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FIRST RECORD OF INVASIVE AUSTRALIAN PSYLLID SPECIES *GLYCASPIS BRIMBLECOMBEI* MOORE, 1964 (HEMIPTERA: PSYLLOIDEA: APHALARIDAE) IN CROATIA

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The Australian red gum lerp psyllid *Glycaspis brimblecombei* Moore, 1964 is recorded for the first time in Croatia. In the paper, a brief overview of the new pest with the locality of its first occurrence is provided.

Key words: psyllids, *Glycaspis brimblecombei*, first record, Croatia

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Australska vrsta lisne buhe *Glycaspis brimblecombei* Moore, 1964 zabilježena je po prvi puta u Hrvatskoj. Rad donosi kratak pregled o novom štetniku s lokalitetom prvog nalaza.

Ključne riječi: lisne buhe, *Glycaspis brimblecombei*, prvi nalaz, Hrvatska

INTRODUCTION

Psyllids or jumping plant-lice (Hemiptera: Sternorrhyncha: Psylloidea) are a relatively small group of phytophagous, mostly monophagous, phloem-feeding insects (Ossiannilsson, 1992), with about 4000 described species worldwide (Percy *et al*., 2018). Together with aphids, scale insects and whiteflies they constitute the suborder Sternorrhyncha within the order Hemiptera. In the first decade of the 21st century it became obvious that there had been a significant increase in the introduction of new alien species of phytophagous insects into Croatia, with species from the order Hemiptera accounting for 57% of all introduced species. Hemipteran species are capable of spreading outside their native range because of the extensive international trade in their host plants and their small size, making them hardly visible (Matošević & Pajač Živković, 2013).

The genus *Glycaspis* was first described by Taylor (1960), with *Aphalara flavilabris* Froggatt, 1903 designated as the type species. *Glycaspis brimblecombei*, commonly known as red gum lerp psyllid (Bella & Rapisarda, 2013), was described on *Eucalyptus* sp. (blue gum) by Moore (1964). According to the last revised classification by Burck-

hardt & Ouvrard (2012), *G. brimblecombei* is classified within the family Aphalaridae, subfamily Spondyliaspidinae. According to Moore (1970), *G. brimblecombei* utilises *Eucalyptus camaldulensis* Dehnh. (Myrtaceae) and other *Eucalyptus* species as its host. Being native to Australia (Moore, 1970), *G. brimblecombei* was first recorded outside its native range in California in 1998 on *E. camaldulensis* (Brennan *et al*., 1999). In Europe, *G. brimblecombei* was reported for the first time from the Iberian Peninsula in 2007 (Hurtado Hernández & Reina Belinchón, 2008; Valente & Hodkinson, 2009). Subsequently, it was reported from other countries of the Mediterranean basin as follows: Italy (Laudonia & Garonna, 2010; Garonna *et al*., 2011), France (Cocquempot *et al*., 2012), Montenegro (Malumphy *et al*., 2013), Greece (Bella & Rapisarda, 2013), Turkey (Karaca *et al*., 2015) and Cyprus (Karaca *et al*., 2017).

In Croatia, the genus *Glycaspis* and the species *G. brimblecombei* have not been recorded before (Ouvrard, 2020). Prior to this finding another Australian psyllid species, *Ctenarytaina eucalypti* (Maskell, 1980), had already been recorded from *Eucalyptus* in Croatia, found on potted *Eucalyptus gunni* (Hook. F.) in 2005 (Šimala *et al*., 2006).

MATERIAL AND METHODS

Infested leaves of *E. camaldulensis* were collected in transparent plastic bags. A fine mesh sweeping net and mouth aspirator were used to obtain adults from the host plant. Samples were stored in a portable refrigerator before being brought into the laboratory for identification. In the laboratory, specimens of adults were used to identify genus and species, on the basis of morphological characters. Adult specimens were placed in 70% ethanol and observed under stereomicroscope (Olympus SZX7). For an accurate identification, male genital terminalia were slide-mounted in Canada balsam according to a modified Watson & Chandler (1999) method and observed under optical microscope (Olympus BX 51). Following identification, dry specimens were mounted on 15x5 mm triangular cardboard using polyvinyl alcohol-based glue and together with slide-mounts of genital terminalia deposited in the collection of the Laboratory for Zoology at Centre for Plant Protection - CAAF, in Zagreb. The species was identified using the description and illustrations provided in Moore (1964), descriptions and key provided in Hollis (2004) and keys developed by Halbert *et al*. (2001) and Laudonia & Garonna (2010). The locality of the finding was mapped using Google Earth Pro.

RESULTS AND DISCUSSION

Heavily infested leaves, with numerous conical, white, scale-like coverings and sticky film of honeydew with an early onset of sooty mould, were discovered in Croatia on August 31st 2020 on a single *E. camaldulensis* tree, planted for ornamental purposes in a private garden in a small coastal town of Drače (N 42°55′52.35′′ E 17°26′45.38′′) on the Pelješac peninsula (Fig. 1). The locality of this finding is fairly isolated and the *E. camaldulensis* tree does not seem to have been planted recently, so the origin of the infestation remains unknown. The species was subsequently identified based on the following morphological characters of adult specimens: forewing elongate, apically angulate, with basal stem vein (R+M+Cu) bifurcating into two main veins, veins Rs and M_{1+2} not in contact; genal processes long, 0.8 times as long as vertex or longer; hind leg coxa without a true meracanthus (Fig. 2); male proctiger bipartite, with a distinct apical segment (Fig 3).

Fig. 1. Satellite image of Pelješac peninsula and the finding place of *G. brimblecombei* (yellow pin)

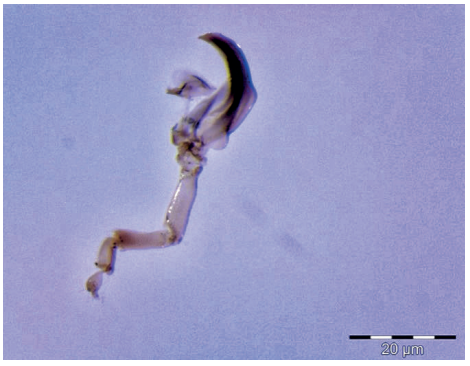

Fig. 2. Hind leg coxa without a true meracanthus (photo: M. Pintar)

Fig. 3. Permanent microscopic slide of male genital terminalia (photo M. Pintar)

The psyllid life cycle typically comprises an egg stage, five larval instars and a sexually reproducing adult stage, with males and females usually showing only moderate deviation from a 1:1 sex ratio at emergence (Hodkinson, 2009). The majority of psyllid species are free-living during their larval development but some 7% of the described species are known to live individually under a scale-like covering or lerp. The first instar larvae begin building their lerps (Fig. 4) soon after they start feeding, weaving their anal exudates to form structure that is attached to the leaf surface. Each subsequent instar increases the diameter and height of the lerp by adding material under its outer edge. Fresh exudates appear as opaque viscous liquid that solidifies quickly upon contact with the air (Hollis, 2004). Nymphs of *G. brimblecombei* develop under such a lerp. Once nymphal development is complete, winged adults leave the protective lerp and fly to infest new plants (Laudonia & Garonna, 2010). Adults of *G.*

brimblecombei are 2 – 4 mm long, light green in colour (Figs. 5 & 6), with dark red eyes (Karaca *et al*., 2017). In Australia, 2 to 4 generations per year are observed (Laudonia & Garonna, 2010).

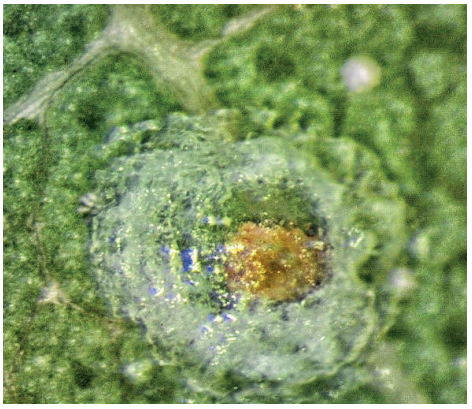

Fig. 4. G. *brimblecombei* larva under fresh lerp (photo: M. Pintar)

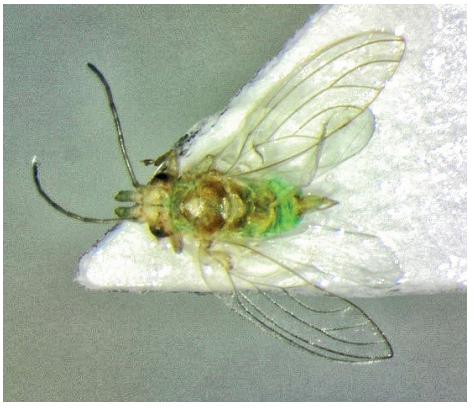

Fig. 5. Male adult of *G. brimblecombei* (photo: M. Pintar)

Fig. 6. Female adult of *G. brimblecombei* (photo: M. Pintar)

Although during visual inspection no symptoms were observed on the infested tree, *G. brimblecombei* has been recorded as a serious pest, causing a reduction of the photosynthetic area of affected leaves, desiccation, premature leaf fall, dieback and consequently a reduction in plant growth (Malumphy *et al*., 2013). The Pelješac peninsula is situated in the southernmost region of Croatia, with typical Mediterranean climate suitable for establishment of *G. brimblecombei*. However, as *E. camaldulensis* is rarely planted in Croatia, *G. brimblecombei* is not likely to become a serious pest in the country. Nevertheless, further research is required.

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SAŽETAK

Prvi nalaz invazivne australske vrste lisne buhe *Glycaspis brimblecombei* Moore, 1964 (Hemiptera: Psylloidea: Aphalaridae) u Hrvatskoj

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Lisne buhe su sitni, fitofagni, uglavnom monofagni kukci, s oko 4000 opisanih vrsta u svijetu. Taksonomski su svrstani u natporodicu Psylloidea unutar reda Hemiptera, gdje zajedno s lisnim ušima, štitastim ušima i štitastim moljcima tvore podred Sternorrhyncha. Značajan porast u broju unosa stranih vrsta fitofagnih kukaca u Hrvatsku vidljiv je u prvom desetljeću 21. stoljeća, od čega čak 57% vrsta pripada redu Hemiptera.

Glycaspis brimblecombei Moore, 1964 nova je vrsta u fauni lisnih buha u Hrvatskoj, pronađena po prvi puta u ljeto 2020. na vrsti *Eucalyptus camaldulensis* Dehnh. (Myrtaceae), u mjestu Drače na Pelješcu. Na listovima svjetlucavim od izlučene medne rose zamijećeni su mnogobrojni bijeli štitići. Naknadnom laboratorijskom analizom na temelju morfoloških karakteristika odraslih mužjaka potvrđeno je da se radi o vrsti *G. brimblecombei.*