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Host Plants of the Newly Invasive Mealybug Species, *Phenacoccus solenopsis* (Hemiptera: Pseudococcidae), in Hormozgan Province, Southern Iran

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Abstract

The present study was conducted to determine the host plant range of *Phenacoccus solenopsis* TINSLEY 1898 (Hemiptera: Pseudococcidae), in Hormozgan province southern Iran during years 2010-2012. A total of 43 plant species belonging to 20 plant families including field crops, vegetables, ornamentals, weeds, bushes and trees were collected and identified. Among them, 9 species were represented new host plant records. Most *P. solenopsis* hosts belonging to families Solanaceae, Malvaceae and Cucurbitaceae, accounting for 48 % of the reported host plants.

Key words: *Solenopsis* mealybug, *Phenacoccus solenopsis*, Host range, Iran.

Zusammenfassung

Vorliegende Arbeit behandelt das Spektrum der Futterpflanzen von *Phenacoccus solenopsis* TINSLEY 1898 (Hemiptera: Pseudococcidae), studiert in der südiranischen Provinz Hormozgan in den Jahren 2010-2012. 43 Pflanzenarten aus 20 Familien, darunter für den Menschen wichtige Nahrungspflanzen, konnten festgestellt werden, darunter 9 bisher unbekannte Wirtspflanzen.

Introduction

The solenopsis mealybug, *Phenacoccus solenopsis* (Hemiptera: Pseudococcidae) was originally described based on specimens from New Mexico and U.S.A (TINSLEY 1898). It is now found in numerous regions and countries (BEN-DOV et al. 2012). This species will be referred to as the cotton field mealybug, although its host range is diverse and attacks numerous agricultural crops, weeds, ornamentals and medicinal plants (ABBAS et al. 2005, HODGSON et al. 2008, ARIF et al. 2009; WANG et al. 2010, SING et al. 2012). In Asia, this pest also has been reported to be present in Pakistan (ABBAS et al. 2005), India (YOUSUF et al. 2007), Thailand and Taiwan (HODGSON et al. 2008), China (WANG et al. 2009, 2010) and Indonesia (MUNIAPPAN et al. 2011) and causes economic damage in cotton field crops in Pakistan and India (NAGRARE et al. 2009). *P. solenopsis* is a serious pest which occurs ubiquitously in the Hormozgan province in south of Iran and it was collected for the first time on *Hibiscus rosa-sinensis* (Malvaceae), on 1st Jan, 2009 in Bandar Abbas (located at 27°12'32"N, 56°17'27.6"E) (MOGHADDAM & BAGHERI 2010). The solenopsis mealybug is now widely distributed throughout the cotton growing areas of the province. Our knowledge of the host range of *P. solenopsis* in Iran is rudimentary. Here, we present results of three years studies that contribute to the knowledge of the host plant range of *P. solenopsis* in Hormozgan southern Iran and provide 9 new host records.

Materials and methods

Surveys for host plants of *P. solenopsis* were conducted in cultivated and non-cultivated plants in different area of Hormozgan province, Iran, from 2010 to 2012. Hormozgan province is like a strap from the North West to the South East and is located on the northern part of the Persian Gulf and the Oman Sea between 25° 30' and 28° 53' North (Latitude) and 52° 44' to 59° 16' East (Longitude) and dominates the Strait of Hormuz. High temperature, low precipitation, and the extension of semi-arid and arid climate are among the climatic characteristics of this province. Consequently, the agriculture of the region is affected by the imposed climatic conditions. During sampling, host plants of *P. solenopsis* were examined, and later categorized for infestation levels as described in ARIF et al. (2009).

Results and discussion

A total of 43 plant species from 20 families were recorded to be host of *P. solenopsis* in Hormozgan province southern Iran (Table 1). The family Solanaceae recorded the highest numbers of host plants followed by Malvaceae and Cucurbitaceae, respectively. The following division of total host can be made: Amaranthaceae 2.32 % (1 species), Apocynaceae 2.32 % (1 species), Asclepiadace 2.32 % (1 species), Asteraceae 6.98 % (3 species), Chenopodiaceae 2.32 % (1 species), Convolvulaceae 4.67 % (2 species), Cucurbitaceae 11.64 % (5 species), Euphorbiaceae 2.32 % (1 species), Lamiaceae 4.67 % (2 species), Malvaceae 16.28 % (7 species), Meliaceae 2.32 % (1 species), Mimosaceae

2.32 % (1 species), Moraceae 6.97 % (3 species), Pedaliaceae 2.32 % (1 species), Poaceae 2.32 % (1 species), Sapindaceae 2.32 % (1 species), Solanaceae 20.94 % (9 species), Rhamnaceae 2.32 % (1 species) and Verbenaceae 2.32 % (1 species). The solenopsis mealybug was found on 7 plant species *Abelmoschus esculentus*, *Gossypium*, *Hibiscus rosa-sinensis* (Malvaceae); *Sesamum orientale* (Pedaliaceae) and *Cestrum nocturnum*, *Solanum melongena*, *Solanum nigrum*, (Solanaceae) with high level of infection.

The host plant list of *P. solenopsis* in Pakistan was prepared by ARIF et al. (2009), and then additional researches were conducted in other parts of the world and so far 192 species belonging to 55 families have been recorded (BEN-DAV et al. 2012). During the course of the 3-year study period, 43 plant species from 20 families were recorded to be host of *P. solenopsis* in Hormozgan province southern Iran. The total number of host plant species being 201 species belonging to 56 families, as a result of present study one family (Sapindaceae) and 9 species, (*Amaranthus retroflexus* L.; *Ipomoea tricolor* CAV.; *Abutilon fruticosum* GUILL & PERR.; *Abutilon hirtum* (LAM.) SWEET; *Malva neglecta* WALLR.; *Acacia nilotica* (L.) WILLD. EX DELILE; *Ficus religiosa* L.; *Dodonaea viscosa* (L.) JACQ. and *Petunia integrifolia* (HOOK.) SCHINZ & THELL. were added.

There have recently been much agricultural trade between Iran and Pakistan and also other Asian countries. Thus the accidental introduction of *P. solenopsis* has already been expected (MOGHADDAM & BAGHERI 2010), so; quarantine issues are a major concern for this mealybug.

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Table 1: Host plants of *Phenacoccus solenopsis* with its infestation levels in Hormozgan Province, Iran.¹

Family-Scientific name	Common name	Plant category	DI
1. Amaranthaceae			
<i>Amaranthus retroflexus</i> L.	Redroot amaranth	Weed	***
2. Apocynaceae			
<i>Nerium oleander</i> L.	Oleander	Ornamental	**
3. Asclepiadaceae			
<i>Calotropis procera</i> (AITON) W.T. AITON	Rooster tree	Weed	*
4. Asteraceae			
<i>Helianthus annuus</i> L.	Common sunflower	Crop	***
<i>Zinnia violacea</i> Cav.	Elegant zinnia	Ornamental	**
<i>Xanthium strumarium</i> L.	Rough cocklebur	Weed	**
5. Chenopodiaceae			
<i>Chenopodium album</i> L.	lambs quarters	Weed	*
6. Convolvulaceae			
<i>Convolvulus arvensis</i> L.	Field bindweed	Weed	**
<i>Ipomoea tricolor</i> CAV.	Granny vine	Ornamental	*
7. Cucurbitaceae			
<i>Citrullus colocynthis</i> (L.) SCHRAD.	Colocynth	Weed	**
<i>Citrullus lanatus</i> (THUNB.) MATSUM. & Nakai	Watermelon	Vegetable	**
<i>Lagenaria siceraria</i> (MOLINA) STANDL.	Bottle gourd	Vegetable	**
<i>Luffa</i> MILL.	Luffa	Vegetable	*
<i>Momordica charantia</i> L.	Balsam pear	Vegetable	*
8. Euphorbiaceae			

¹ DI: Degree of Infestation: *= Incidental ** = Low *** = Medium **** = High

Family-Scientific name	Common name	Plant category	DI
<i>Ricinus communis</i> L.	Castor bean	Tree	*
9. Lamiaceae			
<i>Mentha spicata</i> L.	Spearmint	Weed	**
<i>Salvia</i> L.	Sage	Ornamental	**
10. Malvaceae			
<i>Abelmoschus esculentus</i> (L.) MOENCH	Okra	Vegetable	****
<i>Abutilon fruticosum</i> GUILL & PERR.	Texas Indian mallow	Weed	***
<i>Abutilon hirtum</i> (LAM.) SWEET	Florida Keys Indian mallow	Weed	***
<i>Gossypium</i> L.	Cotton	Crop	****
<i>Hibiscus rosa-sinensis</i> L.	Shoeblack plant	Ornamental	****
11. Meliaceae			
<i>Azadirachta indica</i> A. JUSS.	Neem	Tree	*
12. Mimosaceae			
<i>Acacia nilotica</i> (L.) WILLD. ex DELILE	gum arabic tree	Tree	*
13. Moraceae			
<i>Ficus carica</i> L.	Edible fig	Tree	*
<i>Ficus religiosa</i> L.	Peepul tree	Tree	*
<i>Morus alba</i> L.	White mulberry	Tree	*
14. Pedaliaceae			
<i>Sesamum orientale</i> L.	Sesame	Crop	****
15. Poaceae			
<i>Cynodon dactylon</i> (L.) PERS.	Bermuda grass	Weed	*
16. Sapindaceae			
<i>Dodonaea viscosa</i> (L.) JACQ.	Florida hopbush	Tree	*

Family-Scientific name	Common name	Plant category	DI
17. Rhamnaceae			
<i>Ziziphus mauritiana</i> LAM.	Indian jujube	Tree	*
18. Verbenaceae			
<i>Lantana camara</i> L.	Lantana	Ornamental	***
19. Solanaceae			
<i>Capsicum frutescens</i> L.	Red chilly	Vegetable	**
<i>Cestrum nocturnum</i> L.	Night jessamine	Ornamental	****
<i>Lycopersicon esculentum</i> (L.) MILL.	Tomato	Vegetable	**
<i>Nicotiana tabacum</i> L.	Common tobacco	Crop	**
<i>Petunia integrifolia</i> (HOOK.) SCHINZ & THELL.	Violet flower petunia	Ornamental	**
<i>Solanum melongena</i> L.	Eggplant	Vegetable	****
<i>Solanum nigrum</i> L.	Black nightshade	Weed	****
<i>Solanum tuberosum</i> L.	Potato	Vegetable	***
<i>Withania somnifera</i> (L.) DUNAL	Withania	Weed	**
20. Verbenaceae			
<i>Lantana camara</i> L.	Lantana	Ornamental	***

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