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Chlorocytus languriae (Ashmead, 1896) (Hymenoptera: Pteromalidae) Parasitoid of *Languria mozardi* (Latreille, 1807) in Mexico

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ABSTRACT

The pteromalid wasp *Chlorocytus languriae* (Ashmead, 1896) (Hymenoptera: Pteromalidae) is reported for the first time in Mexico as parasitoid of the soybean petiole borer *Languria mozardi* (Latreille, 1807), in soybean. The state of Tamaulipas and San Luis Potosí are its southernmost distribution record.

Keywords: Insect; pest; natural enemy; biological control.

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INTRODUCTION

Soybean (Fabaceae) is widely used for human and animal food (Pagano & Miransari, 2016). In Mexico, it is grown in tropical and subtropical regions such as Campeche, Chiapas, San Luis Potosí, Tamaulipas and Veracruz. Its total production, in 2022, reached 175,544 t (SIAP, 2023). Soybean pests in Mexico include *Anticarsia gemmatalis* Hübner (Lepidoptera: Erebidae), *Trichoplusia ni* Hübner (Lepidoptera: Noctuidae), *Chrysodeixis includens* (Lepidoptera: Noctuidae) Walker (Vázquez-Porras, González-Gaona, Espinosa-Vásquez, Terán-Vargas, & Azuara-Dominguez, 2016); resulting in yield reduction (Gaur & Mogalapu, 2018). In 2021, the soybean petiole borer *Languria mozardi* Latreille (Coleoptera: Erotylidae) was reported in Mexico, affecting the soybean (Felipe-Victoriano, Maldonado-Moreno, Sánchez-Peña, & Zárate-Martínez, 2021). Although initially considered a secondary pest, this could change if pesticide applications are not directed at the secondary pest (Van Driesche et al., 2007). In the United States, the parasitoid *Chlorocytus languriae* (Ashmead, 1896), formerly *Habrocytus languriae*, has been reported as natural enemy of *L. mozardi* (Chittenden, 1904), likewise is reported that *C. languriae* can also parasitize other beetles such as *Languria angustata* Beauvois and *Dirabius rectirostris* (Curculionidae) (Yu, van Achterberg, & Horstmann, 2016). In the presence of new pests such as *L. mozardi*, the use of natural enemies could help control their populations; however, in Mexico, no natural enemies of this pest have been described in soybeans. Therefore, the objective of this work was to collect petioles from soybean leaves infested with *L. mozardi* larvae and to identify parasitoids that emerge under laboratory conditions.

MATERIALS AND METHODS

Sampling was done in April 2021(21-32.2 °C/ average rainfall of 25 mm) (Ébano, San Luis Potosí, 22° 10’ 8.21” N y 98° 28’ 7.63” W) and November 2022 (17.8-27.8 °C/ average rainfall of 28 mm) (Altamira, Tamaulipas, 22° 33’ 51.93” N y 98° 09’ 52.99” W), in experimental soybean crops of the “Huasteca 700” variety. We collected 219 and 21 soybean petioles respectively, infested with larvae of *L. mozardi* (Fig. 1). Collection of petioles was non-random, directed at leaves with visible damage caused by the petiole borer (Felipe-Victoriano et al., 2021). The soybeans at the time of petiole collection were in the R6 and R7 stages in 2021 and 2022 respectively. Samples were transferred to the Laboratorio de Toxicología at Campo Experimental Las Huastecas, Instituto Nacional de Investigaciones Forestales, Agrícolas, y Pecuarias (INIFAP). Petioles were kept at 23.5 ± 1.5 °C y 80% relative humidity in a bioclimatic chamber until the emergence of the parasitoids or beetles. Specimens that emerged were placed in Eppendorf tubes with 96% alcohol. Males and females were mounted on opaline paper triangles and labelled with the corresponding data. The identification of the specimens was carried out with the support of on the stereoscopic microscope Leica EZ4, and literature for Nearctic species (Ashmead, 1896; Girault, 1917; Gibson, Huber, & Wolley, 1997).

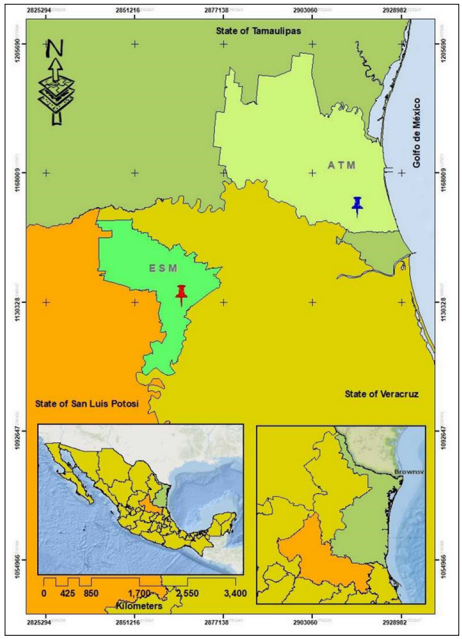

Figure 1. Geographic location of the states of Mexico from where the material was examined. ESM= Municipality of Ébano, San Luis Potosí, México, ATM= Municipality of Altamira, Tamaulipas, México

RESULTS

In total, 23 specimens of the genus *Chlorocytus* were found; 10 specimens emerged in 2021 and 13 specimens in 2022. The specimens belong to the species *Chlorocytus languriae* (Ashmead, 1896), previously reported for the United States and until now unknown at Mexico (Fig. 2 A, B).

Chlorocytus languriae (Ashmead, 1896)

Examined material: Ébano, San Luis Potosí, México (8 ♀ 5 ♂), soybean crop, 19-20 masl, 2021; Altamira, Tamaulipas, México (8 ♀ 2 ♂) (Fig. 2), soybean crop, 15-16 masl, 2022 (Figure 1.).

Characteristics: ♀ Lenght 3 mm. Clypeus distinctly concave or sinuate at distal margin. Antenna with yellow scape, black funicle and club, first funicle more than twice as long as it is wide, twice as long as the pedicel. Propodeum tricarinate and with a very short neck (irregular rugae between the carinae). Coxae concolorous, the femora brown or washed metallic green, with white tibias. Marginal vein on forewing almost twice as long as stigma (Fig. 2 A). The specimens match the above characteristics in the description by Ashmead, (1896) and Girault, (1917).

Distribution. Nearctic. United States of America (Alaska; Arizona; California; Connecticut; Delaware; District of Columbia; Illinois; Kansas; Louisiana; Missouri; New Jersey; New York; Pennsylvania and Virginia) and México (San Luis Potosí and Tamaulipas).

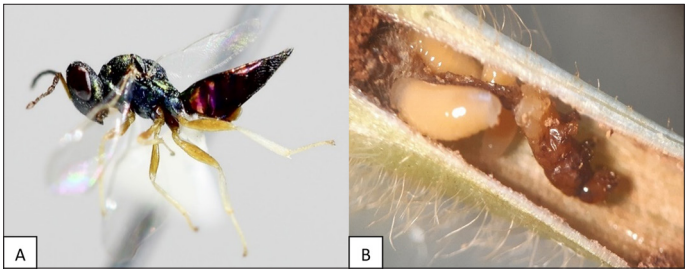

Figure 2. A) Female specimen of *C. languriae*. B) larvae of *C. languriae* (arrow) next to *L. mozardi* larvae.

DISCUSSION

The classification of the species *C. languriae* has changed historically; it was first described within the genus *Habrocytus*. However, in 2003 it was reclassified as *Chlorocytus,* where it currently remains (Dzhanokmen & Grissell, 2003). Its distribution is restricted to the Nearctic zone, and until 2023, there were records from the United States only. Its hosts include various species, such as *D. rectirostris* LeConte*, Epiblema strenuana* Walker (Lepidoptera: Tortricidae), *Janus integer* Norton (Hymenoptera: Cephidae)*, L. angustata* and *L. mozardi* (Yu et al., 2016).

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