

BRACHYBAENUS DOMINGENSIS SP. NOV. OF GRYLLACRIDIDS
(ORTHOPTERA: STENOPELMATOIDEA: GRYLLACRIDIDAE) FROM
DOMINICAN REPUBLIC, HISPANIOLA

***Brachybaenus domingensis* sp. nov. de gryllacrídidos
(Orthoptera: Stenopelmatoidea: Gryllacrididae)
de República Dominicana, Hispaniola**

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ABSTRACT

The gryllacridid *Brachybaenus domingensis* sp. nov. is described and illustrated from specimens collected in various localities of the Dominican Republic. The morphology of the new species is compared to that of the Cuban species *Brachybaenus cubensis* (Brunner von Wattenwyl, 1888), which may be its closest relative. Although these species are similar, diagnostic features of *B. domingensis* are the yellowish coloration of the face, spines on the anterior tibiae shorter than the eye length, and wings that markedly surpass the abdominal end. In *B. cubensis* the face is mostly black, the spines in the anterior tibiae are as long or longer than the eye length and the wings barely surpass the abdominal end. This is only the second species of gryllacridids reported from Hispaniola, the fourth species of *Brachybaenus* Karny in the Caribbean and the 17th species of the genus.

Keywords: Leaf-rolling crickets, Raspy crickets, taxonomy, Greater Antilles, West Indies.

RESUMEN

Se describe e ilustra el grillacrídido *Brachybaenus domingensis* sp. nov. a partir de especímenes colectados en varias localidades de la República Dominicana. La morfología de la nueva especie es comparada con la de la especie cubana *B. cubensis* (Brunner von Wattenwyl, 1888), la cual podría ser su pariente más cercano. Aunque estas especies son similares, rasgos diagnósticos de *B. domingensis* son la coloración amarillenta de la cara, espinas de las tibias anteriores más cortas que el largo del ojo y alas que sobrepasan marcadamente el final del abdomen. En *B. cubensis* la cara es mayormente negra, las espinas de las tibias anteriores son tan o más largas que el largo del ojo y las alas apenas sobrepasan el final del abdomen. Esta es solo la segunda especie de gryllacrídidos reportada para la Hispaniola, la cuarta especie de *Brachybaenus* Karny en el Caribe y la 17va especie del género.

Palabras clave: Grillos enrolladores de hojas, Grillos raspadores, taxonomía, Antillas Mayores, Indias Occidentales.

INTRODUCTION

Gryllacridids, also known as leaf-rolling crickets or raspy crickets, are a family of very small to very large (5 to over 150 mm) nocturnal insects distinguished from other Ensifera (orthopterans with elongated ovipositors shaped like a sword or a needle, like katydids and crickets) by having anterior tibiae without auditory timpana, four-segmented tarsi, and lacking a stridulatory apparatus at the base of the tegminae. They stridulate for defense and accomplish this by rubbing their femora on chitinous pegs located at the sides of their abdomen. Characteristic of

gryllacridids is the production of silk through their salivary glands and they use it to close their shelters of joined leaves. They are omnivorous, scavengers and opportunistic predators. Many species are aggressive and possibly for this reason are mostly solitary (Brunner von Wattenwyl, 1888; Karny, 1937; Rentz, 1996).

The genus *Brachybaenus* Karny until now includes 17 species in the neotropics from Mexico to Brazil, including Jamaica and Cuba, plus one species and two subspecies found in Indonesia (Cigliano *et al.*, 2018). In the Caribbean islands *Brachybaenus* is known from the species *B. cubensis* (Brunner von Wattenwyl, 1888) in Cuba, and *B. longstaffi* (Griffini, 1909) and *B. tapienoides* (Karny, 1928) in Jamaica (Table II). Until now, eight species in four genera of Gryllacrididae are recorded from the West Indies: three in the genus *Abelona* Karny, 1937, three in *Brachybaenus* Karny, 1937, one in *Camptonotus* Uhler, 1864 and one in *Progyllacris* Ander, 1939 (Table II). The only gryllacridid species previously recorded from Hispaniola is *Abelona parvula* (F. Walker, 1870), (Perez-Gelabert, 2008). Material collected in recent years indicates the presence of several other species in this island.

The reported diversity of gryllacridids worldwide includes some 100 genera and about 882 species (Ingrisch, 2018). The purpose of this paper is to describe a new species of *Brachybaenus* from the island of Hispaniola.

OBJECTIVE

-To provide the taxonomic description of a new species of Gryllacrididae from various localities in the Dominican Republic.

MATERIAL AND METHODS

Eight of the 11 specimens studied were collected during the Hispaniolan Orthopteroids Project (2002 – 2004) in the Dominican Republic, through nocturnal forays searching shrub vegetation with lights. Specimens were studied under 10 – 60X stereoscopic magnification. Photographs were taken using a Canon Mark II 5D camera and processed using the Visionary Digital (TM) BK Lab Imaging System. The specimens were measured with a digital caliper with resolution to 0.01 mm. Photographs of the three female syntypes of *B. cubensis* deposited at the Muséum d'Histoire Naturelle, Genève (MHNG), Switzerland were made available. From the newly studied materials, one male and one female of *B. domingensis* will be deposited in the entomological collection of the Museo Nacional de Historia Natural, Santo Domingo, Dominican Republic (MNHNSD), others are deposited in the Instituto de Investigaciones Botánicas y Zoológicas (IIBZ) and the United States National Museum (USNM) entomological collections.

Depositories

FSCA – Florida State Collection of Arthropods, Gainesville, Florida, United States.

IIBZ – Instituto de Investigaciones Botánicas y Zoológicas, Santo Domingo, Dominican Republic.

MHNG – Muséum d'Histoire Naturelle, Genève, Switzerland.

MNCN – Museo Nacional de Ciencias Naturales, Madrid, Spain.

MNHNP – Museum National d'Histoire Naturelle, Paris, France.

MNHNSD – Museo Nacional de Historia Natural de Santo Domingo, Santo Domingo, Dominican Republic.

MRSN – Museo Regionale di Scienze Naturali di Torino, Turin, Italy.

NHM – The Natural History Museum, London, England.

NHMW – Naturhistorisches Museum Wien, Austria.

OUMNH – Oxford University Museum of Natural History, Oxford, England.

USNM – United States National Museum of Natural History, Smithsonian Institution, Washington, DC, United States.

TAXONOMY

Superfamily Stenopelmatoidea Burmeister, 1838

Family Gryllacrididae Blanchard, 1845

Subfamily Gryllacridinae Blanchard, 1845

Genus *Brachybaenus* Karny, 1937

Brachybaenus domingensis sp. nov.

Figures 1-5

Holotype. 1 ♂, DOMINICAN REPUBLIC RD-045 Paso de la Perra, nr. La Ciénaga, La Vega Prov., 19°04.576'N 70°49.623'W, 16.vii.2002. D. Perez, B. Hierro, R. Bastardo, S. Medrano, H. Takizawa (USNM).

Diagnosis. *Brachybaenus domingensis* can be distinguished from its likely closest congener (*B. cubensis*) most obviously by both sexes having a mostly pale yellowish face with only small black markings around the lower margins of the frontal ridge. The spines of anterior tibiae are little curved and shorter than the length of one eye. Both sexes have long wings that extend beyond the abdominal end. In *B. cubensis* females have a face that is mostly black with the rounded ocelli yellow, the spines of the anterior tibiae are more curved and longer than the length of one eye and have shorter wings (barely surpassing the abdominal end).

Diagnosis. *Brachybaenus domingensis* puede distinguirse más obviamente de su probable congénero más cercano (*B. cubensis*) por ambos sexos tener la cara amarillo pálido solo con pequeñas marcas negras alrededor de los márgenes inferiores de la cresta frontal. Las espinas de las tibias anteriores son poco curvadas y más cortas que el largo de un ojo. Ambos sexos tienen alas largas que se extienden más allá del extremo abdominal. En *B. cubensis* las hembras tienen la cara mayormente negra con los ocelos redondeados de color amarillo, las espinas de las tibias anteriores son más curvadas y más largas que el largo de un ojo y tienen alas más cortas (que apenas sobrepasan el extremo abdominal).

Etymology. The epithet *domingensis*, refers to the island of Santo Domingo or Hispaniola inhabited by this species.

Description

Body size. Medium size but somewhat robust orthopterans (see measurements in Table I), with full wings that in both sexes extend well beyond the abdomen (Figs. 1A-C).

General coloration. Body color yellowish-brown, marked by dark brown to black spots mainly on head, pronotum and hind femora. Wings darker brown with conspicuous venation.

Head. Short, with fastigium not produced beyond the bases of antennae, with dark reddish-brown to black patches around the eyes that concentrate on the vertex; patches more strongly marked behind the eyes, dorsally leaving a less-marked space in its center (Figs. 2C-D). Face light yellowish only marked with small brownish spots to the sides of a round central ocellus (Figs. 2A-B). Eyes not protruding, somewhat oval-shaped vertically. Frons smooth, with clypeus somewhat quadrate, narrower at its lower portion. Labrum smooth and rounded (Figs. 2A-B). Palps very long (Fig. 1B).

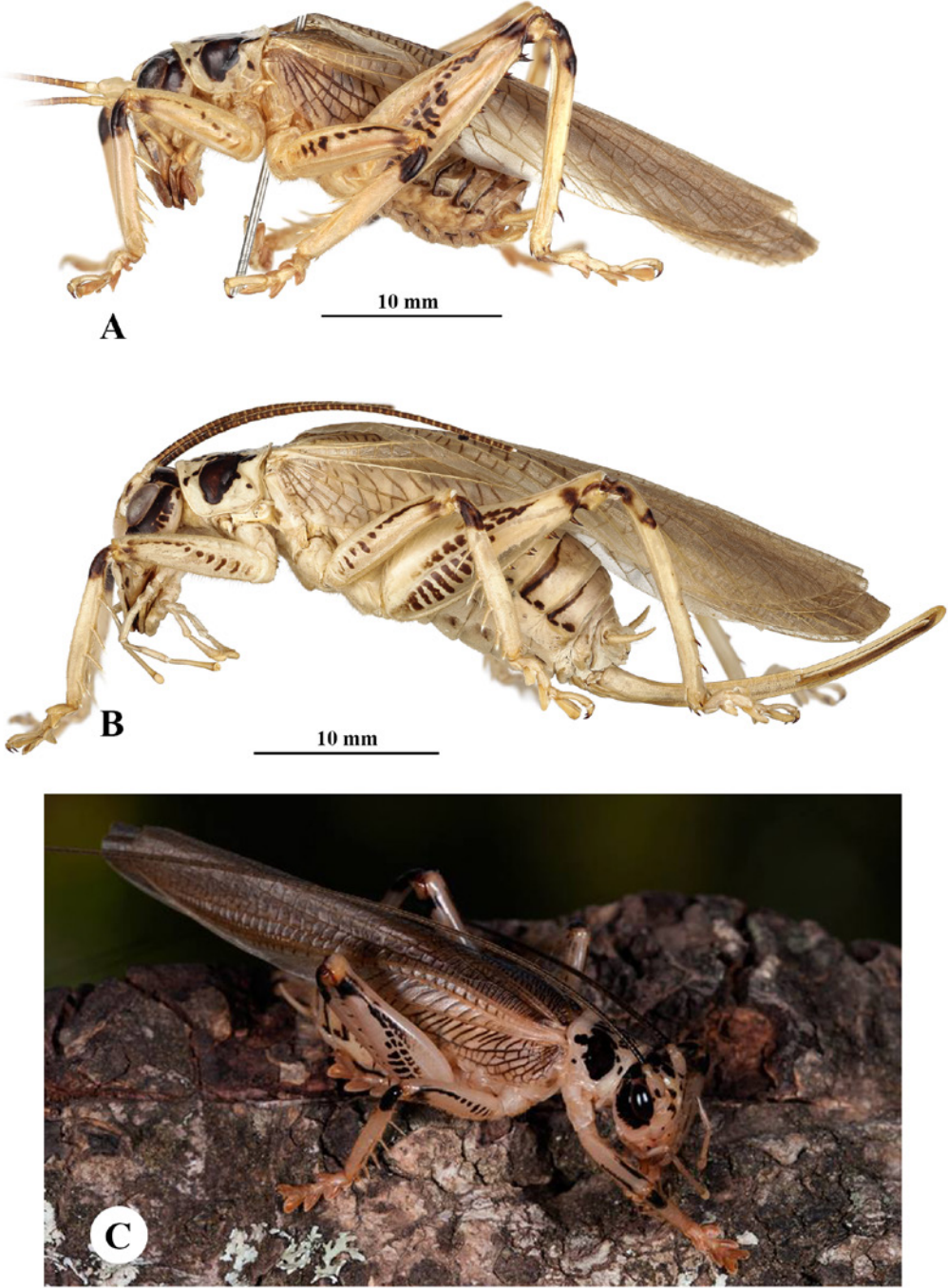


Figure 1. Habitus (both sexes, lateral view) of *Brachybaenus domingensis* sp. nov. A. Male. B. Female. C. Live male (photo credit: Carlos de Soto Molinari). Scale = 10 mm.

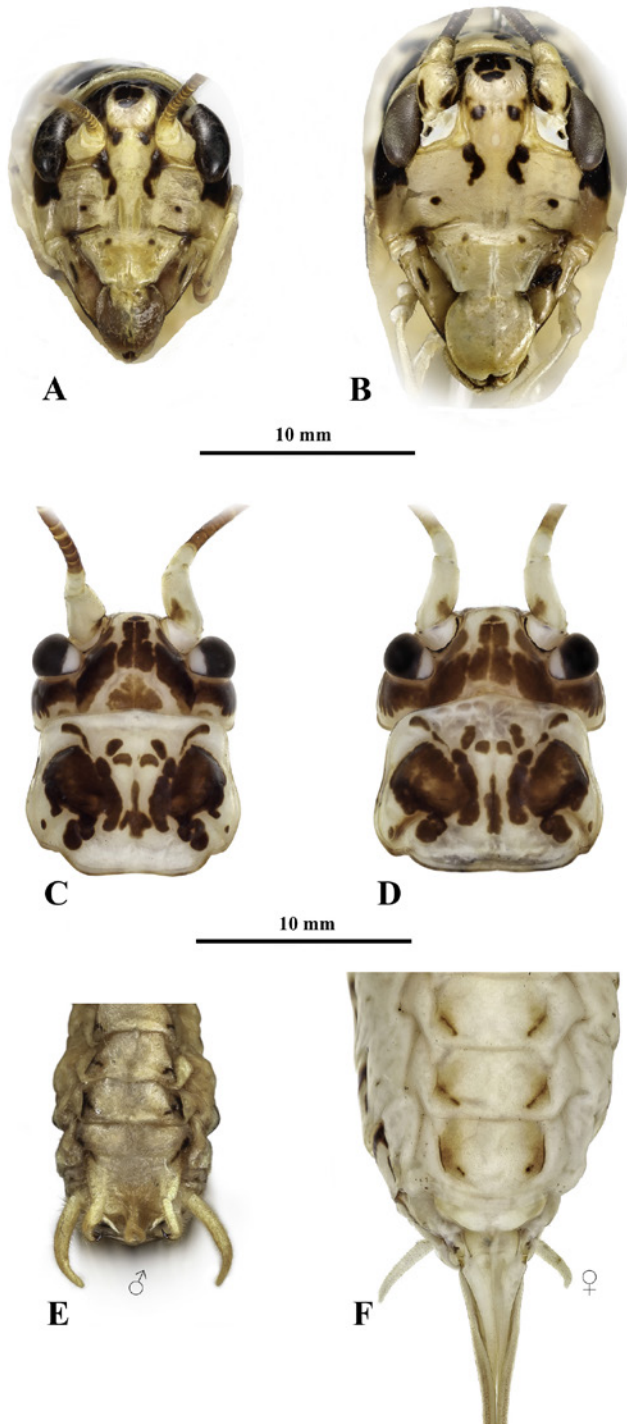


Figure 2. Body parts of *B. domingensis* sp. nov. A. Male face. B. Female face. C. Male head and pronotum (dorsal view). F. Female abdominal end (ventral view). Scale = 10 mm.

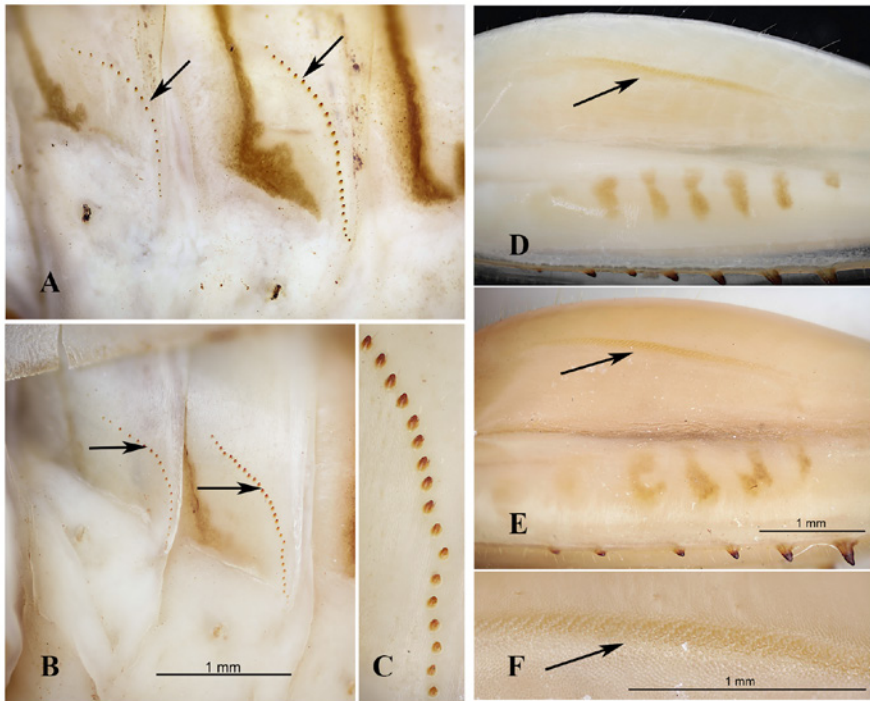


Figure 3. Stridulatory structures in both sexes of *B. domingensis* sp. nov. A. Stridulatory pegs at side of male abdomen. B. Stridulatory pegs at side of female abdomen. C. Close-up of abdominal stridulatory pegs (male). D. Stridulatory denticles at side of femur (male). E. Stridulatory denticles at side of femur (female). F. Close-up of stridulatory denticles on femur (male).

Pronotum. Saddle-shaped, lacking sulci, wider than long and somewhat quadrangular; anterior and posterior margins mostly parallel, smooth, projected anteriorly only very slightly, its sides with rounded margins without lateral lobes. Dorsally colored with unorganized brown to black markings that are larger to the sides of its medial line (Fig. 2C-D).

Abdomen. Abdominal segments smooth, with some dark markings under margin of tergites. Stridulatory pegs on abdomen forming two curved rows of minute conical and dark-colored chitinous pegs (Figs. 3A-C). In the male the two rows are made of 18 and 25 pegs, while in the female their arrangement is very similar and the pegs number 19 and 27.

Legs. Anterior femora without spines but with fine setae mainly on internal face, with variable dark striations on external face and a dark chevron on half of internal face. Anterior tibiae strongly marked black on upper 1/5 portion just below the knees, armed on external and internal margins with 5 strong and long yellow spines (Figs. 1A-C). Meso and metafemur smooth dorsally, with striated dark markings on external face. Spines of hind tibiae brownish, sharply pointed and shorter than those of anterior tibiae. Stridulatory denticles on internal face of femur many and very small, forming a longitudinal array of about 2.5 mm in length (Fig. 3D-F). This is the structure rubbed against the abdominal pegs to make sound.

Male genitalia. External male genitalia with subgenital plate only slightly longer than wide, little extended posteriorly, not surpassing abdominal end and forming a rounded knob at its tip; whole subgenital area with abundant pilosity; male cerci covered with abundant setae, cylindrical in their proximal 2/3, somewhat arched in their distal 1/3 and bluntly pointed (Fig. 2E). Styli cylindrical, about 1/2 the size of cerci, with black sharp recurved tips pointed inwards (Fig. 2E).

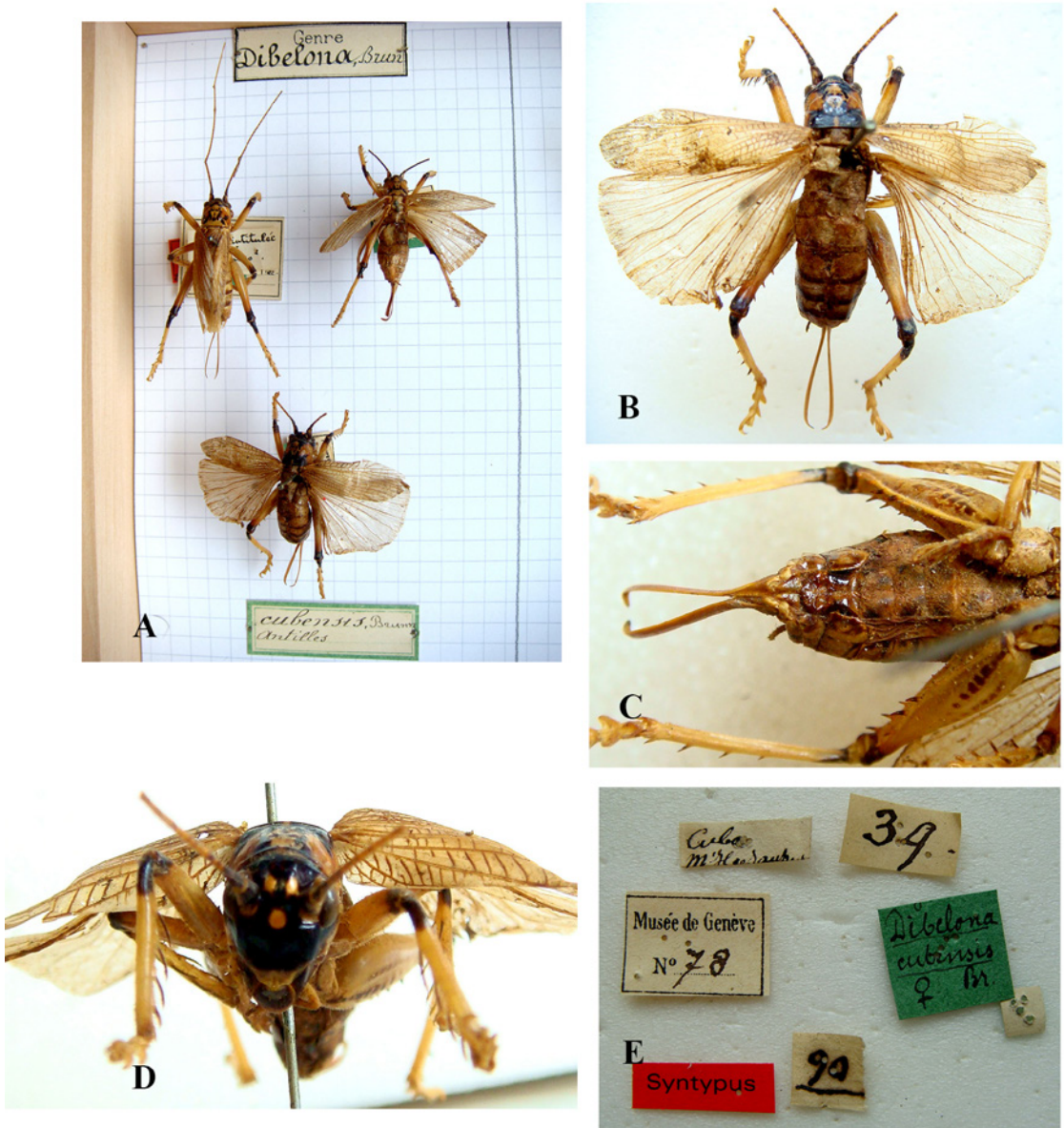


Figure 4. Syntypes of *Brachybaenus cubensis* (Brunner von Wattenwyl, 1888) deposited at the Museum d'Histoire Naturelle, Genève, Switzerland (photo credit: John Hollier). A. Three syntype females. B. Habitus of one syntype female. C. Abdominal end (ventral). D. Face. E. Syntype labels.

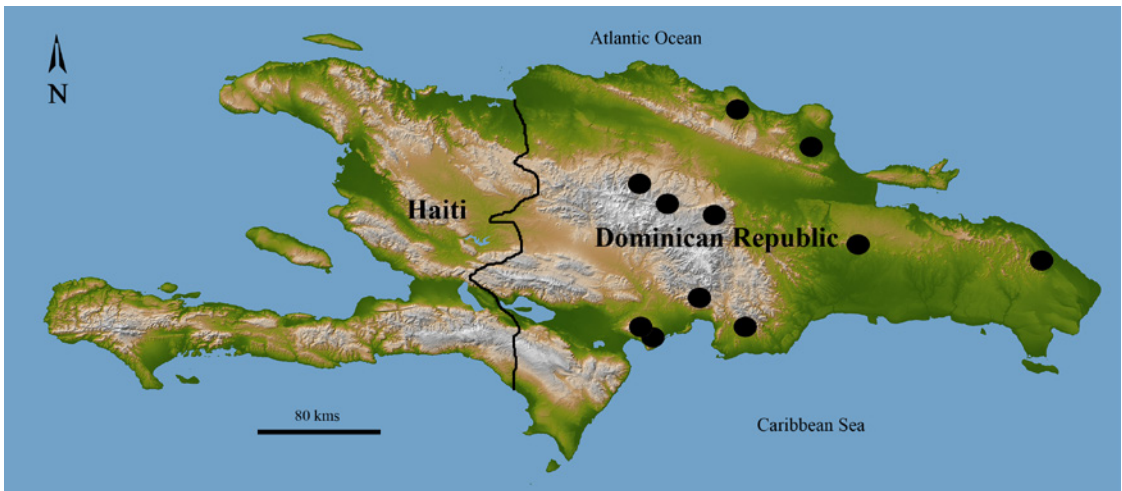


Figure 5. Distribution map of *B. domingensis* specimens collected in the Dominican Republic, Hispaniola.

Female genitalia. Whole subgenital area with little pilosity; female subgenital plate much wider than long, with a small medial concavity; female cerci only with very small setae, their size smaller than in male and little curved (Fig. 2F). Female ovipositor thickened only at its base (Fig. 2F), then cylindrical posteriorly, smoothly recurved upwards, ending bluntly and extended beyond the wing tips (Fig. 1B).

Measurements. See Table I.

Paratypes. Preserved dry: 1 ♀, DOMINICAN REPUBLIC RD-005 15.i.02 Las Yayitas, Azua Prov., 240 m, 316-230 mE 2046-941 mN. D. Otte, D. Perez, R. Bastardo, S. Medrano (MNHNSD); 1 ♀, DOMINICAN REPUBLIC RD-044 La Sal, Reserva Científica Ebano Verde, La Vega Prov., 11-12.vii.2002, 19°04.101'N 70°34.089'W, 1,043 m, D. Perez, B. Hierro, R. Bastardo (USNM); 1 ♂, DOMINICAN REPUBLIC RD-051 Alto del Rancho, Loma Guaconejo, M. T. Sánchez Prov., 170 m, 24-25.vii.2002, 19°18.752'N 69°56.663'W, D. Perez, B. Hierro, R. Bastardo (USNM); 1 ♂, DOMINICAN REPUBLIC RD-126 Caseta Parques en Diferencia, PNAB, Santiago Prov., 740 m, 19°16.313'N 71°03.132'W, 8.iv.2003, D. Perez, R. Bastardo, B. Hierro (USNM); 1 ♂, DOMINICAN REPUBLIC, Prov. Monte Plata, Parque Nacional de la Biodiversidad, 18.88785N 69.73174W, 200 m, 2-v-2015, J. A. Sánchez Borbón (IIBZ); 1 ♂, DOMINICAN REPUBLIC Pr. La Altagracia, Nisibón Finca Papagayo 4-7-IV-2000, blacklight trap, 150° RE Woodruff, TJ Henry (FSCA). Preserved in alcohol: 1 ♀, DOMINICAN REPUBLIC RD-221 ~8 km S Bombita, Parque Nacional El Choco, beside karst mogote, Puerto Plata prov., 144 m, 19°43.249'N 70°28.216'W, 14.iv.2004, D. Perez, B. Hierro, R. Bastardo. (d/n) (USNM); 1 ♀, DOMINICAN REPUBLIC RD-153 La Poza de Agua Nueva, El Curro, Sierra Martín García, Azua Prov., 18°18.324'N 70°57.176'W, ~800 m, 15-16.vii.2003, D. Perez, R. Bastardo, B. Hierro. (day/night) (USNM); 1 ♂, DOMINICAN REPUBLIC RD-156 La Furnia, Barreras, Azua Prov., 18°19.289'N 70°54.755'W, 18.vii.2003, D. Perez, R. Bastardo, B. Hierro. (night) (USNM). 1 ♂, REPUBLICA DOMINICANA, Prov. Peravia, Baní, Honduras, Los Cedros, 351473 mN 2036495 mE, 656 msnm, 23/x/2009, G. de los Santos (MNHNSD).

Table I. Measurements of nine specimens of *Brachybaenus domingensis* sp. nov. (in mm)

Measurements	♀1	♀2	♀3	♀4	♂HT	♂2	♂3	♂4	♂5
Body length	28.4	20.5	25.1	26.6	19.5	17.0	21.0	20.3	26.3
Pronotum length	5.3	4.8	5.1	5.3	4.3	4.6	4.9	4.9	4.5
Wing length	33.9	28.0	---	30.5	25.2	28.5	29.4	27.5	30.7
Hind femur length	14.6	13.6	13.3	14.0	10.7	11.4	11.9	12.0	11.0
Ovipositor length	20.1	19.1	15.1	18.5	---	---	---	---	---

Table II. Species of the family Gryllacrididae reported from the West Indies, with information on distribution, Type (HT= Holotype, ST= Syntypes) and depository.

Taxon	Author, year	Distribution	Type	Deposition
<i>Abelona</i>	Karny, 1937			
<i>Abelona bolivari</i>	(Karny, 1929)	Cuba, Bahamas	HT ♂	MNCN
<i>Abelona guadeloupensis</i>	(Karny, 1935)	Guadeloupe	HT ♂	MNHNP
<i>Abelona parvula</i>	(F. Walker, 1870)	Hispaniola	HT ♂	NHM
<i>Brachybaenus</i>	Karny, 1937			
<i>Brachybaenus cubensis</i>	(Brunner von Wattenwyl, 1888)	Cuba	3 ST ♀♀	MNHG
<i>Brachybaenus domingensis</i>	sp. nov.	Hispaniola	HT ♂	USNM
<i>Brachybaenus longstaffi</i>	(Griffini, 1909)	Jamaica	2 ST ♂♂	OUMNH
<i>Brachybaenus tapienoides</i>	(Karny, 1928)	Jamaica	HT ♂	MRSN
<i>Camptonotus</i>	Uhler, 1864			
<i>Camptonotus jamaicensis</i>	(Brunner von Wattenwyl, 1888)	Jamaica	2 ST ♂♂	NHMW
<i>Progryllacris</i>	Ander, 1939			
<i>Progryllacris sanctivincentii</i>	(Griffini, 1909)	St. Vincent	HT ♂	OUMNH

DISCUSSION

The general similarities (size, robustness, general coloration, markings, tibial spines) between *B. cubensis* and *B. domingensis* suggests that they might be close relatives. Although there was no opportunity to examine the two Jamaican species (*B. tapienoides* and *B. longstaffi*), the smaller biogeographical affinity between the islands of Jamaica and Hispaniola suggests a more distant relationship.

Individuals of *B. domingensis* are encountered only haphazardly while searching vegetation at night (each specimen reported here is from a different locality), so they seem widely distributed, inhabiting varied conditions of humidity and elevation. The elevation of the localities varied from near sea level (Nisibón) to as high as a thousand meters (La Sal, Cordillera Central). Although both sexes of *B. domingensis* have long wings, it is unclear whether these relatively heavy gryllacridids can fly as they never appeared inclined to do that. Their behavior before becoming aware of the collector often suggested that they were foraging, rapidly moving along small branches at night apparently searching for prey. No example of the nest or hideout of this species was found.

ACKNOWLEDGEMENTS

Karolyn Darrow (Department of Entomology, NMNH, Smithsonian Institution) produced the photographs. John Hollier (Muséum d'Histoire Naturelle, Genève) graciously provided photographs of the *B. cubensis* syntypes deposited in their collection. Carlos de Soto Molinari (Santo Domingo) is acknowledged for the picture of the live specimen.

LITERATURE CITED

- Bolívar, I. 1888. Enumération des orthoptères de l'île de Cuba. *Memoires de la Société Zoologique de France*, 1: 116-164.
- Brunner von Wattenwyl, C. 1888. Monographie der Stenopelmatiden und Gryllacriden. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 38: 247-394.
- Cigliano, M. M., H. Braun, D. Eades, and D. Otte. 2018. Orthoptera Species File. Versión 5.0/5.0. (Accessed Jan. 2018). <http://orthoptera.speciesfile.org>.
- Gundlach, J. 1891. *Contribución a la Entomología Cubana, Tomo 2, parte cuarta, Ortópteros*. Imprenta de G. Montiel, La Habana, pp. 335-384.
- Ingrisch, S. 2018. New taxa and records of Gryllacrididae (Orthoptera, Stenopelmatoidea) from South-East Asia and New Guinea with a key to genera. *Zootaxa*, 4510 (1): 1-278.
- Karny, H. H. 1937. Orthoptera Fam. Gryllacrididae, subfamiliae Omnes. In: P. Wytzman, ed., *Genera Insectorum*, 206: 1-317.
- Perez-Gelabert, D. E. 2008. Arthropods of Hispaniola (Dominican Republic and Haiti): a checklist and bibliography. *Zootaxa*, 1831: 1-530.
- Rehn, J. A. G. 1909. A catalog of the Orthoptera of Cuba and the Isle of Pines. Second Report of the central experimental station of the Republic of Cuba. *Academy of Natural Sciences of Philadelphia*, pp. 175-235.
- Rentz, D. 1996. *Grasshopper Country: The Abundant Orthopteroid Insects of Australia*. University of New South Wales Press, Sydney, 284 pp.