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A new *Cryptotermes* (Blattodea (Isoptera): Kalotermitidae) from Honduras and known distribution of New World *Cryptotermes* species

Rudolf H. Scheffrahn¹

Abstract

Cryptotermes garifunae sp. nov. (Isoptera: Kalotermitidae) is described from a single colony sample collected on the coast of Honduras. This species represents the twenty-second *Cryptotermes* species known from the Caribbean Basin and West Indies. The *C. garifunae* soldier and imago are the smallest of the New World *Cryptotermes*. Distribution maps, constructed from 1,452 new records, are given for all 31 species of New World *Cryptotermes*.

Key Words: termite; Nearctic; Neotropical; Caribbean Basin

Resumen

Se describe *Cryptotermes garifunae* sp. nov. (Isoptera: Kalotermitidae) a partir de una muestra de una sola colonia recolectada en la costa de Honduras. Esta especie representa la vigésima segunda especie de *Cryptotermes* conocida de la cuenca del Caribe y las Antillas. El soldado y el imago de *C. garifunae* son los más pequeños de las especies de *Cryptotermes* conocidas en el Nuevo Mundo. Se provee mapas de distribución, contruidos a partir de 1,452 nuevos registros, para las 31 especies de *Cryptotermes* en el Nuevo Mundo.

Palabras Clave: termita; Neártico; Neotropical; Cuenca del Caribe

Cryptotermes Banks (Blattodea (Isoptera): Kalotermitidae), now with 29 endemic species (31 total) is the most speciose kalotermitid genus in the New World. The West Indies and Caribbean mainland, now with 22 species, has a disproportionately diverse number of *Cryptotermes* compared to the rest of the world. After the world revision by Bacchus (1987), the West Indian group was revised by Scheffrahn & Křeček (1999), adding 12 new species. Another new West Indian species, *C. bracketti* Scheffrahn & Křeček, was added by Scheffrahn et al. (2006). The latest mainland endemic *Cryptotermes* to be described include *C. abruptus* Scheffrahn & Křeček from Mexico (Scheffrahn et al. 1998) and *C. colombianus* Casalla, Scheffrahn & Korb from Colombia (Casalla et al. 2016).

Cryptotermes brevis (Walker), endemic to the coastal desert of Peru and Chile (Atacama), is the most economically important and widespread kalotermitid pest of dry wood worldwide (Scheffrahn et al. 2009). Both *Cryptotermes dudleyi* Banks, a pest species from the Indian subcontinent, and *C. havilandi* (Sjöstedt), a pest from equatorial Africa, have been introduced by human commerce to the New World. I herein describe *Cryptotermes garifunae* sp. nov. from a single colony collected on the Caribbean coast of Honduras. I also update the distribution of all described *Cryptotermes* species in the New World from records in the University of Florida Termite Collection and from the literature.

Materials and Methods

Microphotographs (Figs. 1, 2) were taken as multi-layer montages using a Leica M205C stereomicroscope controlled by Leica Application

Suite version 3 software (Leica Geosystems, Inc., Norcross, Georgia, USA). Preserved specimens were taken from 85% ethanol and suspended in a pool of Purell® Hand Sanitizer (GOJO Industries, Akron, Ohio, USA) to position the specimens on a transparent Petri dish back-ground.

Cryptotermes distribution records were taken either from unpublished localities in the University of Florida Termite Collection in Davie, Florida, or from the literature (Table 1). Distribution maps (Figs. 3–5) were prepared using ArcMap 10.3 software (ESRI, Redlands, California, USA).

Results

Cryptotermes garifunae Scheffrahn sp. nov. 2018 (Figs. 1, 2)

DEALATED MALE IMAGO (Fig. 1, Table 2). Head and nota light yellowish brown. Postclypeus hyaline. Chevron pattern on fore wing scales slightly darker than mesonotum. Legs very light yellow concolorous with abdominal sternites. Eyes dark grey, occupying 2/5 distance between vertex and genal margin, the latter of which are closer; ellipsoid with rectate margin at antennal socket. Ocelli moderately large, hyaline, touching eyes; oval except for acute wisp at dorsal margin. Antennae article formula $2 > 3 < 4 < 5$. Pronotum wider than long, distinctly narrower than head width at eyes; anterior and posterior margins nearly rectate, sides slightly convex. Arolia present.

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Table 1. Literature localities of New World *Cryptotermes* species not encompassed in the University of Florida collection.

Species	Latitude	Longitude	Location	Reference
<i>C. cavifrons</i>	32.3°N	64.76°W	Bermuda	Snyder 1956
<i>C. chacoensis</i>	20.695°S	61.929°W	Paraguay: Nueva Asunción	Roisin 2003
<i>C. chacoensis</i>	25.046°S	58.059°W	Argentina: P. N. Río Pilcomayo	Roisin 2003
<i>C. colombianus</i>	11.323°N	74.109°W	Colombia: P. N. Tayrona	Casalla et al. 2016
<i>C. contognathus</i>	21.3°S	40.96°W	Brazil: Espírito Santo, Praia das Neves	Constantino 2000
<i>C. cubicoceps</i>	6.383°N	58.7°W	Guyana: Kartabo	Emerson 1925
<i>C. darwini</i>	1.26°S	90.43°W	Galápagos Islands, Floriana Island	Light 1935
<i>C. dudleyi</i>	9.93°N	84.09°W	Costa Rica: San José	Snyder 1934
<i>C. dudleyi</i>	1.46°S	48.5°W	Brazil: Pará, Belém	Constantino & Cancelló 1992
<i>C. dudleyi</i>	7.13°S	34.84°W	Brazil: Paraíba, João Pessoa	Fontes & Milano 2002
<i>C. dudleyi</i>	22.9°S	43.21°W	Brazil: Rio de Janeiro	Fontes & Milano 2002
<i>C. dudleyi</i>	12.48°N	81.68°W	Colombia: San Andres Island	Fontes & Milano 2002
<i>C. fatulus</i>	2.025°S	80.735°W	Ecuador: Palmar	Bacchus 1987
<i>C. fatulus</i>	21.64°N	106.56°W	Mexico: Maria Madre Island	Light 1935
<i>C. fatulus</i>	19.21°N	104.68°W	Mexico: Jalisco, Barra de Navidad	Nutting 1970
<i>C. fatulus</i>	0.95°S	91.14°W	Galápagos Islands, Isabela Island	Light 1935
<i>C. havilandi</i>	1.46°S	81.68°W	Brazil: Pará, Belém	Constantino & Cancelló 1992
<i>C. havilandi</i>	1.29°S	48.47°W	Brazil: Pará, Icoaraci	Constantino & Cancelló 1992
<i>C. havilandi</i>	23.96°S	46.33°W	Brazil: São Paulo, Santos	Fontes 1998
<i>C. havilandi</i>	22.9°S	43.21°W	Brazil: Rio de Janeiro	Fontes 1998
<i>C. havilandi</i>	3.72°S	38.54°W	Brazil: Ceará, Fortaleza	Fontes 1998
<i>C. longicollis</i>	23.06°N	106.21°W	Mexico: 30 km S. Matzatlan	Light 1933
<i>C. longicollis</i>	19.527°N	105.075°W	Mexico: Chamela	Nickle & Collins 1990*
<i>C. longicollis</i>	9.22°N	79.85°W	Panama	Nickle & Collins 1992
<i>C. verruculosus</i>	6.383°N	58.7°W	Guyana: Kartabo	Emerson 1925

*Misidentified as *C. fatulus*

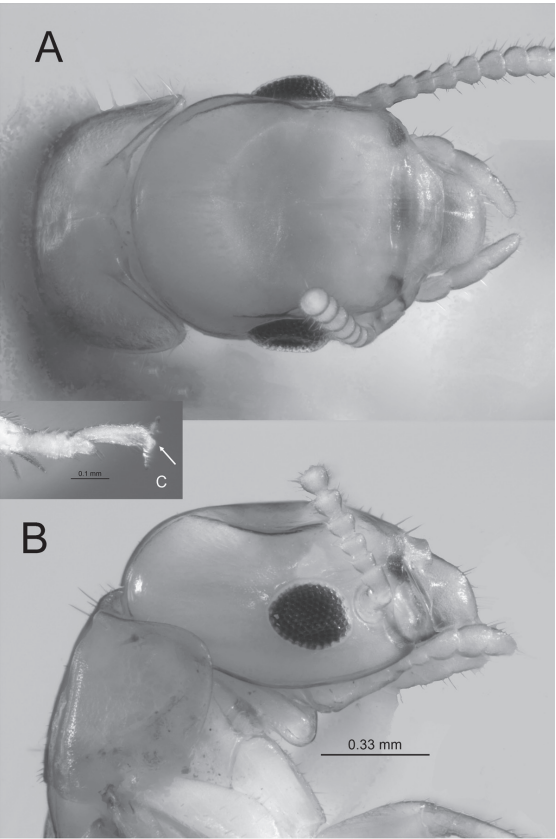


Fig. 1. Dorsal (A) and lateral (B) views of the *Cryptotermes garifunae* female dealate (vertex of head capsule partially collapsed). Arrow of fore tarsus (C) points to arolium of dealate.

SOLDIER (Fig. 2, Table 3). Head, in lateral view, grading from hyaline at the cervical margin to dark ferruginous brown at frontal flange; in dorsal view coloration is a patchwork of reddish brown to dark ferruginous brown corresponding with thickness of cuticular rugosity.

Mandibles concolorous with frons. Anterior pronotal margin yellowish brown, remainder yellowish. Head capsule cuboidal in dorsal view, sides nearly parallel until anterior protrusion of frontal flange; dorsal outline of head capsule, in lateral view, forming a weak “s” shape from flange to occiput.

Texture of dorsal rugosity moderate; more rugose in anterior half including frontal flange and frons. Frons deeply concave. Frontal flange robust, elevated, with median notch continuous with mid-vertex concavity; in dorsal view, flange forms circular 120° arch. Eye spots very faint.

Labrum short, apex upturned. Mandibles short, angular, bent about 120°; finely rugose. Dentition weakly developed.

Table 2. Measurements (mm) of the *Cryptotermes garifunae* sp. nov. male dealate (n = 1).

Measurement	
Head length with labrum	1.05
Head length to postclypeus	0.96
Head width, maximum at eyes	0.84
Eye diameter, maximum	0.26
Eye to head base, minimum	0.12
Ocellus diameter, maximum	0.05
Pronotum, maximum length	0.61
Pronotum, maximum width	0.77
Total length without wings	5.63

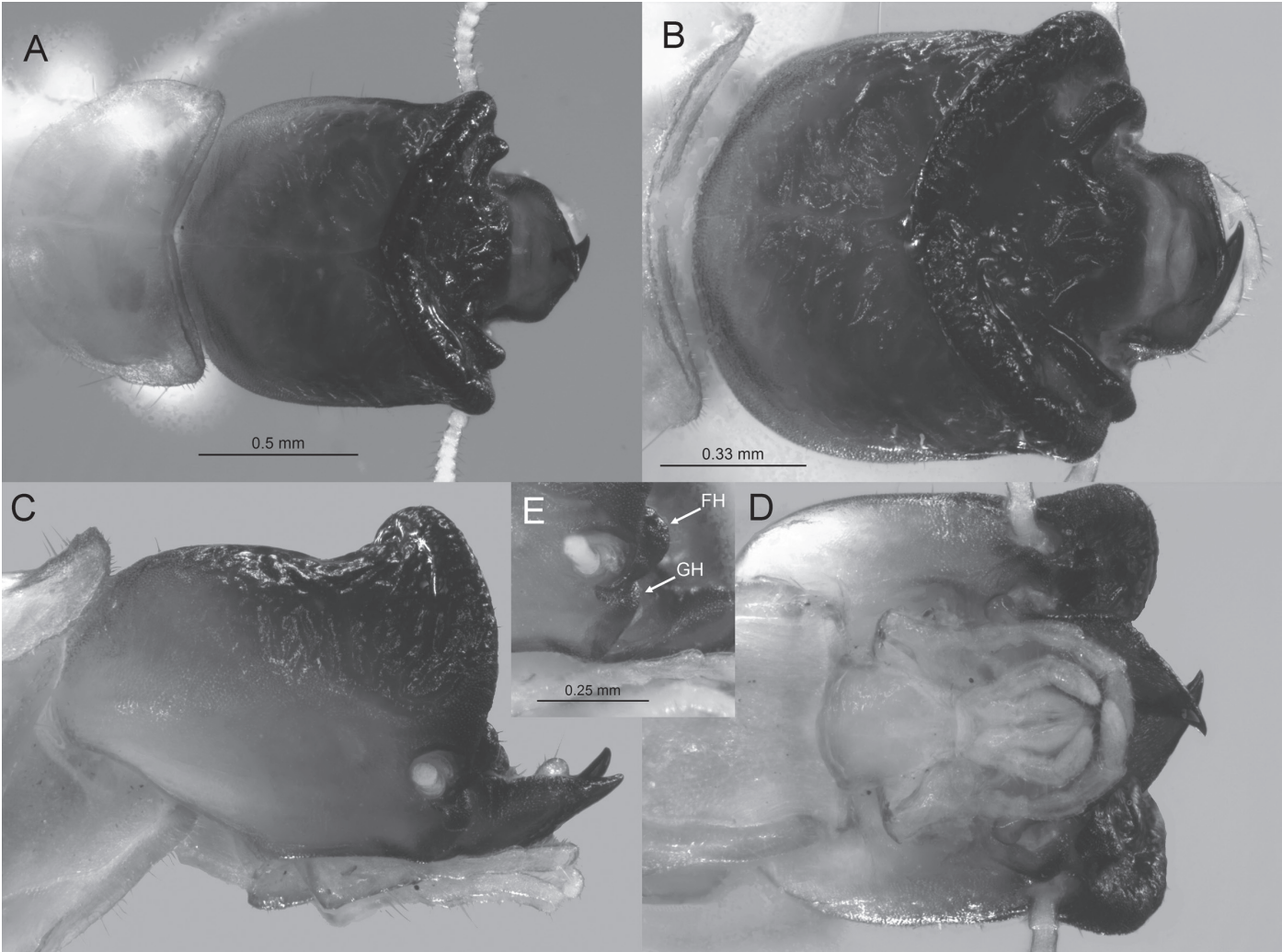


Fig. 2. Dorsal (A), anterodorsal (B), lateral (C), and ventral (D) views of *Cryptotermes garifunae* soldier head capsule. Arrows in lateral view of area near antennal fossa (E) point to frontal horn (FH) and genal horn (GH).

In dorsal view, frontal horns large, globular, projecting beyond the frontal flange reaching the posterior margin of the postclypeus; genal horns small blunt, apex in line with anterior margin of antennal socket. In lateral view, frontal horns nearly semicircular, projecting beyond base of genal horns. Antenna with 11 articles; formula $2 > 3 = 4 < 5$. Anterior margin of pronotum incised with weak irregular

sinuosity; anterolateral corners square, lateral margins and posterior margin form an evenly rounded outline.

TYPE MATERIAL

HOLOTYPE soldier HONDURAS: Kerala, Laguna Guaimoreto (16.0132°N, 85.9184°W, elev. 6 m asl), 29-V-2007, J.A. Chase (UF no. HN273).

ETYMOLOGY

Named after the Garifuna people who live along the coastline of Honduras.

DIAGNOSIS

The dealated imago of *C. garifunae*, along with *C. fatulus* (Light) and *C. undulans* Scheffrahn & Křeček, are the smallest of the New World *Cryptotermes*. However, the *C. garifunae* imago has a lighter yellowish coloration than the other 2. The soldier of *C. garifunae* is the smallest of the New World *Cryptotermes* with the exception of *C. fatulus* (Light) which is of similar size but lacks head capsule rugosity.

Table 3. Measurements (mm) of the *Cryptotermes garifunae* sp. nov. soldier (n = 3).

Measurement	maximum	minimum	mean
Head length to tip of mandibles	1.39	1.23	1.31
Head length to tip frontal horns	1.11	0.98	1.06
Frontal flange width	1.02	1.00	1.01
Frontal horns, outside span	0.74	0.74	0.74
Head width, maximum	1.04	0.96	0.99
Head height, excluding postmentum	0.70	0.63	0.65
Pronotum, maximum length	0.72	0.67	0.70
Pronotum, maximum width	0.96	0.95	0.96
Left mandible length, tip to ventral condyle	0.44	0.39	0.41
Total length	5.13	3.81	4.25

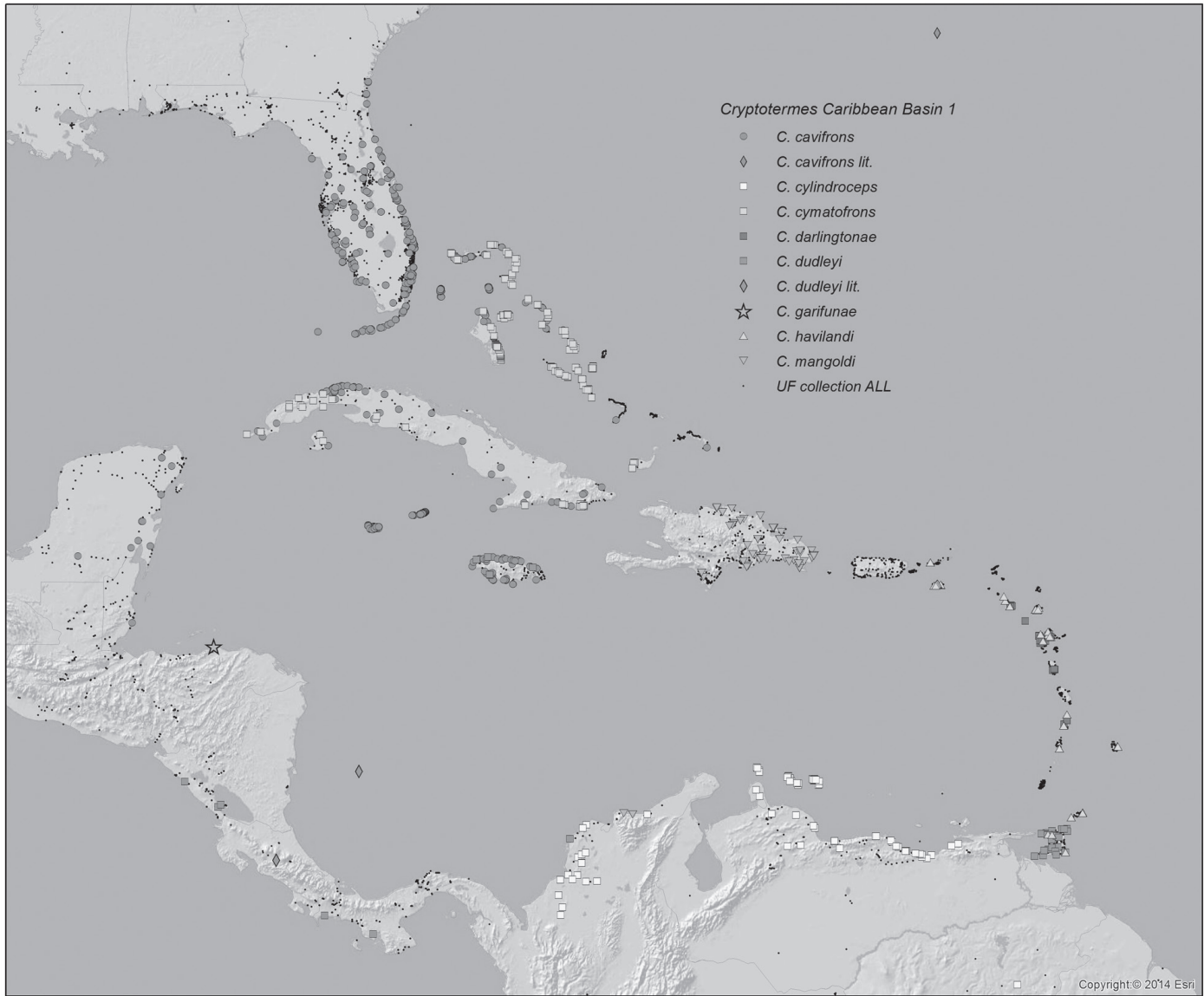


Fig. 3. Distribution of *Cryptotermes* species (Group 1) in Florida, the West Indies, and Caribbean Basin from the University of Florida termite collection and literature records. “UF collection ALL” represents other collection locations in the University of Florida termite collection.



Fig. 4. Distribution of *Cryptotermes* species (Group 2) in the West Indies, and Caribbean Basin from the University of Florida termite collection and literature records.

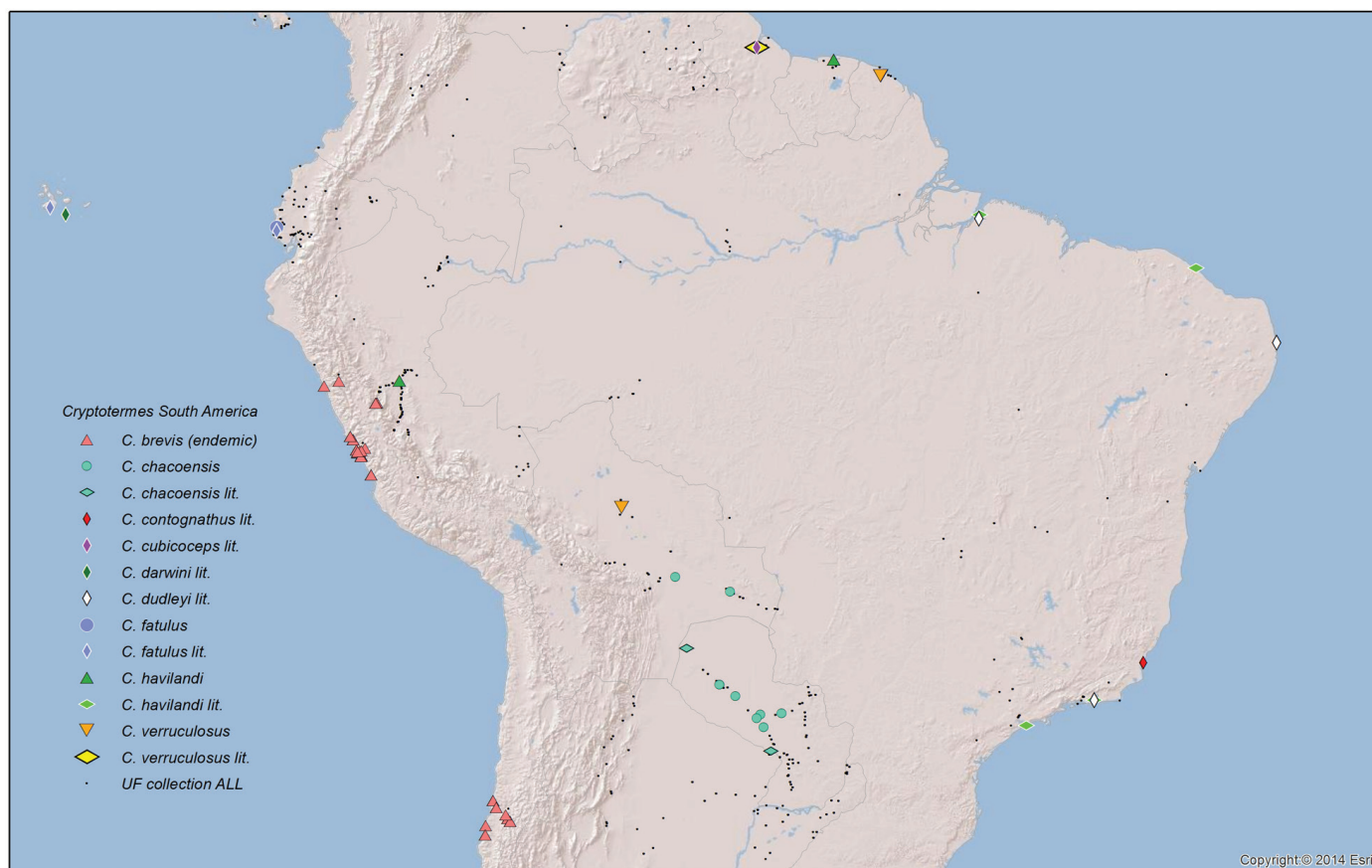


Fig. 5. Distribution of *Cryptotermes* species in South America from the University of Florida termite collection and literature records. Only endemic records of *C. brevis* are shown.

In the key given by Scheffrahn and Křeček (1999), the new species will key out at couplet 10 leading to *C. darlingtonae* **sp. nov.** and modified as follows:

- | | | |
|------|---|--|
| 10. | Frontal horns, in lateral view, about 3 times larger than genal horns | 11 |
| 10'. | Frontal horns, in lateral view either subequal or about 5 times larger than genal horns | 12 |
| 11. | Genal horns projecting forward and only slightly recessed behind frontal horns, left mandible 0.68 to 0.75 mm long (Figs. 40–42) | <i>C. darlingtonae</i> sp. nov. |
| 11'. | Genal horns blunt, apex in line with anterior margin of antennal fossae, left mandible 0.57 mm long | <i>C. garifunae</i> |
| 12. | Frontal horns, in lateral view, about 5 times larger than genal horns; genal horns projecting more dorsally and greatly recessed behind frontal horns, left mandible 0.63 to 0.72 mm long (Figs. 67–69) | <i>C. pyrodomus</i> |
| 12'. | Frontal horns, in lateral view, subequal; smaller species, left mandible 0.56 to 0.62 mm long (Figs. 19–21) | <i>C. aequacornis</i> n. sp. |

In addition to *Cryptotermes* localities reported in Casalla et al. (2016), Scheffrahn & Křeček (1999), Scheffrahn et al. (2003), and Scheffrahn et al. (2009); Figures 3 to 5 include 1,452 new *Cryptotermes* records and localities recorded in the University of Florida Termite Collection. Only endemic *C. brevis* localities are included in these figures because of its expansive non-endemic pest localities (Scheffrahn et al. 2009). Some localities yielded more than 1 sample of the same *Cryptotermes* species. New records are from Florida and Georgia, the West Indies (The Bahamas, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Puerto Rico, Turks and Caicos Islands, Trinidad and Tobago, and The US Virgin Islands), Central America (Belize, Guatemala, Honduras, Mexico, Nicaragua, and Panama), and South America (Bolivia, Ecuador, French Guiana, Paraguay, Peru, and Venezuela).

Discussion

Although the imago morphology is quite conserved, the head capsules of *Cryptotermes* soldiers are variously adorned with protuberances and rugosities that facilitate their phragmotic defensive strategies. The most extreme case of phragmosis is exemplified by *Cryptotermes cryptognathus* from Jamaica, which has a wine cork-shaped head capsule and functionless mandibles (Scheffrahn et al. 1998). *Cryptotermes chasei*, on the other hand, has very long crushing mandibles and weak cephalic phragmosis (Scheffrahn 1993). *Cryptotermes garifunae* is intermediate between these 2 soldier forms.

Presently, *C. garifunae* and *C. cubioceps* are the only *Cryptotermes* known from their type localities. *Cryptotermes bracketti* is known only

from San Salvador Island, The Bahamas, but it is present throughout the island. All other New World *Cryptotermes* species show much greater distributions (Figs. 3–5). *Cryptotermes cubioceps* was described by Emerson (1925) from a single soldier collected in Guyana. It has not been collected again, even though considerable collecting efforts have been conducted in French Guiana (Bourguignon et al. 2011; Davies 2002). Whereas *C. garifunae* is the smallest New World *Cryptotermes*, *C. cubioceps*, with a head width of 2.12 mm, is the largest.

Figures 3 to 5 have reduced the Wallacean shortfall, defined as the state of incompleteness in understanding of geographical distributions of taxa (Lomolino 2004) for New World *Cryptotermes*. The maximum range extensions are increased as follows: *C. abruptus* – 437 km; *C. aequicornis* – 864 km; *C. cavifrons* – 681 km; *C. cylindroceps* – 471 km; *C. chacoensis* – 379 km; and *C. veruculosus* – 2,447 km.

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