

The invasive mealybug *Paracoccus burnerae* expands its range: new distribution and host-plant records

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Abstract

The invasive mealybug *Paracoccus burnerae* (Brain) (Hemiptera Pseudococcidae) is recorded from Gran Canaria (Canary Islands) and Yemen for the first time. Comments on the present world distribution of this polyphagous species and new host-plant records are also provided.

Key words: Pseudococcidae, Cocomorpha, distribution, host-plants, Yemen, Canary Islands.

Introduction

In November 2014, mealybugs (Hemiptera Pseudococcidae) were noticed on several different plant species growing outdoors in the Botanic Garden “Viera y Clavijo” of Las Palmas (Gran Canaria, Canary Islands, Spain) (figures 1 and 2). Specimens from the infested plants were slide mounted and identified as *Paracoccus burnerae* (Brain 1915) (Hemiptera Pseudococcidae), a species not previously recorded from Gran Canaria island. At about at the same time (25.ix.2014-1.x.2014), *P. burnerae* specimens were collected in Tenerife for the first time on undetermined herbaceous and arboreal host plants (Gavrilov-Zimin and Danzig, 2015). These records confirm the establishment in the Spanish archipelago of the Canary Islands of *P. burnerae*, an Afro-tropical species endemic to eastern and southern Africa.

Materials and methods

Specimens collected in Gran Canaria were slide mounted according to the procedure by Ben-Dov and Hodgson (1997); the keys and illustrations by De Lotto (1967) and Williams (2004) were used for the species identification. Slide-mounted specimens are deposited in the scale insect collection at CCAFRA, Institute for Plant Protection - Laboratory of Zoology, Zagreb, Croatia (slide numbers 1015, 1017, 1018, 1019, 1021, 1023 and 1024) (Det. G. Pellizzari, leg. T. Masten Milek) and in the Scientific Museum of the University of Padova at the Department Agronomy, Food, Natural Resources, Animals and Environment (DAFNAE) - Entomology, Legnaro, Italy. Slide numbers: 1856/1-2. Moreover, in the DAFNAE collection, 7 slides labelled *Paracoccus burnerae* (Det. S. Marotta, leg. Van Harten) from Yemen were found; they were studied and the species identification was confirmed. The literature on *P. burnerae* has been reviewed.



Figure 1. Adult females and nymphs of *P. burnerae*.
(In colour at www.bulletinofinsectology.org)



Figure 2. Colony of *P. burnerae* on *Asparagus scoparius* (Asparagaceae).
(In colour at www.bulletinofinsectology.org)

Distribution

García *et al.* (2016) report a list of 13 countries where *P. burnerae* is present: Angola, Ascension Island, Comoros, Kenya, Namibia, Réunion, Saint Helena, Seychelles, South Africa, Zambia and Zimbabwe; besides African countries, this species has been recorded from India (Williams, 2004). With regard to the Palearctic Region, recently *P. burnerae* has been recorded from Iran on *Avicennia officinalis* (Acanthaceae) (Moghadam, 2013).

Apparently *P. burnerae* is a serial invader: according to the USDA report by Miller *et al.* (2014), it was intercepted at U.S. ports-of-entry 115 times between 1995 and 2012, with specimens originating from the above-reported countries, and also from Australia, China, Sri Lanka, Thailand, Vietnam and Madagascar. It was most commonly intercepted on citrus.

In Europe *P. burnerae* was intercepted in Great Britain in 1992, on Valencia and Navel oranges imported from South Africa (Malumphy, 1993). Later, Williams

Table 1. New distributional data and host plant records for *P. burnerae*.

Country Place	Slide number	Host plant family	Host plant	Date
Gran Canaria Island / Spain				
Botanical Garden	1015	Fabaceae	<i>Cercis siliquastrum</i> L.	18.XI.2014
"	1017	Lamiaceae	<i>Teucrium heterophyllum</i> L'Hér	18.XI.2014
"	1018	Arecaceae	<i>Caryota mitis</i> Lour.	18.XI.2014
"	1019	Asparagaceae	<i>Asparagus scoparius</i> Lowe	18.XI.2014
"	1021	Araliaceae	<i>Polyscias</i> sp.	18.XI.2014
"	1023/1-3	Malvaceae	<i>Hibiscus</i> sp.	18.XI.2014
"	1024	Apocynaceae	<i>Nerium oleander</i> L.	20.XI.2014
Yemen				
Sana'a	2709/1-4	Sapindaceae	<i>Dodonea viscosa</i> Jacq.	6.X.1997
	2748			27.X.1997
"	2746	Oleaceae	<i>Ligustrum</i> sp.	27.X.1997
Tur	3090	Rutaceae	<i>Citrus</i> sp.	20.IV.1998

and Malumphy (2012) listed this species among the not-established introductions to Great Britain and refer to multiple interceptions on *Citrus* from South Africa, on *Prunus* (Rosaceae) from Zimbabwe and on *Solanum melongena* (Solanaceae) from Ghana. These plant quarantine interceptions suggest that the species is more widely distributed than has been recorded so far.

Host-plants

P. burnerae is a highly polyphagous pest of many economically important plants; in South Africa it is especially common on *Citrus* and oleander (*Nerium oleander*). Its known host plant species so far include 34 genera in 20 plant families (Moghaddam, 2013; García *et al.*, 2016).

Biology

The biology of *P. burnerae* was studied in detail by Johnson and Giliomee (2010; 2011; 2012) because of its increasing importance as pest of citrus and as a quarantine pest for citrus fruits exported from South Africa. According to these authors, in citrus groves in the Western Cape Province of South Africa the *P. burnerae* population peaks in March, and there are four generations/year. In the laboratory at 22 °C, a fecundity of 68 eggs per female was recorded.

Economic importance

Since 1993, *P. burnerae* has been known as a pest of *Citrus* cultivation in the Eastern and Western Cape provinces of South Africa, where it can outnumber the citrus mealybug, *Planococcus citri* (Risso) (Hattingh, 1993; Johnson and Giliomee, 2010). In 2002, *P. burnerae* was listed among the invasive mealybugs that are either a pest in, or threat to, United States agriculture (Miller *et al.*, 2002). Its economic importance has risen over time and it is presently regarded as a quarantine pest for *Citrus* fruits exported from South Africa. For rapid identification of *Citrus*-infesting mealybugs on fruits for export, both morphological and molecular identification tools have been developed (Wakgari and Giliomee, 2005; Pieterse *et al.*, 2010).

Results and comments

The new records from Gran Canaria and Yemen provide some new data on the host plants and distribution of *P. burnerae* (table 1).

Dodonea viscosa, *Ligustrum* sp., *Cercis siliquastrum*, *Polyscias* sp. and *Teucrium heterophyllum* are new host plant records, and Sapindaceae, Araliaceae and Lamiaceae are new host-plant families. *Teucrium heterophyllum* is an endemic plant of Madeira and Canary islands.

The presence of *P. burnerae* in both Tenerife (Gavrilov and Danzig, 2015) and Gran Canaria suggests that it may have been introduced to the Canary Islands some time ago. Probably the mealybug is more widespread in the Canary Islands than is known currently, as no survey has been done, taking into account that the tiny first instars are dispersed by air currents and the high polyphagy of this species. Moreover, *P. burnerae* resembles other mealybugs and could be mistaken for other widespread, common species [e.g. *Pseudococcus calceolariae* (Maskell)].

The new records of *P. burnerae* from Yemen (Middle East), collected in two consecutive years, confirm once again the spread of this species to new areas. The fact that the Canary Islands belong to Spain and are strongly connected with mainland Spain for commercial and tourism purposes increases the risk of accidental introduction of this pest into other Mediterranean countries, where climatic conditions and host plants (above all *Citrus* orchards) could enable its establishment and further spread.

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Received March 4, 2016. Accepted May 25, 2016.