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A New Species of the Genus *Encarsia*¹, Parasitoid of the Whitefly *Aleurodicus rugioperculatus* Martin² in Mexico

Óscar Ángel Sánchez-Flores^{3*}, Svetlana Nikolaevna Myartseva⁴,
Oswaldo García-Martínez³, and Enrique Ruíz-Cancino⁴

Abstract. *Encarsia fernandae* Sánchez & Myartseva, sp. nov., parasitoid of the whitefly *Aleurodicus rugioperculatus* Martin, 2004, collected on *Persea americana* Mill. in Puebla, Mexico is described. A key for the identification for females of the genus *Encarsia* (*noyesi* group) of Mexico was prepared. A new junior synonym for *Encarsia noyesi* (Hayat) (= *Encarsia narroi* Gómez y García) was proposed.

Resumen. Se describe *Encarsia fernandae* Sánchez & Myartseva, sp. nov., parasitoide de la mosquita blanca *Aleurodicus rugioperculatus* Martin, 2004, colectada en *Persea americana* Mill. en Puebla, México. Se elaboró una clave para la identificación de hembras del género *Encarsia* (grupo *noyesi*) de México. Se propone un nuevo sinónimo: *Encarsia noyesi* (Hayat) (= *Encarsia narroi* Gómez y García).

Introduction

Diversity in the family Aphelinidae (Hymenoptera: Chalcidoidea) is moderate. The family contains more than 1,350 described species in the world (Noyes 2016), including species important for biological control of insect pests. The genus *Encarsia* Förster, 1878 is in the tribe Pteroptricini and subfamily Coccophaginae (Hayat 1998). It is the most diverse genus of the family, with 98 described species from Mexico and more than 50 new species described in the last 10 years (Myartseva et al. 2014).

Whiteflies live in different plants; some species are pests of crops and ornamental plants. In Mexico, 10 species of *Aleurodicus* have been recorded, including *Aleurodicus rugioperculatus* Martin on the genera *Prunus*, *Cocos*, *Ficus*, and *Pithecellobium* (Carapia-Ruiz et al. 2015). Several natural enemies attack this whitefly species in Florida; the most common are aphelinids *Encarsia guadeloupae* Viggiani and *Encarsia noyesi* (Hayat) (Francis et al. 2016). In this article, the whitefly is recorded for the first time in the State of Puebla, Mexico, and collected in avocado, *Persea americana* Mill. A new species of *Encarsia* was described, and a key for identification of *Encarsia* species (*noyesi* group) was provided.

¹Hymenoptera: Aphelinidae.

²Hemiptera: Aleyrodidae.

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Materials and Methods

During December 2015 (no parasitoids emerged) and September 2016, nymphs of the fourth instar of the whitefly *A. rugioeperculatus* were obtained from avocado leaves in the community of San Cristobal los Nava, Municipality of Tepeaca, State of Puebla. Leaves with nymphs were cut, placing the portions inside Petri dishes and sealed by Kleen Pack, then taken to the Laboratory of Taxonomy of Insects and Mites (LTIA), Department of Agricultural Parasitology of the Autonomous Agrarian University Antonio Narro (UAAAN) at Saltillo, Coahuila, where the parasitoids emerged. Parasitoids were photographed alive, and a paintbrush moistened with 75% ethyl alcohol was used to transfer them to 75% ethyl alcohol for storage. Later, the parasitoids were mounted on slides with Canada balsam, using the methodology of Noyes (1982).

The *Encarsia* were identified with keys by Myartseva et al. (2012, 2014). Whitefly pupae were processed using the Martin (2004) technique with some modifications and identified to species using keys by Martin (2008) and Carapia-Ruiz et al. (2015).

Results

Three specimens were obtained of a new species of *Encarsia*.

Description. *Encarsia fernandae* Sánchez & Myartseva, sp. n. (Figs. 1-4)

Material. Holotype: Female. Mexico, Puebla, Tepeaca, San Cristobal los Nava, ex *Aleurodicus rugioeperculatus* Martin on *Persea americana* Mill. 17.IX.2016 (Oscar Angel Sanchez-Flores coll.). Paratypes: same data as holotype, one female, one male. Holotype was deposited in Institute of Biología, UNAM Collection, Ciudad de Mexico; one paratype female in the Entomological Research Museum of the University of California, Riverside, USA, and one paratype male in the UAAAN Collection, Saltillo, Coahuila, Mexico.

Female. Coloration. Head black with the parascrobal zone blue in the top face (in living specimens and newly mounted) (Fig. 1), occiput black, ocelli reddish, antenna with yellow scape with dorsal part brownish, first funicular segment dark, second funicular segment light brownish, third funicular segment yellow, club black. Mesosoma black. Fore wings hialine. Legs black, except the distal part of the tibiae, tarsi yellowish. Metasoma black, ovipositor with valvula 3 brownish.

Head (Fig. 1). Little less wide than mesosoma, 1.15 times as wide as high, frontovertex striate transversely, 0.45 times as wide as head. Distance between posterior ocelli slightly more than twice the distance from the ocellus to the ocular margin. Eyes setose and slightly longer than cheeks. Antenna inserted under the level of the lower eye margin. Antennal radicle twice as long as wide, scape 3.6 times as long as wide, pedicel 1.3 times as long as wide, funicular segment 1 approximately 1.7 times as long as wide and little longer than pedicel, almost 1.1 times as long as segment 2, 1.5 times as long as wide, segment 3 was 1.3 times as long as wide and shorter than segment 2, antennal club truncated obliquely, two times as wide as funicle, flagellar segments 1-6 each with two longitudinal sensilla.

Mesosoma. Sculpture on dorsum cellulate reticulate with cells more or less hexagonal, sides of mesoscutum and scutellum with longitudinal cells, mesoscutum lightly wider than length, with 50 to 64 setae. Scutellum (Fig. 2) approximately as wide as long. Axilla with one seta, lateral lobe with three setae.



Fig. 1. *Encarsia fernandae* Sánchez & Myartseva, sp. nov. head of female, dorsal view.

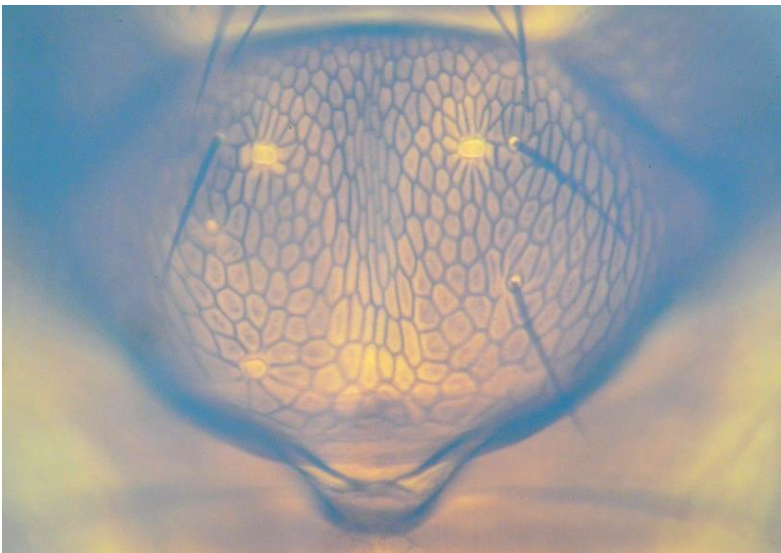


Fig. 2. *Encarsia fernandae* Sánchez & Myartseva, sp. nov., scutellum dorsal view.

Forewing (Fig. 3) two times longer than wide, marginal vein slightly longer than submarginal vein, postmarginal vein absent, stigmal vein very short. Wing base with 7-10 setae, marginal vein with 10-13 setae, setation of disk uniformly distributed. Hind wing six times longer than wide. Tarsal formula 5-5-5. Tibial spur 0.6 time as long as basitarsus.



Fig. 3. *Encarsia fernandae* Sánchez & Myartseva, sp. nov., forewing.

Metasoma. Approximately 0.3 time as long as mesosoma. Ovipositor (Fig. 4) slightly exerted, 0.8 time longer than tibia, valvula 3 was 0.5 time as long as valvifer 2.

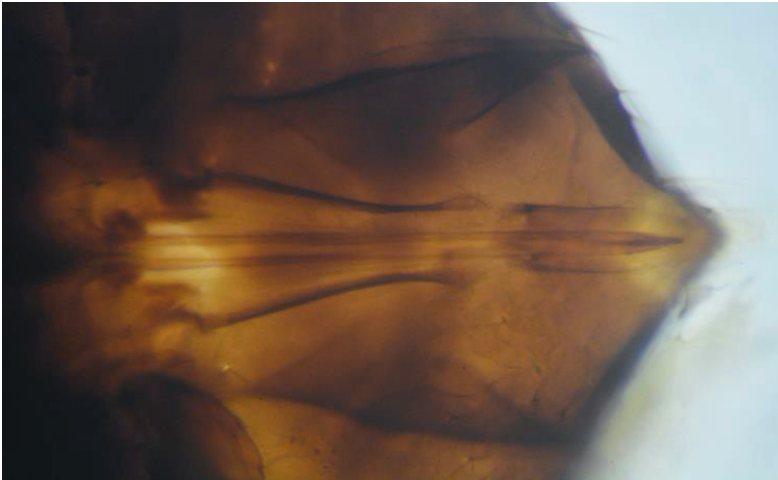


Fig. 4. *Encarsia fernandae* Sánchez & Myartseva, sp. nov., ovipositor in dorsal view.

Male. Coloration. Like female, and also with the parascrobal zone blue in the top face, antenna black, legs black, except the tarsi whitish. Antennae inserted in the level of lower eye margin, at the same distance between the eye margin and the mouth, club two segmented; antennal segments with length/width proportions: R-18: 8, S-50: 15, P-17: 13, F1-34: 18, F2-40: 18, F3-38: 18, F4-38: 15, F5-35: 15, F6-36: 11, pedicel near 0.5 time as funicle, each flagellar segment with three longitudinal sensilla. Forewing with naked base, scutellum approximately 1.6 times as long as wide.

Comments. *Encarsia fernandae* n. sp. is similar to *Encarsia tamaulipeca* Myartseva but *E. fernandae* has two sensilla on funicular segment 1; funicular segments 1 and 2 similar in size, ovipositor 1.5 times as long as mid tibia. *E. tamaulipeca* has no sensilla on funicular segment 1, funicular segment 1 shorter than funicular segment 2, ovipositor 1.3 times as long as mid tibia. Male of *Encarsia fernandae* is similar to the male of *Encarsia tamaulipeca*.

Etymology. The new species is dedicated to Maria Fernanda Flores-Flores who helped collect specimens of *Aleurodicus rugioperculatus*.

The paratype of *Encarsia narroi* Gómez & García, 2000 was studied. It is deposited in the collection of the Department of Agricultural Parasitology at UAAAN, preserved in Canada balsam, and emerged from *Aleurodicus* sp. samples collected on grapevines in the State of Coahuila, Mexico, at 1,500 m on 11 February 1995. It was compared with *Encarsia noyesi* (Hayat) specimens from other Mexican localities, preserved in Canada balsam, and deposited in the Insects Museum of the Faculty of Engineering and Sciences - Autonomous University of Tamaulipas, Mexico. The authors established a new synonymy: *Encarsia noyesi* (Hayat) (= *Encarsia narroi* Gómez & García, syn. nov.).

Key to females of the species group *noyesi* of *Encarsia* from Mexico

- | | |
|---|------------------------------|
| 1. Scutellum black | 2 |
| 1'. Scutellum yellow | 3 |
| 2. Funicular segment 1 without sensilla, ovipositor 1.3 times as long as mid tibia, valvula 3 is 0.5 time as long as valvifer 2 | |
| <i>E. tamaulipeca</i> (Myartseva & Coronado-Blanco) | |
| 2'. Funicular segment 1 with sensilla, ovipositor 1.5 times as long as mid tibia, valvula 3 is 0.6 time as long as valvifer 2 | <i>E. fernandae</i> n. sp. |
| 3. Forewing smoked under marginal vein, hind femur light yellow, funicular segment 1 longer than pedicel, and with sensilla; ovipositor 1.2 times as long as mid tibia, valvula 3 is 0.7 time as long as valvifer 2 | |
| <i>E. andrewi</i> (Myartseva & Coronado-Blanco) | |
| 3'. Forewing hyaline | 4 |
| 4. Funicular segment 1 slightly shorter than pedicel, without sensilla; funicular segment 2 black; ovipositor slightly longer than hind tibia, valvula 3 is 0.7 time as long as valvifer 2 | <i>E. nayarita</i> Myartseva |
| 4'. Funicular segment 1 shorter than funicular segment 2, with sensilla; funicular segment 2 yellow; ovipositor as long as hind tibia, valvula 3 is 0.6 time as long as valvifer 2 | <i>E. noyesi</i> (Hayat) |

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