

**A CONTRIBUTION TO THE KNOWLEDGE OF THE PSYLLIDS OF ISRAEL
(HOMOPTERA: PSYLLOIDEA)***

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ABSTRACT

Forty two species of Psylloidea are recorded from Israel of which 20 are reported herein for the first time. Their host plants, zoogeographical distribution, and economic importance are indicated. References are given to taxonomic and biological information on the species.

INTRODUCTION

Until recently the superfamily Psylloidea has been poorly collected in Israel. The only previous list of species of this group, compiled by Bodenheimer (1937), comprised nine species. Carmin (1951) described two, Vondracek (1954) one new species, while Schweig (1954) and Swirski (1954) each added one described species. Avidov and Harpaz (1969), in their comprehensive book on the plant pests of Israel, mentioned five previously recorded species; Swirski and Berlinger (1970) reported one species new to the fauna; Gerling and Kugler (1973) added two species, one of which was new and later described by Loginova (1974a). Loginova (1973, 1974a, 1978a, b) described four new species, and recorded (1974a) the occurrence of an additional one; Burckhardt (1981) reported one new species. Thus, until now 22 species of Psylloidea had been reported from the Israeli fauna.

During the recent 25 years, two of the authors of the present article (J.H. and M.J.B.) have collected 30 psyllid species, mostly as part of a survey of the entomofauna of forest and ornamental plants of Israel. In addition, several species have been collected by V.F. Eastop, R. Linnavuori, V.A. Trjapitzin and by the staff of the Division of Entomology, Tel Aviv University, Ramat Aviv.

The 42 species of Psylloidea listed here (two of them probably misidentified) are arranged alphabetically by genus and species. Their known or presumed host plants in

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Israel and references to previous publications concerning their occurrence in Israel are given in Table 1. The following indications are used: * species not previously recorded from Israel; (*) species probably misidentified and previously appearing under different name; ** doubtful species. A, Avidov and Harpaz; B, Bodenheimer; Bt, Burckhardt; C, Carmin; G, Gerling and Kugler; Lg, Laing; L, Loginova; Sg, Schweig; S, Swirski; SB, Swirski and Berlinger; V, Vondráček.

The text includes references to taxonomic and biological information and to known host plants and distribution as recorded in the files of Hodkinson and Russell and as recorded by Klimaszewski (1973). Data under "Material examined" specify the comparatively recent collections made in Israel by two of the authors (J.H. and M.J.B.), unless stated otherwise. Abbreviations indicating regions of Israel are as follows: AV, Arava Valley; CA, Carmel, CG, Coast of Galilee; CN, Central Negev; CP, Coastal Plain; DS, Dead Sea area; HV, Hula Valley; JD, Judean Desert; JU, Judea; JV, Jordan Valley; NN, Northern Negev; SA, Samaria; UG, Upper Galilee; VY, Valley of Yizre'el; WN, Western Negev. BMNH indicates specimens found in the British Museum (Natural History), London, England. Most of the material on which this publication is based, is deposited in the Division of Entomology, Ilanot, and in the Department of Biology, Liverpool Polytechnic.

TABLE 1. PSYLLOIDEA OF ISRAEL¹

SPECIES	HOST PLANTS IN ISRAEL	REF.
<i>Acizzia hollisi</i> Burckhardt	<i>Acacia raddiana</i>	Bt
* <i>Agonoscena cisti</i> (Puton)	<i>Pistacia lentiscus</i>	—
<i>A. succincta</i> (Heeger)	<i>Ruta</i> sp.	B
* <i>A. targionii</i> (Lichtenstein)	<i>Pistacia lentiscus</i>	—
* <i>A. viridis</i> Bajeva	<i>Pistacia palaestina</i>	—
<i>Caillardia accola</i> Loginova	<i>Haloxylon persicum</i>	L,1978d
<i>Colposcena aliena</i> (Loew)	<i>Tamarix nilotica</i>	G,L,1974a
	<i>Tamarix</i> sp.	—
<i>C. elegans</i> (Bergevin)	<i>Tamarix aphylla</i>	L,1974a
* <i>C. sp. nr. osmanica</i> Vondráček	<i>Tamarix</i> sp.	—
* <i>Craspedolepta pontica</i> Dobreanu and Monolache	?	—
<i>Crastina linnavuorii</i> Loginova	<i>Tamarix nilotica</i>	G,L,1974a
	<i>Tamarix</i> sp.	—
* <i>Cyamophila glycyrrhizae</i> (Becker)	<i>Glycyrrhiza glabra</i>	—
* <i>Diaphorina lycii</i> Loginova	<i>Lycium europaeum</i>	—
<i>D. salvadorae</i> Loginova	<i>Cordia myxa</i>	L,1978a
	<i>Cordia sinensis</i>	
(*) <i>Egeirotriaza intermedia</i> Bajeva	<i>Populus euphratica</i>	B
<i>Euphyllura olivina</i> (Costa)	<i>Olea europaea</i>	A,B
* <i>E. phillyreae</i> Foerster	<i>Phillyrea latifolia</i>	—
<i>E. straminea</i> Loginova	<i>Olea europaea</i>	L,1973

¹Marking and abbreviations — see previous page.

TABLE 1. (Continued)

SPECIES	HOST PLANTS IN ISRAEL	REF.
* <i>Floria retamae</i> (Puton)	<i>Retama raetam</i>	—
<i>F. syriaca</i> Loew	?	B
<i>Homotoma ficus</i> (L.)	<i>Ficus carica</i>	B
* <i>H. viridis</i> Klimaszewski	<i>Ficus carica</i> (?)	—
* <i>Livia mediterranea</i> Loginova	<i>Carex</i> spp. ?	—
** <i>Pauropsylla bikii</i> Carmin	<i>Ficus sycomorus</i>	C
** <i>P. nussex</i> Carmin	<i>Ficus sycomorus</i>	C
<i>P. willcocksii</i> Dębski	<i>Ficus sycomorus</i>	A,B
* <i>Pseudacanthopsylla retamae</i> Samy	<i>Retama raetam</i>	—
* <i>Psylla crataegi</i> (Schränk)	<i>Crataegus</i> spp. (?)	—
* <i>P. euxina</i> Loginova	<i>Rhamnus alaternus</i>	—
* <i>P. pulchella</i> Loew	<i>Cercis siliquastrum</i>	—
<i>P. pyricola</i> Foerster	<i>Pyrus communis</i>	A,S,1954
<i>P. sulci</i> Vondráček	?	V,1954
(*) <i>Psyllopsis repens</i> Loginova	<i>Fraxinus syriaca</i>	B
* <i>P. securicola</i> Loginova	<i>Fraxinus syriaca</i>	—
<i>Triozia alacris</i> Flor	<i>Laurus nobilis</i>	B
<i>T. buxtoni</i> Laing	<i>Ficus carica</i>	A,B,Lg
* <i>T. centranthi</i> (Vallot)	<i>Centranthus</i> spp. (?)	—
	<i>Valerianella</i> spp. (?)	—
<i>T. chenopodii</i> Reuter	<i>Atriplex</i> spp.	SB,1970
	<i>Chenopodium</i> spp.	SB,1970
* <i>T. galii</i> Foerster	<i>Galium</i> spp. (?)	—
* <i>T. marginepunctata</i> Flor	<i>Rhamnus alaternus</i>	—
(*) <i>T. trigonica</i> Hodkinson	<i>Daucus carota</i> (?)	A,Sg
* <i>T. trisignata</i> Loew	<i>Rubus sanctus</i>	—

NOTES ON GENERA AND SPECIES

ACIZZIA Heslop-Harrison, 1961*Acizzia hollisi* Burckhardt

Acizzia hollisi Burckhardt, 1981:216.

Host plants: *Acacia raddiana* Savi.

Distribution: Saudi Arabia, Israel.

Material examined: Revivim (NN), 25.IV.1968; En Gedi (DS), IV.1969; Ilanot (CP), 24.V.1975; all on *A. raddiana*.

AGONOSCENA Enderlein, 1914

Key to the species in Hodkinson and Hollis, 1981:74.

Agonoscena cisti (Puton)

Rhinocola Puton, 1882:183.

Agonoscena cisti. Hodkinson and Hollis, 1981:74 (description).

Host plants: *Pistacia lentiscus* L., *P. palaestina* Boissier.

Distribution: Mediterranean, Canary Islands, Iraq.

Material examined: Many specimens collected in Israel almost wherever *P. lentiscus* grows naturally or is cultivated. Rare on *P. palaestina* Boissier.

Agonoscena succincta (Heeger)

Rhinocola succincta Heeger, 1856:43 (description and biology); Bodenheimer, 1937:213 (list).

Agonoscena succincta. Hodkinson and Hollis, 1981:74 (description).

Host plants: *Ruta graveolens* L., *R. chalepensis* L.

Distribution: Austria, Italy, Spain, Israel, Transcaucasia.

Material examined: None.

Note: We have not seen any material of this species from Israel. The only evidence of its occurrence here is provided by Bodenheimer (1937:213): "*Rhinocola succincta* (Heeger) – *Ruta*." (*R. chalepensis* is the only species of the genus in Israel).

Agonoscena targionii (Lichtenstein)

Psylla targionii Lichtenstein, 1874:228.

Agonoscena targionii. Davatchi, 1958:32 (description and biology); Hammad and Hafez Mohamed, 1965:153 (biology); Tokmakoğlu, 1973 (biology); Hodkinson and Hollis, 1981:74 (description).

Host plants: *Pistacia lentiscus* L., *P. terebinthus* L., *P. mutica* Fischer and Meyer, *P. khinjuk* Stokes, *P. vera* L.

Distribution: Mediterranean, Netherlands, Crimea.

Material examined: Many specimens, collected in Israel, on *P. lentiscus*.

Agonoscena viridis Bajeva

Agonoscena viridis Bajeva, 1964a:31.

Host plants: *Pistacia vera* L., *P. mutica* Fischer and Meyer, *P. palaestina* Boissier.

Distribution: Israel, Turkey, Georgian S.S.R., Azerbaijan S.S.R., Tadzhik S.S.R.

Material examined: Many specimens, collected on *P. palaestina*, almost wherever this plant grows naturally or is cultivated in Israel. Rare on *P. vera*.

CAILLARDIA Bergevin, 1931

Key to the species in Loginova, 1978b:6.

Caillardia accola Loginova

Caillardia accola Loginova, 1978b:13.

Host plants: *Haloxylon persicum* Bunge.

Distribution: Uzbek S.S.R., Turkmen S.S.R., Kazakh S.S.R.; Iran, Israel.
Material examined: Yotvata (AV), 26.VI.1958; Elat (AV), 20.VI.1958; both on
H. persicum (coll. R. Linnavuori).

COLPOSCENIA Enderlein, 1929

Key to the species in Loginova, 1974a:155.

Colposcencia aliena (Loew)

Aphalara aliena Loew, 1881:225

Colposcencia n.sp. Gerling and Kugler, 1973:26 (list).

Colposcencia aliena. Loginova, 1974a:155 (description).

Host plants: *Tamarix nilotica* (Ehrenberg) Bunge, *Tamarix* sp.

Distribution: Canary Islands, Morocco, Algeria, Egypt, Sudan, Ethiopia, Israel, Turkey, Caucasus, Afghanistan, Pakistan, Kazakh S.S.R., Mongolia.

Material examined: En Gedi (DS), 2.VI.1970, *T. nilotica* (BMNH); Gadot (UG), 26.XI.1975; Deganya (JV), 30.III.1975; Wadi Qilt (JD), 20.IV.1974; all on *Tamarix* sp.

Colposcencia elegans (Bergevin)

Aphalara elegans Bergevin, 1932:8.

Colposcencia elegans. Loginova, 1974a:160 (description).

Host plants: *Tamarix aphylla* Karsten.

Distribution: Algeria, Egypt, Israel, Ethiopia, Yemen, South Yemen, Pakistan.

Material examined: Be'er Sheva (NN), 5.V.1966 (coll. V.A. Trjapitzin); Magen (WN), 17.VII.1974, 9.IV.1975; Urim (CN), 25.V. and 8.IX.1982. All specimens on *T. aphylla*.

Colposcencia sp. nr. *osmanica* Vondráček

Colposcencia sp. nr. *osmanica* Vondráček, 1952:440.

Host plants: *Tamarix* sp.

Distribution: Turkey, Georgian S.S.R., Israel.

Material examined: Ze'elim (CN), 20.V.82, *Tamarix* sp.

CRASPEDOLEPTA Enderlein, 1921

Craspedolepta pontica Dobreanu and Monolache

Craspedolepta pontica Dobreanu et Monolache, 1962:122.

Host plants: *Achillea* spp., *Anthemis* spp., *Pyrethrum* spp.

Distribution: Czechoslovakia, Romania, southeastern Russia, Caucasus, Kazakh S.S.R., Israel.

Material examined: Golan, 27.IV.1981 (coll. V.F. Eastop).

CRASTINA Loginova, 1964

Key to the species in Loginova, 1974a:447.

Crastina linnavuorii Loginova

Crastina linnavuorii Loginova, 1974a:166; Gerling, Kugler and Lupo, 1976:65 (biology).

Host plants: *Tamarix nilotica* (Ehrenberg) Bunge.

Distribution: Jordan, Israel.

Material examined: En Gedi (DS), 2.VI.1970; Ein el Turuba and Ein el Ghuweir (DS), 14.IV.1971, Enot Enan (UG), 22.IV.71 (coll. D. Gerling); En Boqeq (DS), 30.VII.77 (coll. A. Freidberg); Ze'elim (CN), 25.VIII.82. All specimens collected on *T. nilotica* or *Tamarix* sp.

Note: Also recorded from Israel by Loginova (1974a): Deganya (JV), 23.VII.1958 (coll. R. Linnavuori).

CYAMOPHILA Loginova, 1976

Review of the genus in Loginova, 1976a:589.

Cyamophila glycyrrhizae (Becker)

Psyllodes glycyrrhizae Becker, 1864:486.

Cyamophila glycyrrhizae. Loginova and Bajeva, 1972:6 (description).

Host plants: *Glycyrrhiza* spp.

Distribution: Israel, Turkey, southern European USSR, Caucasus, Kazakh S.S.R., Siberia, Mongolia.

Material examined: 5 km N. of En Gev (JV), 25.V.82, *G. glabra* L.

DIAPHORINA Loew, 1880

Diaphorina lycii Loginova

Diaphorina lycii Loginova, 1978a:35.

Host plants: *Lycium* spp.

Distribution: Israel, Caucasus, Uzbek S.S.R., Turkmen S.S.R., Kazakh S.S.R.

Material examined: Bet Dagan (CP), 29.IV.1981, *Lycium europaeum* L. (coll. V.F. Eastop).

Diaphorina salvadorae Loginova

Diaphorina salvadorae Loginova, 1978a:71.

Host plants: *Cordia myxa* L., *C. sinensis* Lamarck, (?) *Salvadora persica* L.

Distribution: Crete, Cyprus, Israel, Sudan.

Material examined: Tel Aviv-Jaffa (CP), 24.IV.66 (coll. R. Linnavuori); En Gedi (DS), 1.V.1966, 30.IV.68, IV.1972, 6.IV.1977, 15.VII.1981 and 26.IV.82; all on *C. sinensis*; Nir Am (WN), 5.XI.1978, *C. myxa*.

Note: Also recorded from Israel by Loginova (1978a): En Gedi (DS), 1958 (coll. R. Linnavuori), 31.V.1966 (coll. V.A. Trjapitzin); both on (?) *S. persica*; Jaffa, 24.IV.1966 (coll. R. Linnavuori).

EGEIOTRIOZA Boselli, 1931

Key to the species in Loginova, 1976b:1320.

Egeirotrioza intermedia Bajeva

Egeirotrioza intermedia Bajeva, 1963b:53; Loginova, 1976b:1320 (description).

Host plants: *Populus euphratica* Oliver, *P. pruinosa* Schrenk.

Distribution: Tadzhik S.S.R., Israel.

Material examined: En Avdat (CN), 6.X.1974; En Gedi (DS), 26.I.1977; both on *P. euphratica*.

Note: The species, listed by Bodenheimer (1937:213) as *Trioza ceardi* (Bergevin) is apparently *E. intermedia*.

EYPHYLLURA Foerster, 1848

Review of the genus in Loginova, 1973:858.

Euphyllura olivina (Costa)

Thrips olivina Costa, 1839:91.

Euphyllura olivina. Bodenheimer, 1937:213 (list); Loureiro Ferreira, 1945 (biology); Avidov and Harpaz, 1969:75 (damage); Loginova, 1973:866 (description); Prophetou and Tzanakakis, 1977 (biology).

Host plants: *Olea europaea* L., *O. sylvestris* Miller.

Distribution: Mediterranean.

Material examined: none.

Euphyllura phillyreae Foerster

Euphyllura phillyreae Foerster, 1848:93; Loginova, 1973:866 (description).

Host plants: *Phillyrea latifolia* L., *Olea europaea* L.

Distribution: Mediterranean; Crimea, Caucasus (introduced).

Material examined: Mt. Carmel (CA), 28.IV.1967 (BMNH), 14.IV.1977, 24.IV.1981; Ilanot (CP), 24.V.1975; all on *P. latifolia*; Daliya (CA), 10.VII.1959, on needles of *Pinus pinea* L.; Haifa, 13.V.78 (coll. A. Freidberg).

Euphyllura straminea Loginova

Euphyllura straminea Loginova, 1973:868.

Host plants: *Olea europaea* L.

Distribution: Cyprus, Lebanon, Israel, Iraq, Iran.

Material examined: Aqua Bella (JU), 1958, *O. europaea* (coll. R. Linnavuori); Hula Valley (HV), 18.IV.1966, *Phragmites australis* (Cavanilles) Trinius (coll. V.A. Trjapitzin); Evron (CG), 14.V.73; Zefat (UG), 24.V.1981; Bet haEmeq (CG), 26.V.82; The last three records – on *O. europaea*.

Note: *E. straminea* is very close to *E. olivina* and the two could easily be confused.

FLORIA Loew, 1879

Floria retamae (Puton)

Psylla retamae Puton, 1878:134.

Floria retamae. Loginova, 1972b:27 (description).

Host plants: *Retama sphaerocarpa* (L.) Boissier, *R. monosperma* (L.) Boissier, *R. raetam* (Forsk.) Webb.

Distribution: Portugal, Spain, Morocco, Algeria, Egypt, Israel.

Material examined: Avdat (CN), 19.IV.1976, and 5.V.82; Rishon leZiyon (CP), 7.V.1981 (coll. V.F. Eastop); all on *R. raetam*; Meron (UG), 5.V.75, Avdat (CN), 19.IV.75 (coll. A. Freidberg).

Floria syriaca Loew

Floria syriaca Loew, 1881:262; Bodenheimer, 1937:213 (list).

Host plants: Unknown, probably a legume of the Genisteae.

Distribution: Cyprus, Syria, Israel.

Material examined: None.

HOMOTOMA Guérin-Ménéville, 1844

Key to the species in Miyatake, 1974:17.

Homotoma ficus (L.)

Chermes ficus L., 1758

Homotoma ficus. Boselli, 1929a (description and biology); Tamanini, 1966:107 (description).

Host plants: *Ficus carica* L.

Distribution: Mediterranean, Great Britain, Switzerland, Austria, Crimea, Caucasus, Iran. Introduced into California.

Material examined: Nahal Amud (UG), 6.X.75, (coll. A. Freidberg); Zefat (UG), 18.X.1976, *Ficus carica*; Tel Aviv, 26.VII.73 (coll. D. Furth).

Homotoma viridis Klimaszewski

Homotoma viridis Klimaszewski, 1961:114; Tamanini, 1966:107 (description).

Host plants: *Ficus carica*.

Distribution: Spain, Italy, Albania, Yugoslavia, Bulgaria, Turkey, Armenian S.S.R., Israel, Tunisia.

Material examined: Banyas (GO), 10.VII.75, Nahal Amud (UG) 6.X.74 (coll. A. Freidberg); Tel Dan (HV), 7.VIII.74 (coll. M. Kaplan); Tel Aviv, 26.VII.73 (coll. D. Furth).

LIVIA Latreille, 1804

Review of the genus in Loginova, 1974b:858.

Livia mediterranea Loginova

Livia mediterranea Loginova, 1974b:863.

Host plants: *Carex* spp.

Distribution: Crimea, Georgian S.S.R., Bulgaria, Israel.

Material examined: Yoqne'am (SA), 25.VI.1959, 19.XI.1959, 24.I.1960, 12.VII.1960; Damun (CA), 7.VII.1959, all on needles of *Pinus halepensis* Miller; Yoqne'am, 6.XI.1959, on needles of *P. brutia* Tenore; Golan, 26.V.1975 (BMNH); Gonen (HV), 15.III.76 (coll. M. Kaplan).

PAUROPSYLLA Rübssaamen, 1899

Pauropsylla bikii Carmin

Pauropsylla bikii Carmin, 1951:1.

Pauropsylla sp. — Carmin and Scheinkin, 1931 (biology).

Host plants: *Ficus sycomorus* L.

Distribution: Israel.

Material examined: None.

Pauropsylla nussex Carmin

Pauropsylla nussex Carmin, 1951:1.

Pauropsylla sp. — Carmin and Scheinkin, 1931 (biology).

Host plants: *Ficus sycomorus* L.

Distribution: Israel.

Material examined: None.

Pauropsylla willcocksii Dębski

Pauropsylla willcocksii Dębski, 1918:14; Bodenheimer, 1937:213 (list); Samy, 1973:458 (description).

Host plants: *Ficus sycomorus* L.

Distribution: Israel, Egypt, Sudan, Ethiopia, Somalia.

Material examined: Many specimens collected in the Coastal Plain, on *F. sycomorus*.

Note: Based on the extensive survey and biological observations, it seems that all the species hitherto described from *F. sycomorus* must be referred to as *P. willcocksii*. This may also be the case of *P. trichaeta* Petzey (Awadallah and Swailem, 1972), in Egypt.

PSEUDACANTHOPSYLLA Samy, 1972

Pseudacanthopsylla retamae Samy

Pseudacanthopsylla retamae Samy, 1972:455.

Host plants: *Retama raetam* (Forsk.) Webb.

Distribution: Egypt, Israel.

Material examined: Avdat (CN), 5.V.82, *R. raetam*.

PSYLLA Geoffroy, 1762

Psylla crataegi (Schrank)

Chermes crataegi Schrank, 1801:142.

Psylla crataegi. Dobreanu and Manolache, 1962:207 (description); Nguyen, 1963:172 and Gegechkori and Djibladze, 1976 (biology).

Host plants: *Crataegus* spp., *Mespilus* spp., *Sorbus* spp.

Distribution: Europe, including the European U.S.S.R., Caucasus, Ussurijski Kraj (U.S.S.R.), northern India, Israel, Morocco.

Material examined: Mt. Hermon, 16.VI.77 (coll. A. Freidberg).

Psylla euxina Loginova

Psylla euxina Loginova, 1975:702 (description and biology).

Host plants: *Rhamnus alaternus* L., *R. palaestina* Boissier.

Distribution: Crimea, Israel.

Material examined: Many specimens collected on natural and cultivated *R. alaternus* and sometimes also on *R. palestina*.

Psylla pulchella Loew

Psylla pulchella Loew, 1877:143; Hodkinson, 1974:81 (description).

Host plants: *Cercis siliquastrum* L.

Distribution: Spain, France, Italy, Austria, Greece, Yugoslavia, Turkey, Crimea,

Israel. Introduced into Great Britain.

Material examined: HaGosherim (HV), 2.VI.1971; Gadot (HV) and Evron (CP), 15.V.1973; Kefar Szold (HV), 20.IV.1976; Haifa, 11.IV.1979; all on *C. siliquastrum*.

Psylla pyricola Foerster

Psylla pyricola Foerster, 1848:77; Swirski, 1954 (biology); Dobrenau and Monolache, 1962:187 (description); Chang and Philogène, 1975 (biology and bibliography).

Host plants: *Pyrus communis* L., *Mespilus* sp.

Distribution: Central and southern Europe, Crimea, Turkey, Israel, central Asia, Japan. Introduced into North and South America.

Material examined: Many specimens collected in pear orchards, including the Negev (Berlinger, 1969).

Psylla sulci Vondráček

Psylla sulci Vondráček, 1954:81.

Host plants: Unknown.

Distribution: Israel.

Material examined: None. (Vondráček, 1954, described it from Judea, Israel).

PSYLLOPSIS Loew, 1879

Psyllopsis repens Loginova

Psyllopsis repens Loginova, 1963:185.

Host plants: *Fraxinus excelsior* L., *F. syriaca* Boissier.

Distribution: Armenian S.S.R., Azerbaijan S.S.R., Iran, Israel.

Material examined: Shamir (HV), 7 and 22.IV.1974, *F. syriaca*.

Psyllopsis securicola Loginova

Psyllopsis securicola Loginova, 1963:188.

Host plants: *Fraxinus* sp., *F. syriaca*.

Distribution: Armenian S.S.R., Azerbaijan S.S.R., Iran, Israel.

Material examined: Dan (HV), 10.VI.1978, *F. syriaca*.

Note: The species, listed by Bodenheimer (1937:213) as *P. fraxini* (L.), is apparently *P. repens* or *P. securicola*.

TRIOZA Foerster, 1848

Trioza alacris Flor

Trioza alacris Flor, 1861:398; Miles, 1928 (biology); Bodenheimer, 1937:213 (list); Vondráček, 1957:364 (description).

Host plants: *Laurus nobilis* L., *L. canariensis* Webb and Berthelot, *Camphora officinalis* Nees.

Distribution: Mediterranean, Crimea, Caucasus; in greenhouses in central and northern Europe. Introduced into North and South America.

Material examined: Many specimens collected almost wherever *L. nobilis* grows naturally or is cultivated.

Trioza buxtoni Laing

Trioza buxtoni Laing, 1924:247; Bodenheimer, 1937:213 (list).

Host plants: *Ficus carica* L., *F. pseudo-sycomorus* Decaisne.

Distribution: Israel.

Material examined: Amir (HV), 8.III.1977; Nahal Qilt (JD), 15.III.1978; both on *F. carica*.

Note: It was also found on *F. pseudo-sycomorus* near St. Katherine Monastery (Sinai), 18.IX.78.

Trioza centranthi (Vallot)

Psylla centranthi (Vallot), 1829:106.

Trioza centranthi. Vondráček, 1957:321 (description); Sampo, 1975:169, André, 1978 (biology).

Host plants: *Centranthus* spp., *Valerianella* spp.

Distribution: Europe (except the extreme north and south) including U.S.S.R., Transcaucasus, Israel.

Material examined: Mt. Hermon, 16.VI.77 (coll. A. Freidberg).

Trioza chenopodii Reuter

Trioza chenopodii Reuter, 1876:76; Hodkinson and White, 1979:73 (description).

Host plants: *Atriplex* spp., *Chenopodium* spp., *Halimione portulacoides* (L.) Aellen.

Distribution: Europe, Israel, Georgian S.S.R., Korea, Japan.

Material examined: Many specimens collected almost everywhere in Israel on *Chenopodium*; less on *Atriplex*.

Note: This is a polymorphic species in which previously two forms have been regarded as separate species (Hodkinson and White, 1979). Specimens of formae *autumnalis* and *aestivalis* collected at En Gedi (DS) are in the BMNH.

Trioza galii Foerster

Trioza galii Foerster, 1848:87; Boselli, 1929b (biology); Dobreanu and Manolache, 1962:300 (description).

Host plants: *Galium* spp.

Distribution: Europe, Israel, USSR, Japan, Taiwan.

Material examined: Yatir (JU), 18.IV.1966, on needles of *Pinus halepensis* Miller; Kabri (CG), 17.II.73 (coll. M. Kaplan).

Trioza marginepunctata Flor

Trioza marginepunctata Flor, 1861:380; Šulc, 1912:44 (description).

Host plants: *Rhamnus alaternus* L.

Distribution: Spain, France, Hungary, Israel.

Material examined: HaZorea (VY), 20.X.75; HaZorea, Mishmar haEmeq (VY), En haShofet (SA), 2.XI.1977; all on *R. alaternus*.

Trioza trigonica Hodkinson

Trioza trigonica Hodkinson, 1981:676.

Host plant: *Daucus carota* L.

Distribution: Portugal, Italy, Turkey, Cyprus, Israel, Egypt, Iran.

Material examined: Bet Dagan (CP), 24.IV.81 (coll. V.F. Eastop).

Note: The species mentioned by Schweig (1954:148) as *T. viridula* Zetterstedt, and by Avidov and Harpaz (1969:75) as *T. nigricornis* Foerster, is probably *T. trigonica*.

Trioza trisignata Loew

Trioza trisignata Loew, 1886:163; Šulc, 1913:28 (description).

Host plants: *Rubus fruticosus* L., *Prunus mahaleb* L.

Distribution: Spain, France, Switzerland, Italy, Yugoslavia, Bulgaria, Cyprus, Israel.

Material examined: Nahal Amud (UG), 18.X.1976, *R. sanctus* Schreber.

DISCUSSION

1. Zoogeographical distribution of the psyllids of Israel.

The total number of psyllid species recorded from Israel is low in comparison with the number of genera. In Poland, for example, 106 species of Psylloidea are placed by Klimaszewski (1975) in 19 genera; i.e., approximately 5.6 species per genus, with *Cacopsylla* and *Trioza* having 27 and 20 species, respectively. In Israel, the 40 recorded species (not including the two misidentified species of *Pauropsylla*) are placed in 18 genera, an average of about 2.2 species per genus. The largest genera are *Trioza* with eight species, *Psylla* with five, *Agonoscena* with four, *Colposcena* and *Euphyllura* with three species each. The relatively large number of genera probably reflects the great diversity in climatic conditions and phytogeographical regions. The latter according to Zohary (1962) are: Mediterranean, Irano-Turanian, Saharo-Arabian, and Sudanian. The psyllids are distributed geographically as follows: Eu-Mediterranean: *Euphyllura olivina*, *E. phillyreae*, *Homotoma viridis*, *Trioza alacris* and *T. trigonica*; Sub-Mediterranean: *Agonoscena cistis*, *A. succincta*, *A. targionii*, *Homotoma ficus*, *Livia mediterranea*, *Psylla euxina*, *P. pulchella*, *Trioza marginepunctata* and *T. trisignata*; East Mediterranean-Irano-Turanian: *Euphyllura straminea*; Mediterranean-Saharo-Arabian: *Floria retamae*; Mediterranean-Saharo-Arabian-Sudanian: *Colposcena aliena*; East Mediterranean: *Colposcena* nr. *osmanica*, *Floria syriaca*, and *Pseudacanthopsylla retamae*; (or endemic) *Crastina linnavuorii*, *Trioza buxtoni* and *Psylla sulci*.

The 17 species of Israeli psyllids that do not belong to the Mediterranean element are as follows: Palaearctic, *Trioza galii*, *Psylla pyricola* and *Trioza chenopodii*; European, *Psylla crataegi* and *Trioza centranthi*; east Palaearctic, *Cyamophila glycyrrhizae*; Irano-Turanian, *Agonoscena viridis*, *Caillardia accola*, *Diaphorina lycii*, *Egeirotrioza intermedia*, *Psyllopsis repens* and *P. securicola*; Pontic, *Craspedolepta pontica*; Sudanian, *Acizzia hollisi*, *Colposcena elegans*, *Diaphorina salvadorae*, and *P. willcocksii*.

The zoogeographical pattern of psyllid distribution is related to the phytogeographical grouping of the host plants. Species feeding on such plants as *Cercis*, *Laurus*, *Olea*, *Phillyrea*, and *Rhamnus* occur essentially in the Mediterranean phytogeographical area of Israel, except when cultivation has extended their range. *Acizzia hollisi*, though found also in the Mediterranean area, must be primarily sought in the Sudanian enclaves of the Arava and possibly in the Irano-Turanian northern Negev where its host plant, *Acacia raddiana*, occurs. The distribution of *Caillardia accola* matches the Irano-Turanian distribution of its host, *Haloxylon*, in Central Asia and the Near East deserts. The distribution of the presumably endemic *Crastina linnavuorii* is uncertain because collections have not been made throughout the whole distribution area of the genus *Tamarix*.

2. Host plants and food habits.

The 42 species of Israeli psyllids are known to feed on 28 plant genera belonging to 19 families, all but one of which are dicotyledons. One species, *Livia mediterranea*, probably feeds on *Carex*, a monocotyledon, although its host in Israel is still unknown. In Israel, the largest number of psyllid host plants belong to the genera *Ficus* and *Tamarix*, with four species each, *Pistacia* with three, and *Fraxinus*, *Olea*, *Retama* and *Rhamnus*, each with two psyllid species. Most psyllid species have been found in Israel on a single plant species and they probably are strictly monophagous. *Trioza chenopodii*, however, feeds on two plant genera belonging to the same family. The occurrence of adults of a few psyllid species on plants other than their usual host plants, such as *Euphyllura straminea* on *Phragmites*, *Livia mediterranea* and *Trioza galii* on pine, is not necessarily evidence of a polyphagous habit; instead, it demonstrates the ability of the adults to fly from their true hosts and possibly to feed on diverse plants.

3. Economic importance.

Five psyllid species are considered to be pests in Israel. *Psylla pyricola*, *Trioza trigonica*, and *Euphyllura straminea* feed on agricultural crops, and chemicals (Avidov and Harpaz, 1969) are sometimes used to control the first two species. *Trioza alacris* deforms young leaves of *Laurus*, and *Psylla pulchella* excretes sticky honeydew on which fungus grows, disfigures leaves, and prevents normal gas exchange of the plant. Some psyllids such as *Trioza alacris* and *Psylla pulchella* often occur in masses when their host plants are grown under cultivation (irrigation, hedging of *Laurus*), or in dense stands. *Trioza trisignata* may be abundant when *Rubus*, its host, has an adequate supply of water. Some species, such as *Agonoscena* spp., *Cyamophila glycyrrhizae*, *Colposcena* spp., *Euphyllura phillyreae*, *Psylla euxina* and *Trioza buxtoni*, usually form large populations under natural conditions.

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