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FIRST RECORD IN ITALY OF *PSYLLAEPHAGUS BLITEUS* RIEK
(Hymenoptera Encyrtidae) PARASITOID
OF *GLYCASPIS BRIMBLECOMBEI* MOORE (Hemiptera Psyllidae)

SUMMARY

Psyllaephagus bliteus Riek (Hymenoptera Encyrtidae), parasitoid of the red gum lerp psyllid *Glycaspis brimblecombei* Moore (Hemiptera Psyllidae), has been recorded for the first time in Italy in September 2011. The arrival of *P. bliteus* in Sicily is due to an accidental introduction, probably together with its host, as already happened in New Zealand, Brazil, Spain and Morocco.

RIASSUNTO

Ritrovamento in Italia di Psyllaephagus bliteus Riek (Hymenoptera Encyrtidae) parassitoide di Glycaspis brimblecombei Moore (Hemiptera Psyllidae). Viene segnalata per la prima volta in Italia la presenza di *Psyllaephagus bliteus* Riek (Hymenoptera Encyrtidae) parassitoide della psilla dal folliolo bianco ceroso dell'eucalipto, *Glycaspis brimblecombei* Moore (Hemiptera Psyllidae). Il rinvenimento del parassitoide in Sicilia segue di pochi mesi le prime segnalazioni del suo ospite nell'isola. Il suo arrivo, probabilmente insieme al suo ospite, è da ritenere accidentale così come già avvenuto in Nuova Zelanda, Brasile, Spagna e Marocco.

INTRODUCTION

In late spring 2011 *Glycaspis brimblecombei* Moore, an Australian psyllid feeding on *Eucalyptus* spp., was recorded in Sicily (LO VERDE *et al.*, 2011), while in Southern and Central Italy it was found in June 2010 (LAUDONIA & GARONNA 2010; GARONNA *et al.* 2011; PERIS-FELIPO *et al.*, 2011), and few months after it was also detected in Sardinia (EPPO, 2011). *G. brimblecombei* arrived in North America in 1998 (California, 1998: GILL,

1998; BRENNAN *et al.* 1999; Mexico 2001: CIBRIÁN *et al.* 2001); afterwards it spread in Hawaii (NAGAMINE & HEU, 2001), South America (Chile, SANDOVAL & ROTHMANN, 2002; Brazil, WICKEN *et al.*, 2003; Argentina, BOUVET *et al.*, 2005; Ecuador, ONORE & GARA, 2007; Venezuela, ROSALES *et al.*, 2008; Peru, BURCKHARDT *et al.*, 2008) and some African islands (Mauritius, SOOKAR *et al.*, 2003; Madagascar, HOLLIS, 2004). In 2008 the psyllid was found in Europe (Spain and Portugal, HURTADO & REINA, 2008; BORRAJO *et al.*, 2009; PRIETO-LILLO *et al.*, 2009), and in 2009 reached Morocco (BAMI, 2011; IBNELAZYZ, 2011).

G. brimblecombei can be easily detected observing the presence on leaf surfaces of the characteristic white cones (lerps) produced by nymphs. High population levels can cause leaf fall, a decrease in growth rate, and in some cases death of the infested plant (GILL, 1998; DAHLSTEN *et al.*, 2005). In Italy it threatens eucalyptus trees in parks, urban areas and plantations, and Italian beekeepers are worried because of the dramatically lower quality and quantity of eucalyptus honey (GARONNA *et al.*, 2011; PIBIRI, 2011).

In California, a classical biological control program has been launched, collecting natural enemies in Australia, selecting them and finally releasing the encyrtid wasp *Psyllaephagus bliteus* Riek from the end of 1999 to 2003 (PAINE *et al.*, 2000; DAHLSTEN *et al.*, 2005). As a consequence of biological studies and parasitoid rearing carried out before its release in the field, Zuparko (in DAANE *et al.*, 2005) synonymized *Psyllaephagus quadricyclus* Riek, described on male specimens (characterized by four ring segments in the antenna, Fig. 1) under *P. bliteus*, described on female specimens (Fig. 2).

P. bliteus parasitizes *G. brimblecombei* and other psyllids as *Boreioglycaspis melaleucaae* Moore on *Melaleuca quinquenervia* (Cav.) S.T. Blake (Myrtaceae), *Creiis costatus* (Froggatt), *Ctenarytaina eucalypti* (Maskell), *Glycaspis granulata* (Froggatt) and *Glycaspis* sp. on *Eucalyptus* spp. (RIEK, 1962; HERTING, 1972; WITHERS, 2001; DAHLSTEN *et al.*, 2002; DAANE *et al.*, 2005; BERRY, 2007).

Known distribution of *Psyllaephagus bliteus*: Australia (Australian Capital Territory, South Australia, New South Wales, Queensland) (RIEK, 1962); New Zealand (WITHERS, 2001; BERRY, 2007); North America (California, PAINE *et al.*, 2000; Mexico, PLASCENCIA *et al.*, 2005); South America (Brazil, BERTI-FILHO *et al.*, 2003; Chile, IDE *et al.*, 2006); Spain, (PEREZ-OTERO *et al.*, 2011); Morocco (BAMI, 2011).

P. bliteus has been also released in Mexico (2002: PLASCENCIA *et al.*, 2005) and Chile (2003: IDE *et al.*, 2006). In several countries the parasitoid arrived without any release: in New Zealand it has been detected on *G. granulata* (WITHERS, 2001; BERRY, 2007), while in Brazil, Spain and Morocco on

Fig. 1 — Head and prothorax of a male *Psyllaephagus bliteus*; four ring segments are clearly visible in the antenna.



Fig. 2 — Female *P. bliteus*.

G. brimblecombei (BERTI-FILHO *et al.*, 2003; PEREZ-OTERO *et al.*, 2011; BAMI, 2011; Jean Claude Malausa, *pers. comm.*).

Based on these records, in September 2011 a monitoring on *G. brimblecombei* started in Western Sicily to detect the possible occurrence of the encyrtid.

MATERIALS AND METHODS

Samplings were carried out in September, October and November in 32 sites of Palermo, Trapani and Agrigento Provinces. Each sample consisted of leaves of *Eucalyptus camaldulensis* Dehnh. bearing a total number of at least 100 fully developed lerps. Lerps were analysed to detect the exit hole of the parasitoid (Fig. 3). In the laboratory lerps without hole were removed counting the number of parasitized host, in this case called mummies (Fig. 4). The psyllid instars found on the leaves have been reared at room temperature (for about two weeks) until adults emerged. The parasitization level was calculated as the percentage of parasitized psyllid (pierced lerps and unpierced mummies/total collected fully developed lerps).



Fig. 3 — Lerp of *Glycaspis brimblecombei* pierced by an emerging adult of *P. bliteus.s.*



Fig. 4 — Mummy of *G. brimblecombei* deriving from the transformation of the last instar nymph due to the parasitization by *P. bliteus*.

RESULTS AND DISCUSSION

The parasitization due to *P. bliteus* has been verified for the first time on September 19th in Marsala (Contrada Granatello, Trapani Province), finding few pierced lerps and mummies (Figs. 3, 5). Afterwards, pierced lerps, mummies and adults of *P. bliteus* (Figs. 1-6) have been collected in other six sites: two in Sciacca (Agrigento Province), one in Marsala (Contrada Digerbato, Trapani Province) and the last one in Balestrate (Contrada Sicciarotta, Palermo Province) and the last two in Palermo town (Fig. 7). All these sites are close (less than 4 km) to the coastline.

The maximum level of parasitization (6.6%) has been recorded in samples collected in October in one of Sciacca sites. In the other six sites the parasitization resulted between 1 and 4%. The distance among the sites of recovery (Fig. 7) indicates that the parasitoid can be considered spread in all coastal areas of Western Sicily.



Fig. 5 — Male *P. bliteus* emerging from a *G. brimblecombei* mummy.

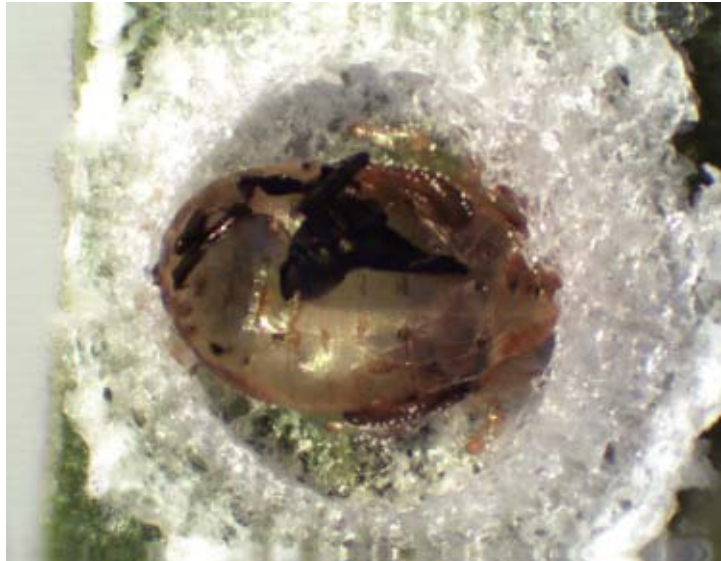


Fig. 6 — Pierced *G. brimblecombei* mummy and *P. bliteus* pupal remnants soon after the parasitoid emergence.

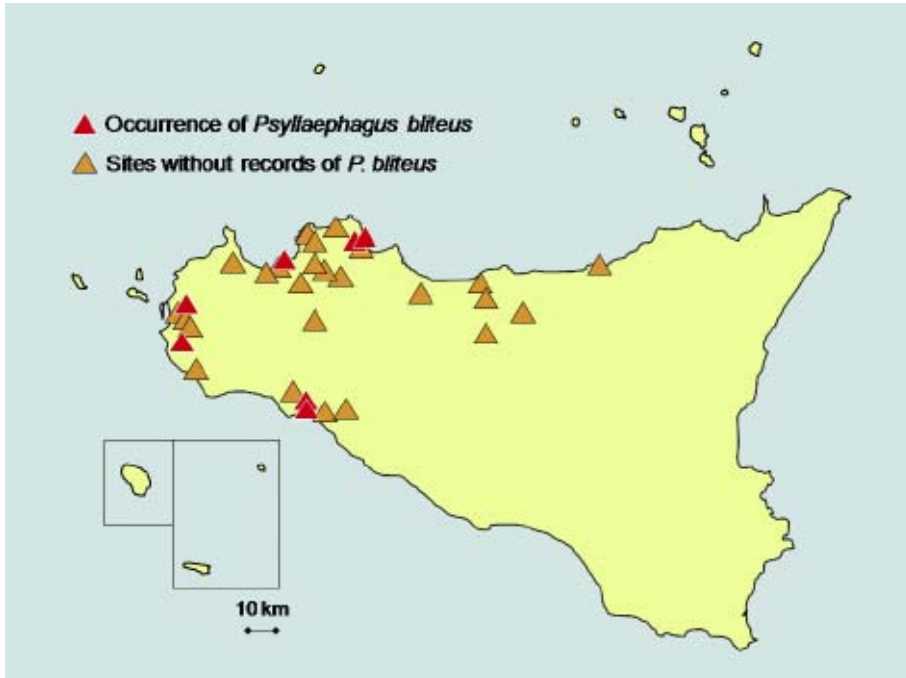


Fig. 7 — Sicilian sites in which the presence of *P. bliteus* has been investigated.

CONCLUSIVE REMARKS

The arrival of *P. bliteus* in Italy is due to an accidental introduction, probably together with its host, as already happened in New Zealand, Brazil, Spain and Morocco (WITHERS, 2001; BERRY, 2007; BERTI-FILHO *et al.*, 2003; PEREZ-OTERO *et al.*, 2011; BAMI, 2011; Jean Claude Malausa, *pers. comm.*). The ability of several parasitoid species to spread is well known, as demonstrated also by *Closterocerus chamaeleon* (Girault) (Hymenoptera Eulophidae), parasitoid of the eucalyptus gall wasp *Ophelimus maskelli* (Ashmead) (Eulophidae), released in Sicily in 2006 and found in Tunisia and Algeria in 2007 and 2008, respectively (CALECA, 2010; LO VERDE *et al.*, 2010; CALECA *et al.*, 2011).

The recovery of *P. bliteus* in Italy finds a remarkable interest in the perspective of a biological control of its host, as the presence and gradual diffusion of *P. bliteus* allowed a satisfactory control in the countries where it has been released in classical biological control programs against the red gum lerp psyllid (California, DAHLSTEN *et al.*, 2005; Mexico, PLASCENCIA *et al.*, 2005; Chile, IDE *et al.*, 2006). In spite of the occurrence of several native natural ene-

mies attacking the newly introduced *G. brimblecombei* (VALENTE & HODKINSON, 2009; GARONNA *et al.*, 2010, 2011), they usually don't guarantee an effective control of the psyllid (DAHLSTEN *et al.*, 2005).

Moreover, the spontaneous diffusion of this exotic parasitoid allows to solve the paradoxical situation due to a recent Italian law, which currently prohibits the introduction of any exotic species, even if useful and essential for biological control of pests.

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