

NEW RECORDS FOR THE CICADA FAUNA FROM FOUR CENTRAL AMERICAN COUNTRIES (HEMIPTERA: CICADOIDEA: CICADIDAE)

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ABSTRACT

Analysis of museum specimens has added to the cicada fauna of Belize, El Salvador, Guatemala, and Honduras. Information on the cicada fauna reported in the literature as well as the first records of cicada species to the fauna are reported here to provide a more accurate understanding of cicada diversity in each country and the region. The new records represent an increase of 75, 14, 110, and 320%, respectively, to the cicada faunal diversity of each country.

Key Words: cicadas, biodiversity, Central America

RESUMEN

Un estudio de los especímenes de museos han incrementado la fauna de las chicharras (Hemiptera: Cicadidae) de Belize, El Salvador, Guatemala y Honduras. Información sobre la fauna de las chicharras reportadas en la literatura, los nuevos registros de las especies mencionadas en este artículo están reportados para proveer un entendimiento más preciso de la diversidad de las chicharras en cada país de la región. Estos nuevos registros representan un aumento de 75, 14, 110, y 320%, respectivamente, en la diversidad de la fauna de chicharras en estos países.

The Central American cicada fauna has received little study since Distant's *Biologia Centrali-Americana* (Distant 1881, 1883, 1900, 1905). Davis (1919, 1928, 1936, 1941, 1944) described new cicada genera and species, primarily from specimens he received from Mexico. Since that time, most work on Central American cicadas has focused on the ecology of Costa Rican (Young 1972, 1976, 1980, 1981) and Panamanian (Wolda 1984, 1993; Wolda & Ramos 1992) cicadas with limited work being done on the Mexican fauna (Moore 1962, 1996; Sueur 2000, 2002; Sanborn 2006). The lack of knowledge was illustrated in the paper by Sanborn (2001), who identified the first cicadas to be reported from El Salvador. The taxonomic position of some of the Central American species has been altered (Boulard & Martynelli 1996; Moulds 2003) and the process of describing new species (Sueur 2000; Sanborn et al. 2005) has begun but there are still many species to be described (Sanborn unpublished).

I have come across multiple species in various museum collections that have not been described as being part of the cicada fauna in several Central American countries as published in the Cicadoidea bibliographies (Metcalf 1963a, b, c; Duffels & van der Laan 1985) or more recent literature. I have now identified specimens from several collections and individuals that represent additions to the cicada fauna of Belize, El Salvador, Guatemala, and Honduras. These new additions to the cicada fauna of the region are identified along with a listing of previously identified species from

the various countries to provide a current view of the cicada fauna for the region.

MATERIALS AND METHODS

Specimens for this study were found among the undetermined material in the collections of the Florida State Collection of Arthropods (FSCA), the Smithsonian Institution, United States National Museum (USNM), San Diego Natural History Museum (SDMC), Bohart Museum of Entomology at the University of California at Davis (UCDC), Carnegie Museum of Natural History (CMNH), University of Mississippi Insect Collection (UMIC), William R. Enns Entomological Museum, University of Missouri (UMRM), University of Connecticut (UCMS), University of Georgia (UGCA) and three individuals who donated their specimens to the author. Original specimens are housed in the collections above with vouchers of most species and the specimens donated to the author in the author's collection. The number of species previously attributed to each country was determined from the cicada bibliographies (Metcalf 1963a, b, c; Duffels & van der Laan 1985) and the more recent literature. Original references can be located in these materials.

RESULTS

The regional cicada fauna for Belize, El Salvador, Guatemala, and Honduras is summarized here. Species identified as new to a country in-

clude available collection information. Bibliographic information is provided for species that have been described previously from a country.

There are currently four species that have been collected in Belize, one of which is a recently described new species (Sanborn et al. 2005). Three species are added to the cicada fauna with this report. The cicada fauna of El Salvador was unknown until I reported on representatives of seven species collected in the country (Sanborn 2001). One additional species was found in the collection of the USNM. There are currently ten species attributed to Guatemala. Eleven additional species are added to the fauna in this report. There are currently five species reported to inhabit Honduras. One of these is a recently described species (Sanborn et al. 2005). Sixteen new species records are added in this report.

Family Cicadidae

Subfamily Tibiceninae Atkinson, 1886

Tribe Zammarini Distant, 1905

Odopoea signoreti Stål, 1864. Specimens in the UMIC collected at Honduras, Olancho, La Union, Parque Nacional La Muralia, 15.07°N 86.45°W, 17-V-1996. The species is described from México (Metcalf 1963a).

Miranha imbellis (Walker, 1858). Specimens in the FSCA collected at Honduras, Cortés, Parque Nacional Cusuco, 15°29'47"N 88°12'43"W, 1600 m, 1-VII-2000. It has been reported previously from Guatemala and Central America (Metcalf 1963a).

Zammaria smaragdina Walker, 1850. Specimens in the FSCA were collected in Guatemala, Petén at the Tikal Ruins. Specimens in the SDMC were collected at Honduras, Atlántida, El Pino, Morrañas Arriba, 12-VIII-1979 and specimens in the UGCA were collected at Honduras, Olancho, Dulce Mombro de Culmi, Montaña de Malacate, 26-VII-2001 and 11-VI-2003. The species is described from Central America (Metcalf 1963a).

Zammaria smaragdula Walker, 1850. Specimens from Guatemala, Petén, Morajan, 4.8 km East of Poptun, IV-V-1993 were given to the author by Br. Leon Cook. The species is described from Central and South America (Metcalf 1963a).

Zammaria tympanum (Fabricius, 1803). A specimen collected in Belize, Cayo District, Maya Mountain Lodge, 19-VII-1993 was given to the author by Vince Golia. The FSCA has specimens from Guatemala, Izabal, Puerto Barrios Cerro, San Gil, 1,000 m, 13-IV-1992. The UGCA contains specimens from Honduras, Cortés Merendón, 1500 m, adjacent to Parque Nacional De Cusuco, N15°30'12", W88°11'54", collected 19-V-2002 and 24-VII-2001. The species is described from South and Central America (Metcalf 1963a; Duffels & van der Laan 1985).

Tribe Tibicenini Distant, 1889

Diceroprocta belizensis (Distant, 1910). Specimens in the UMRM are from Guatemala, Escuintla, Nueva Concepcion, 30-VII-1985. Specimens have been reported previously from Belize, Honduras (Metcalf 1963a) and El Salvador (Sanborn 2001).

Diceroprocta bicosta (Walker, 1850). Specimens have been reported from Honduras (Metcalf 1963a) and El Salvador (Sanborn 2001).

Diceroprocta bulgara (Distant, 1906). A female in the UCMS was collected in Guatemala, Sacatepequez, Cerro Alux, 2,000 m, X-2002. The species is described from México (Metcalf 1963a).

Diceroprocta pusilla Davis, 1942. The FSCA has specimens collected at Guatemala, Guatemala, 11-V-1991; Honduras, Atlántida, RVS Cuero y Salado, Salado Barra, 15°46'N 89°59'W, 2 m, 1-VIII-2000; Olancho, 1.1 km North of El Cerro, 750 m, 15°08'48"N 85°33'19"W, 19-IV-1999; and Honduras, Cortes, 9.3 km NNW Cofradia, 800 m, 15°29'14"N 88°11'22"W, 16-VI-1999. The species is described from México (Metcalf 1963a).

Diceroprocta ruatana (Walker, 1850). Specimens have been reported from Honduras (Metcalf 1963a).

Cacama maura (Distant, 1881). The FSCA has specimens from Honduras, Olancho, Culuco, Aguan Valley, 29-III-1978. The species is described from México (Metcalf 1963a).

Tribe Fidicinini Distant, 1905

Proarna insignis Distant, 1881. The FSCA has specimens from Guatemala, Izabal, La Graciosa, 15-IV-1995. The FSCA also has specimens collected at Honduras, El Paraiso, 7 km North of Oropoli, 30-IV-1993 and Atlántida, RVS Cuero y Salado, Salado Barra, 15°46'N 89°59'W, 2-5 m, 22-IV to 1-VIII-2000. There is a specimen from Honduras, El Paraiso, Yuscaran, 1-VI-2003 in the UGCA. The species has been reported in Central America (Metcalf 1963a).

Proarna olivieri Metcalf, 1963. The UCDC contains specimens collected at Guatemala, Retalhuleu, Retalhuleu, 18-23-VI-1986 and Retalhuleu, Retalhuleu, El Asintal, 6-V-1989. The UCMS contains a male from Guatemala, Chimaltenango, Pochula Fca El Rosario, 15-IV-2003. The species has been reported in Central America (Metcalf 1963a).

Proarna sallaei Stål, 1864. The UGCA has a specimen collected at Honduras, Atlántida, ~20 km SW La Ceiba, base of Pico Bonito, 16-VII-2001. The species is described from México (Metcalf 1963a).

Pacarina championi (Distant, 1881). The FSCA has specimens from the Belize, Toledo District, Punta Gorda, 5-8-VI-1990. Specimens in the CMNH were collected at Honduras, Rio Grande.

The species has been reported from Guatemala and Central America (Metcalf 1963a).

Pacarina puella Davis, 1923. The species has been reported from Guatemala and Central America (Metcalf 1963a).

Pacarina schumanni Distant, 1905. Specimens collected in Belize, Cayo District, Maya Mountain Lodge, 19 and 20-VII-1993 were given to the author by Vince Golia. Additional specimens collected by Charles Bartlett were collected in the Belize, Cayo District, Teakettle Bank, Pooks Hill, 17°09.257'N 88°51.094'W, 294 ft., 8-VII-2003 and given to the author. Specimens in the SDMC were collected at Belize, Chaa Creek, 18-21 August 1987. Specimens in the FSCA were collected at Honduras, La Paz, San Martin, 1-V-1988 and at Honduras, Colon, Trujillo, 22-VII-1968. Specimens have been reported from El Salvador (Sanborn 2001).

Sub-tribe Fidicinina Boulard & Martinelli, 1996

Fidicina cachla Distant, 1899. Specimens from Honduras, El Paraiso, 8.3 km SE Capire, 675 m, 13°58'54"N 85°49'25"W, 16-IV-1999 are in the FSCA. The species is described from Costa Rica (Metcalf 1963a).

Fidicinoides determinata (Walker, 1858). The FSCA has specimens from Guatemala, Guatemala, 1-V-1994. There are also specimens in the FSCA from Honduras, Yoro, Parque Nacional Pico Bonito, El Portillo, 640 m, 15°26'27"N 87°08'09"W, 11-III-2000; and Honduras, Atlántida, Parque Nacional Pico Bonito, El Manchon, 350 m, 15°29'18"N 87°07'39"W, 18-III-2001. The species has been reported from El Salvador (Sanborn 2001).

Fidicinoides pronoe (Walker, 1850). The FSCA has specimens collected in Honduras, Olancho, 14 km east of La Colonia, 610 m, 28-IV-1993; and Honduras, Lempira, Montana de Puca, 14°42'00"N 88°34'07"W, 1150 m, 28-VI-2000. Specimens have been reported previously from El Salvador (Sanborn 2001) and Guatemala (Metcalf 1963a).

Sub-tribe Guyalnina Boulard & Martinelli, 1996

Dorisiana amoena (Distant, 1899). Specimens from Guatemala, Petén, Morajan, 4.8 km East of Poptun, IV-V-1993 were given to the author by Br. Leon Cook. The species is described from Costa Rica (Metcalf 1963a).

Majeorona truncata Goding, 1925. A specimen from Honduras, Atlántida, PN Pico Bonito, Estacion CURLA, 17-VII-2001 is in the UGCA. The species is described from Ecuador (Metcalf 1963a).

Tribe Hyantini Distant, 1905

Quesada gigas (Olivier, 1790). It has been reported from Central America, Belize, Guatemala, Honduras (Metcalf 1963a) and El Salvador (Sanborn 2001).

Tribe Cicadini Oshanin, 1907

Neocicada centramericana Sanborn, 2005. The species is reported from Belize, Guatemala and Honduras (Sanborn et al. 2005).

Cicada pennata (Distant, 1881). The species is described from Guatemala (Metcalf 1963b). The taxonomic position of the species remains unclear based on the description of a single female specimen.

Subfamily Tibicininae Distant, 1906

Tribe Dazini Distant, 1905

Daza montezuma (Walker, 1850). Specimens in the FSCA from Guatemala, Petén, Cam. Yaxhá-Nakum, 180-300 m, 30-VI-1992. The species is described from México (Metcalf 1963a).

Tribe Carinetini Distant, 1905

Carineta trivittata Walker, 1858. The FSCA has specimens from Honduras, Cortés, Cofradia, Cusuco, 26-VIII-1994. The species has been reported from Guatemala and Central America (Metcalf 1963c).

Herrera ancilla (Stål, 1864). The FSCA has specimens collected in Honduras, El Paraiso, 5.3 km N Cifuentes, N 15°08'04" W 85°35'36", 13-14-VI-1999, Honduras, EAP, 30 km ESE of Tegus, 23-V-1983 and EAP 35 km Este Teg., 20-VII-1983. The species has been reported from Central America, Belize, Guatemala (Metcalf 1963c) and El Salvador (Sanborn 2001).

Tribe Taphurini Distant, 1905

Chrysolasia guatemalena (Distant, 1883). The species is described from Guatemala (Metcalf 1963c).

Dorachosa explicata Distant, 1892. A single specimen collected at El Salvador, San Salvador, San Salvador, 3-6-VI-1958 is in the USNM. The species is described from Panama (Metcalf 1963c).

DISCUSSION

This work has added significant numbers of representatives to the cicada fauna of the northern Central American countries (Fig. 1). However, there are probably many additional cicada species present in each country. The distribution of a species may bypass an individual country while being reported from border countries. It may be that insufficient collecting has occurred to produce representatives of these species in some countries, e.g., neighboring Guatemala, Honduras, and Nicaragua have been reported to have 24 species and 13 genera not reported from El Salva-



Fig. 1. Summary listing of first species records for the Central American countries of this study.

dor here and in Sanborn (2001). Continued museum study and field work will no doubt result in the identification of new species and additions to the cicada fauna of each country.

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REFERENCES CITED

- BOULARD, M., AND N. M. MARTINELLI. 1996. Révision des Fidicini, nouveau statut de la tribu, espèces connues et nouvelles espèces (Cicadomorpha, Cicadidae, Cicadinae). Première partie: Sous-tribu nouvelle des Fidicinina. EPHE, Biol. Evol. Insectes 9: 11-81.
- DISTANT, W. L. 1881. Rhynchota: Homoptera. Biologia Centrali-Americana; contributions to the knowledge of the fauna and flora of Mexico and Central America. Part 15, 1: 1-16.
- DISTANT, W. L. 1883. Rhynchota: Homoptera. Biologia Centrali-Americana; contributions to the knowledge of the fauna and flora of Mexico and Central America. Part 15, 1: 17-24.
- DISTANT, W. L. 1900. Rhynchota: Homoptera. Biologia Centrali Americana; contributions to the knowledge of the fauna and flora of Mexico and Central America. Part 15, 1: 41-43.
- DISTANT, W. L. 1905. Cicadidae and Fulgoridae. Biologia Centrali Americana; contributions to the knowledge of the fauna and flora of Mexico and Central America. Part 15, 1: 140-146.
- DAVIS, W. T. 1919. Cicadas of the genus *Cacama*, with descriptions of several new species. J. New York Entomol. Soc. 27: 68-79.
- DAVIS, W. T. 1928. Cicadas belonging to the genus *Diceroprocta* with descriptions of new species. J. New York Entomol. Soc. 36: 439-458.
- DAVIS, W. T. 1936. A remarkable cicada from Mexico and other North American species. J. New York Entomol. Soc. 45: 101-123.
- DAVIS, W. T. 1941. New cicadas from North America with notes. J. New York Entomol. Soc. 49: 85-99.
- DAVIS, W. T. 1944. The remarkable distribution of an American cicada; a new genus, and other cicada notes. J. New York Entomol. Soc. 52: 213-222.
- DUFFELS, J. P., AND P. A. VAN DER LAAN. 1985. Catalogue of the Cicadoidea (Homoptera, Auchenorrhyncha) 1956-1980. Dr. W. Junk Publishers, Series Entomologica 34, Dordrecht. 414 pp.
- METCALF, Z. P. 1963a. General Catalogue of the Homoptera, Fascicle VIII. Cicadoidea. Part 1. Cicadidae. Section I. Tibiceninae. North Carolina State Coll. Contr. 1502: 1-585.
- METCALF, Z. P. 1963b. General Catalogue of the Homoptera, Fascicle VIII. Cicadoidea. Part 1. Cicadidae. Section II. Gaeninae and Cicadinae. North Carolina State Coll. Contr. 1502: 587-919.
- METCALF, Z. P. 1963c. General Catalogue of the Homoptera, Fascicle VIII. Cicadoidea. Part 2. Tibicinidae. North Carolina State Coll. Contr. 1564: 1-492.
- MOORE, T. E. 1962. Acoustical behavior of the cicada *Fidicina pronoe* (Walker) (Homoptera: Cicadidae). Ohio J. Sci. 62: 113-119.
- MOORE, T. E. 1996. Cicadoidea, pp. 221-223 In J. E. Llorente Bousquets, A. N. García Aldrete and E. González Soriano [eds.], Biodiversidad, Taxonomía y Biogeografía de Artrópodos de México: Hacia Una Síntesis de Su Conocimiento. Cd. Universitaria, Mexico, Instituto de Biología, UNAM.
- MOULDS, M. S. 2003. An appraisal of the cicadas of the genus *Abrieta* Stål and allied genera (Hemiptera: Auchenorrhyncha: Cicadidae). Rec. Australian Mus. 55: 245-304.
- SANBORN, A. F. 2001. A first contribution to a knowledge of the cicada fauna of El Salvador (Homoptera: Cicadoidea). Florida Entomol. 84: 449-450.
- SANBORN, A. F. New records of cicadas from México (Hemiptera: Cicadoidea: Cicadidae). Southwest. Nat. 51(2): in press.
- SANBORN, A. F., M. S. HEATH, J. SUEUR, AND P. K. PHILLIPS. 2005. Taxonomy and biogeography of the genus *Neocicada* Kato, 1932 (Hemiptera: Cicadomorpha: Cicadidae), with descriptions of three new species. Syst. Entomol. 30: 191-207.
- SUEUR, J. 2000. Une nouvelle espèce de cigale du Mexique (Los Tuxtlas, Veracruz), et étude de son émission sonore (Homoptera, Auchenorrhyncha, Cicadoidea). Bull. Soc. Entomol. France 105: 217-222.
- SUEUR, J. 2002. Cicada acoustic communication: potential sound partitioning in a multispecies community from Mexico (Hemiptera: Cicadomorpha: Cicadidae). Biol. J. Linn. Soc. 75: 379-394.
- WOLDA, H. 1984. Diversity and seasonality of Panamanian cicadas. Mitt. Schweizerischen Ent. Ges. 57: 451.
- WOLDA, H. 1993. Diel and seasonal patterns of mating calls in some neotropical cicadas. Acoustic interference? Proc. Konin. Nederlandse Akad. Wetens. Biol., Chem., Geol., Phys. Med. Sci. 96: 369-381.

- WOLDA, H., AND J. A. RAMOS. 1992. Cicadas in Panama, their distribution, seasonality and diversity, pp. 271-279 *In* D. Quintero and A. Aiello [eds.], *The Insects of Panama and Mesoamerica. Selected Studies*. Oxford University Press, New York.
- YOUNG, A. M. 1972. Cicada ecology in a Costa Rican tropical rain forest. *Biotropica* 4: 152-159.
- YOUNG, A. M. 1976. Notes on the faunistic complexity of cicadas (Homoptera: Cicadidae) in Northern Costa Rica. *Rev. Biol. Trop.* 24: 267-279.
- YOUNG, A. M. 1980. Habitat and seasonal relationships of some cicadas (Homoptera: Cicadidae) in central Costa Rica. *American Midl. Nat.* 103: 155-166.
- YOUNG, A. M. 1981. Notes on seasonality and habitat associations of tropical cicadas (Homoptera: Cicadidae) in premontane and montane tropical moist forest in Costa Rica. *J. New York Entomol. Soc.* 89: 123-142.