

Notes on jumping plant-lice (Hemiptera, Psylloidea) from the Sarnena Gora Mountains

MONIKA PRAMATAROVA*, IGOR MALENOVSKÝ**, ***, ILIA GJONOV*

*Department of Zoology and Anthropology, Faculty of Biology, Sofia University, Dragan Tzankov 8, 1164 Sofia, Bulgaria, monicapramatarova@gmail.com, gjonov@cicadina.com

**Department of Botany and Zoology, Faculty of Science, Masaryk University, Kotlarska 2, 611 37 Brno, Czech Republic, malenovsky@sci.muni.cz

***Department of Entomology, Moravian Museum, Zelný trh 6, 659 37 Brno, Czech Republic, imalenovsky@mzm.cz

Abstract. Jumping plant-lice (Hemiptera, Sternorrhyncha, Psylloidea) are small phloem-feeding insects. With about 400 species distributed in Europe, the European fauna is considered well-studied. However, information on psyllids occurring in the eastern Balkan Peninsula is insufficient. So far, less than a hundred psyllid species are known for Bulgaria, most of which have been reported only from a few regions. Knowledge on the psyllid fauna of the Sarnena Sredna Gora Mountains in central Bulgaria is sparse and relatively old, with only a handful of recorded species. The aim of the present study is to summarise the information on Psylloidea from this region, including recently collected material kept in the zoological collection of Sofia University. A total of 17 species were found of which 7 species had been previously published and 10 species from 3 families are new to the region: *Aphalara freji* Burckhardt & Lauterer, 1997 (Aphalaridae), *Diaphorina lycii* Loginova, 1978, *Arytaina maculata* (Löw, 1886), *Cacopsylla bidens* (Sulc, 1907), *Cacopsylla melanoneura* (Foerster, 1848), *Cacopsylla pulchra* (Zetterstedt, 1838), *Livilla horvathi* (Scott, 1879), *Psylla foersteri* Flor, 1861 (all Psyllidae), *Bactericera modesta* (Foerster, 1848) and *Trioza rotundata* Flor, 1861 (Trioziidae).

Key words: Psyllids, the Balkans, Bulgaria.

Introduction

Jumping-plant lice or psyllids are a group of phytophagous, phloem-feeding insects belonging to the suborder Sternorrhyncha (Hemiptera) with about 4000 described species worldwide (Burckhardt *et al.* 2021). They are usually highly host-specific. From Bulgaria, 99 species have been reported; however, the group is considered poorly known. Information on the psyllid fauna of the Sarnena Gora Mountains in central Bulgaria is sparse and relatively old, with only a few psyllid records. At the beginning of the last century, Joakimov (1909) published the first data on the jumping-plant lice in Bulgaria, including several species collected in the Sarnena Gora Mountains. Harizanov (1964) and Klimaszewski (1965) reported three more species. This brings the number of psyllid species published to date from Sarnena Gora to seven. The region was occasionally visited by the authors in recent years during their faunistic work on the Psylloidea of Bulgaria. The aim of the present study, which is part of a larger initiative on the faunistic survey of the Sarnena Gora Mountains (Georgiev *et al.* 2020), is to summarise the information on Psylloidea from this region, including the recently collected material.

PSYLLOIDEA

Material and Methods

Recent material was collected using an entomological sweep net. Specimens were dry mounted and stored in the entomological collection of Sofia University. Identification was mainly based on Burckhardt (1984), Burckhardt & Hodkinson (1986), Burckhardt & Lauterer (1997a,b, 2002, 2006), Hodkinson & Hollis (1987) and Ossiannilsson (1992). The material of Psylloidea from the collection of Joakimov, kept in the National Museum of Natural History of the Bulgarian Academy of Sciences in Sofia, was reviewed, but the specimens from Sarnena Gora published by Joakimov (1909) were not found, so their original identification could not be verified. Even the specimens collected and published by Harizanov (1964), formerly at the Agricultural University in Plovdiv, have not survived to the present day (V. Harizanova, pers. comm.). The classification and nomenclature of Psylloidea follows Burckhardt *et al.* (2021) and Ouvrard (2021), the nomenclature of host plants is adopted from WFO (2021). The distribution of individual psyllid species in Bulgaria follows the morphostructural territorial classification of Hubenov (1997).

Results

Aphalaridae Löw, 1879

Aphalarinae Löw, 1879

Aphalara freji Burckhardt & Lauterer, 1997

Material examined. Domljan vill., N42°32'28.1" E24°56'28.6", 364 m a.s.l., 10.viii.2020, 3 ♀♀; Srednogorovo vill., N42°31'14.4" E25°20'10.8", 418 m a.s.l., 13.vii.2020, , 1 ♂, 3 ♀♀.

Known distribution in Bulgaria. Rila-Rhodopi Massif: Krupnik-Sandanski-Petrich Valley, Western Rhodopi Mts (Głowacka & Harizanov 1983; Klimaszewski 1965; both as *Aphalara polygoni*); Bulgaria, without precise locality data (Burckhardt 2004).

Comments. *Aphalara* is a difficult genus to identify because many species are similar in morphology. Many records published before Ossiannilsson (1992) and Burckhardt and Lauterer (1997b) were misidentified. Records of *Aphalara polygoni* Foerster, 1848 previously published for Bulgaria, with the host plant *Polygonum* sp. given, probably concern *A. freji* or *A. avicularis* Ossiannilsson, 1981 (cf. Burckhardt & Lauterer 1997b). *Aphalara freji* is widespread in the Palaearctic region (Burckhardt & Lauterer 1997b; Cho *et al.* 2017). First record for the region of Sarnena Gora.

Psyllidae Latreille, 1807

Diaphorininae Vondráček, 1951

Diaphorina lycii Loginova, 1978

Material examined. Kriva krusha vill., N42°32'52.0" E25°52'41.5", 438 m a.s.l., 27.ix.2020, 5 ♂♂, 5 ♀♀.

Known distribution in Bulgaria. Black Sea coast: Northern Black Sea coast, Southern Black Sea coast (Loginova 1978); Rila-Rhodopi Massif: Western Rhodopi Mts (Nakabachi *et al.* 2020).

Comments. *Diaphorina lycii* is associated with several host species of the genus *Lycium* in southern Europe, North Africa, Caucasus, Middle East, Central Asia and Mongolia (Burckhardt 1984). In Bulgaria, it occurs on *Lycium barbarum* (Loginova 1978). First record for the region of Sarnena Gora.

PSYLLOIDEA

Psyllinae Latreille, 1807

***Arytaina maculata* (Löw, 1886)**

Material examined. Chavdar hut, N42°45'23.0" E23°56'41.2", 1145 m a.s.l., 17.viii.2020, 1 ♂, 2 ♀♀.

Known distribution in Bulgaria. Rila-Rhodopi Massif: Krupnik-Sandanski-Petrich Valley (Głowacka 1989), Mesta Valley (Klimaszewski 1970), Pirin Mt. (Głowacka 1989), Western Rhodopi Mts (Głowacka & Harizanov 1983; Klimaszewski 1965).

Comments. On *Cytisus* spp. in central and southern parts of Europe (Hodkinson & Hollis 1987; Malenovský *et al.* 2011). First record for the region of Sarnena Gora.



Fig. 1. *Diaphorina lycii* Loginova, 1978 – adult, Bjaga vill., 15.04.2017, photo I. Gjonov.

***Cacopsylla bidens* (Šulc, 1907)**

Material examined. Novo selo vill., N42°29'12.1" E25°30'34.7", 457 m a.s.l., 13.viii.2020, 1 ♀.

Known distribution in Bulgaria. Transitional region: Kraishite-Konyavo district, Sofia Basin (Etropolska *et al.* 2015); Rila-Rhodopi Massif: Krupnik-Sandanski-Petrich Valley (Głowacka 1989).

Comments. The species is widespread in southern and central Europe, North Africa, southwestern and Central Asia, India, and it was introduced to South America (Cho *et al.* 2020; Valle *et al.* 2017). It develops on *Pyrus communis*, *P. pyraeaster* and *P. syriaca* (Burckhardt & Hodkinson 1986). First record for the region of Sarnena.

PSYLLOIDEA

Cacopsylla crataegi (Schrank, 1801)

Published records. Straldzhansko marsh, N42°37'20.3" E26°45'54.0", viii.1905 (Joakimov 1909).

Material examined. 11.viii.2020, Svezhen vill., Hadzhi Dimitar place, N42°30'28.2" E25°0'1.4", 879 m a.s.l., 1 ♂; 17.viii.2020, Chavdar hut, N42°45'23.0" E23°56'41.2", 1145 m a.s.l., 1 ♂, 1 ♀.

Known distribution in Bulgaria. Transitional region: Podbalkan Basins (Joakimov 1909), Sofia Basin (Joakimov 1909); Rila-Rhodopi Massif: Krupnik-Sandanski-Petrich Valley (Joakimov 1909), Western Rhodopi Mts (Klimaszewski 1965).

Comments. On *Crataegus* spp., widespread in the Palearctic region (Ossiannilsson 1992).

Cacopsylla melanoneura (Foerster, 1848)

Material examined. Chavdar hut, N42°45'23.0" E23°56'41.2", 1145 m a.s.l., 17.viii.2020, 1 ♂, 3 ♀♀.

Known distribution in Bulgaria. Danubian Plain: Popovo-Provadiya district (Joakimov 1909); Stara Planina Range system: Middle Predbalkan (Klimaszewski 1970); Transitional region: Kraishite-Konyavo district, Sofia Basin, Thracian Lowland (Etropolska *et al.* 2015, Joakimov 1909); Rila-Rhodopi Massif: Mesta Valley (Klimaszewski 1970), Pirin Mt. (Głowacka 1989; Klimaszewski 1970), Western Rhodopi Mts (Głowacka & Harizanov 1983; Harizanov & Lauterer 1968; Klimaszewski 1965).

Comments. The species is widespread in Europe, North Africa, Caucasus, Middle East, Russia and Mongolia (Ouvrard 2021). It has been also reported from most main regions in Bulgaria. The host plants belong to the genera *Crataegus*, *Malus*, *Mespilus* and *Pyrus* (Ossiannilsson 1992). A vector of the apple proliferation phytoplasma (Jarusch *et al.* 2019). First record for the region of Sarnena Gora.

Cacopsylla peregrina (Foerster, 1848)

Published records. Straldzhansko marsh, N42°37'20.3" E26°45'54.0", viii.1905 (Joakimov 1909).

Material examined. Mrachenik vill., Hadzhi Dimitar place, N42°31'4.8" E24°59'14.3", 11.viii.2020, 940 m a.s.l., 1 ♂; Chavdar hut, N42°45'23.0" E23°56'41.2", 1145 m a.s.l., 17.viii.2020, 9 ♂♂, 3 ♀♀.

Known distribution in Bulgaria. Transitional region: Sushtinska Sredna Gora Mts (Joakimov 1909), Podbalkan Basins Sofia Basin (Nokkala *et al.* 2003); Rila-Rhodopi Massif: Krupnik-Sandanski-Petrich Valley, Western Rhodopi Mts (Głowacka & Harizanov 1983).

Comments. Common species across Europe, oligophagous on *Crataegus* spp. (Lauterer 1999).

Cacopsylla picta (Foerster, 1848)

Published records. Stara Zagora, N42°25'28.8" E25°37'32.3", 1962 (Harizanov 1963).

Known distribution in Bulgaria. Black Sea coast: Northern Black Sea coast (Harizanov 1963, 1966a), Southern Black Sea coast (Harizanov 1963, 1966a); Stara Planina Range system: Middle Stara Planina Mts (Balkan) (Harizanov 1966a); Transitional region: Kraishite-Konyavo district (Etropolska *et al.* 2015, Harizanov 1966a), Sofia Basin (Etropolska *et al.* 2015), Thracian Lowland (Harizanov 1963, 1966a); Rila-Rhodopi Massif: Boboshevo-Simitli Valley (Harizanov 1966a), Western Rhodopi Mts (Głowacka & Harizanov 1983).

PSYLLOIDEA

Comments. Widespread in Europe and Turkey, a vector of the apple proliferation phytoplasma (Drohojowska & Burckhardt 2014; Jarausch *et al.* 2019). In Bulgaria, it is considered as a pest on *Malus* spp. and it was studied by Harizanov (1966a).

***Cacopsylla pulchra* (Zetterstedt, 1838)**

Material examined. Chavdar hut, N42°45'23.0" E23°56'41.2", 1145 m a.s.l., 17.viii.2020, 1 ♂.

Known distribution in Bulgaria. Transitional region: Kraishte-Konyavo district (Percy & Cronk 2020); Rila-Rhodopi Massif: Krupnik-Sandanski-Petrich Valley (Percy & Cronk 2020), Western Rhodopi Mts (Głowacka & Harizanov 1983).

Comments. Widespread in the Palearctic region, associated with many *Salix* spp. (Percy & Cronk 2020, Lauterer 1999). First record for the region of Sarnena Gora.

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

Published records. Strjama vill., N42°15'46.6" E24°52'43.7, 1961-1965 (Harizanov 1964); Borets vill., N42°20'43.1" E24°55'55.2", 1961-1965 (Harizanov 1964); Dolna Mahala vill., N42°24'59.2" E24°46'52.7", 1961-1965 (Harizanov 1964).

Known distribution in Bulgaria. Danubian Plain: Popovo-Provadiya district (Harizanov 1963); Black Sea coast: Northern Black Sea coast (Harizanov 1963), Southern Black Sea coast (Harizanov 1963); Stara Planina Range system: Eastern Stara Planina Mts (Balkan), Eastern Predbalkan (Harizanov 1963); Transitional region: Bakadzhik-Bourgas district (Harizanov 1963), Sushtinska Sredna Gora Mts (Harizanov 1966b; Joakimov 1909), Podbalkan Basins (Etropolska *et al.* 2015, Harizanov 1963), Kraishte-Konyavo district, Sofia Basin (Etropolska *et al.* 2015); Thracian Lowland (Harizanov 1966b); Sofia Basin (Joakimov 1909; Klimaszewski 1965); Rila-Rhodopi Massif: Pirin Mt. (Głowacka 1989), Rila Mt. (Joakimov 1909); Eastern Rhodopi Mts (Harizanov 1963).

Comments. Widespread in the western Palearctic region (Cho *et al.* 2020); associated with *Pyrus communis*, *P. amygdaliformis* and *P. salicifolia* (Burckhardt & Hodkinson 1986).

***Livilla horvathi* (Scott, 1879)**

Material examined. Svezhen vill., marshy biotope, N42°30'48.5" E25°3'22.4", 1078 m a.s.l., 12.viii.2020, 2 ♀♀.

Known distribution in Bulgaria. Rila-Rhodopi Massif: Mesta Valley (Głowacka 1989), Western Rhodopi Mts (Głowacka & Harizanov 1983; Klimaszewski 1965).

Comments. Distributed in the eastern parts of Europe as well as Italy and Turkey; known host plants are *Cytisus austriacus* and *Genista tinctoria* (Hodkinson & Hollis 1987; Drohojowska & Burckhardt 2014, Seljak 2020). First record for the region of Sarnena Gora.



Fig. 2. *Livilla horvathi* (Scott, 1879) – adult, Gaberovo vill., 01.05.2019, photo I. Gjonov.

***Psylla foersteri* Flor, 1861**

Material examined. Turia vill., N42°34'7.8" E25°10'17.3", 412 m a.s.l., 13.viii.2020, 3♂♂, 1♀; Srednogorovo vill., N42°31'14.4" E25°20'10.8", 418 m a.s.l., 13.viii.2020, 6♂♂, 8♀♀.

Known distribution in Bulgaria. Transitional region (Joakimov 1909); Rila-Rhodopi Massif: Krupnik-Sandanski-Petrich Valley (Głowacka 1989; Głowacka & Harizanov 1983; Klimaszewski 1965).

Comments. Widespread in the western Palearctic region, associated with *Alnus glutinosa* and *A. incana* (Ossiannilsson 1992, Ouvrard 2021). First record for the region of Sarnena Gora.

Trioziidae Löw, 1879

***Bactericera modesta* (Foerster, 1848)**

Material examined. Rozovets vill., N42°29'50.676", E25°6'38.592", 1005 a.s.l., 13.viii.2020, 1♀.

Known distribution in Bulgaria. Rila-Rhodopi Massif: Western Rhodopi Mts (Głowacka & Harizanov 1983); Bulgaria, without precise locality data (Burckhardt & Lauterer 1997a).

Comments. The species is widespread in the western Palearctic region and Mongolia and associated with *Sanguisorba minor* and *S. officinalis* (Burckhardt & Lauterer 1997a). First record for the region of Sarnena Gora.

***Eryngiofaga dlabolai* (Vondráček, 1957)**

Published records. Turia vill., N42°34'21.6", E25°10'55.2", ix. 1905, (Joakimov, 1909, as *Trioza mesomela* Flor, 1861).

Material examined. Domljan vill., N42°32'28.1" E24°56'28.6", 364 m a.s.l., 10.viii.2020, 1 ♀; Kriva krusha vill., N42°32'52.0" E25°52'41.5", 438 m a.s.l., 27.ix.2020, 2 ♀♀.

Known distribution in Bulgaria. Transitional region: Podbalkan Basins (Joakimov 1909).

Comments. The record of *Trioza mesomela* Flor, 1861 (now *Eryngiofaga mesomela*) published by Joakimov (1909) is attributed here to *E. dlabolai*, based on the identification of recently collected material. *Eryngiofaga dlabolai* has been reported from eastern Europe and Caucasus and is associated with *Eryngium campestre* (Loginova 1977).



Fig. 3. *Eryngiofaga dlabolai* (Vondráček, 1957) – adults and immatures, Brjagovec vill., 06.09.2016, photo I. Gjonov.

***Phyllopecta trisignata* (Löw, 1886)**

Published records. Turia vill., N42°34'21.6", E25°10'55.2", ix. 1905 (Joakimov, 1909).

Known distribution in Bulgaria. Transitional region: Podbalkan Basins (Joakimov 1909); Rila-Rhodopi Massif: Krupnik-Sandanski-Petrich Valley (Głowacka 1989).

Comments. On *Rubus* spp., widespread in southern Europe and Turkey (Conci & Tamanini 1984, Drohojowska & Burckhardt 2014).

***Trioza galii* Foerster, 1848**

Published records. Stara Zagora, N42°25'28.8" E25°37'32.3", 200 m a.s.l., 08.vi.1959, 2 ♀♀ (Klimaszewski 1965).

PSYLLOIDEA

Known distribution in Bulgaria. Transitional region: Thracian Lowland (Klimaszewski 1965); Rila-Rhodopi Massif: Eastern Rhodopi Mts (Klimaszewski 1965).

Comments. The *Trioza galii* complex was recently revised by Burckhardt & Lauterer (2006). The material recorded from Bulgaria by Klimaszewski (1965) has to be revised as it may belong to *T. galii*, *T. velutina* or both species which are associated with Rubiaceae, mainly *Galium* and *Asperula* spp. (Burckhardt & Lauterer 2006).

Trioza rotundata Flor, 1861

Material examined. Chavdar hut, N42°45'23.0" E23°56'41.2", 1145 m a.s.l., 17.viii.2020, 1 ♀.

Known distribution in Bulgaria. Rila-Rhodopi Massif: Pirin Mt. (Głowacka 1989; Głowacka & Harizanov 1983), Western Rhodopi Mts (Głowacka & Harizanov 1983; Harizanov & Lauterer 1968); Bulgaria, without precise locality data (Burckhardt & Lauterer 2002).

Comments. Host plants of *T. rotundata* are *Cardamine* species (Burckhardt & Lauterer 2002). First record for the region of Sarnena Gora.



Fig. 4. *Phylloplecta trisignata* – adult, Novi han vill., 21.08.2016, photo I. Gjonov.



Fig. 5. *Phylloplecta trisignata* – immature, Novi han vill., 21.08.2016, photo I. Gjonov.

Discussion

A total of 17 species were found in Sarnena Gora. Ten species from 3 families are new to the region. So far, four of them, viz. *Aphalara freji*, *Arytaina maculata*, *Livilla horvathi* and *Bactericera modesta*, had been known in Bulgaria only from the region of the Rila-Rhodopes Massif. Most other species currently known from Sarnena Gora are quite widespread in Europe or at least in its southern or eastern parts and they have been also reported from several other regions of Bulgaria (Etropolska *et al.* 2015, Joakimov 1909; Harizanov 1963, 1966a,b; Klimaszewski 1965, 1970; Harizanov & Lauterer 1968; Loginova 1978; Głowacka & Harizanov 1983; Głowacka 1989; Nokala *et al.* 2003; Nakabachi *et al.* 2020; Percy & Cronk 2020).

With 17 species recorded so far, the psyllid fauna of Sarnena Gora is still poorly studied. In comparison, the number of known species from the well-studied Western Rhodope subregion is 62 (Głowacka 1989). We assume that after more detailed field work many more species will be found due to the great diversity of habitats and flora in the mountains.

PSYLLOIDEA

Acknowledgements. Igor Malenovský was supported through long-term conceptual development program for research institutions (MK000094862, to Moravian Museum, Brno) by the Ministry of Culture of the Czech Republic.

References

- Burckhardt, D. (1984) The Mediterranean species of *Diaphorina* Loew (Homoptera, Psylloidea). *Phytophaga* 2: 1–30.
- Burckhardt, D. (2004) Fauna Europaea: Psylloidea. Fauna Europaea version 1.0, <http://www.faunaeur.org>.
- Burckhardt, D. & Hodkinson, I. (1986) A revision of the west Palearctic pear psyllids (Hemiptera: Psyllidae). *Bulletin of Entomological Research* 76: 119–132.
- Burckhardt, D. & Lauterer, P. (1997a) A taxonomic reassessment of the trioqid genus *Bactericera* (Hemiptera: Psylloidea). *Journal of Natural History* 31: 99–153.
- Burckhardt, D. & Lauterer, P. (1997b) Systematics and biology of the *Aphalara exilis* (Weber and Mohr) species assemblage (Hemiptera, Psyllidae). *Entomologica Scandinavica* 28: 271–305.
- Burckhardt, D. & Lauterer, P. (2002) Revision of the Central European *Trioza rotundata* (Hemiptera, Psylloidea): taxonomy and bionomy. *Bulletin de La Société Entomologique Suisse* 75: 21–34.
- Burckhardt, D. & Lauterer, P. (2006) The Palaearctic trioquids associated with Rubiaceae (Hemiptera, Psylloidea): A taxonomic re-evaluation of the *Trioza galii* Foerster complex. *Revue Suisse de Zoologie* 113: 269–286.
- Burckhardt, D., Ouvrard, D. & Percy, D. (2021) An updated classification of the jumping plant-lice (Hemiptera: Psylloidea) using molecular and morphological evidence. *European Journal of Taxonomy* 736: 137–182.
- Cho, G., Burckhardt, D.H. & Lee, S. (2017) On the taxonomy of Korean jumping plant-lice (Hemiptera: Psylloidea). *Zootaxa* 4238: 531–561.
- Cho, G., Malenovský, I., Burckhardt, D., Inoue, H. & Lee, S. (2020) DNA barcoding of pear psyllids (Hemiptera: Psylloidea: Psyllidae), a tale of continued misidentifications. *Bulletin of Entomological Research* 110: 521–534.
- Conci, C. & Tamanini, L. (1984) *Phylloplecta trisignata* (Low, 1886), host plant *Rubus* sp., of the complex *Rubi Corylifolii* (Homoptera: Psylloidea). *Studi Trentini di Scienze Naturali* 61: 249–261.
- Drohojowska, J. & Burckhardt, D. (2014) The jumping plant-lice (Hemiptera: Psylloidea) of Turkey: A checklist and new records. *Turkish Journal of Zoology* 38: 559–568.
- Etropolska, A., Jarausch, W., Jarausch, B. & Trenchev, G. (2015) Detection of European fruit tree phytoplasmas and their insect vectors in important fruit-growing regions in Bulgaria. *Bulgarian Journal of Agricultural Science* 21: 1248–1253.
- Georgiev, D., Bechev, D. & Yancheva, V. (2020) Fauna of Sarnena Sredna Gora Mts, Part 1. *Zoonotes* 9: 184 pp.
- Głowacka, E. (1989) Jumpin plant-lice (Homoptera: Psylloidea) of the Pirin Mountains (Bulgaria). *Acta Biologica Silesiana* 13: 14–19.
- Głowacka, E. & Harizanov, A. (1983) The jumping plant lice (Homoptera, Psylloidea) from Western Rodope Mountains (Bulgaria). *Acta Biologica Katowice* 12: 62–69.
- Harizanov, A. (1963) [Jumping plan-lice on fruit trees in Bulgaria]. *Priroda [Nature]* 12: 91–97.
- Harizanov, A. (1964) [Jumping plan-lice on fruit trees]. *Ovoshtarstvo [Pomology]*, 30–33.
- Harizanov, A. (1966a) [Biological studies on southern apple jumping plant-lice — *Psylla costalis* Flor.]. *Landwirtschaftlichen Hochschule „Wassil Kolarow“ Plowdiw, Bulgarien* 15: 261–270.

PSYLLOIDEA

- Harizanov, A. (1966b) [Physiological changes in pear leaves damaged by the larvae of *Psylla pyri* L.]. *Priroda [Nature]* 4: 52–54.
- Harizanov, A. & Lauterer, P. (1968) Beitrag zur fauna der Blattflöhe (Homoptera-Psyloidea) in Bulgarien. *Landwirtschaftlichen Hochschule „Wassil Kolarow“ Plowdiw, Bulgarien* 17: 139–145.
- Hodkinson, I. & Hollis, D. (1987) The legume-feeding psyllids (Homoptera) of the West Palaearctic Region. *Bulletin of the British Museum (Natural History)* 56: 1–86.
- Hubenov, Z. (1997) Possibilities for using of a system from the really defined natural territories for the faunistic researches in Bulgaria. *Acta Zoologica Bulgarica* 49: 5–9.
- Jarausch, B., Tedeschi, R., Sauvion, N., Gross, J. & Jarausch, W. (2019) Psyllid vectors. Pp. 53–78. In: Bertaccini, A. et al. (eds.), *Phytoplasmas: Plant Pathogenic Bacteria - II: Transmission and Management of Phytoplasma - Associated Diseases*, 53–78.
- Joakimov, D. (1909) [On the Fauna of Hemiptera of Bulgaria]. [*Collection of folklore, science and literature*] 25: 1–34.
- Klimaszewski, S. (1965) Psyllidologische Notizen XII— XIV (Homoptera). *Annales Zoologici* 23: 195–209.
- Klimaszewski, S. (1970) Psyllidologische Notizen XVIII—XX (Homoptera). *Annales Zoologici* 27: 417–428.
- Lauterer, P. (1999) Results of the investigations on Hemiptera in Moravia, made by the Moravian museum (Psyloidea 2). *Acta Musei Moraviae, Scientiae Biologicae (Brno)* 84: 71–151.
- Loginova, M. (1978) New species of psyllids (Homoptera, Psyloidea). *Trudy Zoologicheskogo Instituta* 61: 30–123.
- Loginova, M.M. (1977) A review of the genus *Eryngiofaga* Klimasz. (Triozidae, Homoptera). *Zoologicheskii Zhurnal* 56: 510–521.
- Malenovský, I., Baňář, P. & Kment, P. (2011) A contribution to the faunistics of the Hemiptera (Cicadomorpha, Fulgoromorpha, Heteroptera, and Psyloidea) associated with dry grassland sites in southern Moravia (Czech Republic). *Acta Musei Moraviae, Scientiae Biologicae (Brno)* 96: 41–187.
- Nakabachi, A., Malenovský, I., Gjonov, I. & Hirose, Y. (2020) 16S rRNA Sequencing Detected *Proffttella*, *Liberibacter*, *Wolbachia*, and *Diplorickettsia* from Relatives of the Asian Citrus Psyllid. *Microbial Ecology* 80:410-422.
- Nokkala, S., Grozeva, S., Kuznetsova, V. & Maryańska-Nadachowska, A. (2003) The origin of the achiasmatic XY sex chromosome system in *Cacopsylla peregrina* (Frst.) (Psyloidea, Homoptera). *Genetica* 119: 327–332.
- Ossiannilsson, F. (1992) The Psyloidea (Homoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* 26: 347.
- Ouvrard, D. (2021) Psyllist - The World Psyloidea Database. <http://www.hemiptera-databases.com/psyllist>. Accessed on 6 December 2021.
- Percy, D. & Cronk, Q. (2020) Salix transect of Europe: patterns in the distribution of willow-feeding psyllids (Hemiptera: Psyloidea) from Greece to Arctic Norway. *Biodiversity Data Journal* 8: 1–20.
- Seljak, G. (2020) Jumping plant-lice of Slovenia (Insecta: Hemiptera: Psyloidea). *Journal of the Slovenian Museum of Natural History, Ljubljana* 98: 1–224.
- Valle, D., Burckhardt, D., Mujica, V., Zappolo, R. & Morelli, E. (2017) The occurrence of the Pear Psyllid, *Cacopsylla bidens* (Šulc, 1907) (Insecta: Hemiptera: Psyllidae), in Uruguay. *Check list* 13: 2088.
- WFO (2021) World Flora Online. Published on the Internet; <http://www.worldfloraonline.org>. Accessed on: 06 Dec 2021.