L. (Rhamnaceae)

##### ***Cacopsylla iranica* Burckhardt and Lauterer, 1993**

Recorded from Fars, Kerman (Burckhardt and Lauterer, 1993).

Host plant: unknown.

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***Cacopsylla notata* (Flor, 1861)**

Recorded from Kohgiluyeh-Va-Boyer-Ahmad (Burckhardt and Lauterer, 1993).

Host plants: *Pyrus* spp. (Rosaceae).

***Cacopsylla pruni* (Scopoli, 1763)**

Recorded from Ardabil, Mazandaran (Burckhardt and Lauterer, 1993; Steffek *et al.*, 2012).

Host plants: *Prunus* spp., *Prunus spinosa* L. (Rosaceae).

***Cacopsylla permixta* Burckhardt and Hodkinson, 1986**

Recorded from Golestan, Semnan (Burckhardt and Lauterer, 1993).

Host plants: *Pyrus* spp. (Rosaceae).

***Cacopsylla pyri* (Linnaeus, 1758)**

Recorded from Zanjan (Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Host plants: *Pyrus* spp. (Rosaceae).

***Cacopsylla pyricola* (Foerster, 1848)**

Recorded from Alborz, Tehran (Ossiannilsson, 1992; Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Material examined: 10 ♂♂, 15 ♀♀, Khorasan-e-Razavi, Mashhad, 10.10.2013, *Pyrus* sp. (A. Zendedel); 5 ♂♂, 5 ♀♀, Kalat, 27.5.2014, *Pyrus* sp. (A. Zendedel); 7 ♂♂, 9 ♀♀, Khorasan-e-Jonoubi, Ferdows, 27.4.2014, *Pyrus* sp. (A. Zendedel); 4 ♂♂, 7 ♀♀, Esfahan province, Esfahan, 20.5.2014, *Pyrus* sp. (A. Zendedel); 2 ♂♂, 4 ♀♀, Azerbaijan-e-Sharghi, Marand, 30.8.2014, *Pyrus* sp. (A. Zendedel); 3 ♂♂, 6 ♀♀, Azerbaijan-e-Gharbi, Urmia, 3.9.2014, *Pyrus* sp. (A. Zendedel).

Host plants: *Pyrus* spp. (Rosaceae).

***Cacopsylla pyrisuga* (Foerster, 1848)**

Recorded from Alborz (Burckhardt and Lauterer 1993).

Host plants: *Pyrus* spp. (Rosaceae).

***Cacopsylla saliceti* (Foerster, 1848)**

Recorded from Kerman (Burckhardt and Lauterer, 1993).

Host plants: *Salix* spp. (Salicaceae).

Comments. With only a single female at hand, Burckhardt and Lauterer (1993) reported the species provisionally from Iran. Males are required to for species identification.

***Cacopsylla suturalis* (Horváth, 1897)**

Recorded from Fars, Kerman, Kohgiluyeh-Va-Boyer-Ahmad (Burckhardt and Lauterer, 1993).

Material examined: 1 ♀, Khorasan-e-Razavi, Khaf, 2.5.2014, *Salix* sp. (A. Zendedel).

Host plants: *Rhamnus* spp. (Rhamnaceae).

### ***Cyamophila astragalicola* (Gegechkori, 1977)**

Recorded from Azerbaijan-e-Sharghi, Esfahan, Kohgiluyeh-Va-Boyer-Ahmad, Semnan, Tehran, Yazd, (Gegechkori, 1977; Naeem and Behdad, 1988, as *Cyamophila dicora* Loginova; Gegechkori and Loginova, 1990; Burckhardt and Lauterer, 1993).

Material examined: 1 ♂, Khorasan-e-Razavi, Zoshk, 10.10.2014, sweeping, (A. Zendedel).

Host plants: *Astragalus* spp., *Astracantha adscendens* (Boiss. and Hausskn.) Podlech (Fabaceae).

### ***Cyamophila coluteae* (Baeva, 1966)**

Recorded from Iran without further details (Gegechkori and Loginova, 1990), from Esfahan, Golestan, Kerman, Khuzestan, Kohgiluyeh-Va-Boyer-Ahmad, Sistan and Baluchestan (Burckhardt and Lauterer, 1993; Burckhardt and Mifsud, 1998).

Host plants: *Colutea* spp. (Fabaceae).

### ***Cyamophila glycyrrhizae* (Becker, 1864)**

Recorded from Kerman, Fars, Kohgiluyeh-Va-Boyer-Ahmad, Khorasan-e-Razavi, Kurdistan, Tehran, Sistan and Baluchestan, Qazvin, South Khorasan, (Loginova and Baeva, 1972, as *Psylla glycyrrhizae*; Loginova, 1978a, as *Cyamophila odontopyx*; Gegechkori and Loginova, 1990, as *Cyamophila eremita*; Hodkinson and Hollis, 1987; Burckhardt, 1988; Burckhardt and Lauterer, 1993; Labina, 2008).

Material examined: 1 ♂, 1 ♀, Khorasan-e-Razavi, Chenaran, 30.5.2014, sweeping (A. Zendedel).

Host plants: *Glycyrrhiza* spp., *Glycyrrhiza glabra* L. (Fabaceae).

### ***Cyamophila oshanini* (Loginova, 1964)**

Recorded from Khorasan-e-Razavi, Khuzestan (Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi et al., 2012).

Host plants: *Halimodendron halodendron* (Pall.) Voss (Fabaceae).

### ***Spanioneura persica* Burckhardt and Lauterer, 1993**

Recorded from Kerman, Kohgiluyeh-Va-Boyer-Ahmad (Burckhardt and Lauterer, 1993).

Host plant. Perhaps *Prunus dulcis* (Mill.) D.A. Webb (Rosaceae).

## **Family: Trioziidae**

### ***Bactericera albiventris* (Foerster, 1848)**

Recorded from Alborz, Kohgiluyeh-Va-Boyer-Ahmad, Tehran (Burckhardt and Lauterer, 1993; Azerbaijan-e-Sharghi (Ahmadi et al., 2012).

Material examined: 2 ♂♂, 2 ♀♀, Khorasan-e-Razavi, Chenaran, 30.5.2014, *Salix* sp. (A. Zendedel).

Host plants: *Salix* spp. (Salicaceae).

***Bactericera ligulariae* (Baeva, 1973)**

Recorded from Alborz, Tehran (Burckhardt and Lauterer, 1993).

Host plants: *Ligularia thomsonii* (C. B. Clarke) Pojark., *L. persica* Boiss. (Asteraceae).

***Bactericera lycii* (Loginova, 1970)**

Recorded from Khorasan-e-Razavi (Burckhardt and Lauterer, 1993, as *Paratrioza lycii* Loginova; Burckhardt and Lauterer, 1997).

Host plants: *Lycium ruthenicum* Murray (Solanaceae).

***Bactericera nigricornis* (Foerster, 1848)**

Recorded from Chaharmahal and Bakhtiari, Khorasan-e-Razavi, Khuzestan, Kohgiluyeh-Va-Boyer-Ahmad, Fars, Khorasan-e-Shomali, Hamadan, Mazandaran, Sistan-Va-Baluchestan (Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Material examined: 2 ♂♂, 3 ♀♀, Khorasan-e-Razavi, Zoshk, 24.5.2014, sweeping, (A. Zendedel).

Host plants: Polyphagous.

***Bactericera perrisii* Puton, 1876**

Recorded from Iran without locality details (Gegechkori and Loginova, 1990); Qazvin, Kerman (Burckhardt, Lauterer, 1993; Burckhardt and Lauterer, 1997; Malenovský *et al.*, 2012).

Host plants: *Artemisia* spp. (Asteraceae).

***Bactericera petiolata* (Loginova, 1960)**

Recorded from Sistan-Va-Baluchestan (Burckhardt and Lauterer, 1993, as *Paratrioza petiolata* Loginova).

Host plants: *Lycium depressum* Stocks (Solanaceae).

***Bactericera striola* (Flor, 1861)**

Recorded from Alborz (Burckhardt and Lauterer, 1993).

Host plants: *Salix* spp. (Salicaceae).

***Bactericera tremblayi* (Wagner, 1961)**

Recorded from Alborz, Azerbaijan-e-Gharbi, Tehran (Burckhardt and Lauterer, 1993; Kazemi and Jafarloo, 2008); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Host plants: Polyphagous, particularly *Allium* spp. (Amaryllidaceae).

***Bactericera trigonica* Hodkinson, 1981**

Recorded from Khuzestan, Tehran, (Hodkinson, 1981; Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Host plants: Probably polyphagous, particularly on *Daucus carota* L. (Apiaceae).

***Egeirotrioza ceardi* (De Bergevin, 1926)**

Recorded from Kerman, Fars, Khuzestan (Rübsaamen, 1902; Houard, 1922; Bergevin, 1926; Hodkinson, 1986; Burckhardt and Lauterer, 1993).

Host plants: *Populus* spp. (Salicaceae).

***Egeirotrioza corporosa* Burckhardt and Lauterer, 1993**

Recorded from Fars, Tehran, Khuzestan, Golestan (Burckhardt and Lauterer 1993).

Material examined: 1 ♀, Khorasan-e Razavi, Kalat, 27.5.2014, *Salix* sp. (A. Zendedel).

Host plant: *Populus euphratica* Oliv. (Salicaceae).

***Egeirotrioza gemina* Burckhardt and Lauterer, 1993**

Recorded from Fars (Burckhardt and Lauterer, 1993).

Material examined: 1 ♂, Khorasan-e Razavi, Kalat, 27.5.2014, *Salix* sp. (A. Zendedel).

Host plants: *Salix* sp. (Salicaceae).

***Egeirotrioza justa* Burckhardt and Lauterer, 1993**

Recorded from Fars (Burckhardt and Lauterer, 1993).

Host plants: Unknown.

***Heterotrioza chenopodii* (Reuter, 1876)**

Recorded from Iran without locality details (Lauterer, 1982, as *Trioza chenopodii* Reuter; Burckhardt, 1986, as *Trioza chenopodii* Reuter); Khuzestan, Fars (Burckhardt, 1986; Ossiannilsson, 1992; Burckhardt and Lauterer, 1993, as *Trioza chenopodii* Reuter).

Material examined: 2 ♂♂, 1 ♀, Khorasan-e-Razavi, Chenaran, 30.5.2014, sweeping (A. Zendedel).

Host plants. *Chenopodium* sp., *Atriplex* sp., *Beta vulgaris* L., *Halimione portulacoides* Aellen, *Spinacia oleracea* L. (Amaranthaceae).

***Heterotrioza dichroa* (Scott, 1879)**

Recorded from Khuzestan (Burckhardt and Lauterer, 1993, as *Trioza dichroa*).

Host plants. *Atriplex* spp., *Chenopodium* sp. (Amaranthaceae).

***Heterotrioza eurotiae* (Loginova, 1960)**

Recorded from Alborz (Burckhardt and Lauterer, 1993, as *Trioza eurotiae*).

Host plants. *Krascheninnikovia ceratoides* (L.) Gueldenst., *Kochia cana* Bunge ex Boiss. (Amaranthaceae).

***Trioza berbericola* Loginova, 1966**

Recorded from Kerman (Burckhardt and Lauterer, 1993).

Host plant. *Berberis* sp. (Berberidaceae)..

***Trioza elaeagni* Scott, 1880**

Recorded from Esfahan, Tehran, Fars (Burckhardt, 1986; Burckhardt and Lauterer, 1993).

Material examined: 4♂♂, 5♀♀, Khorasan-e-Razavi, Mashhad, 29.10.2013, *Elaeagnus* sp. (Elaeagnaceae) (A. Zendedel).

Host plants. *Elaeagnus* sp. (Elaeagnaceae).

***Trioza galii* Foerster, 1848**

Recorded from Hamadan ( Burckhardt and Lauterer, 1993).

Host plants. *Asperula cynanchica* L., *Galium* spp., *Rubia* sp., *Sherardia* sp. (Rubiaceae).

***Trioza magnisetosa* Loginova, 1964**

Recorded from Azerbaijan-e-Sharghi, Sistan and Baluchestan, Khorasan-e-Razavi, Kohgiluyeh-Va-Boyer-Ahmad (Burckhardt and Lauterer, 1993).

Host plant. *Elaeagnus angustifolia* L. ( Elaeagnaceae)..

***Trioza neglecta* Loginova, 1978**

Recorded from Azerbaijan-e-Gharbi, Kohgiluyeh-Va-Boyer-Ahmad (Loginova, 1978; Burckhardt and Lauterer, 1993).

Host plants. *Elaeagnus angustifolia* L. (Elaeagnaceae).

***Trioza remota* Foerster, 1848**

Recorded from Lorestan (Burckhardt and Lauterer, 1993).

Host plants. *Quercus* spp. (Fagaceae).

Comments. Burckhardt and Lauterer (1993) examined a female and fourth instar immature from Iran that they identified questionably as *T. remota* due to insufficient material.

***Trioza rumicis* Löw, 1880**

Recorded from Alborz (Burckhardt and Lauterer, 1993).

Host plants. *Rumex scutatus* L. (Polygonaceae).

***Trioza scottii* Löw, 1880**

Recorded from Tehran (Burckhardt and Lauterer, 1993).

Host plants. *Berberis* spp. (Berberidaceae).

***Trioza urticae* (Linnaeus, 1758)**

Recorded from Lorestan, Mazandaran (Burckhardt and Lauterer, 1993); Azerbaijan-e-Sharghi (Ahmadi *et al.*, 2012).

Material examined: 8 ♂♂, 9 ♀♀, Khorasan-e-Razavi, Akhلامad, 25.IV.2014, *Urtica dioica* L. (A. Zendedel); 5 ♂♂, 7 ♀♀, Zoshk, 25.4.2014, *Urtica dioica* L. (A. Zendedel).

Host plants: *Urtica* spp. (Urticaceae).

### Unidentified species recorded from Iran

Burckhardt, Lauterer (1993) reported eight species from Iran identified only to genus belonging to *Bactericera* (Triozidae), *Cacopsylla* (Psyllidae: Psyllinae), *Colposcena* (Aphalaridae: Aphalarinae), *Craspedolepta* (Aphalaridae: Aphalarinae), *Psylla* (Psyllidae: Psyllinae) and *Trioza* (3 spp., Triozidae).

### Recorded species not occurring in Iran

#### *Euphyllura olivina* (Costa, 1839)

All the records of *E. olivina* from Iran (e.g. Farahbakhch and Moini, 1975) are misidentifications and concern *E. pakistanica* or *E. pakistanica* (Asadi et al., 2009).

#### *Euphyllura phillyrae* Foerster, 1848 (Liviidae, Euphyllurinae)

Gegechkori and Loginova (1990) mentioned the species from Iran referring to a publication of Loginova (1972) which, however, does not list the species. Asadi et al. (2009) confirmed that *E. phillyrae* does not occur in Iran.

## DISCUSSION

Iran is one of the largest countries in Southwest Asia and considered as a biogeographic multidimensional bridge connecting the Palaearctic, Oriental, and Afrotropical regions (Abivardi, 2001). The number of psyllid species reported from Iran is high compared to that of among some of its neighboring countries such as Iraq, Pakistan and Afghanistan. However, this is probably a consequence of inadequate surveys in these countries, rather than a reflection of the real number of existed species.

Afghanistan has 17 (of 37) psyllid species in common with Iran. Considering the size and botanical richness of Afghanistan, and the number of psyllid species known from adjacent countries, the psyllid fauna of this country remains poorly known.

Drohojowska and Burckhardt (2014) reported 99 psyllid species from Turkey, of which 39 species are in common with Iran. Turkey is expected to have more faunal similarity with countries in the Mediterranean basin than with Iran.

Armenia, Turkmenistan, Azerbaijan, Iraq and Pakistan, have 16, 26, 14, 7 and 9 species in common with Iran. With 51 recorded species, Turkmenistan, has the highest number of reported species.

Further studies, in particular targeted field work in the different biomas of Iran, are needed to improve our knowledge on the taxonomy, biogeography and economic importance of the jumping plant-lice in Iran.



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