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Glycaspis brimblecombei Moore (Hemiptera: Aphalaridae), the New Exotic Pest of *Eucalyptus* in Northern Cyprus

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Abstract: Eucalypt-feeding psyllids, *Glycaspis brimblecombei* Moore (Hemiptera: Psylloidea: Aphalaridae), native to the Australian region, has emerged as an aggressive pest on *Eucalyptus* in many countries as it was described recently in Greece and Turkey. This study aimed to report this invasive species and its parasitoids on *Eucalyptus* growing area in Northern Cyprus. *G. brimblecombei* infested leaves were collected and brought to the laboratory for identification and collection of parasitoids emerged from the pest. In this paper, presence of *G. brimblecombei* and the parasitoid of the red gum lerp psyllid *Psyllaephagus bliteus* Riek (Hymenoptera: Encyrtidae) were reported for the first time in Northern Cyprus. Detailed information about the pest and its parasitoids were discussed.

Key words: *Glycaspis brimblecombei*, Northern Cyprus, *Psyllaephagus bliteus*, red gumlerp psyllid.

1. Introduction

Eucalyptus (Myrtaceae: *Eucalyptus*) is a fast growing evergreen tree, mostly native to Australia [1], and has been planted commercially in tropical and subtropical areas all over the world. *Eucalyptus* is very important and highly used plant for timber, firewood, oil, honeybee foraging and recreation areas. It can be also used for draining of marshes to eradicate malaria. Unfortunately, drying of the soil negatively affects other plant species. *Eucalyptus* trees were introduced to Cyprus for the first time in 1881 by French Forest Service member, Madon, P. G. for afforestation of Nicosia walls [2].

In spite of various pests reported on *Eucalyptus* trees [3-6], in the Middle East and the Mediterranean, eucalypt trees were considered almost free of serious insect pests. Australian insects have been introduced and established all over the world and turn into an important management issue in most eucalypt growing areas [7, 8]. During the last few years, several insects became established in *Eucalyptus* trees in Europe [9-13]. One of the most recently introduced species is *Glycaspis brimblecombei* Moore (Hemiptera: Psyllidae), commonly known as the red gum lerp psyllid, which was considered a serious pest. Production of large amounts of honeydew, on which sooty mould develops and feeds on sap by adults and nymphs, caused leaf discoloration and infested trees becoming susceptible to attacking by secondary pests [10]. Severe and multiple defoliations can result in tree death.

As a part of the psyllid biological control programs, the parasitoid *Psyllaephagus bliteus* Riek (Hymenoptera: Encyrtidae) was imported from Australia and introduced to several countries, such as California, USA [14], Mexico [15] and Chile [16]. The parasitoid was not intentionally introduced, but probably was established itself in Spain, Italy, Greece and Turkey [9-13, 17].

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This study aimed to observe and find invasive species, *G. brimblecombei* and its parasitoid *P. bliteus* during summer 2015 in North Cyprus.

2. Materials and Methods

During 2015, visual inspections of *Eucalyptus* leaves in several areas showed the presence of adults, nymphs and lerps of *G. brimblecombei*. Samples were collected from Nicosia (Lefkoşa), Morphou (Güzelyurt), Famagusta (Magusa), where *Eucalyptus* spp. were planted. This pest was observed in all regions and mostly in Morphou (Güzelyurt).

Heavy infested leaves of *Eucalyptus* spp. were sampled, wrapped in dry newspaper and then placed in plastic bags to bring to laboratory for detail examinations. Additionally, the leaves were placed into parasitoid extraction box to collect natural enemies. The plastic container was covered with black cover to prevent light entering, and clear plastic tube was attached to plastic container to collect parasitoids, which showed tendency of moving to light. Emerging parasitoids in the clear plastic tube were collected daily. Lerps, adult, eggs on the leaves and immature stages of *G. brimblecombei* were measured and photographed for identifications (Fig. 1).

The white coverings (lerps) secreted by the nymphs are easily recognized on the infested *Eucalyptus* leaves. *G. brimblecombei* was identified by senior author using the important key characters, such as long genal combs, long vertex and apically angulate forewings [5, 10]. Parasitoid, *P. bliteus* was identified by Dr. George Japoshvili. All insect samples were stored at Entomological Museum of Ispart, Turkey (EMIT).

3. Results and Discussion

G. brimblecombei Moore, 1964 (synonym: *Alloglycaspis brimblecombei* More, 1961). Observations made on *Eucalyptus* spp. in several areas of North Cyprus in 2015 confirmed *G. brimblecombei* infestation for the first time. Adults of red gum lerp psyllid are 2-4 mm long, light green-colored on the head with dark red eyes and have a characteristic of long genital processes and elongate forewings [10] (Fig. 1a). Immatures develop under a lerp, shield-like white crystalline cover that is on the leaf surface [5] (Fig. 1b). Lerps are usually whitish in appearance, but may turn to a grey or black color with age. Adults lay spindle-shaped, yellow-orange colored eggs randomly on the leaves. Nymphs are yellow-orange with brown coloration on the wing pads (Fig. 1c).

Parasitoid of the red gum lerp psyllid, *P. bliteus* Riek (Hymenoptera: Encyrtidae) (synonym: *P. bliteus* Riek, 1962) was also recorded for the first time in this study in North Cyprus (Fig. 1f). This parasitic wasp feeds only on *G. brimblecombei*. Females generally lay eggs in the psyllid nymphs and the parasitoid larvae feed on the psyllid, and then metamorphose in the lerp. When the wasp was ready to leave, it will make an emergence hole in the lerp [18].

G. brimblecombei has been reported from many areas where *Eucalyptus* spp. grown. This insect was first found and identified in Queensland, Australia by Moore [19]. This insect showed very rapid spread in different countries and became a major pest of *Eucalyptus* trees. *Blastopsylla occidentalis* Taylor and *G. brimblecombei* were found in California and Florida, North America [20]. Also, *G. brimblecombei* was found and reported in Brazil [21], Peru [22], Portugal and Spain [23]. *B. occidentalis* and *G. brimblecombei* were reported from Israel for the first time in 2015, and both species were collected from a dominant eucalypt species, *E. camaldulensis* Dehnh. In Italy, *E. camaldulensis* is very common eucalypt species and *G. brimblecombei* and generalist predators, such as ants, spiders and pirate bugs, were observed from several urban and rural areas, but psyllid parasitoids were not found [10]. Later on this, the specific parasitoid, *P. bliteus* was reported in Italy in 2011 [18]. During a survey in 2013 in Tunisia, high *G. brimblecombei* infestation was observed on *Eucalyptus* trees [12]. The red gum lerp

Fig. 1 *G. brimblecombei*: adult (a), lerps on *Eucalyptus* spp. leaves (b), nymph (c), eggs (d), parasitized lerps and nymph (e), pupa of *P. bliteus* (f).

psyllid and its parasitoid in Greece were found for the first time during the observations conducted in summer 2013 [11, 17]. After reporting this species in Greece, the occurrence of *G. brimblecombei* and its parasitoids *P. bliteus* was reported for the first time on *E. camaldulensis* leaves in İzmir area in Turkey [13].

4. Conclusions

The invasive alien species, *G. brimblecombei* was originated in Australia and became an invasive pest since its establishment overseas in the Middle East and the Mediterranean region in 2000. The establishment of this species in North Cyprus was not surprising, because of its infestation on eucalypt trees

in other Mediterranean countries, especially in Greece and Turkey. This pest was observed in 2015 in several areas where *Eucalyptus* spp. was planted in North Cyprus. The establishment of this species in North Cyprus also brought together with its principle parasitoid of *P. bliteus*. The rapid colonization of this pest demands a detail study about its biology, ecology, natural enemies and especially invasion dynamics to understand its potential distribution before causing economic loss.

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