

## Jumping plant-lice (Hemiptera: Psylloidea) of Afghanistan

Igor MALENOVSKÝ<sup>1)</sup>, Pavel LAUTERER<sup>1,2)</sup>, Eugenia LABINA<sup>3)</sup>  
& Daniel BURCKHARDT<sup>4)</sup>

<sup>1)</sup>Department of Entomology, Moravian Museum, Hviezdoslavova 29a, CZ-627 00 Brno, Czech Republic;  
e-mail: imalenovsky@mzm.cz

<sup>2)</sup>e-mail: ento.laut@volny.cz

<sup>3)</sup>Laboratory of Systematics of Insects, Zoological Institute of Russian Academy of Sciences,  
Universitetskaya nab. 1, 199034 St. Petersburg, Russia; e-mail: labina\_e@mail.ru

<sup>4)</sup>Naturhistorisches Museum, Augustinergasse 2, CH-4001 Basel, Switzerland;  
e-mail: daniel.burckhardt@unibas.ch

**Abstract.** The psyllid fauna of Afghanistan is reviewed comprising, 32 identified species, 15 of which are recorded from the country for the first time, including *Agonoscena klapperichi* sp. nov. (Psyllidae: Rhinocolinae), which is formally described and illustrated. Additional illustrations are provided for *Craspedolepta manica* Baeva, 1978, *Cacopsylla* cf. *nasuta* (Horváth, 1904) and *Trioza urticae* Linnaeus, 1758. Another 5 species are represented by insufficient material and cannot be currently identified. The bulk of the examined material comes from four expeditions by J. Klapperich, O. Jakeš, M. Daniel and E. S. Sugonyaev in the 1950's and 1960's. The psyllid fauna of Afghanistan remains poorly known and additional species can be expected. The biogeographical relationships and economic importance of the Afghan psyllid fauna are briefly discussed. In addition, a new record of *Psyllopsis securicola* Loginova, 1963 from Iraq is provided.

**Key words.** Hemiptera, Sternorrhyncha, Psylloidea, taxonomy, distribution, new species, Afghanistan, Central Asia, Palaearctic Region

## Introduction

Jumping plant-lice or psyllids, with some 4,000 described species worldwide, are usually highly host-specific plant-sap sucking insects. Central Asia comprises a characteristic psyllid fauna but the knowledge on the different countries is very uneven (BAEVA 1985, GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1993, LI 2011). The psyllid fauna of Afghanistan is poorly known. So far, four species have been described partly or entirely based on material from Afghanistan: *Cyamophila afganica* Loginova, 1978, *C. odontopyx* Loginova, 1978 [= *C. glycyrrhizae* (Becker, 1874)], *Livilla klapperichi* Hodkinson & Hollis, 1987, and *Homotoma caroliquarti* Burckhardt & Lauterer, 1993. Additional 13 species have been

reported in the literature. This information is scattered in taxonomic papers or in check-lists lacking detailed collecting data (e.g. LOGINOVA 1972, 1974, 1978; LOGINOVA & BAEVA 1972; GEGECHKORI & LOGINOVA 1990).

Afghanistan is a land-locked country located in Central Asia with a surface area of 652,089 km<sup>2</sup>. It is dominated by mountains that cover about two thirds of its surface (27 % of the area above 2,500 m elevation; highest point Mt. Nowshak at 7,484 m). The climate throughout most of the country is arid or semi-arid, continental, with cold winters, long hot and extremely dry summers, most precipitation falling in winter and early spring. The mean monthly temperature and precipitation are largely influenced by elevation and vary by region (UNEP 2008).

Most of Afghanistan lies in the Palaearctic biogeographical Realm while a small area of the lower Kabul Valley at the eastern border is sub-tropical and belongs to the Oriental Realm. OLSON et al. (2001) recognise in Afghanistan 15 eco-regions representing four biomes. The mountains with a comparatively rich subalpine and alpine vegetation have been originally surrounded by semi-desert and open woodlands while extensive deserts are found in the south-west. The extreme east is characterised by monsoon-influenced evergreen and coniferous forests (BRECKLE 2007, UNEP 2008). Most of the natural vegetation, except for that in alpine regions and deserts, is now largely reduced by overgrazing, tree cutting (resulting in an almost complete deforestation), shrub collection for fuel and climate change (desertification) in the last 40 years (UNEP 2008, MoAIL 2009).

The habitat diversity and the position at the boundary of biogeographical Realms contribute to a diverse flora consisting of about 5,000 species of vascular plants with 25–30 % endemics (BRECKLE 2007). Accordingly, a rich fauna of phytophagous insects can be expected. However, as most other groups of insects, psyllids are poorly studied in Afghanistan partly due to the long-lasting complicated political situation and war conflicts. Entomological activities in the country were rare before World War II. Most of known data on Afghan insects come from the period from the 1950's to the onset of war in 1978 when several expeditions of European, American and Asian scientists visited Afghanistan to collect biological material which was then worked up by taxonomists (NAHIF 1986).

Recently, we have identified the Psylloidea collected by Johann Friedrich Klapperich in north-eastern Afghanistan and Kandahar environs in 1952–1953, Oldřich Jakeš in the north-western part of the country in 1963–1964 and Milan Daniel in Badakhshan in 1965. In addition we revised specimens collected by Eugeny S. Sugonyaev in north-eastern Afghanistan in 1966; most of the previously published records are based on these latter collections (records predominantly by Marianna M. Loginova). The aim of the present paper is to provide an updated list of the psyllid fauna of Afghanistan with a summary of published records and detailed collecting data of the material at hand.

## Material and methods

The material examined is deposited in or cited from the following collections:

- BMNH The Natural History Museum, London, United Kingdom;
- HNHM Magyar Természettudományi Múzeum [= Hungarian National History Museum], Budapest, Hungary;
- MHNG Muséum d'histoire naturelle, Genève [= Natural History Museum, Geneva], Switzerland;
- MMBC Moravské zemské muzeum [= Moravian Museum], Brno, Czech Republic;
- NHMB Naturhistorisches Museum [= Natural History Museum], Basel, Switzerland;

NMPC Národní muzeum, Praha [= National Museum, Prague], Czech Republic;

ZIN Zoologicheskii Institut Rossiyskoy Akademii Nauk [= Zoological Institute of the Russian Academy of Sciences], St. Petersburg, Russia.

Localities of the material examined are placed in provinces (wilayat) of the current administrative division of Afghanistan, as of 2004 (Fig. 1). For the holotype of *Agonoscena klapperichi* sp. nov., label data are quoted verbatim: lines are indicated by a single slash (/), separate labels by a double slash (/). Further details on the collecting sites, habitats and collecting methods for the material acquired on Klapperich's expedition can be found in KLAPPERICH (1954); for Jakeš' expedition see JAKES (1967) and ANONYMUS (1967).

The morphological terminology follows OSSIANNILSSON (1992). The classification of Psylloidea adopted in the paper is mostly based on WHITE & HODKINSON (1985) and BURCKHARDT (1987). The host plant species names are used in the same form as originally given in the corresponding references; the plant family names follow APG III (2009). The general distribution of each psyllid species is explicitly recorded only for countries neighbouring with Afghanistan; extralimital distribution is mostly abstracted (more detailed data can be found e.g. in GEGECHKORI & LOGINOVA 1990 and BURCKHARDT 2011).

Drawings, photographs and measurements were made from permanent or temporary slide-mounts using an Olympus BX41 microscope with a drawing tube and a digital camera attached and the Olympus QuickPHOTO PRO software.

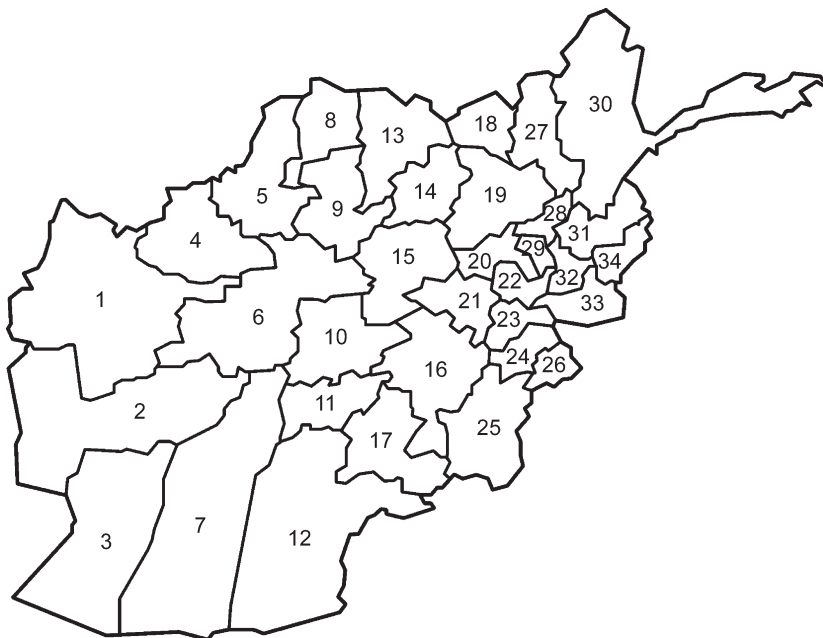


Fig. 1. The provinces of Afghanistan. 1 – Herat; 2 – Farah; 3 – Nimruz; 4 – Badghis; 5 – Faryab; 6 – Ghor; 7 – Helmand; 8 – Jowzjan; 9 – Sar-e Pol; 10 – Daykundi; 11 – Orūzgān; 12 – Kandahar; 13 – Balkh; 14 – Samangan; 15 – Bamiyan; 16 – Ghazni; 17 – Zabul; 18 – Kunduz; 19 – Baghlan; 20 – Parwan; 21 – Wardak; 22 – Kabul; 23 – Logar; 24 – Paktia; 25 – Khost; 26 – Paktia; 27 – Takhar; 28 – Panjshir; 29 – Kapisa; 30 – Badakhshan; 31 – Nuristan; 32 – Laghman; 33 – Nangarhar; 34 – Kunar.

## Systematic account of Psylloidea of Afghanistan

HOMOTOMIDAE Heslop-Harrison, 1958

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

**Published records.** BURCKHARDT & LAUTERER (1993): Nuristan (Bashgul Valley; paratypes).

**Material examined.** NURISTAN: Bashgul Valley, 1100 m, 17.iv.1953, 5 ♂♂ 8 ♀♀ (paratypes, 1 ♂ 1 ♀ not included in type series), J. Klapperich leg. (MHNG, MMBC, NMPC; dry and slide-mounted).

**General distribution.** Iran, Pakistan (BURCKHARDT & LAUTERER 1993).

**Host plant.** *Ficus* sp. (Moraceae) (BURCKHARDT & LAUTERER 1993).

### *Homotoma indica* (Mathur, 1975)

**Material examined.** NURISTAN: Bashgul Valley, 1100–1200 m, 6.–17.iv.1953, 13 ♂♂ 16 ♀♀; same data, 1200 m, 3.v.1953, 3 ♂♂. KUNAR: Kunar [= Chitral] Valley, Asmar, 900 m, 3.iv.1953, 1 ♂. All J. Klapperich leg. (MMBC; dry and slide-mounted).

**General distribution.** India (Uttar Pradesh) (MATHUR 1975, HOLLIS & BROOMFIELD 1989). New record for Afghanistan.

**Host plants.** *Ficus microcarpa* and *F. tsjahela* or *F. virens* (Moraceae) (HOLLIS & BROOMFIELD 1989).

PSYLLIDAE Latreille, 1807

APHALARINAE Löw, 1879

### *Colposcencia albomaculata* Loginova, 1960

**Published records.** LOGINOVA (1974): Afghanistan.

**Material examined.** BAGHLAN: Baghlan, flood plain, on *Tamarix* sp., 4.viii.1966, 1 ♂, E. S. Sugonyaev leg. (ZIN; dry-mounted). KUNDUZ: Kunduz Valley, Shikari, Duab, 1000 m, 24.vi.1953, 2 ♀♀, J. Klapperich leg. (MMBC; dry and slide-mounted).

**General distribution.** Tajikistan, Uzbekistan, Turkmenistan; Central Asia (GEGECHKORI & LOGINOVA 1990).

**Host plants.** *Tamarix hispida* and *Tamarix* sp. (Tamaricaceae) (GEGECHKORI & LOGINOVA 1990).

### *Colposcencia aliena* (Löw, 1882)

**Published records.** LOGINOVA (1972): Baghlan, Kunduz (Imam Sahib); HODKINSON (1986): Afghanistan.

**Material examined.** BAGHLAN: Baghlan, flood plain, 4.viii.1966, 1 ♂, E. S. Sugonyaev leg. (ZIN; dry-mounted). KANDAHAR: Kandahar, 950 m, 11.ii.1953, 1 ♂ (terminalia missing), J. Klapperich leg. (MMBC; dry and slide-mounted). KUNDUZ: Imam Sahib, saline land, on *Tamarix* sp., 18.x.1966, 2 ♂♂ 2 ♀♀, E. S. Sugonyaev leg. (ZIN; dry-mounted). PARVAN: southern slope of Hindu Kush, 50 km W from Charikar, 2100–2200 m, flood plain, on *Tamarix* sp., 17.ix.1966, 2 ♂♂ 2 ♀♀, E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** Iran, China, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Mongolia, Caucasus, Middle East, North Africa, southern Europe (HODKINSON 1986, GEGECHKORI & LOGINOVA 1990, BURCKHARDT & ÖNUÇAR 1993, BURCKHARDT 2011, LI 2011).

**Host plants.** *Tamarix* spp. (Tamaricaceae) (GEGECHKORI & LOGINOVA 1990).

*Colposcenia jakowleffi* (Scott, 1879)

**Material examined.** KANDAHAR: Kandahar, 950 m, 11.ii.1953, 1 ♂, J. Klapperich leg. (MMBC; slide-mounted).

**General distribution.** Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Caucasus, Yemen (GEGECHKORI & LOGINOVA 1990). New record for Afghanistan.

**Host plants.** *Tamarix hispida*, *T. smyrnensis* and *T. ramosissima* (Tamaricaceae) (GEGECHKORI & LOGINOVA 1990).

*Colposcenia orientalis* (Klimaszewski, 1970)

**Published records.** GEGECHKORI & LOGINOVA (1990): Afghanistan.

**Material examined.** No material examined.

**General distribution.** Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Caucasus, Russia (SW part), Middle East (GEGECHKORI & LOGINOVA 1990).

**Host plants.** *Tamarix hispida*, *T. ramosissima* and *T. ?kotschy* (Tamaricaceae) (GEGECHKORI & LOGINOVA 1990).

*Colposcenia vicina* Loginova, 1960

**Material examined.** KUNDUZ: Kunduz Valley, Shikari, Duab, 1000 m, 24.vi.1953, 1 ♂ 1 ♀, J. Klapperich leg. (MMBC; slide-mounted).

**General distribution.** Iran, China, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Caucasus, Russia (SW part) (GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1993, LI 2011). New record for Afghanistan.

**Host plants.** *Tamarix hispida*, *T. ramosissima* and other *Tamarix* spp. (Tamaricaceae) (GEGECHKORI & LOGINOVA 1990).

*Colposcenia* sp.

**Material examined.** NURISTAN: Bashgul Valley, Kamu, 1300 m, 15.vii.1952, 1 ♀, J. Klapperich leg. (MMBC; slide-mounted).

**Comments.** The female specimen at hand differs morphologically from the other Afghan *Colposcenia* spp. Without the taxonomically relevant males, however, it cannot be identified.

*Craspedolepta manica* Baeva, 1978

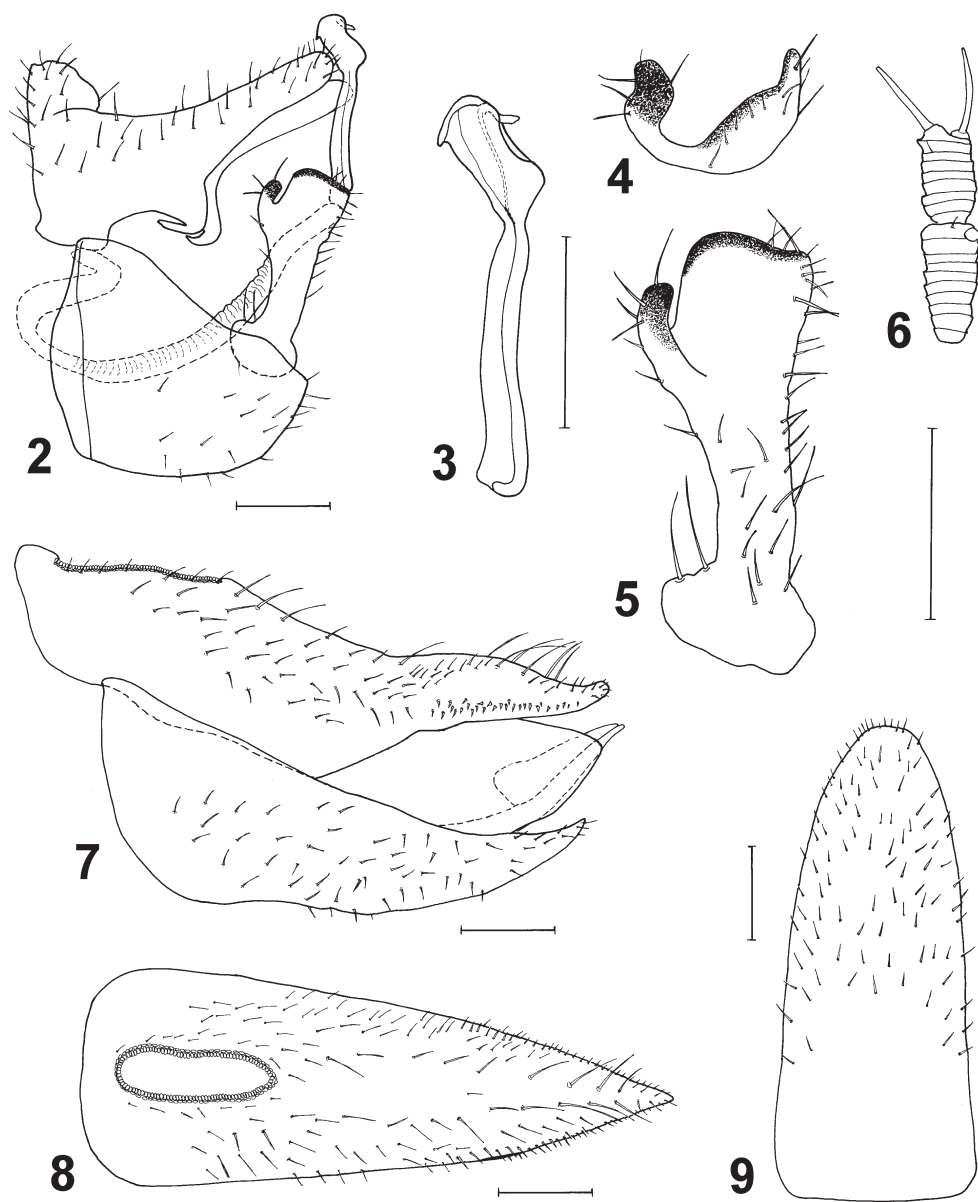
(Figs. 2–9, 13–14)

**Material examined.** NURISTAN: Bashgul Valley, Peschawurdo, 2200 m, 21.vii.1952, 8 ♂♂ 3 ♀♀; Bashgul Valley, Achmede Dewane, 2700 m, 25.vii.1952, 1 ♂ 1 ♀, all J. Klapperich leg. (MMBC; dry and slide-mounted).

**General distribution.** Tajikistan, Kyrgyzstan (GEGECHKORI & LOGINOVA 1990). New record for Afghanistan.

**Host plant.** *Lepidolopsis turkestanica* (Asteraceae) (BAEVA 1978, 1985; GEGECHKORI & LOGINOVA 1990).

**Comments.** Some of the drawings of taxonomically relevant structures provided by BAEVA (1978, 1985) lack diagnostic details. Figs. 2–9 and 13–14 are taken from the Afghan material at hand.



Figs. 2–9. *Craspedolepta manica* Baeva, 1978 from Afghanistan. 2 – male terminalia, lateral view; 3 – distal segment of aedeagus, lateral view; 4 – paramere, dorsal view; 5 – paramere, inner surface, lateral view; 6 – antennal segments 9–10; 7 – female terminalia, lateral view; 8 – female proctiger, dorsal view; 9 – female subgenital plate, ventral view. Scale bars: 0.1 mm.

*Craspedolepta setosa* (Wagner, 1947)

**Published records.** LOGINOVA (1972): Afghanistan.

**Material examined.** BADA KHSHAN: Ishmara, 19.vi.1965, 20 ♂♂ 18 ♀♀, M. Daniel leg.; same data, 19.vii.1965, 9 ♂♂ 9 ♀♀ (MMBC, NMPC, dry-mounted). KABUL: Kabul environs, 2000 m, desertified steppe in the mountains, *Artemisia* spp., Poaceae, 21.vii.1966, 2 ♂♂, E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Mongolia, Caucasus, Turkey, eastern Europe (GEGECHKORI & LOGINOVA 1990).

**Host plants.** *Artemisia* spp. (Asteraceae) (GEGECHKORI & LOGINOVA 1990).

*Craspedolepta vestita* Baeva, 1967

**Material examined.** BADA KHSHAN: Shiva Lake, high altitude steppe, 2800 m, 7.vii.1953, 1 ♀; same data, 12.vii.1953, 2 ♂♂ 2 ♀♀, all J. Klapperich leg. (MMBC; dry-mounted).

**General distribution.** Tajikistan, Kyrgyzstan (GEGECHKORI & LOGINOVA 1990). New record for Afghanistan.

**Host plant.** *Artemisia rhodantha* (Asteraceae) (BAEVA 1985).

PSYLLINAE Latreille, 1807 (including ARYTAININAE Crawford, 1914)

*Cacopsylla* cf. *nasuta* (Horváth, 1904)

(Figs. 10–12)

**Material examined.** BADA KHSHAN: Ishmara, 19.vi.1965, 3 ♂♂, M. Daniel leg. (MMBC, NMPC; dry-mounted).

**General distribution.** Kyrgyzstan (HORVÁTH 1904). New record for Afghanistan.

**Host plant.** Unknown.

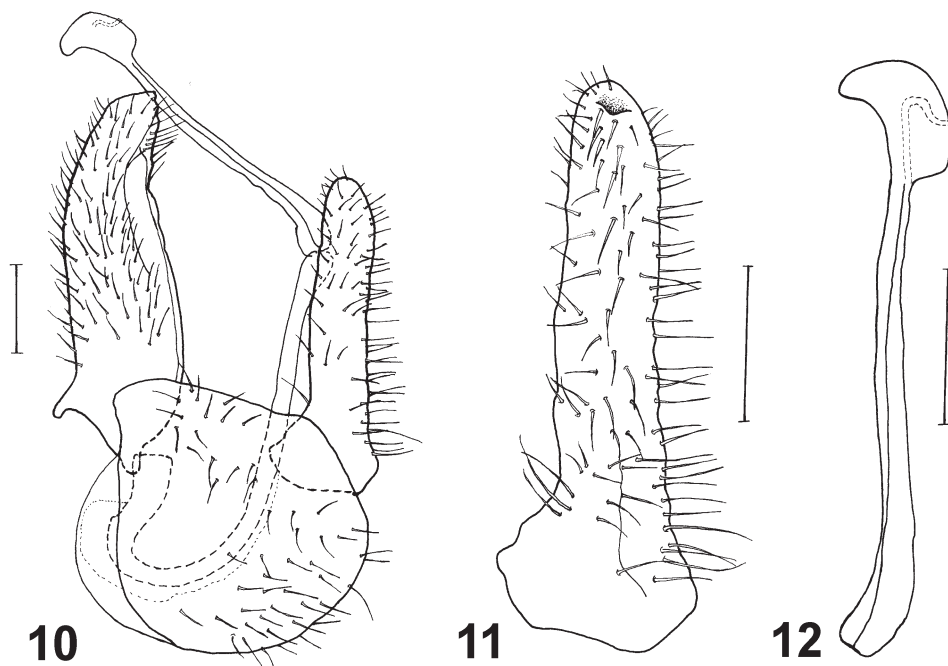
**Comments.** *Cacopsylla nasuta* is a poorly documented species. HORVÁTH (1904) described it from one female from Przevalsk (Kyrgyzstan) without host plant data. The species has not been recorded since. The male specimens from Afghanistan match ŠULC's (1913) redescription of the holotype of *C. nasuta*, particularly the coloration, the long genal processes and the forewing shape, venation and membrane spinulation. They differ in the smaller body size (total body length from head to forewing apex: 2.9–3.2 mm, compared to 3.7 mm as reported by Šulc) which may, however, be sexual dimorphism. Male terminalia of a specimen from Afghanistan are illustrated in Figs. 10–12. *Cacopsylla nasuta* may be related to *C. hippophaes* (Foerster, 1848) along with several Palaearctic species associated with *Hippophae* and *Elaeagnus* (Elaeagnaceae) (see BURCKHARDT & ÖNUÇAR 1993). BAEVA (1985) considers *C. nasuta* as a junior synonym of *C. hippophaes* which is not followed here.

*Cacopsylla* spp.

**Material examined.** NURISTAN: Bashgul Valley, Peschawurdo, 2200 m, 21.vii.1952, 1 ♀; Bashgul Valley, Achmede Dewane, 2700 m, 27.vii.1952, 1 ♀. All J. Klapperich leg. (MMBC; dry-mounted).

**Comments.** The specimens at hand belong to two different species. In the absence of taxonomically relevant males it is impossible to identify them.





Figs. 10–12. *Cacopsylla* cf. *nasuta* (Horváth, 1904) from Afghanistan. 10 – male terminalia, lateral view; 11 – paramere, inner surface, lateral view; 12 – distal segment of aedeagus, lateral view. Scale bars: 0.1 mm.

### *Cyamophila aberrans* (Baeva, 1972) in LOGINOVA & BAEVA (1972)

**Material examined.** **BADAKHSHAN:** Wardush Valley, Barak, 1650 m, 5.vii.1953, 1 ♀; Wardush Valley, Tchakaran, 1850 m, 6.vii.1953, 2 ♂♂ 1 ♀, all J. Klapperich leg. (MMBC; dry-mounted).

**General distribution.** Tajikistan (BAJEVA & KLIMASZEWSKI 1993). New record for Afghanistan.

**Host plant.** *Glycyrrhiza glabra* (Fabaceae) (BAEVA 1985, BAJEVA & KLIMASZEWSKI 1993).

### *Cyamophila afganica* Loginova, 1978

**Published records.** LOGINOVA (1978): Baghlan (105 km N Kabul on road to N Salang), Bamyan (70 km W Bamyan, Band-e-Amir lake).

**Material examined.** **BAGHLAN:** 105 km N from Kabul, road to N Salang [= Salang Pass?], southern slope of Hindu Kush, canyon with streams at the bottom, 2400 m, 25.vii.1966, 2 ♂♂ 1 ♀, 1 ex. without abdomen (holotype and paratypes). **BAMYAN:** 70 km W from Bamyan, Band-e-Amir lake, 2800 m, mountain desert, *Artemisia* sp., *Stipa* sp. and other plants, 16.ix.1966, 1 ♀ (paratype). All E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** So far only known from Afghanistan (BAJEVA & KLIMASZEWSKI 1993).

**Host plant.** Unknown (BAJEVA & KLIMASZEWSKI 1993).



**Comments.** The male holotype and one male and two female paratypes got lost during the transport from the ZIN to the MMBC in stolen luggage. The remaining material of *C. afganica* at the ZIN includes one paratype without abdomen (no corresponding slide preparation was found) and one male determined by Loginova which is, however, not labelled as a type.

### *Cyamophila glycyrrhizae* (Becker, 1874)

= *Cyamophila odontopyx* Loginova, 1978. Synonymised by HODKINSON & HOLLIS (1987).

**Published records.** LOGINOVA & BAEVA (1972, as *Psylla glycyrrhizae*) and LOGINOVA (1978, as *Cyamophila odontopyx*): Baghlan, Nangarhar (Jalalabad); HODKINSON & HOLLIS (1987, as *Cyamophila glycyrrhizae*): Afghanistan.

**Material examined.** **BADAKHSHAN:** Kokcha Valley, *Senna*, 1800 m, 16.vii.1953, 4 ♂♂ 1 ♀, J. Klapperich leg. (MMBC; dry-mounted); Ishmara, 19.vi.1965, 135 ♂♂ 142 ♀♀ 2 larvae, M. Daniel leg.; same data but 19.vii.1965, 55 ♂♂ 33 ♀♀ 1 larva (MMBC, NHMB, NMPC; dry-mounted). **BADGHIS:** Bala Murghab, 470 m, 20.iii.–28.x.1964, 140 ♂♂ 137 ♀♀, O. Jakeš leg.; same data, 550 m, 3.–15.iv.1964, 38 ♂♂ 42 ♀♀, O. Jakeš leg.; Murichaq, 400 m, 16.vi.1964, 1 ♂, O. Jakeš leg. (MMBC; dry-mounted). **BAGHLAN:** Baghlan, flood plain, *Tamarix* sp., 7.x.1966, 1 ♀ 1 ♂ (paratypes of *C. odontopyx*), E. S. Sugonyaev leg. (ZIN; dry-mounted). **KABUL:** Kabul environs, 1743 m, 16.vi.1952, 1 ♀, J. Klapperich leg. (MMBC; dry-mounted). **NANGARHAR:** Jalalabad, flood plain of the Kabul River, 22.vii.1966, 2 ♂♂ 1 ♀ (paratypes of *C. odontopyx*); 40 km W of Jalalabad, flood plain, on herbs, 23.vii.1966, 2 ♀♀ (paratypes of *C. odontopyx*), all E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** Iran, China, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Mongolia, Middle East, Caucasus, eastern Europe (HODKINSON & HOLLIS 1987, BURCKHARDT 1988, GEGECHKORI & LOGINOVA 1990, BAJEVA & KLIMASZEWSKI 1993, LI 2011).

**Host plants.** *Glycyrrhiza glabra* and *G. uralensis* (Fabaceae) (GEGECHKORI & LOGINOVA 1990).

**Comments.** The material at hand varies considerably in the paramere structure. More material, preferably series of many specimens from different localities and host information, is required to analyse the significance of this variation. *Cyamophila odontopyx* was described by LOGINOVA (1978) based on material from Central Asia including Afghanistan, slightly differing from a typical *C. glycyrrhizae* in the length of the genal processes, the size of the anterior apical tooth on the paramere in males, and the shape of the dorsal margin of the subgenital plate in females. These differences were considered by HODKINSON & HOLLIS (1987) as falling within the range of variation of *C. glycyrrhizae*. For the same reasons, BURCKHARDT & LAUTERER (1993) synonymized *Cyamophila eremita* Loginova, 1978 described from Kazakhstan, Tajikistan, Uzbekistan, and Turkmenistan with *C. glycyrrhizae*. Other taxa falling in the same species complex include also *Cyamophila caucasica* (Baeva, 1972) and *C. edentata* (Baeva, 1972) (both in LOGINOVA & BAEVA 1972) which are still considered valid.

### *Cyamophila gorodkovi* Loginova, 1978

**Material examined.** **BADAKHSHAN:** Sarekanda, mountains, 2800 m, 21.vii.1953, 1 ♂, J. Klapperich leg. (MMBC; dry-mounted). Ishmara, 19.vi.1965, 8 ♂♂ 11 ♀♀, M. Daniel leg.; same data, 19.vii.1965, 12 ♂♂ 16 ♀♀ (MMBC, NHMB, NMPC; dry-mounted).

**General distribution.** Tajikistan, Uzbekistan; Central Asia, Russia (western Siberia) (GEGECHKORI & LOGINOVA 1990). New record for Afghanistan.

**Host plants.** *Onobrychis chorassanica*, *O. laxoflora* and *O. oxytropoides* (Fabaceae) (GEGECHKORI & LOGINOVA 1990).

***Livilla klapperichi* Hodkinson & Hollis, 1987**

**Published records.** HODKINSON & HOLLIS (1987): Nuristan, Kamdesch, Bashgul Valley, 2200 m, 17.vii.1952, 2 ♂♂, 1 ♀, 1 adult lacking terminalia, J. Klapperich leg. (BMNH, holotype and paratypes).

**Material examined.** No specimens examined.

**General distribution.** So far only known from Afghanistan (HODKINSON & HOLLIS 1987).

**Host plant.** Unknown.

DIAPHORININAE Vondráček, 1957

***Diaphorina citri* (Kuwayama, 1908)**

**Published records.** CIE (1974): Jalalabad, Laghman.

**Material examined.** NANGARHAR: Jalalabad, 500 m, 30.iii.1953, 11 ♂♂, 15 ♀♀, J. Klapperich leg.; Jalalabad, 500–800 m, 13.iv.1967, 1 ♀, D. Povolný leg. (MHNG, MMBC; dry-mounted).

**General distribution.** Iran, Pakistan, China; tropical Asia, introduced into the Arabian Peninsula, Mascarenes, Pacific islands, South, Central and North America as well as Europe (e.g. CABI 2001, HALBERT & MANJUNATH 2004, BURCKHARDT & VAN HARTEN 2006, AL-ZADJALI et al. 2008, LI 2011).

**Host plants.** *Murraya* spp., *Citrus* spp., and other closely related Rutaceae (HALBERT & MANJUNATH 2004).

***Diaphorina zygophylli* Loginova, 1978**

**Material examined.** KANDAHAR: Kuna, 950 m, 5.iii.1953, 1 ♀. NURISTAN: Bashgul Valley, 1100–1200 m, 8–20.iv.1953 and 6.v.1953, 6 ♂♂, 15 ♀♀. KUNAR: Kunar [= Chitral] Valley, Asmar, 900 m, 3.iv.1953, 5 ♂♂, 8 ♀♀. All J. Klapperich leg. (MHNG, MMBC; dry and slide-mounted).

**General distribution.** Iran, Tajikistan, Uzbekistan, Turkmenistan; Kyrgyzstan, Caucasus (LOGINOVA 1978, GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1993). New record for Afghanistan.

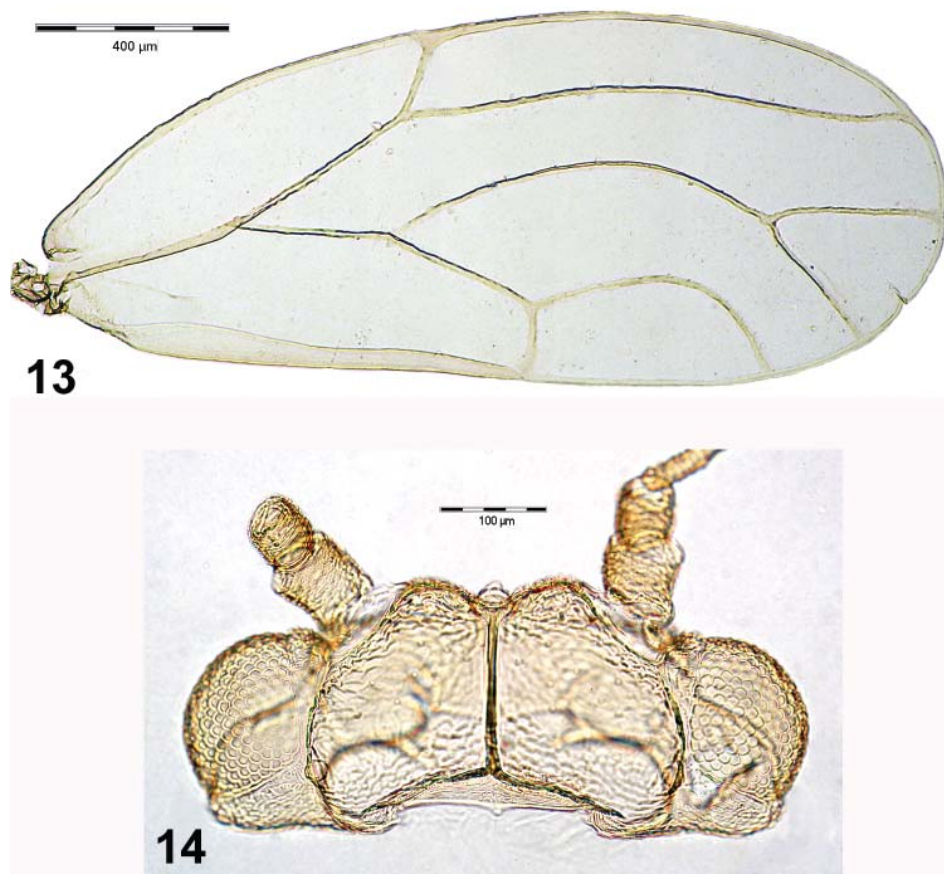
**Host plants.** *Zygophyllum atriplicoides*, *Z. eurypterum*, *Z. gontscharovii* and *Z. cf. megacarpum* (Zygophyllaceae) (LOGINOVA 1978, GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1993).

***Psyllopsis machinosa* Loginova, 1963**

**Material examined.** BADGHIS: Bala Murghab, 470 m, 28.x.1964, 5 ♂♂, 11 ♀♀; same data, 30.x.1964, 1 ♀, all O. Jakeš leg. (MMBC; dry-mounted).

**General distribution.** Iran, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Caucasus, Turkey, south-eastern Europe (GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1993). New record for Afghanistan.

**Host plant.** *Fraxinus angustifolia* subsp. *oxycarpa* and *Fraxinus* sp. (Oleaceae) (GEGECHKORI & LOGINOVA 1990).



Figs. 13–14. *Craspedolepta manica* Baeva, 1978 from Afghanistan. 13 – forewing; 14 – head, dorsal view.

### *Psyllopsis repens* Loginova, 1963

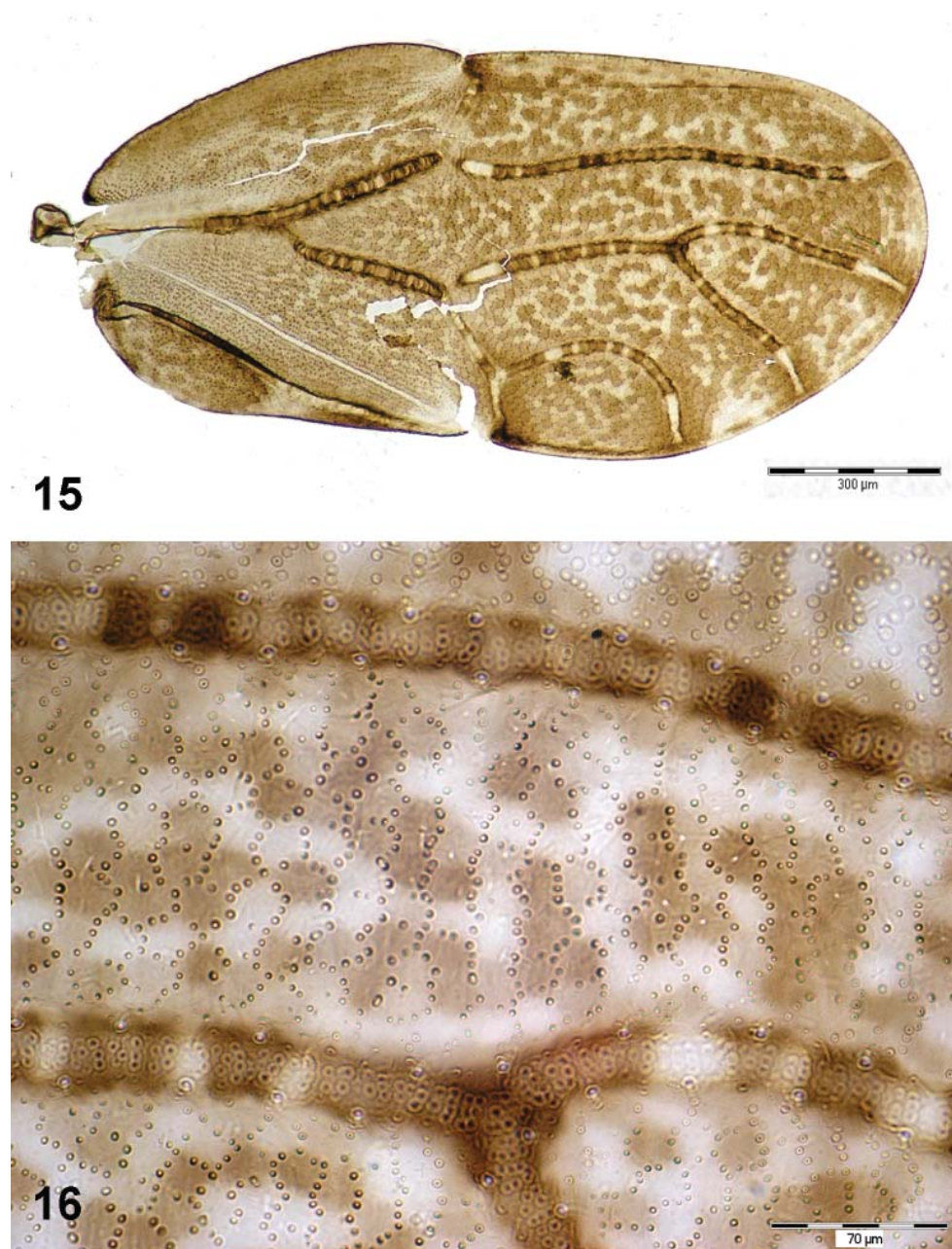
**Material examined.** BADGHIS: Bala Murghab, 470 m, 28.x.1964, 5 ♂♂ 2 ♀♀, O. Jakeš leg. (MMBC; dry-mounted).

**General distribution.** Iran; Caucasus, Israel; Serbia (GEGECHKORI & LOGINOVA 1990, MALENOVSKÝ & JERINIĆ-PRODANOVIĆ 2011). New record for Afghanistan.

**Host plant.** *Fraxinus angustifolia* subsp. *oxycarpa*, subsp. *syriaca*, *F. excelsior* and *F. ornus* (Oleaceae) (HALPERIN et al. 1982, GEGECHKORI & LOGINOVA 1990, MALENOVSKÝ & JERINIĆ-PRODANOVIĆ 2011).

### *Psyllopsis securicola* Loginova, 1963

**Material examined.** BADGHIS: Bala Murghab, 470 m, 28.x.1964, 2 ♂♂ 3 ♀♀, O. Jakeš leg. (MMBC; dry-mounted).



Figs. 15–16. *Agonosцена klapperichi* sp. nov., holotype. 15 – forewing; 16 – forewing, detail showing part of membrane between veins Rs and bifurcation of M.



**Additional material examined. IRAQ: KURDISTAN:** Salahuddin, 9.vii.1968, 2 ♀♀, P. Starý leg. (MMBC, dry-mounted).

**General distribution.** Iran, Tajikistan, Turkmenistan, Uzbekistan; Caucasus, Israel, Turkey (GEGECHKORI & LOGINOVA 1990); Iraq (this paper). New records for Afghanistan and Iraq.

**Host plant.** *Fraxinus angustifolia* subsp. *oxycarpa* (Oleaceae) (GEGECHKORI & LOGINOVA 1990).

#### PAUROCEPHALINAE Vondráček, 1963

##### *Syntomoza unicolor* (Loginova, 1958) in LOGINOVA & PARFENTIEV (1958)

**Published records.** LOGINOVA (1972, as *Camaratoscena unicolor*): Afghanistan.

**Material examined.** KUNDUZ: Shir Khan, left bank of Amu Darya River, on *Populus* spp. close to *P. diversifolia* and *P. pruinosa* and other plants, 3.x.1966, 1 ♀, E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** Iran, China, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Mongolia, Caucasus, Middle East (GEGECHKORI & LOGINOVA 1990; BURCKHARDT & MIFSUD 2003).

**Host plants.** *Populus euphratica*, *P. diversifolia* and *P. pruinosa* (Salicaceae) (GEGECHKORI & LOGINOVA 1990; BURCKHARDT & MIFSUD 2003, Li 2011).

#### RHINOCOLINAE Vondráček, 1957

##### *Agonoscena klapperichi* sp. nov.

(Figs. 15–21)

**Type locality.** Afghanistan, Nuristan, Bashgul Valley, at the Kabul river, 1200 m.

**Material examined.** HOLOTYPE: ♀, NURISTAN: 'Baschgultal (1200 m) / 10.4.1953 am Kabulfluss / J. Klapperich leg. Afgh. // HOLOTYPE, slide 1/5–5/5 / *Agonoscena / klapperichi* sp. nov. / det. Malenovský, Lauterer, / Labina & Burckhardt, 2012' (MMBC; slide-mounted on five slides in glycerin-gelatin and Liquid de Swan).

**Description. Adult. Coloration** (from slide-mounted specimen). Head and pronotum light with dark brown pattern consisting of several curved streaks and lines. Antenna pale with entire segments 1 and 9–10, basal half of segment 2 and apices of segments 4 and 6 darker brown. Mesopraescutum and mesoscutum marbled dark brown. Forewing membrane light brown, bearing a dark brown pattern consisting of many densely spaced small spots, confluent especially in the subapical part of the wing and along apices of veins, lighter brown and less distinct in the proximal half of wing; membrane lighter medially in cells  $r_2$ ,  $m_1$  and  $m_2$  at wing margin and in the distal-posterior corner of  $cu_2$ ; veins densely spotted dark brown, apices of veins  $Rs$ ,  $M_1$ ,  $M_2$  and  $Cu_{1a}$ , and basal portions of  $Rs$ ,  $M$  and  $Cu_{1b}$  light (Fig. 15). Hind wing clear, infuscated brown basally.

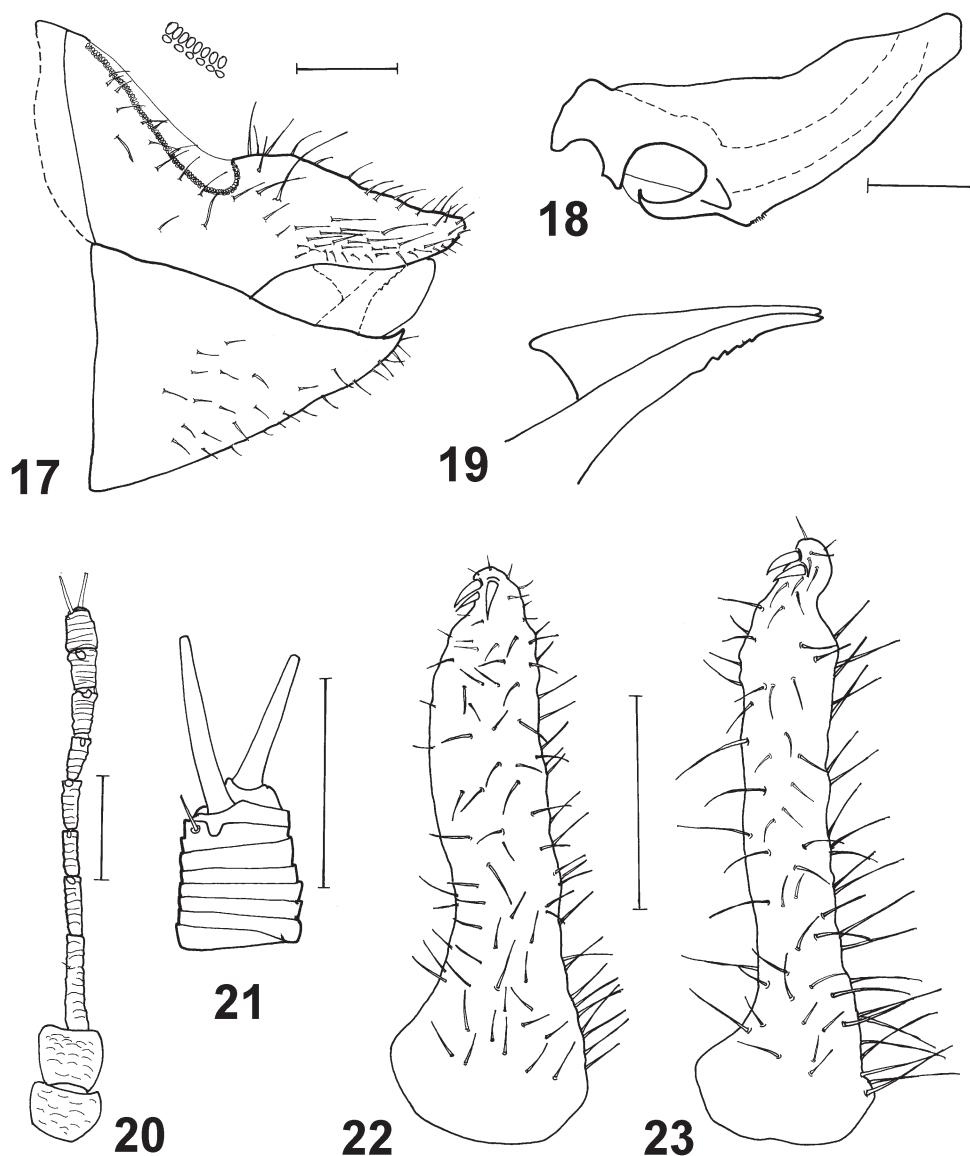
**Structure.** Head broadly rounded anteriorly. Coronal suture almost fully developed, indistinct only at posterior vertex margin. Genal processes absent. Eyes hemispherical. Clypeus globular, bearing a group of several setae anteriorly. Antenna 10-segmented, relatively short (shorter than head width), flagellar segments robust, weakly widening to apex (Fig. 20); a single oval rhinarium situated subapically on each of segments 4–9; terminal setae 0.8 and 1.05 times as long as segment 10 (Fig. 21). Propleurites subequal. Forewing

ovate, widest in the middle, broadly rounded apically (Fig. 15); vein C+Sc convex, broad, indistinctly delimited towards cell c+sc; costal break developed; pterostigma developed, about half as wide as adjacent part of cell  $r_1$ ; bases of veins Rs, M+Cu<sub>1</sub> and M indistinct; veins raised, covered in minute setae; surface spinules relatively large, forming irregular hexagonal pattern (Fig. 16), present in all cells and reaching veins. Hind wing with seven equidistant costal setae basally and one curved seta distally. Metacoxa with weakly raised tubercular meracanthus and with relatively slender, small tubular process on trochanteral cavity (Fig. 18). Metatibia smooth basally, with an open crown of eight evenly spaced sclerotised stout spurs and five unsclerotised thickened setae apically. Metabasisarsus with a single sclerotised spur subapically. Female terminalia relatively short; dorsal margin of proctiger, in lateral view, with median hump, convex distal of circumanal pore ring (Fig. 17); ventral valvula with a row of five distinct ventral teeth; dorsal valvula cuneate, weakly curved downwards (Fig. 19). Male and larva unknown.

Measurements (in mm). Head width: 0.57; antenna length: 0.51; forewing length: 1.56; forewing width: 0.74; metatibia length: 0.49; female proctiger length: 0.42; circumanal pore ring length: 0.19; female subgenital plate length: 0.29.

**Differential diagnosis.** *Agonoscena* Enderlein, 1914 includes thirteen described species in the Palearctic, Afrotropical and Oriental biogeographical Realms (BURCKHARDT & LAUTERER 1989, LI 2011). *Agonoscena klapperichi* sp. nov. shares with the other described *Agonoscena* species the presence of a well-developed nodal line on the forewing and the ventrally serrate ventral valvula, but it differs in the more or less uniformly dark forewing which lacks a well-delimited zig-zag pattern along the outer margin, and a well-delimited transverse band stretching from base of pterostigma to apex of cell Cu<sub>1b</sub>. *Agonoscena klapperichi* sp. nov. resembles *A. bimaculata* Mathur, 1973, from Iran and Pakistan in the body size, the structure and coloration of the forewing (wing apex broadly rounded, pterostigma present, vein C+Sc broad and convex, surface spinules relatively large and arranged into an irregular hexagonal pattern, membrane with pattern relatively dark and expanded), the structure of the metacoxa (meracanthus weakly raised, tubular process on trochanteral cavity relatively small and slender), and the female terminalia (female proctiger in profile with convex dorsal margin and a relatively long circumanal pore ring) (MATHUR 1973, BURCKHARDT & LAUTERER 1989). Besides the different forewing pattern (in *A. bimaculata* consisting of two well-delimited transverse dark brown bands along the outer wing margin and the nodal line widely separated by a transparent piece of membrane), *A. klapperichi* sp. nov. differs from *A. bimaculata* also in the slightly shorter terminal setae on the antenna (in *A. bimaculata* 0.9 and 1.2 times as long as segment 10, in *A. klapperichi* sp. nov. 0.8 and 1.05 times), the relatively shorter and broader forewing (in *A. bimaculata*, the ratio forewing length/width = 2.27–2.41 while in *A. klapperichi* sp. nov. this ratio equals to 2.11) and the narrower pterostigma (in *A. bimaculata*, the pterostigma is about as wide as the adjacent part of the cell  $r_1$  (see BURCKHARDT & LAUTERER 1989), in *A. klapperichi* sp. nov. about half as wide).

BURCKHARDT & LAUTERER (1989) proposed a phylogeny for *Agonoscena* which is partly based on characters of the male terminalia. More material, especially male specimens, are needed to place *A. klapperichi* sp. nov. into their phylogenetic scheme.



Figs. 17–23. 17–21 – *Agonosцена klapperichi* sp. nov., holotype: 17 – female terminalia, with detail of structure of circumanal pore ring, lateral view; 18 – metacoxa, lateral view; 19 – dorsal valvula and apex of ventral valvula, lateral view; 20 – antenna; 21 – antennal segment 10. 22–23 – *Trioza urticae* (Linnaeus, 1758), paramere, inner surface, lateral view. 22 – specimen from Afghanistan, Baghlan province; 23 – specimen from the Czech Republic, Moravia. Scale bars: 16–17, 19, 21–22: 0.1 mm; 18, 20: 0.05 mm.



**Etymology.** Named after the entomologist Johann Friedrich Klapperich (1913–1987) who collected the holotype of *A. klapperichi* sp. nov. and many other psyllids cited in the paper.

**General distribution.** Known only from the type locality in north-eastern Afghanistan.

**Host plant.** Unknown. Other species of *Agonosцена* are associated with *Pistacia*, *Rhus* (both Anacardiaceae), *Ruta* (Rutaceae), *Peganum* (Zygophyllaceae), and perhaps also *Xanthoceras* (Sapindaceae) and *Reaumuria* (Tamaricaceae) (BURCKHARDT & LAUTERER 1989, L1 2011).

### *Agonosцена pistaciae* Burckhardt & Lauterer, 1989

**Published records.** GEGECHKORI & LOGINOVA (1990): Afghanistan.

**Material examined.** BAGHLAN: 10 km W from Baghlan, *Pistacia* sp., 1.viii.1966, 5 ♂♂ 9 ♀♀, E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** Iran, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Caucasus, Middle East, southern Europe (GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1993, BURCKHARDT 2011).

**Host plants.** *Pistacia atlantica*, *P. mutica*, *P. palaestina*, *P. terebinthus* and *P. vera* (Anacardiaceae) (BURCKHARDT & LAUTERER 1989).

## TRIOZIDAE Löw, 1879

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

**Published records.** GEGECHKORI & LOGINOVA (1990, as *Trioza albiventris*): Afghanistan.

**Material examined.** BAGHLAN: Baghlan, waste land, *Elytrigia* sp., *Artemisia* sp., *Alhagi* sp. and other plants, 28.xi.1966, 1 ♀, E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** Iran, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Mongolia, Russian Far East and Siberia, Caucasus, Europe (GEGECHKORI & LOGINOVA 1990; BURCKHARDT & LAUTERER 1993, 1997).

**Host plants.** *Salix* spp., mainly *S. alba*, *S. fragilis*, *S. gracilis* and *S. triandra* (Salicaceae) (BURCKHARDT & LAUTERER 1997).

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

**Published records.** LOGINOVA (1972, as *Trioza nigricornis*): Baghlan.

**Material examined.** BADAQSHAN: Kokcha Valley, *Senna*, 1800 m, 16.vii.1953, 2 ♂♂ 1 ♀, J. Klapperich leg.; Wardush Valley, Tchakaran, 6.vii.1953, 1850 m, 1 ♂ 1 ♀, J. Klapperich leg. (MMBC; dry and slide-mounted). Ishmara, 19.vi.1965, 2 ♂♂ 2 ♀♀, M. Daniel leg.; same data, 19.vii.1965, 1 ♂ (MMBC, NMPC; dry-mounted). BADAQSHAN: Bala Murghab, 470 m, 20.iii.–1.iv.1964, 1 ♀, O. Jakeš leg.; same data, 8.viii.1964 (MMBC; dry-mounted). BAGHLAN: Baghlan, state farm, 14.vi.1966, 1 ex. without abdomen; Baghlan, 4.vii.1966, 1 ♂, E. S. Sugonyaev leg. (ZIN; dry-mounted). HERAT: Adraskan, 8.vi.1967, car trap, 1 ♀, M. Daniel leg. (NMPC, dry-mounted). KABUL: Kabul, 28.viii.1966, 3 ♂♂, E. S. Sugonyaev leg. (ZIN; dry-mounted). LOGAR: Moghulkhel, 2000 m, 14.v.1994, 4 ♀♀, L. Papp leg. (HNHM; dry-mounted).

**General distribution.** Iran, Tajikistan, Uzbekistan; Central Asia, Mongolia, Russian Far East and Siberia, Caucasus, Turkey; North Africa, Europe (GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1997).

**Host plants.** Polyphagous on herbaceous plants of at least four unrelated families including cultivated potatoes, turnips, beets and carrots (HODKINSON 1981, BURCKHARDT & LAUTERER 1997).

### *Bactericera perrisii* Puton, 1876

**Published records.** LOGINOVA (1972), BURCKHARDT & LAUTERER (1997): Afghanistan.

**Material examined.** KABUL: Kabul env., steppe in the mountains, 18.vii.1966, 4 ♂♂ 3 ♀♀; same locality, desertified steppe in the mountains, *Artemisia* spp., Poaceae, 21.vii.1966, 10 ♂♂ 2 ♀♀, E. S. Sugonyaev leg. (ZIN; dry-mounted); Tangi Gharu, at the Kabul river, 1600 m, 21.viii.1953, 1 ♂ 2 ♀♀, J. Klapperich leg. (MMBC; dry and slide-mounted).

**General distribution.** Iran, China, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Mongolia, Russia (western Siberia), Middle East, Egypt, Caucasus, Europe (GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1997).

**Host plants.** *Artemisia* spp. (Asteraceae) (BAEVA 1985, GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1997, LI 2011).

**Comments.** The specimens examined from Tangi Gharu have short, broadly conical genal processes (usually absent in *B. perrisii*). They resemble, however, specimens from Europe and Iraq (MMBC) in other characters including the structure of the male terminalia. A variation of the shape of the genae is also known from other *Bactericera* spp. (BURCKHARDT & LAUTERER 1997).

### *Bactericera rossica* Horváth, 1901

**Published records.** GEGECHKORI & LOGINOVA (1990), BURCKHARDT & LAUTERER (1997): Afghanistan.

**Material examined.** BAMYAN: 70 km W from Bamyán, Band-e-Amir lake, 2800 m, mountain desert, *Artemisia* sp., *Stipa* sp. and other plants, 16.ix.1966, 7 ♂♂, E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** Uzbekistan; Kyrgyzstan, Mongolia, Russia (European part, western Siberia) (GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1997).

**Host plants.** *Artemisia* sp. (Asteraceae) (BURCKHARDT & LAUTERER 1997).

### *Bactericera* sp.

**Material examined.** BADAKHSHAN: Shiva Lake, high altitude steppe, 2800 m, 7.vii.1953, 1 ♀, J. Klapperich leg. (MMBC; dry-mounted).

**Comments.** In the absence of taxonomically relevant males, it is impossible to identify the specimen at hand.

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

**Published records.** GEGECHKORI & LOGINOVA (1990): Afghanistan.

**Material examined.** KUNDUZ: Shir Khan, left bank of Amu Darya river, on *Populus* spp. close to *P. diversifolia* and *P. pruinosa*, galls, 3.–16.ix.1966, 32 ♂♂ 22 ♀♀, 3 larvae, 8 galls, E. S. Sugonyaev leg.; surroundings of Shir Khan port, 12.x.1966, 6 ♂♂ 4 ♀♀, 4 galls; same data, from galls of *Populus* spp. close to *P. diversifolia* and *P. pruinosa*, 4 ♀♀; same data but 19.x.1966, 9 ♂♂ 3 ♀♀, 2 larval exuviae, 4 galls, M. Stolyarov leg. (all ZIN; dry-mounted).

**General distribution.** Iran, Pakistan, China, Tajikistan, Turkmenistan; India, Middle East, Central Asia, North Africa (GEGECHKORI & LOGINOVA 1990, LI 2011).

**Host plants.** *Populus euphratica*, *P. diversifolia* and *P. pruinosa* (Salicaceae) (GEGECHKORI & LOGINOVA 1990).

### *Egeirotrioza intermedia* Baeva, 1963

**Published records.** GEGECHKORI & LOGINOVA (1990): Afghanistan.

**Material examined.** KUNDUZ: Shir Khan, left bank of Āmu Darya river, on *Populus* spp. close to *P. diversifolia* and *P. pruinosa*, smooth galls, 3.–16.ix.1966, 6 ♂♂ 10 ♀♀, 12 galls, E. S. Sugonyaev leg. (ZIN; dry-mounted).

**General distribution.** Tajikistan, Uzbekistan, Turkmenistan; Israel (GEGECHKORI & LOGINOVA 1990).

**Host plants.** *Populus diversifolia* and *P. pruinosa* (Salicaceae) (GEGECHKORI & LOGINOVA 1990).

### *Trioza dichroa* Scott, 1879

**Material examined.** BADGHIS: Bala Murghab, 470 m, 30.vi.–31.viii.1964, 1 ♂ 2 ♀♀, O. Jakeš leg. NANGARHAR: Jalalabad, 500 m, 30.iii.1953, 1 ♀, J. Klapperich leg. (all MMBC; dry-mounted).

**General distribution.** Iran, Tajikistan, Uzbekistan, Turkmenistan; Central Asia, Caucasus, Europe (GEGECHKORI & LOGINOVA 1990, BURCKHARDT 2011). New record for Afghanistan.

**Host plants.** *Atriplex* spp. and *Chenopodium* spp. (Amaranthaceae) (GEGECHKORI & LOGINOVA 1990).

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

(Figs. 22–23)

**Material examined.** BAGHLAN: Hindu Kush, Khinjan Valley, Do-Shak, 2500 m, 26.ix.1952, 1 ♂ 1 ♀, J. Klapperich leg.; same data, 1.x.1952, 1 ♂ 1 ♀ (MMBC; dry-mounted).

**General distribution.** Iran, China, Tajikistan; India, Central Asia, Mongolia, Russian Far East and Siberia, Caucasus, Turkey, Europe (GEGECHKORI & LOGINOVA 1990, BURCKHARDT & LAUTERER 1993, BURCKHARDT 2011, LI 2011). New record for Afghanistan.

**Host plants.** *Urtica cannabina*, *U. dioica* and *U. urens* (Urticaceae) (GEGECHKORI & LOGINOVA 1990).

**Comments.** Males from Afghanistan differ from European specimens in the slightly broader paramere which is hardly constricted subapically (Figs. 22–23). More material is needed to assess the taxonomic significance of this difference.

### *Trioza* sp.

**Material examined.** NURISTAN: Bashgul Valley, 1100 m, 14.iv.1953, 1 ex., J. Klapperich leg. (MMBC; dry-mounted).

**Comments.** The specimen is damaged and lacks terminalia. It resembles *Trioza alacris* Flor, 1861, in general aspect but differs in the relatively shorter and broader forewings. More material is needed for its identification.

## Discussion and conclusions

Thirty-seven species of Psylloidea are reported from Afghanistan, five of which remain unidentified due to insufficient material available. Fifteen species, including *Agonoscena klapperichi* which is described as new, are recorded here for the first time from the country. The psyllid fauna of Afghanistan remains poorly known and many additional species can be expected considering the size and botanical richness of the country, as well as the number of psyllid species known from the adjacent countries. Ninety-six species of jumping plant-lice have been reported from Iran (BURCKHARDT & LAUTERER 1993, ASADI et al. 2009). GEGECHKORI & LOGINOVA (1990) list 228 species of Psylloidea from former Soviet Central Asia (Afghanistan's neighbours Tajikistan, Uzbekistan and Turkmenistan plus Kyrgyzstan) with a high proportion of endemics – 62 species (27 %). Tajikistan has, with 162 recorded species, the highest number of known species in the region (BAEVA 1985). The psyllid fauna of China, also a country adjacent to Afghanistan but with a much larger and biologically diverse territory includes 1001 species (LI 2011).

Most of the available data come from north-eastern Afghanistan (provinces of Nuristan – 10 spp., Baghlan – 8, Badakhshan – 7, Kunduz – 6) while only five species are known from the west (Badghis) and three from Kandahar in southern Afghanistan. No information is available for the extensive deserts and semi-deserts in the south-west. Big differences in faunal composition between different regions of Afghanistan are known from other insects such as beetles or grasshoppers (KRYZHANOVSKIY 1983).

Most of the Afghan psyllid fauna as presently known is a mix of species with wide Palaearctic (*Bactericera nigricornis*, *B. perrisii*, *Trioza dichroa* and *T. urticae*), wide south-western Asian (most *Colposcena* spp., *Cyamophila glycyrrhizae*, *Psyllopsis securicola*, and *Syntomoza unicolor*) and restricted Central Asian distributions (*Craspedolepta manica*, *C. vestita*, and *Cyamophila aberrans*). A few species are Oriental biogeographical elements (*Diaphorina citri* and *Homotoma indica*). Three species (*Agonoscena klapperichi*, *Cyamophila afganica* and *Livilla klapperichi*) are currently known only from Afghanistan.

Two of the psyllid species reported from Afghanistan are pests of cultivated plants. *Diaphorina citri* is a vector of the causal agent of „huanglongbing“ (greening disease) on *Citrus* spp. and constitutes currently the most serious citrus pest in Asia and the New World (HALBERT & MANJUNATH 2004). *Agonoscena pistaciae* inflicts damage to pistachio plants and has some economic impact in south-eastern Europe and the Middle East (HASSANI et al. 2009).

Further studies are needed for a better understanding of the taxonomy, biogeography and economic importance of the jumping plant-lice in Afghanistan.

## Acknowledgements

We are obliged to the late Johann Friedrich Klapperich for the gift of material to the Moravian Museum, Brno. Petr Kment (NMPC), András Orosz and Dávid Rédei (both HNHN) kindly provided access to the collections under their care. Jowita Drohojowska (Department of Zoology, University of Silesia, Katowice, Poland), Petr Kment and an anonymous reviewer

are thanked for critical reading of the manuscript and useful comments. The paper was partly prepared with the institutional support of the Moravian Museum, Brno from the Ministry of Culture of the Czech Republic (MK000094862).

## References

- AL-ZADJALI T. S., IBRAHIM R. & AL-RAWAHI A. K. 2008: First record of *Diaphorina citri* Kuwayama (Hemiptera: Psyllidae) from the Sultanate of Oman. *Insecta Mundi* **39**: 1–3.
- ANONYMUS 1967: Verzeichnis der Lokalitäten. In: Beiträge zur Kenntnis der Fauna Afghanistans I. *Acta Musei Moraviae, Scientiae Naturales* **52(Supplementum)**: 15–34.
- APG III [the Angiosperm Phylogeny Group III] 2009: An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. *Botanical Journal of the Linnean Society* **161**: 105–121.
- ASADI R., TALEBI A. A., BURCKHARDT D., KHALGANI J., FATHIPOUR Y. & MOHARRAMIPOUR S. 2009: On the identity of the olive psyllids in Iran (Hemiptera, Psylloidea). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* **82**: 197–200.
- BAEVA V. G. 1978: Novye vidy listobloshek iz Sredney Asii. (New species of jumping plant lice (Homoptera, Psylloidea) from Middle Asia). *Zoologicheskii Zhurnal* **57**: 32–45 (in Russian, English summary).
- BAEVA V. G. 1985: *Fauna Tadzhikskoy SSR. Tom VIII. Psillidy, ili listobloshky (Homoptera, Psylloidea). (Fauna of the Tadjik Soviet Socialist Republic. Volume VIII. Jumping plant lice (Homoptera, Psylloidea))*. Donish, Dushanbe, 340 pp (in Russian, English title).
- BAJEVA [sic!] V. G. & KLIMASZEWSKI S. M. 1993: A survey of the species of the genus *Cyamophila* Log. (Homoptera, Psylloidea). *Acta Biologica Silesiana* **22**: 30–56.
- BRECKLE S. W. 2007: Flora and vegetation of Afghanistan. *Basic and Applied Dryland Research* **1(2)**: 155–194.
- BURCKHARDT D. 1987: Jumping plant lice (Homoptera: Psylloidea) of the temperate neotropical region. Part 1: Psyllidae (subfamilies Aphalarinae, Rhinocolinae and Aphalaroidinae). *Zoological Journal of the Linnean Society* **89**: 299–392.
- BURCKHARDT D. 1988: Angaben zur Psyllidenfauna der Nordosttürkei (Homoptera: Psylloidea). *Mitteilungen der Entomologischen Gesellschaft Basel* **38**: 31–44.
- BURCKHARDT D. 2011: Fauna Europaea: Psylloidea. In: Fauna Europaea, version 2.4. Available online at <http://www.faunaeur.org> (accessed 13 January 2012).
- BURCKHARDT D. & LAUTERER P. 1989: Systematics and biology of the Rhinocolinae (Homoptera, Psylloidea). *Journal of Natural History* **23**: 643–712.
- BURCKHARDT D. & LAUTERER P. 1993: The jumping plant-lice of Iran (Homoptera, Psylloidea). *Revue Suisse de Zoologie* **100**: 829–898.
- BURCKHARDT D. & LAUTERER P. 1997: A taxonomic reassessment of the trioqid genus *Bactericera* (Hemiptera, Psylloidea). *Journal of Natural History* **31**: 99–153.
- BURCKHARDT D. & MIFSUD D. 2003: Jumping plant-lice of the Paurocephalinae (Insecta, Hemiptera, Psylloidea): systematics and phylogeny. *Contributions to Natural History (Bern)* **2**: 3–34.
- BURCKHARDT D. & ÖNÜÇAR A. 1993: A review of Turkish jumping plant-lice (Homoptera, Psylloidea). *Revue Suisse de Zoologie* **100**: 547–574.
- BURCKHARDT D. & VAN HARTEN A. 2006: Jumping plant-lice (Insecta: Hemiptera: Psylloidea) of Yemen. *Fauna of Saudi Arabia* **21**: 189–216.
- CABI (Centre for Agricultural Bioscience International) 2001: *Diaphorina citri* (Distribution map). *Distribution Maps of Plant Pests, 2001, December (1st revision), Map 334*. Available online at <http://www.cabi.org/dmpps/loadmodule=review&page=4049&reviewid=15411&site=164> (accessed 17 May 2011).
- CIE (Commonwealth Institute of Entomology) 1974: Pest: *Diaphorina citri* (Kuway.). *Distribution Maps of Pests, Series A (Agricultural)*, Map 334. Commonwealth Agricultural Bureaux, London.
- GEGECHKORIA A. M. & LOGINOVA M. M. 1990: *Psillidy (Homoptera, Psylloidea) SSSR (annotirovannyi spisok). [The Psyllids (Homoptera, Psylloidea) of the USSR (an annotated check list)]*. Mecnieraba, Tbilisi, 191 pp (in Russian, English summary).

- HALBERT S. E. & MANJUNATH K. L. 2004: Asian citrus psyllids (Sternorrhyncha: Psyllidae) and greening disease of citrus: a literature review and assessment of risk in Florida. *Florida Entomologist* **87**: 330–353.
- HALPERIN J., HODKINSON I. D., RUSSELL L. M. & BERLINGER M. J. 1982: A contribution to the knowledge of the psyllids of Israel (Homoptera: Psylloidea). *Israel Journal of Entomology* **16**: 27–44.
- HASSANI M. R., NOURI-GANBALANI G., IZADI H., SHOJAI M. & BASIRAT M. 2009: Economic injury level of the psyllid, *Agonoscaen pistaciae*, on pistachio, *Pistacia vera* cv. Ohadi. *Journal of Insect Science* **9**(40): 1–4 (available online at: <http://www.insectscience.org/9.40/i1536-2442-9-40.pdf>, accessed 17 May 2011).
- HODKINSON I. D. 1981: Status and taxonomy of the Trioza (Bactericera) nigricornis Förster complex (Hemiptera: Triozidae). *Bulletin of Entomological Research* **71**: 671–679.
- HODKINSON I. D. 1986: The psyllids (Homoptera: Psylloidea) of the Oriental Zoogeographical Region: an annotated check-list. *Journal of Natural History* **20**: 299–357.
- HODKINSON I. D. & HOLLIS D. 1987: The legume-feeding psyllids (Homoptera) of the west Palaearctic Region. *Bulletin of the British Museum (Natural History), Entomology* **56**: 1–86.
- HOLLIS D. & BROOMFIELD P. S. 1989: Ficus-feeding psyllids (Homoptera), with special reference to the Homotomidae. *Bulletin of the British Museum (Natural History), Entomology* **58**: 131–183.
- HORVÁTH G. 1904: Insecta Heptapotamica a DD. Almásy et Stummer-Traunfels collecta. I. Hemiptera. *Annales Musei Nationalis Hungarici* **2**: 574–590.
- JAKEŠ O. 1967: Reisebericht und Charakteristik des Sammelgebietes. In: Beiträge zur Kenntnis der Fauna Afghanistans I. *Acta Musei Moraviae, Scientiae Naturales* **52**(Supplementum): 9–11.
- KLAPPERICH J. 1954: Auf Forschungsreisen in Afghanistan. *Entomologische Blätter* **50**: 107–118.
- KRYZHANOVSKIY O. L. 1983: Osnovnye zakonomernosti sostava i raspredeleniya entomofauny Afganistana. [The major patterns of composition and distribution of entomofauna of Afghanistan]. Pp. 101–114. In: SOKOLOV V. E. (ed.): *Ekologiya i biogeografiya v Afganistane. (Ecology and biogeography in Afghanistan)*. Moscow, Nauka (in Russian).
- LI F. 2011: [*Psyllidomorpha of China (Insecta: Hemiptera)*]. Science Press, Beijing, China, 1976 pages + 19 plates (in Chinese, English summary).
- LOGINOVA M. M. 1972: Psillidy (Psylloidea, Homoptera) Mongol'skoy Narodnoy Respubliki. [The psyllids (Psylloidea, Homoptera) of the Mongolian People's Republic]. *Nasekomye Mongolii* **1**: 261–324 (in Russian).
- LOGINOVA M. M. 1974: Listobloshki tribu Stigmaphalarini Vondr. (Psylloidea, Aphalaridae) aridnykh rayonov Palearktiki. (Jumping plant-lice of the tribe Stigmaphalarini Vondr. (Psylloidea, Aphalaridae) from arid regions of Palaearctic). *Entomologicheskoe Obozrenie* **53**: 150–170 (in Russian, English title).
- LOGINOVA M. M. 1978: Novye vidy psillid (Homoptera, Psylloidea). [New species of psyllids (Homoptera: Psylloidea)]. *Trudy Zoologicheskogo Instituta* **61**: 30–123 (in Russian).
- LOGINOVA M. M. & BAEVA V. G. 1972: Obzor psillid roda Psylla Geoffr. (Homoptera, Psylloidea), svyazannykh s solodkami. (Review of psyllids of the genus *Psylla* Geoffr. (Homoptera, Psylloidea), connected with Glycyrrhiza species). *Trudy Vsesoyuznogo Entomologicheskogo Obshchestva* **55**: 4–13 (in Russian, English title).
- MALENOVSKÝ I. & JERINIĆ-PRODANOVIĆ D. 2011: A revised description of *Psyllopsis repens* Loginova, 1963 (Hemiptera: Psylloidea: Psyllidae), with first records from Europe. *Archives of Biological Sciences (Belgrade)* **63**: 275–286.
- MATHUR R. N. 1973: On a collection of Psyllidae (Homoptera) from the Indian subregion with descriptions of three new species. *Oriental Insects* **7**: 515–526.
- MATHUR R. N. 1975: *Psyllidae of the Indian Subcontinent*. Indian Council of Agricultural Research, New Delhi, 429 pp.
- MoAIl (Ministry of Agriculture, Irrigation and Livestock, Islamic Republic of Afghanistan) 2009: *Afghanistan's Fourth National Report to the Convention on Biological Diversity*. 138 pp. Available online at <http://www.cbd.int/doc/world/af/af-nr-04-en.pdf> (accessed 1 February 2011).
- NAHIF A. A. 1986: Bibliographie der zoologischen Literatur über Afghanistan. *Bonner Zoologische Beiträge* **37**: 311–339.
- OLSON D. M., DINNENSTEIN E., WIKRAMANAYAKE E. D., BURGESS N. D., POWELL G. V. N., UNDERWOOD E. C., D'AMICO J. A. D., ITOUA I., STRAND H. E., MORRISON J. C., LOUCKS C. J., ALLNUTT T. F., RICKETTS T. H., KURA Y., LAMOREUX J. F., WETTENGEL W. W., HEDAO P. & KASSEM K. R. 2001: Terrestrial ecoregions of the world: A new map of life on Earth. *BioScience* **51**: 933–938.

- OSSIANNILSSON F. 1992: *The Psylloidea (Homoptera) of Fennoscandia and Denmark. Fauna Entomologica Scandinavica* 26. E. J. Brill, Leiden, New York, Köln, 347 pp.
- ŠULC K. 1913: Zur Kenntnis einiger Psylla Arten aus dem Ungarischen National-Museum in Budapest. *Annales Historico-Naturales Musei Nationalis Hungarici* **11**: 409–435.
- UNEP (United Nations Environment Programme, Post-Conflict and Disaster Management Branch) 2008: *Biodiversity Profile of Afghanistan. An Output of the National Capacity Needs Self-Assessment for Global Environment Management (NCSA) for Afghanistan*. United Nations Environment Programme, Kabul, 152 pp. Available online at [http://postconflict.unep.ch/publications/afg\\_tech/theme\\_02/afg\\_biodiv.pdf](http://postconflict.unep.ch/publications/afg_tech/theme_02/afg_biodiv.pdf) (accessed 1 February 2011).
- WHITE I. M. & HODKINSON I. D. 1985: Nymphal taxonomy and systematics of the Psylloidea (Homoptera). *Bulletin of the British Museum (Natural History), Entomology* **50**: 153–301.