Zootaxa 3920 (3): 463–473
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3920.3.5
http://zoobank.org/urn:lsid:zoobank.org:pub:A7B20FC1-7959-4D16-9A55-B938462B7F2A

The jumping plant-louse *Diaphorina teucrii* sp. nov. (Hemiptera, Liviidae) associated with *Teucrium* (Lamiaceae) and its parasitoid *Tamarixia dorchinae* sp. nov. (Hymenoptera, Eulophidae) from the Negev desert, Israel

DANIEL BURCKHARDT[1], ZOYA YEFREMOVA[2, 3] & EKATERINA YEGORENKOVA[3]

[1]*Naturhistorisches Museum, Augustinergasse 2, CH-4001 Basel, Switzerland. E-mail: daniel.burckhardt@bs.ch*
[2]*Department of Zoology, The George S. Wise Faculty of Life Sciences, Tel-Aviv University, 69978 Tel-Aviv, Israel. E-mail: eulophids@mail.ru*
[3]*Ulyanovsk State Pedagogical University, Ulyanovsk 432700, Russia. E-mail: egorenkova80@mail.ru*

Abstract

Adults and immatures of *Diaphorina teucrii* **sp. nov.** (Hemiptera, Liviidae, Euphyllurinae) and adults of *Tamarixia dorchinae* **sp. nov.** (Hymenoptera, Eulophidae, Tetrastichinae) from Israel are described, diagnosed and illustrated. *D. teucrii* **sp. nov.** develops on *Teucrium capitatum* (Lamiaceae), representing a family which was previously not recorded as a psyllid host from Israel, and is parasitised by *Tamarixia dorchinae* **sp. nov.** Identification keys are provided for the *Diaphorina* and *Tamarixia* species occurring in Israel.

Key words: Sternorrhyncha, Psylloidea, Euphyllurinae, Chalcidoidea, Tetrastichinae, systematics, morphology, distribution, Palaearctic, host plant

Introduction

Diaphorina (Psylloidea, Liviidae, Euphyllurinae) is a genus of plant-sap feeding psyllids which comprises 78 described species restricted to the Old World (Loginova 1978; Ouvrard 2014). In addition, there are probably just as many undescribed species (BMNH, NHMB data). The genus includes *Diaphorina citri* (Kuwayama), the vector of the causal agent of huanglongbing (HLB, greening disease). Originating probably from China, the species has been introduced into Southeast Asia, India, the Arabian Peninsula and the Americas. It constitutes today the economically most important citrus pest. Psyllids are generally very host specific, and related psyllid species tend to develop on related host species (Burckhardt *et al.* 2014). *Diaphorina* is exceptional in that plants of at least 18 families belonging to 10 orders are colonised (Hollis 1987). Also reasonably host specific are the parasitoids associated with jumping plant-lice such as the cosmopolitan *Tamarixia* (Chalcidoidea, Eulophidae, Tetrastichinae) which comprises 51 described species associated mostly with Psylloidea, in addition to two species with Aphidoidea (Hemiptera) and one questionably with Agromyzidae (Diptera) (Zuparko *et al.* 2011; Noyes 2014; Yefremova *et al.* 2014). Several *Tamarixia* species are used for the biological control of jumping plant-lice, such as *T. radiata* (Waterston) for *Diaphorina citri* (Halbert & Manjunath 2004).

Recently an unknown *Diaphorina* species with an associated, equally unknown, *Tamarixia* species was discovered on *Teucrium capitatum* L. (Lamiaceae) in the Negev desert, Israel. In Israel six *Diaphorina* spp. have been previously recorded: *D. aegyptiaca* Puton from *Cordia* (Cordiaceae), *D. chobauti* Puton from *Convolvulus* (Convolvulaceae), *D. lamproptera* Burckhardt from *Zygophyllum* (Zygophyllaceae), *D. luteola* Loginova from *Solanum* (Solanaceae), *D. lycii* Loginova from *Lycium* (Solanaceae) and *D. putonii* (Löw) from *Thymelaea* (Thymelaeaceae), as well as 14 Tetrastichinae species: *Aprostocetus bucculentus* (Kostjukov), *A. ceroplastae* (Girault), *A. hagenowii* (Ratzeburg), *A. neglectus* (Domenichini), *A. sicarius* (Silvestri), *A. toddaliae* (Risbec), *Baryscapus ceroplastophilus* (Domenichini), *B. crassicornis* (Erdös), *B. servadeii* (Domenichini), *Leptocybe invasa* Fisher & LaSalle, *Minotetrastichus platanellus* (Mercet), *Pronotalia carlinarum* (Szelényi & Erdös),

Accepted by D. Ouvrard: 28 Jan. 2015; published: 23 Feb. 2015

Discussion and conclusions

Diaphorina is a species-rich genus in the Old World with 78 described and many undescribed species. With over 18 known host families *Diaphorina* is exceptional among psyllid genera which are often restricted to one or a few related host families. Lamiaceae is an atypical psyllid host family; Ouvrard (2014) lists nine species of Lamiaceae which were cited in the literature as psyllid hosts. Five of these are, however, not confirmed by the presence of immatures and are unlikely hosts. Two, also not confirmed by immatures but likely, are hosts of *Diaphorina* spp., viz. *D. micula* Baeva, 1970 from Turkmenistan on *Scutellaria bucharica* and *D. premnae* Li, 2011 from China on *Premna* sp. The discovery of *D. teucrii* is significant in this respect as it confirms the Lamiaceae as a host family of *Diaphorina*.

Five species of *Tamarixia* are reported from Israel for the first time: *T. bicolor* from *Trioza chenopodii* (Triozidae), *T. flaviventris* (host unknown), *T. pronomus* from *Trioza centranthi* and *T. urticae* (outside Israel also from *Bactericera kratochvili* and *Trioza apicalis*, all Triozidae), and *T. upis* Walker from *Trioza urticae* (Triozidae). *Tamarixia dorchinae* is the fifth species of Israel *Tamarixia*. It can be distinguished from other species by characters given in the key and by having large plaque on male scape (Fig. 7).

Acknowledgments

We thank Dr N. Dorchin and Gilad Danon (Tel Aviv University, Israel) for collecting the specimens described in this paper.

References

Bouček, Z. (1977) A faunistic review of the Yugoslavian Chalcidoidea (Parasitic Hymenoptera). *Acta Entomologica Jugoslavica*, 13 (Supplement), 1–145.

Bouček, Z. (1988) *Tamarixia leucaenae* sp. n. (Hymenoptera: Eulophidae) parasitic on the leucaena psyllid *Heteropsylla cubana* Crawford (Hemiptera) in Trinidad. *Bulletin of Entomological Research*, 78, 545–547. http://dx.doi.org/10.1017/S0007485300013298

Burckhardt, D., Ouvrard, D., Queiroz, D. & Percy, D. (2014) Psyllid host-plants (Hemiptera: Psylloidea): resolving a semantic problem. *Florida Entomologist*, 97 (1), 242–246. http://dx.doi.org/10.1653/024.097.0132

Domenichini, G. (1966 [1965]) I Tetrastichini (Hymenoptera Eulophidae) paleartici e di loro aspiti. *Bollettino di Zoologia Agraria e Bachicoltura*, 2, 6, 61–204.

Gibson, G.A.P., Huber, J.T. & Woolley, J.B. (1997) *Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera)*. NRC Research Press, Ottawa, Ontario, 794 pp.

Graham, M.W.R. de V. (1991) A reclassification of the European Tetrastichinae (Hymenoptera: Eulophidae): revision of the remaining genera. *Memoirs of the American Entomological Institute,* 49, 1–322.

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 (3), 330–353. http://dx.doi.org/10.1653/0015-4040(2004)087[0330:ACPSPA]2.0.CO;2

Hollis, D. (1987) A new citrus-feeding psyllid from the Comoro Islands, with a review of the *Diaphorina amoena* species group (Homoptera). *Systematic Entomology*, 12, 47–61. http://dx.doi.org/10.1111/j.1365-3113.1987.tb00547.x

Kostjukov, V.V. (1978) Hymenoptera II. Chalcidoidea 13. Eulophidae (Tetrastichinae). *In*: Medvedev, G.S. (Ed.), *Opredeliteli Nasekomykh Evropeyskoy Chasti SSR*, 3, pp. 430–467 [Nauka, Leningrad, in Russian]

Loginova, M.M. (1978) Novije vidy psillid (Homoptera, Psylloidea). *In*: Medvedev, G.S. (Ed.), Novye vidy zhivotnykh. *Trudy Zoologicheskogo Instituta* "Nauka" Leningradskoe otdelenie, Leningrad, 61, 30–123. [in Russian]

Lomeli-Flores, J.R. & Bueno Partida, R. (2002) New record of *Tamarixia triozae* (Burks), parasitoid of the tomatoe [sic] psilid [sic] *Paratrioza cockerelli* (Sulc) (Homoptera: Psyllidae) in Mexico. *Folia Entomológica Mexicana* , 41 (3), 375–376.

Mercet, R.G. (1924) Eulófidos de España (1.a nota). *Boletín de la Real Sociedad Española de Historia Natural*, 24, 54–59.

Noyes, J.S. (2014) Universal Chalcidoidea Database, World Wide Web electronic publication. The Natural History Museum, London. Available from: http://www.nhm.ac.uk/entomology/chalcidoids/index.html (accessed 23 February 2014)

Ossiannilsson, F. (1992) The Psylloidea (Homoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica*, 26, 1–346. [E. J. Brill, Leiden, Netherlands]

Ouvrard, D. (2014) Psyl'list – The World Psylloidea Database. Available from: http://www.hemiptera-databases.com/psyllist (accessed 1 March 2014)

Yefremova, Z.A., González-Santarosa, G., Refugio Lomeli-Flores, J. & Bautista-Martínez, N. (2014) A new species of *Tamarixia* Mercet (Hymenoptera: Eulophidae), parasitoid of *Trioza aguacate* Hollis & Martin (Hemiptera: Triozidae) in Mexico. *ZooKeys*, 368, 23–35.
http://dx.doi.org/10.3897/zookeys.368.6468

Zhu, C.D. & Huang, D.W. (2002) A taxonomic study on Eulophidae from Guangxi, China (Hymenoptera: Chalcidoidea). *Acta Zootaxonomica Sinica*, 27 (3), 583–607.

Zuparko, R.L, de Queiroz, D.L. & La Salle, J. (2011) Two new species of *Tamarixia* (Hymenoptera: Eulophidae) from Chile and Australia, established as biological control agents of invasive psyllids (Hemiptera: Calophyidae, Triozidae) in California. *Zootaxa*, 2921, 13–27.