New Host Records and Biological Notes for *Diceroprocta bulgara*[1] (Distant) in Mexico

José Antonio Sánchez-García[2]*, José Joaquín Velázquez-Monreal[3], Héctor Miguel Guzmán-Vásquez[2], Roselia Jarquín-López[2], Jesús Alberto Ortíz-López[3], Miguel Ángel Manzanilla-Ramírez[3], Manuel Ovando-Cruz[4], Teodulfo Aquino-Bolaños[2], and Allen F. Sanborn[5]

Abstract. New host records and observations of the process of oviposition for *Diceroprocta bulgara* (Distant) in Mexico are presented.

Diceroprocta is a New World cicada genus distributed in North America, Central America, and the Caribbean. The genus currently is represented by 60 species and four subspecies, with 30 species reported from Mexico (Sanborn 2006b, 2007, 2013).

Diceroprocta bulgara (Distant) is a large species of the genus, identifiable in part by the large male opercula reported from Mexico and Guatemala (Sanborn 2006a). In Mexico, it was recorded in the states of Chihuahua, Coahuila, Colima, Jalisco, Nayarit, Oaxaca, Sinaloa, and Sonora (Sanborn 2007).

Chavez Cervantes (1973), CESAVECOL (2005), and Orozco-Santos et al. (2014) reported cicadas as a citrus pest at Tecoman, Colima, but did not identify the species. We report for the first time host plants and observations of the process of oviposition for *Diceroprocta bulgara* in Mexico (Colima and Oaxaca). New host records for *D. bulgara* are: Mexican lime *Citrus aurantifolia* Swingle, alemow *Citrus macrophylla* Wester, soursup *Annona muricata* L., guava *Psidium guajava* L., tamarind *Tamarindus indica* L., guaya *Melicoccus bijugatus* Jacq., guasima *Guazuma ulmifolia* Lam., guamuchil *Pithecellobium dulce* (Roxb.) Benth., nance *Byrsonima crassifolia* (L.), black olive *Bucida buceras* L., carambola tree *Averrhoa carambola* L., parota *Enterolobium cyclocarpum* (Jacq.) Griseb., mango *Mangifera indica* L., and coconut palm *Coccus nucifera* L.

In total, 87 female (Fig. 1a) and four male adult cicadas were collected by J. Sanchez and students using a light trap at the Experimental Station Tecoman-INIFAP, Tecoman, Colima on 20 June 2018. In total, 64 cast nymphal skeletons (37 females and 25 males) were found on parota, coconut palm, soursup (Fig. 2e), and guava by J. Velazquez and J. Ortiz at Puerta Caleras, Tecoman, Colima on 10 July 2018, and one male on alemow and one male on nance on 29 June 2018 at Tecoman,

[1]Hemiptera: Cicadidae.

[2]Instituto Politécnico Nacional, CIIDIR Unidad Oaxaca. Hornos 1003, Col. Nochebuena, Santa Cruz Xoxocotlán, Oaxaca, Mexico CP 71230.
[3]INIFAP-Campo Experimental Tecomán, Km 35 Carretera Colima-Manzanillo, Tecomán, Col. Mexico CP 28100.
[4]INIFAP-Campo Experimental Costa Oaxaqueña, Km 94 Carretera Costera a Puerto Escondido, Río Grande, Villa de Tututepec, Oax. Mexico CP 71830.
[5]Department of Biology, Barry University, 11300 NE Second Avenue, Miami Shores, FL 33161-6695.
*Corresponding author e-mail: braconido2@yahoo.com

Colima by J. Velazquez. Three females and one male were collected at Comitancillo, Oaxaca, on 23 May 2014 and three additional females on 13 June 2015 by M. Gomez; 27 females and one male, light trap were collected at Huatulco, Oaxaca 17-22 June 2017 by J. Sanchez, along with 10 cast nymphal skeletons (seven female and three male) on mango and coconut palm; two male cast nymphal skeletons were collected on guamuchil at Tenexcamilpa, Jalisco, on 20 June 2018 by H. Guzman. The material was deposited in the Coleccion de Insectos del Instituto Politecnico Nacional/CIIDIR Oaxaca (Santa Cruz Xoxocotlan, Oaxaca, Mexico).

There was obvious sexual dimorphism in the cicada adults. The male (Fig. 1d) had a very large operculum while the female had a short operculum (1e), making sex determination easy in the field.

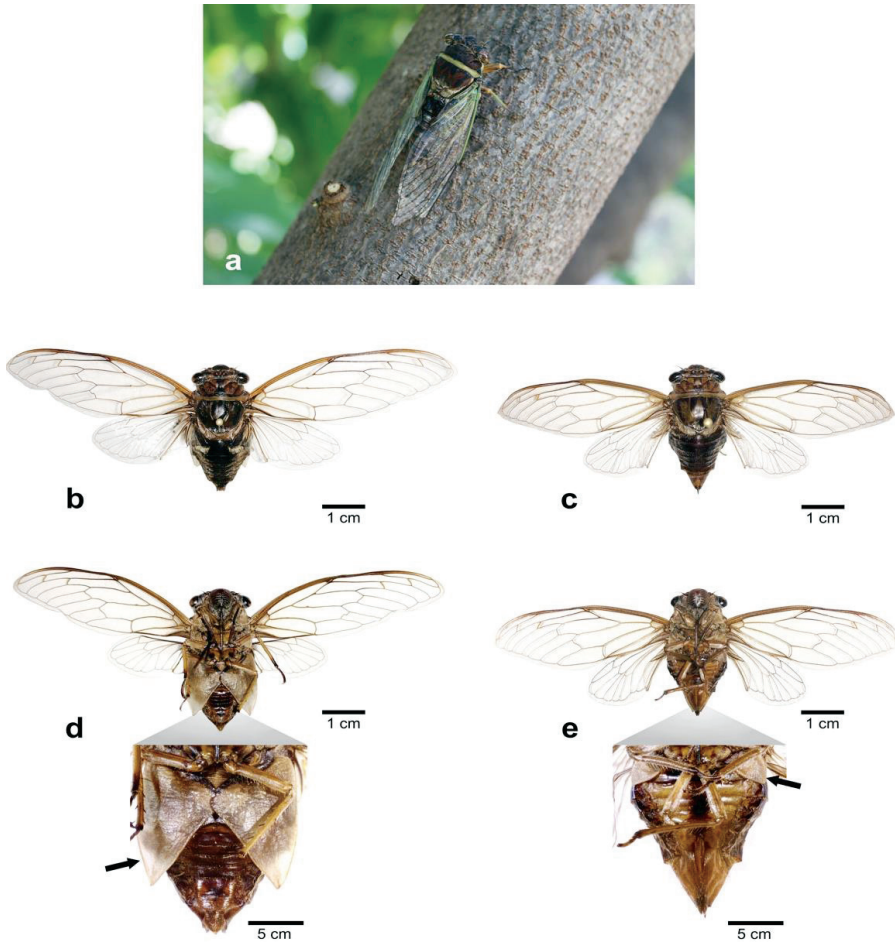

Fig. 1. *Diceroprocta bulgara* (Distant): a) adult on soursup, b) male dorsal view, c) female dorsal view, d) male ventral view, arrow indicates large operculum, e) female ventral view, arrow indicates small operculum.

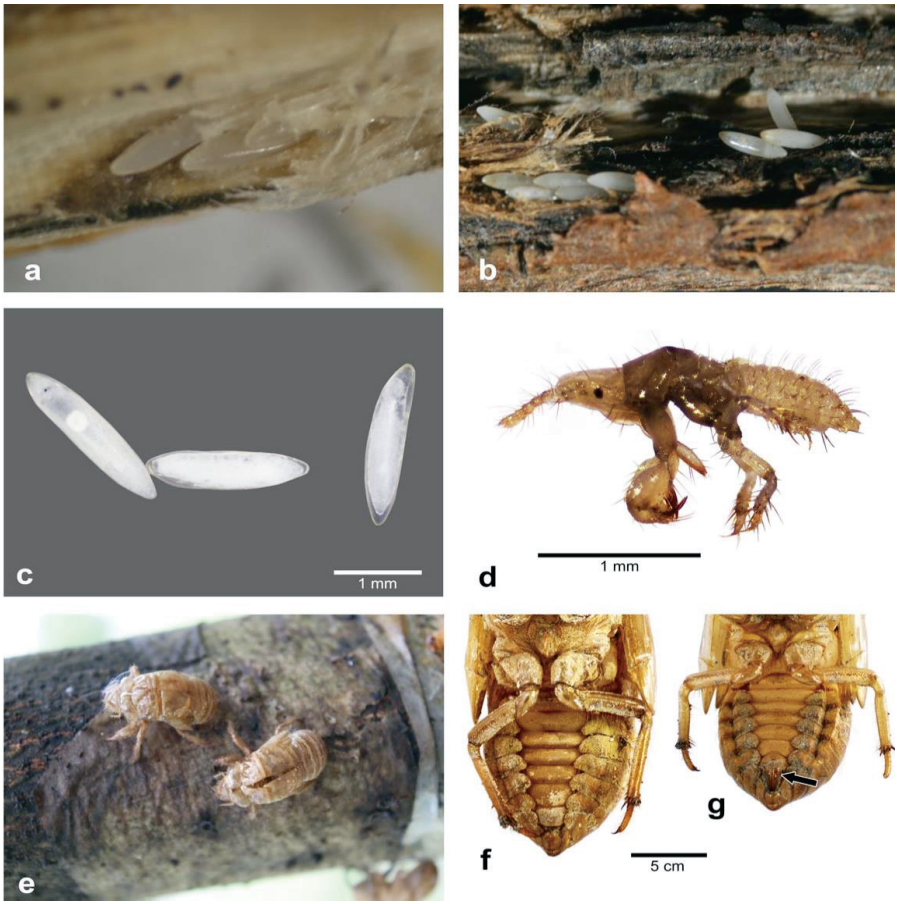

Fig. 2. *D. bulgara*: a) eggs on Mexican lime, b) eggs on soursup, c) eggs, d) first-instar nymph, e) cast nymphal skeleton on soursup, f) male cast nymphal skeleton, g) female cast nymphal skeleton, arrow indicates a pair of finger-like longitudinal processes at midline.

The female at the time of ovipositing made grooves in twigs of trees, which caused the twigs to dry and leaves to turn brown (Figs. 3a-g). Cicadas preferred young plants as oviposition sites, especially on citrus and soursup. The eggs (Figs. 2a-c) are white, approximately 2 mm long, similar to rice, with a female ovipositing about 35.0 eggs per twig on soursup, 36.3 eggs per twig on black olive, 40.4 eggs per twig on guaya, 48.4 eggs per twig on Mexican lime, 50.0 eggs per twig on guamuchil, 61.0 eggs per twig on tamarind, 65.8 eggs per twig on carambolo, 66.0 eggs per twig on guasima, 98.2 eggs per twig on guava, and 145.9 eggs per twig on nance. Oviposition occurred principally from July to August at Tecoman, Colima, and Rio Grande, Oaxaca. Glinski and Ohmart (1984) studied factors of reproduction and abundance of the Apache cicada, *Diceroprocta apache* (Davis). The authors

Fig. 3. *D. bulgara*: a) alemow twig damaged, b) oviposture on alemow, c) soursup twig damaged, d) carambola tree twig damaged, e) oviposture on black olive, f) oviposture on guava.

observed that salt cedar *Tamarix Chinensis* Lour provided the most oviposition sites. *D. apache* normally selected wild plants to oviposit but was documented on some occasions being a pest of asparagus, sunflower, and fruit trees (Beamer and Beamer 1930, Hopkins and Caruth 1954, Glinski and Ohmart 1984, Ellingson et al. 2002).

The first-instar nymph was small, white, approximately 2 mm long, with long antennae composed of seven segments; the foreleg was adapted to dig in the ground with the femora enlarged with a pointed posterior tooth and a basal tooth (Fig. 2d). The nymphs drink fluids of twigs with their rostrum before falling to the ground. There also was sexual dimorphism in the cast nymphal skeleton, with the eighth abdominal sternite of the female (Fig. 2g) with a pair of finger-like longitudinal processes along the midline while the processes are absent in the male (Fig. 2f).

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