

ADDITIONS TO THE PSYLLID FAUNA OF ISRAEL
(HOMOPTERA : PSYLLOIDEA)*

D. BURCKHARDT¹ AND J. HALPERIN²

¹Museum d'Histoire naturelle, C.P. 434, CH-1211 Geneve 6, Switzerland

²Department of Entomology, Agricultural Research Organization,
P.O. Box 6, Bet Dagan 50250, Israel

ABSTRACT

Eighteen species of psyllids not previously known from Israel are recorded. *Acaerus loginovae* n. sp., *Acaerus negevensis* n. sp., and *Pachypsyllodes shalmoni* n. sp. are described and illustrated, and their phylogenetic relationships are discussed. The three species develop on *Calligonum com- osum*.

KEY WORDS: Psylloidea, new species, new records, Israel.

INTRODUCTION

Eighteen species of psyllids, not previously recorded from Israel, were recently collected by the junior author (J.H.) and identified by the senior author (D.B.). They are listed with the information on host plants and distribution. These additions to the species previously recorded (Burckhardt and Lauterer, 1989; Halperin et al., 1982; Halperin, 1986; Halperin, Hodkinson and Burckhardt, 1988) raise the total number of psyllids, presently known from Israel, to 65.

The material examined is deposited in the Museum d'Histoire naturelle, Geneve (MHNG) and in the National Collections, Department of Zoology, Tel Aviv University, Ramat Aviv, Israel (NCI).

Abbreviations used are: AV, Arava Valley; Ca, Mt. Carmel; CN, Central Negev; CP, Coastal Plain; DS, Dead Sea environs; HV, Hula Valley; JD, Judean Desert; JV, Jordan Valley; LG, Lower Galilee; MH, Mt. Hermon; NN, Northern Negev; Sh, Shefela; UG, Upper Galilee.

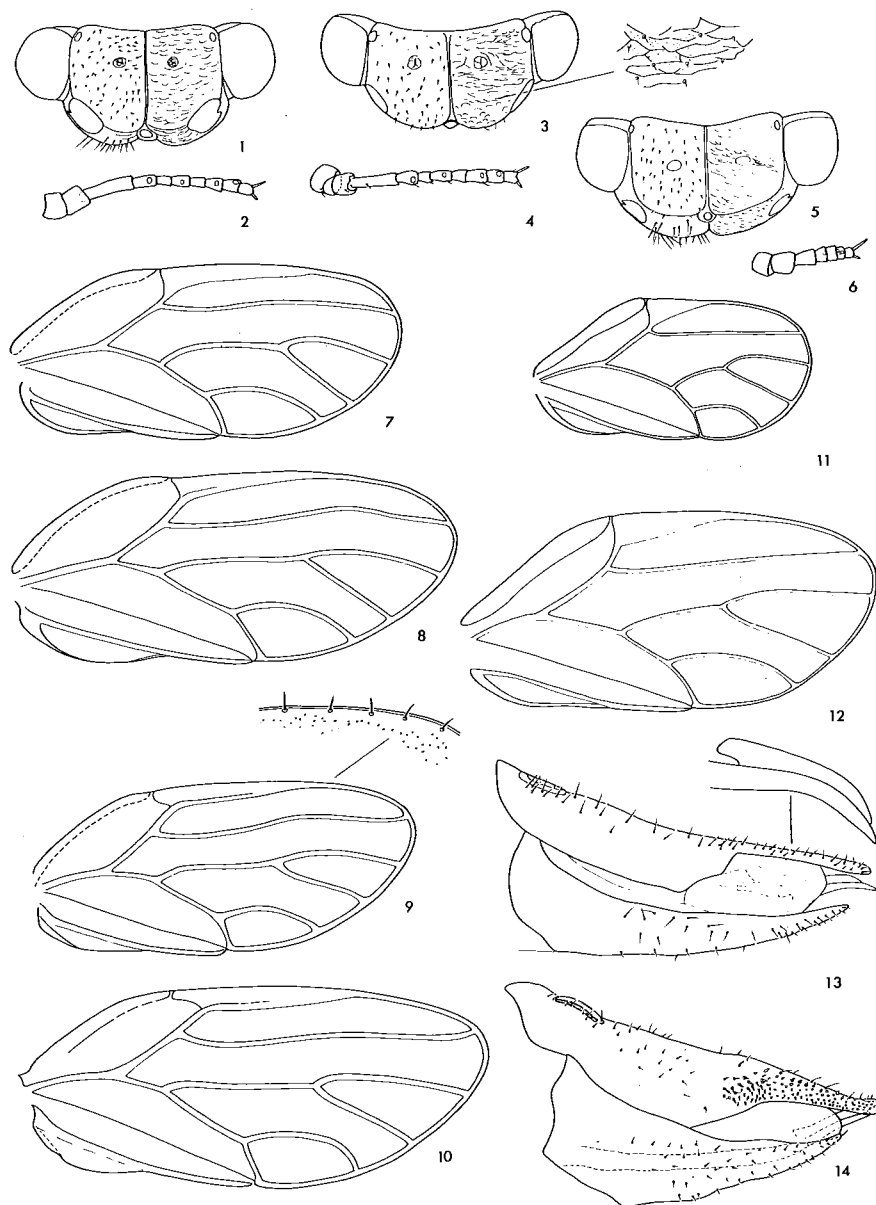
Acaerus loginovae n. sp.

(Figs. 1, 2, 7, 8, 13, 15, 16)

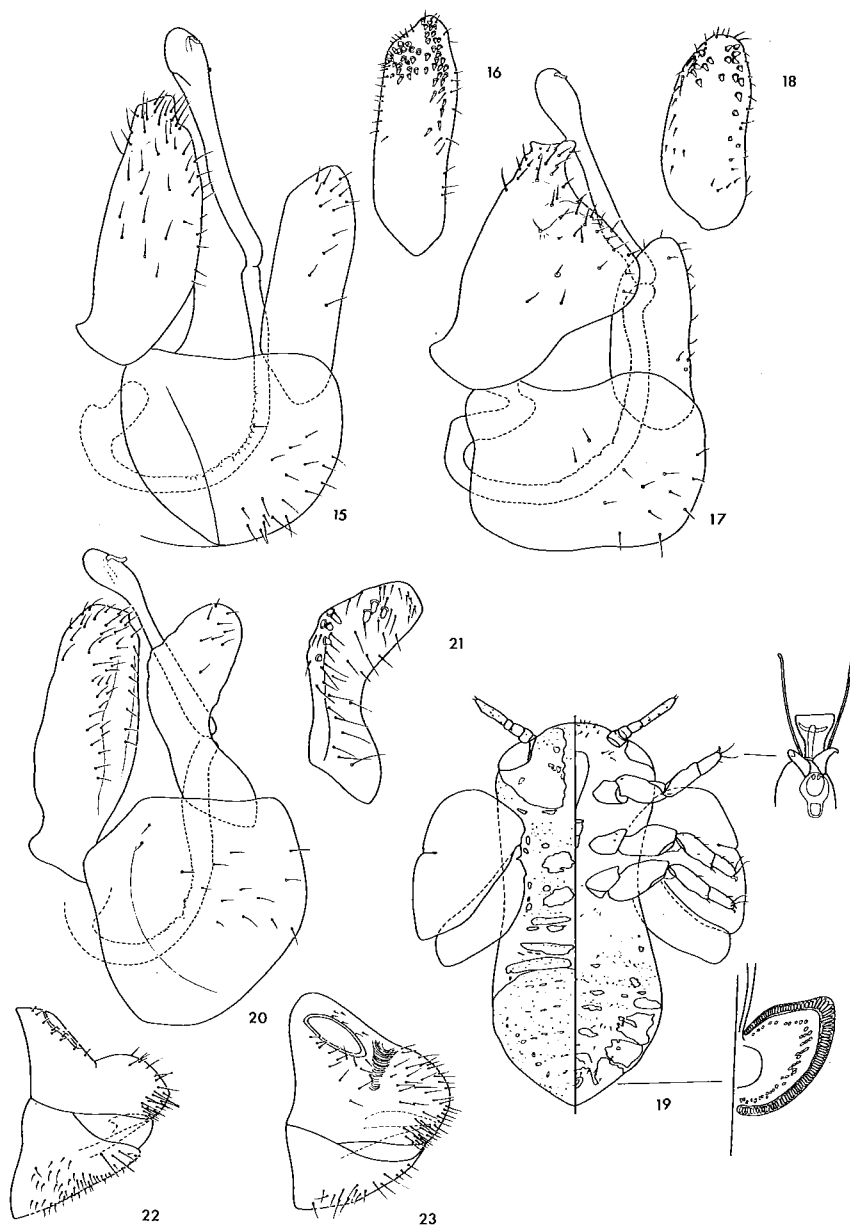
DESCRIPTION. Adult. Coloration. Ochreous, antennae yellow, segment 10 dark brown. Forewings semitransparent or opaque, greyish. Mesonotum with four longitudinal brown stripes. Abdomen including terminalia brown.

Structure. Head (Fig. 1) from above narrower than mesonotum, evenly rounded anteriorly; in profile weakly to strongly deflexed from longitudinal body axis. Surface of vertex and genae coarsely pitted; surface sculpture of vertex forming small irregular cells containing tubercles arranged in transverse rows. Setosity on head microscopical, evenly arranged dorsally, macroscopical anteriorly and ventrally, much longer ventrally. Antennae (Fig. 2) shorter than head

* Contribution from the Agricultural Research Organization, The Volcani Center, BetDagan, Israel, No. 3286 E, 1991 series.



Figs. 1–14. 1, 2, 7, 8, 13, *Acaerus loginovae* n. sp.; 3, 4, 9, 10, 14, *Acaerus negevensis* n. sp.; 5, 6, 11, 12, *Pachypylloides shalmoni* n. sp. 1, 3, 5, head, dorsal view; 2, 4, 6, antenna; 7, 9, 11, male forewing; 8, 10, 12, female forewing; 13–14, female terminalia, lateral view.



Figs. 15-23. 15, 16, *Acaerus loginovae* n. sp.; 17-19, *Acaerus negevensis* n. sp.; 20-23, *Pachypsyloides shalmoni* n. sp.; 15, 17, 20, male terminalia, lateral view; 16, 18, 21, paramere, inner surface; 19, fifth instar larva; left, dorsal aspect; right, ventral aspect; 22, female terminalia, lateral view; 23, female terminalia, oblique dorso-lateral view.

width, 10-segmented, in females relatively shorter than in males; one large rhinarium on each of segments 4, 6, 8, and 9; both terminal antennal setae shorter than segment 10, blunt apically, strongly differing in length. Forewings weakly dimorphic (Figs. 7, 8), in male slightly shorter with outer margin more rounded. Membrane weakly coriaceous with a narrow marginal band of spinules on the lower surface, otherwise without surface spinules. Hindwings slightly shorter than the forewings; costal setae grouped. Legs robust, tarsomeres long. Metacoxae with subacute, spur-shaped meracanthus. Metatibiae without basal spine, with a crown of 5 to 6, small, evenly spaced apical spurs; metatarsi with 2 black spurs. Terminalia as in Figs. 13, 15, 16. Male proctiger with hardly rounded posterior margin. Parameres lamellar, angular apically; inner surface with two groups of dark pegs in apical half. Proximal portion of aedeagus straight subapically, distal portion straight with rounded apical dilatation; sclerotised end tube of ductus ejaculatorius short, curved. Dorsal margin of female proctiger almost straight, apex narrowly rounded; apical third forming a narrow lamella bearing short setae but no pegs; subgenital plate evenly tapered, apex pointed; valvulae 1 and 2 distinctly curved.

Measurements in mm (3 ♂, 3 ♀). Head width (HW) 0.60–0.69; antenna length (AL) 0.49–0.57; forewing length (WL) ♂ 1.68–1.80, ♀ 2.01–2.15; male proctiger length (MP) 0.30–0.32; paramere length 0.29–0.30; length of distal portion of aedeagus 0.31–0.32; female proctiger length (FP) 0.85–0.88; AL/HW 0.62–0.72; labium length/HW 0.25–0.29; metatibia length/HW 0.67–0.76; WL/HW 2.63–3.10; WL/forewing width 2.15–2.29; MP/HW 0.46–0.52; FP/HW 1.23–1.29; FP/circumanal ring length 13.38–17.67; FP/female subgenital plate length 1.18–1.24; relative length of antennal flagellar segments from base to apex 1.0 : 0.5 : 0.3 : 0.5 : 0.3 : 0.5 : 0.3 : 0.3; relative length of antennal segment 10 and terminal setae 1.0 : 0.5 : 0.9.

Larva unknown.

HOST PLANT. *Calligonum comosum*.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: Mishor Rotem (NN), 1.iv.1991; on *C. comosum* (J. Halperin) (MHNG).

Paratypes. ISRAEL: 6 ♂ 7 ♀, same data as holotype (J. Halperin) (MHNG).

COMMENTS. *Acaerus* comprises six described species in the Palaearctic which all develop on *Calligonum* spp. (Loginova, 1976). Two species groups, with three species each, are defined by the structure of the male parameres. Members of the *memoratus* group comprising *A. memoratus* (Loginova), *tumidulus* (Loginova), and *deminutus* (Loginova), possess long lamellar parameres bearing an elongate swelling along the basal two thirds of the fore margin. The *turkestanicus* group with *A. turkestanicus* (Löw), *callygoni* (Bajeva), and *luridus* (Loginova) is characterised by shorter parameres with a simple inner surface covered in dark, sclerotised pegs. *Acaerus loginovae* and the following new species, *A. negevensis*, both belong to the latter species group on the basis of their paramere structure. *A. loginovae* differs from *turkestanicus* and *negevensis* in the less produced posterior margin of the male proctiger, and from *callygoni* and *luridus* in the longer and apically more angular male parameres which are about as long as the proctiger in *loginovae* and about two thirds proctiger length in *callygoni* and *luridus*. In the female, *A. loginovae* is characterised by the distinctly curved valvulae 1 and 2, which are straight or weakly curved in the other species, and the narrowly sclerotised apical portion of the proctiger.

Acaerus negevensis n. sp.
(Figs. 3, 4, 9, 10, 14, 17–19)

DESCRIPTION. *Adult. Coloration.* Ochreous, antennal segments 8–10 dark brown to black. Forewings semitransparent or opaque, pale or weakly infuscate; veins yellowish. Thorax with slightly darker dorsal patches. Female proctiger brown.

Structure. Head (Fig. 3) from above slightly narrower than mesonotum, evenly rounded anteriorly; in profile very weakly deflexed from longitudinal body axis. Surface of vertex and genae coarsely pitted; surface sculpture of vertex forming small irregular cells containing a small number of tubercles arranged in transverse rows. Setosity on head microscopical, evenly arranged dorsally, macroscopical anteriorly and ventrally, much longer ventrally. Antennae (Fig. 4) shorter than head width, 10-segmented; large rhinaria on each of segments 4, 6, 8, and 9; both terminal antennal setae shorter than segment 10, blunt apically. Forewings slightly dimorphic, irregularly oval-shaped in male (Fig. 9) and trapezoidal in female (Fig. 10). Membrane weakly coriaceous with a marginal band of spinules on the lower surface. Hindwings slightly shorter than the forewings; costal setae grouped. Legs robust, tarsomeres long. Metacoxae with blunt, spur-shaped meracanthus. Metatibiae without basal spine, with a crown of usually 5, sometimes 6, evenly spaced apical spurs; metatarsi with 2 black spurs. Terminalia as in Figs. 14, 17, 18. Male proctiger with evenly rounded posterior lobes. Parameres lamellar, angular apically; inner surface with two groups of dark pegs in apical half. Proximal portion of aedeagus sinuous subapically, distal portion straight with rounded apical dilatation; sclerotised end tube of ductus ejaculatorius short, curved. Dorsal margin of female proctiger with flat hump in the middle, apex obliquely truncate, apical portion bearing densely spaced sclerotised pegs; subgenital plate evenly tapered, apex pointed.

Measurements in mm (3 ♂, 3 ♀). Head width (HW) 0.49-0.57; antenna length (AL) 0.39-0.45; forewing length (WL) ♂ 1.22-1.36, ♀ 1.57-1.73; male proctiger length (MP) 0.22-0.24; paramere length 0.17-0.19; length of distal portion of aedeagus 0.19-0.22; female proctiger length (FP) 0.67-0.75; AL/HW 0.70-0.84; labium length/HW 0.28-0.34; metatibia length/HW 0.54-0.63; WL/HW 2.44-3.03; WL/forewing width 2.06-2.36; MP/HW 0.44-0.48; FP/HW 1.17-1.31; FP/circumanal ring length 3.19-3.41; FP/female subgenital plate length 1.31-1.56; relative length of antennal flagellar segments from base to apex 1.0 : 0.4 : 0.2 : 0.4 : 0.4 : 0.4 : 0.3 : 0.2; relative length of antennal segment 10 and terminal setae 1.0 : 0.6 : 0.8.

Fifth instar larva. Coloration. Yellow with brown tergites, antennae and legs; wing pads dark brown.

Structure. Body (Fig. 19) broad, flattened. Sclerites, wing pads and caudal plate strongly sclerotised. Very small microscopic setae sparsely covering cephalothoracic sclerites, dorsal surface and margin of wing pads and caudal plate. Antennae 3 to 6-segmented. Forewing pads large with humeral lobes and an incision along the outer margin. Tarsal arolia triangular, longer than claws, with visible unguitactor. Circumanal rings small, outer ring consisting of a single row of very elongate pores, inner ring consisting of several irregular rows of rounded pores.

Measurements in mm (3 larvae). Antenna length (AL) 0.24-0.28; forewing pad length (WL) 0.56-0.60; body length (BL) 1.36-1.57; caudal plate width (CPW) 0.62-0.71; AL/BL 0.40-0.50; BL/body width 1.05-1.19; CPW/caudal plate length 1.29-1.35; outer circumanal ring width/CPW 0.07-0.12.

HOST PLANT. *Calligonum comosum*.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: Mishor Rotem (NN), 13.iii.90; on *C. comosum* (J. Halperin) (MHNG).

Paratypes. ISRAEL: 20 ♂ 20 ♀ 27 larvae, same data as holotype; 1 ♂ 9 ♀, same but 1.iv.1991; 1 ♀, Yahel (AV), 24.iii.1989; on *C. comosum* (MHNG, NCI).

COMMENTS. Within the *turkestanicus* group as defined above, *A. negevensis* resembles *turkestanicus* in the posteriorly strongly produced male proctiger. It differs from the latter in (1) the shorter, more evenly rounded posterior lobes of the male proctiger; (2) the shorter parameres with two separated groups of internal pegs; (3) the subapically more sinuous proximal portion of the aedeagus; (4) the apically more inflated distal portion of the aedeagus; (5) the terminally obliquely

truncate female proctiger, which is narrowly rounded in *turkestanicus*; (6) and the apically more massive subgenital plate which is slender in *turkestanicus*.

Acizzia sp.

HOST PLANT. *Acacia raddiana*, *A. tortilis*.

MATERIAL EXAMINED. 5 ♀, En Gedi (DS), Hazeva, 'En Yahav, Evrona (AV), Elat, i, iii; on *A. raddiana* and *A. tortilis*.

COMMENTS. This probably undescribed species differs from other west Palaearctic members of *Acizzia* in the evenly spotted, slightly subrectangular forewings. Males are needed for reliable species identification.

Acizzia wittmeri Burckhardt

HOST PLANT. *Acacia raddiana*, *A. tortilis*.

DISTRIBUTION. Saudi Arabia (Burckhardt, 1985a).

MATERIAL EXAMINED. 1 ♀, Yotvata (AV), 19.ii.89; 3 ♂ 5 ♀, Hazeva and Nahal Baraq (AV), 9.i.90; on *A. raddiana* and *A. tortilis*.

Brachystetha nitrariae Loginova

HOST PLANT. *Nitraria* spp.

DISTRIBUTION. Kazakh, Tadjik and Turkmen SSR (Baeva, 1985).

MATERIAL EXAMINED. 3 ♂ 7 ♀, CN, AV, i-iii, X, 5 larvae in x; on *N. retusa*.

Caillardia dilatata Loginova

HOST PLANT. *Hammada salicornica*, *H. elegans* (leaf galls).

DISTRIBUTION. Egypt, Saudi Arabia, Iran (Burckhardt, 1985a).

MATERIAL EXAMINED. 7 ♂ 12 ♀, NN, AV, v, vi, ix, x, many larvae iv-vi, ix; on *H. salicornica* (leaf galls).

Craspedolepta innoxia (Förster)

HOST PLANT. *Daucus carota*, *Seseli leucospermum*.

DISTRIBUTION. N. Africa, Central and S. Europe, Moldavia, Caucasus, Kazakh, Tadjik and Turkmen SSR, Siberia, Mongolia (Burckhardt, 1989; Gegechkori and Tamanini, 1990).

MATERIAL EXAMINED. 1 ♂, Ma'alot (UG), 3.v.90.

Diaphorina chobauti Puton

HOST PLANT. *Convolvulus* spp.

DISTRIBUTION. Italy, N. Africa, Cyprus, Caucasus, Kazakh SSR, Middle Asia, Mongolia (Burckhardt, 1985b, 1989).

MATERIAL EXAMINED. 31 ♂ 33 ♀, CP, Sh, JD, iii-vi, many larvae in iii; on *C. dorycnium* and *C. secundus*.

Diaphorina lamproptera Burckhardt

HOST PLANT. *Zygophyllum* spp.

DISTRIBUTION. Saudi Arabia, Egypt (Burckhardt, 1985b).

MATERIAL EXAMINED. 2 ♂ 5 ♀, Paran (AV), 1.vi.1991; 1 ♂, 1 ♀, Samar (AV), 1.vi.1991; on *Zygophyllum simplex*.

Lisronia varicicosta (Hodkinson and Hollis)

HOST PLANT. *Cistus* spp., *Tuberaria lignosa*.

DISTRIBUTION. Mediterranean (Burckhardt, 1989).

MATERIAL EXAMINED. 6 ♂ 20 ♀ 1 larva, Ca, CP, iv, on *Helianthemum stipulatum*.

Livilla spectabilis (Flor)

HOST PLANT. *Spartium junceum*.

DISTRIBUTION. Mediterranean, Switzerland (Burckhardt, 1989).

MATERIAL EXAMINED. 8 ♂ 5 ♀, MH, UG, iv, v, viii; on *S. junceum*.

Pachypsylloides dumonti Bergevin

HOST PLANT. *Calligonum comosum*.

DISTRIBUTION. Tunisia (Burckhardt, 1986).

MATERIAL EXAMINED. 7 ♀ Evrona, Yahel (AV), Mishor Rotem (NN), ii, iii, many larvae i-vi, xii; in spindle or sphaerical galls on woody twigs of *C. comosum*.

COMMENTS. The psyllid fauna of *Calligonum* is quite diverse; it has been well studied in Central Asia but less in the west Palaearctic (Burckhardt, 1986).

Pachypsylloides shalmoni n. sp.

(Figs. 5, 6, 11, 12, 20-23)

DESCRIPTION. *Adult. Coloration.* Vertex orange, lower head surface yellowish; scape orange, pedicel ochreous, antennal flagellum yellow. Thorax ochreous dorsally, yellow with some dark brown spots laterally and ventrally; mesoscutum bearing 4 longitudinal darker stripes. Wings whitish. Legs ochreous. Abdomen yellowish with dark brown tergites. Immature specimens lighter.

Structure. Head (Fig. 5) from above about as wide as mesonotum, genae weakly, irregularly produced anteriorly; in profile weakly to strongly declined from longitudinal body axis. Surface of vertex and genae granular; setosity on vertex microscopical, even, on genae short, macroscopical. Antennae (Fig. 6) much shorter than head width, indistinctly 5 to 7-segmented, with 1 to several rhinaria on flagellar segments except for the first and ultimate, first flagellar segment sometimes with one small rhinarium; size and number of rhinaria very variable, often asymmetri-

cal on the two antennae; both terminal setae longer than ultimate segment, strongly differing in length. Forewings distinctly dimorphic, broadly rounded apically in males (Fig. 11), tapered in females (Fig. 12); pterostigma large, sessile in males, pedunculate in females. Membrane semi-transparent, weakly rugose, lacking surface spinules. Hindwings slightly shorter than forewings, costal setae grouped. Legs robust, tarsomeres long. Metacoxae with short subacute meracanthus. Metatibiae strongly widened to apex, without basal spine, with 5–6 indistinctly grouped apical spurs; metatarsi with 2 black spurs. Terminalia as in Figs. 20–23. Male proctiger almost straight posteriorly. Parameres strongly widened in apical half, bearing two groups of dark, strongly sclerotised pegs on the inner surface. Proximal portion of aedeagus weakly curved subapically, distal portion straight with slightly dilated apex; sclerotised end tube of ductus ejaculatorius short, sinuate. Female terminalia short, proctiger strongly indented distal to circumanal ring, broadly rounded and strongly setose apically; ventral margin of subgenital plate straight, covered in long, fine, weakly undulated setae; valvulae 1 and 2 straight, pointed.

Measurements in mm (2 ♂, 3 ♀). Head width (HW) 0.60–0.76; antenna length (AL) 0.26–0.30; forewing length (WL) ♂ 1.24–1.27, ♀ 1.55–1.92; male proctiger length (MP) 0.24–0.25; paramere length 0.22–0.23; length of distal portion of aedeagus 0.20–0.21; female proctiger length (FP) 0.36–0.38; AL/HW 0.37–0.44; labium length/HW 0.17–0.23; metatibia length/HW 0.38–0.48; WL/HW 1.96–2.53; WL/forewing width 1.93–2.16; MP/HW 0.38–0.40; FP/HW 0.47–0.54; FP/circumanal ring length 2.81–3.21; FP/female subgenital plate length 0.78–0.91.

Larva unknown.

HOST PLANT. *Calligonum comosum*.

MATERIAL EXAMINED. Holotype ♂, ISRAEL: Yahel (S) (AV), 1.vi.1991; on *C. comosum* (J. Halperin) (MHNG).

Paratypes. ISRAEL: 7 ♂ 13 ♀, same data as holotype; 1 ♀, Qetura (N), 24.iii.1989; on *C. comosum* (J. Halperin) (MHNG).

COMMENTS. *Pachypsylloides* comprises 11 described species in the Palaearctic all confined to *Calligonum* spp. (Loginova, 1976). *P. shalmoni* differs from all known members of the genus in the short, 5–7-segmented antennae, and the apically widened parameres.

Pachypsylloides sp.

HOST PLANT. *Calligonum comosum*.

MATERIAL EXAMINED. 2 ♀, Yahel (AV), 1.vi.1991; on *C. comosum*.

COMMENT. This species is close to *Pachypsylloides reverendus* Loginova and *errator* Loginova in the rhomboidal, apically subacute forewings and the long branches of vein M in the forewing. It differs in the smaller body dimensions and the apically slightly more bulged female proctiger. Without the diagnostically important males the species cannot be identified.

Psyllopsis fraxinicola (Förster)

HOST PLANT. *Fraxinus excelsior*, *F. ornus*.

DISTRIBUTION. Europe, Turkey, N. Africa, European USSR, Caucasus, Kazakh SSR; introduced into the USA (Burckhardt, 1989; Gegechkori and Tamanini, 1990).

MATERIAL EXAMINED. 40 ♂ 31 ♀, Dan (HV), iv, v; on *F. syriaca*.

Psyllopsis machinosa Loginova

HOST PLANT. *Fraxinus* spp.

DISTRIBUTION. European part of USSR, Armenia, Kazakh, Tadzhik, Turkmen and Uzbek SSR, Turkey (Burckhardt, 1988; Gegechkori, 1984; Gegechkori and Loginova, 1990).

MATERIAL EXAMINED. 15 ♂ 17 ♀, Dan, Shamir (HV); Kefar Gil'adi, Misgav Am (UG), iv, v; in rolled leaves of *F. syriaca*.

Rhodochlanis bicolor (Scott)

HOST PLANT. *Petrosimonia*, *Salicornia*, *Suaeda*.

DISTRIBUTION. Central Asia, Kazakh SSR, Caucasus, Greece, Bulgaria, Italy (Burckhardt, 1989; Conci and Tamanini, 1984; Gegechkori, 1984; Gegechkori and Tamanini, 1990).

MATERIAL EXAMINED. 2 ♂ 5 ♀, Kalia (DS), v, vi; on *Suaeda asphaltica*.

Trioza sahlbergi Šulc

HOST PLANT. *Atriplex halimus*; *leucoclada*.

DISTRIBUTION. Algeria, ? Tunisia, Italy (Burckhardt, 1989).

MATERIAL EXAMINED. 19 ♂ 20 ♀, LG, JV, Sh, JD, DS, AV, NN, CN, ii-v, 35 larvae, i, iv; on *A. halimus* sometimes forming leaf galls; *A. leucoclada*.

ACKNOWLEDGEMENTS

We thank Nicolette Lavoyer, Geneva, for preparing the drawings and G. Roth (MHNG) for inking them. Thanks to a grant from the Academy of Sciences of the USSR, under the scientific exchange agreement between the Soviet and Swiss Academies of Sciences, the senior author could study relevant type material in the Zoological Institute, St. Petersburg (Leningrad). This is gratefully acknowledged. D.B. is very indebted to Dr I.M. Kerzhner and the staff of the Hemiptera lab of the Zoological Institute, St. Petersburg (Leningrad), for their help during his stay in this institution. J.H. is grateful to Dr B. Shalmon, the Society for the Protection of Nature in Israel, Elat, for his assistance in the identification of some plants.

REFERENCES

- Baeva, V.G. 1985. Jumping plant lice (Homoptera, Psylloidea). Fauna of the Tadjik SSR, Dushanbe, 332 pp. (In Russian).
- Burckhardt, D. 1985a. Psylloidea of Saudi Arabia 2. *Fauna of Saudi Arabia* 7: 141-159.
- Burckhardt, D. 1985b. The mediterranean species of *Diaphorina* Loew (Homoptera, Psylloidea). *Phytophaga, Palermo* 2 (1984): 1-30.
- Burckhardt, D. 1986. Beitrag zur Kenntnis der Pachypsylloiden von Europa und Nordafrika (Homoptera, Psylloidea). *Mitteilungen der entomologischen Gesellschaft Basel* 36(4): 163-170.
- Burckhardt, D. 1988. Angaben zur Psyllidenfauna der Nordosttürkei (Homoptera: Psylloidea). *Mitteilungen der entomologischen Gesellschaft Basel* 38(1): 31-44.
- Burckhardt, D. 1989. Les psylles (Insecta, Homoptera, Psylloidea) de l'Algérie. *Archives des Sciences, Genève* 42: 367-424.
- Burckhardt, D. and Lauterer, P. 1989. Systematics and biology of the Rhinocolinae. *Journal of Natural History* 23: 643-712.
- Conci, C. and Tamanini, L. 1984. *Rhodochlanis salicorniae* Klim., nuovo per l'Italia, *R. hodkinsoni* n. sp.,

- di Puglia, da *Suaeda vera*, e considerazioni sul genere. *Atti della Societa italiana di Scienze naturali e del Museo civico di Storia naturale in Milano* 125: 61–80.
- Gegechkori, A.M.** 1984. Psillidy (Homoptera, Psylloidea) Kavkaza. Akademiya Nauk Gruzinskoyi SSR, Tbilissi, 296 pp. (in Russian).
- Gegechkori, A.M. and Tamanini, L.** 1990. Psillidy (Homoptera, Psylloidea) SSR. Akademiya Nauk Gruzinskoyi SSR, Tbilissi (in Russian).
- Halperin, J.** 1986. An introduced psyllid injurious to *Acacia* trees. *Phytoparasitica* 14(3): 235.
- Halperin, J., Hodkinson, I. D. and Burckhardt, D.** 1988. Six local psyllids (Homoptera: Psylloidea) new to the Israeli fauna. *Phytoparasitica* 16(3): 283–284.
- Halperin, J., Hodkinson, I. D., Russell, L. M. and Berlinger, M. J.** 1982. A contribution to the knowledge of the psyllids of Israel (Homoptera: Psylloidea). *Israel Journal of Entomology* 16: 27–44.
- Loginova, M.M.** 1976. Psillidy tribu Pachypsylloidini (Psylloidea, Aphalaridae). *Zoologicheskiy Zhurnal* 55(4): 612–614.