First record of the Australian genus *Platyobria* Taylor, 1987 from Europe and *P. biemani* sp. nov. as a potential pest of *Eucalyptus* (Myrtaceae) (Hemiptera: Psylloidea)

● Daniel Burckhardt, Dalva L. Queiroz & Igor Malenovský

Abstract. *Platyobria biemani* sp. nov. (Aphalaridae, Spondyliaspidinae) is described from the island of Lesbos (Greece) based on a series of adult specimens which were collected on a long-leaved *Eucalyptus* species. This is a likely host as immatures of three of the nine previously known species of *Platyobria* Taylor, 1987 develop on young succulent terminal branchlets or leaves of eucalypts. This is the first time that *Platyobria* is recorded from outside Australia from where the new species probably originates. Whereas *Platyobria* species do not seem to affect their hosts significantly in Australia, there is a potential that in a new environment lacking specific parasitoids, *P. biemani* sp. nov. may become a pest of eucalypts.

Zusammenfassung. Die neue Blattflohart *Platyobria biemani* sp. nov. (Aphalaridae, Spondyliaspidinae) wird von einer Serie von Adulten beschrieben, die auf der Insel Lesbos (Griechenland) auf langblättrigen *Eucalyptus* gesammelt wurden. *Eucalyptus*-Arten sind wahrscheinlich ihre Wirtspflanzen, da sich drei der neun bisher beschriebenen Arten von *Platyobria* Taylor, 1987 auf den frischen Trieben dieser Pflanzengattung entwickeln. Dies ist der erste Fund von *Platyobria* außerhalb Australiens, woher die neue Art mit größter Wahrscheinlichkeit stammt. Während *Platyobria*-Arten in Australien ihre Wirte nicht maßgeblich zu beeinträchtigen scheinen, besteht die Möglichkeit, dass sich *P. biemani* sp. nov. in der neuen Umgebung ohne spezifische Parasitoide zu einem *Eucalyptus*-Schädling entwickelt.

Key words. Systematics, new species, introduction, pest species, Greece, Australia, Palaearctic Region, Australian Region, *Eucalyptus*, Sternorrhyncha, Spondyliaspidinae.

Introduction

Platyobria was erected by Taylor (1987) for nine species of Australian jumping plant-lice. The immatures, as far as known, develop on young succulent terminal branchlets and leaves or induce shallow pit galls in young leaves of *Eucalyptus* species (Myrtaceae) (Taylor 1987, Hollis 2004). On the basis of immature characters Taylor (1987) assigned the genus to the Aphalaridae, Diaphorininae [= Lividae: Euphyllurinae: Diaphorinini *sensu* Burckhardt & Ouvrard (2012)]. It was later transferred by Burckhardt (1991) to the Psyllidae: Spondyliaspidinae [= Aphalaridae: Spondyliaspidinae *sensu* Burckhardt & Ouvrard (2012)].

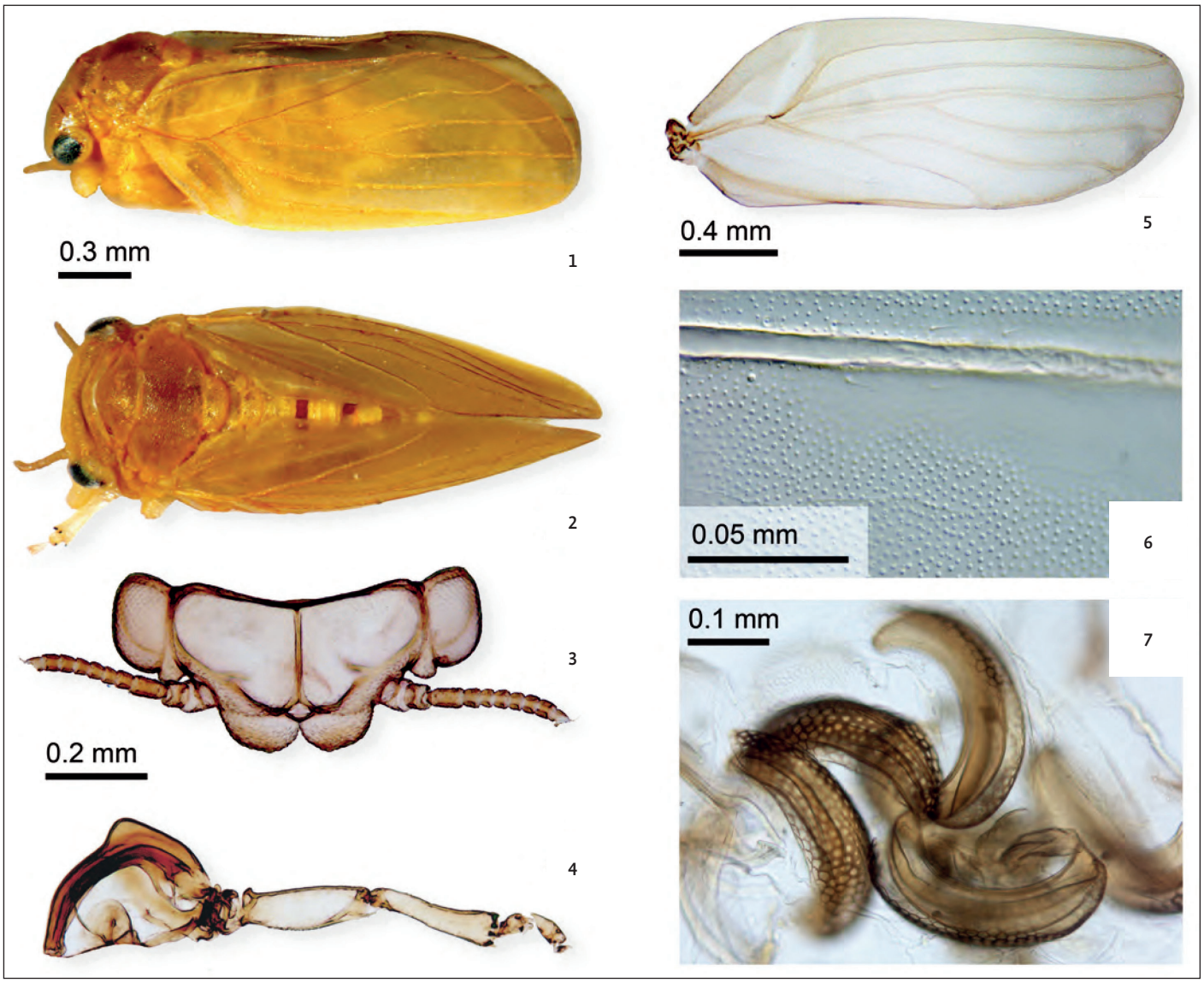
The Spondyliaspidinae contains 24 nominal genera (Burckhardt 1991, Burckhardt & Ouvrard 2012) and more than 300 species (Ouvrard 2013). It is almost exclusively restricted to Australia and most species develop on Myrtaceae with a large proportion (species of 19 genera) associated with eucalypts (Hollis 2004). Eucalypts occur naturally outside Australia only in New Guinea, Sulawesi, Mindanao and some adjacent islands but they are widely planted in suitable habitats around the globe, e. g. for producing cellulose, fibre, hardwood or fuel, or as ornamental or shadow trees. It is, therefore, not surprising that some of the Australian eucalypt psyllids have been introduced into other countries where some of them became serious pests. Currently, seven Australian species are known from other continents (*Blastopsylla occidentalis* Taylor, 1985 [introduced into Europe, Africa, Asia, New Zealand, North and South America], *Cardiaspina fiscella* Taylor, 1962 [New Zealand], *Cryptoneossa triangula* Taylor, 1990 [USA], *Ctenarytaina eucalypti* (Maskell, 1890) [Europe, Africa, Papua New Guinea, New Zealand, North and South America], *C. spatulata* Taylor, 1997 [Europe, New Zealand, North and South America], *Eucalyptolyma maideni* Froggatt, 1901 [USA] and *Glycaspis brimblecombei* Moore, 1964 [Europe, Africa, North and South America]). An eighth species, *Ctenarytaina peregrina* Hodkinson, 2007, probably also originates from Australia but has not yet been found there. It is known only from Eire and Germany (Hodkinson 2007, Queiroz et al. 2012).

Recently we received some psyllids from the island of Lesbos (Greece) collected on an unidentified, long-leaved eucalypt which turned out to be an undescribed *Platyobria* species. Here we record *Platyobria* for the first time from Europe, describe the new species and discuss its potential as a pest of eucalypts.

Material and methods

The material examined is deposited in the Australian National Insect Collection, CSIRO, Canberra, Australia (ANIC), the Muséum d'Histoire Naturelle, Genève, Switzerland (MHNG), the Moravian Museum, Brno, Czech Republic (MMBC), the Naturhistorisches Museum, Basel, Switzerland (NHMB) and the private collection of K. den Bieman, Ulvewnhout, The Netherlands (KDBC).

Morphological terminology follows mostly Ossiannilsson (1992) and Yang et al. (2009). Permanently slide-mounted specimens were used to prepare the drawings and take the measurements apart from the body length which was taken from dry-mounted specimens.



Figs 1–7. *Platyobria biemani* sp. nov. **1.** Female, lateral view. **2.** Female, dorsal view. **3.** Head with antennae, dorsal view. **4.** Hind leg, lateral view. **5.** Forewing. **6.** Surface spinules of forewing cell m_1. **7.** Eggs in female abdomen. Scale bars for **1, 2** = 0.3 mm; **3, 4** = 0.2 mm.

Platyobria biemani sp. nov.

Holotype. ♂, Greece: Lesbos, Petra, village edge, 27.VIII.2010, long-leaved *Eucalyptus*, leg. K. den Bieman (NHMB, dry-mounted).

Paratypes. 8♂, 7♀, same data as holotype (KDBC, MMBC, NHMB, 7♂, 6♀ dry-mounted; 1♂, 1♀ slide-mounted).

Etymology. The species is named after its collector Kees den Bieman.

Description. *Adult. Measurements.* Body length (measured in dry-mounted specimens from anterior head margin to tip of forewing when folded over the body; 8♂, 6♀, range (mean±standard deviation)): ♂ 1.60–1.80 mm (1.69±0.06 mm), ♀ 2.10–2.30 mm (2.20±0.06 mm). Measurements in mm and ratios of morphological details (taken from slide-mounted specimens; 1♂, 1♀): head width (HW) male 0.39 mm, female 0.46 mm; antenna length (AL) male 0.23 mm, female 0.24 mm; forewing length (WL) male 0.88 mm, female 1.14 mm; male proctiger length, proximal segment 0.08 mm; male proctiger length, distal segment 0.08 mm; paramere length 0.16 mm; length of distal aedeagus segment 0.15 mm; female proctiger length (FP) 0.26 mm. Relative measures. AL/HW 0.52–0.59; WL/HW 2.24–2.54; WL/forewing width 2.54–2.62; length ratio of forewing veins M/M_{1+2} 0.58–0.89; length ratio of forewing veins Cu/Cu_{1b} 0.49–0.52; cu_1 cell value (length of vein Cu_{1b}/distance between apices of veins Cu_{1a} and Cu_{1b}) 0.84–1.05; metatibia length/HW 0.41–0.43; FP/HW 0.57; FP/circumanal ring length 3.30; FP/female subgenital plate length 1.65.

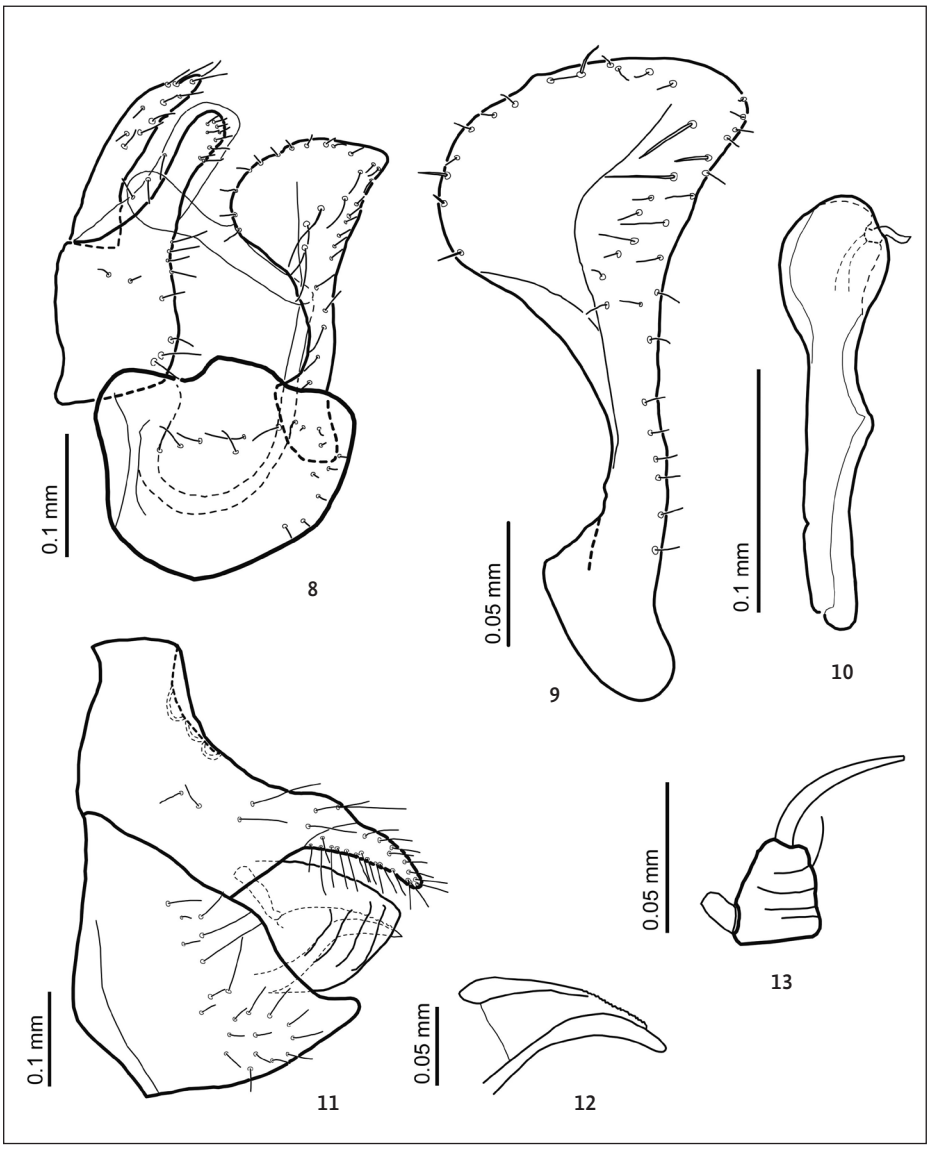
Coloration. General body colour yellow to straw-coloured (Figs 1, 2). Genal processes whitish. Eyes grey, ocelli dull red. Antennomeres I and II light yellow, flagellum straw-coloured, getting slightly darker towards the apex. Forewing semi-transparent, membrane light yellow or straw-coloured, veins hardly darker. Hindwing semi-transparent, whitish. Femora, tibiae and tarsi dirty whitish; metatibial and metatarsal spurs black. Apex of female subgenital plate dark brown to black.

Head (Fig. 3) inclined in a 45–90° angle from longitudinal body axis, slightly wider than mesothorax. Vertex flat, trapezoidal, less than half as long as wide, lacking macroscopic setae, evenly covered in fine microsculpture. Genal processes shorter than wide at base, irregularly rounded apically, touching basally, beset with moderately long setae of variable length. Median ocellus completely covering frons, anteri-

orly delimited by base of genal processes, posteriorly by vertex. Preocular sclerite forming prominent tubercule anteriorly, reaching lateral ocellus basally. Antenna very short, relative length of antennomeres as 1.0 : 0.8 : 1.2 : 0.4 : 0.4 : 0.4 : 0.4 : 0.4 : 0.4 : 0.4; longer terminal seta longer than segment 10, strongly curved, shorter seta, very short, cylindrical, situated at the base of segment (Fig. 13). Clypeus rounded, rostrum short.

Thorax. Forewing (Fig. 5) slightly sexually dimorphic, irregularly oval and relatively shorter in male and irregularly trapezoidal and relatively longer in female; irregularly narrowly rounded apically; apex at end of vein M_{1+2}; vein C+Sc broad, cell c+sc short; costal break well developed; pterostigma broad and long, ending in apical fifth of forewing; veins R and M+Cu very short, in male longer than in female; branches of M very long, sometimes weakly sinuous; branches of Cu much longer than stem, sinuous; wing membrane densely covered in surface spinules (Fig. 6), leaving narrow spinule-free stripes along the veins in basal half of wing. Hindwing slightly shorter than forewing, membranous, vein C+Sc with a basal group of three to seven densely spaced, short setae and an adjacent distal group of four to six widely spaced, long, weakly curved setae; vein M+Cu developed. Hind leg (Fig. 4) with posteriorly angular coxa; metatibia about as long as metafemur, strongly expanding to apex, with (one to two)+(two to three) small, apical metatibial spurs; metabasitarsus subglobular, with one lateral sclerotised spur.

Abdomen. Male terminalia (Fig. 8), with two-segmented proctiger; distal segment narrowly tubular, about as long as dorsal length of proximal segment (without appendages); proximal segment bearing posterior appendages with membranous fringe, about as long as distal segment; both segments sparsely covered in moderately long hairs; subgenital plate hemispherical, with a strongly sinuous dorsal margin and a row of long lateral setae as well as a group of sparse, short distal setae. Paramere (Fig. 9), in profile, capitate with narrow basal half and large semi-circular apical half, facing forward. Outer face with some long setae along posterior margin and a row of very long, slightly thickened setae in the middle of apical part, and short setae along apical and anterior margin of apical part; inner face with a few long setae in apical half near caudal margin, lacking an anterobasal comb of black rods. Aedeagus two-segmented, proximal portion U-shaped; distal portion (Fig. 10) elongate, with sclerotised hump in the middle of dorsal margin, apical inflation oval; sclerotised end tube of ductus ejaculatorius short, S-shaped. Female terminalia (Fig. 11), in profile, shortly cuneate. Proctiger strongly concave in basal three quarters, with a few very long setae, apical portion forming lamellar process which is separated from basal portion by narrow transverse embossment and membranous band, and which is covered in dense medium long setae. Circumanal ring undulating, consisting of two rows of pores. Subgenital plate shorter than proctiger, covered in moderately to very long setae in apical half, bearing short acute, strongly sclerotised apex. Valvula lateralis broad, angular, with four strongly sclerotised ridges on the outer face; valvula dorsalis cuneate, curved, serrate dorsally in apical third, valvula ventralis strongly curved, pointed apically, lacking teeth (Fig. 12).



Figs 8–13. *Platyobria biemani* sp. nov. **8.** Male terminalia, lateral view. **9.** Inner face of paramere, lateral view. **10.** Distal portion of aedeagus, lateral view. **11.** Female terminalia, lateral view. **12.** Valvulae dorsalis and ventralis, lateral view. **13.** Tenth antennal segment.

Egg (in female abdomen) (Fig. 7). Curved, 0.3 mm long, covered in cellular microsculpture on one side.

Fifth instar immature. Unknown.

Diagnosis. Vertex flat, trapezoidal, less than half as long as wide. Genal processes shorter than wide at base, irregularly rounded apically. Forewing irregularly oval; apex at end of M_{1+2}. Paramere, in profile, capitate with narrow basal half and large semi-circular apical half, facing forward; inner face lacking an anterobasal comb of black rods.

Taylor (1987) described nine *Platyobria*

species which he referred to five species groups defined by characters on the forewing and paramere. *Platyobria biemani* sp. nov. runs in Taylor's key to the *P. capitata* group, based on the vein M_{1+2} terminating on the apex of the forewing, and the capitate paramere that lacks an anterobasal comb of black rods. From both members of the *P. capitata* group (*P. capitata* Taylor, 1987 and *P. minima* Taylor, 1987), *P. biemani* sp. nov. differs in the semi-circular rather than crescent-shaped apical half of the paramere. In addition, *P. biemani* sp. nov. differs from *P. minima* in the female proctiger whose apex is not separated from basal portion by narrow transverse embossment and membranous band in the latter. From *P. capitata*, to which *P. biemani* sp. nov. is most similar, it differs also in the slightly shorter genal processes. Among unidentified material in the ANIC, MHNG and NHMB which we examined there are many more undescribed species but we could not find any specimen matching *P. biemani* sp. nov. This situation is reminiscent of *Ctenarytaina peregrina* known from Eire and Germany which is also associated with eucalypts and is unknown from Australia from where it most likely originates (Hodkinson 2007, Queiroz et al. 2012).

Host-plant. Adults have been collected on a long-leaved *Eucalyptus* species (Myrtaceae), which is a likely host as the other congeners, as far as known, develop on *Eucalyptus* species (Taylor 1987).

Discussion and conclusion. In Australia *Platyobria* species have not been reported to have any significant effect on their eucalypt hosts (Taylor 1987, Hollis 2004). On the other hand, in eucalypt plantations outside Australia, the situation may be different, as known for *Ctenarytaina eucalypti* which became a pest in various countries where it was introduced (Hodkinson 1999, Santana & Burckhardt 2007). As *Platyobria*, in Australia *C. eucalypti* is not a problem, mainly due to the fact that it is sufficiently controlled by parasitoids and predators. Investigation on the distribution and biology of *P. biemani* in Greece should be made and eradication of the species considered before the species can spread and develop into a serious new eucalypt pest.

Acknowledgments. We thank Kees den Bieman (Ulvewnhout) for entrusting us with the study of the new *Platyobria* species and for the gift of specimens, and Dr. Beth Mantle (ANIC) for the loan of material.

References

Burckhardt, D. 1991. *Boreioglycaspis* and spondyliaspidine classification (Homoptera: Psylloidea). *Raffles Bulletin of Zoology* **39**: 15–52.

Burckhardt, D. & Ouvrard, D. 2012. A revised classification of the jumping plant-lice (Hemiptera: Psylloidea). *Zootaxa* **3509**: 1–34.

Hodkinson, I. D. 1999. Biocontrol of *Eucalyptus* psyllid *Ctenarytaina eucalypti* by the Australian parasitoid *Psyllaephagus pilosus*: a review of current programmes and their success. *Biocontrol News and Information* **20**: 129–134.

Hodkinson, I. D. 2007. A new introduced species of *Ctenarytaina* (Hemiptera, Psylloidea) damaging cultivated *Eucalyptus parvula* (= *parvifolia*) in Europe. *Deutsche Entomologische Zeitschrift* **54**: 27–33.

Hollis, D. 2004. Australian Psylloidea: jumping plantlice and lerp insects. Australian Biological Resources Study (ABRS), Canberra, Australia, 232 pp.

Ossiannilsson, F. 1992. The Psylloidea (Homoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* **26**: 1–347.

Ouvrard, D. 2013. Psyl'list – The World Psylloidea Database [WWW document]. URL http://www.hemiptera-databases.com/psyllist.

Queiroz, D. L. D., Burckhardt, D. & Majer, J. 2012. Integrated pest management of eucalypt psyllids (Insecta, Hemiptera, Psylloidea). In: Integrated pest management and pest control – current and future tactics. Ed. by Larramendi, M. L. & Soloneski, S., InTech, 385–412.

Santana, D. L. D. Q. & Burckhardt D. 2007. Introduced *Eucalyptus* psyllids in Brazil. *Journal of Forest Research* **12**: 337–344.

Taylor, K. L. 1987. *Platyobria*, new aphalarid genus (Homoptera: Psylloidea) from Australia. *Journal of the Australian Entomological Society* **26**: 253–264.

Yang, M.-M., Burckhardt, D. & Fang, S.-J. 2009. Psylloidea of Taiwan. Families Calophyidae, Carsidaridae, Homotomidae und Phacopteronidae, with overview and keys to families and genera of Taiwanese Psylloidea (Insecta: Hemiptera). National Chung Hsing University.

● PD Dr. Daniel Burckhardt,
Naturhistorisches Museum,
Augustinergasse 2, CH-4001 Basel;
E-Mail: daniel.burckhardt@bs.ch

● Dr. Dalva L. Queiroz,
Embrapa Florestas, Estrada da Ribeira,
km 111, Caixa postal 319, 83411-000,
Colombo, PR, Brazil;
E-Mail: dalva.queiroz@embrapa.br

● Dr. Igor Malenovský,
Department of Entomology,
Moravian Museum, Hviezdoslavova 29a,
CZ-627 00 Brno, Czech Republic &
Department of Botany and Zoology,
Faculty of Sciences, Masaryk University,
Kotlářská 2, CZ-611 37 Brno, Czech Republic;
E-Mail: imalenovsky@mzm.cz