

HARRISIA CACTUS MEALYBUG

by

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Abstract

Thirteen species of cacti occurring in Puerto Rico are threatened by *Harrisia* Cactus Mealybug (HCM), *Hypogeococcus pungens*, a mealybug native of South America. Specific natural enemies from Argentina could help HCM control, however, some evidence regarding host plants utilization and biological differences support the presence of host races or cryptic species. Jesse de León (ARS-Weslaco) has conducted molecular studies; preliminary results indicated the presence of 3-4 different mealybug species. As soon as molecular work is finalized and genetic matching between the material from Puerto Rico and Argentina is established, the survey for natural enemies will continue focused on those host races.

Introduction

The *Harrisia* cactus mealybug is a severe pest of columnar cacti in Puerto Rico. It is native to Northern Argentina and Chile, westernmost Brazil, Paraguay and southern Perú. In its native range, *H. pungens* also utilizes species in Portulacaceae, Amaranthaceae. It has been misidentified as *H. festerianus* in many publications (Hodges & Hodges 2009).

Current distribution of HCM includes Australia, South Africa, the Caribbean, Italy, Spain, North and South America. Only in Australia and South Africa the introductions were intended for biological control. In the United States, HCM was reported in Hawaii (2005), Puerto Rico (2000) and Florida (1984) (Feliú-Mójer 2008, Hodges & Hodges 2008), and was recently collected in California.

Field collection of HCM

Since July 2010, we carried out 3 field trips in central and northern Argentina to collect HCM and related species for genetic studies. Collections were conducted on 8 species of Cactaceae (*Harrisia martini*, *H. bonplandii*, *H. tortuosa*, *H. baumanii*, *Monvillea cavindeshii*, *M. spegazzinii*, *Cleistocactus smaragdiflorus* and *C. baumanii*.) in 13 sites in Chaco (4), Catamarca (4), Formosa (2), Corrientes (1), Córdoba (1) and Santiago del Estero (1) provinces. On non-cacti hosts, HCM was collected very abundantly on *Alternanthera pungens*, *Guilleminea densa*, *Gomphrena* near *boliviana* (Amaranthaceae), and *Portulaca* spp. (Portulacaceae) in 20 sites in Córdoba (6), Santiago del Estero (5), Tucumán (4), Catamarca (3), and Salta (2) provinces. As reported in the Annual Report 2010, HCM was always collected in the aerial part of cacti hosts, whereas on roots and creeping stems of Portulacaceae and Amaranthaceae.

Laboratory rearing

Several techniques have been used to start a HCM culture on cacti and Amaranthaceae: transfers of egg masses, crawlers, and adults to excised and potted cacti and Amaranthaceae plants. So far, the most successful rearing method was to transfer young nymphs to potted plants. Utilizing this technique, 20 cultures on several cacti and Amaranthaceae hosts are growing at the laboratory and are being used to carry out studies to confirm the presence of host-adapted biotypes or cryptic species within HCM.

Genetic analysis

Jesse de León is amplifying the D2 loop of the 28S rDNA gene in *H. pungens* complex to look for fragment size differences. Preliminary results indicated the presence of 3-4 different mealybug species. However, sequence analysis of the rDNA fragments is necessary to (1) characterize the species complex in *H. pungens* and (2) identify the Argentina haplotype that matches with the one in Puerto Rico. After fragments are sequenced, more mealybug species might exist. In addition, de León is working on the amplification of the COI gene with two different primers sets used on mealybugs according to the literature. After some preliminary failures, de León obtained positive amplification with most populations. These COI fragments are being sequenced to conduct a phylogenetic analysis.

Field Trips

- Jun 27-Jul3, 2010. Chaco, Salta and Catamarca (Logarzo, Moore and Dalto).
- Nov 5-14, 2010. Formosa, Chaco, Santiago del Estero, Tucumán and Catamarca (Logarzo, Aguirre)
- Feb 8-12, 2011. Córdoba, Catamarca, Santiago del Estero, Tucumán and Catamarca (Logarzo, Aguirre).

Future Plans

Confirm the potential presence of *H. pungens* host races to continue the survey of natural enemies. Get accurate ID of the host races/species present in Puerto Rico and in Argentina through genetic analyses. With genetic results, Lucia Claps will conduct morphological studies. Material of *Hypogeococcus* from Puerto Rico, Florida, California, Australia, Spain, and Argentina is already available for the studies. If genetic matching exists between the entities in Puerto Rico and Argentina, the survey for natural enemies will be focused on those host races or species.

Relevant accomplishment

A complex of species or host-adapted biotypes of HCM was genetically identified, but it has not been characterized.

References

Feliu-Mojer, M. 2008. Puerto Rican cactuses under serious threat. Ciencia PR http://www.cienciapr.org/news_view.php (14 January 2008).

Hodges A, Hodges G, Buss L, Osborne L. (2008). Mealybugs and mealybug look-alikes of the Southeastern United States. North Central IPM Center. <http://www.ncipmc.org/alerts/phmb/mealybugs.pdf> (19 June 2009).