First record of *Hemiberlesia cyanophylli* (Hemiptera: Coccoidea) on *Opuntia ficus-indica* in Mexico

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**ABSTRACT**

*Opuntia ficus-indica* is a cactus distributed in more than 30 countries in the word, it is affected by the presence of hemipteran, of which the superfamily Coccoidea stand out, sessile insect, with a hard cover (armored scales) or without it (soft scales). There are other species of coccoids known as armed scales in the country, which are little studied, since they are usually secondary pests in crops. Therefore, the objective of this work is to present the first record of a species of armed scale on *O. ficus-indica* in Mexico. For this, cladodes of *O. ficus-indica* were collected and placed in tricot-nylon bags for review in the laboratory, a photographic record was made, sampling adult scales and fixed in 70% ethanol. The specimens were processed with the Hamon and Kosztarab technique and were determined; obtaining an identification of *Hemiberlesia cyanophylli* (Signoret) that can occupy up to 86% of the cladode surface.

**Keywords:** *Opuntia ficus-indica* cladodes, *Hemiberlesia cyanophylli*.

**INTRODUCTION**

The cactus *Opuntia ficus-indica* is distributed in over 30 countries of the world (CAB International, 2020) due to its potential in diverse industries, besides incidental dispersion by humans and other animals. In Mexico, an area of origin and domestication (Griffith, 2004), the main use its young cladodes as vegetable named nopalitos (12,523 ton/year) and its fruits (43,765 ton/year) (SIAP, 2019); although, it is an ornate plant in houses and green areas.

Hemiptera are one of the primary groups of insects associated with *Opuntia* spp (Mann, 1969). Of which stand out the superfamily Coccoidea, sessile insects, with a hard cover (armored scales) or lacking it (soft scales), which suck the sap and weaken these plants. The presence and damage of the family Dactylopiidae, soft scales covered by a whitish wax known as “prickly pear cochineal”, is most noticeable on *Opuntia*. Some *Dactylopius* species are primary pests.
in Mexico and other regions of the world, where biological control strategies are sought (Vanegas-Rico et al., 2010). There are other species of coccoids known as armored scales in the country, which are little studied, since many are usually secondary pests on Opuntia crops in Valley of Mexico, the principal zones of nopalitos. Considering that scale insects introductions to new sites is a serious threat to growers (Miller et al., 2005). In addition, outside the agricultural field, the species of armed scales affecting Opuntia spp. are unknown. The aim of this paper is to present the first record of a species of armed scale on O. ficus-indica in Mexico.

MATERIALS AND METHODS

In the municipality of Irapuato, Guanajuato, cladodes of O. ficus-indica were collected in a gardener of the flower field colony, in February 2018. The cladodes were placed in tricot-nylon fabric bags for review in a personal laboratory, where they were kept at room temperature. A photographic record was made, sampling adult scales and fixed in 70% ethanol. The specimens were processed in 2019 with the technique of Hamon and Kosztarab (1979), for their determination the keys of Ferris (1955) and Evans et al. (2009) were used by the first author. It would be deposited some Voucher specimens in the authors’ personal collections and in the Coccoidea collection of the Faculty of Higher Studies Iztacala (UNAM).

RESULTS AND DISCUSSION

The identified scale corresponded to Hemiberlesia cyanophylli (Signoret) (Fig.1), which occupy up to 86% of the surface of the cladode. The damage recorded is the weakening of the plant by the insect feeding; besides the opportunistic development of pathogens, apparently of Erwinia complex, which occurs in other states of the country (data not published). These damages are similar to reports on the impact of the Diaspis echinocacti (Bouché) on Opuntia spp. and other Cactaceae (Claps and de Haro, 2001; Zimmermann and Granata, 2002).

![Figure 1](image)

**Figure 1.** Hemiberlesia cyanophylli (Signoret). A) Full body scale 0.1 mm, B) Detail of the pigidia 0.1mm.
H. cyanophylli develops on 180 species of plants (73 families and 141 genera), among these 17 species correspond to cacti (García-Morales et al., 2016). Of the affected plants there are several of economic interest such as avocado, coffee, cocoa, mango, tea, and citrus (García-Morales et al., 2016), on which it can cause damage as chlorotic spots on the leaves and defoliation (Miller and Davidson, 2005). The presence of this phytophagous on Opuntia spp. dates from 1932 to 2011 and corresponds to records in the Canary Islands (O. humifusa), the Middle East (Opuntia sp.), Madagascar (Opuntia sp.), England (O. quitensis), and the island of Crete in Greece (O. ficus-indica) (Balachowsky 1932; Mamet 1954; Gómez-Menor, 1962; Malumphy y Redstone, 2011; Pellizzari et al., 2011).

In Mexico, the presence of two armored species on Opuntia is known, D. echinocacti (Bouché), that has a wide worldwide distribution on Opuntia and other Cactaceae, and Opuntiaspis philococus (Cockerell) that has little distribution in Mexico, in addition to being mentioned in Germany, France and Japan (García-Morales et al., 2016). Is mentioned in a technical brochure about H. cyanophylli on Opuntia crops of Milpa Alta, Mexico City (Delgadillo et al., 2018), which does not describe assembly or determination techniques, besides presenting taxonomic errors in other nopal pests. This suggests that they based it on technical literature (lists of nopal pests not updated and with taxonomic errors) to determine the association of the species with the host. The scale collected by the second author in Milpa Alta (data not published) corresponds to D. echinocacti, species associated, among other plants, to O. ficus-indica in the Valley of Mexico and with a few incidences in the crops of the region (Vanegas-Rico et al., 2018). In Mexico H. cyanophylli is mainly associated with avocado (Lázaro-Castellanos et al., 2012), the unusual presence of nopal until now could become a problem for the Opuntia crops of neighboring municipalities. The absence of parasitoids suggests an initial adaptation process to this plant.

**CONCLUSIONS**

The present work is considered representing the first record of H. cyanophylli on O. ficus-indica in Mexico, and the third species of armored scale associated with this Cactaceae in the country.

**REFERENCES**


